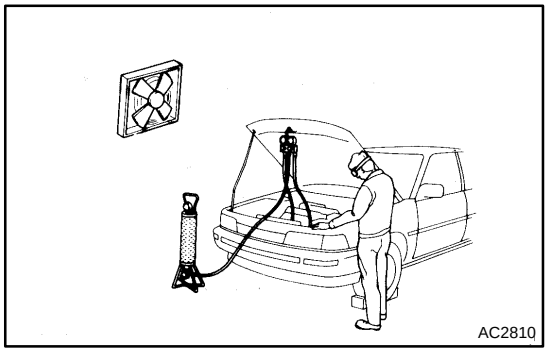
AIR CONDITIONING SYSTEM

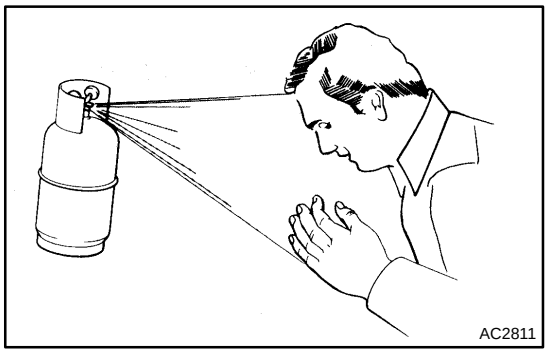
PRECAUTION

550BQ-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:

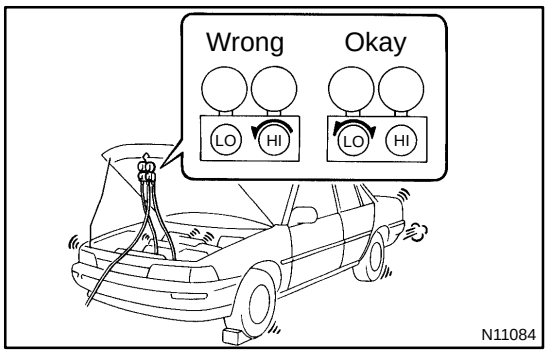
Do not rub your eyes or skin.

(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.

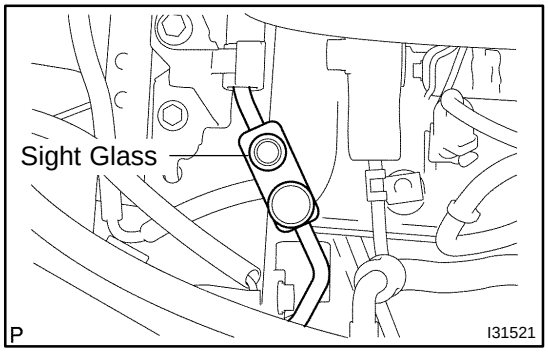
8. BE CAREFUL NOT TO OVERCHARGE SYSTEM WITH REFRIGERANT

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

REFRIGERANT

ON-VEHICLE INSPECTION

550D4-02



1. INSPECT REFRIGERANT VOLUME

(a) Observe the sight glass on the cooler refrigerant liquid pipe A.

Test conditions:

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

Item	Symptom	Amount of refrigerant	Corrective Actions
1	Bubbles present	Insufficient*	(1) Check for gas leakage and repair if necessary (2) Add refrigerant until bubbles disappear
2	No bubbles present	None, insufficient or too much	Refer 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	Considerable temperature difference between compressor inlet and outlet.	Correct or too much	Refer to 5 and 6
5	Immediately after air conditioning is turned off, refrigerant clear	Too much	(1) Discharge refrigerant (2) Remove air and supply proper amount or purified refrigerant
6	Immediately after air conditioning is turned off, refrigerant foams and then becomes clear	Correct	-

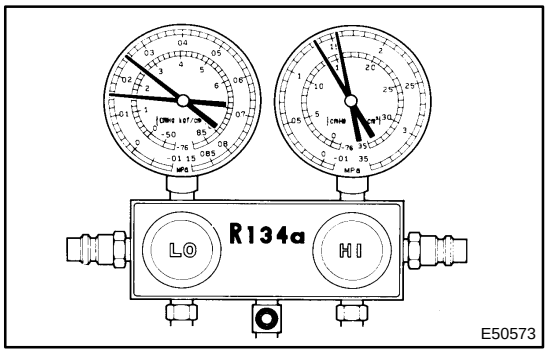
*: Bubbles in the sight glass with ambient temperatures higher than usual can be considered normal if cooling is sufficient.

2. INSPECT REFRIGERANT PRESSURE WITH MANIFOLD GAUGE SET

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

Test conditions:

- Temperature at the air inlet with the switch set at RECIRC is 30 - 35 °C (86 - 95 °F)
- Engine running at 1,500 rpm
- Blower speed control switch at "HI" position
- Temperature control dial at "COOL" position
- A/C switch ON
- Fully open doors



E50573

(1) Normally functioning refrigeration system.

Gauge reading:

Low pressure side:

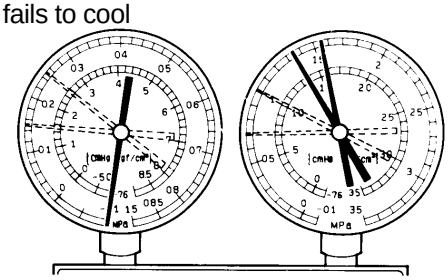
0.15 - 0.25 MPa (1.5 - 2.5 kgf/cm^2)

High pressure side:

1.37 - 1.57 MPa (14 - 16 kgf/cm$^{2)}$

(2) Moisture present in refrigeration system.

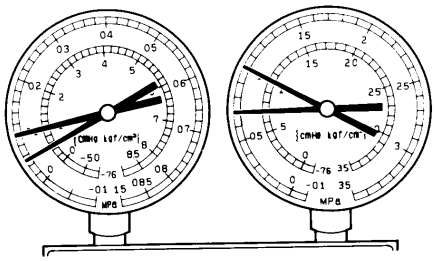
Condition : Periodically cools and then fails to cool


I22117

Symptom	Probable cause	Diagnosis	Remedy
During operation, pressure on low pressure side sometimes become a vacuum and sometime normal	Moisture in refrigerating system freezes at expansion valve orifice causing a temporary stop of cycle, however, when it melts, normal state is restored.	◆Drier in oversaturected state ◆Moisture in refrigerating system freezes at expansion valve orifice and blocks circulation of refrigerant	(1) Replace condenser (2) Remove moisture in cycle by repeatedly evacuating air (3) Supply proper amount of new refrigerant

(3) Insufficient cooling

Condition: Cooling system does not function effectively.

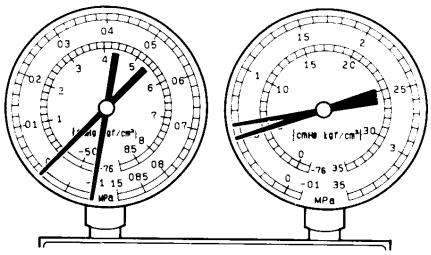


I22118

Symptom	Probable cause	Diagnosis	Corrective Actions
◆Pressure low on both low and high pressure sides ◆Bubbles seen thought sight glass continuously ◆Insufficient cooling performance	Gas leakage in refrigeration system	◆Insufficient refrigerant ◆Refrigerant leaking	(1) Check for gas leakage and repair if necessary (2) Supply proper amount of new refrigerant (3) If indicated pressure value is close to a 0 when connected to gauge, create the vacuum after inspecting and repairing location of leak

(4) Poor circulation of refrigerant

Condition: Cooling system close not function effectively.

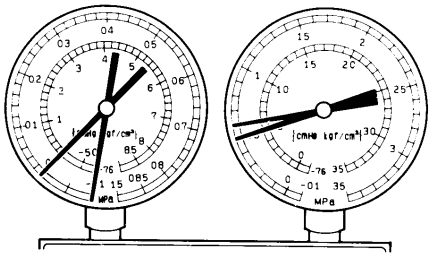


I22119

Symptom	Probable cause	Diagnosis	Corrective Action
◆Pressure low on both low and high pressure sides ◆Frost on pipe from condenser to unit	Refrigerant flow obstructed by dirt in receiver	Receiver clogged	Replace condenser

(5) Refrigerant does not circulate

Condition: Cooling system does not function. (Sometimes it way function)

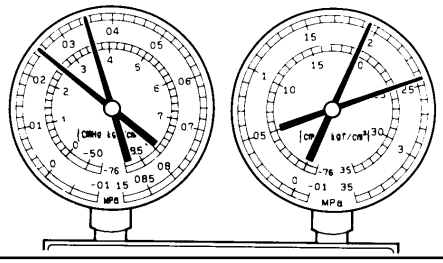


I22120

Symptom	Probable cause	Diagnosis	Corrective Actions
◆Vacuum indicated on low pressure side, very low pressure indicated on high pressure side ◆Frost or dew seen on piping before and after receiver/ drier or expansion valve	◆Refrigerant flow obstructed by moisture or dirt in refrigerating system ◆Refrigerant flow obstructed by gas leaked from expansion valve	Refrigerant does not circulate	(1) Check expansion valve (2) Clean out dirt in expansion valve by air blowing (3) Replace condenser (4) Evaporate air and supply proper amount of new refrigerant. (5) For gas leakage from expansion valve, replace expansion valve

(6) Refrigerant overcharged or insufficient cooling of condenser

Condition: Cooling system does not function effectively.

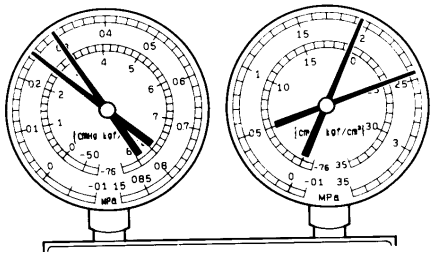


I22121

Symptom	Probable cause	Diagnosis	Remedy
◆Pressure too high on both low and high pressure sides ◆No sir bubbles seen through the sight glass even when the engine rpm is lowered	◆Unable to develop sufficient performance due to excessive use of refrigerating system ◆Insufficient cooling of condenser	◆Excessive refrigerant in cycle→too much refrigerant supplied ◆Condenser cooling insufficient→condenser fins clogged at cooling fan	(1) Clean condenser (2) Check cooling fan with cooling fan motor operation (3) If (1) and (2) are in normal state, check amount of refrigerant and supply proper amount of refrigerant

(7) Air present in refrigeration system

Condition: Cooling system does not function.



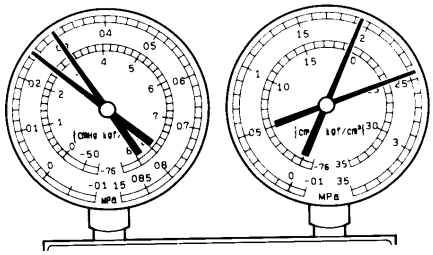
NOTE : These gauge indications are shown when the refrigerating system has been opens and the refrigerant charged without vacuum purging.

I22122

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

(8) Expansion valve improperly

Condition: Refrigerant functions insufficient.

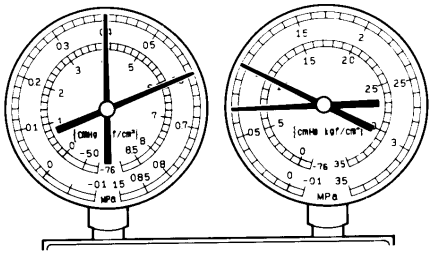


I22123

Symptom	Probable cause	Diagnosis	Corrective Actions
◆Pressure too high on both low and high pressure sides ◆Frost or large amount of dew on piping on low pressure side	Trouble in expansion valve	◆Excessive refrigerant in low pressure piping ◆Expansion valve opened too wide	Check expansion valve

(9) Defective compression compressor

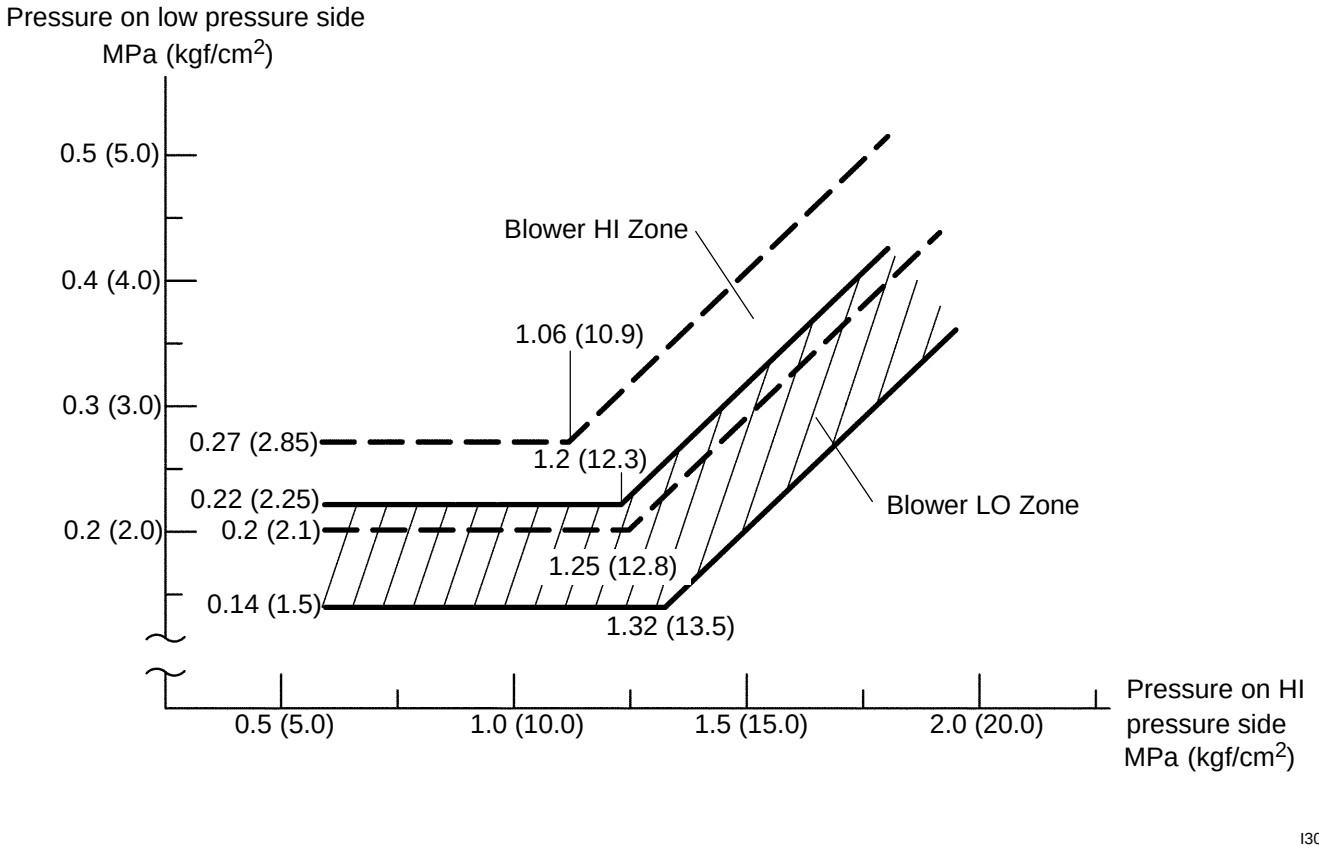
Condition : Refrigerant is not effective.



I22124

Symptom	Probable cause	Diagnosis	Corrective Actions
◆Pressure too high on low high pressure sides ◆Pressure too low to on high pressure side	Internal leak in compressor	◆Compression failure ◆Leakage from valve damaged or broken sliding parts	Repair or replace compressor

Gauge readings (Reference)



I30081

550D5-02

REPLACEMENT

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

(a) Turn the A/C switch ON.

(b) Operating the cooler compressor at the engine rpm of approx. 1,000 for 5 to 6 min., circulate the refrigerant and collect compressor oil remaining in each component into the cooler compressor as much as possible.

(c) Stop the engine.

(d) Let the refrigerant gas out.

SST 07110-58060 (07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080)

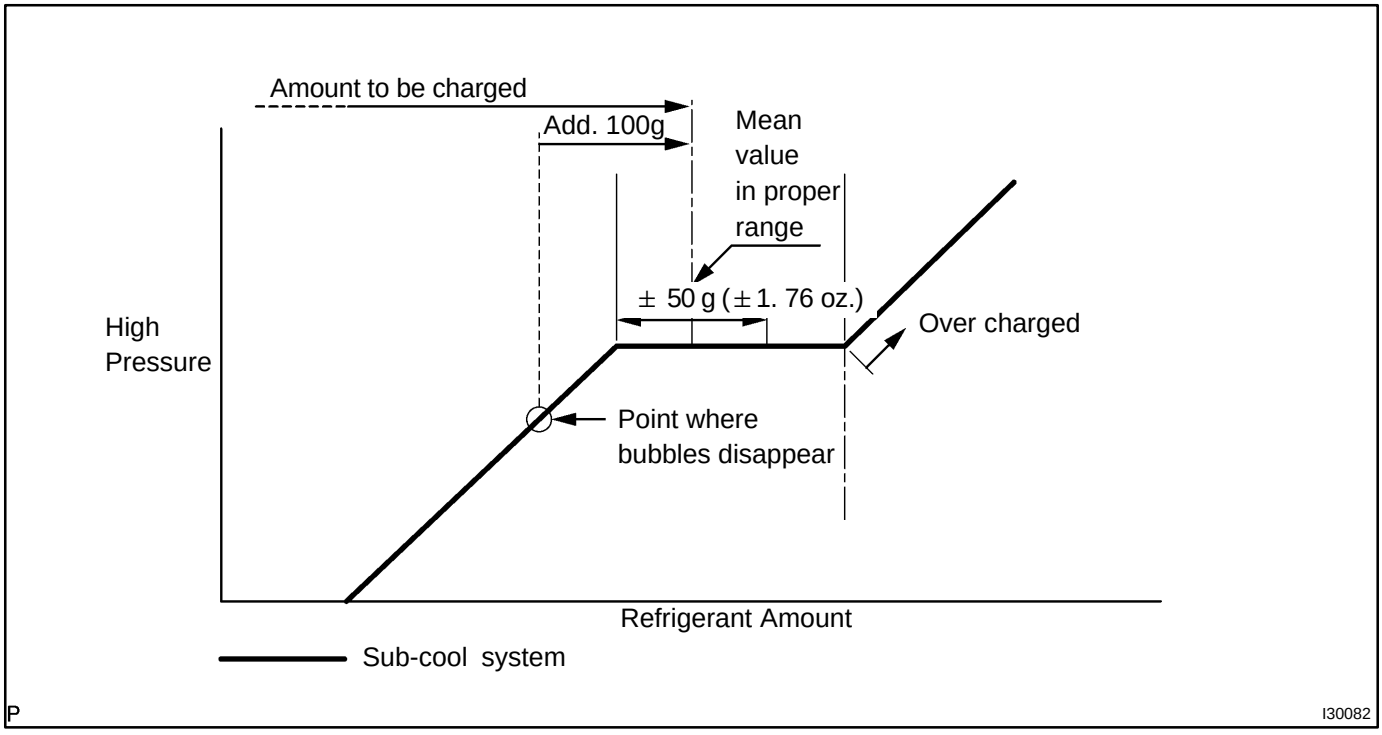
2. CHARGE REFRIGERANT

(a) Using a vacuum pump, perform a vacuum pumping.

(b) Charge refrigerant, HFC-134a (R134a).

Standard: 550 ± 50 g (19.37 ± 1. 76 oz.)

SST 07110-58060 (07117-58060, 07117-58070, 07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080)



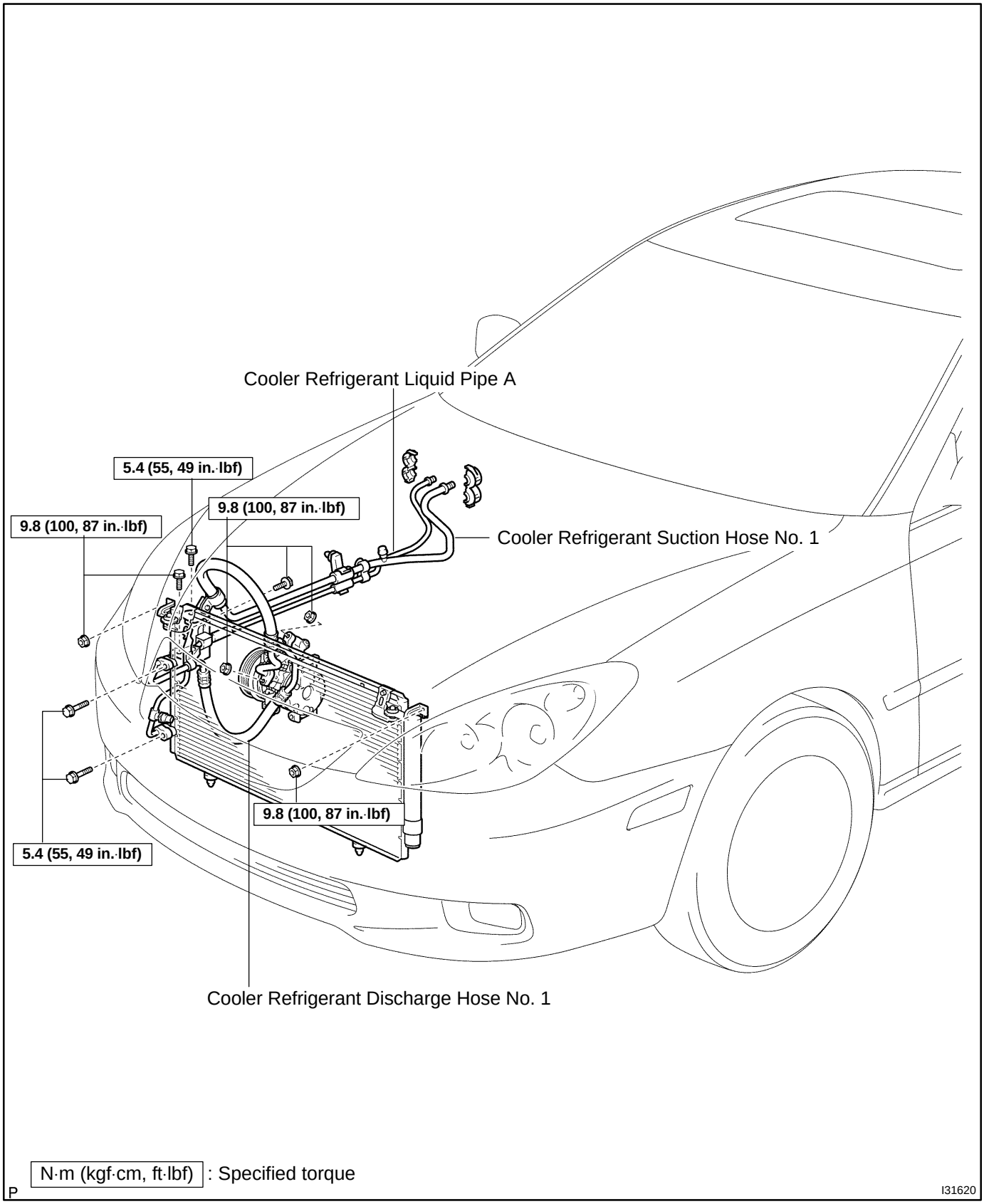
3. WARM UP ENGINE

4. INSPECT LEAKAGE OF REFRIGERANT

REFRIGERANT LINE

COMPONENTS

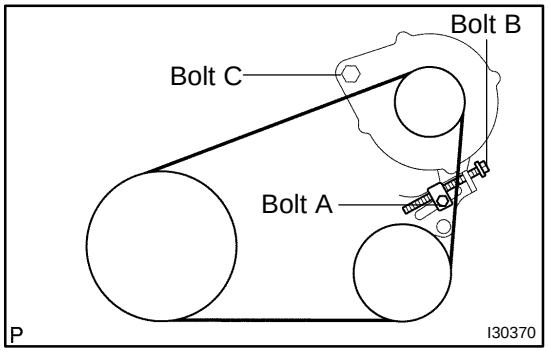
550D6-02



V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1

550D7-02

REPLACEMENT

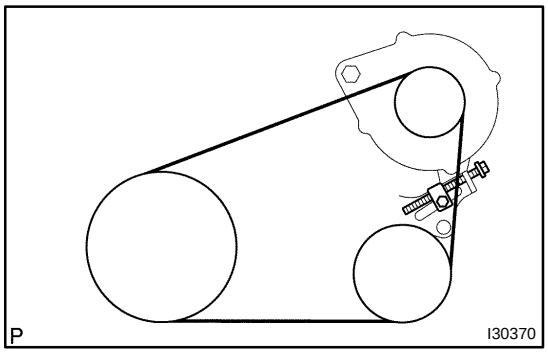


1. REMOVE V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1

(a) Loosen the bolt C.

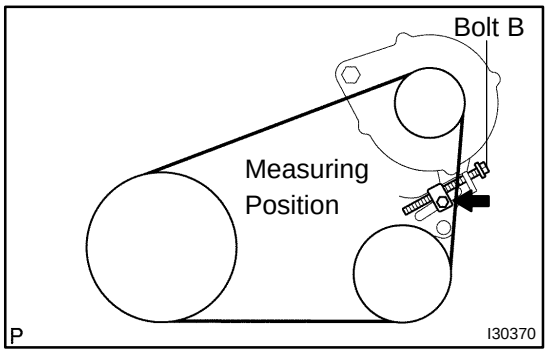
(b) Loosen the bolt A.

(c) Loosen the bolt B and remove the cooler V belt No. 1.



2. INSTALL V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1

(a) Temporarily install the cooler V belt No. 1 as illustrated.



3. ADJUST V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1

(a) Apply drive belt tension by turning the bolt B.

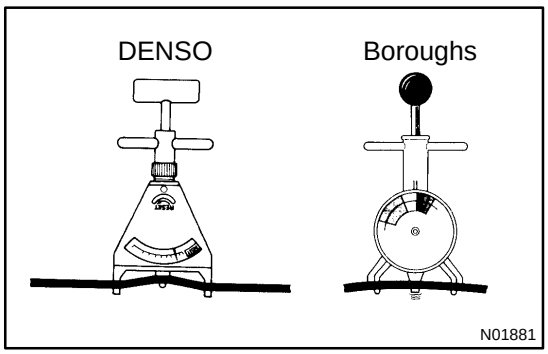
Drive belt tension:

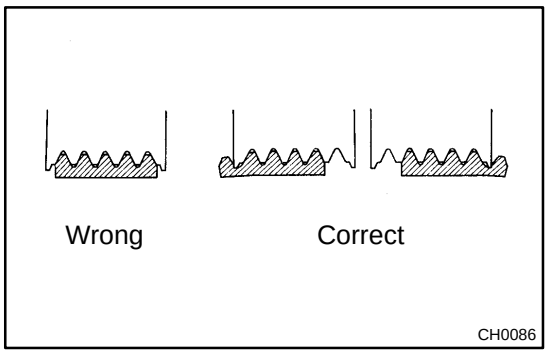
New Belt: 165 ± 27 lbf

Used belt: 88 ± 22 lbf

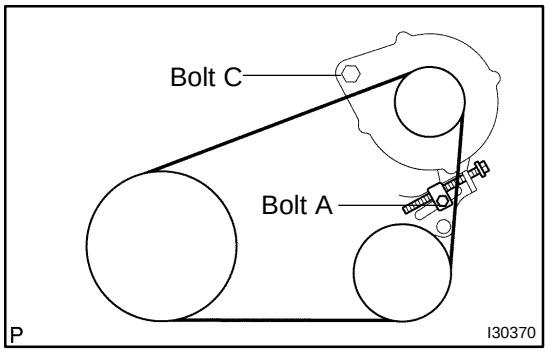
HINT:

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





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



4. FULLY TIGHTEN V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1

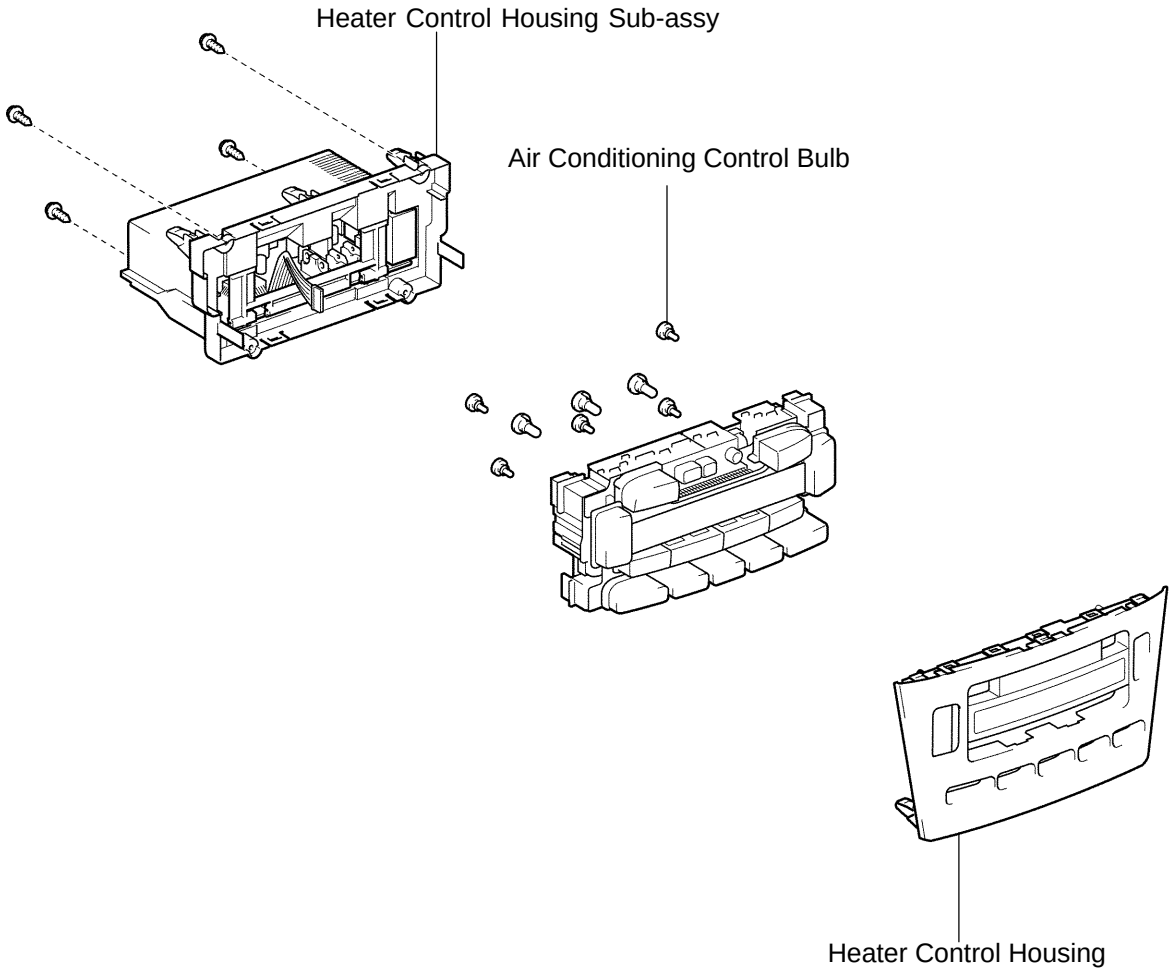
(a) Tighten the bolt A.
Torque: 17.5 N·m (178 kgf·cm, 12 ft·lbf)

(b) Tighten the bolt C.
Torque: 58 N·m (591 kgf·cm, 43 ft·lbf)

AIR CONDITIONER CONTROL ASSEMBLY

550D8-02

COMPONENTS



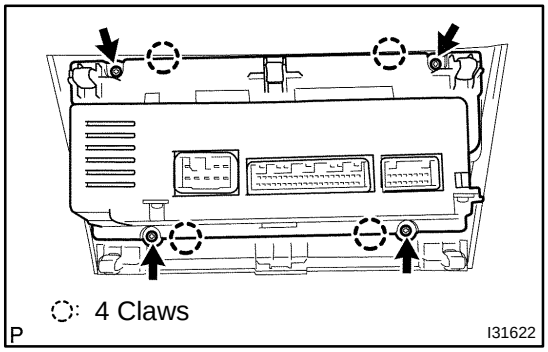
550D9-02

OVERHAUL

HINT:

COMPONENTS: See page 55-12

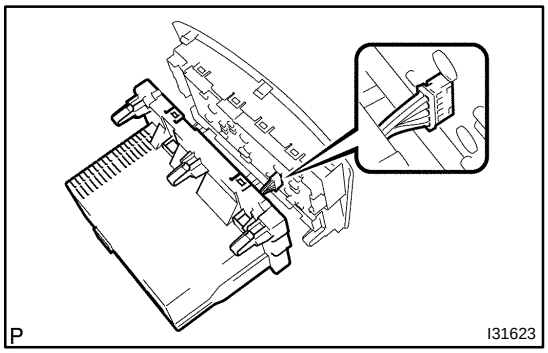
1. REMOVE AIR CONDITIONER CONTROL ASSEMBLY (See page 71-1 1)



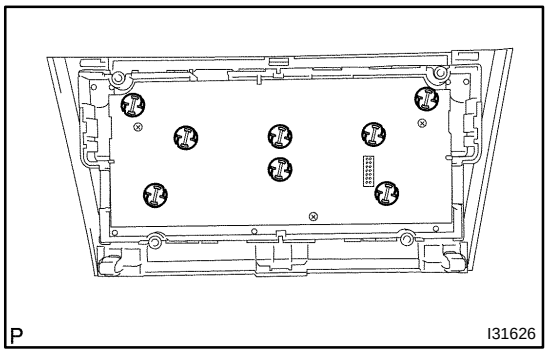
2. REMOVE HEATER CONTROL HOUSING SUB-ASSY

(a) Remove the 4 screws.

(b) Release the 4 fitting claws, disconnect the heater control housing sub-assy.

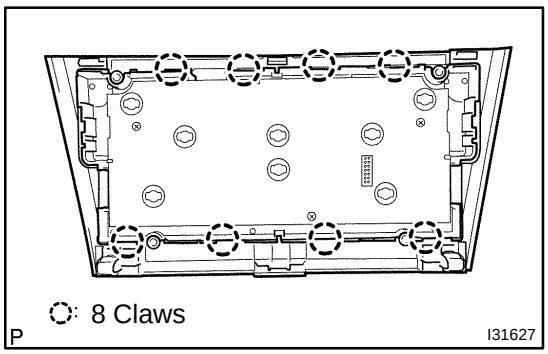


(c) Disconnect the connect, remove the heater control housing sub-assy.



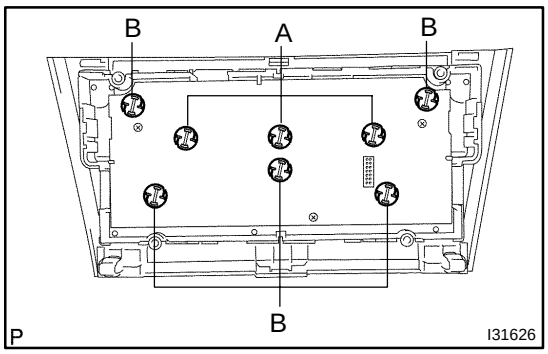
3. REMOVE AIR CONDITIONING CONTROL BULB

(a) Remove the air conditioning control bulb.



4. REMOVE HEATER CONTROL HOUSING

(a) Release the 8 fitting claws, remove the heater control housing.



5. INSTALL AIR CONDITIONING CONTROL BULB

(a) Install the air conditioning control bulb to the air conditioner panel sub-assy.

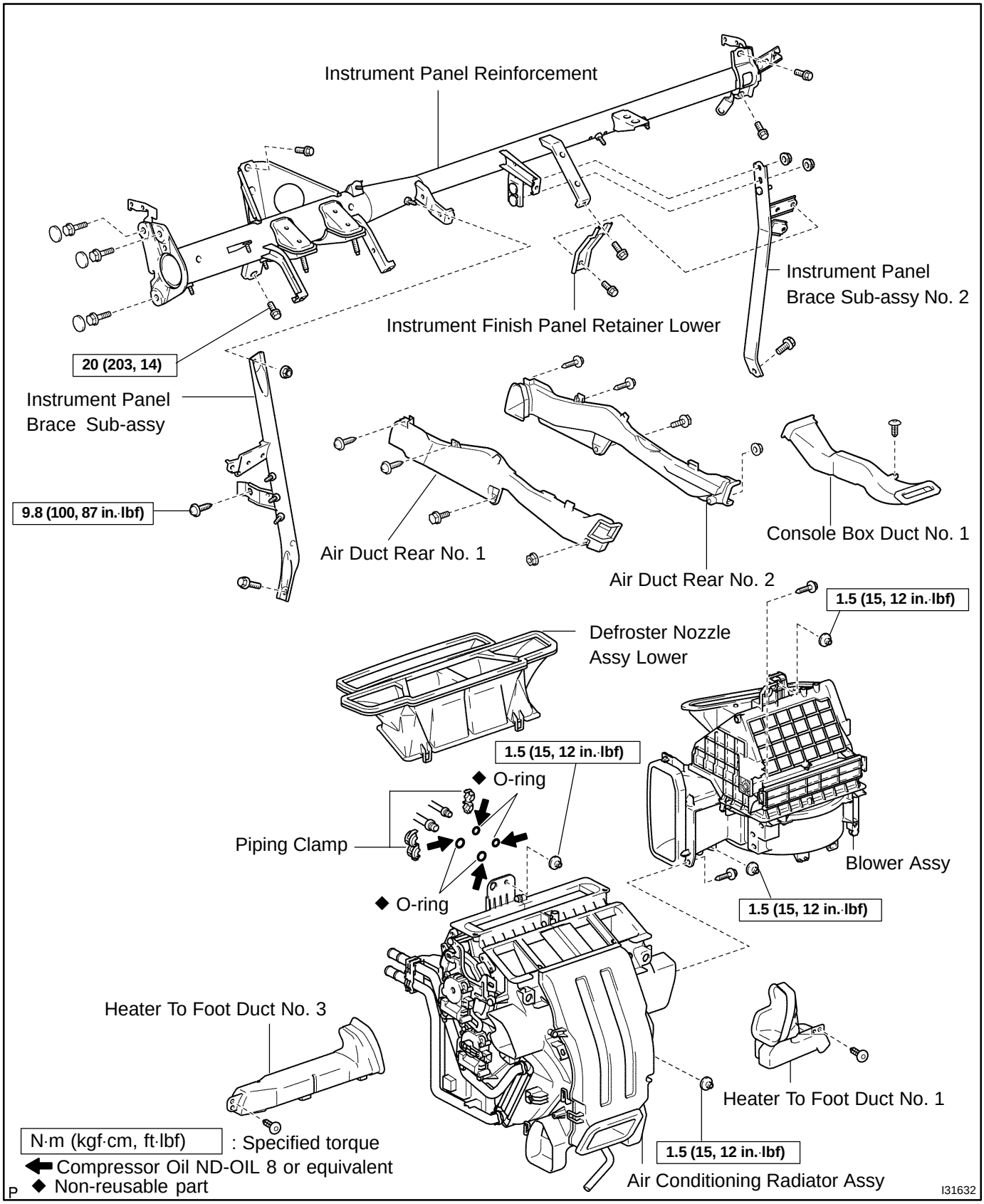
Bulb position:

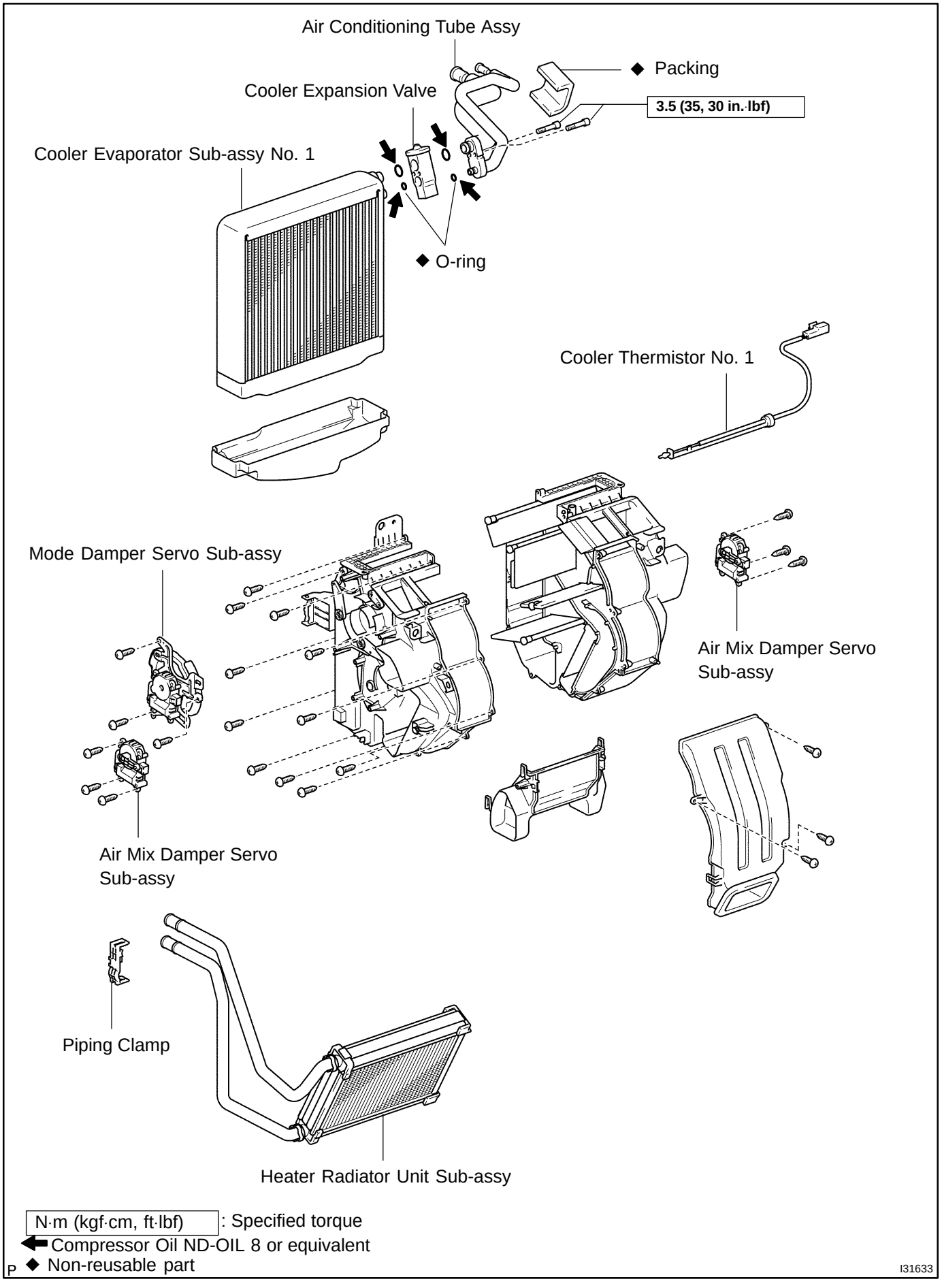
Position	Part No.
A	90010 - 03048
B	90010 - 03049

AIR CONDITIONING RADIATOR ASSY

COMPONENTS

550DA-02




Air Conditioning Tube Assy
◆ Packing
Cooler Expansion Valve
3.5 (35, 30 in.·lbf)
Cooler Evaporator Sub-assy No. 1
◆ O-ring
Cooler Thermistor No. 1
Mode Damper Servo Sub-assy
Air Mix Damper Servo Sub-assy
Air Mix Damper Servo Sub-assy
Piping Clamp
Heater Radiator Unit Sub-assy
N·m (kgf·cm, ft·lbf): Specified torque
Compressor Oil ND-OIL 8 or equivalent
P ◆ Non-reusable part
I31633

550DB-02

OVERHAUL

HINT:

COMPONENTS: See page 55-15

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM (See page 55-8)

SST 07110-58060 (07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080)

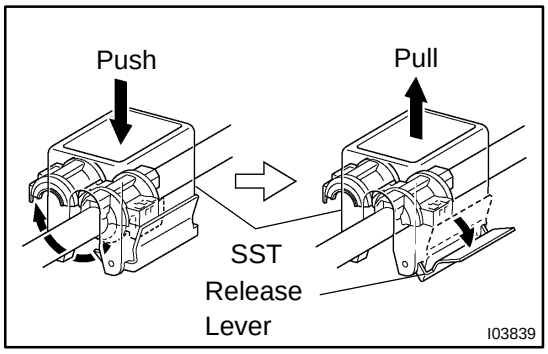
2. DISCONNECT COOLER REFRIGERANT SUCTION HOSE NO.1

(a) Install SST to piping clamp.

SST 09870-00015

HINT:

Confirm the direction of the piping clamp claw and SST using the illustration showing on the caution label.

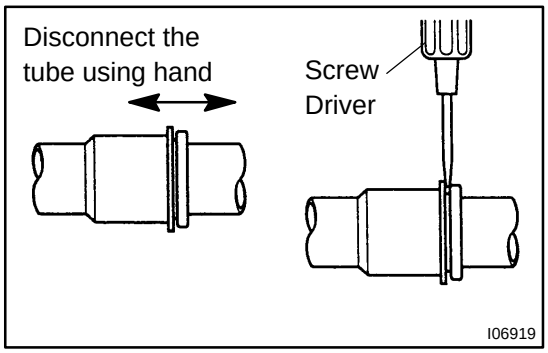


(b) Push down SST and release the clamp lock.

NOTICE:

Be careful not to deform the tube, when pushing SST.

(c) Pull SST slightly and push the release lever, then remove the piping clamp with SST.



(d) Disconnect the cooler refrigerant suction hose No. 1.

NOTICE:

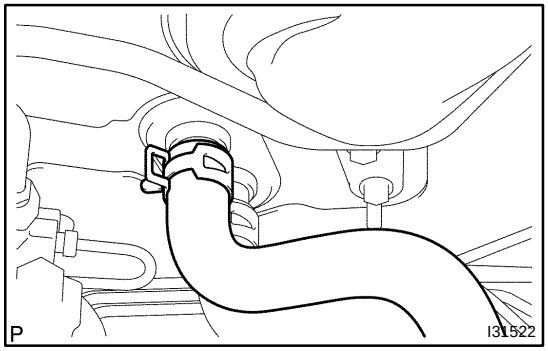
- **Do not use tools like screwdriver to remove the tube.**
- **Cap the open fittings immediately to keep moisture or dirt out of the system.**

3. DISCONNECT COOLER REFRIGERANT LIQUID PIPE A

SST 09870-00025

HINT:

Disconnect cooler refrigerant liquid pipe A in the same way as the cooler refrigerant suction hose No. 1.



4. DISCONNECT HEATER OUTLET WATER HOSE

(a) Using pliers, grip the claws of clip and slide the clip and disconnect the heater outlet water hose.

5. DISCONNECT HEATER INLET WATER HOSE

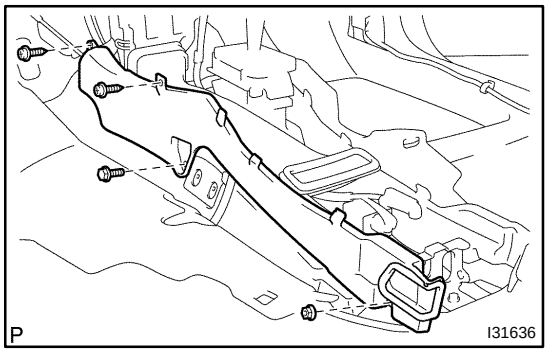
HINT:

Disconnect in the same way as the heater outlet water hose.

6. REMOVE INSTRUMENT PANEL SAFETY PAD SUB-ASSY (See page 71-1 1)

HINT:

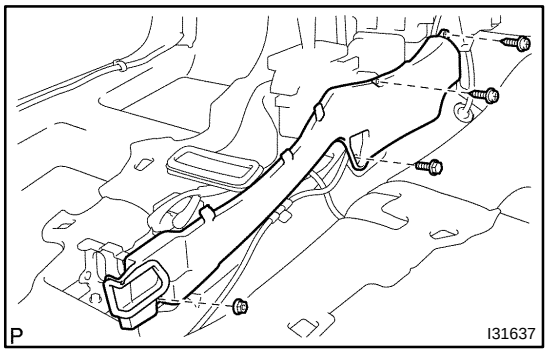
Refer to the instructions for removal of the instrument panel safety pad sub-assy.



7. REMOVE AIR DUCT REAR NO.1

(a) Remove the 2 screws, bolt and nut.

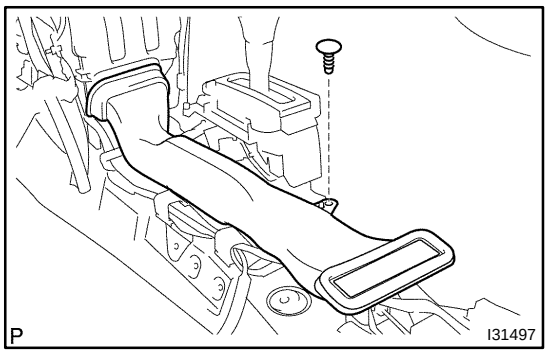
(b) Remove the air duct rear No. 1.



8. REMOVE AIR DUCT REAR NO.2

(a) Remove the 2 screws, bolt and nut.

(b) Remove the air duct rear No. 2.



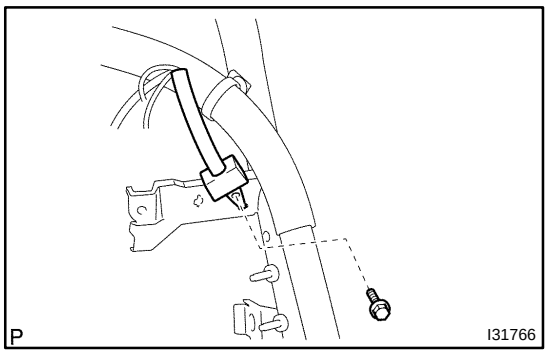
9. REMOVE CONSOLE BOX DUCT NO.1

(a) Remove the clip and console box duct No. 1.

10. DISCONNECT FLOOR SHIFT PARKING LOCK CABLE ASSY

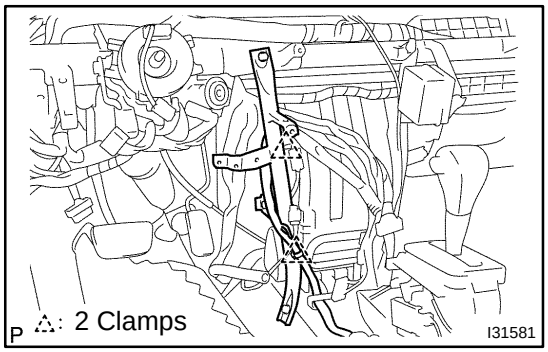
11. REMOVE WINDSHIELD WIPER RELAY ASSY

12. REMOVE HEADLAMP LEVELING ECU ASSY

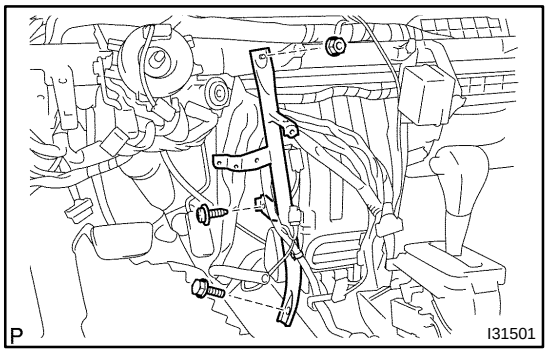


13. REMOVE INSTRUMENT PANEL BRACE SUB-ASSY NO.1

(a) Remove the bolt and earth wire.

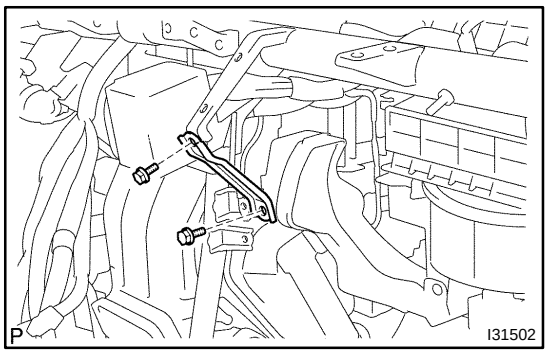


(b) Release the 2 clamps.



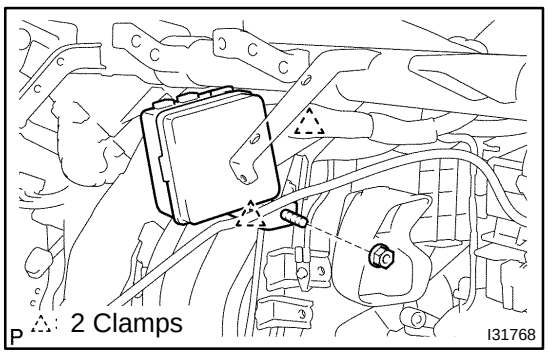
(c) Remove the bolt and screw.

(d) Remove the nut and instrument panel brace sub-assy No. 1.



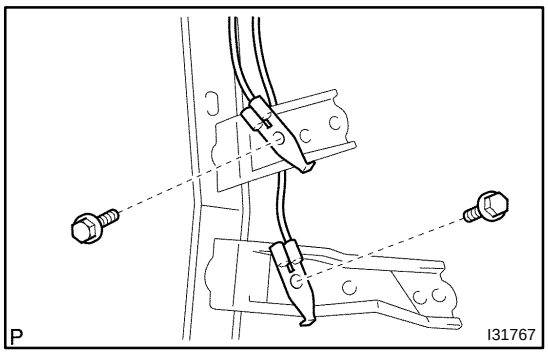
14. REMOVE INSTRUMENT FINISH PANEL RETAINER LOWER

(a) Remove the 2 bolts and instrument finish retainer lower.

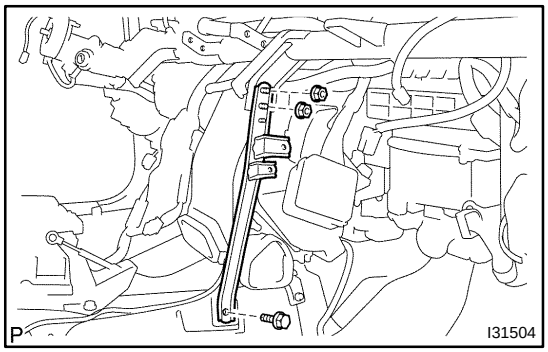


15. REMOVE INSTRUMENT PANEL BRACE SUB-ASSY NO.2

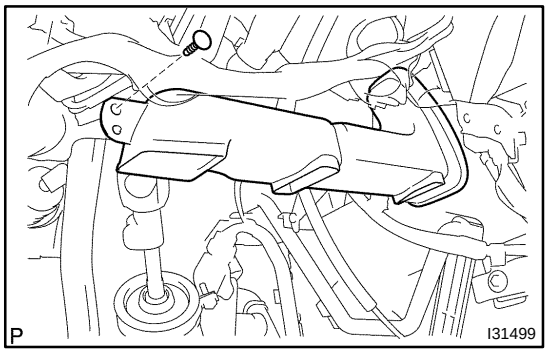
(a) Remove the 2 clamps, nut and passenger side junction block.



(b) Remove the 2 bolts and 2 earth wires.

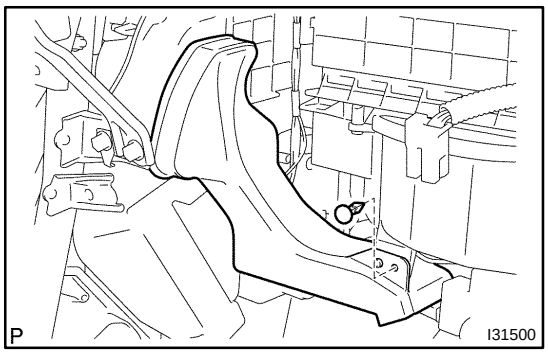


(c) Remove the 2 nuts, bolt and instrument panel brace sub-assy No. 2.



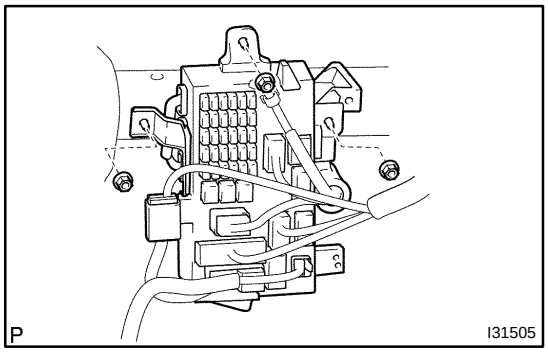
16. REMOVE HEATER TO FOOT DUCT NO.3

(a) Remove the clip and heater to foot duct No. 3.



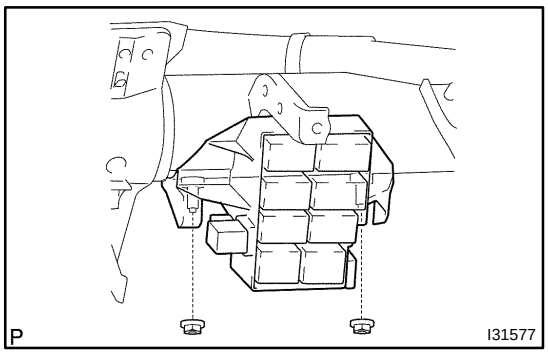
17. REMOVE HEATER TO FOOT DUCT NO.1

(a) Remove the clip and heater to foot duct No. 1.

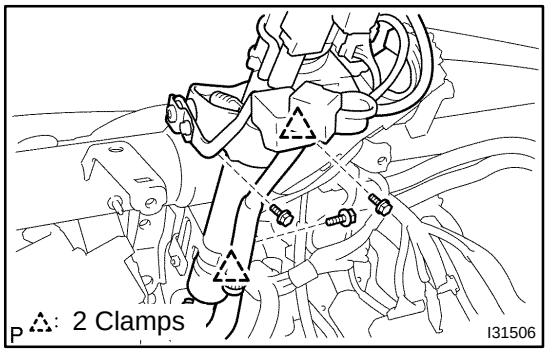


18. DISCONNECT STEERING COLUMN ASSY

(a) Remove the 3 nuts and driver side junction block.



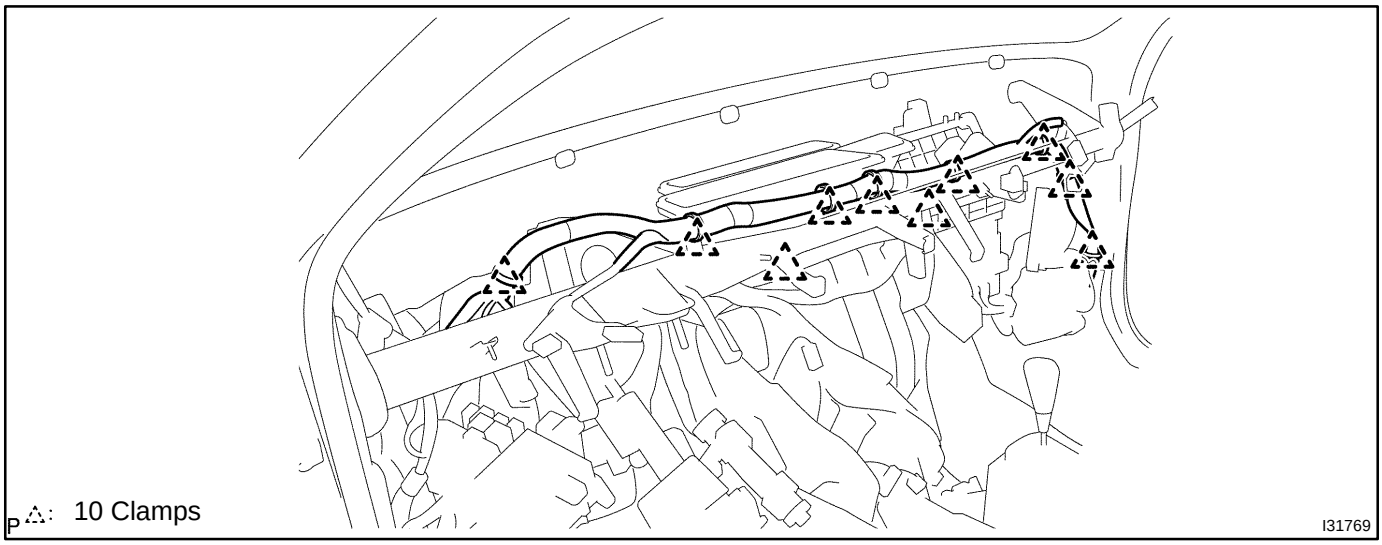
(b) Remove the 2 nuts and steering side connector block.



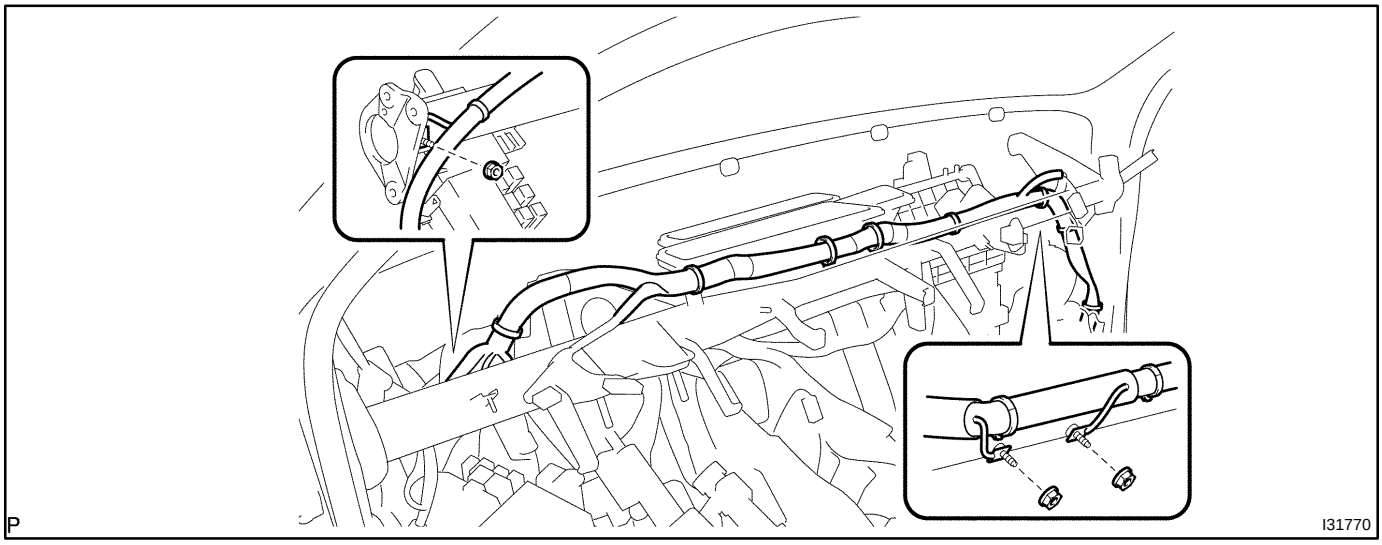
(c) Release the 2 clamps.
(d) Remove the 3 bolts, disconnect the steering column assy.

19. REMOVE INSTRUMENT PANEL REINFORCEMENT

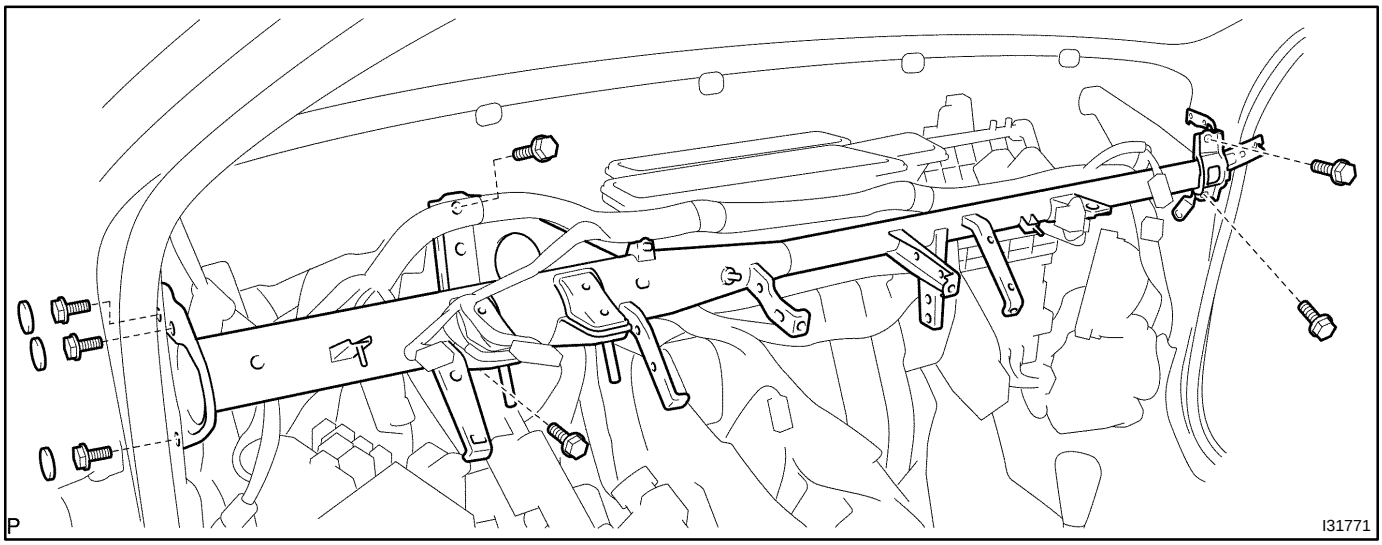
(a) Disconnect the 10 clamps and the wire harness.

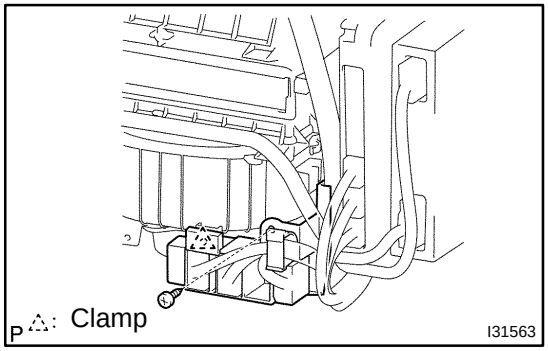


(b) Remove the 3 nuts, disconnect the 3 earth wires.



(c) Remove the 3 caps, 7 bolts and instrument panel reinforcement.

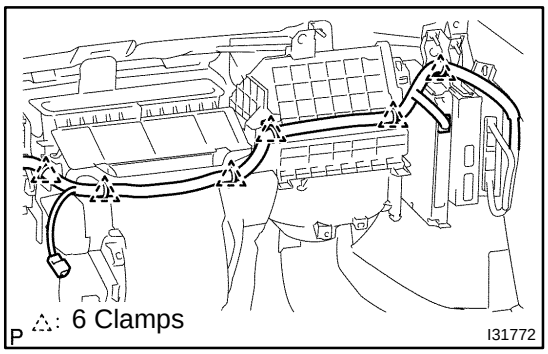




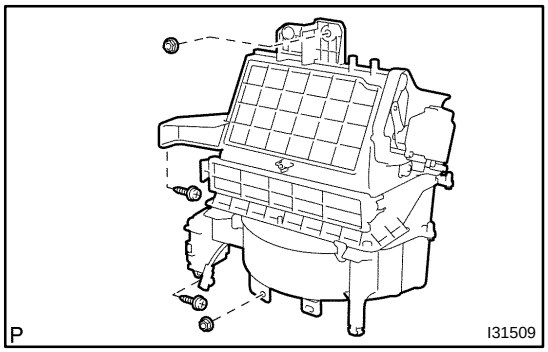
20. REMOVE BLOWER ASSY

(a) Disconnect the connectors.

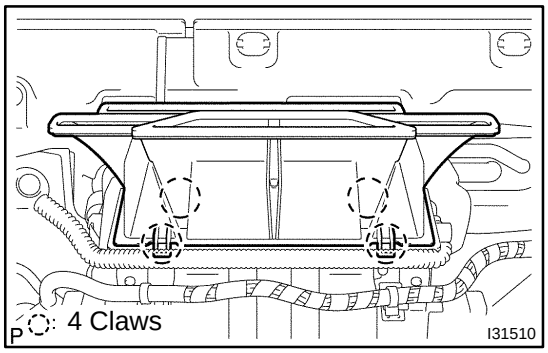
(b) Remove the screw, clamp and blower connector holder.



(c) Disconnect the 6 clamps and the wire harness.

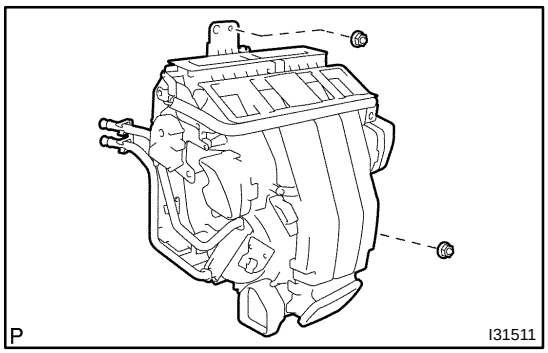


(d) Remove the 2 screws, 2 nuts and blower assy.



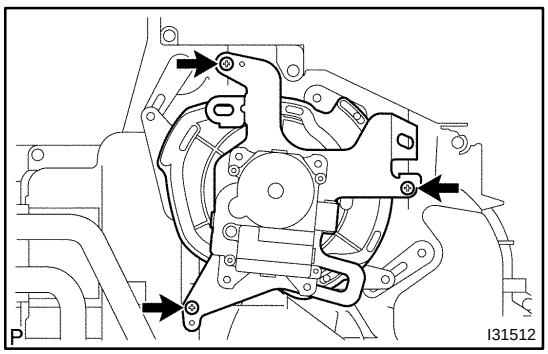
21. REMOVE DEFROSTER NOZZLE ASSY LOWER

(a) Release the 4 fitting claws, remove the defroster nozzle assy lower.



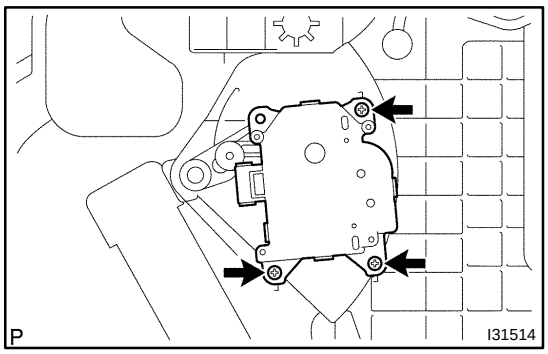
22. REMOVE AIR CONDITIONING RADIATOR ASSY

(a) Remove the 2 nuts and air conditioning radiator assy.



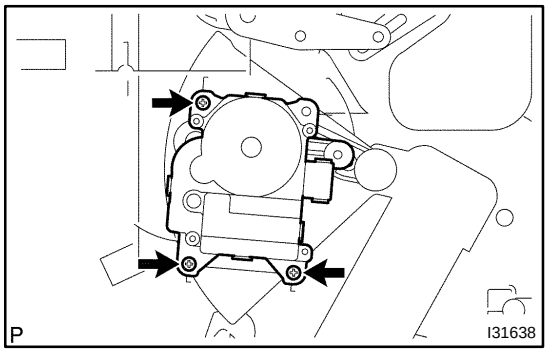
23. REMOVE MODE DAMPER SERVO SUB-ASSY

(a) Remove the 3 screws and mode damper servo sub-assy.

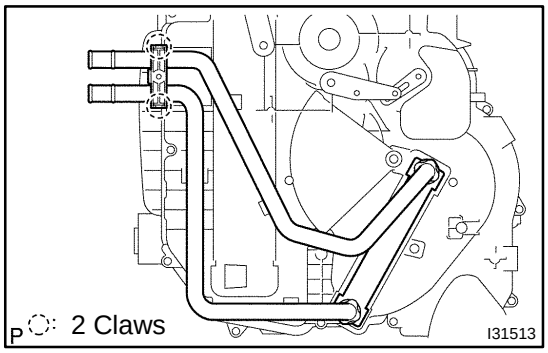


24. REMOVE AIRMIX DAMPER SERVO SUB-ASSY

(a) LH side:
Remove the 3 screws and air mix damper servo sub-assy.



(b) RH side:
Remove the 3 screws and air mix damper servo sub-assy.



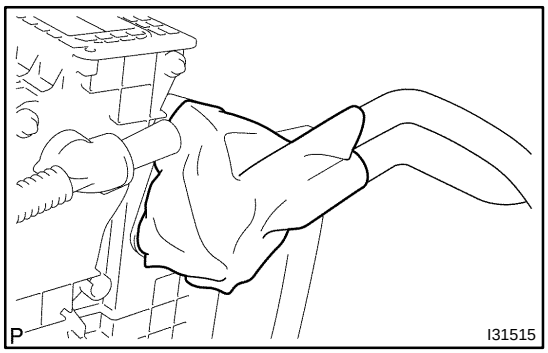
25. REMOVE HEATER RADIATOR UNIT SUB-ASSY

(a) Release the 2 fitting claws, remove the piping clamp.

(b) Remove the heater radiator unit sub-assy.

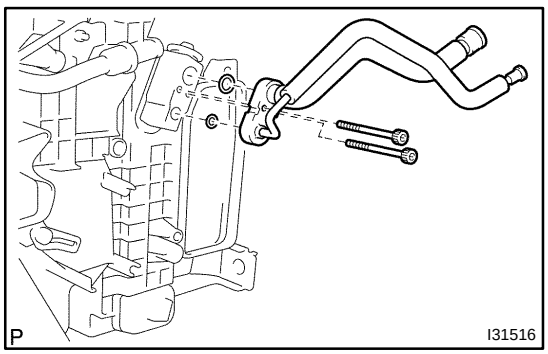
NOTICE:

Prepare a support plate and waste to catch the leaked coolant.



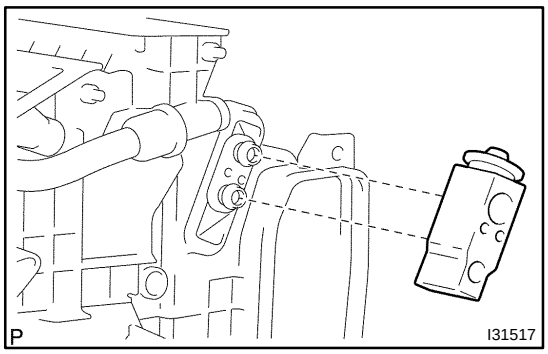
26. REMOVE AIR CONDITIONING TUBE ASSY

(a) Remove the packing.



(b) Using a hexagon wrench 4 mm (0.16 in.), remove the 2 hexagon bolts and air conditioning tube assy.

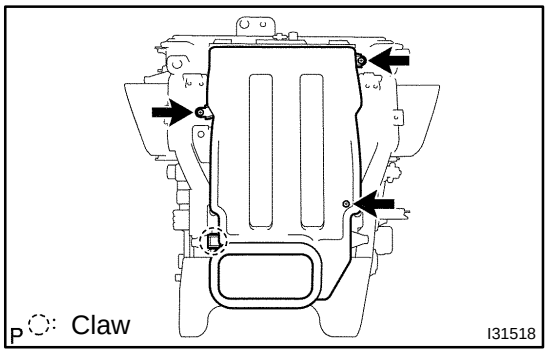
(c) Remove the 2 O-rings from the air conditioning tube assy.



27. REMOVE COOLER EXPANSION VALVE

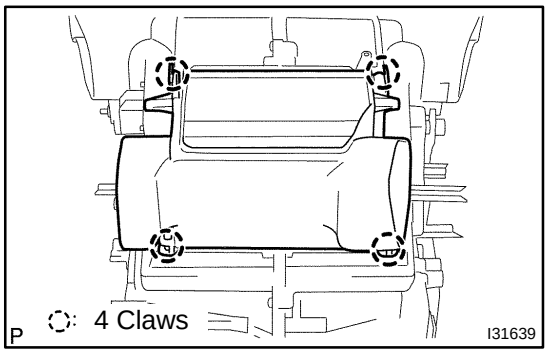
(a) Remove the cooler expansion valve from the cooler evaporator sub-assy No. 1.

28. REMOVE COOLER THERMISTOR NO.1

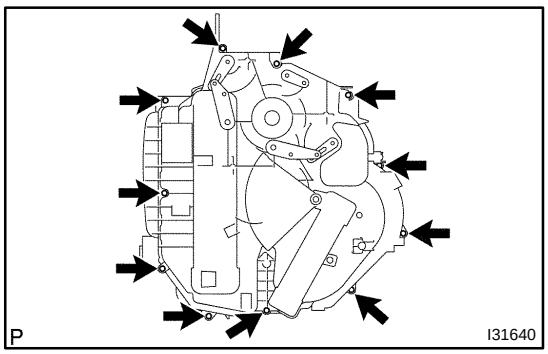


29. REMOVE COOLER EVAPORATOR SUB-ASSY NO.1

(a) Release the fitting claw, remove the 3 screws and air duct sub-assy .

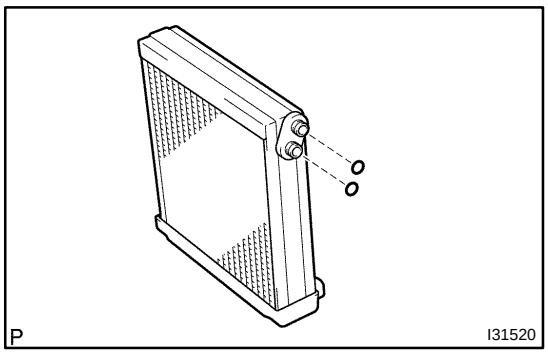


(b) Release the 4 fitting claws, remove the air duct sub-assy.

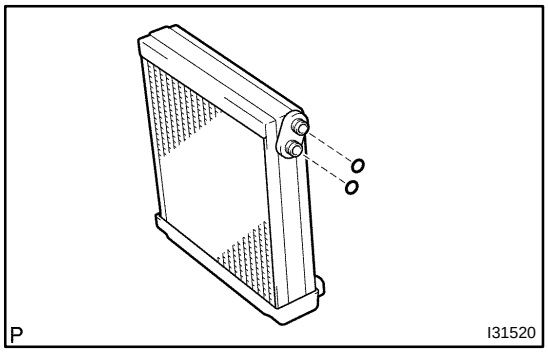


(c) Remove the 11 screws and heater case LH.

(d) Remove the cooler evaporator sub-assy No. 1 from the heater case RH.

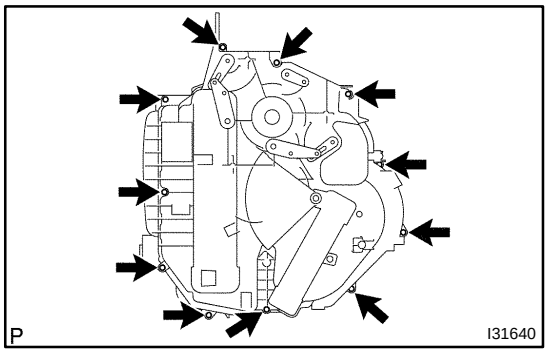


(e) Remove the 2 O-rings from the cooler evaporator sub-assy No. 1.



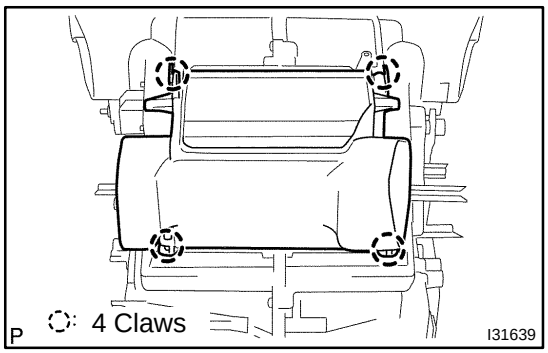
30. INSTALL COOLER EVAPORATOR SUB-ASSY NO.1

(a) Apply compressor oil to the contact surfaces of 2 new O-rings and the cooler expansion valve and install them.
Compressor oil: ND-OIL 8 or equivalent

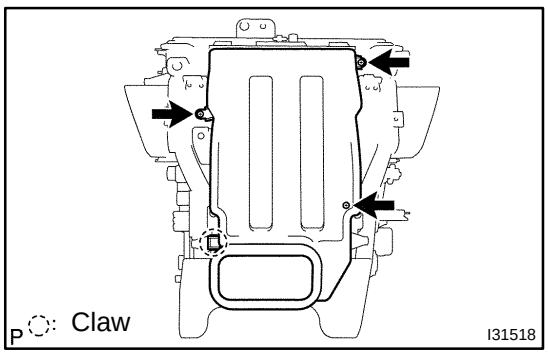


(b) Install the cooler evaporator sub-assy No. 1 to the heater case RH.

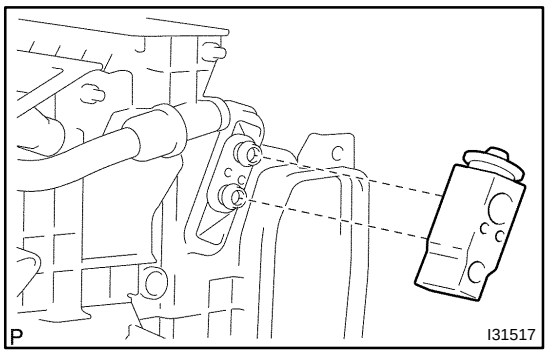
(c) Install the heater case LH with the 11 screws.



(d) Install the air duct sub-assy.

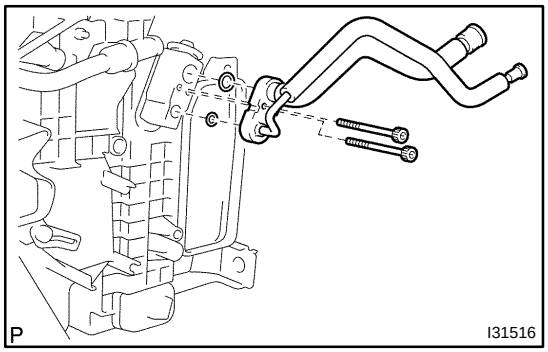


(e) Install the air duct sub-assy with the 3 screws.



31. INSTALL COOLER EXPANSION VALVE

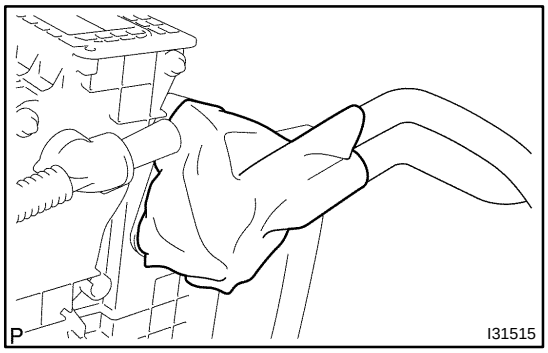
(a) Install the cooler expansion valve to the cooler evaporator No. 1.



32. INSTALL AIR CONDITIONING TUBE ASSY

(a) Apply compressor oil to the contact surfaces of 2 new O-rings and the air conditioning tube assy and install them.
Compressor oil: ND-OIL 8 or equivalent

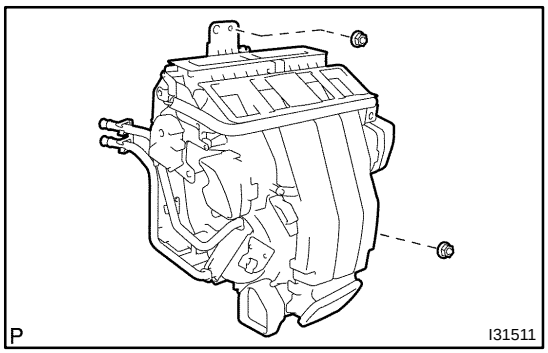
(b) Using a hexagon wrench 4 mm (0.16 in.), install the air conditioner tube assy and 2 hexagon bolts to the cooler evaporator sub-assy No. 1.
Torque: 3.5 N·m (35 kgf·cm, 30 in.·lbf)



(c) Install the packing.

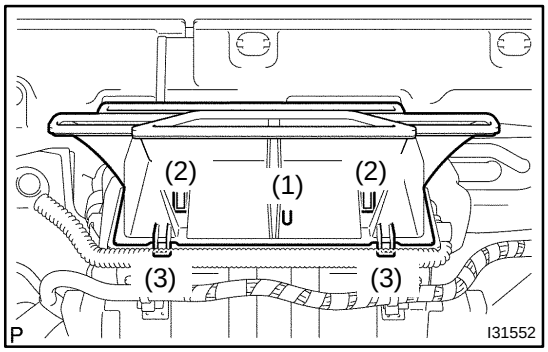
HINT:

Securely attach so that the gap in the packing will not be mode.



33. INSTALL AIR CONDITIONING RADIATOR ASSY

(a) Install the air conditioning radiator assy with the 2 nuts.
Torque: 1.5 N·m (15 kgf·cm, 12 in.·lbf)

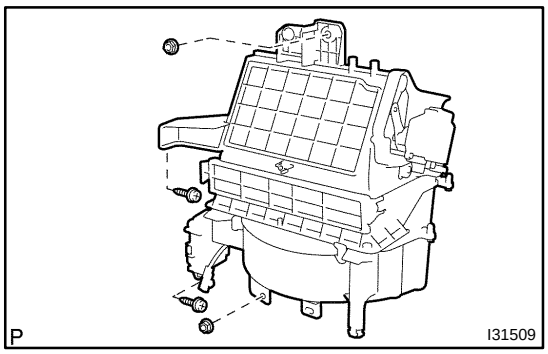


34. INSTALL DEFROSTER NOZZLE ASSY LOWER

(a) Install the defroster nozzle assy lower.

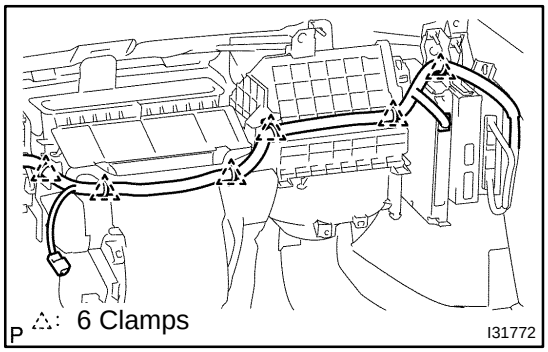
NOTICE:

After locating the pin (1) in the illustration, install (2), then (3).

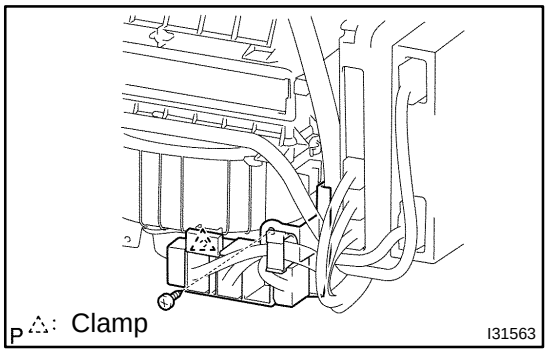


35. INSTALL BLOWER ASSY

(a) Install the blower assy with the 2 screws and 2 nuts.
Torque: 1.5 N·m (15 kgf·cm, 12 in.·lbf)



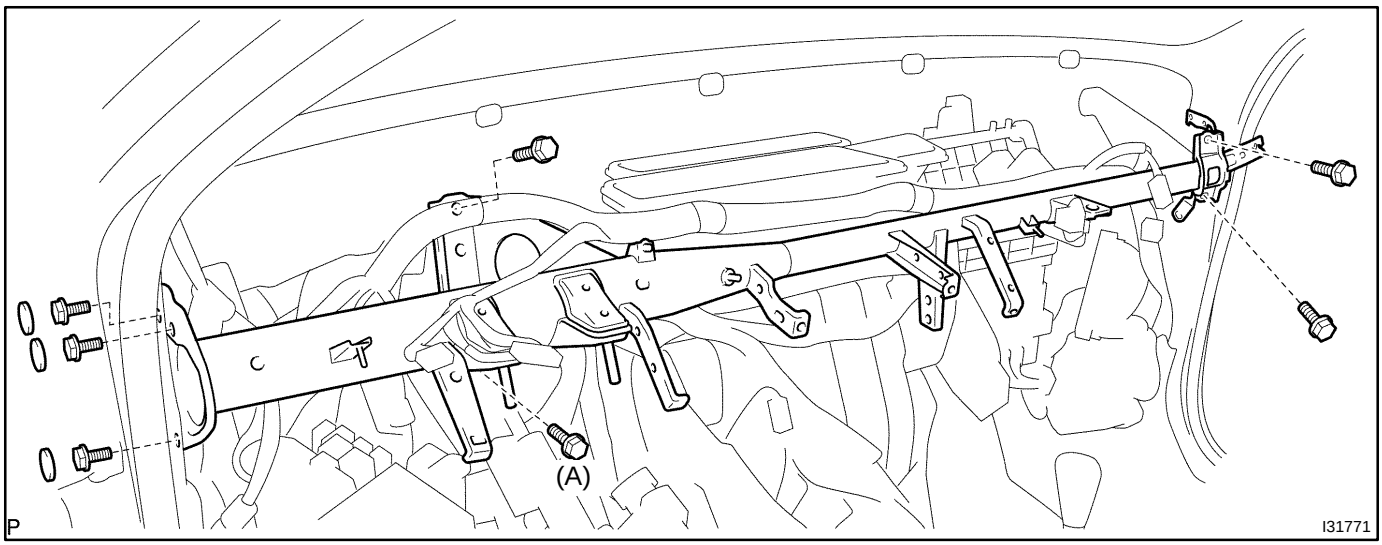
(b) Install the 6 clamps, connect the wire harness.



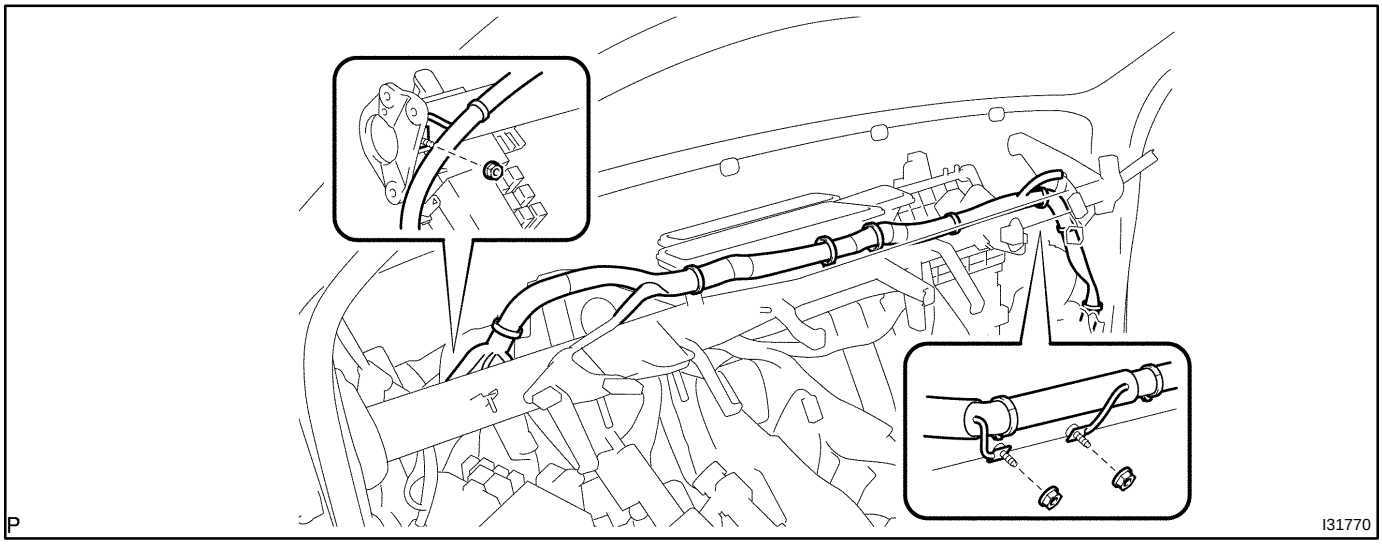
(c) Install the blower connector holder with the screw.
(d) Connect the connectors.

36. INSTALL INSTRUMENT PANEL REINFORCEMENT

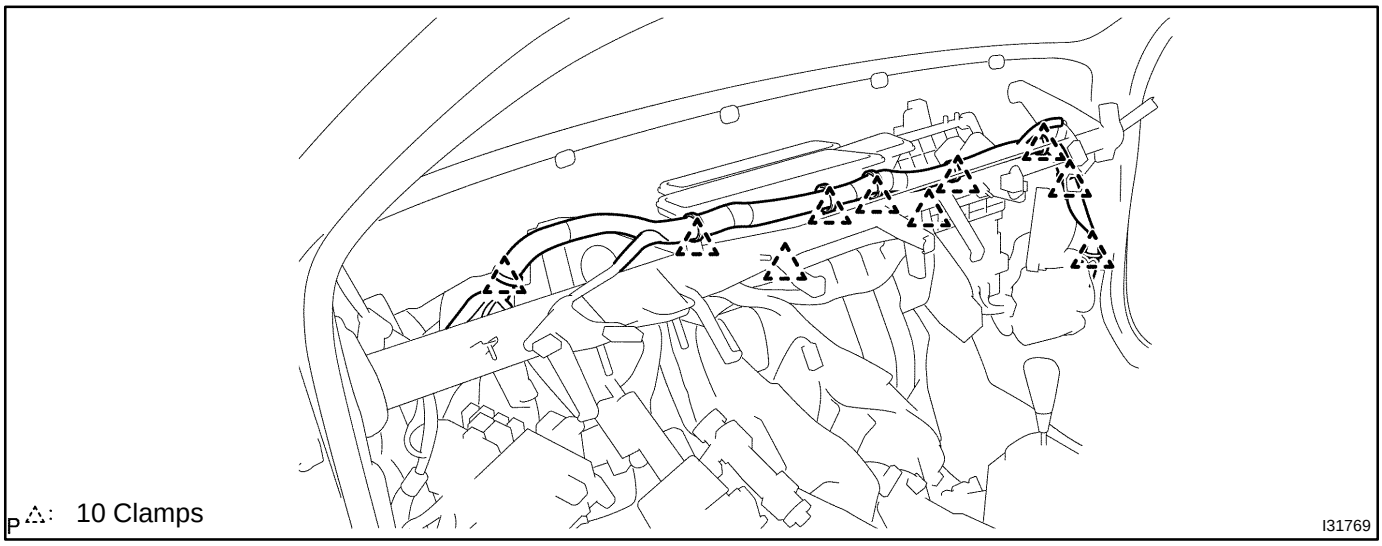
(a) Install the instrument panel reinforcement with the 7 bolts and 3 caps.
Torque: 20 N·m (203 kgf·cm, 14 ft·lbf) (Bolt A)

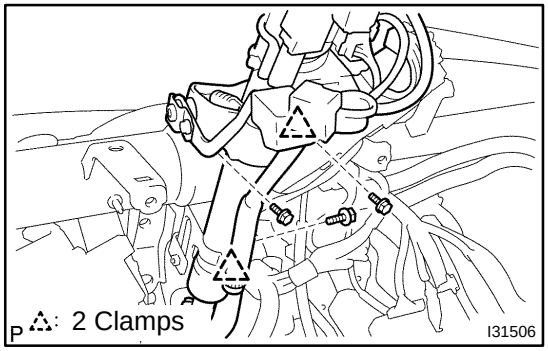


(b) Install the 3 earth wires with the 3 nuts.
Torque: 8.4 N·m (85 kgf·cm, 73 in.·lbf)



(c) Install the 10 clamps, connect the wire harness.

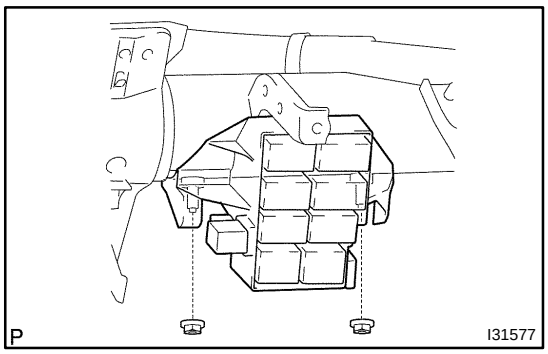




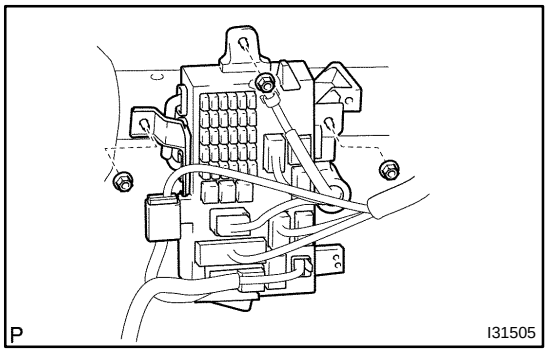
37. INSTALL STEERING COLUMN ASSY

(a) Install the steering column assy with the 3 bolts.

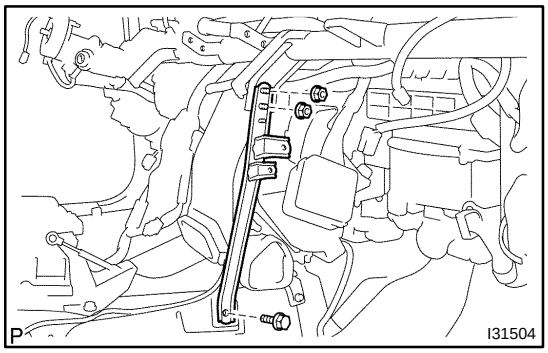
(b) Install the 2 clamps.



(c) Install the steering side connector block with the 2 nuts.

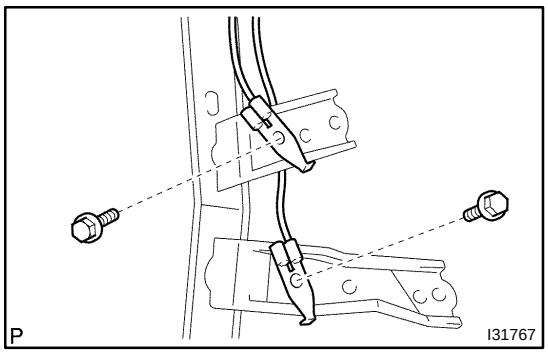


(d) Install the driver side junction block with the 3 nuts.
Torque: 8.4 N·m (85 kgf·cm, 73 in.·lbf)

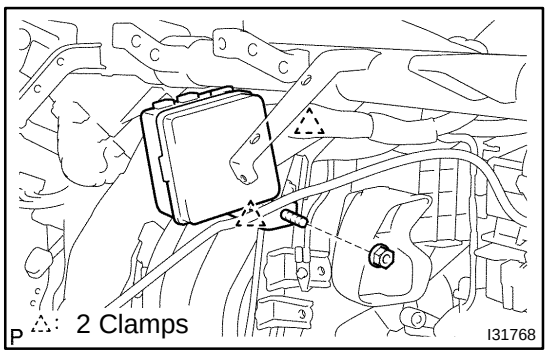


38. INSTALL INSTRUMENT PANEL BRACE SUB-ASSY NO.2

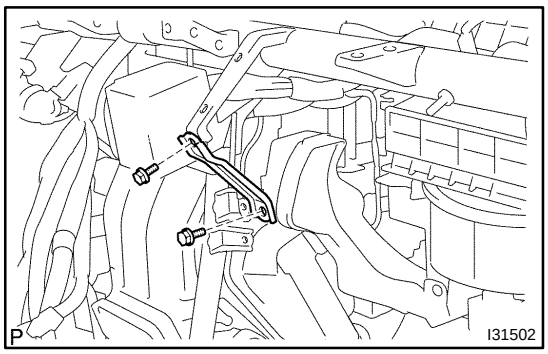
(a) Install the instrument panel brace sub-assy No. 2 with the 2 nuts and bolt.



(b) Install the 2 earth wires with the 2 bolts.
Torque: 8.4 N·m (85 kgf·cm, 73 in.·lbf)

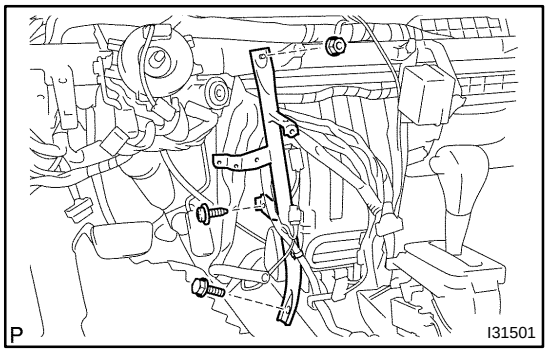


(c) Install the passenger side junction block with the nut and 2 clamps.
Torque: 8.4 N·m (85 kgf·cm, 73 in.·lbf)



39. INSTALL INSTRUMENT FINISH PANEL RETAINER LOWER

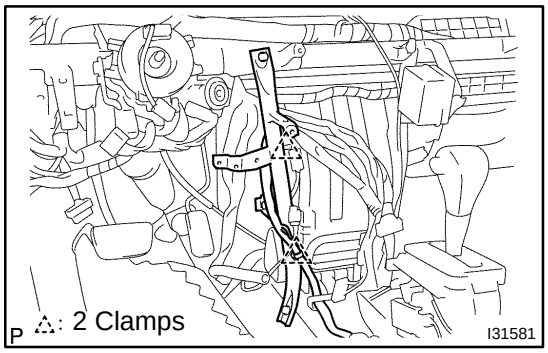
(a) Install the instrument finish panel retainer lower with the 2 bolts.



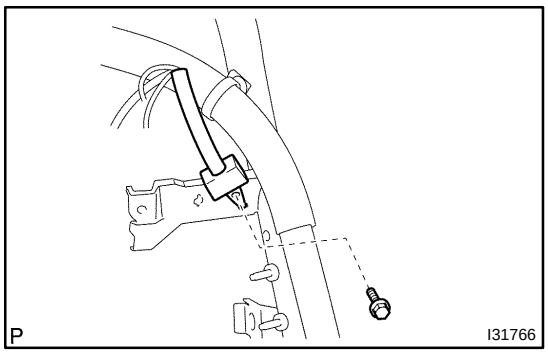
40. INSTALL INSTRUMENT PANEL BRACE SUB-ASSY NO.1

(a) Install the instrument panel brace sub-assy No. 1 with the nut.

(b) Install the bolt and screw.
Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf) (Screw)

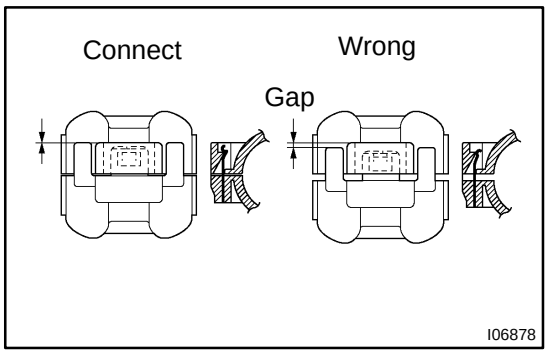


(c) Install the 2 clamps.



(d) Install the earth wire with the bolt.
Torque: 8.4 N·m (85 kgf·cm, 73 in.·lbf)

41. INSTALL INSTRUMENT PANEL SAFETY PAD SUB-ASSY (See page 71-1 1)



42. INSTALL COOLER REFRIGERANT SUCTION HOSE NO.1

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

Compressor oil: ND-OIL 8 or equivalent

(b) Install the cooler refrigerant suction hose No.1 and piping clamp.

HINT:

After connection, check the fitting for claw of the piping clamp.

43. INSTALL COOLER REFRIGERANT LIQUID PIPE A

HINT:

Install in the same way as the cooler refrigerant suction hose No. 1.

44. ADD COOLANT (See page 16-9)

45. CHARGE REFRIGERANT (See page 55-8)

SST 07110-58060 (07117-58060, 07117-58070, 07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080)

Specified amount: 550 ± 50 g (19.37 ± 1.76 oz.)

46. WARM UP ENGINE

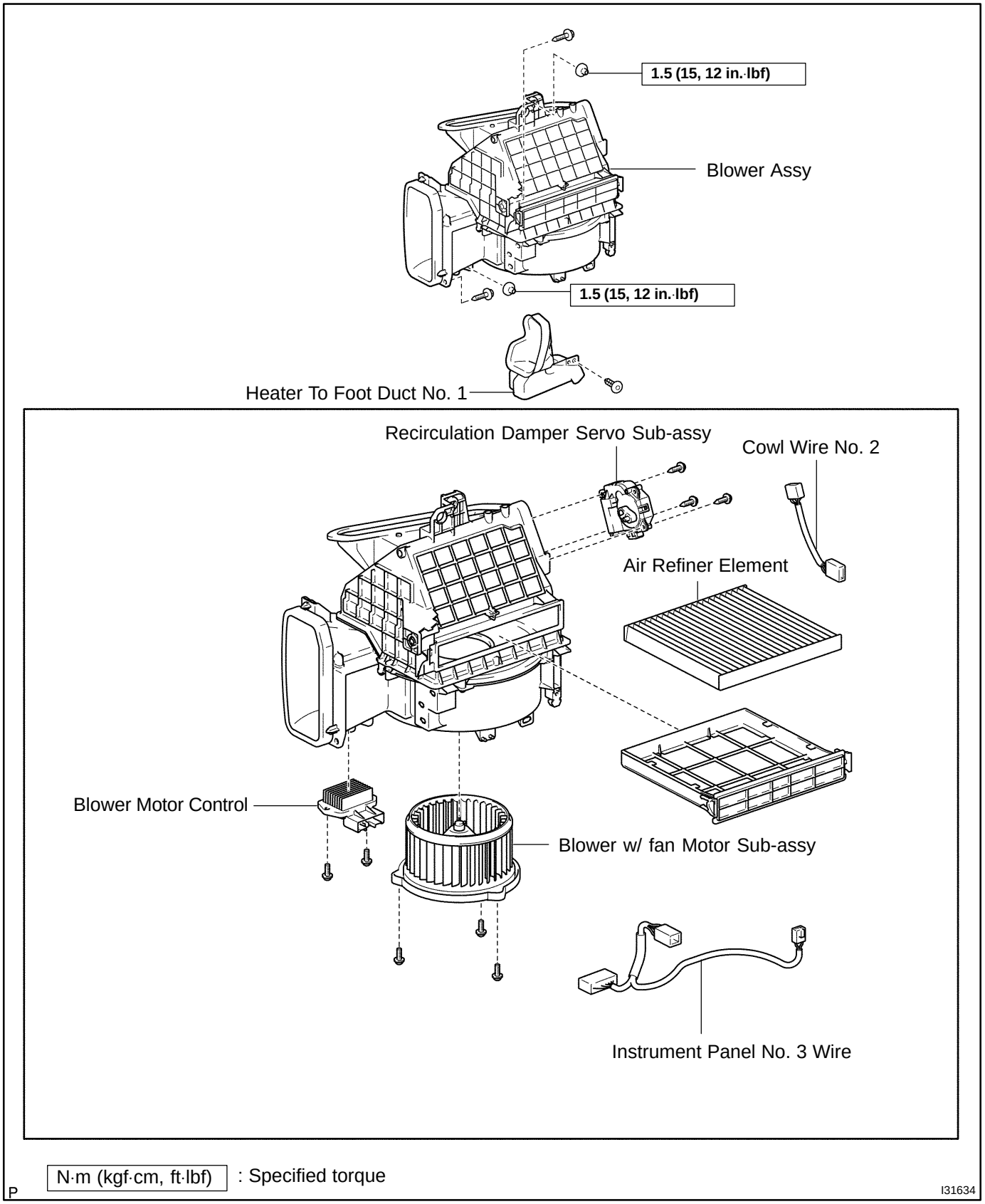
47. CHECK ENGINE COOLANT LEAK (See page 16-9)

48. INSPECT LEAKAGE OF REFRIGERANT (See page 55-8)

BLOWER ASSY

COMPONENTS

550DC-02



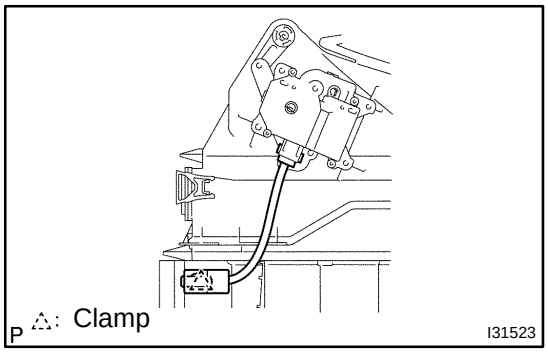
550DD-02

OVERHAUL

HINT:

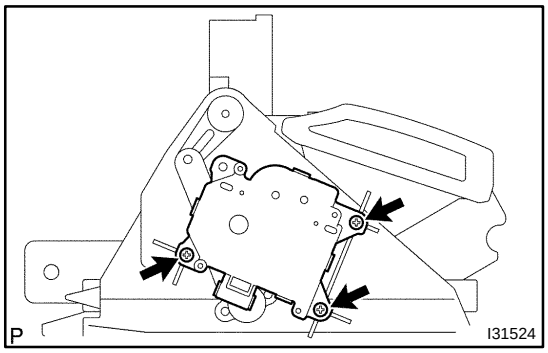
COMPONENTS: See page 55-33

1. **REMOVE INSTRUMENT PANEL SAFETY PAD SUB-ASSY (See page 71-1 1)**
2. **REMOVE HEATER TO FOOT DUCT NO.1 (See page 55-17)**
3. **REMOVE BLOWER ASSY (See page 55-17)**
4. **REMOVE AIR REFINER ELEMENT**



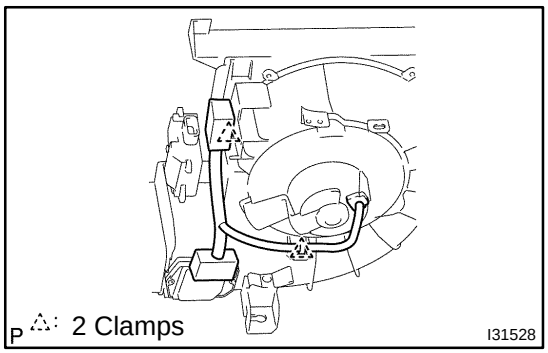
5. REMOVE COWL WIRE NO.2

(a) Remove the clamp and cowl wire No. 2.



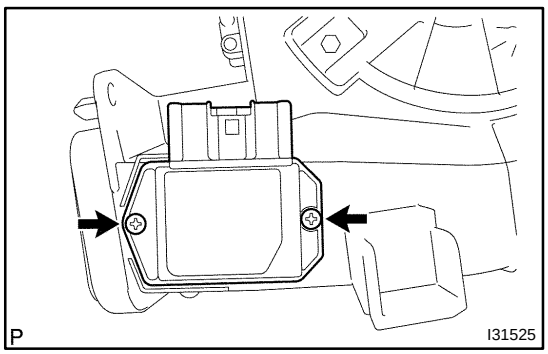
6. REMOVE RECIRCULATION DAMPER SERVO SUB-ASSY

(a) Remove the 3 screws and recirculation damper servo sub-assy .



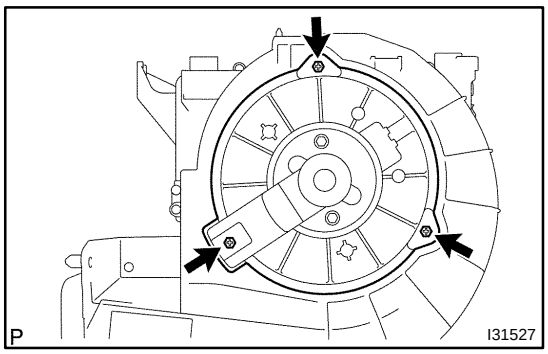
7. REMOVE INSTRUMENT PANEL NO.3 WIRE

(a) Disconnect the connectors, remove the 2 clamps and instrument panel No. 3 wire.



8. REMOVE BLOWER MOTOR CONTROL

(a) Remove the 2 screws and blower motor control.



9. REMOVE BLOWER W/FAN MOTOR SUB-ASSY

(a) Remove the 3 screws and blower w/fan motor sub-assy.

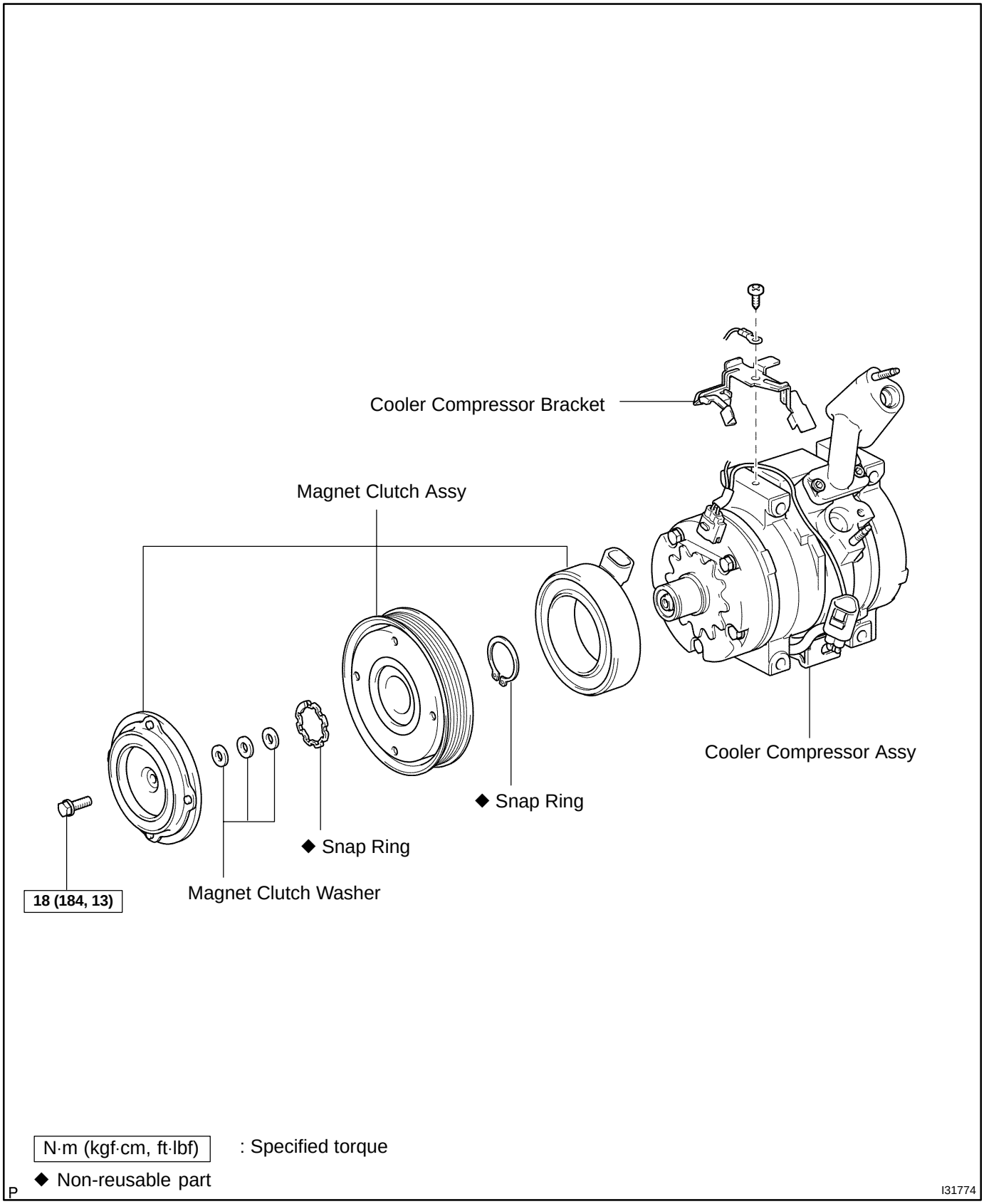
10. INSTALL BLOWER ASSY (See page 55-17)

11. INSTALL INSTRUMENT PANEL SAFETY PAD SUB-ASSY (See page 71-1 1)

COOLER COMPRESSOR ASSY

COMPONENTS

550DE-02



550DF-02

REPLACEMENT

HINT:

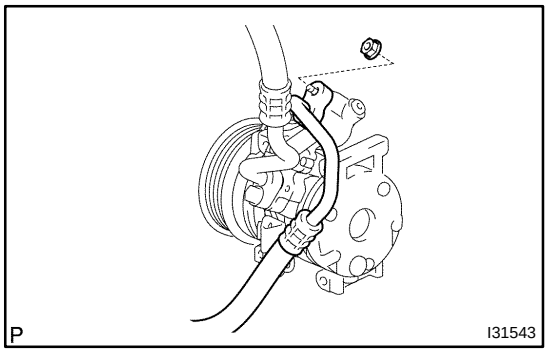
COMPONENTS: See page 55-36

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM (See page 55-8)

SST 07110-58060 (07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080)

2. REMOVE V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (See page 55-10)

3. REMOVE GENERATOR ASSY (See page 19-21)



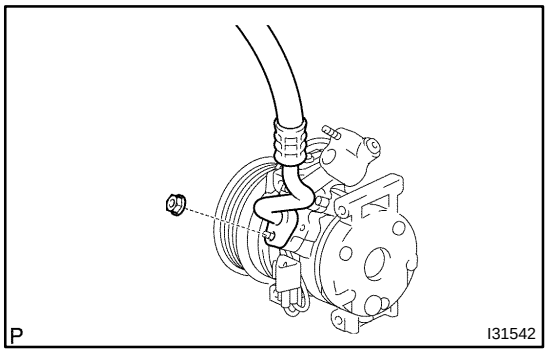
4. DISCONNECT COOLER REFRIGERANT DISCHARGE HOSE NO.1

(a) Remove the nut and disconnect the cooler refrigerant discharge hose No. 1.

(b) Remove the O-ring from the cooler refrigerant discharge hose No. 1.

NOTICE:

Seal the opening of the disconnected parts using vinyl tape to prevent moisture and foreign matter from entering.



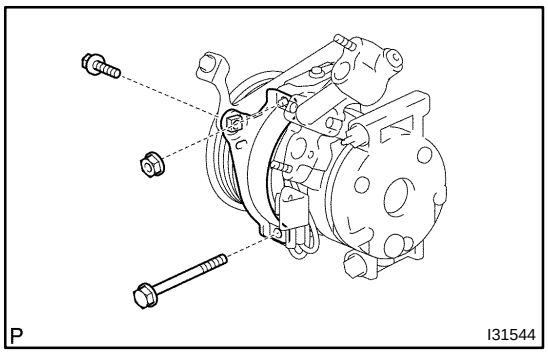
5. DISCONNECT COOLER REFRIGERANT SUCTION HOSE NO.1

(a) Remove the nut and disconnect the cooler refrigerant suction hose No. 1.

(b) Remove the O-ring from the cooler refrigerant suction hose No. 1.

NOTICE:

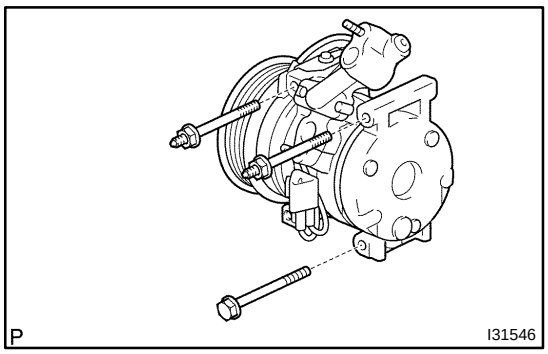
Seal the opening of the disconnected parts using vinyl tape to prevent moisture and foreign matter from entering.



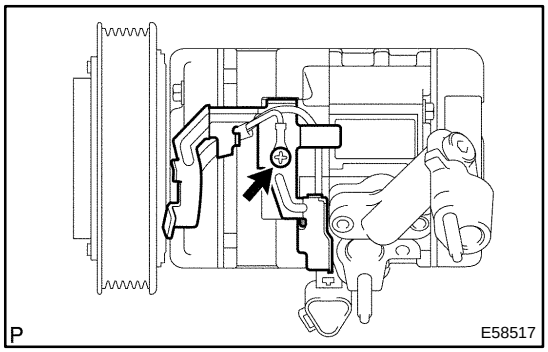
6. REMOVE COMPRESSOR AND MAGNETIC CLUTCH

(a) Disconnect the connector and clamp.

(b) Remove the 2 bolts, nut and cooler compressor bracket.

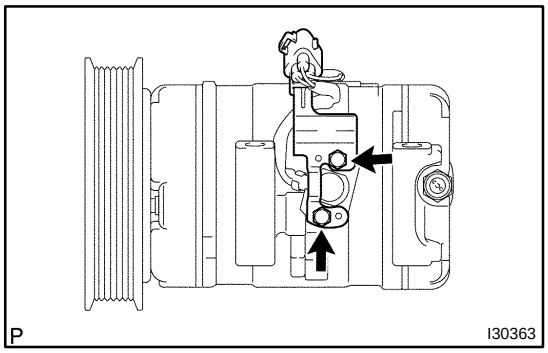


(c) Remove the 3 bolts and compressor and magnetic clutch.



7. REMOVE COOLER COMPRESSOR BRACKET

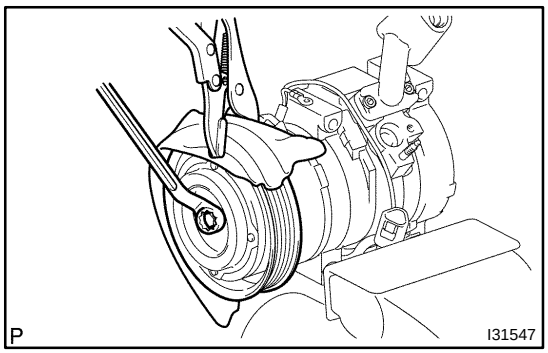
(a) Remove the screw, earth wire and cooler compressor bracket.



8. REMOVE MAGNET CLUTCH ASSY

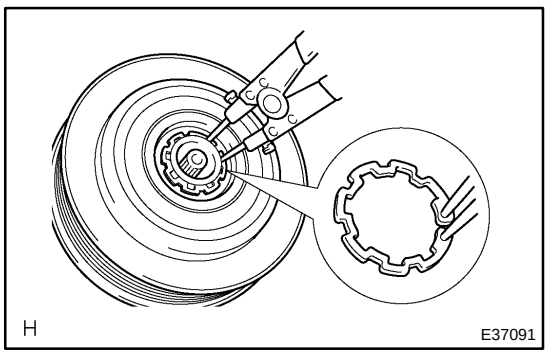
(a) Remove the bolt and bracket.

(b) Place the compressor and magnetic clutch in vise.



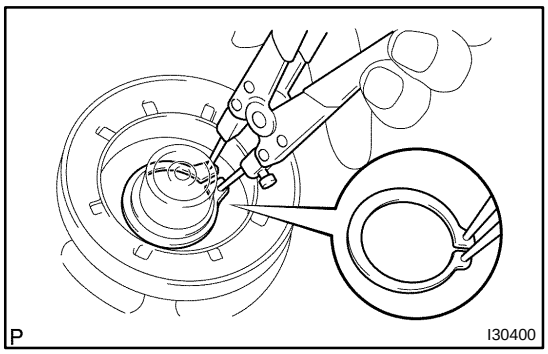
(c) Using a vise pliers, hold the magnet clutch hub.

(d) Remove the bolt, magnet clutch hub and magnet clutch washer.



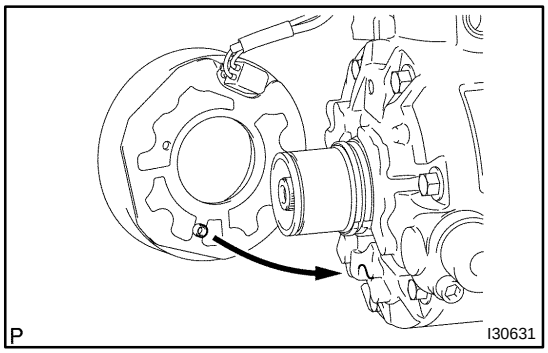
(e) Using a snap ring expander, remove the snap ring and magnet clutch rotor.

(f) Disconnect the connector.



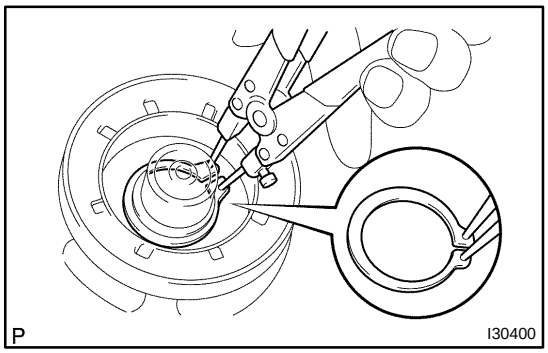
(g) Using a snap ring expander, remove the snap ring and magnet clutch starter.

9. REMOVE COOLER COMPRESSOR ASSY



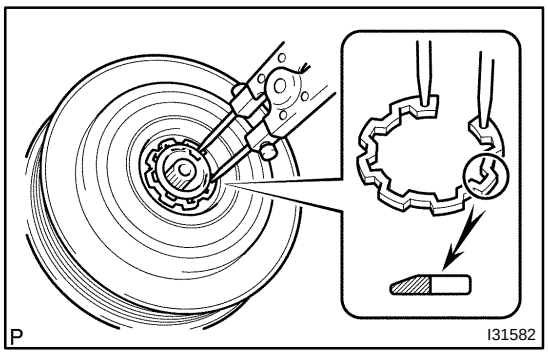
10. INSTALL MAGNET CLUTCH ASSY

(a) Matching the parts shown in the illustration, install the magnet clutch starter.



(b) Using a snap ring expander, install a new snap ring with the chamfered side facing up.

(c) Connect the connector.

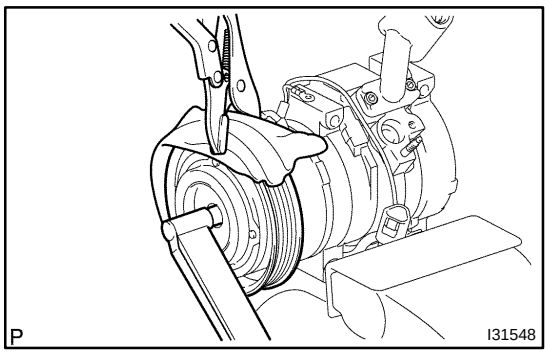


(d) Using a snap ring expander, install the magnet clutch rotor and a new snap ring with the chamfered side facing up.

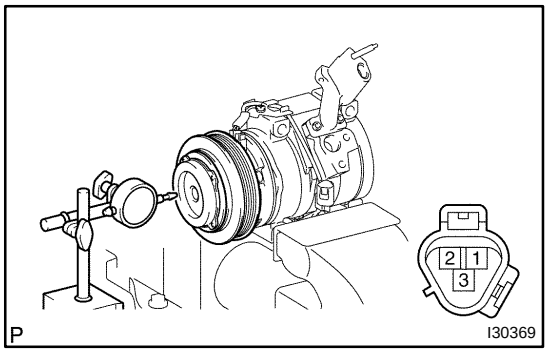
(e) Install the magnet clutch washer and magnet clutch hub.

NOTICE:

Do not change the combination of the magnet clutch washers used before disassembly.



(f) Using a vise pliers, hold the magnet clutch hub and install the bolt.
Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)



11. INSPECT MAGNETIC CLUTCH CLEARANCE

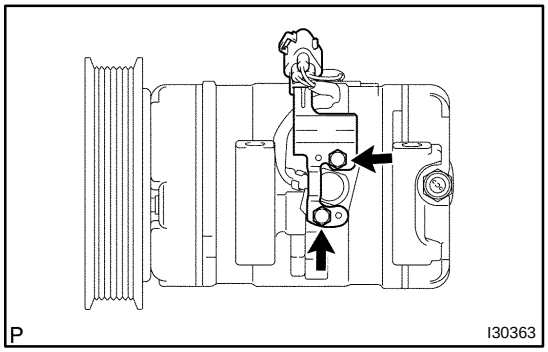
(a) Set the dial indicator to the magnet clutch hub.

(b) Connect the battery positive lead to the terminal 3 of magnet clutch connector and the negative lead to the earth wire. Turn on and off the magnet clutch and measure the clearance.
Standard clearance:
0.35 - 0.60 mm (0.014 - 0.024 in.)

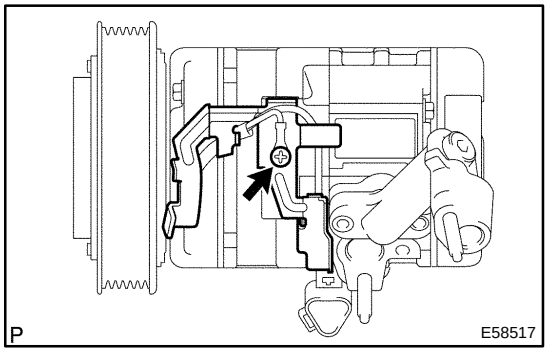
If the measured value is out of the standard range, remove the magnet clutch hub and adjust it with magnet clutch washers.

NOTICE:
Adjustment shall be performed with 3 or less magnet clutch washers.

(c) Remove the compressor and magnetic clutch from the vise.



(d) Install the bolt and bracket.



12. INSTALL COOLER COMPRESSOR BRACKET

(a) Install the earth wire and cooler compressor bracket with the screw.

13. INSPECT COMPRESSOR OIL

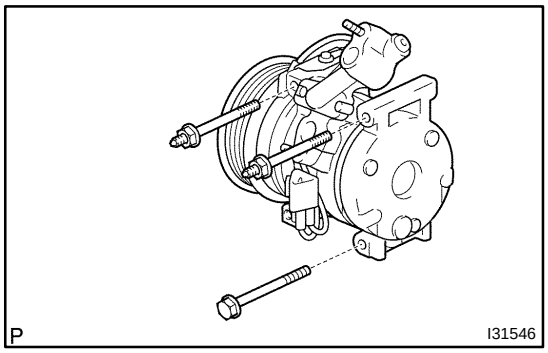
(a) When replacing the compressor and magnetic clutch with new one, after gradually removing the refrigerant gas from the service valve, drain the following amount of oil from the new compressor and magnetic clutch before installation.

Standard:

(Oil capacity inside new compressor and magnetic clutch: 120 + 15 cc (4.1 + 0.51 fl.oz.)) - (Remaining oil amount in the removed compressor and magnetic clutch) = (Oil amount to be removed when replacing)

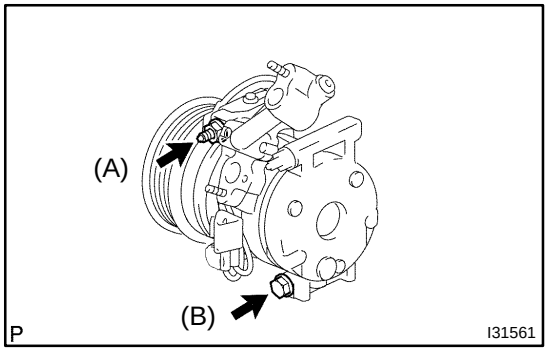
NOTICE:

- **When checking the compressor oil level, observe the precautions on the cooler removal/installation.**
- **Because compressor oil remains in the pipes of the vehicle, if a new compressor and magnetic clutch is installed without removing some oil inside, the oil amount becomes too much, preventing heat exchange in the refrigerant cycle and causing refrigerant failure.**
- **If the remaining oil in the removed compressor and magnetic clutch is too small in volume, check for oil leakage.**
- **Be sure to use ND-OIL8 for compressor oil.**



14. TEMPORARY TIGHTEN COMPRESSOR AND MAGNETIC CLUTCH

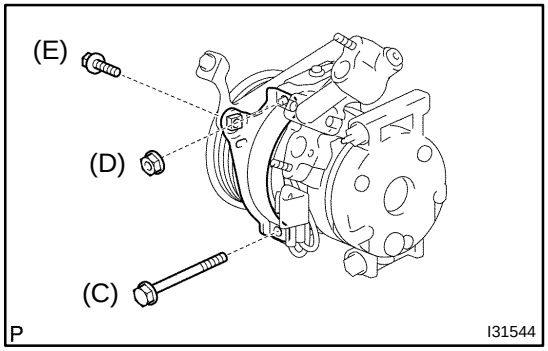
(a) Temporarily the compressor and magnetic clutch with the 3 bolts.



15. FULLY TIGHTEN COMPRESSOR AND MAGNETIC CLUTCH

(a) Tighten the compressor and magnetic clutch with the bolt (A) and bolt (B).

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



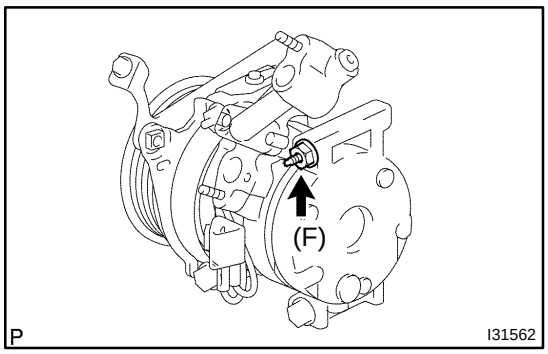
(b) Install the cooler compressor bracket with the 2 bolts and nut.

Torque:

25 N·m (250 kgf·cm, 18 ft·lbf) (Bolt (C))

25 N·m (250 kgf·cm, 18 ft·lbf) (Nut (D))

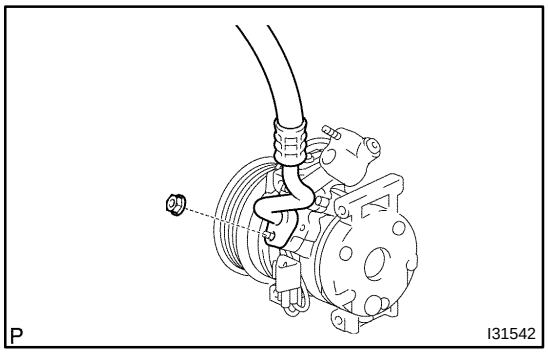
18 N·m (184 kgf·cm, 13 ft·lbf) (Bolt (E))



(c) Tighten the compressor and magnetic clutch with the bolt (F).
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)
(d) Connect the connector.

16. INSTALL COOLER REFRIGERANT SUCTION HOSE NO.1

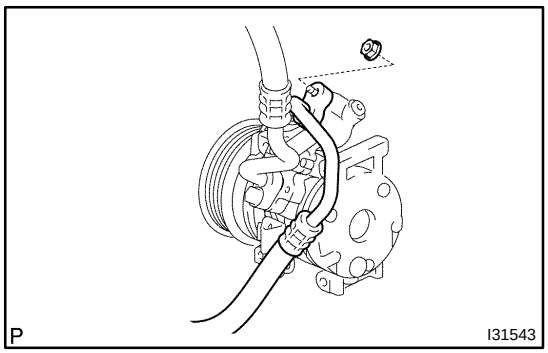
(a) Remove the attached vinyl tape from the hose.
(b) Sufficiently apply compressor oil to the new O-ring and fit surface of the compressor and magnetic clutch.
Compressor oil: ND-OIL 8 or equivalent
(c) Install a O-ring to the cooler refrigerant suction hose No. 1.



(d) Install the cooler refrigerant suction hose No. 1 to the compressor and magnetic clutch with the nut.
Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf)

17. INSTALL COOLER REFRIGERANT DISCHARGE HOSE NO.1

(a) Remove the attached vinyl tape from the hose.
(b) Sufficiently apply compressor oil to the new O-ring and fit surface of the compressor and magnetic clutch.
Compressor oil: ND-OIL 8 or equivalent
(c) Install a O-ring to the cooler refrigerant discharge hose No. 1.



(d) Install the cooler refrigerant discharge hose No. 1 to the compressor and magnetic clutch with the nut.
Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf)

18. INSTALL GENERATOR ASSY (See page 19-21)
19. INSTALL V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (See page 55-10)
20. CHARGE REFRIGERANT (See page 55-8)
SST 07110-58060 (07117-58060, 07117-58070, 07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080)
Specified amount: 550 ± 50 g (19.37 ± 1.76 oz.)
21. WARM UP ENGINE
22. INSPECT LEAKAGE OF REFRIGERANT (See page 55-8)

COOLER CONDENSER ASSY

550DG-02

ON-VEHICLE INSPECTION

1. INSPECT COOLER CONDENSER ASSY

(a) If a fin of the cooler condenser assy is dirty, clean it with water and dry it with compressor air.

NOTICE:

Do not damage the fin of the condenser assy.

(b) If a fin of the condenser assy is bent, make it straight using a screwdriver or pliers.

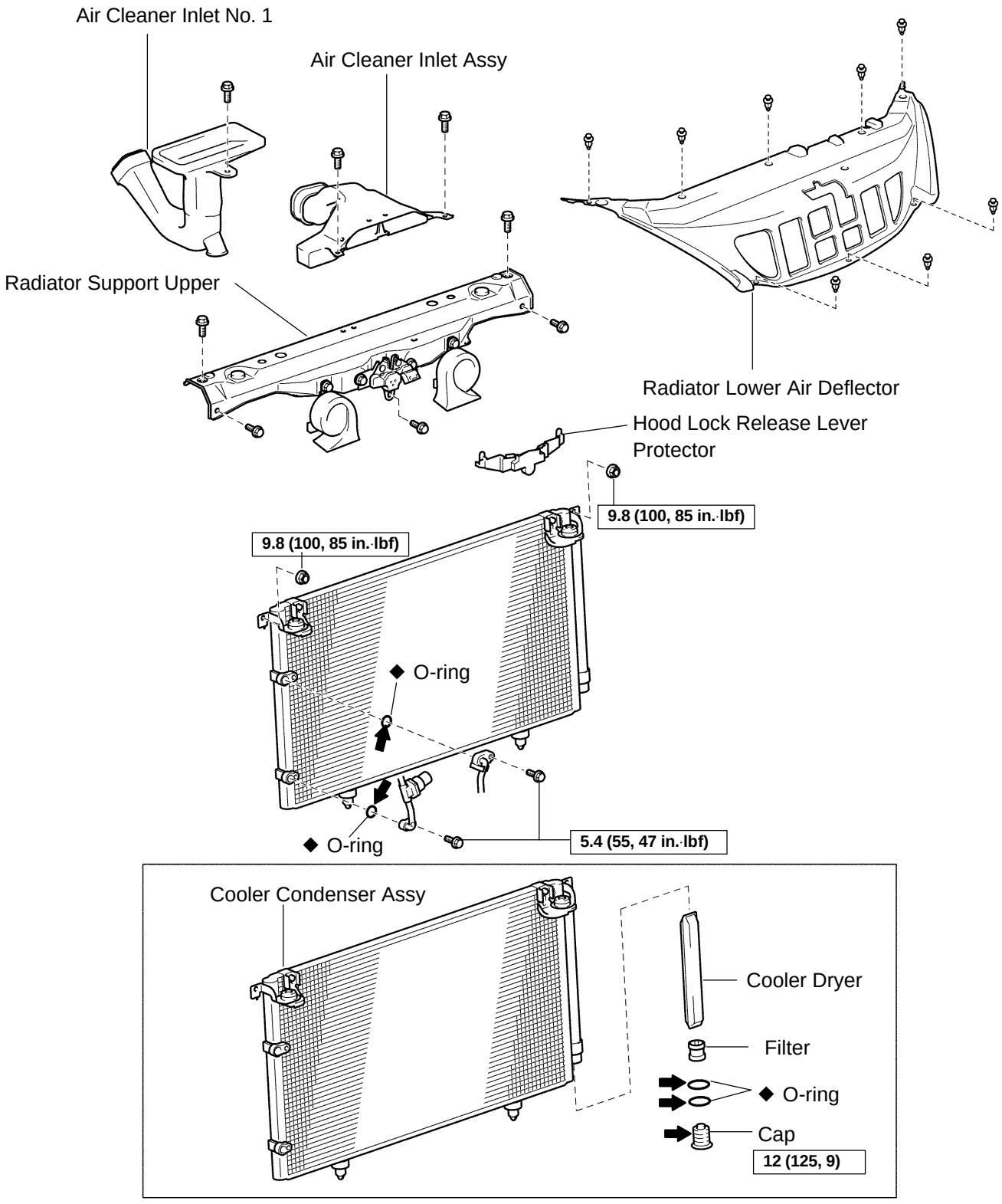
2. INSPECT CONDENSER FOR LEAKAGE OF REFRIGERANT

(a) Using a halogen leak detector, check pipe joints for gas leakage.

(b) If gas leakage is detected in a joint, check the torque of the joint.

550DH-02

COMPONENTS



P N·m (kgf·cm, ft·lbf) : Specified torque
⬅ Compressor oil ND-OIL 8 or equivalent
◆ Non-reusable parts

I31635

550DI-02

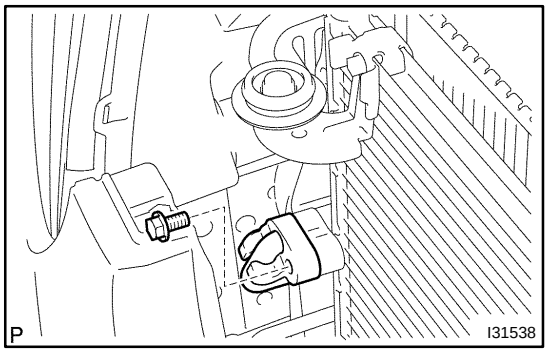
OVERHAUL

HINT:

COMPONENTS: See page 55-44

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM (See page 55-8)

SST 07110-58060 (07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080)



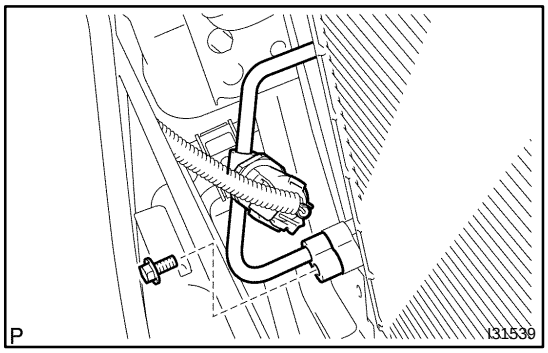
2. REMOVE COOLER REFRIGERANT DISCHARGE HOSE NO.1

(a) Remove the bolt and disconnect the cooler refrigerant discharge hose No. 1 from the cooler condenser assy.

(b) Remove the O-ring from the cooler refrigerant discharge hose No. 1.

NOTICE:

Seat the opening of the disconnected parts using vinyl tape to prevent moisture and foreign matter from entering.



3. DISCONNECT COOLER REFRIGERANT LIQUID PIPE A

(a) Remove the bolt and disconnect the cooler refrigerant liquid pipe A from the cooler condenser assy.

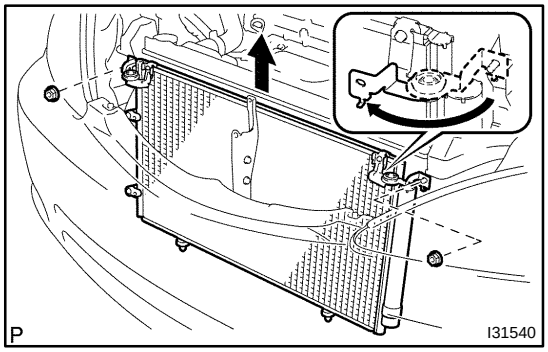
(b) Remove the O-ring from the cooler refrigerant liquid pipe A.

NOTICE:

Seal the opening of the disconnected parts using vinyl tape to prevent moisture and foreign matter from entering.

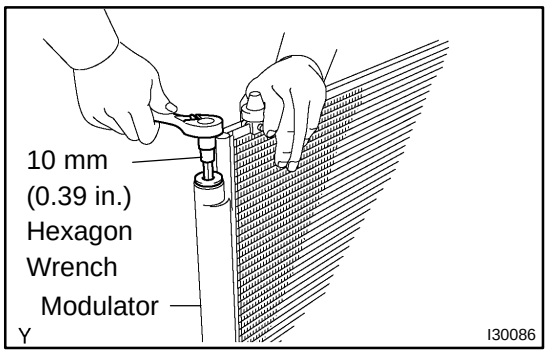
4. REMOVE AIR CLEANER INLET ASSY (See page 16-21)

5. REMOVE RADIATOR SUPPORT UPPER (See page 16-21)



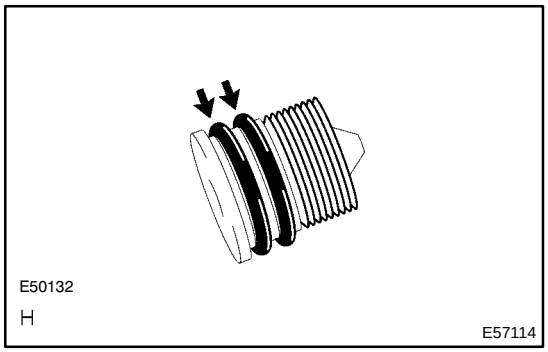
6. REMOVE COOLER CONDENSER ASSY

(a) Remove the 2 nuts and cooler condenser assy.

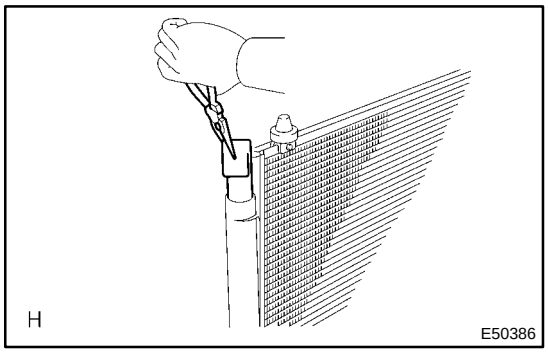


7. REMOVE COOLER DRYER

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



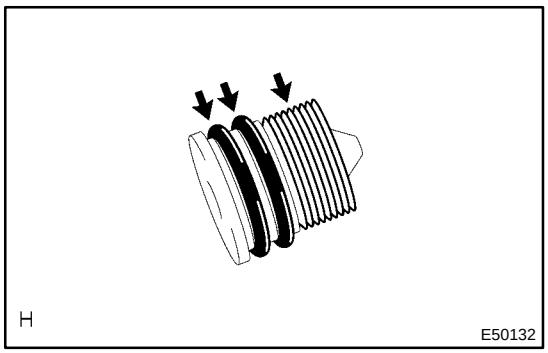
(b) Remove the 2 O-rings from the cap.



(c) Using a needle nose pliers, remove the cooler dryer.

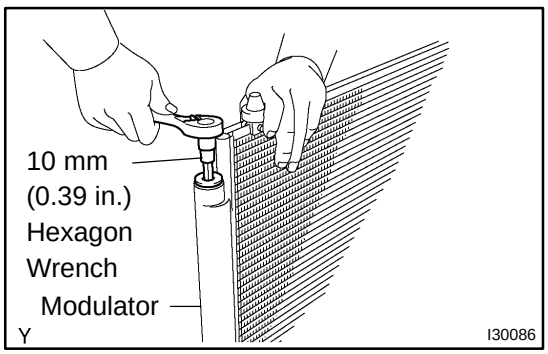
8. INSTALL COOLER DRYER

(a) Using a needle nose pliers, install the cooler dryer.

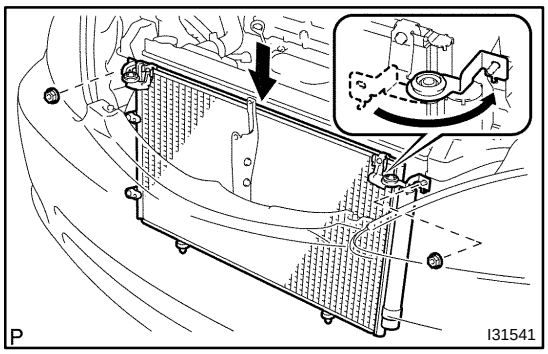


(b) Install 2 new O-rings to the cap.

(c) Sufficiently apply compressor oil to the fit surfaces of the O-ring and the cap.
Compressor oil: ND-OIL 8 or equivalent



(d) Using hexagon wrench 10 mm (0.39 in.), install the cap to the condenser assy.
Torque: 12 N·m (125 kgf·cm, 9 ft·lbf)



9. INSTALL COOLER CONDENSER ASSY

(a) Install the cooler condenser assy with the 2 nuts.
Torque: 9.8 N·m (100 kgf·cm, 85 in.·lbf)

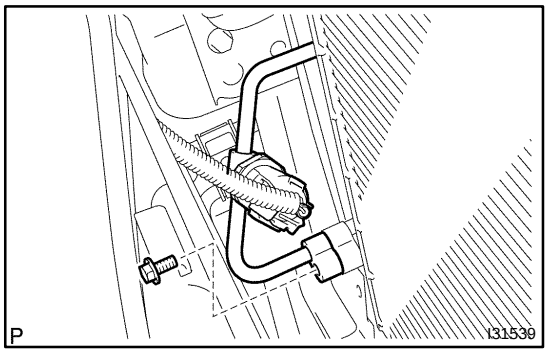
10. INSTALL RADIATOR SUPPORT UPPER (See page 16-21)

11. INSTALL COOLER REFRIGERANT LIQUID PIPE A

(a) Remove the attached vinyl tape from the tube and connecting part of the cooler condenser assy.

(b) Sufficiently apply compressor oil to the new O-ring and tube joint.
Compressor oil: ND-OIL 8 or equivalent

(c) Install a O-ring to the cooler refrigerant liquid pipe A.



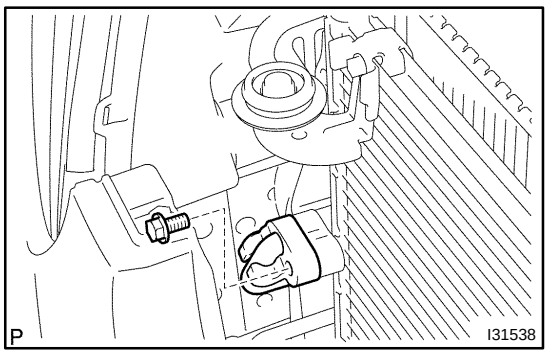
(d) Connect the cooler refrigerant liquid pipe A to the cooler condenser assy with the bolt.
Torque: 5.4 N·m (55 kgf·cm, 47 in.·lbf)

12. INSTALL COOLER REFRIGERANT DISCHARGE HOSE NO.1

(a) Remove the attached vinyl tape from the tube and connecting part of the cooler condenser assy.

(b) Sufficiently apply compressor oil to the new O-ring and tube joint.
Compressor oil: ND-OIL 8 or equivalent

(c) Install a O-ring to the cooler refrigerant discharge hose No. 1.



(d) Connect the cooler refrigerant discharge hose No. 1 to the cooler condenser assy with the bolt.
Torque: 5.4 N·m (55 kgf·cm, 47 in.·lbf)

13. CHARGE REFRIGERANT (See page 55-8)

SST 07110-58060 (07117-58060, 07117-58070, 07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080)

Specified amount: 550 ± 50 g (19.37 ± 1.76 oz.)

14. WARM UP ENGINE

15. INSPECT LEAKAGE OF REFRIGERANT (See page 55-8)

HOW TO USE THIS AUTOMATIC TRANSAXLE REPAIR MANUAL

0103A-07

GENERAL INFORMATION

1. GENERAL DESCRIPTION

(a) This manual is made in accordance with SAE J2008.

(b) Generally repair operations can be separated in the following 3 main processes:
1. Diagnosis
2. Removing and Installing, Replacing, Disassembling, Installing and Checking, Adjusting
3. Final Inspection

(c) This manual explains" Removing and Installing, Replacing, Disassembling ,Instaling and Checking, Adjusting" , but" Final inspection" is omitted.

(d) The following essential operations are not written in this manual, however these operations must be done in the practical situation.
(1) Operation with a jack or lift
(2) Cleaning of a removed part when necessary
(3) Visual check

2. INDEX

(a) An alphabetical INDEX is provided as a section on the end of the book to guide you to the item to be repaired.

3. PREPARATION

(a) Use of special service tools (SST) and special service materials (SSM) may be required, depending on the repairing condition. Be sure to use SST and SSM when they are required and follow the working procedure properly. A list of SST and SSM is in the Preparation section of this manual.

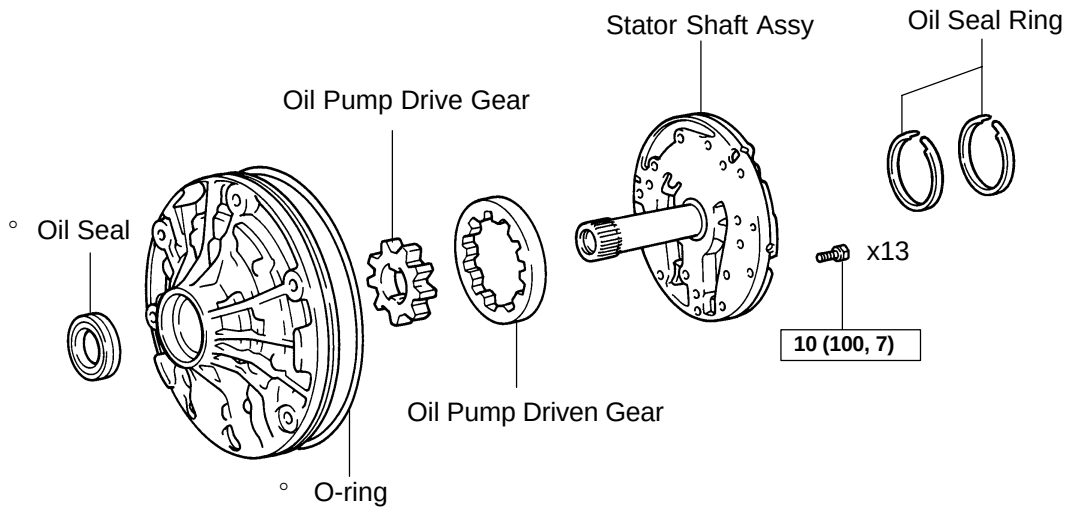
4. REPAIR PROCEDURES

(a) Component drawing is placed as the section or title when necessary.

(b) Illustrations of the parts catalog are placed as the" disassembled parts drawing" so that it enables you to understand the fitting condition of the components.

(c) Non-reusable parts, grease applied parts, precoated parts and tightening torque are specified in the components drawing.

Example:



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

° Non-reusable part

D25697

(d) Tightening torque, oil applying position, and non-reusable parts are described as important points in the procedure.

NOTICE:

There are cases where such information can only be indicated by an illustration. In that case, all the information such as torque, oil, etc are described in the illustration.

(e) Installing procedure of operation item is performed in the reverse order of the removing, and only the important points are described.

(f) Only items with points are described in the procedure, and the operational portion and content are placed using an illustration. In the explanations, details of the operational method, standard value and notice are placed.

(g) There may be a case where the illustrations of similar models are used. In that case the details may be different from the actual vehicle.

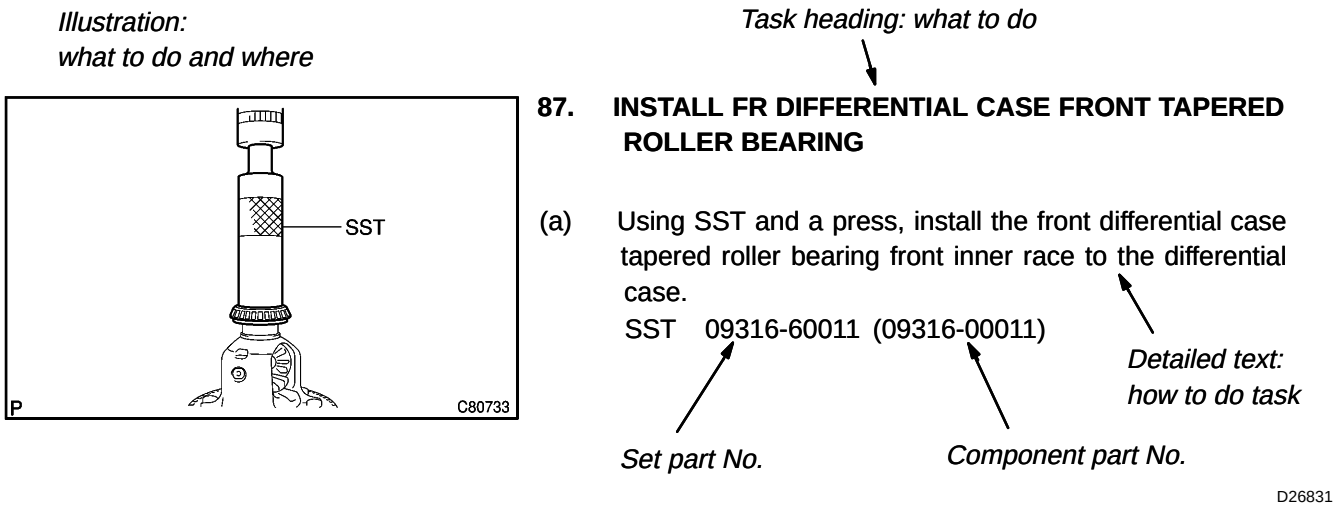
(h) The procedures are presented in a step-by-step format:

(1) The illustration shows what to do and where to do it.

(2) The task heading tells what to do.

(3) The detailed text tells how to perform the task and gives other information such as specifications and warnings.

Example:



HINT:

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

5. SERVICE SPECIFICATIONS

(a) Specifications are presented in bold type throughout the manual. You never have to leave the procedure to look up your specifications. The specifications are also found in the Service Specifications section for a quick reference.

6. TERMS DEFINITION

CAUTION	Indicate the possibility of injury to you or other people.
NOTICE	Indicate the possibility of damage to the components being repaired.
HINT	Provide additional information to help you perform the repair efficiently.

7. SI UNIT

(a) 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:

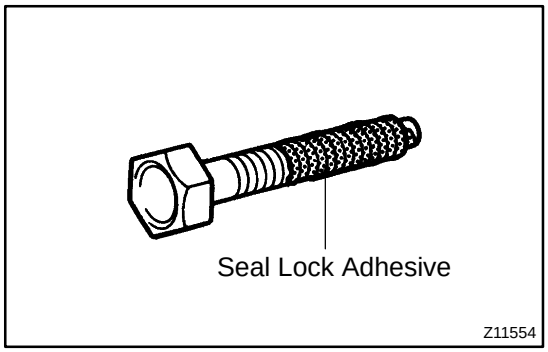
Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)

REPAIR INSTRUCTION FOR AUTOMATIC TRANSAXLE REPAIR MANUAL

0103B-07

PRECAUTION

1. BASIC REPAIR HINT



(a) PRECOATED PARTS

(1) Precoated parts are bolts, nuts, etc. that are coated with a seal lock adhesive at the factory.

(2) If a precoated part is retightened, loosened or caused to move in any way, it must be recoated with the specified adhesive.

(3) 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.

NOTICE:

Do the torque checking with the lower limit value of the torque tolerance.

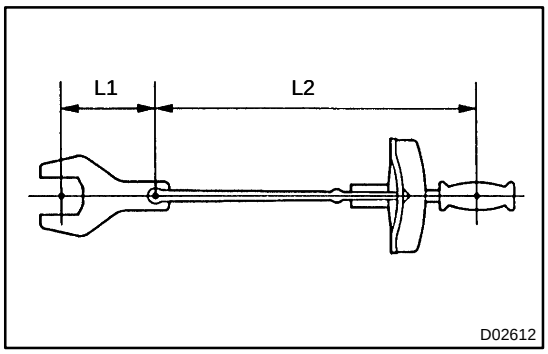
(4) Depending on the seal lock agent to apply, there may be a case where it is necessary to leave it for a specified time until it hardens.

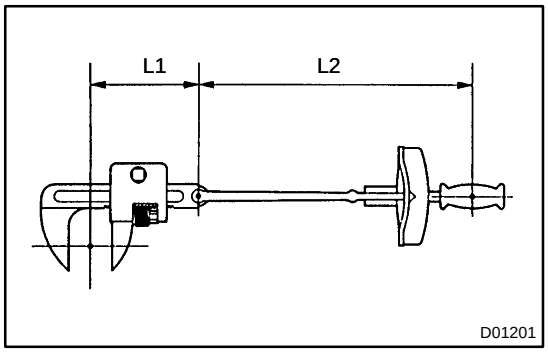
(b) GASKETS

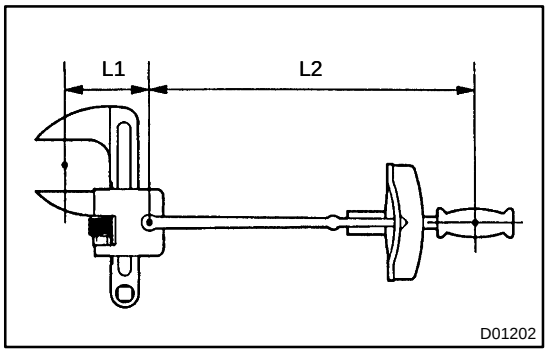
When necessary, use a sealer on gaskets to prevent leaks.

(c) BOLTS, NUTS AND SCREWS

Carefully observe all specifications for bolt tightening torques. Always use a torque wrench.







(d) TORQUE WHEN USING EXTENSION TOOL WITH TORQUE WRENCH

(1) In case of tightening by extending the entire length of the torque wrench combined with SST or tool, if you tighten until the reading of the torque wrench reached the specified torque value, the actual torque becomes excessive.

(2) In this text, only the specified torque is described. In case of using SST or extension tool, find the reading of the torque wrench by the formula.

(3) Formula T'=T x L2/(L1 + L2)

T'	Reading of torque wrench {N·m (kgf·cm, ft·lbf)}
T	Torque {N·m (kgf·cm, ft·lbf)}
L1	Length of SST or tool (cm)
L2	Length of torque wrench (cm)

TERMS FOR AUTOMATIC TRANSAXLE REPAIR MANUAL

0103C-05

ABBREVIATIONS USED IN THIS MANUAL

Abbreviations	Meaning
ASSY	Assembly
ATF	Automatic Transaxle Fluid
B_3	U/D Brake
C_2	Reverse Clutch
C_3	U/D Clutch
FIPG	Formed In Place Gasket
O/D	Overdrive
SSM	Special Service Materials
SST	Special Service Tools
U/D	Underdrive
w/	With
w/o	Without
1st	First
2nd	Second

0103D-09

GLOSSARY OF SAE AND TOYOTA TERMS

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

SAE ABBREVIATIONS	SAE TERMS	TOYOTA TERMS ( )--ABBREVIATIONS
A/C	Air Conditioning	Air Conditioner
ACL	Air Cleaner	Air Cleaner
AIR	Secondary Air Injection	Air Injection (AI)
AP	Accelerator Pedal	-
B+	Battery Positive Voltage	+B, Battery Voltage
BARO	Barometric Pressure	-
CAC	Charge Air Cooler	Inter cooler
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 Potion	-
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 Control Temperature	Coolant Temperature, Water Temperature (THW)
EEPROM	Electrically Erasable Programmable Read Only memory	Electrically Erasable Programmable Read Only memory (EEPROM), Erasable Programmable Read Only memory (EPROM)
EFE	Early Fuel Evaporation	Cold Mixture Heater (CMH), Heat Control Valve (HCV)
EGR	Exhaust Gas Recirculation	Exhaust Gas Recirculation (EGR)
EI	Electronic Ignition	Distributorless Ignition (DI)
EM	Engine Modification	Engine Modification (EM)
EPROM	Erasable Programmable Read Only Memory	Programmable Read Only Memory (PROM)
EVAP	Evaporative Emission	Evaporative Emission Control (EVAP)
FC	Fan Control	-
FEEPROM	Flash Electrically Erasable Programmable Read Only Memory	-
FEPROM	Flash Erasable Programmable Read Only Memory	-
FF	Flexible Fuel	-
FP	Fuel Pump	Fuel Pump
GEN	Generator	Alternator
GND	Ground	Ground (GND)
HO2S	Heated Oxygen Sensor	Heated Oxygen Sensor (HO2S)
IAC	Idol Air Control	Idol Speed Control (ISC)
IAT	Intake Air Temperature	Intake or Inlet Air Temperature
ICM	Ignition Control Module	-
IFI	Indirect Fuel Injection	Indirect Injection
IFS	Inertia Fuel-Shutoff	-

ISC	Idle Speed Control	-
KS	Knock Sensor	Knock Sensor
MAF	Mass Air Flow	Air Flow Meter
MAP	Manifold Absolute Pressure	Manifold Pressure Intake Vacuum
MC	Mixture Control	Electric Bleed Air Control Valve (EBCV) Mixture Control Valve (MCV) Electric Air Control Valve (EACV)
MDP	Manifold Differential Pressure	-
MFI	Multiport Fuel Injection	Electronic Fuel Injection (EFI)
MIL	Malfunction Indicator Lamp	Check Engine Light
MST	Manifold Surface temperature	-
MVZ	Manifold Vacuum Zone	-
NVRAM	Non-Volatile Random Access Memory	-
O2S	Oxygen Sensor	Oxygen Sensor, O_2 Sensor ($O_{2S)}$
OBD	On-Board Diagnostic	On-Board Diagnostic (OBD)
OC	Oxidation Catalytic Converter	Oxidation Catalyst Converter (OC), CC_0
OP	Open Loop	Open Loop
PAIR	Pulsed Secondary Air Injection	Air Suction (AS)
PCM	Powertrain Control Module	-
PNP	Park/Neutral Position	-
PROM	Programmable Read Only Memory	-
PSP	Power Steering Pressure	-
PTOX	Periodic Trap Oxidizer	Diesel Particulate Filter (DPF) Diesel Particulate Trap (DPT)
RAM	Random Access Memory	Random Access Memory (RAM)
RM	Relay Module	-
ROM	Read Only Memory	Read Only Memory (ROM)
RPM	Engine Speed	Engine Speed
SC	Supercharger	Supercharger
SCB	Supercharger Bypass	-
SFI	Sequential Multiport Fuel Injection	Electronic Fuel Injection (EFI), Sequential Injection
SPL	Smoke Puff Limiter	-
SRI	Service Reminder Indicator	-
SRT	System Readiness Test	-
ST	Scan Tool	-
TB	Throttle Body	Throttle Body
TBI	Throttle Body Fuel Injection	Single Point Injection Central Fuel Injection (Ci)
TC	Turbocharger	Turbocharger
TCC	Torque Converter Clutch	Torque Converter
TCM	Transmission Control Module	Transmission ECU (Electronic Control Unit)
TP	Throttle Position	Throttle Position
TR	Transmission Range	-
TVV	Thermal Vacuum Valve	Bimetallic Vacuum Switching Valve (BVSV) Thermostatic Vacuum Switching Valve (TVSV)
TWC	Three-Way Catalytic Converter	Three-Way Catalytic (TWC) CC_{RO}
TWC+OC	Three-Way + Oxidation Catalytic Converter	$CC_R + CC_O$
VAF	Volume Air Flow	Air Flow Meter
VR	Voltage Regulator	Voltage Regulator
VSS	Vehicle Speed Sensor	Vehicle Speed Sensor (Read Switch Type)
WOT	Wide Open Throttle	Full Throttle

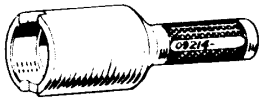
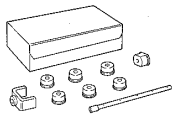
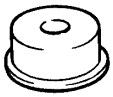
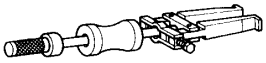
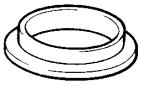
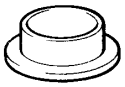
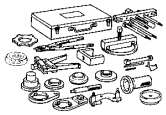
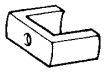
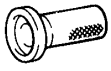
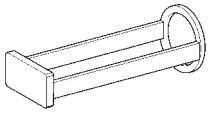
WU-OC	Warm Up Oxidation Catalytic Converter	-
WU-TWC	Warm Up Three-Way Catalytic Converter	Manifold Converter
3GR	Third Gear	-
4GR	Fourth Gear	-

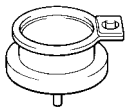
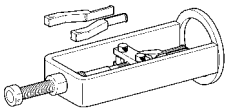
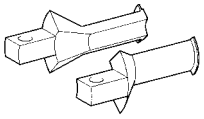
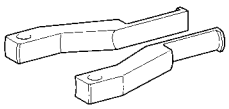
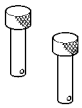
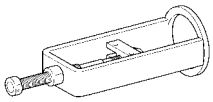
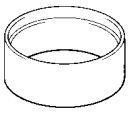
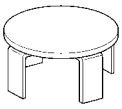
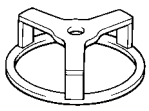
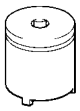
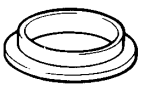
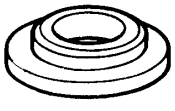
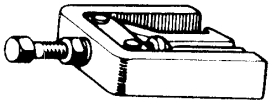
AUTOMATIC TRANSMISSION / TRANS

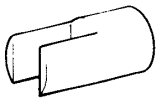
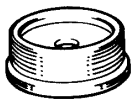
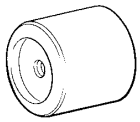
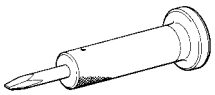
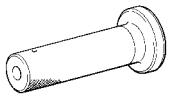
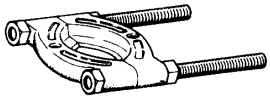
022FX-01

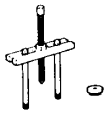
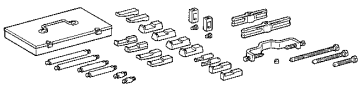
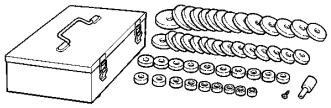
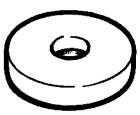
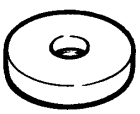
PREPARATION

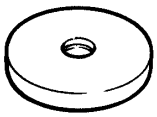
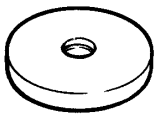
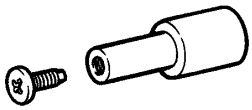
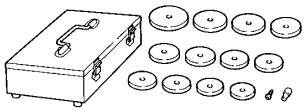
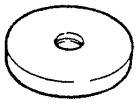
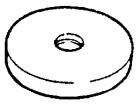
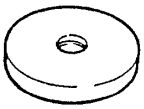
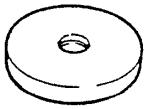
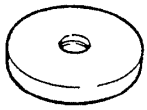
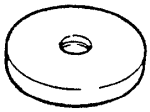
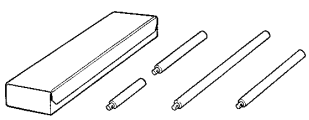
SST

	09214-7601 1	Crankshaft Pulley Replacer	FRONT DIFFERENTIAL ASSY(U151F)
	09215-00013	Crankshaft Bearing Remover & Replacer Set B	FRONT DIFFERENTIAL ASSY(U151E)
	(09215-00471)	Camshaft Bearing Remover & Replacer	FRONT DIFFERENTIAL ASSY(U151E)
	09223-15020	Oil Seal & Bearing Replacer	FRONT DIFFERENTIAL ASSY(U151E) FRONT DIFFERENTIAL ASSY(U151F)
	09223-15030	Oil Seal & Bearing Replacer	AUTOMATIC TRANSAXLE ASSY(U151E/U151F)
	09308-00010	Oil Seal Puller	FRONT DIFFERENTIAL ASSY(U151E) OIL PUMP ASSY(U151E/U151F) FRONT DIFFERENTIAL ASSY(U151F)
	09316-12010	Transfer Bearing Replacer	FRONT DIFFERENTIAL ASSY(U151E)
	09316-2001 1	Transfer Bearing Replacer	UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F) FRONT DIFFERENTIAL ASSY(U151F)
	09350-32014	TOYOTA Automatic Transmission Tool Set	OIL PUMP ASSY(U151E/U151F) UNDERDRIVE CLUTCH ASSY(U151E/U151F)
	(09351-32070)	No.2 Piston Spring Compressor	UNDERDRIVE CLUTCH ASSY(U151E/U151F)
	(09351-32140)	Oil Seal Replacer	OIL PUMP ASSY(U151E/U151F)
	09387-00020	Direct Clutch Wrench	AUTOMATIC TRANSAXLE ASSY(U151E/U151F) FORWARD CLUTCH ASSY(U151E/U151F) DIRECT CLUTCH ASSY(U151E/U151F)

	09387-00030	Counter Drive Gear Holding Tool	AUTOMATIC TRANSAXLE ASSY(U151E/U151F)
	09387-00041	Bearing Puller Assembly	AUTOMATIC TRANSAXLE ASSY(U151E/U151F)
	(09387-01010)	Claw No.1	AUTOMATIC TRANSAXLE ASSY(U151E/U151F)
	(09387-01021)	Claw No.2	AUTOMATIC TRANSAXLE ASSY(U151E/U151F)
	(09387-01030)	Pin	AUTOMATIC TRANSAXLE ASSY(U151E/U151F)
	(09387-01040)	Bearing Puller Body	AUTOMATIC TRANSAXLE ASSY(U151E/U151F)
	09387-00050	Under Drive Gear Puller	UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F)
	09387-00060	Second Brake Wrench	SECOND BRAKE PISTON ASSY(U151E/U151F)
	09387-00070	First & Reverse Brake Wrench	AUTOMATIC TRANSAXLE ASSY(U151E/U151F)
	09387-00080	Counter Drive Gear Nut Wrench	AUTOMATIC TRANSAXLE ASSY(U151E/U151F)
	09502-12010	Differential Bearing Replacer	UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F)
	09506-35010	Differential Drive Pinion Rear Bearing Replacer	UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F)
	09514-3501 1	Rear Wheel Bearing Puller	AUTOMATIC TRANSAXLE ASSY(U151E/U151F)

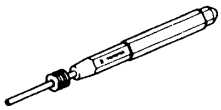
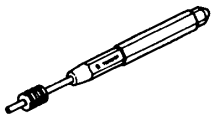
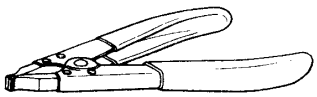
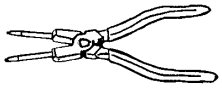
	09527-1701 1	Rear Axle Shaft Bearing Remover	AUTOMATIC TRANSAXLE ASSY(U151E/U151F) FRONT DIFFERENTIAL ASSY(U151F)
	09550-60010	Differential Side Bearing Replacer	FRONT DIFFERENTIAL ASSY(U151E)
	(09951-00490)	Replacer 49	FRONT DIFFERENTIAL ASSY(U151E)
	09564-3201 1	Differential Preload Adaptor	FRONT DIFFERENTIAL ASSY(U151E) FRONT DIFFERENTIAL ASSY(U151F)
	09608-10010	Steering Knuckle Oil Seal Replacer	FRONT DIFFERENTIAL ASSY(U151E) FRONT DIFFERENTIAL ASSY(U151F)
	09649-17010	Steering Knuckle Tool	AUTOMATIC TRANSAXLE ASSY(U151E/U151F) FRONT DIFFERENTIAL ASSY(U151F)
	09710-30050	Suspension Arm Bushing Replacer	FRONT DIFFERENTIAL ASSY(U151E)
	09726-40010	Lower Control Shaft Bearing Replacer	UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F)
	09930-00010	Drive Shaft Nut Chisel	UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F)
	(09931-00010)	Handle	UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F)
	(09931-00020)	Nut Chisel	UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F)
	09950-00020	Bearing Remover	FRONT DIFFERENTIAL ASSY(U151E) AUTOMATIC TRANSAXLE ASSY(U151E/U151F) UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F) FRONT DIFFERENTIAL ASSY(U151F)

	09950-00030	Bearing Remover Attachment	FRONT DIFFERENTIAL ASSY(U151E) AUTOMATIC TRANSAXLE ASSY(U151E/U151F) UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F) FRONT DIFFERENTIAL ASSY(U151F)
	09950-4001 1	Puller B Set	FRONT DIFFERENTIAL ASSY(U151E) AUTOMATIC TRANSAXLE ASSY(U151E/U151F) UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F)
	(09957-04010)	Attachment	FRONT DIFFERENTIAL ASSY(U151E) AUTOMATIC TRANSAXLE ASSY(U151E/U151F) UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F)
	09950-60010	Replacer Set	FRONT DIFFERENTIAL ASSY(U151E) AUTOMATIC TRANSAXLE ASSY(U151E/U151F) UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F) FRONT DIFFERENTIAL ASSY(U151F)
	(09951-00230)	Replacer 23	AUTOMATIC TRANSAXLE ASSY(U151E/U151F)
	(09951-00260)	Replacer 26	UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F)
	(09951-00320)	Replacer 32	AUTOMATIC TRANSAXLE ASSY(U151E/U151F) UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F)
	(09951-00450)	Replacer 45	AUTOMATIC TRANSAXLE ASSY(U151E/U151F)
	(09951-00480)	Replacer 48	FRONT DIFFERENTIAL ASSY(U151F)
	(09951-00490)	Replacer 49	FRONT DIFFERENTIAL ASSY(U151E)
	(09951-00500)	Replacer 50	AUTOMATIC TRANSAXLE ASSY(U151E/U151F)

	(09951-00590)	Replacer 59	AUTOMATIC TRANSAXLE ASSY(U151E/U151F)
	(09951-00600)	Replacer 60	FRONT DIFFERENTIAL ASSY(U151F)
	(09952-06010)	Adapter	AUTOMATIC TRANSAXLE ASSY(U151E/U151F)
	09950-60020	Replacer Set No.2	FRONT DIFFERENTIAL ASSY(U151E) AUTOMATIC TRANSAXLE ASSY(U151E/U151F) UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F) FRONT DIFFERENTIAL ASSY(U151F)
	(09951-00730)	Replacer 73	FRONT DIFFERENTIAL ASSY(U151F)
	(09951-00750)	Replacer 75	AUTOMATIC TRANSAXLE ASSY(U151E/U151F)
	(09951-00810)	Replacer 81	AUTOMATIC TRANSAXLE ASSY(U151E/U151F)
	(09951-00890)	Replacer 89	FRONT DIFFERENTIAL ASSY(U151E) UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F) FRONT DIFFERENTIAL ASSY(U151F)
	(09951-00910)	Replacer 91	FRONT DIFFERENTIAL ASSY(U151E) AUTOMATIC TRANSAXLE ASSY(U151E/U151F)
	(09951-01030)	Replacer 103	AUTOMATIC TRANSAXLE ASSY(U151E/U151F) FRONT DIFFERENTIAL ASSY(U151F)
	09950-70010	Handle Set	FRONT DIFFERENTIAL ASSY(U151E) AUTOMATIC TRANSAXLE ASSY(U151E/U151F) UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F) FRONT DIFFERENTIAL ASSY(U151F)

	(09951-07100)	Handle 100	FRONT DIFFERENTIAL ASSY(U151E) AUTOMATIC TRANSAXLE ASSY(U151E/U151F) UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F) FRONT DIFFERENTIAL ASSY(U151F)
	(09951-07150)	Handle 150	FRONT DIFFERENTIAL ASSY(U151E) AUTOMATIC TRANSAXLE ASSY(U151E/U151F) FRONT DIFFERENTIAL ASSY(U151F)

Recomended Tools

	09031-00030	Pin Punch	AUTOMATIC TRANSAXLE ASSY(U151E/U151F)
	09031-00040	Pin Punch .	FRONT DIFFERENTIAL ASSY(U151E) FRONT DIFFERENTIAL ASSY(U151F)
	09905-00012	Snap Ring No.1 Expander	AUTOMATIC TRANSAXLE ASSY(U151E/U151F) FORWARD CLUTCH ASSY(U151E/U151F) DIRECT CLUTCH ASSY(U151E/U151F) FRONT DIFFERENTIAL ASSY(U151F)
	09905-00013	Snap Ring Pliers	UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F)

Equipment

Dial indicator with magnetic base	
Feeler gauge	
Vernier calipers	
Torque wrench	
Plastic hammer	
Straight edge	
Press	
Seal packing 2403, THREE BOND 2403 or equivalent	
Seal packing 2430, THREE BOND 2430 or equivalent	

Lubricant

item		
U151E / U151F Automatic transaxle fluid Dry fill Drain and refill	 6.8 liter (7.2 USqts, 6.0 lmp.qts) 2.9 liter (3.1 USqts, 2.6 lmp.qts)	ATF type T-IV

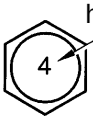
SSM (Special Service Materials)

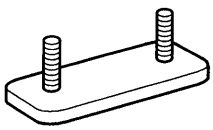
08826-00090	Seal Packing 1281, THREE BOND 1281 or equivalent (FIPG)	
08833-00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	

STANDARD BOLT FOR AUTOMATIC TRANSAXLE REPAIR MANUAL

HOW TO DETERMINE BOLT STRENGTH

030JK-02

	Mark	Class
Hexagon head bolt	 Bolt head No. 4- 5- 6- 7- 8- 9- 10- 11-	4T 5T 6T 7T 8T 9T 10T 11T
	No mark	4T
Hexagon flange bolt w/ washer hexagon bolt	No mark	4T
Hexagon head bolt	2 Protruding lines	5T
Hexagon flange bolt w/ washer hexagon bolt	2 Protruding lines	6T
Hexagon head bolt	3 Protruding lines	7T
Hexagon head bolt	4 Protruding lines	8T

	Mark	Class
Hexagon flange bolt w/ washer hexagon bolt	4 Protruding lines	9T
Hexagon flange bolt w/ washer hexagon bolt	5 Protruding lines	10T
Hexagon flange bolt w/ washer hexagon bolt	6 Protruding lines	11T
Stud bolt	No mark	4T
	Grooved	6T
Welded bolt		4T

V06821

030JL-02

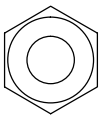
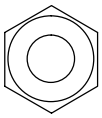
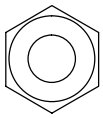
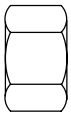
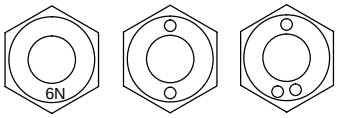
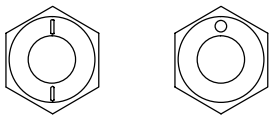
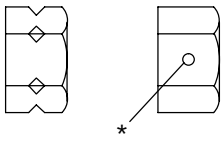
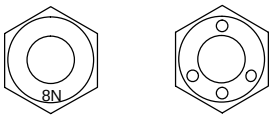
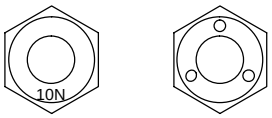
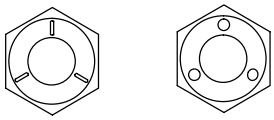
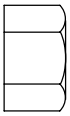
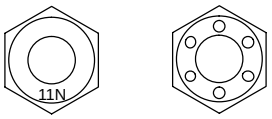
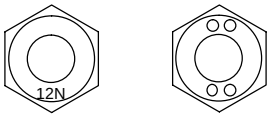
SPECIFIED TORQUE FOR STANDARD BOLTS

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

V00079

030JM-02

HOW TO DETERMINE NUT STRENGTH

Nut Type			Class
Present Standard Hexagon Nut	Old Standard Hexagon Nut		
	Cold Forging Nut	Cutting Processed Nut	
 No Mark			4N
 No Mark (w/ Washer)	 No Mark (w/ Washer)	 No Mark	5N (4T)
 6N			6N
		 *	7N (5T)
 8N			8N
 10N		 No Mark	10N (7T)
 11N			11N
 12N			12N

*: Nut with 1 or more marks on one side surface of the nut.

B06432

HINT:

Use the nut with the same number of the nut strength classification or the greater than the bolt strength classification number when tightening parts with a bolt and nut.

Example: Bolt = 4T

Nut = 4N or more

AUTOMATIC TRANSMISSION / TRANSAXLE

0305K-11

SERVICE DATA

Oil pump		
Body clearance	STD	0.10 - 0.17 mm (0.0039 - 0.0067 in.)
	Max.	0.17 mm (0.0067 in.)
Tip clearance	STD	0.07 - 0.15 mm (0.0028 - 0.0059 in.)
	Max.	0.15 mm (0.0059 in.)
Side clearance	STD	0.02 - 0.05 mm (0.0008 - 0.0020 in.)
	Max.	0.05 mm (0.0020 in.)
Drive gear thickness	Mark	
	A	11.690 - 11.699 mm (0.4602 - 0.4606 in.)
	B	11.700 - 11.709 mm (0.4606 - 0.4610 in.)
	C	11.710 - 11.720 mm (0.4610 - 0.4614 in.)
	D	11.721 - 11.730 mm (0.4615 - 0.4618 in.)
	E	11.731 - 11.740 mm (0.4619 - 0.4622 in.)
Driven gear thickness	Mark	
	A	11.690 - 11.699 mm (0.4602 - 0.4606 in.)
	B	11.700 - 11.709 mm (0.4606 - 0.4610 in.)
	C	11.710 - 11.720 mm (0.4610 - 0.4614 in.)
	D	11.721 - 11.730 mm (0.4615 - 0.4618 in.)
	E	11.731 - 11.740 mm (0.4619 - 0.4622 in.)
Pump body bushing inside diameter	STD	38.113 - 38.138 mm (1.50050 - 1.50149 in.)
	Max.	38.188 mm (1.50346 in.)
Stator shaft bushing inside diameter	STD	21.500 - 21.526 mm (0.84646 - 0.84748 in.)
	Max.	21.57 mm (0.8492 in.)

Multiple disc clutch		
Inside diameter	STD	23.025 - 23.045 mm (0.9065 - 0.9073 in.)
	Max.	23.09 mm (0.9091 in.)

Forward clutch		
Pack clearance		1.00 - 1.25 mm (0.0394 - 0.4921 in.)
Return spring free length		26.74 mm (1.0528 in.)
Flange thickness	Mark	
	1	3.00 mm (0.1181 in.)
	2	3.15 mm (0.1240 in.)
	3	3.30 mm (0.1299 in.)
	4	3.45 mm (0.1358 in.)
	5	3.60 mm (0.1417 in.)

Reverse clutch		
Pack clearance:		0.60 - 0.82 mm (0.02362 - 0.03228 in.)
Flange thickness	Mark	
	1	3.0 mm (0.118 in.)
	2	3.1 mm (0.122 in.)
	3	3.2 mm (0.126 in.)
	4	3.3 mm (0.130 in.)
	5	3.4 mm (0.134 in.)
	6	3.5 mm (0.138 in.)
	7	3.6 mm (0.142 in.)

Direct clutch & O/D clutch		
Pack clearance		0.61 - 0.83 mm (0.02401 - 0.03268 in.)
Return spring free length		25.91 mm (1.0201 in.)
Flange thickness	Mark	
	0	2.5 mm (0.098 in.)
	1	2.6 mm (0.102 in.)
	2	2.7 mm (0.106 in.)
	3	2.8 mm (0.110 in.)
	4	2.9 mm (0.114 in.)
	5	3.0 mm (0.118 in.)
	6	3.1 mm (0.122 in.)

2nd brake		
Pack clearance		0.62 - 0.91 mm (0.0244 - 0.0358 in.)
Return spring free length		16.61 mm (0.6539 in.)
Flange thickness	Mark	
	1	3.0 mm (0.118 in.)
	2	3.1 mm (0.122 in.)
	3	3.2 mm (0.126 in.)
	4	3.3 mm (0.130 in.)
	5	3.4 mm (0.134 in.)
	6	3.5 mm (0.138 in.)
	7	3.6 mm (0.142 in.)

U/D clutch		
Pack clearance		1.51 - 1.71 mm (0.0594 - 0.0673 in.)
U/D clutch drum bushing inside diameter	STD	37.06 - 37.08 mm (1.4591 - 1.4598 in.)
	Max.	37.13 mm (1.4618 in.)
Return spring free length		17.14 mm (0.6752 in.)
Flange thickness	Mark	
	1	3.0 mm (0.118 in.)
	2	3.1 mm (0.122 in.)
	3	3.2 mm (0.126 in.)
	4	3.3 mm (0.130 in.)
	5	3.4 mm (0.134 in.)

U/D brake		
Pack clearance		1.81 - 2.20 mm (0.0713 - 0.0866 in.)
Return spring free length		14.04 mm (0.5528 in.)
Flange thickness	Mark	
	1	3.0 mm (0.118 in.)
	2	3.2 mm (0.126 in.)
	3	3.4 mm (0.134 in.)

1st & reverse brake		
Pack clearance		1.16 - 1.35 mm (0.0457 - 0.0531in.)
Return spring free length		15.53 mm (0.6114 in.)
Flange thickness	Mark	
	1	1.8 mm (0.071 in.)
	2	1.9 mm (0.075 in.)
	3	2.0 mm (0.079 in.)
	4	2.1 mm (0.083 in.)
	5	2.2 mm (0.087 in.)
	6	2.3 mm (0.091 in.)
	7	2.4 mm (0.094 in.)
	8	2.5 mm (0.098 in.)

U/D planetary gear	
Preload (at 60 rpm)	0.50 - 1.42 N·m (5.1 - 14.5 kgf·cm, 0.06 - 0.17 in.·lbf)

Front planetary gear		
Turning torque (at 60 rpm)	New Bearing	0.51 - 1.02 N·m (5.1 - 10.0 kgf·cm, 4.4 - 8.7 in.·lbf)
	Used Bearing	0.26 - 0.51 N·m (2.7 - 5.2 kgf·cm, 2.3 - 4.5 in.·lbf)

Input shaft	
End play	0.262 - 1.249 mm (0.0103 - 0.0492 in.)

Transaxle rear cover	
Bearing press fit depth	20.55 - 21.25 mm (0.8091 - 0.8366 in.)

Transmission valve body		
Valve body installation bolt length	A	41 mm (1.614 in.)
	B	57 mm (2.244 in.)
	C	25 mm (0.984 in.)

Accumulator			
Spring		Free length/Outer diameter	Color
B_3	Inner	62.00 (2.4409) / 15.50 (0.610)	Purple
	Outer	74.23 (2.9224) / 16.50 (0.649)	Purple
C_2		60.96 (2.3999) / 14.10 (0.555)	Yellow
C_3		72.20 (2.8425) / 19.0 (0.748)	Colorless

Front differential(U151E)		
Backlash		0.05 - 0.20 mm (0.0020 - 0.0079 in.)
Thrust washer thickness	Mark	
	-	1.625 mm (0.0640 in.)
	-	1.725 mm (0.0679 in.)
	-	1.825 mm (0.0719 in.)
Praload (at 60 rpm)	New bearing	0.20 - 0.69 N·m (2.0 - 7.0 kgf·cm, 1.8 - 6.1 in.·lbf)
	Used bearing	0.10 - 0.35 N·m (1.0 - 3.6 kgf·cm, 0.9 - 3.1 in.·lbf)
Flange thickness	Mark	
	0	2.00 mm (0.0787 in.)
	1	2.05 mm (0.0807 in.)
	2	2.10 mm (0.0827 in.)
	3	2.15 mm (0.0846 in.)
	4	2.20 mm (0.0866 in.)
	5	2.25 mm (0.0886 in.)
	6	2.30 mm (0.0906 in.)
	7	2.35 mm (0.0925 in.)
	8	2.40 mm (0.0945 in.)
	9	2.45 mm (0.0965 in.)
	A	2.50 mm (0.0984 in.)
	B	2.55 mm (0.1004 in.)
	C	2.60 mm (0.1024 in.)
	D	2.65 mm (0.1043 in.)
	E	2.70 mm (0.1063 in.)
	F	2.75 mm (0.1083 in.)
	G	2.80 mm (0.1102 in.)
	H	2.85 mm (0.1122 in.)

Front differential (U151F)	
Side gear backlash	0.05 - 0.20 mm (0.0020 - 0.0079 in.)

Thrust washer thickness = Clearance - 0.162 - 0.265 mm (0.0064 - 0.0104 in.)		
	Mark	
	A	0.95 mm (0.0373 in.)
	B	1.00 mm (0.0393 in.)
	C	1.05 mm (0.0413 in.)
	D	1.10 mm (0.0433 in.)
	E	1.15 mm (0.0453 in.)
	F	1.20 mm (0.0472 in.)
	G	1.25 mm (0.0492 in.)
	H	1.30 mm (0.0512 in.)
	J	1.35 mm (0.0532 in.)
	K	1.40 mm (0.0552 in.)
Pinion's backlash		0.05 - 0.20 mm (0.0020 - 0.0079 in.)
Thrust washer thickness	Mark	
	MA	0.80 mm (0.0313 in.)
	MB	0.85 mm (0.0333 in.)
	MC	0.90 mm (0.0353 in.)
	MD	0.95 mm (0.0373 in.)
	ME	1.00 mm (0.0393 in.)
	MF	1.05 mm (0.0413 in.)
	MG	1.10 mm (0.0433 in.)
	MH	1.15 mm (0.0453 in.)
	MJ	1.20 mm (0.0472 in.)
	MK	1.25 mm (0.0492 in.)
	ML	1.30 mm (0.0512 in.)
	MM	1.35 mm (0.0532 in.)
	MN	1.40 mm (0.0552 in.)
Praload (at 60 rpm)	New bearing	0.20 - 0.69 N·m (2.0 - 7.0 kgf·cm, 1.8 - 6.1 in.·lbf)
	Used bearing	0.10 - 0.35 N·m (1.0 - 3.6 kgf·cm, 0.9 - 3.1 in.·lbf)
Flange thickness	Mark	
	0	2.00 mm (0.0787 in.)
	1	2.05 mm (0.0807 in.)
	2	2.10 mm (0.0827 in.)
	3	2.15 mm (0.0846 in.)
	4	2.20 mm (0.0866 in.)
	5	2.25 mm (0.0886 in.)
	6	2.30 mm (0.0906 in.)
	7	2.35 mm (0.0925 in.)
	8	2.40 mm (0.0945 in.)
	9	2.45 mm (0.0965 in.)
	A	2.50 mm (0.0984 in.)
	B	2.55 mm (0.1004 in.)
	C	2.60 mm (0.1024 in.)
	D	2.65 mm (0.1043 in.)
	E	2.70 mm (0.1063 in.)
	F	2.75 mm (0.1083 in.)
	G	2.80 mm (0.1102 in.)
	H	2.85 mm (0.1122 in.)
Oil seal press in depth		5.5 - 6.5 mm (0.217 - 0.256 in.)

0305L-11

TORQUE SPECIFICATION

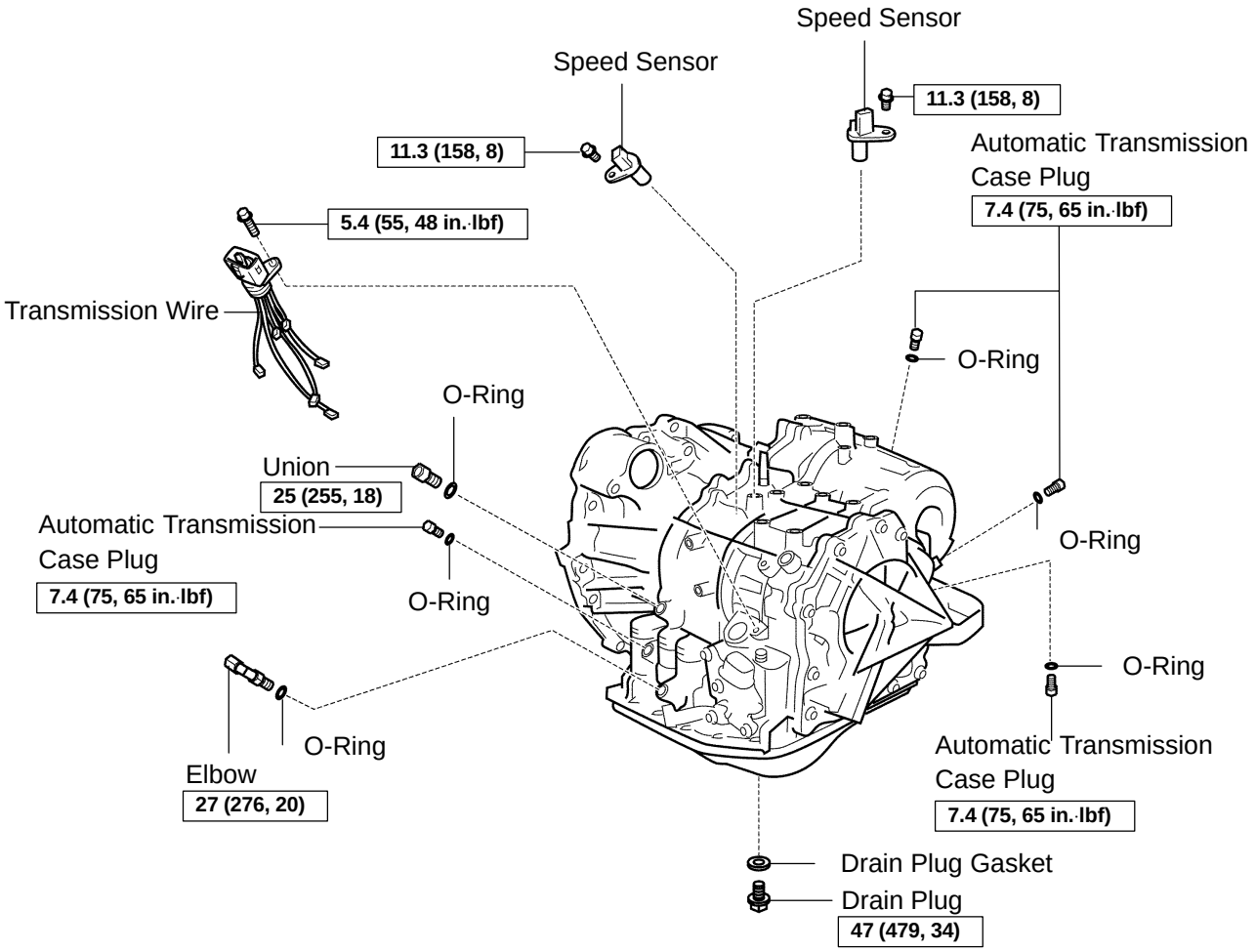
Part Tightened		N·m	kgf·cm	ft·lbf
Differential gear lube apply tube x Transaxle housing		9.8	100	87 in.·lbf
Front planetary gear lock nut		210-350	2141-3569	155-258
Brake apply tube clamp x Transaxle case		5.4	55	48 in.·lbf
Transaxle case No. 1 plug x Transaxle rear cover		7.4	75	65 in.·lbf
Transaxle rear cover x Transaxle case	Bolt A	19	190	14
	Other bolt	25	250	18
Pawl shaft clamp x Transaxle case		9.8	100	87 in.·lbf
Oil pump assy x Transaxle case		22	226	16
Transaxle housing x Transaxle case	Bolt A	25	255	18
	Bolt B	33	337	24
	Bolt C	29	295	21
	Bolt D	22	226	16
Automatic transmission case plug x Transaxle housing		7.4	75	65 in.·lbf
Automatic transmission case plug x Transaxle case		7.4	75	65 in.·lbf
Parking lock pawl bracket x Transaxle case		20	205	15
Manual detent spring x Transaxle case	Bolt A	20	205	15
	Bolt B	12	120	9
Transmission wire x Transaxle housing		5.4	55	48 in.·lbf
Transmission valve body x Transaxle case		11	110	8
ATF temperature sensor clamp x Transmission valve body		6.6	67	58 in·lbf
Valve body oil strainer assy x Transmission valve body		11	110	8
Automatic transaxle oil pan sub-assy x Transaxle case		7.8	80	69 in.·lbf
Drain plug x Automatic transaxle oil pan sub-assy		49	500	36
Speed sensor x Transaxle case		11	115	8
Oil cooler tube union x Transaxle case	Union	27	276	20
	Elbow	27	276	20
Park/neutral start switch x nut		6.9	70	61 in.·lbf
Park/neutral start switch x Bolt		5.4	55	48 in.·lbf
Park/neutral start switch x Control shaft lever		13	130	9
Speedometer driven hole cover sub-assy x Transaxle case		6.9	70	61
Oil pump body x Stator shaft assy		9.8	100	87 in.·lbf
Line pressure control solenoid assy x Transmission valve body assy		6.6	67	58 in.·lbf
Shift solenoid valve SL1x Transmission valve body assy		6.6	67	58 in.·lbf
Shift solenoid valve SL2x Transmission valve body assy		10.8	110	8
Shift solenoid valve SL3x Transmission valve body assy		6.6	67	58 in.·lbf
Shift solenoid valve S4x Transmission valve body assy		10.8	110	8
Shift solenoid valve DSL x Transmission valve body assy		10.8	110	8
Front differential case x Front differential ring gear		95.1	970	70

AUTOMATIC TRANSMISSION / TRANSAXLE (U151E/U151F)

4010I-01

COMPONENTS

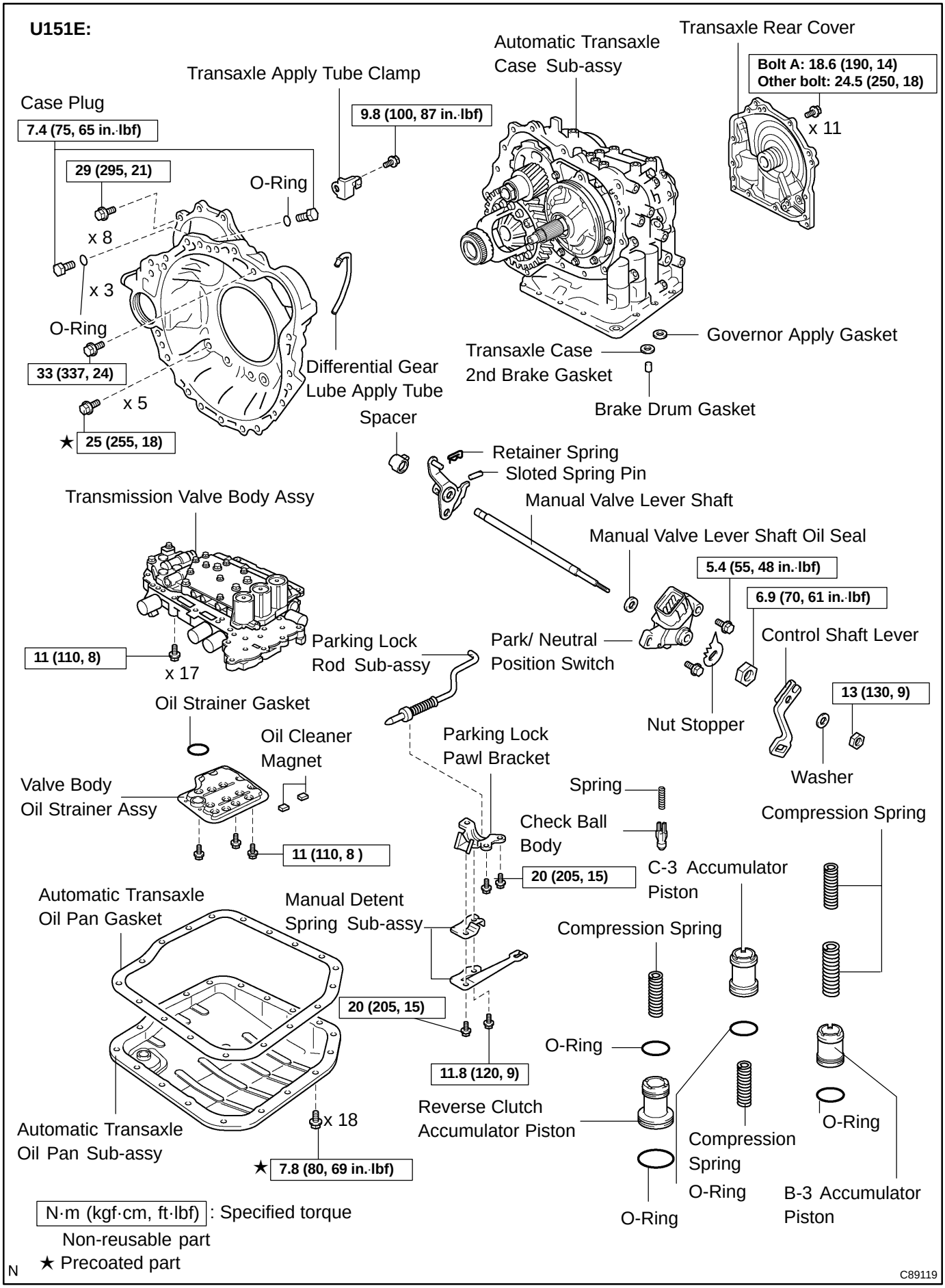
U151E:

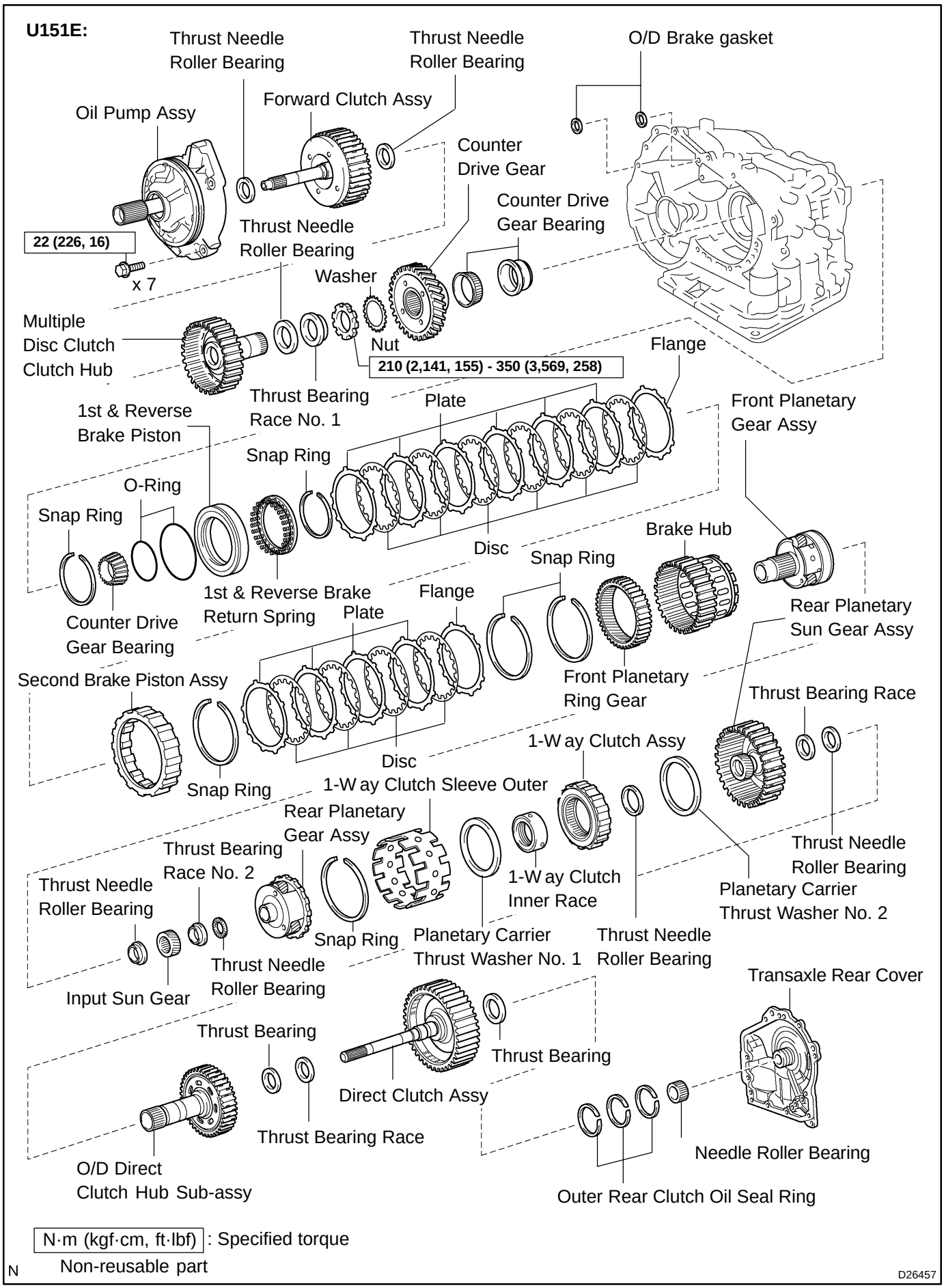


N·m (kgf·cm, ft·lbf) : Specified torque

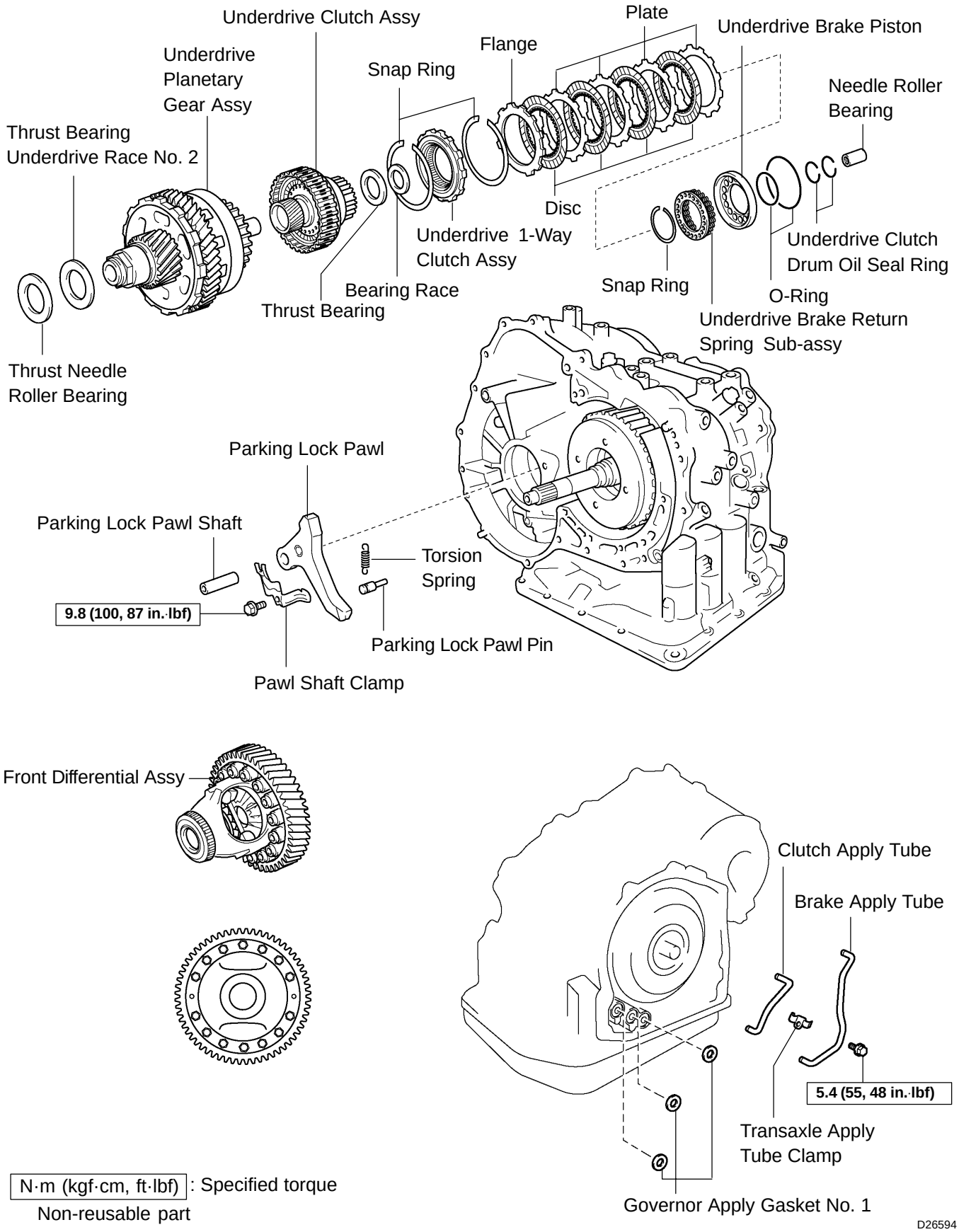
Non-reusable part

C86320


U151E:
Transaxle Rear Cover
Automatic Transaxle Case Sub-assy
Transaxle Apply Tube Clamp
Bolt A: 18.6 (190, 14)
Other bolt: 24.5 (250, 18)
Case Plug
7.4 (75, 65 in.·lbf)
9.8 (100, 87 in.·lbf)
x 11
29 (295, 21)
O-Ring
x 8
x 3
O-Ring
33 (337, 24)
x 5
★ 25 (255, 18)
Differential Gear Lube Apply Tube
Governor Apply Gasket
Transaxle Case 2nd Brake Gasket
Brake Drum Gasket
Spacer
Retainer Spring
Sloted Spring Pin
Manual Valve Lever Shaft
Transmission Valve Body Assy
Manual Valve Lever Shaft Oil Seal
5.4 (55, 48 in.·lbf)
6.9 (70, 61 in.·lbf)
11 (110, 8)
x 17
Parking Lock Rod Sub-assy
Park/ Neutral Position Switch
Control Shaft Lever
13 (130, 9)
Oil Strainer Gasket
Nut Stopper
Washer
Oil Cleaner Magnet
Parking Lock Pawl Bracket
Valve Body Oil Strainer Assy
Spring
Check Ball
Body
Compression Spring
11 (110, 8)
20 (205, 15)
C-3 Accumulator Piston
Automatic Transaxle Oil Pan Gasket
Manual Detent Spring Sub-assy
Compression Spring
20 (205, 15)
O-Ring
11.8 (120, 9)
Reverse Clutch Accumulator Piston
O-Ring
x 18
Automatic Transaxle Oil Pan Sub-assy
★ 7.8 (80, 69 in.·lbf)
Compression Spring
O-Ring
O-Ring
B-3 Accumulator Piston
O-Ring
N·m (kgf·cm, ft·lbf) : Specified torque
Non-reusable part
★ Precoated part
N
C89119


U151E:
Thrust Needle Roller Bearing
Thrust Needle Roller Bearing
O/D Brake gasket
Forward Clutch Assy
Oil Pump Assy
Counter Drive Gear
Counter Drive Gear Bearing
22 (226, 16)
x 7
Thrust Needle Roller Bearing
Washer
Multiple Disc Clutch Clutch Hub
Nut
210 (2,141, 155) - 350 (3,569, 258)
Flange
Thrust Bearing Race No. 1
Plate
1st & Reverse Brake Piston
Front Planetary Gear Assy
Snap Ring
O-Ring
Snap Ring
Brake Hub
Disc
Snap Ring
1st & Reverse Brake Return Spring
Flange
Plate
Rear Planetary Sun Gear Assy
Counter Drive Gear Bearing
Second Brake Piston Assy
Front Planetary Ring Gear
Thrust Bearing Race
1-Way Clutch Assy
Disc
Snap Ring
1-Way Clutch Sleeve Outer
Rear Planetary Gear Assy
Thrust Needle Roller Bearing
Thrust Bearing Race No. 2
1-Way Clutch Inner Race
Thrust Needle Roller Bearing
Planetary Carrier Thrust Washer No. 2
Snap Ring
Planetary Carrier Thrust Washer No. 1
Thrust Needle Roller Bearing
Thrust Needle Roller Bearing
Input Sun Gear
Transaxle Rear Cover
Thrust Bearing
Thrust Bearing
Direct Clutch Assy
Thrust Bearing Race
Needle Roller Bearing
O/D Direct Clutch Hub Sub-assy
Outer Rear Clutch Oil Seal Ring
N·m (kgf·cm, ft·lbf) : Specified torque
N Non-reusable part
D26457

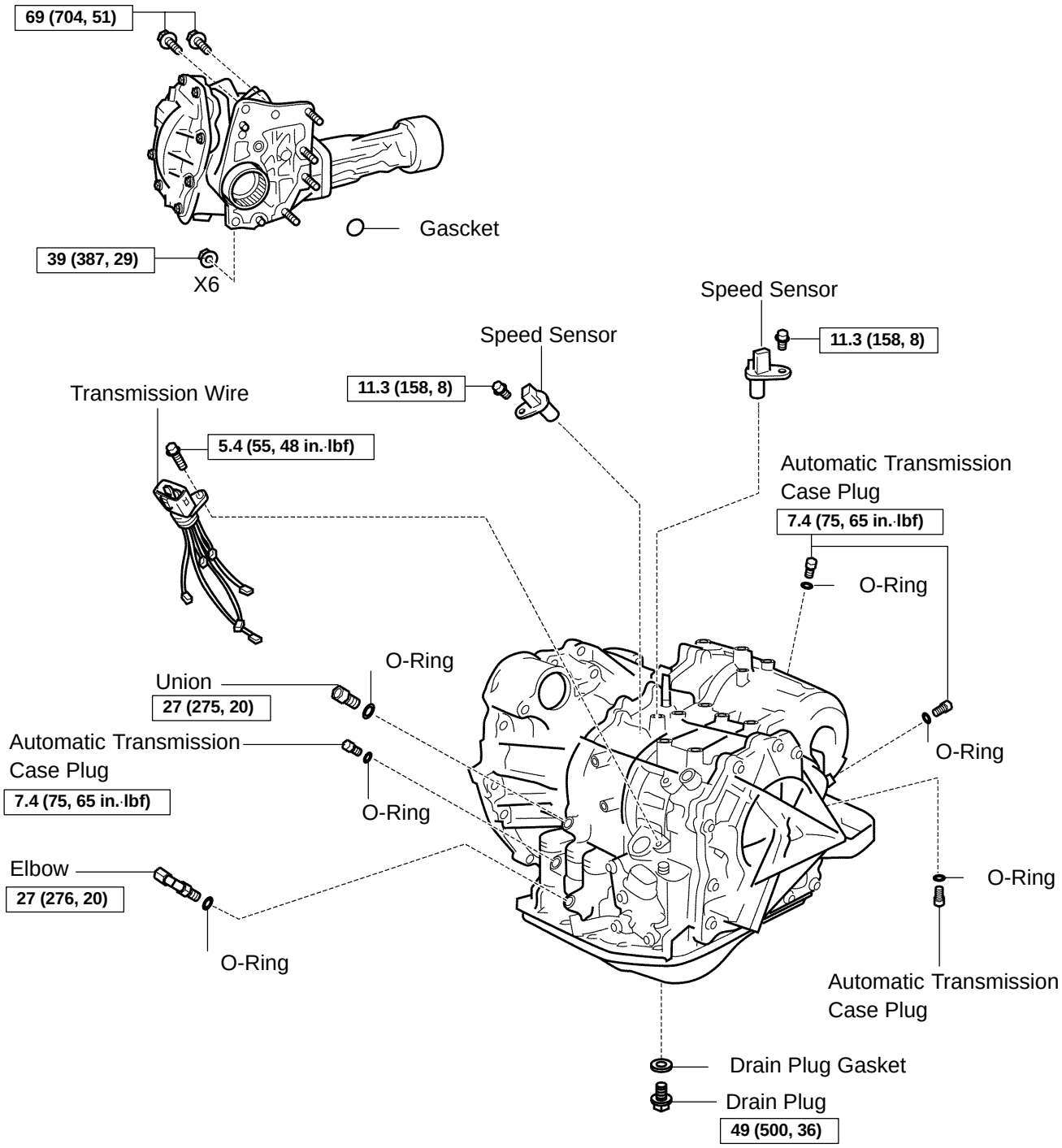
U151E:



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

Non-reusable part

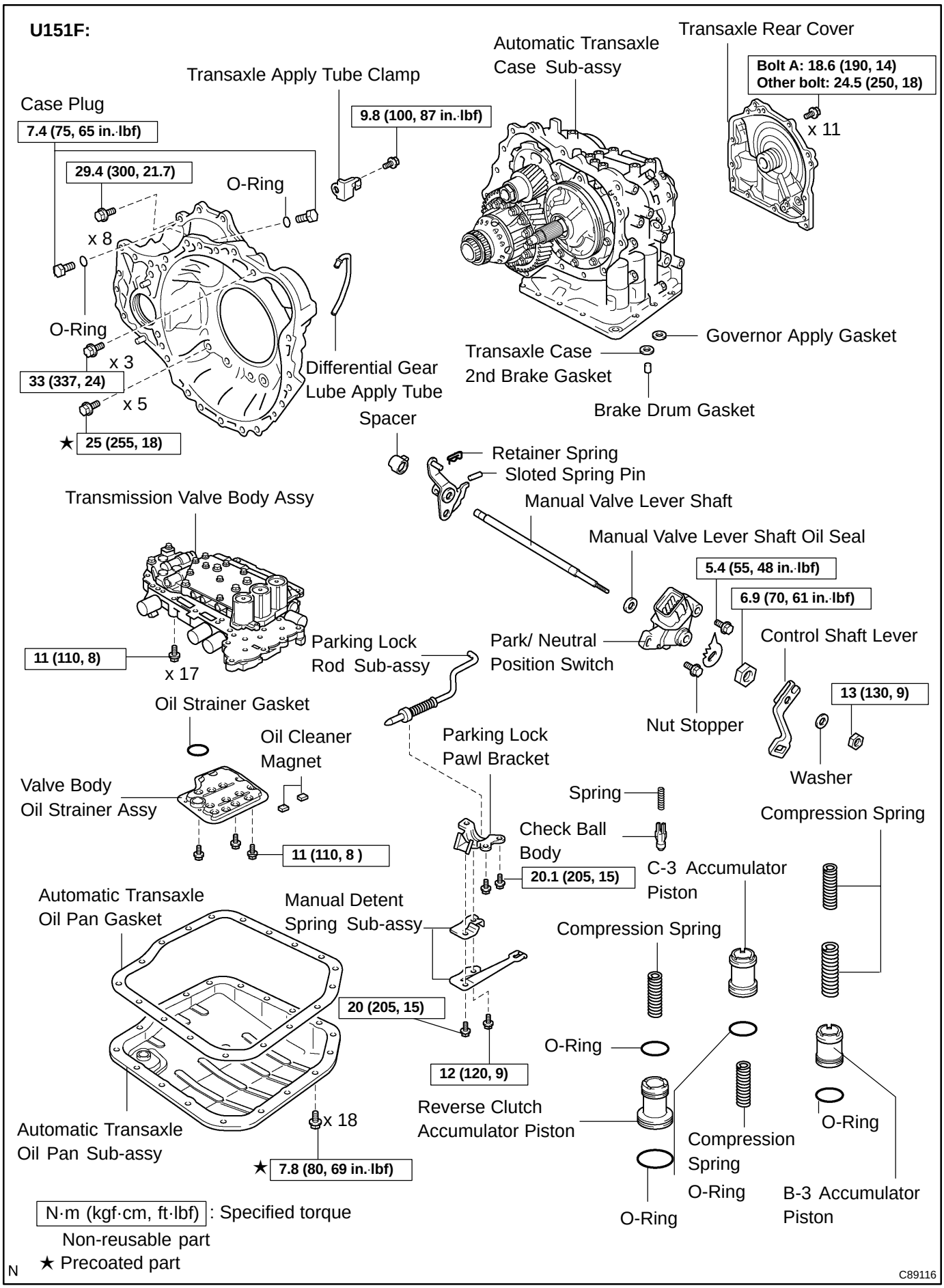
U151F:

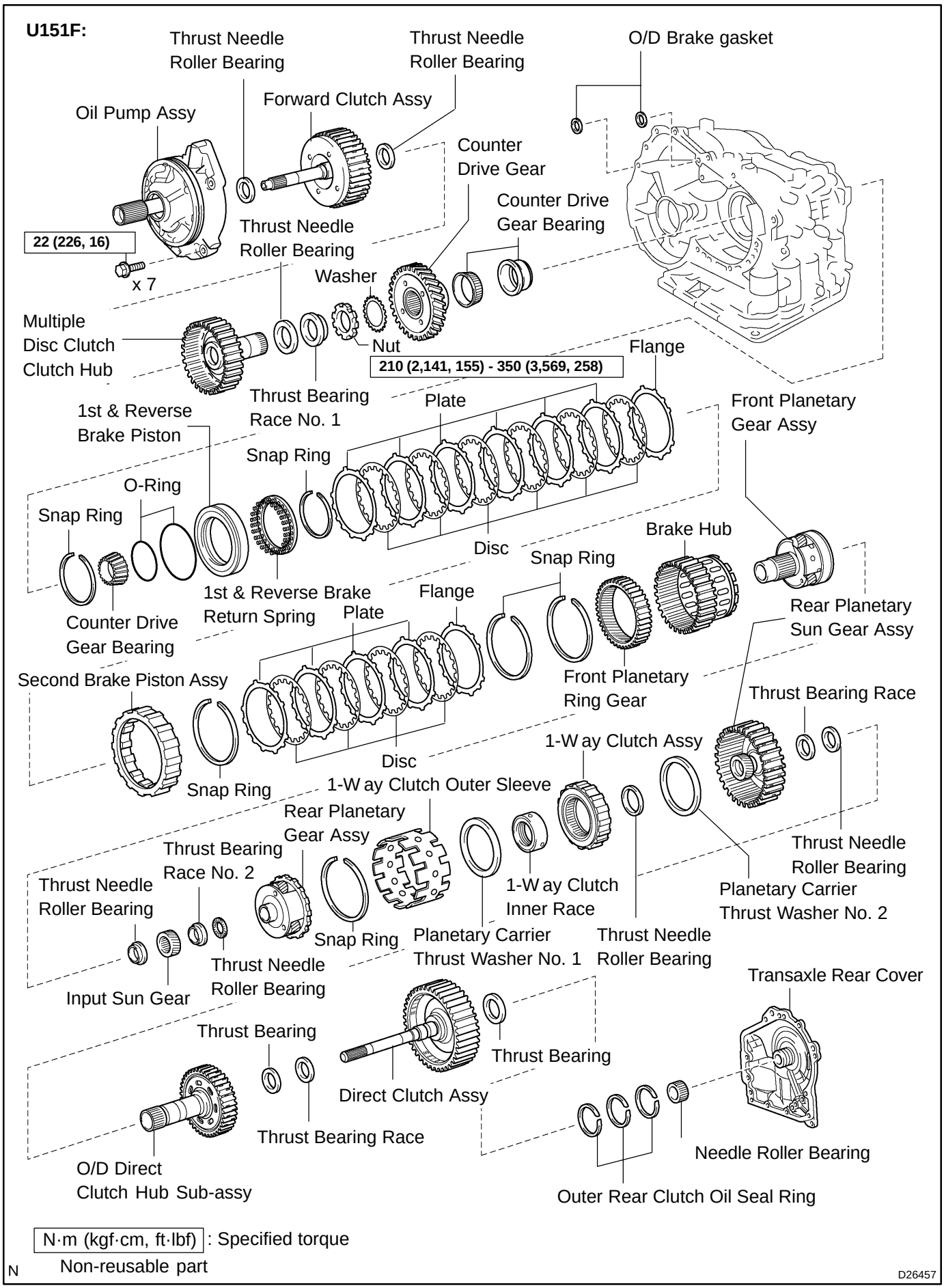


N·m (kgf·cm, ft·lbf) : Specified torque

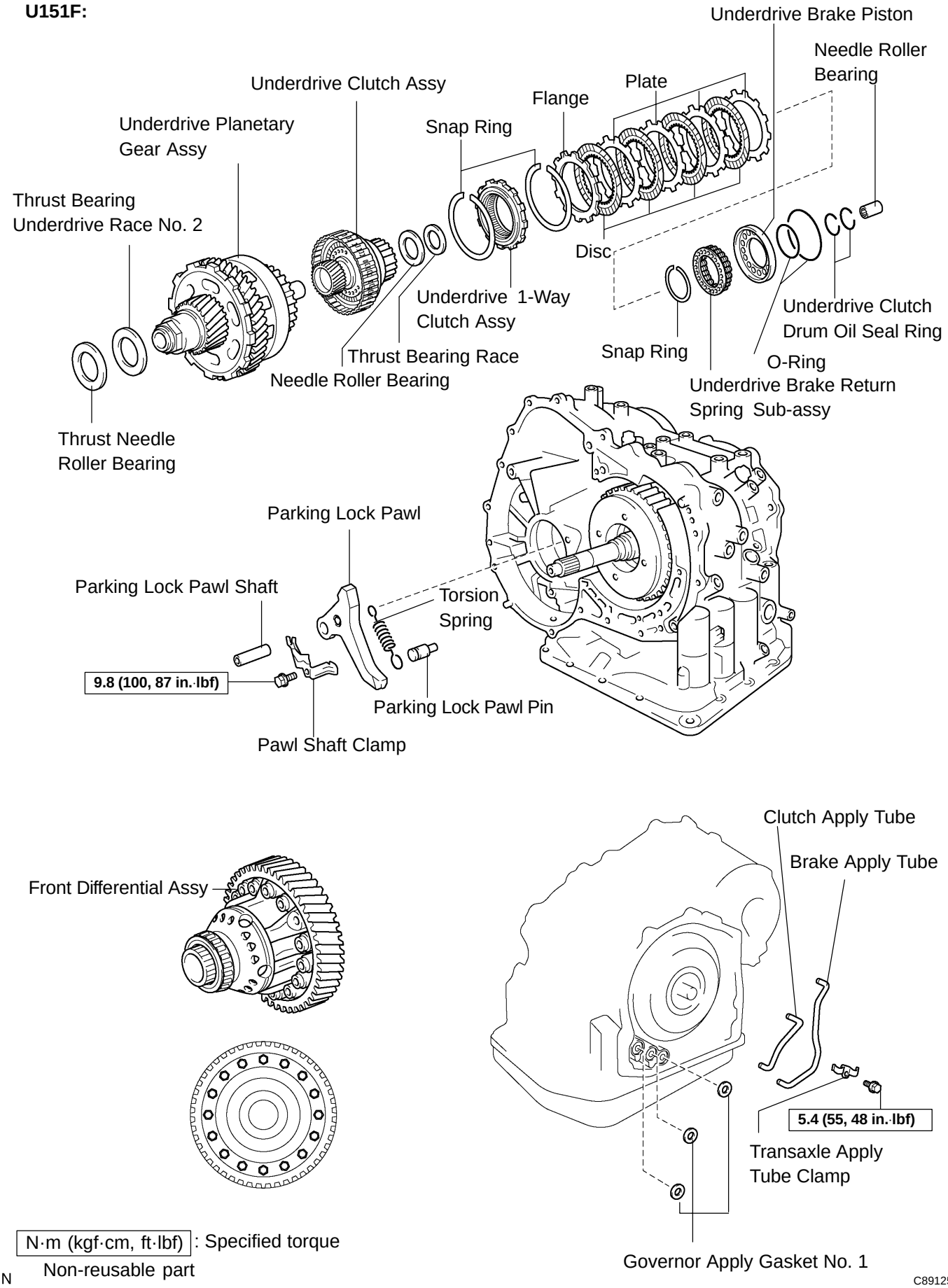
Non-reusable part

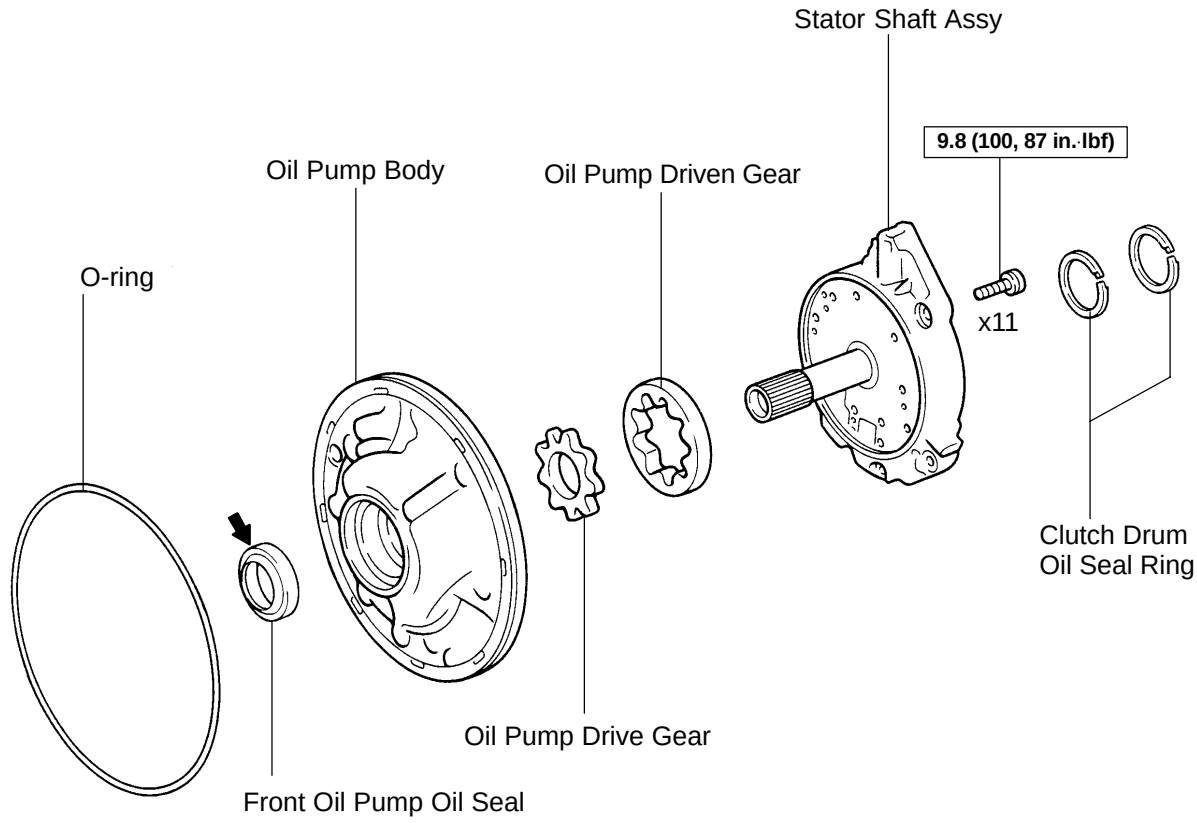
C86315


U151F:
Transaxle Rear Cover
Automatic Transaxle Case Sub-assy
Transaxle Apply Tube Clamp
Bolt A: 18.6 (190, 14)
Other bolt: 24.5 (250, 18)
Case Plug
7.4 (75, 65 in.·lbf)
9.8 (100, 87 in.·lbf)
x 11
29.4 (300, 21.7)
O-Ring
x 8
O-Ring
x 3
33 (337, 24)
x 5
★ 25 (255, 18)
Differential Gear Lube Apply Tube
Governor Apply Gasket
Transaxle Case 2nd Brake Gasket
Brake Drum Gasket
Spacer
Retainer Spring
Sloted Spring Pin
Manual Valve Lever Shaft
Transmission Valve Body Assy
Manual Valve Lever Shaft Oil Seal
5.4 (55, 48 in.·lbf)
6.9 (70, 61 in.·lbf)
11 (110, 8)
x 17
Parking Lock Rod Sub-assy
Park/ Neutral Position Switch
Control Shaft Lever
13 (130, 9)
Oil Strainer Gasket
Oil Cleaner Magnet
Nut Stopper
Washer
Parking Lock Pawl Bracket
Valve Body Oil Strainer Assy
Spring
Compression Spring
Check Ball
Body
11 (110, 8)
20.1 (205, 15)
C-3 Accumulator Piston
Automatic Transaxle Oil Pan Gasket
Manual Detent Spring Sub-assy
Compression Spring
20 (205, 15)
O-Ring
12 (120, 9)
Reverse Clutch Accumulator Piston
O-Ring
x 18
Automatic Transaxle Oil Pan Sub-assy
★ 7.8 (80, 69 in.·lbf)
Compression Spring
O-Ring
O-Ring
B-3 Accumulator Piston
N·m (kgf·cm, ft·lbf) : Specified torque
Non-reusable part
★ Precoated part
N
C89116


U151F:
Thrust Needle Roller Bearing
Thrust Needle Roller Bearing
O/D Brake gasket
Oil Pump Assy
Forward Clutch Assy
Counter Drive Gear
Counter Drive Gear Bearing
22 (226, 16)
x 7
Thrust Needle Roller Bearing
Washer
Multiple Disc Clutch Clutch Hub
Nut
210 (2,141, 155) - 350 (3,569, 258)
Flange
Thrust Bearing Race No. 1
Plate
Front Planetary Gear Assy
1st & Reverse Brake Piston
Snap Ring
O-Ring
Snap Ring
Brake Hub
Disc
Snap Ring
1st & Reverse Brake Return Spring
Flange
Plate
Rear Planetary Sun Gear Assy
Counter Drive Gear Bearing
Second Brake Piston Assy
Front Planetary Ring Gear
Thrust Bearing Race
1-Way Clutch Assy
Disc
Snap Ring
1-Way Clutch Outer Sleeve
Rear Planetary Gear Assy
Thrust Needle Roller Bearing
Thrust Bearing Race No. 2
Thrust Needle Roller Bearing
1-Way Clutch Inner Race
Planetary Carrier Thrust Washer No. 2
Snap Ring
Planetary Carrier Thrust Washer No. 1
Thrust Needle Roller Bearing
Input Sun Gear
Thrust Needle Roller Bearing
Transaxle Rear Cover
Thrust Bearing
Thrust Bearing
Direct Clutch Assy
Thrust Bearing Race
Needle Roller Bearing
O/D Direct Clutch Hub Sub-assy
Outer Rear Clutch Oil Seal Ring
N·m (kgf·cm, ft·lbf) : Specified torque
N Non-reusable part
D26457

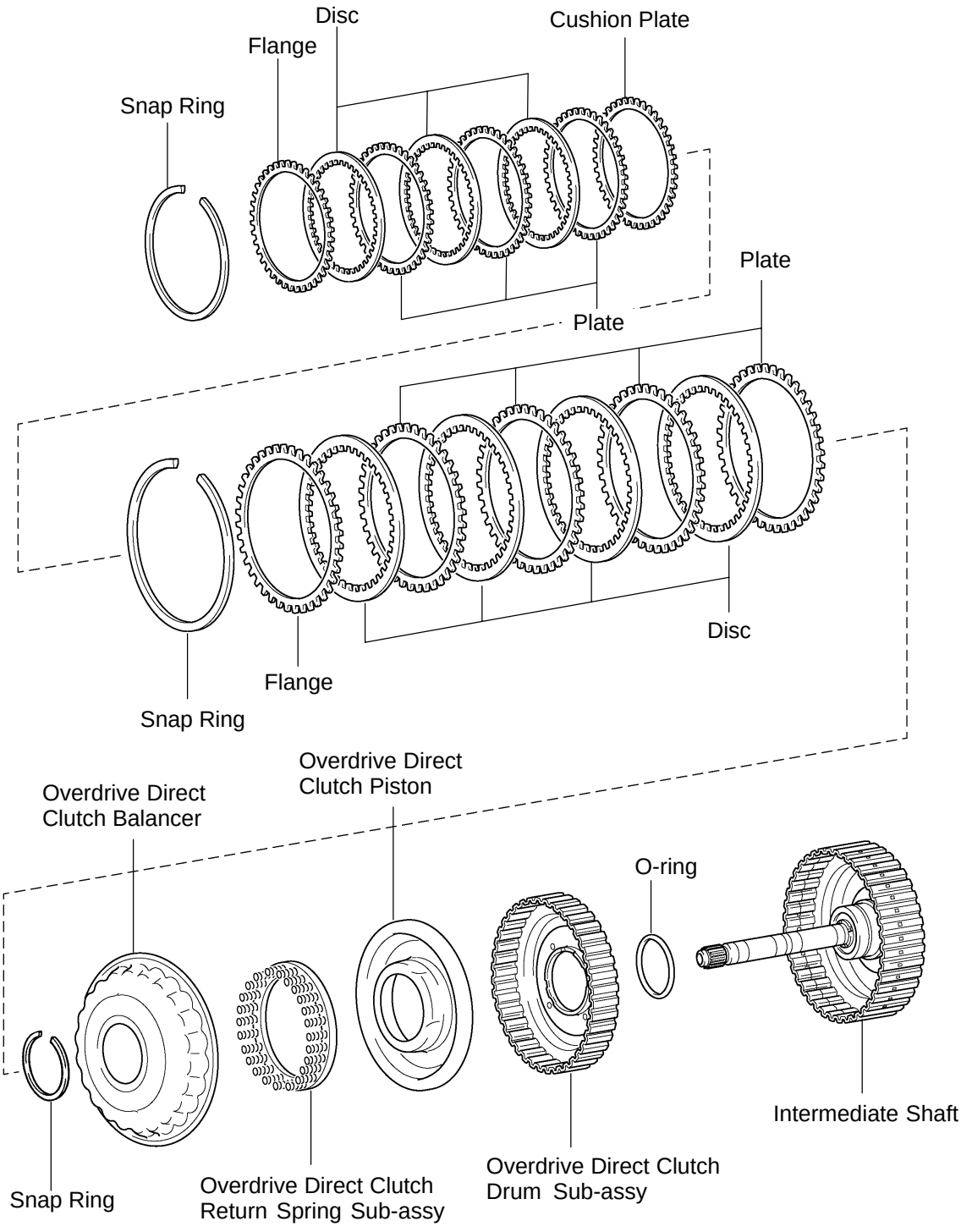
U151F:

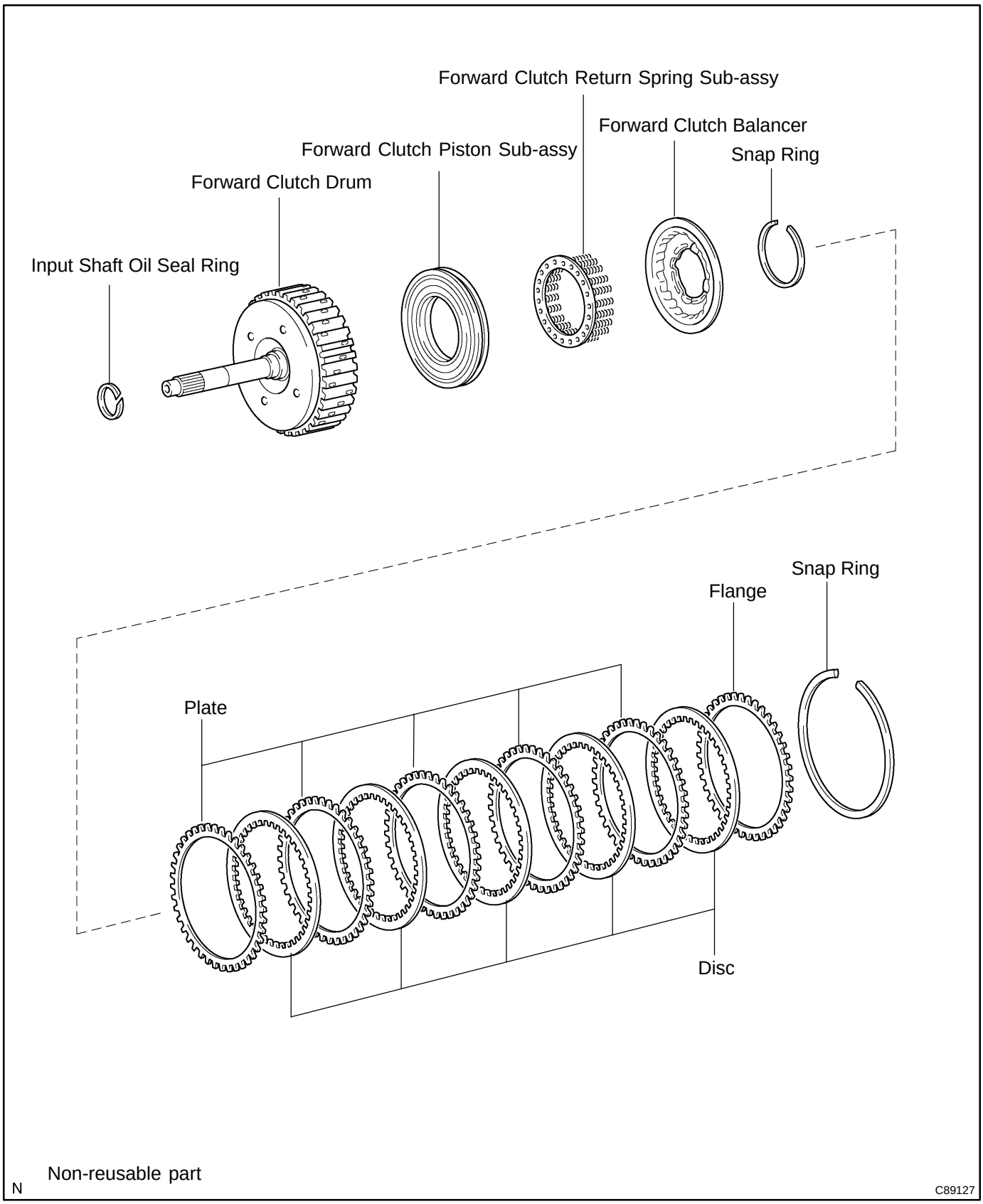

Underdrive Brake Piston
Needle Roller Bearing
Underdrive Clutch Assy
Plate
Flange
Underdrive Planetary Gear Assy
Snap Ring
Thrust Bearing Underdrive Race No. 2
Disc
Underdrive 1-Way Clutch Assy
Underdrive Clutch Drum Oil Seal Ring
Thrust Bearing Race
Snap Ring
O-Ring
Needle Roller Bearing
Underdrive Brake Return Spring Sub-assy
Thrust Needle Roller Bearing
Parking Lock Pawl
Parking Lock Pawl Shaft
Torsion Spring
9.8 (100, 87 in.·lbf)
Parking Lock Pawl Pin
Pawl Shaft Clamp
Front Differential Assy
Clutch Apply Tube
Brake Apply Tube
5.4 (55, 48 in.·lbf)
Transaxle Apply Tube Clamp
Governor Apply Gasket No. 1
N·m (kgf·cm, ft·lbf) : Specified torque
N Non-reusable part
C89125

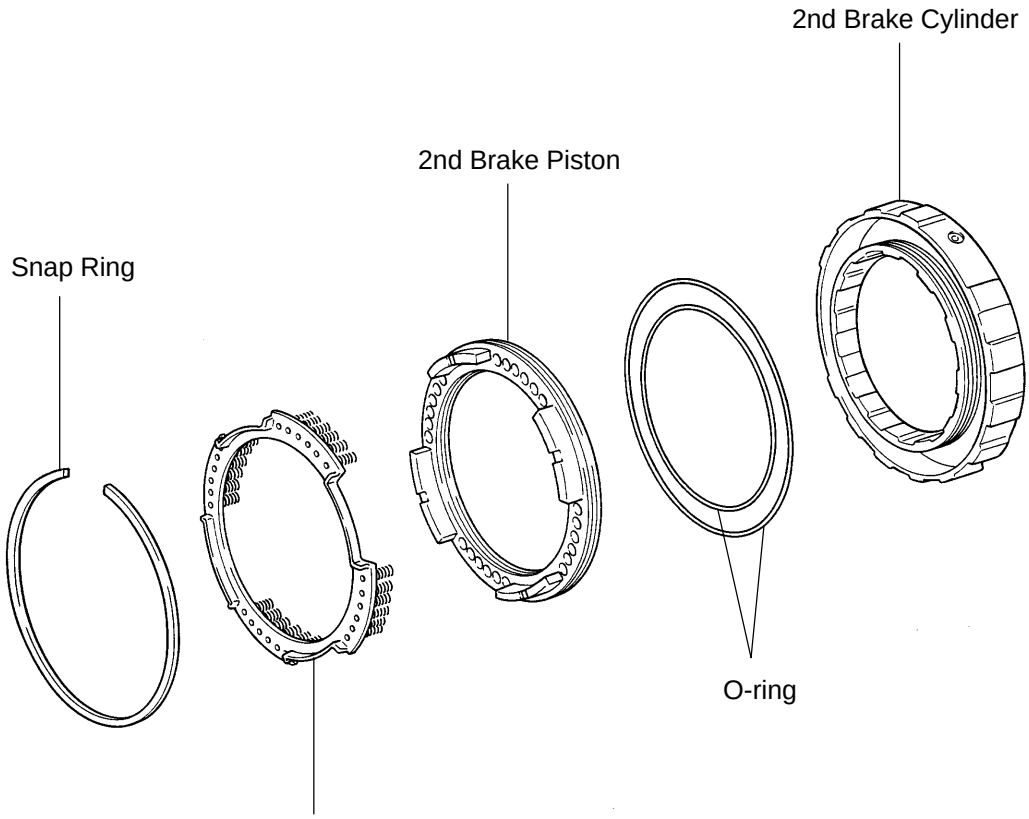


N·m (kgf·cm, ft·lbf) : Specified torque
Non-reusable part
Apply petroleum jelly

D03643


Disc
Flange
Cushion Plate
Snap Ring
Plate
Plate
Disc
Flange
Snap Ring
Overdrive Direct Clutch Piston
Overdrive Direct Clutch Balancer
O-ring
Intermediate Shaft
Snap Ring
Overdrive Direct Clutch Return Spring Sub-assy
Overdrive Direct Clutch Drum Sub-assy
N
Non-reusable part
D26471

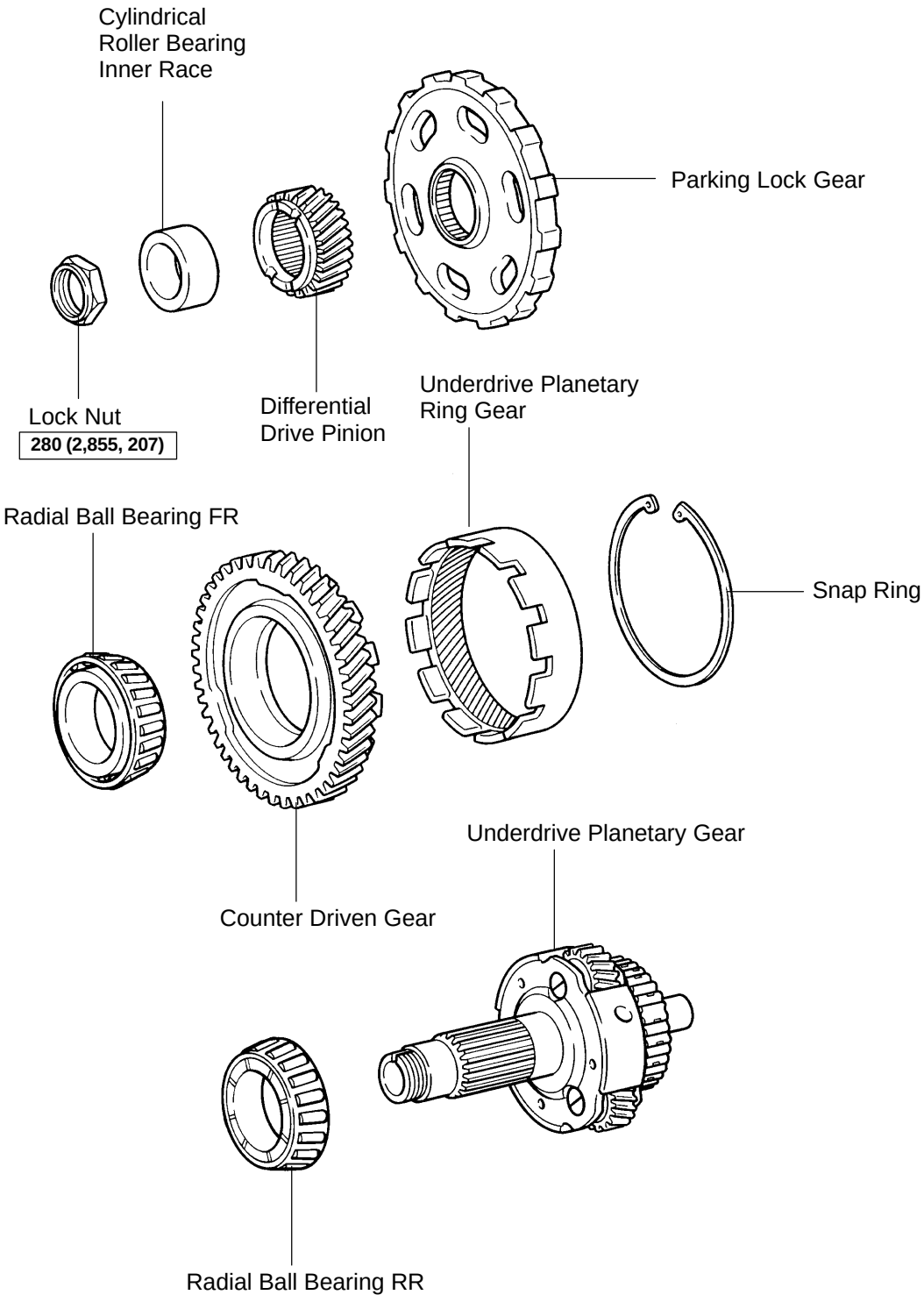

Forward Clutch Return Spring Sub-assy
Forward Clutch Balancer
Forward Clutch Piston Sub-assy
Snap Ring
Forward Clutch Drum
Input Shaft Oil Seal Ring
Snap Ring
Flange
Plate
Disc
N
Non-reusable part
C89127



Non-reusable part

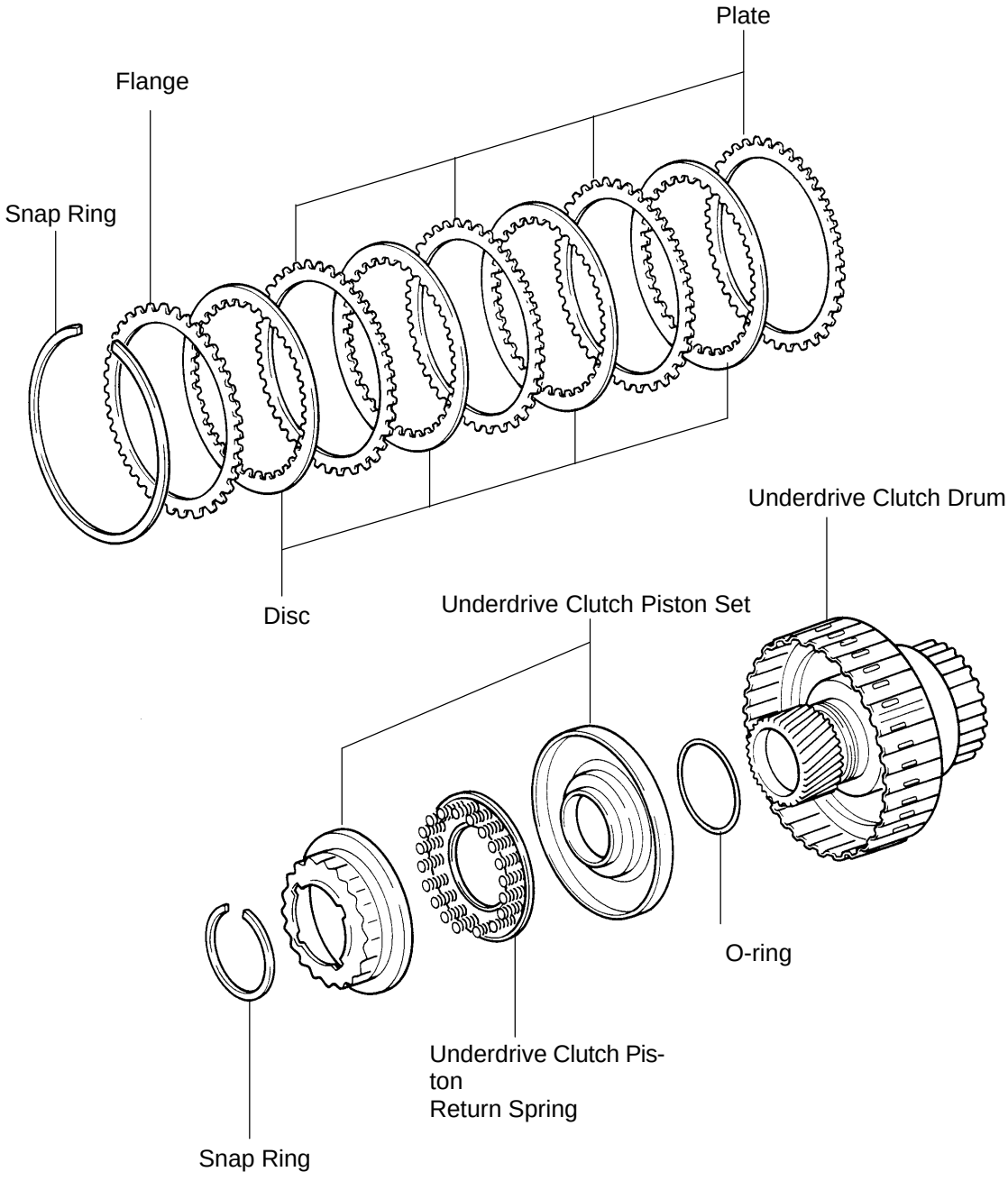
N

D26702



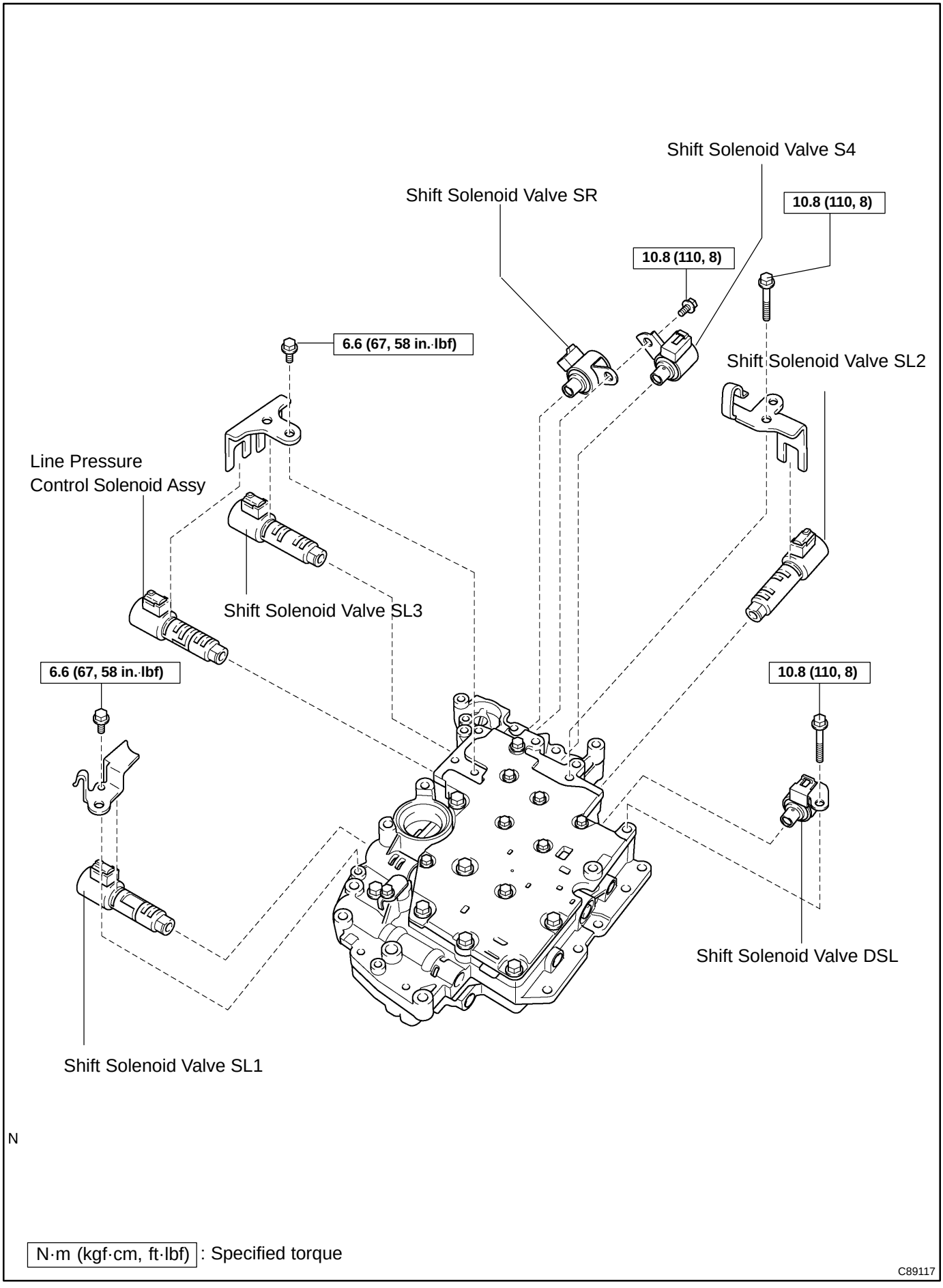
N·m (kgf·cm, ft·lbf) : Specified torque
Non-reusable part

D03683

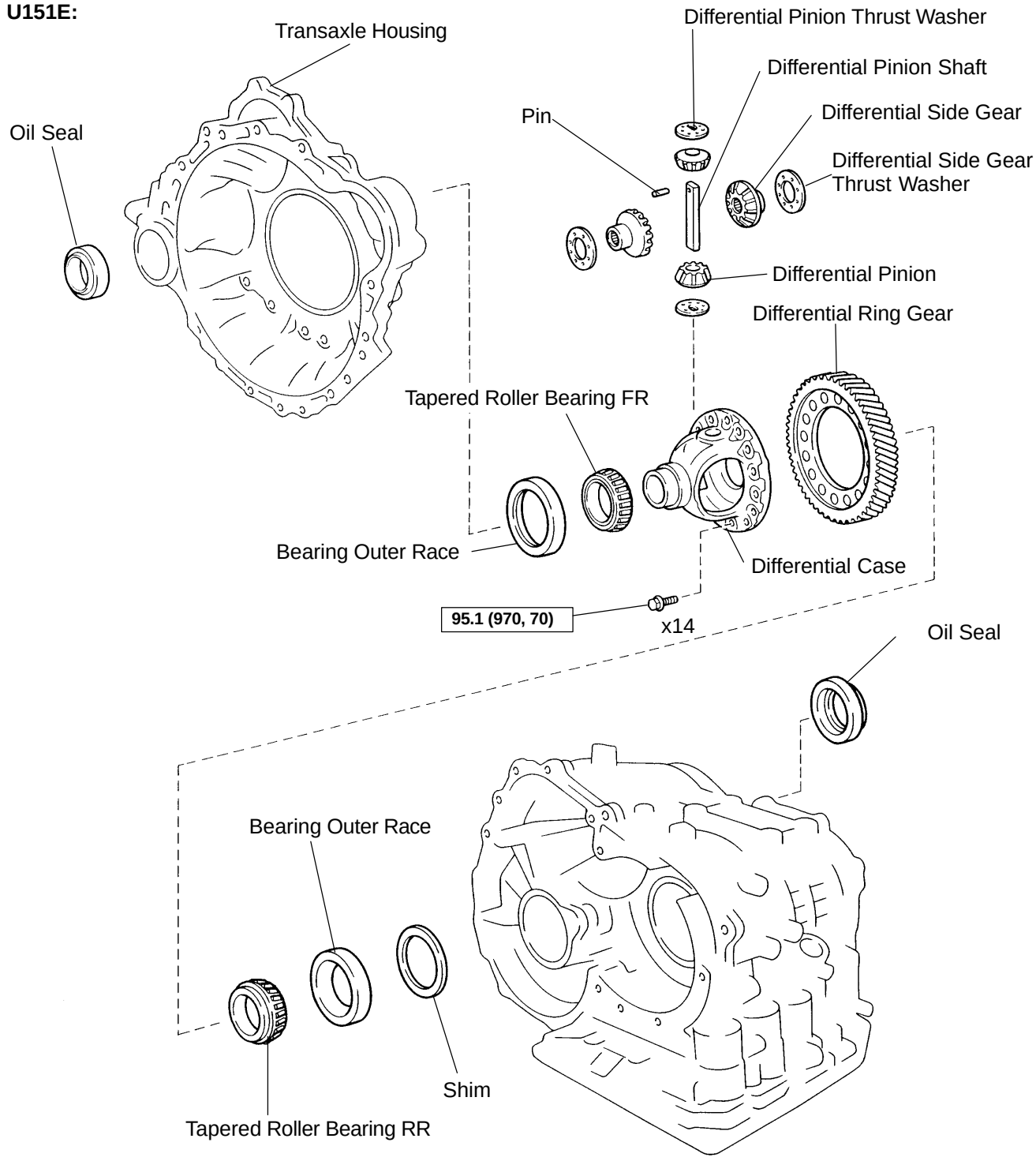


Non-reusable part

D03697


Shift Solenoid Valve S4
Shift Solenoid Valve SR
10.8 (110, 8)
10.8 (110, 8)
6.6 (67, 58 in.·lbf)
Shift Solenoid Valve SL2
Line Pressure
Control Solenoid Assy
Shift Solenoid Valve SL3
6.6 (67, 58 in.·lbf)
10.8 (110, 8)
Shift Solenoid Valve DSL
Shift Solenoid Valve SL1
N
N·m (kgf·cm, ft·lbf) : Specified torque
C89117

U151E:

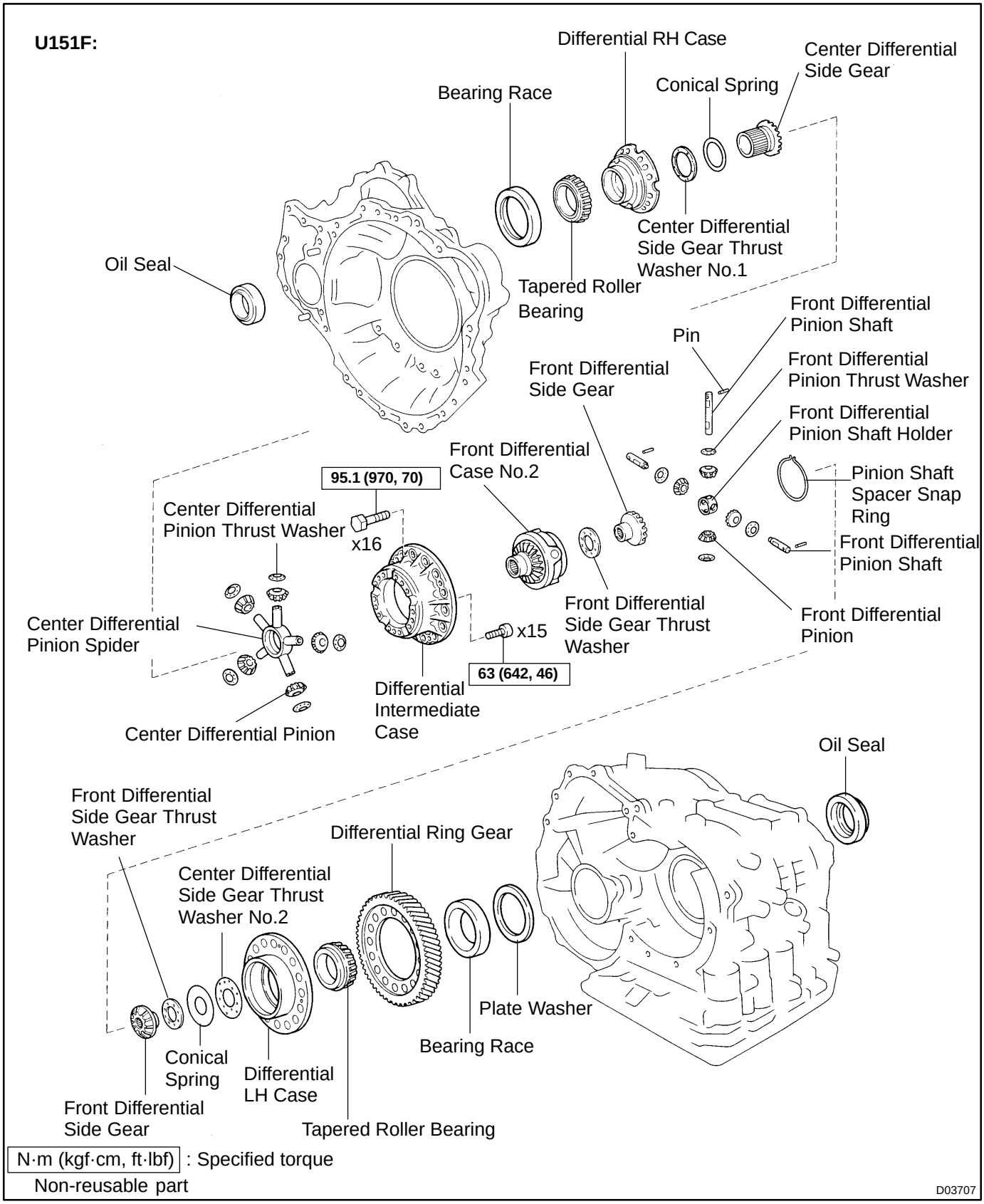


N·m (kgf·cm, ft·lbf) : Specified torque

Non-reusable part

D03761

U151F:


Differential RH Case
Center Differential Side Gear
Conical Spring
Bearing Race
Oil Seal
Center Differential Side Gear Thrust Washer No.1
Tapered Roller Bearing
Front Differential Pinion Shaft
Pin
Front Differential Pinion Thrust Washer
Front Differential Side Gear
Front Differential Pinion Shaft Holder
Front Differential Case No.2
95.1 (970, 70)
Pinion Shaft Spacer Snap Ring
Center Differential Pinion Thrust Washer
x16
Front Differential Pinion Shaft
Center Differential Pinion Spider
Front Differential Side Gear Thrust Washer
Front Differential Pinion
x15
63 (642, 46)
Differential Intermediate Case
Center Differential Pinion
Oil Seal
Front Differential Side Gear Thrust Washer
Differential Ring Gear
Center Differential Side Gear Thrust Washer No.2
Plate Washer
Bearing Race
Conical Spring
Differential LH Case
Front Differential Side Gear
Tapered Roller Bearing
N·m (kgf·cm, ft·lbf) : Specified torque
Non-reusable part
D03707

AUTOMATIC TRANSAXLE ASSY (U151E/U151F)

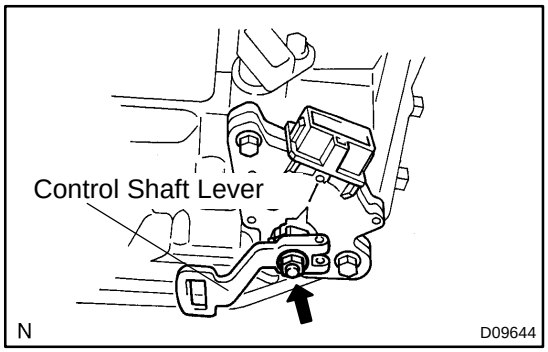
4010K-01

OVERHAUL

1. REMOVE SPEEDOMETER DRIVEN HOLE (ATM) COVER SUB-ASSY

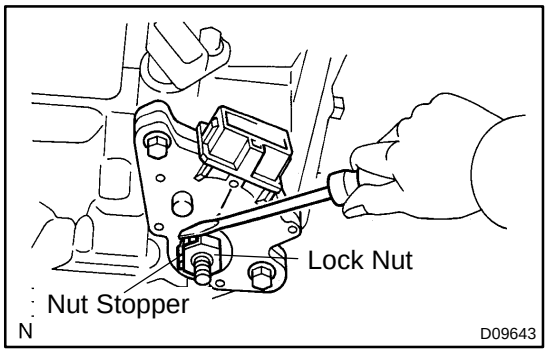
(a) Remove the bolt and speedometer driven hole cover sub-assy from the transaxle assy.

(b) Remove the O-ring from the speedometer driven hole cover.

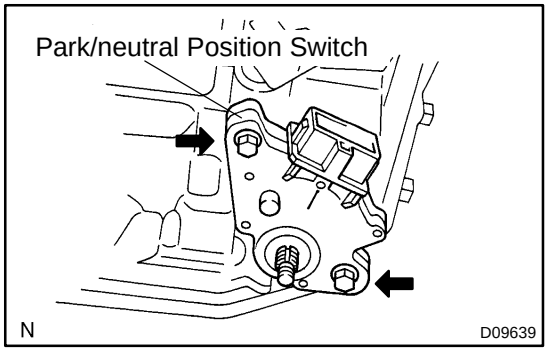


2. REMOVE PARK/NEUTRAL POSITION SWITCH ASSY

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



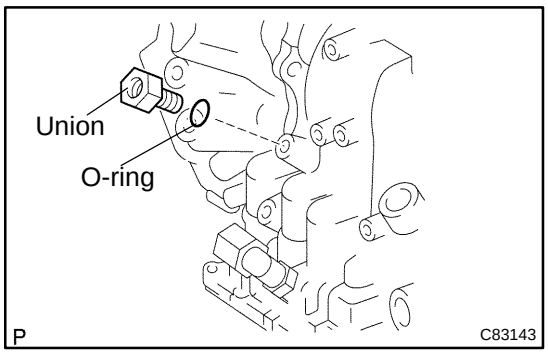
(b) Using a screwdriver, unstake the nut stopper, and remove the lock nut and nut stopper.



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

3. REMOVE BREATHER PLUG HOSE

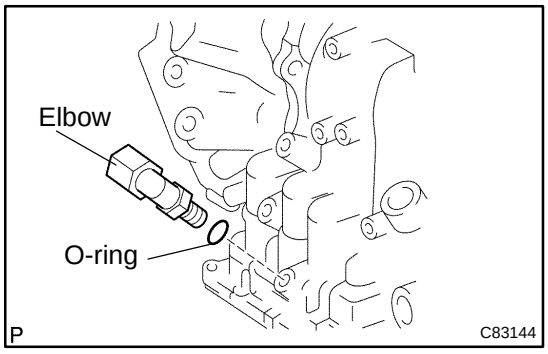
(a) Remove the breather plug hose from the transaxle case.



4. REMOVE OIL COOLER TUBE UNION (INLET OIL COOLER UNION)

(a) Remove the union.

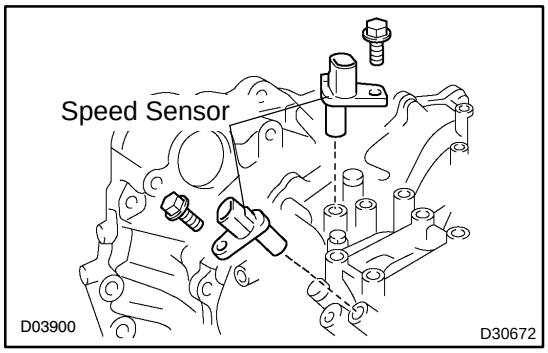
(b) Remove the O-ring from the union.



5. REMOVE OIL COOLER TUBE UNION (OUTLET OIL COOLER UNION)

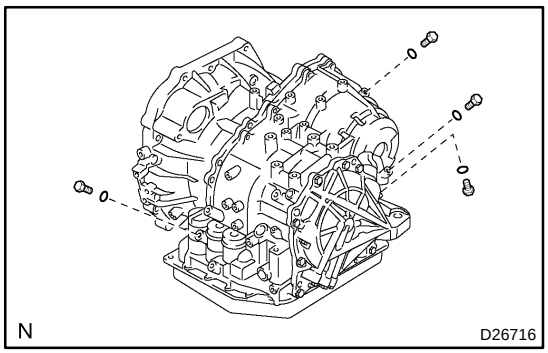
(a) Remove the elbow.

(b) Remove the O-ring from the elbow.



6. REMOVE SPEED SENSOR

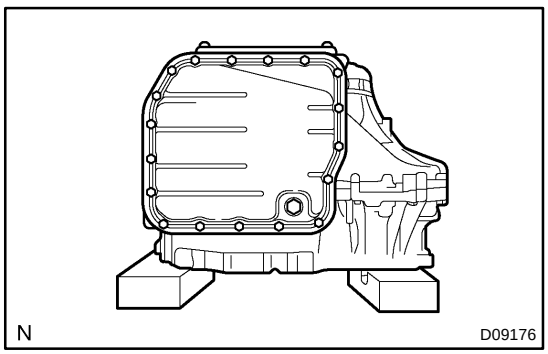
(a) Remove the 2 bolts and the 2 speed sensors from the transaxle assy.



7. REMOVE TRANSAXLE CASE NO.1 PLUG

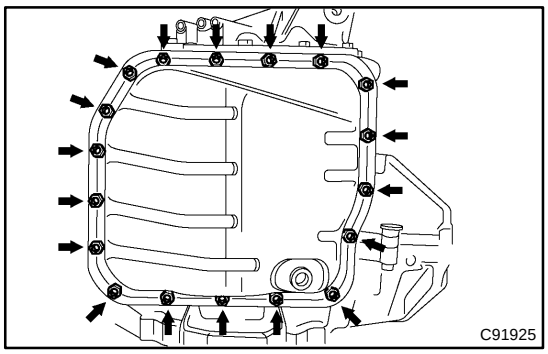
(a) Remove the 4 transaxle case No. 1 plugs from the transaxle case.

(b) Remove the 4 O-rings from the 4 transaxle case No.1 plugs.



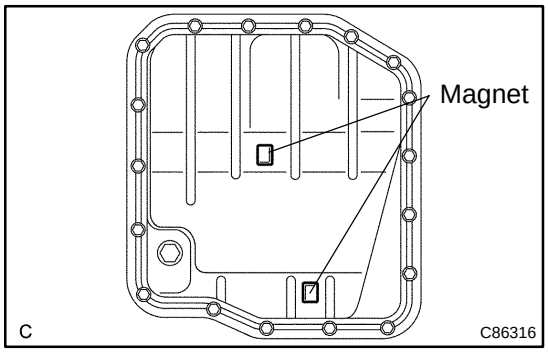
8. FIX AUTOMATIC TRANSAXLE ASSY

(a) Fix the transaxle assy.

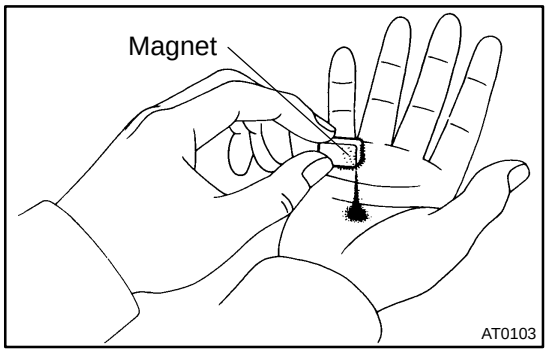


9. REMOVE AUTOMATIC TRANSAXLE OIL PAN SUB-ASSY

(a) Remove the 18 bolts, oil pan and gasket.

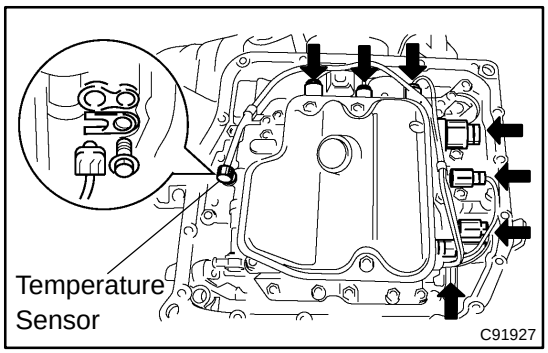


(b) Remove the 2 magnets from the oil pan.



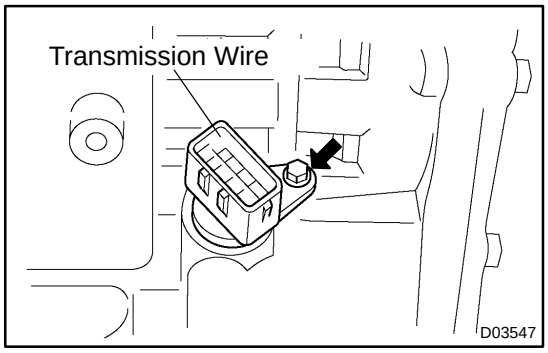
10. INSPECT TRANSMISSION OIL CLEANER MAGNET

(a) Remove the magnets and use them to collect any steel chips. Examine the chips and particles in the pan and on the magnet to determine what type of wear has occurred in the transaxle:
Steel (magnetic).... bearing, gear and plate wear
Brass (non-magnetic).... bushing wear



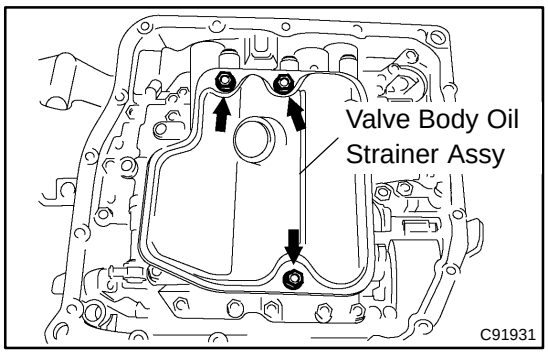
11. DISCONNECT TRANSMISSION WIRE

(a) Remove the 7 connectors from the shift solenoid valves.
(b) Remove the bolt, lock plate and ATF temperature sensor.



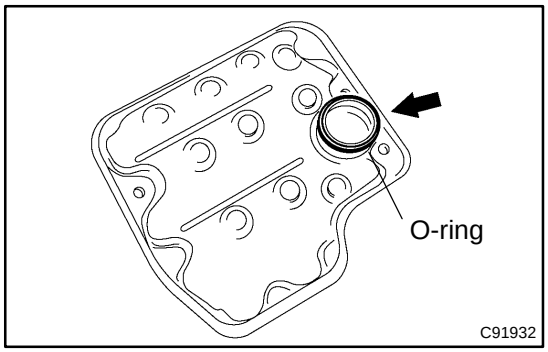
12. REMOVE TRANSMISSION WIRE

(a) Remove the bolt and transmission wire from the transaxle case.

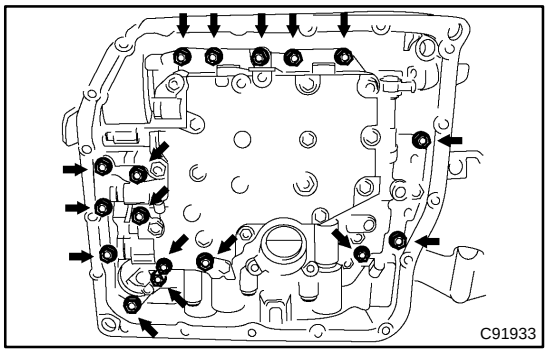


13. REMOVE VALVE BODY OIL STRAINER ASSY

(a) Remove the 3 bolts and oil strainer.

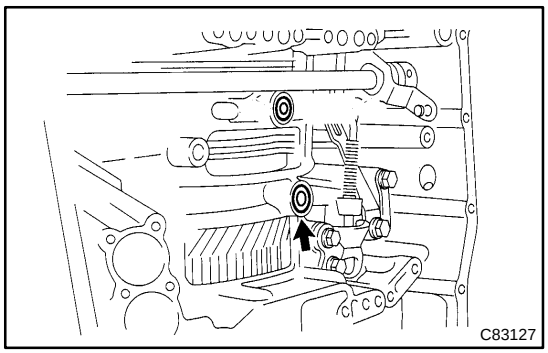


(b) Remove the O-ring from the oil strainer.



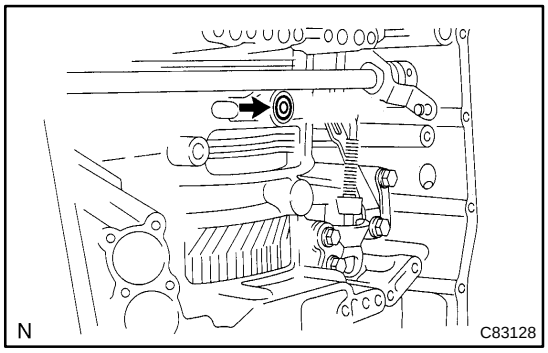
14. REMOVE TRANSMISSION VALVE BODY ASSY

(a) Support the valve body assy and remove the 17 bolts and valve body assy.



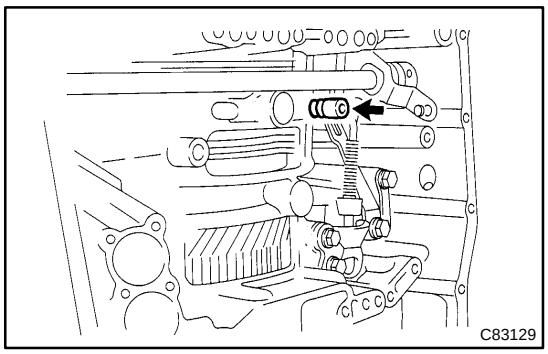
15. REMOVE GOVERNOR APPLY GASKET NO.1

(a) Remove the governor apply gasket No.1 from the transaxle case.



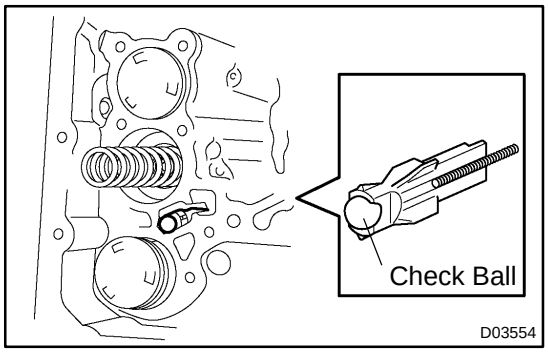
16. REMOVE TRANSAXLE CASE 2ND BRAKE GASKET

(a) Remove the transaxle case 2nd brake gasket from the transaxle case.



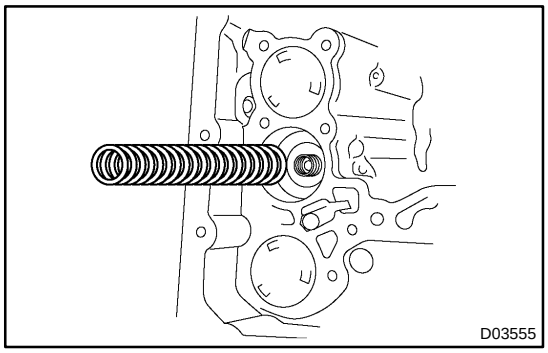
17. REMOVE BRAKE DRUM GASKET

(a) Remove the brake drum gasket from the transaxle case.



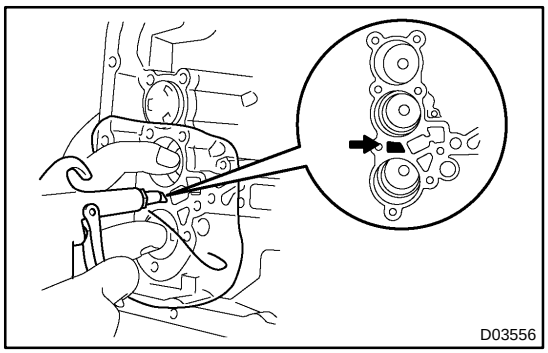
18. REMOVE CHECK BALL BODY

(a) Remove the check ball body and spring from the transaxle case.



19. REMOVE C-3 ACCUMULATOR PISTON

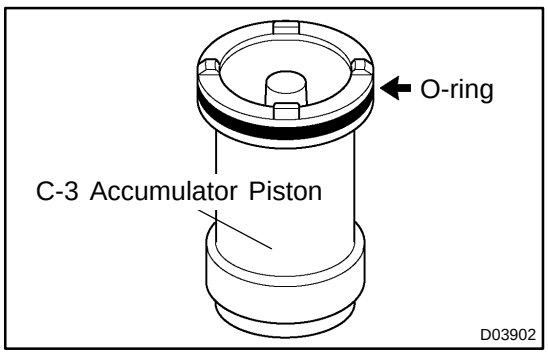
(a) Remove the spring from the C-3 accumulator piston.



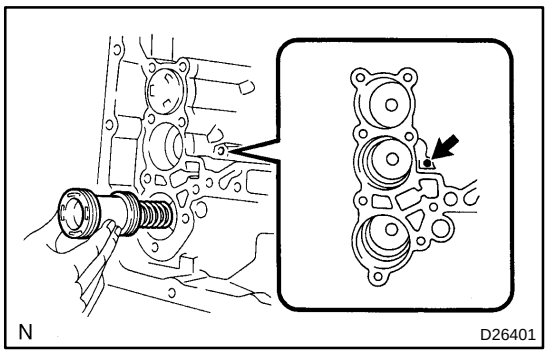
(b) Apply compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi) to the oil hole and remove the C-3 accumulator piston.

NOTICE:

- **Blowing off the air may cause the piston to jump-out. When removing the piston, hold it by your hand using a waste cloth.**
- **Take care not to splash ATF when air-blowing.**



(c) Remove the O-ring from the C-3 accumulator piston.



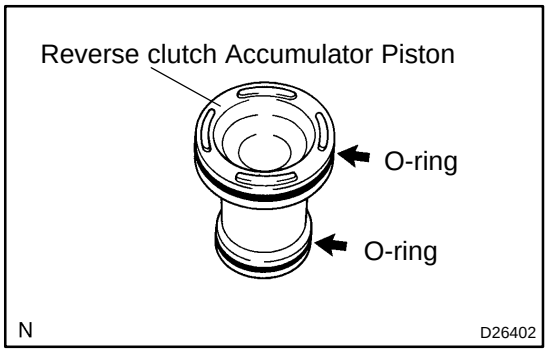
20. REMOVE REVERSE CLUTCH ACCUMULATOR PISTON

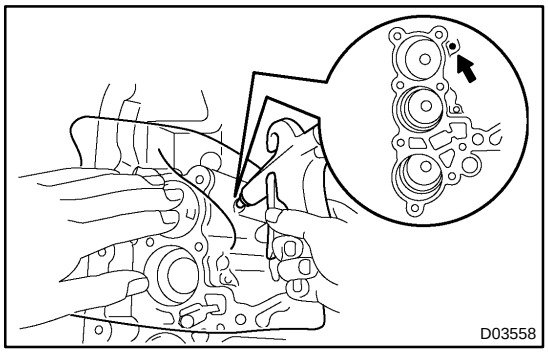
(a) Apply compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi) to the oil hole and remove the reverse accumulator piston and spring.

NOTICE:

- **Blowing off the air may cause the piston to jump-out. When removing the piston, hold it by your hand using a waste cloth.**
- **Take care not to splash ATF when air-blowing.**

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





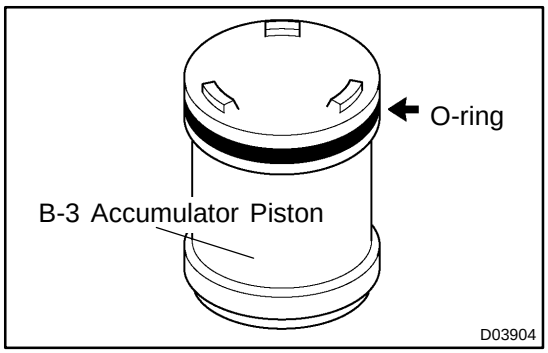
21. REMOVE B-3 ACCUMULATOR PISTON

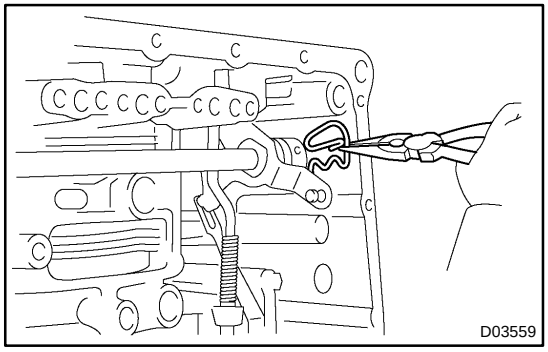
(a) Apply compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi) to the oil hole and remove the B-3 accumulator piston and 2 springs.

NOTICE:

- **Blowing off the air may cause the piston to jump-out. When removing the piston, hold it by your hand using a waste cloth.**
- **Take care not to splash ATF when air-blowing.**

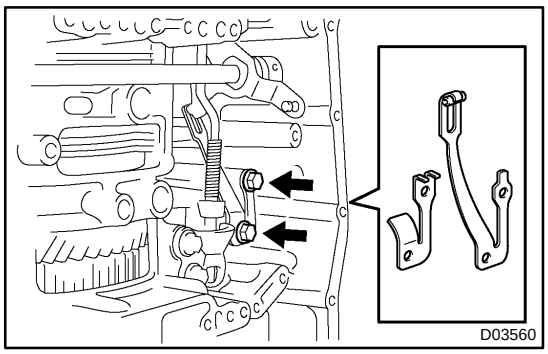
(b) Remove the O-ring from the B-3 accumulator piston.





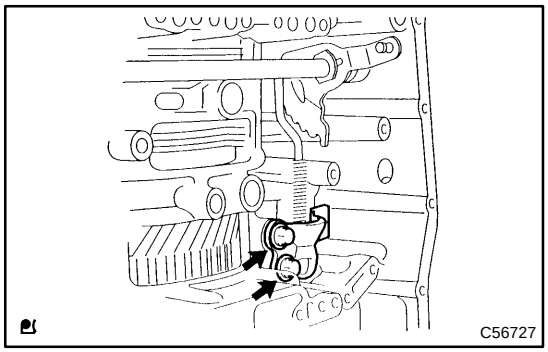
22. REMOVE MANUAL VALVE LEVER SHAFT RETAINER SPRING

(a) Using a needle-nose pliers, remove the manual valve lever shaft retainer spring.



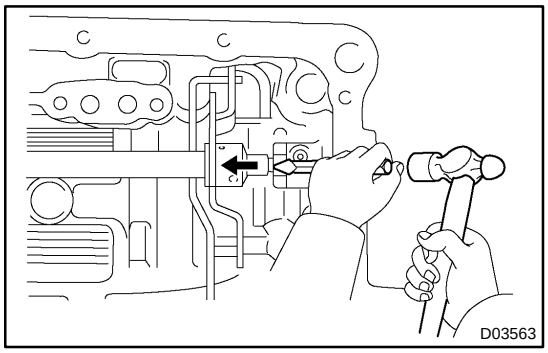
23. REMOVE MANUAL DETENT SPRING SUB-ASSY

(a) Remove the 2 bolts, the manual detent spring sub-assy and cover.



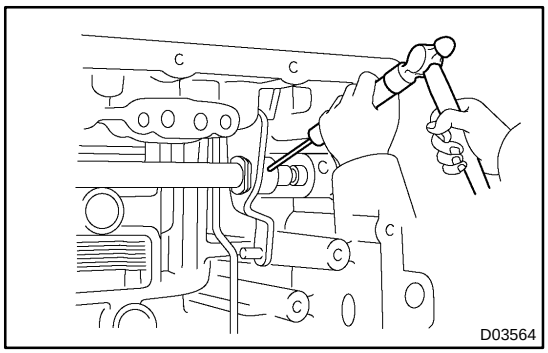
24. REMOVE PARKING LOCK PAWL BRACKET

(a) Remove the 2 bolts and parking lock pawl bracket.



25. REMOVE MANUAL VALVE LEVER SUB-ASSY

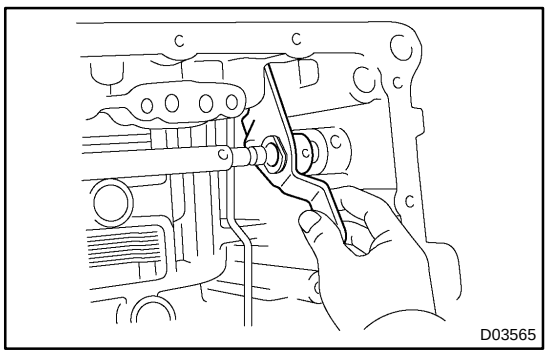
(a) Using a chisel and hammer, cut off and remove the spacer.



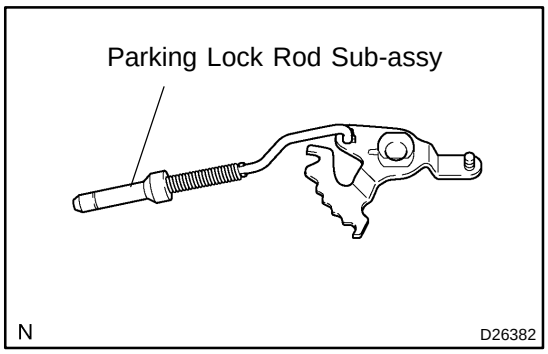
(b) Using a pin punch (ϕ35 mm) and hammer, drive out the pin.

HINT:

Slowly drive out the pin so that it will not fall into the transaxle case.

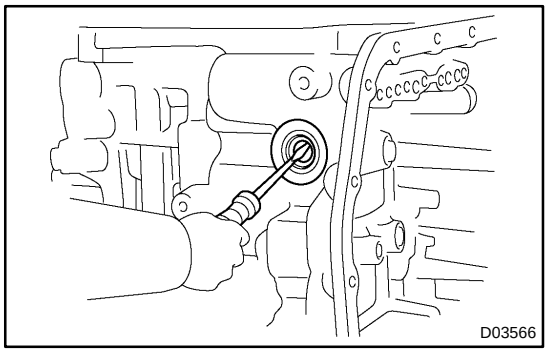


(c) Remove the manual valve lever shaft and manual valve lever.



26. REMOVE PARKING LOCK ROD SUB-ASSY

(a) Remove the parking lock rod from the manual valve lever.

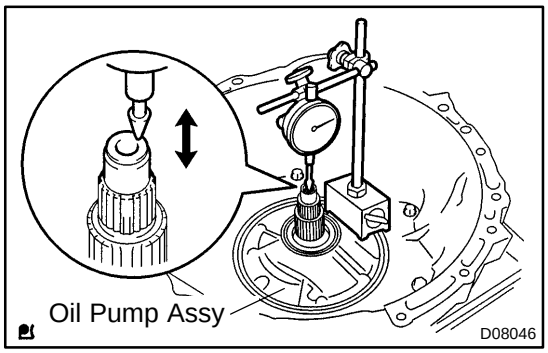


27. REMOVE MANUAL VALVE LEVER SHAFT OIL SEAL

(a) Using a screwdriver, remove the oil seal from the transaxle case.

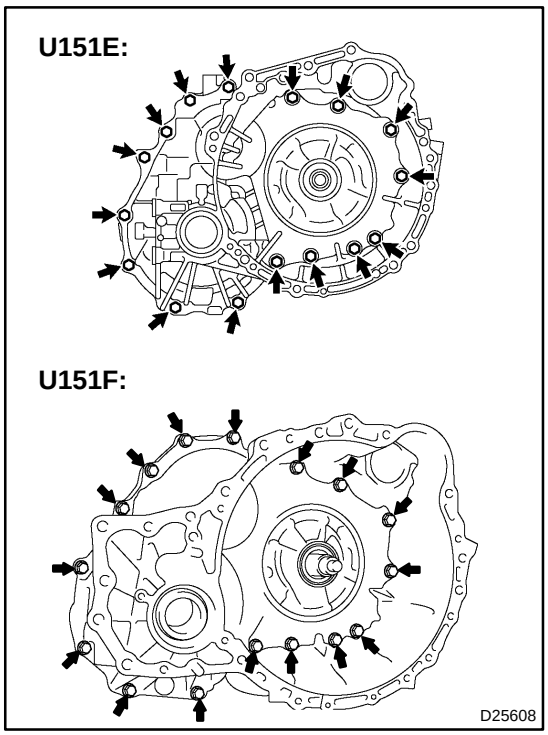
28. FIX AUTOMATIC TRANSAXLE ASSY

(a) Fix the transaxle case with the oil pump side facing up.



29. INSPECT INPUT SHAFT ENDPLAY

(a) Using a dial indicator, measure the input shaft endplay.
Endplay: 0.262 - 1.244 mm (0.01 - 0.049 in.)



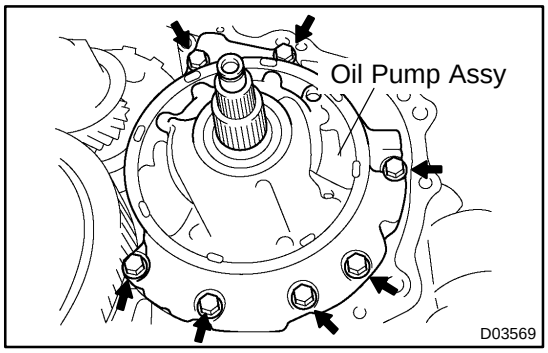
30. REMOVE TRANSAXLE HOUSING

(a) Remove the 16 bolts.

(b) Tap on the circumference of the transaxle housing with a plastic hammer to remove the transaxle housing from the transaxle case.

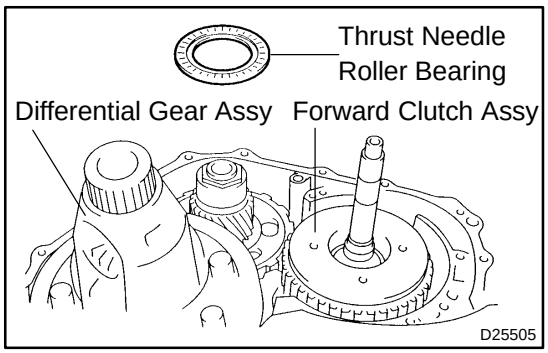
NOTICE:

Differential may be accidentally removed when the transaxle housing is removed.



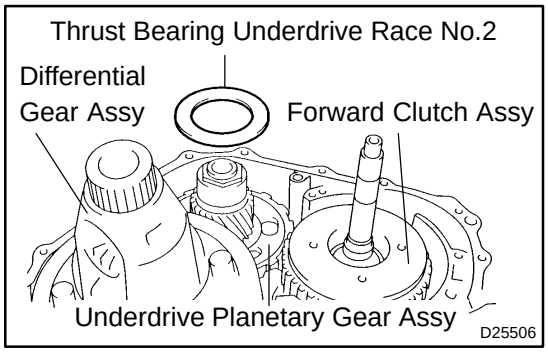
31. REMOVE OIL PUMP ASSY

(a) Remove the 7 bolts and oil pump from the transaxle case.



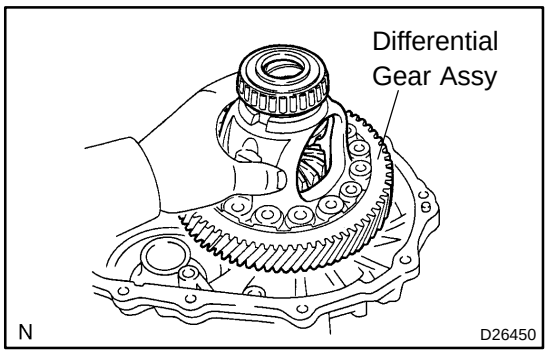
32. REMOVE THRUST NEEDLE ROLLER BEARING

(a) Remove the thrust needle roller bearing from the underdrive planetary gear assy.



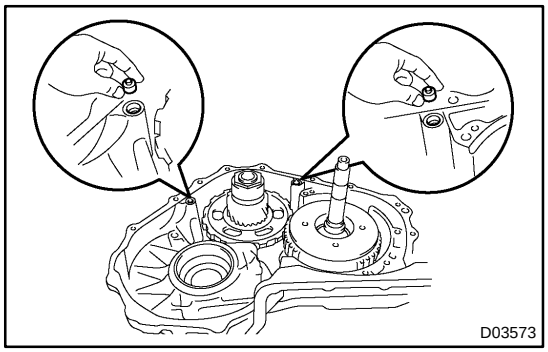
33. REMOVE THRUST BEARING UNDERDRIVE RACE NO.2

(a) Remove the thrust bearing underdrive race No. 2 from the underdrive planetary gear assy.



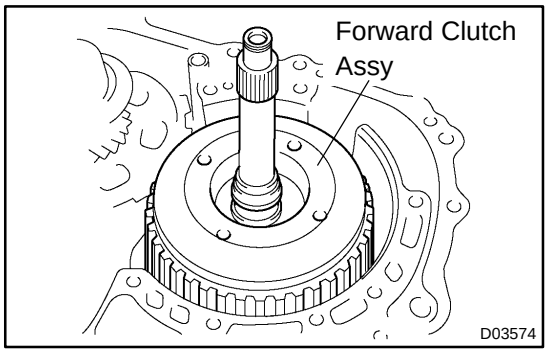
34. REMOVE DIFFERENTIAL GEAR ASSEMBLY

(a) Remove the differential gear assy from the transaxle case.



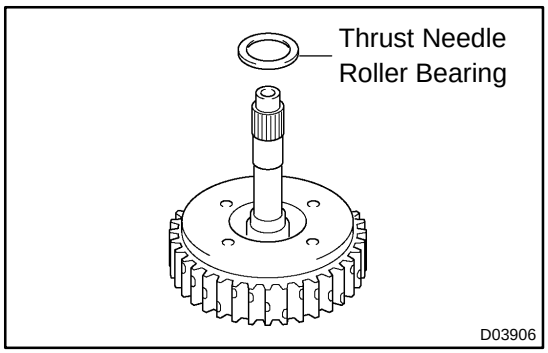
35. REMOVE OVERDRIVE BRAKE GASKET

(a) Remove the 2 overdrive brake gaskets from the transaxle case.

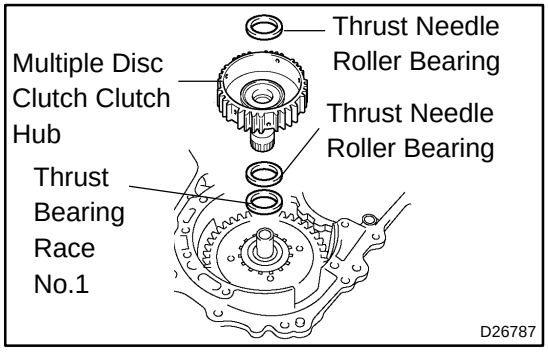


36. REMOVE FORWARD CLUTCH ASSY

(a) Remove the forward clutch assy from the transaxle case.

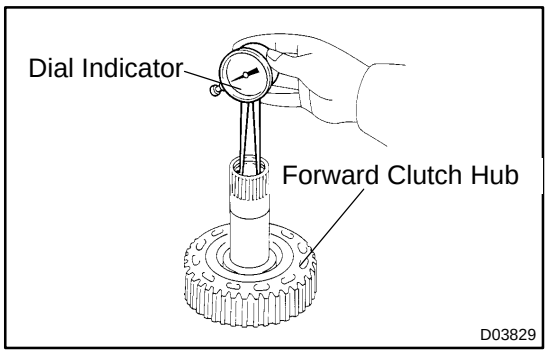


(b) Remove the thrust needle roller bearing from the forward clutch.



37. REMOVE MULTIPLE DISC CLUTCH CLUTCH HUB

(a) Remove the thrust needle roller bearing, multiple disc clutch clutch hub, thrust needle roller bearing and thrust bearing race No.1 from the transaxle case.



38. INSPECT MULTIPLE DISC CLUTCH CLUTCH HUB

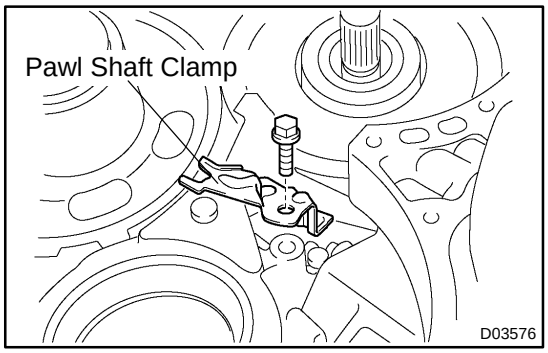
(a) Using a dial indicator, measure the inside diameter of the forward clutch hub bushing

Standard inside diameter:
23.025 - 23.046 mm (0.9065 - 0.9073 in.)
Maximum inside diameter: 23.09 mm (0.9091 in.)

NOTICE:

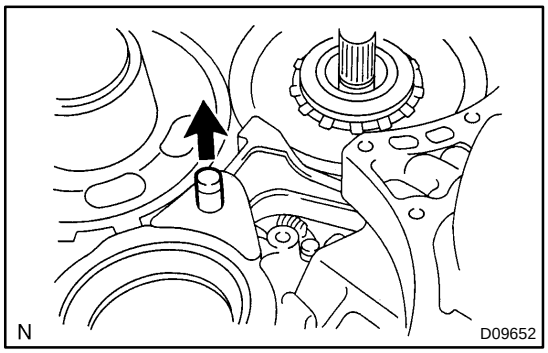
- **When the diameter is over the maximum, replace the multiple disc clutch hub with new one.**
- **Check the contact surface of the bush in the direct clutch shaft. If any scratch or discolor is identified, replace the direct clutch sub-assy with new one.**

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

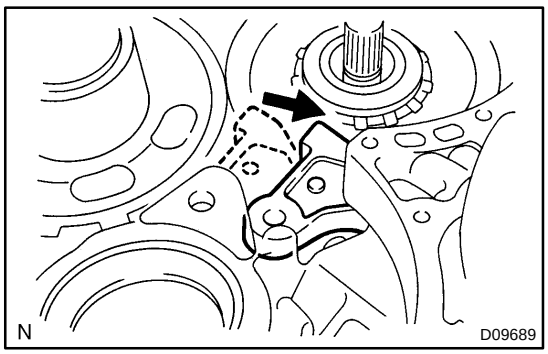


39. REMOVE UNDERDRIVE PLANETARY GEAR ASSY

(a) Remove the bolt and pawl shaft clamp.



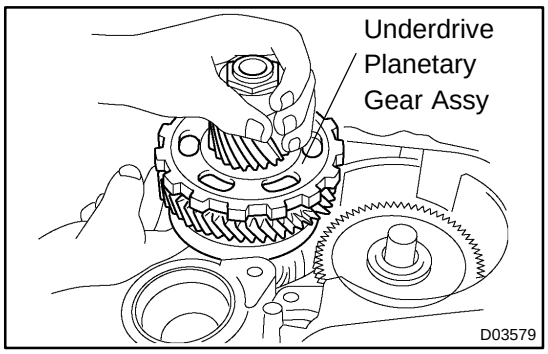
(b) Remove the parking lock pawl shaft.



(c) Push the parking lock pawl.

HINT:

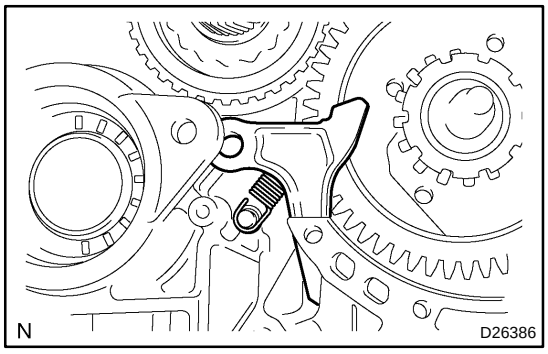
Failure to do so will cause interference when the underdrive planetary gear is removed.



(d) Remove the underdrive planetary gear assy from the transaxle case.

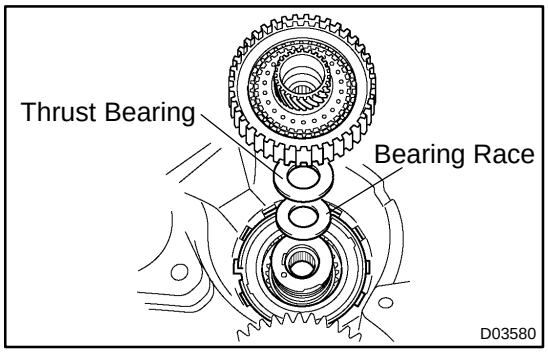
NOTICE:

Be careful so that the underdrive planetary gear assy will not fall out.



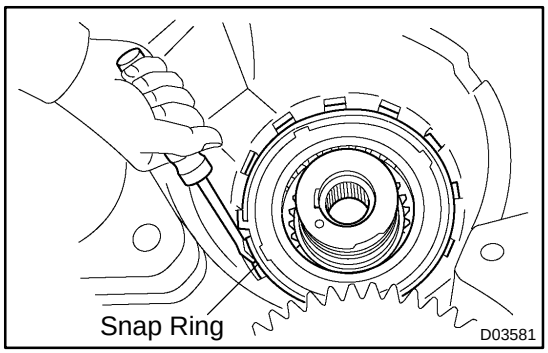
40. REMOVE PARKING LOCK PAWL

(a) Remove the spring, pawl pin and parking lock pawl.



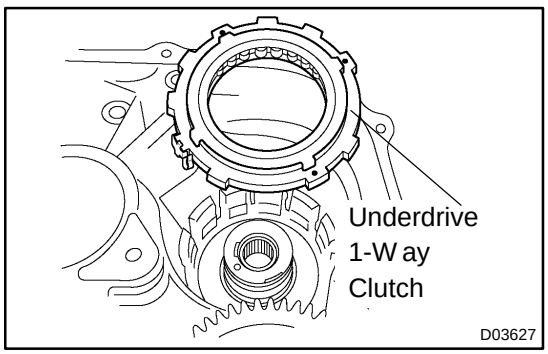
41. REMOVE UNDERDRIVE CLUTCH ASSY

(a) Remove the underdrive clutch assy, thrust bearing and bearing race from the transaxle case.

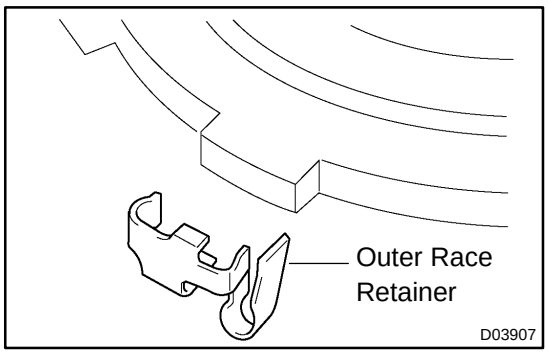


42. REMOVE UNDERDRIVE 1 WAY CLUTCH ASSY

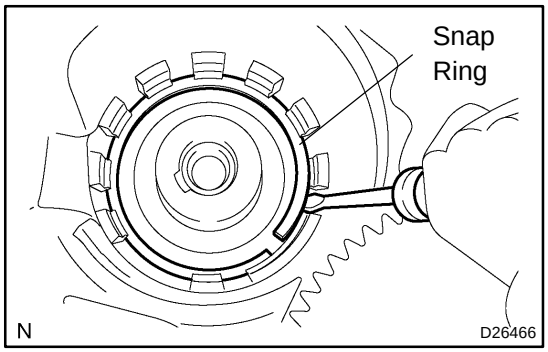
(a) Using a screwdriver, remove the snap ring from the transaxle case.



(b) Remove the underdrive 1-way clutch from the transaxle case.

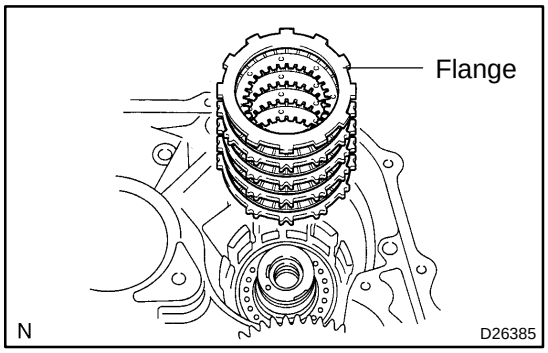


(c) Remove the outer race retainer from the 1-way clutch.

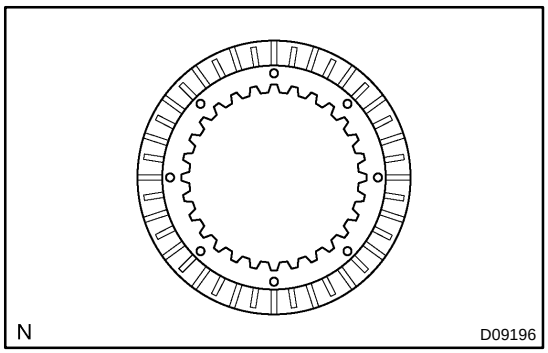


43. REMOVE UNDERDRIVE CLUTCH DISC NO.2

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



(b) Remove the flange, 4 discs and 4 plates from the transaxle case.



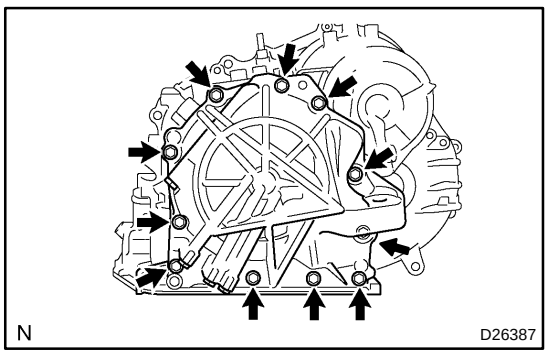
44. INSPECT UNDERDRIVE CLUTCH DISC NO.2

(a) Check to see if the sliding surface of the disc, plate and flange are worn or burnt.

If necessary, replace them.

NOTICE:

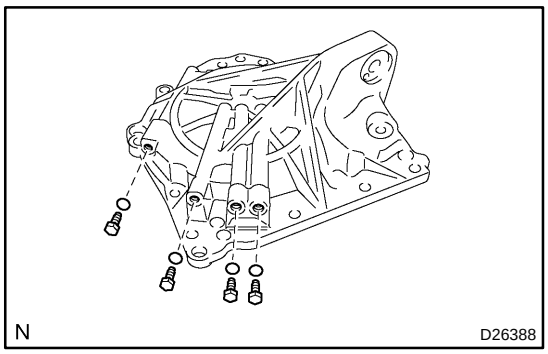
- **If the lining of the disc comes off or discolors, or even if a part of the groove is defaced, replace all discs.**
- **Before assembling new discs, soak them in ATF for at least 15 minutes.**



45. REMOVE TRANSAXLE REAR COVER SUB-ASSY

(a) Remove the 11 bolts.

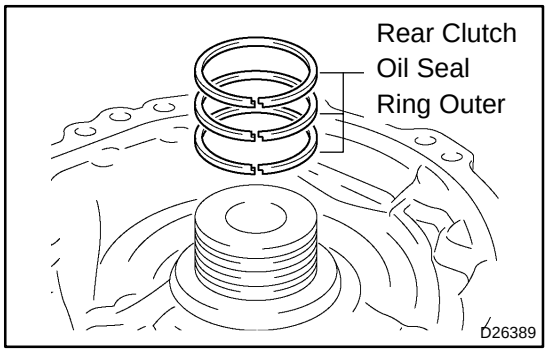
(b) Tap in the circumference of the rear cover with a plastic hammer to remove the transaxle rear cover from the transaxle case.



46. REMOVE TRANSAXLE CASE NO.1 PLUG

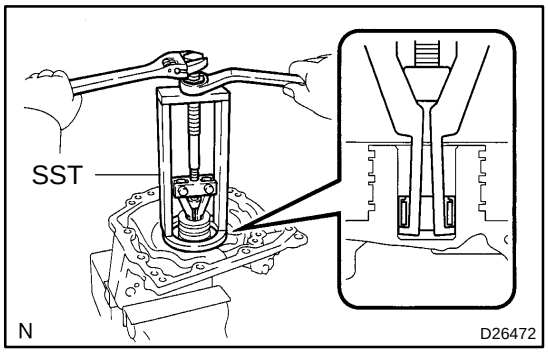
(a) Remove the 4 transaxle case No.1 plugs from the transaxle rear cover.

(b) Remove the 4 O-rings from the 4 transaxle case No.1 plugs.



47. REMOVE REAR CLUTCH OIL SEAL RING OUTER

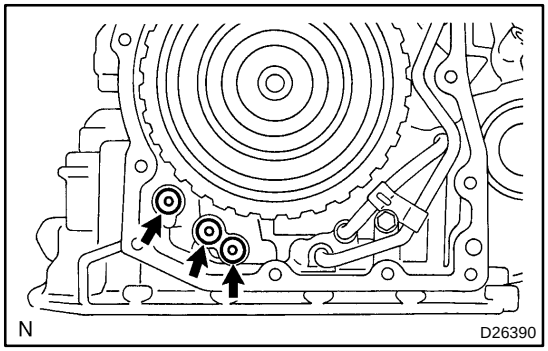
(a) Remove the 3 rear clutch oil seal rings from the transaxle rear cover.



48. REMOVE NEEDLE ROLLER BEARING

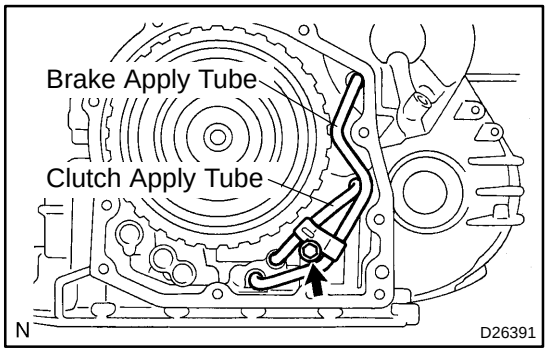
(a) Using SST, remove the needle-roller bearing from the transaxle rear cover.

SST 09387-00041 (09387-01021, 09387-01030, 09387-01040)



49. REMOVE GOVERNOR APPLY GASKET NO.1

(a) Using a screwdriver, remove the 3 apply gaskets.

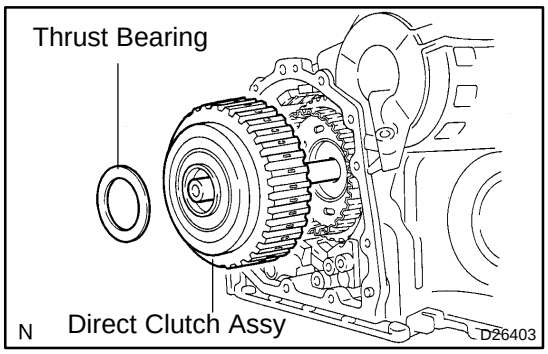


50. REMOVE BRAKE APPLY TUBE

(a) Remove the bolt, clamp and brake apply tube.

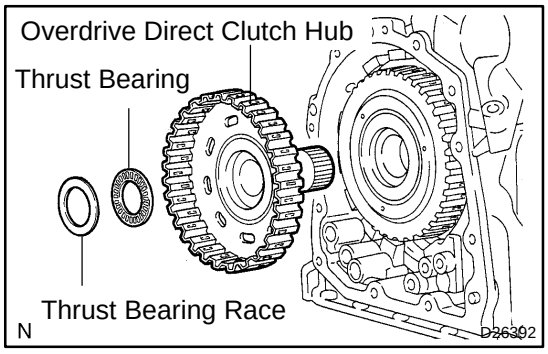
(b) Remove the clutch apply tube.

(c) Remove the brake apply tube from the clamp.



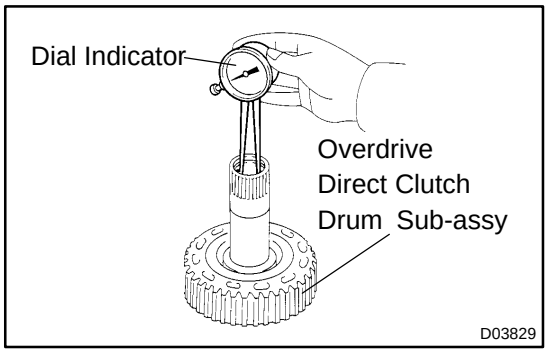
51. REMOVE DIRECT CLUTCH ASSY

(a) Remove the thrust bearing and the direct clutch assy from the transaxle case.



52. REMOVE OVERDREVE DIRECT CLUTCH HUB SUB-ASSY

(a) Remove the thrust bearing race, thrust bearing and overdrive direct clutch hub from the planetary gear assy.



53. INSPECT OVERDRIVE DIRECT CLUTCH DRUM SUB-ASSY

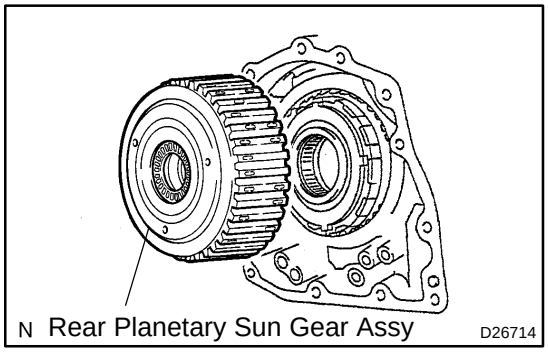
(a) Using a dial indicator, measure the inside diameter of the forward clutch hub bushing.

Standard inside diameter:
23.025 - 23.046 mm (0.9065 - 0.9073 in.)
Maximum inside diameter: 23.09 mm (0.9091 in.)

NOTICE:

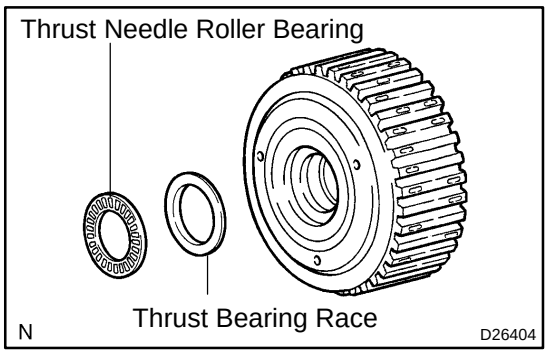
- **When the diameter is over the maximum, replace the multiple disc clutch hub with new one.**
- **Check the contact surface of the bush in the direct clutch shaft. If any scratch or discolor is identified, replace the direct clutch sub-assy with new one.**

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

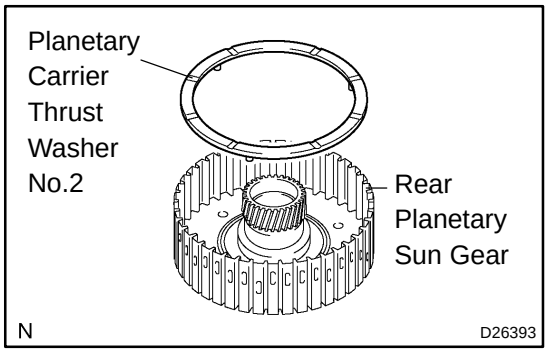


54. REMOVE REAR PLANETARY SUN GEAR ASSY

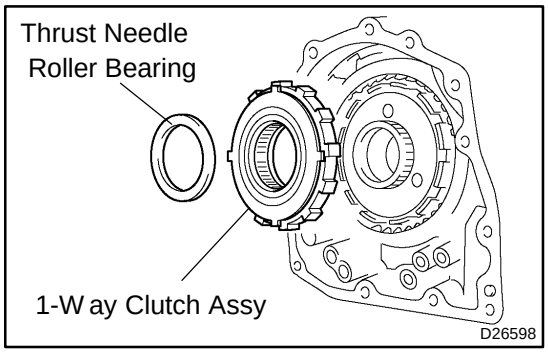
(a) Remove the rear planetary sun gear assy from the transaxle case.



(b) Remove the thrust needle roller bearing and thrust bearing race from the rear planetary sun gear assy.

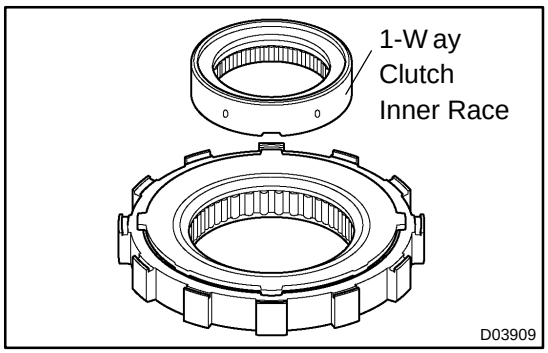


(c) Remove the planetary carrier thrust washer No.2 from the rear planetary sun gear assy.

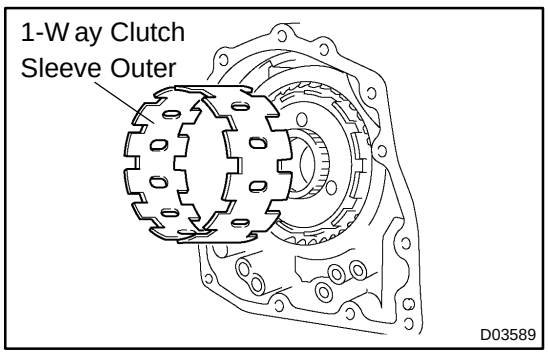


55. REMOVE 1 WAY CLUTCH ASSY

(a) Remove the 1-way clutch assy and the thrust needle roller bearing from the transaxle case.

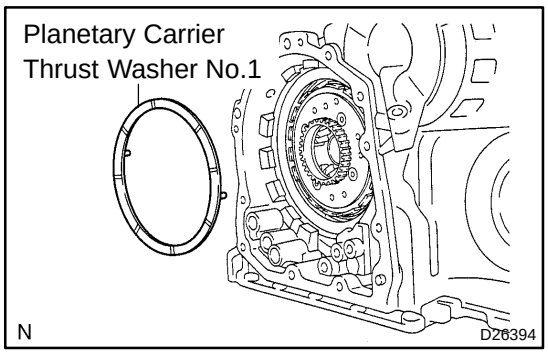


(b) Remove the 1-way clutch inner race from the 1-way clutch assy.



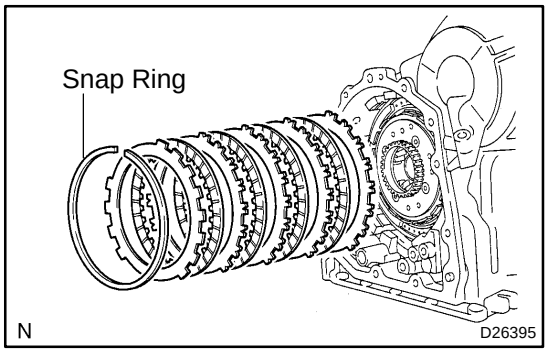
56. REMOVE 1WAY CLUTCH SLEEVE OUTER

(a) Remove the 1-way clutch sleeve outer from the transaxle case.



57. REMOVE PLANETARY CARRIER THRUST WASHER NO.1

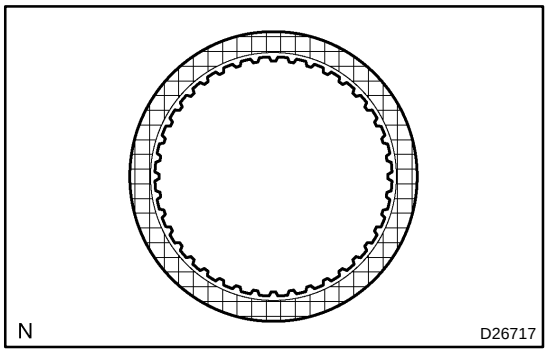
(a) Remove the planetary carrier thrust washer No.1 from the planetary gear assy.



58. REMOVE 2ND BRAKE CLUTCH DISC

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

(b) Remove the flange, 4 discs and 4 plates from the transaxle case.



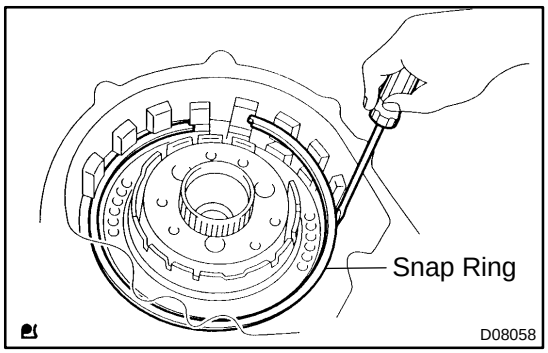
59. INSPECT 2ND BRAKE CLUTCH DISC

(a) Check to see if the sliding surface of the disc, plate and flange are worn or burnt.

If necessary, replace them.

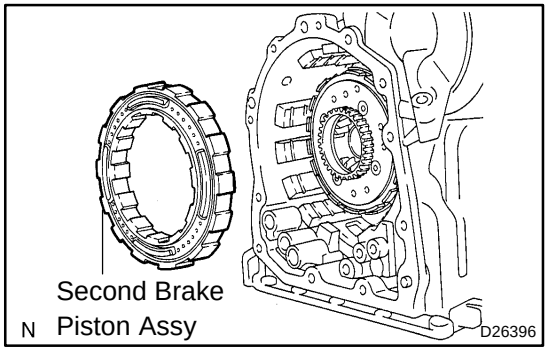
NOTICE:

- **If the lining of the disc comes off or discolors, or even if a part of the groove is defaced, replace all discs.**
- **Before assembling new discs, soak them in ATF for at least 15 minutes.**

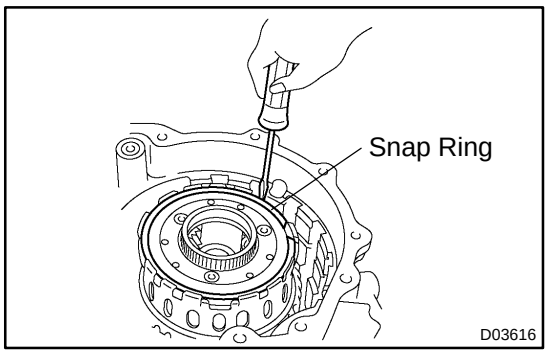


60. REMOVE SECOND BRAKE PISTON ASSY

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

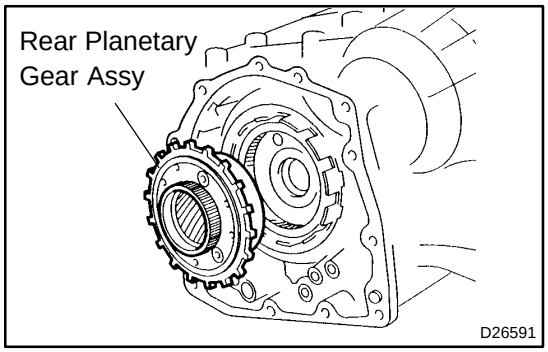


(b) Remove the second brake piston assy from the transaxle case.

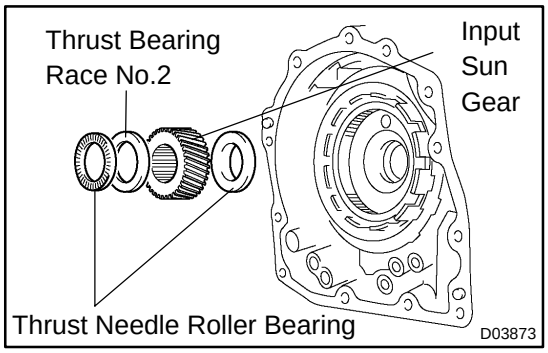


61. REMOVE REAR PLANETARY GEAR ASSY

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

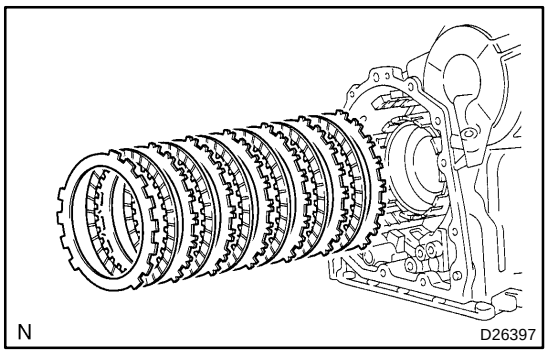


(b) Remove the rear planetary gear assy from the transaxle case.



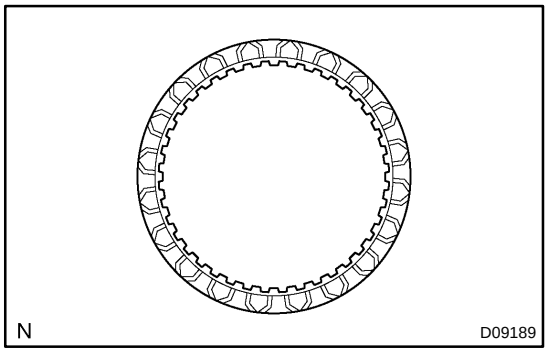
62. REMOVE INPUT SUN GEAR

(a) Remove the 2 thrust needle roller bearings, thrust bearing race No.2 and input sun gear from the transaxle case.



63. REMOVE 1ST & REVERSE BRAKE CLUTCH DISC

(a) Remove the flange, 6 discs and 6 plates from the transaxle case.



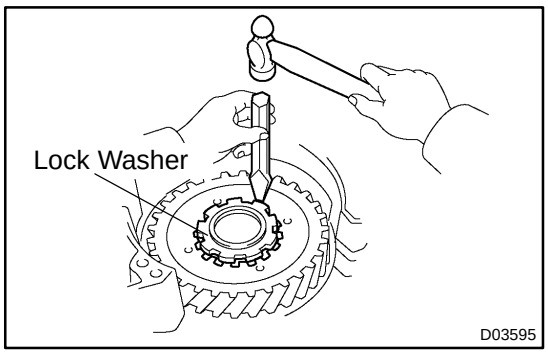
64. INSPECT 1ST & REVERSE BRAKE CLUTCH DISC

(a) Check to see if the sliding surface of the disc, plate and flange are worn or burnt.

If necessary, replace them.

NOTICE:

- **If the lining of the disc comes off or discolors, or even if a part of the groove is defaced, replace all discs.**
- **Before assembling new discs, soak them in ATF for at least 15 minutes.**

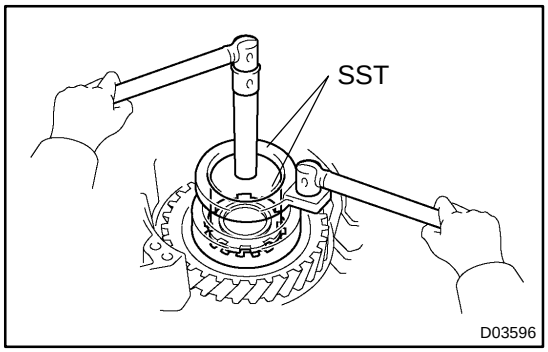


65. REMOVE FRONT PLANETARY GEAR ASSY

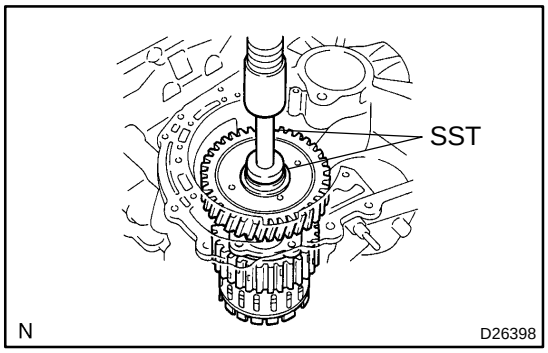
(a) Using a chisel and hammer, unstake the lock washer.

NOTICE:

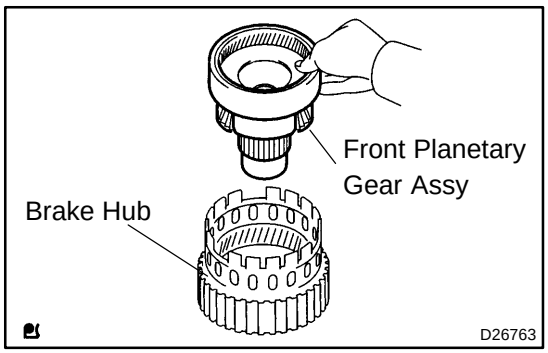
Push down all claws of the washer. Otherwise SST cannot be fully pressed against the nut, and cannot loosen the nut.



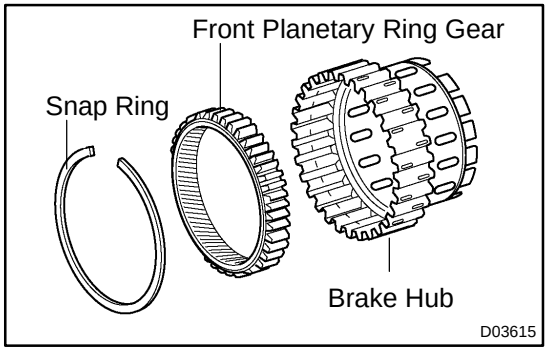
(b) Using SST, remove the nut.
SST 09387-00030, 09387-00080



(c) Using SST and a press, remove the front planetary gear assy from the counter drive gear.
SST 09950- 60010 (09951- 00450), 09950- 70010 (09951-07100)

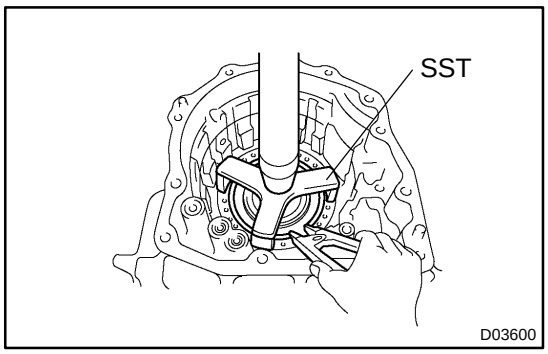


(d) Remove the front planetary gear assy from the brake hub.



66. REMOVE FRONT PLANETARY RING GEAR

(a) Using a screwdriver, remove the snap ring and front planetary ring gear from the brake hub.



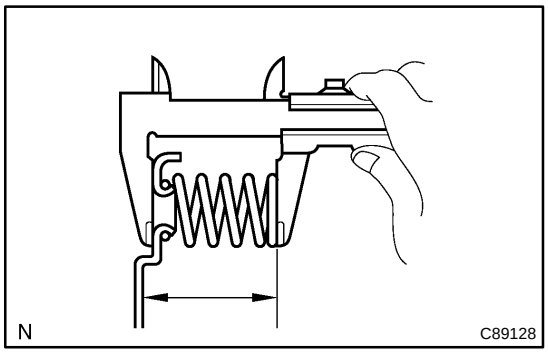
67. REMOVE 1ST & REVERSE BRAKE RETURN SPRING SUB-ASSY

(a) Place SST on the return spring, and compress the return spring with a press.
SST 09387-00070

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

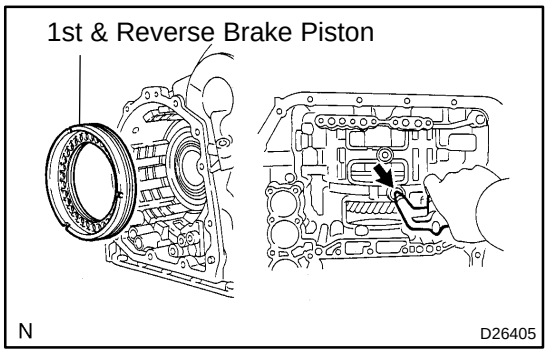
NOTICE:

- **Stop the press when the spring sheet is lowered 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove, to prevent the spring sheet from deforming.**
- **Do not expand the snap ring excessively.**



68. INSPECT 1ST & REVERSE BRAKE RETURN SPRING SUB-ASSY

(a) Using a vernier calipers, measure the free length of the spring together with the spring seat.
Standard free length: 17.61 mm (0.6933 in.)

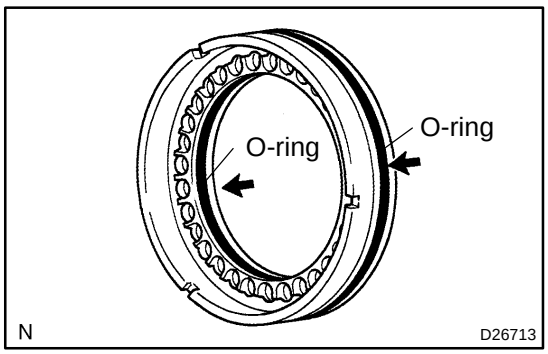


69. REMOVE 1ST & REVERSE BRAKE PISTON

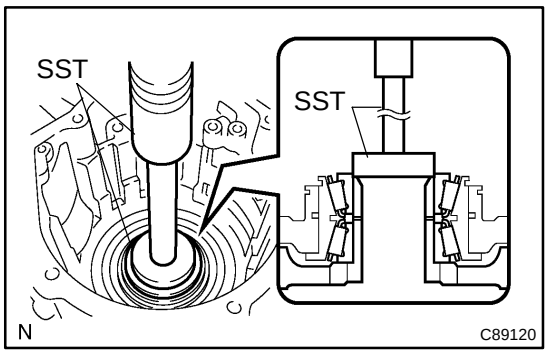
(a) Apply compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi) to the transaxle case to remove 1st & reverse brake piston.

NOTICE:

- **Blowing off the air may cause the piston to jump-out. When removing the piston, hold it by your hand using a waste cloth.**
- **Take care not to splash ATF when air-blowing.**

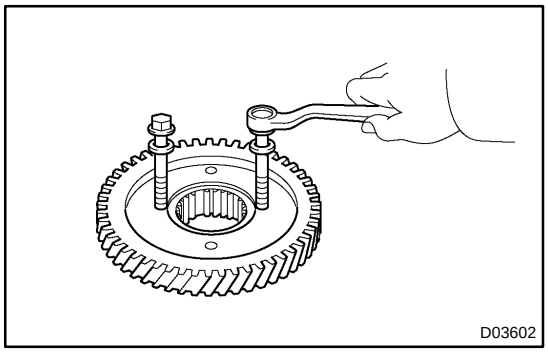


(b) Remove the 2 O-rings from the 1st & reverse brake piston.

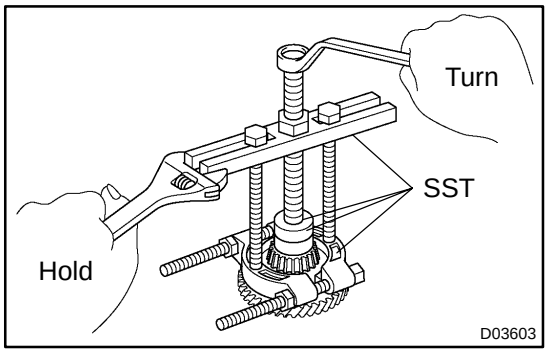


70. REMOVE COUNTER DRIVE GEAR

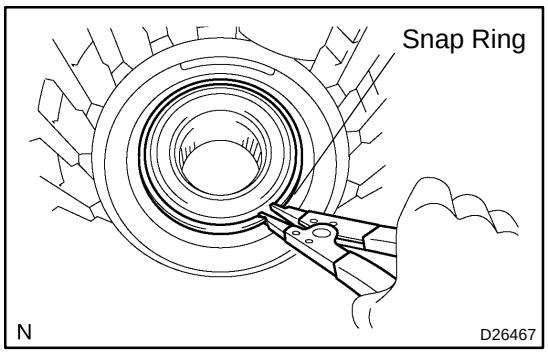
(a) Using SST and a press, remove the counter drive gear from the transaxle case.
SST 09950- 60010 (09951- 00590), 09950- 70010 (09951-07100)



(b) As shown in the illustration, tighten 2 bolts evenly and make clearance of approx. 20.0 mm (0.797 in.) between the counter drive gear and the inner race.

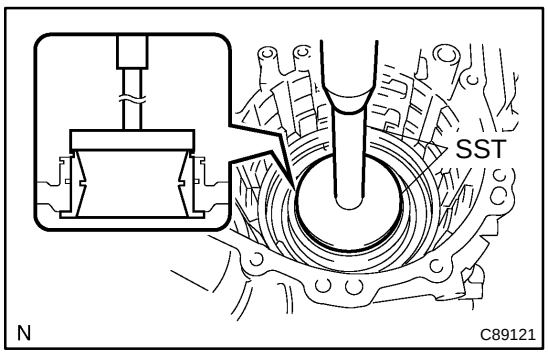


(c) Using SST, remove the tapered roller bearing.
SST 09950- 60010 (09951- 00590), 09950- 70010 (09951-07100), 09950-00020, 09950-00030, 09950-4001 1 (09957-04010)



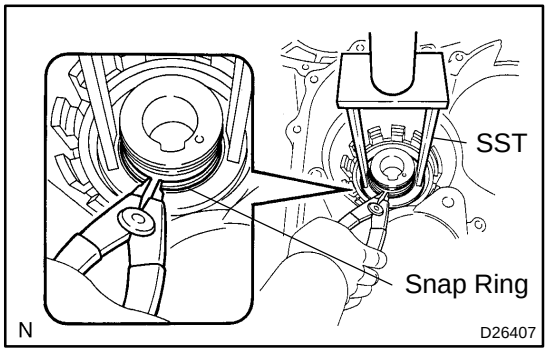
71. REMOVE COUNTER DRIVE GEAR BEARING

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



(b) Using SST and a press, remove the bearing outer race.
SST 09950- 60020 (09951- 00910), 09950- 70010 (09951-07100)

72. REMOVE BREATHER PLUG NO.2 (ATM)



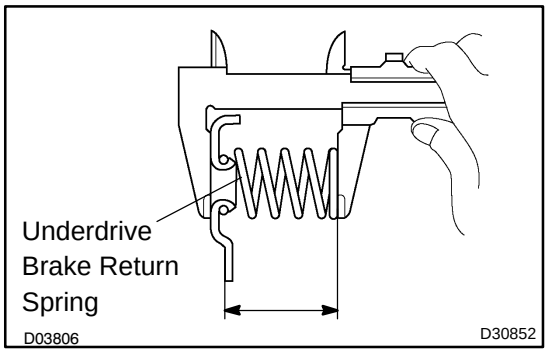
73. REMOVE UNDERDRIVE BRAKE RETURN SPRING SUB-ASSY

(a) Place SST on the return spring, and compress the return spring with a press.
SST 09387-00020

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

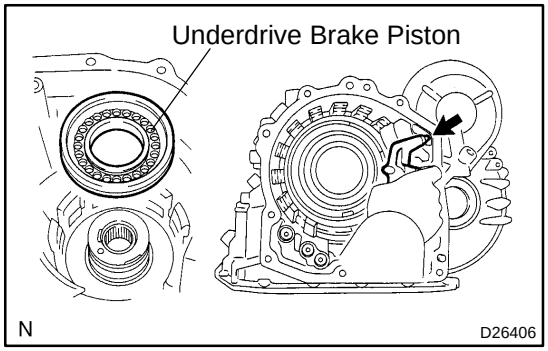
NOTICE:

- **Stop the press when the spring sheet is lowered 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove, to prevent the spring sheet from deforming.**
- **Do not expand the snap ring excessively.**



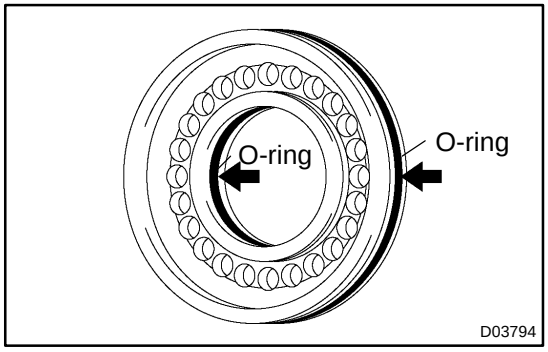
74. INSPECT UNDERDRIVE BRAKE RETURN SPRING SUB-ASSY

(a) Using a vernier calipers, measure the free length of the spring together with the spring seat.
Standard free length: 13.24 mm (0.5213 in.)

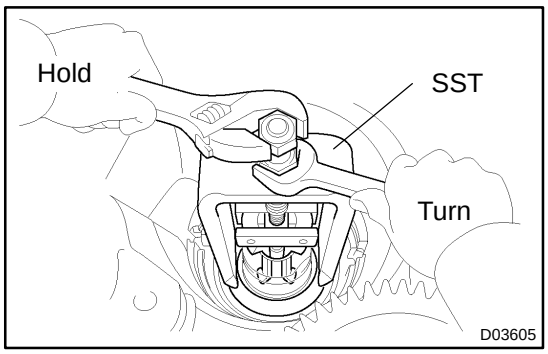


75. REMOVE UNDERDRIVE BRAKE PISTON

(a) Apply compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi) to the transaxle case to remove the underdrive brake piston.

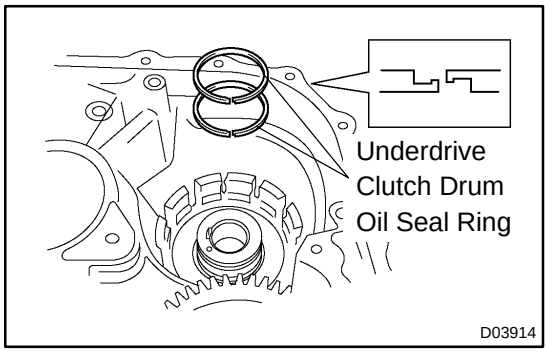


(b) Remove the 2 O-rings from the underdrive brake piston.



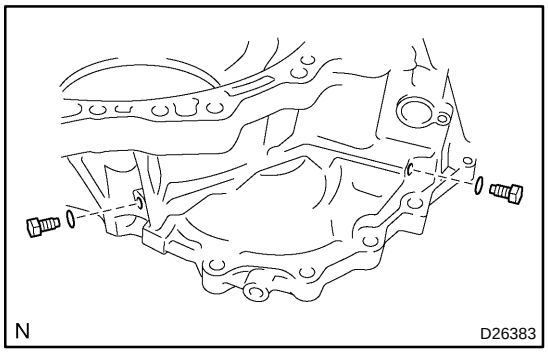
76. REMOVE NEEDLE ROLLER BEARING

(a) Using SST, remove the needle-roller bearing from the transaxle case.
SST 09387- 00041 (09387- 01010, 09387- 01030, 09387-01040)



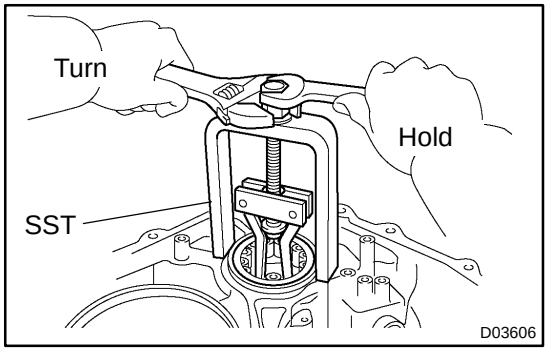
77. REMOVE UNDERDRIVE CLUTCH DRUM OIL SEAL RING

(a) Remove the 2 oil seal rings from the transaxle case.



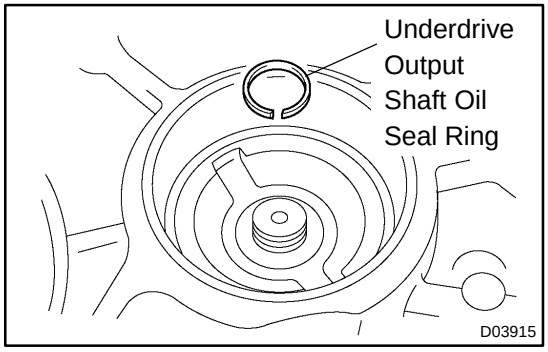
78. REMOVE TRANSAXLE CASE NO.1 PLUG

(a) Remove the 2 transaxle case No. 1 plugs.
(b) Remove the 2 O-rings from the 2 transaxle case No. 1 plugs.



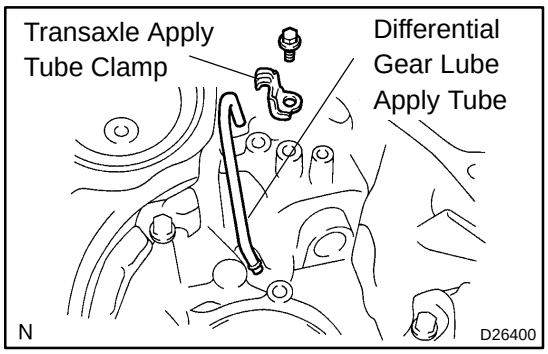
79. REMOVE UNDERDRIVE CYLINDRICAL ROLLER BEARING

(a) Using SST, remove the underdrive cylindrical roller bearing from the transaxle case.
SST 09514-3501 1



80. REMOVE UNDERDRIVE OUTPUT SHAFT OIL SEAL RING

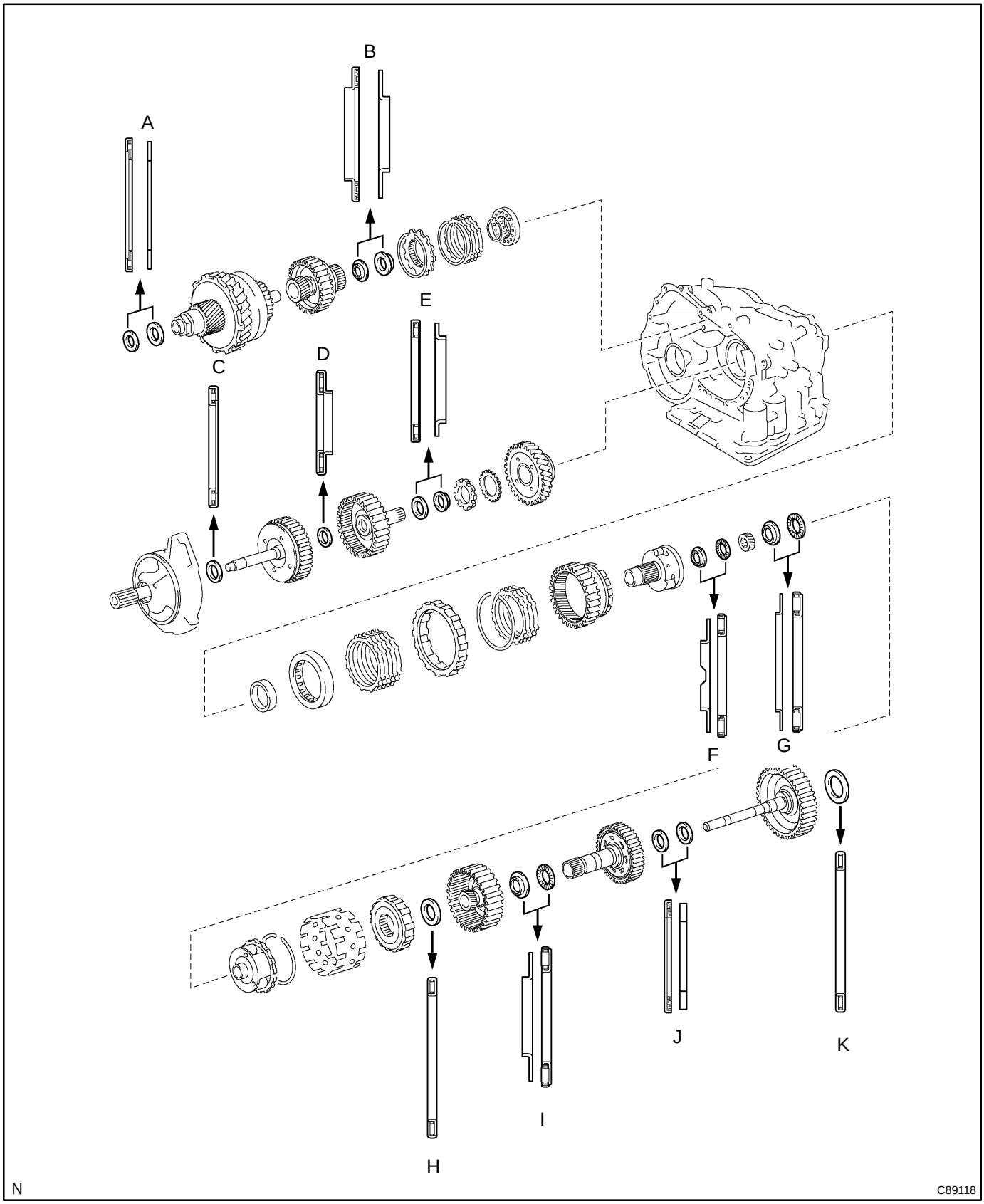
(a) Remove the oil seal ring from the transaxle housing.



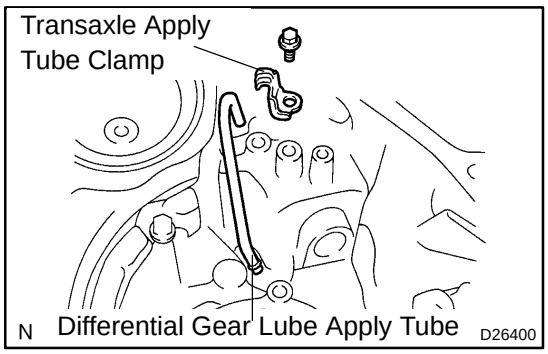
81. REMOVE DIFFERENTIAL GEAR LUBE APPLY TUBE

(a) Remove the bolt, transaxle apply tube clamp and differential gear lube apply tube from the transaxle housing.

82. BEARING POSITION



Mark	Front Race Diameter Inside / Outside mm (in.)	Thrust Bearing Diameter Inside / Outside mm (in.)	Rear Race Diameter Inside / Outside mm (in.)
A	-	57.2 (2.252) / 84.96 (3.3449)	56.4 (2.220) / 83.0 (3.268)
B	-	37.73 (1.4854) / 58.0 (2.283)	-
C	-	33.85 (1.3327) / 52.2 (2.055)	-
D	24.94 (0.982)	23.5 (0.925) / 44.0(1.732)	-
E	-	36.3 (1.429) / 51.93 (2.044)	34.5 (1.358) / 48.35 (1.904)
F	34.35 (1.352) / 56.57 (2.227)	32.45 (1.278) / 56.48 (2.223)	-
G	40.15 (1.581) / 59.25 (2.333)	38.65 (1.522) / 59.79 (2.354)	38.65 (1.522) / 59.25 (2.332)
H	-	53.6 (2.110) / 69.6 (2.740)	-
I	33.02 (1.3) / 45.8 (1.803)	31.85 (1.254) / 57.3 (2.256)	-
J	-	24.79 (0.976) / 39.5 (1.555)	23.6 (0.929) / 37.95 (1.494)
K	-	56.3 (2.216) / 75.96 (2.991)	-

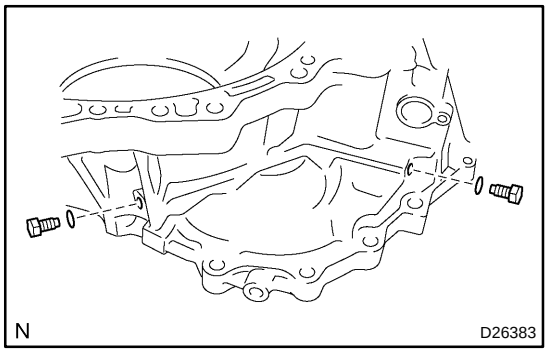


83. INSTALL DIFFERENTIAL GEAR LUBE APPLY TUBE

(a) Install the differential gear lube apply tube and transaxle apply tube clamp with the bolt to the transaxle housing.
Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf)

NOTICE:

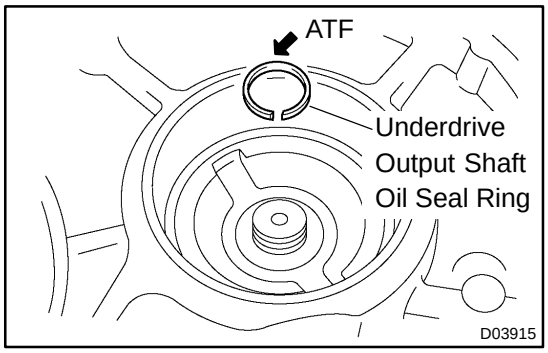
Make sure to insert the pipe to the stopper.



84. INSTALL TRANSAXLE CASE NO.1 PLUG

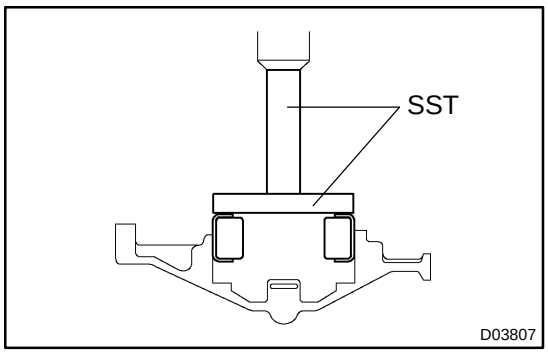
(a) Install the 2 new O-rings to the 2 transaxle case No.1 plugs.

(b) Install the 2 transaxle case No.1 plugs to the transaxle rear cover.
Torque: 7.4 N·m (75 kgf·cm, 65 in.·lbf)



85. INSTALL UNDERDRIVE OUTPUT SHAFT OIL SEAL RING

(a) Coat the new oil seal ring with ATF and install it to the transaxle housing.



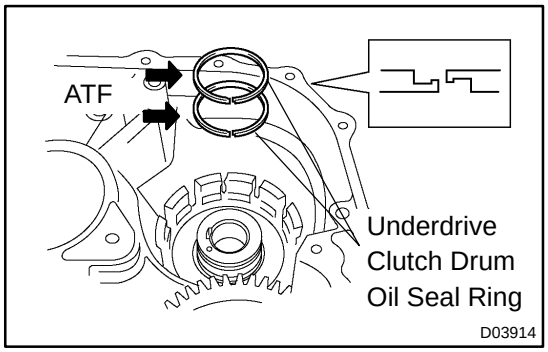
86. INSTALL UNDERDRIVE CYLINDRICAL ROLLER BEARING

(a) Coat the underdrive cylindrical roller bearing with ATF.

(b) Using SST and a press, install the underdrive cylindrical roller bearing.
SST 09950- 60020 (09951- 00810), 09950- 70010 (09951-07100)

NOTICE:

Do not apply excessive pressure to it.

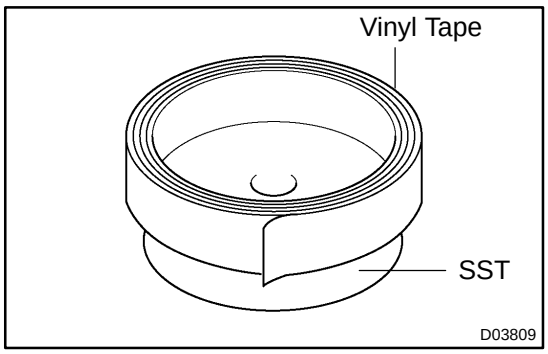


87. INSTALL UNDERDRIVE CLUTCH DRUM OIL SEAL RING

(a) Coat the 2 new oil seal rings with ATF, install them to the transaxle rear cover.

NOTICE:

- **Do not expand the gap of the oil seal ring too much.**
- **Fix the hooks certainly. Confirm the smooth rotation.**



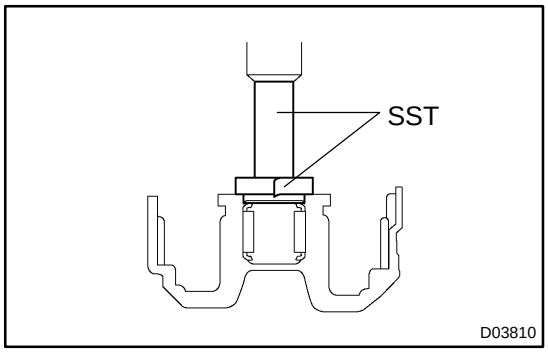
88. INSTALL NEEDLE ROLLER BEARING

(a) Wind a vinyl tape around SST at the place 4.0 mm (0.157 in.) above from the bottom end until the thickness of the wound tape is about 5.0 mm (0.197 in.).

NOTICE:

Clean SST to remove deposited oil, before winding a vinyl tape.

(b) Coat the needle roller bearing with ATF.

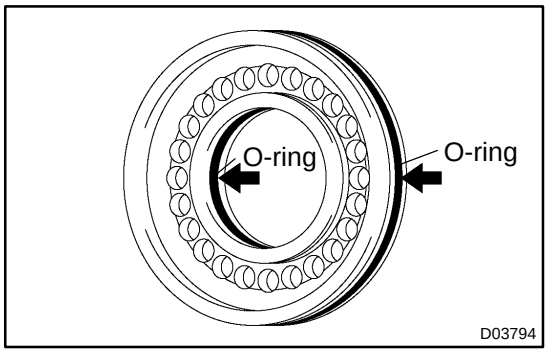


(c) Using SST and a press, install the needle-roller bearing to the transaxle case.

SST 09950- 60010 (09951- 00320), 09950- 70010 (09951-07100)

NOTICE:

When the wound vinyl tape contacts the transaxle case, stop press-fitting.



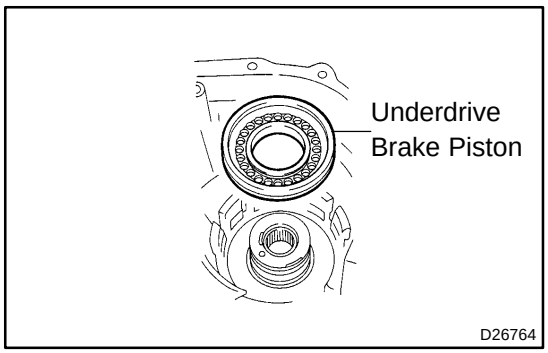
89. INSTALL UNDERDRIVE BRAKE PISTON

(a) Coat the 2 new O-rings with ATF, install them to the underdrive brake piston.

NOTICE:

- **Assemble the O-ring carefully not to have a twist and a pinching.**
- **Apply enough ATF to the O-ring prior to assembling.**

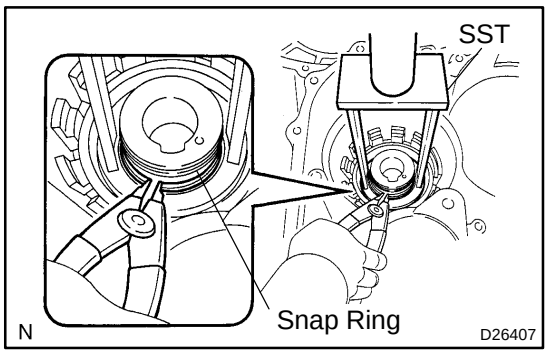
(b) Coat the underdrive brake piston with ATF.



(c) Install the underdrive brake piston to the transaxle case.

NOTICE:

Be careful not to damage the O-ring.



90. INSTALL UNDERDRIVE CLUTCH RETURN SPRING SUB-ASSY

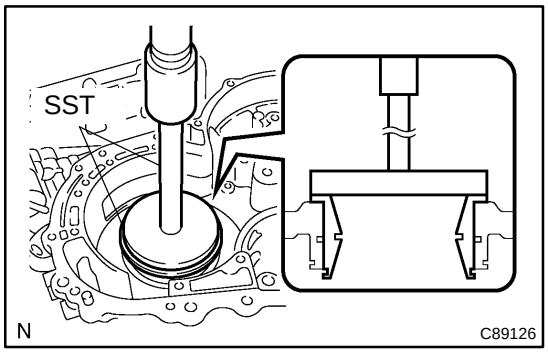
(a) Place SST on the return spring and compress the return spring with a press.
SST 09387-00020

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

NOTICE:

- **Stop the press when the spring sheet is lowered 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove, to prevent the spring sheet from deforming.**
- **Do not expand the snap ring excessively.**
- **Installing the spring sub-assembly, check all of the springs are fit in the piston correctly.**
- **The snap ring should be fixed surely in the groove of the transaxle case.**

91. INSTALL BREATHER PLUG NO.2 (ATM)



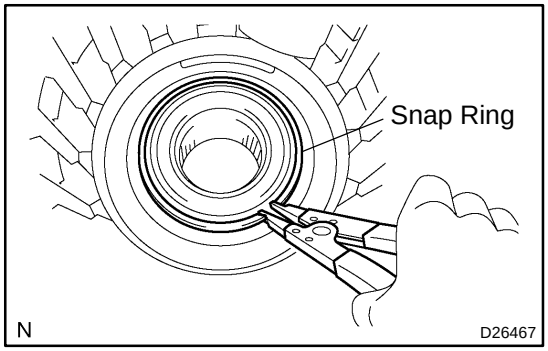
92. INSTALL COUNTER DRIVE GEAR BEARING

(a) Coat the counterdrive gear bearing with ATF.

(b) Using SST and a press, install the bearing outer race.
SST 09950- 60020 (09951- 01030), 09950- 70010 (09951-07150), 09649-17010

NOTICE:

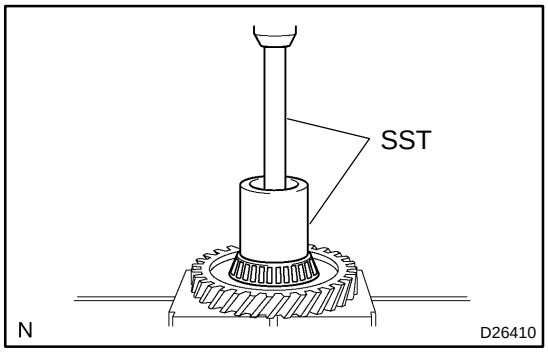
- **Do not apply excessive pressure to it.**
- **Press-fit the bearing outer race until it contacts the transaxle case.**



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

NOTICE:

Face the white mark side of the snap ring up.



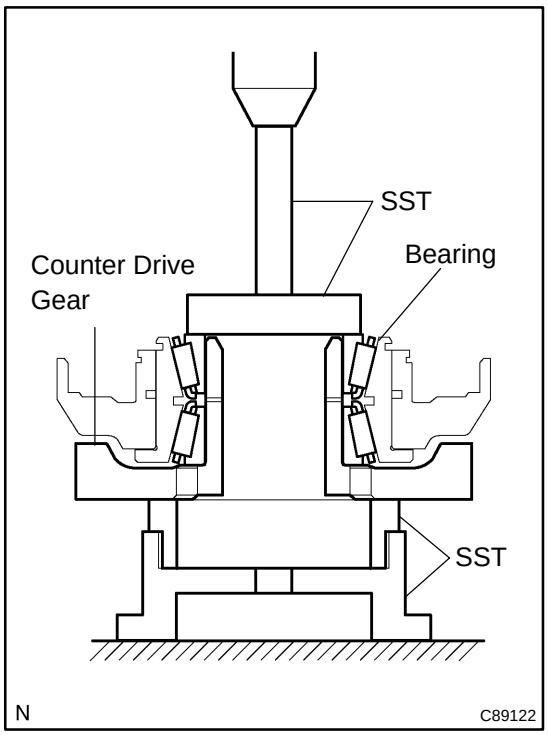
93. INSTALL COUNTER DRIVE GEAR

(a) Coat the couterdrive gear with ATF.

(b) Using SST and a press, install the tapered roller bearing to the counter drive gear.
SST 09950-70010 (09951-07150), 09649-17010

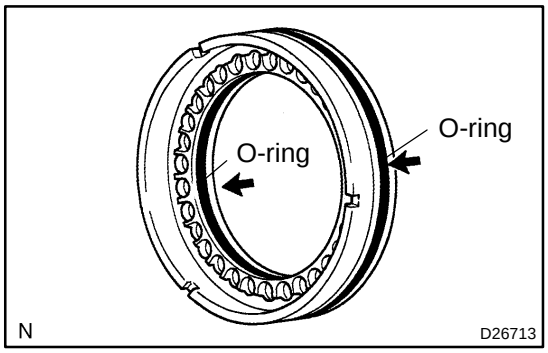
NOTICE:

Do not apply excessive pressure to it.



(c) Using SST and a press, install the counter drive gear and bearing to the transaxle case.
SST 09223- 15030, 09527- 17011, 09950- 60020 (09951-00750), 09950-70010 (09951-07150)

NOTICE:
Do not apply excessive pressure to it.

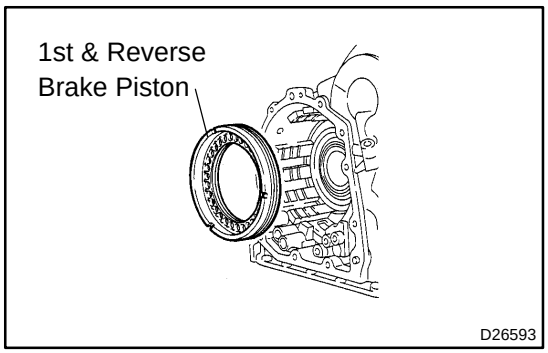


94. INSTALL 1ST & REVERSE BRAKE PISTON

(a) Coat the 2 new O-rings with ATF.

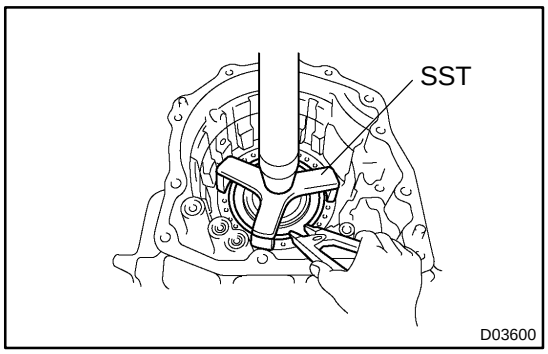
(b) Install the 2 O-rings to the 1st & reverse brake piston.

NOTICE:
- **Assemble the O-ring carefully not to have a twist and a pinching.**
- **Apply enough ATF to the O-ring prior to assembling.**



(c) Coat a 1st & reverse brake piston with ATF, install it to the transaxle case.

NOTICE:
Be careful not to damage the O-ring.



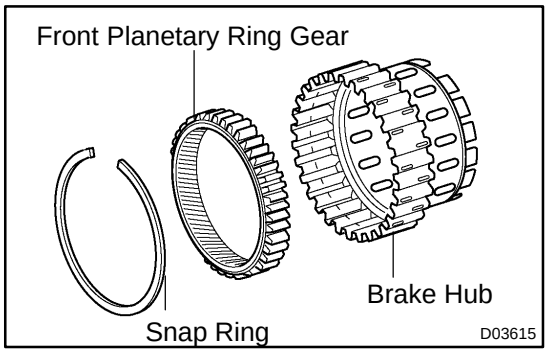
95. INSTALL 1ST & REVERSE BRAKE RETURN SPRING SUB-ASSY

(a) Place SST on the return spring and compress the return spring with a press.
SST 09387-00070

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

NOTICE:

- **Stop the press when the spring sheet is lowered to the place 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove, preventing the spring sheet from being deformed.**
- **Do not expand the snap ring excessively.**
- **Installing the spring sub-assembly, check all of the springs are fit in the piston correctly.**
- **The snap ring should be fixed surely in the groove of the cylinder.**
- **Fix the snap ring to the inside of the claw of the spring seat surely.**

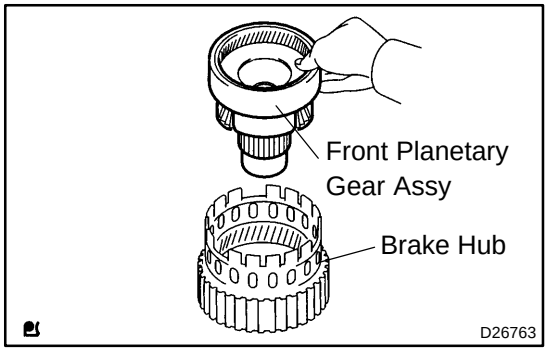


96. INSTALL FRONT PLANETARY RING GEAR

(a) Using a screwdriver, install the front planetary ring gear and snap ring to the brake hub.

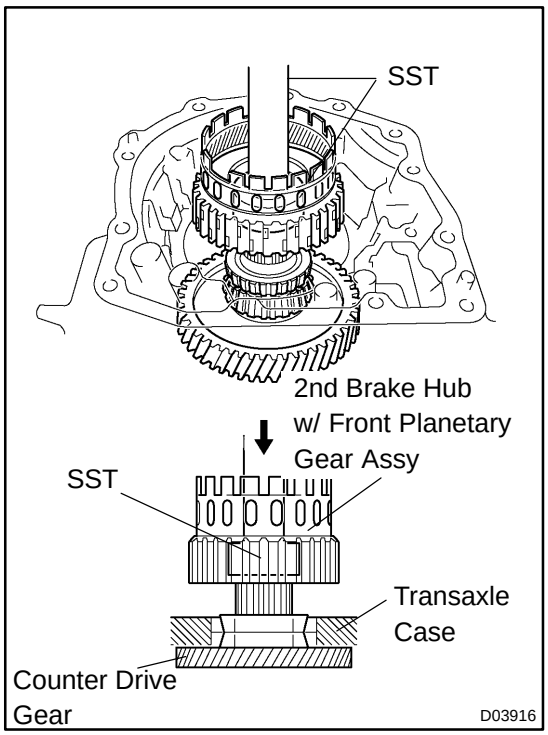
NOTICE:

Confirm the snap ring is fixed in the groove of the brake hub correctly.



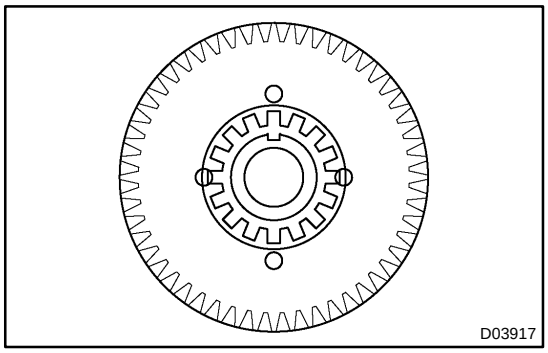
97. INSTALL FRONT PLANETARY GEAR ASSY

(a) Install the front planetary gear assy to the brake hub.

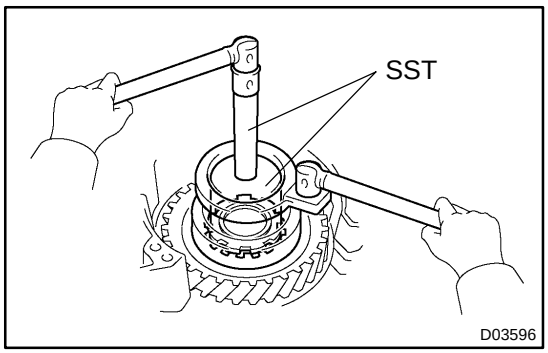


(b) Using SST and a press, press-fit the front planetary gear assy.
SST 09950- 60010 (09951- 00500), 09950- 70010 (09951-07100)

NOTICE:
- **Do not apply excessive pressure to it.**
- **Press the inner race of LH tapered roller bearing, counter gear and front planetary gear assembly to the position where no pre-load should be applied to one pair of tapered roller bearings (left and right).**

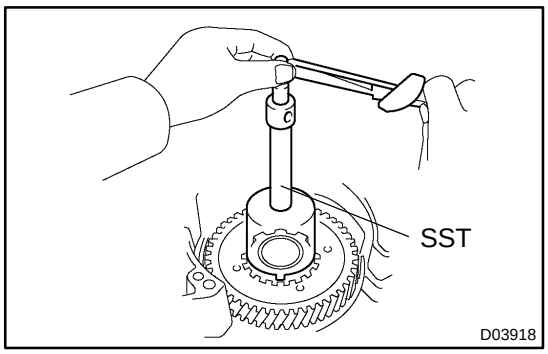


(c) Install the new washer, as shown in the illustration.



(d) Using SST, install the nut.
SST 09387-00030, 09387-00080
Torque: 210 - 350 N·m
(2,141 kgf·cm, 155 ft·lbf - 3,569 kgf·cm, 258 ft·lbf)

NOTICE:
Assemble the washer after pressing each part, then tighten the nut to minimum tightening torque.



(e) Using SST and a torque wrench, measure the turning torque of the bearing while rotating SST at 60 rpm. When the measured value is not within the specified value, gradually tighten the nut until it reaches the specified value.

SST 09387-00080

Turning torque at 60 rpm:

New Bearing

0.51 - 1.02 N·m (5.1 - 10.0 kgf·cm, 4.4 - 8.7 in.·lbf)

Used Bearing

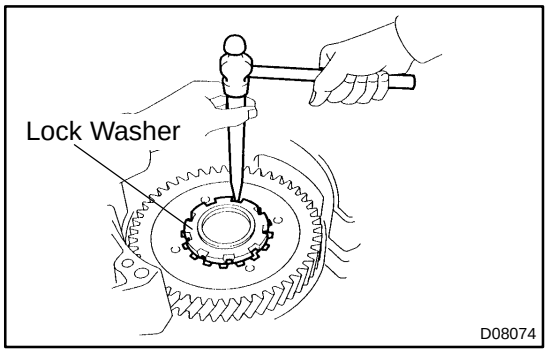
0.26 - 0.51 N·m (2.7 - 5.2 kgf·cm, 2.3 - 4.5 in.·lbf)

HINT:

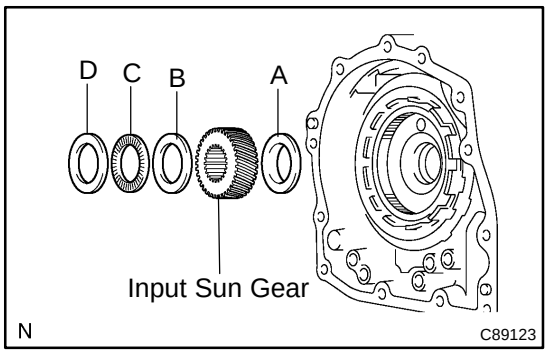
Use a torque wrench with a fulcrum length of 160 mm (6.3 in.).

(f) Tighten the nut gradually until the specified rotation torque of tapered roller bearing is measured.

Torque: 350 N·m (3,569 kgf·cm, 258 ft·lbf) (a limit)



(g) Using a chisel and hammer, stake the front lock washer.



98. INSTALL INPUT SUN GEAR

(a) Coat the 2 thrust bearings with ATF.

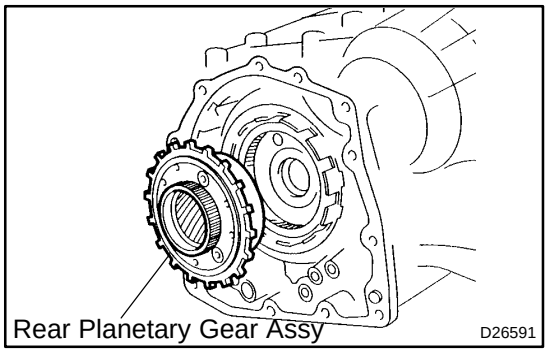
(b) Install the 2 thrust bearings, the bearing race and the front planetary sun gear to the front planetary gear assy.

NOTICE:

- **Install the bearing race on the side of the front planetary carrier. Be careful about the orientation of the race.**
- **Installing thrust bearing and front sun gears, be careful about the orientation of the parts.**
- **Install the bearing race on the side of the front sun gear. Be careful about the orientation of the race.**
- **Install the thrust bearing and the race after holding the parts on the rear planetary carrier by applying grease. Be sure the assembling order.**

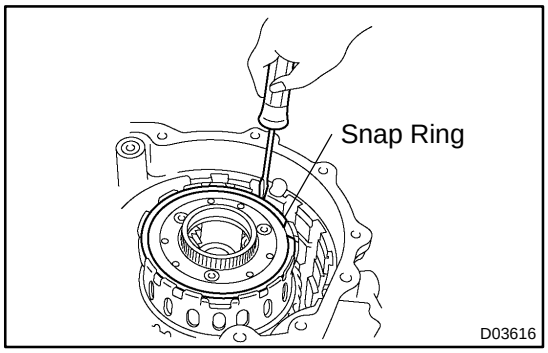
Thrust bearing and bearing race diameter: mm (in.)

	inside	outside
Thrust Bearing, A	32.5 (1.28)	56.5 (2.224)
Bearing Race, B	40.2 (1.583)	59.3 (2.335)
Thrust Bearing, C	38.6 (1.520)	59.7 (2.35)
Bearing Race, D	38.6 (1.520)	59.3 (2.335)



99. INSTALL REAR PLANETARY GEAR ASSY

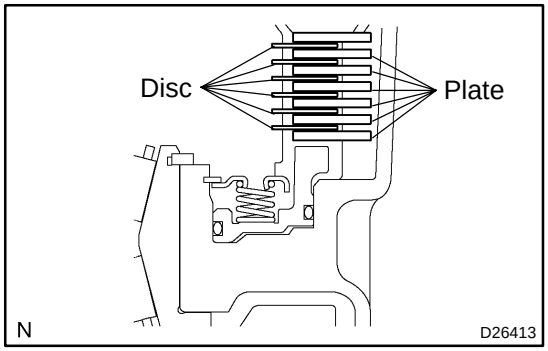
(a) Install the rear planetary gear assy to the rear planetary ring gear.



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

NOTICE:

Confirm the snap ring is fixed in the groove of the 1st & reverse brake hub correctly.



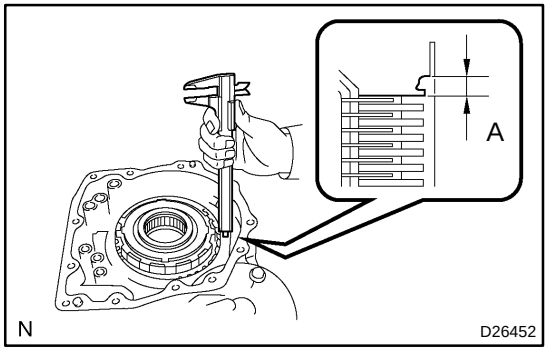
100. INSTALL 1ST & REVERSE BRAKE CLUTCH DISC

(a) Coat the 6 discs with ATF.

(b) Install the 6 plates and 6 discs.

NOTICE:

Be careful about the order of discs, plates and flange assembly.



101. INSPECT PACK CLEARANCE OF FIRST & REVERSE BRAKE

(a) Using vernier calipers, measure the distance between the disc surface and the contact surface of the 2nd brake cylinder and transaxle case(Dimension A).

(b) Select an appropriate flange so that the pack clearance will meet the specified value.

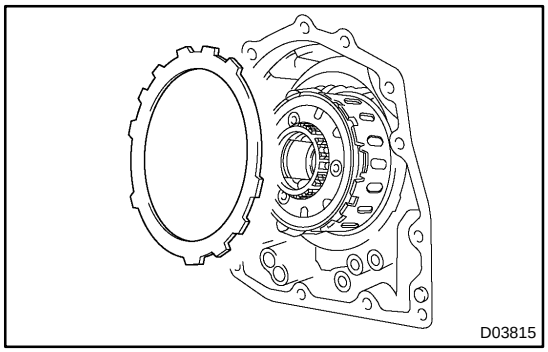
Pack clearance: 1.16 - 1.35 mm (0.0457 - 0.0531 in.)

HINT:

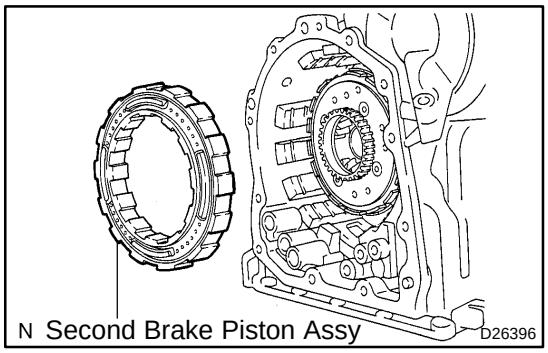
Piston stroke = Dimension A -Flange thickness

Flange thickness: mm (in.)

Mark	Thickness	Mark	Thickness
1	1.8 (0.071)	5	2.2 (0.087)
2	1.9 (0.075)	6	2.3 (0.091)
3	2.0 (0.079)	7	2.4 (0.094)
4	2.1 (0.083)	8	2.5 (0.098)

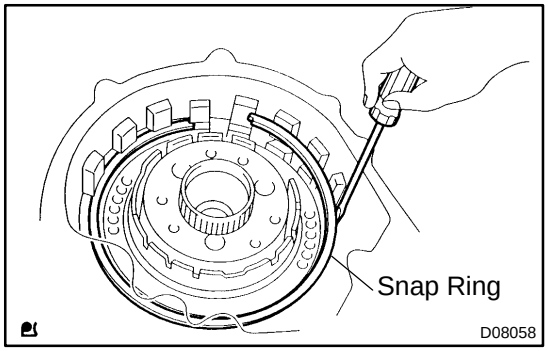


(c) Install the flange.



102. INSTALL SECOND BRAKE PISTON ASSY

(a) Install the second brake piston assy to the transaxle case.



(b) Install the snap ring and measure the inside diameter.
Inside diameter: More than 167 mm (6.57 in.)

NOTICE:

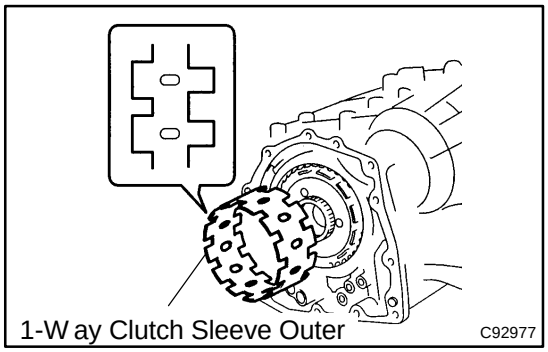
- **Because the taper snap ring has the positioning direction, check it when installing.**
- **When the diameter does not meet the specified value, replace the snap ring with new one.**
- **After assembling, confirm that there is no clearance between the second brake cylinder and the fitting surface of the cylinder in the transaxle case.**

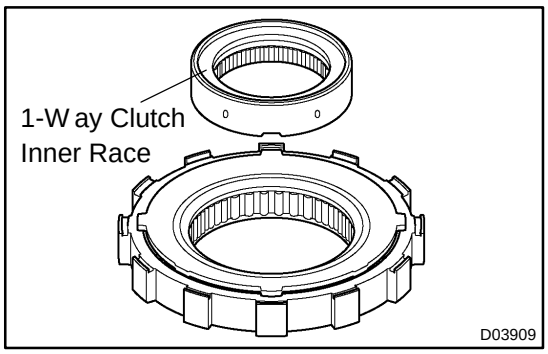
103. INSTALL 1WAY CLUTCH SLEEVE OUTER

(a) Install the 1-way clutch sleeve outer to the 2nd brake cylinder assy.

NOTICE:

Check the positioning direction of the outer sleeve.



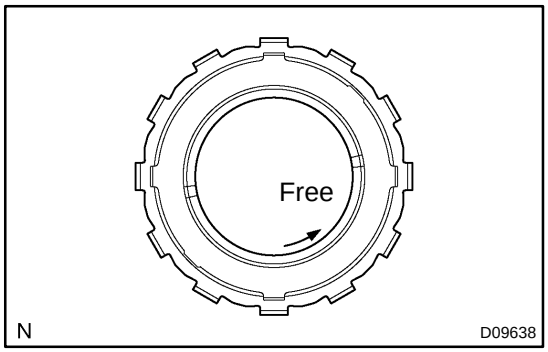


104. INSTALL 1 WAY CLUTCH ASSY

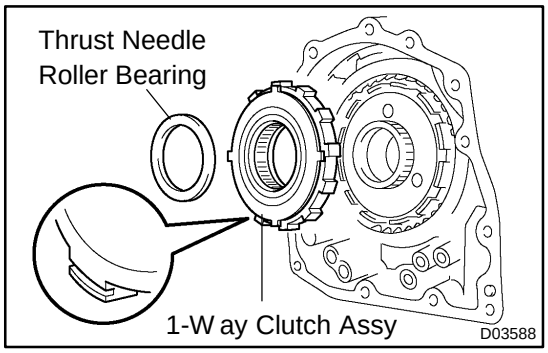
(a) Install the 1-way clutch inner race to the 1-way clutch.

NOTICE:

- **Check the direction of the inner race.**
- **Confirm that the discrimination mark can be seen by the worker.**



(b) Check the rotating direction of 1-way clutch for the lock or free operation, as shown in the illustration.



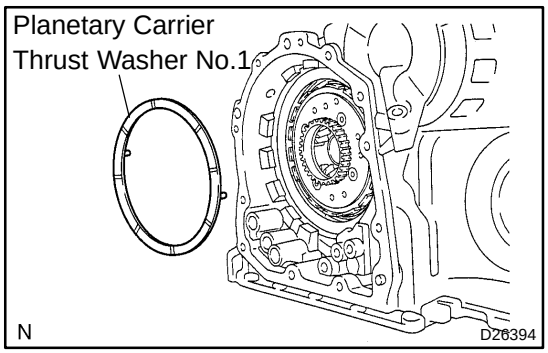
(c) Install the 1-way clutch and thrust needle roller bearing to the 1-way clutch sleeve outer.

Bearing diameter: mm (in.)

	Inside	Outside
Bearing	53.6 (2.110)	69.4 (2.732)

NOTICE:

Install the thrust bearing properly so that no-colored race will be visible.

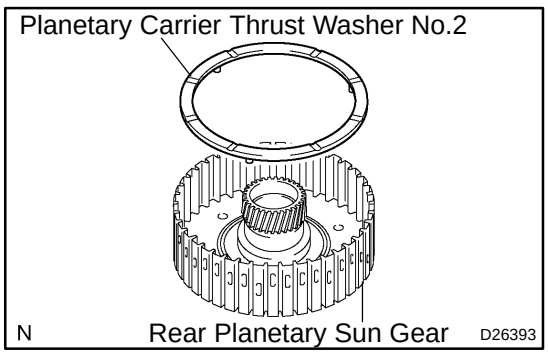


105. INSTALL PLANETARY CARRIER THRUST WASHER NO.1

(a) Coat the planetary carrier thrust washer No. 1 with yellow petrolatum, install it onto the planetary sun gear assy.

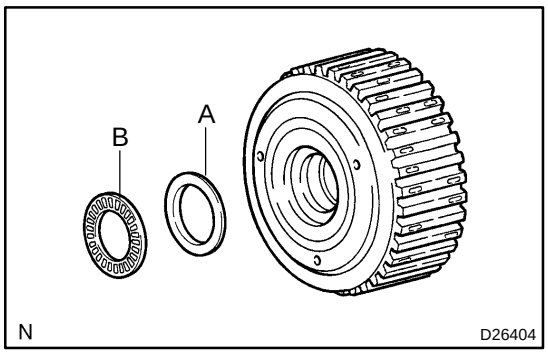
NOTICE:

After assembling, confirm that the projection should be fixed surely in the hole of the planetary sun gear assembly.



106. INSTALL REAR PLANETARY SUN GEAR ASSY

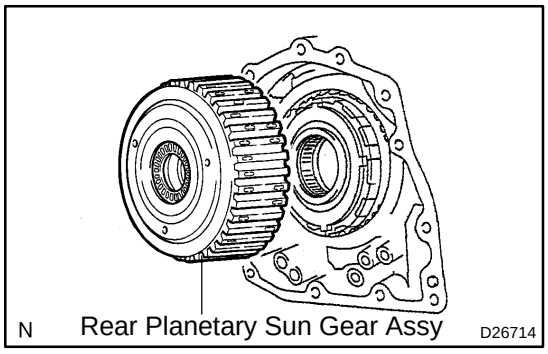
(a) Coat the planetary carrier thrust washer No. 2 with yellow petrolatum, install it onto the rear planetary sun gear.



(b) Coat the bearing with yellow petrolatum, install it onto the rear planetary sun gear.

Bearing diameter: mm (in.)

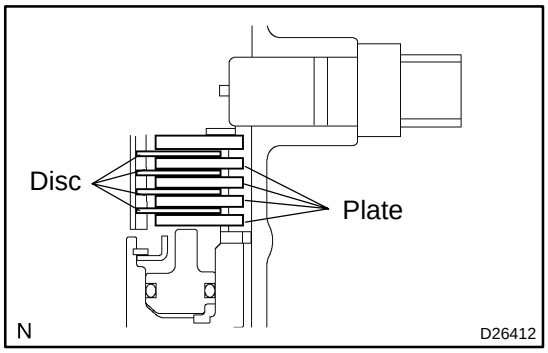
	Inside	Outside
Race, A	33.0 (1.299)	45.4 (1.787)
Bearing, B	31.85 (1.254)	45.2 (1.78)



(c) Install the rear planetary sun gear assy to the rear planetary gear.

NOTICE:

Installing the rear planetary sun gear assembly, confirm that the B1 discs engage.

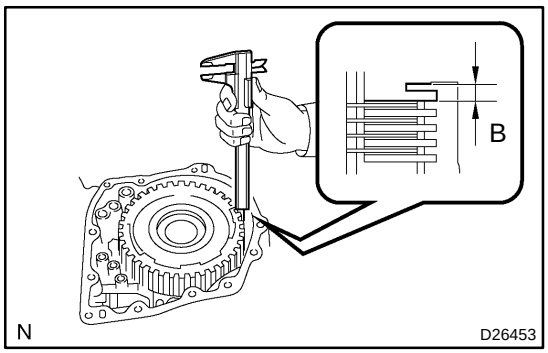


107. INSTALL 2ND BRAKE CLUTCH DISC

(a) Coat the 4 discs with ATF.

(b) Install the 4 discs and 4 plates to the transaxle case.

(c) Temporarily install the snap ring.



108. INSPECT PACK CLEARANCE OF SECOND BRAKE

(a) Using a vernier calipers, measure the distance between the disc surface and snap ring surface (Dimension B).

(b) Select an appropriate flange so that the pack clearance will meet the specified value.

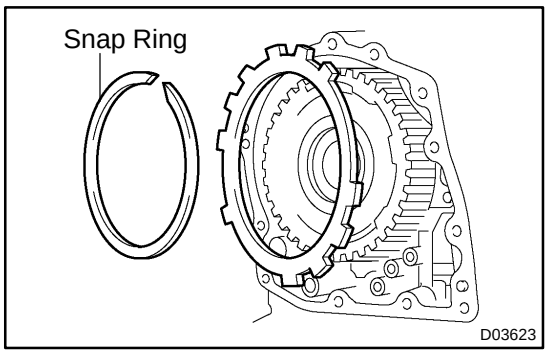
Pack clearance: 0.62 - 0.91 mm (0.0244 - 0.0358 in.)

HINT:

Piston stroke = Dimension B - Flange thickness - Snap ring thickness 1.6 mm (0.063 in.)

Flange thickness: mm (in.)

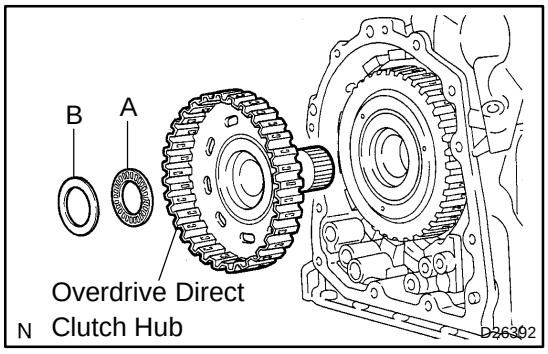
Mark	Thickness	Mark	Thickness
1	3.0 (0.118)	5	3.4 (0.134)
2	3.1 (0.122)	6	3.5 (0.138)
3	3.2 (0.126)	7	3.6 (0.142)
4	3.3 (0.130)	8	-



(c) Temporarily remove the snap ring, attach the selected flange and restore the snap ring.

NOTICE:

Secure the snap ring so that its gap is visible through the groove of the transaxle case.



109. INSTALL OVERDREVE DIRECT CLUTCH HUB SUB-ASSY

(a) Install the direct clutch hub to the planetary gear assy.

NOTICE:

Be careful not to damage the bush inside of the overdrive clutch hub during instaling.

(b) Coat the thrust bearing with ATF.

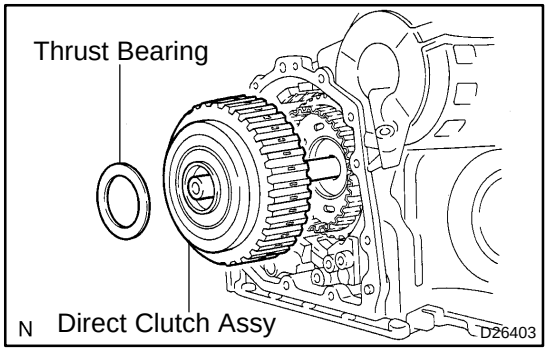
(c) Install the bearing race and the thrust bearing to the direct clutch hub.

NOTICE:

Installing the bearing, hold the part on the side of the overdrive clutch hub.

Bearing and race diameter: mm (in.)

	Inside	Outside
Bearing, A	24.7 (0.972)	39.5 (1.555)
Race, B	23.6 (0.929)	38.0 (1.496)



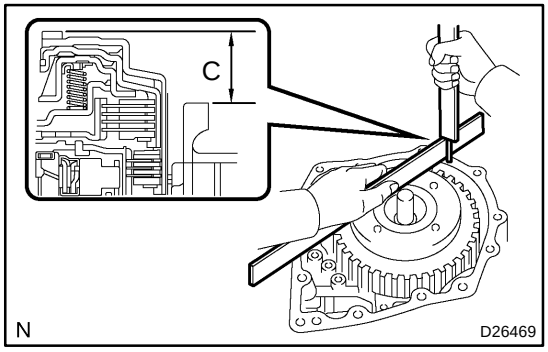
110. INSTALL DIRECT CLUTCH ASSY

(a) Coat the thrust bearing with ATF.

(b) Install the direct clutch assy and thrust bearing to the rear planetary sun gear assy.

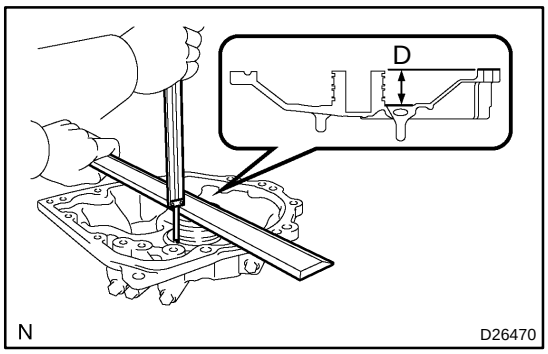
NOTICE:

The disc in the direct clutch should completely match with the hub attached outside the rear planetary sun gear. Otherwise, the rear cover can not be installed.



(c) Clean the connecter part of the transaxle case and the rear cover.

(d) As shown in the illustration, place a straight edge on the direct clutch drum and measure the distance between transaxle case and the straight edge using vernier calipers (Dimension C).



(e) Using vernier calipers and a simple straightedge, measure the position shown in the illustration.

(f) Calculate the end play value using the following formula. Select a thrust bearing which satisfies the end play value and install it.

End play: 0.244 - 0.901 mm (0.0096 - 0.0355 in.)

NOTICE:

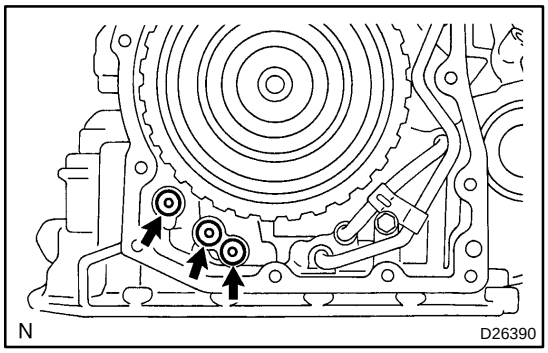
Make sure that the no colored race side is facing the direct clutch assy.

HINT:

End play = Dimension D - Dimension C

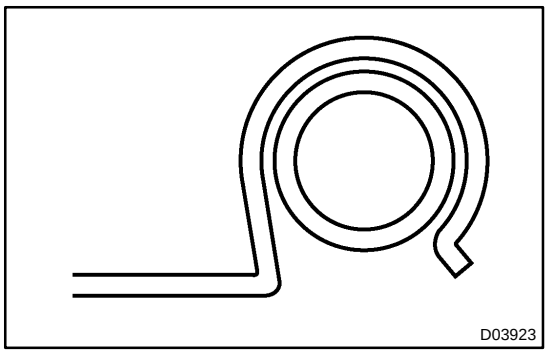
Bearing thickness and diameter : mm (in.)

Thickness	Inside	Outside
3.6 (0.1417)	56.3 (2.217)	75.7 (2.980)
3.8 (0.1496)	56.3 (2.217)	75.7 (2.980)



111. INSTALL GOVERNOR APPLY GASKET NO.1

(a) Install the 3 new governor apply gaskets No. 1 to the transaxle case.



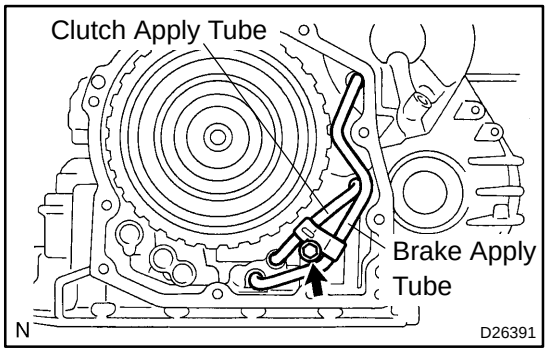
112. INSTALL BRAKE APPLY TUBE

(a) Install the clamp to the brake apply tube.

NOTICE:

Make sure to install the clamp to the apply tube before installing the apply tube to the transaxle case. This prevents the apply tube from being deformed or damaged.

(b) Install the clutch apply tube.

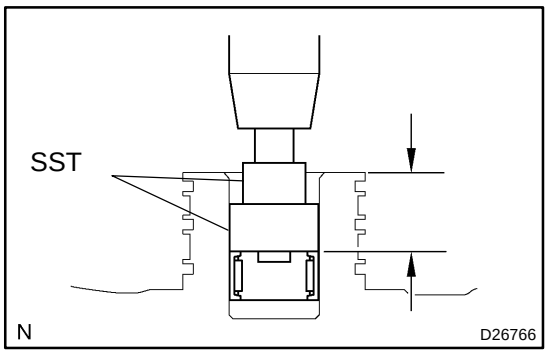


(c) Install the brake apply tube and a bolt to the transaxle case.

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

NOTICE:

Each pipe should be securely inserted until it reaches the stopper.



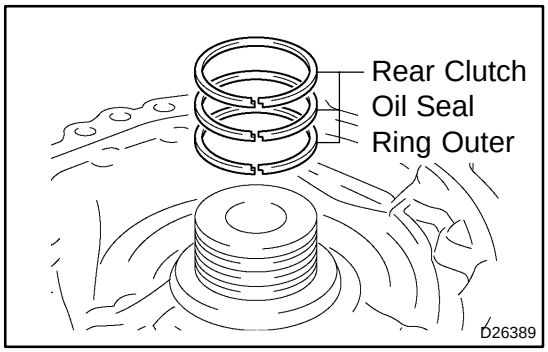
113. INSTALL NEEDLE ROLLER BEARING

(a) Using SST and a press, install the needle roller bearing to the transaxle rear cover.
SST 09950-60010 (09951-00230, 09952-06010)
Press fit depth: 20.55 - 21.25 mm (0.8091 - 0.8366 in.)

NOTICE:

- **Face the inscribed mark side of the bearing race up.**
- **Repeat the press fit until the specified value is obtained.**

(b) Coat a needle roller bearing with ATF.

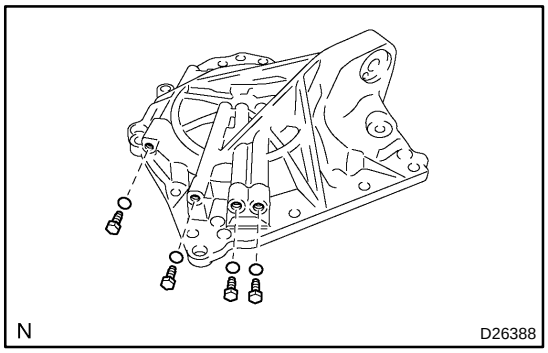


114. INSTALL REAR CLUTCH OIL SEAL RING OUTER

(a) Coat the 3 new rear clutch oil seal rings with ATF, install them to the transaxle rear cover.

NOTICE:

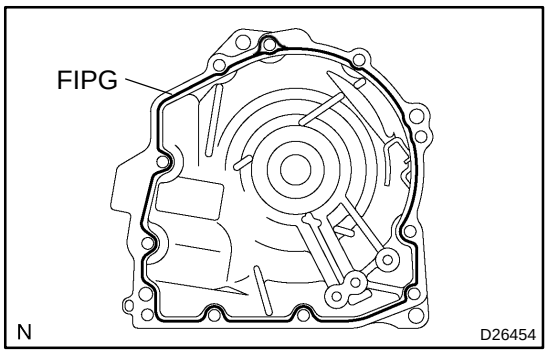
The snap ring should be fixed certainly in the groove of the drum.



115. INSTALL TRANSAXLE CASE NO.1 PLUG

(a) Install the 4 new O-ring to the 4 transaxle case No. 1 plugs.

(b) Install the 4 transaxle case No. 1 plugs to the transaxle rear cover.
Torque: 7.4 N·m (75 kgf·cm, 65 in.·lbf)



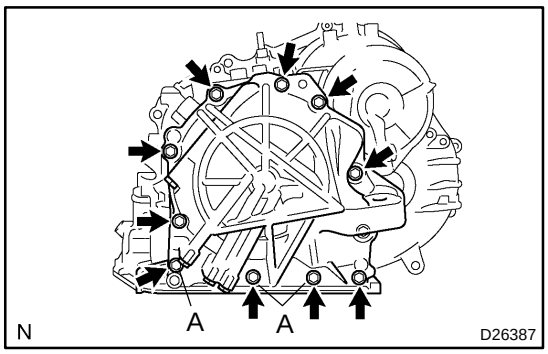
116. INSTALL TRANSAXLE REAR COVER SUB-ASSY

(a) Remove any packing material and be careful not to get oil on the contacting surfaces of the transaxle rear cover or the transaxle case.

(b) Apply FIPG to the cover.
FIPG:
Part No. 08826-00090, THREE BOND 1281 or equivalent.

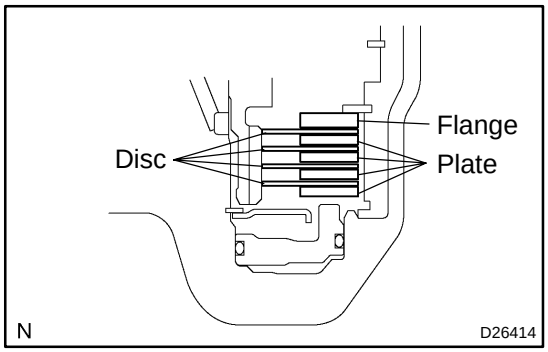
NOTICE:

Concerning about the amount of the FIPG application, the amount should be controlled to from even sealing film on entire flange surface and have slight protrusion of the FIPG all around of the connecting area. The FIPG shall be applied continuously on the flange. (Reference value of the section diameter: ϕ1.2)



(c) Apply liquid sealer to the "A" bolt threads.
Sealant:
Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent.

(d) Install the 11 bolts.
Torque:
Bolt A: 19.0 N·m (190 kgf·cm, 14 ft·lbf)
Other bolt: 25.0 N·m (250 kgf·cm, 18 ft·lbf)

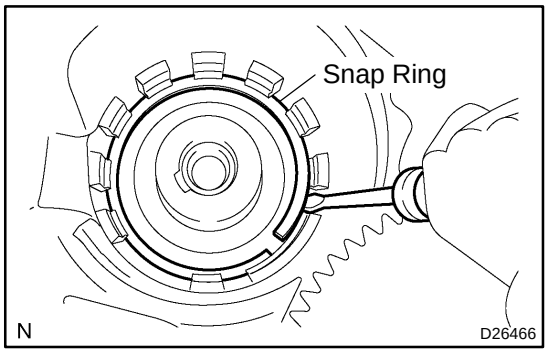


117. INSTALL UNDERDRIVE CLUTCH DISC NO.2

(a) Coat the 4 discs with ATF.

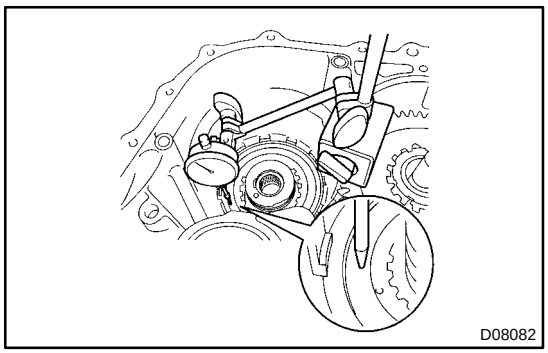
(b) Install the 4 discs, 4 plates and flange to the transaxle case.

NOTICE:
Be careful about the order of discs, plate and flange assembly.



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

NOTICE:
The snap ring should be fixed certainly in the groove of the drum.



118. INSPECT PACK CLEARANCE OF UNDERDRIVE BRAKE

(a) Using a dial indicator, measure the underdrive brake pack clearance while applying and releasing compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi).
Pack clearance: 1.81 - 2.20 mm (0.0713 - 0.0866 in.)

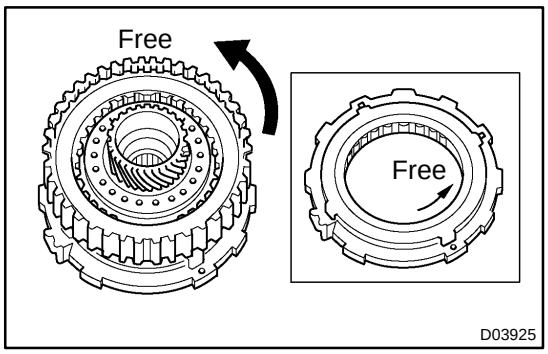
HINT:
Select an appropriate flange from the table below so that it will meet the specified value.

Flange thickness: mm (in.)

Mark	Thickness	Mark	Thickness
1	3.0 (0.118)	4	3.1 (0.122)
2	3.2 (0.126)	5	3.3 (0.130)
3	3.4 (0.134)	-	-

(b) Temporally remove the snap ring and attach to the flange.

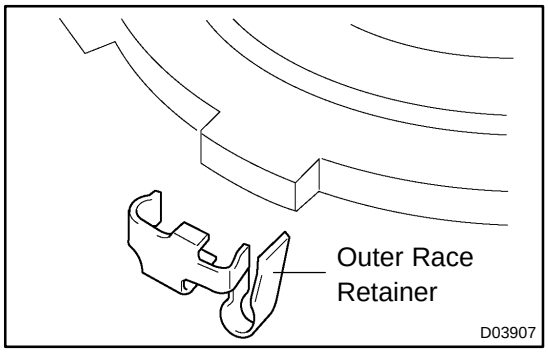
(c) Restore the snap ring.



119. INSPECT UNDERDRIVE 1 WAY CLUTCH ASSY

(a) Install the underdrive clutch assy to the 1-way clutch.

(b) Rotate the underdrive clutch assy to check the rotating direction for the lock or free operation.

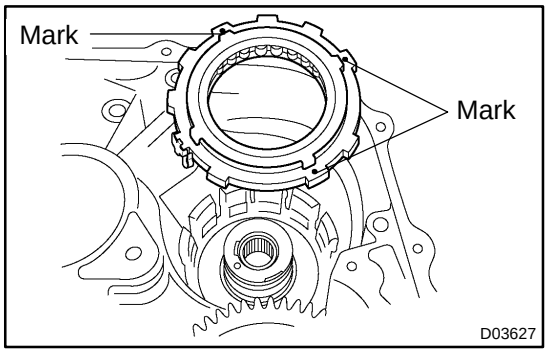


120. INSTALL UNDERDRIVE 1 WAY CLUTCH ASSY

(a) Install the outer race retainer to the 1-way clutch.

NOTICE:

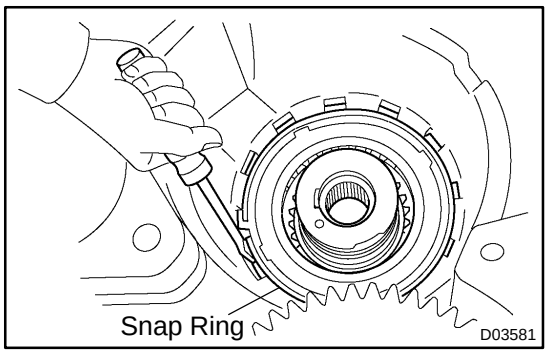
Fix the outer race retainer to the external tooth of the one way clutch surely.



(b) Install the 1-way clutch to the transaxle case.

NOTICE:

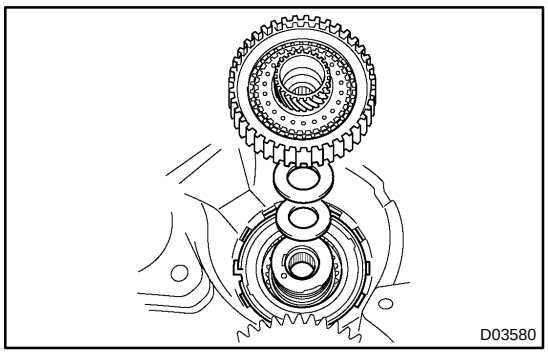
Make sure that the mark on the 1-way clutch outer race is visible.



(c) Using a screwdriver, install the snap ring to the transaxle case.

NOTICE:

The snap ring should be fixed certainly in the groove of the transaxle case as the gap exists except in the lock of teeth.



121. INSTALL UNDERDRIVE CLUTCH ASSY

(a) Coat the bearing and bearing race with petroleum jelly, install them onto the underdrive clutch.

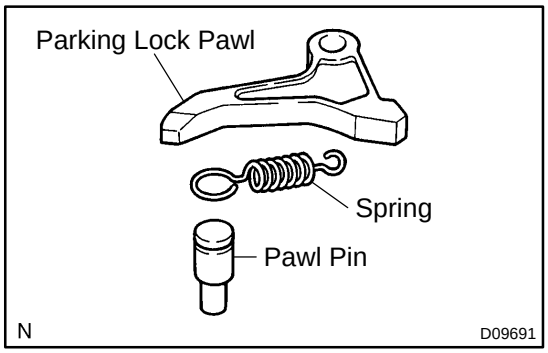
Bearing and bearing race diameter: mm (in.)

	Inside	Outside
Bearing	37.73 (1.4854)	58.0 (2.2835)
Race	29.9 (1.1772)	55.5 (2.185)

(b) Install the underdrive clutch assy to the transaxle case.

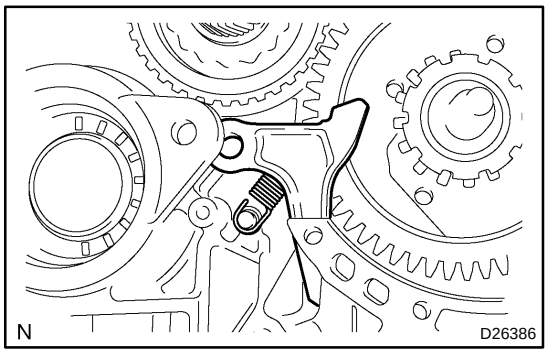
NOTICE:

Installing the underdrive clutch drum sub-assy, be sure not to damage the oil seal ring.

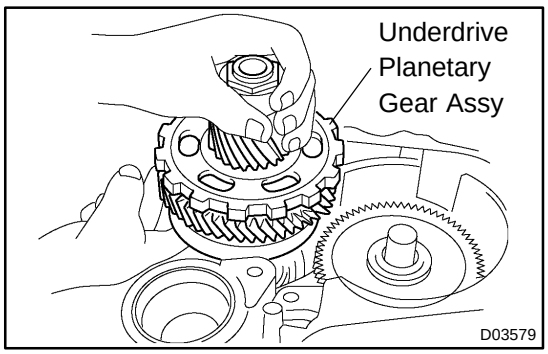


122. INSTALL PARKING LOCK PAWL

(a) Install the pawl pin and spring to the parking lock pawl.



(b) Temporarily install the parking lock pawl, shaft and spring to the transaxle case, as shown in the illustration.

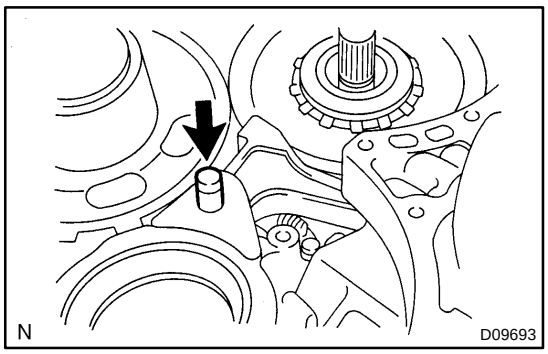


123. INSTALL UNDERDRIVE PLANETARY GEAR ASSY

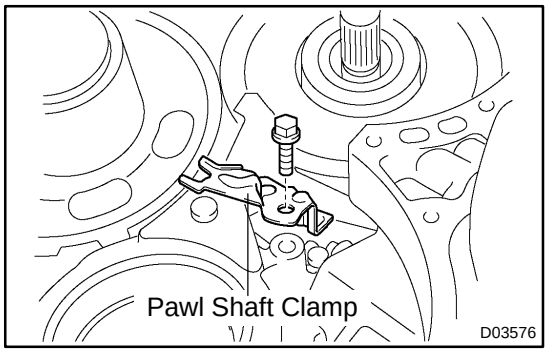
(a) Install the underdrive planetary gear assy to the transaxle case.

NOTICE:

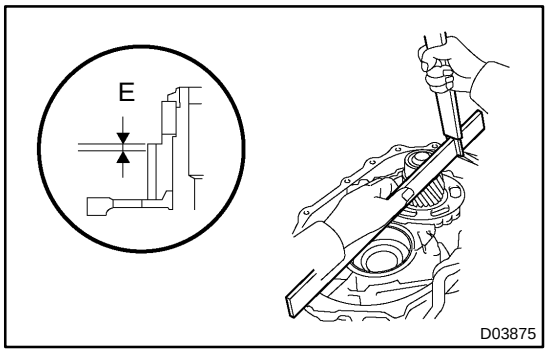
Engage all the discs of underdrive clutch and hub splines of the underdrive planetary gear assy firmly and assemble them securely.



(b) Install the parking lock pawl shaft.

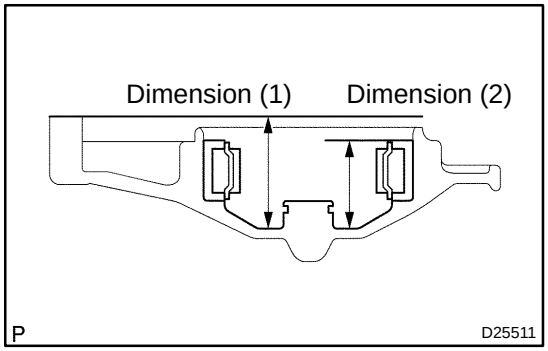


(c) Install the pawl shaft clamp with the bolt.
Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf)



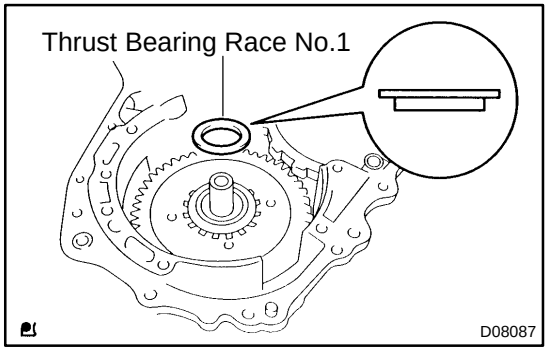
(d) Using a straight edge and vernier calipers as shown in the illustration, measure the gap between the top of the differential drive pinion in the underdrive planetary gear and contact surface of the transaxle case and housing (Dimension E).

NOTICE:
Note down the dimension E as it is necessary for the following process.



(e) As shown in the illustration, measure the 2 places of the transaxle housing, calculate the dimension F using the formula.

NOTICE:
Note down the dimension F as it is necessary for the following process.
HINT:
Dimension F = Dimension (1) - Dimension (2)

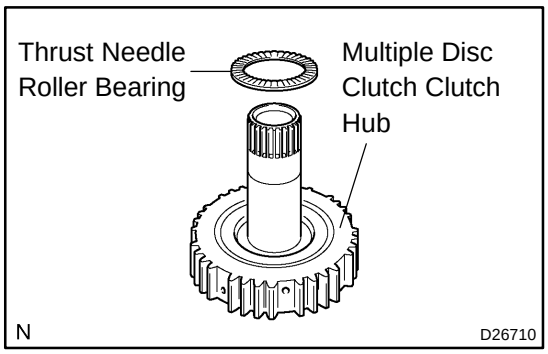


124. INSTALL MULTIPLE DISC CLUTCH CLUTCH HUB

(a) Install the thrust bearing race No.1 to the transaxle case while checking its direction.

Bearing race diameter: mm (in.)

	Inside	Outside
Bearing race	39.5 (1.555)	45.8 (1.803)

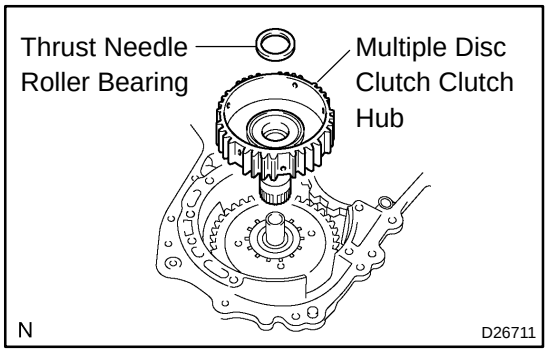


(b) Coat the thrust needle roller bearing and race with yellow petrolatum, install them onto the multiple disc clutch hub.

Thrust bearing and race diameter: mm (in.)

	Inside	Outside
Thrust Bearing	36.4 (1.433)	52.2 (2.055)

(c) Coat the needle roller bearing with ATF.

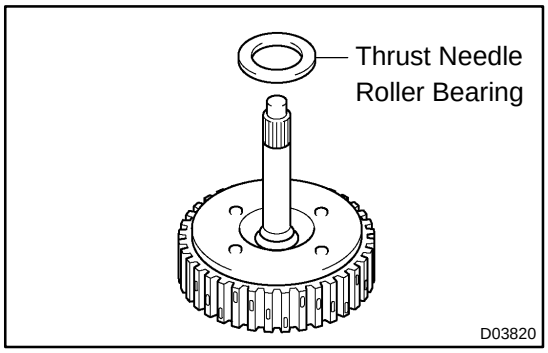


(d) Install the needle roller bearing to the multiple clutch hub.

Bearing diameter: mm (in.)

	Inside	Outside
Bearing	23.6 (0.929)	44 (1.732)

(e) Install the multiple clutch hub to the transaxle case.



125. INSTALL FORWARD CLUTCH ASSY

(a) Coat the thrust needle roller bearing with ATF.

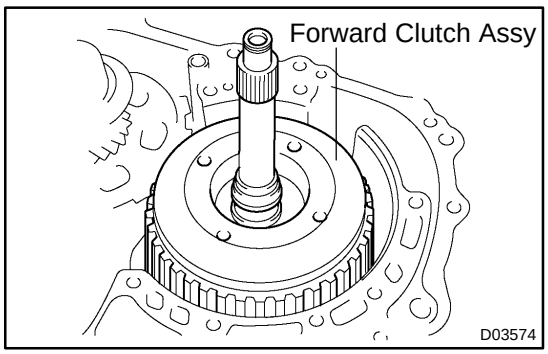
(b) Install the thrust needle roller bearing to the forward clutch.

Thrust bearing diameter: mm (in.)

	Inside	Outside
Thrust Bearing	33.58 (1.3220)	51.9 (2.043)

NOTICE:

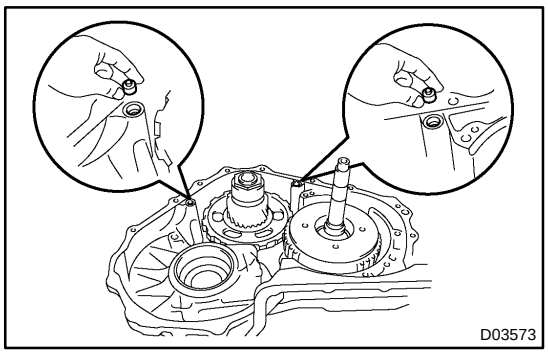
Install the thrust bearing properly so that the no colored race or blue ink jet race will be visible.



(c) Install the forward clutch to the forward clutch assy.

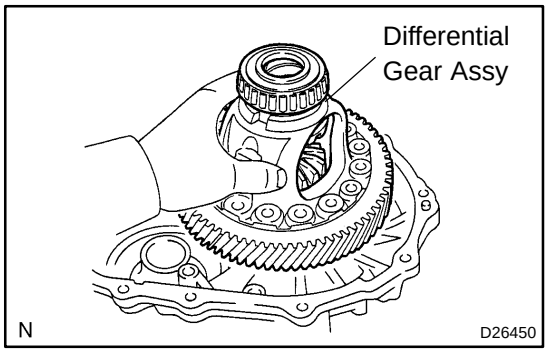
NOTICE:

- **Align the splines of all discs in the forward clutch with those of multiple clutch hub to assemble them securely.**
- **Be careful not to damage the bush inside of the forward clutch hub during installing.**



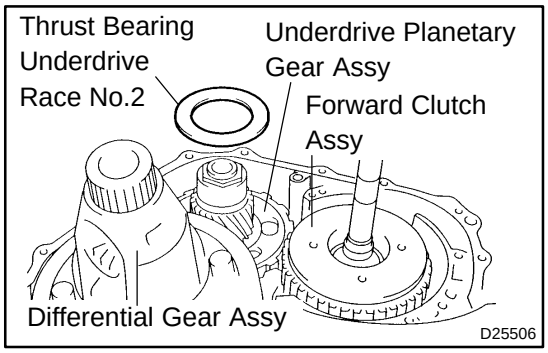
126. INSTALL OVERDRIVE BRAKE GASKET

(a) Install the 2 new overdrive brake gaskets.



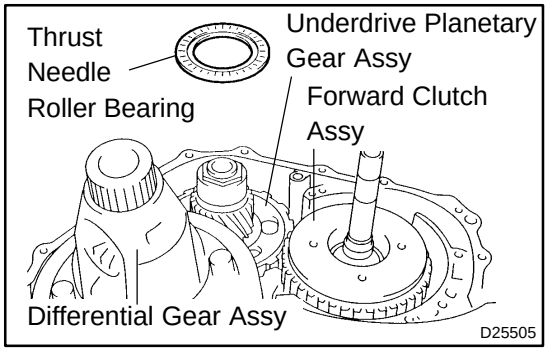
127. INSTALL DIFFERENTIAL GEAR ASSEMBLY

(a) Install the differential gear assy to the transaxle case.



128. INSTALL THRUST BEARING UNDERDRIVE RACE NO.2

(a) Install the thrust bearing underdrive race No.2 to the underdrive planetary gear assy.



129. INSTALL THRUST NEEDLE ROLLER BEARING

(a) Coat the thrust needle roller bearing with ATF.

(b) Calculate the end play value using the following formula and values of Dimension E and F that ware measured when installing cylindrical roller bearing and underdrive planetary gear. Select an appropriate underdrive planetary gear thrust bearing race No. 2 which satisfies the specified end play value, and install it.

End play: 0.498 - 0.993 mm (0.01961 - 0.03909 in.)

HINT:

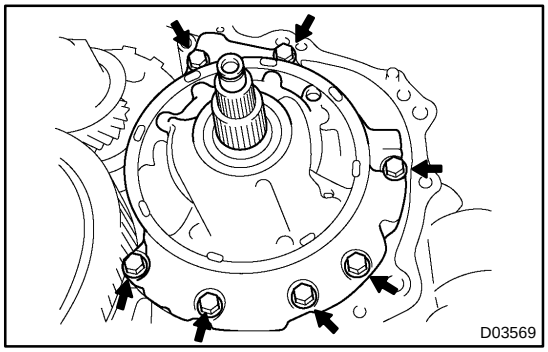
End play = Dimension F - Dimension E - thrust bearing thickness 2.5 mm (0.0984 in.) - underdrive thrust bearing race No. 2 thickness.

Race thickness: mm (in.)

F - E	Thickness
Less than 7.72 (0.3039)	3.5 (0.138)
7.72 (0.3039)	3.8 (0.150)

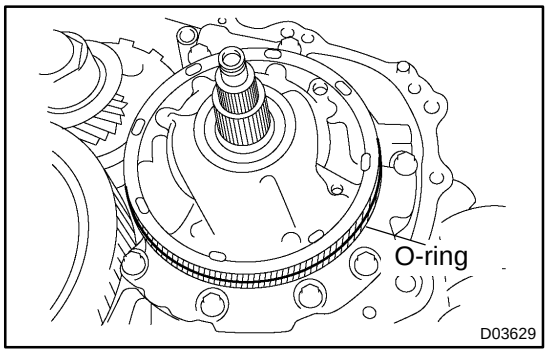
Bearing and bearing race diameter: mm (in.)

	Inside	Outside
Bearing	57.2 (2.252)	84.96 (3.345)
Bearing race	56.4 (2.22)	83 (3.268)



130. INSTALL OIL PUMP ASSY

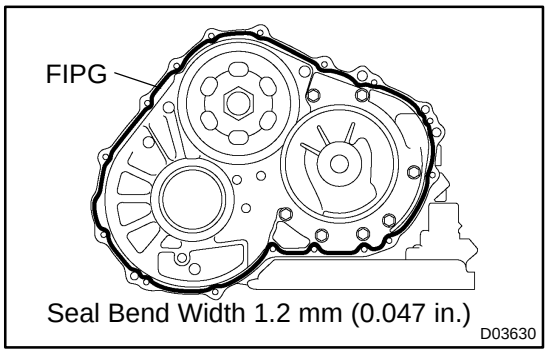
(a) Install the oil pump to the transaxle case with the 7 bolts.
Torque: 22.0 N·m (226 kgf·cm, 16 ft·lbf)



(b) Coat the O-ring of oil pump with ATF.

NOTICE:

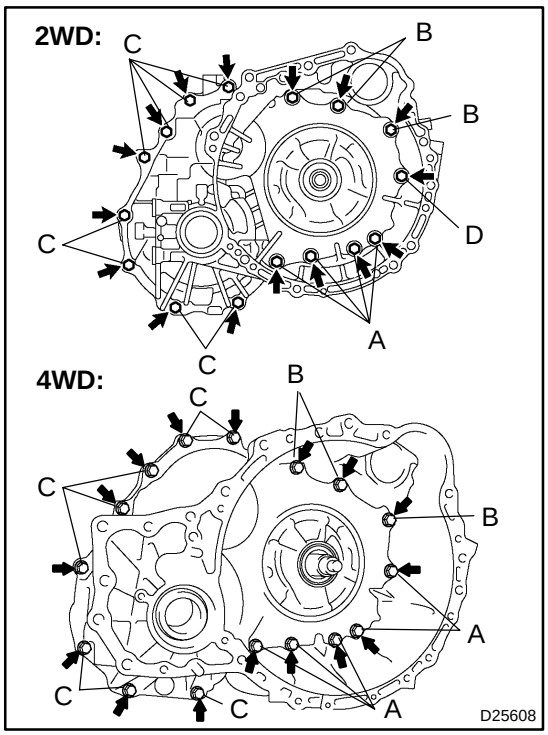
Confirm the input shaft rotates smoothly with the manual operation after assembling the oil pump.



131. INSTALL TRANSAXLE HOUSING

(a) Remove any parking material and be careful not to get oil on the contacting surface of the transaxle case or transaxle housing.

(b) Apply FIPG to the transaxle case.
FIPG:
Part No. 08826-00090, THREE BOND 1281 or equivalent



(c) Install the transaxle housing and 16 bolts to the transaxle case.

Torque:
Bolt A: 25 N·m (255 kgf·cm, 18 ft·lbf)
Bolt B: 33 N·m (337 kgf·cm, 24 ft·lbf)
Bolt C: 29 N·m (295 kgf·cm, 21 ft·lbf)
Bolt D: 22 N·m (226 kgf·cm, 16.0 ft·lbf)

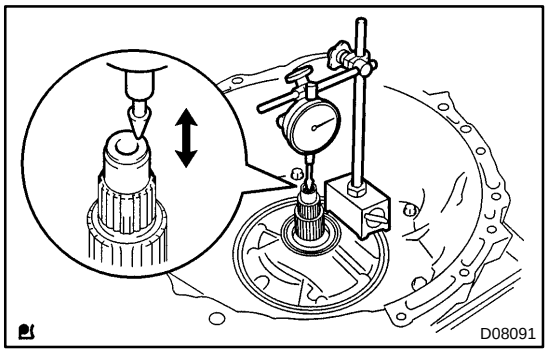
HINT:

Apply seal packing or equivalent to the bolt A and D.

Seal packing:
THREE BOND 2403 or equivalent
Bolt length:
Bolt A: 50 mm (1.969 in.)
Bolt B: 50 mm (1.969 in.)
Bolt C: 42 mm (1.654 in.)
Bolt D: 72 mm (2.835 in.)

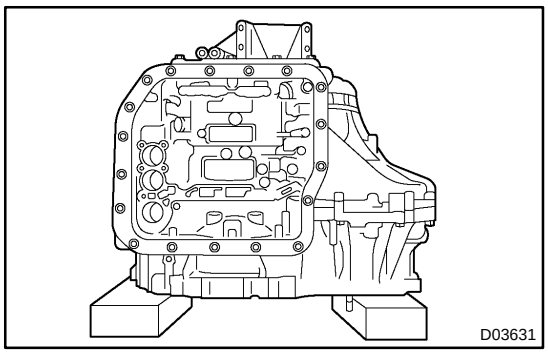
NOTICE:

Because the bolt A is a seal bolt, apply the seal packing to new bolts and tighten them within 10 minutes after application.



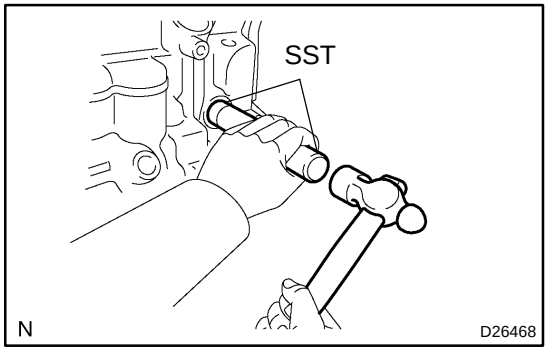
132. INSPECT INPUT SHAFT ENDPLAY

(a) Using a dial indicator, measure the input shaft end play.
End play: 0.262 - 1.249 mm (0.0100 - 0.0494 in.)



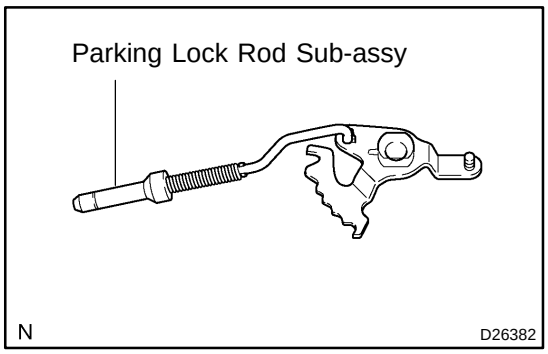
133. FIX AUTOMATIC TRANSAXLE ASSY

(a) Fix the transaxle assy.



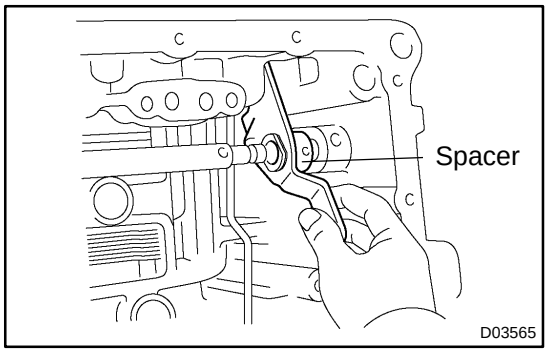
134. INSTALL MANUAL VALVE LEVER SHAFT OIL SEAL

(a) Coat a new oil seal with MP grease.
(b) Install the oil seal to the transaxle case.
SST 09950- 60010 (09951- 00230), 09950- 70010 (09951-07100)
Oil seal drive in depth: 0 ± 0.5 mm (0 ± 0.0197 in.)



135. INSTALL PARKING LOCK ROD SUB-ASSY

(a) Install the parking lock rod to the manual valve lever.

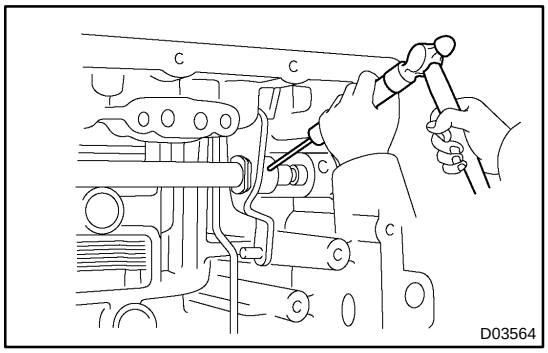


136. INSTALL MANUAL VALVE LEVER SUB-ASSY

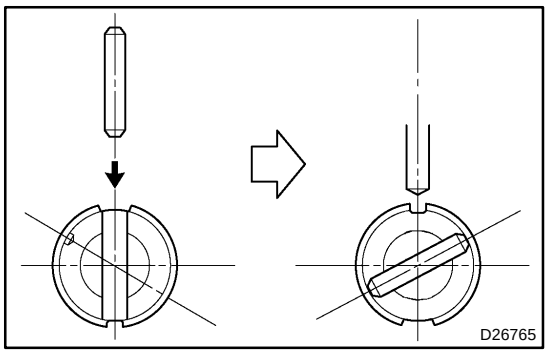
(a) Install a new spacer and manual valve lever shaft to the transaxle case.

NOTICE:

Do do not damage on the oil seal during assembling the shaft to the transaxle case.



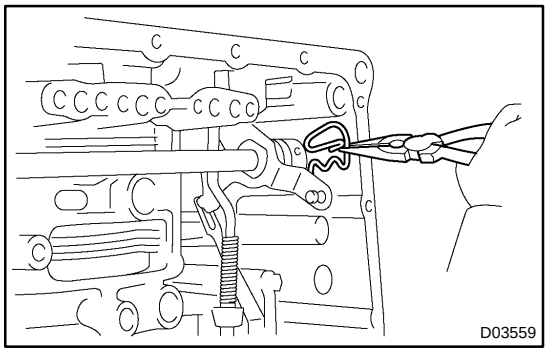
(b) Using a pin punch and hammer, drive in a new pin.



(c) Turn the spacer and the lever shaft to align the small hole for locating the staking position in the spacer with the staking position mark on the lever shaft.

(d) Using a pin punch, stake the spacer through the small hole.

(e) Check that the spacer does not turn.

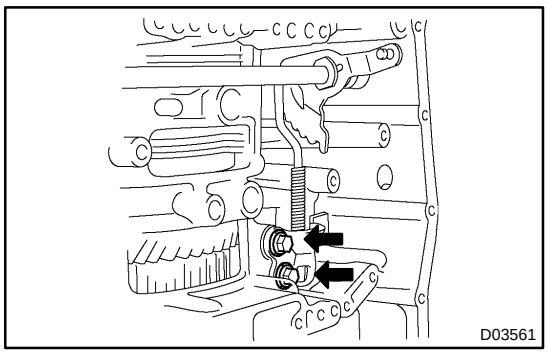


137. INSTALL MANUAL VALVE LEVER SHAFT RETAINER SPRING

(a) Using needle-nose pliers, install the retainer spring.

NOTICE:

Hang the spring on the shaft certainly.



138. INSTALL PARKING LOCK PAWL BRACKET

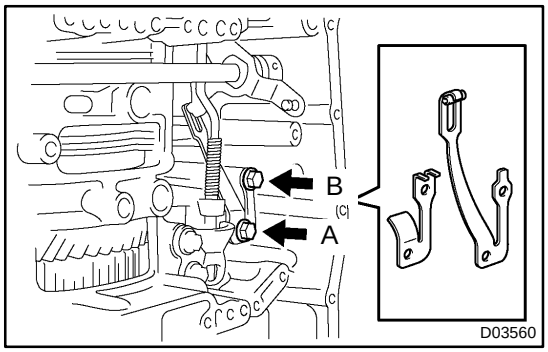
(a) Install the parking lock pawl bracket with the 2 bolts.

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

Bolt length: 25 mm (0.984 in.)

NOTICE:

Be sure the parking rod is placed between the parking pawl and the guide of the parking bracket when the parking bracket is assembled.



139. INSTALL MANUAL DETENT SPRING SUB-ASSY

(a) Install the manual detent spring with the 2 bolts.

NOTICE:

Make sure to install the manual detent spring and cover in this order.

HINT:

Tighten them in the order, A and B.

Torque:

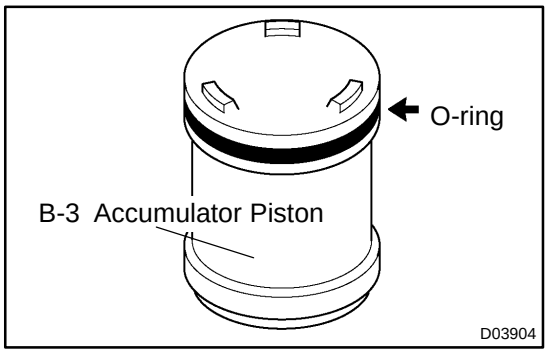
Bolt A: 20 N·m (205 kgf·cm, 15 ft·lbf)

Bolt B: 12 N·m (120 kgf·cm, 9 ft·lbf)

Bolt length:

Bolt A: 27 mm (1.063 in.)

Bolt B: 16 mm (0.630 in.)

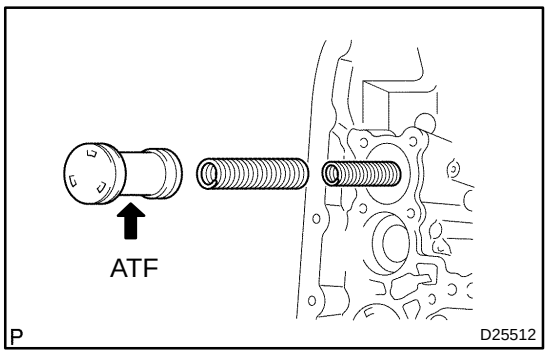


140. INSTALL B-3 ACCUMULATOR PISTON

(a) Coat a new O-ring with ATF, install it to the B-3 accumulator piston.

NOTICE:

Install the O-ring to the accumulator piston and the accumulator sleeve not to have a twist and a protrusion. Moreover, apply enough ATF prior to assembling. Be sure to the installed position.



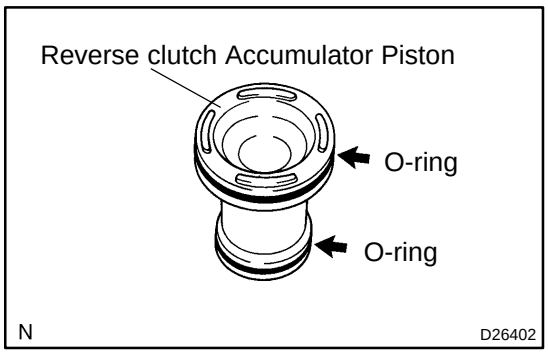
(b) Coat the piston with ATF, install it to the transaxle case.

NOTICE:

Install the springs to each accumulator piston with checking of the identification color or each spring.

Accumulator spring:

Free length Outer diameter mm (in.)	Color
Inner 62.00 (2.4409) / 15.50 (0.610)	Purple
Outer 74.23 (2.9224) / 21.70 (0.854)	Purple

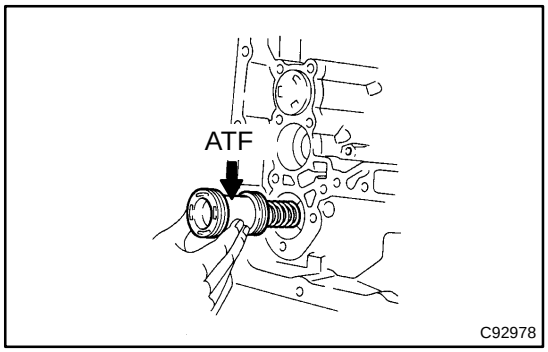


141. INSTALL REVERSE CLUTCH ACCUMULATOR PISTON

(a) Coat the 2 new O-rings with ATF, install them to the reverse accumulator piston.

NOTICE:

Install the O-ring to the accumulator piston and the accumulator sleeve not to have a twist and a protrusion. Moreover, apply enough ATF prior to assembling. Be sure to the installed position.



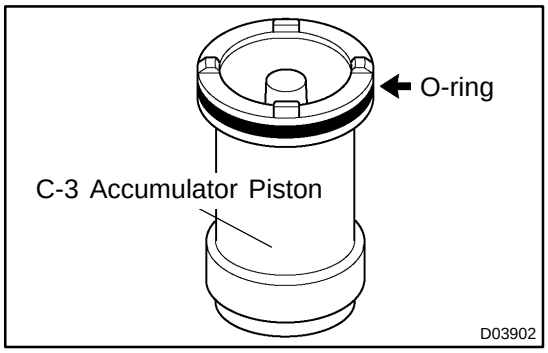
(b) Coat the piston with ATF, install it to the transaxle case.

NOTICE:

Install the springs to each accumulator piston with checking of the identification color or each spring.

Accumulator spring:

Free length Outer diameter mm (in.)	Color
60.96 (2.3999) / 14.10 (0.555)	Yellow

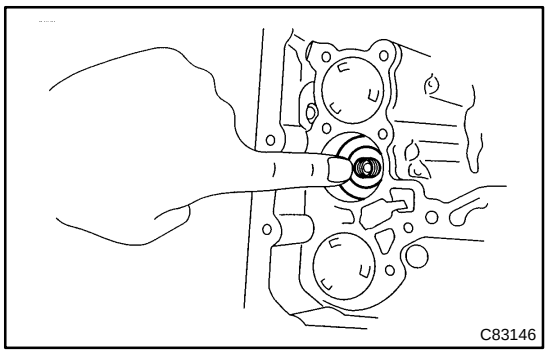


142. INSTALL C-3 ACCUMULATOR PISTON

(a) Coat a new O-ring with ATF, install it to the C-3 accumulator piston.

NOTICE:

Install the O-ring to the accumulator piston and the accumulator sleeve not to have a twist and a protrusion. Moreover, apply enough ATF prior to assembling. Be sure to the installed position.



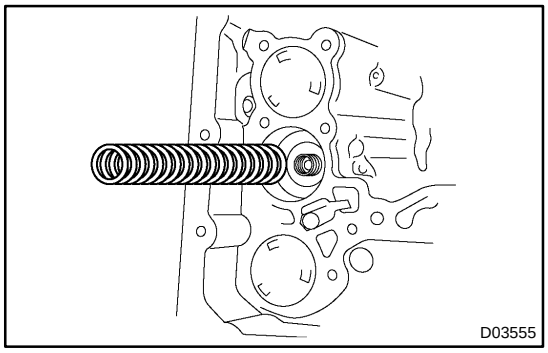
(b) Coat the piston with ATF, install it to the transaxle case.

NOTICE:

Install the springs to each accumulator piston with checking of the identification color or each spring.

Accumulator spring:

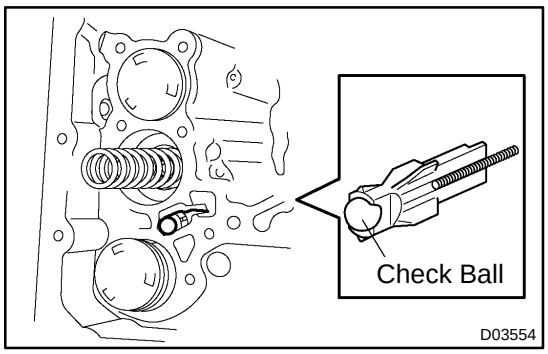
Free length Outer diameter mm (in.)	Color
72.20 (2.8425) / 19.0 (0.748)	Colorless



(c) Install the spring from the C-3 accumulator piston.

NOTICE:

Install the springs to each accumulator piston with checking of the identification color or each spring.



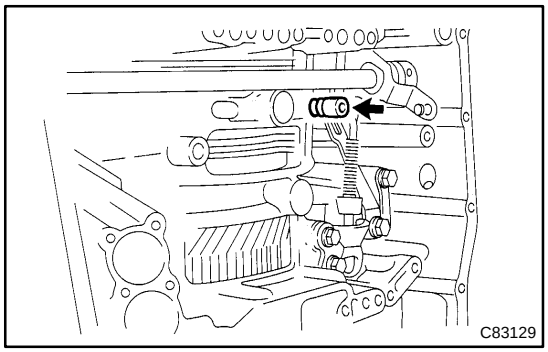
143. INSTALL CHECK BALL BODY

(a) Coat the check ball body with ATF.

(b) Install the check ball body and spring.

NOTICE:

Regarding the installation of the spring for the check ball body, be sure to place the spring in the hole in the ball body. Be careful about the parts orientation.

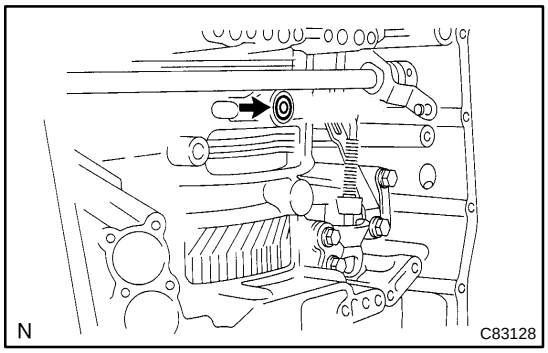


144. INSTALL BRAKE DRUM GASKET

(a) Coat a new brake drum gasket with ATF, install it to the transaxle case.

NOTICE:

Be sure not to damage the lip portion of the transaxle case brake gasket when inserting the gasket to the case. Moreover, apply enough ATF to the gasket prior to assembling. Also, be careful about the parts orientation.

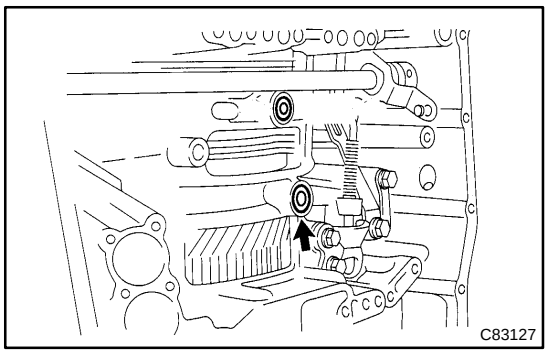


145. INSTALL TRANSAXLE CASE 2ND BRAKE GASKET

(a) Coat a new transaxle case 2nd brake gasket with ATF, install it to the transaxle case.

NOTICE:

Be sure not to damage the lip portion of the transaxle case brake gasket when inserting the gasket to the case. Moreover, apply enough ATF to the gasket prior to assembling. Also, be careful about the parts orientation.

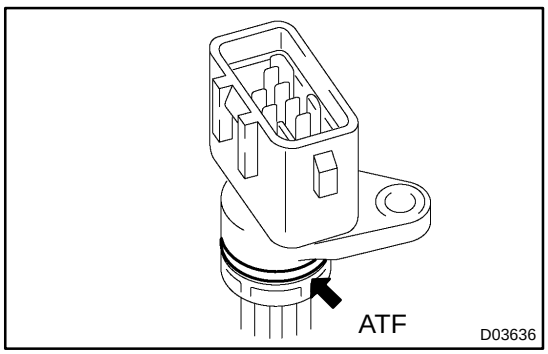


146. INSTALL GOVERNOR APPLY GASKET NO.1

(a) Coat a new governor apply gasket No. 1 with ATF, install it to the transaxle case.

NOTICE:

Be sure not to damage the lip portion of the transaxle case brake gasket when inserting the gasket to the case. Moreover, apply enough ATF to the gasket prior to assembling. Also, be careful about the parts orientation.

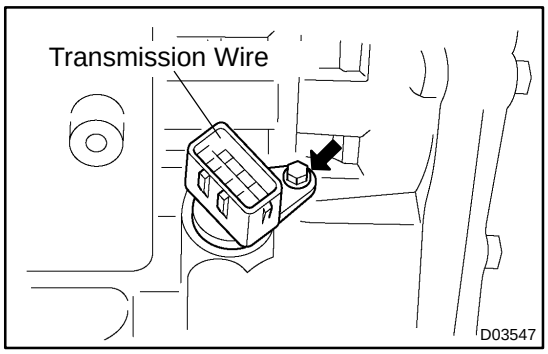


147. INSTALL TRANSMISSION WIRE

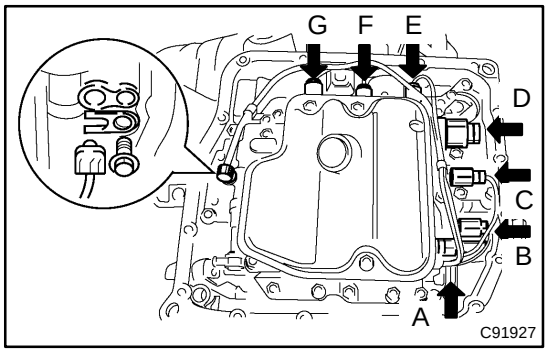
(a) Coat a new O-ring with ATF, install it to the transmission wire.

NOTICE:

Be careful about the O-ring not to have a twist, a protrusion and a pinching during installing the wire transmission to the transaxle case. Moreover, apply enough ATF to the O-ring prior to assembling.



(b) Install the transmission wire retaining bolt.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)



148. CONNECT TRANSMISSION WIRE

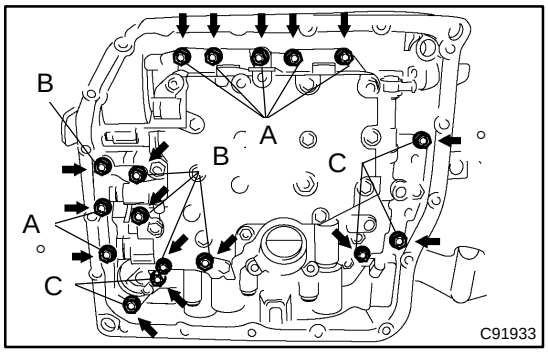
(a) Coat a O-ring of the ATF temperature sensor with ATF.

(b) Install the ATF temperature sensor, with the lock plate and bolt.
Torque: 6.6 N·m (67 kgf·cm, 58 in.·lbf)

(c) Connect the 7 solenoid connectors.

NOTICE:

- **Connect the connector to A, B, C, D, E, F, G, from shorter one.**
- **Apply ATF to the bolt.**

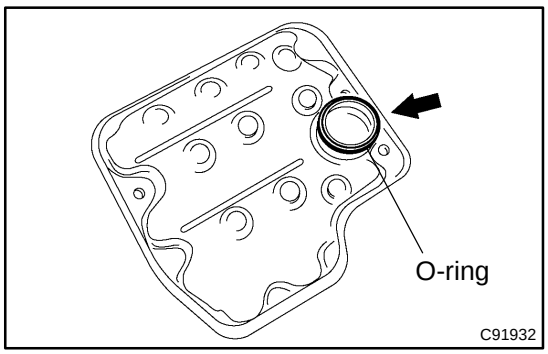


149. INSTALL TRANSMISSION VALVE BODY ASSY

(a) Make sure that the manual valve lever position, install the valve body with 17 bolts to the transaxle case.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)
Bolt length:
Bolt A: 41 mm (1.614 in.)
Bolt B: 57 mm (2.244 in.)
Bolt C: 25 mm (0.984 in.)

NOTICE:

- **Push the valve body against the accumulator piston spring and the check ball body to install it.**
- **When installing the valve body to the transaxle case, do not hold the solenoids.**
- **Tighten temporarily those bolts marked by ° in the illustration first because they are positioning bolts.**

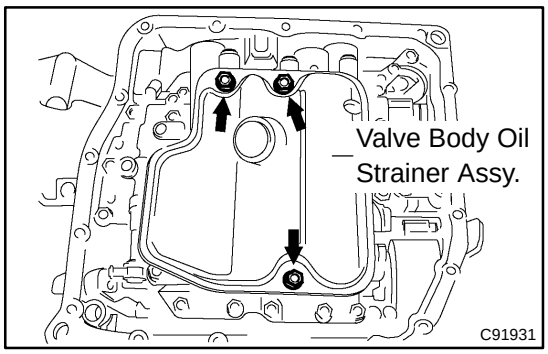


150. INSTALL VALVE BODY OIL STRAINER ASSY

(a) Coat a new O-ring with ATF, install it to the oil strainer.

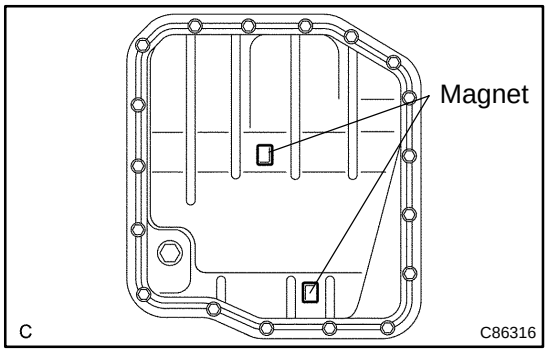
NOTICE:

Assemble the O-ring carefully not to have a twist and a pinching. Moreover, apply enough ATF to the O-ring prior to assembling.



(b) Install the oil strainer and 3 bolts to the valve body.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

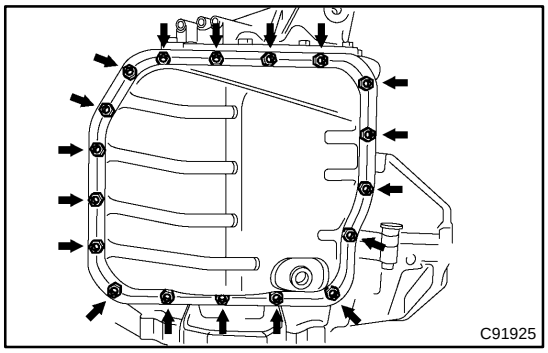
NOTICE:
Apply ATF to the bolts.



151. INSTALL AUTOMATIC TRANSAXLE OIL PAN SUB-ASSY

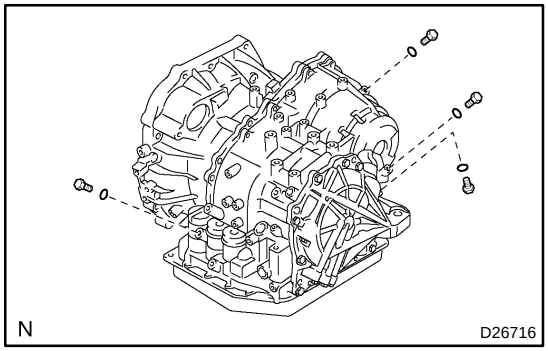
(a) Install the 2 magnets in the oil pan.

(b) Apply seal packing or equivalent to new 18 bolts.
Seal packing:
THREE BOND 2430 or equivalent



(c) Install the new oil pan gasket with the 18 bolts to the transaxle case.
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

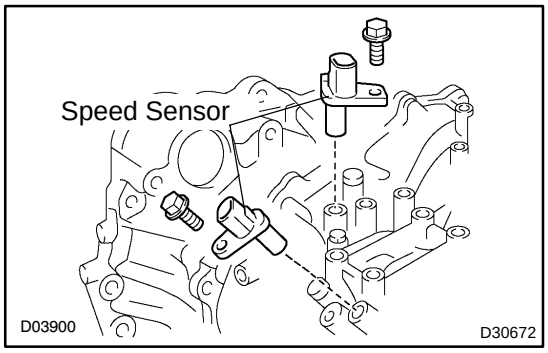
NOTICE:
- **Because the bolts should be seal bolts, apply seal packing to new bolts and tighten them within 10 minutes after application.**
- **Remove any oil or grease from the contacting surface of the transaxle case and the oil pan with the gasket completely before the oil pan to the case.**



152. INSTALL TRANSAXLE CASE NO.1 PLUG

(a) Coat the 4 new O-rings with ATF, install them to the 4 transaxle case No. 1 plugs.

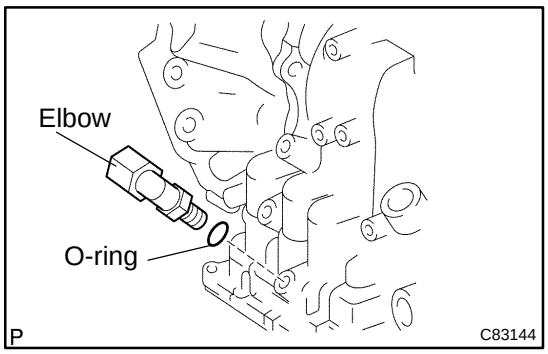
(b) Install the 4 transaxle case No. 1 plugs to the transaxle case.
Torque: 7.4 N·m (75 kgf·cm, 65 in.·lbf)



153. INSTALL SPEED SENSOR

(a) Install them to the 2 sensors.

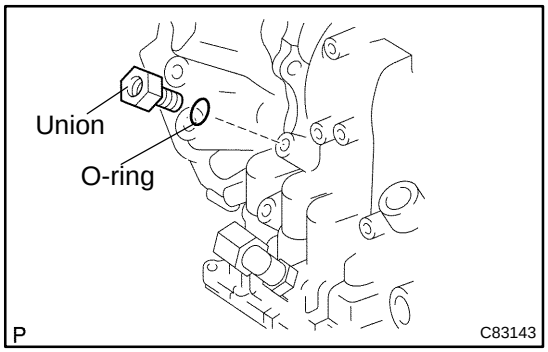
(b) Install the 2 sensors to the transaxle case with the 2 bolts.
Torque: 11.0 N·m (115 kgf·cm, 8 ft·lbf)



154. INSTALL OIL COOLER TUBE UNION (OUTLET OIL COOLER UNION)

(a) Coat a new O-ring with ATF, install it to the elbow.

(b) Install the elbow to the transaxle case.
Torque: 27 N·m (276 kgf·cm, 20 ft·lbf)



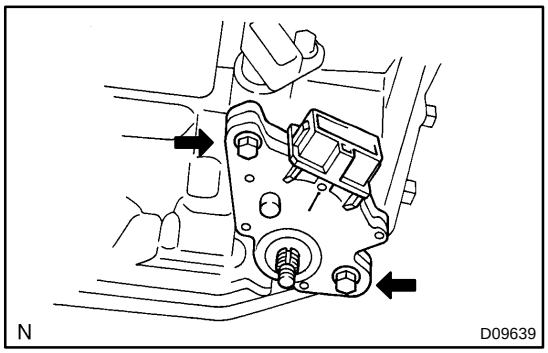
155. INSTALL OIL COOLER TUBE UNION (INLET OIL COOLER UNION)

(a) Coat a new O-ring with ATF, install it to the union.

(b) Install the union to the transaxle case.
Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)

156. INSTALL BREATHER PLUG HOSE

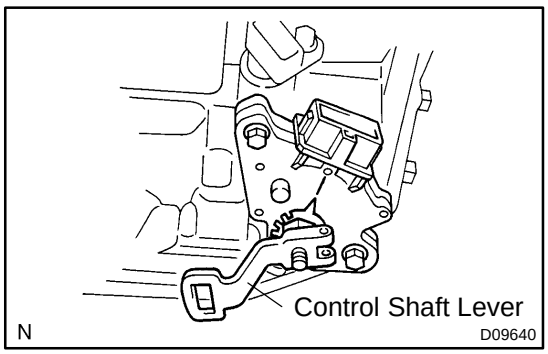
(a) Install the breather plug hose into the transaxle case certainly.



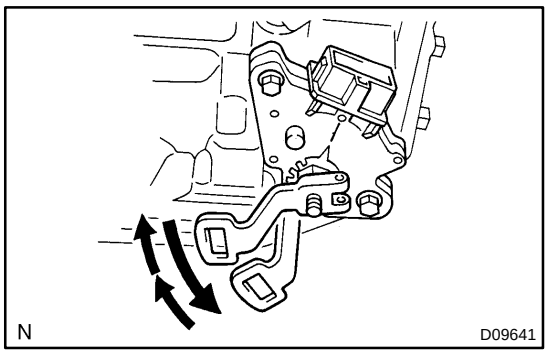
157. INSTALL PARK/NEUTRAL POSITION SWITCH ASSY

(a) Install the park/neutral position switch onto the manual valve lever shaft and temporarily install the 2 adjusting bolts.

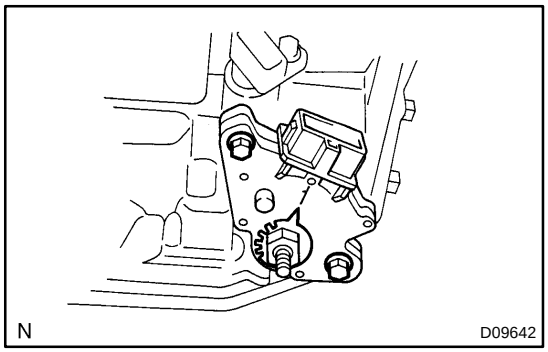
(b) Install a new nut stopper and nut.
Torque: 6.9 N·m (70 kgf·cm, 61 in.·lbf)



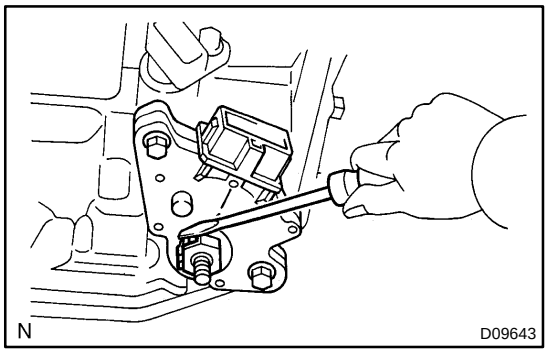
(c) Temporarily install control shaft lever.



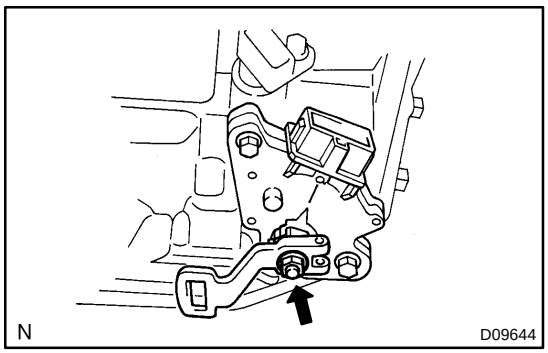
(d) Turn the lever counterclockwise until it stops, and then turn it clockwise 2 notches.
(e) Remove the control shaft lever.



(f) Align the groove with neutral basic line.
(g) Tighten the 2 bolts.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)



(h) Using a screwdriver, stake the nut with the nut stopper.



(i) Install the control shaft lever, washer and nut.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

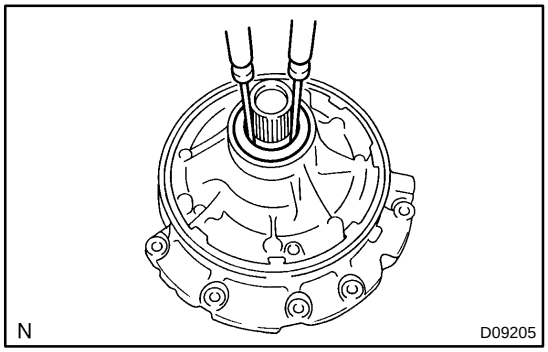
158. INSTALL SPEEDOMETER DRIVEN HOLE (ATM) COVER SUB-ASSY

(a) Coat a new O-ring with ATF and install it to the speedometer driven hole cover.
(b) Install the bolt and speedometer driven hole cover sub-assy to the transaxle assy.
Torque: 6.9 N·m (70 kgf·cm, 61 ft·lbf)

OIL PUMP ASSY (U151E/U151F)

4006F-03

OVERHAUL

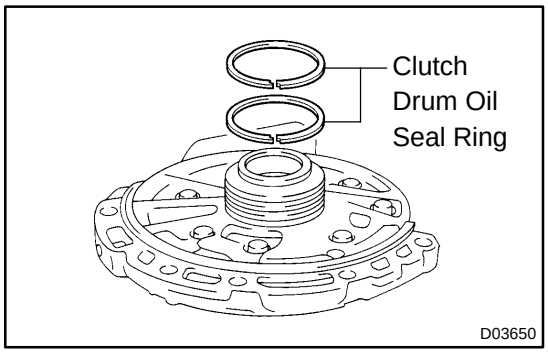


1. INSPECT OIL PUMP ASSY

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

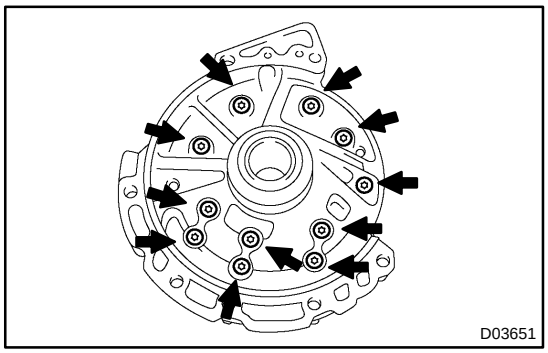
NOTICE:

Be careful not to damage the oil seal lip.



2. REMOVE CLUTCH DRUM OIL SEAL RING

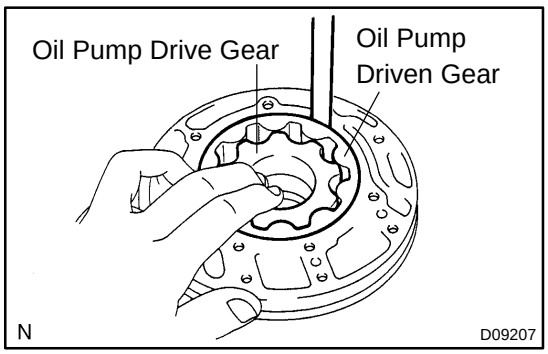
(a) Remove the 2 clutch drum oil seal rings.



3. REMOVE STATOR SHAFT ASSY

(a) Using a torx socket (T30), remove the 11 bolts and stator shaft.

(b) Keep the gears in assembling order.



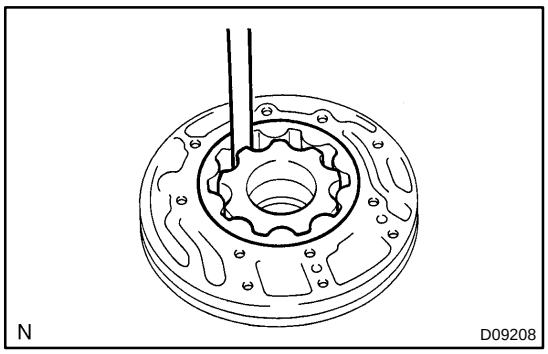
4. INSPECT CLEARANCE OF OIL PUMP ASSEMBLY

(a) Push the driven gear to one side of the body.

(b) Using a feeler gauge, measure the clearance.

Standard body clearance:
0.10 - 0.17 mm (0.0039 - 0.0067 in.)
Side clearance: 0.02 - 0.05 mm (0.001 - 0.02 in.)
Maximum body clearance: 0.17 mm (0.0067 in.)

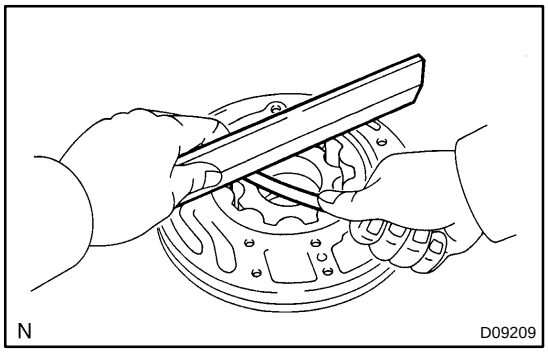
If the body clearance is greater than the maximum, replace the oil pump body sub-assy.



(c) Using a feeler gauge measure the tip clearance between the driven gear teeth and drive gear teeth.

Standard tip clearance:
0.07 - 0.15 mm (0.0028 - 0.0059 in.)
Maximum tip clearance: 0.15 mm (0.0059 in.)

If the tip clearance is greater than the maximum, replace the oil pump body sub-assy.



(d) Using a straight edge and feeler gauge, measure the side clearance of both gears.

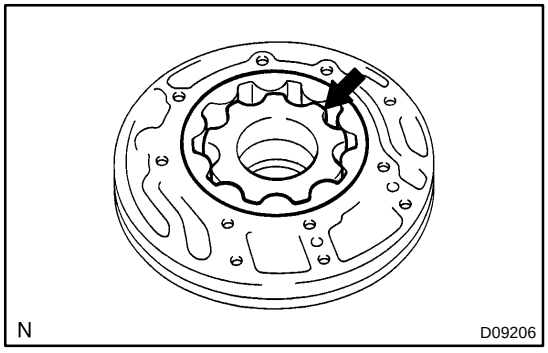
Standard side clearance:
0.02 - 0.05 mm (0.0008 - 0.0020 in.)
Maximum side clearance: 0.05 mm (0.0020 in.)

Drive gear thickness: mm (in.)

Mark	Thickness
A	11.690 - 11.699 (0.4602 - 0.4606)
B	11.700 - 11.709 (0.4606 - 0.4610)
C	11.710 - 11.720 (0.4610 - 0.4614)
D	11.721 - 11.730 (0.4615 - 0.4618)
E	11.731 - 11.740 (0.4619 - 0.4622)

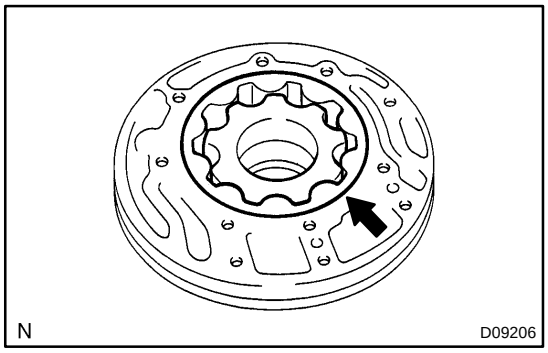
Driven gear thickness: mm (in.)

Mark	Thickness
A	11.690 - 11.699 (0.4602 - 0.4606)
B	11.700 - 11.709 (0.4606 - 0.4610)
C	11.710 - 11.720 (0.4610 - 0.4614)
D	11.721 - 11.730 (0.4615 - 0.4618)
E	11.731 - 11.740 (0.4619 - 0.4622)



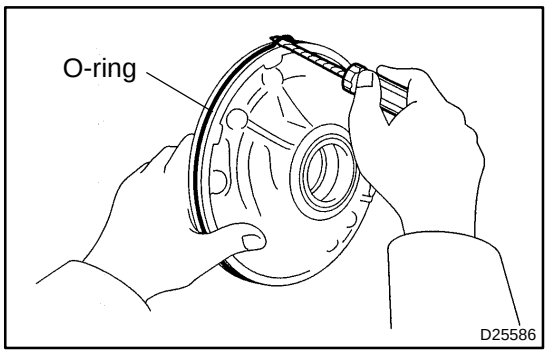
5. REMOVE FRONT OIL PUMP DRIVE GEAR

(a) Remove the front oil pump drive gear.



6. REMOVE FRONT OIL PUMP DRIVEN GEAR

(a) Remove the front oil pump driven gear.

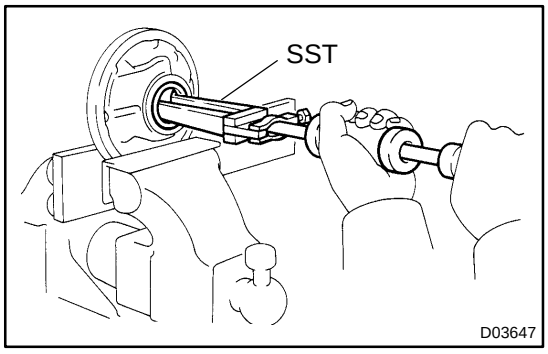


7. REMOVE FRONT OIL PUMP BODY O-RING

(a) Using a screwdriver, remove the O-ring.

HINT:

Tape the screwdriver before use.

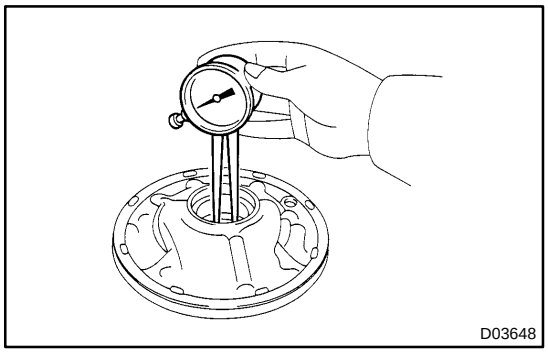


8. REMOVE FRONT OIL PUMP OIL SEAL

(a) Mount oil pump in a soft jaw vise.

(b) Using SST, remove the oil seal from the oil pump body.

SST 09308-00010



9. INSPECT FR OIL PUMP & GEAR BODY SUB-ASSY

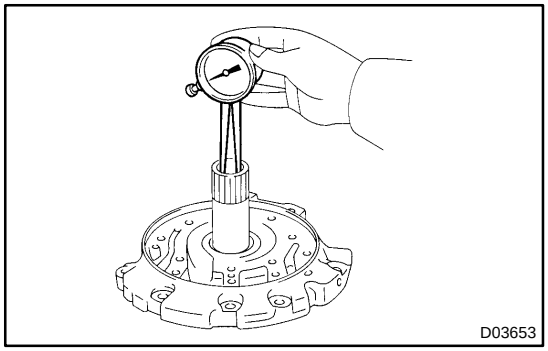
(a) Using a dial indicator, measure the inside diameter of the oil pump body bushing.

Standard inside diameter:

38.113 - 38.138 mm (1.50051 - 1.50149 in.)

Maximum inside diameter: 38.188 mm (1.50346 in.)

If the inside diameter is greater than the maximum, replace the oil pump body sub-assy.



10. INSPECT STATOR SHAFT ASSY

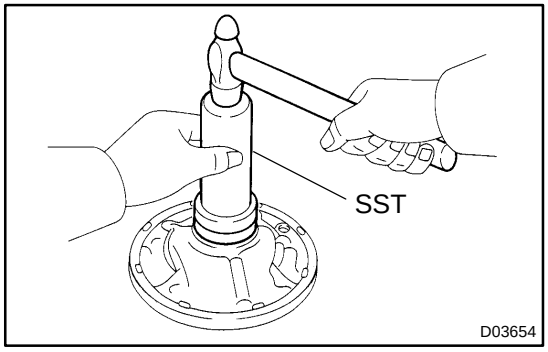
(a) Using a dial indicator, measure the inside diameter of the stator shaft.

Standard inside diameter:

21.500 - 21.526 mm (0.84646 - 0.84748 in.)

Maximum inside diameter: 21.57 mm (0.8492 in.)

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



11. INSTALL FRONT OIL PUMP OIL SEAL

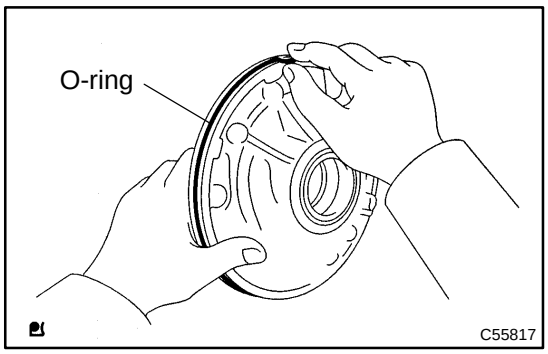
(a) Using SST and a hammer, install a new oil seal to the oil pump body.

SST 09350-32014 (09351-32140)

HINT:

The seal end should be flat with the outer edge of the oil pump.

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

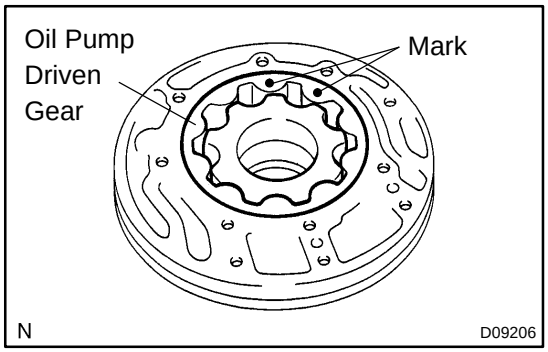


12. INSTALL FRONT OIL PUMP BODY O-RING

(a) Coat the new O-ring with ATF, install it to the oil pump body.

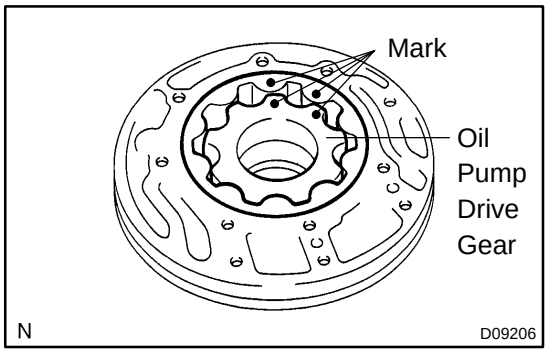
NOTICE:

Assemble the O-ring carefully not to have a twist and a pinching. Moreover, apply enough ATF to the O-ring prior to assembling.



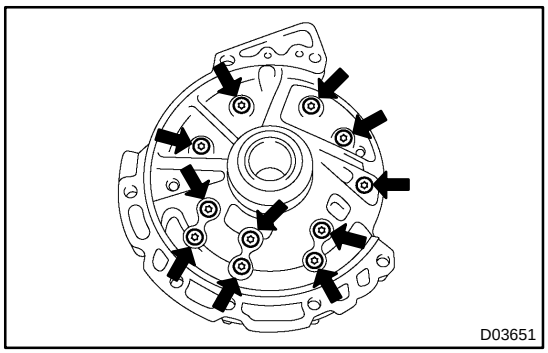
13. INSTALL FRONT OIL PUMP DRIVEN GEAR

(a) Coat the front oil pump driven gear with ATF, install it to the oil pump body with the marked side up.



14. INSTALL FRONT OIL PUMP DRIVE GEAR

(a) Coat the front oil pump drive gear with ATF, install it to the oil pump body with the marked side up.

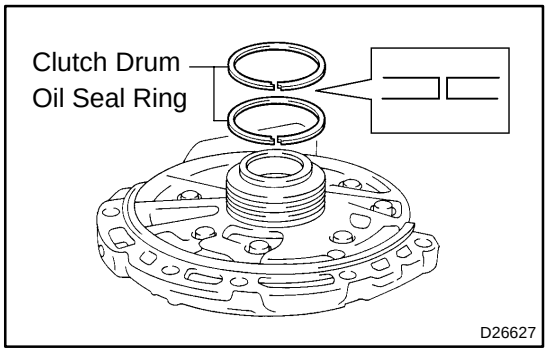


15. INSTALL STATOR SHAFT ASSY

(a) Set the stator shaft aligned with each bolt hole.

(b) Using a torx socket (T30), install the 11 bolts.

Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf)



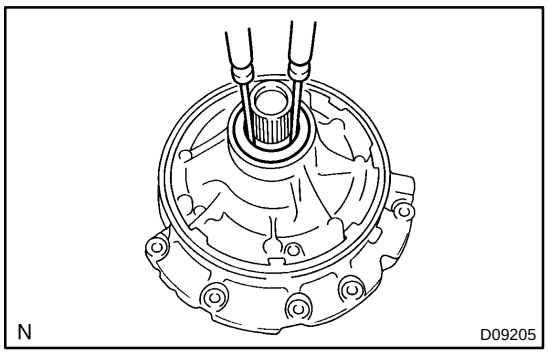
16. INSTALL CLUTCH DRUM OIL SEAL RING

(a) Coat the 2 new clutch drum oil seal rings with ATF.

(b) Install the 2 new clutch drum oil seal rings.

NOTICE:

Do not expand the ring ends excessively.



17. INSPECT OIL PUMP ASSY

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

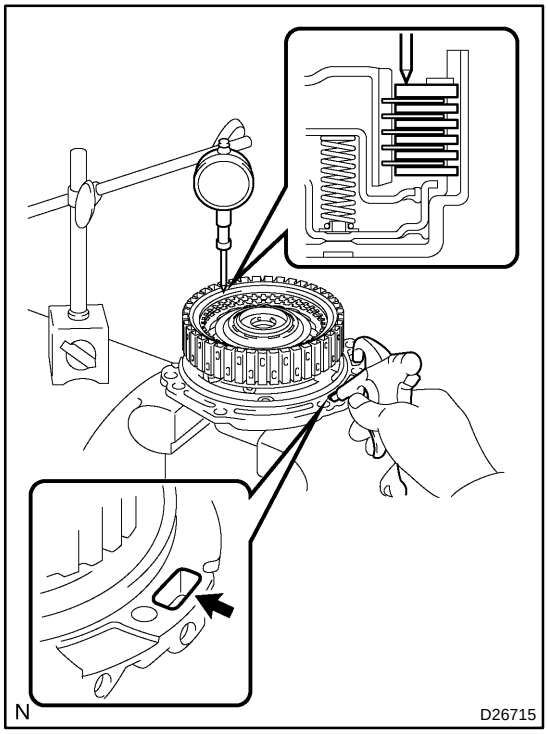
NOTICE:

Be careful not to damage the oil seal lip.

FORWARD CLUTCH ASSY (U151E/U151F)

400H1-02

OVERHAUL



1. INSPECT PACK CLEARANCE OF FORWARD CLUTCH

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

NOTICE:

Be careful not to damage the oil seal ring of oil pump.

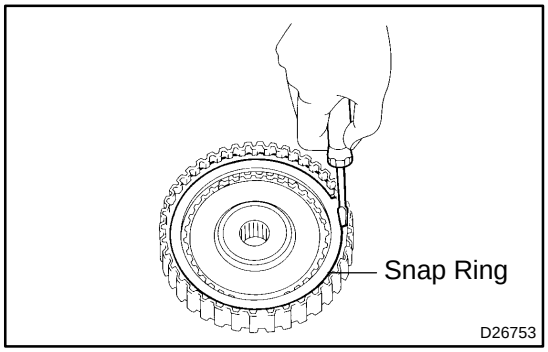
(b) Using a dial indicator, measure the forward clutch pack clearance while applying and releasing compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi).

Pack clearance: 1.00 - 1.25 mm (0.0394 - 0.4921 in.)

If the clearance is not within standard, inspect the discs, plates and flange.

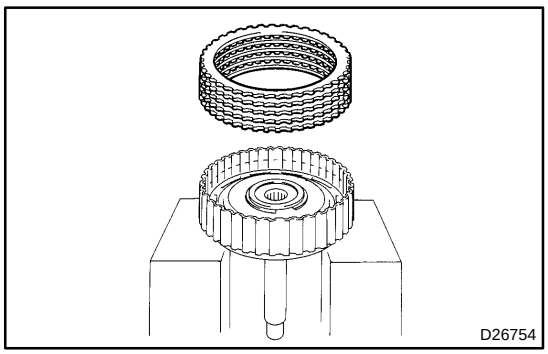
HINT:

As the opening is large, cover it with a shop rug to prevent the compressed air from being released.

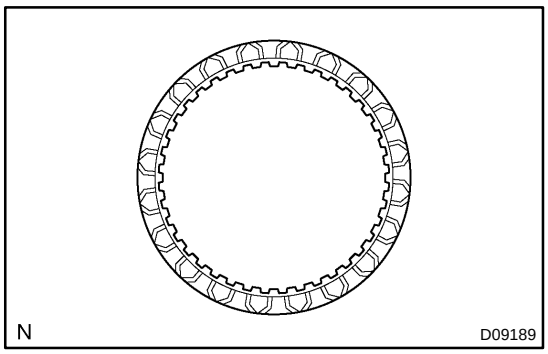


2. REMOVE FORWARD MULTIPLE DISC CLUTCH CLUTCH DISC

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



(b) Remove the flange, 5 discs and 5 plates from the input shaft assy.



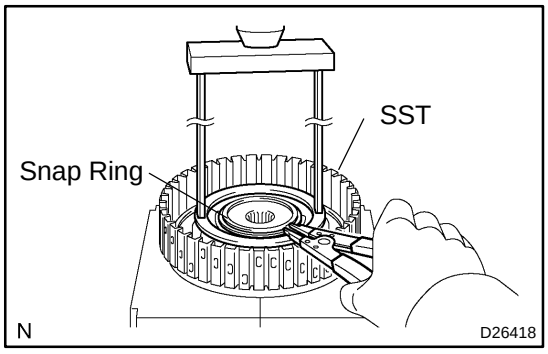
3. INSPECT FORWARD MULTIPLE DISC CLUTCH CLUTCH DISC

(a) Check to see if the sliding surface of the disc, plate and flange are worn or burnt.

If necessary, replace them.

HINT:

- If the lining of the disc comes off or discolors, or even if replace all discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.



4. REMOVE FORWARD CLUTCH RETURN SPRING SUB-ASSY

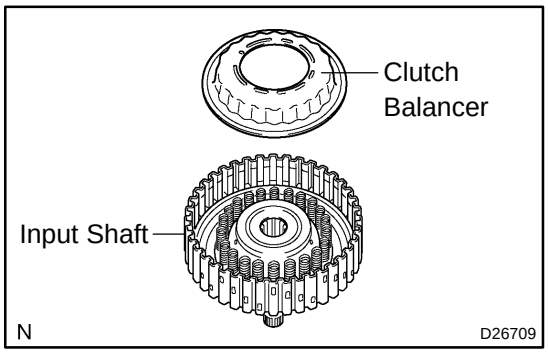
(a) Place SST on the spring retainer and compress the return spring with a press.

SST 09387-00020

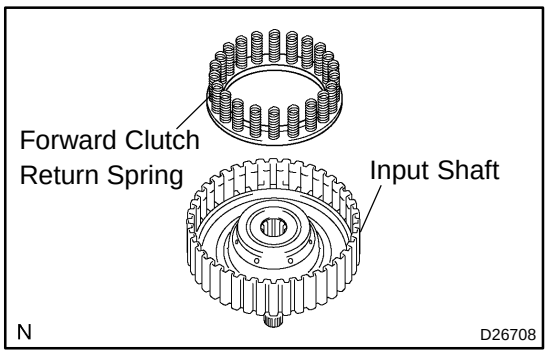
(b) Using a snap ring expander, remove the snap ring.

NOTICE:

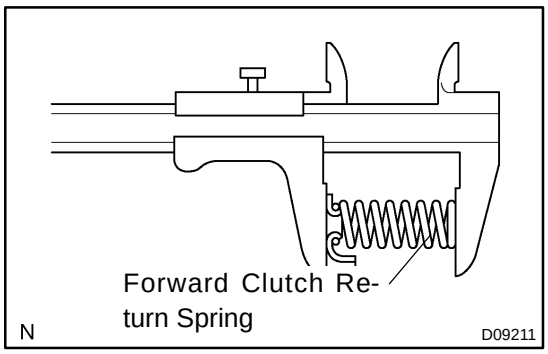
- **Stop the press when the spring sheet is lowered 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove, preventing the spring sheet from deforming.**
- **Do not expand the snap ring excessively.**



(c) Remove the clutch balancer from the input shaft.

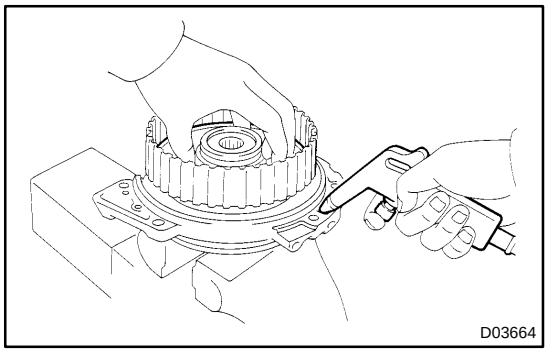


(d) Remove the forward clutch return spring from the input shaft.



5. INSPECT FORWARD CLUTCH RETURN SPRING SUB-ASSY

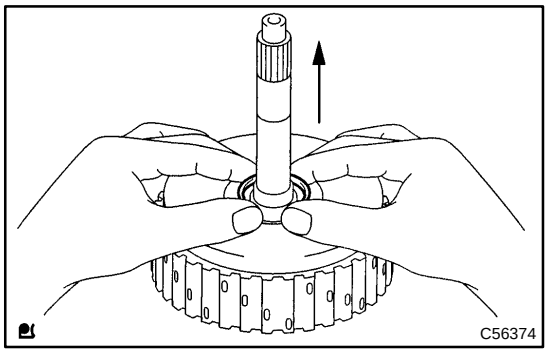
(a) Using vernier calipers, measure the free length of the spring together with the spring seat.
Standard free length: 26.74 mm (1.0528 in.)



6. REMOVE FORWARD CLUTCH PISTON SUB-ASSY

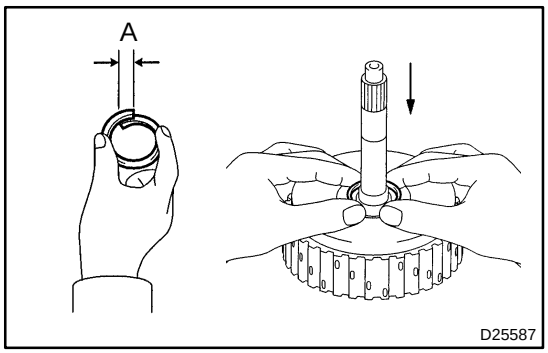
(a) Place the forward clutch drum onto the oil pump.
(b) Holding the forward clutch piston by hand, apply compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi) to the oil pump to remove the forward clutch piston.

HINT:
When the piston cannot be removed as it is slanted, either blow the air again with the protruding side pushed, or remove the piston using the needle nose plier with vinyl tape on the tip.



7. REMOVE INPUT SHAFT OIL SEAL RING

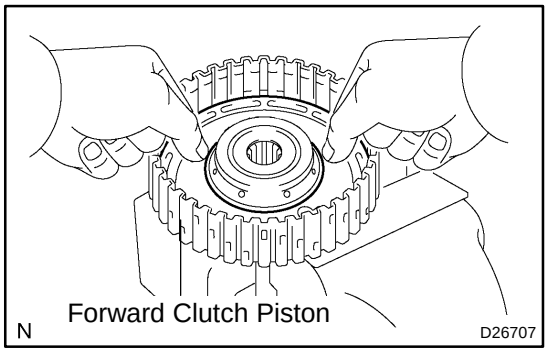
(a) Remove the input shaft oil seal ring to the input shaft.



8. INSTALL INPUT SHAFT OIL SEAL RING

(a) Compress the new input shaft oil seal ring from both sides to reduce dimension A.
Dimension A: 5 mm (0.197 in.)
(b) Coat the oil seal ring with ATF and install it to the input shaft.

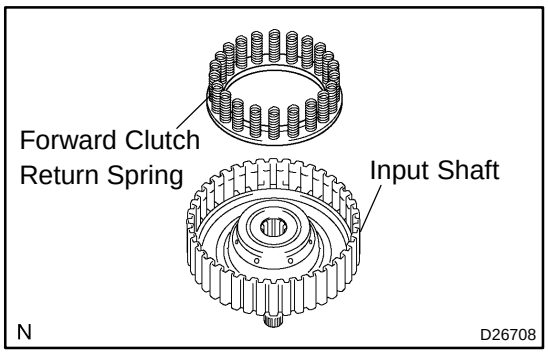
NOTICE:
Do not expand the gap of the oil seal ring too much. Fix the hooks certainly.



9. INSTALL FORWARD CLUTCH PISTON SUB-ASSY

(a) Coat the forward clutch piston with ATF, and install it to the input shaft.

NOTICE:
Be careful not to damage the lip seal of the forward clutch piston.



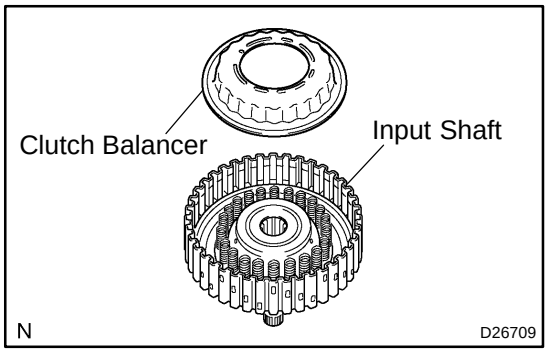
10. INSTALL FORWARD CLUTCH RETURN SPRING SUB-ASSY

(a) Install the return spring to the input shaft.

NOTICE:

Installing the spring sub- assembly, check all of the springs are fit in the piston correctly.

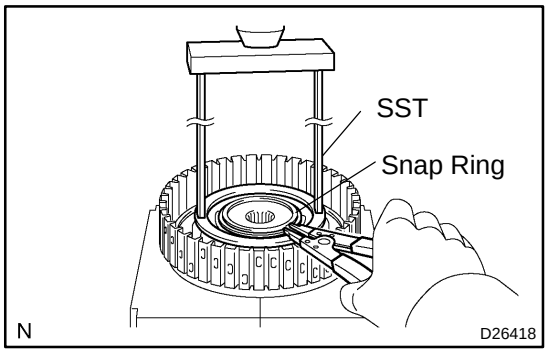
(b) Coat the clutch balancer with ATF.



(c) Install the clutch balancer to the input shaft.

NOTICE:

- **Be careful not to damage the lip seal of the forward clutch balancer.**
- **Install the clutch balancer carefully not to have a pinching and any other defects at the sealing lip.**
- **Apply enough ATF to the sealing lip prior to assembling.**



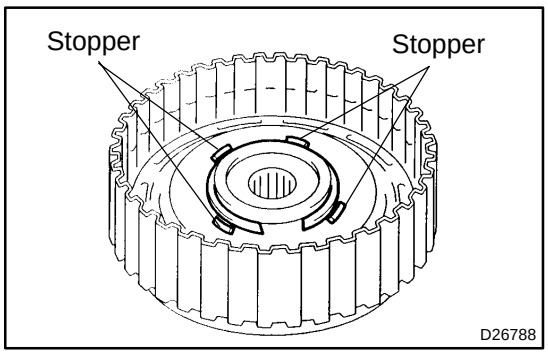
(d) Place SST on the clutch balancer, and compress the clutch balancer with a press.
SST 09387-00020

(e) Install the snap ring with a snap ring expander.

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

NOTICE:

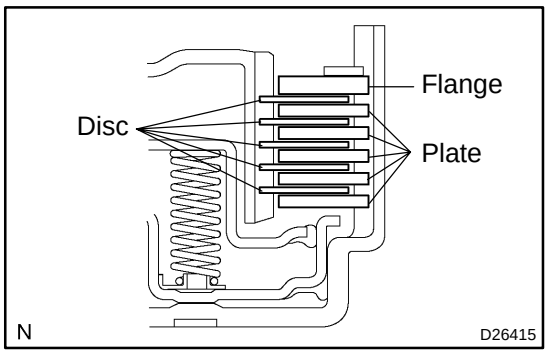
- **Stop the press when the spring sheet is lowered to the place 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove.**
- **This prevents the spring sheet from being deformed.**
- **Do not expand the snap ring excessively.**



(g) Set the end gap of the snap ring in the piston shown in the illustration.

NOTICE:

The end gap of the snap ring should not coincide with any of the stoppers.



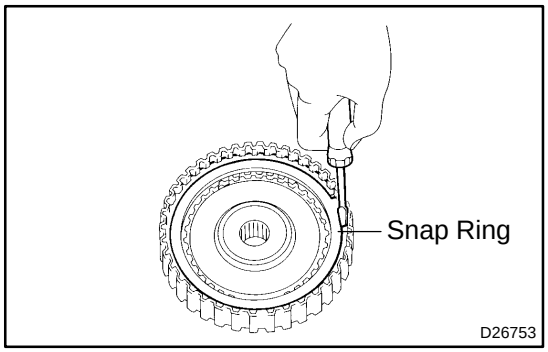
11. INSTALL FORWARD MULTIPLE DISC CLUTCH CLUTCH DISC

(a) Coat the 5 discs with ATF.

(b) Install the 5 plates, 5 discs and flange input shaft.

NOTICE:

Be careful about the order of discs, plates and flange assembly.

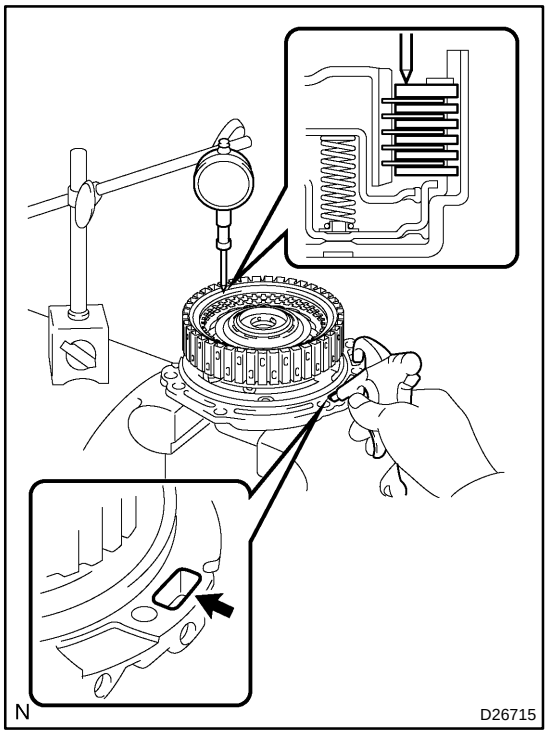


(c) Using a screwdriver, install the snap ring.

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

NOTICE:

The snap ring should be fixed certainly in the groove of the drum.



12. INSPECT PACK CLEARANCE OF FORWARD CLUTCH

(a) Using a dial indicator, measure the forward clutch pack clearance while applying and releasing compressed air (392 kgf·cm^2, 4.0 kPa, 57 psi).

Pack clearance: 1.00 - 1.25 mm (0.0394 - 0.4921 in.)

If the piston stroke is less than the minimum, parts may have been assembled incorrectly. Check and reassemble again.

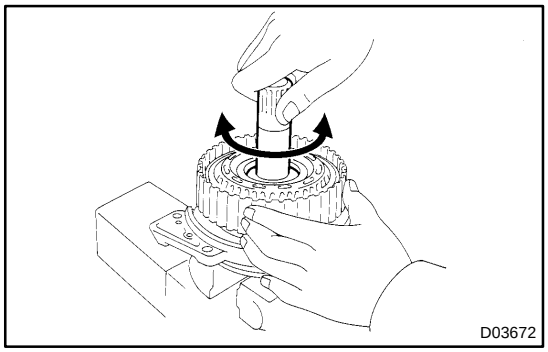
If the clearance is not standard, select another flange.

HINT:

There are 5 different flanges in thickness.

Flange thickness: mm (in.)

No.	Thickness	No.	Thickness
1	3.00 (0.1181)	4	3.45 (0.1358)
2	3.15 (0.1240)	5	3.60 (0.1417)
3	3.30 (0.1299)	-	-



13. INSPECT FORWARD MULTIPLE DISC CLUTCH CLUTCH DISC

(a) Check if the disc lightly rotates when rotating the forward clutch assy after inserting the multiple disc clutch into it.

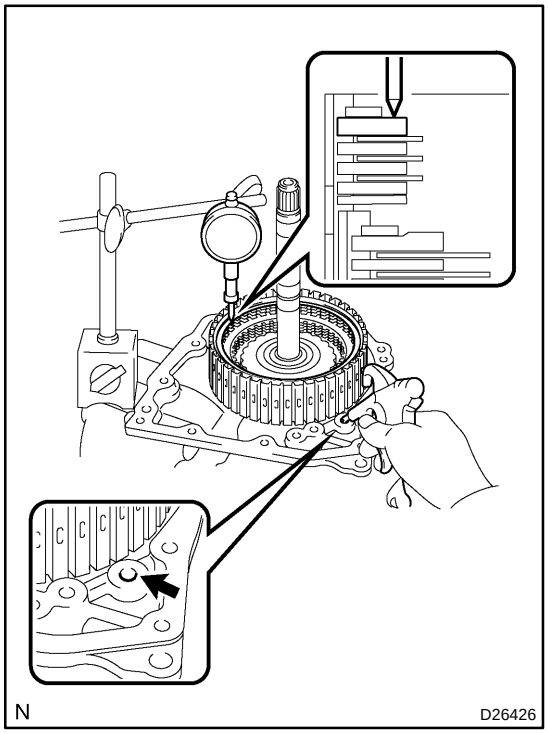
NOTICE:

Do not place the forward clutch assy in a vise.

DIRECT CLUTCH ASSY (U151E/U151F)

400H2-02

OVERHAUL



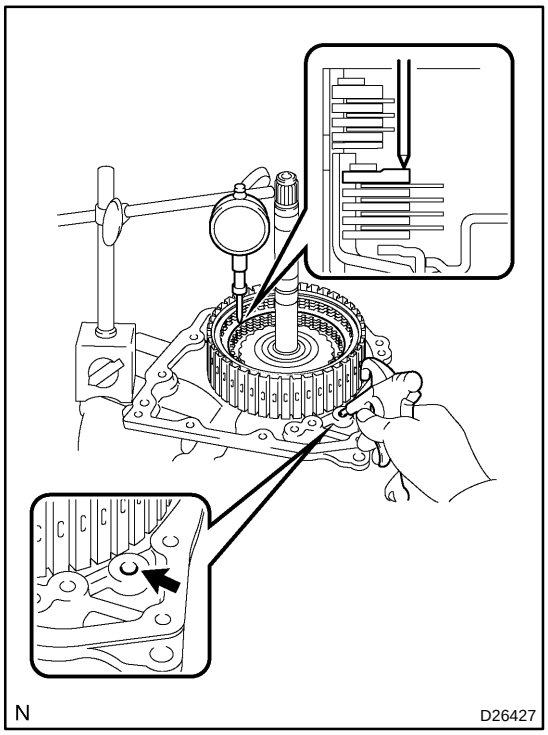
1. INSPECT PACK CLEARANCE OF REVERSE CLUTCH

(a) Install the intermediate shaft and needle roller bearing on the transaxle rear cover .

(b) Using a dial indicator, measure the reverse clutch pack clearance while applying and releasing compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi).

Pack clearance:0.60 - 0.82 mm (0.02362 - 0.03228 in.)

If the pack clearance is not within standard, inspect the discs, plates and flange.

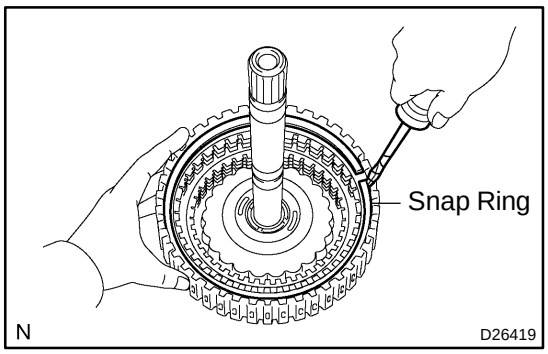


2. INSPECT PACK CLEARANCE OF DIRECT CLUTCH & OVERDRIVE CLUTCH

(a) Using a dial indicator, measure the direct clutch & overdrive clutch pack clearance while applying and releasing compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi).

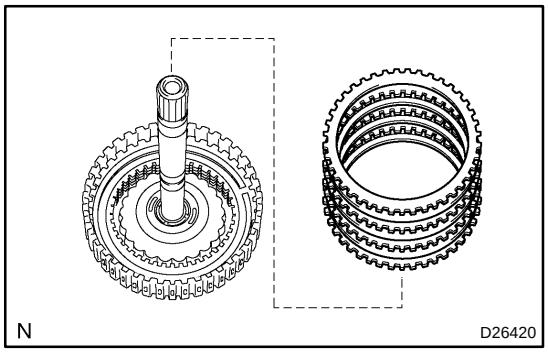
Pack clearance:0.61 - 0.83 mm (0.02401 - 0.03268 in.)

If the pack clearance is not within standard, inspect the discs, plates and flange.

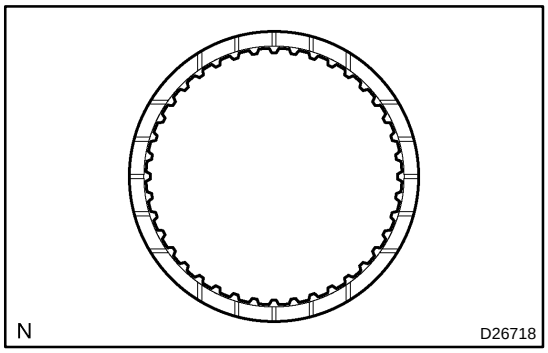


3. REMOVE DIRECT MULTIPLE DISC CLUTCH CLUTCH DISC

(a) Using a screwdriver, remove the snap ring from the intermediate shaft.



(b) Remove the flange, 3 discs,, 3 plates and cushion plate from the intermediate shaft.



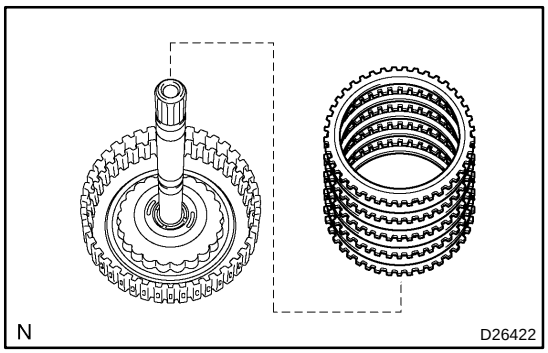
4. INSPECT DIRECT MULTIPLE DISC CLUTCH CLUTCH DISC

(a) Check to see if the sliding surface of the disc, plate and flange are worn or burnt.

If necessary, replace them.

HINT:

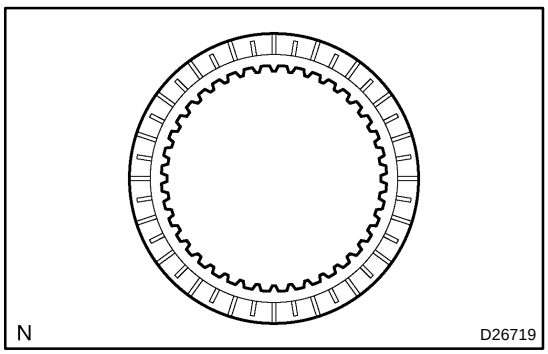
- If the lining of the disc comes off or discolors, or even if a part of the groove is defaced, replace all discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.



5. REMOVE OVERDRIVE DIRECT CLUTCH DISC

(a) Using a screwdriver, remove the snap ring from the intermediate shaft.

(b) Remove the flange, 4 discs and 4 plates from the intermediate shaft.



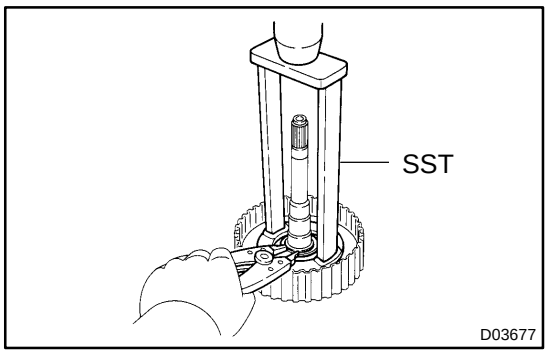
6. INSPECT OVERDRIVE DIRECT CLUTCH DISC

(a) Check to see if the sliding surface of the disc, plate and flange are worn or burnt.

If necessary, replace them.

HINT:

- If the lining of the disc comes off or discolors, or even if a part of the groove is defaced, replace all discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.



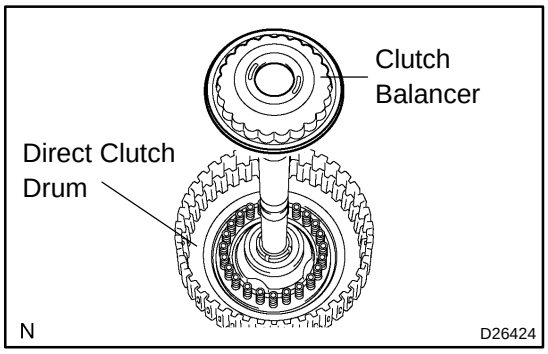
7. REMOVE OVERDRIVE CLUTCH RETURN SPRING SUB-ASSY

(a) Place SST on the clutch balancer and compress the spring with a press.
SST 09387-00020

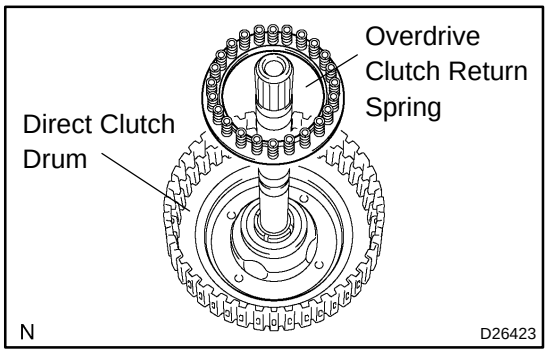
(b) Using a snap ring expander, remove the snap ring from the direct clutch drum.

NOTICE:

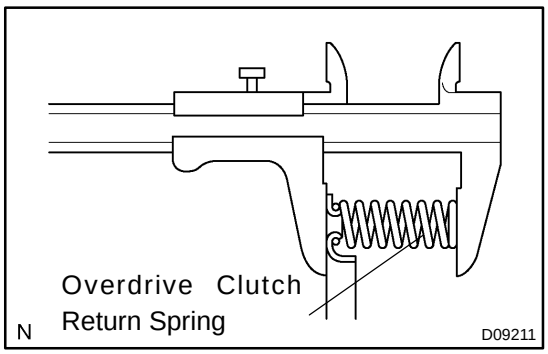
- **Stop the press when the spring sheet is lowered to the place 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove.**
- **This prevents the spring sheet from being deformed.**
- **Do not expand the snap ring excessively.**



(c) Remove the clutch balancer from the direct clutch drum.

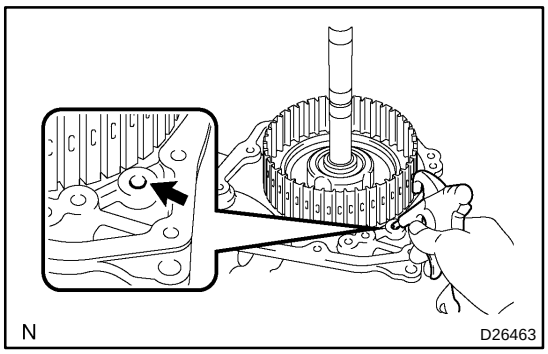


(d) Remove the overdrive clutch return spring from the direct clutch drum.



8. INSPECT OVERDRIVE CLUTCH RETURN SPRING SUB-ASSY

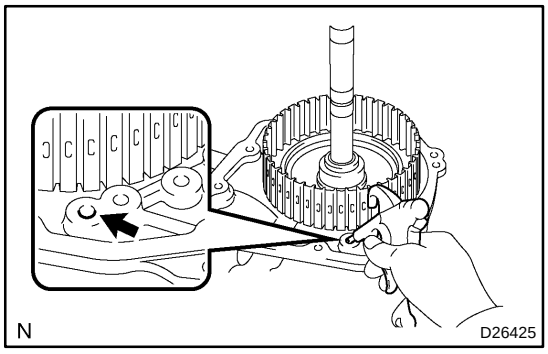
(a) Using vernier calipers, measure the free length of the spring together with the spring seat.
Standard free length: 25.91 mm (1.0201 in.)



9. REMOVE OVERDRIVE DIRECT CLUTCH PISTON

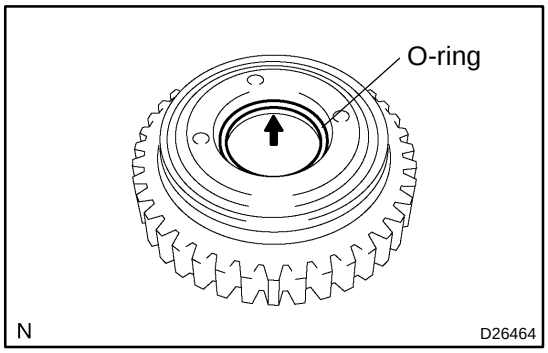
(a) Install intermediate shaft on the transaxle rear cover.

(b) Holding the direct clutch piston with your hand, apply compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi) to the transaxle rear cover to remove the direct clutch piston.



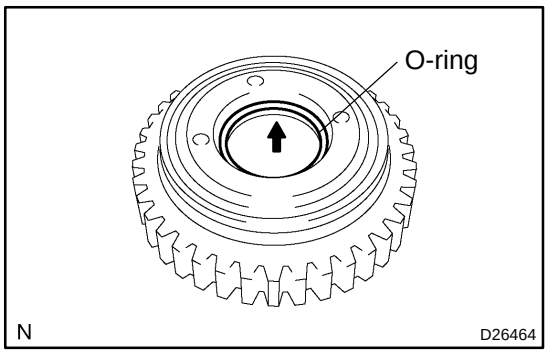
10. REMOVE OVERDRIVE DIRECT CLUTCH DRUM SUB-ASSY

(a) Holding the direct clutch drum by hand, apply compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi) to the transaxle rear cover to remove the direct clutch drum.



11. REMOVE OVERDRIVE DIRECT CLUCH O-RING

(a) Using a screwdriver, remove the O-ring from the direct clutch drum.

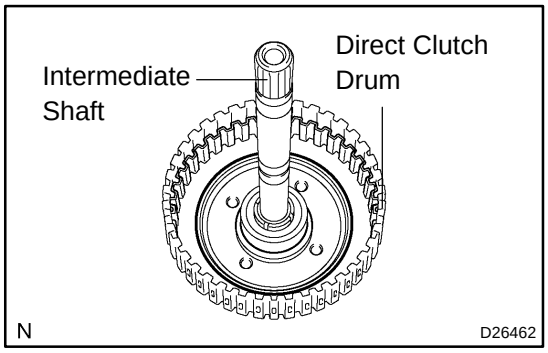


12. INSTALL OVERDRIVE DIRECT CLUCH O-RING

(a) Coat a O-ring with ATF, and install it to the direct clutch drum.

NOTICE:

Assemble the O-ring carefully not to have a twist and a pinching.

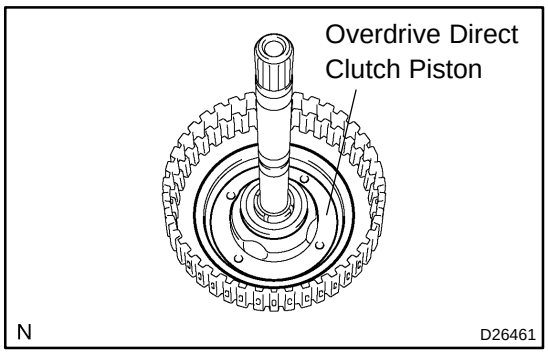


13. INSTALL OVERDRIVE DIRECT CLUTCH DRUM SUB-ASSY

(a) Coat the direct clutch drum with ATF, and install it to the intermediate shaft.

NOTICE:

- **Be careful not to damage the O-ring.**
- **Be careful not to damage the lip seal of the direct clutch drum.**

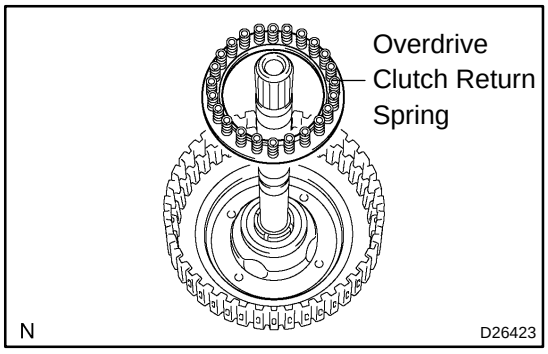


14. INSTALL OVERDRIVE DIRECT CLUTCH PISTON

(a) Apply the overdrive direct clutch piston with ATF, and install it to the direct clutch drum.

NOTICE:

Be careful not to damage the lip seal of the direct clutch piston.



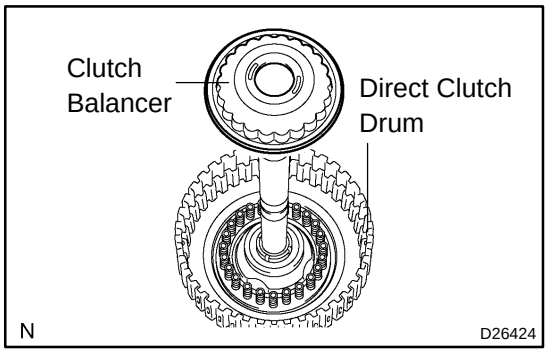
15. INSTALL OVERDRIVE CLUTCH RETURN SPRING SUB-ASSY

(a) Install the piston return spring to the direct clutch drum.

NOTICE:

Installing the spring sub- assembly, check all of the springs are fit in the piston correctly.

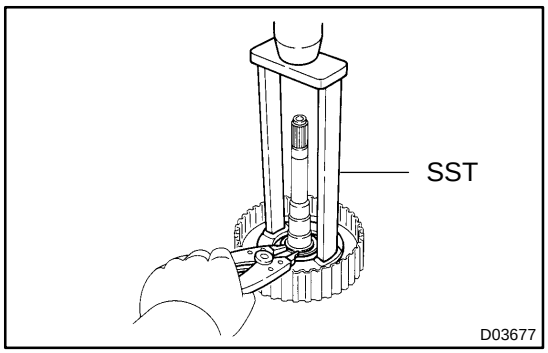
(b) Coat the clutch balancer with ATF.



(c) Install the clutch balancer to the direct clutch drum.

NOTICE:

- **Be careful not to damage the lip seal of the direct clutch balancer.**
- **Install the clutch balancer carefully not to have a pinching and any other defects at the sealing lip.**
- **Apply enough ATF to the sealing lip prior to assembling.**



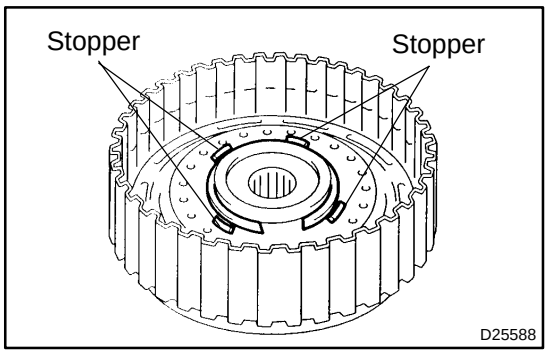
(d) Place SST on the clutch balancer and compress the piston return spring with a press.
SST 09387-00020

(e) Using a snap ring expander, install the snap ring to the direct clutch drum.

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

NOTICE:

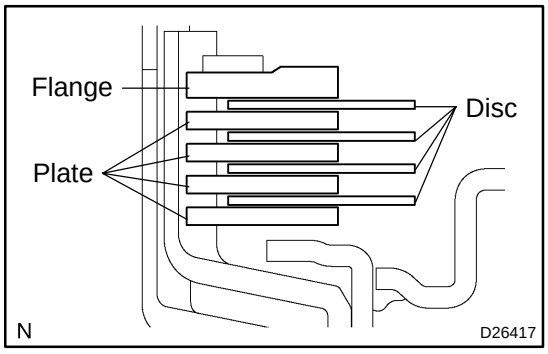
- **Stop the press when the spring sheet is lowered to the place 1 - 2 mm (0.039 - 0.078 in.) from the snap ring grove.**
- **This prevents the spring sheet from being deformed.**
- **Do not expand the snap ring excessively.**



(g) Set the end gap of the snap ring in the piston shown in the illustration.

NOTICE:

The end gap of the snap ring should not coincide with any of the stoppers.



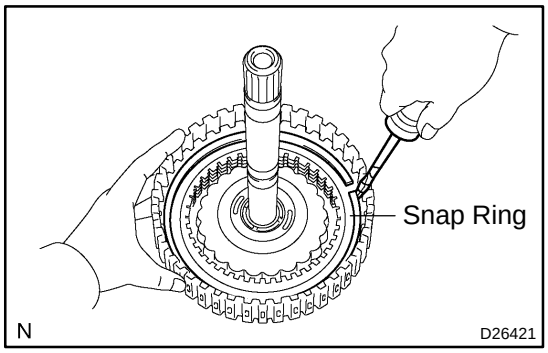
16. INSTALL OVERDRIVE DIRECT CLUTCH DISC

(a) Coat the 4 discs with ATF.

(b) Install the 4 plates, 4 discs and flange to the intermediate shaft.

NOTICE:

Be careful about the order of discs, plates and flange assembly.

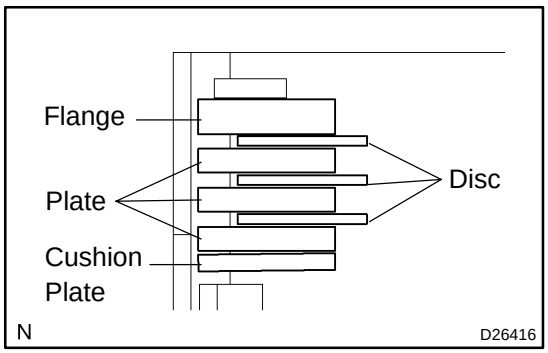


(c) Using a screwdriver, install the snap ring.

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

NOTICE:

The snap ring should be fixed certainly in the groove of the drum.



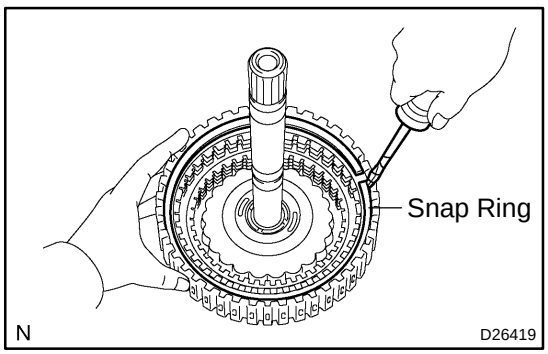
17. INSTALL DIRECT MULTIPLE DISC CLUTCH CLUTCH DISC

(a) Apply the 3 discs with ATF.

(b) Install the cushion plate, 3 plates, 3 discs and flange to the intermediate shaft.

NOTICE:

- **Install the cushion plate with the mark on the white surface facing to plate.**
- **Be careful about the order of discs, plates and flange assembly.**

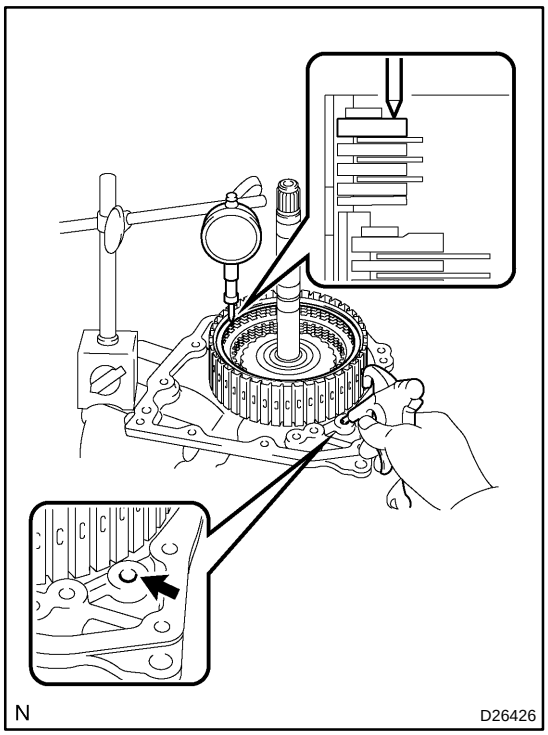


(c) Using a screwdriver, install the snap ring.

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

NOTICE:

The snap ring should be fixed certainly in the groove of the drum.



18. INSPECT PACK CLEARANCE OF REVERSE CLUTCH

(a) Install the intermediate shaft on the transaxle rear cover.

(b) Using a dial indicator, measure the direct clutch pack clearance while applying and releasing compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi).

Pack clearance:0.60 - 0.82 mm (0.02362 - 0.03228 in.)

If the pack clearance is less than the minimum, parts may have been assembled incorrectly, so check and reassemble again.

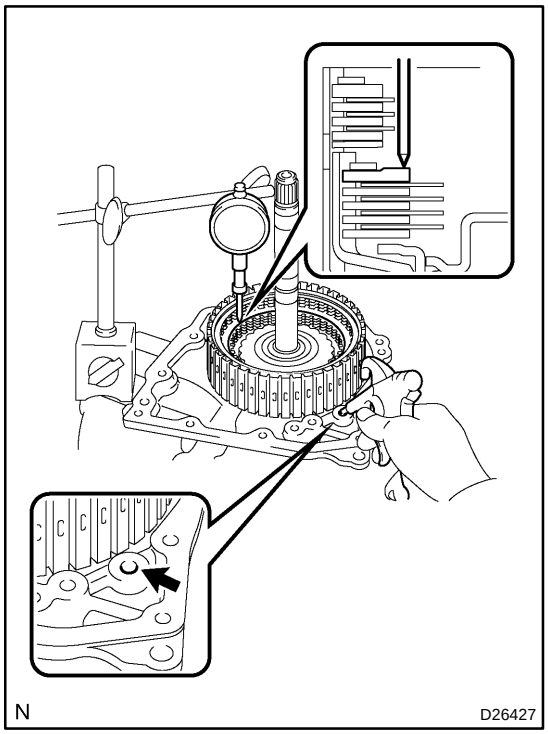
If the stroke is not within standard, select another flange.

HINT:

There are 6 flanges of different thickness.

Flange thickness: mm (in.)

No.	Thickness	No.	Thickness
1	3.0 (0.118)	5	3.4 (0.134)
2	3.1 (0.122)	6	3.5 (0.138)
3	3.2 (0.126)	7	3.6 (0.142)
4	3.3 (0.130)	-	-



19. INSPECT PACK CLEARANCE OF DIRECT CLUTCH & OVERDRIVE CLUTCH

(a) Using a dial indicator, measure the direct clutch & overdrive clutch pack clearance while applying and releasing compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi).

Pack clearance:0.61 - 0.83 mm (0.02401 - 0.03268 in.)

If the pack clearance is less than the minimum, parts may have been assembled incorrectly, so check and reassemble again.

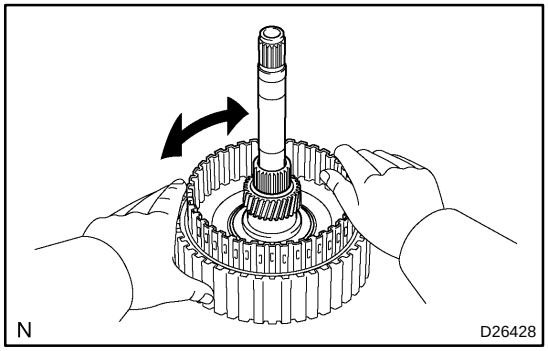
If the stroke is not within standard, select another flange.

HINT:

There are 7 flanges in different thickness.

Flange thickness: mm (in.)

No.	Thickness	No.	Thickness
0	2.5 (0.098)	4	2.9 (0.114)
1	2.6 (0.102)	5	3.0 (0.118)
2	2.7 (0.106)	6	3.1 (0.122)
3	2.8 (0.110)	-	-



(b) Check that the disc rotates when rotating the disc after inserting the rear planetary sun gear.

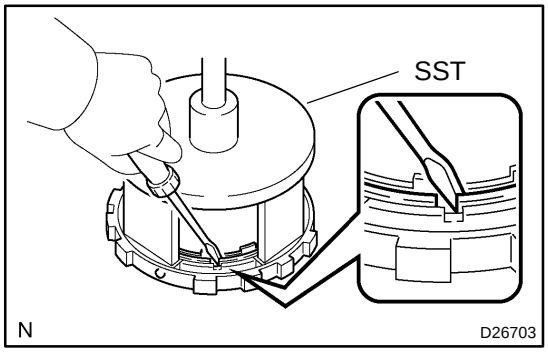
NOTICE:

Do not place the rear planetary sun gear in a vise.

SECOND BRAKE PISTON ASSY (U151E/U151F)

4006I-03

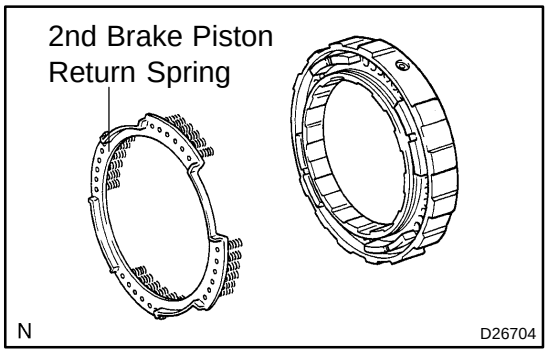
OVERHAUL



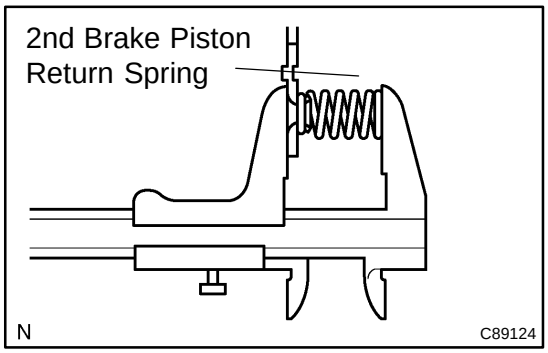
1. REMOVE 2ND BRAKE PISTON RETURN SPRING SUB-ASSY

(a) Place SST on the return spring and compress.
SST 09387-00060

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

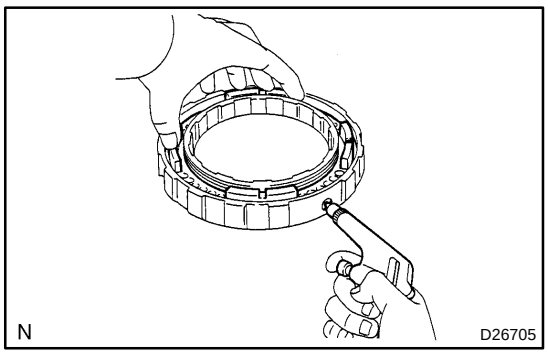


(c) Remove the 2nd brake piston return spring.



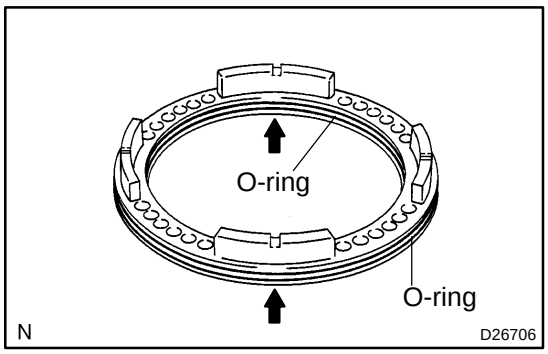
2. INSPECT 2ND BRAKE PISTON RETURN SPRING SUB-ASSY

(a) Using vernier calipers, measure the free length of the spring together with the spring seat.
Standard free length: 16.61 mm (0.6539 in.)



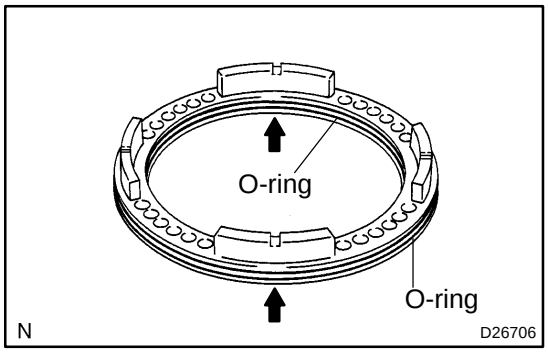
3. REMOVE 2ND BRAKE PISTON

(a) Hold the 2nd brake piston and apply compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi) to the 2nd brake cylinder to remove the 2nd brake piston.



4. REMOVE 2ND BRAKE PISTON O-RING

(a) Remove the 2 O-rings from the 2nd brake piston.

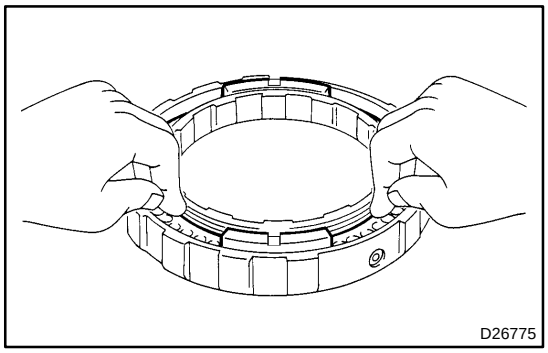


5. INSTALL 2ND BRAKE PISTON O-RING

(a) Apply the 2 new O-rings with ATF, install them in the 2nd brake piston.

NOTICE:

Assemble the O-ring carefully not to have a twist and a pinching.

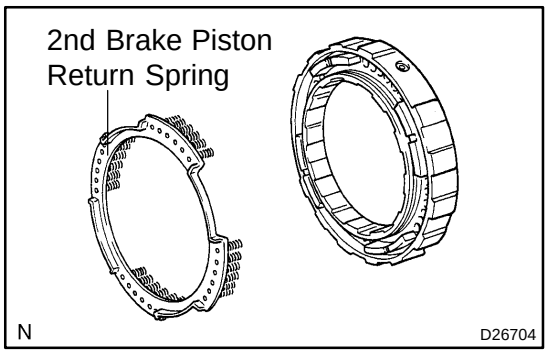


6. INSTALL 2ND BRAKE PISTON

(a) Apply the 2nd brake piston with ATF, and install it to the 2nd brake cylinder.

NOTICE:

Be careful not to damage the O-ring.

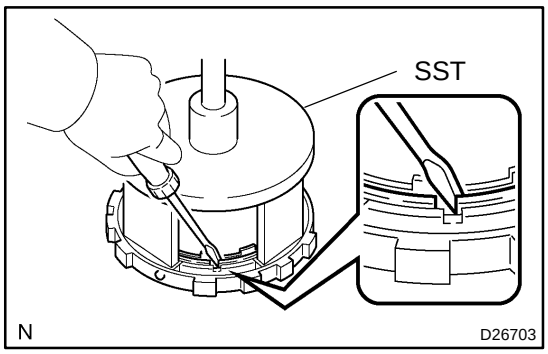


7. INSTALL 2ND BRAKE PISTON RETURN SPRING SUB-ASSY

(a) Install the 2nd brake piston return spring.

NOTICE:

Installing the spring sub- assembly, check all of the springs are fit in the piston correctly.



(b) Place SST on the piston return spring, and compress the piston return spring with a press.
SST 09387-00060

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

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

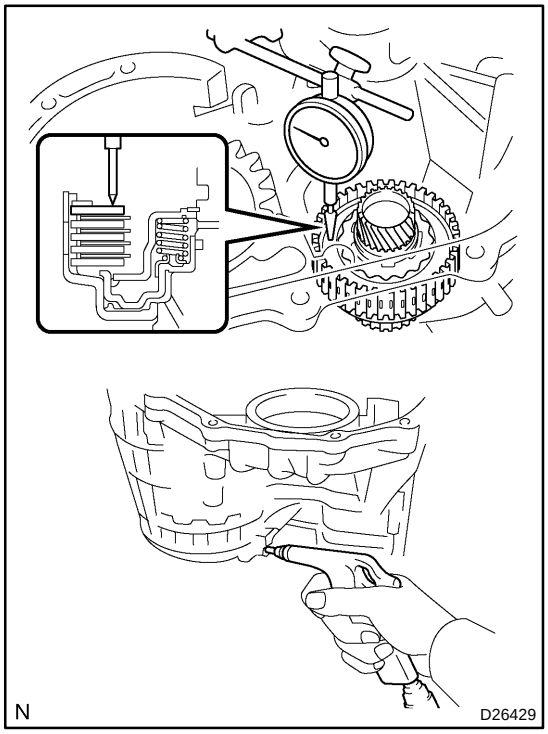
NOTICE:

- **Stop the press when the spring sheet is lowered to the place 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove.**
- **This prevents the spring sheet from being deformed.**

UNDERDRIVE CLUTCH ASSY (U151E/U151F)

400H3-02

OVERHAUL



1. INSPECT UNDERDRIVE PACK CLEARANCE

(a) Install the underdrive clutch to the transaxle case.

NOTICE:

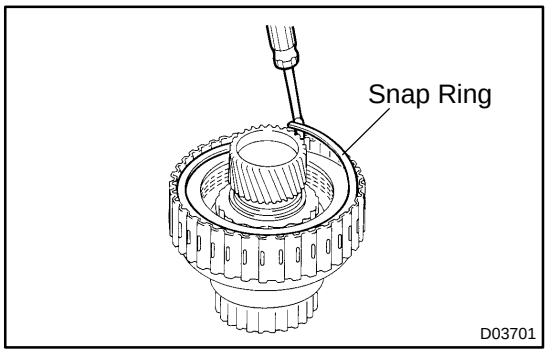
Be careful not to damage the oil seal rings.

(b) Install a dial indicator as shown in the illustration.

(c) Measure the underdrive clutch pack clearance while applying and releasing compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi).

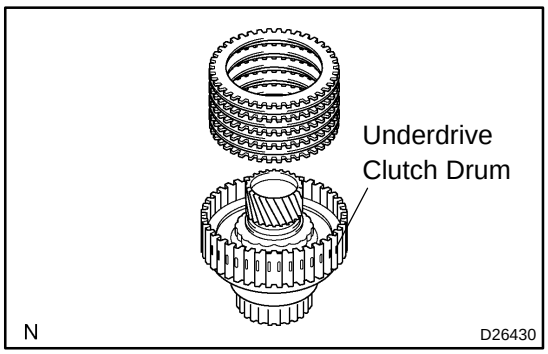
Pack clearance: 1.51 - 1.71 mm (0.0594 - 0.0673 in.)

If the pack clearance is not within standard, inspect the discs, plates and flange.



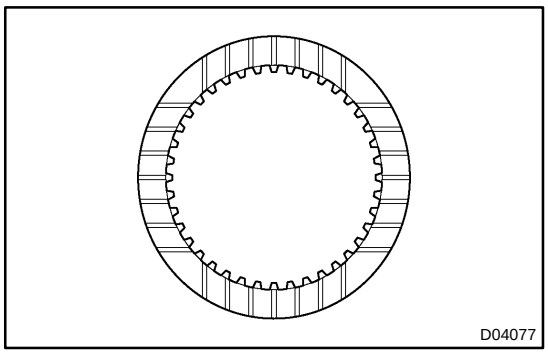
2. REMOVE UNDERDRIVE CLUTCH FLANGE NO.2 HOLE SNAP RING

(a) Using a screwdriver, remove the underdrive clutch flange No.2 snap ring.



3. REMOVE UNDERDRIVE CLUTCH DISC NO.1

(a) Remove the flange, 4 discs and 4 plates from the underdrive clutch drum.

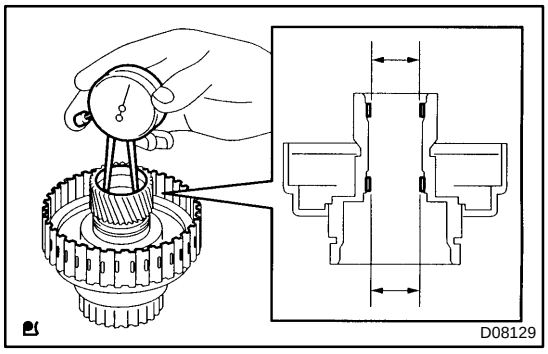


4. INSPECT UNDERDRIVE CLUTCH DISC NO.1

(a) Check to see if the sliding surface of the disc, plate and flange are worn or burnt. If necessary, replace them.

HINT:

- If the lining of the disc comes off or discolors, or even if a part of the groove is defaced, replace all discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.

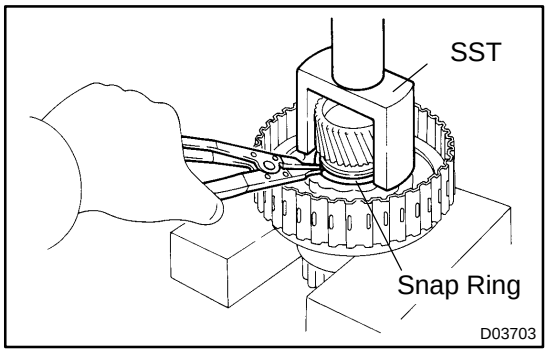


5. INSPECT UNDERDRIVE CLUTCH DRUM SUB-ASSY

(a) Using a dial indicator, measure the inside diameter of the underdrive clutch drum bushing.

Standard drum bushing:
37.06 - 37.08 mm (1.4591 - 1.4598 in.)
Maximum drum bushing: 37.13 mm (1.4618 in.)

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



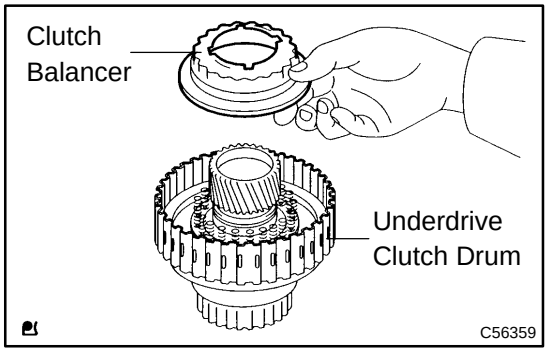
6. REMOVE UNDERDRIVE CLUTCH RETURN SPRING SUB-ASSY

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

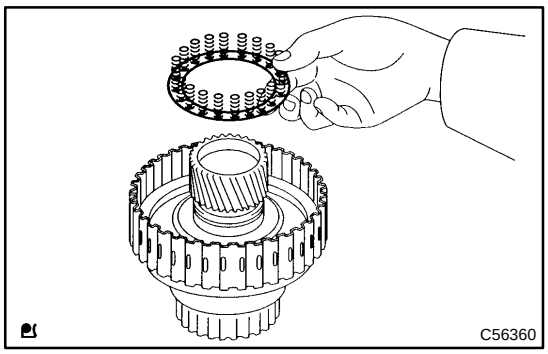
(b) Using a snap ring expander, remove the snap ring.

NOTICE:

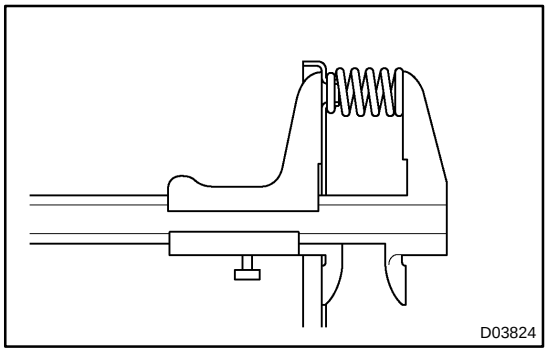
- **Stop the press when the spring sheet is lowered to the place 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove.**
- **This prevents the spring sheet from being deformed.**
- **Do not expand the snap ring excessively.**



(c) Remove the clutch balancer from the underdrive clutch drum.

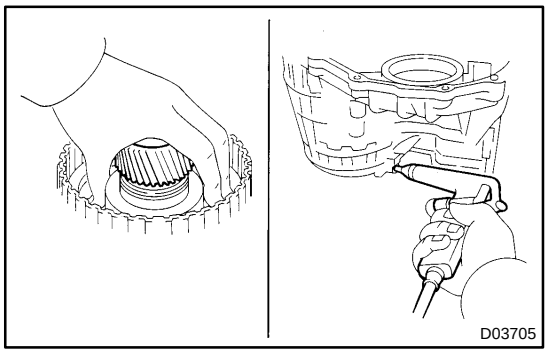


(d) Remove the return spring from the underdrive clutch drum.



7. INSPECT UNDERDRIVE CLUTCH RETURN SPRING SUB-ASSY

(a) Using a vernier calipers, measure the free length of the spring together with the spring seat.
Standard free length: 17.14 mm (0.6752 in.)



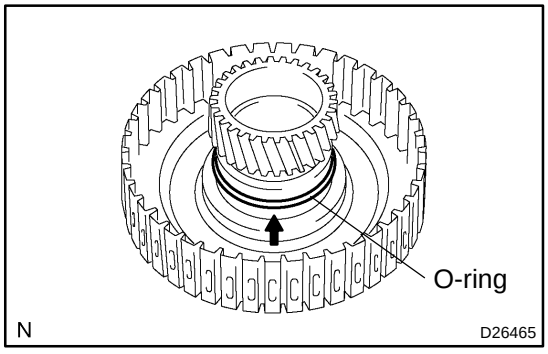
8. REMOVE UNDERDRIVE CLUTCH PISTON SET

(a) Install the underdrive clutch to the transaxle case.

NOTICE:

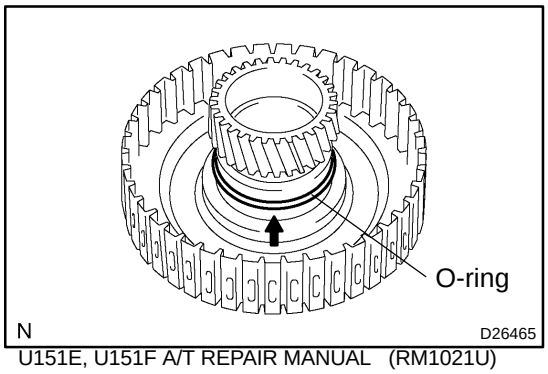
Be careful not to damage the oil seal ring.

(b) Holding the underdrive clutch piston by hand, apply compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi) to the transaxle case to remove the underdrive clutch piston.



9. REMOVE UNDERDRIVE CLUTCH DRUM O-RING

(a) Using a screwdriver, remove the O-ring from the underdrive clutch drum.

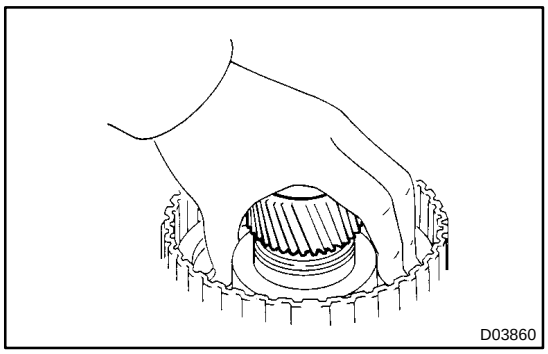


10. INSTALL UNDERDRIVE CLUTCH DRUM O-RING

(a) Apply the new O-ring with ATF, install it to the underdrive clutch drum.

NOTICE:

Assemble the O-ring carefully not to have a twist and a pinching.

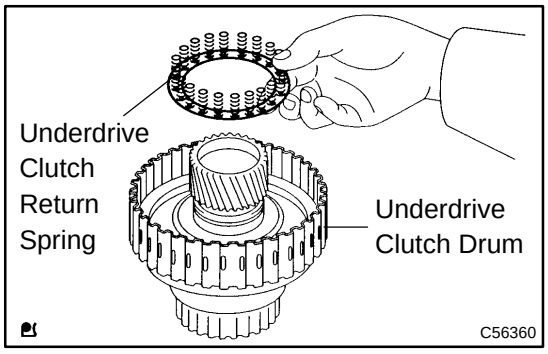


11. INSTALL UNDERDRIVE CLUTCH PISTON SET

(a) Coat the underdrive clutch piston with ATF, install it to the underdrive clutch piston drum.

NOTICE:

- **Be careful not to damage the O-ring.**
- **Be careful not to damage the lip seal of the piston.**



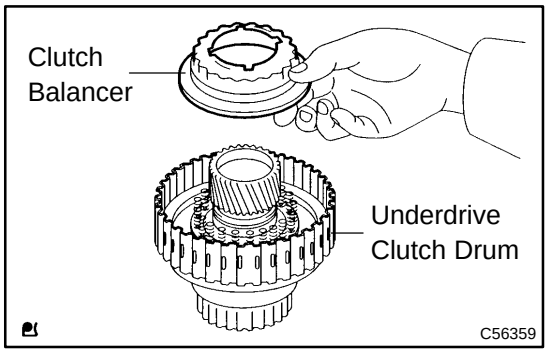
12. INSTALL UNDERDRIVE CLUTCH RETURN SPRING SUB-ASSY

(a) Install the return spring to the underdrive clutch drum.

NOTICE:

Installing the spring sub- assembly, check all of the springs are fit in the piston correctly.

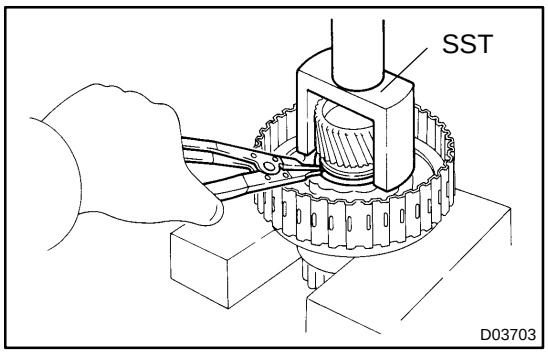
(b) Coat the clutch balancer with ATF.



(c) Install the clutch balancer to the underdrive clutch drum.

NOTICE:

Be careful not to damage the lip seal of the clutch balancer.



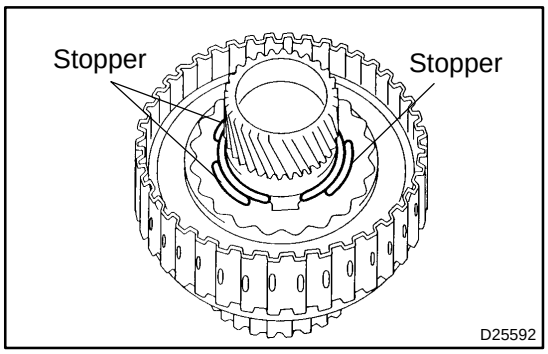
(d) Place SST on the clutch balancer and compress the piston return spring with a press.
SST 09350-32014 (09351-32070)

(e) Using a snap ring expander, install the snap ring to the underdrive clutch drum.

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

NOTICE:

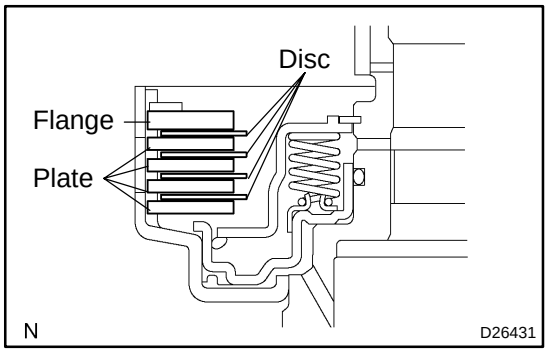
- **Stop the press when the spring sheet is lowered to the place 1 - 2 mm (0.039 - 0.078 in.) from the snap ring grove.**
- **This prevents the spring sheet from being deformed.**
- **Do not expand the snap ring excessively.**



(g) Set the end gap of the snap ring in the underdrive clutch drum shown in the illustration.

NOTICE:

The end gap of the snap ring should not coincide with any of the stopper.



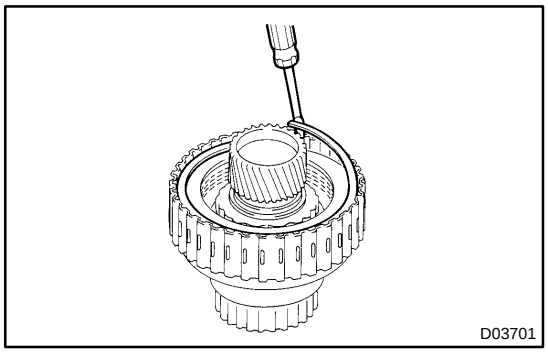
13. INSTALL UNDERDRIVE CLUTCH DISC NO.1

(a) Apply the 4 discs with ATF.

(b) Install the 4 plates, 4 discs and flange to the underdrive clutch drum.

NOTICE:

Be careful about the order of discs, plates and flange assembly.



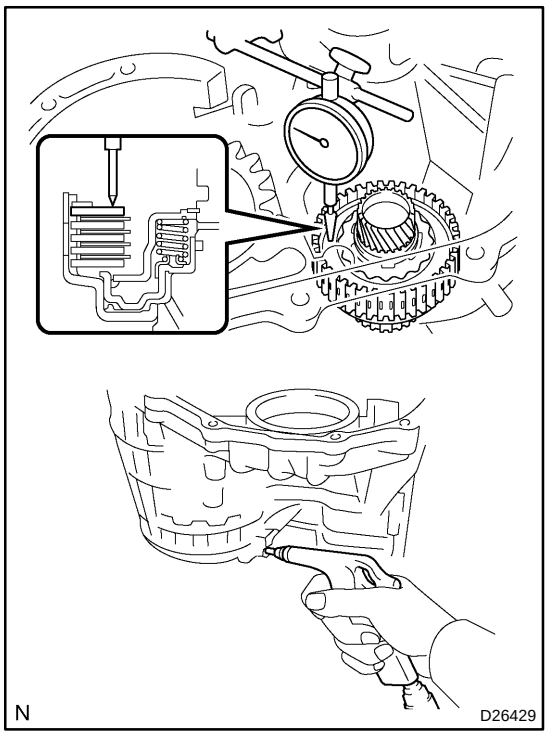
14. INSTALL UNDERDRIVE CLUTCH FLANGE NO.2 HOLE SNAP RING

(a) Using a screwdriver, install the underdrive clutch flange No.2 hole snap ring.

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

NOTICE:

The snap ring should be fixed certainly in the groove of the drum.



15. INSPECT UNDERDRIVE PACK CLEARANCE

(a) Install the underdrive clutch to the transaxle case.

NOTICE:

Be careful not to damage the oil seal ring.

(b) Set a dial indicator as shown in the illustration.

(c) Measure the underdrive clutch piston stroke while applying and releasing compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi).

Park clearance: 1.51 - 1.71 mm (0.0594 - 0.0673 in.)

If the pack clearance is less than the minimum, parts may have been assembled incorrectly, so check and reassemble again.

If the pack clearance is not within standard, select another flange.

HINT:

There are 5 flanges in different thickness.

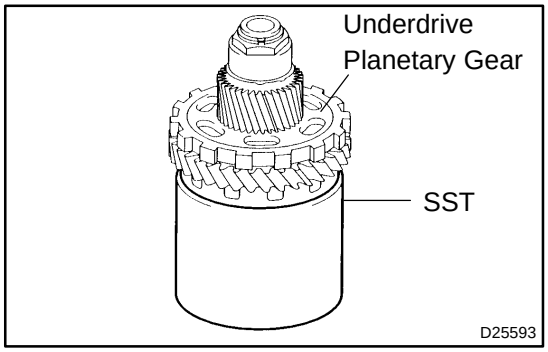
Flange thickness: mm (in.)

Mark	Thickness	Mark	Thickness
1	3.0 (0.118)	4	3.1 (0.122)
2	3.2 (0.126)	5	3.3 (0.130)
3	3.4 (0.134)	-	-

UNDERDRIVE PLANETARY GEAR ASSY (U151E/U151F)

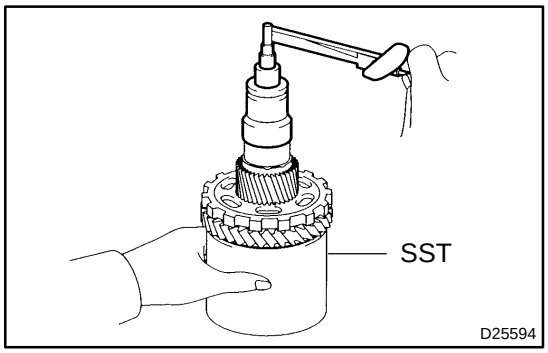
4006K-03

OVERHAUL



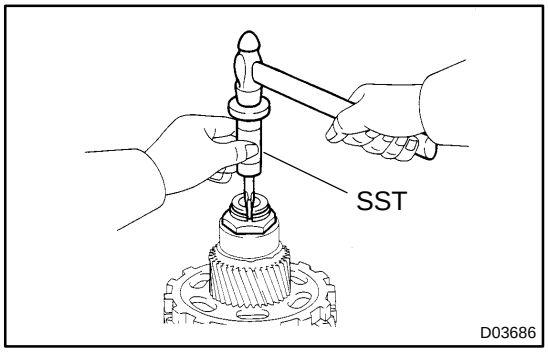
1. INSPECT UNDERDRIVE PLANETARY GEAR PRELOAD

(a) Using SST, fix the underdrive planetary gear assy.
SST 09387-00050



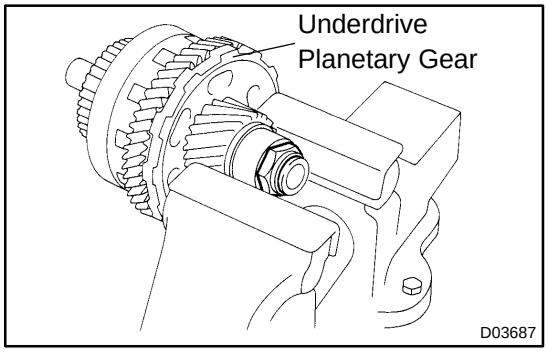
(b) Using SST and a torque wrench, measure the turning torque of underdrive planetary gear assy while rotating the torque wrench at 60 rpm.
SST 09387-00050
Turning torque at 60 rpm.:
0.50 - 1.42 N·m (5.1 - 14.5 kgf·cm, 0.06 - 0.17 in.·lbf)

HINT:
Use a torque wrench with a fulcrum length of 160 mm (6.3 in.).



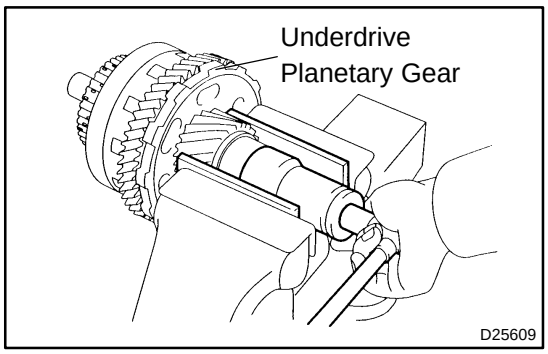
2. REMOVE FRONT PLANETARY GEAR NUT

(a) Using SST, loosen the staked part of the lock nut.
SST 09930-00010 (09931-00010, 09931-00020), 09387-00050

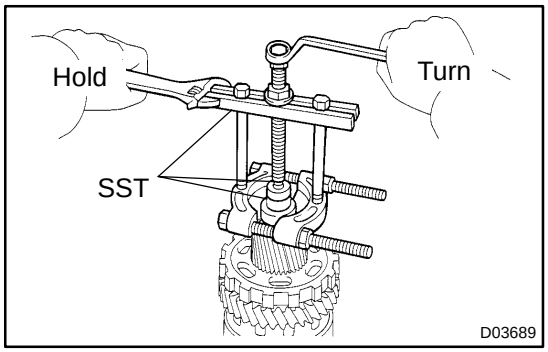


(b) Clamp the underdrive planetary gear in soft jaw vise.

NOTICE:
Be careful not to damage the differential drive pinion.



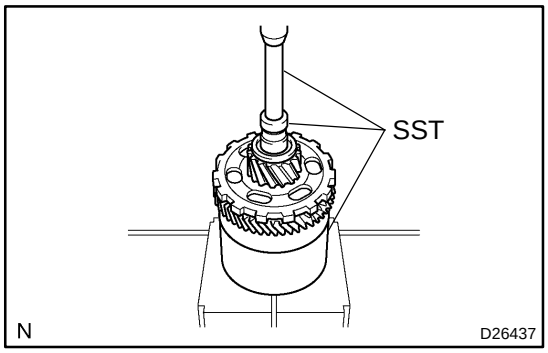
(c) Using a socket wrench, remove the lock nut.



3. REMOVE CYLINDRICAL ROLLER BEARING RACE INNER

(a) Using SST, remove the cylindrical roller bearing race inner.

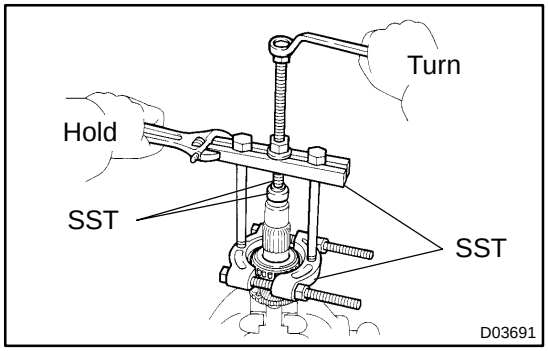
SST 09950- 00020, 09950- 00030, 09950- 60010 (09951-00320), 09950-40011 (09957-04010)



4. REMOVE UNDERDRIVE PLANETARY GEAR ASSY

(a) Using SST and a press, remove the differential drive pinion, parking lock gear, counter driven gear with underdrive planetary ring gear and front tapered roller bearing.

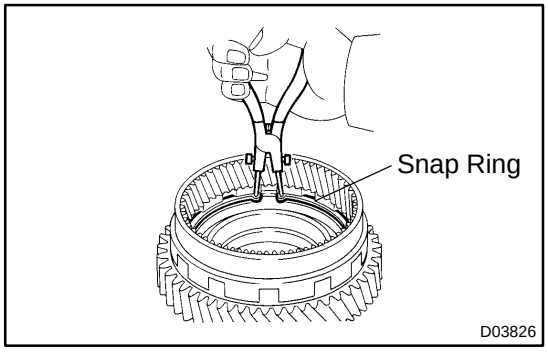
SST 09950-60010 (09951-00320), 09387-00050



(b) Clamp the underdrive planetary gear in soft jaw vise.

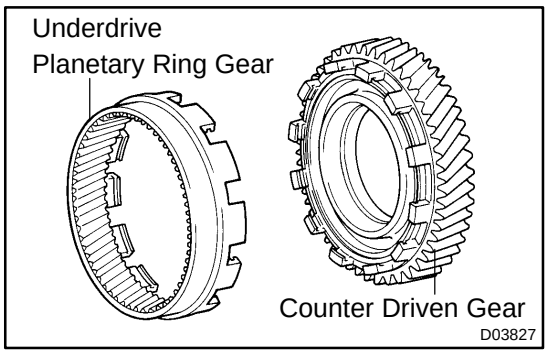
(c) Using SST, remove the rear tapered roller bearing form the underdrive planetary gear.

SST 09950- 00020, 09950- 00030, 09950- 60010 (09951-00320), 09950-40011 (09957-04010)

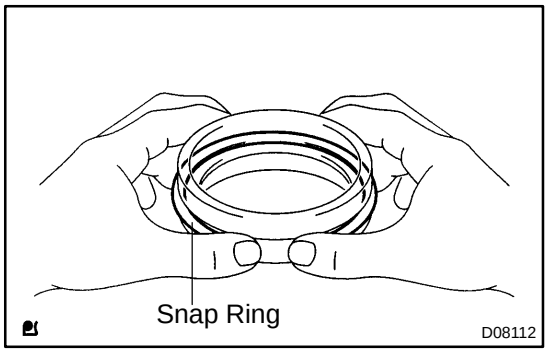


5. REMOVE UNDERDRIVE PLANETARY RING GEAR

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



(b) Remove the underdrive planetary ring gear from the counter driven gear.

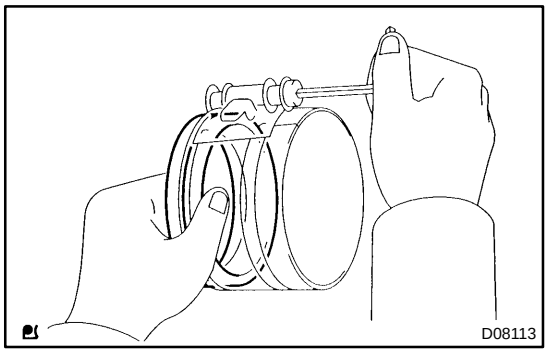


6. INSTALL UNDERDRIVE PLANETARY RING GEAR

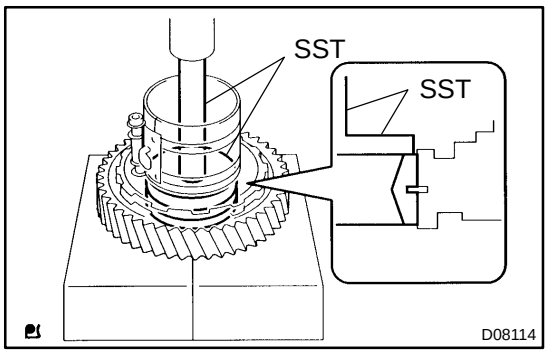
(a) Install a new snap ring to the outer race of the tapered roller bearing.

HINT:

When replacing the bearing, also replace the counter driven gear with a new one.



(b) Using a piston ring compressor, squeeze the snap ring.

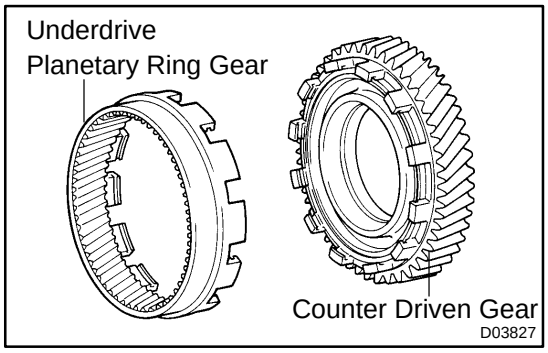


(c) Using SST and a press, press in the outer race of the tapered roller bearing.

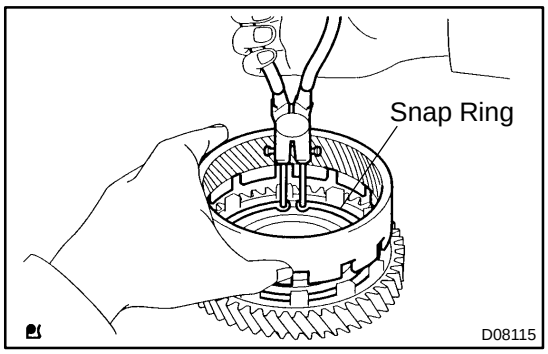
SST 09950- 60020 (09951- 00890), 09950- 70010 (09951-07100)

NOTICE:

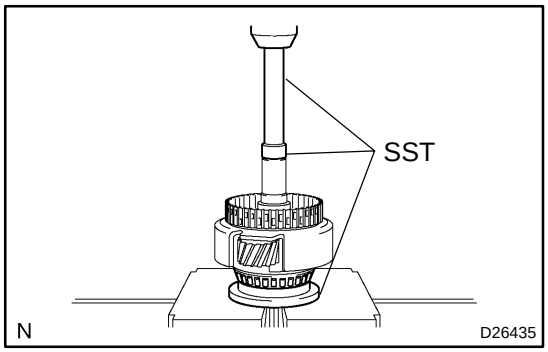
Be sure not to damage on the snap ring during the outer race installation.



(d) Install the underdrive planetary ring gear to the counter driven gear.



(e) Using a snap ring pliers, install the snap ring.



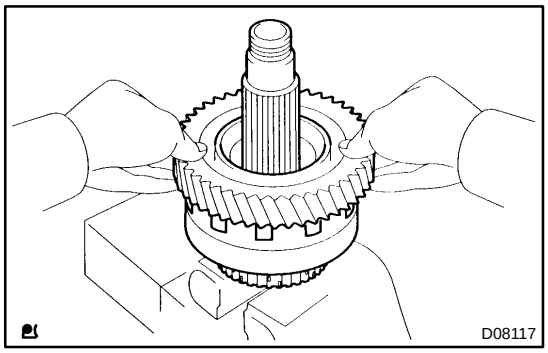
7. INSTALL UNDERDRIVE PLANETARY GEAR ASSY

(a) Using a press, press the rear tapered roller bearing to the underdrive planetary gear.

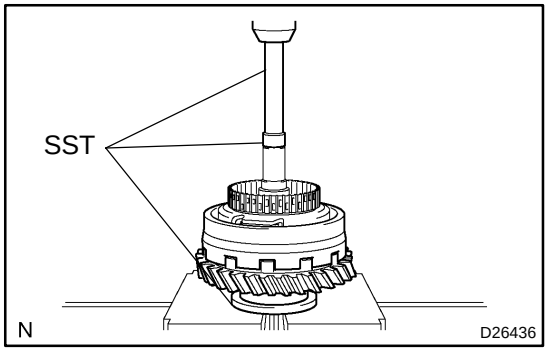
SST 09502- 12010, 09950- 60010 (09951- 00260), 09950-70010 (09951-07100), 09316-20011

NOTICE:

Press the bearing until it becomes flat at the bottom.



(b) Install the counter driven gear with planetary ring gear to the underdrive planetary gear.

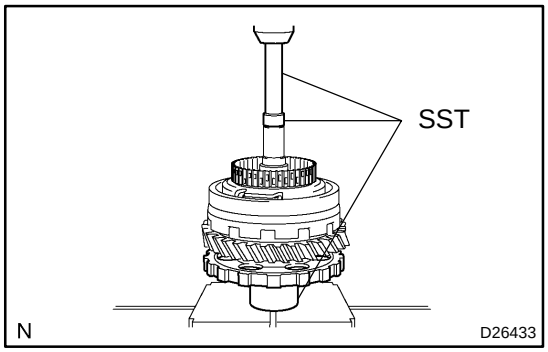


(c) Using SST and a press, press in the front tapered roller bearing.

SST 09502- 12010, 09950- 60010 (09951- 00260), 09950-70010 (09951-07100), 09316-20011

NOTICE:

Press the counter driven gear while rotating it.

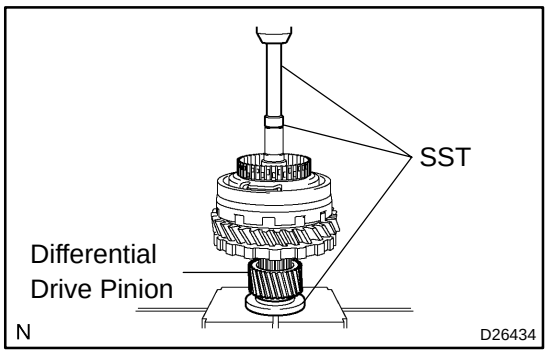


(d) Using a press, press in the parking lock gear.

SST 09502- 12010, 09950- 60010 (09951- 00260), 09950-70010 (09951-07100), 09316-20011

NOTICE:

Press the counter driven gear while rotating it.



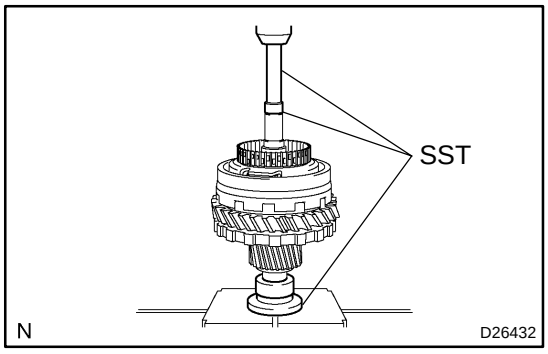
8. INSTALL DIFFERENTIAL DRIVE PINION

(a) Using a press, press the differential drive pinion.

SST 09726- 40010, 09950- 60010 (09951- 00260), 09950-70010 (09951-07100)

NOTICE:

Press the counter driven gear while rotating it.



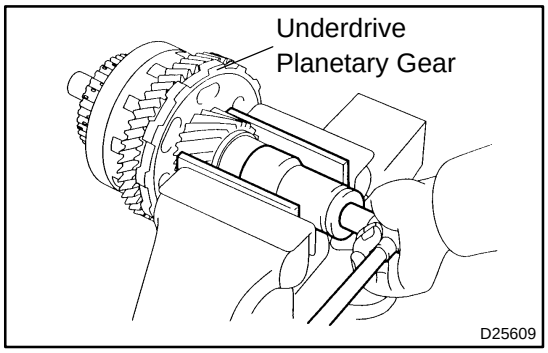
9. INSTALL CYLINDRICAL ROLLER BEARING RACE INNER

(a) Using a press, press the cylindrical roller bearing race inner.

SST 09506- 35010, 09950- 60010 (09951- 00260), 09950-70010 (09951-07100)

NOTICE:

Press the counter driven gear while rotating it.



10. INSTALL FRONT PLANETARY GEAR NUT

(a) Clamp the underdrive planetary gear in soft jaw vise.

NOTICE:

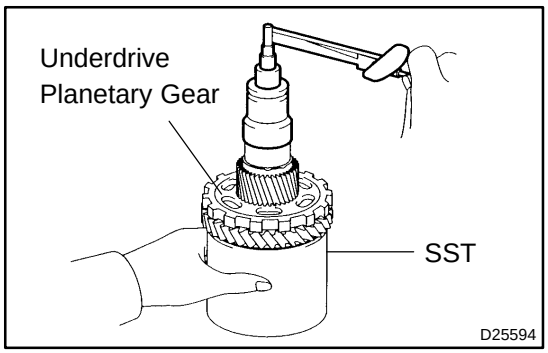
Be careful not to damage the differential drive pinion.

(b) Using a socket wrench, install a new lock nut.

Torque: 280 N·m (2,855 kgf·cm, 207 in.·lbf)

HINT:

Use a torque wrench with a fulcrum length of 750 mm (29.53 in.).



11. INSPECT UNDERDRIVE PLANETARY GEAR PRELOAD

(a) Using SST and a torque wrench, measure the turning torque of underdrive planetary gear assy while rotating the torque wrench at 60 rpm.

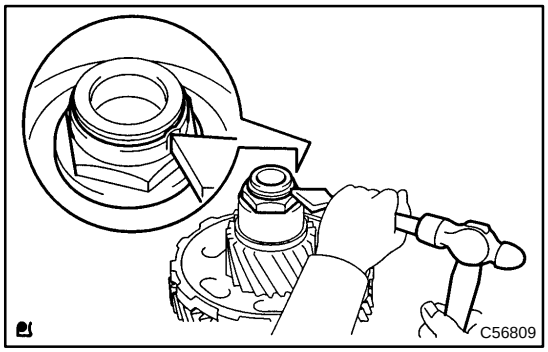
SST 09387-00050

Turning torque at 60 rpm.:

0.5 - 1.42 N·m (5.1 - 14.5 kgf·cm, 0.06 - 0.17 in.·lbf)

HINT:

Use a torque wrench with a fulcrum length of 160 mm (6.30 in.).



(b) Using a pin punch and hammer, stake the lock nut.

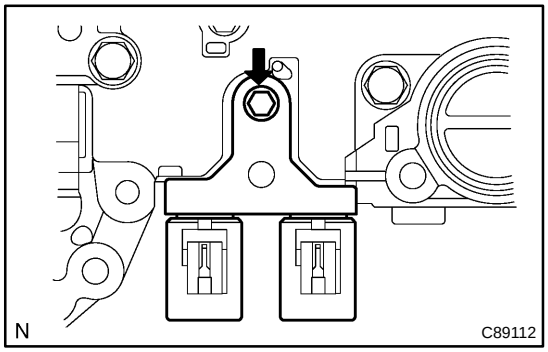
NOTICE:

Make sure that there are no cracks on the nut.

TRANSMISSION VALVE BODY ASSY (U151E/U151F)

4010J-01

OVERHAUL

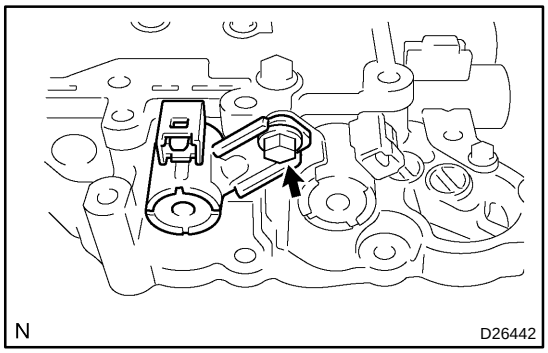


1. REMOVE SHIFT SOLENOID VALVE SL3

(a) Remove the bolt and shift solenoid valve SL3 from the valve body assy.

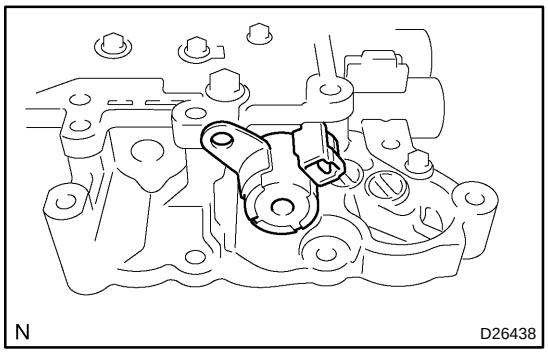
2. REMOVE LINE PRESSURE CONTROL SOLENOID ASSY

(a) Remove the shift solenoid valve SLT from the valve body assy.



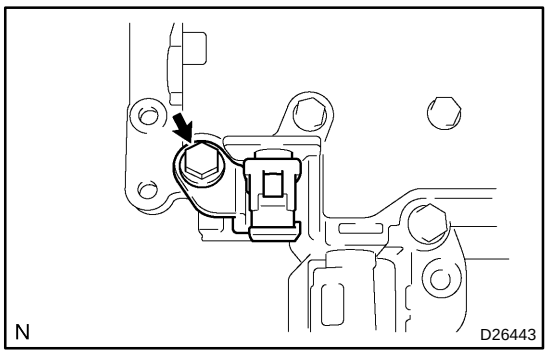
3. REMOVE SHIFT SOLENOID VALVE S4

(a) Remove the bolt and shift solenoid valve S4 from the valve body assy.



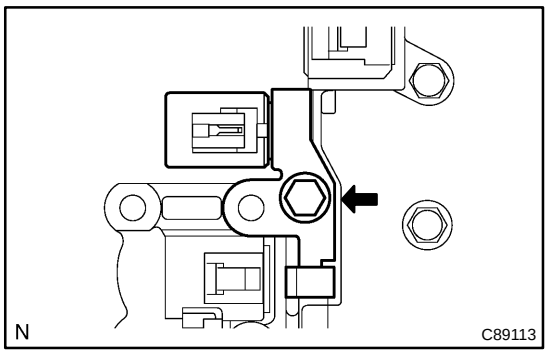
4. REMOVE SHIFT SOLENOID VALVE SR

(a) Remove the shift solenoid valve SR from the valve body assy.



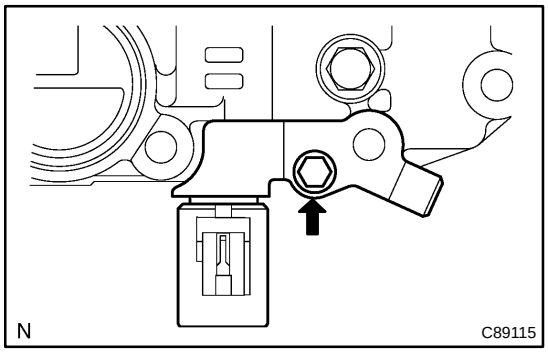
5. REMOVE SHIFT SOLENOID VALVE DSL

(a) Remove the bolt and shift solenoid valve DSL from the valve body assy.



6. REMOVE SHIFT SOLENOID VALVE SL2

(a) Remove the bolt and shift solenoid valve SL2 from the valve body assy.



7. REMOVE SHIFT SOLENOID VALVE SL1

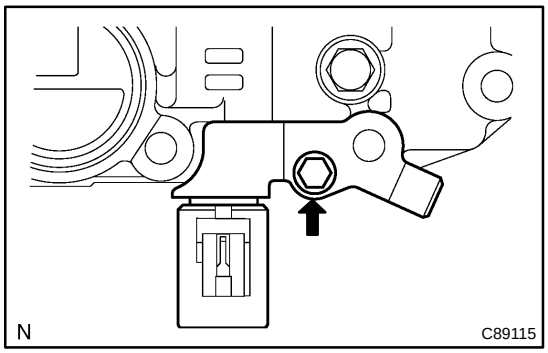
(a) Remove the bolt and shift solenoid valve SL1 from the valve body assy.

8. REMOVE MANUAL VALVE

(a) Remove the manual valve from the valve body assy.

9. INSTALL MANUAL VALVE

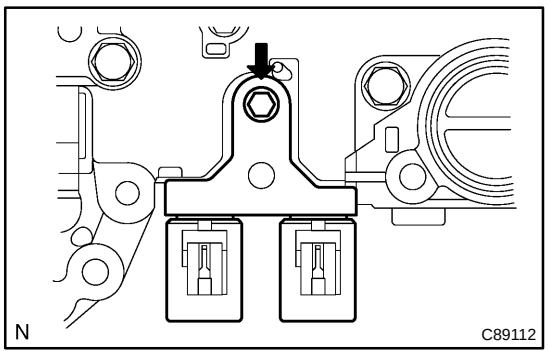
(a) Install the manual valve to the valve body assy.



10. INSTALL SHIFT SOLENOID VALVE SL1

(a) Install the shift solenoid valve SL1 to the valve body assy with the bolt.

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



11. INSTALL LINE PRESSURE CONTROL SOLENOID ASSY

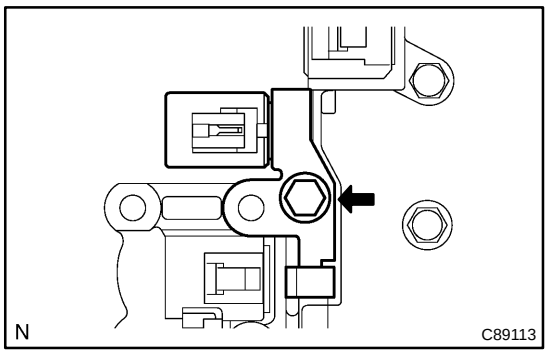
(a) Install the shift solenoid valve SLT to the valve body assy with the bolt.

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

12. INSTALL SHIFT SOLENOID VALVE SL3

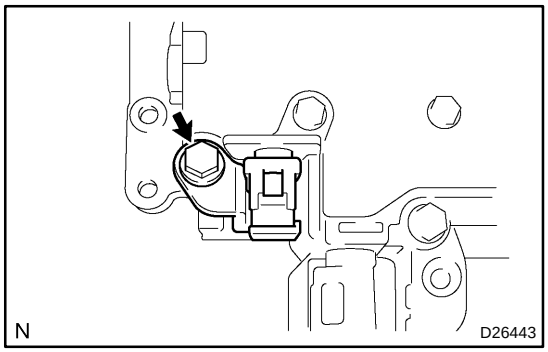
(a) Install the shift solenoid valve SL3 to the valve body assy with the bolt.

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



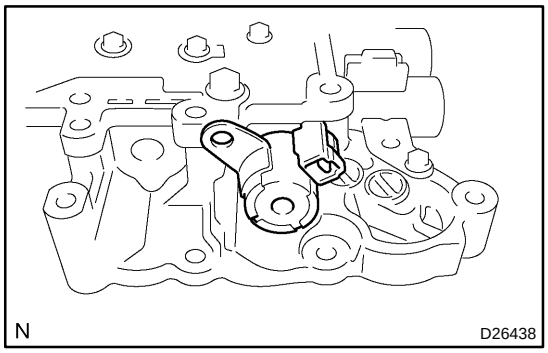
13. INSTALL SHIFT SOLENOID VALVE SL2

(a) Install the shift solenoid valve SL2 to the valve body assy with the bolt.
Torque: 10.8 N·m (110 kgf·cm, 8 ft·lbf)



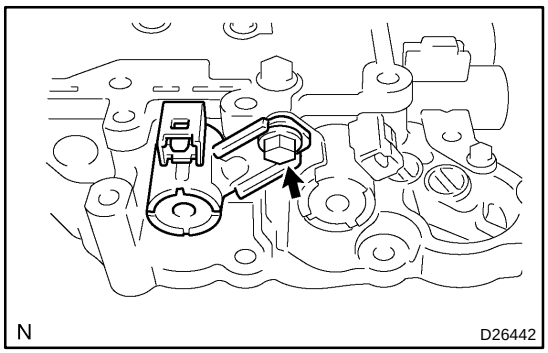
14. INSTALL SHIFT SOLENOID VALVE DSL

(a) Install the shift solenoid valve DSL to the valve body assy with the bolt.
Torque: 10.8 N·m (110 kgf·cm, 8 ft·lbf)



15. INSTALL SHIFT SOLENOID VALVE SR

(a) Install the shift solenoid valve SR to the valve body assy.



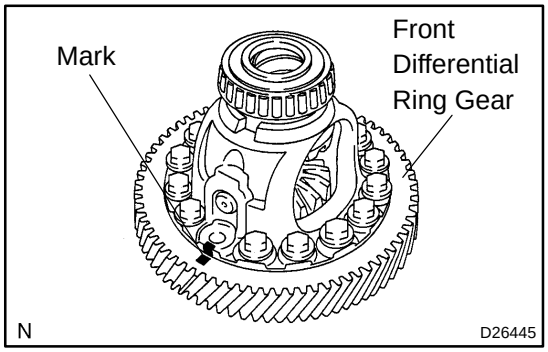
16. INSTALL SHIFT SOLENOID VALVE S4

(a) Install the shift solenoid valve S4 to the valve body assy with the bolt.
Torque: 10.8 N·m (110 kgf·cm, 8 ft·lbf)

FRONT DIFFERENTIAL ASSY (U151E)

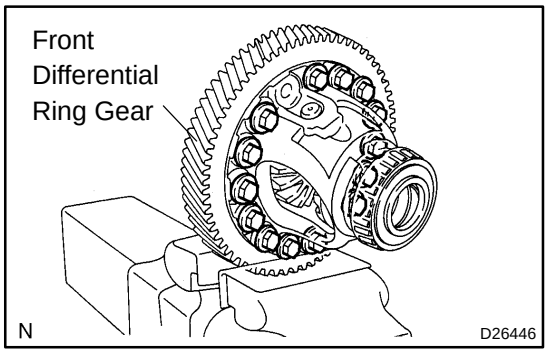
OVERHAUL

4006M-03

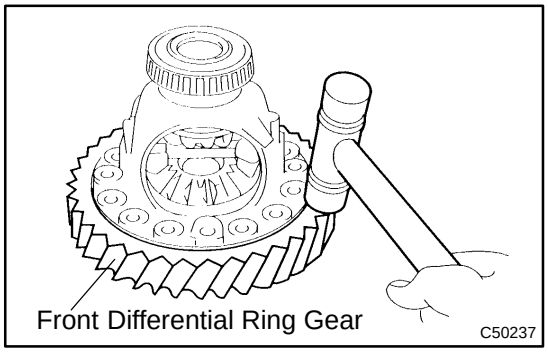


1. REMOVE FRONT DIFFERENTIAL RING GEAR

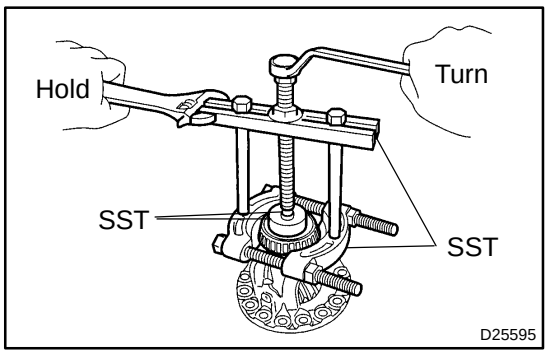
(a) Place the match-marks on the front differential ring gear and differential case.



(b) Remove the 14 bolts.



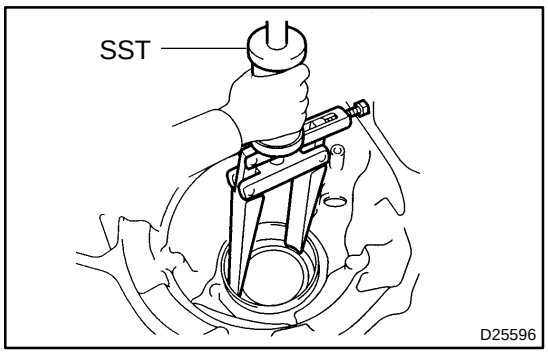
(c) Using a plastic hammer, tap on the front differential ring gear to remove it from the case.



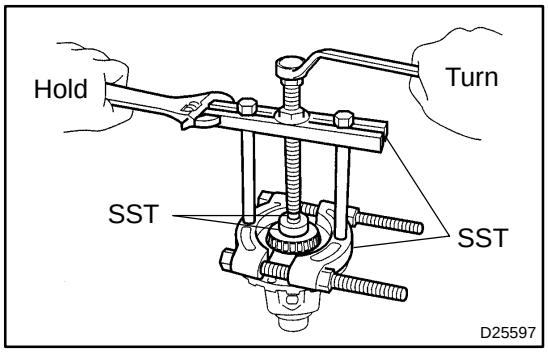
2. REMOVE FR DIFFERENTIAL CASE FRONT TAPERED ROLLER BEARING

(a) Using SST, remove the front differential case front differential tapered roller bearing from the differential case.

SST 09950- 00020, 09950- 00030, 09950- 60010 (09951-00490), 09950-40011 (09957-04010)

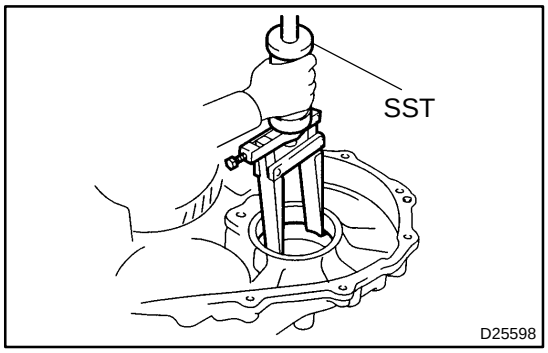


(b) Using SST, remove the front differential case front tapered roller bearing outer race.
SST 09308-00010

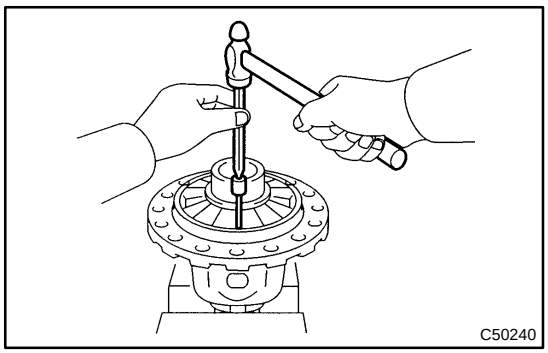


3. REMOVE FR DIFFERENTIAL CASE REAR TAPERED ROLLER BEARING

(a) Using SST, remove the front differential case rear tapered roller bearing from the differential case.
SST 09950- 00020, 09950- 00030, 09950- 60010 (09951-00490), 09950-40011 (09957-04010)



(b) Using SST, remove the front differential case rear tapered roller bearing outer race.
SST 09308-00010

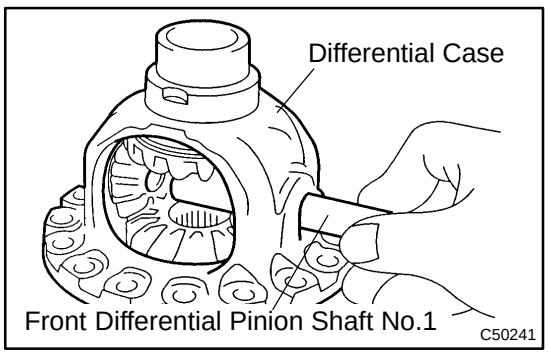


4. REMOVE FRONT DIFFERENTIAL PINION SHAFT STRAIGHT PIN

(a) Using a pin punch and hammer, install the straight pin.

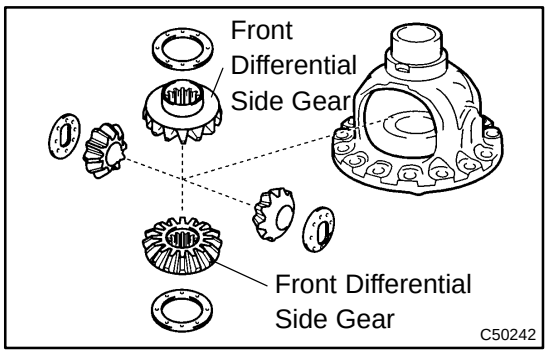
NOTICE:

Before removing the straight pin, unstake it with a pin punch.



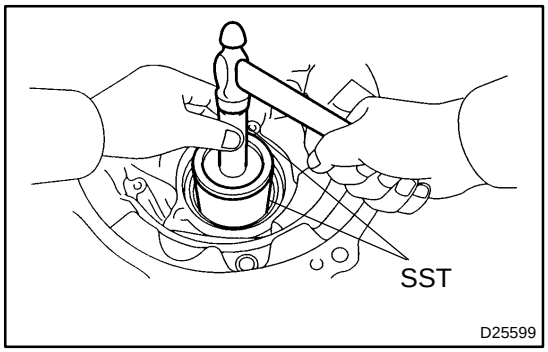
5. REMOVE FRONT DIFFERENTIAL PINION SHAFT NO.1

(a) Remove the front differential pinion shaft No.1 from the differential case.



6. REMOVE FRONT DIFFERENTIAL SIDE GEAR

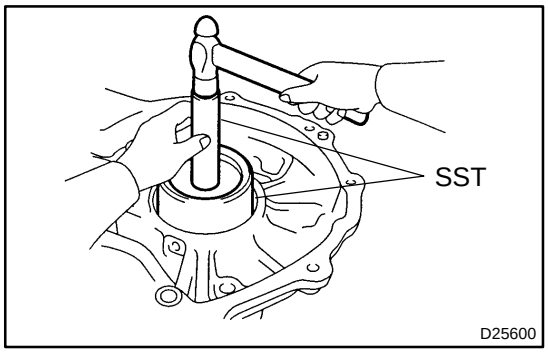
(a) Remove the 2 front differential pinions, 2 pinion thrust washers, 2 front differential side gears and 2 side gear thrust washers from the differential case.



7. REMOVE TRANSAXLE HOUSING OIL SEAL

(a) Using SST, remove the oil seal.

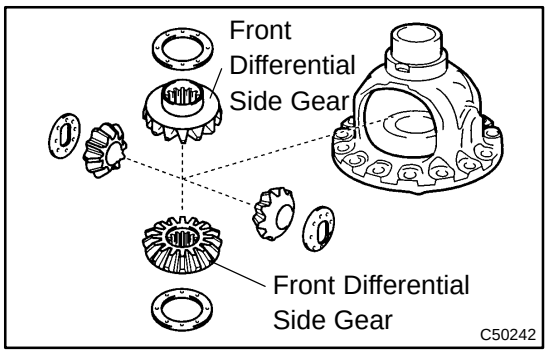
SST 09950- 70010 (09951- 07100), 09215- 00013 (09215-00471)



8. REMOVE DIFFERENTIAL SIDE BEARING RETAINER OIL SEAL

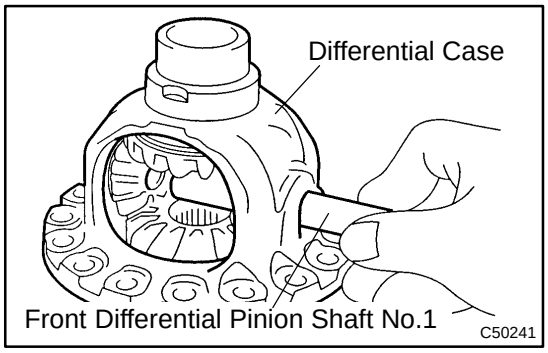
(a) Using SST, remove the oil seal.

SST 09950-70010 (09951-07100), 09608-10010



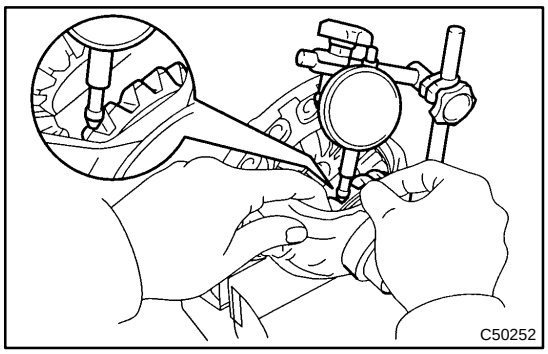
9. INSTALL FRONT DIFFERENTIAL SIDE GEAR

(a) Apply the 2 front differential side gears, 2 side gear thrust washers, 2 front differential pinions and 2 pinion thrust washers with ATF and install them to the differential case.



10. INSTALL FRONT DIFFERENTIAL PINION SHAFT NO.1

(a) Apply the front differential pinion shaft No.1 with ATF, install it to the differential case.

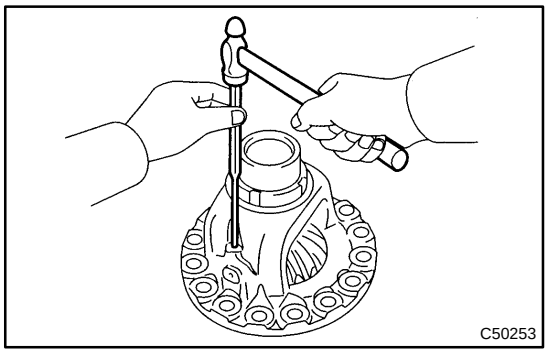


11. INSPECT BACKLASH

(a) Using a dial indicator, inspect the backlash of the side gear.

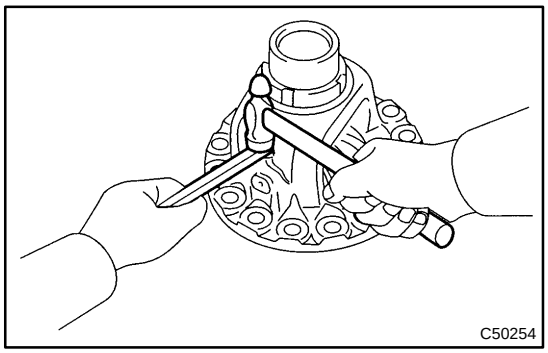
Standard backlash:
0.05 - 0.20 mm (0.0020 - 0.0079 in.)
Thrust washer thickness

Mark	Thickness
-	1.625 mm (0.0640 in.)
-	1.725 mm (0.0679 in.)
-	1.825 mm (0.0719 in.)



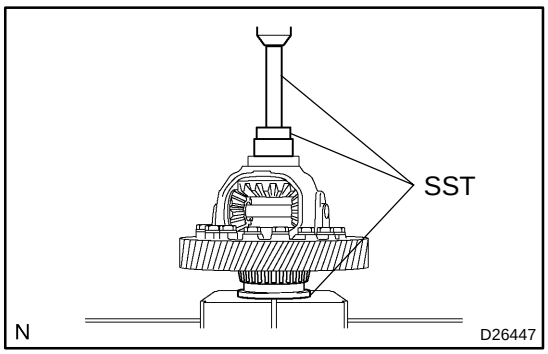
12. INSTALL FRONT DIFFERENTIAL PINION SHAFT STRAIGHT PIN

(a) Using a pin punch and hammer, install the pinion shaft straight pin.



(b) Using a chisel and hammer, stake the differential case.

NOTICE:
Stake it after adjusting the backlash.

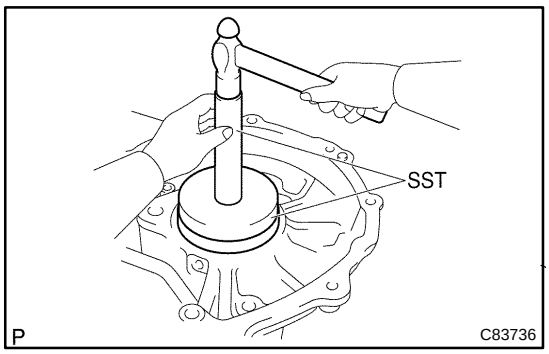


13. INSTALL FR DIFFERENTIAL CASE FRONT TAPERED ROLLER BEARING

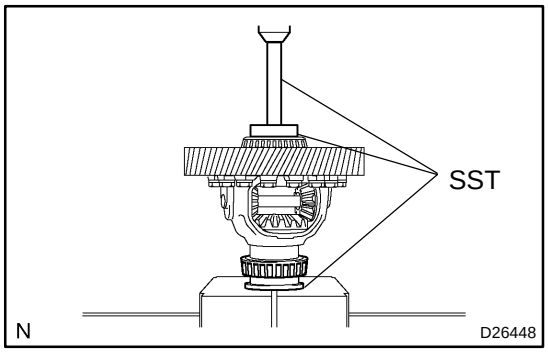
(a) Using SST and a press, install the front differential case rear tapered roller bearing to the differential case.

SST 09316- 12010, 09550- 60010 (09951- 00490), 09950-70010 (09951-07100)

NOTICE:
Do not make a damage on the bearing cage during the bearing inner race installation.



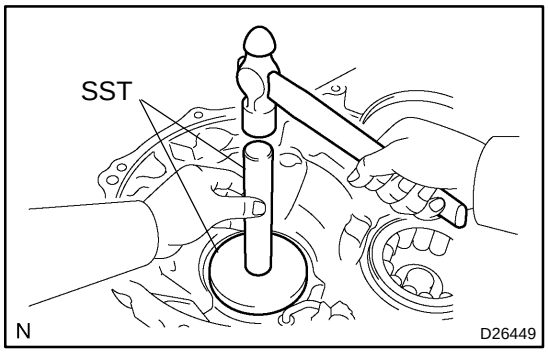
(b) Using SST and a hammer, install the front differential case tapered roller bearing front outer race to the transaxle housing.
SST 09550- 60010 (09951- 00490), 09950- 60020 (09951-00910)



14. INSTALL FR DIFFERENTIAL CASE REAR TAPERED ROLLER BEARING

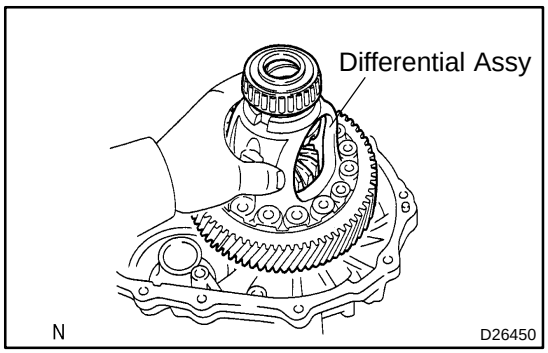
(a) Using SST and a press, install the front differential case front tapered roller bearing to the differential case.
SST 09316- 12010, 09550- 60010 (09951- 00490), 09950-70010 (09951-07100)

NOTICE:
Do not make a damage on the bearing cage during the bearing inner race installation.



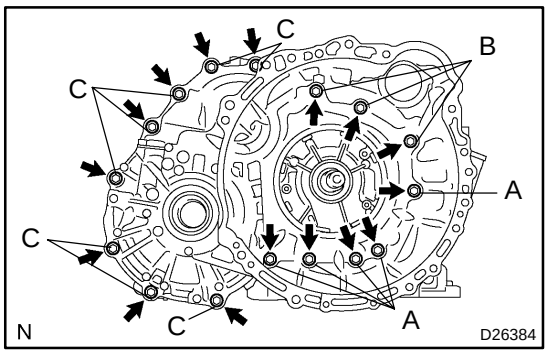
(b) Using SST and a hammer, install the front differential case tapered roller bearing front outer race to the transaxle housing.
SST 09950- 70010 (09951- 07150), 09950- 60020 (09951-00890)

NOTICE:
Clearance is not allowed between the bearing and transaxle housing.



15. ADJUST DIFFERENTIAL SIDE BEARING RRELOAD

(a) Install the differential assy to the transaxle case.



(b) Clean the matching surfaces of the transaxle case and transaxle housing.

(c) Install the transaxle housing to the transaxle case and tighten them with the 16 bolts.

Torque:
Bolt A: 25 N·m (255 kgf·cm, 18 ft·lbf)
Bolt B: 33 N·m (337 kgf·cm, 24 ft·lbf)
Bolt C: 29 N·m (295 kgf·cm, 21 ft·lbf)
Bolt D: 22 N·m (226 kgf·cm, 16.0 ft·lbf)

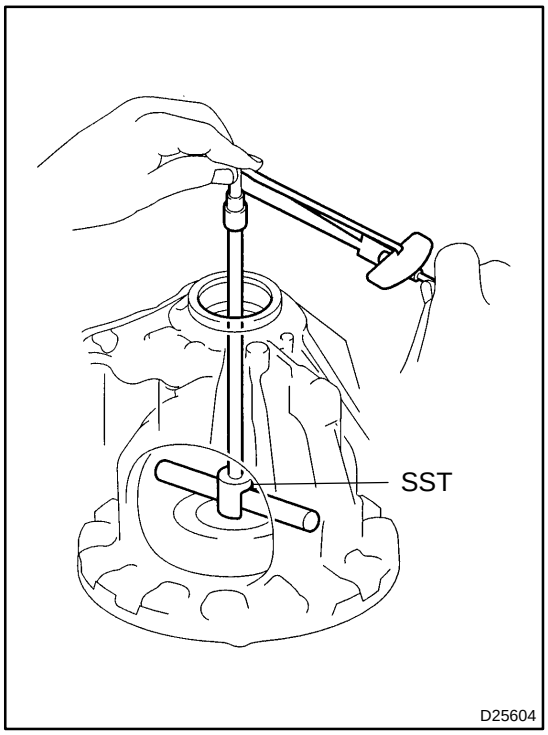
HINT:

Apply seal packing or equivalent to the A and D.

Seal packing:
THREE BOND 2403 or equivalent
Bolt length:
Bolt A: 50 mm (1.969 in.)
Bolt B: 50 mm (1.969 in.)
Bolt C: 42 mm (1.654 in.)
Bolt D: 72 mm (2.835 in.)

HINT:

Usually, bolt A is a non-reusable bolt. In this case, however, it can be used after cleaning it.



(d) Using SST, turn the differential assy right and left 2 or 3 times to settle the bearing.

SST 09564-3201 1

(e) Using SST and a torque wrench, measure the turning torque of the differential.

SST 09564-3201 1

Turning torque at 60 rpm:
New bearing
0.20 - 0.69 N·m (2.0 - 7.0 kgf·cm, 1.8 - 6.1 in.·lbf)
Used bearing
0.10 - 0.35 N·m (1.0 - 3.6 kgf·cm, 0.9 - 3.1 in.·lbf)

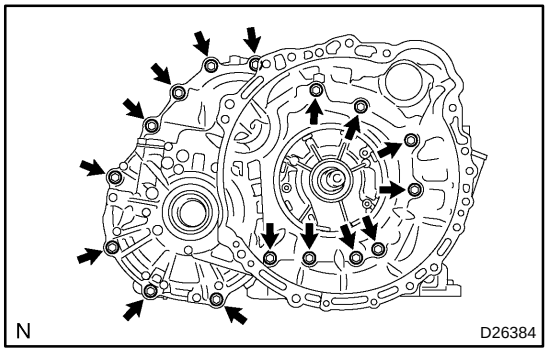
HINT:

If the turning torque is not within the specified value, refer to the table below to select a thrust washer which turning torque is within the specified value.

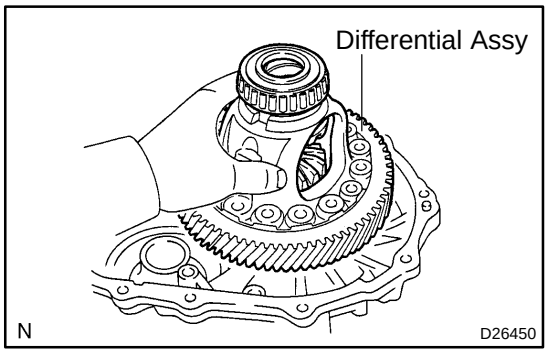
Flange thickness: mm (in.)

Mark	Thickness	Mark	Thickness
0	2.00 (0.0787)	9	2.45 (0.0965)
1	2.05 (0.0807)	A	2.50 (0.0984)
2	2.10 (0.0827)	B	2.55 (0.1004)
3	2.15 (0.0846)	C	2.60 (0.1024)
4	2.20 (0.0866)	D	2.65 (0.1043)
5	2.25 (0.0886)	E	2.70 (0.1063)
6	2.30 (0.0906)	F	2.75 (0.1083)

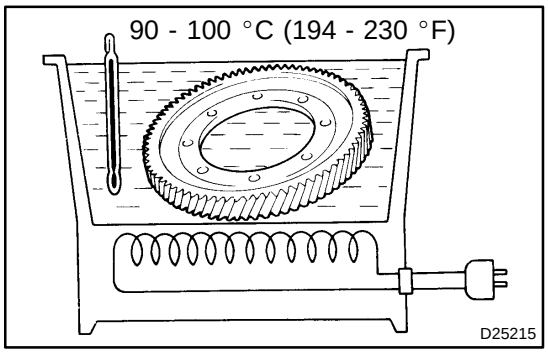
Mark	Thickness	Mark	Thickness
7	2.35 (0.0925)	G	2.80 (0.1102)
8	2.40 (0.0945)	H	2.85 (0.1122)



(f) Remove the 16 bolts and the transaxle housing.



(g) Remove the differential assy.



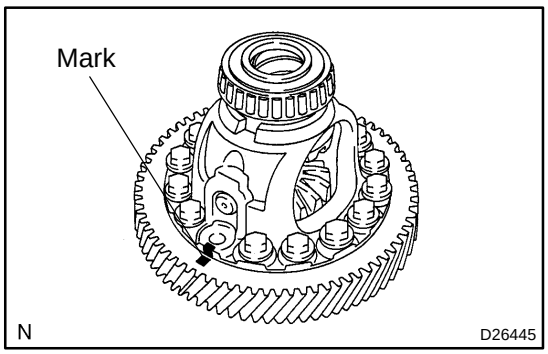
16. INSTALL FRONT DIFFERENTIAL RING GEAR

(a) Using ATF and heater, heat the front differential ring gear to 90 - 110 °C (194.0 - 230.0 °F).

NOTICE:

Do not overheat the ring gear to 110 °C (230.0 °F) or more.

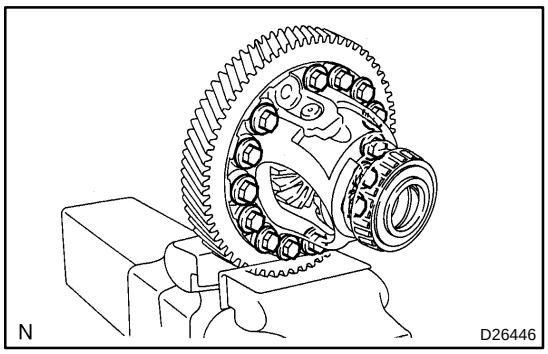
(b) Clean the contact surface of the front differential case.



(c) Align the match-marks, install the front differential ring gear case quickly.

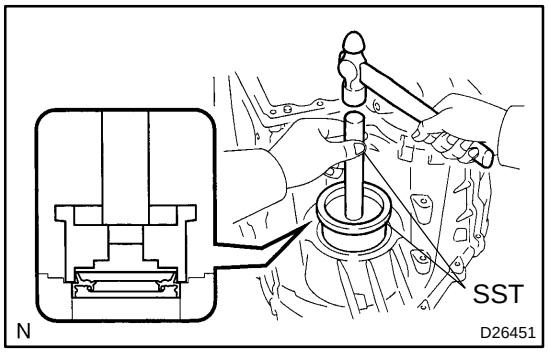
NOTICE:

Do not install the bolts while the ring gear is hot.



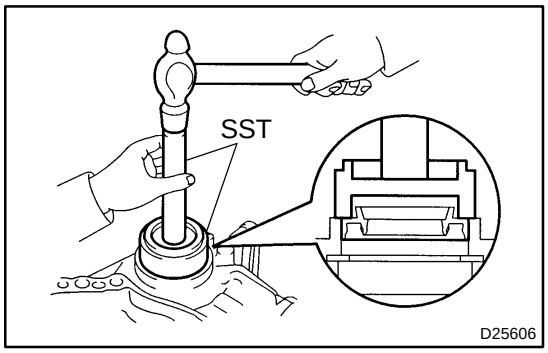
(d) Tighten the 14 bolts.
Torque: 95.0 N·m (970 kgf·cm, 70 ft·lbf)

NOTICE:
Tighten the bolts a little at a time in diagonal order.



17. INSTALL TRANSAXLE HOUSING OIL SEAL

(a) Using SST and a hammer, install a new oil seal.
(b) Apply the rip of oil seal with a little MP grease.
SST 09223-15020, 09950-70010 (09951-07150)
Oil seal drive in depth: 0 ± 0.5 mm (0 ± 0.0197 in.)



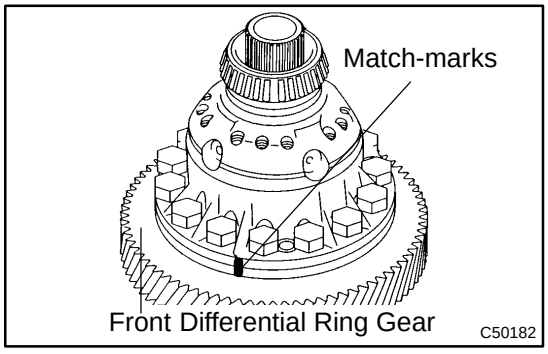
18. INSTALL DIFFERENTIAL SIDE BEARING RETAINER OIL SEAL

(a) Using SST and a hammer, drive into a new oil seal.
(b) Apply the lip of the oil seal with a little MP grease.
SST 09710-30050, 09950-70010 (09951-07150)
Oil seal drive in depth: 0 ± 0.5 mm (0 ± 0.0197 in.)

FRONT DIFFERENTIAL ASSY (U151F)

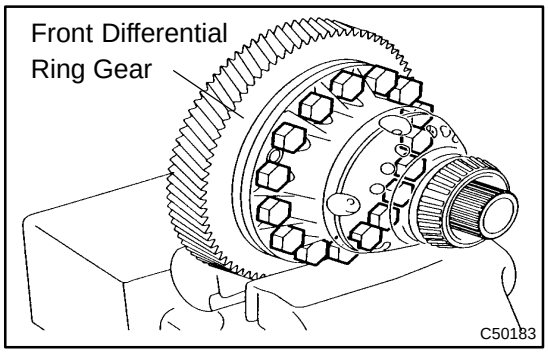
4006N-02

OVERHAUL

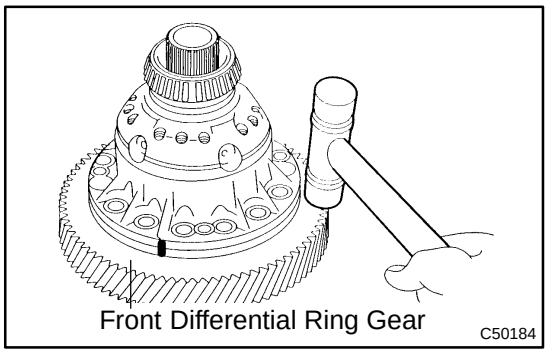


1. REMOVE FRONT DIFFERENTIAL RING GEAR

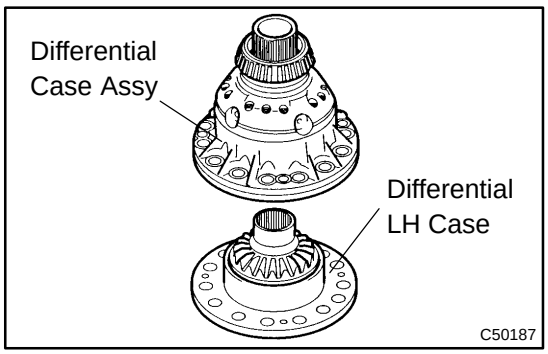
(a) Place the match-marks on the ring gear and differential case.



(b) Remove the 16 bolts.

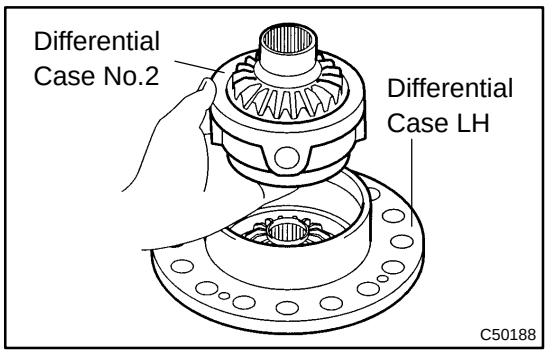


(c) Using a plastic hammer, tap on the ring gear to remove it from the case.

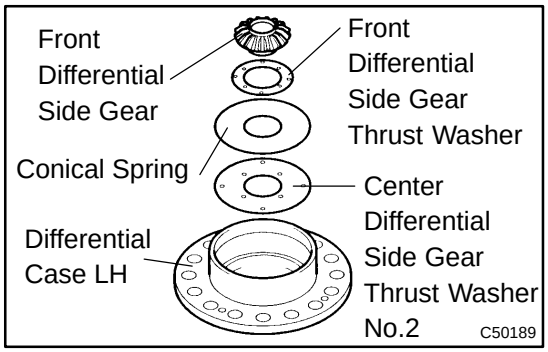


2. REMOVE FRONT DIFFERENTIAL SIDE GEAR

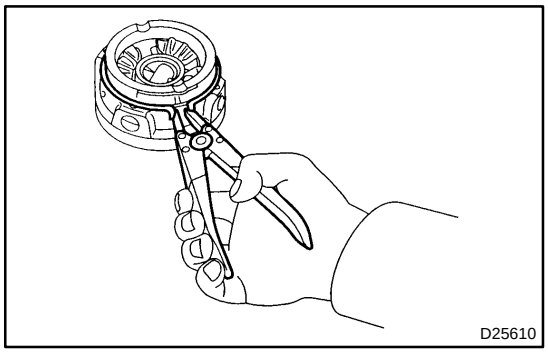
(a) Remove the differential LH case from the differential case assy.



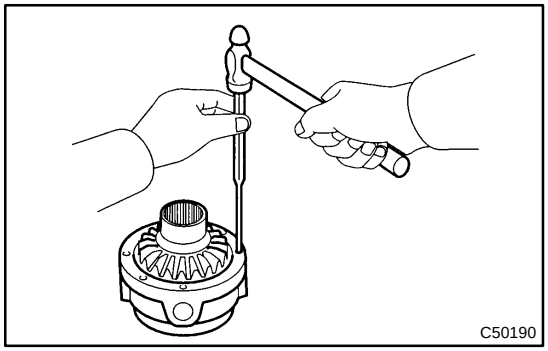
(b) Remove the differential case No.2 from the differential case LH.



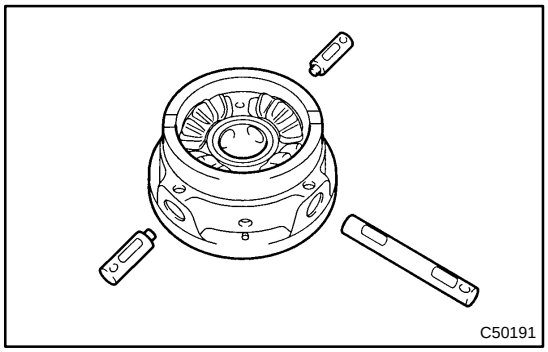
(c) Remove the front differential side gear, front differential side gear thrust washer, conical spring and center differential side gear thrust washer No.2 from the differential case LH.



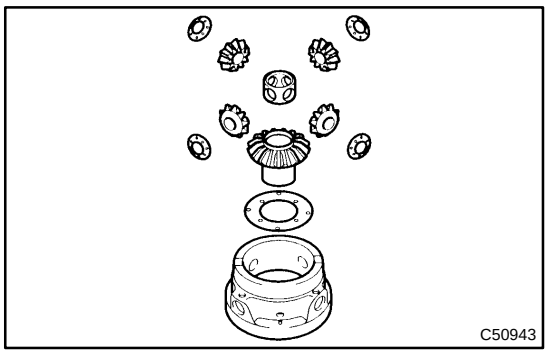
(d) Using a snap ring expander, remove the pinion shaft spacer snap ring.



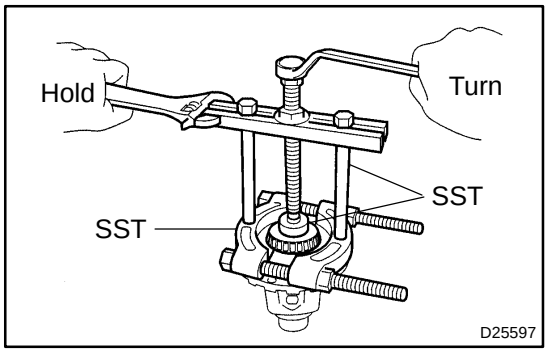
(e) Using a pin punch and a hammer, remove 3 straight pins.



(f) Remove the center differential pinion shaft and 2 differential pinion shafts.

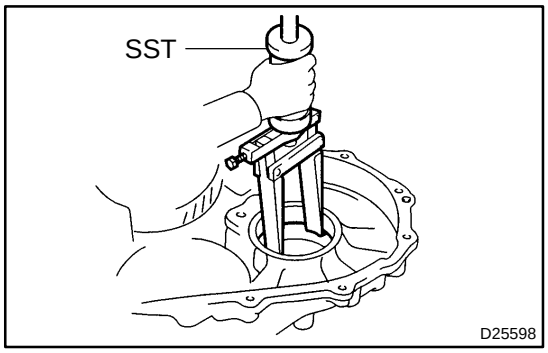


(g) Remove 4 front differential pinions, 4 front differential pinion thrust washers, front differential pinion shaft holder, front differential planetary ring gear and differential side gear thrust washer No. 1.

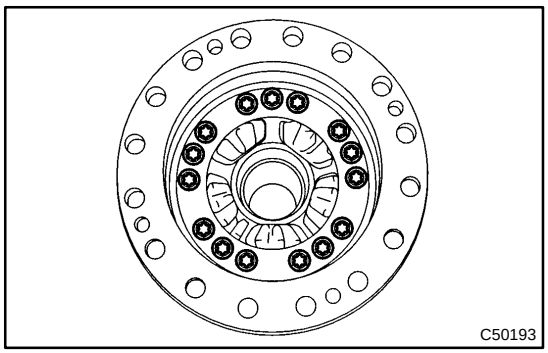


3. REMOVE FR DIFFERENTIAL CASE REAR TAPERED ROLLER BEARING

(a) Using SST, remove the front differential case rear tapered roller bearing from the differential case.
SST 09950- 00020, 09950- 00030, 09950- 60010 (09951-00480)

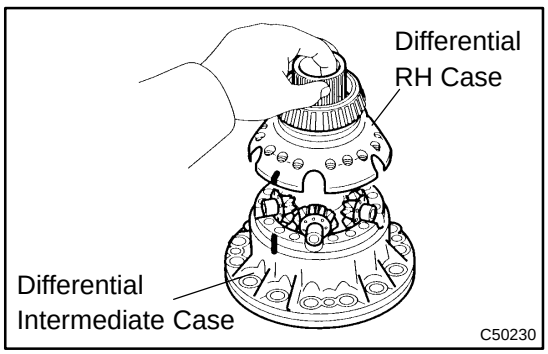


(b) Using SST, remove the front differential case rear tapered roller bearing outer race and differential case washer.
SST 09308-00010



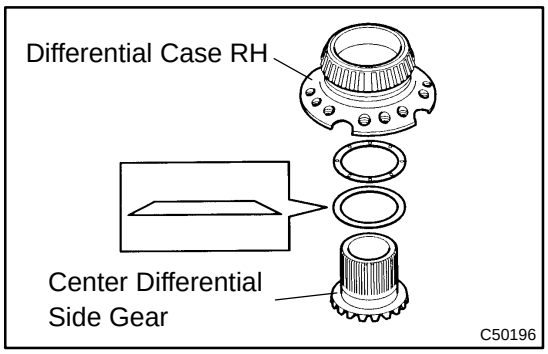
4. REMOVE CENTER DIFFERENTIAL PINION

(a) Using torx socket (T50), remove the 15 bolts.

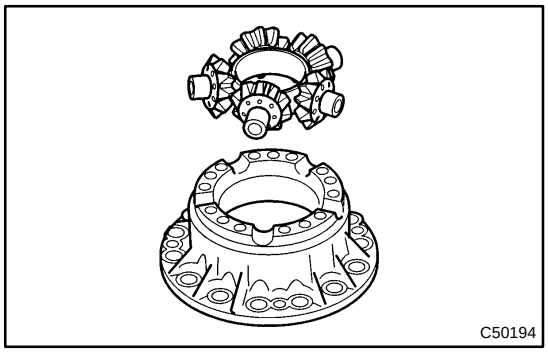


(b) Place the matchmarks on the differential intermediate case and differential case.

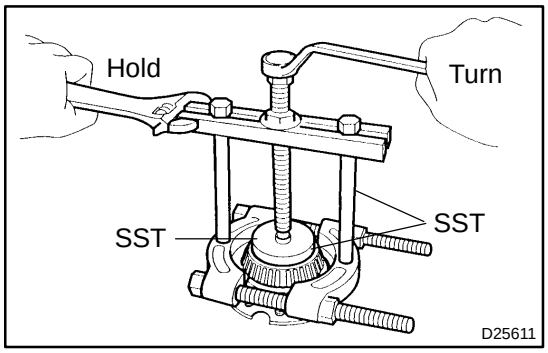
(c) Remove the differential intermediate case from the differential case RH.



(d) Remove the center differential side gear, conical spring washer and center differential side gear thrust washer No. 1 RH from the differential case RH.

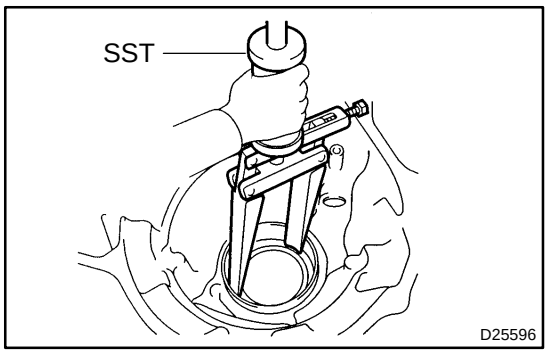


(e) Remove the differential spider, 5 center differential pinions and 5 center differential pinion thrust washers from the differential intermediate case.

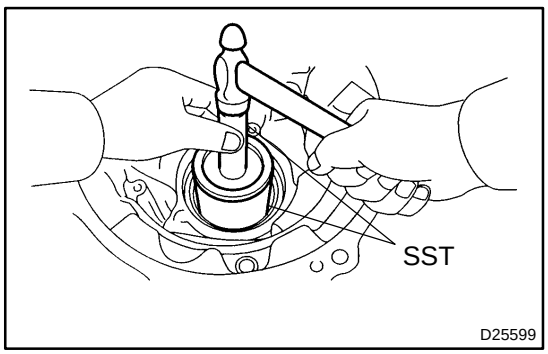


5. REMOVE FR DIFFERENTIAL CASE FRONT TAPERED ROLLER BEARING

(a) Using SST, remove the front differential case front tapered roller bearing from the differential case.
SST 09950- 00020, 09950- 00030, 09950- 60010 (09951-00600)

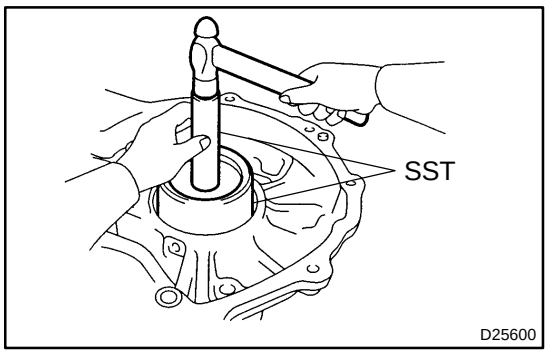


(b) Using SST, remove the front differential case front tapered roller bearing outer race and differential case washer.
SST 09308-00010



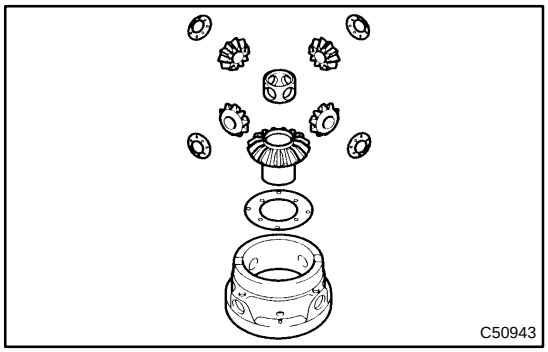
6. REMOVE TRANSAXLE HOUSING OIL SEAL

(a) Using SST, remove the oil seal.
SST 09950-70010 (09951-07100), 09649-17010



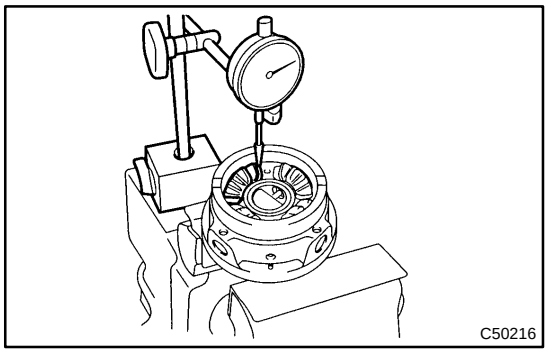
7. REMOVE DIFFERENTIAL SIDE BEARING RETAINER OIL SEAL

(a) Using SST, remove the oil seal.
SST 09950-70010 (09951-07100), 09608-10010



8. INSTALL DIFFERENTIAL CASE SUB-ASSY NO.2

(a) Coat the front differential side gear thrust washer No.1, front differential planetary ring gear, front differential pinion No.2, front differential pinion thrust washer No.2, front differential pinion shaft holder, front differential pinion shaft and 2 differential pinion shafts with ATF, install them to the differential case No.2.



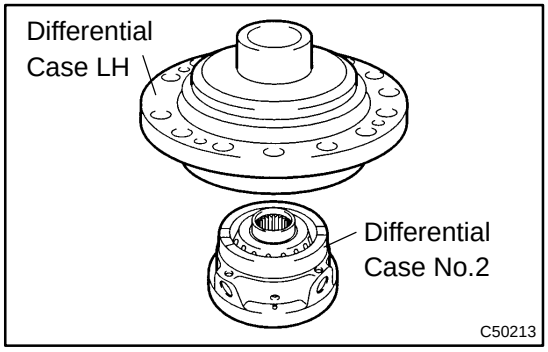
(b) Using a dial indicator, measure the backlash of one pinion gear while holding the front differential side gear toward the case.
Standard backlash:
0.05 - 0.20 mm (0.0020 - 0.0079 in.)

NOTICE:
Do not mount the surface of front differential case which contacts with bushing in a vise.

If the backlash is not within the specified value, refer to the table below and select a thrust washer which will ensure that the backlash is within the specified value.

Thrust washer thickness: mm (in.)

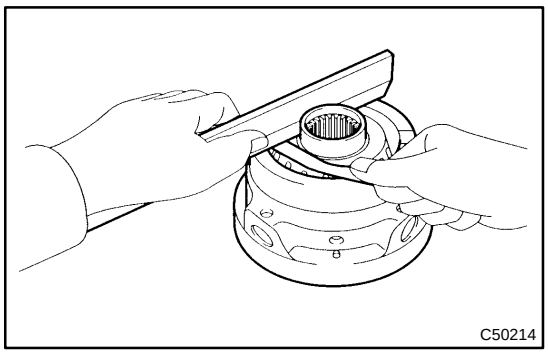
Mark	Thickness	Mark	Thickness
A	0.95 (0.0373)	F	1.20 (0.0472)
B	1.00 (0.0393)	G	1.25 (0.0492)
C	1.05 (0.0413)	H	1.30 (0.0512)
D	1.10 (0.0433)	J	1.35 (0.0532)
E	1.15 (0.0453)	K	1.40 (0.0552)



(c) Engage the front differential side gear to the above mentioned front differential case.

(d) Install the differential case LH to the front differential case and measure its center.

(e) After that, remove the differential case LH.


C50214

(f) Using a straight edge and feeler gauge, measure the clearance between the front differential case and the front differential side gear.

t= Thrust washer thickness

L= Clearance

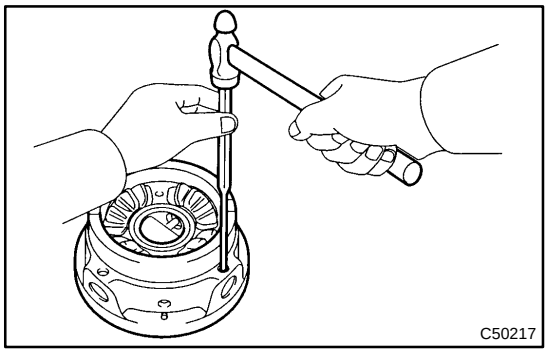
t= L-0.162 - 0.265 mm (0.0064 - 0.0104 in.)

If the clearance is not within the specified value, refer to the table below and select a thrust washer which will ensure that the clearance is within the specified value.

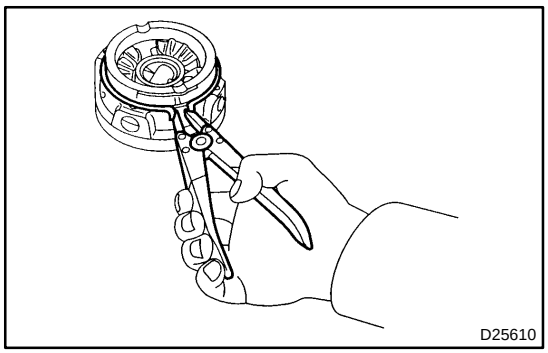
Thrust washer thickness: mm (in.)

Mark	Thickness	Mark	Thickness
A	0.95 (0.0373)	F	1.20 (0.0472)
B	1.00 (0.0393)	G	1.25 (0.0492)
C	1.05 (0.0413)	H	1.30 (0.0512)
D	1.10 (0.0433)	J	1.35 (0.0532)
E	1.15 (0.0453)	K	1.40 (0.0552)

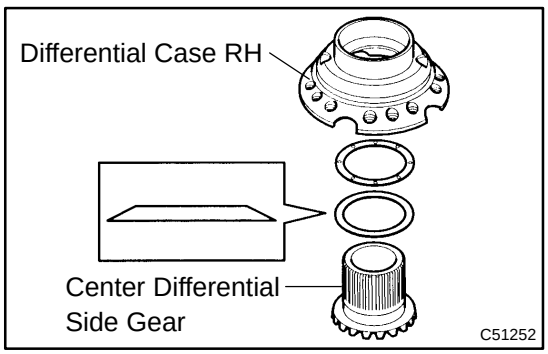
If the clearance is not within the specified value, parts may have been assembled incorrectly, so check and reassemble it.


C50217

(g) Using a pin punch and a hammer, install 3 straight pins.


D25610

(h) Using a snap ring expander, install the pinion shaft spacer snap ring.



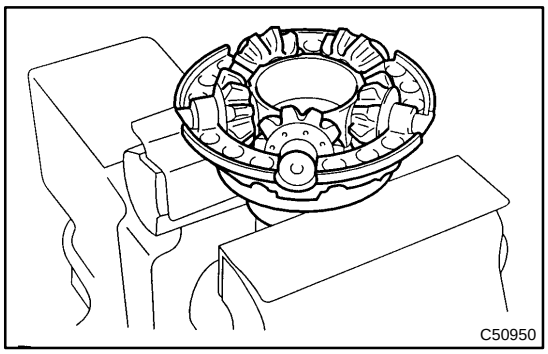
C51252

9. INSTALL CTR DIFFERENTIAL PLANETARY GEAR ASSY

(a) Install the center differential side gear, conical spring washer and center differential side gear thrust washer No.2 RH from the differential case RH.

HINT:

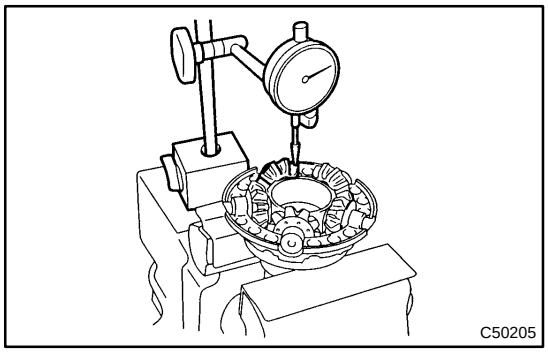
Ensure that the conical washers is installed correctly.


C50950

(b) Hold the differential case RH by vice. Install the center differential pinion and pinion thrust washer to the differential spider and install them to the differential case RH.

NOTICE:

When holding the differential case RH by vise, be sure to place an aluminum sheet between them and use a minimum force.


C50205

(c) Pressing and holding the differential spider toward the differential case RH, measure the pinion's backlash with a dial indicator as illustrated.

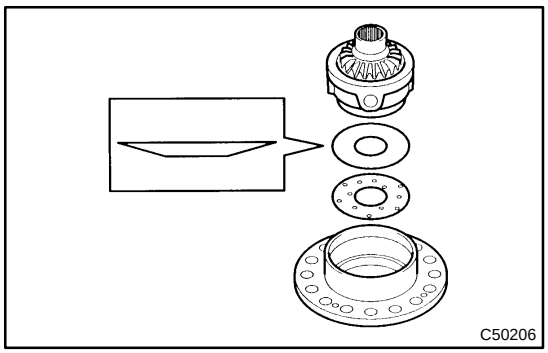
Standard backlash:

0.05 - 0.20 mm (0.0020 - 0.0079 in.)

If the backlash is not within the specified value, refer to the table below and select a thrust washer which will ensure that the backlash is within the specified value.

Thrust washer thickness: mm (in.)

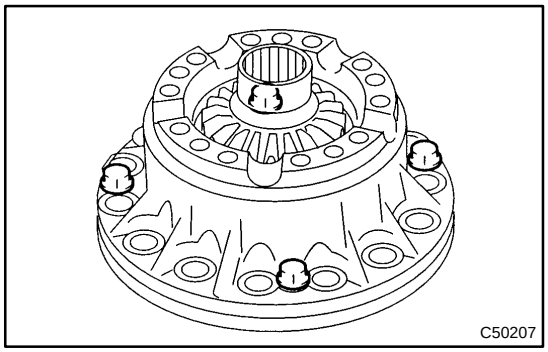
Mark	Thickness	Mark	Thickness
MA	0.80 (0.0313)	MH	1.15 (0.0453)
MB	0.85 (0.0333)	MJ	1.20 (0.0472)
MC	0.90 (0.0353)	MK	1.25 (0.0492)
MD	0.95 (0.0373)	ML	1.30 (0.0512)
ME	1.00 (0.0393)	MM	1.35 (0.0532)
MF	1.05 (0.0413)	MN	1.40 (0.0552)
MG	1.10 (0.0433)	-	-


C50206

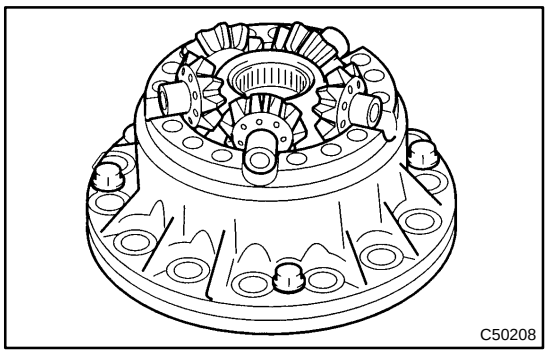
(d) Temporarily install the differential side gear thrust washer No.2 LH, center differential side gear conical spring washer and differential case No.2 to the differential case LH.

HINT:

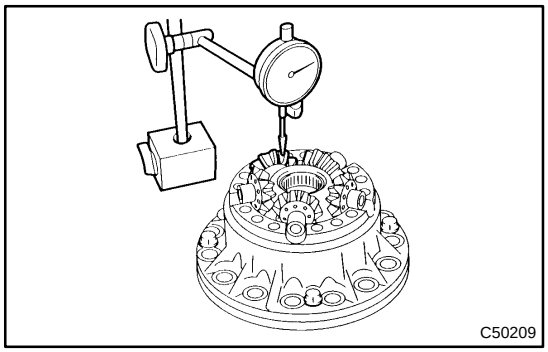
Ensure that the conical washers is installed correctly.


C50207

(e) Install the differential intermediate case to the above and fix them with 4 bolts.


C50208

(f) Remove the differential spider, 5 center differential pinions and 5 center differential pinion thrust washers from the differential case RH. Put them in the differential intermediate case and fix the case.


C50209

(g) Pressing and holding the differential spider toward the differential intermediate case, measure the pinion's backlash with a dial indicator.

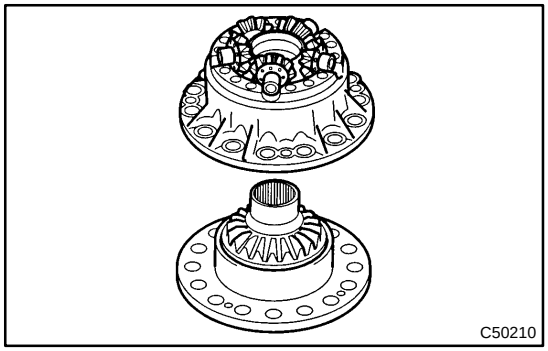
Standard backlash:

0.05 - 0.20 mm (0.0020 - 0.0079 in.)

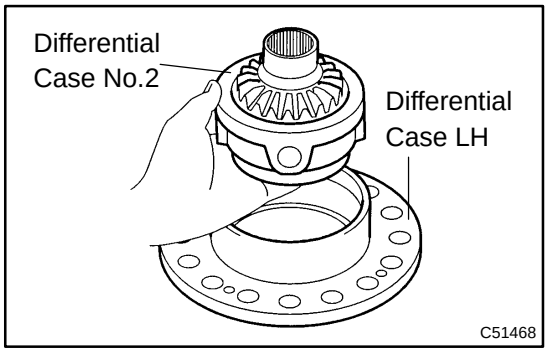
If the backlash is not within the specified value, refer to the table below and select a thrust washer which will ensure that the backlash is within the specified value.

Thrust washer thickness: mm (in.)

Mark	Thickness	Mark	Thickness
MA	0.80 (0.0313)	MH	1.15 (0.0453)
MB	0.85 (0.0333)	MJ	1.20 (0.0472)
MC	0.90 (0.0353)	MK	1.25 (0.0492)
MD	0.95 (0.0373)	ML	1.30 (0.0512)
ME	1.00 (0.0393)	MM	1.35 (0.0532)
MF	1.05 (0.0413)	MN	1.40 (0.0552)
MG	1.10 (0.0433)	-	-

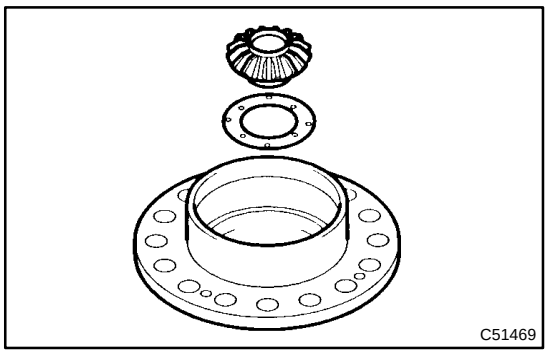

C50210

(h) Remove the 4 bolts and disconnect the differential case LH from the differential intermediate case.

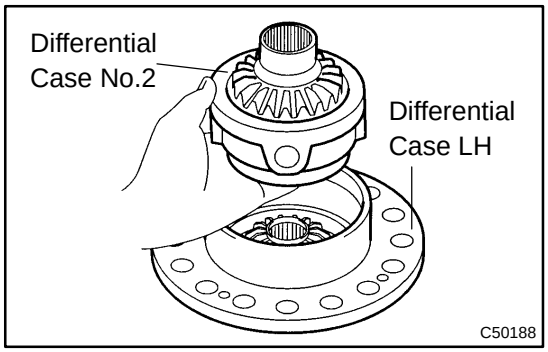


C51468

(i) Remove the differential case No.2 from the differential case LH.

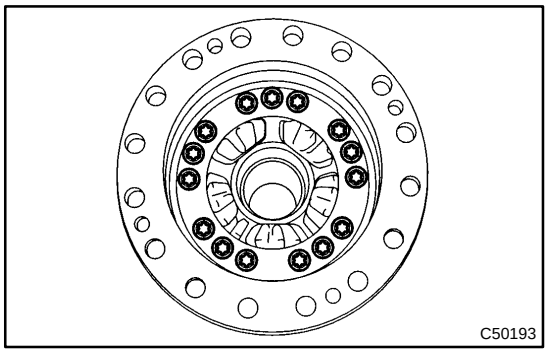

C51469

(j) Install the selected differential side gear thrust washer No. 2 LH and center differential planetary gear to the differential case LH.



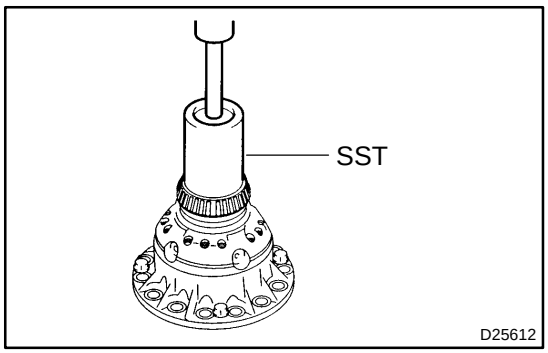
C50188

(k) Install the differential case No. 2 to the differential case LH again.


C50193

(l) Install the adjusted differential case RH to the intermediate case and tighten the 15 bolts using a torx socket wrench (T50).
Torque: 63 N·m (642 kgf·cm, 46 ft·lbf)

NOTICE:
Align the matchmarks.

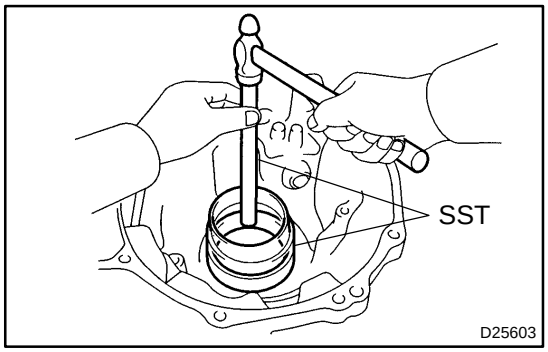


D25612

10. INSTALL FR DIFFERENTIAL CASE FRONT TAPERED ROLLER BEARING

(a) Using SST and a press, install the front differential case tapered roller bearing FR to the differential case.
SST 09950-70010 (09951-07100), 09649-17010

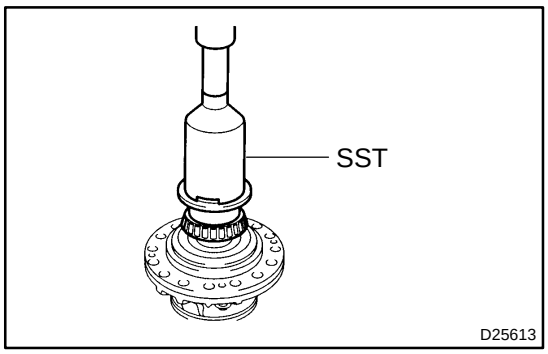
NOTICE:
Do not make a damage on the bearing cage during the bearing inner race installation.



D25603

(b) Using SST, install the outer race of the tapered roller bearing FR.
SST 09527-1701 1, 09950-60020 (09951-01030)

NOTICE:
Clearance is not allowed between the plate washer and transaxle housing.



11. INSTALL FR DIFFERENTIAL CASE REAR TAPERED ROLLER BEARING

(a) Using SST and a press, install the front differential case tapered roller bearing RR to the differential case.
SST 09316-2001 1, 09214-76011

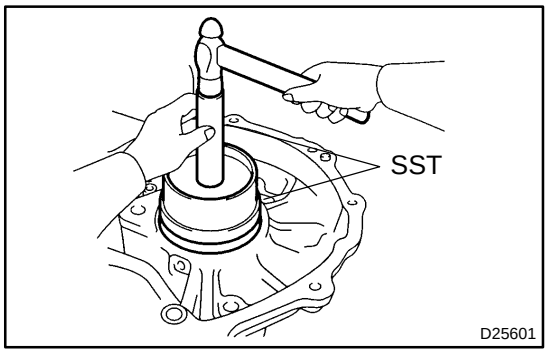
NOTICE:

Do not make a damage on the bearing cage during the bearing inner race installation.

(b) Install the front differential case shim RR to the transaxle case.

If the bearing is new, check to select a front differential case shim RR of proper thickness starting from the thinner ones.

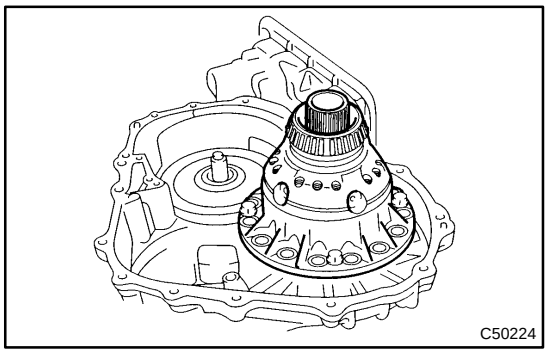
If the bearing is reused, check to select a front differential case shim RR starting from the same thickness as one installed before disassembly.



(c) Using SST, install the outer race of the front differential case tapered roller bearing RR.
SST 09950- 60020 (09951- 00890), 09950- 70010 (09951-07100)

NOTICE:

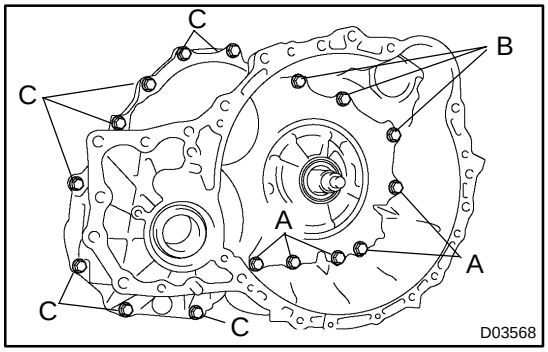
Clearance is not allowed between the differential case shim and transaxle case.



12. ADJUST TAPERED POLLER BEARING PRELOAD

(a) Install the intermediate case to the differential case LH and fix them with 4 bolts.

(b) Install the differential assy to the transaxle case.



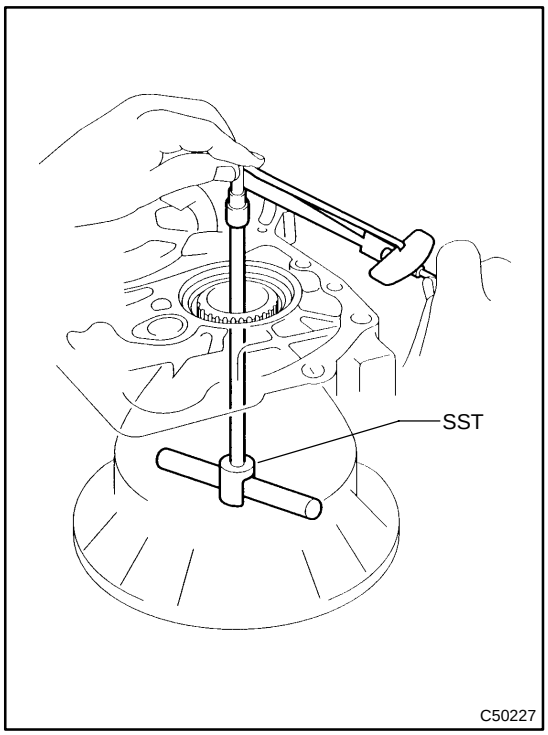
(c) Clean the matching surfaces of the transaxle case and transaxle housing.

(d) Install the transaxle housing to the transaxle case and tighten them with the 16 bolts.

Torque:
Bolt A: 25 N·m (255 kgf·cm, 18 ft·lbf)
Bolt B 33 N·m (337 kgf·cm, 24 ft·lbf)
Bolt C 29 N·m (295 kgf·cm, 21 ft·lbf)
Bolt length:
Bolt A: 50 mm (1.969 in.)
Bolt B: 50 mm (1.969 in.)
Bolt C: 42 mm (1.654 in.)

HINT:

Usually, bolt A is a non-reusable bolt. In this case, however, it can be used after cleaning it.



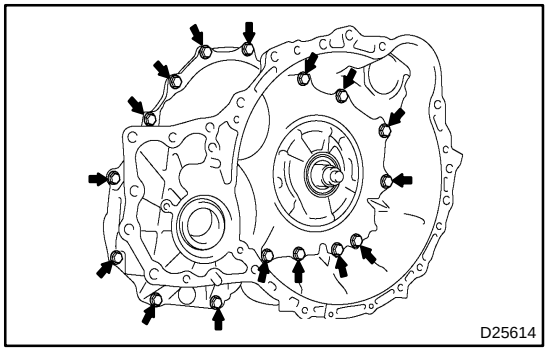
(e) Using SST, turn the differential assy right and left 2or 3 times to allow the bearing settle.
SST 09564-3201 1

(f) Using SST and a torque wrench, measure the turning torque of the differential case assy.
SST 09564-3201 1
Turning torque at 60 rpm:
New bearing
0.20 - 0.69 N·m (2.0 - 7.0 kgf·cm, 1.8 - 6.1 in.·lbf)
Used bearing
0.10 - 0.35 N·m (1.0 - 3.6 kgf·cm, 0.9 - 3.1 in.·lbf)

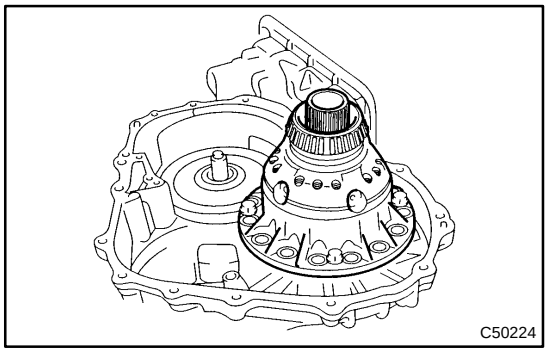
HINT:
If the turning torque is not within the specified value, refer to the table below and select a thrust washer which turning torque is within the specified value.

Flange thickness: mm (in.)

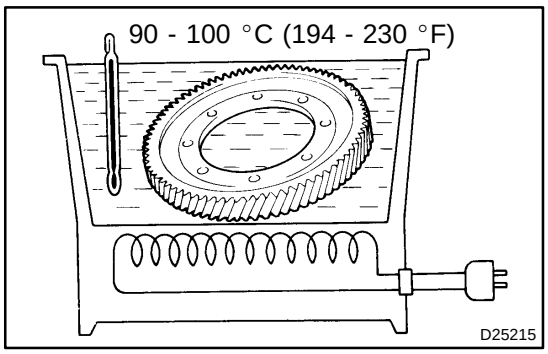
Mark	Thickness	Mark	Thickness
0	2.00 (0.0787)	9	2.45 (0.0965)
1	2.05 (0.0807)	A	2.50 (0.0984)
2	2.10 (0.0827)	B	2.55 (0.1004)
3	2.15 (0.0846)	C	2.60 (0.1024)
4	2.20 (0.0866)	D	2.65 (0.1043)
5	2.25 (0.0886)	E	2.70 (0.1063)
6	2.30 (0.0906)	F	2.75 (0.1083)
7	2.35 (0.0925)	G	2.80 (0.1102)
8	2.40 (0.0945)	H	2.85 (0.1122)



(g) Remove the 16 bolts and the transaxle housing.



(h) Remove the differential assy.



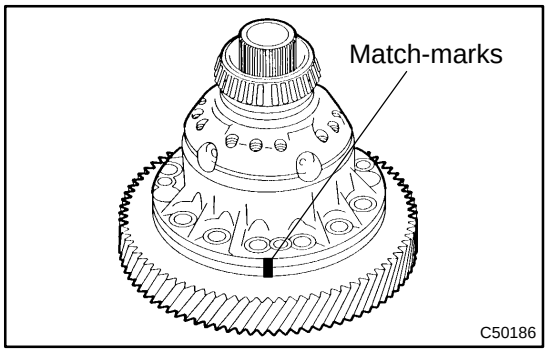
13. INSTALL FRONT DIFFERENTIAL RING GEAR

(a) Using ATF and heater, heat the front differential ring gear to 90 - 110 °C. (194.0 - 230.0 °F)

NOTICE:

Do not overheat the ring gear to 110 °C (230.0 °F) or more.

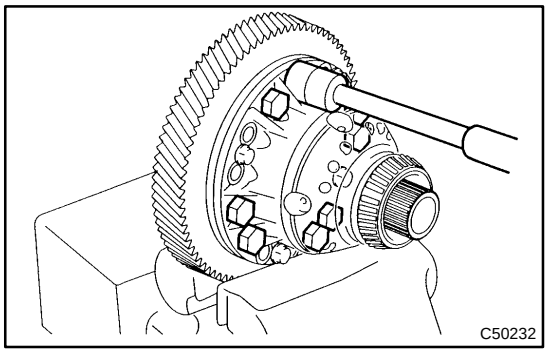
(b) Clean the contact surface of the front differential case.



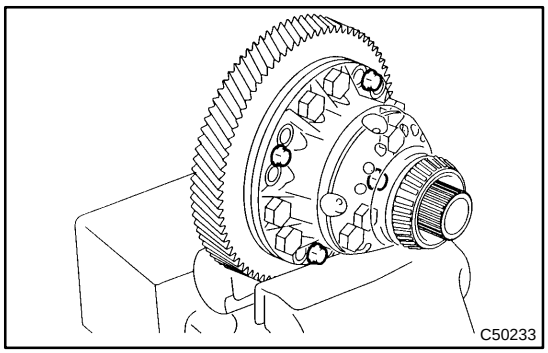
(c) Set the match-marks, install the front differential ring gear case quickly.

NOTICE:

Do not install the bolts while the ring gear is hot.



(d) Temporarily install the 8 bolts as shown in the illustration.



(e) Remove the 4 bolts shown in the illustration.

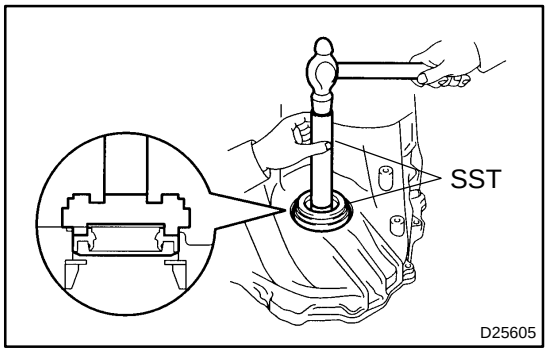
(f) Temporarily install the remaining 8 set bolts.

(g) Fully tighten the set bolts.

Torque: 95.1 N·m (970 kgf·cm, 70 ft·lbf)

NOTICE:

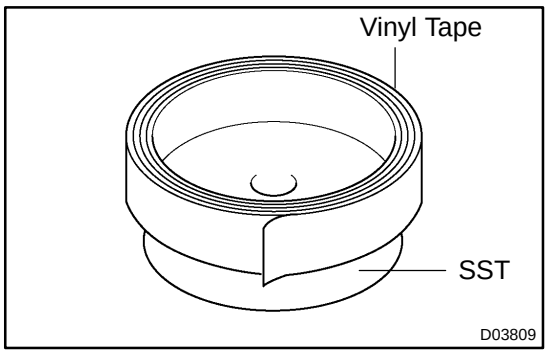
Tighten the bolts a little at a time in diagonal order.



14. INSTALL DIFFERENTIAL SIDE BEARING RETAINER OIL SEAL

(a) Using SST and a hammer, install a new oil seal.
SST 09223-15020, 09950-70010 (09951-07100)

(b) Coat the rip of oil seal with a little MP grease.



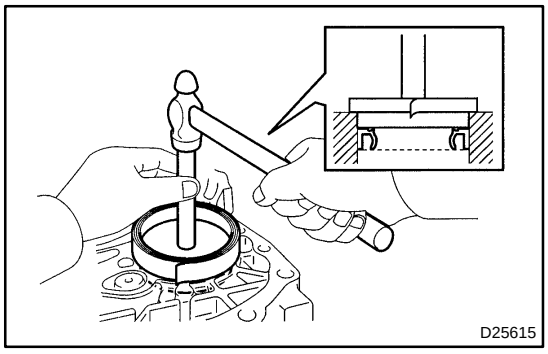
15. INSTALL TRANSAXLE HOUSING OIL SEAL

(a) Wind a vinyl tape around SST at the place 6.0 mm (0.236 in.) above from the bottom end until the thickness of the wound tape is about 5.0 mm (0.197 in.).
SST 09950-60020 (09951-00730)

NOTICE:

Remove foreign matter such as grease on the SST before winding the tape.

(b) Coat the rip of oil seal with a little MP grease.



(c) Using SST, install a new oil seal.
SST 09950- 60020 (09951- 00730), 09950- 70010 (09951-07150)
Standard press in depth:
5.5 - 6.5 mm (0.217 - 0.256 in.)

NOTICE:

Stop pressing when the would vinyl tape is contact with the transaxle housing.

AUTOMATIC TRANSAXLE FLUID

4005R-08

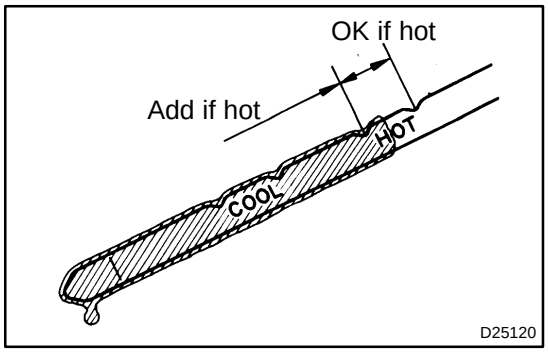
ON-VEHICLE INSPECTION

1. CHECK THE FLUID LEVEL

HINT:

Drive the vehicle so that the engine and transaxle are at normal operating temperature.

Fluid temperature: 70 - 80 ˚C (158 - 176 ˚F)



(a) Park the vehicle on a level surface and set the parking brake.
(b) With the engine idling and the brake pedal depressed, shift the shift lever into all positions from P to L position, and return to P position.
(c) take out the dipstick and wipe it clean.
(d) Put it back fully into the pipe.
(e) take it out and check that the fluid level is in the HOT position.

If there are leaks, it is necessary to repair or replace O-rings, FIPGs, oil seals, plugs and/or other parts.

AUTOMATIC TRANSAXLE ASSY

400FX-04

PRECAUTION

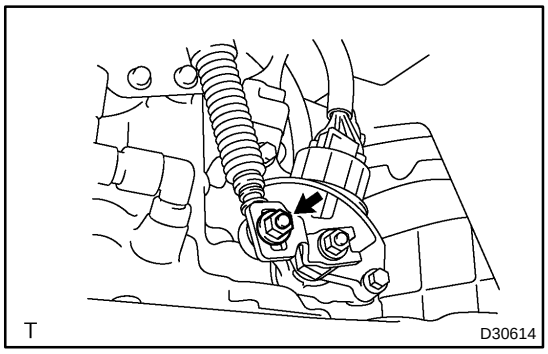
1. The automatic transaxle is composed of highly precision-finished parts, if nequine careful inspection before reassembly therefore even a small nick may cause fluid leakage or may degrade the performance. The instructions here are organized so that you work on only one component group at a time. This will help you to avoid confusion about similar-looking parts of different sub-assemblies being on your workbench at the same time. The component groups are inspected and repaired from the converter housing side. Inspectio, repair and reassembly As much as possible, before proceeding to the next component group. If a defect is found in a certain component group during reassembly, inspect and repair this group immediately. If a component group cannot be assembled because parts are being ordered, be sure to keep all parts of the group in a separate container while proceeding with disassembly, inspection, repair and reassembly of other component groups.
   Recommended ATF: T-IV
2. All disassembled parts should be washed clean and any fluid passages and holes should be blown with compressed air.
3. Dry all parts with compressed airnever use shop rags.
4. When using compressed air, do not aim at yourself to prevent accidentally spraying ATF or kerosene on your face.
5. The recommended automatic transaxle fluid or kerosene should be used for cleaning.
6. After cleaning, the parts should be arranged in the correct order for efficient inspection, repairs, and reassembly.
7. When disassembling a valve body, be sure to match each valve together with the corresponding spring.
8. New discs for the brakes and clutches that are to be used for replacement must be soaked in ATF for at least 15 minutes before reassembly.
9. All oil seal rings, clutch discs, clutch plates, rotating parts, and sliding surfaces should be coated with ATF prior to reassembly.
10. All gaskets and rubber O-rings should be replaced.
11. Do not apply adhesive cements to gaskets and similar parts.
12. Make sure that the ends of a snap ring are not aligned with one of the cutouts and are installed in the groove correctly.
13. If a worn bushing is to be replaced, the sub-assembly containing the bushing must also be replaced.
14. Check thrust bearings and races for wear or damage. Replace if necessary.
15. Use petroleum jelly to keep parts in place.
16. When working with FIPG material, you must perform the following.
    Using a razor blade and a gasket scraper, remove all the old packing (FIPG) material from the gasket surface.
    Thoroughly clean all components to remove all the loose material.
    Clean both sealing surfaces with a non-residue solvent.
    Parts must be reassembled within 10 minutes of application. Otherwise, the packing (FIPG) material must be removed and reapplied.

PARK/NEUTRAL POSITION SWITCH ASSY (U151E)

4010O-05

REPLACEMENT

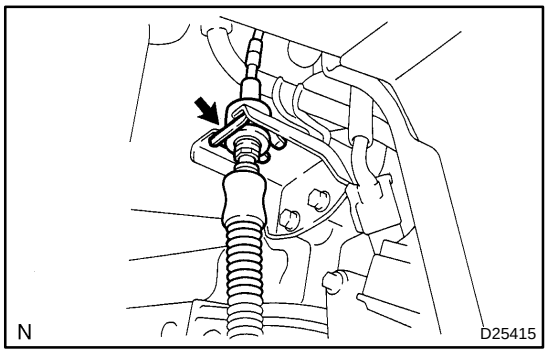
1. **REMOVE BATTERY**
2. **REMOVE AIR CLEANER ASSY**
3. **REMOVE AIR CLEANER HOSE NO.1**
4. **REMOVE AIR CLEANER BRACKET**
5. **REMOVE AIR CLEANER INLET NO.1**
6. **REMOVE INTAKE AIR RESONATOR SUB-ASSY**
7. **REMOVE ENGINE UNDER COVER NO.1**



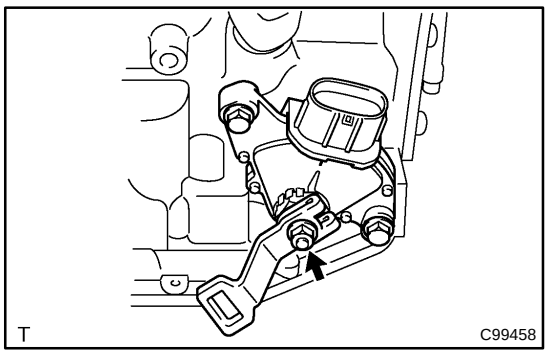
8. DISCONNECT TRANSMISSION CONTROL CABLE ASSY

(a) Remove the nut from the control shaft lever.

(b) Disconnect the control cable from the control shaft lever.



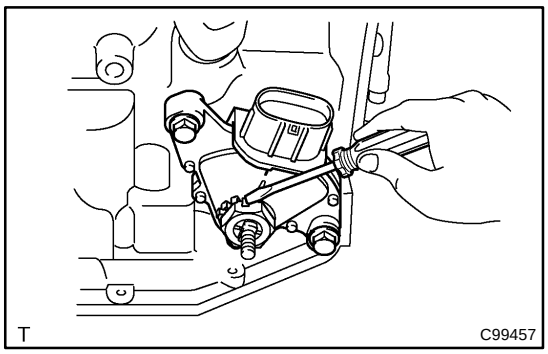
(c) Remove the clip and disconnect the control cable from the control cable bracket.



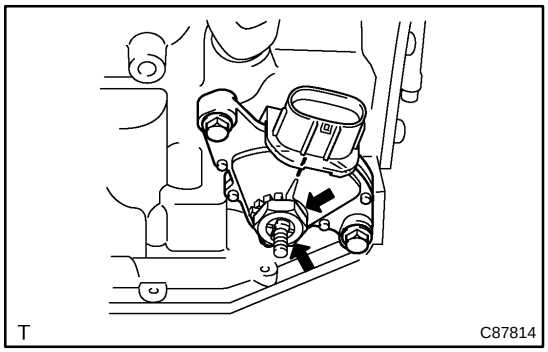
9. REMOVE PARK/NEUTRAL POSITION SWITCH ASSY

(a) Disconnect the park/neutral position switch connector.

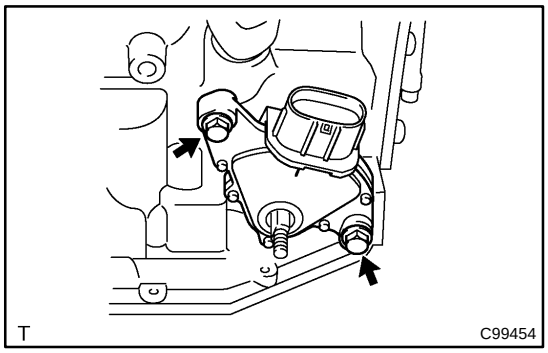
(b) Remove the nut, washer and control shaft lever.



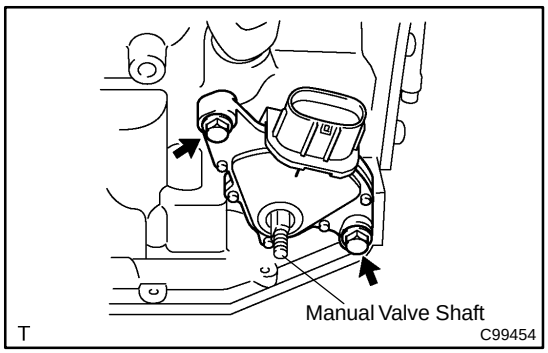
(c) Pry out the lock plate.



(d) Remove the lock nut and lock plate.



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



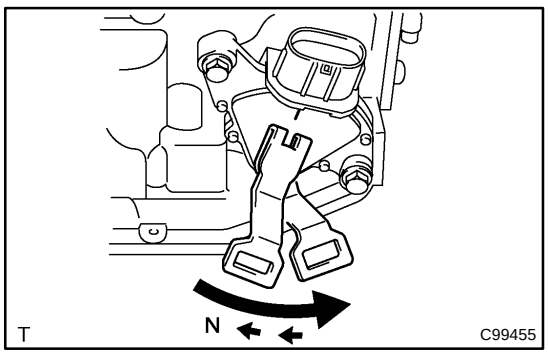
10. INSTALL PARK/NEUTRAL POSITION SWITCH ASSY

(a) Install the park/neutral position switch to the manual valve shaft.

(b) Temporarily install the 2 bolts.

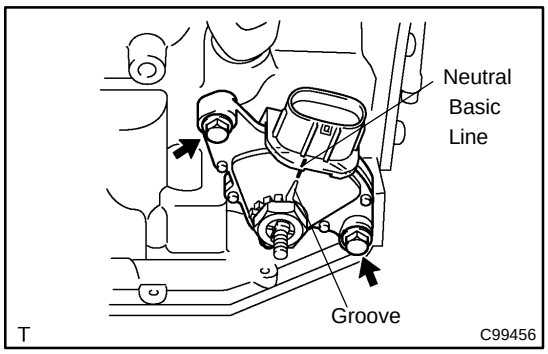
(c) Place the lock plate and tighten the nut.
Torque: 6.9 N·m (70 kgf·cm, 61 in.·lbf)

(d) Temporarily install the control shaft lever.

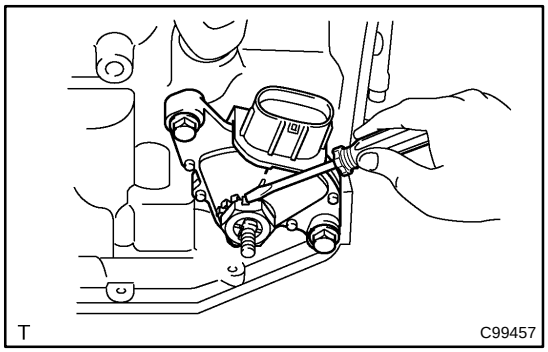


(e) Turn the lever counterclockwise until it stops, then turn it clockwise 2 notches.

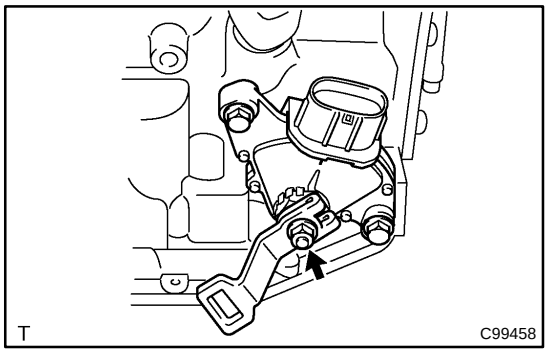
(f) Remove the control shaft lever.



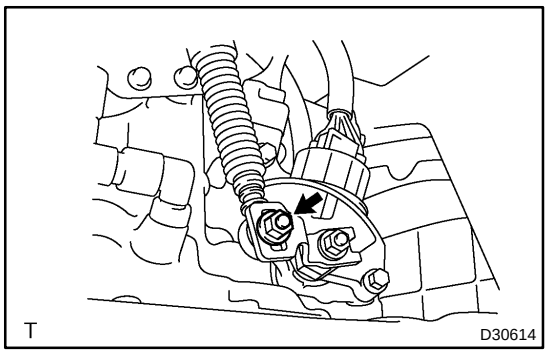
(g) Align the groove with neutral basic line.
(h) Hold the switch in position and tighten the 2 bolts.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)



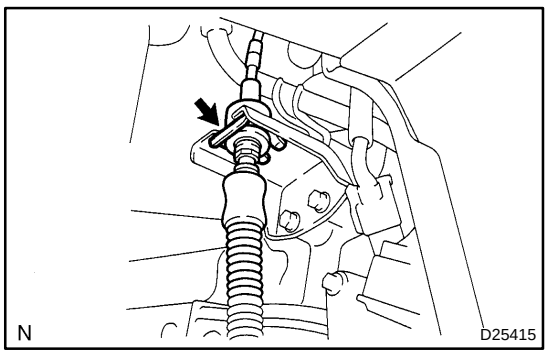
(i) Using a screwdriver, stake the nut with the lock plate.



(j) Install the control shaft lever, washer and nut.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)
(k) Connect the park/neutral position switch connector.



11. CONNECT TRANSMISSION CONTROL CABLE ASSY
(a) Temporarily install the control cable to the control shaft lever with the nut.



(b) Install the control cable and a new clip to the bracket.

12. ADJUST SHIFT LEVER POSITION (SEE PAGE 40-40)
13. INSPECT SHIFT LEVER POSITION (SEE PAGE 40-40)
14. INSPECT PARK/NEUTRAL POSITION SWITCH ASSY (SEE PAGE 40-7)
15. INSTALL ENGINE UNDER COVER NO.1
16. INSTALL INTAKE AIR RESONATOR SUB-ASSY
17. INSTALL AIR CLEANER INLET NO.1
18. INSTALL AIR CLEANER BRACKET
19. INSTALL AIR CLEANER HOSE NO.1
20. INSTALL AIR CLEANER ASSY
21. INSTALL BATTERY

4010P-03

ADJUSTMENT

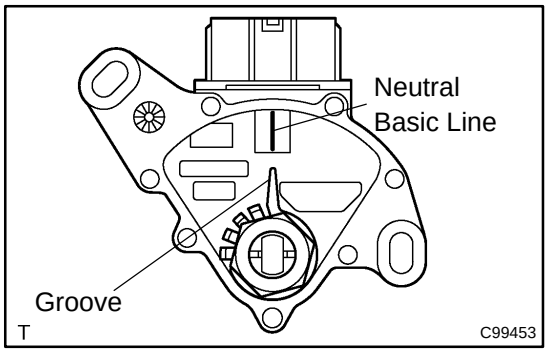
1. INSPECT PARK/NEUTRAL POSITION SWITCH ASSY

(a) Apply the parking brake and turn the ignition switch to ON.

(b) Depress the brake pedal and check that the engine starts only when the shift lever is set in N or P position.

(c) Check that the back-up light is lit and the reverse warning buzzer sounds only when the shift lever is set in R position.

If a failure is found, check the continuity of the park/neutral position switch.



2. ADJUST PARK/NEUTRAL POSITION SWITCH ASSY

(a) Loosen the 2 bolts of park/neutral position switch and set the shift lever to the N position.

(b) Align the groove with neutral basic line.

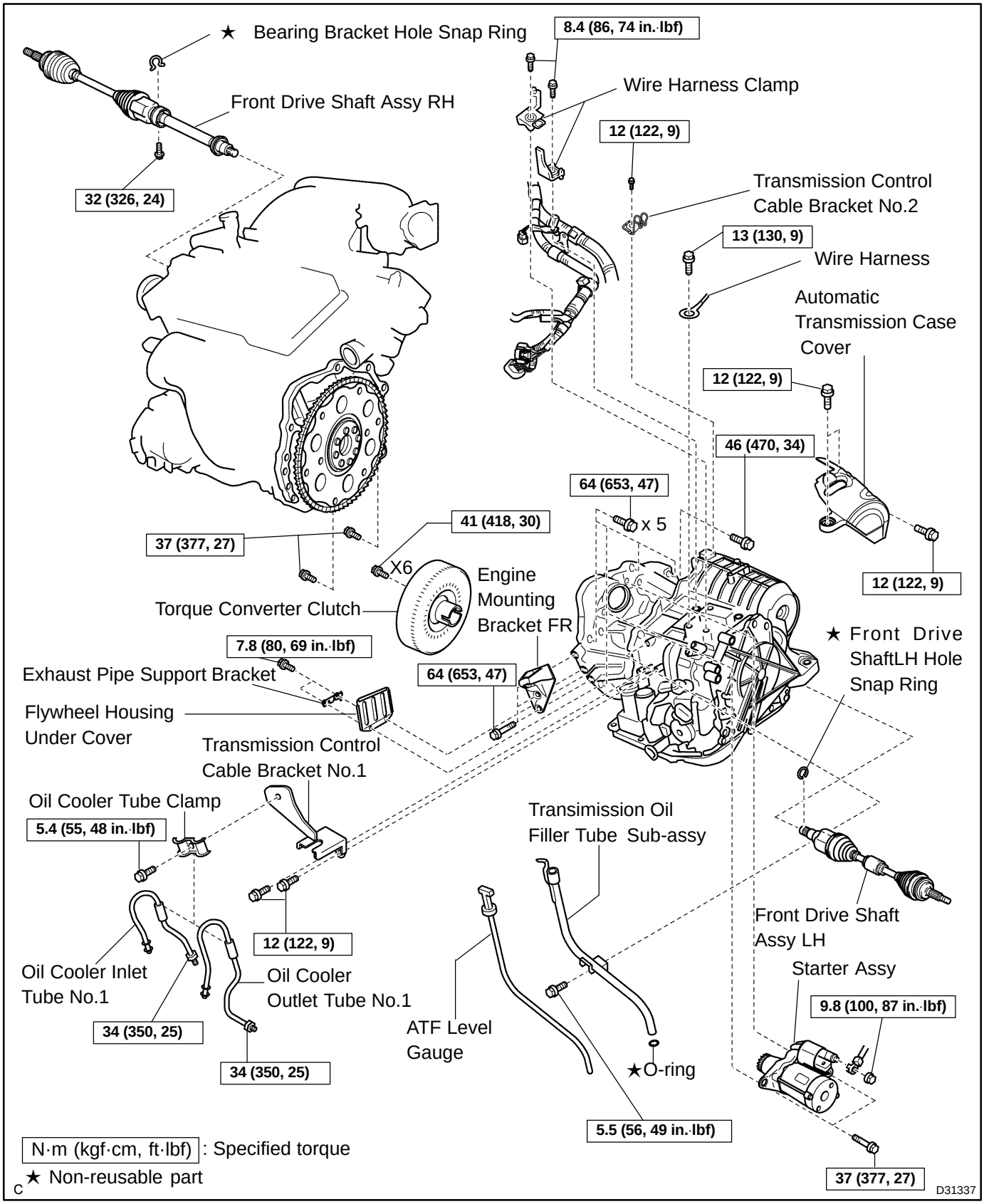
(c) Hold the switch in position and tighten the 2 bolts.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(d) After adjustment, perform the inspection described in step 1.

AUTOMATIC TRANSAXLE ASSY (U151E)

COMPONENTS

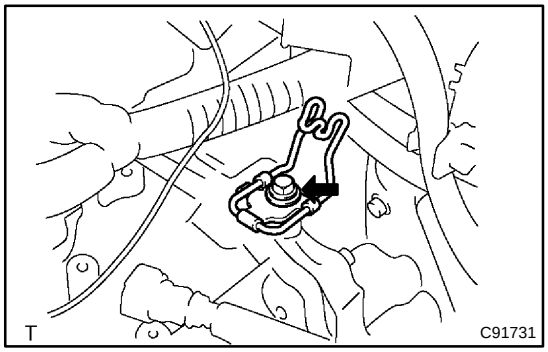
4010Q-02



4010R-03

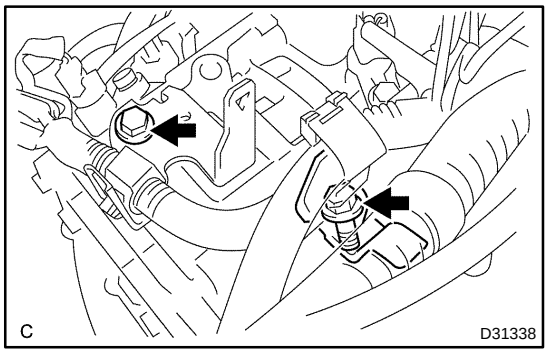
REPLACEMENT

1. REMOVE ENGINE ASSEMBLY WITH TRANSAXLE (SEE PAGE 14-29)
2. REMOVE FRONT DRIVE SHAFT ASSY RH (SEE PAGE 30-8)
3. REMOVE FRONT DRIVE SHAFT ASSY LH (SEE PAGE 30-8)



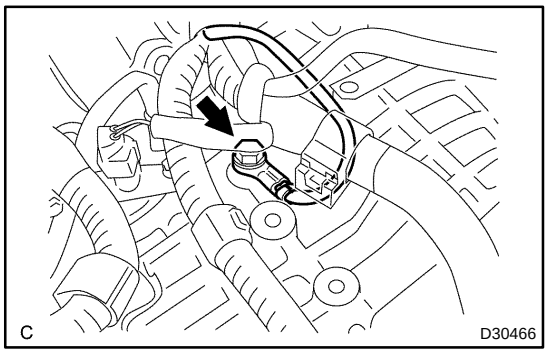
4. REMOVE TRANSMISSION CONTROL CABLE BRACKET NO.2

(a) Remove the bolt and transmission control cable bracket No.2.



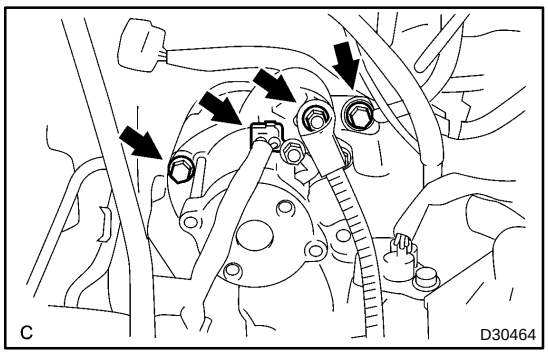
5. REMOVE WIRE HARNESS CLAMP

(a) Disconnect the wire harnesses from the clamps.
(b) Remove the 2 bolts and 2 clamps.



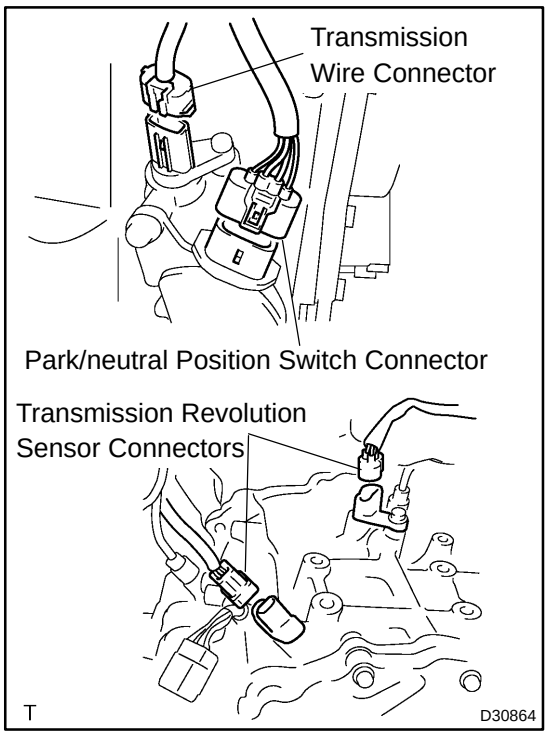
6. DISCONNECT WIRE HARNESS

(a) Remove the bolt and wire harness.



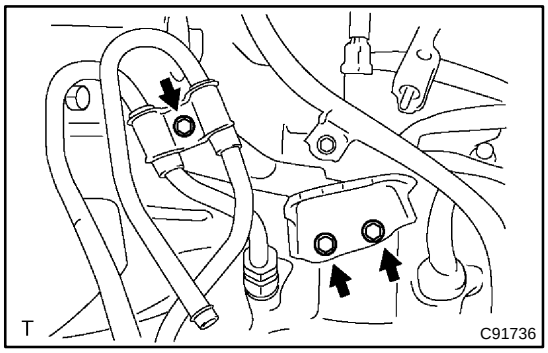
7. REMOVE STARTER ASSY

(a) Disconnect the connector.
(b) Remove the nut and disconnect the starter wire.
(c) Remove the 2 bolts and starter assy.



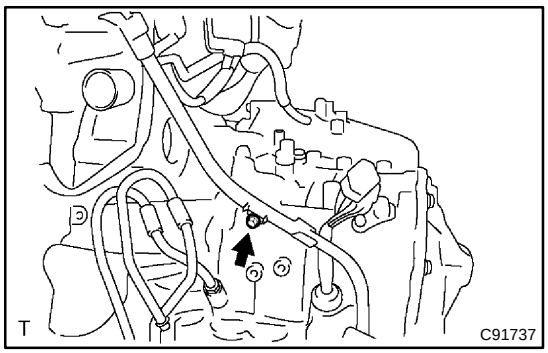
8. DISCONNECT CONNECTORS

(a) Disconnect the transmission wire connector.
(b) Disconnect the park/neutral position switch connector.
(c) Disconnect the 2 transmission revolution sensor connectors.



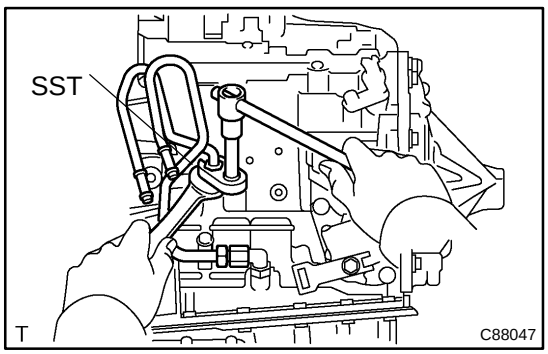
9. REMOVE TRANSMISSION CONTROL CABLE BRACKET NO.1

(a) Remove the bolt and oil cooler tube clamp.
(b) Remove the 2 bolts and transmission control cable bracket.



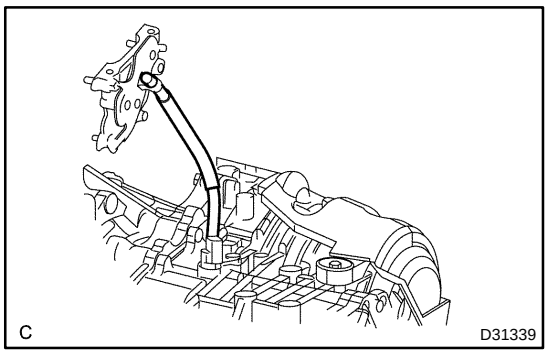
10. REMOVE TRANSMISSION OIL FILLER TUBE SUB-ASSY

(a) Remove the ATF level gauge.
(b) Remove the bolt and oil filler tube.
(c) Remove the O-ring from the oil filler tube.



11. REMOVE OIL COOLER INLET TUBE NO.1

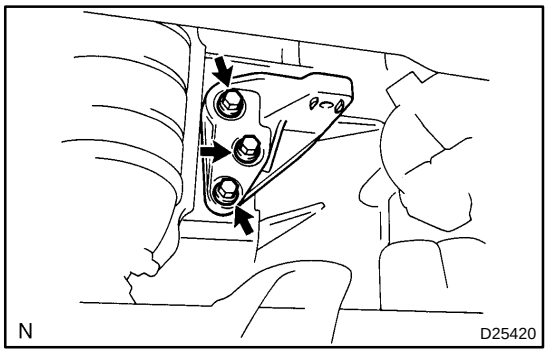
(a) Using SST and spanner, disconnect the oil cooler inlet tube No.1.
SST 09023-12701



(b) Disconnect the breather hose from the wire harness bracket.

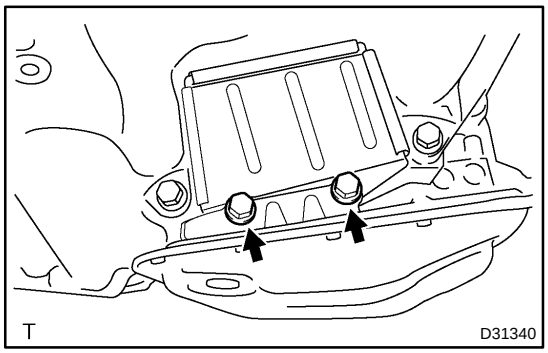
12. REMOVE OIL COOLER OUTLET TUBE NO.1

(a) Using SST and spanner, disconnect the oil cooler outlet tube No.1.
SST 09023-12701



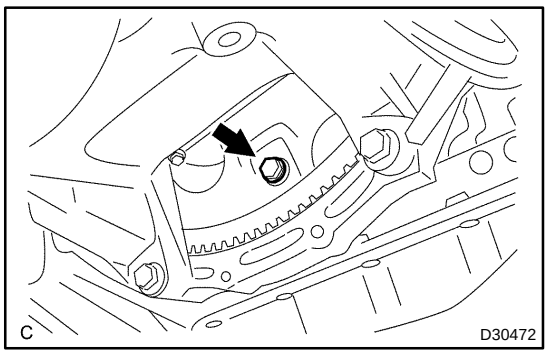
13. REMOVE ENGINE MOUNTING BRACKET FR

(a) Remove the 3 bolts and engine mounting bracket FR.

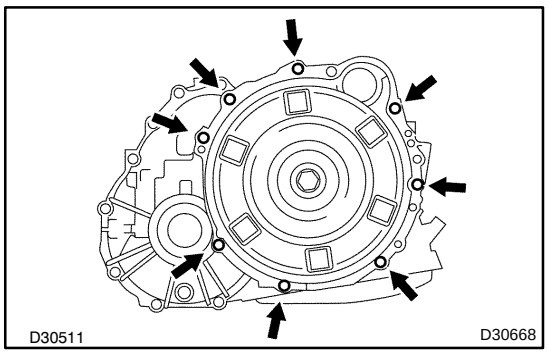


14. REMOVE AUTOMATIC TRANSAXLE ASSY

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

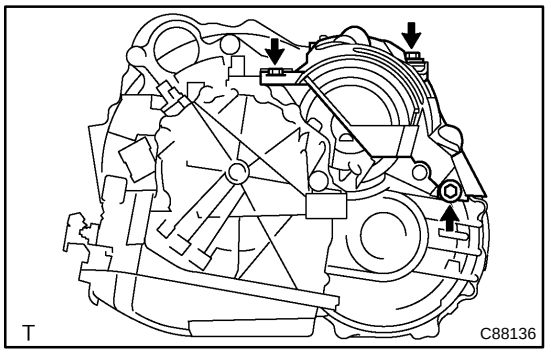


(b) Turn the crankshaft to gain access and remove the 6 bolts while holding the crankshaft pulley bolt with a wrench.



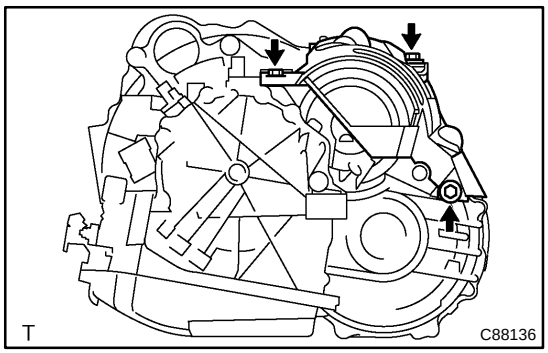
(c) Remove the 8 bolts.
(d) Separate and remove the automatic transaxle.

15. REMOVE TORQUE CONVERTER CLUTCH ASSY



16. REMOVE TRANSAXLE CASE COVER UPPER
(a) Remove the 3 bolts and transmission case cover.

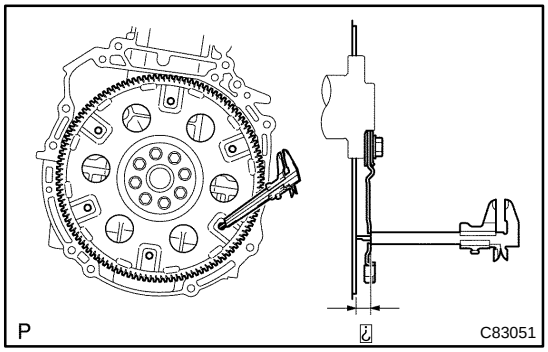
17. INSPECT TORQUE CONVERTER CLUTCH ASSY (SEE PAGE 40-17)
SST 09350-32014 (09351-32010, 09351-32020)



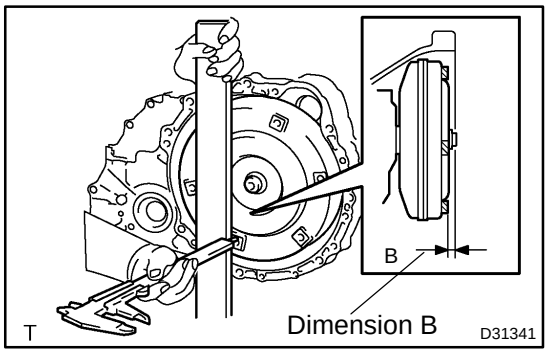
18. INSTALL TRANSAXLE CASE COVER UPPER
(a) Install the transmission case cover with the 3 bolts.
Torque: 12 N·m (122 kgf·cm, 9 ft·lbf)

19. INSTALL TORQUE CONVERTER CLUTCH ASSY

(a) Install the torque converter clutch to the automatic transaxle.

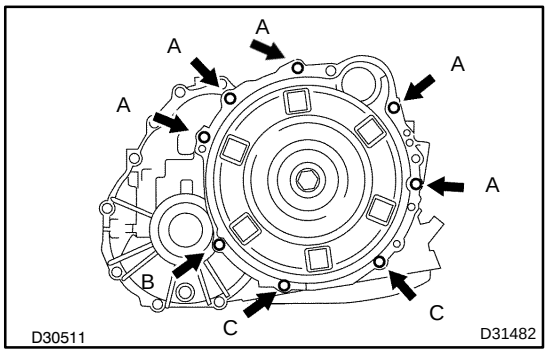


(b) Using vernier calipers, measure dimension ”A” between the transaxle fitting part and the converter fitting part of the drive plate.



(c) Using vernier calipers and a straight edge, measure dimension ”B” shown in the illustration and check that ”B” is greater than ”A” measured in (b).
Standard: A + 1 mm or more

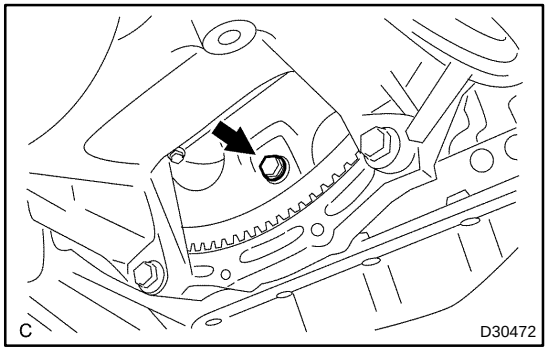
NOTICE:
Do not add the thickness of the straight edge.



20. INSTALL AUTOMATIC TRANSAXLE ASSY

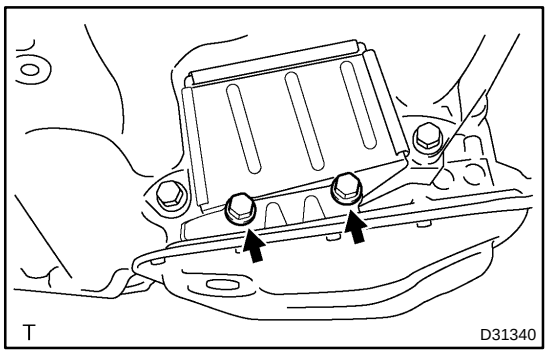
(a) Install the automatic transaxle and 8 bolts to the engine.
Torque:
Bolt A: 64 N·m (653 kgf·cm, 47 ft·lbf)
Bolt B: 46 N·m (470 kgf·cm, 34 ft·lbf)
Bolt C: 37 N·m (377 kgf·cm, 27 ft·lbf)

(b) Apply a few drops of adhesive to each 2 threads on the tip of the 6 torque converter clutch mounting bolts.
Adhesive: Part No. 08833-00070, THREE BOND 1324 or equivalent

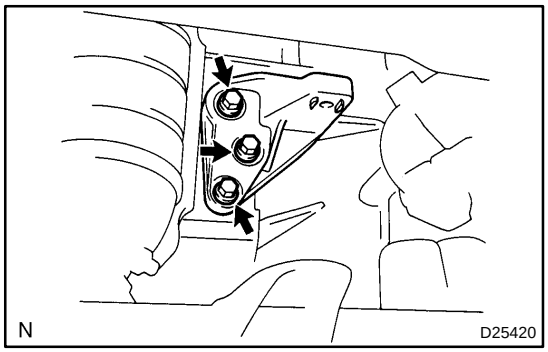


(c) Install the 6 torque converter clutch mounting bolts.
Torque: 41 N·m (418 kgf·cm, 30 ft·lbf)

HINT:
First install green colored bolt, and then install the other 5 bolts.



(d) Install the flywheel housing under cover with the 2 bolts.
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

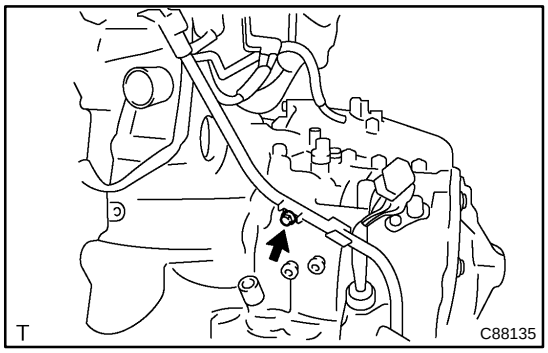


21. INSTALL ENGINE MOUNTING BRACKET FR

(a) Install the engine mounting bracket FR with the 3 bolts to the automatic transaxle.
Torque: 64 N·m (653 kgf·cm, 47 ft·lbf)

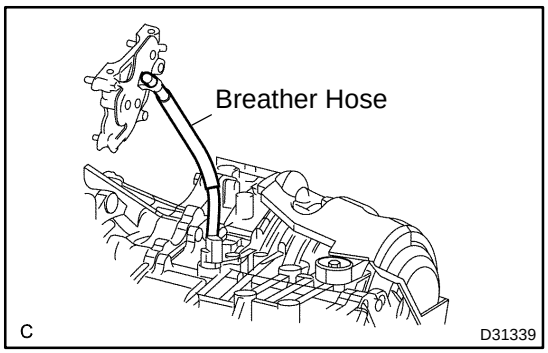
22. INSTALL TRANSMISSION OIL FILLER TUBE SUB-ASSY

(a) Coat a new O-ring with ATF, and install it to the oil filler tube.

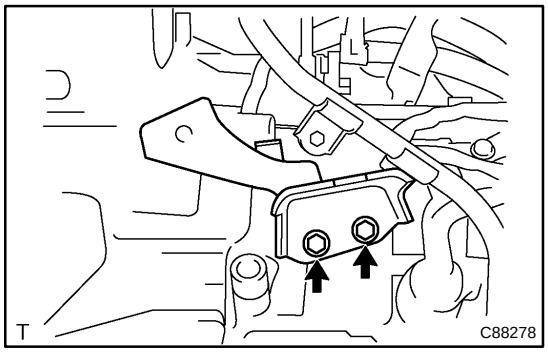


(b) Install the oil filler tube with the bolt to the automatic transaxle.
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

(c) Install the ATF level gauge.



(d) Connect the breather hose to the wire harness bracket.



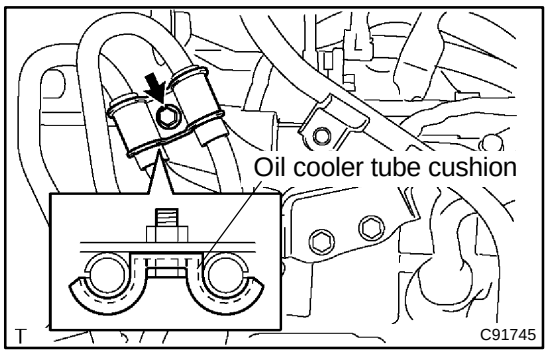
23. INSTALL TRANSMISSION CONTROL CABLE BRACKET NO.1

(a) Install the control cable bracket No.1 with the 2 bolts.
Torque: 12 N·m (122 kgf·cm, 9 ft·lbf)

24. INSTALL OIL COOLER INLET TUBE NO.1

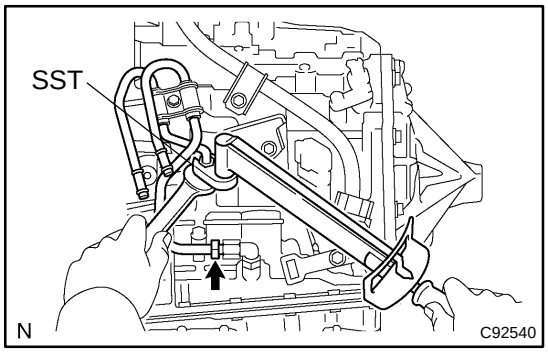
(a) Temporarily install the oil cooler outlet tube No.1.

(b) Temporarily install the oil cooler inlet tube No.1.



(c) Install the oil cooler tube clamp with the bolt.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

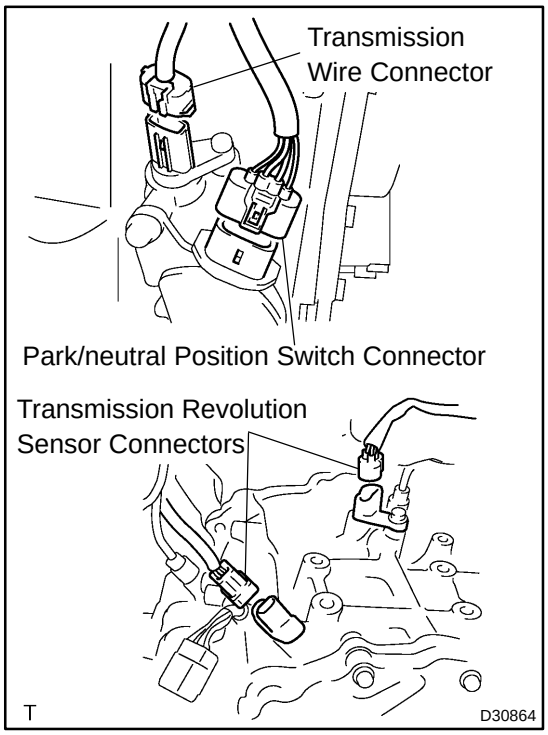
HINT:
Install them so that the oil cooler tube cushion is positioned as shown in the illustration.



(d) Using SST and spanner, tighten the oil cooler inlet tube No.1.
Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)
SST 09023-12701

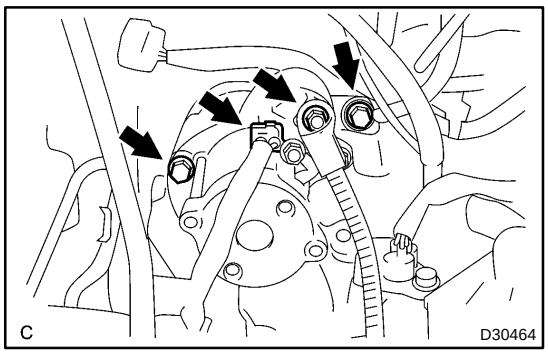
25. INSTALL OIL COOLER OUTLET TUBE NO.1

(a) Using SST and spanner, tighten the oil cooler outlet tube No.1.
Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)
SST 09023-12701



26. CONNECT CONNECTORS

(a) Connect the transmission wire connector.
(b) Connect the park/neutral position switch connector.
(c) Connect the 2 transmission revolution sensor connectors.

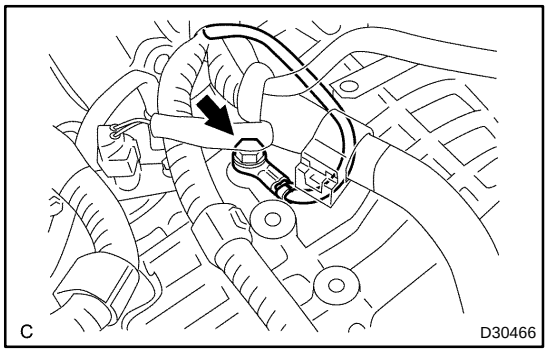


27. INSTALL STARTER ASSY

(a) Install the starter assy with the 2 bolts.
Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)

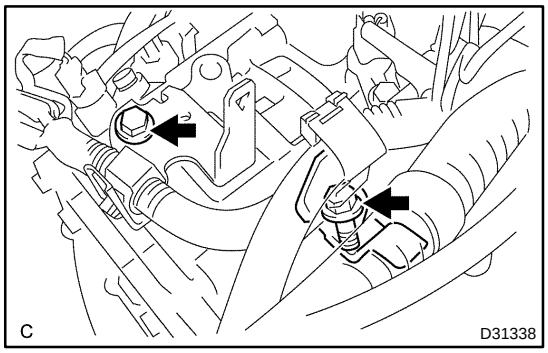
(b) Connect the connecter.

(c) Install the starter wire and nut.
Torque: 9.8 N·m (100 kgf·cm, 87 in·lbf)



28. INSTALL WIRE HARNESS

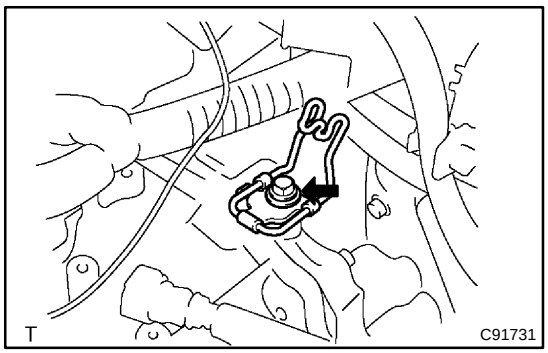
(a) Install the wire harness and bolt.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)



29. INSTALL WIRE HARNESS CLAMP

(a) Install the 2 clamps and 2 bolts.
Torque: 8.4 N·m (86 kgf·cm, 74 in.·lbf)

(b) Connect the wire harnesses to the clamps.



30. INSTALL TRANSMISSION CONTROL CABLE BRACKET NO.2

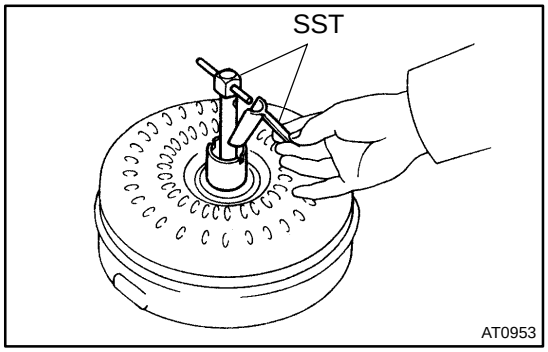
(a) Install the transmission control cable bracket No.2 with a bolt.
Torque: 12 N·m (122 kgf·cm, 9 ft·lbf)

31. INSTALL FRONT DRIVE SHAFT ASSY LH (SEE PAGE 30-8)
32. INSTALL FRONT DRIVE SHAFT ASSY RH (SEE PAGE 30-8)
33. INSTALL ENGINE ASSEMBLY WITH TRANSAXLE (SEE PAGE 14-29)
34. RESET MEMORY(SEE PAGE 05-604)

TORQUE CONVERTER CLUTCH AND DRIVE PLATE

40063-10

INSPECTION



1. INSPECT TORQUE CONVERTER CLUTCH ASSY

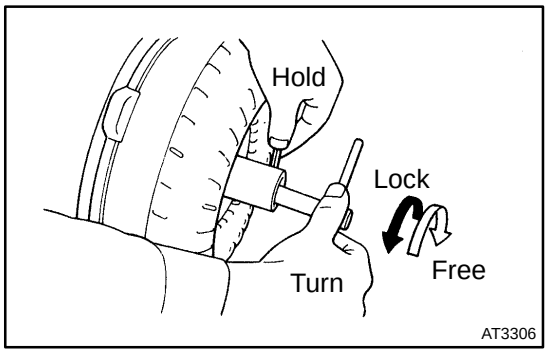
(a) Inspect the one-way clutch.

(1) Set SST into the inner race of the one-way clutch.

SST 09350-32014 (09351-32010)

(2) Install SST so that it fits in the notch of the converter hub and outer race of the one-way clutch.

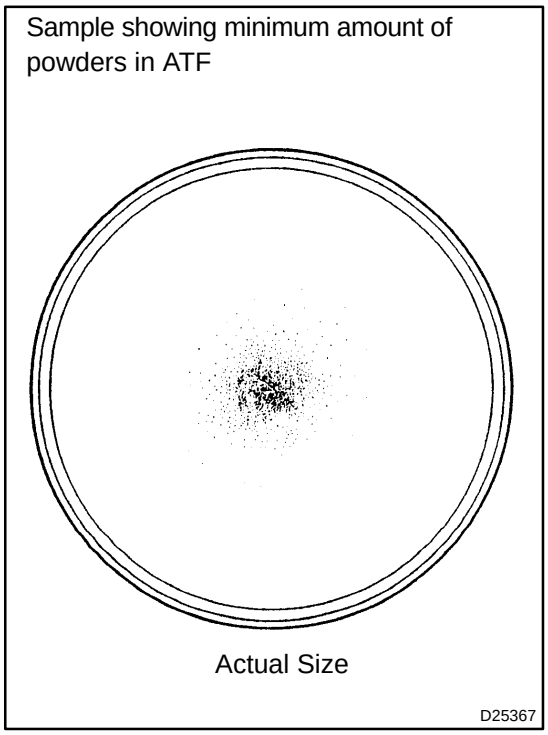
SST 09350-32014 (09351-32020)



(3) With the torque converter clutch setting up on its side, check that the one-way clutch locks when it is turned counterclockwise, and rotates clockwise smoothly.

If necessary, clean the converter and retest the one- way clutch.

Replace the converter if the one-way clutch still fails the test.



(b) Determine the condition of the torque converter clutch assy.

(1) If the inspection result of the torque converter clutch assy meets the following item, replace the torque converter clutch.

Malfunction item:

Any metallic sound is heard from the torque converter clutch during stall test or when the shift lever is in neutral position.

One-way clutch is free or locked in both directions.

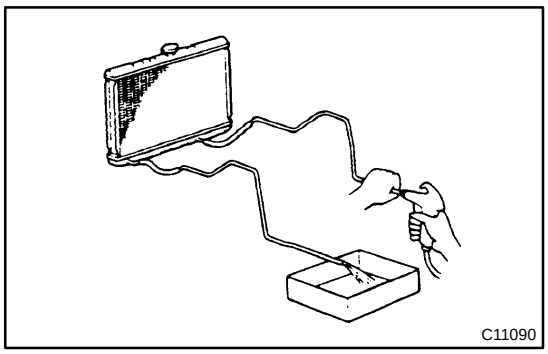
Fine powders exceeding the sample limit is identified in ATF. (See the sample.)

HINT:

The sample shows the auto fluid of approx. 0.25 liters (0.26 US qts, 0.22 Imp. qts) that is taken out from the removed torque converter clutch

(c) Replace the ATF in the torque converter clutch.

(1) If the ATF is discolored and/or has a foul odor, completely stir the ATF in the torque converter clutch and drain it with the face for installation facing up.

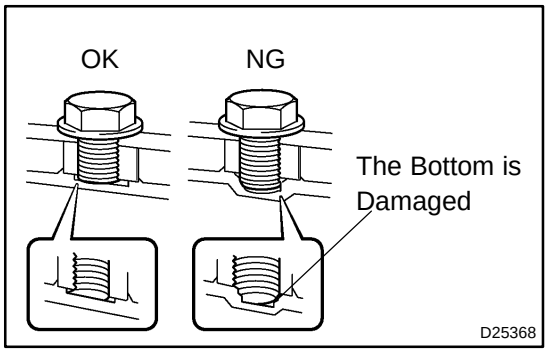


(d) Clean and check the oil cooler and oil pipe line.
(1) If the torque converter clutch is inspected or the ATF is exchanged, clean the oil cooler and oil pipe line.

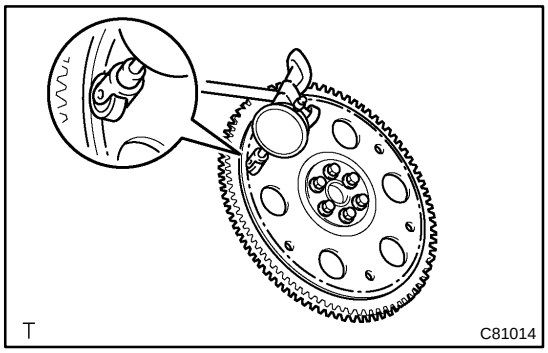
HINT:

★ Spray compressed air of 196 kPa (2 kgf/cm^2, 28 psi) from the inlet hose.
★ If plenty of fine powders are identified in the ATF, add new ATF using a bucket pump and clean it again.

(2) If the ATF is cloudy, inspect the oil cooler (radiator).



(e) Prevent deformation of the torque converter clutch and damage to the oil pump gear.
(1) When any marks due to interference are found on the end of the bolt for the torque converter clutch and on the bottom of the bolt hole, replace the bolt and the torque converter clutch.
(2) All of the bolts must be have the same length.
(3) No missing spring washer.



2. INSPECT DRIVE PLATE & RING GEAR SUB-ASSY

(a) Set up a dial indicator and measure the drive plate runout.
(b) Check the damage of the ring gear.

Maximum runout: 0.20 mm (0.0079 in.)

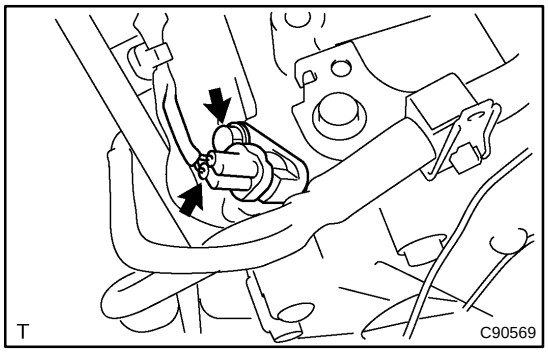
If the runout is not within the specification or ring gear is damaged, replace the drive plate.

SPEED SENSOR

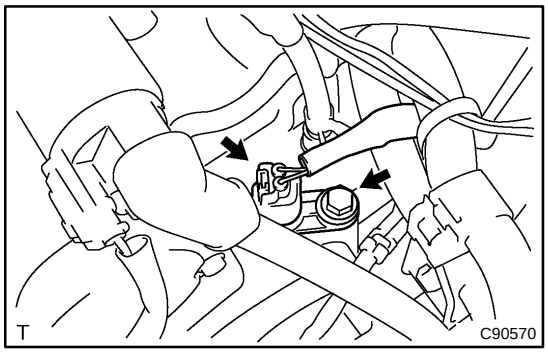
40060-08

REPLACEMENT

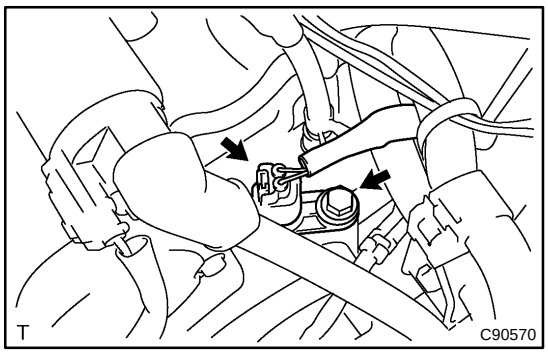
1. REMOVE BATTERY
2. REMOVE AIR CLEANER ASSY
3. REMOVE AIR CLEANER HOSE NO.1



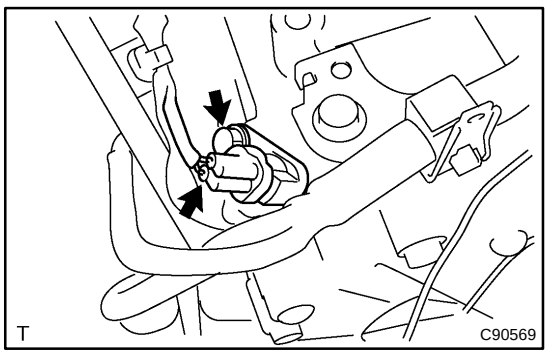
4. REMOVE SPEED SENSOR (NT SENSOR)
(a) Disconnect the speed sensor connector.
(b) Remove the bolt and speed sensor.



5. REMOVE SPEED SENSOR (NC SENSOR)
(a) Disconnect the speed sensor connector.
(b) Remove the bolt and speed sensor.



6. INSTALL SPEED SENSOR (NC SENSOR)
(a) Coat O-ring with ATF.
(b) Install the speed sensor with the bolt.
Torque: 11.3 N·m (115 kgf·cm, 8 ft·lbf)
HINT:
Make sure of the manufacturer's name.
(c) Connect the speed sensor connector.



7. INSTALL SPEED SENSOR (NT SENSOR)
(a) Coat O-ring with ATF.
(b) Install the speed sensor with the bolt.
Torque: 11.3 N·m (115 kgf·cm, 8 ft·lbf)
HINT:
Make sure of the manufacturer's name.
(c) Connect the speed sensor connector.

8. INSTALL AIR CLEANER HOSE NO.1

9. INSTALL AIR CLEANER ASSY
Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)

10. INSTALL BATTERY

TRANSMISSION WIRE (U151E)

4010V-04

REPLACEMENT

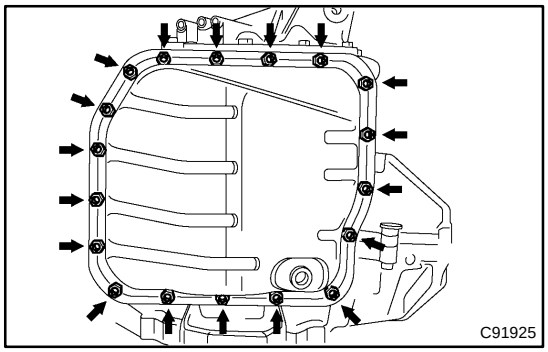
1. REMOVE ENGINE UNDER COVER NO.1

2. DRAIN AUTOMATIC TRANSAXLE FLUID

(a) Remove the drain plug, gasket, and drain ATF.

(b) Install a new gasket and drain plug.

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

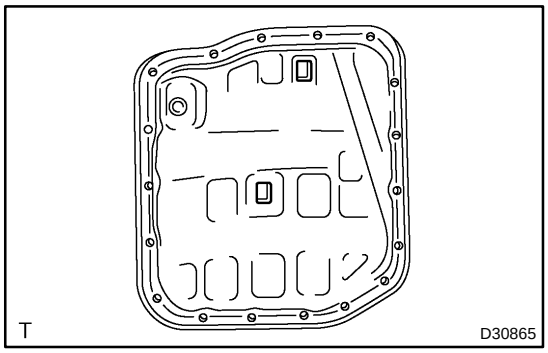


3. REMOVE AUTOMATIC TRANSAXLE OIL PAN SUB-ASSY

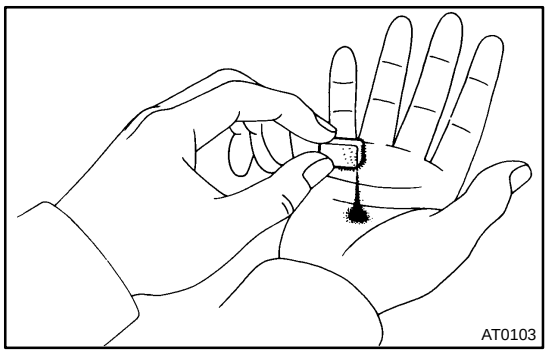
(a) Remove the 18 bolts, oil pan and gasket.

NOTICE:

Some fluid will remain in the oil pan. Remove all the pan bolts, and carefully remove the oil pan assembly.



(b) Remove the 2 magnets from the oil pan.

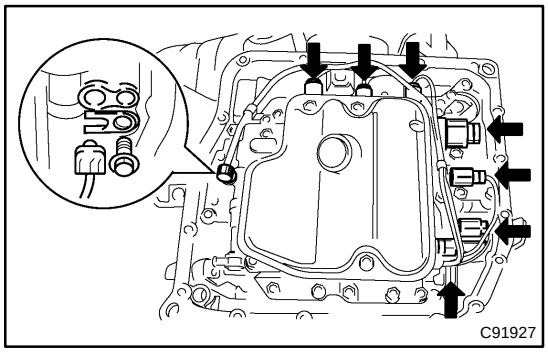


(c) Examine particles in pan.

(1) Use the removed magnets to collect steel chips. Look carefully at the chips and particles in the pan and the magnet to anticipate the type of wear you will find in the transaxle.

Steel (magnetic): bearing, gear and plate wear

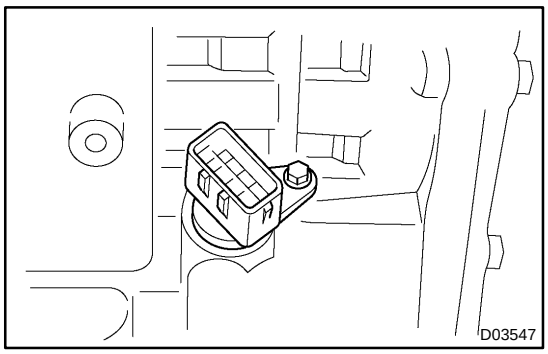
Brass (non-magnetic): bearing wear



4. DISCONNECT TRANSMISSION WIRE

(a) Disconnect the 7 shift solenoid valve connectors.

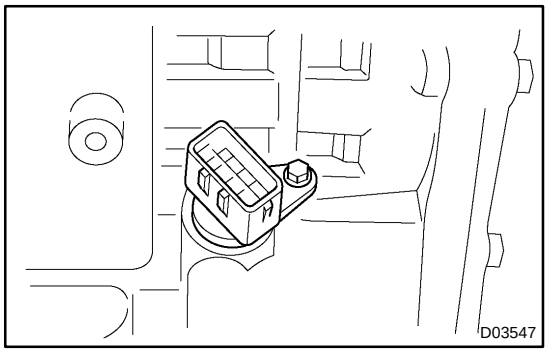
(b) Remove the bolt and lock plate, and disconnect the ATF temperature sensor.



5. REMOVE TRANSMISSION WIRE

(a) Disconnect the transmission wire connectors.

(b) Remove the bolt and transmission wire.

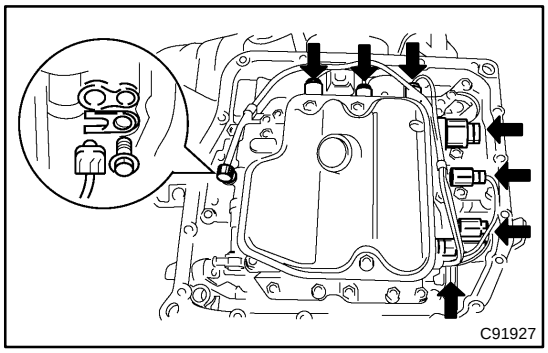


6. INSTALL TRANSMISSION WIRE

(a) Coat a O-ring of the transmission wire connector with ATF.

(b) Install the transmission wire with the bolt.

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



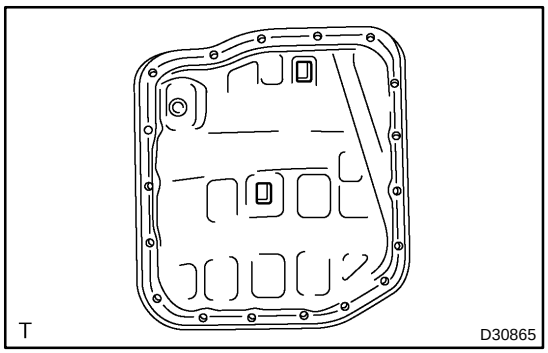
7. CONNECT TRANSMISSION WIRE

(a) Coat a O-ring of the ATF temperature sensor with ATF.

(b) Install the ATF temperature sensor with the lock plate and bolt.

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

(c) Connect the 7 shift solenoid valve connectors.

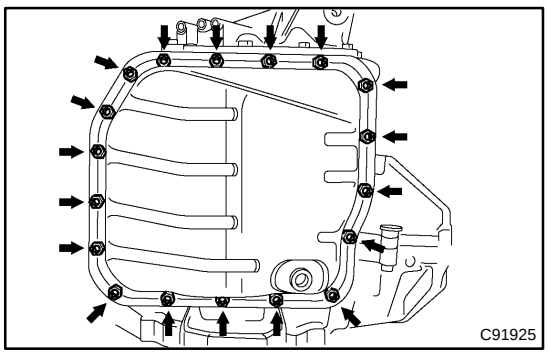


8. INSTALL AUTOMATIC TRANSAXLE OIL PAN SUB-ASSY

(a) Install the 2 magnets in the oil pan.

(b) Apply seal packing to the 18 bolts.

Seal packing:
THREE BOND 2430 or equivalent



(c) Install a new gasket, oil pan and 18 bolts to the transaxle case.

Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

NOTICE:

Since the bolts should be seal bolts, apply seal packing to the bolts and tighten them within 10 minutes after applying.

9. ADD AUTOMATIC TRANSAXLE FLUID
10. INSPECT AUTOMATIC TRANSAXLE FLUID (SEE PAGE 40-1)
11. INSTALL ENGINE UNDER COVER NO.1
12. RESET MEMORY (SEE PAGE 05-604)

TRANSMISSION VALVE BODY ASSY (U151E)

4010W-04

REPLACEMENT

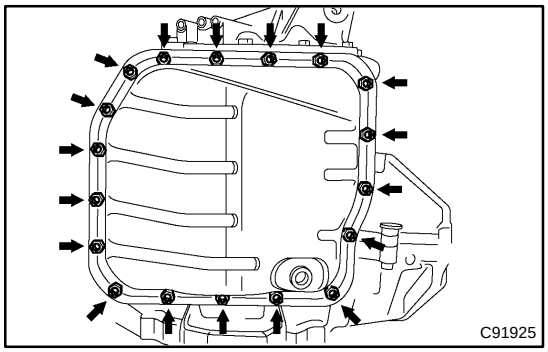
1. REMOVE ENGINE UNDER COVER NO.1

2. DRAIN AUTOMATIC TRANSAXLE FLUID

(a) Remove the drain plug, gasket, and drain ATF.

(b) Install a new gasket and drain plug.

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

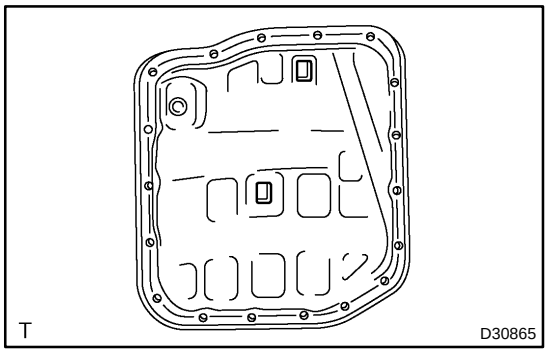


3. REMOVE AUTOMATIC TRANSAXLE OIL PAN SUB-ASSY

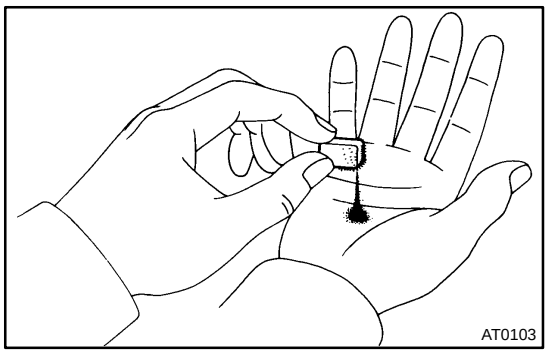
(a) Remove the 18 bolts, oil pan and gasket.

NOTICE:

Some fluid will remain in the oil pan. Remove all the pan bolts, and carefully remove the oil pan assembly.



(b) Remove the 2 magnets from the oil pan.

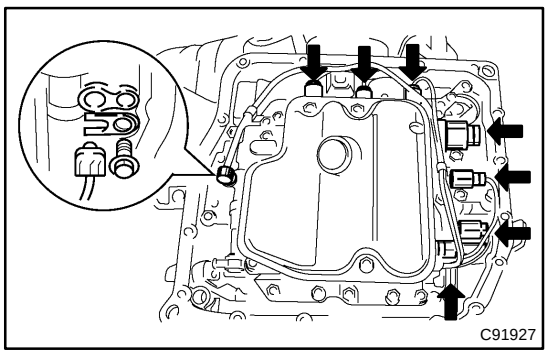


(c) Examine particles in pan.

(1) Use the removed magnets to collect steel chips. Look carefully at the chips and particles in the pan and the magnet to anticipate the type of wear you will find in the transaxle.

Steel (magnetic): bearing, gear and plate wear

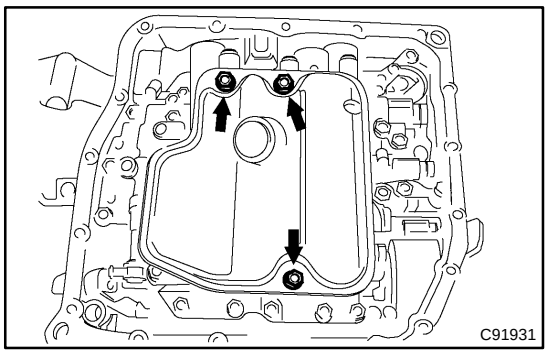
Brass (non-magnetic): bearing wear



4. DISCONNECT TRANSMISSION WIRE

(a) Disconnect the 7 shift solenoid valve connectors.

(b) Remove the bolt and lock plate, and disconnect the ATF temperature sensor.

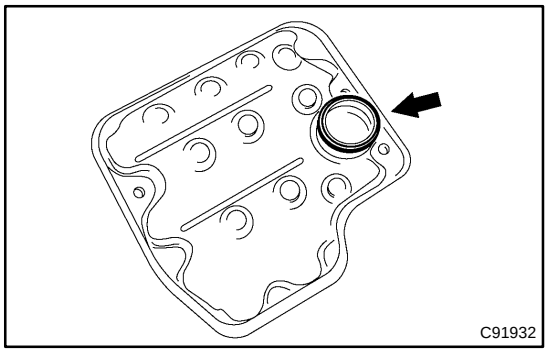


5. REMOVE VALVE BODY OIL STRAINER ASSY

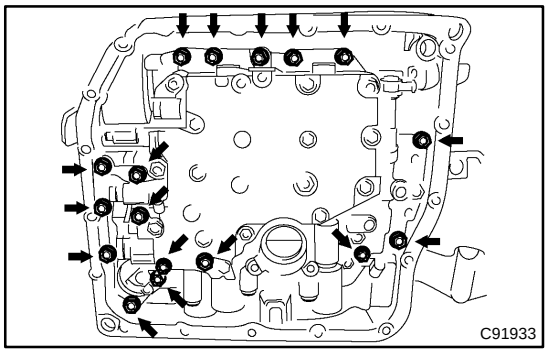
(a) Remove the 3 bolts and oil strainer.

NOTICE:

Be careful that some fluid will come out from the oil strainer.



(b) Remove the O-ring from the oil strainer.

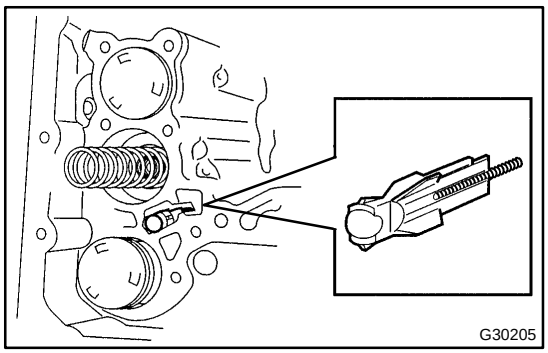


6. REMOVE TRANSMISSION VALVE BODY ASSY

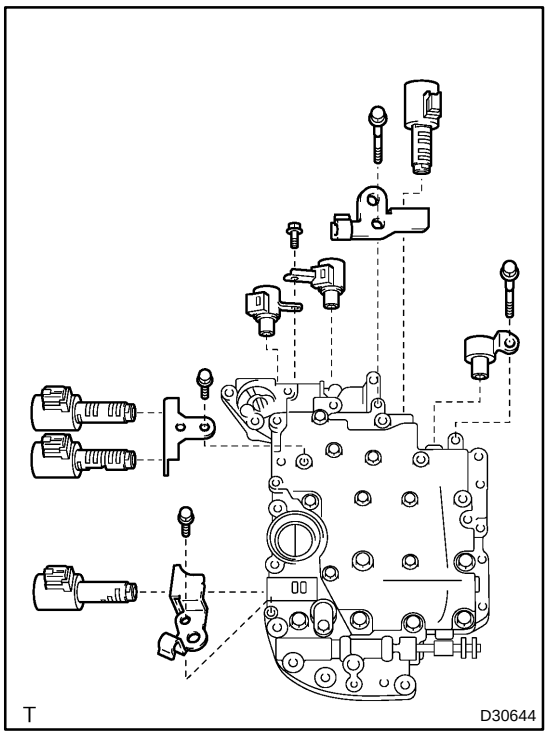
(a) Support the valve body assy and remove the 17 bolts and the valve body assy.

NOTICE:

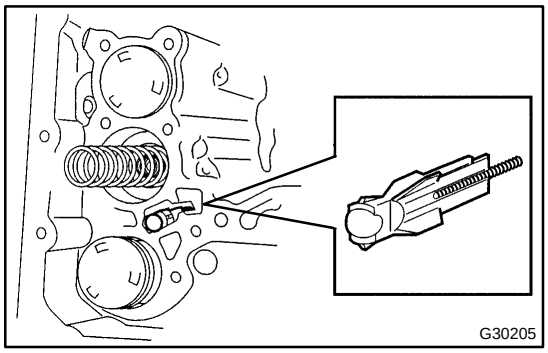
Be careful not to drop the check valve body, spring and accumulator piston.



(b) Remove the check ball body and spring.

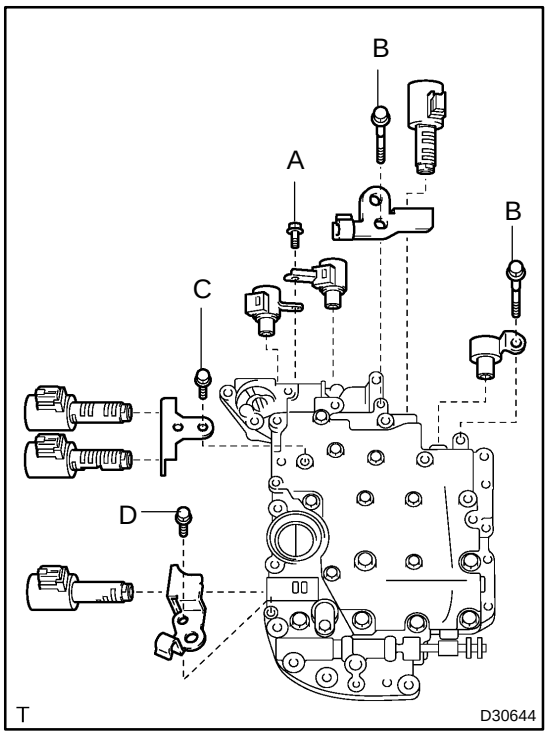


(c) Remove the 5 bolts and 7 shift solenoid valves.



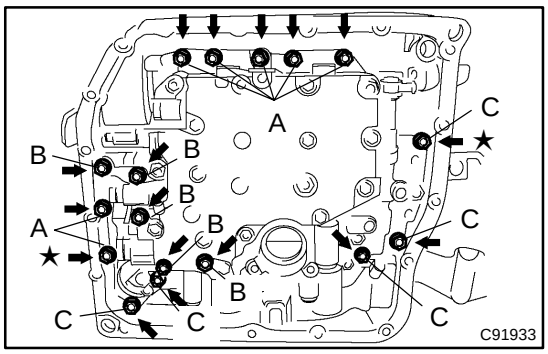
7. INSTALL TRANSMISSION VALVE BODY ASSY

(a) Install the spring and check ball body.



(b) Install the 7 shift solenoid valves with the 5 bolts.

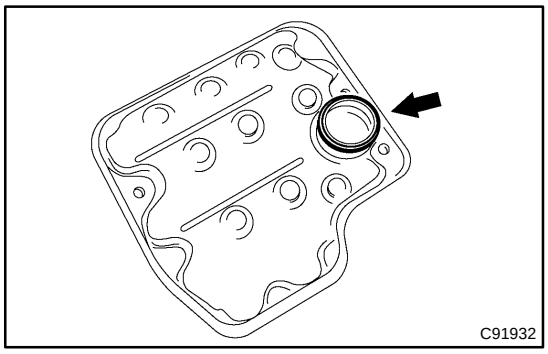
Torque:
Bolt A, B: 11 N·m (110 kgf·cm, 8 ft.·lbf)
Bolt C, D: 6.6 N·m (67 kgf·cm, 58 in. lbf)
Bolt length:
Bolt A: 16 mm (0.63 in.)
Bolt B: 57 mm (2.2 in.)
Bolt C: 23 mm (0.9 in.)
Bolt D: 12 mm (0.47 in.)



(c) Align the groove of the manual valve with the pin of lever.
(d) Install the 17 bolts.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

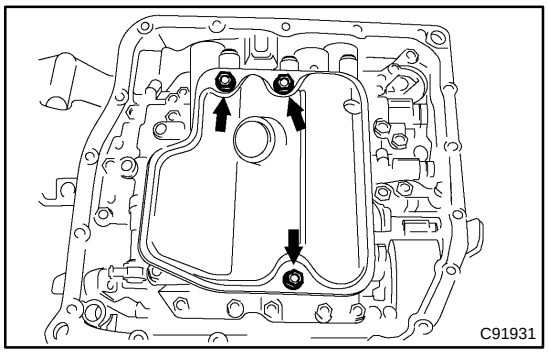
NOTICE:

Push the valve body against the accumulator piston spring and the check ball body to install it.
Temporarily tighten those bolts marked by ★ in the illustration first because they are positioning bolts.
Bolt length:
Bolt A: 25 mm (0.984 in.)
Bolt B: 57 mm (2.244 in.)
Bolt C: 41 mm (1.614 in.)

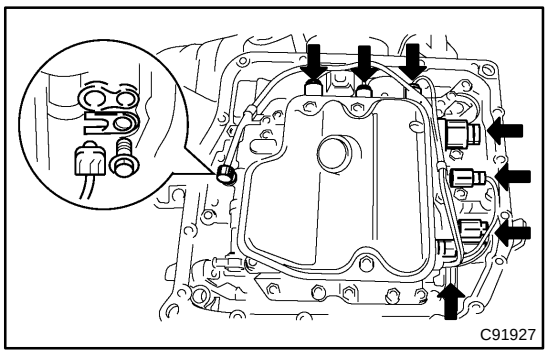


8. INSTALL VALVE BODY OIL STRAINER ASSY

(a) Coat a new O-ring with ATF.
(b) Install the O-ring to the oil strainer.

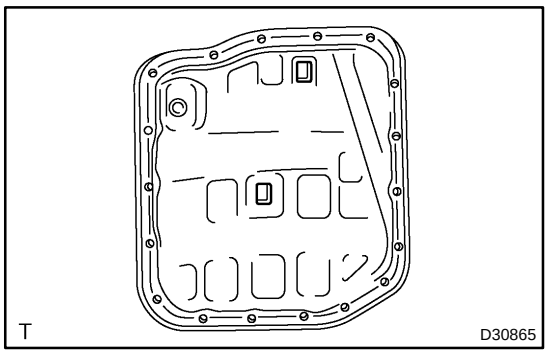


(c) Install the oil strainer with the 3 bolts.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)



9. INSTALL TRANSMISSION WIRE

(a) Coat a O-ring with ATF.
(b) Install the ATF temperature sensor with the lock plate and bolt.
Torque: 6.6 N·m (67 kgf·cm, 58 in.·lbf)
(c) Connect the 7 shift solenoid valve connectors.

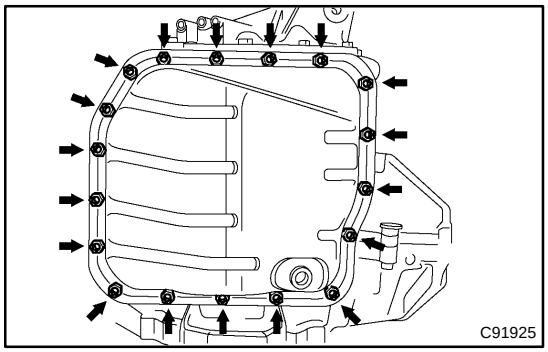


10. INSTALL AUTOMATIC TRANSAXLE OIL PAN SUB-ASSY

(a) Install the 2 magnets in the oil pan.

(b) Apply seal packing to 18 bolts.

Seal packing:
THREE BOND 2430 or equivalent



(c) Install a new gasket, oil pan and 18 bolts to the transaxle case.

Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

NOTICE:

Since the bolts should be seal bolts, apply seal packing to the bolts and tighten them within 10 minutes after applying.

11. ADD AUTOMATIC TRANSAXLE FLUID

12. INSPECT AUTOMATIC TRANSAXLE FLUID (SEE PAGE 40-1)

13. INSTALL ENGINE UNDER COVER NO.1

14. RESET MEMORY (SEE PAGE 05-604)

FRONT DIFFERENTIAL OIL SEAL (U151E)

4010X-04

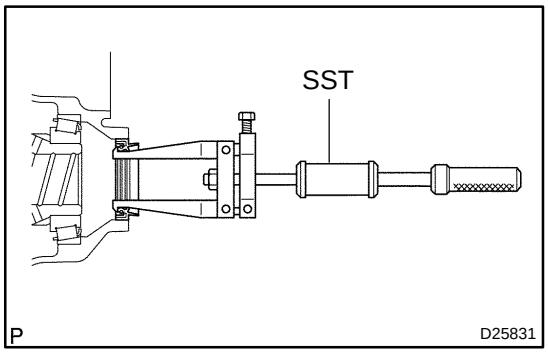
REPLACEMENT

1. **REMOVE FRONT WHEELS**
2. **REMOVE ENGINE UNDER COVER NO.1**
3. **DRAIN AUTOMATIC TRANSAXLE FLUID**

(a) Remove the drain plug, gasket and drain ATF.

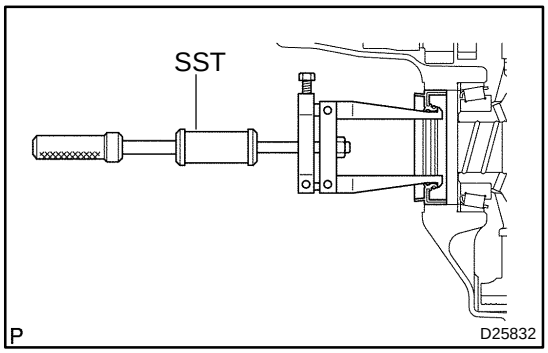
(b) Install a new gasket and drain plug.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

4. **REMOVE FRONT DRIVE SHAFT ASSY RH (SEE PAGE 30-8)**
5. **REMOVE FRONT DRIVE SHAFT ASSY LH (SEE PAGE 30-8)**



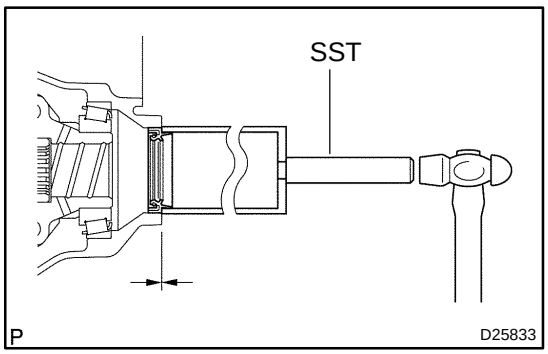
6. **REMOVE TRANSAXLE HOUSING OIL SEAL**

(a) Using SST, pull out the oil seal.
SST 09308-00010



7. **REMOVE DIFFERENTIAL SIDE BEARING RETAINER OIL SEAL**

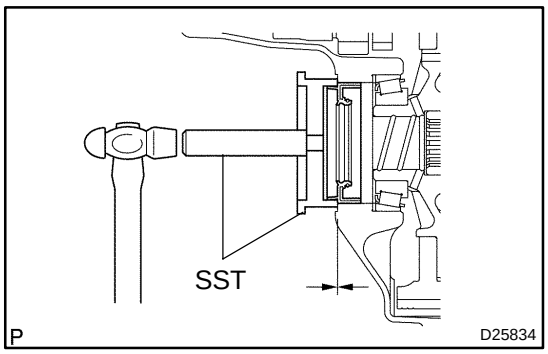
(a) Using SST, pull out the oil seal.
SST 09308-00010



8. **INSTALL DIFFERENTIAL SIDE BEARING RETAINER OIL SEAL**

(a) Using SST and a hammer, drive in a new oil seal.
SST 09316-6001 1 (09316-00011)
Oil seal drive in depth:
0 ± 0.5 mm (0 ± 0.020 in.)

(b) Coat the lip of the oil seal with MP grease.
SST 09316-6001 1 (09316-00011)



9. INSTALL TRANSAXLE HOUSING OIL SEAL

(a) Using SST and a hammer, drive in a new oil seal.
SST 09223-15020, 09950-70010 (09951-07150)
Oil seal drive in depth:
0 ± 0.5 mm (0 ± 0.020 in.)

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

10. INSTALL FRONT DRIVE SHAFT ASSY LH (SEE PAGE 30-8)
11. INSTALL FRONT DRIVE SHAFT ASSY RH (SEE PAGE 30-8)
12. INSTALL FRONT WHEELS
13. ADD AUTOMATIC TRANSAXLE FLUID
14. INSPECT AUTOMATIC TRANSAXLE FLUID (SEE PAGE 40-1)
15. CHECK ABS SPEED SENSOR SIGNAL
w/ VSC (SEE PAGE 05-471)
w/o VSC (SEE PAGE 05-420)

SHIFT LOCK SYSTEM

40067-09

ON-VEHICLE INSPECTION

1. CHECK SHIFT LOCK OPERATION

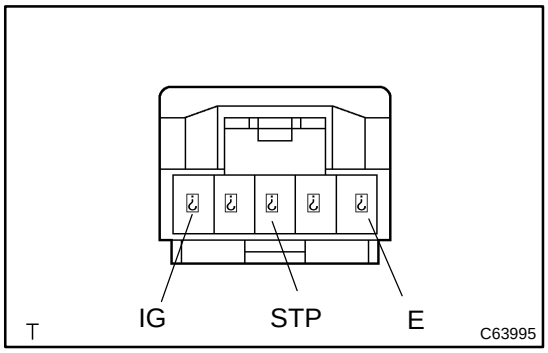
(a) Shift the shift lever to P position.
(b) Turn the ignition switch to LOCK.
(c) Check that the shift lever cannot be shifted to any other positions other than P.
(d) Turn the ignition switch to ON, depress the brake pedal and check that the shift lever can be shifted to any other positions.

2. CHECK SHIFT LOCK RELEASE BUTTON OPERATION

(a) Using a small screwdriver, remove the shift lock release cover.
(b) When operating the shift lever with the shift lock release button pressed, check that the lever can be shifted to any position other than P.

3. CHECK KEY INTERLOCK OPERATION

(a) Turn the ignition switch to ON.
(b) Depress the brake pedal and shift the shift lever to any other position other than P.
(c) Check that the ignition key cannot be turned to LOCK.
(d) Shift the shift lever to P position, turn the ignition key to LOCK and check that the ignition key can be removed.



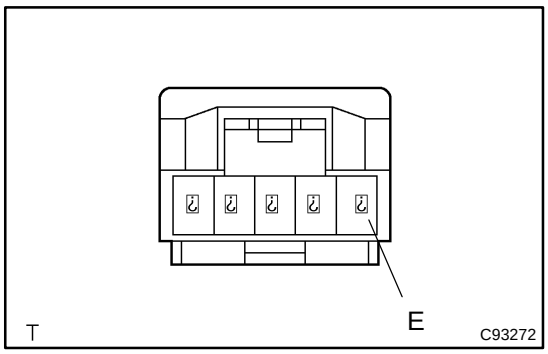
4. INSPECT SHIFT LOCK CONTROL UNIT ASSEMBLY

(a) Using a voltmeter, measure the voltage at each terminal.

HINT:

Do not disconnect the shift lock control unit assembly connector.

Terminal	Measuring Condition	Voltage (V)
3 (STP) - 1 (E)	Depress brake pedal	10 - 14
3 (STP) - 1 (E)	Release brake pedal	0
5 (IG) - [illegible] (E)	Ignition switch ON	10 - 14
5 (IG) -[illegible] (E)	Ignition switch OFF	0



(b) Using an ohmmeter, measure the resistance at terminal E (1) and body ground.

HINT:

Do not disconnect the shift lock control unit assembly connector.

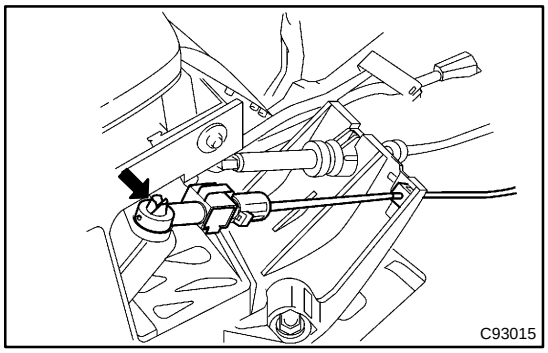
Terminal	Measuring Condition	Specified Value
1 (E) - Body ground	Always	Continuity

FLOOR SHIFT ASSY

400FU-02

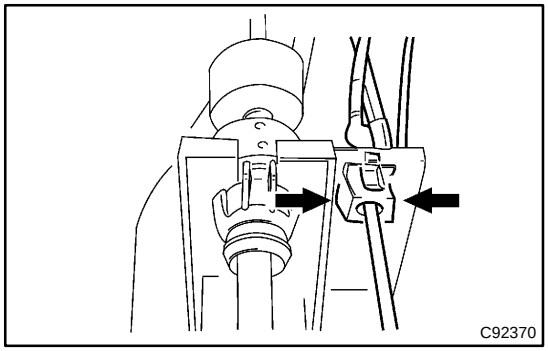
OVERHAUL

1. REMOVE FRONT DOOR SCUFF PLATE LH (SEE PAGE 71-1 1)
2. REMOVE FRONT DOOR SCUFF PLATE RH (SEE PAGE 71-1 1)
3. REMOVE INSTRUMENT PANEL UNDER COVER SUB-ASSY NO.1 (SEE PAGE 71-1 1)
4. REMOVE INSTRUMENT PANEL SUB-ASSY LOWER (SEE PAGE 71-1 1)
5. REMOVE INSTRUMENT PANEL SUB-ASSY UPPER (SEE PAGE 71-1 1)
6. REMOVE INSTRUMENT PANEL INSERT SUB-ASSY LOWER LH (SEE PAGE 71-1 1)
7. REMOVE CONSOLE BOX ASSY (SEE PAGE 71-1 1)
8. REMOVE CONSOLE BOX CARPET
9. REMOVE CONSOLE BOX ASSY (SEE PAGE 71-1 1)
10. REMOVE INSTRUMENT PANEL FINISH PANEL END RH (SEE PAGE 71-1 1)
11. REMOVE INSTRUMENT PANEL FINISH PANEL END LH (SEE PAGE 71-1 1)
12. REMOVE AIR DUCT REAR NO.1 (SEE PAGE 55-17)
13. REMOVE AIR DUCT REAR NO.2 (SEE PAGE 55-17)
14. REMOVE CONSOLE BOX DUCT NO.1 (SEE PAGE 55-17)



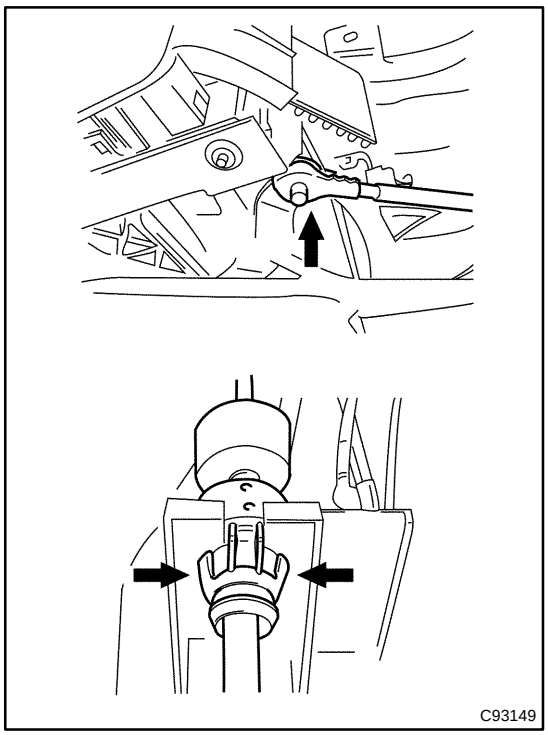
15. DISCONNECT FLOOR SHIFT PARKING LOCK CABLE ASSY

(a) Disconnect the parking lock cable end from the lever pin of the floor shift assembly.



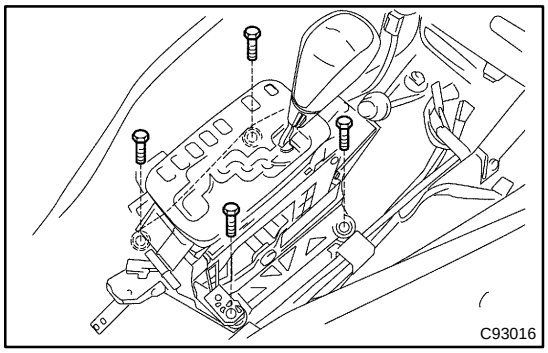
(b) Using a screwdriver, disconnect the parking lock cable from the floor shift assembly and clamp.

(c) Disconnect the cable clamp.



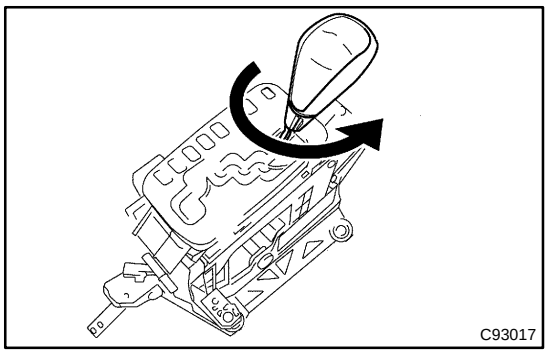
16. DISCONNECT TRANSMISSION CONTROL CABLE ASSY

(a) Disconnect the floor shift transmission control cable from the rod of the floor shift assy.



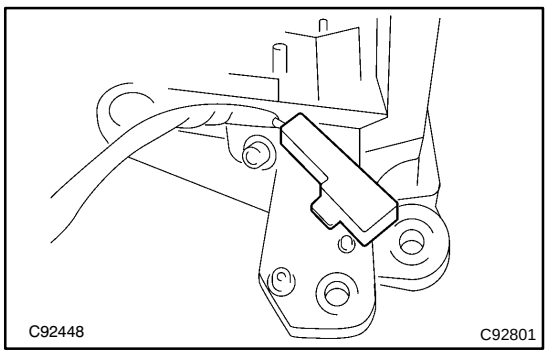
17. REMOVE FLOOR SHIFT ASSY

(a) Disconnect the shift lock control computer connector.
(b) Disconnect the indicator lamp wire connector.
(c) Remove the 4 bolts and transmission floor shift assy.



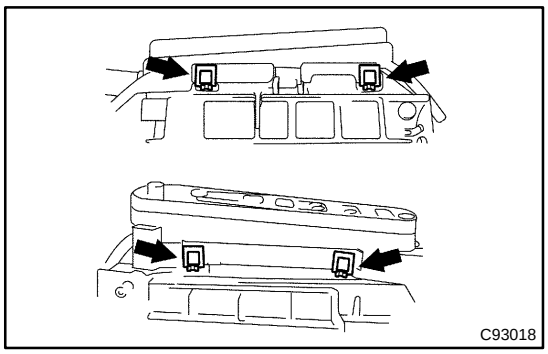
18. REMOVE SHIFT LEVER KNOB SUB-ASSY

(a) Remove the floor shift lever knob from the shift lever.

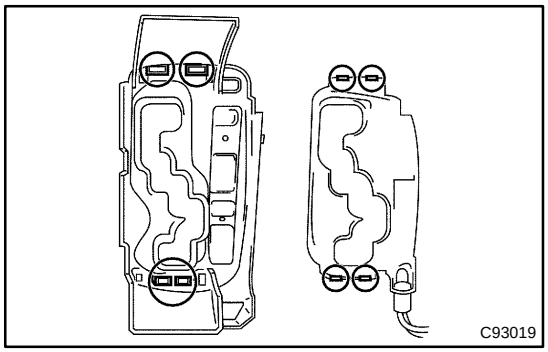


19. REMOVE FLOOR SHIFT POSITION INDICATOR HOUSING SUB-ASSY

(a) Disconnect the wire harness from the clamp.

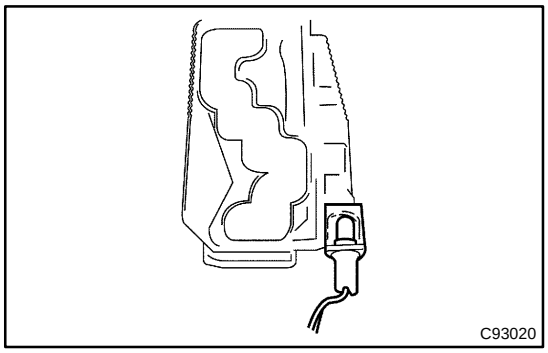


(b) Using a screwdriver, release the 4 claws and remove the position indicator housing.



20. REMOVE POSITION INDICATOR LIGHT GUIDE

(a) Using a screwdriver, release the 4 claws and remove the position indicator light guide.



21. REMOVE INDICATOR LAMP WIRE SUB-ASSY

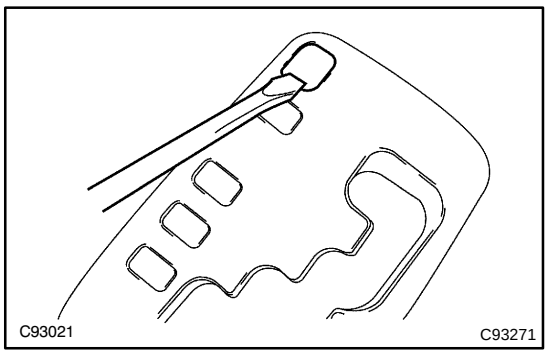
(a) Remove the indicator lamp wire from the position indicator light guide.

22. REMOVE POSITION INDICATOR LAMP CAP

(a) Remove the floor shift position indicator lamp cap from the floor shift position indicator lamp bulb.

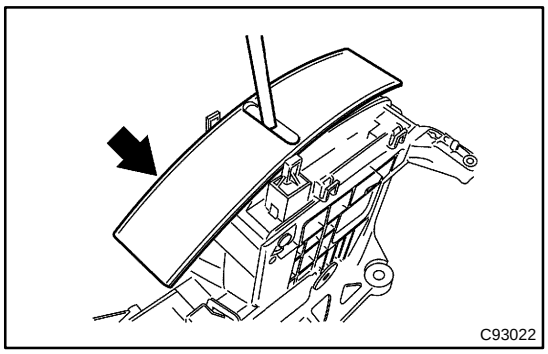
23. REMOVE POSITION INDICATOR LAMP BULB

(a) Remove the floor shift position indicator lamp bulb from the indicator lamp wire.



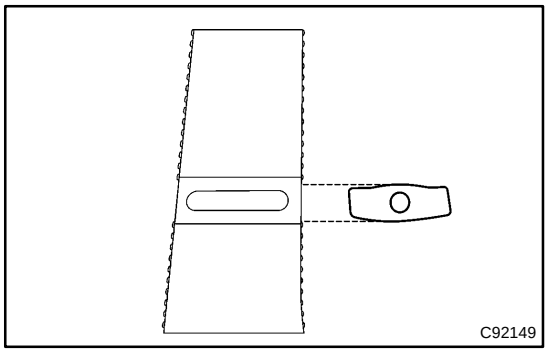
24. REMOVE SHIFT LOCK RELEASE BUTTON COVER

(a) Using a screwdriver, remove the shift lock release button cover.



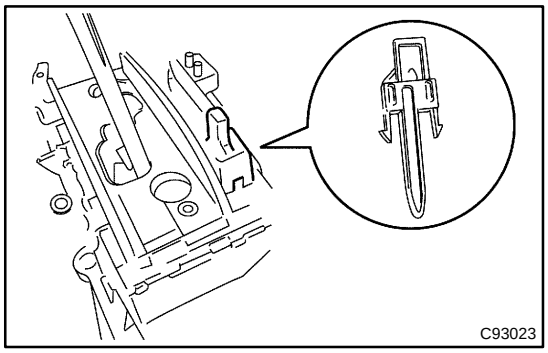
25. REMOVE POSITION INDICATOR SLIDE COVER

(a) Remove the position indicator slide cover from the shift lever.



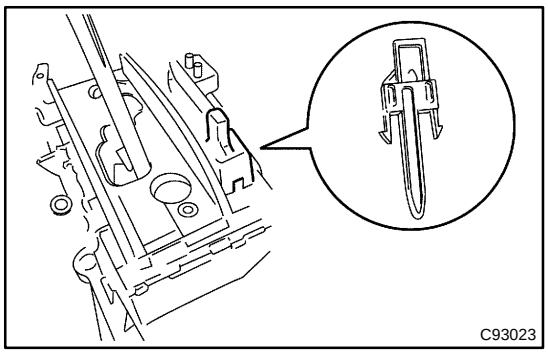
26. REMOVE POSITION INDICATOR SLIDE COVER

(a) Remove the position indicator slide cover from the position indicator slide cover.



27. REMOVE SHIFT LOCK RELEASE BUTTON

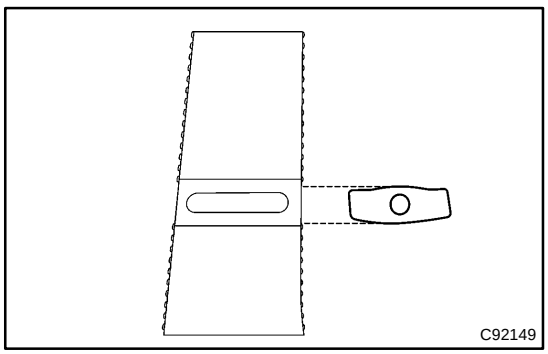
(a) While pressing the 2 claws, remove the shift lock release button and shift lock release spring.



28. INSTALL SHIFT LOCK RELEASE BUTTON

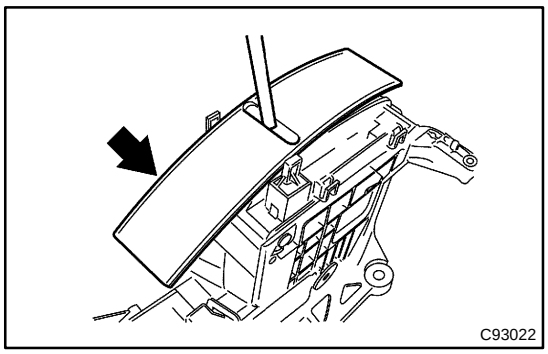
(a) Apply MP grease to the shift lock release spring and shift lock release button.

(b) Install the shift lock release button and shift lock release spring to the shift lever.



29. INSTALL POSITION INDICATOR SLIDE COVER

(a) Install the position indicator slide cover to the position indicator slide cover.



30. INSTALL POSITION INDICATOR SLIDE COVER

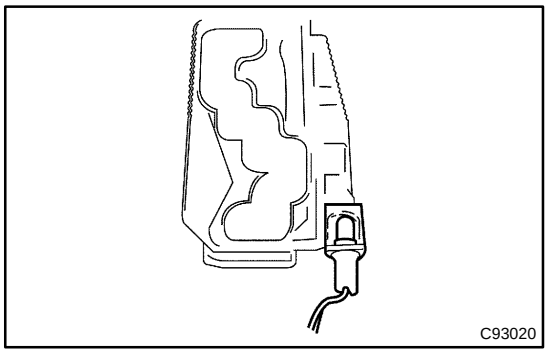
(a) Install the position indicator slide cover to the shift lever.

31. INSTALL POSITION INDICATOR LAMP BULB

(a) Install the floor shift position indicator lamp bulb to the indicator lamp wire.

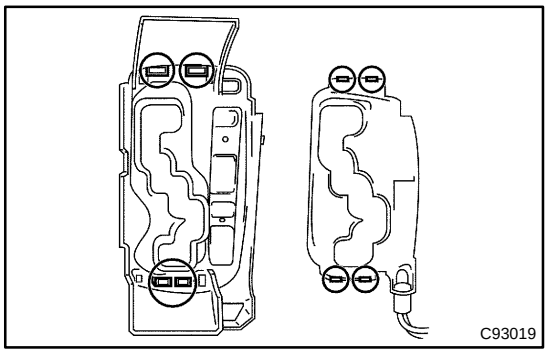
32. INSTALL POSITION INDICATOR LAMP CAP

(a) Install the floor shift position indicator lamp cap to the floor shift position indicator lamp bulb.



33. INSTALL INDICATOR LAMP WIRE SUB-ASSY

(a) Install the indicator lamp wire to the position indicator light guide.

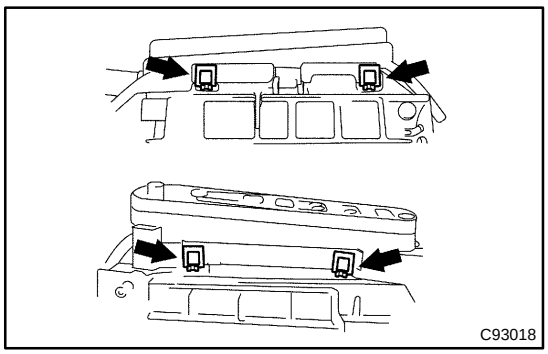


34. INSTALL POSITION INDICATOR LIGHT GUIDE

(a) Install the position indicator light guide to the floor shift position indicator housing.

HINT:

Fit the claws securely.

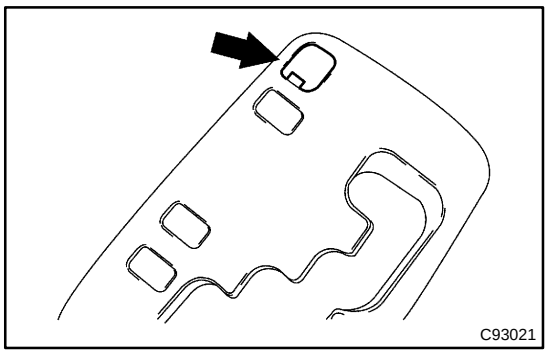


35. INSTALL FLOOR SHIFT POSITION INDICATOR HOUSING SUB-ASSY

(a) Install the floor shift position indicator housing to the shift lever.

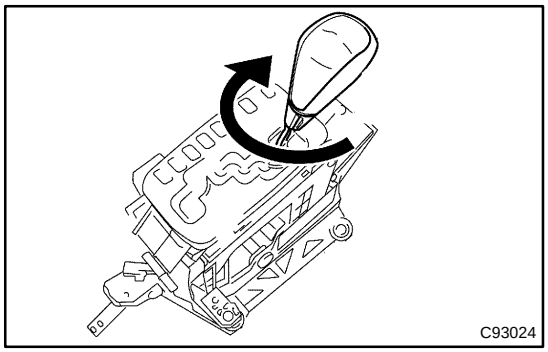
HINT:

Fit the claws securely.



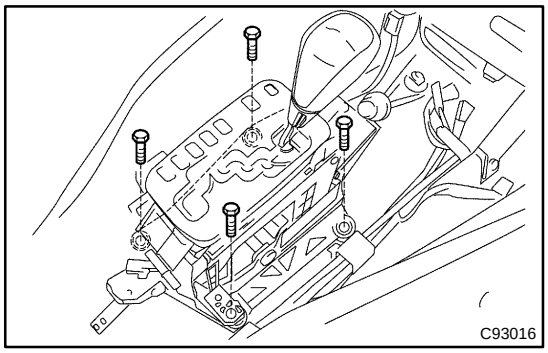
36. INSTALL SHIFT LOCK RELEASE BUTTON COVER

(a) Install the shift lock release button cover to the position indicator housing.



37. INSTALL SHIFT LEVER KNOB SUB-ASSY

(a) Install the floor shift lever knob to the shift lever.

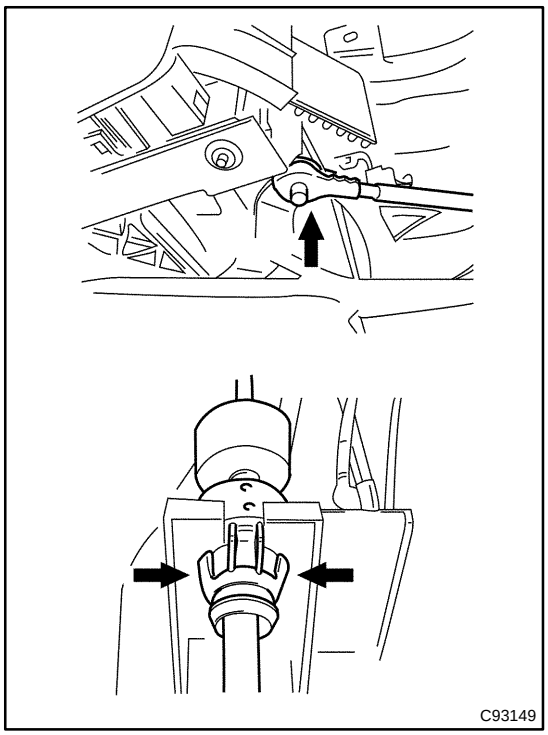


38. INSTALL FLOOR SHIFT ASSY

(a) Install the floor shift assy to the vehicle with the 4 bolts.
Torque: 11.8 N·m (122 kgf·cm, 9 ft·lbf)

(b) Connect the shift lock control computer.

(c) Connect the indicator lamp wire connector.

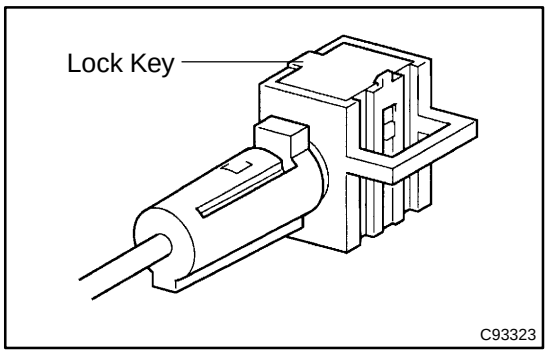


39. INSTALL TRANSMISSION CONTROL CABLE ASSY

(a) Install the floor shift transmission control cable to the shift lever.

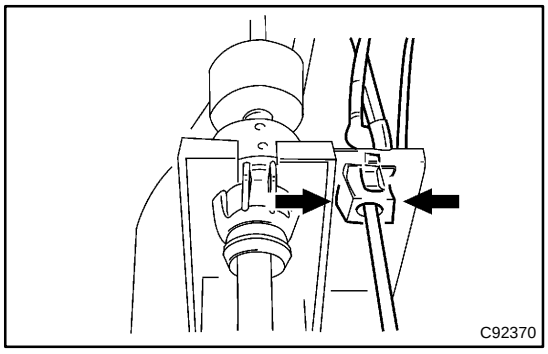
HINT:

Install it with the uneven surface facing up.



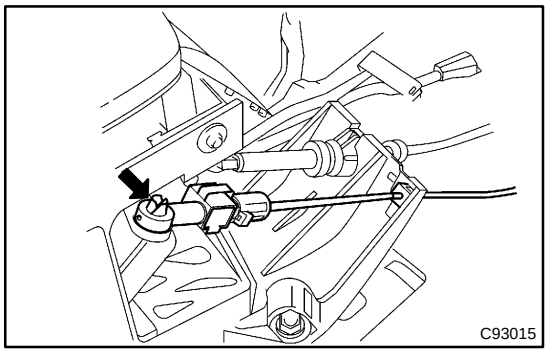
40. INSTALL FLOOR SHIFT PARKING LOCK CABLE ASSY

(a) Using a screwdriver, unlock the claw of the lock key of automatic adjustment part.

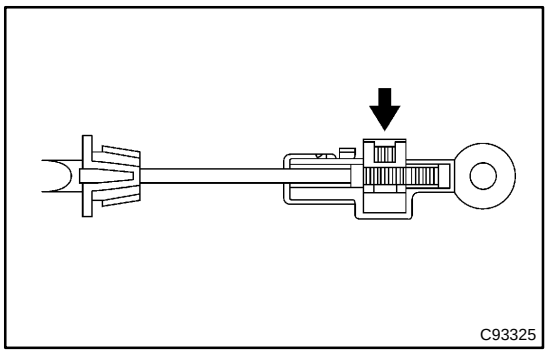


(b) Insert the slide cap into the through hole and install.

(c) Shift the shift lever to P position and turn the ignition switch to Lock.



(d) Insert the lever pin into the hole of the parking lock cable.



(e) Lock the lock key.

41. INSTALL BATTERY
42. ADJUST SHIFT LEVER POSITION(SEE PAGE 40-40)
43. INSPECT SHIFT LEVER POSITION(SEE PAGE 40-40)
44. INSPECT CHECK KEY INTERLOCK OPERATION(SEE PAGE 40-31)
45. INSPECT CHECK SHIFT LOCK OPERATION(SEE PAGE 40-31)
46. INSPECT CHECK SHIFT LOCK RELEASE BUTTON OPERATION(SEE PAGE 40-31)
47. INSTALL CONSOLE BOX DUCT NO.1(SEE PAGE 55-17)
48. INSTALL AIR DUCT REAR NO.2(SEE PAGE 55-17)
49. INSTALL AIR DUCT REAR NO.1(SEE PAGE 55-17)

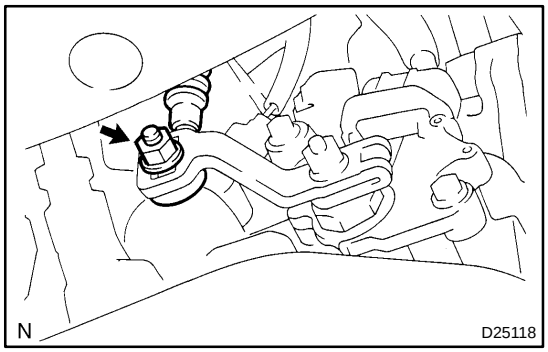
400H6-03

ADJUSTMENT

1. INSPECT SHIFT LEVER POSITION

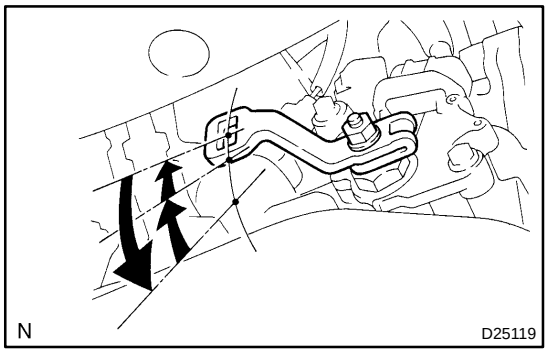
(a) When shifting from P to R position only with ignition switch ON and brake pedal, make sure that the shifting lever moves smoothly and can be moderately operated.

(b) 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.



2. ADJUST SHIFT LEVER POSITION

(a) Loosen the nut on the control shaft lever.



(b) Push the control shaft fully downward.

(c) Return the control shaft lever 2 notches to N position.

(d) Set the shift lever to N position.

(e) While holding the shift lever lightly toward the R position side, tighten the shift lever nut.

Torque: 14.7 N·m (150 kgf·cm, 10 ft·lbf)

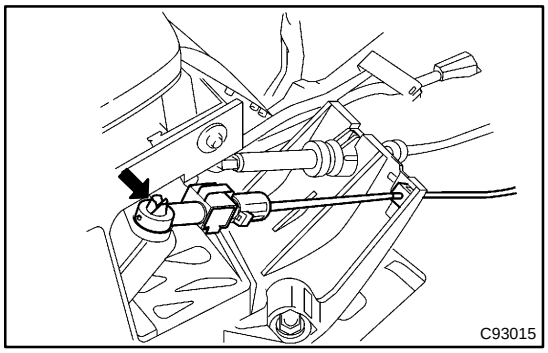
(f) Start the engine and make sure that the vehicle moves forward when shifting the lever from N to D position and moves rearward when shifting it to R position.

FLOOR SHIFT PARKING LOCK CABLE ASSY

400FV-02

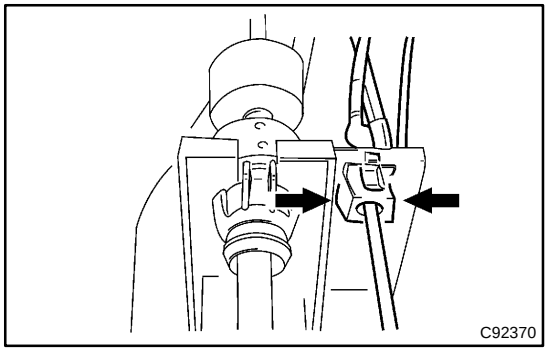
REPLACEMENT

1. REMOVE FRONT DOOR SCUFF PLATE LH (SEE PAGE 71-1 1)
2. REMOVE FRONT DOOR SCUFF PLATE RH (SEE PAGE 71-1 1)
3. REMOVE INSTRUMENT PANEL UNDER COVER SUB-ASSY NO.1 (SEE PAGE 71-1 1)
4. REMOVE INSTRUMENT PANEL SUB-ASSY LOWER (SEE PAGE 71-1 1)
5. REMOVE INSTRUMENT PANEL SUB-ASSY UPPER (SEE PAGE 71-1 1)
6. REMOVE INSTRUMENT PANEL INSERT SUB-ASSY LOWER LH (SEE PAGE 71-1 1)
7. REMOVE CONSOLE PANEL UPPER REAR (SEE PAGE 71-1 1)
8. REMOVE CONSOLE BOX CARPET
9. REMOVE CONSOLE BOX ASSY (SEE PAGE 71-1 1)
10. REMOVE INSTRUMENT PANEL FINISH PANEL END LH (SEE PAGE 71-1 1)
11. REMOVE INSTRUMENT PANEL FINISH PANEL END RH (SEE PAGE 71-1 1)
12. REMOVE AIR DUCT REAR NO.1 (SEE PAGE 55-17)
13. REMOVE AIR DUCT REAR NO.2 (SEE PAGE 55-17)
14. REMOVE CONSOLE BOX DUCT NO.1 (SEE PAGE 55-17)

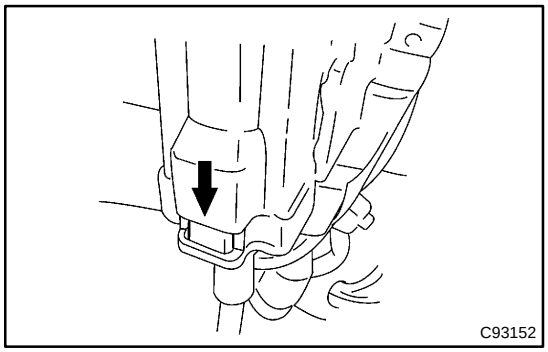


15. REMOVE FLOOR SHIFT PARKING LOCK CABLE ASSY

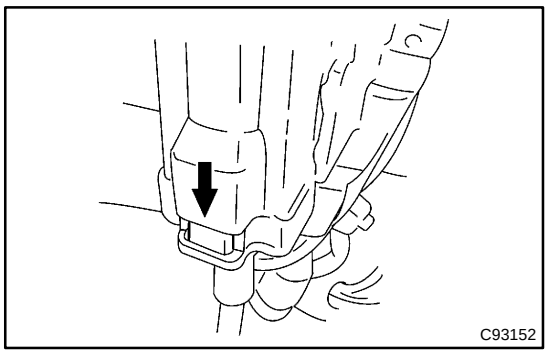
(a) Disconnect the parking lock cable end from the lever pin of the floor shift assembly.



(b) Using a screwdriver, disconnect the parking lock cable from the floor shift assembly and clamp.
(c) Disconnect the cable clamp.
(d) Turn the ignition switch to ACC or ON.



(e) Using a screwdriver, remove the cable from the upper bracket.



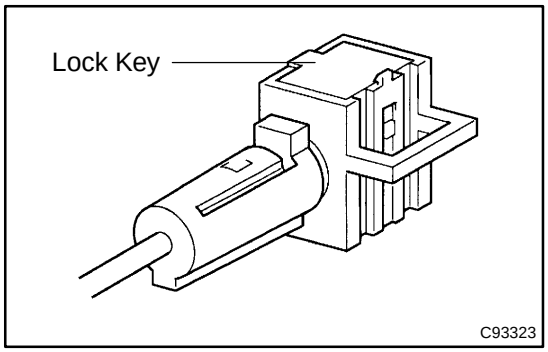
16. INSTALL FLOOR SHIFT PARKING LOCK CABLE ASSY

(a) Turn the ignition switch to ACC or ON.

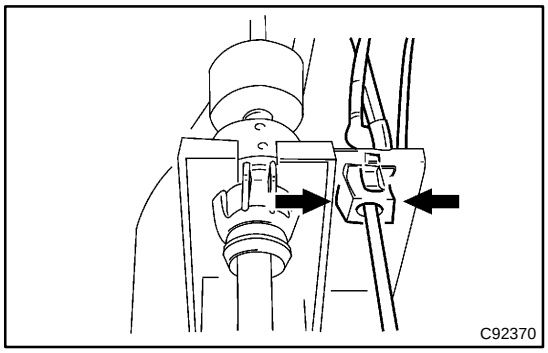
(b) Connect the cable to the upper bracket.

(c) Connect the cable clamp.

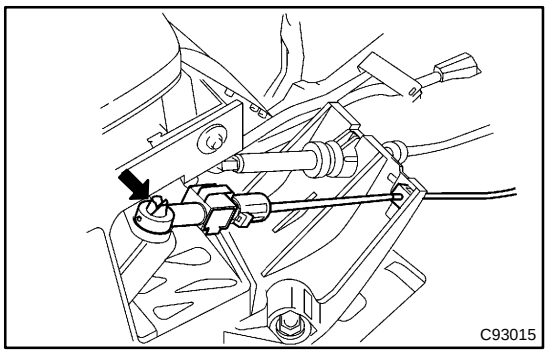
(d) Shift the shift lever to P range and turn the ignition switch to LOCK.



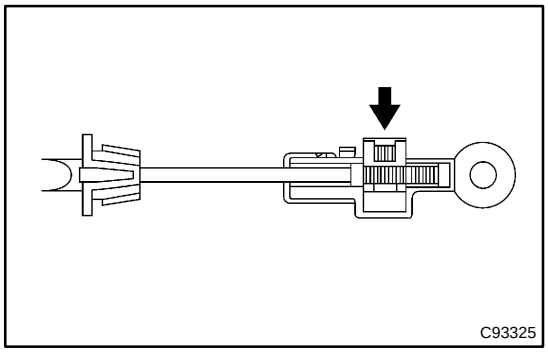
(e) Using a screwdriver, unlock the claw of the lock key of automatic adjustment part.



(f) Insert the slide cap into the through hole and install.



(g) Insert the lever pin into the hole of the parking lock cable.



(h) Lock the lock key.

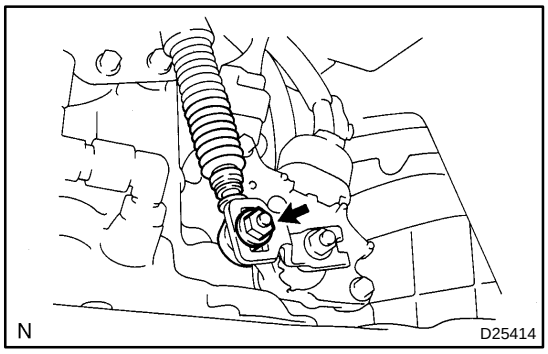
17. INSPECT CHECK KEY INTERLOCK OPERATION(See page 40-31)
18. INSTALL CONSOLE BOX DUCT NO.1
19. INSTALL AIR DUCT REAR NO.2
20. INSTALL AIR DUCT REAR NO.1
21. INSTALL INSTRUMENT PANEL FINISH PANEL END RH
22. INSTALL INSTRUMENT PANEL FINISH PANEL END LH
23. INSTALL CONSOLE BOX ASSY
24. INSTALL CONSOLE BOX CARPET
25. INSTALL CONSOLE PANEL UPPER REAR
26. INSTALL INSTRUMENT PANEL INSERT SUB-ASSY LOWER LH
27. INSTALL INSTRUMENT PANEL SUB-ASSY UPPER
28. INSTALL INSTRUMENT PANEL SUB-ASSY LOWER
29. INSTALL INSTRUMENT PANEL UNDER COVER SUB-ASSY NO.1
30. INSTALL FRONT DOOR SCUFF PLATE RH
31. INSTALL FRONT DOOR SCUFF PLATE LH

TRANSMISSION CONTROL CABLE ASSY

400FW-02

REPLACEMENT

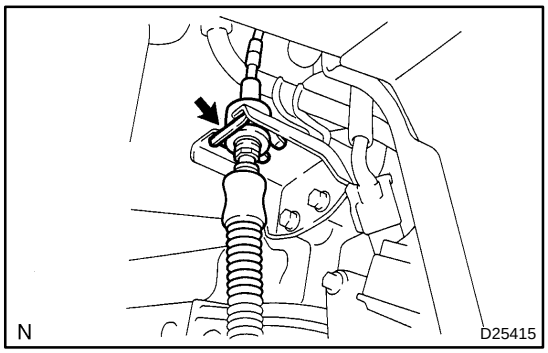
1. REMOVE INSTRUMENT PANEL SAFETY PAD SUB-ASSY (SEE PAGE 71-1 1)
2. REMOVE AIR CONDITIONING RADIATOR ASSY (SEE PAGE 55-17)
3. REMOVE AIR BAG SENSOR ASSY CENTER (SEE PAGE60-55)
4. REMOVE BATTERY
5. REMOVE AIR CLEANER ASSY
6. REMOVE AIR CLEANER HOSE NO.1
7. REMOVE INTAKE AIR RESONATOR SUB-ASSY



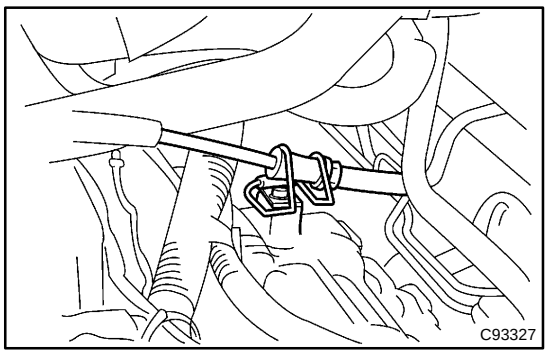
8. REMOVE TRANSMISSION CONTROL CABLE ASSY

(a) Remove the nut from the control shaft lever.

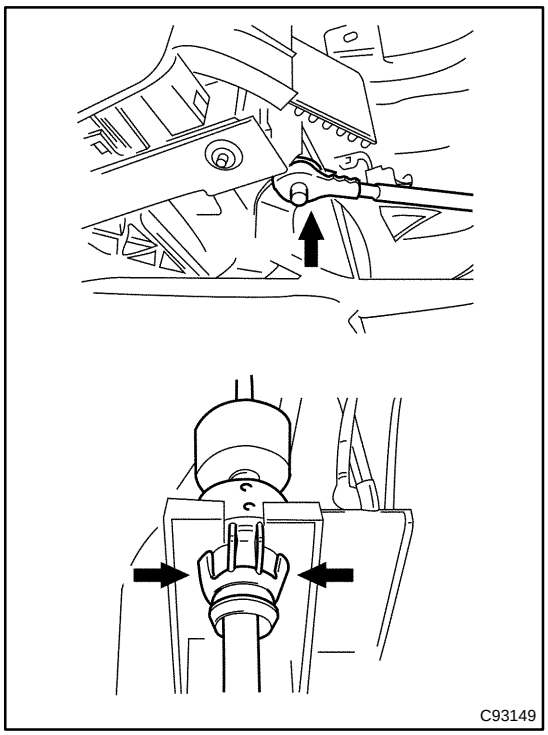
(b) Disconnect the control cable from the control shaft lever.



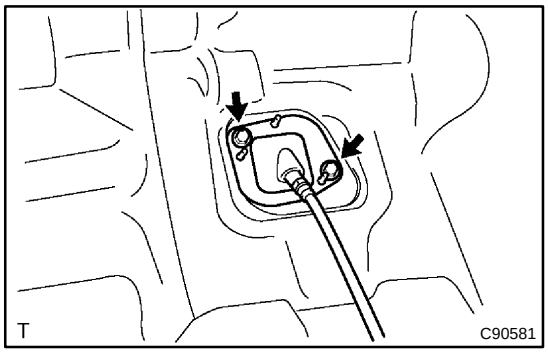
(c) Remove the clip and disconnect the control cable from the control cable bracket.



(d) Disconnect the control cable from the control cable clamp.

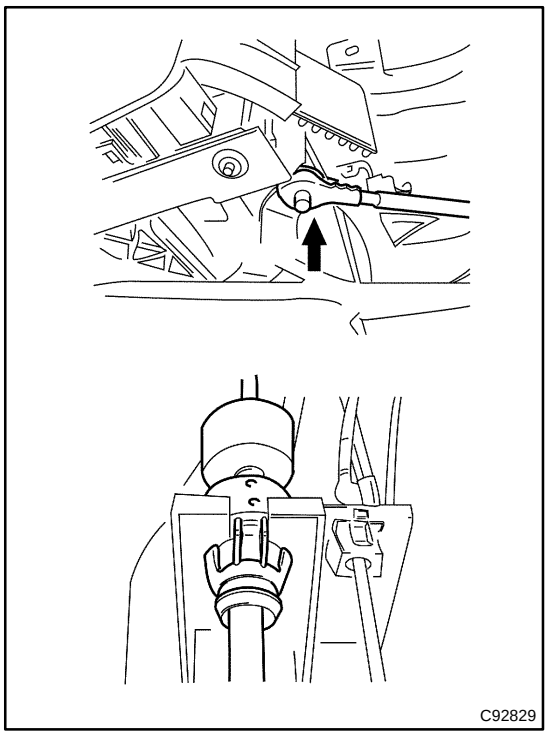


(e) Disconnect the floor shift cable from the rod of the floor shift assy.



(f) Remove the 2 bolts and shift cable grommet retainer No.2.

(g) Pull out the control cable from the body.



9. INSTALL TRANSMISSION CONTROL CABLE ASSY

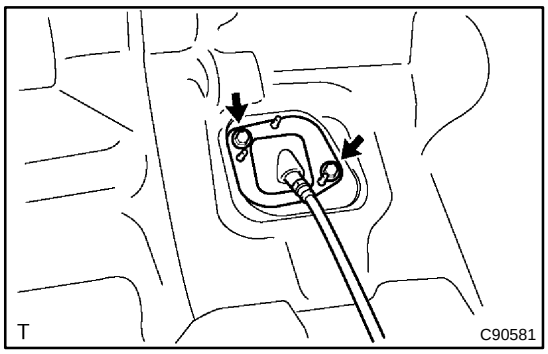
(a) put in the control cable to the body.

(b) Install the shift cable grommet retainer No.2 to the floor shift cable.

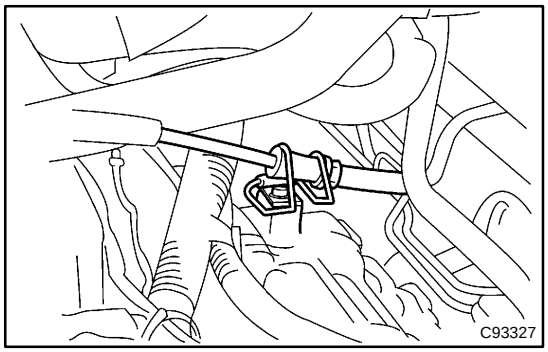
(c) Install the floor shift cable, as shown in the illustration.

HINT:

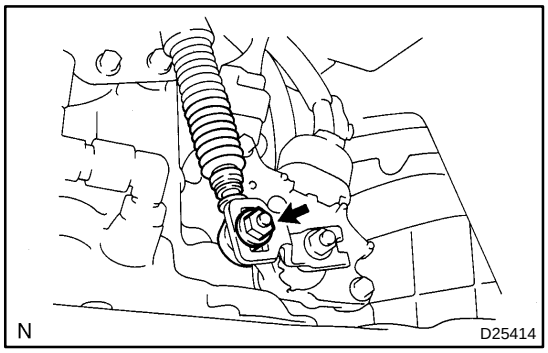
Install it with the uneven surface facing up.



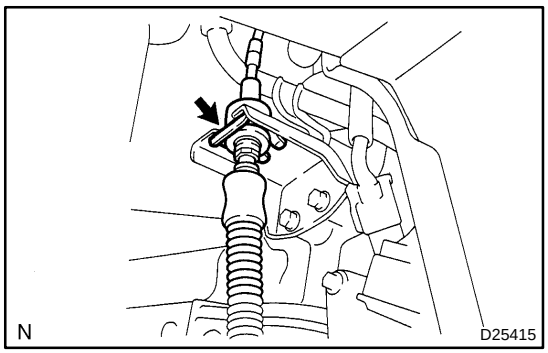
(d) Install the shift cable grommet retainer No.2 with the 2 bolts.
Torque: 4.9 N·m (50 kgf·cm, 43 in.·lbf)



(e) Connect the control cable to the control cable clamp.



(f) Temporarily install the control cable to the control shaft lever with nuts.



(g) Install the control cable and a new clip to the bracket.

10. INSTALL INTAKE AIR RESONATOR SUB-ASSY
11. INSTALL AIR CLEANER HOSE NO.1
12. INSTALL AIR CLEANER ASSY
13. INSTALL AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-55)
14. INSTALL AIR CONDITIONING RADIATOR ASSY (SEE PAGE 55-17)
15. INSTALL INSTRUMENT PANEL SAFETY PAD SUB-ASSY (SEE PAGE 71-1 1)
16. INSTALL BATTERY
17. ADJUST SHIFT LEVER POSITION (SEE PAGE40-40)
18. INSPECT SHIFT LEVER POSITION (SEE PAGE40-40)

BRAKE SYSTEM

32038-03

PRECAUTION

- **Care must be taken to replace each part properly as it could affect the performance of the brake system and result in a driving hazard. Replace the parts with parts having the same part number or equivalent.**
- **It is very important to keep parts and the area clean when repairing the brake system.**
- **If the vehicle is equipped with a mobile communication system, refer to the precaution in the INTRODUCTION section.**

32039-18

PROBLEM SYMPTOMS TABLE

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Low pedal or spongy pedal	2. Fluid leaks for brake system	-
	3. Air in brake system	32-4
	4. Piston seals (Worn or damaged)	32-33 32-41
	5. Master cylinder (Fauly)	32-21
	6. Booster push rod (Out of adjustment)	32-8 32-12
Brake drag	1. Brake pedal free play (Minimal)	32-8 32-12
	2. Parking brake pedal travel (Out of adjustment)	33-2
	3. Parking brake wire (Sticking)	33-8 33-11 33-14
	4. Parking brake shoe clearance (Out of adjustment)	33-2
	5. Pad (Cracked or distorted)	32-33 32-41
	6. Piston (Stuck)	32-33 32-41
	7. Piston (Frozen)	32-33 32-41
	8. Tension or return spring (Faulty)	33-16
	9. Booster push rod (Out of adjustment)	32-8 32-12
	10. Vacuum leaks for booster system	32-26
	11. Master cylinder (Faulty)	32-21
Brake pull	1. Piston (Stuck)	32-33 32-41
	2. Pad (Oily)	32-33 32-41
	3. Piston (Frozen)	32-33 32-41
	4. Disc (Scored)	32-33 32-41
	5. Pad (Cracked or distorted)	32-33 32-41
Hard pedal but brake inefficient	1. Fluid leaks for brake system	-
	2. Air in brake system	32-4
	3. Pad (Worn)	32-33 32-41
	4. Pad (Cracked or distorted)	32-33 32-41
	5. Pad (Oily)	32-33 32-41
	6. Pad (Glanzed)	32-33 32-41
	7. Disc (Scored)	32-33 32-41
	8. Booster push rod (Out of adjustment)	32-8 32-12
	9. Vacuum leaks for booster system	32-26

Noise from brakes	1. Pad (Cracked or distorted)	32-33 32-41
	2. Installation bolt (Loose)	32-33 32-41
	3. Disc (Scored)	32-33 32-41
	4. Pad support plate (Loose)	32-33 32-41
	5. Sliding pin (Worn)	32-33 32-41
	6. Pad (dirty)	32-33 32-41
	7. Pad (Glanzed)	32-33 32-41
	8. Tension or return spring (Faulty)	33-16
	9. Anti-squeal shim (Damaged)	32-33 32-41
	10.Shoe hold-down spring (Damaged)	33-16

BRAKE FLUID (From July, 2003)

3211W-03

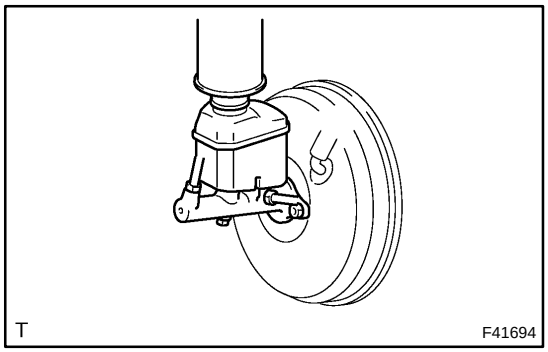
BLEEDING

HINT:

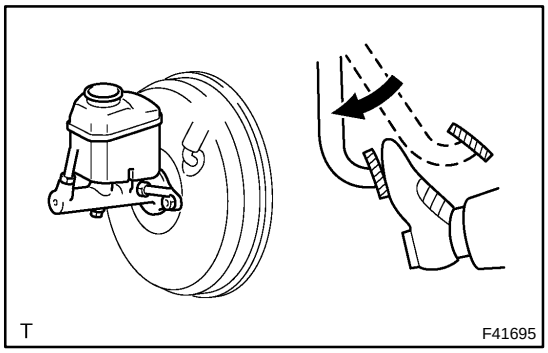
If any work is done on the brake system or if air in the brake lines is suspected, bleed the air from the system.

NOTICE:

Wash off the brake fluied immediately if it comes into contact with a painted surface.



1. FILL RESERVOIR WITH BRAKE FLUID
Fluid: SAE J1703 or FMVSS No. 116 DOT3

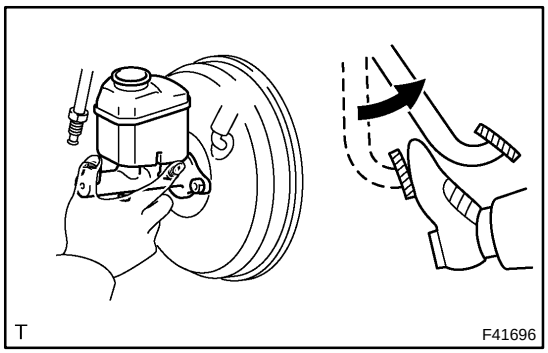


2. BLEED MASTER CYLINDER

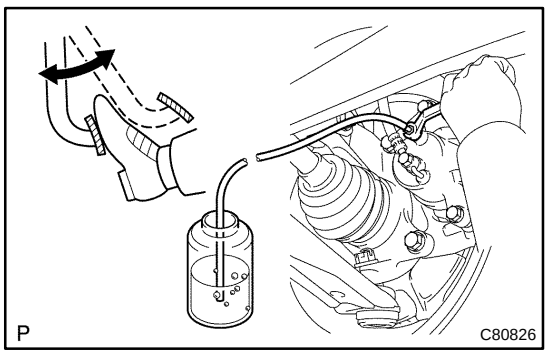
HINT:

If the master cylinder has been disassembled or if the reservoir becomes empty, bleed the air from the master cylinder.

(a) Remove the air cleaner assembly with hose.
(b) Disconnect the brake lines from the master cylinder.
SST 09023-00101
(c) Slowly depress the brake pedal and hold it.



(d) Block off the outer holes with your fingers, and release the brake pedal.
(e) Repeat (c) and (d) 3 or 4 times.
(f) Install the air cleaner assembly with hose.



3. 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) Tighten the bleeder plug certainly.
Torque: 8.3 N·m (85 kgf·cm, 73 in.·lbf)

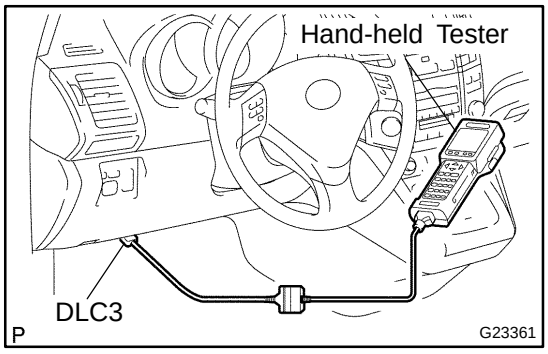
(f) Repeat the above procedure to bleed the air out of the brake line for each wheel.

4. BLEED BRAKE ACTUATOR ASSY (W/ VSC)

NOTICE:

After performing the usual air bleeding in the brake system, if the height or feel of the brake pedal cannot be obtained, perform air bleeding in the brake actuator assy with a hand-held tester by following procedures below.

(a) Depress the brake pedal more than 20 times with the engine off.



(b) Connect the hand-held tester to the DLC3, then turn the ignition switch to the ON position.

NOTICE:

Do not start the engine.

(c) Select "AIR BLEEDING" on the hand-held tester.

HINT:

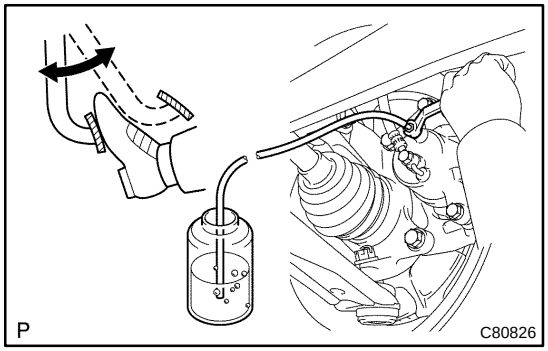
Please refer to the Hand-Held Tester Operator's Manual for further details.

(d) Bleed the air out of the regular brake line in "Step1: Increase" on the hand-held tester display.

NOTICE:

- **Perform the air bleeding by following the steps displayed on the hand-held tester.**
- **Make sure that the brake fluid in the master cylinder reservoir tank does not become empty.**

(1) Connect the vinyl tube to either one of the bleeder plugs.



(2) Depress the brake pedal several times, then loosen the bleeder plug of one of the above wheels with the pedal depressed.

(3) When fluid stops coming out, tighten the bleeder plug, then release the brake pedal.

(4) Repeat (2) and (3) until all air in the fluid is completely bled out.

(5) Tighten the bleeder plug certainly.

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

(6) Repeat the above procedure to bleed the air out of the brake line for each wheel.

(e) Bleed the air out of the suction line in "Step2: Inhalation" on the hand-held tester display.

NOTICE:

- **Perform the air bleeding by following the steps displayed on the hand-held tester.**
- **Make sure that the brake fluid in the master cylinder reservoir tank does not become empty.**

(1) Connect the vinyl tube to the bleeder plug at the right front wheel or the right rear wheel and loosen the bleeder plug.
(2) Operate the brake actuator assy using the hand-held tester to bleed the air.

NOTICE:

- **The operation stops automatically in 4 seconds.**
- **At this time, be sure to release the brake pedal.**

(3) Check that the operation has stopped, by referring to the hand-held tester display.
(4) Repeat (2) and (3) until all the air in the fluid is completely bled out.
(5) Tighten the bleeder plug certainly.

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

(6) For the rest of the wheels, bleed the air in the same way as stated in the above procedure.

(f) Bleed the air out of the pressure reduction line in ”Step3: Decrease” on the hand-held tester display.

NOTICE:

- **Perform air bleeding by following the steps displayed on the hand-held tester.**
- **Make sure that the brake fluid in the master cylinder reservoir tank does not become empty.**

(1) Connect a vinyl tube to either one of the bleeder plugs.
(2) Loosen the bleeder plug.
(3) Using the hand-held tester, operate the brake actuator assy using hand-held tester, completely depress the brake pedal and keep it.

NOTICE:

- **The operation stops automatically in 4 seconds. When performing this procedure continuously, an interval of at least 20 seconds is required.**
- **When the operation is completed, the brake pedal slightly goes down. This is a normal phenomenon caused when the solenoid opens.**
- **During this procedure, the pedal seems heavy, but completely depress it so that the brake fluid comes out from the bleeder plug.**
- **Be sure to keep depressing the brake pedal. Never depress and release the pedal repeatedly.**

(4) Tighten the bleeder plug, then release the brake pedal.
(5) Repeat (2) to (4) until all the air in the fluid is completely bled out.
(6) Tighten the bleeder plug certainly.

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

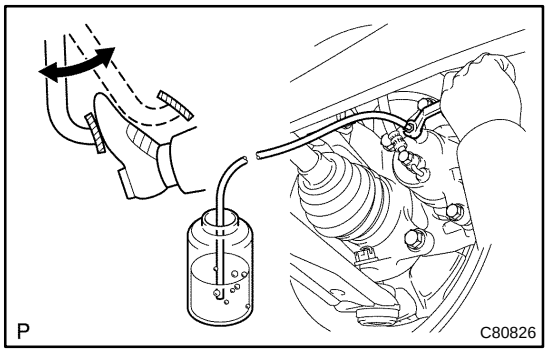
(7) Repeat the above procedure to bleed the air out of the brake line for each wheel.

(g) Bleed the air out of the regular brake line again in ”Step4: Increase” on the hand-held tester display.

NOTICE:

- **Perform air bleeding by following the steps displayed on the hand-held tester.**
- **Make sure that the brake fluid in the master cylinder reservoir tank does not become empty.**

(1) Connect the vinyl tube to either one of the bleeder plug.



(2) Depress the brake pedal several times, then loosen the bleeder plug of one of the above wheels with the pedal depressed.

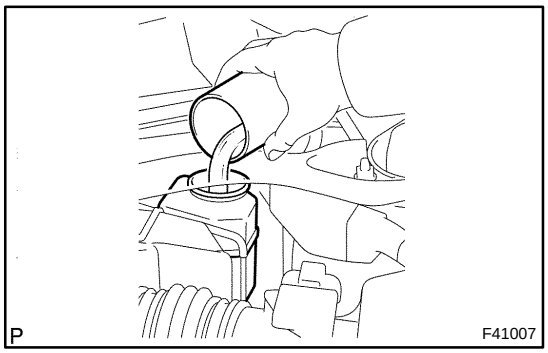
(3) When fluid stops coming out, tighten the bleeder plug, then release the brake pedal.

(4) Repeat (2) and (3) until all the air in the fluid is completely bled out.

(5) Tighten the bleeder plug certainty.

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

(6) Repeat the above procedure to bleed the air out of the brake line for each wheel.



5. CHECK FLUID LEVEL IN RESERVOIR

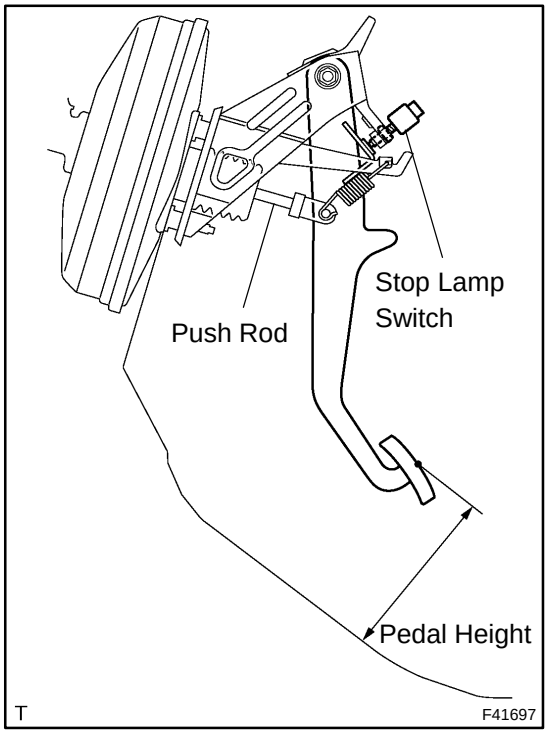
(a) Check the fluid level and add fluid if necessary.

Fluid: SAE J1703 or FMVSS No. 116 DOT3

BRAKE PEDAL SUPPORT ASSY

ADJUSTMENT

320DV-02



1. CHECK AND ADJUST BRAKE PEDAL HEIGHT

(a) Inspect brake pedal height.

Pedal height from asphalt sheet:
144.1 - 154.1 mm (5.673 - 6.067 in.)

(b) Adjust brake pedal height.

(1) Remove the instrument panel finish panel sub-assy lower and instrument panel insert sub-assy lower LH.

(2) Disconnect the connector from the stop lamp switch.

(3) Loosen the stop lamp switch lock nut and remove the stop lamp switch.

(4) Loosen the clevis lock nut.

(5) Adjust the pedal height by turning the pedal push rod.

(6) Tighten the push rod lock nut.

Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)

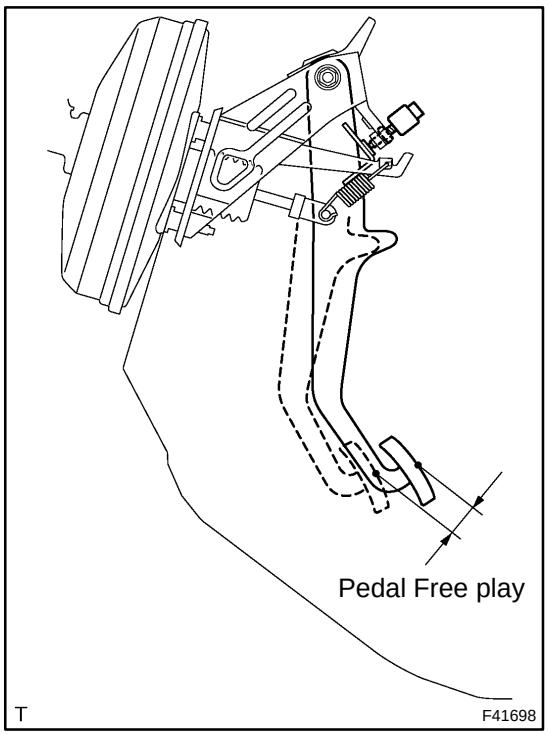
(7) Install the stop lamp switch.

(8) Connect the connector to the stop lamp switch.

(9) Push the brake pedal in 5 - 10 mm (0.20 - 0.39 in.), turn the stop lamp switch to lock the nut in the position where the stop lamp goes off.

(10) After installation, push the brake pedal in 5 - 10 mm (0.20 - 0.39 in.), check that stop lamp lights up.

(11) Install the instrument panel insert sub-assy lower LH and instrument panel finish panel sub-assy lower.



2. CHECK PEDAL FREE PLAY

(a) Stop the engine and depress the brake pedal several times until there is no more vacuum left in the booster.

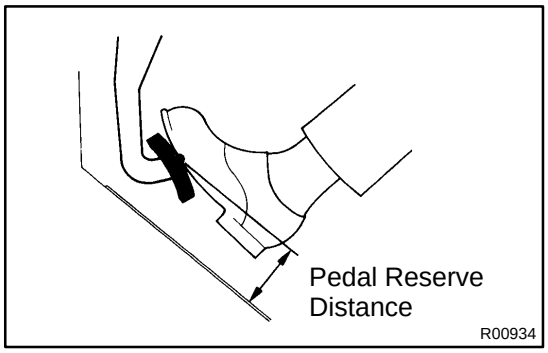
(b) Push in the pedal until the beginning of the resistance is felt. Measure the distance, as shown.

Pedal free play: 1 - 6 mm (0.04 - 0.24 in.)

If incorrect, check the stop lamp switch clearance.

If the clearance is OK, then troubleshoot the brake system.

Stop lamp switch clearance:
0.5 - 2.5 mm (0.020 - 0.098 in.)



3. CHECK PEDAL RESERVE DISTANCE

(a) Release the parking brake pedal.

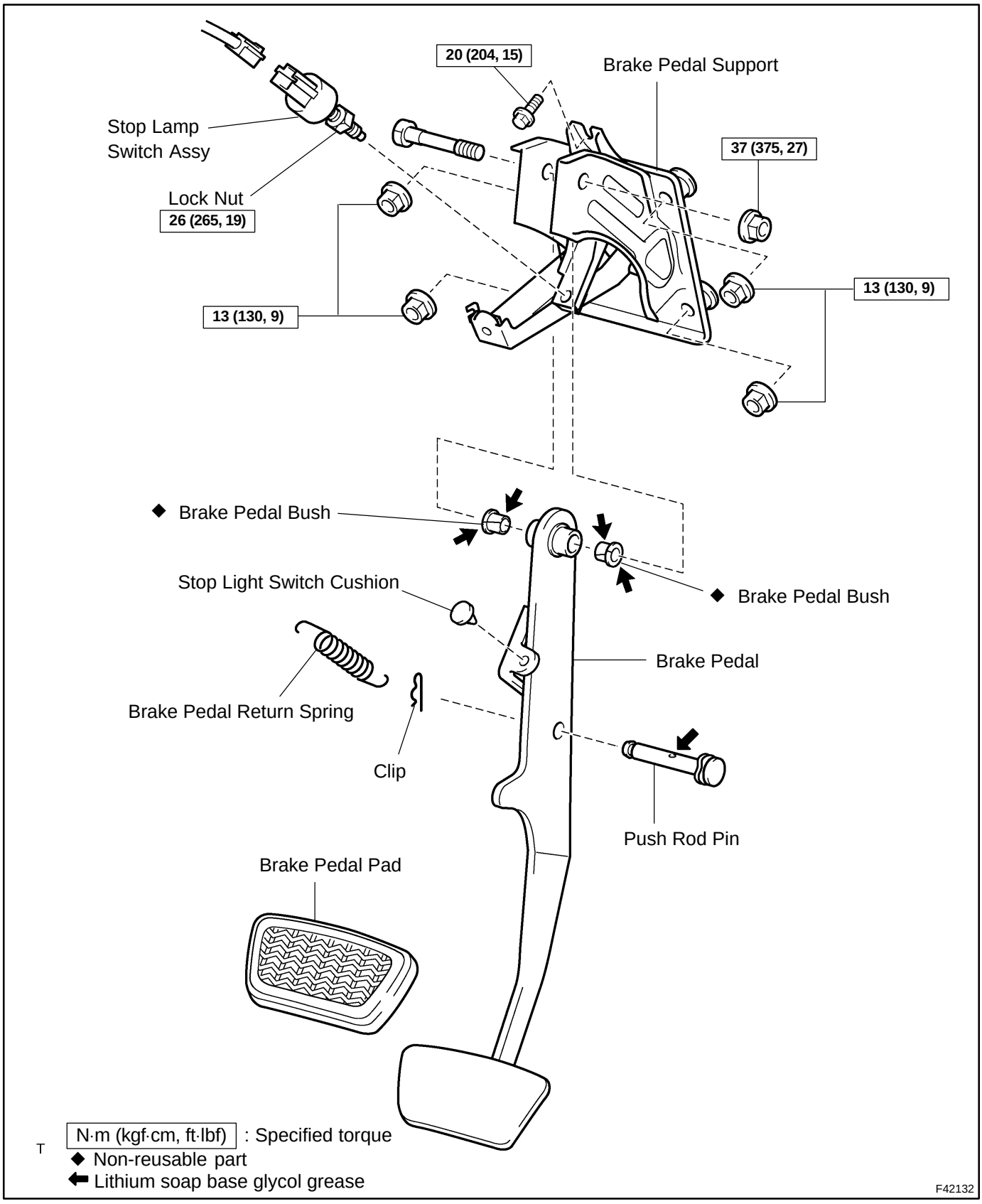
With engine running, depress the pedal and measure the pedal reserve distance, as shown.

Pedal reserve distance from asphalt sheet at 490 N (50 kgf, 110.2 lbf): More than 70 mm (2.76 in.)

If incorrect, troubleshoot the brake system.

320DW-02

COMPONENTS



320DX-02

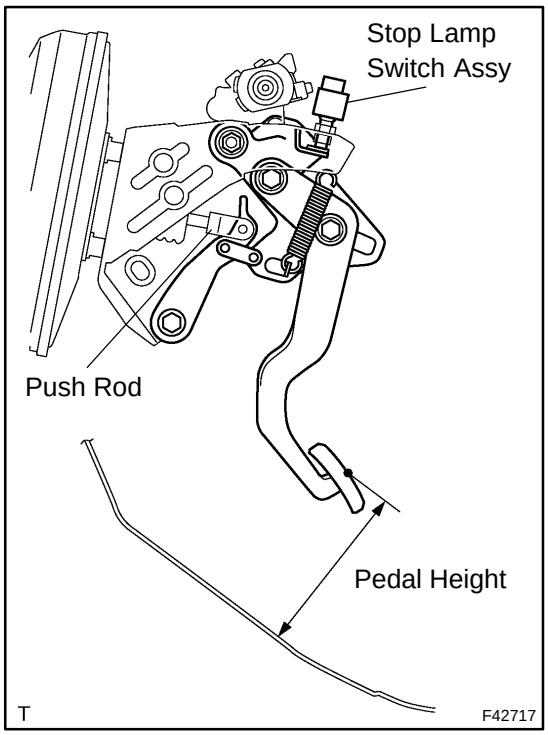
OVERHAUL

1. REMOVE INSTRUMENT PANEL SAFETY PAD SUB-ASSY (SEE PAGE 71-1 1)
2. REMOVE INSTRUMENT PANEL REINFORCEMENT (SEE PAGE 71-1 1)
3. REMOVE BRAKE PEDAL RETURN SPRING
4. REMOVE PUSH ROD PIN
(a) Remove the clip and push rod pin.
5. REMOVE BRAKE PEDAL SUPPORT ASSY
(a) Disconnect the stop lamp switch connector.
(b) Remove the bolt, 4 nuts and brake pedal support assy.
6. REMOVE STOP LAMP SWITCH ASSY
(a) Loosen the lock nut and remove the stop lamp switch.
7. REMOVE BRAKE PEDAL SUB-ASSY
(a) Remove the nut, bolt and brake pedal sub-assy from brake pedal support assy.
8. REMOVE BRAKE PEDAL PAD
9. REMOVE BRAKE PEDAL BUSH
(a) Remove the 2 brake pedal bushes from brake pedal.
10. REMOVE STOP LAMP SWITCH CUSHION
11. INSTALL STOP LAMP SWITCH CUSHION
12. INSTALL BRAKE PEDAL BUSH
(a) Install the new 2 brake pedal bushes to brake pedal.
HINT:
Apply the lithium soap base glycol grease to the parts indicates by arrows (see page 32-10).
13. INSTALL BRAKE PEDAL PAD
14. INSTALL BRAKE PEDAL SUB-ASSY
(a) Install the brake pedal sub-assy with the bolt and nut.
Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)
15. INSTALL STOP LAMP SWITCH ASSY
(a) Install the stop lamp switch with the lock nut.
Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)
16. INSTALL BRAKE PEDAL SUPPORT ASSY
(a) Install the brake pedal support assy with the bolt and 4 nuts.
Torque:
Bolt: 20 N·m (204 kgf·cm, 15 ft·lbf)
Nut: 13 N·m (130 kgf·cm, 9 ft·lbf)
17. INSTALL PUSH ROD PIN
(a) Install the push rod pin and clip.
HINT:
Apply the lithium soap base glycol grease to the parts indicates by arrows (see page 32-10).
18. INSTALL BRAKE PEDAL RETURN SPRING
19. INSTALL INSTRUMENT PANEL REINFORCEMENT (SEE PAGE 71-1 1)
20. INSTALL INSTRUMENT PANEL SAFETY PAD SUB-ASSY (SEE PAGE 71-1 1)
21. CHECK AND ADJUST BRAKE PEDAL HEIGHT (SEE PAGE 32-8)
22. CHECK PEDAL FREE PLAY (SEE PAGE 32-8)
23. CHECK PEDAL RESERVE DISTANCE (SEE PAGE 32-8)

ACCELERATOR & BRAKE PEDAL ASSY (From August, 2002)

320OF-03

ADJUSTMENT



1. CHECK AND ADJUST BRAKE PEDAL HEIGHT

(a) Inspect brake pedal height.

Pedal height from asphalt sheet:

144.1 - 154.1 mm (5.673 - 6.067 in.)

(b) Adjust brake pedal height.

(1) Remove the instrument panel finish panel sub-assy lower and instrument panel insert sub-assy lower LH.

(2) Disconnect the connector from the stop lamp switch assy.

(3) Loosen the stop lamp switch lock nut and remove the stop lamp switch assy.

(4) Loosen the clevis lock nut.

(5) Adjust the pedal height by turning the pedal push rod.

(6) Tighten the push rod lock nut.

Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)

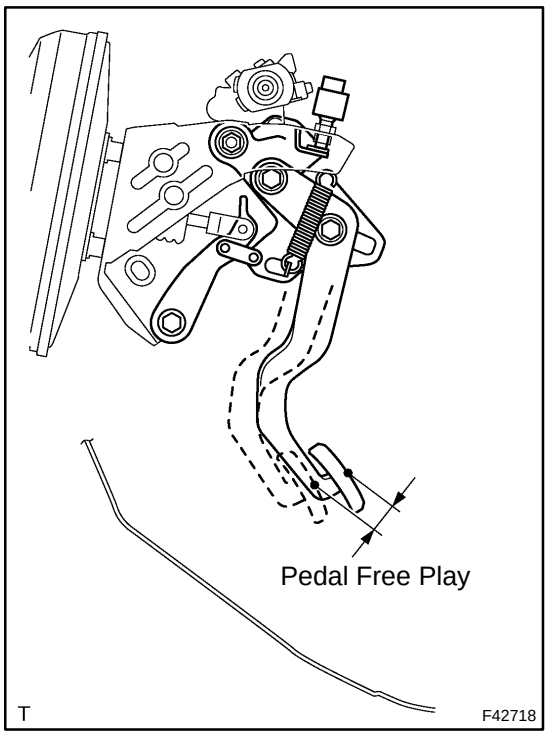
(7) Install the stop lamp switch assy.

(8) Connect the connector to the stop lamp switch assy.

(9) Push the brake pedal in 5 - 10 mm (0.20 - 0.39 in.), turn the stop lamp switch assy to lock the nut in the position where the stop lamp goes off.

(10) After installation, push the brake pedal in 5 - 10 mm (0.20 - 0.39 in.), check that stop lamp lights up.

(11) Install the instrument panel insert sub-assy lower LH and instrument panel finish panel sub-assy lower.



2. CHECK PEDAL FREE PLAY

(a) Stop the engine and depress the brake pedal several times until there is no more vacuum left in the booster.

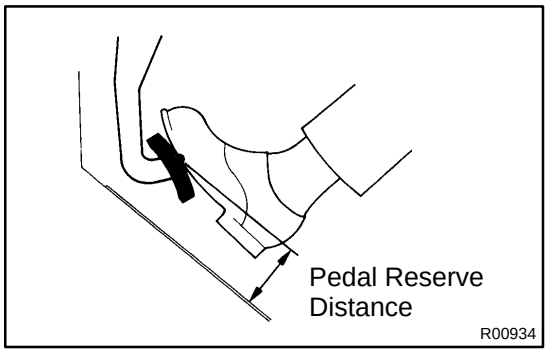
(b) Push in the pedal until the beginning of the resistance is felt. Measure the distance, as shown.

Pedal free play: 1 - 6 mm (0.04 - 0.24 in.)

If incorrect, check the stop lamp switch assy clearance.

If the clearance is OK, then troubleshoot the brake system.

Stop lamp switch clearance:
0.5 - 2.5 mm (0.020 - 0.098 in.)



3. CHECK PEDAL RESERVE DISTANCE

(a) Release the parking brake pedal.

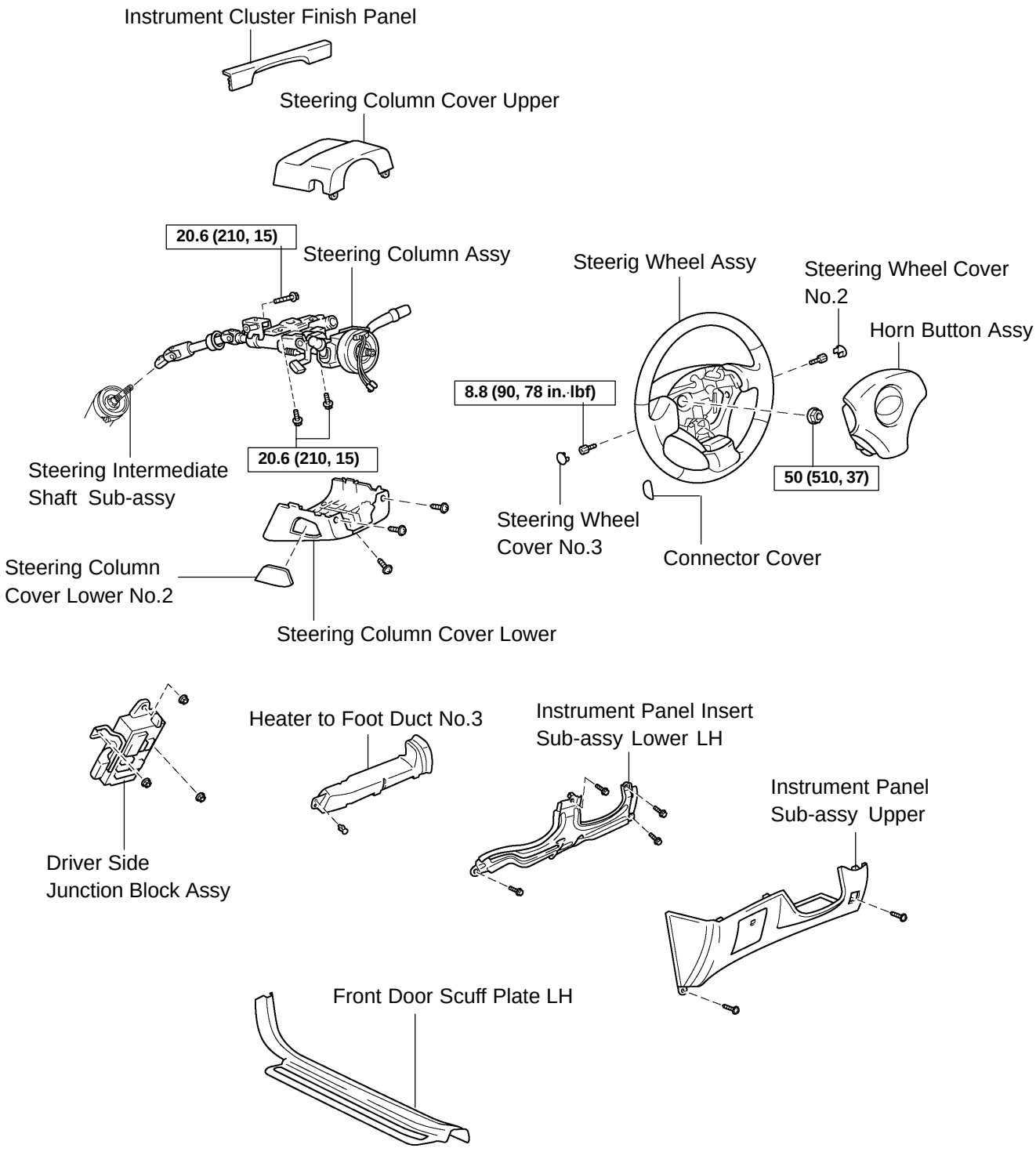
With engine running, depress the pedal and measure the pedal reserve distance, as shown.

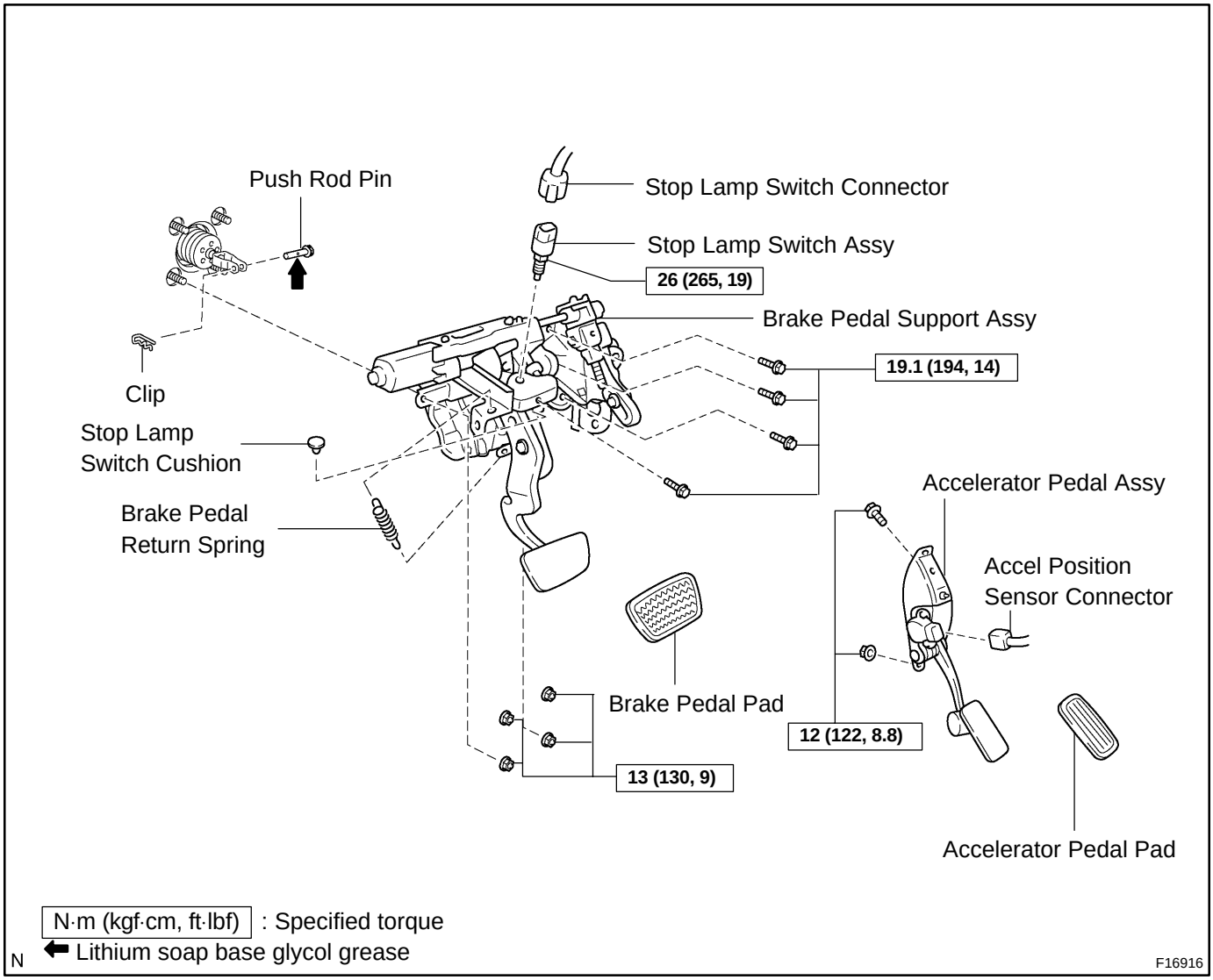
Pedal reserve distance from asphalt sheet at 490 N (50 kgf, 110.2 lbf): More than 63 mm (2.48 in.)

If incorrect, troubleshoot the brake system.

320OJ-03

COMPONENTS

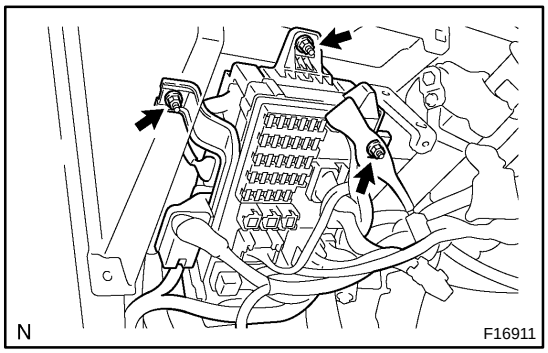



Push Rod Pin
Stop Lamp Switch Connector
Stop Lamp Switch Assy
26 (265, 19)
Brake Pedal Support Assy
19.1 (194, 14)
Clip
Stop Lamp
Switch Cushion
Brake Pedal
Return Spring
Accelerator Pedal Assy
Accel Position
Sensor Connector
Brake Pedal Pad
12 (122, 8.8)
13 (130, 9)
Accelerator Pedal Pad
N·m (kgf·cm, ft·lbf) : Specified torque
Lithium soap base glycol grease
N
F16916

320OG-05

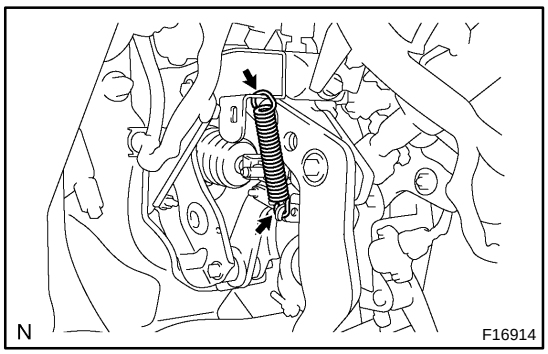
OVERHAUL

1. PRECAUTION (SEE PAGE 60-1)
2. DISCONNECT BATTERY NEGATIVE TERMINAL (SEE PAGE 60-1)
3. PLACE FRONT WHEELS FACING STRAIGHT AHEAD
4. REMOVE STEERING WHEEL COVER LOWER NO.2
5. REMOVE CONNECTOR COVER (SEE PAGE 82-1)
6. REMOVE STEERING PAD SWITCH (SEE PAGE 82-1)
7. REMOVE HORN BUTTON ASSY (SEE PAGE 60-22)
8. REMOVE STEERING WHEEL ASSY (SEE PAGE 50-8)
   SST 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05021)
9. REMOVE FRONT DOOR SCUFF PLATE LH (SEE PAGE 71-1 1)
10. REMOVE INSTRUMENT PANEL SUB-ASSY UPPER (SEE PAGE 71-1 1)
11. REMOVE INSTRUMENT PANEL INSERT SUB-ASSY LOWER LH (SEE PAGE 71-1 1)
12. REMOVE HEATER TO FOOT DUCT NO.3 (SEE PAGE 32-14)
13. REMOVE STEERING COLUMN COVER LWR NO.2 (SEE PAGE 50-8)
14. REMOVE STEERING COLUMN COVER (SEE PAGE 50-8)
15. REMOVE TURN SIGNAL SWITCH ASSY (SEE PAGE 50-8)
16. DISCONNECT FLOOR SHIFT PARKING LOCK CABLE ASSY (SEE PAGE 50-8)
17. DISCONNECT STEERING SLIDING YOKE SUB-ASSY (SEE PAGE 50-8)
18. REMOVE STEERING COLUMN HOLE COVER SUB-ASSY NO.2 (SEE PAGE 50-8)
19. REMOVE STEERING COLUMN ASSY (SEE PAGE 50-8)

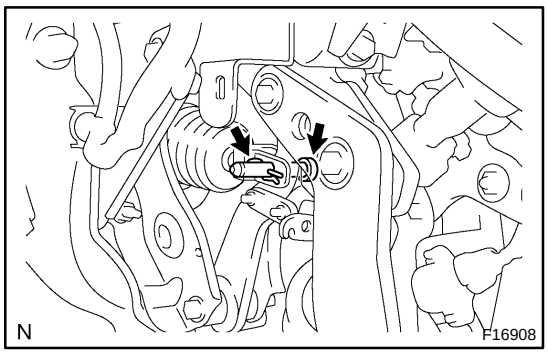


20. REMOVE DRIVER SIDE JUNCTION BLOCK ASSY

(a) Remove the 3 nuts and junction bloke assy, then disconnect the connector.

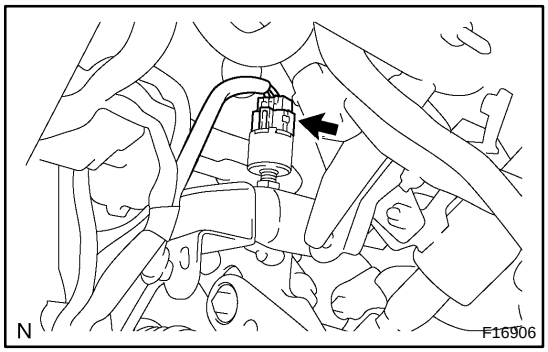


21. REMOVE BRAKE PEDAL RETURN SPRING



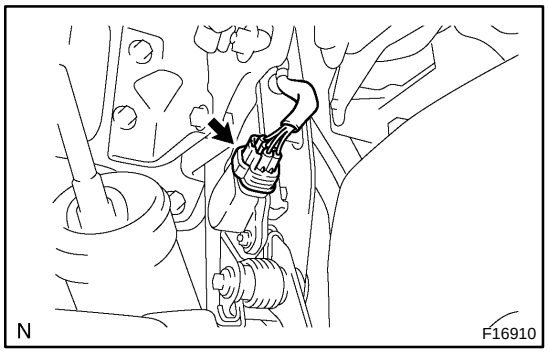
22. REMOVE PUSH ROD PIN

(a) Remove the clip and push rod pin.

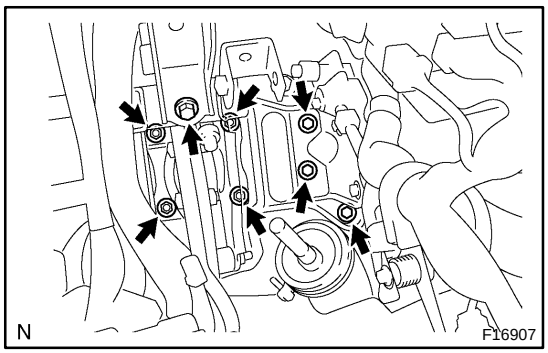


23. REMOVE ACCELERATOR & BRAKE PEDAL ASSY

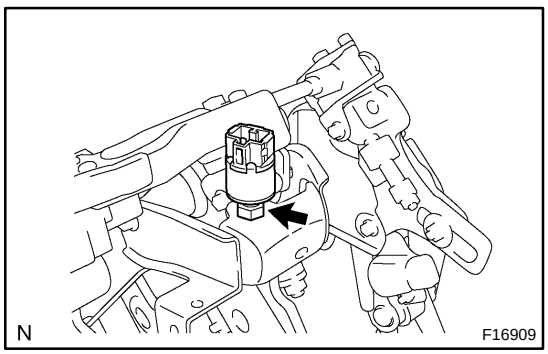
(a) Disconnect the stop lamp switch connector.



(b) Disconnect the accel position sensor connector.



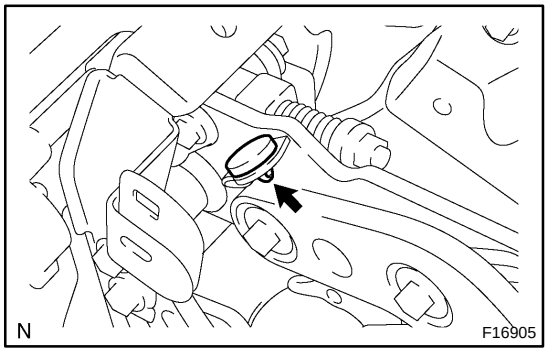
(c) Remove the 4 bolts, nuts and accelerator & brake pedal assy.



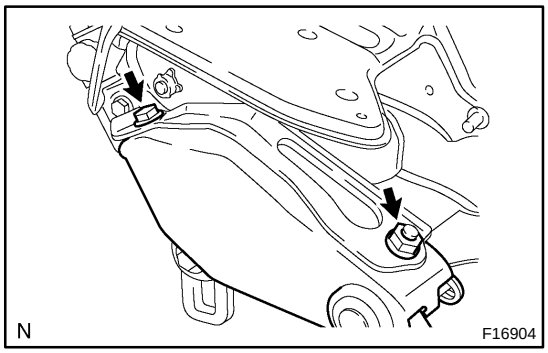
24. REMOVE STOP LAMP SWITCH ASSY

(a) Loosen the nut and remove the stop lamp switch assy.

25. REMOVE BRAKE PEDAL PAD

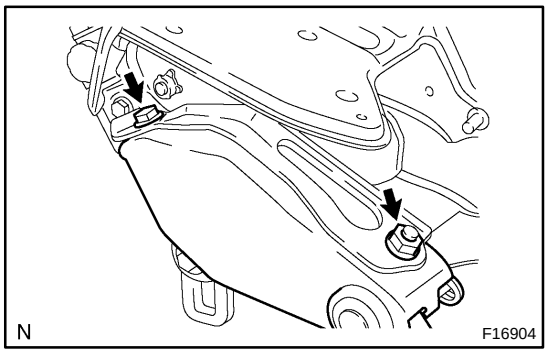


26. REMOVE STOP LAMP SWITCH CUSHION



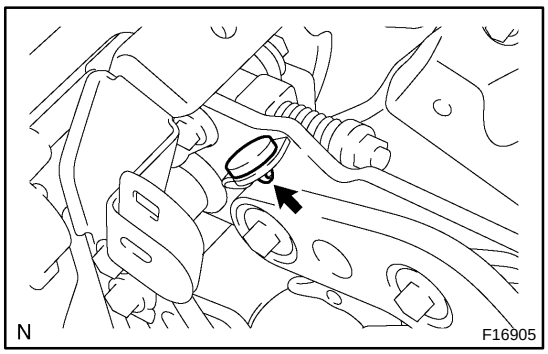
27. REMOVE ACCELERATOR PEDAL ASSY

(a) Remove the bolt, nut and accelerator pedal assy.



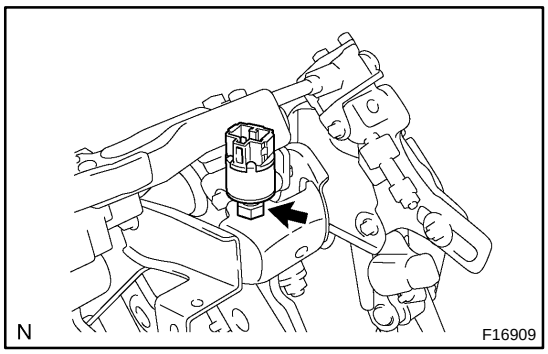
28. INSTALL ACCELERATOR PEDAL ASSY

(a) Install the accelerator pedal assy with nut and bolt.
Torque: 12 N·m (122 kgf·cm, 8.8 ft·lbf)



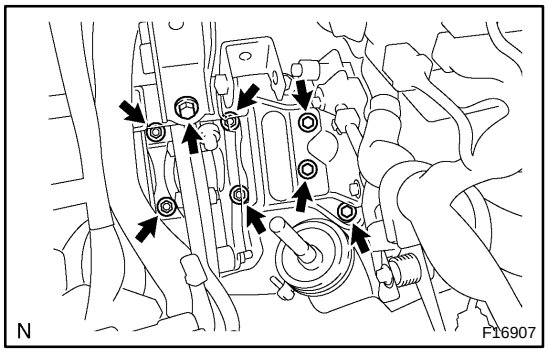
29. INSTALL STOP LAMP SWITCH CUSHION

30. INSTALL BRAKE PEDAL PAD



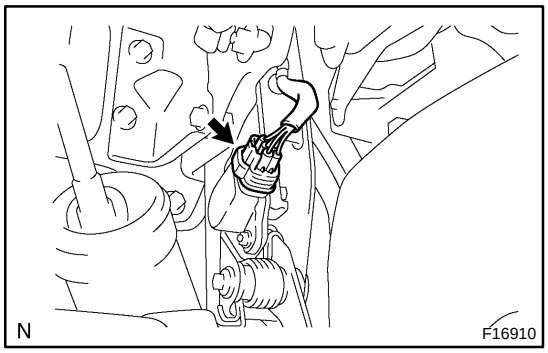
31. INSTALL STOP LAMP SWITCH ASSY

(a) Install the stop lamp switch assy with a nut.
Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)

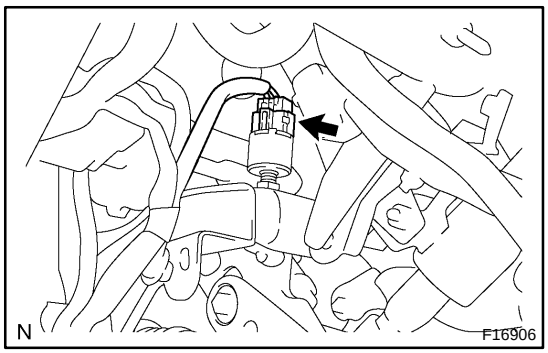


32. INSTALL ACCELERATOR & BRAKE PEDAL ASSY

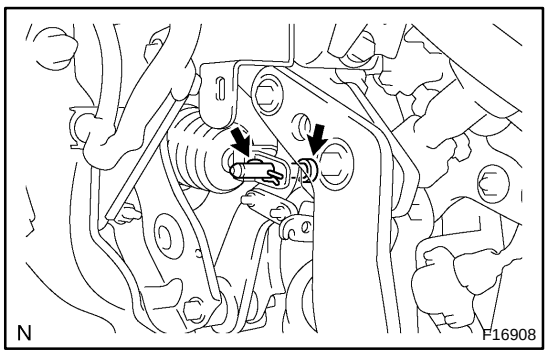
(a) Install the accelerator & brake pedal assy with the 4 nuts and bolts.
Torque:
Nut: 13 N·m (130 kgf·cm, 9 ft·lbf)
Bolt: 19.1 N·m (194 kgf·cm, 14 ft·lbf)



(b) Connect the accel position sensor connector.



(c) Connect the stop lamp switch connector.

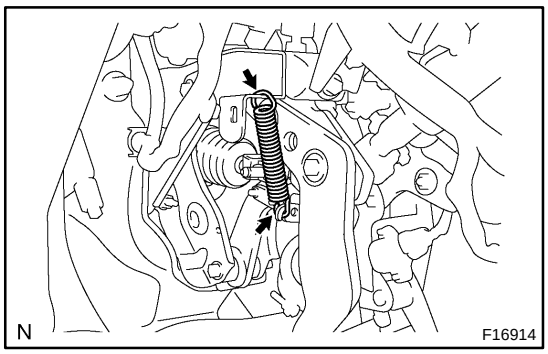


33. INSTALL PUSH ROD PIN

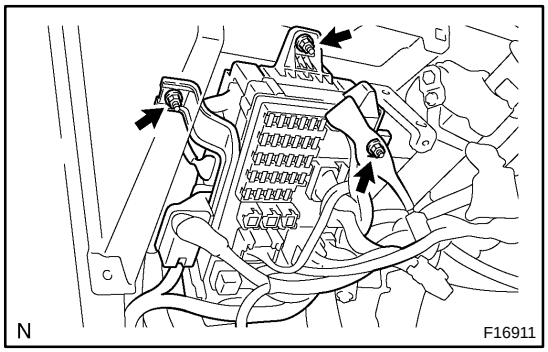
(a) Install the push rod pin and clip.

HINT:

Apply the lithium soap base glycol grease to the parts indicates by arrows (see page 32-14).



34. INSTALL BRAKE PEDAL RETURN SPRING



35. INSTALL DRIVER SIDE JUNCTION BLOCK ASSY

(a) Install the junction block assy with the 3 nuts, then connect the each connector.

36. INSTALL STEERING COLUMN ASSY (SEE PAGE 50-8)
37. CONNECT STEERING SLIDING YOKE SUB-ASSY (SEE PAGE 50-8)
38. CONNECT FLOOR SHIFT PARKING LOCK CABLE ASSY (SEE PAGE 50-8)
39. INSPECT CHECK KEY INTERLOCK OPERATION (SEE PAGE 50-8)
40. INSTALL TURN SIGNAL SWITCH ASSY (SEE PAGE 50-8)
41. INSPECT SPIRAL CABLE SUB-ASSY (SEE PAGE 60-31)
42. INSTALL STEERING COLUMN COVER (SEE PAGE 50-8)
43. INSTALL STEERING COLUMN COVER LWR NO.2 (SEE PAGE 50-8)
44. INSTALL HEATER TO FOOT DUCT NO.3 (SEE PAGE 32-14)
45. INSTALL INSTRUMENT PANEL INSERT SUB-ASSY LOWER LH (SEE PAGE 71-1 1)
46. INSTALL INSTRUMENT PANEL SUB-ASSY UPPER (SEE PAGE 71-1 1)
47. INSTALL FRONT DOOR SCUFF PLATE LH (SEE PAGE 71-1 1)
48. PLACE FRONT WHEELS FACING STRAIGHT AHEAD
49. INSTALL STEERING WHEEL ASSY (SEE PAGE 50-8)
50. INSPECT HORN BUTTON ASSY (SEE PAGE 60-22)
51. INSTALL HORN BUTTON ASSY (SEE PAGE 60-22)
52. INSTALL STEERING PAD SWITCH (SEE PAGE 82-1)
53. INSTALL CONNECTOR COVER (SEE PAGE 82-1)
54. INSTALL STEERING WHEEL COVER LOWER NO.2
55. INSPECT SRS WARNING LIGHT (SEE PAGE 05-818)

BRAKE MASTER CYLINDER SUB-ASSY (From August, 2002)

320DY-06

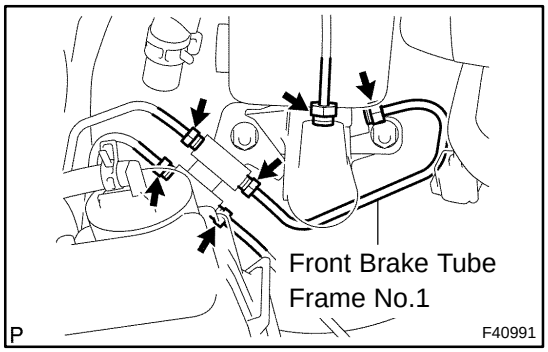
OVERHAUL

1. REMOVE AIR CLEANER ASSY

2. DRAIN BRAKE FLUID

NOTICE:

Wash off the brake fluied immediately if it comes into contact with a painted surface.

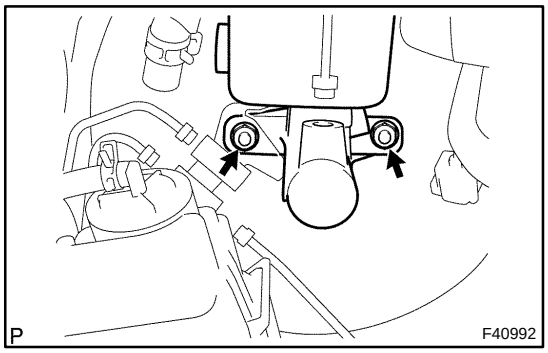


3. REMOVE BRAKE MASTER CYLINDER SUB-ASSY

(a) Disconnect the level warning switch connector.

(b) Using SST, remove the front brake tube frame No.1.
SST 09023-00101

(c) Using SST, disconnect the 4 brake tubes from the master cylinder.
SST 09023-00101



(d) Remove the 2 nuts, pull out the 2-way and brake master cylinder sub-assy.

4. REMOVE BRAKE MASTER CYLINDER RESERVOIR FILLER CAP ASSY

(a) Remove the master cylinder reservoir filler cap assy.

5. REMOVE BRAKE MASTER CYLINDER RESERVOIR STRAINER

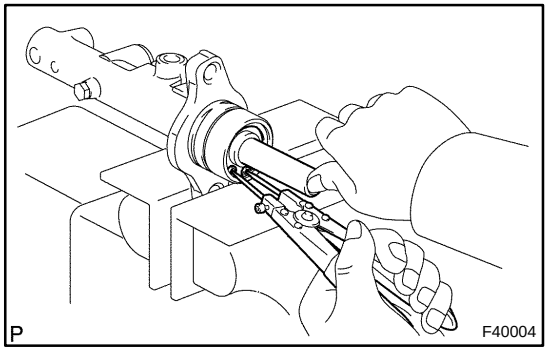
(a) Remove the master cylinder reservoir strainer.

6. REMOVE BRAKE MASTER CYLINDER RESERVOIR SUB-ASSY

(a) Remove the screw and pull out the master cylinder reservoir sub-assy.

7. REMOVE MASTER CYLINDER RESERVOIR GROMMET

(a) Remove the 2 master cylinder reservoir grommets.

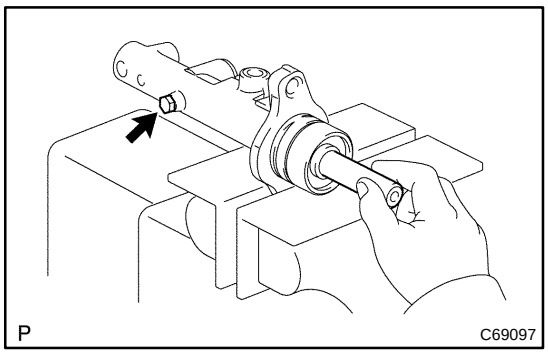


8. REMOVE BRAKE MASTER CYLINDER KIT (W/O VSC)

(a) Place master cylinder in vise.

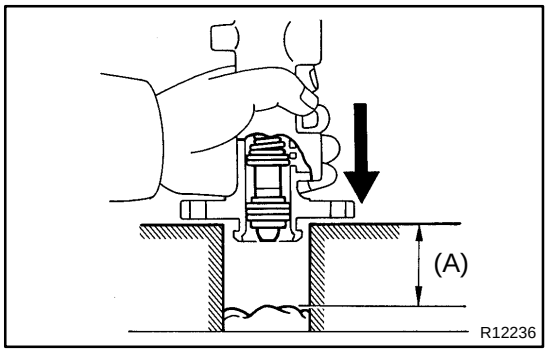
(b) Remove the O-ring.

(c) Push in the piston and remove the snap ring with snap ring pliers.



(d) Push in the piston and remove the piston stopper bolt and gasket.
(e) Remove the No.1 piston sub-assy, pulling straight out not at an angle.

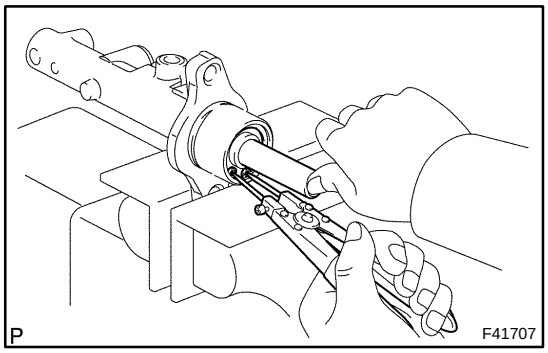
NOTICE:
If pulled out at an angle, there is a possibility that the cylinder bore could be damaged.



(f) Place a waste cloth and 2 wooden blocks on the work table and lightly edges until the No.2 piston sub-assy drops out of the cylinder.

HINT:
Make sure the distance (A) from the rag the top of the blocks is at least 100 mm (3.94 in.).

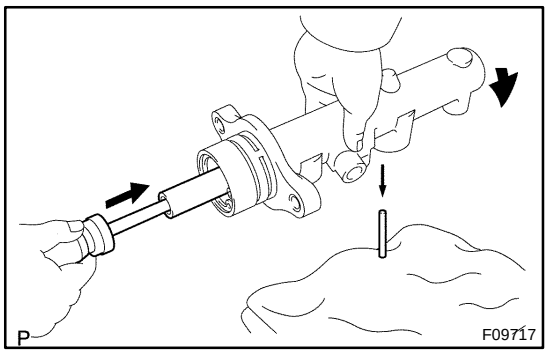
NOTICE:
If pulled out at an angle, there is a possibility that the cylinder bore could be damaged.



9. REMOVE BRAKE MASTER CYLINDER KIT (W/ VSC)

(a) Place master cylinder in vise.
(b) Remove the O-ring.
(c) Push in the piston and remove the snap ring with snap ring pliers.

NOTICE:
If pulled out at an angle, there is a possibility that the cylinder bore could be damaged.

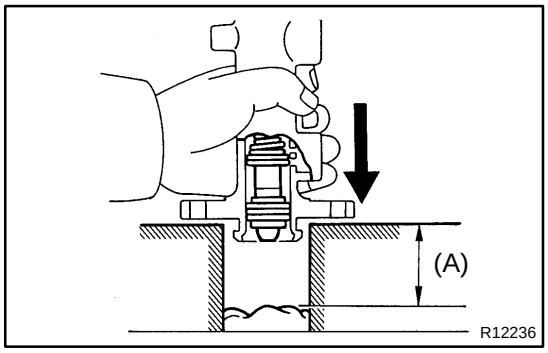


(d) Push in the piston with a screwdriver, and remove the straight pin by turning over the cylinder body.

HINT:
Tape the screwdriver tip before use.

(e) Remove the No.1 piston sub-assy, pulling straight out not at an angle.

NOTICE:
If pulled out at an angle, there is a possibility that the cylinder bore could be damaged.



(f) Place a waste cloth and 2 wooden blocks on the work table and lightly edges until the No.2 piston sub-assy drops out of the cylinder.

HINT:
Make sure the distance (A) from the rag the top of the blocks is at least 100 mm (3.94 in.).

NOTICE:
If pulled out at an angle, there is a possibility that the cylinder bore could be damaged.

10. INSPECT MASTER CYLINDER BODY

(a) Check the cylinder bore for rust or scoring.

11. INSTALL BRAKE MASTER CYLINDER KIT (W/O VSC)

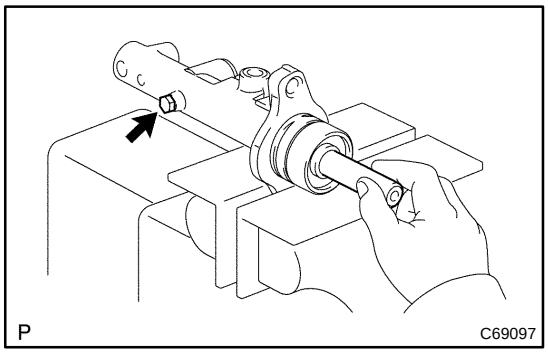
(a) Place master cylinder in vise.

(b) Apply the lithium soap base glycol grease on new No.1 and No.2 piston sub-assy.

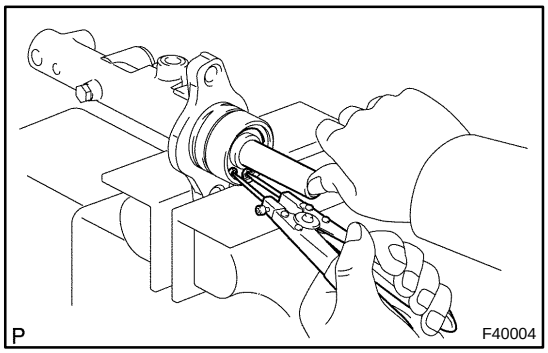
(c) Install the No.2 and No.1 piston sub-assy.

NOTICE:

- **If the piston is inserted at an angle, there is a possibility that the cylinder bore could be damaged.**
- **Be careful not to damage the rubber lips on the pistons.**



(d) Push in the piston and install a new gasket and a new piston stopper bolt.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)



(e) Push in the piston and install the snap ring with snap ring pliers.

(f) Apply the lithium soap base glycol grease on a new O-ring and install the O-ring to the master cylinder.

12. INSTALL BRAKE MASTER CYLINDER KIT (W/ VSC)

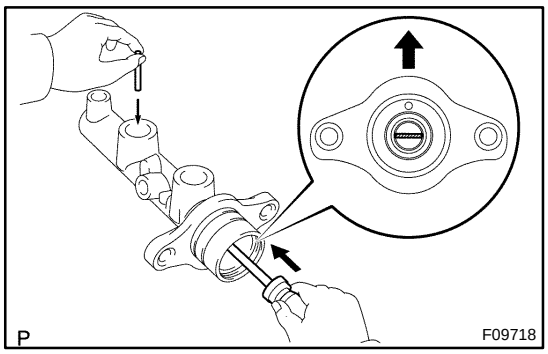
(a) Place master cylinder in vise.

(b) Apply the lithium soap base glycol grease on new No.1 and No.2 piston sub-assy.

(c) Install the No.2 and No.1 piston sub-assy.

NOTICE:

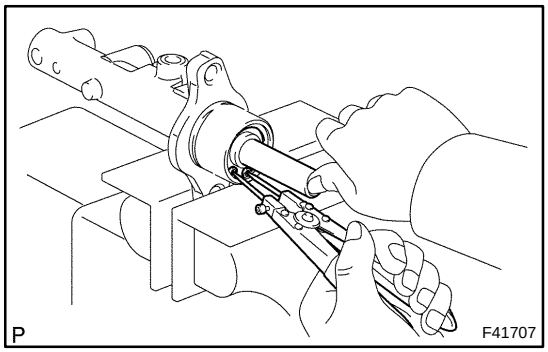
- **If the piston is inserted at an angle, there is a possibility that the cylinder bore could be damaged.**
- **Be careful not to damage the rubber lips on the pistons.**



(d) Install a straight pin.

HINT:

Insert the No.2 piston with the groove positioning horizontally.



(e) Push in the piston and install the snap ring with snap ring pliers.

(f) Apply the lithium soap base glycol grease on a new O-ring and install the O-ring to the master cylinder.

13. INSTALL MASTER CYLINDER RESERVOIR GROMMET

(a) Apply the lithium soap base glycol grease on the 2 master cylinder reservoir grommets.

(b) Install the 2 master cylinder reservoir grommets to the master cylinder reservoir sub-assy.

14. INSTALL BRAKE MASTER CYLINDER RESERVOIR SUB-ASSY

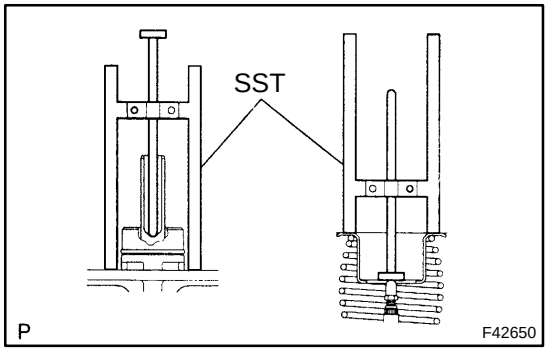
(a) Install the master cylinder reservoir sub-assy to the master cylinder with the screw.

15. INSTALL BRAKE MASTER CYLINDER RESERVOIR STRAINER

(a) Install the brake master cylinder reservoir strainer.

16. INSTALL BRAKE MASTER CYLINDER RESERVOIR FILLER CAP ASSY

(a) Install the brake master cylinder reservoir filler cap assy.



17. INSPECT AND ADJUST BRAKE BOOSTER PUSH ROD

(a) Apply SST to the master cylinder.
SST 09737-00013

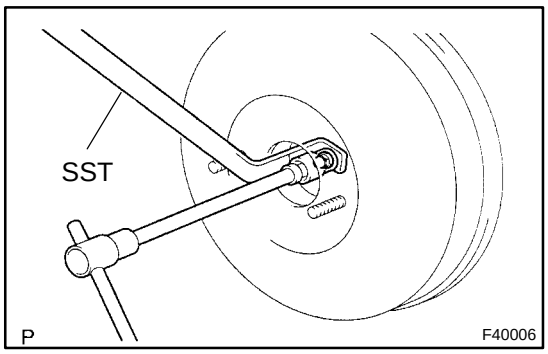
(b) Set SST, on the master cylinder, lower the pin of the SST until it slightly touches the piston.

(c) Apply the chalk to the flat surfaced tip of the SST pin.

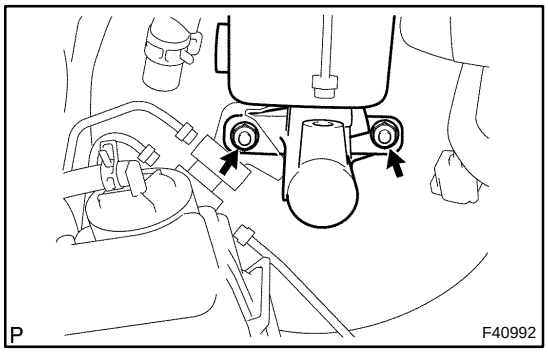
(d) Turn SST upside down and place it clearance between the brake booster and SST.
Clearance: 0 mm (0 in.)

HINT:

- If there is a clearance between the SST main body and the booster shell. It means that the specified value, and no chalk attachment on the booster push rod means that it is more than the specified value.
- Brake booster push rod clearance before shipment is adjusted to be ± 0.105 mm (± 0.004 in.).

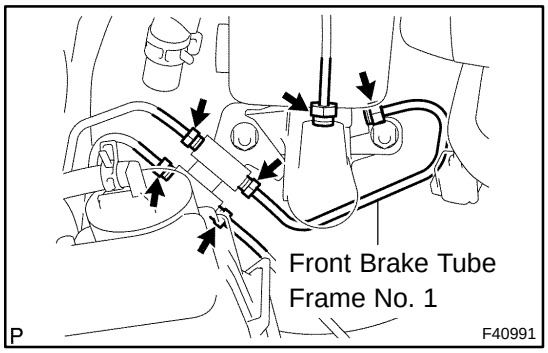


(e) Using SST, adjust the booster push rod length until the push rod lightly touches the pin head.
SST 09737-00020



18. INSTALL BRAKE MASTER CYLINDER SUB-ASSY

(a) Install the master cylinder sub-assy and 2-way with the 2 nuts.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)



(b) Using SST and connect the 4 front brake tubes to the master cylinder sub-assy.
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)
SST 09023-00101

(c) Using SST and install the front brake tube frame No.1 to the master cylinder.
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)
SST 09023-00101

(d) Connect the level warnig switch connector.

19. FILL RESERVOIR WITH BRAKE FLUID

20. BLEED MASTER CYLINDER (SEE PAGE 32-4)
SST 09023-00101

21. BLEED BRAKE LINE (SEE PAGE 32-4)

22. INSTALL AIR CLEANER ASSY

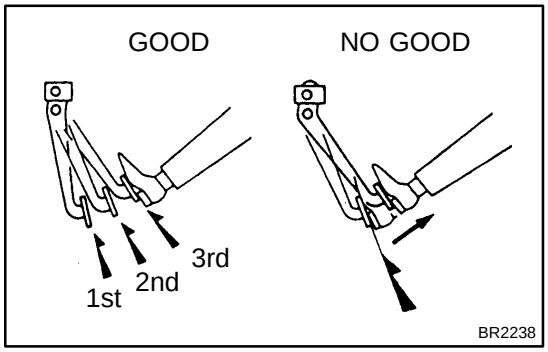
23. CHECK FLUID LEVEL IN RESERVOIR (SEE PAGE 32-4)

24. CHECK BRAKE FLUID LEAKAGE

BRAKE BOOSTER ASSY (From July, 2003)

3203F-08

ON-VEHICLE INSPECTION



1. INSPECT BRAKE BOOSTER

(a) Air tightness check.

(1) Start the engine and stop it after 1 or 2 minutes. Depress the brake pedal several times slowly.

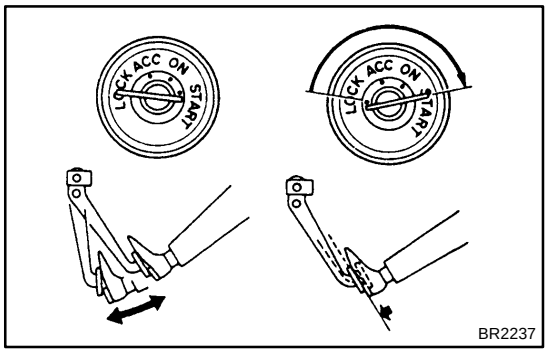
HINT:

If the pedal goes down farthest the 1st time, but gradually rises after the 2nd or 3rd time, the booster is air tight.

(2) Depress the brake pedal while the engine is running, and stop the engine with the pedal depressed.

HINT:

If there is no change in the pedal reserve distance after holding the pedal for 30 seconds, the booster is air tight.



(b) Operating check.

(1) Depress the brake pedal several times with the ignition switch OFF and check that there is no change in the pedal reserve distance.

(2) Depress the brake pedal and start the engine.

HINT:

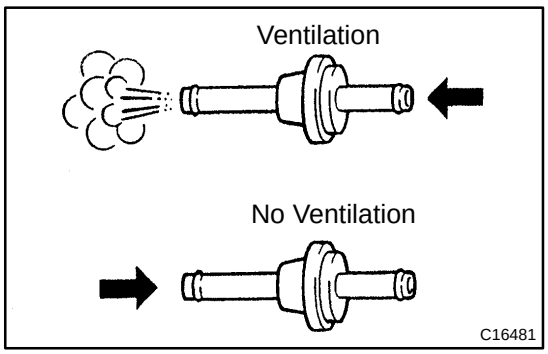
If the pedal goes down slightly, operation is normal.

2. INSPECT VACUUM CHECK VALVE

(a) Check vacuum check valve.

(1) Slide the clip and disconnect the vacuum hose.

(2) Remove the vacuum check valve.

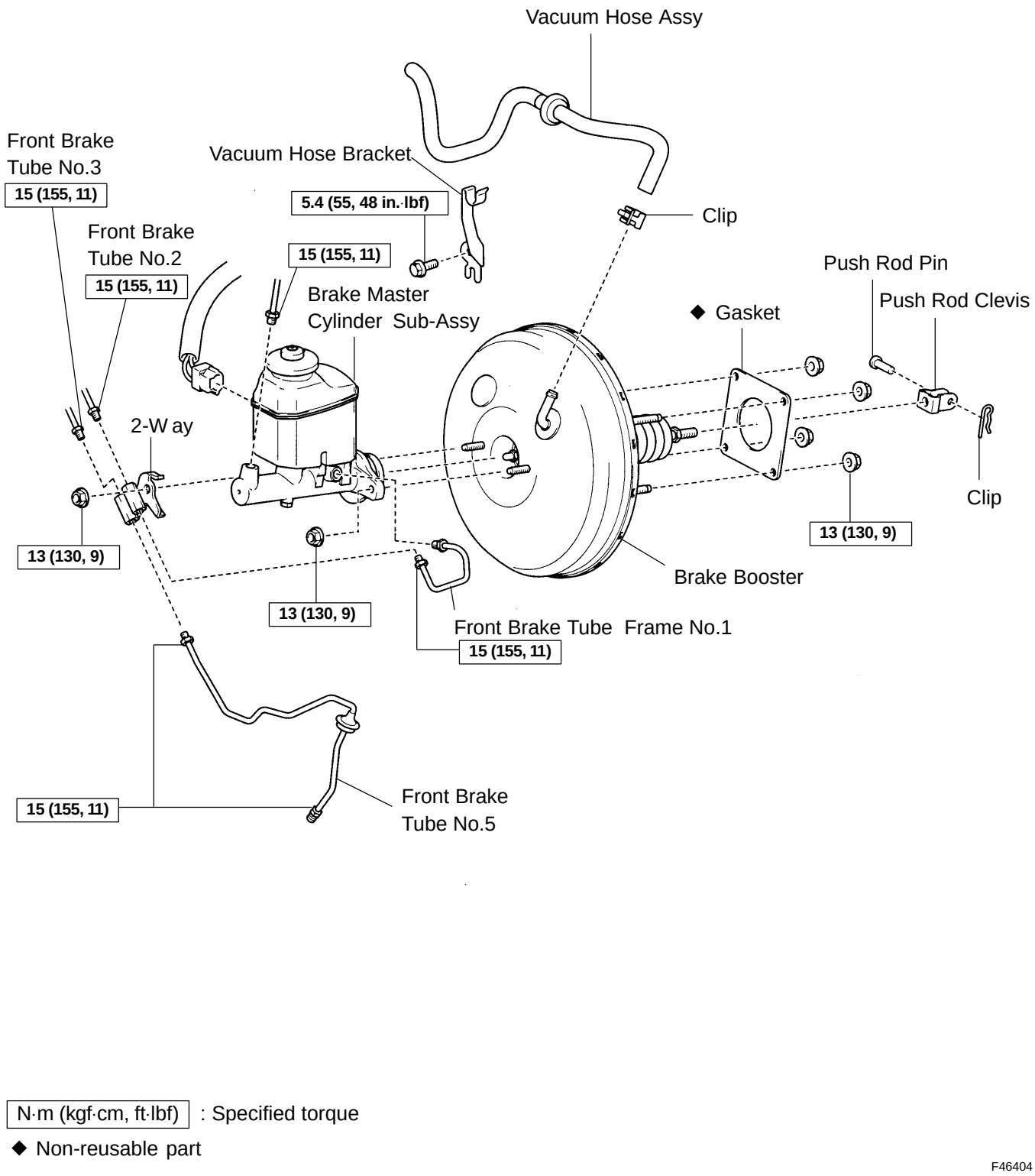


(3) Check that there is ventilation from the booster to engine, and no ventilation from the engine to the booster.

(4) If any fault is found, replace the vacuum check valve.

320DZ-05

COMPONENTS



3211X-04

REPLACEMENT

1. REMOVE AIR CLEANER ASSY

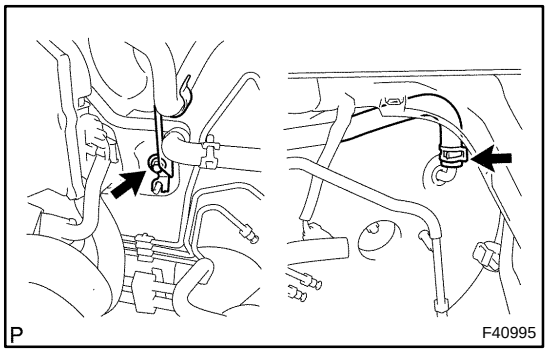
2. DRAIN BRAKE FLUID

NOTICE:

Wash off the brake fluid immediately if it comes into contact with a painted surface.

3. REMOVE BRAKE MASTER CYLINDER SUB-ASSY (SEE PAGE 32-21)

SST 09023-00101



4. REMOVE VACUUM HOSE ASSY

(a) Remove the bolt and separate the vacuum hose from the vacuum hose bracket.

(b) Slide the clip and disconnect the vacuum hose from the brake booster.

5. REMOVE FRONT DOOR SCUFF PLATE LH (SEE PAGE 71-1 1)

6. REMOVE INSTRUMENT PANEL SUB-ASSY UPPER (SEE PAGE 71-1 1)

7. REMOVE INSTRUMENT PANEL INSERT SUB-ASSY LOWER LH (SEE PAGE 71-1 1)

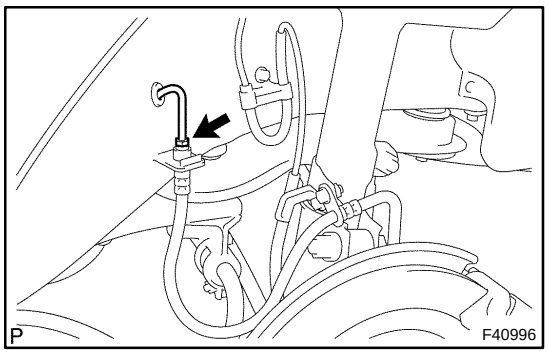
8. REMOVE BRAKE PEDAL RETURN SPRING

9. REMOVE PUSH ROD PIN

(a) Remove the clip and push rod pin.

10. REMOVE BRAKE MASTER CYLINDER PUSH ROD CLEVIS

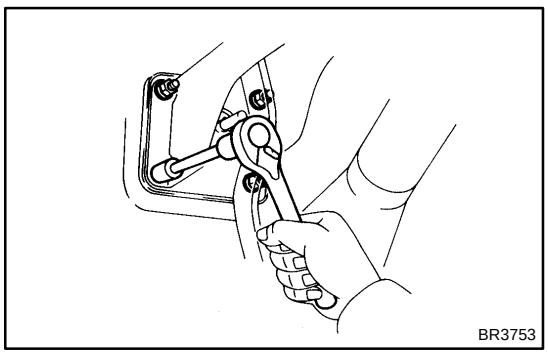
(a) Loosen the lock nut and remove the push rod clevis.



11. REMOVE FRONT BRAKE TUBE NO.5

(a) Using SST and remove the front brake tube No.5.

SST 09023-00101



12. REMOVE BRAKE BOOSTER ASSY

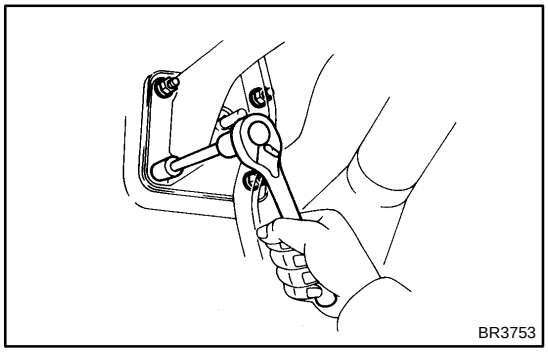
(a) Remove the 4 nuts.

(b) Pull out the brake booster assy.

13. REMOVE BRAKE BOOSTER GASKET

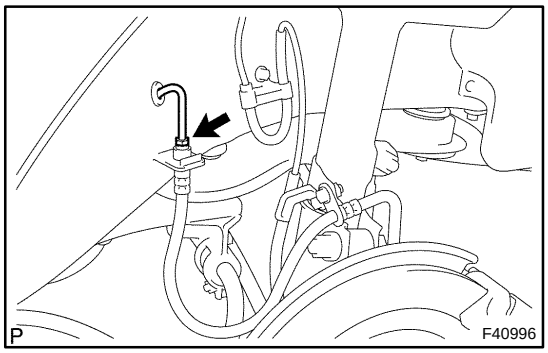
14. INSTALL BRAKE BOOSTER GASKET

(a) Install a new brake booster gasket to the brake booster.



15. INSTALL BRAKE BOOSTER ASSY

(a) Install the brake booster with the 4 nuts.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)



16. INSTALL FRONT BRAKE TUBE NO.5

(a) Using SST and install the front brake tube No.5.
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)
SST 09023-00101

17. INSTALL BRAKE MASTER CYLINDER PUSH ROD CLEVIS

(a) Install the push rod clevis and lock nut.

18. INSTALL PUSH ROD PIN

(a) Install the push rod pin and clip.

HINT:

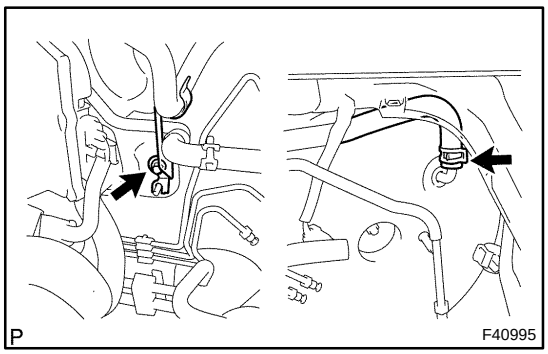
Apply the lithium soap base glycol grease to the part indicate by arrow (see page 32-27).

19. INSTALL BRAKE PEDAL RETURN SPRING

20. INSTALL INSTRUMENT PANEL INSERT SUB-ASSY LOWER LH (SEE PAGE 71-1 1)

21. INSTALL INSTRUMENT PANEL SUB-ASSY UPPER (SEE PAGE 71-1 1)

22. INSTALL FRONT DOOR SCUFF PLATE LH (SEE PAGE 71-1 1)



23. INSTALL VACUUM HOSE ASSY

(a) Install the vacuum hose and vacuum hose bracket to the body with a bolt.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(b) Connect the vacuum hose to the brake booster with the clip.

24. INSPECT AND ADJUST BRAKE BOOSTER PUSH ROD (SEE PAGE 32-21)
SST 09737-00013, 09737-00020

25. INSTALL BRAKE MASTER CYLINDER SUB-ASSY (SEE PAGE 32-21)
SST 09023-00101

26. FILL RESERVOIR WITH BRAKE FLUID

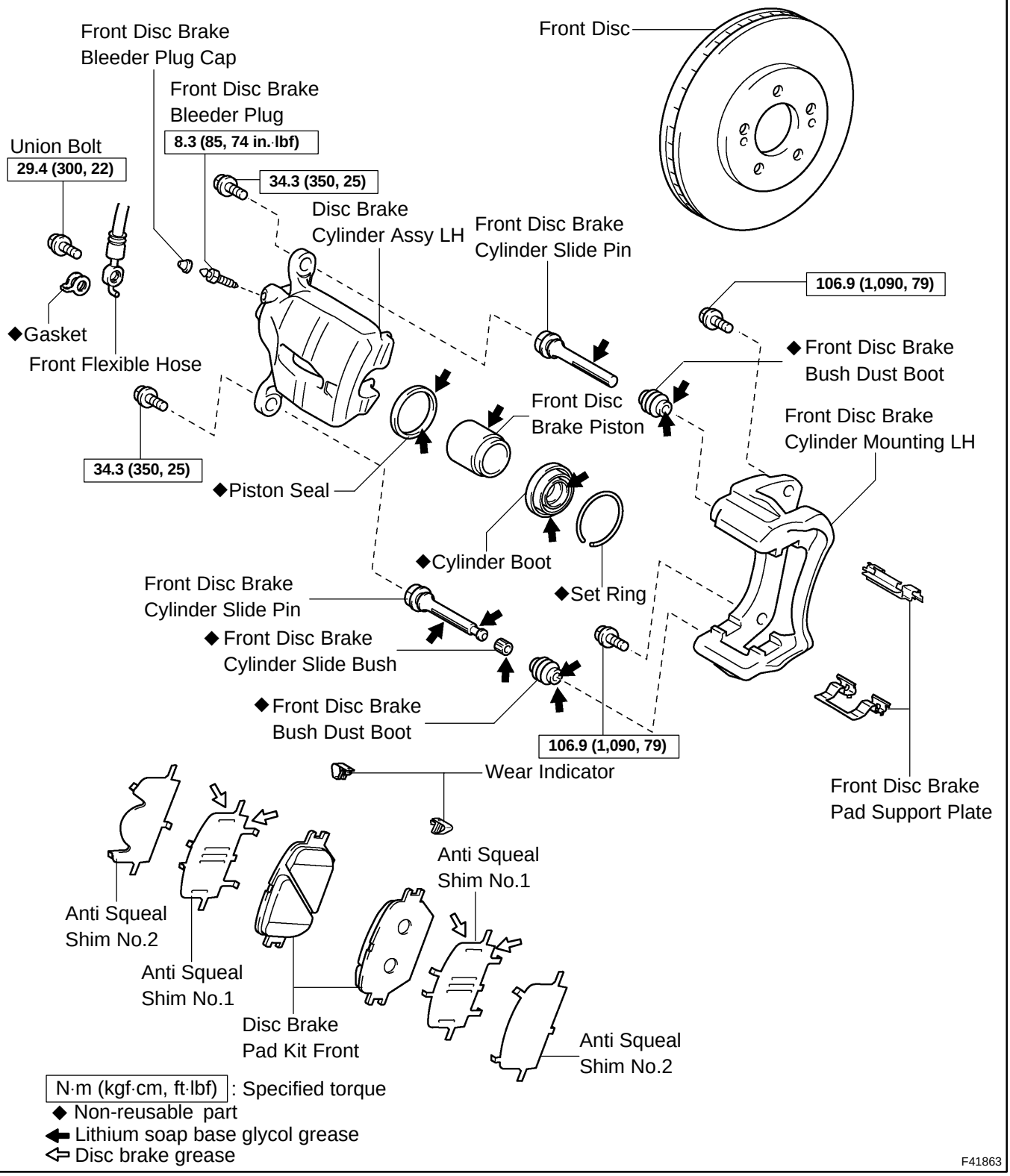
27. BLEED MASTER CYLINDER (SEE PAGE 32-4)
SST 09023-00101
28. BLEED BRAKE LINE (SEE PAGE 32-4)
29. INSTALL AIR CLEANER ASSY
30. CHECK FLUID LEVEL IN RESERVOIR (SEE PAGE 32-4)
31. CHECK BRAKE FLUID LEAKAGE
32. CHECK AND ADJUST BRAKE PEDAL HEIGHT (SEE PAGE 32-8 or 32-12)

FRONT BRAKE

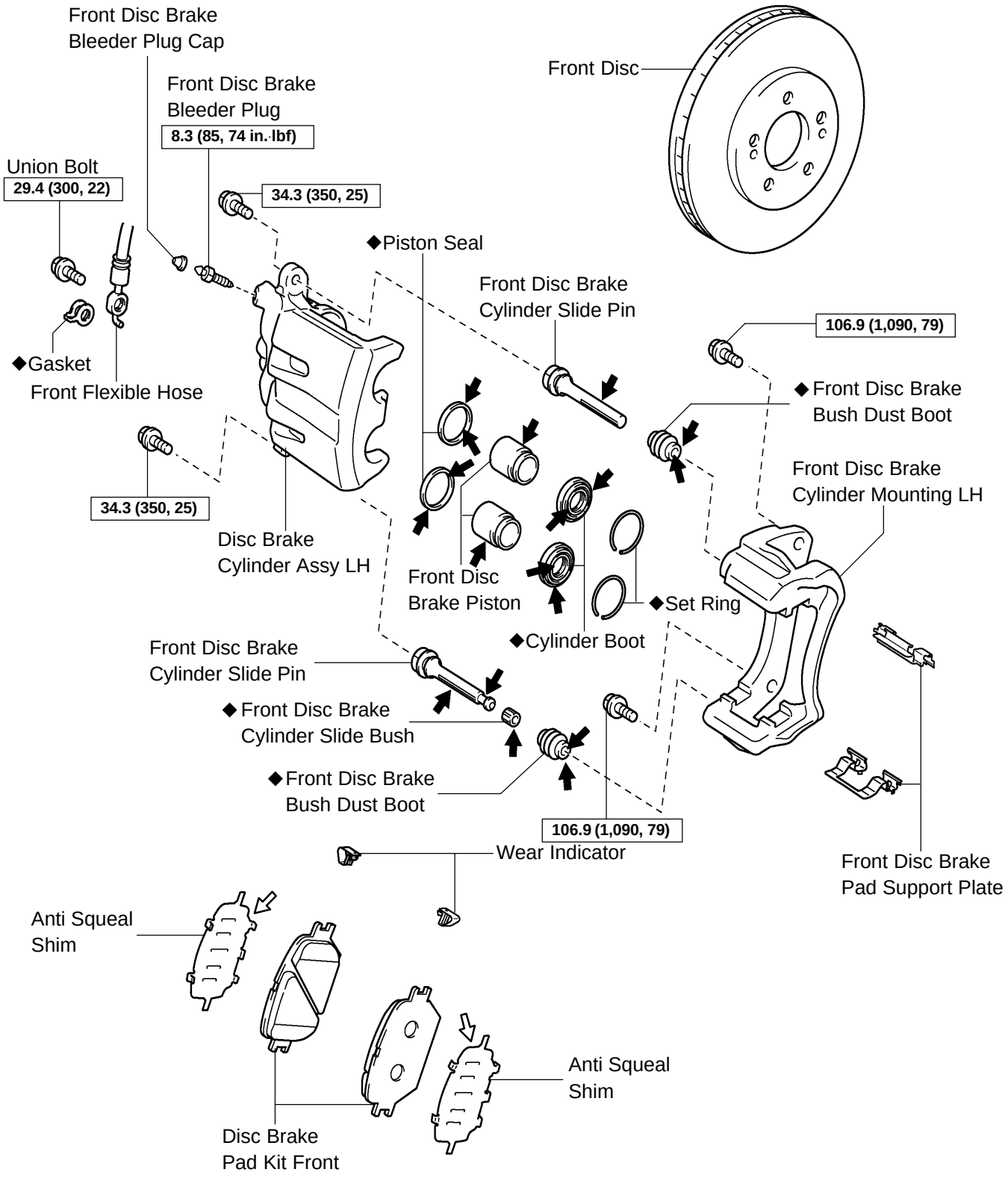
320E5-02

COMPONENTS

Single Piston Type:



Twin Piston Type:



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
⬅ Lithium soap base glycol grease
⇦ Disc brake grease

T

F41533

320E6-04

OVERHAUL

HINT:

Overhaul the RH side by the same procedures with LH side.

1. REMOVE FRONT WHEEL

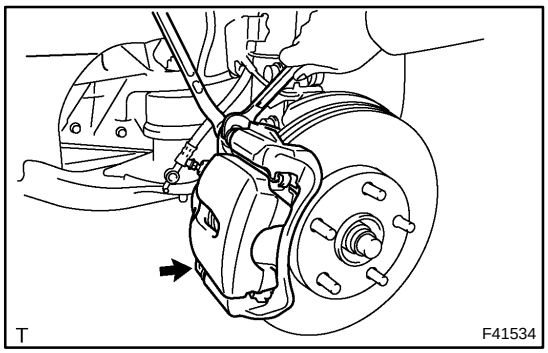
2. DRAIN BRAKE FLUID

NOTICE:

Wash the brake fluid off immediately if it comes into contact with any painted surfaces.

3. DISCONNECT FRONT FLEXIBLE HOSE

(a) Remove the union bolt and a gasket from the disc brake cylinder, then disconnect the flexible hose from the disc brake cylinder.

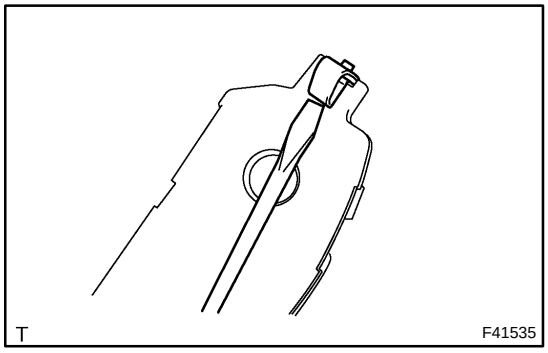


4. REMOVE DISC BRAKE CYLINDER ASSY LH

(a) Remove the 2 bolts and disc brake cylinder.

5. REMOVE DISC BRAKE PAD KIT FRONT (PAD ONLY)

(a) Remove the 2 brake pads with anti squeal shims.



6. REMOVE ANTI SQUEAL SHIM KIT FRONT

(a) Remove the 2 anti squeal shims from 2 brake pads.

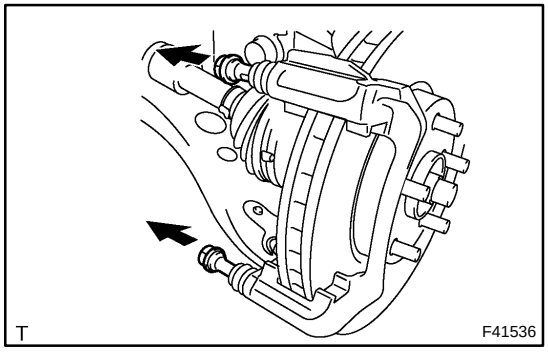
(b) Using a screwdriver, remove the wear indicator from 2 brake pads.

7. REMOVE FRONT DISC BRAKE PAD SUPPORT PLATE

(a) Remove the upper side front disc brake pad support plate.

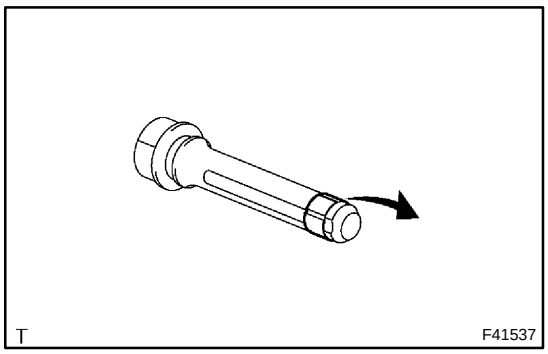
8. REMOVE FRONT DISC BRAKE PAD SUPPORT PLATE

(a) Remove the bottom side front disc brake pad support plate.



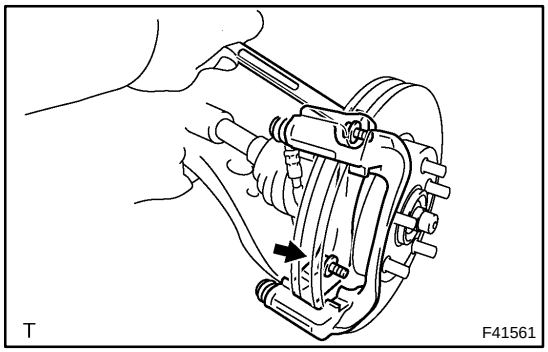
9. REMOVE FRONT DISC BRAKE CYLINDER SLIDE PIN

(a) Remove the 2 cylinder slide pins from the disc brake cylinder mounting.



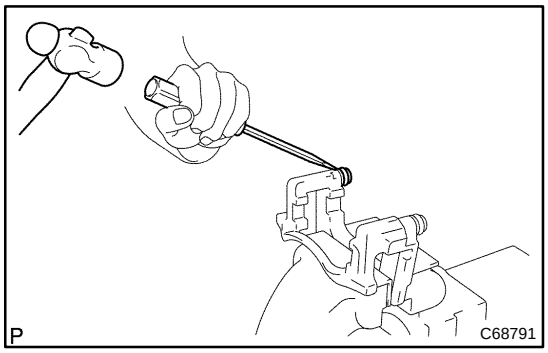
10. REMOVE FRONT DISC BRAKE CYLINDER SLIDE BUSH

(a) Remove the cylinder slide bush from the cylinder slide pin.



11. REMOVE FRONT DISC BRAKE CYLINDER MOUNTING LH

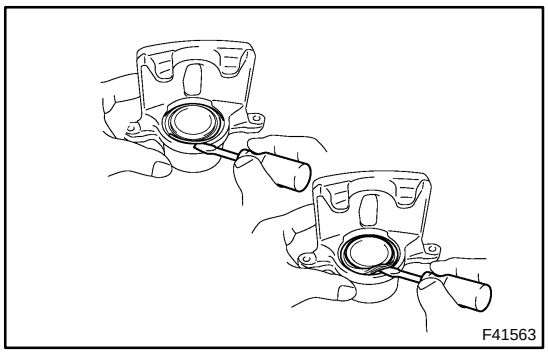
(a) Remove the 2 bolts and disc brake cylinder mounting.



12. REMOVE FRONT DISC BRAKE BUSH DUST BOOT

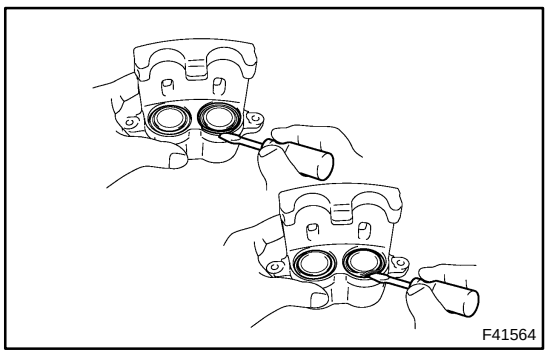
(a) Place front disc brake cylinder mounting in vise.

(b) Using a screwdriver and hammer, remove the 2 bush dust boots from the disc brake cylinder mounting.

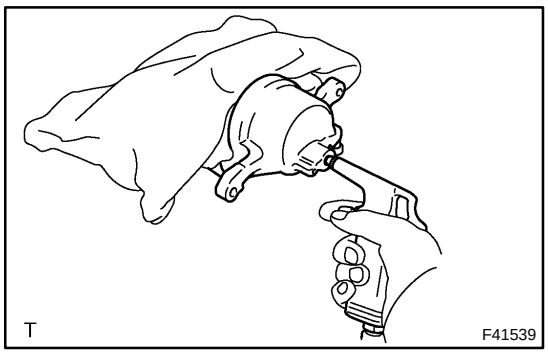


13. REMOVE CYLINDER BOOT

(a) Using a screwdriver, remove the set ring and cylinder boot from the disc brake cylinder (Single piston Type).



(b) Using a screwdriver, remove the 2 set rings and 2 cylinder boots from the disc brake cylinder (Twin piston Type).

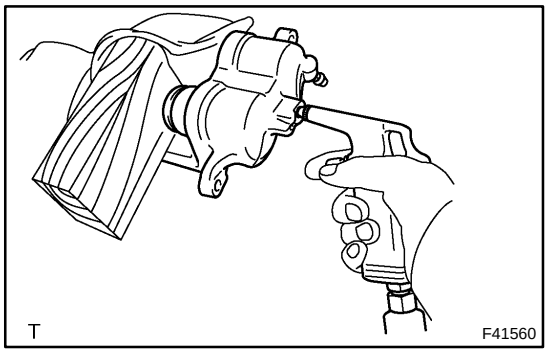


14. REMOVE FRONT DISC BRAKE PISTON

(a) Remove the front disc brake piston (Single piston Type).
  (1) Place a piece of cloth or like, between the piston and the disc brake cylinder.
  (2) Use compressed air to remove the piston from the disc brake cylinder.

CAUTION:
Do not place your fingers in front of the piston when using compressed air.
NOTICE:
Do not spatter the brake fluid.

(b) Remove the 2 front disc brake pistons (Twin piston Type).
  (1) Place a piece of cloth or like, between the piston and the disc brake cylinder.
  (2) Use compressed air to remove one of the piston from the disc brake cylinder.



  (3) Press the removed piston to the cylinder with a certain force that prevent the piston from flying out via a chip of wood. Then blow into the air of compressor again to remove the other piston.

CAUTION:
Do not place your fingers in front of the piston when using compressed air.
NOTICE:
Do not spatter the brake fluid.

15. REMOVE PISTON SEAL

(a) Using a screwdriver, remove the piston seal from the disc brake cylinder (Single piston Type).

NOTICE:
Do not damage the inner cylinder and the cylinder groove.

(b) Using a screwdriver, remove the 2 piston seals from the disc brake cylinder (Twin piston Type).

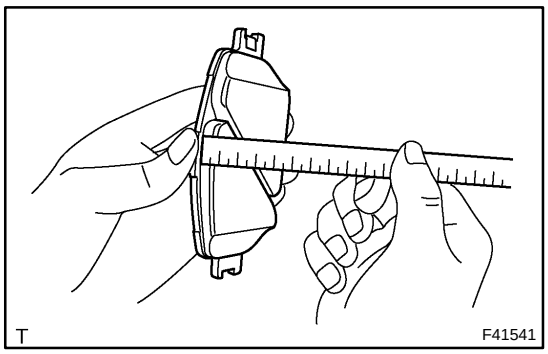
NOTICE:
Do not damage the inner cylinder and the cylinder groove.

16. REMOVE FRONT DISC BRAKE BLEEDER PLUG CAP

17. REMOVE FRONT DISC BRAKE BLEEDER PLUG

18. INSPECT BRAKE CYLINDER AND PISTON

(a) Check the cylinder bore and piston for rust or scoring.



19. INSPECT PAD LINING THICKNESS

(a) Using a ruler, measure the pad lining thickness.

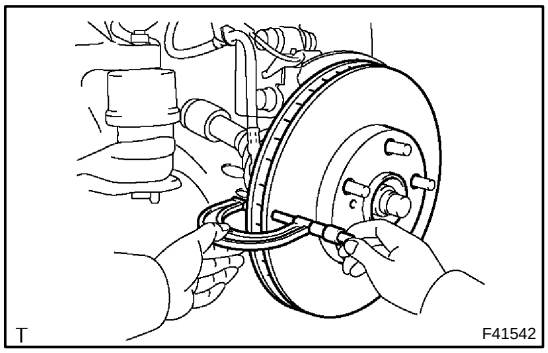
Single piston type:
Standard thickness: 12.0 mm (0.472 in.)
Minimum thickness: 1.0 mm (0.039 in.)
Twin piston type:
Standard thickness: 10.6 mm (0.417 in.)
Minimum thickness: 1.0 mm (0.039 in.)

20. INSPECT FRONT DISC BRAKE PAD SUPPORT PLATE

(a) Make sure that they have sufficient rebound, no deformation cracks or wear, and all rust, dirt are cleaned off.

21. INSPECT FRONT DISC BRAKE PAD SUPPORT PLATE

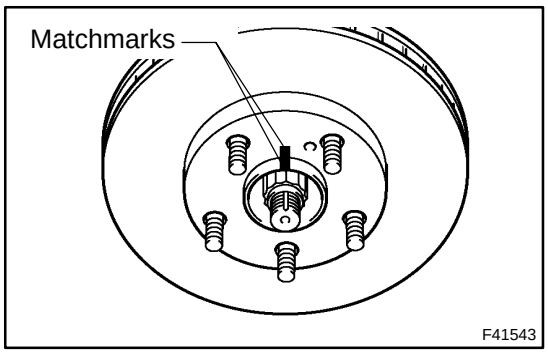
(a) Make sure that they have sufficient rebound, no deformation cracks or wear, and all rust, dirt are cleaned off.



22. INSPECT DISC THICKNESS

(a) Using a micrometer, measure the disc thickness.

Standard thickness: 28.0 mm (1.102 in.)
Minimum thickness: 26.0 mm (1.024 in.)



23. REMOVE FRONT DISC

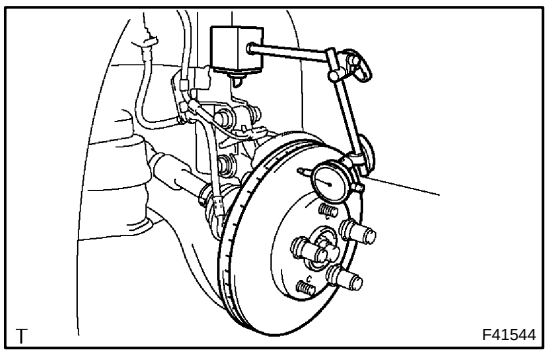
(a) Put matchmarks on the disc and the axle hub.
(b) Remove the disc.

24. INSTALL FRONT DISC

(a) Aligning the matchmarks, install the front disc.

HINT:

When replacing the disc with a new one, select the installation position where the disc has the minimum run-out.



25. INSPECT DISC RUNOUT

(a) Temporarily install the disc with hub nuts.
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

(b) Using a dial indicator, measure the disc runout 10 mm (0.39 in.) away from the outer edge of the disc.
Maximum disc runout: 0.05 mm (0.0020 in.)

(c) If the disc runout is greater than the maximum value, check the bearing play in the axial direction and check the axle hub runout (see page 30-2). If the bearing play and axle hub runout are normal, adjust the disc runout or grind it on a "On-car" brake lathe.

26. TEMPORARILY TIGHTEN FRONT DISC BRAKE BLEEDER PLUG

(a) Temporarily tighten the bleeder plug to the disc brake cylinder.

27. INSTALL FRONT DISC BRAKE BLEEDER PLUG CAP

28. INSTALL PISTON SEAL

(a) Install the piston seal (Single piston Type).
  (1) Apply the lithium soap base glycol grease to a new piston seal.
  (2) Install the piston seal to the disc brake cylinder.

(b) Install the 2 piston seals (Twin piston Type).
  (1) Apply the lithium soap base glycol grease to the 2 new piston seals.
  (2) Install the 2 piston seals to the disc brake cylinder.

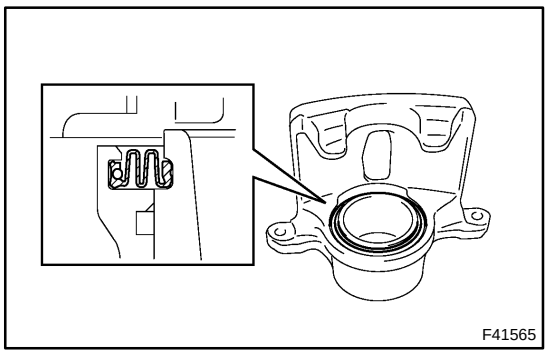
29. INSTALL FRONT DISC BRAKE PISTON

(a) Install the front disc brake piston (Single piston Type).
  (1) Apply the lithium soap base glycol grease to the piston.
  (2) Install the piston to the disc brake cylinder.

NOTICE:
Do not screw the piston forcibly into the disc brake cylinder.

(b) Install the 2 front disc brake pistons (Twin piston Type).
  (1) Apply the lithium soap base glycol grease to the 2 pistons.
  (2) Install the 2 pistons to the disc brake cylinder.

NOTICE:
Do not screw the piston forcibly into the disc brake cylinder.



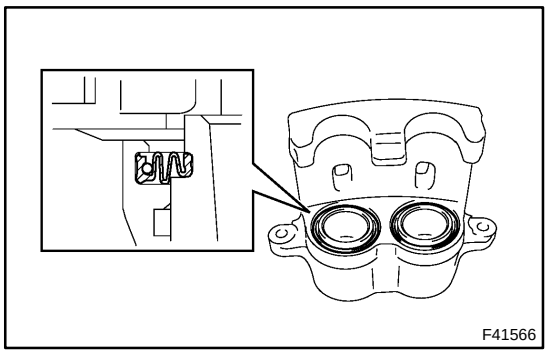
30. INSTALL CYLINDER BOOT

(a) Install the cylinder boot (Single piston Type).
  (1) Apply the lithium soap base glycol grease to a new cylinder boot.
  (2) Install the cylinder boot to the disc brake cylinder.

HINT:
Install the boot securely to the grooves of the cylinder and piston.

  (3) Using a screwdriver, install a new set ring.

NOTICE:
Do not damage the cylinder boot.

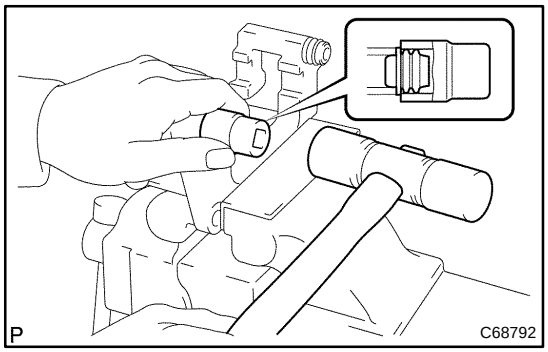


(b) Install the 2 cylinder boots (Twin piston Type).
(1) Apply the lithium soap base glycol grease to the 2 new cylinder boots.
(2) Install the 2 cylinder boots to the disc brake cylinder.

HINT:
Install the boot securely to the grooves of the cylinder and piston.

(3) Using a screwdriver, install the 2 new set rings.

NOTICE:
Do not damage the cylinder boot.



31. INSTALL FRONT DISC BRAKE BUSH DUST BOOT

(a) Place front disc brake cylinder mounting in vise.
(b) Apply the lithium soap base glycol grease to seal surface of 2 new bush dust boots.
(c) Using a socket wrench (19 mm) and hammer, drive the 2 brake bush dust boots into the brake cylinder mounting.

32. INSTALL FRONT DISC BRAKE CYLINDER MOUNTING LH

(a) Install the disc brake cylinder mounting with the 2 bolts.
Torque: 106.9 N·m (1,090 kgf·cm, 79 ft·lbf)

33. INSTALL FRONT DISC BRAKE CYLINDER SLIDE BUSH

(a) Apply the lithium soap base glycol grease to a new cylinder slide bush.
(b) Install the cylinder slide bush to the cylinder slide pin.

34. INSTALL FRONT DISC BRAKE CYLINDER SLIDE PIN

(a) Apply the lithium soap base glycol grease to the sliding part and the seal surface of the 2 cylinder slide pins.
(b) Install the 2 cylinder slide pins to the disc brake cylinder mounting.

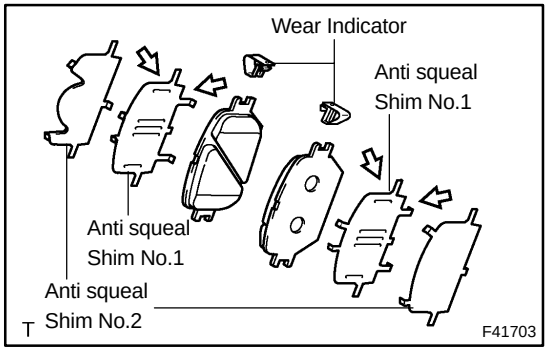
HINT:
Install the cylinder slide pin with cylinder slide bush into the bottom side.

35. INSTALL FRONT DISC BRAKE PAD SUPPORT PLATE

(a) Install the bottom side front disc brake pad support plate.

36. INSTALL FRONT DISC BRAKE PAD SUPPORT PLATE

(a) Install the upper side front disc brake pad support plate.



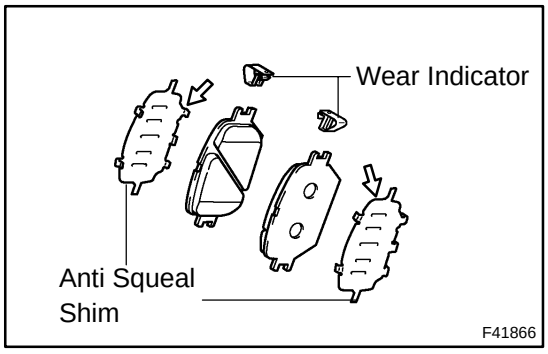
37. INSTALL ANTI SQUEAL SHIM KIT FRONT

(a) Install the anti squeal shim kit front (Single piston Type).
(1) Apply the both sides of anti squeal shim No.1 with pad grease, and install the shim together with anti squeal shim No.2 to each pad.

(2) Install the wear indicator to the 2 brake pads.

NOTICE:

- **When replacing worn pads, the anti squeal shims must be replaced together with the pads.**
- **Install the shims and pad wear indicator correctly of which positions and directions.**



(b) Install the anti squeal shim kit front (Twin piston Type).

(1) Apply the anti squeal shim with pad grease, and install the anti squeal shim to each pad.

(2) Install the wear indicator to the 2 brake pads.

NOTICE:

- **When replacing worn pads, the anti squeal shims must be replaced together with the pads.**
- **Install the shims and pad wear indicator correctly of which positions and directions.**

38. INSTALL DISC BRAKE PAD KIT FRONT (PAD ONLY)

(a) Install the 2 disc brake pads with the pad wear indicator facing upward.

NOTICE:

There should be no oil or grease on the friction surface of the pads and the disc.

39. INSTALL DISC BRAKE CYLINDER ASSY LH

(a) Install the disc brake cylinder with the 2 bolts.

Torque: 34.3 N·m (350 kgf·cm, 25 ft·lbf)

40. CONNECT FRONT FLEXIBLE HOSE

(a) Connect a new gasket and flexible hose with the union bolt.

Torque: 29.4 N·m (300 kgf·cm, 22 ft·lbf)

HINT:

Install the flexible hose lock securely in the lock hold of the disc brake cylinder.

41. FILL RESERVOIR WITH BRAKE FLUID

42. BLEED MASTER CYLINDER (SEE PAGE 32-4)

SST 09023-00101

43. BLEED BRAKE LINE (SEE PAGE 32-4)

44. CHECK FLUID LEVEL IN RESERVOIR (SEE PAGE 32-4)

45. CHECK BRAKE FLUID LEAKAGE

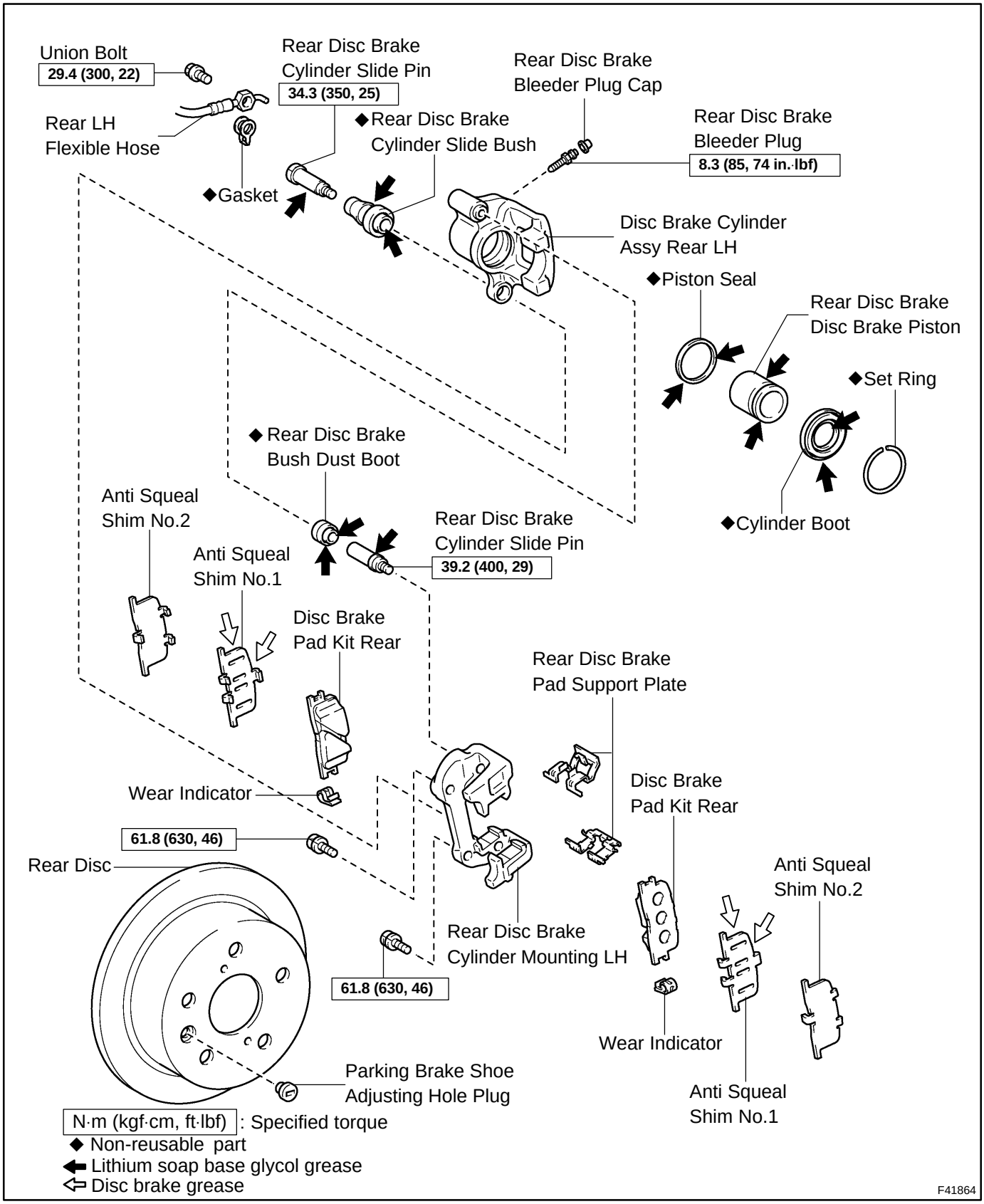
46. INSTALL FRONT WHEEL

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

REAR BRAKE

COMPONENTS

320E7-03



320E8-04

OVERHAUL

HINT:

- Overhaul the RH side by the same procedures with LH side.
- Two types of brake pad exist; one is with slit and the other without slit.

1. REMOVE REAR WHEEL

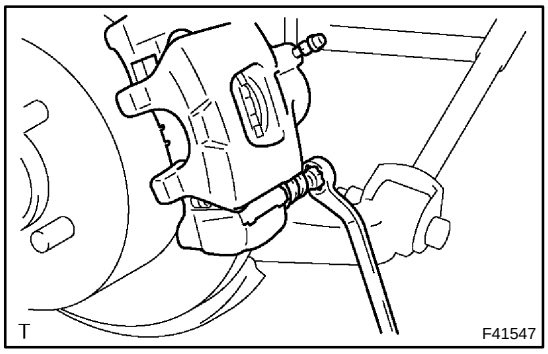
2. DRAIN BRAKE FLUID

NOTICE:

Wash the brake fluid off immediately if it comes into contact with any painted surfaces.

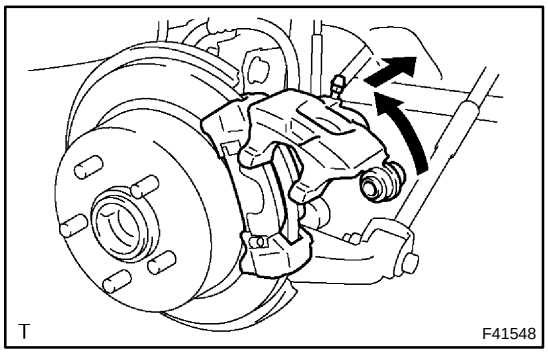
3. DISCONNECT REAR LH FLEXIBLE HOSE

(a) Remove the union bolt and a gasket from the disc brake cylinder, then disconnect the flexible hose from the disc brake cylinder.



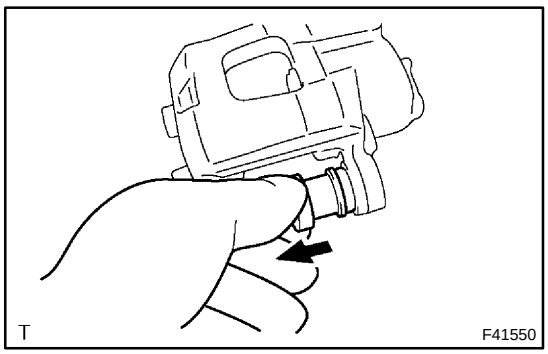
4. REMOVE REAR DISC BRAKE CYLINDER SLIDE PIN

(a) Remove the rear disc brake cylinder slide pin.



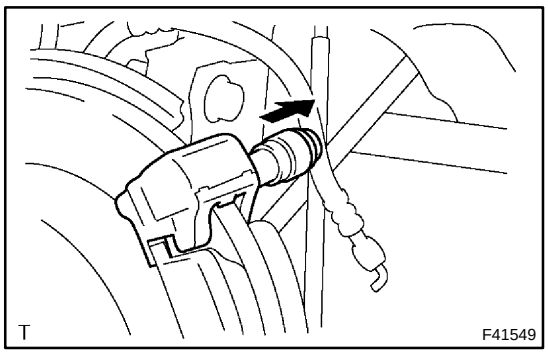
5. REMOVE DISC BRAKE CYLINDER ASSY REAR LH

(a) Lift up the disc brake cylinder and remove the disc brake cylinder.



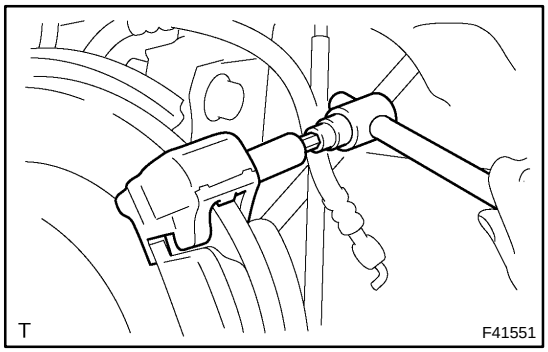
6. REMOVE REAR DISC BRAKE CYLINDER SLIDE BUSH

(a) Remove the cylinder slide bush from the disc brake cylinder.



7. REMOVE REAR DISC BRAKE BUSH DUST BOOT

(a) Remove the bush dust boot from the cylinder slide pin.

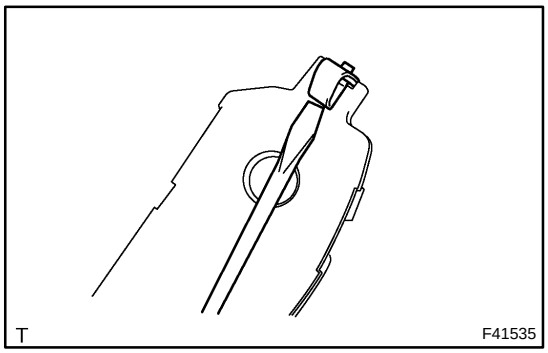


8. REMOVE REAR DISC BRAKE CYLINDER SLIDE PIN

(a) Using a hexagon wrench (8 mm), remove the cylinder slide pin.

9. REMOVE DISC BRAKE PAD KIT REAR (PAD ONLY)

(a) Remove the 2 brake pads with anti squeal shims.



10. REMOVE REAR DISC BRAKE ANTI SQUEAL SHIM KIT

(a) Remove the 2 anti squeal shims from 2 brake pads.

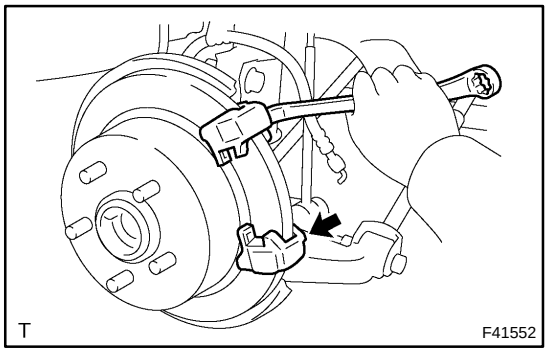
(b) Using a screwdriver, remove the wear indicator from 2 brake pads.

11. REMOVE REAR DISC BRAKE PAD SUPPORT PLATE

(a) Remove the upper side rear disc brake pad support plate.

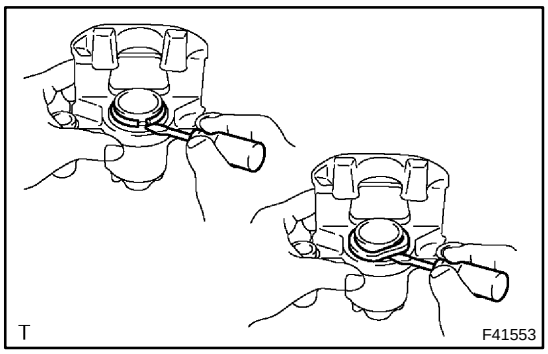
12. REMOVE REAR DISC BRAKE PAD SUPPORT PLATE

(a) Remove the bottom side rear disc brake pad support plate.



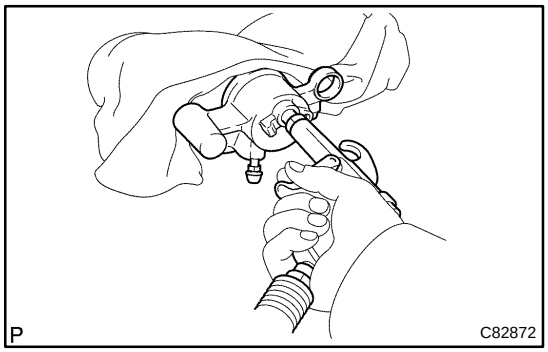
13. REMOVE REAR DISC BRAKE CYLINDER MOUNTING LH

(a) Remove the 2 bolts and disc brake cylinder mounting.



14. REMOVE CYLINDER BOOT

(a) Using a screwdriver, remove the set ring and cylinder boot from the disc brake cylinder.



15. REMOVE REAR DISC BRAKE PISTON

(a) Place a piece of cloth or like, between the piston and the disc brake cylinder.

(b) Use compressed air to remove the piston from the disc brake cylinder.

CAUTION:

Do not place your fingers in front of the piston when using compressed air.

NOTICE:

Do not spatter the brake fluid.

16. REMOVE PISTON SEAL

(a) Using a screwdriver, remove the piston seal from the disc brake cylinder.

NOTICE:

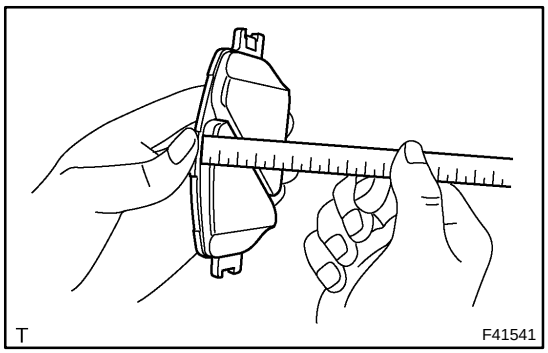
Do not damage the inner cylinder and the cylinder groove.

17. REMOVE REAR DISC BRAKE BLEEDER PLUG CAP

18. REMOVE REAR DISC BRAKE BLEEDER PLUG

19. INSPECT BRAKE CYLINDER AND PISTON

(a) Check the cylinder bore and piston for rust or scoring.



20. INSPECT PAD LINING THICKNESS

(a) Using a ruler, measure the pad lining thickness.

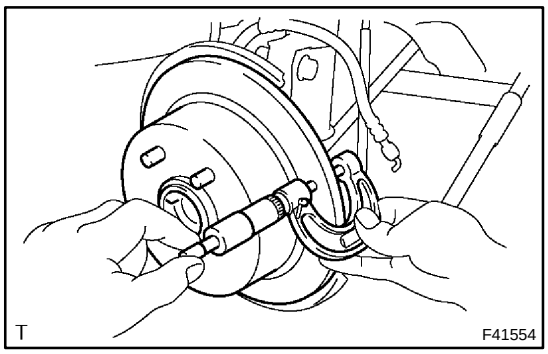
USA, Canada models:
Standard thickness: 10.0 mm (0.394 in.)
Minimum thickness: 1.0 mm (0.039 in.)
Brazil models:
Standard thickness: 11.0 mm (0.433 in.)
Minimum thickness: 1.0 mm (0.039 in.)

21. INSPECT REAR DISC BRAKE PAD SUPPORT PLATE

(a) Make sure that they have sufficient rebound, no deformation cracks or wear, and all rust, dirt are cleaned off.

22. INSPECT REAR DISC BRAKE PAD SUPPORT PLATE

(a) Make sure that they have sufficient rebound, no deformation cracks or wear, and all rust, dirt are cleaned off.

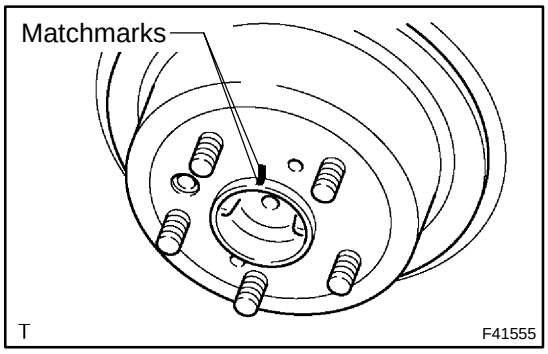


23. INSPECT DISC THICKNESS

(a) Using a micrometer, measure the disc thickness.

USA, Canada models:
Standard thickness: 12.0 mm (0.472 in.)
Minimum thickness: 10.5 mm (0.413 in.)
Brazil models:
Standard thickness: 10.0 mm (0.394 in.)
Minimum thickness: 8.5 mm (0.335 in.)

24. REMOVE PARKING BRAKE SHOE ADJUSTING HOLE PLUG



25. REMOVE REAR DISC

(a) Put matchmarks on the disc and the axle hub.

(b) Remove the disc.

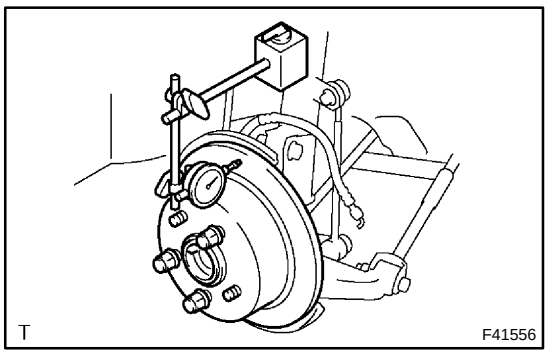
26. INSTALL REAR DISC

(a) Aligning the matchmarks, install the rear disc.

HINT:

When replacing the disc with a new one, select the installation position where the disc has the minimum run-out.

27. INSTALL PARKING BRAKE SHOE ADJUSTING HOLE PLUG



28. INSPECT DISC RUNOUT

(a) Temporarily install the disc with hub nuts.

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

(b) Using a dial indicator, measure the disc runout 10 mm (0.39 in.) away from the outer edge of the disc.

Maximum disc runout: 0.15 mm (0.0059 in.)

(c) If the disc runout is greater than the maximum value, check the bearing play in the axial direction and check the axle hub runout (see page 30-2). If the bearing play and axle hub runout are normal, adjust the disc runout or grind it on a "On-car" brake lathe.

29. ADJUST PARKING BRAKE SHOE CLEARANCE (SEE PAGE 33-16)

30. TEMPORARILY TIGHTEN REAR DISC BRAKE BLEEDER PLUG

(a) Temporarily tighten the bleeder plug to the disc brake cylinder.

31. INSTALL REAR DISC BRAKE BLEEDER PLUG CAP

32. INSTALL PISTON SEAL

(a) Apply the lithium soap base glycol grease to a new piston seal.

(b) Install the piston seal to the disc brake cylinder.

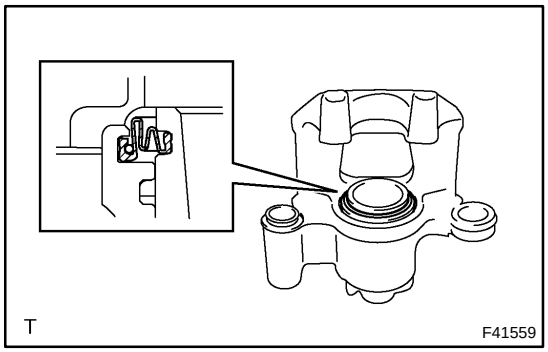
33. INSTALL REAR DISC BRAKE PISTON

(a) Apply the lithium soap base glycol grease to the piston.

(b) Install the piston to the disc brake cylinder.

NOTICE:

Do not screw the piston forcibly into the disc brake cylinder.



34. INSTALL CYLINDER BOOT

(a) Apply the lithium soap base glycol grease to a new cylinder boot.

(b) Install the cylinder boot to the disc brake cylinder.

HINT:

Install the boot securely to the grooves of the cylinder and piston.

(c) Using a screwdriver, install a new set ring.

NOTICE:

Do not damage the cylinder boot.

35. INSTALL REAR DISC BRAKE CYLINDER MOUNTING LH

(a) Install the disc brake cylinder mounting with the 2 bolts.

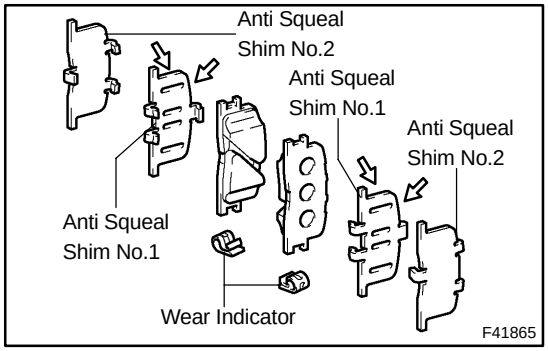
Torque: 61.8 N·m (630 kgf·cm, 46 ft·lbf)

36. INSTALL REAR DISC BRAKE PAD SUPPORT PLATE

(a) Install the bottom side rear disc brake pad support plate.

37. INSTALL REAR DISC BRAKE PAD SUPPORT PLATE

(a) Install the upper side rear disc brake pad support plate.



38. INSTALL REAR DISC BRAKE ANTI SQUEAL SHIM KIT

(a) Apply the both sides of anti squeal shim No.1 with pad grease, and install the shim together with anti squeal shim No.2 to each pad.

(b) Install the wear indicator to the 2 brake pads.

NOTICE:

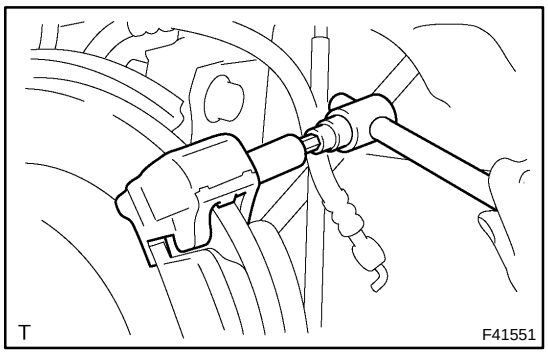
- **When replacing worn pads, the anti squeal shims must be replaced together with the pads.**
- **Install the shims and pad wear indicator correctly of which positions and directions.**

39. INSTALL DISC BRAKE PAD KIT REAR (PAD ONLY)

(a) Install the 2 disc brake pads with the pad wear indicator facing downward.

NOTICE:

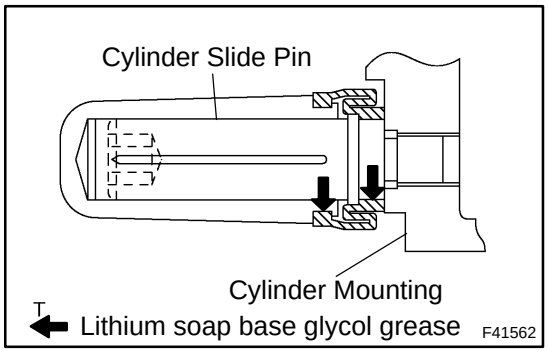
There should be no oil or grease on the friction surface of the pads and the disc.



40. INSTALL REAR DISC BRAKE CYLINDER SLIDE PIN

(a) Using a hexagon wrench (8 mm), install the cylinder slide pin.

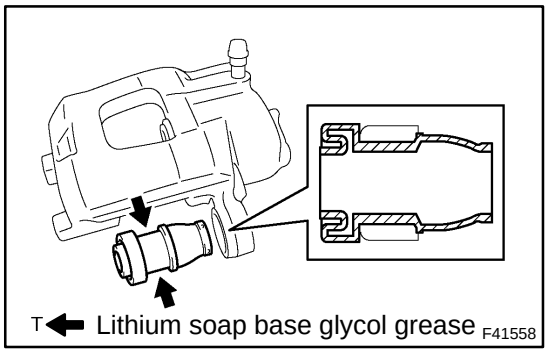
Torque: 39.2 N·m (400 kgf·cm, 29 ft·lbf)



41. INSTALL REAR DISC BRAKE BUSH DUST BOOT

(a) Apply the lithium soap base glycol grease to seal surface of a new bush dust boot.

(b) Install the bush dust boot to the cylinder slide pin.



42. INSTALL REAR DISC BRAKE CYLINDER SLIDE BUSH

(a) Apply the lithium soap base glycol grease to a new cylinder slide bush.

(b) Install the cylinder slide bush to the disc brake cylinder.

43. INSTALL DISC BRAKE CYLINDER ASSY REAR LH

(a) Apply the lithium soap base glycol grease to the cylinder slide pin.

(b) Install the disc brake cylinder to the cylinder slide pin.

44. INSTALL REAR DISC BRAKE CYLINDER SLIDE PIN

(a) Apply the lithium soap base glycol grease to the cylinder slide pin.

(b) Install the cylinder slide pin to the disc brake cylinder.

Torque: 34.3 N·m (350 kgf·cm, 25 ft·lbf)

45. CONNECT REAR LH FLEXIBLE HOSE

(a) Connect a new gasket and flexible hose with the union bolt.

Torque: 29.4 N·m (300 kgf·cm, 22 ft·lbf)

HINT:

Install the flexible hose lock securely in the lock hole of the disc brake cylinder.

46. FILL RESERVOIR WITH BRAKE FLUID

47. BLEED MASTER CYLINDER (SEE PAGE 32-4)

SST 09023-00101

48. BLEED BRAKE LINE (SEE PAGE 32-4)

49. CHECK FLUID LEVEL IN RESERVOIR (SEE PAGE 32-4)

50. CHECK BRAKE FLUID LEAKAGE

51. INSTALL REAR WHEEL

Torque: 103 N·m (1050 kgf·cm, 76 ft·lbf)

BRAKE ACTUATOR ASSY (W/O VSC)

320E1-02

ON-VEHICLE INSPECTION

1. CONNECT HAND-HELD TESTER:

(a) Connect the hand-held tester to the DLC3.

(b) Start the engine and run it at idle.

(c) Select the ACTIVE TEST mode on the hand-held tester.

HINT:

Please refer to the hand-held tester operator's manual for further details.

2. INSPECT ACTUATOR MOTOR OPERATION

(a) With the motor relay ON, check the actuator motor operation noise.

(b) Turn the motor relay OFF.

(c) Depress the brake pedal and hold it for about 15 seconds. Check that the brake pedal cannot be depressed.

(d) With the motor relay ON, check that the pedal does not pulsate.

NOTICE:

Do not keep motor relay ON for more than 5 seconds continuously. When operating it continuously, set the interval of more than 20 seconds.

(e) Turn the motor relay OFF and release the brake pedal.

3. INSPECT RIGHT FRONT WHEEL OPERATION

NOTICE:

Never turn ON the solenoid which is not described below.

(a) With the brake pedal depressed, perform the following operations.

(b) Turn the SFRH and SFRR solenoid ON simultaneously, and check that the pedal cannot be depressed.

NOTICE:

Do not keep solenoid ON for more than 10 seconds continuously. When operating it continuously, set the interval of more than 20 seconds.

(c) Turn the SFRH and SFRR solenoid OFF simultaneously, and check that the pedal can be depressed.

(d) Turn the motor relay ON, and check that the pedal returns.

NOTICE:

Do not keep motor relay ON for more than 5 seconds continuously. When operating it continuously, set the interval of more than 20 seconds.

(e) Turn the motor relay OFF and release the brake pedal.

4. INSPECT OTHER WHEEL OPERATION

(a) As in the same procedure, check the solenoids of other wheels.

HINT:

Left front wheel: SFLH, SFLR

Right rear wheel: SRRH, SRRR

Left rear wheel: SRLH, SRLR

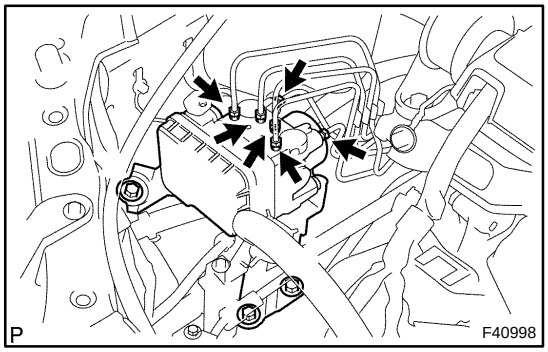
320E2-04

REPLACEMENT

1. DRAIN BRAKE FLUID

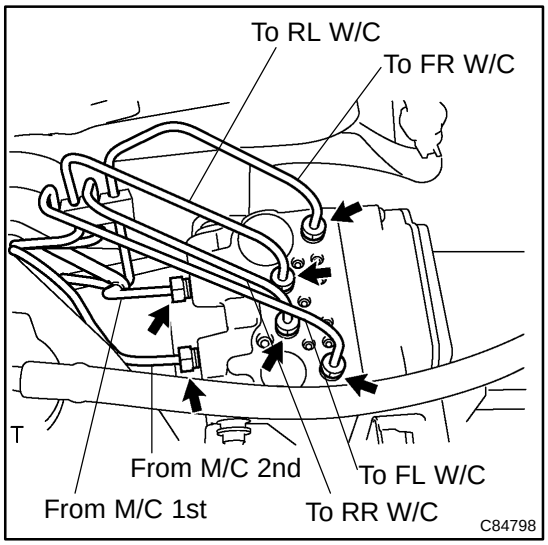
NOTICE:

Wash off the brake fluid immediately if it comes into contact with a painted surface.



2. REMOVE BRAKE ACTUATOR WITH BRACKET

(a) Using SST, disconnect the 6 brake lines from the actuator.
SST 09023-00101



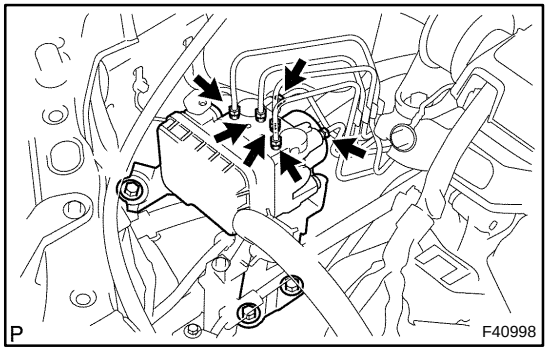
(b) Use tags or make a memo to identify the place to reconnect.
(c) Disconnect the brake actuator connector.
(d) Remove the 3 nuts and brake actuator with bracket.

3. REMOVE BRAKE ACTUATOR ASSY

(a) Remove the 2 nuts and brake actuator from the bracket.
(b) Remove the 2 holders and 3 cushions from the brake actuator.

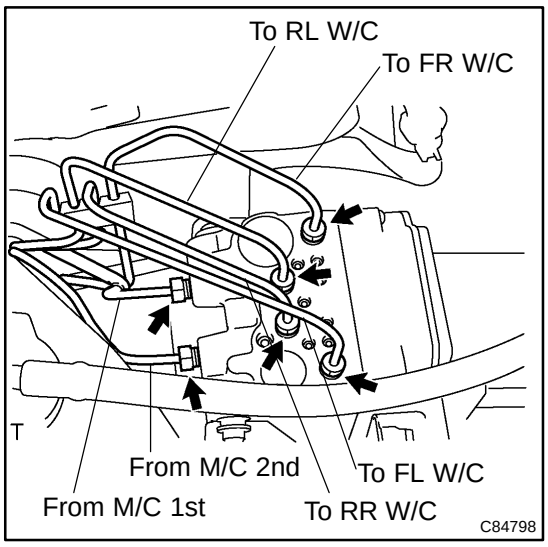
4. INSTALL BRAKE ACTUATOR ASSY

(a) Install the 3 cushions and 2 holders to the brake actuator.
(b) Install the brake actuator to the bracket with the 2 nuts.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)



5. INSTALL BRAKE ACTUATOR WITH BRACKET

(a) Install the brake actuator with the 3 nuts.
Torque: 19 N·m (194 kgf·cm, 14 ft·lbf)
(b) Connect the brake actuator connector.



(c) Using SST, connect the each brake line to the correct position of brake actuator, as shown in the illustration.
SST 09023-00101
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

6. **FILL RESERVOIR WITH BRAKE FLUID**
7. **BLEED MASTER CYLINDER (SEE PAGE 32-4)**
   SST 09023-00101
8. **BLEED BRAKE LINE (SEE PAGE 32-4)**
9. **CHECK FLUID LEVEL IN RESERVOIR (SEE PAGE 32-4)**
10. **CHECK BRAKE FLUID LEAKAGE**
11. **CHECK OPERATION OF BRAKE ACTUATOR (SEE PAGE 32-47)**

BRAKE ACTUATOR ASSY (W/VSC)(From July, 2003)

3203J-09

ON-VEHICLE INSPECTION

1. CONNECT HAND-HELD TESTER:

(a) Connect the hand-held tester to the DLC3.

(b) Start the engine and run it at idle.

(c) Select the ACTIVE TEST mode on the hand-held tester.

HINT:

Please refer to the hand-held tester operator's manual for further details.

2. INSPECT ACTUATOR MOTOR OPERATION

(a) With the motor relay ON, check the actuator motor operation noise.

(b) Turn the motor relay OFF.

(c) Depress the brake pedal and hold it for about 15 seconds. Check that the brake pedal cannot be depressed.

(d) With the motor relay ON, check that the pedal does not pulsate.

NOTICE:

Do not keep motor relay ON for more than 5 seconds continuously. When operating it continuously, set the interval of more than 20 seconds.

(e) Turn the motor relay OFF and release the brake pedal.

3. INSPECT RIGHT FRONT WHEEL OPERATION

NOTICE:

Never turn ON the solenoid which is not described below.

(a) With the brake pedal depressed, perform the following operations.

(b) Turn the SFRH and SFRR solenoid ON simultaneously, and check that the pedal cannot be depressed.

NOTICE:

Do not keep solenoid ON for more than 10 seconds continuously. When operating it continuously, set the interval of more than 20 seconds.

(c) Turn the SFRH and SFRR solenoid OFF simultaneously, and check that the pedal can be depressed.

(d) Turn the motor relay ON, and check that the pedal returns.

NOTICE:

Do not keep motor relay ON for more than 5 seconds continuously. When operating it continuously, set the interval of more than 20 seconds.

(e) Turn the motor relay OFF and release the brake pedal.

4. INSPECT OTHER WHEEL OPERATION

(a) As in the same procedure, check the solenoids of other wheels.

HINT:

Left front wheel: SFLH, SFLR

Right rear wheel: SRRH, SRRR

Left rear wheel: SRLH, SRLR

3211Y-04

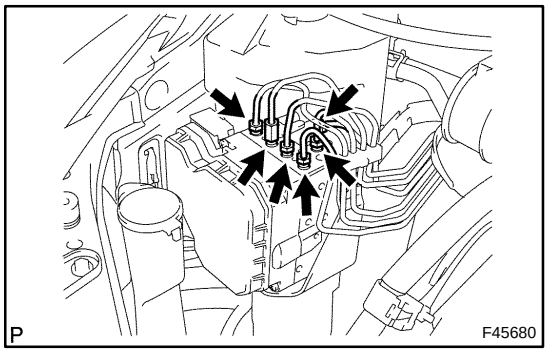
REPLACEMENT

1. DRAIN BRAKE FLUID

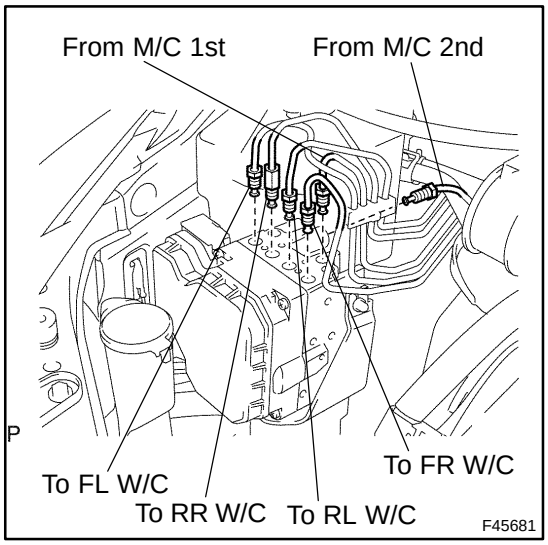
NOTICE:

Wash off the brake fluid immediately if it comes into contact with a painted surface.

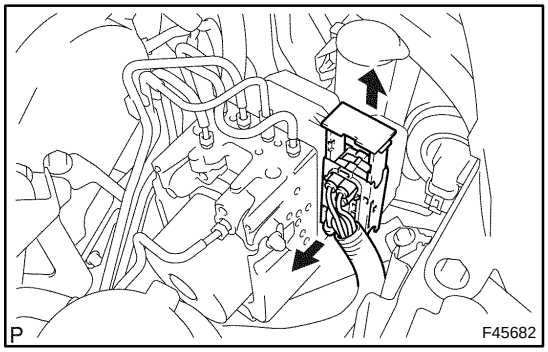
2. REMOVE BRAKE ACTUATOR WITH BRACKET



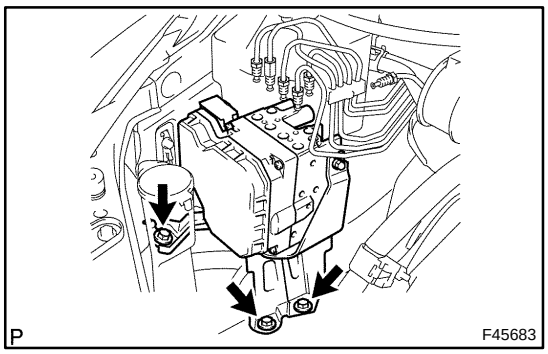
(a) Using SST, disconnect the 6 brake lines from the actuator.
SST 09023-00101



(b) Use tags or make a memo to identify the place to reconnect.



(c) Disconnect the actuator connector.



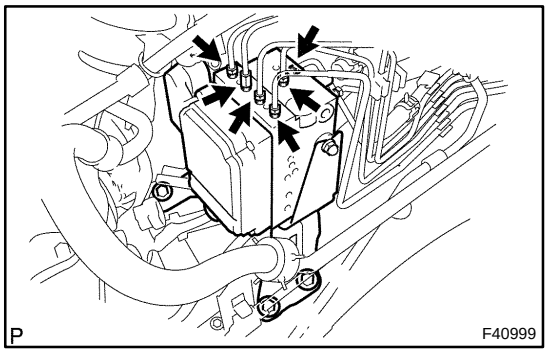
(d) Remove the 3 nuts and brake actuator with bracket.

3. REMOVE BRAKE ACTUATOR ASSY

(a) Remove the 2 nuts and brake actuator from the bracket.

4. INSTALL BRAKE ACTUATOR ASSY

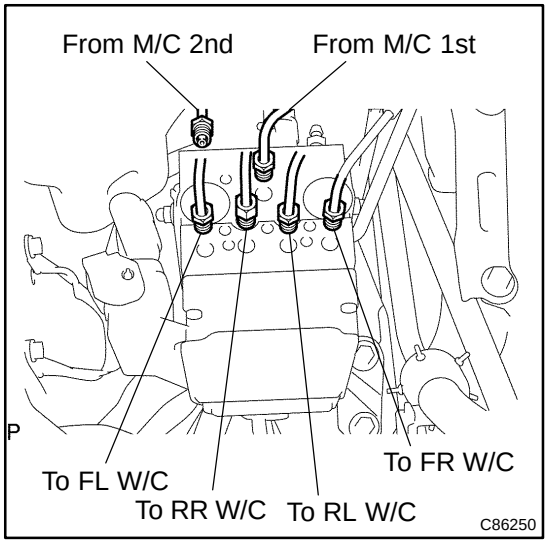
(a) Install the brake actuator to the bracket with the 2 nuts.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)



5. INSTALL BRAKE ACTUATOR WITH BRACKET

(a) Install the brake actuator with the 3 nuts.
Torque: 19 N·m (194 kgf·cm, 14 ft·lbf)

(b) Connect the brake actuator connector.



(c) Using SST, connect the each brake line to the correct position of brake actuator, as shown in the illustration.
SST 09023-00101
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

6. FILL RESERVOIR WITH BRAKE FLUID

7. BLEED MASTER CYLINDER (SEE PAGE 32-4)
SST 09023-00101

8. BLEED BRAKE LINE (SEE PAGE 32-4)

9. BLEED BRAKE ACTUATOR ASSY (W/ VSC) (SEE PAGE 32-4)
SST 09992-00242, 09992-00350

10. CHECK FLUID LEVEL IN RESERVOIR(SEE PAGE 32-4)

11. CHECK BRAKE FLUID LEAKAGE

12. CHECK OPERATION OF BRAKE ACTUATOR (SEE PAGE 32-47)

SPEED SENSOR FRONT LH

3203N-09

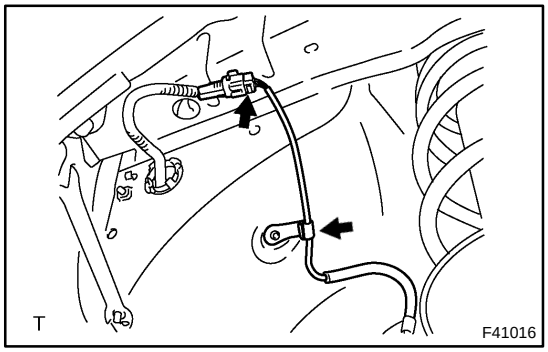
REPLACEMENT

HINT:

Replace the RH side by the same procedures with LH side.

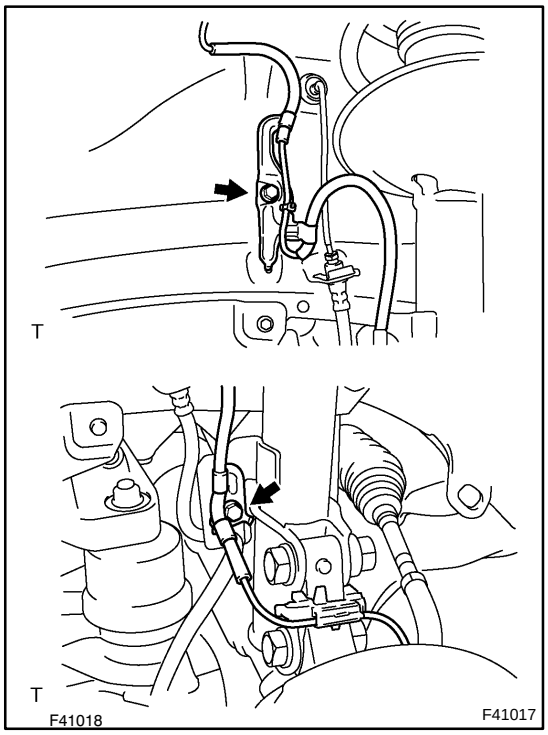
1. REMOVE FRONT WHEEL

2. REMOVE FRONT FENDER LINER LH

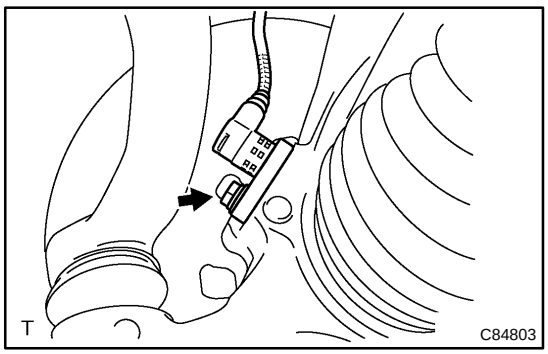


3. REMOVE SPEED SENSOR FRONT LH

(a) Disconnect the speed sensor connector and clamp.



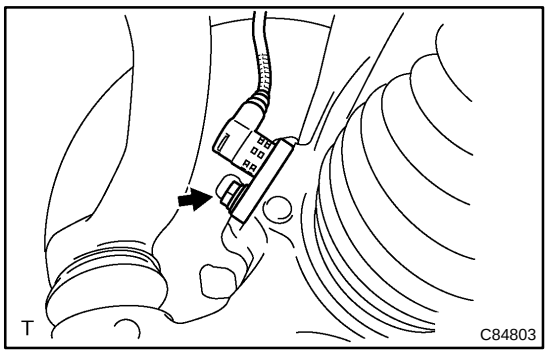
(b) Remove the 2 clamp bolts holding the sensor harness and clamp from the body and shock absorber.



(c) Remove the bolt and speed sensor FR LH.

NOTICE:

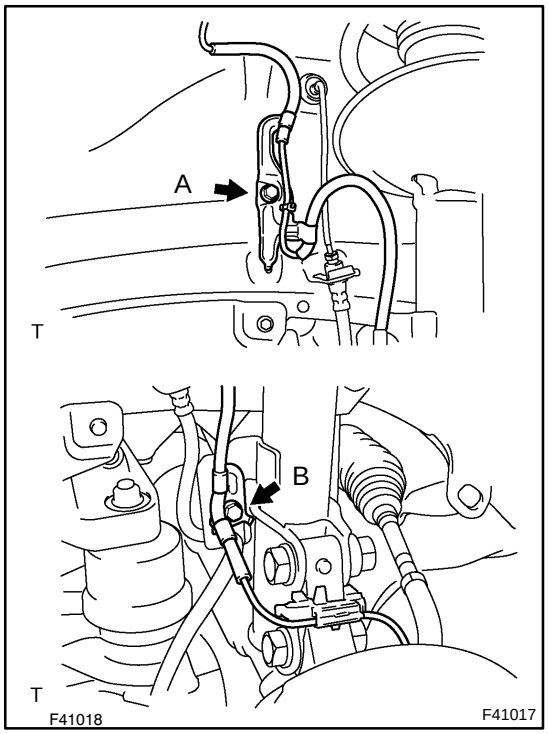
Do not stick and foreign matter on the sensor tip.



4. INSTALL SPEED SENSOR FRONT LH

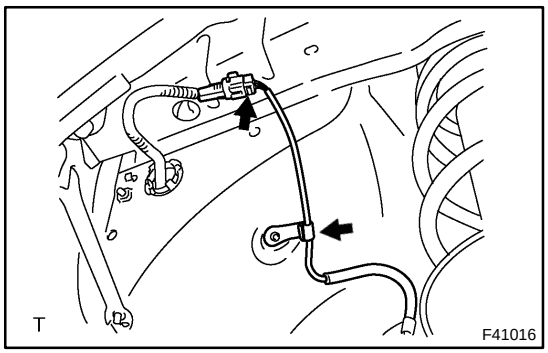
(a) Install the speed sensor FR LH with the bolt.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

NOTICE:
Make sure the sensor tip is clean.



(b) Install the sensor harness clamps with the 2 bolts ”A” and ”B” to the body and shock absorber.
Torque:
Bolt A: 5.0 N·m (51 kgf·cm, 44 in.·lbf)
Bolt B: 18.8 N·m (192 kgf·cm, 14 ft·lbf)

(c) Connect the clamp to the knuckle.



(d) Connect the speed sensor connector and clamp.

5. INSTALL FRONT FENDER LINER LH

6. INSTALL FRONT WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

7. CHECK ABS SPEED SENSOR SIGNAL (SEE PAGE 05-420 or 05-471)

SKID CONTROL SENSOR

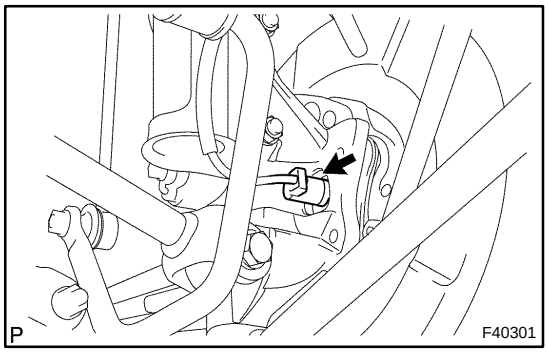
3203O-06

REPLACEMENT

HINT:

Replace the RH side by the same procedure with LH side.

1. REMOVE REAR WHEEL

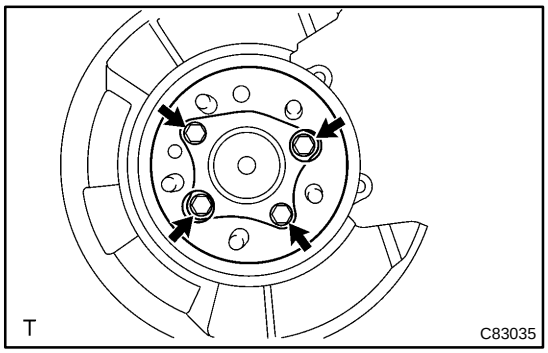


2. SEPARATE SKID CONTROL SENSOR WIRE

(a) Disconnect the connector from the skid control sensor.

3. REMOVE REAR DISC BRAKE CALIPER ASSY LH (SEE PAGE 32-41)

4. REMOVE REAR DISC



5. REMOVE REAR AXLE HUB & BEARING ASSY LH

(a) Remove the 4 bolts and rear axle hub & bearing assy.

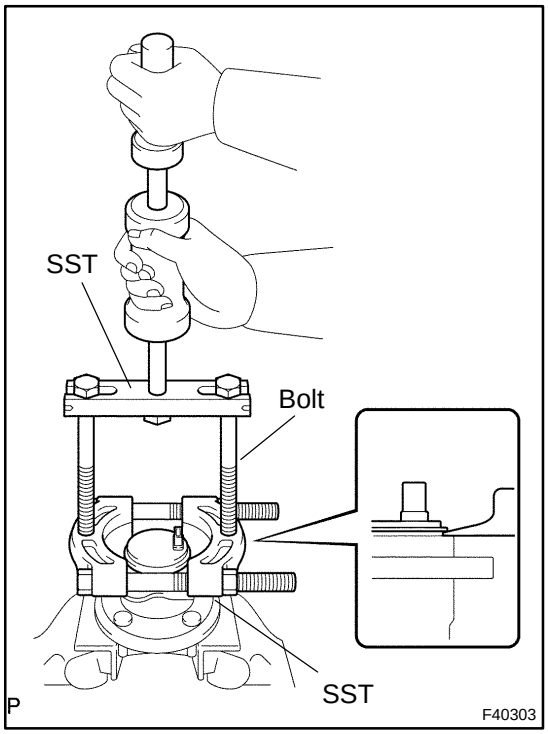
6. REMOVE SKID CONTROL SENSOR

(a) Mount the rear axle hub in a soft jaw vise.

NOTICE:

Replace the axle hub assembly if it is dropped or a strong shock is given to it.

(b) Using a pin punch and hammer, drive out the 2 pins and remove the 2 attachments from SST.



(c) Using SST and 2 bolts (Diameter: 12 mm, pitch: 1.5 mm), remove the skid control sensor from the rear axle hub.

SST 09520- 00031 (09520- 00040), 09521- 00020, 09950-00020

NOTICE:

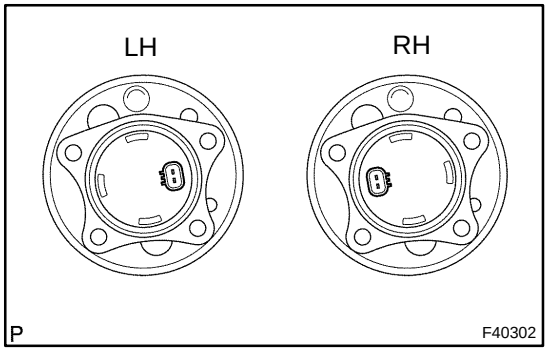
- **If a damage is inflicted to the sensor rotor, replace the axle hub assembly.**
- **Do not scratch the contacting surface of axle hub and speed sensor.**

7. INSTALL SKID CONTROL SENSOR

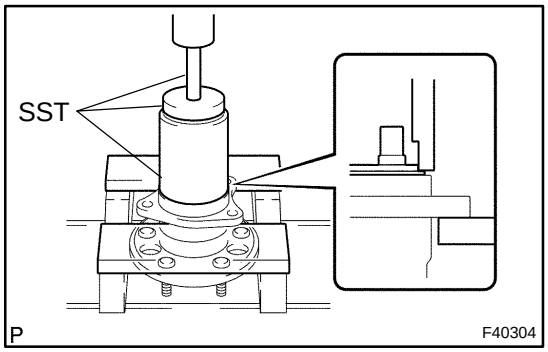
(a) Clean the contacting surface of the axle hub and a new skid control sensor.

NOTICE:

Make sure the sensor rotor is clean.



(b) Place the speed sensor on the axle hub so that the connector is positioned, as shown in the illustration.

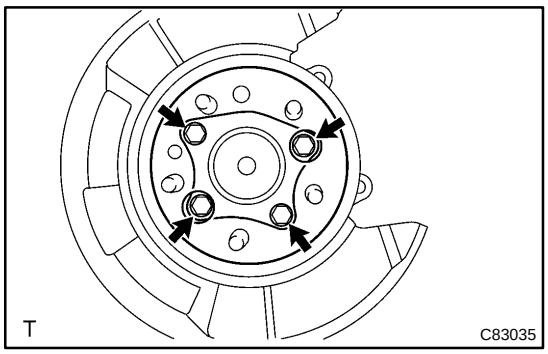


(c) Using SST and a press, install the skid control sensor to the axle hub.

NOTICE:

- **Do not tap the skid control sensor with a hammer directly.**
- **Check that the skid control sensor detection part is clean.**
- **Press in the skid control sensor straight and slowly.**

SST 09830- 36010, 09950- 60010 (09951- 00650), 09950-70010 (09951-07100)



8. INSTALL REAR AXLE HUB & BEARING ASSY LH

(a) Install the rear axle hub & bearing assy with the 4 bolts.
Torque: 80 N·m (816 kgf·cm, 59 ft·lbf)

9. INSTALL REAR DISC

10. INSTALL REAR DISC BRAKE CALIPER ASSY LH (SEE PAGE 32-41)

11. CONNECT SKID CONTROL SENSOR WIRE

12. INSTALL REAR WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

13. INSPECT TIRE (SEE PAGE 28-1)

14. MEASURE VEHICLE HEIGHT (SEE PAGE 27-3)

15. INSPECT SIDE SLIP (SEE PAGE 27-3)

16. INSPECT CAMBER (SEE PAGE 27-3)

17. INSPECT TOE-IN (SEE PAGE 27-3)

18. ADJUST CAMBER AND TOE-IN (SEE PAGE 27-3)

19. CHECK ABS SPEED SENSOR SIGNAL (SEE PAGE 05-420 or 05-471)

YAWRATE SENSOR (From July, 2003)

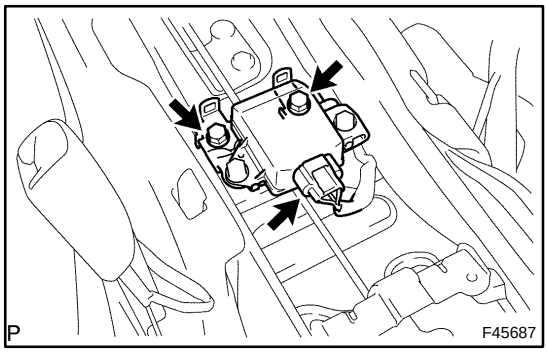
320E4-03

REPLACEMENT

NOTICE:

Do not separate the sensor from the bracket.

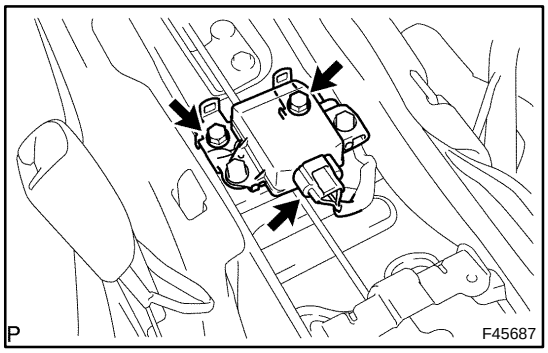
1. **REMOVE CONSOLE PANEL UPPER REAR (SEE PAGE 71-1 1)**
2. **REMOVE RR CONSOLE BOX (SEE PAGE71-1 1)**



3. **REMOVE YAWRATE SENSOR**

(a) Disconnect the yawrate sensor connector.

(b) Remove the 2 bolts and yawrate sensor.



4. **INSTALL YAWRATE SENSOR**

(a) Install the yawrate sensor with the 2 bolts.

Torque: 12.5 N·m (127 kgf·cm, 9 ft·lbf)

(b) Connect the yawrate sensor connector.

5. **INSTALL RR CONSOLE BOX (SEE PAGE 71-1 1)**
6. **INSTALL CONSOLE PANEL UPPER REAR (SEE PAGE 71-1 1)**
7. **PERFORM YAWRATE SENSOR ZERO POINT CALIBRATION (SEE PAGE 05-471)**

STEERING SENSOR

3203S-11

REPLACEMENT

1. PRECAUTION (SEE PAGE 60-1)
2. SEPARATE BATTERY NEGATIVE TERMINAL (SEE PAGE 60-1)
3. PLACE FRONT WHEELS FACING STRAIGHT AHEAD
4. REMOVE HORN BUTTON ASSY (SEE PAGE 60-22)
5. REMOVE STEERING WHEEL ASSY (SEE PAGE 50-8)
6. REMOVE STEERING COLUMN LOWER COVER (SEE PAGE 50-8)
7. REMOVE SPIRAL CABLE SUB-ASSY (SEE PAGE 60-31)
8. REMOVE WINDSHIELD WIPER SWITCH ASSY
9. REMOVE STEERING SENSOR
10. INSTALL STEERING SENSOR
11. INSPECT SPIRAL CABLE SUB-ASSY

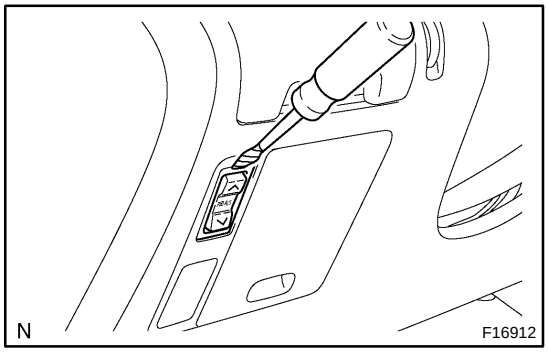
(a) If the following condition is identified, replace the spiral cable sub-assy with new one.
Condition:
Scratches or cracks on the connector
Cracks, dents or chipping of the spiral cable sub-assy

12. INSTALL WINDSHIELD WIPER SWITCH ASSY
13. PLACE FRONT WHEELS FACING STRAIGHT AHEAD
14. INSTALL SPIRAL CABLE SUB-ASSY (SEE PAGE 60-31)
15. INSTALL STEERING COLUMN LOWER COVER (SEE PAGE 50-8)
16. CENTER SPIRAL CABLE (SEE PAGE 60-31)
17. INSTALL STEERING WHEEL ASSY (SEE PAGE 50-8)
18. INSPECT STEERING WHEEL CENTER POINT (SEE PAGE 50-8)
19. INSTALL HORN BUTTON ASSY (SEE PAGE 60-22)
20. INSPECT SRS WARNING LIGHT (SEE PAGE 05-818)

ADJUSTABLE PEDAL SWITCH (From August, 2002)

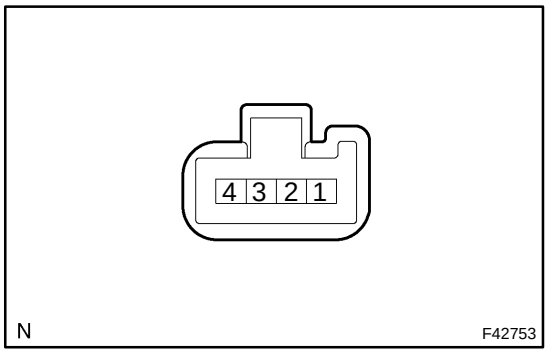
320OH-03

INSPECTION



1. REMOVE ADJUSTABLE PEDAL SWITCH

(a) Using a screwdriver, remove the adjustable pedal switch, then disconnect the connector.



2. INSPECT ADJUSTABLE PEDAL SWITCH

Switch position	Tester connection	Specified condition
OFF	1 - 2 - 3	Continuity
FRONT	1 - 3	Continuity
	2 - 4	
REAR	1 - 2	Continuity
	3 - 4	

3. INSTALL ADJUSTABLE PEDAL SWITCH

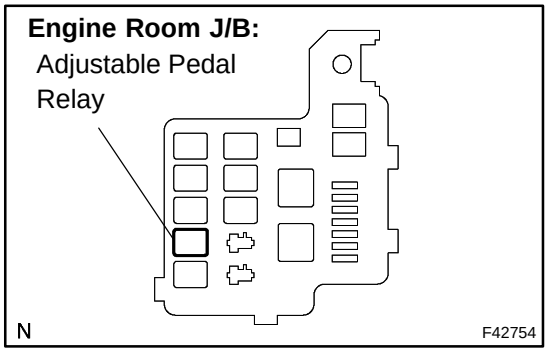
(a) Connect the connector.

(b) Install the adjustable pedal switch.

ADJUSTABLE PEDAL RELAY (From August, 2002)

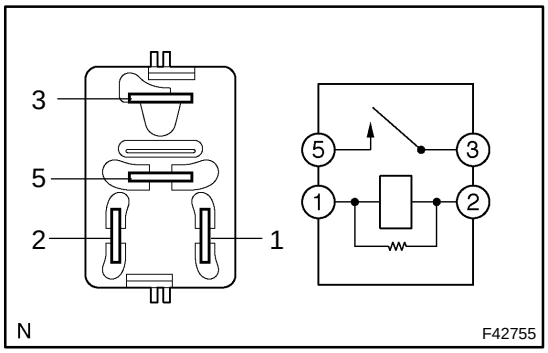
320OI-03

INSPECTION



1. REMOVE ADJUSTABLE PEDAL RELAY

(a) Remove the adjustable pedal relay from the engine room J/B.



2. INSPECT ADJUSTABLE PEDAL RELAY

Condition	Tester condition	Specified condition
Constant	1 - 2	Continuity
	3 - 5	No continuity
Apply +B between terminals 1 and 2	3 - 5	continuity

3. INSTALL ADJUSTABLE PEDAL RELAY

(a) Install the adjustable pedal relay to the engine room J/B.

PARKING BRAKE SYSTEM

3305F-02

PROBLEM SYMPTOMS TABLE

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Brake drag	1. Parking brake pedal or lever travel (Out of adjustment)	33-2
	2. Parking brake wire (Sticking)	33-8 33-11 33-14
	3. Parking brake shoe clearance (Out of adjustment)	33-16
	4. Parking brake shoe lining (Cracked or distorted)	33-16
	5. Tension or return spring (Damaged)	33-16

3305G-02

ADJUSTMENT

1. REMOVE REAR WHEEL

2. ADJUST PARKING BRAKE SHOE CLEARANCE(See page 33-16)

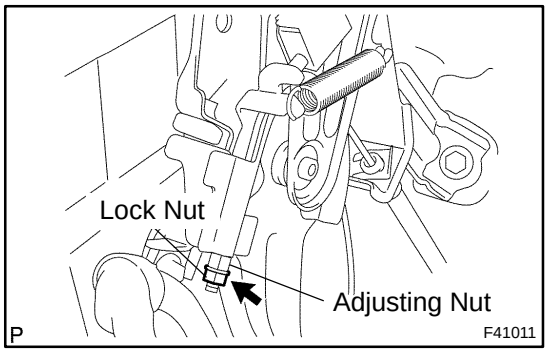
3. INSTALL REAR WHEEL

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

4. INSPECT PARKING BRAKE PEDAL TRAVEL

(a) Slowly depress the parking brake pedal all the way, and count the number of clicks.

Parking brake pedal travel: 3 - 6 clicks at 300 N (31 kgf, 68.3 lbf)



5. ADJUST PARKING BRAKE PEDAL TRAVEL

(a) Depress the parking brake pedal 3 notches to make a room for the procedure, and loosen the lock nut.

(b) Return the parking brake pedal to the original position.

(c) Turn the adjusting nut until the parking brake pedal travel is correct.

(d) Depress the parking brake pedal 3 notches to make a room for the procedure, and tighten the lock nut.

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

(e) Return the parking brake pedal to the original position.

(f) Check whether parking brake drags or not.

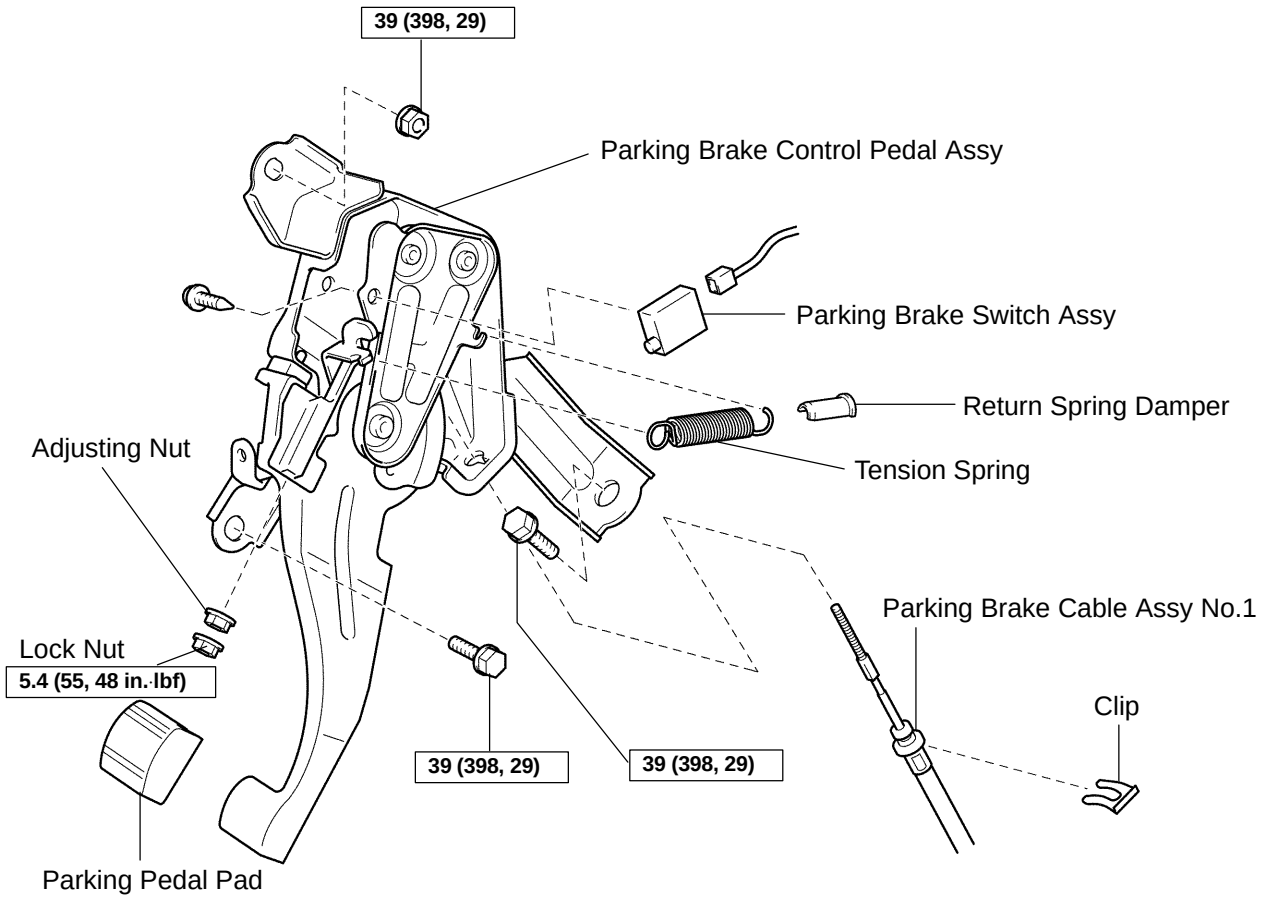
(g) When operating the parking brake pedal, check that the parking brake pedal indicator light lights up.

PARKING BRAKE

3305H-02

COMPONENTS

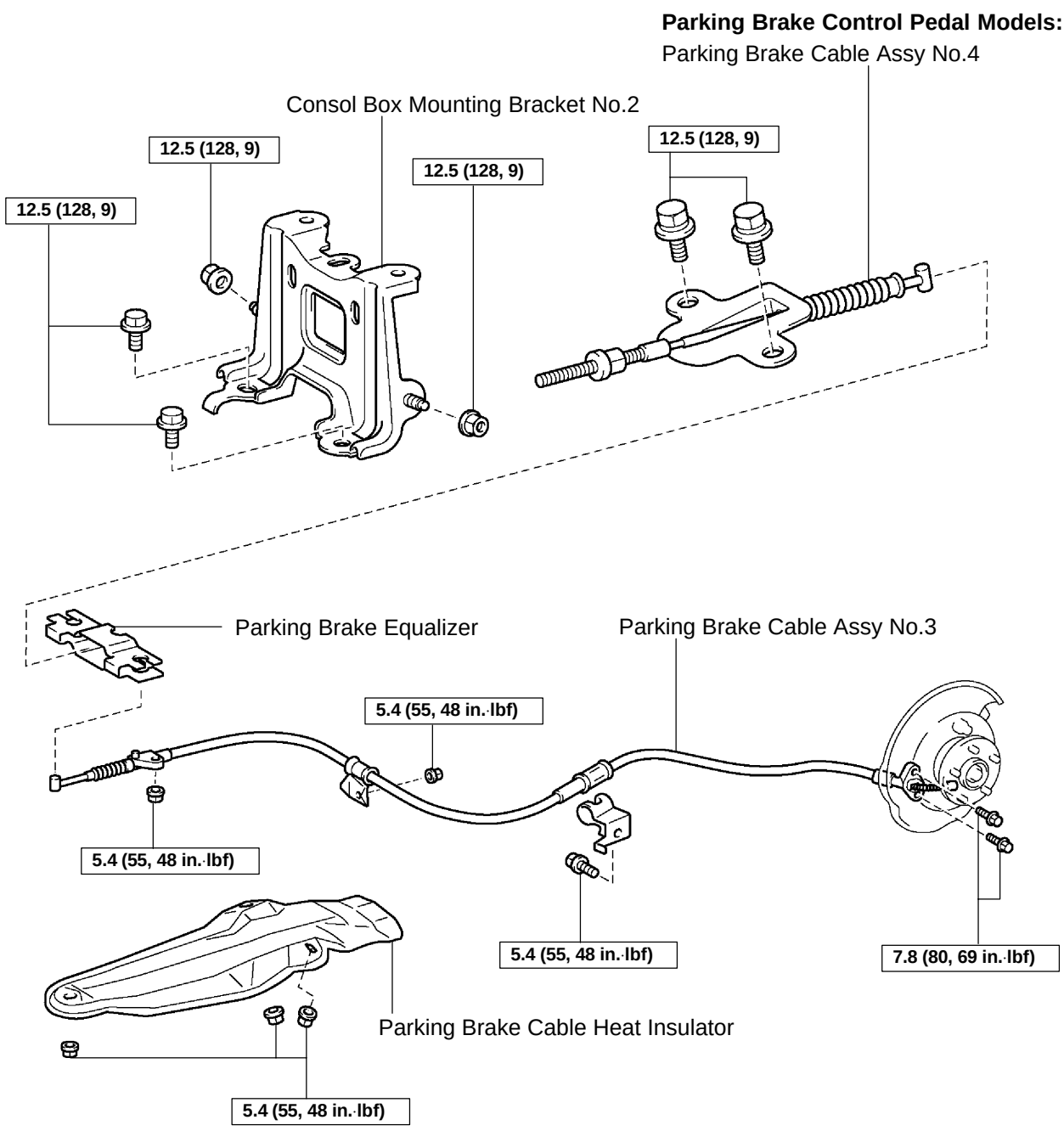
Parking Brake Control Pedal Assy:



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

F41008

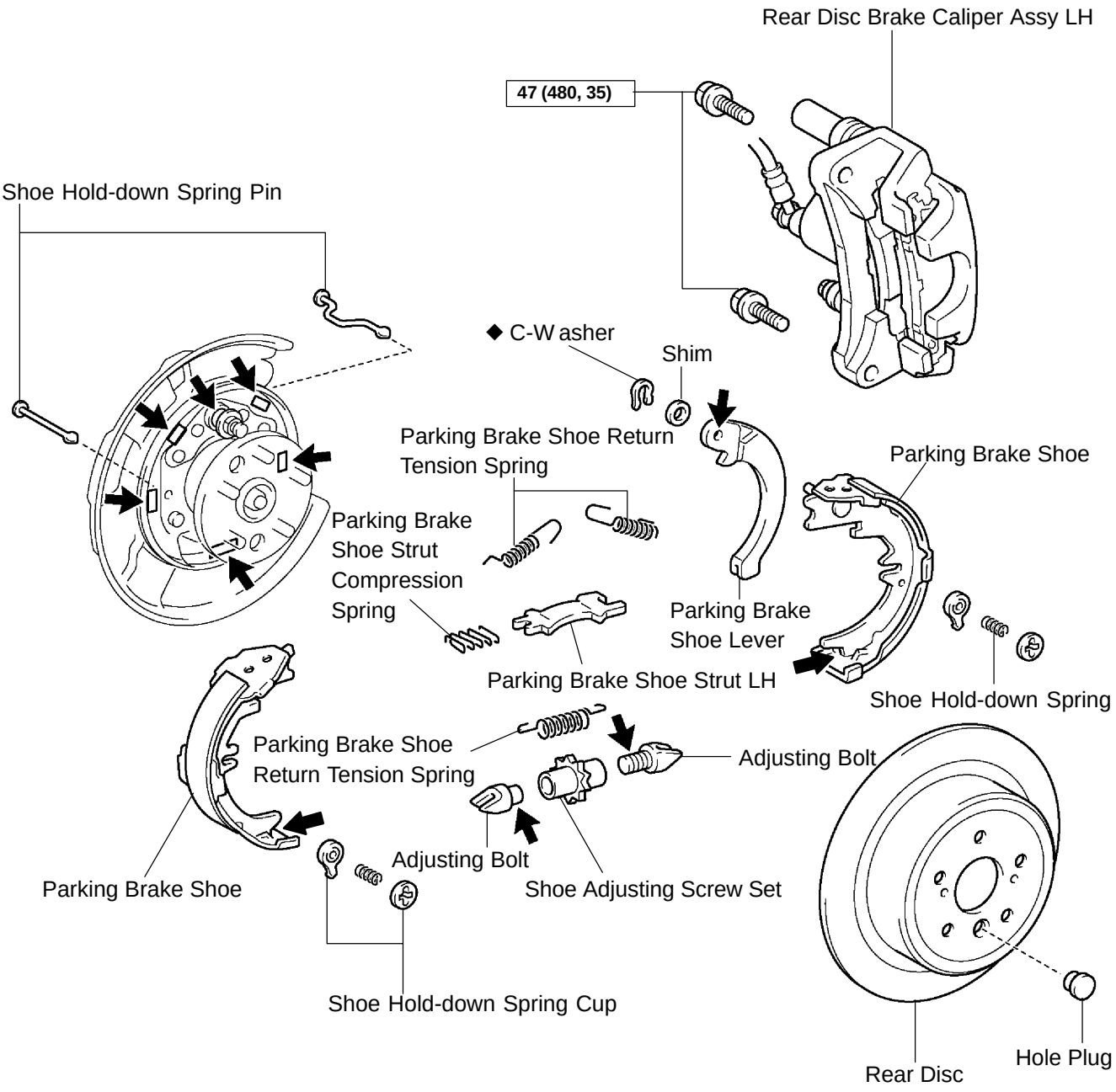
Parking Brake Cable:



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

C90467 F41686

Parking Brake Assy:



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

C90458 F41967

PARKING BRAKE CONTROL PEDAL ASSY

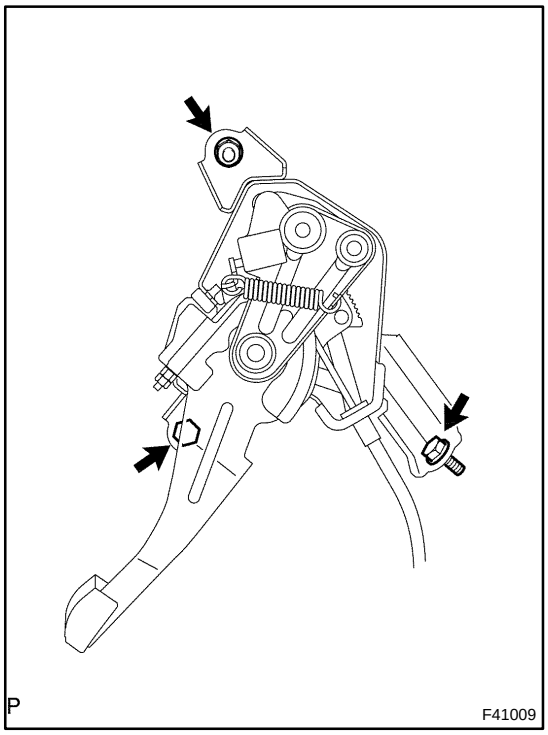
3305I-02

OVERHAUL

HINT:

COMPONENTS: See page 71-8 and 33-3

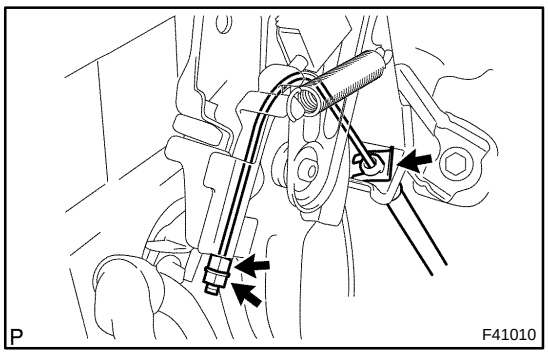
1. **REMOVE INSTRUMENT CLUSTER FINISH PANEL SUB-ASSY(See page 71-1 1)**
2. **REMOVE COMBINATION METER ASSY(See page 71-1 1)**
3. **REMOVE FRONT DOOR SCUFF PLATE LH(See page 71-1 1)**
4. **REMOVE INSTRUMENT PANEL SUB-ASSY UPPER(See page 71-1 1)**
5. **REMOVE INSTRUMENT PANEL INSERT SUB-ASSY LOWER LH(See page 71-1 1)**



6. **REMOVE PARKING BRAKE CONTROL PEDAL ASSY**

(a) Disconnect the parking brake switch connector.

(b) Remove the 2 bolts, nut and parking brake control pedal assy.



7. **DISCONNECT PARKING BRAKE CABLE ASSY NO.1**

(a) Remove the lock nut, adjusting nut and clip, then disconnect the parking brake cable assy No.1 from the parking brake control pedal assy.

8. **REMOVE PARKING BRAKE SWITCH ASSY**

(a) Remove the screw and parking brake switch assy.

9. **REMOVE TENSION SPRING**
10. **REMOVE RETURN SPRING DAMPER**
11. **REMOVE PARKING PEDAL PAD**

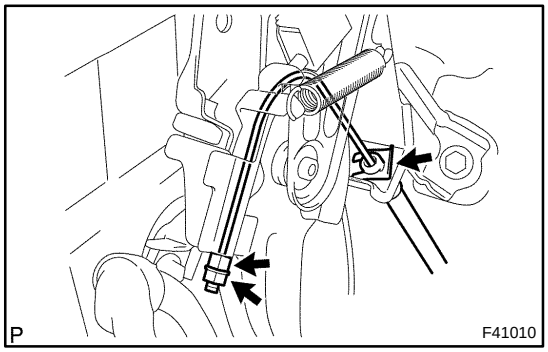
12. INSTALL PARKING PEDAL PAD

13. INSTALL RETURN SPRING DAMPER

14. INSTALL TENSION SPRING

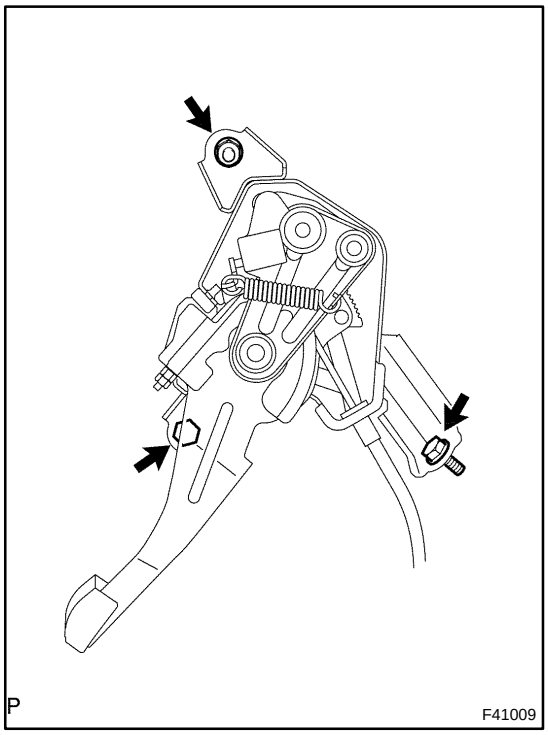
15. INSTALL PARKING BRAKE SWITCH ASSY

(a) Install the parking brake switch assy with the screw.



16. CONNECT PARKING BRAKE CABLE ASSY NO.1

(a) Connect the parking brake cable assy No.1 with the clip, adjusting nut and lock nut.



17. INSTALL PARKING BRAKE CONTROL PEDAL ASSY

(a) Install the parking brake control pedal assy with the 2 bolts and nut.

Torque: 39 N·m (398 kgf·cm, 29 ft·lbf)

(b) Connect the parking brake switch connector.

18. INSTALL INSTRUMENT PANEL INSERT SUB-ASSY LOWER LH

19. INSTALL INSTRUMENT PANEL SUB-ASSY UPPER

20. INSTALL FRONT DOOR SCUFF PLATE LH

21. INSTALL COMBINATION METER ASSY

22. INSTALL INSTRUMENT CLUSTER FINISH PANEL SUB-ASSY

23. INSPECT AND ADJUST PARKING BRAKE PEDAL TRAVEL(See page 33-2)

PARKING BRAKE CABLE ASSY NO.1

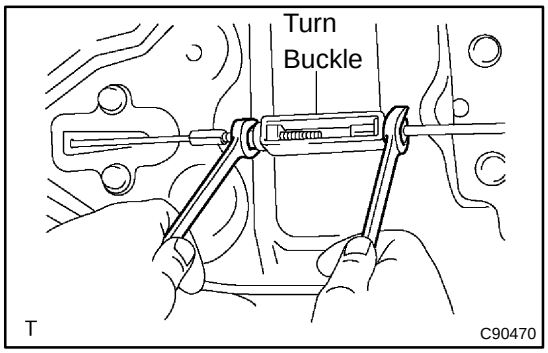
3305J-02

REPLACEMENT

HINT:

COMPONENTS: See page 71-8 and 33-3

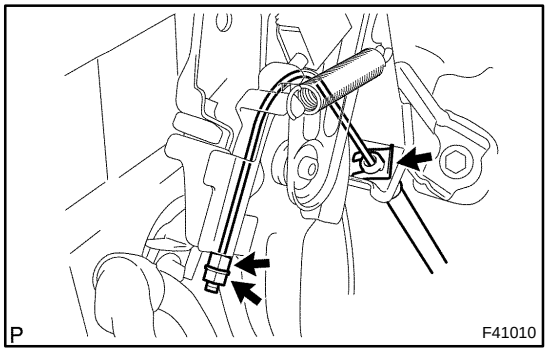
1. **REMOVE FRONT DOOR SCUFF PLATE RH**
2. **REMOVE FRONT DOOR SCUFF PLATE LH**
3. **REMOVE INSTRUMENT PANEL SUB-ASSY UPPER(See page 71-1 1)**
4. **REMOVE INSTRUMENT PANEL INSERT SUB-ASSY LOWER LH(See page 71-1 1)**
5. **REMOVE INSTRUMENT PANEL UNDER COVER SUB-ASSY NO.1(See page 71-1 1)**
6. **REMOVE INSTRUMENT PANEL SUB-ASSY LOWER(See page 71-1 1)**
7. **REMOVE CONSOLE PANEL UPPER REAR(See page 71-1 1)**
8. **REMOVE CONSOLE BOX CARPET**
9. **REMOVE RR CONSOLE BOX(See page 71-1 1)**
10. **REMOVE INSTRUMENT PANEL FINISH PANEL END RH**
11. **REMOVE INSTRUMENT PANEL FINISH PANEL END LH(See page 71-1 1)**
12. **REMOVE AIR DUCT REAR NO.1**
13. **REMOVE AIR DUCT REAR NO.2**
14. **REMOVE CONSOLE BOX DUCT NO.1**
15. **REMOVE YAWRATE SENSOR (W/ VSC)(See page 32-59)**



16. REMOVE PARKING BRAKE CABLE ASSY NO.1

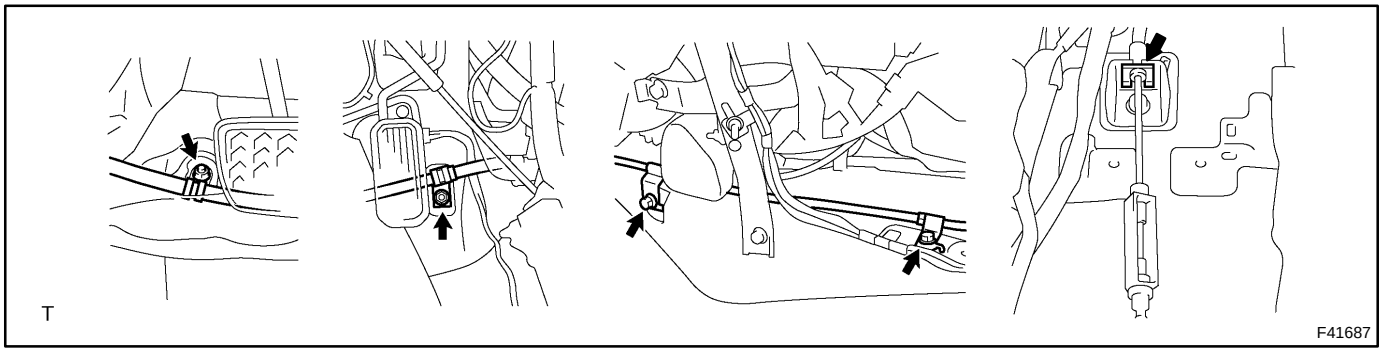
(a) Loosen the turn buckle, disconnect the parking brake cable assy No.1 from the parking brake cable assy No.4.

(b) Remove the 2 bolts and console box mounting bracket No.2.



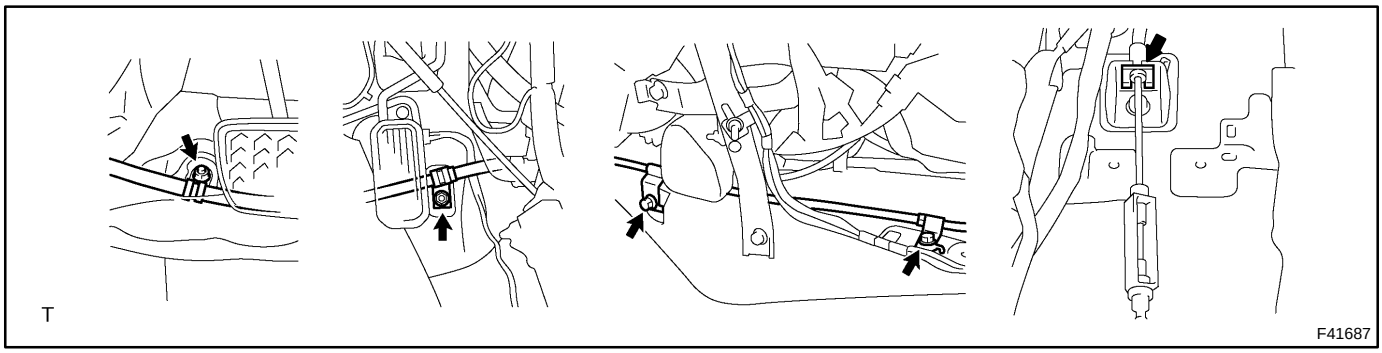
(c) Remove the lock nut, adjusting nut and clip, then disconnect the parking brake cable assy No.1 from the parking brake control pedal assy.

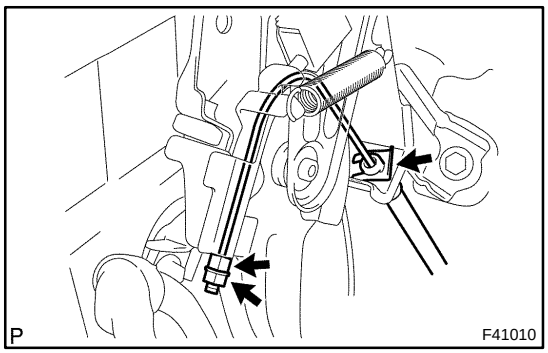
(d) Remove the 2 nuts, 2 bolts, clip and parking brake cable assy No.1.



17. INSTALL PARKING BRAKE CABLE ASSY NO.1

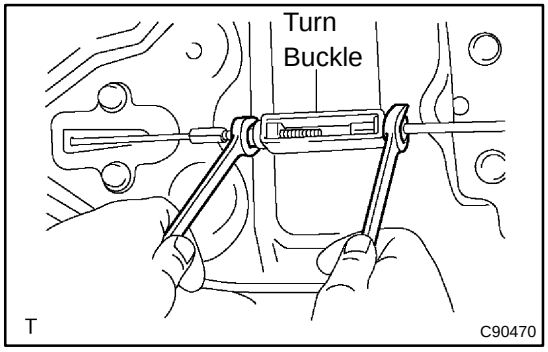
(a) Install the parking brake cable assy No.1 with the 2 nuts, 2 bolts and clip.





(b) Install the parking brake cable assy No.1 with the clip, adjusting nut and lock nut to the parking brake control pedal assy.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(c) Install the console box mounting bracket No.2 with the 2 bolts.
Torque: 12.5 N·m (128 kgf·cm, 9 ft·lbf)



(d) Tighten the turn buckle, connect the parking brake cable assy No.1 to the parking brake cable assy No.4.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

18. **INSTALL YAWRATE SENSOR (W/ VSC)(See page 32-59)**
19. **INSTALL CONSOLE BOX DUCT NO.1**
20. **INSTALL AIR DUCT REAR NO.2**
21. **INSTALL AIR DUCT REAR NO.1**
22. **INSTALL INSTRUMENT PANEL FINISH PANEL END LH**
23. **INSTALL INSTRUMENT PANEL FINISH PANEL END RH**
24. **INSTALL RR CONSOLE BOX**
25. **INSTALL CONSOLE BOX CARPET**
26. **INSTALL CONSOLE PANEL UPPER REAR**
27. **INSTALL INSTRUMENT PANEL SUB-ASSY LOWER**
28. **INSTALL INSTRUMENT PANEL UNDER COVER SUB-ASSY NO.1**
29. **INSTALL INSTRUMENT PANEL INSERT SUB-ASSY LOWER LH**
30. **INSTALL INSTRUMENT PANEL SUB-ASSY UPPER**
31. **INSTALL FRONT DOOR SCUFF PLATE LH**
32. **INSTALL FRONT DOOR SCUFF PLATE RH**
33. **INSPECT AND ADJUST PARKING BRAKE PEDAL TRAVEL(See page 33-2)**
34. **CHECK VSC SENSOR SIGNAL (W/ VSC)(See page 05-471)**

PARKING BRAKE CABLE ASSY NO.3

3305K-02

REPLACEMENT

HINT:

- COMPONENTS: See page 33-3
- For parking brake cable No.2, employ the same procedure to the RH side.

1. REMOVE REAR WHEEL

2. REMOVE REAR DISC BRAKE CALIPER ASSY LH

(a) Remove the 2 bolts and separate the rear disc brake caliper assy LH.

HINT:

Do not the flexible hose from the brake caliper assy LH.

3. REMOVE REAR DISC(See page 33-16)

4. REMOVE PARKING BRAKE SHOE RETURN TENSION SPRING(See page 33-16)

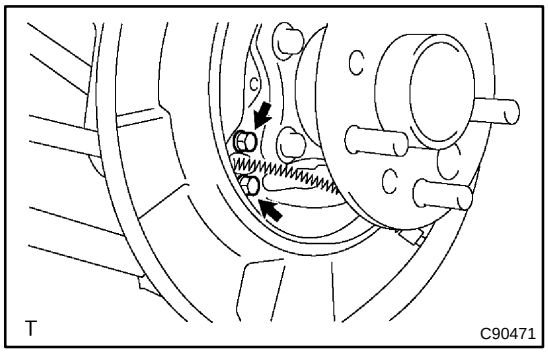
5. REMOVE PARKING BRAKE SHOE STRUT COMPRESSION SPRING(See page 33-16)

6. REMOVE PARKING BRAKE SHOE STRUT LH(See page 33-16)

7. REMOVE PARKING BRAKE SHOE(See page 33-16)

8. REMOVE PARKING BRAKE CABLE HEAT INSULATOR

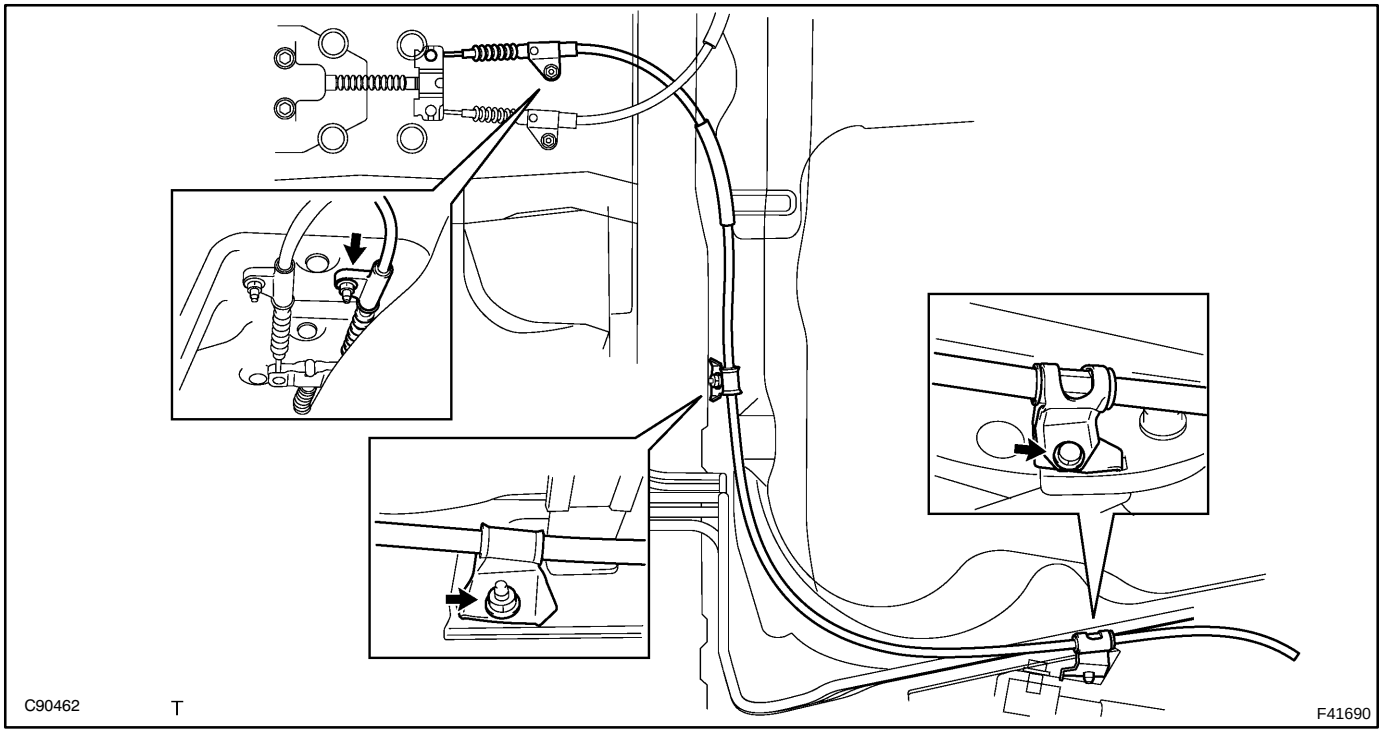
(a) Remove the 3 nuts and parking brake heat insulator.



9. REMOVE PARKING BRAKE CABLE ASSY NO.3

(a) Remove the 2 bolts and disconnect the parking brake cable assy No.3 from the backing plate.

(b) Remove the 2 nuts, bolt and parking brake cable assy No.3.



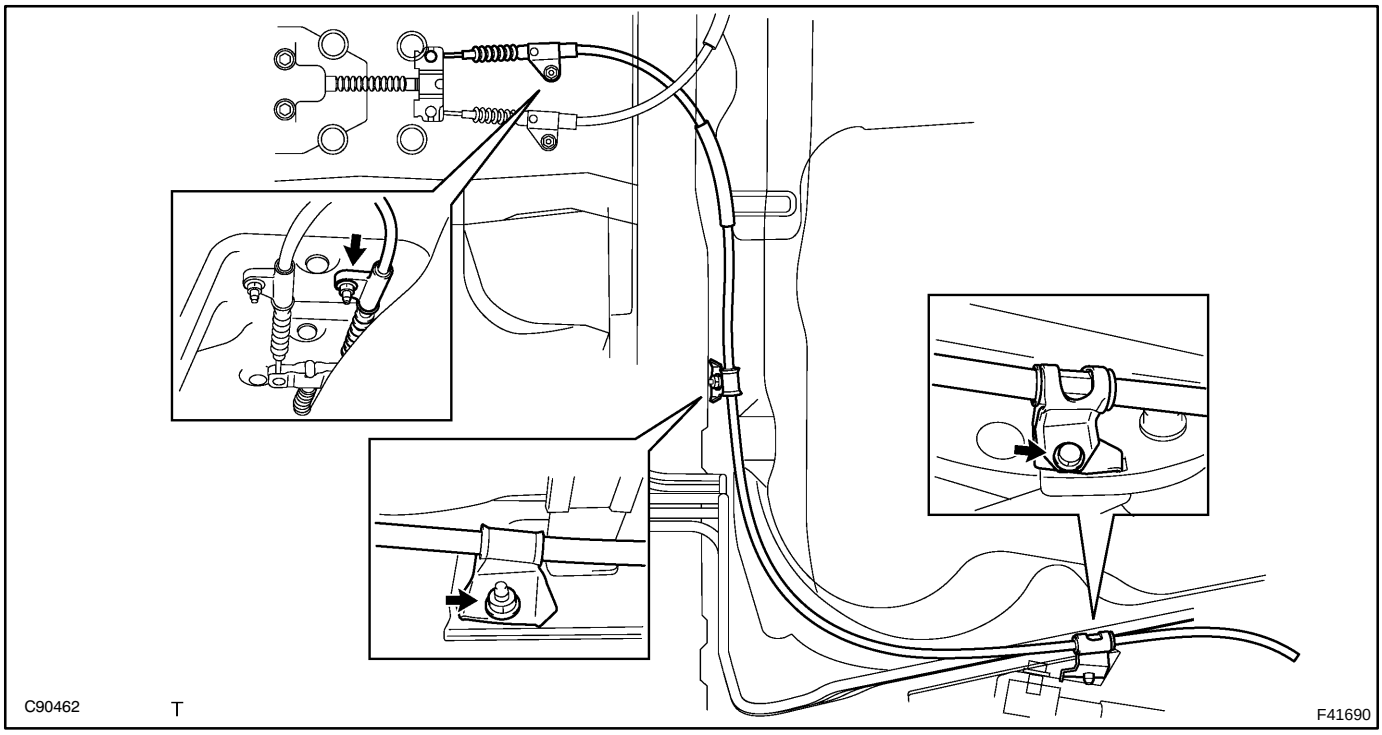
(c) Disconnect the parking brake cable assy No.3 from the parking brake equalizer.

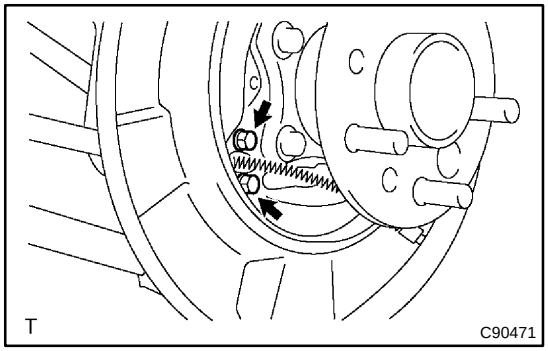
10. INSTALL PARKING BRAKE CABLE ASSY NO.3

(a) Connect the parking brake cable assy No.3 to the parking brake equalizer.

(b) Install the parking brake cable assy No.3 with the 2 nuts and bolt.

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





(c) Install the parking brake cable assy No.3 with the 2 bolts to the backing plate.

Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

11. INSTALL PARKING BRAKE CABLE HEAT INSULATOR

(a) Install the parking brake heat insulator with the 3 nuts.

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

12. APPLICATION HIGH TEMPERATURE GREASE(See page 33-16)

13. INSTALL PARKING BRAKE SHOE(See page 33-16)

14. INSTALL PARKING BRAKE SHOE STRUT LH(See page 33-16)
15. INSTALL PARKING BRAKE SHOE STRUT COMPRESSION SPRING(See page 33-16)
16. INSTALL PARKING BRAKE SHOE RETURN TENSION SPRING(See page 33-16)
17. CHECK PARKING BRAKE INSTALLATION(See page 33-16)
18. INSTALL REAR DISC(See page 33-16)
19. ADJUST PARKING BRAKE SHOE CLEARANCE(See page 33-16)
20. INSTALL REAR DISC BRAKE CALIPER ASSY LH
(a) Install the rear disc brake caliper with the 2 bolts.
Torque: 47 N·m (480 kgf·cm, 35 ft·lbf)
21. INSTALL REAR WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
22. INSPECT AND ADJUST PARKING BRAKE PEDAL TRAVEL(See page 33-2)

PARKING BRAKE CABLE ASSY NO.4

3305L-02

REPLACEMENT

HINT:

COMPONENTS: See page 71-8 and 33-3

1. REMOVE CONSOLE PANEL UPPER REAR(See page 71-1 1)

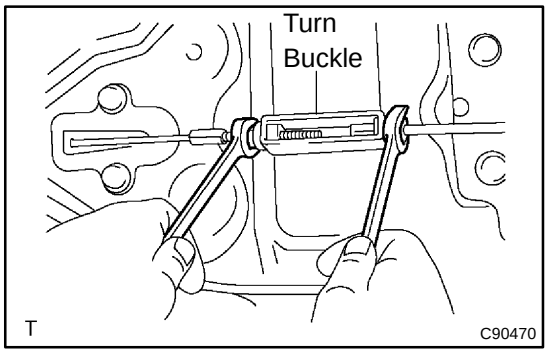
2. REMOVE CONSOLE BOX CARPET

3. REMOVE RR CONSOLE BOX(See page 71-1 1)

4. REMOVE CONSOLE BOX MOUNTING BRACKET NO.2

(a) Remove the 2 bolts and console box mounting bracket No.2.

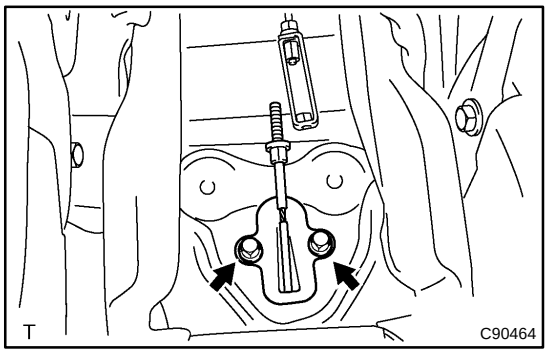
5. REMOVE YAWRATE SENSOR (W/ VSC)(See page 32-59)



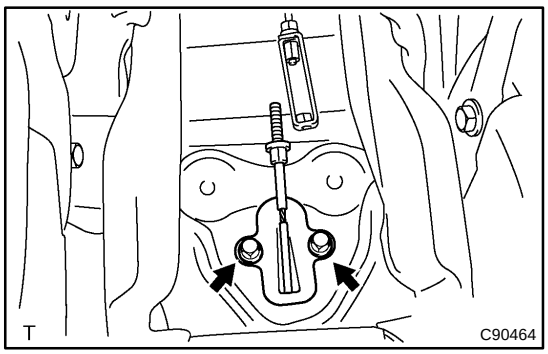
6. REMOVE PARKING BRAKE CABLE ASSY NO.4

(a) Loosen the turn buckle, disconnect the parking brake cable assy No.4 from the parking brake cable assy No.1.

(b) Disconnect the parking brake cable assy No.4 from the parking brake equalizer.



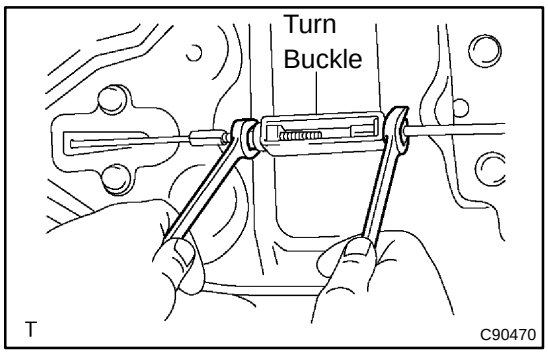
(c) Remove the 2 bolts and parking brake cable assy No.4.



7. INSTALL PARKING BRAKE CABLE ASSY NO.4

(a) Install the parking brake cable No.4 with the 2 bolts.
Torque: 12.5 N·m (128 kgf·cm, 9 ft·lbf)

(b) Connect the parking brake cable assy No.4 to the parking brake equalizer.



(c) Tighten the turn buckle, connect the parking brake cable assy No.4 to the parking brake cable assy No.1.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

8. INSTALL YAWRATE SENSOR (W/ VSC)(See page 32-59)
9. INSTALL CONSOLE BOX MOUNTING BRACKET NO.2
(a) Install the console box mounting bracket No.2 with the 2 bolts.
Torque: 12.5 N·m (128 kgf·cm, 9 ft·lbf)
10. INSTALL RR CONSOLE BOX
11. INSTALL CONSOLE BOX CARPET
12. INSTALL CONSOLE PANEL UPPER REAR
13. INSPECT AND ADJUST PARKING BRAKE PEDAL TRAVEL
14. CHECK VSC SENSOR SIGNAL (W/ VSC)(See page 05-471)

PARKING BRAKE ASSY

3305M-03

OVERHAUL

HINT:

- COMPONENTS: See page 33-3
- Overhaul the RH side by the same procedures with LH side.

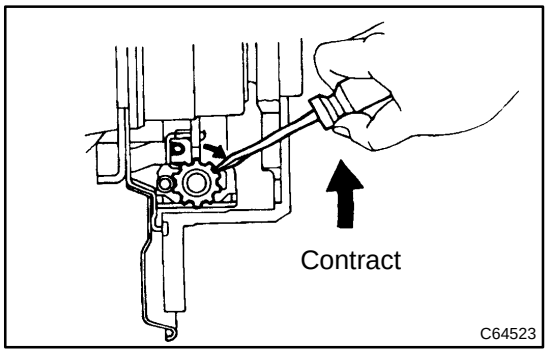
1. REMOVE REAR WHEEL

2. REMOVE REAR DISC BRAKE CALIPER ASSY LH

(a) Remove the 2 bolts and separate the rear disc brake caliper assy LH.

HINT:

Do not disconnect the flexible hose from the brake caliper.

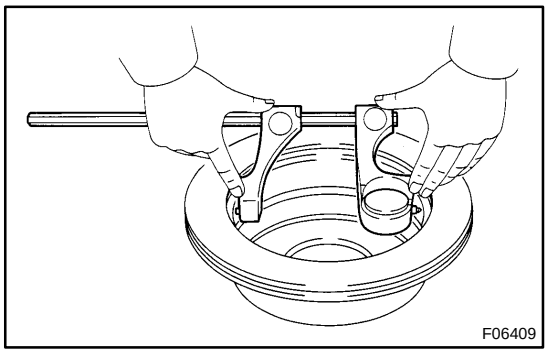


3. REMOVE REAR DISC

(a) Release the parking brake, and remove the rear disc.

HINT:

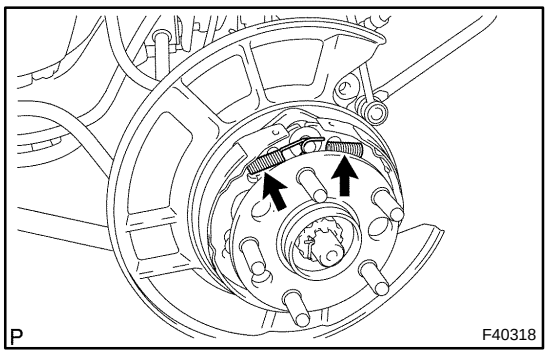
- Put matchmarks on the disc and the axle hub.
- If the disc cannot be removed easily, turn the shoe adjuster until the wheel turns freely.



4. INSPECT BRAKE DISC INSIDE DIAMETER

(a) Using a brake drum gauge or equivalent, measure the inside diameter of the disc.

Standard inside diameter: 170 mm (6.69 in.)
Maximum inside diameter: 171 mm (6.73 in.)



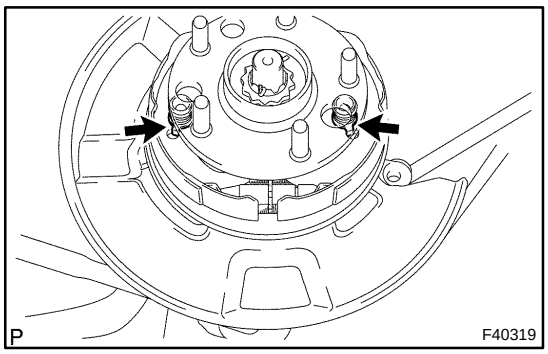
5. REMOVE PARKING BRAKE SHOE RETURN TENSION SPRING

(a) Using a needle-nose pliers, remove the 2 return tension springs.

6. REMOVE PARKING BRAKE SHOE STRUT COMPRESSION SPRING

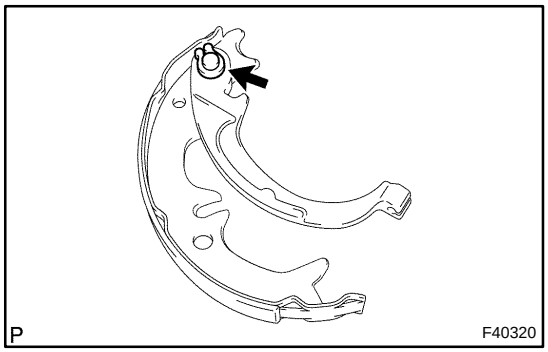
(a) Slide out the front shoe and remove the compression spring.

7. REMOVE PARKING BRAKE SHOE STRUT LH

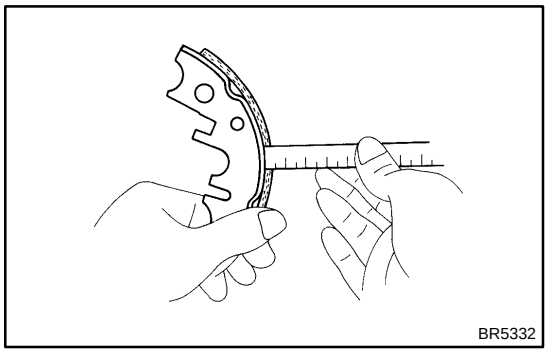


8. REMOVE PARKING BRAKE SHOE

(a) Release the cup claw and remove the front and rear parking brake shoe.
(b) Disconnect the parking brake cable from the shoe lever.
(c) Remove the tension spring and shoe adjuster screw set from the front and rear shoe.
(d) Remove the 2 shoe hold-down springs, 4 cups and 2 pins.



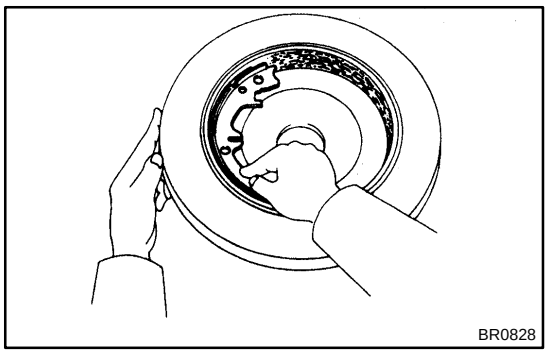
(e) Using a screwdriver, remove the C-washer.
(f) Remove the shim and shoe lever from the parking brake shoe.



9. INSPECT PARKING BRAKE SHOE LINING THICKNESS

(a) Using a ruler, measure the thickness of the shoe lining.
Standard thickness: 2.0 mm (0.079 in.)
Minimum thickness: 1.0 mm (0.039 in.)

If the lining thickness is at the minimum thickness or less, or if there is severe, uneven wear, replace the brake shoe.



10. INSPECT BRAKE DISC AND PARKING BRAKE SHOE LINING FOR PROPER CONTACT

(a) Apply chalk to the inside surface of the disc, then grind down the brake shoe lining to fit.

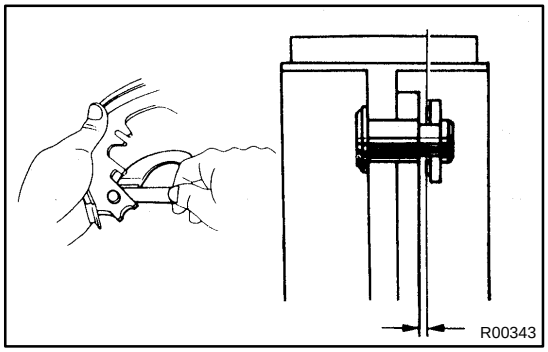
If the contact between the brake disc and the shoe lining is improper, repair it using a brake shoe grinder or replace the brake shoe assembly.

11. APPLICATION HIGH TEMPERATURE GREASE

(a) Apply the high temperature grease to the shoe attached surface of backing plate.

12. INSTALL PARKING BRAKE SHOE

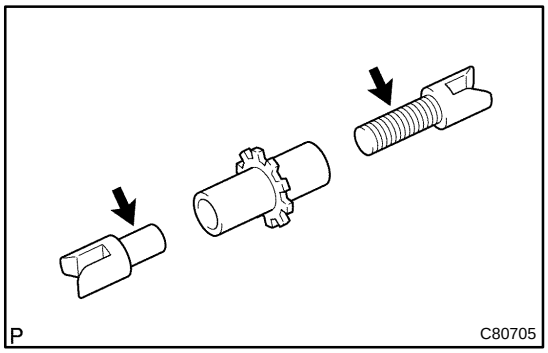
(a) Install the shoe lever and shim to the rear shoe with a new C-washer .



(b) Using a feeler gauge, measure the clearance.
Standard clearance: Less than 0.35 mm (0.0138 in.)

If the clearance is not within the specification, replace the shim with one of the correct size.

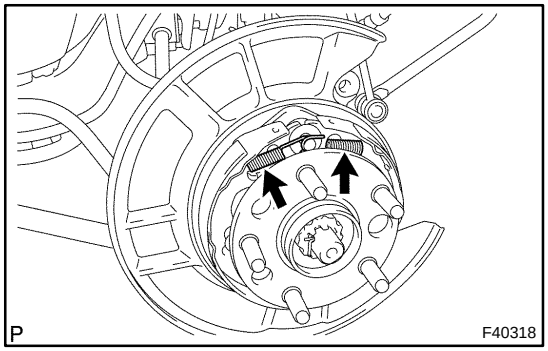
Shim Thickness	Shim Thickness
0.3 mm (0.012 in.)	0.9 mm (0.035 in.)
0.6 mm (0.024 in.)	-



(c) Apply the high temperature grease to the adjusting bolt.
(d) Install the shoe adjusting screw set and tension spring to the front and rear shoe.
(e) Install the 2 pins, 4 cups and 2 shoe hold-down springs.
(f) Connect the parking brake cable to the shoe lever.
(g) Install the front and rear parking brake shoe.

13. INSTALL PARKING BRAKE SHOE STRUT LH

14. INSTALL PARKING BRAKE SHOE STRUT COMPRESSION SPRING



15. INSTALL PARKING BRAKE SHOE RETURN TENSION SPRING

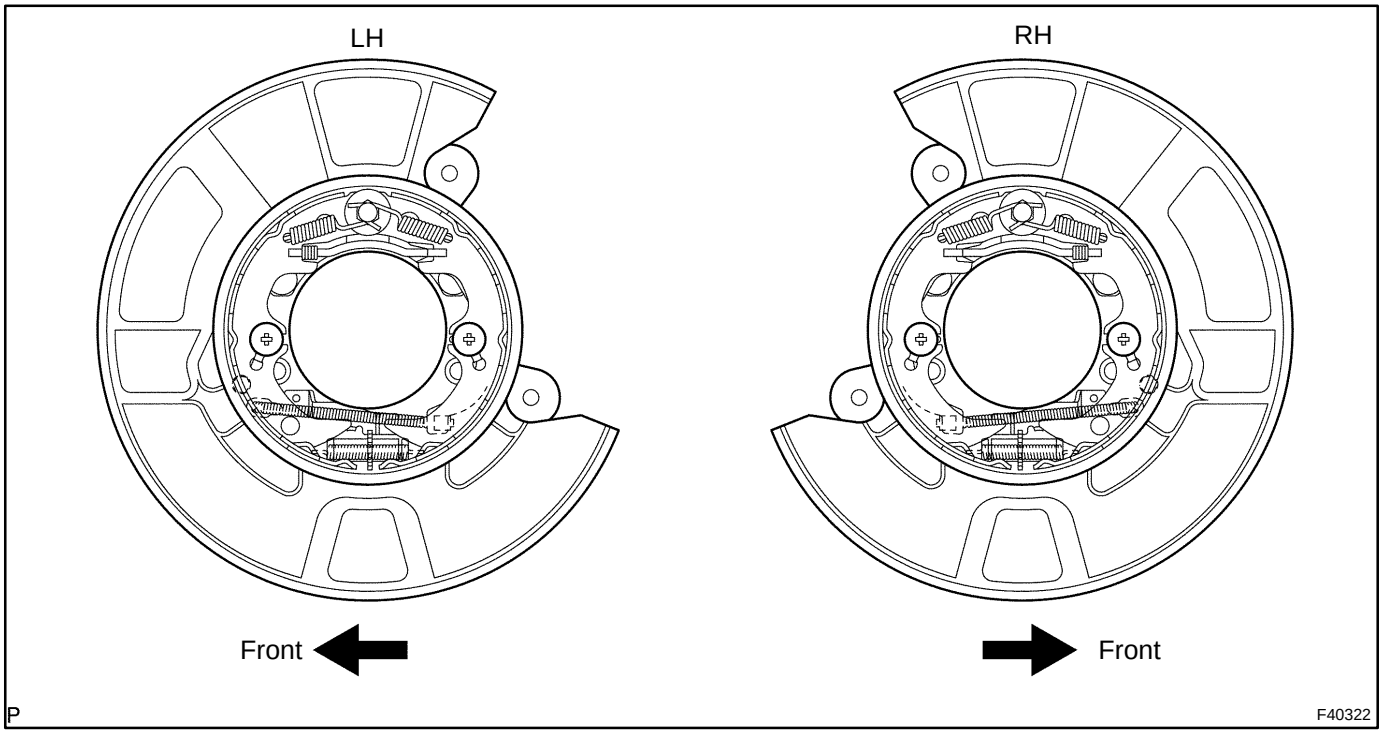
(a) Using a needle nose pliers, install the 2 return tension springs.

16. CHECK PARKING BRAKE INSTALLATION

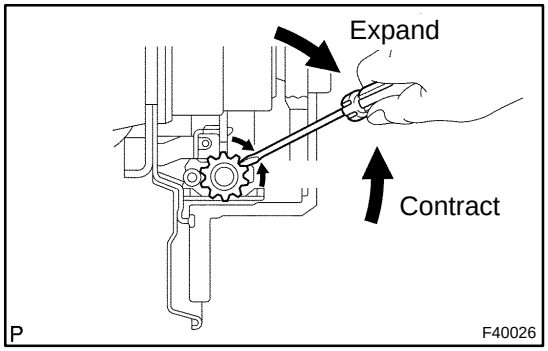
(a) Check that each part is installed properly.

NOTICE:

There should be no oil or grease adhering to the friction surface of the shoe lining and disc.



17. INSTALL REAR DISC(See page 32-41)



18. ADJUST PARKING BRAKE SHOE CLEARANCE

(a) Temporarily install the hub nuts.

(b) Remove the hole plug, and turn the adjuster and expand the shoes until the disc locks.

(c) Contract the shoe adjuster until the disc can rotate smoothly.

Standard : Return 8 notches

(d) Check shoe is no brake drag.

(e) Install the hole plug.

19. INSTALL REAR DISC BRAKE CALIPER ASSY LH

(a) Install the rear disc brake caliper with the 2 bolts.

Torque: 47 N·m (480 kgf·cm, 35 ft·lbf)

20. INSTALL REAR WHEEL

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

21. INSPECT AND ADJUST PARKING BRAKE PEDAL TRAVEL(See page 33-2)

PARKING BRAKE SYSTEM

3305F-02

PROBLEM SYMPTOMS TABLE

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Brake drag	1. Parking brake pedal or lever travel (Out of adjustment)	33-2
	2. Parking brake wire (Sticking)	33-8 33-11 33-14
	3. Parking brake shoe clearance (Out of adjustment)	33-16
	4. Parking brake shoe lining (Cracked or distorted)	33-16
	5. Tension or return spring (Damaged)	33-16

3305G-02

ADJUSTMENT

1. REMOVE REAR WHEEL

2. ADJUST PARKING BRAKE SHOE CLEARANCE(See page 33-16)

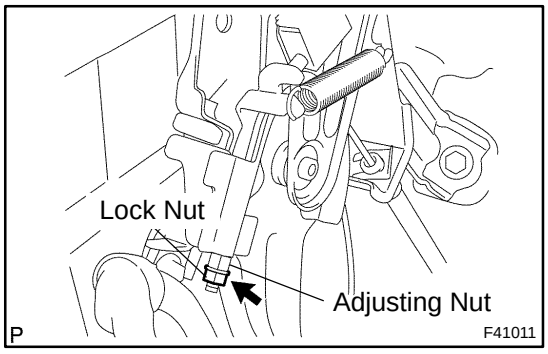
3. INSTALL REAR WHEEL

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

4. INSPECT PARKING BRAKE PEDAL TRAVEL

(a) Slowly depress the parking brake pedal all the way, and count the number of clicks.

Parking brake pedal travel: 3 - 6 clicks at 300 N (31 kgf, 68.3 lbf)



5. ADJUST PARKING BRAKE PEDAL TRAVEL

(a) Depress the parking brake pedal 3 notches to make a room for the procedure, and loosen the lock nut.

(b) Return the parking brake pedal to the original position.

(c) Turn the adjusting nut until the parking brake pedal travel is correct.

(d) Depress the parking brake pedal 3 notches to make a room for the procedure, and tighten the lock nut.

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

(e) Return the parking brake pedal to the original position.

(f) Check whether parking brake drags or not.

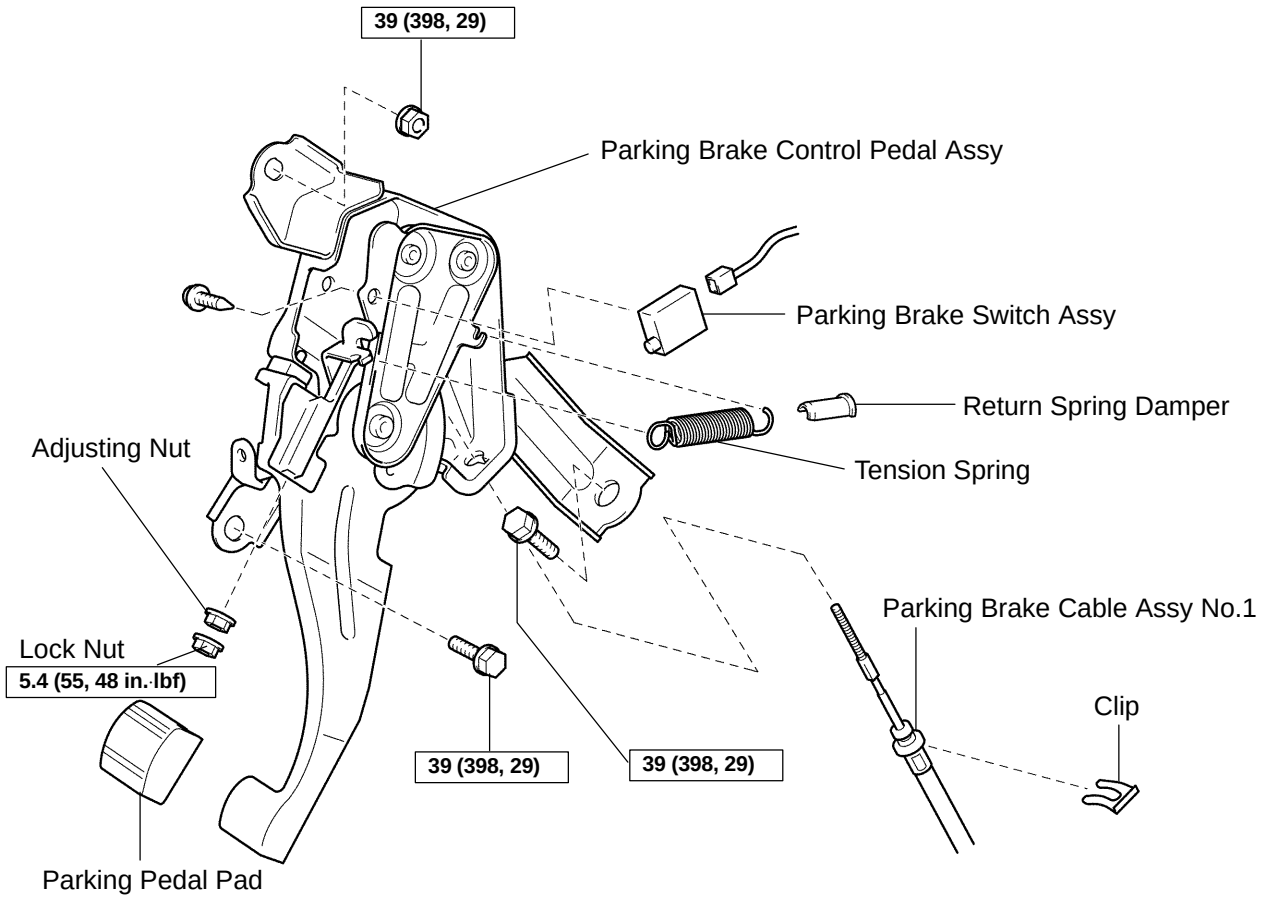
(g) When operating the parking brake pedal, check that the parking brake pedal indicator light lights up.

PARKING BRAKE

3305H-02

COMPONENTS

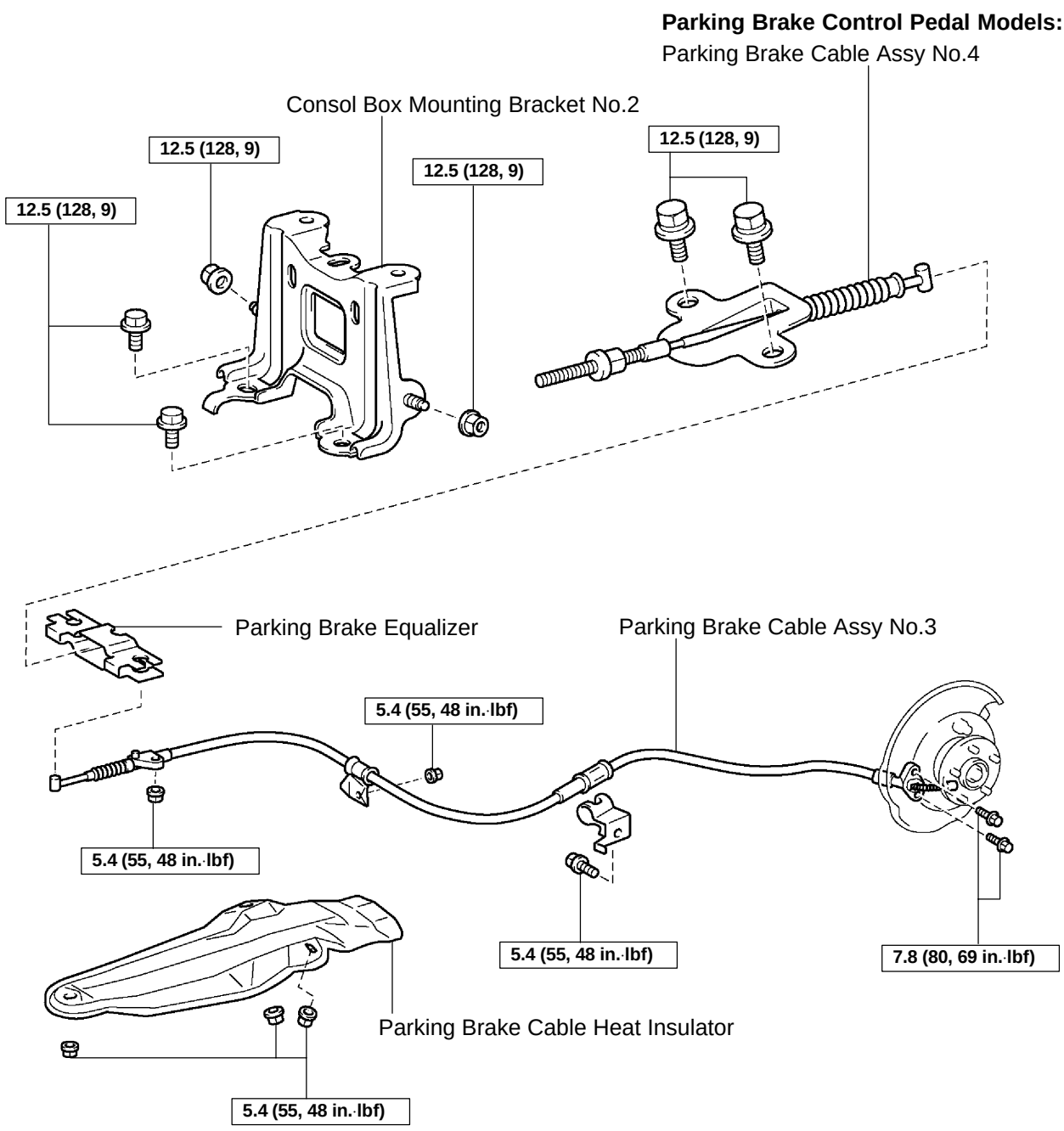
Parking Brake Control Pedal Assy:



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

F41008

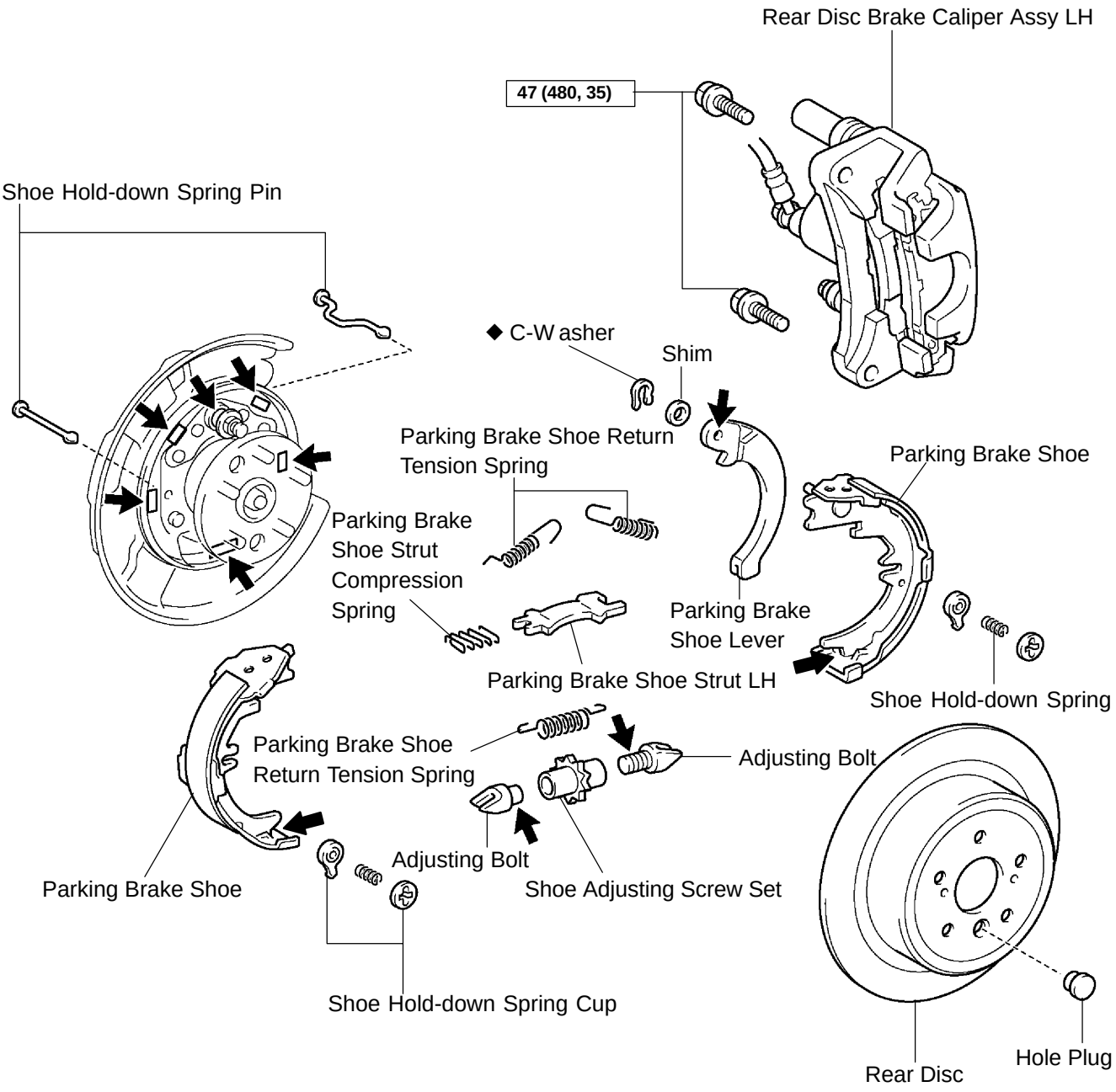
Parking Brake Cable:



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

C90467 F41686

Parking Brake Assy:



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

C90458 F41967

PARKING BRAKE CONTROL PEDAL ASSY

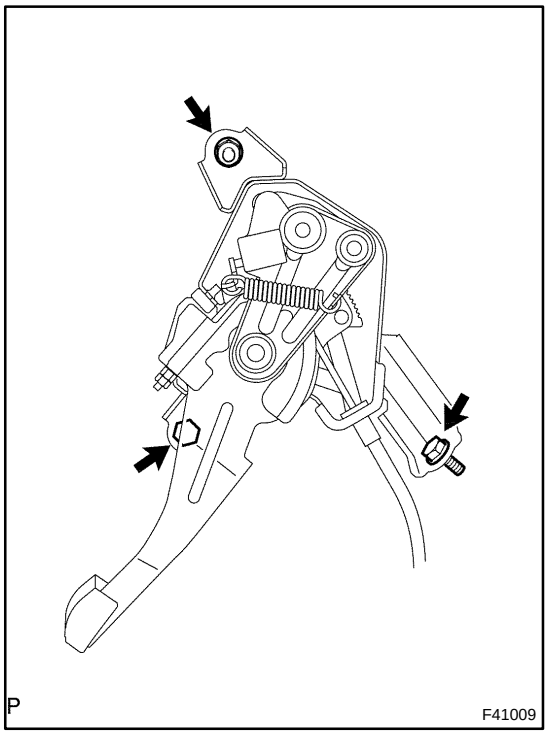
3305I-02

OVERHAUL

HINT:

COMPONENTS: See page 71-8 and 33-3

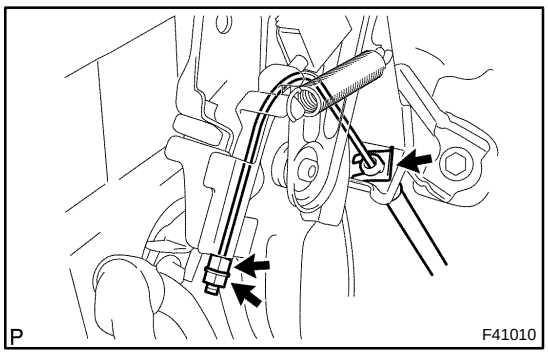
1. **REMOVE INSTRUMENT CLUSTER FINISH PANEL SUB-ASSY(See page 71-1 1)**
2. **REMOVE COMBINATION METER ASSY(See page 71-1 1)**
3. **REMOVE FRONT DOOR SCUFF PLATE LH(See page 71-1 1)**
4. **REMOVE INSTRUMENT PANEL SUB-ASSY UPPER(See page 71-1 1)**
5. **REMOVE INSTRUMENT PANEL INSERT SUB-ASSY LOWER LH(See page 71-1 1)**



6. **REMOVE PARKING BRAKE CONTROL PEDAL ASSY**

(a) Disconnect the parking brake switch connector.

(b) Remove the 2 bolts, nut and parking brake control pedal assy.



7. **DISCONNECT PARKING BRAKE CABLE ASSY NO.1**

(a) Remove the lock nut, adjusting nut and clip, then disconnect the parking brake cable assy No.1 from the parking brake control pedal assy.

8. **REMOVE PARKING BRAKE SWITCH ASSY**

(a) Remove the screw and parking brake switch assy.

9. **REMOVE TENSION SPRING**
10. **REMOVE RETURN SPRING DAMPER**
11. **REMOVE PARKING PEDAL PAD**

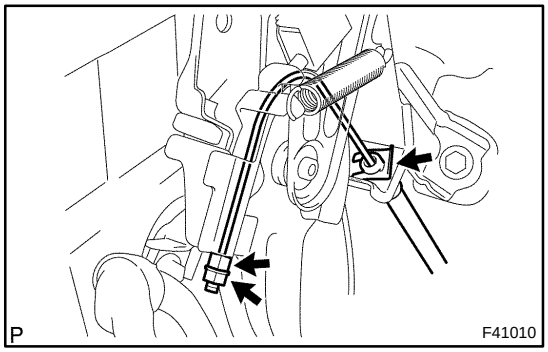
12. INSTALL PARKING PEDAL PAD

13. INSTALL RETURN SPRING DAMPER

14. INSTALL TENSION SPRING

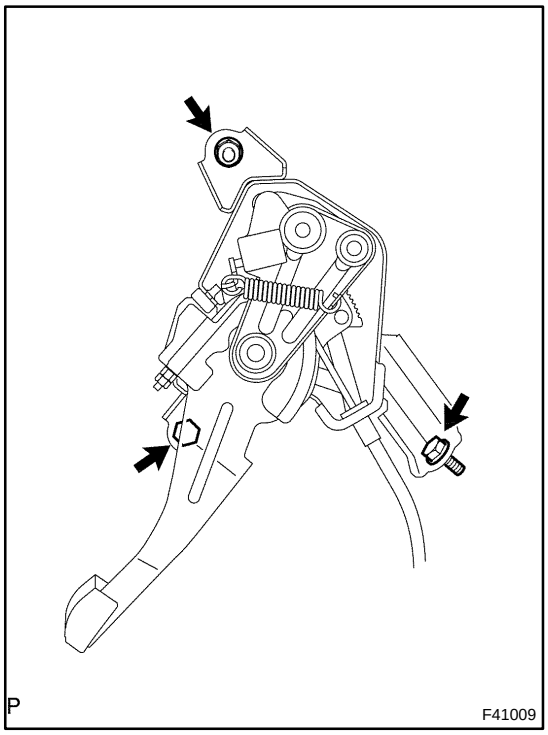
15. INSTALL PARKING BRAKE SWITCH ASSY

(a) Install the parking brake switch assy with the screw.



16. CONNECT PARKING BRAKE CABLE ASSY NO.1

(a) Connect the parking brake cable assy No.1 with the clip, adjusting nut and lock nut.



17. INSTALL PARKING BRAKE CONTROL PEDAL ASSY

(a) Install the parking brake control pedal assy with the 2 bolts and nut.

Torque: 39 N·m (398 kgf·cm, 29 ft·lbf)

(b) Connect the parking brake switch connector.

18. INSTALL INSTRUMENT PANEL INSERT SUB-ASSY LOWER LH

19. INSTALL INSTRUMENT PANEL SUB-ASSY UPPER

20. INSTALL FRONT DOOR SCUFF PLATE LH

21. INSTALL COMBINATION METER ASSY

22. INSTALL INSTRUMENT CLUSTER FINISH PANEL SUB-ASSY

23. INSPECT AND ADJUST PARKING BRAKE PEDAL TRAVEL(See page 33-2)

PARKING BRAKE CABLE ASSY NO.1

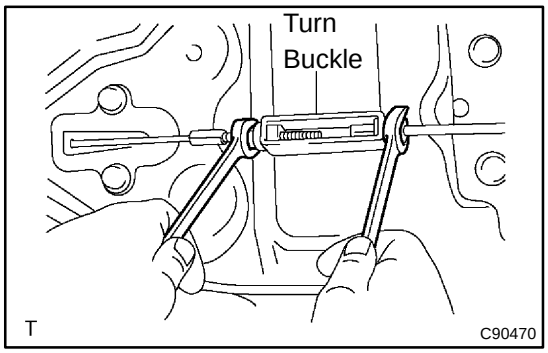
3305J-02

REPLACEMENT

HINT:

COMPONENTS: See page 71-8 and 33-3

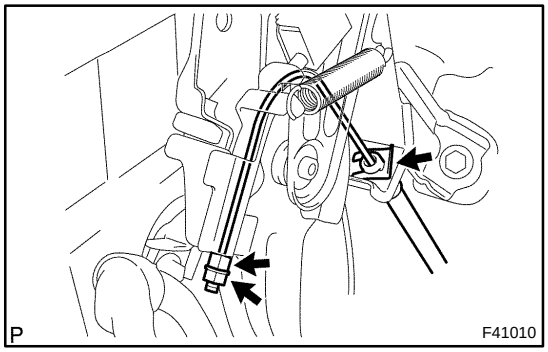
1. **REMOVE FRONT DOOR SCUFF PLATE RH**
2. **REMOVE FRONT DOOR SCUFF PLATE LH**
3. **REMOVE INSTRUMENT PANEL SUB-ASSY UPPER(See page 71-1 1)**
4. **REMOVE INSTRUMENT PANEL INSERT SUB-ASSY LOWER LH(See page 71-1 1)**
5. **REMOVE INSTRUMENT PANEL UNDER COVER SUB-ASSY NO.1(See page 71-1 1)**
6. **REMOVE INSTRUMENT PANEL SUB-ASSY LOWER(See page 71-1 1)**
7. **REMOVE CONSOLE PANEL UPPER REAR(See page 71-1 1)**
8. **REMOVE CONSOLE BOX CARPET**
9. **REMOVE RR CONSOLE BOX(See page 71-1 1)**
10. **REMOVE INSTRUMENT PANEL FINISH PANEL END RH**
11. **REMOVE INSTRUMENT PANEL FINISH PANEL END LH(See page 71-1 1)**
12. **REMOVE AIR DUCT REAR NO.1**
13. **REMOVE AIR DUCT REAR NO.2**
14. **REMOVE CONSOLE BOX DUCT NO.1**
15. **REMOVE YAWRATE SENSOR (W/ VSC)(See page 32-59)**



16. REMOVE PARKING BRAKE CABLE ASSY NO.1

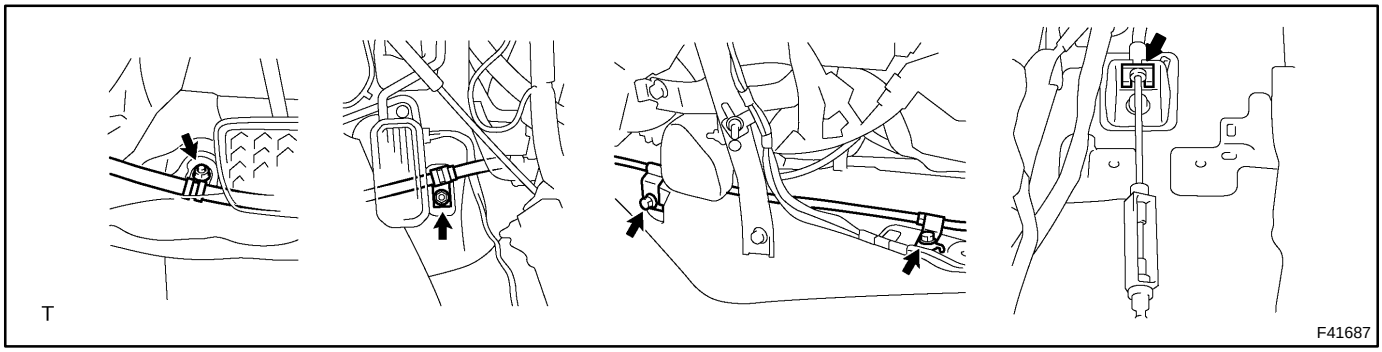
(a) Loosen the turn buckle, disconnect the parking brake cable assy No.1 from the parking brake cable assy No.4.

(b) Remove the 2 bolts and console box mounting bracket No.2.



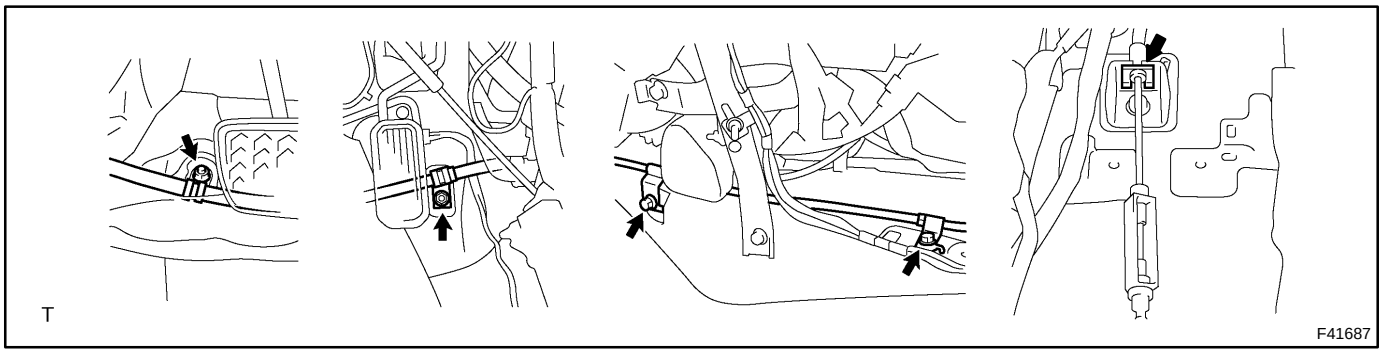
(c) Remove the lock nut, adjusting nut and clip, then disconnect the parking brake cable assy No.1 from the parking brake control pedal assy.

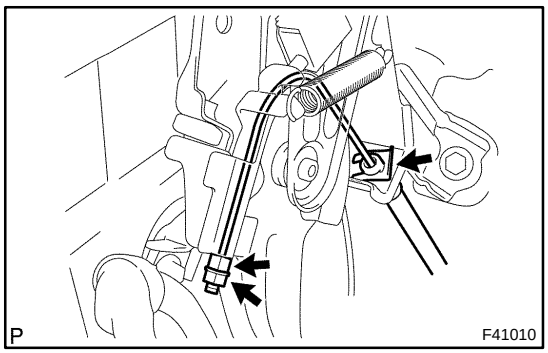
(d) Remove the 2 nuts, 2 bolts, clip and parking brake cable assy No.1.



17. INSTALL PARKING BRAKE CABLE ASSY NO.1

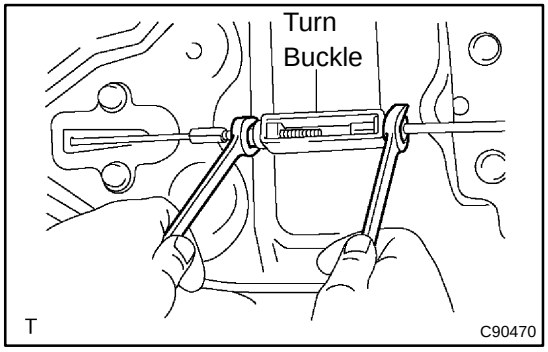
(a) Install the parking brake cable assy No.1 with the 2 nuts, 2 bolts and clip.





(b) Install the parking brake cable assy No.1 with the clip, adjusting nut and lock nut to the parking brake control pedal assy.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(c) Install the console box mounting bracket No.2 with the 2 bolts.
Torque: 12.5 N·m (128 kgf·cm, 9 ft·lbf)



(d) Tighten the turn buckle, connect the parking brake cable assy No.1 to the parking brake cable assy No.4.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

18. **INSTALL YAWRATE SENSOR (W/ VSC)(See page 32-59)**
19. **INSTALL CONSOLE BOX DUCT NO.1**
20. **INSTALL AIR DUCT REAR NO.2**
21. **INSTALL AIR DUCT REAR NO.1**
22. **INSTALL INSTRUMENT PANEL FINISH PANEL END LH**
23. **INSTALL INSTRUMENT PANEL FINISH PANEL END RH**
24. **INSTALL RR CONSOLE BOX**
25. **INSTALL CONSOLE BOX CARPET**
26. **INSTALL CONSOLE PANEL UPPER REAR**
27. **INSTALL INSTRUMENT PANEL SUB-ASSY LOWER**
28. **INSTALL INSTRUMENT PANEL UNDER COVER SUB-ASSY NO.1**
29. **INSTALL INSTRUMENT PANEL INSERT SUB-ASSY LOWER LH**
30. **INSTALL INSTRUMENT PANEL SUB-ASSY UPPER**
31. **INSTALL FRONT DOOR SCUFF PLATE LH**
32. **INSTALL FRONT DOOR SCUFF PLATE RH**
33. **INSPECT AND ADJUST PARKING BRAKE PEDAL TRAVEL(See page 33-2)**
34. **CHECK VSC SENSOR SIGNAL (W/ VSC)(See page 05-471)**

PARKING BRAKE CABLE ASSY NO.3

3305K-02

REPLACEMENT

HINT:

- COMPONENTS: See page 33-3
- For parking brake cable No.2, employ the same procedure to the RH side.

1. REMOVE REAR WHEEL

2. REMOVE REAR DISC BRAKE CALIPER ASSY LH

(a) Remove the 2 bolts and separate the rear disc brake caliper assy LH.

HINT:

Do not the flexible hose from the brake caliper assy LH.

3. REMOVE REAR DISC(See page 33-16)

4. REMOVE PARKING BRAKE SHOE RETURN TENSION SPRING(See page 33-16)

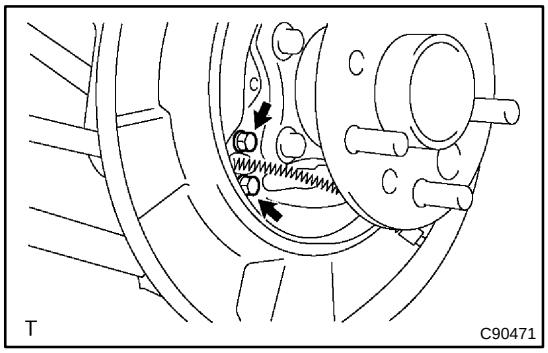
5. REMOVE PARKING BRAKE SHOE STRUT COMPRESSION SPRING(See page 33-16)

6. REMOVE PARKING BRAKE SHOE STRUT LH(See page 33-16)

7. REMOVE PARKING BRAKE SHOE(See page 33-16)

8. REMOVE PARKING BRAKE CABLE HEAT INSULATOR

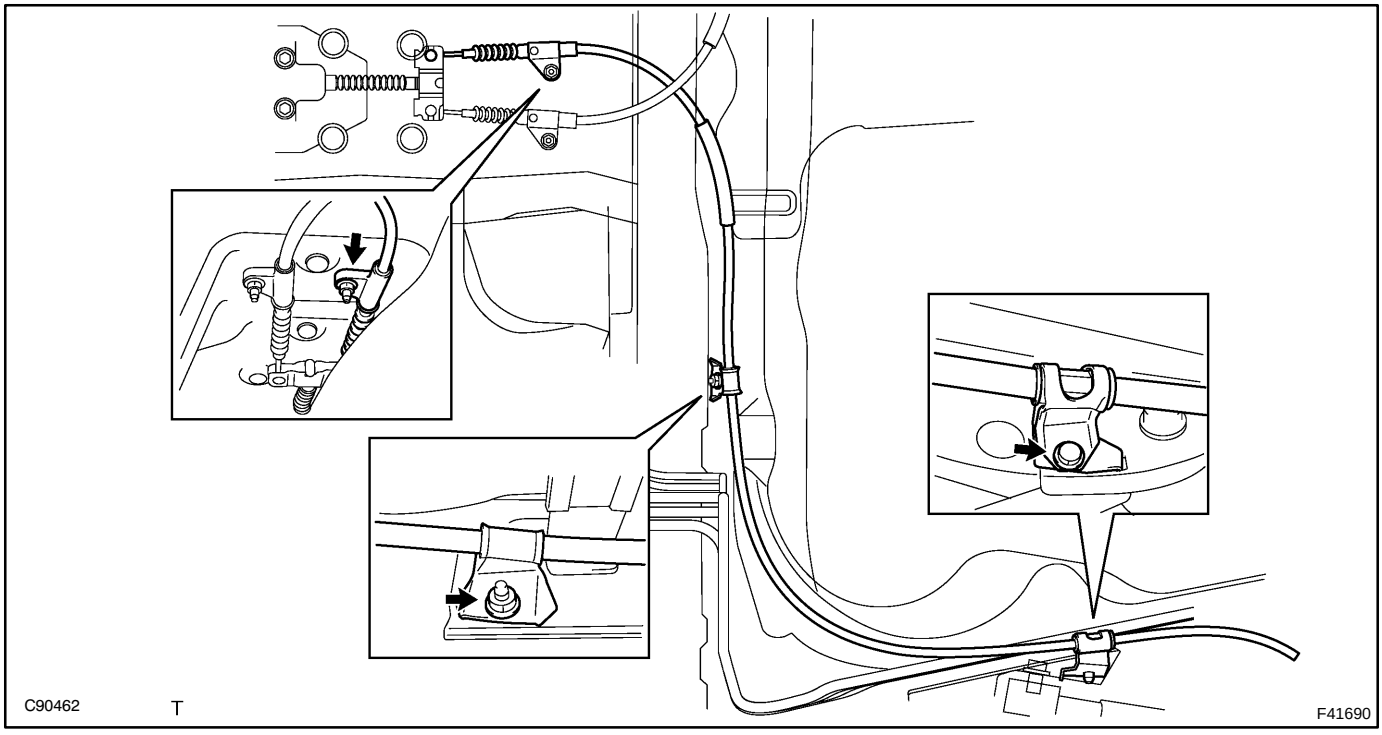
(a) Remove the 3 nuts and parking brake heat insulator.



9. REMOVE PARKING BRAKE CABLE ASSY NO.3

(a) Remove the 2 bolts and disconnect the parking brake cable assy No.3 from the backing plate.

(b) Remove the 2 nuts, bolt and parking brake cable assy No.3.



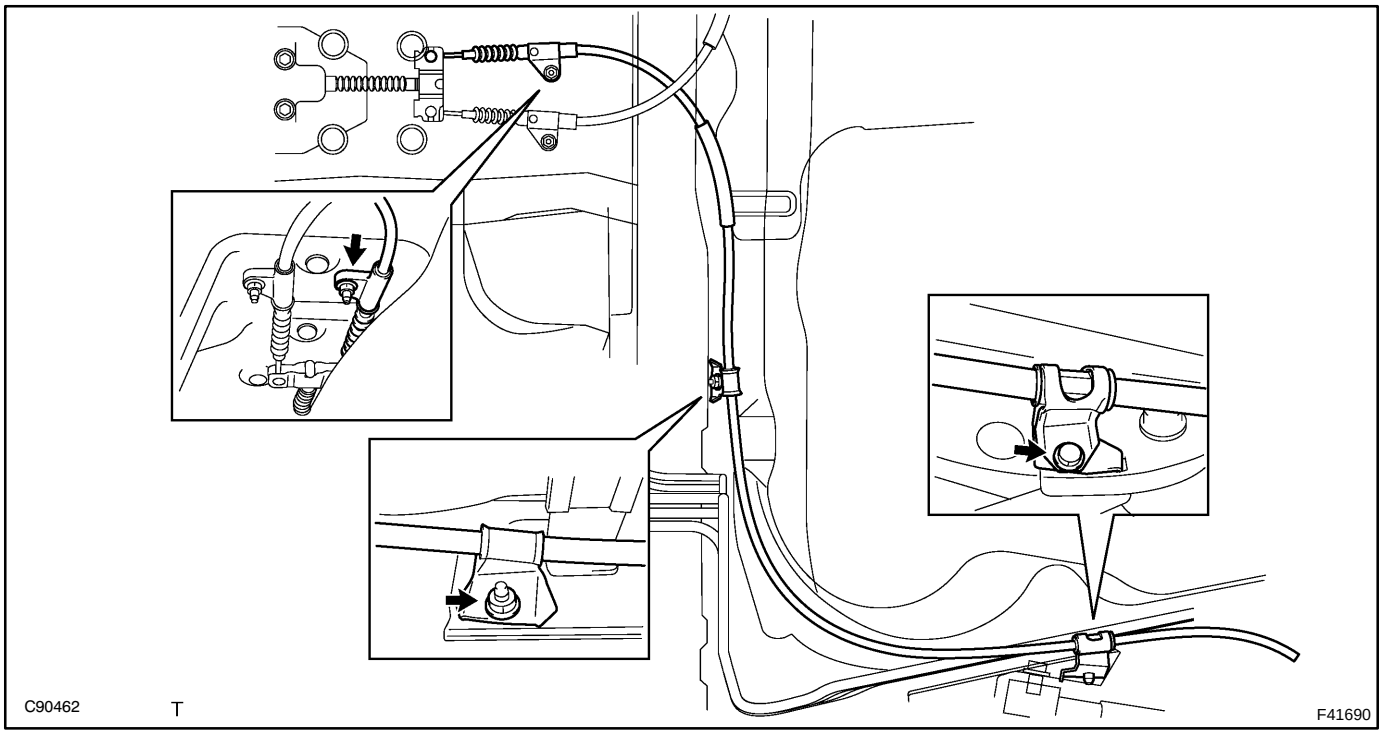
(c) Disconnect the parking brake cable assy No.3 from the parking brake equalizer.

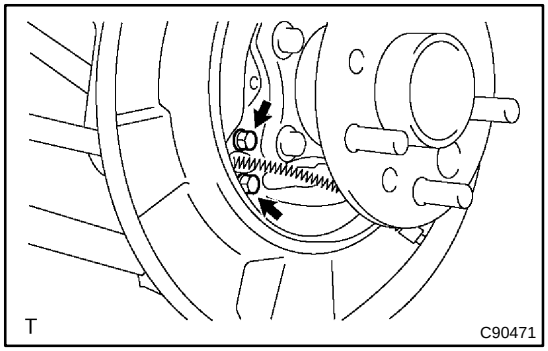
10. INSTALL PARKING BRAKE CABLE ASSY NO.3

(a) Connect the parking brake cable assy No.3 to the parking brake equalizer.

(b) Install the parking brake cable assy No.3 with the 2 nuts and bolt.

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





(c) Install the parking brake cable assy No.3 with the 2 bolts to the backing plate.

Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

11. INSTALL PARKING BRAKE CABLE HEAT INSULATOR

(a) Install the parking brake heat insulator with the 3 nuts.

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

12. APPLICATION HIGH TEMPERATURE GREASE(See page 33-16)

13. INSTALL PARKING BRAKE SHOE(See page 33-16)

14. INSTALL PARKING BRAKE SHOE STRUT LH(See page 33-16)
15. INSTALL PARKING BRAKE SHOE STRUT COMPRESSION SPRING(See page 33-16)
16. INSTALL PARKING BRAKE SHOE RETURN TENSION SPRING(See page 33-16)
17. CHECK PARKING BRAKE INSTALLATION(See page 33-16)
18. INSTALL REAR DISC(See page 33-16)
19. ADJUST PARKING BRAKE SHOE CLEARANCE(See page 33-16)
20. INSTALL REAR DISC BRAKE CALIPER ASSY LH
(a) Install the rear disc brake caliper with the 2 bolts.
Torque: 47 N·m (480 kgf·cm, 35 ft·lbf)
21. INSTALL REAR WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
22. INSPECT AND ADJUST PARKING BRAKE PEDAL TRAVEL(See page 33-2)

PARKING BRAKE CABLE ASSY NO.4

3305L-02

REPLACEMENT

HINT:

COMPONENTS: See page 71-8 and 33-3

1. REMOVE CONSOLE PANEL UPPER REAR(See page 71-1 1)

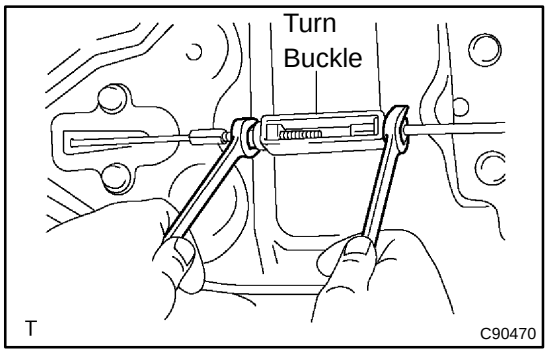
2. REMOVE CONSOLE BOX CARPET

3. REMOVE RR CONSOLE BOX(See page 71-1 1)

4. REMOVE CONSOLE BOX MOUNTING BRACKET NO.2

(a) Remove the 2 bolts and console box mounting bracket No.2.

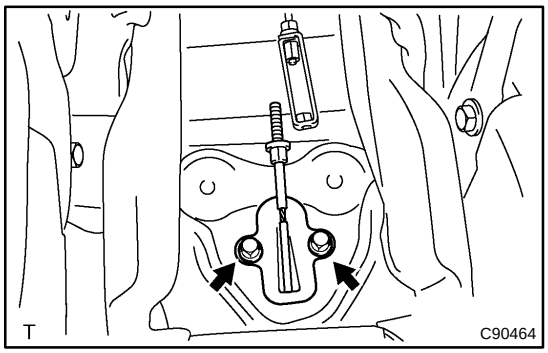
5. REMOVE YAWRATE SENSOR (W/ VSC)(See page 32-59)



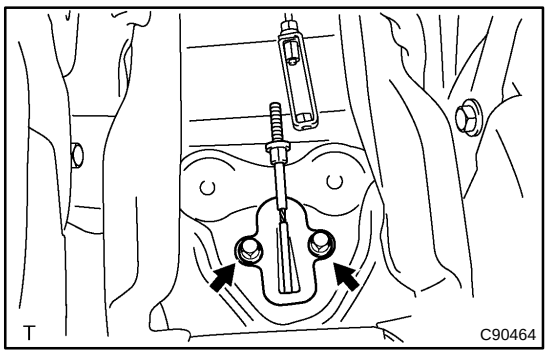
6. REMOVE PARKING BRAKE CABLE ASSY NO.4

(a) Loosen the turn buckle, disconnect the parking brake cable assy No.4 from the parking brake cable assy No.1.

(b) Disconnect the parking brake cable assy No.4 from the parking brake equalizer.



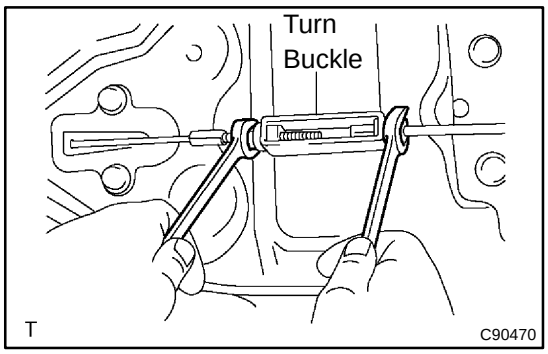
(c) Remove the 2 bolts and parking brake cable assy No.4.



7. INSTALL PARKING BRAKE CABLE ASSY NO.4

(a) Install the parking brake cable No.4 with the 2 bolts.
Torque: 12.5 N·m (128 kgf·cm, 9 ft·lbf)

(b) Connect the parking brake cable assy No.4 to the parking brake equalizer.



(c) Tighten the turn buckle, connect the parking brake cable assy No.4 to the parking brake cable assy No.1.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

8. INSTALL YAWRATE SENSOR (W/ VSC)(See page 32-59)
9. INSTALL CONSOLE BOX MOUNTING BRACKET NO.2
(a) Install the console box mounting bracket No.2 with the 2 bolts.
Torque: 12.5 N·m (128 kgf·cm, 9 ft·lbf)
10. INSTALL RR CONSOLE BOX
11. INSTALL CONSOLE BOX CARPET
12. INSTALL CONSOLE PANEL UPPER REAR
13. INSPECT AND ADJUST PARKING BRAKE PEDAL TRAVEL
14. CHECK VSC SENSOR SIGNAL (W/ VSC)(See page 05-471)

PARKING BRAKE ASSY

3305M-03

OVERHAUL

HINT:

- COMPONENTS: See page 33-3
- Overhaul the RH side by the same procedures with LH side.

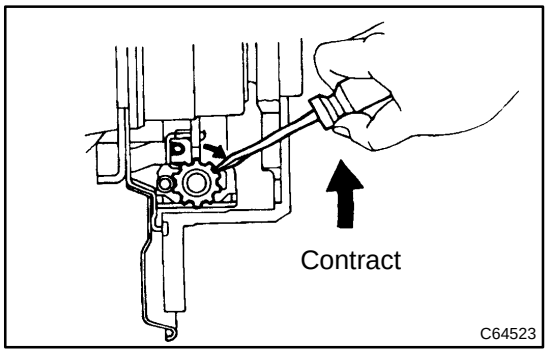
1. REMOVE REAR WHEEL

2. REMOVE REAR DISC BRAKE CALIPER ASSY LH

(a) Remove the 2 bolts and separate the rear disc brake caliper assy LH.

HINT:

Do not disconnect the flexible hose from the brake caliper.

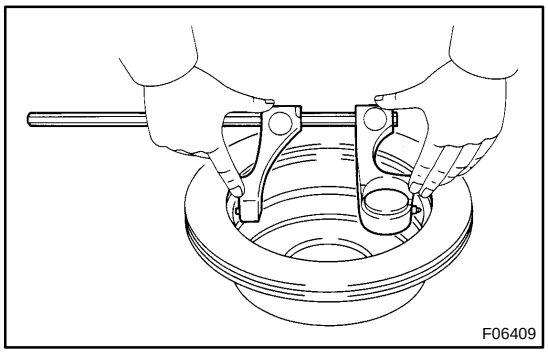


3. REMOVE REAR DISC

(a) Release the parking brake, and remove the rear disc.

HINT:

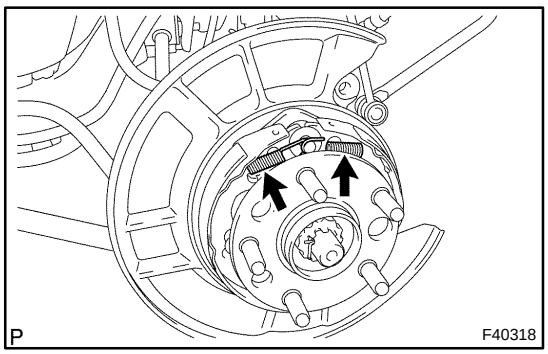
- Put matchmarks on the disc and the axle hub.
- If the disc cannot be removed easily, turn the shoe adjuster until the wheel turns freely.



4. INSPECT BRAKE DISC INSIDE DIAMETER

(a) Using a brake drum gauge or equivalent, measure the inside diameter of the disc.

Standard inside diameter: 170 mm (6.69 in.)
Maximum inside diameter: 171 mm (6.73 in.)



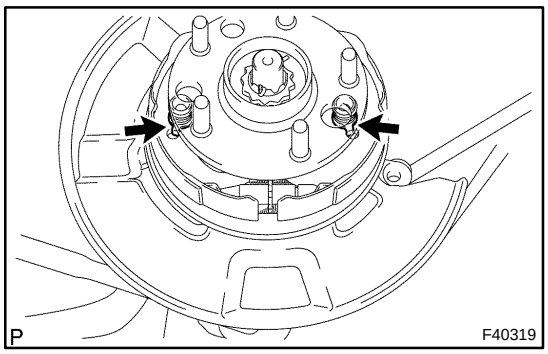
5. REMOVE PARKING BRAKE SHOE RETURN TENSION SPRING

(a) Using a needle-nose pliers, remove the 2 return tension springs.

6. REMOVE PARKING BRAKE SHOE STRUT COMPRESSION SPRING

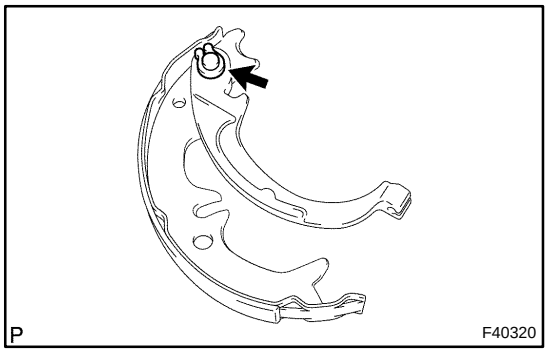
(a) Slide out the front shoe and remove the compression spring.

7. REMOVE PARKING BRAKE SHOE STRUT LH

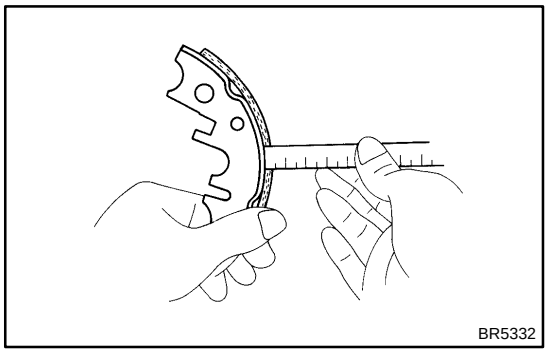


8. REMOVE PARKING BRAKE SHOE

(a) Release the cup claw and remove the front and rear parking brake shoe.
(b) Disconnect the parking brake cable from the shoe lever.
(c) Remove the tension spring and shoe adjuster screw set from the front and rear shoe.
(d) Remove the 2 shoe hold-down springs, 4 cups and 2 pins.



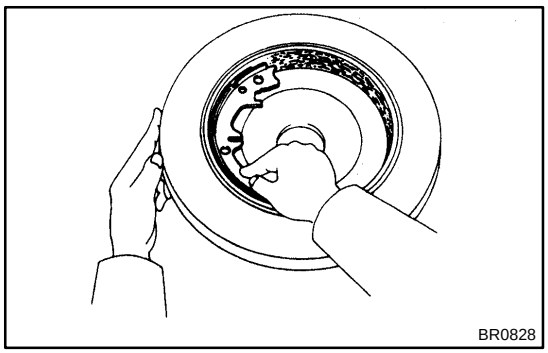
(e) Using a screwdriver, remove the C-washer.
(f) Remove the shim and shoe lever from the parking brake shoe.



9. INSPECT PARKING BRAKE SHOE LINING THICKNESS

(a) Using a ruler, measure the thickness of the shoe lining.
Standard thickness: 2.0 mm (0.079 in.)
Minimum thickness: 1.0 mm (0.039 in.)

If the lining thickness is at the minimum thickness or less, or if there is severe, uneven wear, replace the brake shoe.



10. INSPECT BRAKE DISC AND PARKING BRAKE SHOE LINING FOR PROPER CONTACT

(a) Apply chalk to the inside surface of the disc, then grind down the brake shoe lining to fit.

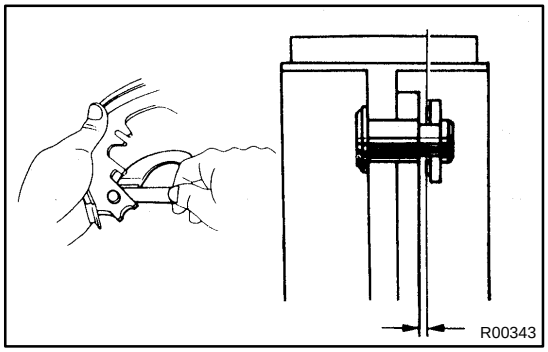
If the contact between the brake disc and the shoe lining is improper, repair it using a brake shoe grinder or replace the brake shoe assembly.

11. APPLICATION HIGH TEMPERATURE GREASE

(a) Apply the high temperature grease to the shoe attached surface of backing plate.

12. INSTALL PARKING BRAKE SHOE

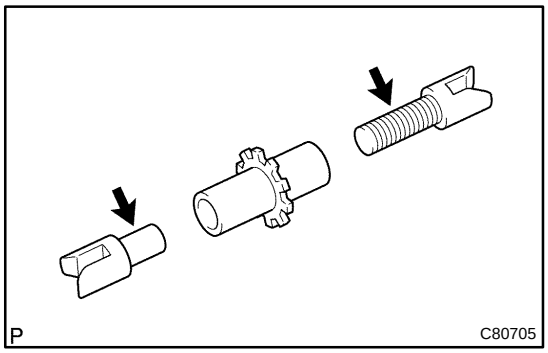
(a) Install the shoe lever and shim to the rear shoe with a new C-washer .



(b) Using a feeler gauge, measure the clearance.
Standard clearance: Less than 0.35 mm (0.0138 in.)

If the clearance is not within the specification, replace the shim with one of the correct size.

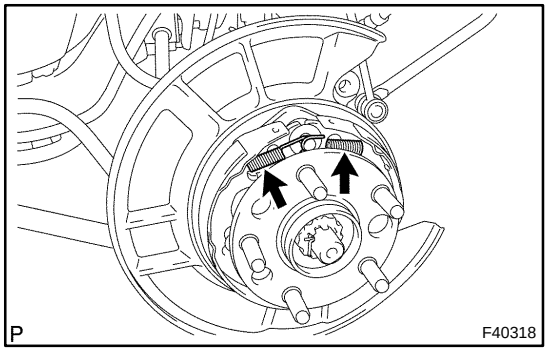
Shim Thickness	Shim Thickness
0.3 mm (0.012 in.)	0.9 mm (0.035 in.)
0.6 mm (0.024 in.)	-



(c) Apply the high temperature grease to the adjusting bolt.
(d) Install the shoe adjusting screw set and tension spring to the front and rear shoe.
(e) Install the 2 pins, 4 cups and 2 shoe hold-down springs.
(f) Connect the parking brake cable to the shoe lever.
(g) Install the front and rear parking brake shoe.

13. INSTALL PARKING BRAKE SHOE STRUT LH

14. INSTALL PARKING BRAKE SHOE STRUT COMPRESSION SPRING



15. INSTALL PARKING BRAKE SHOE RETURN TENSION SPRING

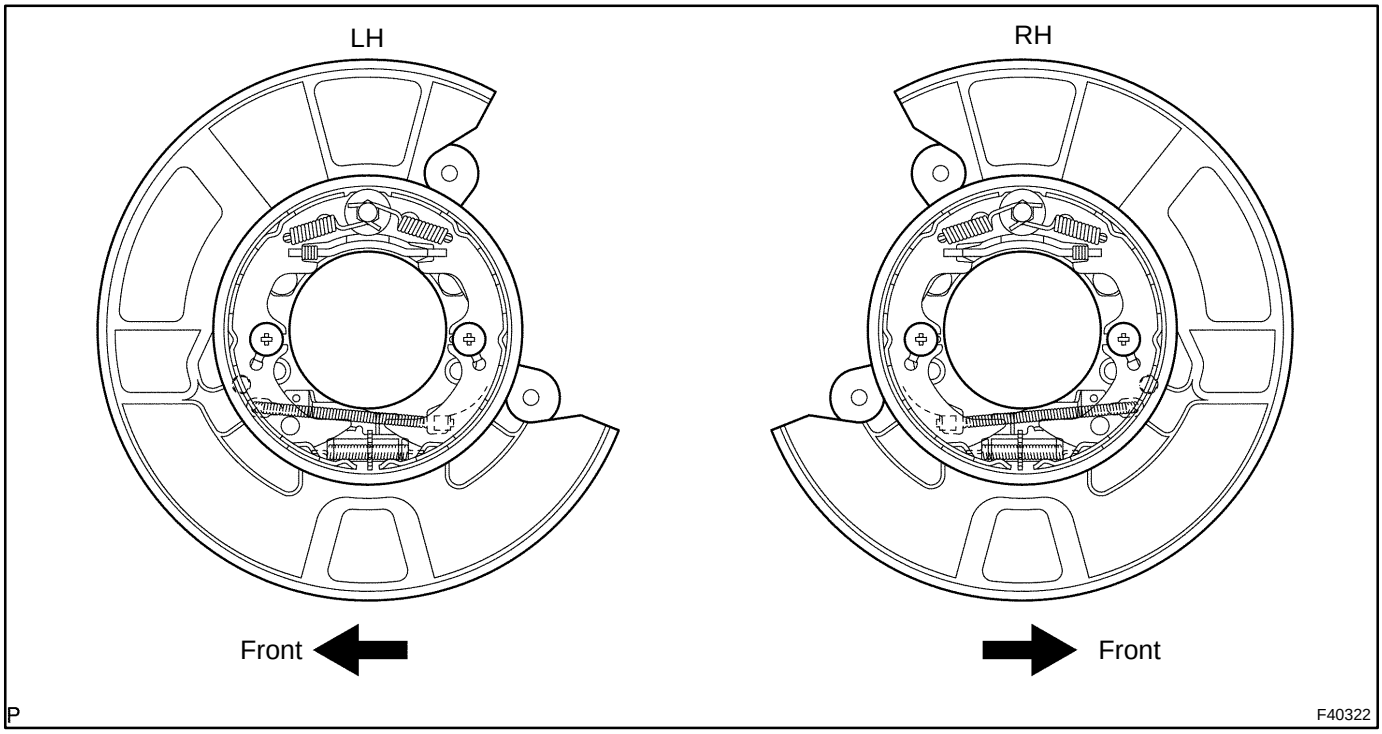
(a) Using a needle nose pliers, install the 2 return tension springs.

16. CHECK PARKING BRAKE INSTALLATION

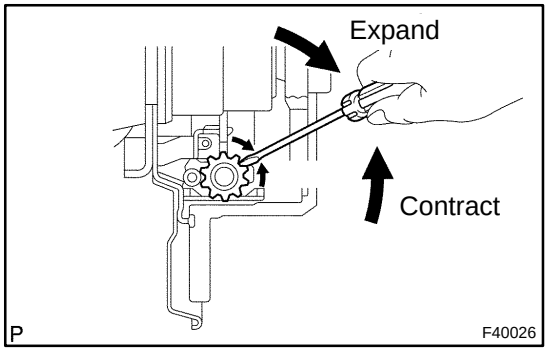
(a) Check that each part is installed properly.

NOTICE:

There should be no oil or grease adhering to the friction surface of the shoe lining and disc.



17. INSTALL REAR DISC(See page 32-41)



18. ADJUST PARKING BRAKE SHOE CLEARANCE

(a) Temporarily install the hub nuts.

(b) Remove the hole plug, and turn the adjuster and expand the shoes until the disc locks.

(c) Contract the shoe adjuster until the disc can rotate smoothly.

Standard : Return 8 notches

(d) Check shoe is no brake drag.

(e) Install the hole plug.

19. INSTALL REAR DISC BRAKE CALIPER ASSY LH

(a) Install the rear disc brake caliper with the 2 bolts.

Torque: 47 N·m (480 kgf·cm, 35 ft·lbf)

20. INSTALL REAR WHEEL

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

21. INSPECT AND ADJUST PARKING BRAKE PEDAL TRAVEL(See page 33-2)

DRIVE SHAFT, PROPELLER SHAFT, AXLE (From July, 2003)

3001U-13

PROBLEM SYMPTOMS TABLE

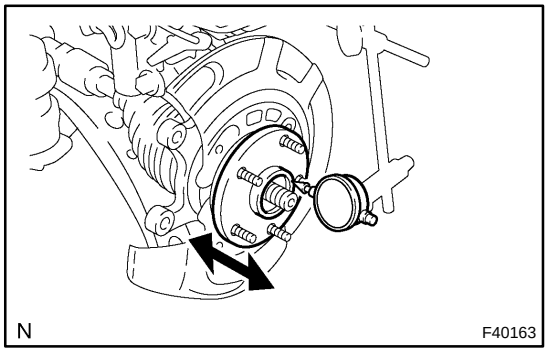
Use the table below to help determine the cause of the problem. The numbers indicate the priority of the possible cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspected Area	See page
Wander	1. Wheel alignment	26-5 27-3
	2. Steering linkage (Loosen or worn)	-
	3. Hub bearing (Worn)	30-2
	4. Stabilizer bar	26-17 27-18
Front wheel shimmy	1. Wheel balance	28-1
	2. Shock absorber	26-8 27-4
	3. Ball joint (Worn)	26-16
	4. Hub bearing (Worn)	30-2
Noise	1. Inboard joint or outboard joint (Worn)	30-8

3001V-08

ON-VEHICLE INSPECTION

1. REMOVE FRONT WHEEL
2. DISCONNECT FRONT DISC BRAKE CALIPER ASSY LH (SEE PAGE 30-8)
3. REMOVE FRONT DISC



4. INSPECT FRONT AXLE HUB BEARING BACKLASH

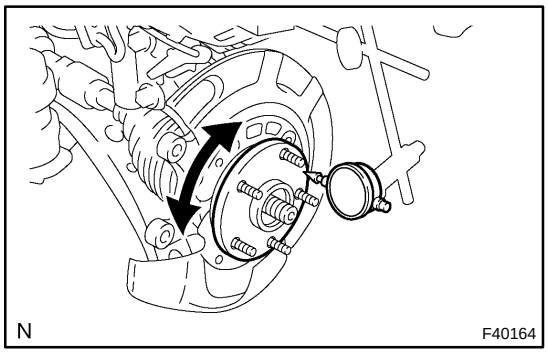
(a) Using a dial indicator, check the backlash near the center of the axle hub.

Maximum: 0.05 mm (0.0020 in.)

If the backlash exceeds the maximum, replace the bearing.

NOTICE:

Ensure that the dial indicator is set at right angles to the measurement surface.



5. INSPECT FRONT AXLE HUB DEVIATION

(a) 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.)

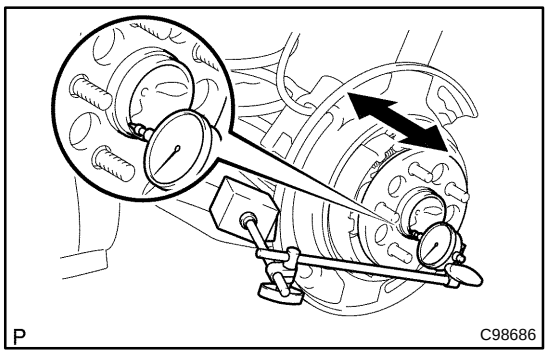
If the deviation exceeds the maximum, replace the axle hub.

NOTICE:

Ensure that the dial indicator is set at right angles to the measurement surface.

6. INSTALL FRONT DISC
7. INSTALL FRONT DISC BRAKE CALIPER ASSY LH (SEE PAGE 30-8)
8. INSTALL FRONT WHEEL

   Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
9. REMOVE REAR WHEEL
10. DISCONNECT REAR DISC BRAKE CALIPER ASSY LH (SEE PAGE 30-26)
11. REMOVE REAR DISC



12. INSPECT REAR AXLE HUB BEARING BACKLASH

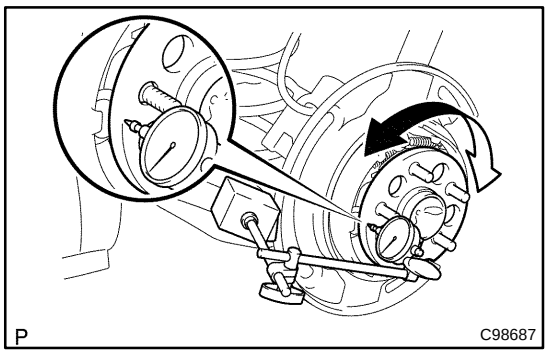
(a) Set a dial indicator near the center of the axle hub and check the backlash in the bearing shaft direction.

Maximum: 0.05 mm (0.0020 in.)

If the backlash exceeds the maximum, replace the axle hub assembly.

NOTICE:

Ensure that the dial indicator is set at right angles to the measurement surface.



13. INSPECT REAR AXLE HUB DEVIATION

(a) Using a dial indicator, check the deviation at the surface of the axle hub outside the hub bolt.

Maximum: 0.07 mm (0.0027 in.)

If the deviation exceeds the maximum, replace the axle hub assembly.

NOTICE:

Ensure that the dial indicator is set at right angles to the measurement surface.

14. INSTALL REAR DISC

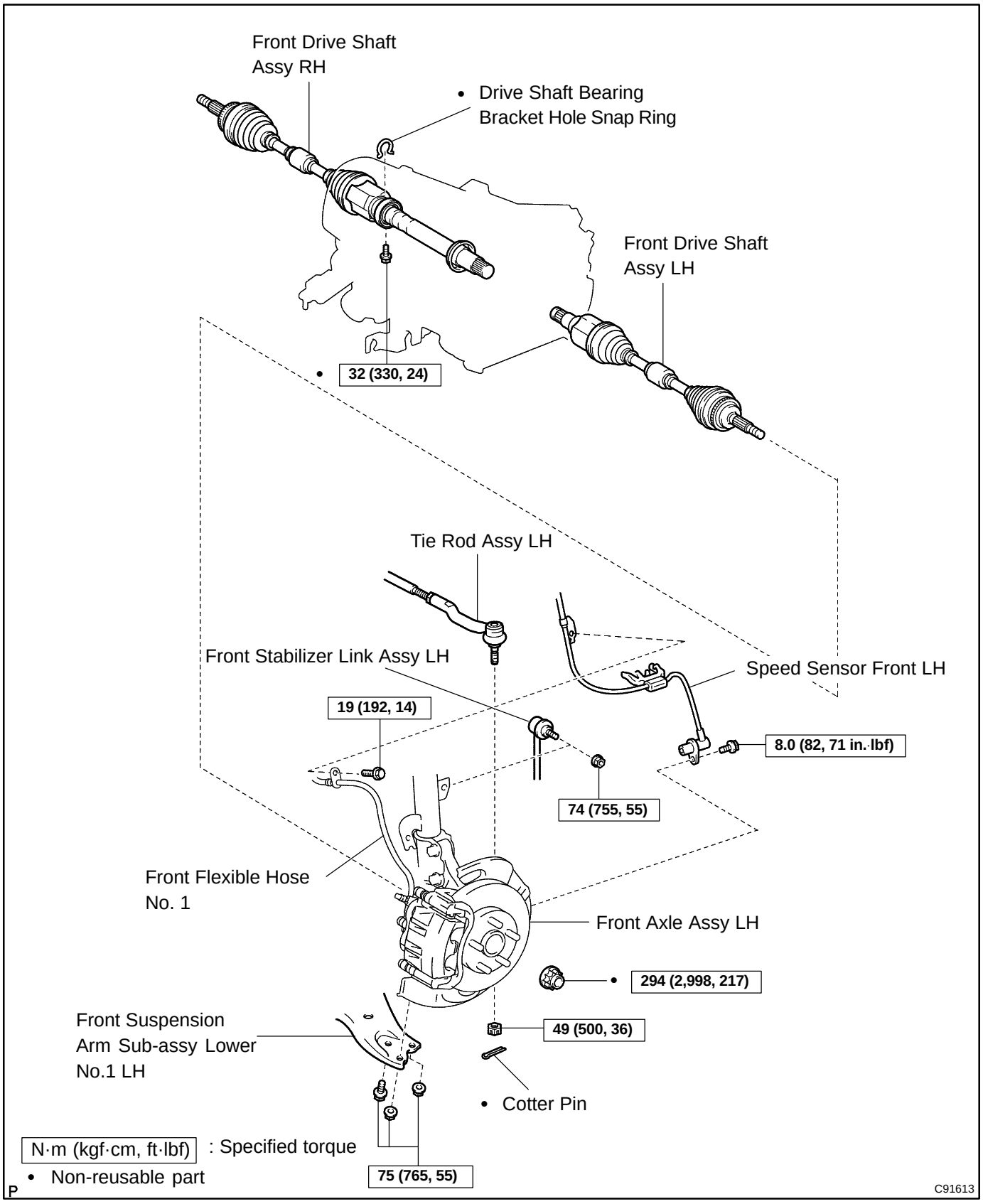
15. INSTALL REAR DISC BRAKE CALIPER ASSY LH (SEE PAGE 30-26)

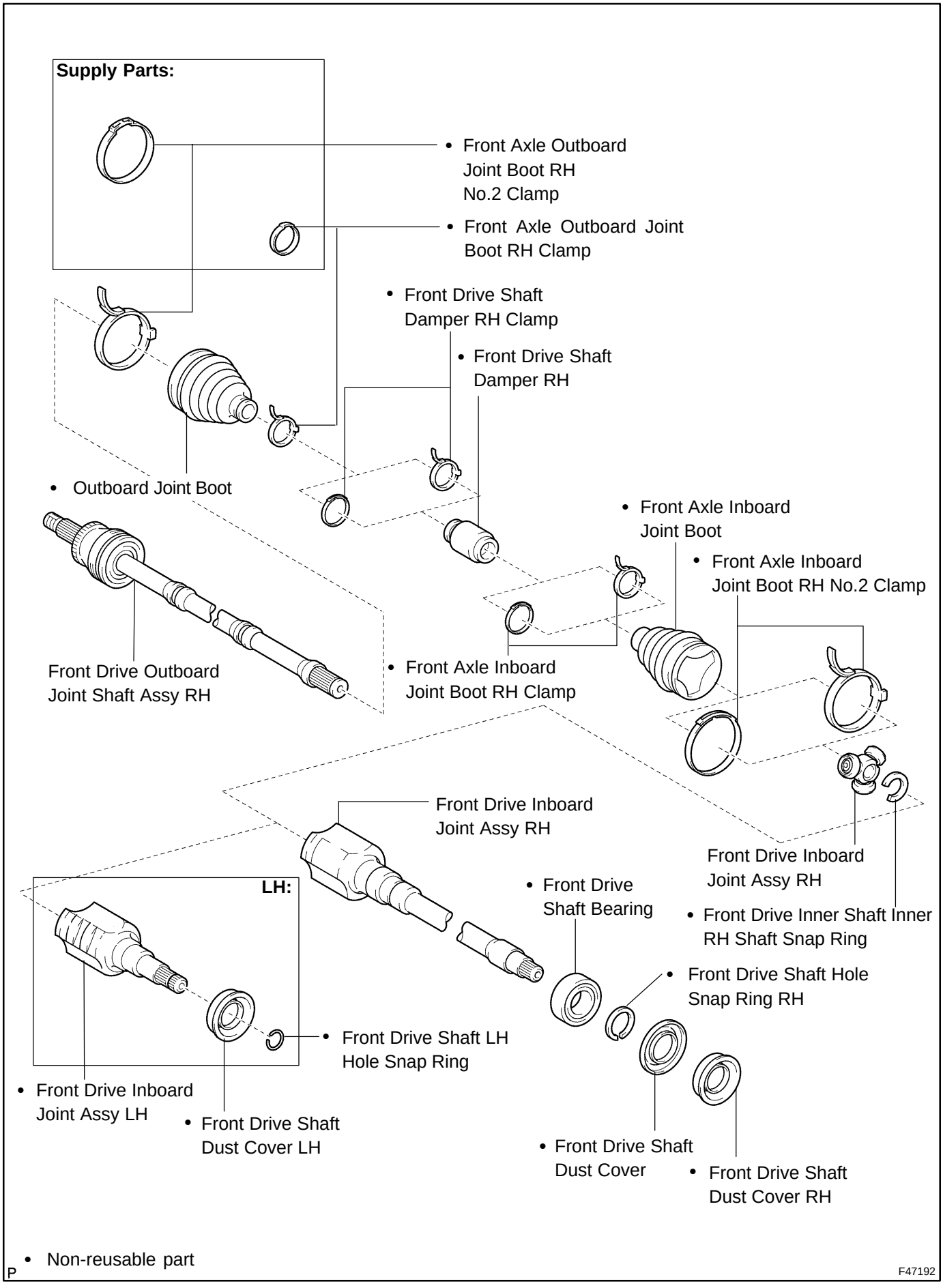
16. INSTALL REAR WHEEL

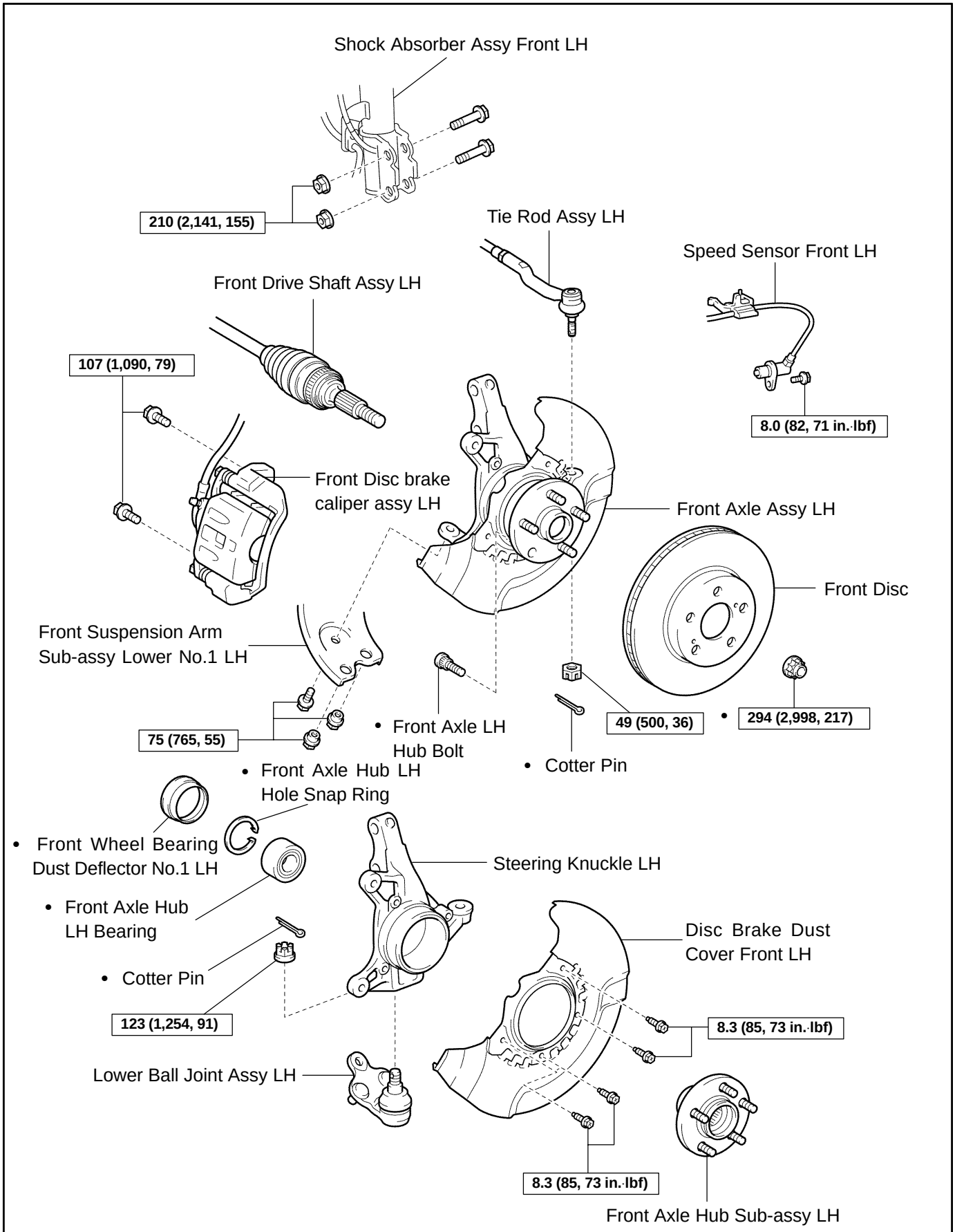
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

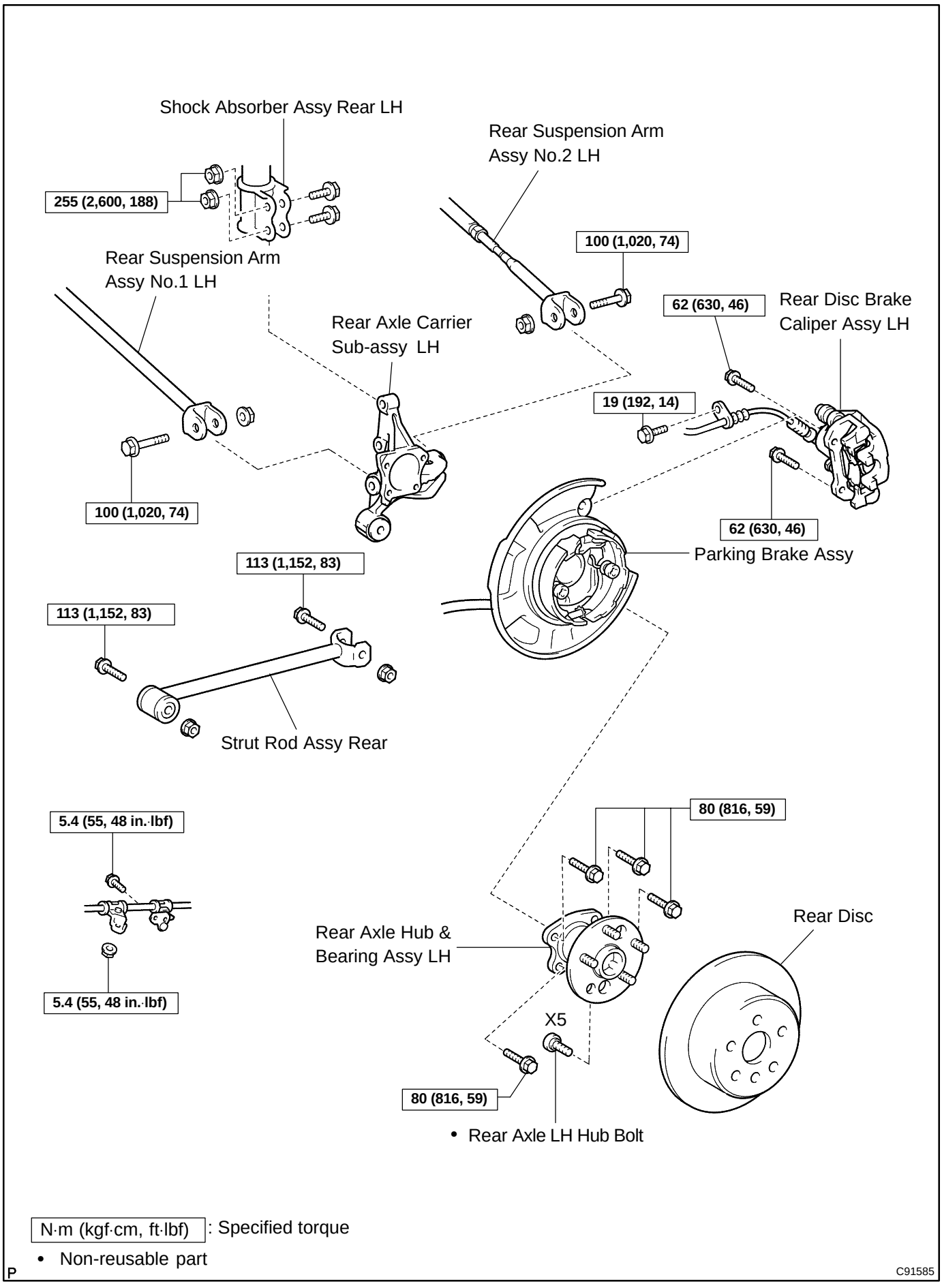
300AX-02

COMPONENTS




Supply Parts:
• Front Axle Outboard Joint Boot RH No.2 Clamp
• Front Axle Outboard Joint Boot RH Clamp
• Front Drive Shaft Damper RH Clamp
• Front Drive Shaft Damper RH
• Outboard Joint Boot
• Front Axle Inboard Joint Boot
• Front Axle Inboard Joint Boot RH No.2 Clamp
Front Drive Outboard Joint Shaft Assy RH
• Front Axle Inboard Joint Boot RH Clamp
Front Drive Inboard Joint Assy RH
Front Drive Inboard Joint Assy RH
LH:
• Front Drive Shaft Bearing
• Front Drive Inner Shaft Inner RH Shaft Snap Ring
• Front Drive Shaft Hole Snap Ring RH
• Front Drive Shaft LH Hole Snap Ring
• Front Drive Inboard Joint Assy LH
• Front Drive Shaft Dust Cover LH
• Front Drive Shaft Dust Cover
• Front Drive Shaft Dust Cover RH
• Non-reusable part
P
F47192


Shock Absorber Assy Front LH
210 (2,141, 155)
Tie Rod Assy LH
Speed Sensor Front LH
Front Drive Shaft Assy LH
107 (1,090, 79)
8.0 (82, 71 in.·lbf)
Front Disc brake caliper assy LH
Front Axle Assy LH
Front Disc
Front Suspension Arm Sub-assy Lower No.1 LH
75 (765, 55)
• Front Axle LH Hub Bolt
49 (500, 36)
• 294 (2,998, 217)
• Cotter Pin
• Front Axle Hub LH Hole Snap Ring
• Front Wheel Bearing Dust Deflector No.1 LH
Steering Knuckle LH
• Front Axle Hub LH Bearing
Disc Brake Dust Cover Front LH
• Cotter Pin
123 (1,254, 91)
8.3 (85, 73 in.·lbf)
Lower Ball Joint Assy LH
8.3 (85, 73 in.·lbf)
Front Axle Hub Sub-assy LH
N·m (kgf·cm, ft·lbf) : Specified torque
• Non-reusable part
P
G29148


Shock Absorber Assy Rear LH
255 (2,600, 188)
Rear Suspension Arm Assy No.2 LH
100 (1,020, 74)
Rear Suspension Arm Assy No.1 LH
Rear Axle Carrier Sub-assy LH
62 (630, 46)
Rear Disc Brake Caliper Assy LH
19 (192, 14)
100 (1,020, 74)
62 (630, 46)
Parking Brake Assy
113 (1,152, 83)
113 (1,152, 83)
Strut Rod Assy Rear
5.4 (55, 48 in.·lbf)
5.4 (55, 48 in.·lbf)
80 (816, 59)
Rear Axle Hub & Bearing Assy LH
Rear Disc
X5
80 (816, 59)
• Rear Axle LH Hub Bolt
N·m (kgf·cm, ft·lbf) : Specified torque
• Non-reusable part
P
C91585

FRONT DRIVE SHAFT (From July, 2003)

300M5-01

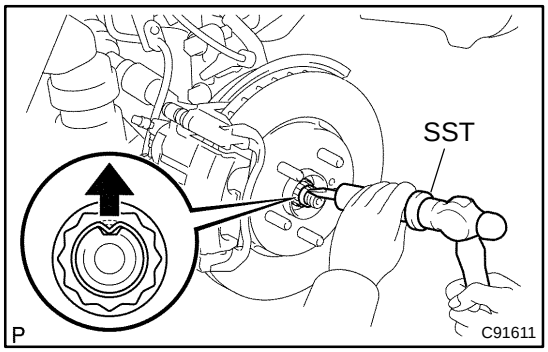
OVERHAUL

HINT:

- COMPONENTS: See page 30-4
- Overhaul the RH side following the same procedures as for the LH side.

1. DRAIN AUTOMATIC TRANSAXLE FLUID

2. REMOVE FRONT WHEEL



3. REMOVE FRONT AXLE HUB LH NUT

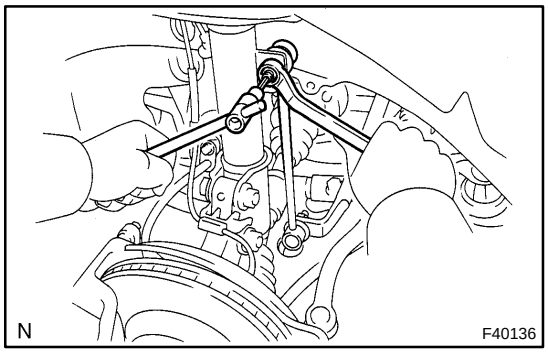
(a) Using SST and a hammer, unstake the staked part of the front axle hub LH nut.

SST 09930-00010

NOTICE:

Loosen the staked part of the lock nut completely, otherwise the screw of the drive shaft may be damaged.

(b) While applying the brake, remove the front axle hub LH nut.

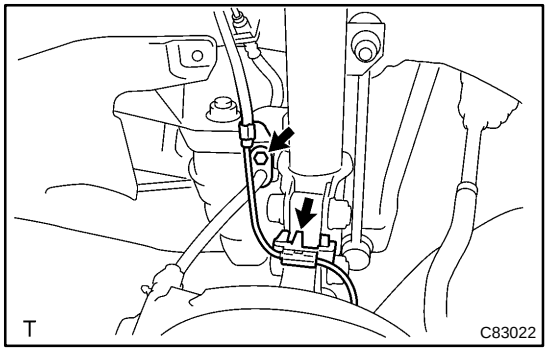


4. DISCONNECT FRONT STABILIZER LINK ASSY LH

(a) Remove the nut, and separate the stabilizer link assy LH.

HINT:

If the ball joint turns together with the nut, use a hexagon wrench (6 mm) to hold the stud.

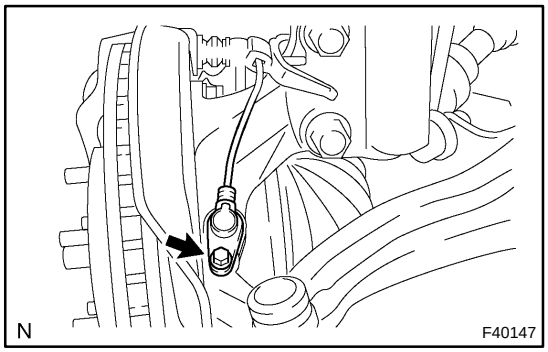


5. DISCONNECT SPEED SENSOR FRONT LH

(a) Remove the bolt and clip, and separate the sensor wire and hose from the shock absorber.

NOTICE:

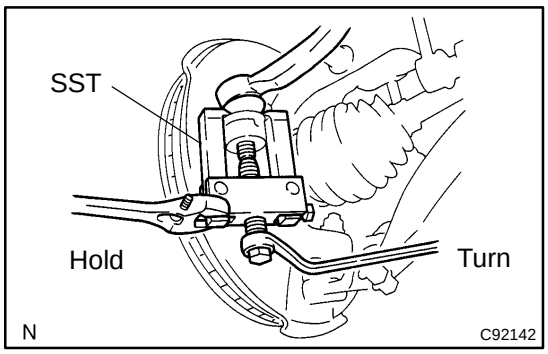
Be careful not to damage the speed sensor.



(b) Remove the bolt, and separate the speed sensor front LH from the steering knuckle.

NOTICE:

Prevent foreign matter from adhering to the speed sensor.

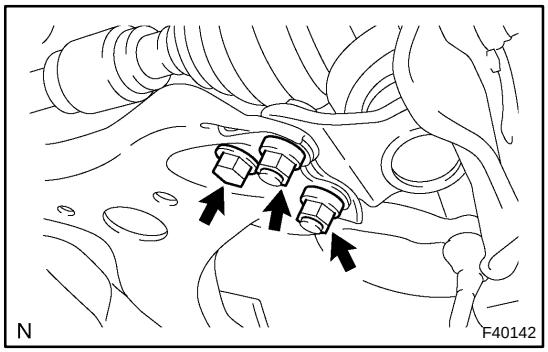


6. DISCONNECT TIE ROD ASSY LH

(a) Remove the cotter pin and nut.

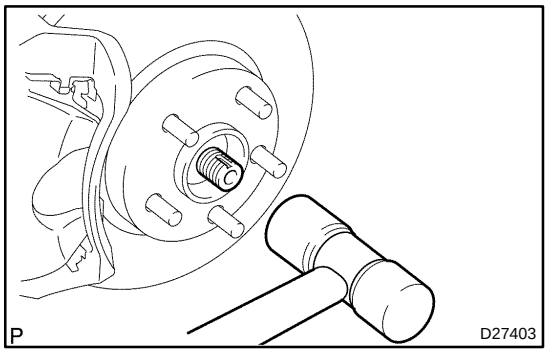
(b) Using SST, separate the tie rod end from the steering knuckle.

SST 09628-6201 1



7. DISCONNECT FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH

(a) Remove the bolt and 2 nuts, and disconnect the front suspension arm sub-assy lower No.1 LH from the lower ball joint.

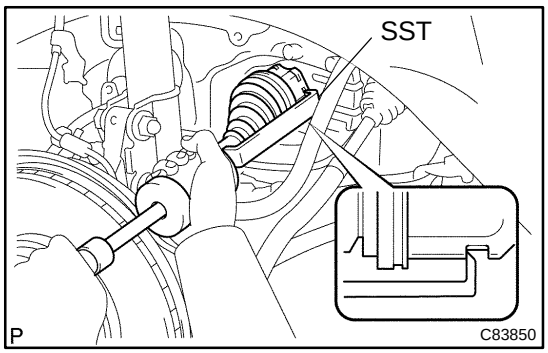


8. DISCONNECT FRONT AXLE ASSY LH

(a) Using a plastic hammer, separate the drive shaft from the axle hub.

NOTICE:

Be careful not to damage the boot and speed sensor rotor.



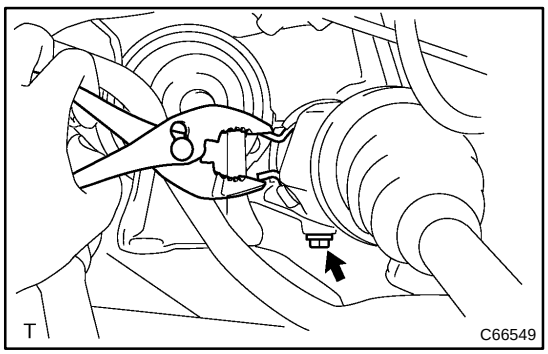
9. REMOVE FRONT DRIVE SHAFT ASSY LH

(a) Using SST, remove the front drive shaft assy LH.

SST 09520-01010, 09520-24010 (09520-32040)

NOTICE:

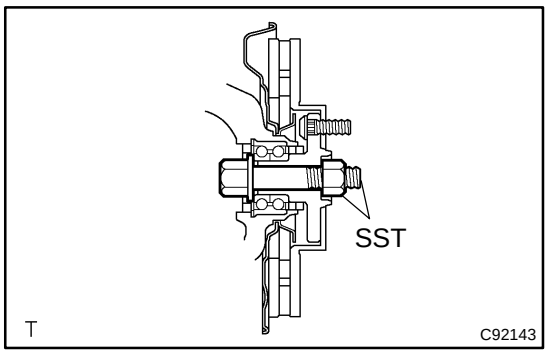
- **Be careful not to damage the transaxle case oil seal, inboard joint boot and drive shaft dust cover.**
- **Be careful not to drop the drive shaft assy.**



10. REMOVE FRONT DRIVE SHAFT ASSY RH

(a) Using pliers, remove the drive shaft bearing bracket hole snap ring.

(b) Remove the bolt and front drive shaft assy RH from the drive shaft bearing bracket.



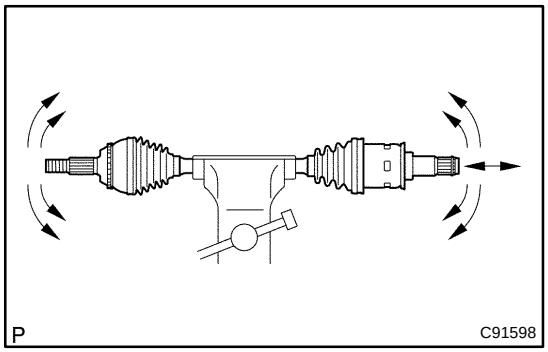
11. FIX FRONT AXLE ASSY LH

SST 09608-16042 (09608-02021, 09608-02041)

NOTICE:

The hub bearing could be damaged if it is subjected to the vehicle's full weight, such as when moving the vehicle with the drive shaft removed.

Therefore, if it is absolutely necessary to place the vehicle weight on the hub bearing, first support it with SST.



12. INSPECT FRONT DRIVE SHAFT ASSY LH

NOTICE:

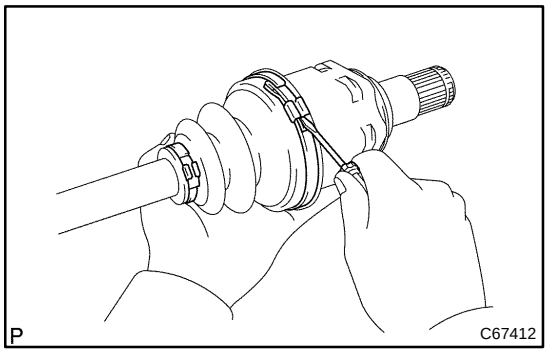
Move the drive shaft assy keeping it level.

(a) Check that there is no remarkable play in the radial direction of the outboard joint.

(b) Check that the inboard joint slides smoothly in the thrust direction.

(c) Check that there is no remarkable play in the radial direction of the inboard joint.

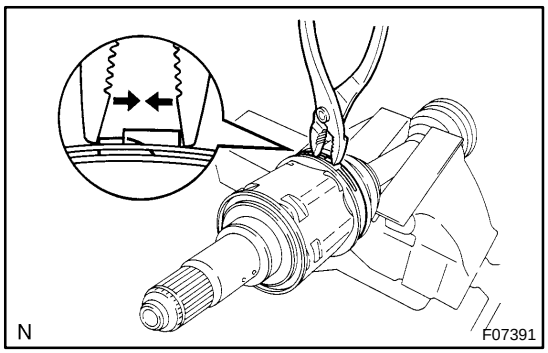
(d) Check the boots for damage.



13. REMOVE FRONT AXLE INBOARD JOINT BOOT CLAMP

(a) One touch type

(1) Using a screwdriver, remove the front axle inboard joint boot LH clamp and front axle inboard joint boot LH No.2 clamp, as shown in the illustration.

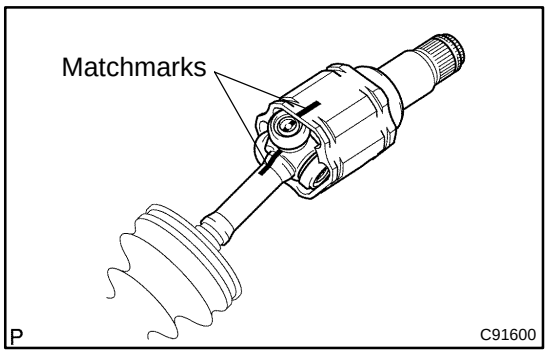


(b) Claw Engagement type

(1) Using pliers, remove the front axle inboard joint boot LH clamp and front axle inboard joint boot LH No.2 clamp, as shown in the illustration.

14. DISCONNECT FR AXLE INBOARD JOINT BOOT

(a) Separate the inboard joint boot from the inboard joint assy.



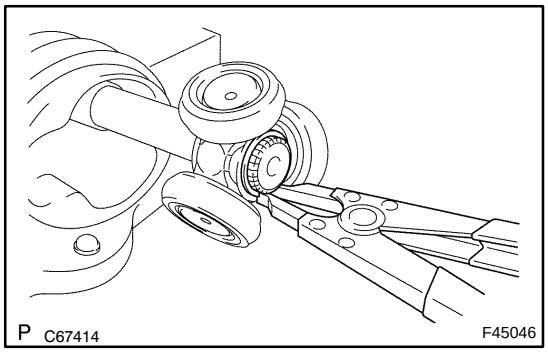
15. REMOVE FRONT DRIVE INBOARD JOINT ASSY LH

(a) Put matchmarks on the inboard joint assy and outboard joint shaft.

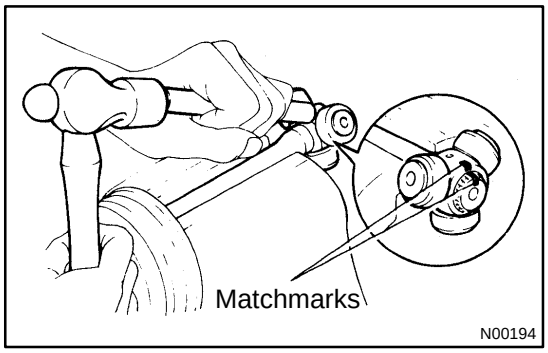
NOTICE:

Do not use a punch for the marks.

(b) Remove the inboard joint assy from the outboard joint shaft.



(c) Using a snap ring expander, remove the front drive inner shaft inner RH shaft snap ring.



(d) Put matchmarks on the outboard joint shaft and tripod joint.

NOTICE:

Do not use a punch for the marks.

(e) Using a brass bar and hammer, remove the tripod joint from the outboard joint shaft.

NOTICE:

Do not tap the roller.

16. REMOVE FRONT DRIVE SHAFT DAMPER LH

(a) Using a screwdriver, remove the front drive shaft damper LH clamp.

(b) Remove the front drive shaft damper LH.

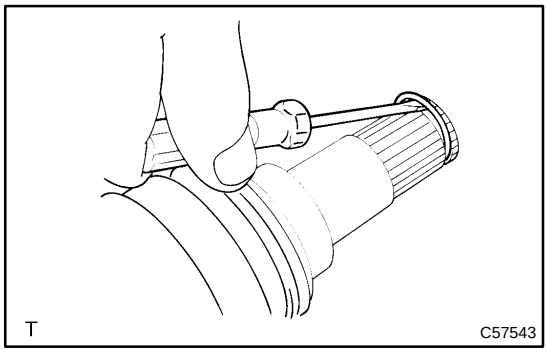
17. REMOVE FRONT AXLE OUTBOARD JOINT BOOT CLAMP

(a) Using a screwdriver, remove the front axle outboard joint boot LH clamp and front axle outboard joint boot LH No.2 clamp.

18. REMOVE OUTBOARD JOINT BOOT

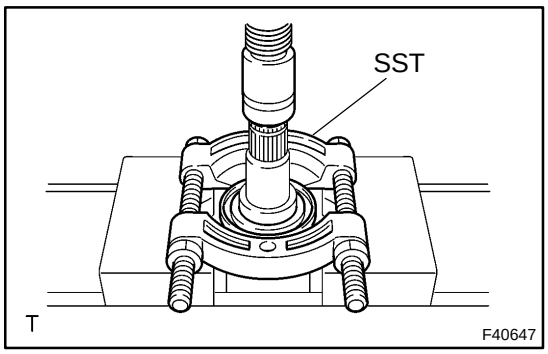
(a) Remove the outboard joint boot from the outboard joint shaft.

(b) Remove the old grease from the outboard joint.



19. REMOVE FRONT DRIVE SHAFT LH HOLE SNAP RING

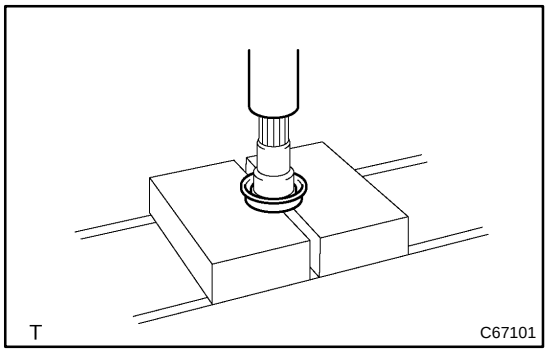
(a) Using a screwdriver, remove the hole snap ring.



20. REMOVE FRONT DRIVE SHAFT DUST COVER LH

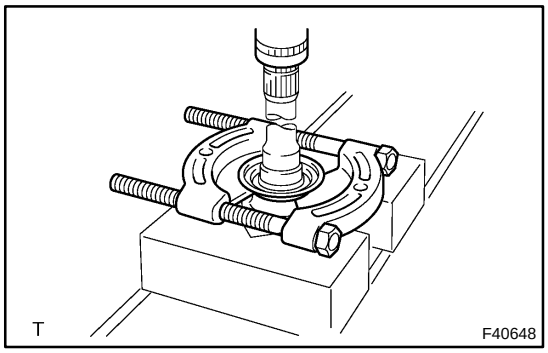
(a) Using SST and a press, remove the front drive shaft dust cover LH.
SST 09950-00020

NOTICE:
Be careful not to drop the inboard joint assy.



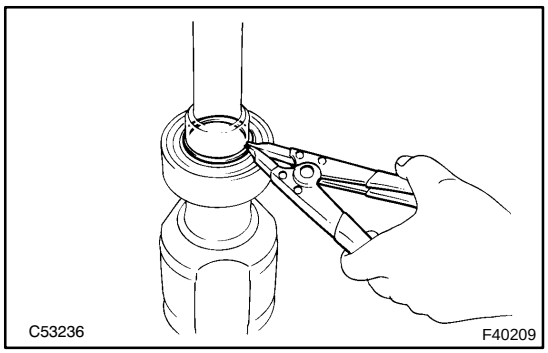
21. REMOVE FRONT DRIVE SHAFT DUST COVER RH

(a) Using a press, remove the front drive shaft dust cover RH.



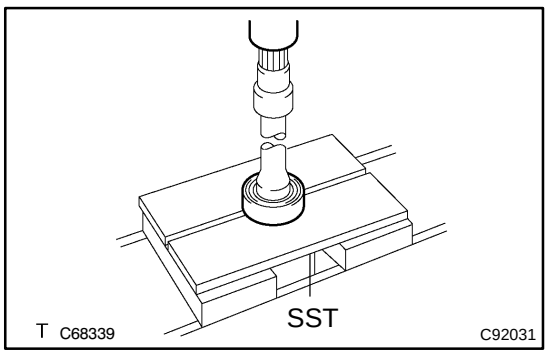
22. REMOVE FRONT DRIVE SHAFT DUST COVER

(a) Using SST and a press, remove the front drive shaft dust cover.
SST 09950-00020



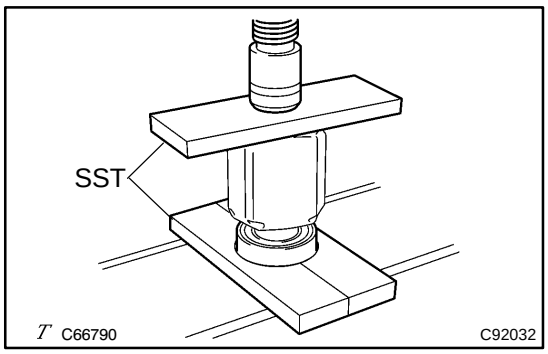
23. REMOVE FRONT DRIVE SHAFT BEARING

(a) Using a snap ring expander, remove the front drive shaft hole snap ring RH.



(b) Using SST and a press, remove the bearing.
SST 09527-1001 1

NOTICE:
Be careful not to drop the inboard joint assy.



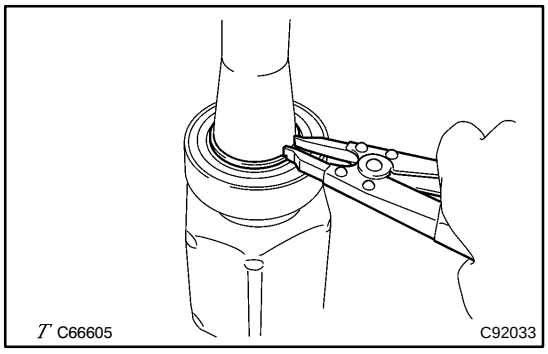
24. INSTALL FRONT DRIVE SHAFT BEARING

(a) Using SST and a steel plate, install a new front drive shaft bearing.

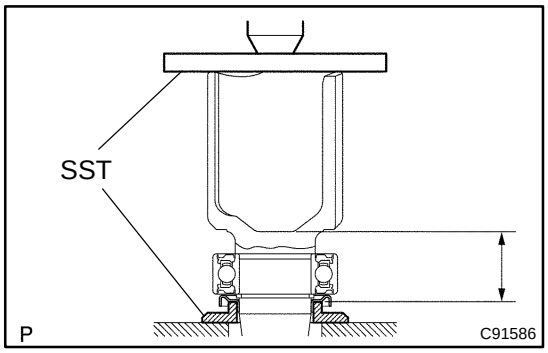
SST 09527-30010, 09527-10011

NOTICE:

Bearing should be completely installed.



(b) Using a snap ring expander, install a new front drive shaft hole snap ring RH.

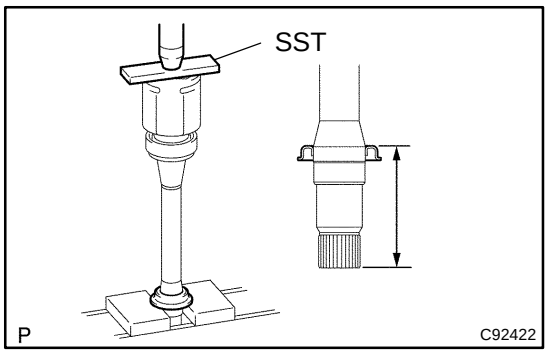


25. INSTALL FRONT DRIVE SHAFT DUST COVER

(a) Using SST and a press, install a new front drive shaft dust cover until the distance from the tip of the center drive shaft to the front drive shaft dust cover meets the specification, as shown in the illustration.

SST 09527-1001 1, 09726-40010

Distance: 42.1 ± 0.5 mm (1.7 ± 0.02 in.)



26. INSTALL FRONT DRIVE SHAFT DUST COVER RH

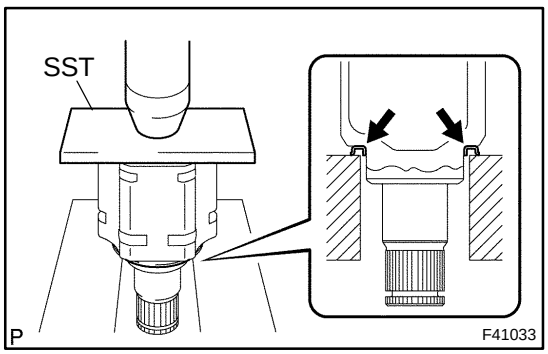
(a) Using SST and a press, install a new drive shaft dust cover RH until the distance from the tip of the center drive shaft to the drive shaft dust cover RH meets the specification, as shown in the illustration.

SST 09527-1001 1

Distance: 110.5 ± 0.5 mm (4.4 ± 0.02 in.)

NOTICE:

- **Dust cover should be completely installed.**
- **Be careful not to damage the dust cover.**



27. INSTALL FRONT DRIVE SHAFT DUST COVER LH

(a) Using SST and a press, install a new front drive shaft dust cover LH.

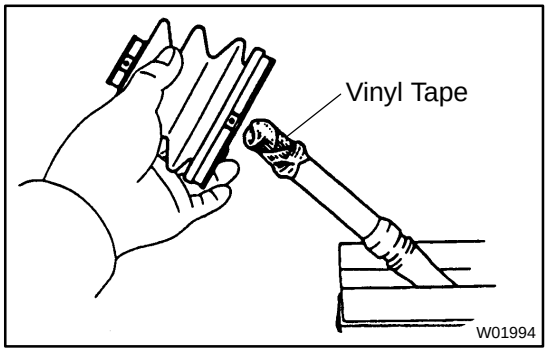
SST 09527-1001 1

NOTICE:

- **Dust cover should be completely installed.**
- **Be careful not to damage the dust cover.**

28. INSTALL FRONT DRIVE SHAFT LH HOLE SNAP RING

(a) Install a new front drive shaft LH hole snap ring.



29. INSTALL OUTBOARD JOINT BOOT

HINT:

Before installing the boots, wrap the spline of the drive shaft with vinyl tape to prevent the boots from being damaged.

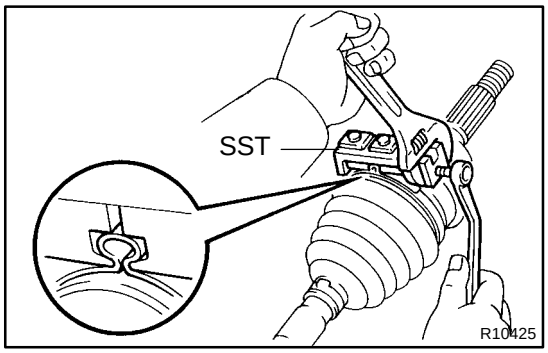
(a) Hold the drive shaft lightly in a soft vise.

(b) Temporarily install a new outboard joint boot with 2 new clamps to the drive shaft.

(c) Pack the outboard joint shaft and boot with grease.

Grease capacity:

205 - 215 g (7.2 - 7.6 oz.)



30. INSTALL FRONT AXLE OUTBOARD JOINT BOOT CLAMP

(a) Hold the drive shaft lightly in a soft vise.

(b) Install the 2 outboard joint boot clamps onto the boot.

(c) Place SST onto the outboard joint large boot clamp.

SST 09521-24010

(d) Tighten the SST so that the large clamp is pinched.

NOTICE:

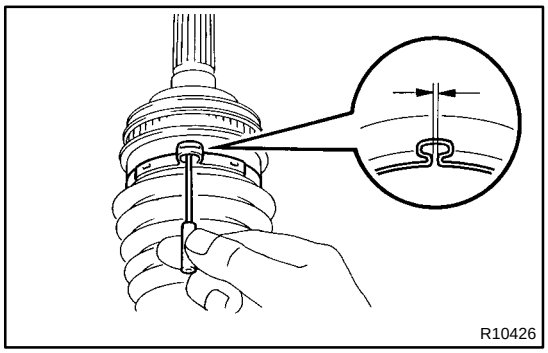
Do not overtighten the SST.

(e) Using SST, adjust the clearance of the large clamp.

SST 09240-00020

Clearance: 0.8 mm (0.032 in.) or less

(f) Employ the same manner to the outboard joint small boot clamp.



31. INSTALL FRONT DRIVE SHAFT DAMPER LH

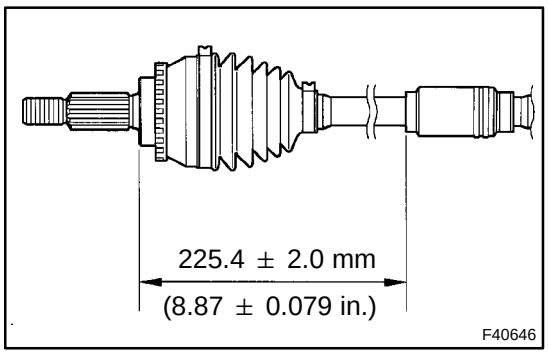
(a) Install the drive shaft damper LH to the drive shaft.

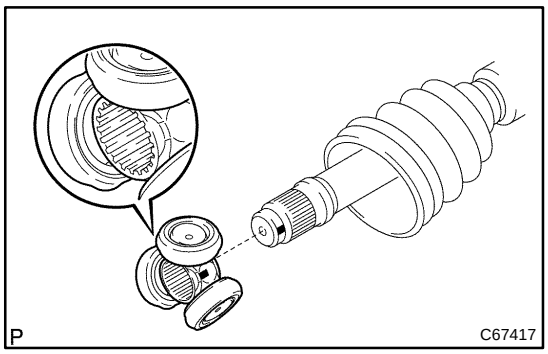
(b) Make sure that the damper is on the shaft groove.

(c) Set the distance, as described below.

Distance: 225.4 ± 2.0 mm (8.87 ± 0.079 in.)

(d) Install a new front drive shaft damper LH clamp to the front drive shaft damper LH.





32. INSTALL FRONT DRIVE INBOARD JOINT ASSY LH

(a) Temporarily install a new inboard joint boot with 2 new clamps to the drive shaft.

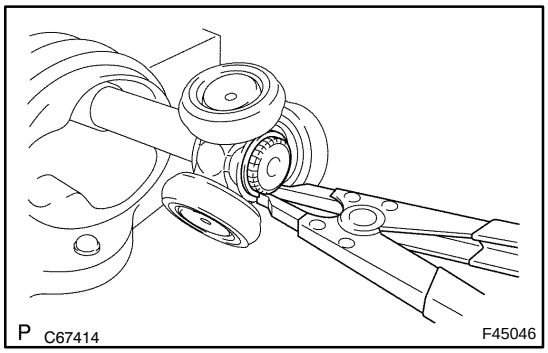
(b) Place the beveled side of the tripod joint axial spline toward the outboard joint shaft.

(c) Align the matchmarks.

(d) Using a brass bar and hammer, tap in the tripod joint to the outboard joint shaft.

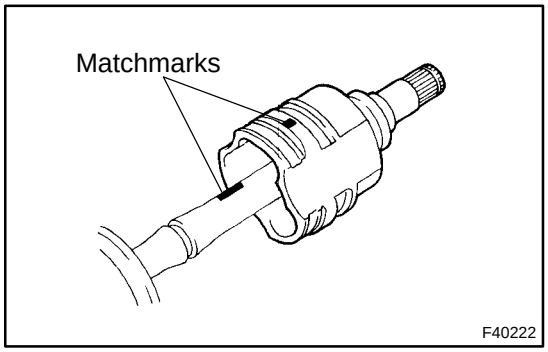
NOTICE:

- **Do not tap the roller.**
- **Be sure to install the tripod joint assy in the correct direction.**



(e) Using a snap ring expander, install a new shaft snap ring.

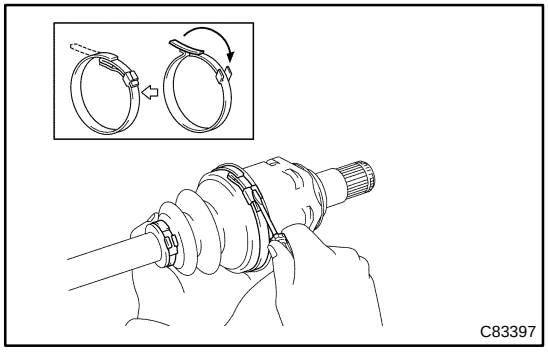
(f) Pack the outboard joint shaft and boot with grease.
Grease capacity: 175 to 185 g (6.25 to 6.61 oz.)



(g) Aligning the matchmarks, install the inboard joint assy to the outboard joint shaft assy.

33. INSTALL FR AXLE INBOARD JOINT BOOT

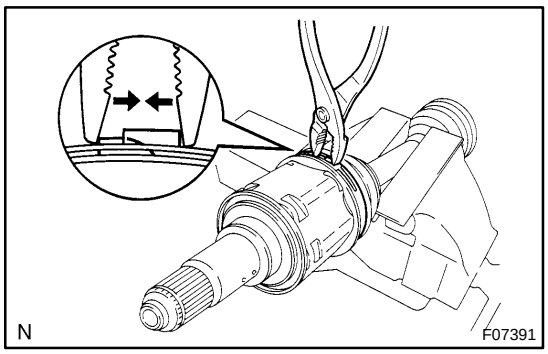
(a) Install the inboard joint boot to the inboard joint assy.



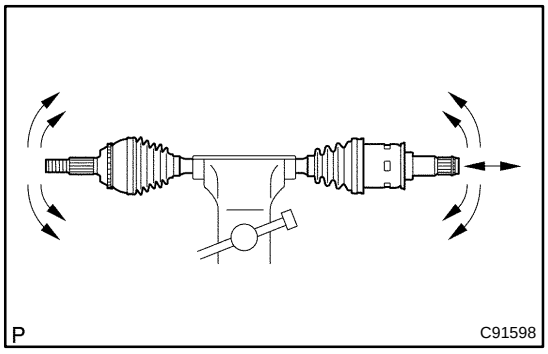
34. INSTALL FRONT AXLE INBOARD JOINT BOOT CLAMP

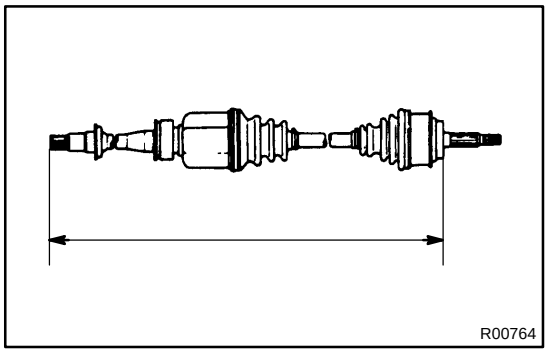
(a) One touch type

(1) Using a screwdriver, install the front axle inboard joint boot LH clamp and front axle inboard joint boot LH No.2 clamp, as shown in the illustration.



(b) Claw Engagement type
(1) Using pliers, install the front axle inboard joint boot LH clamp and front axle inboard joint boot LH No.2 clamp, as shown in the illustration.





35. INSPECT FRONT DRIVE SHAFT

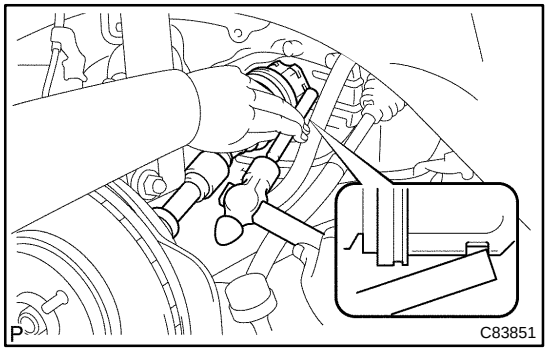
NOTICE:

Move the drive shaft assy keeping it level.

(a) Check that there is no remarkable play in the radial direction of the outboard joint.
(b) Check that the inboard joint slides smoothly in the thrust direction.
(c) Check that there is no remarkable play in the radial direction of the inboard joint.
(d) Check the boots for damage.
(e) Make sure that the 2 boots are on the shaft groove.
(f) Make sure that the 2 boots are not stretched or contracted when the drive shaft is at standard length.

Drive shaft standard length: mm (in.)

LH	576.9 ± 2.0 (22.713 ± 0.079)
RH	896.4 ± 2.0 (35.291 ± 0.079)

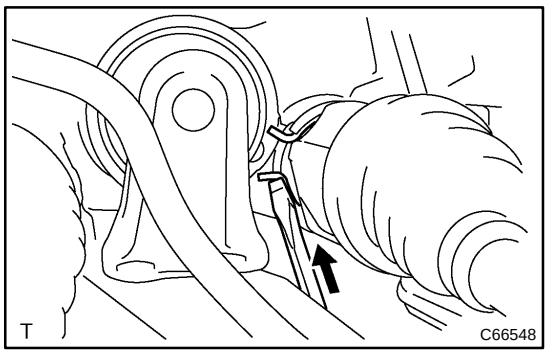


36. INSTALL FRONT DRIVE SHAFT ASSY LH

(a) Install a new front drive shaft LH hole snap ring.
(b) Coat the spline of the inboard joint shaft assy with ATF.
(c) Align the shaft splines and install the drive shaft assy with a brass bar and hammer.

NOTICE:

- **Set the snap ring with the opening side facing downward.**
- **Be careful not to damage the oil seal, boot and dust cover.**
- **Move the drive shaft assy while keeping it level.**



37. INSTALL FRONT DRIVE SHAFT ASSY RH

(a) Using a screwdriver, install a new bearing bracket hole snap ring.

NOTICE:

Do not damage the oil seal and boot.

(b) Install the bolt.

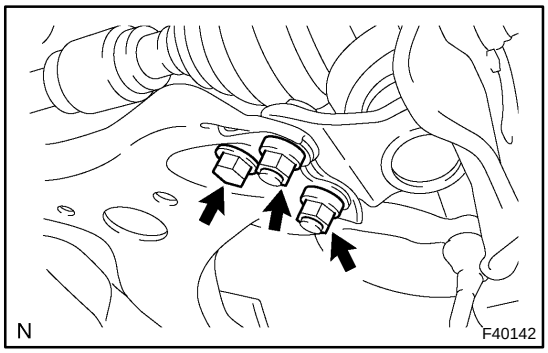
Torque: 32 N·m (330 kgf·cm, 24 ft·lbf)

38. INSTALL FRONT AXLE ASSY LH

(a) Install the front drive shaft assy LH to the front axle assy LH.

NOTICE:

- **Be careful not to damage the outboard joint boot.**
- **Be careful not to damage the speed sensor rotor.**



39. INSTALL FRONT SUSPENSION ARM SUB- ASSY LOWER NO.1 LH

(a) Install the lower ball joint to the front suspension arm sub-assy lower with the bolt and nuts.

Torque: 75 N·m (765 kgf·cm, 55 ft·lbf)

40. INSTALL TIE ROD ASSY LH

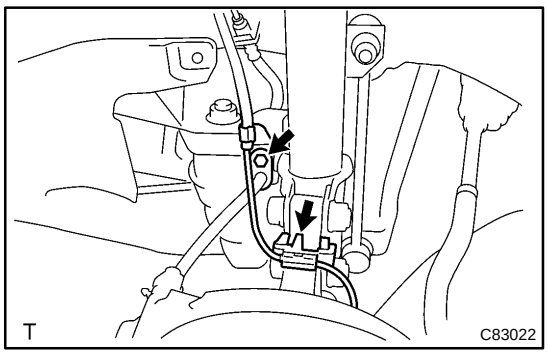
(a) Install the tie rod end to the steering knuckle with the nut.

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

(b) Install a new cotter pin.

NOTICE:

If the holes for the cotter pin are not aligned, tighten the nut up to 60° further.



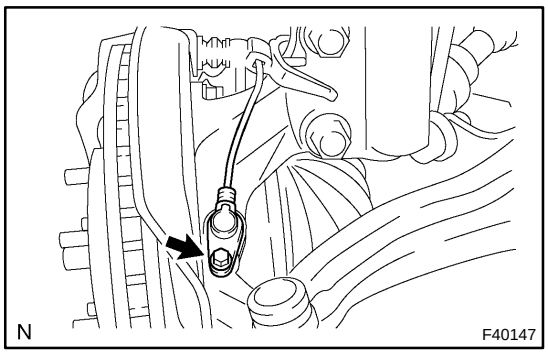
41. INSTALL SPEED SENSOR FRONT LH

(a) Install the flexible hose and the speed sensor to the shock absorber with the bolt and set the clip of sensor on knuckle.

Torque: 19 N·m (192 kgf·cm, 14 ft·lbf)

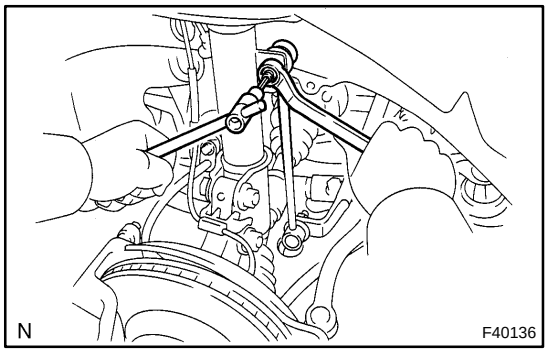
NOTICE:

- **Be careful not to damage the speed sensor.**
- **Do not twist the sensor wire when installing the speed sensor.**



(b) Install the speed sensor to the steering knuckle with the bolt.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

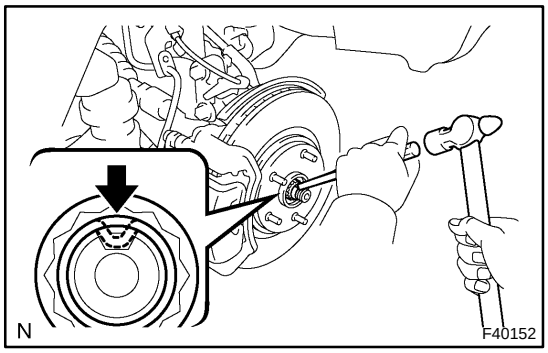
NOTICE:
Prevent foreign matter from adhering to the speed sensor.



42. INSTALL FRONT STABILIZER LINK ASSY LH

(a) Install the front stabilizer link assy LH with the nut.
Torque: 74 N·m (755 kgf·cm, 55 ft·lbf)

HINT:
If the ball joint turns together with the nut, use a hexagon (6 mm) wrench to hold the stud.



43. INSTALL FRONT AXLE HUB LH NUT

(a) Using a socket wrench (30 mm), install a new axle hub LH nut.
Torque: 294 N·m (2,998 kgf·cm, 217 ft·lbf)

(b) Using a chisel and hammer, stake the front axle hub LH nut.

44. INSTALL FRONT WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

45. ADD AUTOMATIC TRANSAXLE FLUID (SEE PAGE 40-1)

46. INSPECT AUTOMATIC TRANSAXLE FLUID

47. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT (SEE PAGE 26-5)

48. CHECK ABS SPEED SENSOR SIGNAL
w/ VSC (SEE PAGE 05-471)
w/o VSC (SEE PAGE 05-420)

FRONT AXLE HUB SUB-ASSY LH (From July, 2003)

300M6-02

REPLACEMENT

HINT:

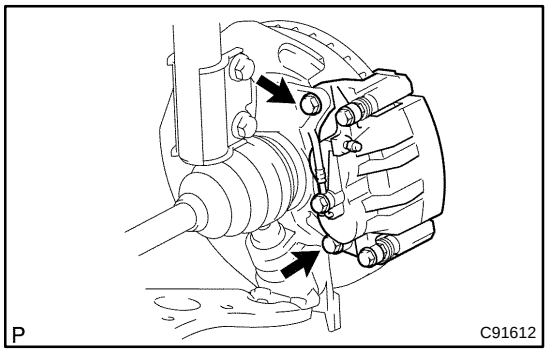
- Replace the RH side using the same procedures as for the LH side.

1. REMOVE FRONT WHEEL

2. REMOVE FRONT AXLE HUB LH NUT (SEE PAGE 30-8)

SST 09930-00010

3. DISCONNECT SPEED SENSOR FRONT LH (SEE PAGE 30-8)



4. SEPARATE FRONT DISC BRAKE CALIPER ASSY LH

(a) Remove the 2 bolts and separate the front disc brake caliper assy LH from the steering knuckle LH.

NOTICE:

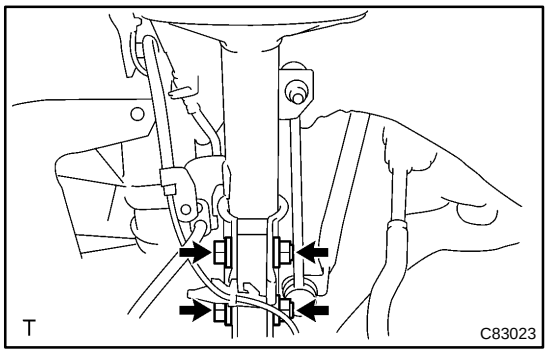
Use a string or other device to keep the brake caliper from hanging down by the flexible hose.

5. REMOVE FRONT DISC

6. SEPARATE TIE ROD ASSY LH (SEE PAGE 30-8)

SST 09628-6201 1

7. SEPARATE FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH (SEE PAGE 30-8)



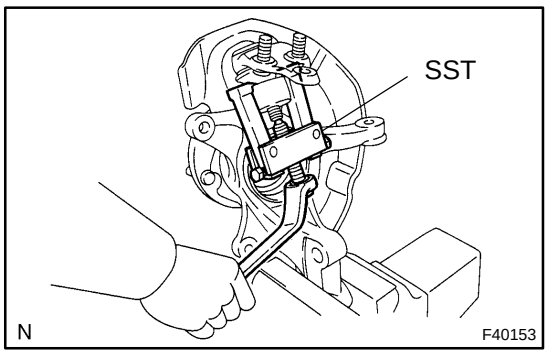
8. REMOVE FRONT AXLE ASSY LH

(a) Using a plastic hammer, separate the front drive shaft assy LH from the front axle hub sub-assy LH.

NOTICE:

Be careful not to damage the boot and speed sensor rotor.

(b) Remove the 2 bolts, nuts and steering knuckle with the axle hub.

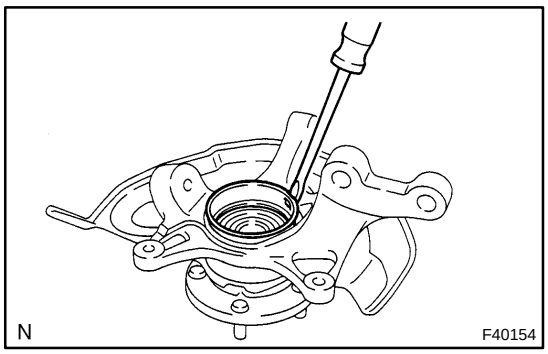


9. REMOVE LOWER BALL JOINT ASSY FRONT LH

(a) Remove the cotter pin and nut.

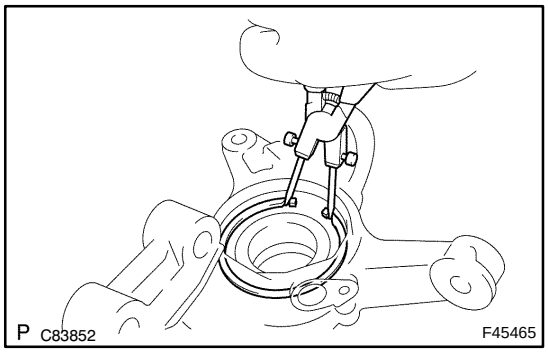
(b) Using SST, remove the lower ball joint assy front LH.

SST 09628-6201 1



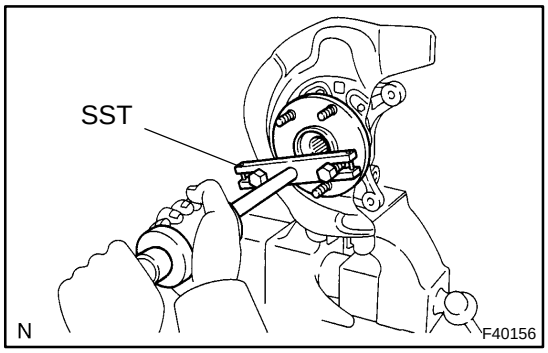
10. REMOVE FRONT WHEEL BEARING DUST DEFLECTOR NO.1 LH

(a) Using a screwdriver, remove the bearing dust deflector No.1 LH.



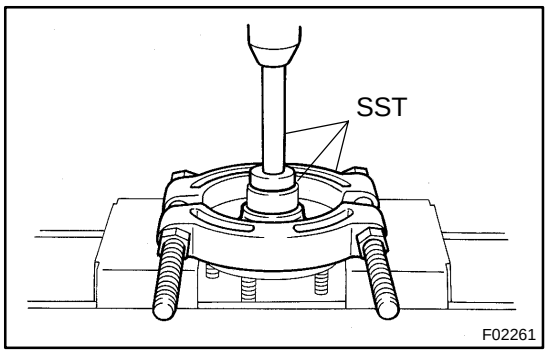
11. REMOVE FRONT AXLE HUB LH HOLE SNAP RING

(a) Using a snap ring expander, remove the front axle hub LH hole snap ring.



12. REMOVE FRONT AXLE HUB SUB-ASSY LH

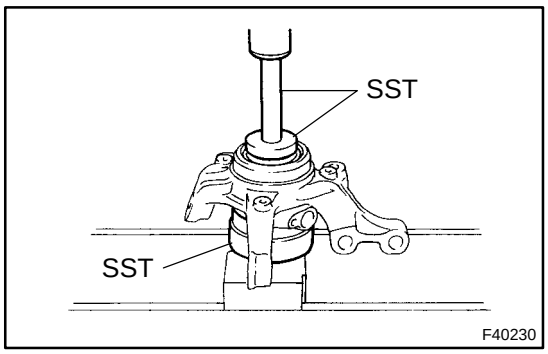
(a) Using SST, remove the front axle hub sub-assy LH.
SST 09520-00031



(b) Using SST and a press, remove the bearing inner race (outside) from the front axle hub sub-assy LH.
SST 09950- 00020, 09950- 60010 (09951- 00410), 09950-70010 (09951-07100)

13. REMOVE DISC BRAKE DUST COVER FRONT LH

(a) Using a torx® wrench (T30), remove the 4 bolts and disc brake dust cover front LH.

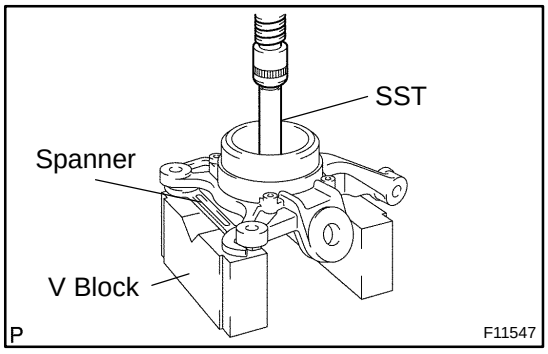


14. REMOVE FRONT AXLE HUB LH BEARING

(a) Place the bearing inner race (outside) on the front axle hub LH bearing.

(b) Using SST and a press, press the front axle hub LH bearing until it contacts the SST.

SST 09527- 17011, 09950- 60010 (09951- 00600), 09950-70010 (09951-07100)



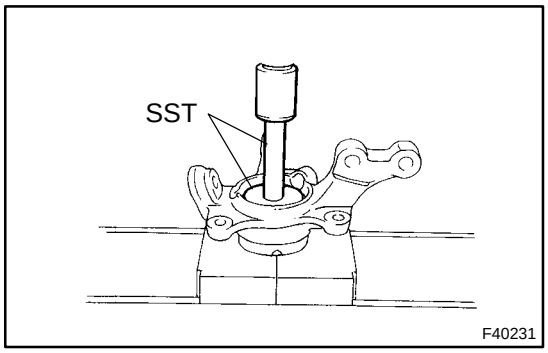
(c) Using a spanner to make the steering knuckle LH horizontal, fix it to the V block as shown in the illustration.

NOTICE:

Be sure that the steering knuckle is horizontally positioned.

(d) Using SST and a press, remove the front axle hub LH bearing.

SST 09950- 60010 (09951- 00600), 09950- 70010 (09951-07100)



15. INSTALL FRONT AXLE HUB LH BEARING

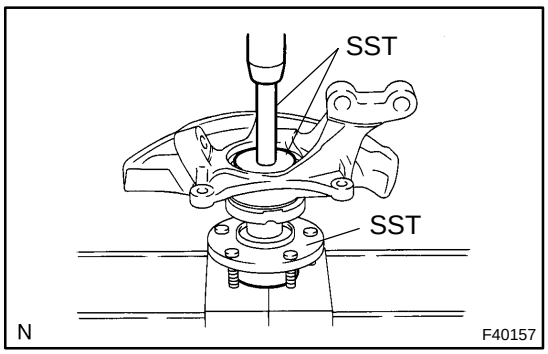
(a) Using SST and a press, install a new front axle hub LH bearing to the steering knuckle LH.

SST 09950- 60020 (09951- 00790), 09950- 70010 (09951-07100)

16. INSTALL DISC BRAKE DUST COVER FRONT LH

(a) Place the disc brake dust cover front LH and using a torx wrench (T30), torque the 4 bolts.

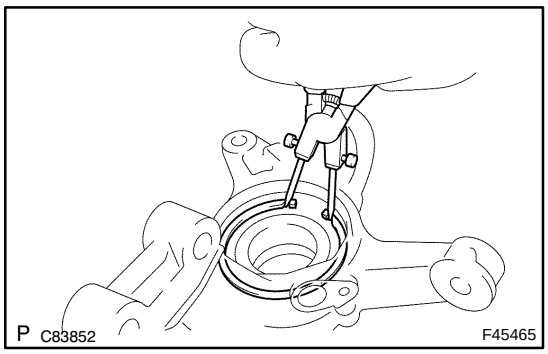
Torque: 8.3 N·m (85 kgf·cm, 73 in.·lbf)



17. INSTALL FRONT AXLE HUB SUB-ASSY LH

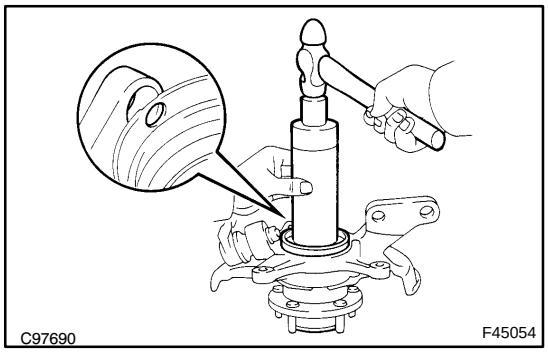
(a) Using SST and a press, install the front axle hub subassy LH.

SST 09608- 32010, 09950- 60020 (09951- 00790), 09950-70010 (09951-07100)



18. INSTALL FRONT AXLE HUB LH HOLE SNAP RING

(a) Using snap ring pliers, install a new front axle hub LH hole snap ring.



19. INSTALL FRONT WHEEL BEARING DUST DEFLECTOR NO.1 LH

(a) Using SST and a hammer, install the bearing dust deflector No.1 LH.

SST 09316- 60011 (09316- 00011, 09316- 00031), 09608-32010

HINT:

Aligh the hole for the speed sensor in the bearing dust deflector No.1 LH with the steering knuckle.

20. INSTALL LOWER BALL JOINT ASSY FRONT LH

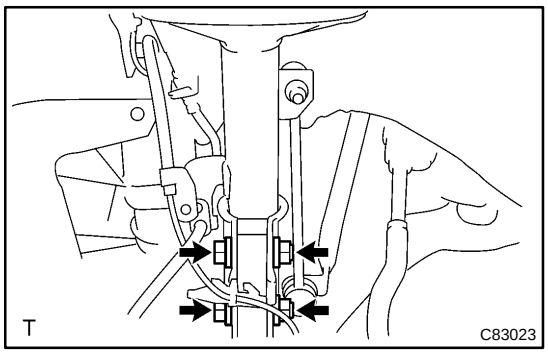
(a) Install the lower ball joint assy front LH and tighten the nut.

Torque: 123 N·m (1,254 kgf·cm, 90 ft·lbf)

(b) Install a new cotter pin.

NOTICE:

If the holes for the cotter pin are not aligned, tighten the nut up to 60° further.



21. INSTALL FRONT AXLE ASSY LH

(a) Install the front axle assy LH with the 2 bolts and nuts to the shock absorber assy front LH.

Torque: 210 N·m (2,141 kgf·cm, 155 ft·lbf)

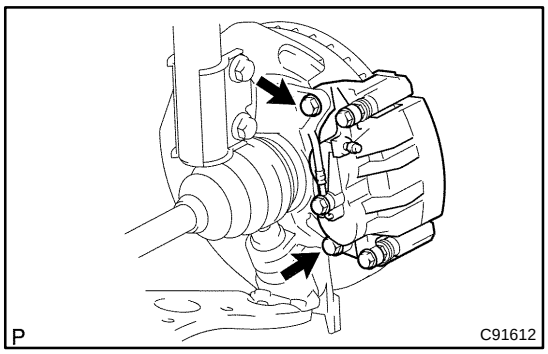
NOTICE:

- **Only when reusing the bolts and nuts, apply the small amount of engine oil to the screw part of the nuts.**
- **Do not excessively push out the front axle assy LH.**
- **Be careful not to damage the outboard joint boot.**
- **Be careful not to damage the speed sensor rotor.**

22. INSTALL FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH (SEE PAGE 30-8)

23. INSTALL TIE ROD ASSY LH (SEE PAGE 30-8)

24. INSTALL FRONT DISC

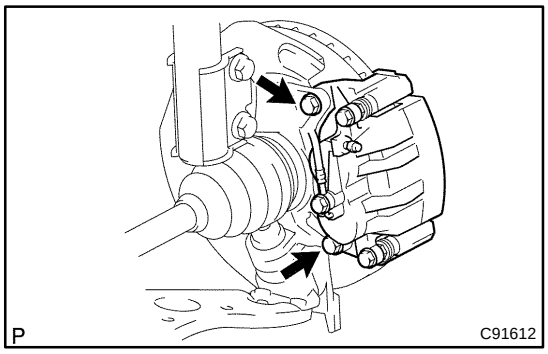


25. INSTALL FRONT DISC BRAKE CALIPER ASSY LH

(a) Install the front disc brake caliper assy LH with the 2 bolts to the steering knuckle LH.
Torque: 107 N·m (1,090 kgf·cm, 79 ft·lbf)

26. INSTALL FRONT AXLE HUB LH NUT (SEE PAGE30-8)

(a) Using a socket wrench (30 mm), install a new axle hub LH nut.
Torque: 294 N·m (2,998 kgf·cm, 217 ft·lbf)

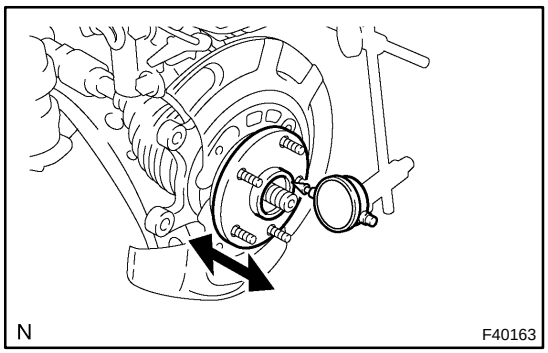


27. DISCONNECT FRONT DISC BRAKE CALIPER ASSY LH

(a) Remove the 2 bolts and separate the front disc brake caliper assy LH from the steering knuckle LH.

NOTICE:
Use a string or other device to keep the brake caliper from hanging down by the flexible hose.

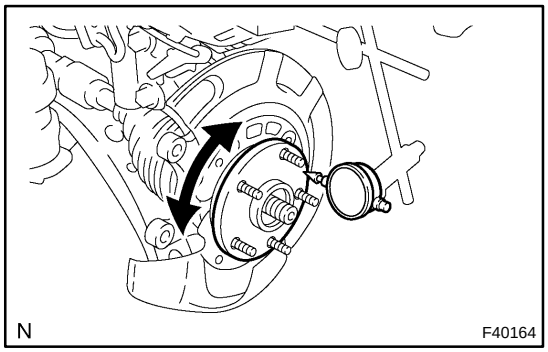
28. REMOVE FRONT DISC



29. INSPECT BEARING BACKLASH

(a) Using a dial indicator, check the backlash near the center of the axle hub.
Maximum: 0.05 mm (0.0020 in.)

If the backlash exceeds the maximum, replace the bearing.

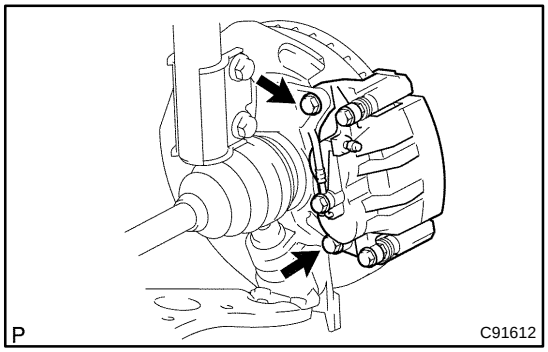


30. INSPECT AXLE HUB DEVIATION

(a) 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.

31. INSTALL FRONT DISC

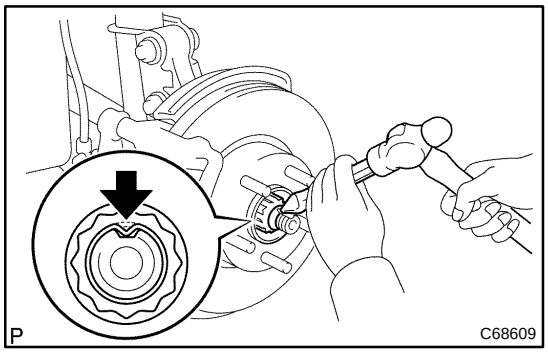


32. INSTALL FRONT DISC BRAKE CALIPER ASSY LH

(a) Install the front disc brake caliper assy LH with the 2 bolts to the steering knuckle LH.

Torque: 107 N·m (1,090 kgf·cm, 79 ft·lbf)

33. INSTALL SPEED SENSOR FRONT LH (SEE PAGE 30-8)



34. INSTALL FRONT AXLE HUB LH NUT

(a) Using a socket wrench (30 mm), install a new axle hub LH nut.

Torque: 294 N·m (2,998 kgf·cm, 217 ft·lbf)

(b) Using a chisel and hammer, stake the axle hub LH nut.

35. INSTALL FRONT WHEEL

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

36. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT (SEE PAGE 26-5)

37. CHECK ABS SPEED SENSOR SIGNAL

w/ VSC (SEE PAGE 05-471)

w/o VSC (SEE PAGE 05-420)

FRONT AXLE LH HUB BOLT

30020-09

REPLACEMENT

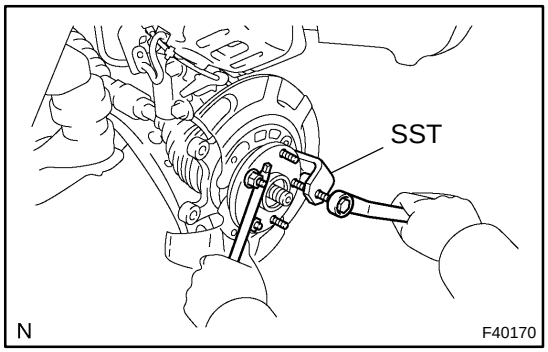
HINT:

- COMPONENTS: See page 30-4
- Replace the RH side by the same procedures with LH side.

1. REMOVE FRONT WHEEL

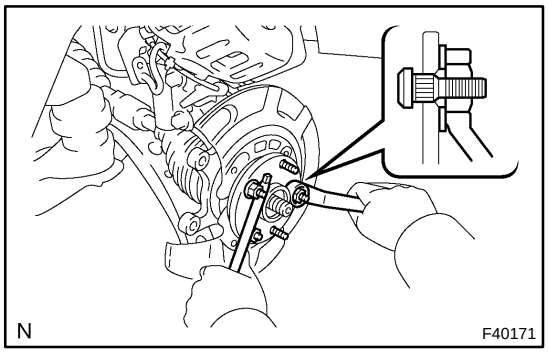
2. DISCONNECT FRONT DISC BRAKE CALIPER ASSY LH (SEE PAGE 30-19)

3. REMOVE FRONT DISC



4. REMOVE FRONT AXLE LH HUB BOLT

(a) Using SST and a screwdriver or an equivalent to hold, remove the front axle LH hub bolt.
SST 09628-1001 1



5. INSTALL FRONT AXLE LH HUB BOLT

(a) Install a washer and nut to a new front axle LH hub bolt as shown in the illustration.

(b) Using a screwdriver to hold, install the hub bolt by torquing the nut.

6. INSTALL FRONT DISC

7. INSTALL FRONT DISC BRAKE CALIPER ASSY LH (SEE PAGE 30-19)

8. INSTALL FRONT WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

REAR AXLE HUB & BEARING ASSY LH

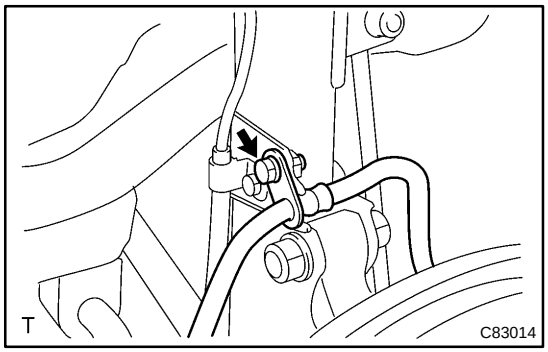
3006I-04

REPLACEMENT

HINT:

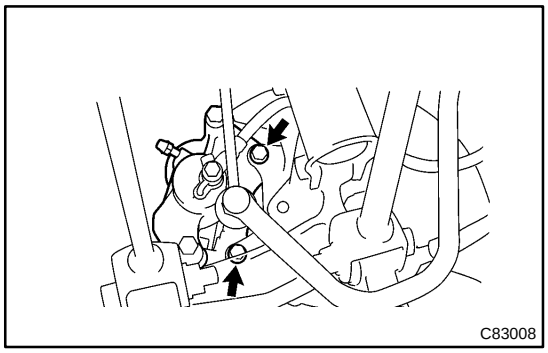
- COMPONENTS: See page 30-4
- Replace the RH side by the same procedures with the LH side.

1. REMOVE REAR WHEEL



2. DISCONNECT REAR DISC BRAKE CALIPER ASSY LH

(a) Remove the bolt and disconnect the rear flexible hose.

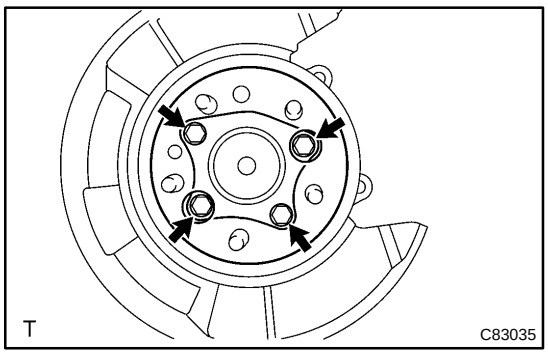


(b) Remove the 2 bolts and rear disc brake caliper assy LH.

(c) Support the rear disc brake caliper assy LH securely.

3. REMOVE REAR DISC

4. DISCONNECT SKID CONTROL SENSOR WIRE

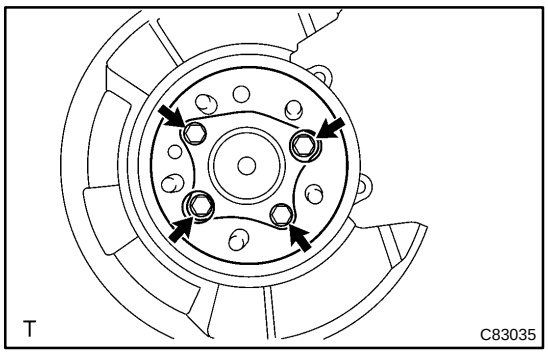


5. REMOVE REAR AXLE HUB & BEARING ASSY LH

(a) Remove the 4 bolts and rear axle hub & bearing assy LH.

6. REMOVE SKID CONTROL SENSOR (SEE PAGE 32-56)

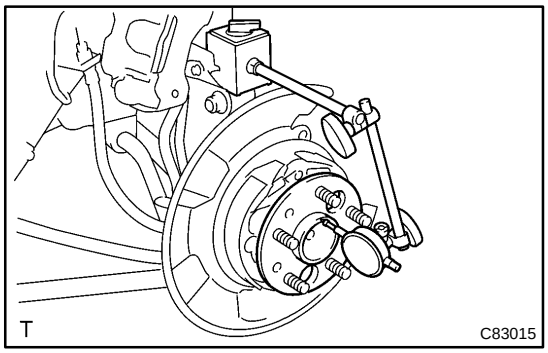
7. INSTALL SKID CONTROL SENSOR (SEE PAGE 32-56)



8. INSTALL REAR AXLE HUB & BEARING ASSY LH

(a) Install the rear axle hub & bearing assy LH with the 4 bolts.
Torque: 80 N·m (816 kgf·cm, 59 ft·lbf)

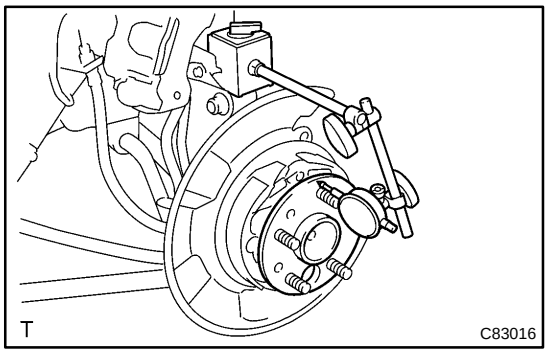
9. INSTALL SKID CONTROL SENSOR WIRE



10. INSPECT BEARING BACKLASH

(a) Set a dial indicator near the center of the axle hub and check the backlash in the bearing shaft direction.
Maximum: 0.05 mm (0.0020 in.)

If the backlash exceeds the maximum, replace the axle hub assembly.

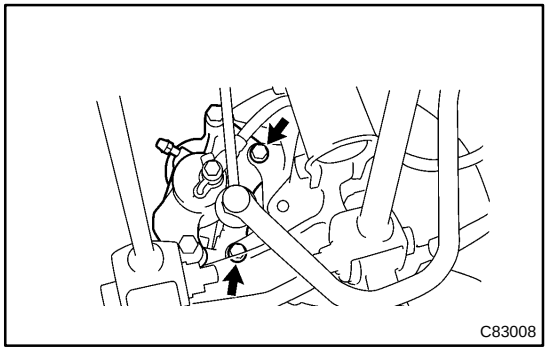


11. INSPECT AXLE HUB DEVIATION

(a) 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.)

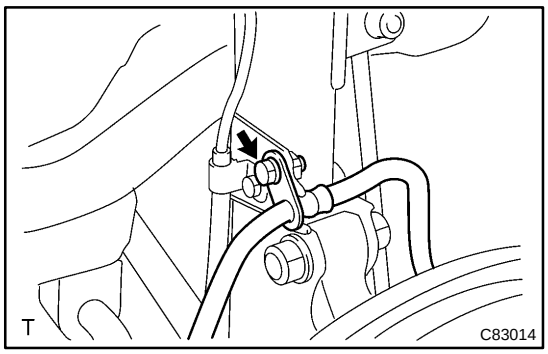
If the backlash exceeds the maximum, replace the axle hub assembly.

12. INSTALL REAR DISC



13. INSTALL REAR DISC BRAKE CALIPER ASSY LH

(a) Install the rear disc brake caliper assy LH with the 2 bolts.
Torque: 62 N·m (630 kgf·cm, 46 ft·lbf)



(b) Install the rear flexible hose with the bolt.
Torque: 19 N·m (192 kgf·cm, 14 ft·lbf)

14. INSTALL REAR WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

15. INSPECT AND ADJUST REAR WHEEL ALIGNMENT (SEE PAGE 27-3)

16. CHECK ABS SPEED SENSOR SIGNAL
w/ VSC (SEE PAGE 05-471)
w/o VSC (SEE PAGE 05-420)

REAR AXLE CARRIER SUB-ASSY LH

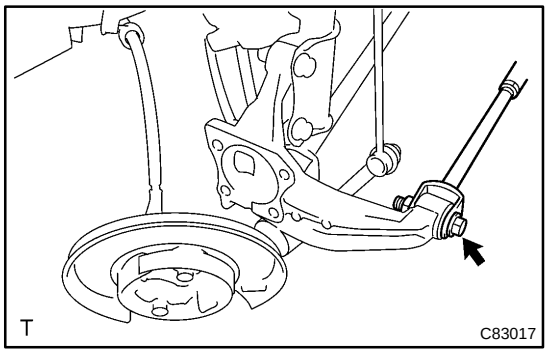
3006J-06

REPLACEMENT

HINT:

- COMPONENTS: See page 30-4
- Replace the RH side by the same procedures with the LH side.

1. **REMOVE REAR WHEEL**
2. **REMOVE STRUT ROD ASSY REAR (SEE PAGE 27-18)**
3. **DISCONNECT REAR DISC BRAKE CALIPER ASSY LH (SEE PAGE 30-26)**
4. **REMOVE REAR DISC**
5. **DISCONNECT SKID CONTROL SENSOR WIRE**
6. **REMOVE REAR AXLE HUB & BEARING ASSY LH (SEE PAGE 30-26)**

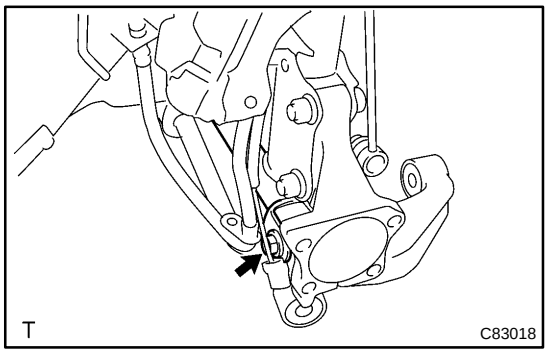


7. SEPARATE REAR SUSPENSION ARM ASSY NO.2 LH

(a) Remove the bolt, nut and rear suspension arm assy No.2 LH from the rear axle carrier sub-assy LH.

HINT:

While fixing the nut, turn and remove the bolt.

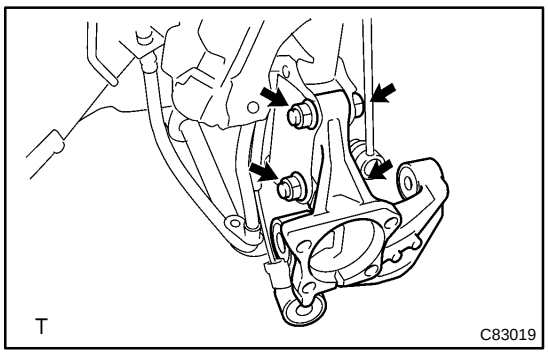


8. SEPARATE REAR SUSPENSION ARM ASSY NO.1 LH

(a) Remove the bolt, nut and rear suspension arm assy No.1 LH from the rear axle carrier sub-assy LH.

HINT:

While fixing the nut, turn and remove the bolt.

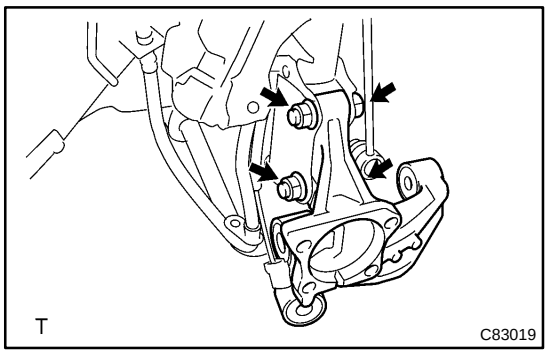


9. REMOVE REAR AXLE CARRIER SUB-ASSY LH

(a) Remove the 2 bolts, nuts and rear axle carrier sub-assy LH from the shock absorber assy rear LH.

NOTICE:

When removing bolt, stop the bolt from rotating and loosen the nut.



10. INSTALL REAR AXLE CARRIER SUB-ASSY LH

(a) Install the rear axle carrier sub-assy LH with the 2 bolts and nuts.

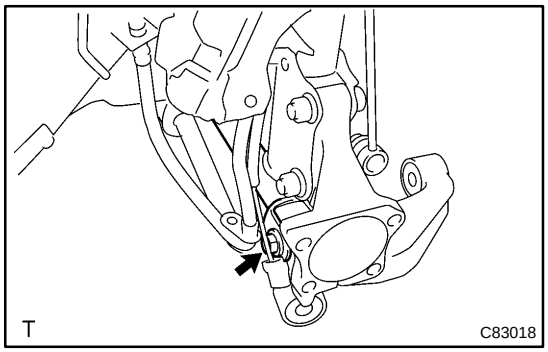
Torque: 255 N·m (2,600 kgf·cm, 188 ft·lbf)

NOTICE:

When installing bolt, stop the bolt from rotating and torque the nut.

HINT:

Insert the bolt from the rear side of the vehicle and install the nut.

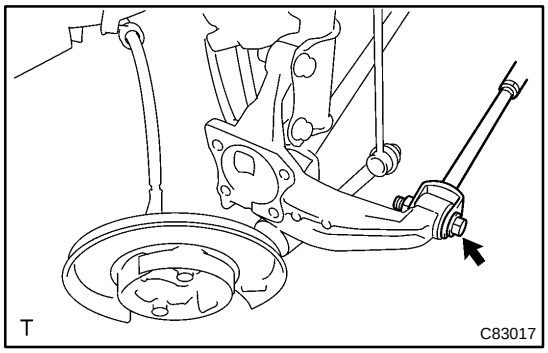


11. TEMPORARILY TIGHTEN REAR SUSPENSION ARM ASSY NO.1 LH

(a) Install the rear suspension arm assy No.1 LH to the rear axle carrier sub-assy LH with the bolt and nut, temporarily tighten the bolt.

HINT:

Insert the bolt from the front side of the vehicle and while fixing the nut, turn and install the bolt.



12. TEMPORARILY TIGHTEN REAR SUSPENSION ARM ASSY NO.2 LH

(a) Install the rear suspension arm No.2 to the rear axle carrier sub-assy LH with the bolt and nut, temporarily tighten the bolt.

HINT:

Insert the bolt from the rear side of the vehicle and while fixing the nut, turn and install the bolt.

13. INSTALL REAR AXLE HUB & BEARING ASSY LH (SEE PAGE 30-26)
14. INSTALL SKID CONTROL SENSOR WIRE
15. INSTALL REAR DISC
16. INSTALL REAR DISC BRAKE CALIPER ASSY LH (SEE PAGE 30-26)
17. TEMPORARILY TIGHTEN STRUT ROD ASSY REAR (SEE PAGE 27-18)
18. STABILIZE SUSPENSION (SEE PAGE 27-18)
19. FULLY TIGHTEN REAR SUSPENSION ARM ASSY NO.1 LH (SEE PAGE 27-10)
20. FULLY TIGHTEN REAR SUSPENSION ARM ASSY NO.2 LH (SEE PAGE 27-14)
21. FULLY TIGHTEN STRUT ROD ASSY REAR (SEE PAGE 27-18)
22. INSTALL REAR WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
23. INSPECT AND ADJUST REAR WHEEL ALIGNMENT (SEE PAGE 27-3)
24. CHECK ABS SPEED SENSOR SIGNAL
w/ VSC (SEE PAGE 05-471)
w/o VSC (SEE PAGE 05-420)

REAR AXLE LH HUB BOLT

30024-07

REPLACEMENT

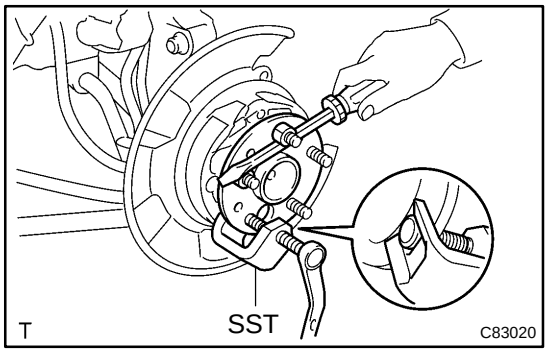
HINT:

- COMPONENTS: See page 30-4
- Replace the RH side by the same procedures with the LH side.

1. REMOVE REAR WHEEL

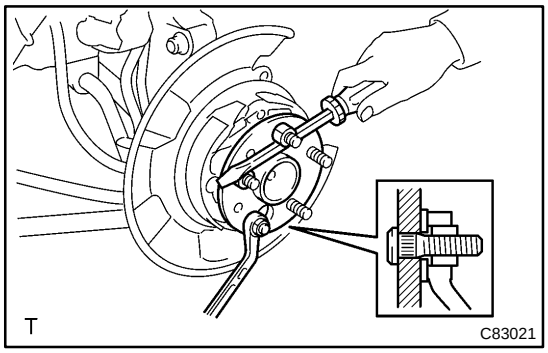
2. DISCONNECT REAR DISC BRAKE CALIPER ASSY LH (SEE PAGE 30-26)

3. REMOVE REAR DISC



4. REMOVE REAR AXLE LH HUB BOLT

(a) Using SST and a screwdriver or an equivalent to hold, remove the rear axle LH hub bolt.
SST 09628-1001 1



5. INSTALL REAR AXLE LH HUB BOLT

(a) Install a washer and nut to a new rear axle LH hub bolt as shown in the illustration.

(b) Using a screwdriver to hold, install the rear axle LH hub bolt by torquing the nut.

6. INSTALL REAR DISC

7. INSTALL REAR DISC BRAKE CALIPER ASSY LH (SEE PAGE 30-26)

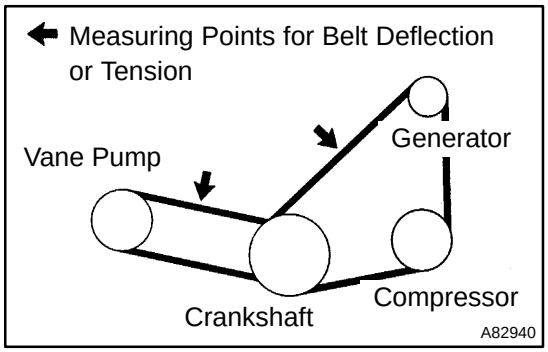
8. INSTALL REAR WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

ENGINE (3MZ-FE)

141C0-02

INSPECTION

1. **INSPECT ENGINE COOLANT (See page 16-1)**
2. **INSPECT ENGINE OIL**
3. **INSPECT BATTERY**
   Standard specific gravity: 1.25 to 1.29 at 20°C (68°F)
4. **INSPECT AIR CLEANER FILTER ELEMENT SUB-ASSY**
5. **INSPECT SPARK PLUG (See page 18-3)**



6. **INSPECT V-RIBBED BELT**

(a) Belt deflection:

Pressing force: 98 N (10 kgf, 22 lbf)

	New Belt mm (in.)	Used Belt mm (in.)
V-ribbed Belt (For fan and generator)	9.1 to 10.5 (0.358 to 0.413)	11 to 13.5 (0.433 to 0.531)
V-ribbed Belt (For vane pump)	8 to 10 (0.315 to 0.394)	11 to 14 (0.433 to 0.551)

(b) Belt tension:

	New Belt N (kg , lb)	Used Belt N (kg , lb)
V-ribbed Belt (For fan and generator)	637 to 735 (65 to 75 , 143 to 165)	392 to 588 (40 to 60 , 88 to 132)
V-ribbed Belt (For vane pump)	588 to 686 (60 to 70 , 132 to 154)	245 to 392 (25 to 40 , 55 to 88)

NOTICE:

- **Check the drive belt deflection at the specified point.**
- **When installing a new belt, set its tension value as specified.**
- **When inspecting a belt which is used for over 5 minutes, apply the specification of "Used belt".**
- **When reinstalling a belt which is used for over 5 minutes, adjust its belt deflection and tension to the intermediate value of each specification in "Used belt".**
- **The V- ribbed belt tension and deflection value should be checked after 2 revolutions of engine cranking.**
- **When using a belt tension gauge, confirm the accuracy first by using a master gauge.**

7. **INSPECT IGNITION TIMING**

(a) Warm up engine.

(b) When using the hand-held tester or OBD II scan tool:

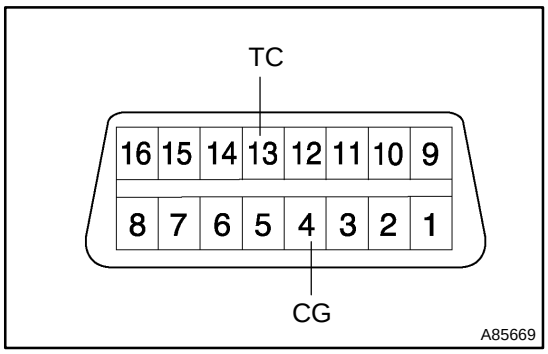
(1) Connect the hand-held tester or OBD II scan tool to the DLC3.

(2) Enter DATA LIST MODE on the hand-held tester or OBD II scan tool.

Ignition timing: 8 to 12°BTDC

HINT:

Refer to the hand-held tester or OBD II scan tool operator's manual if you need help to select DATA LIST.

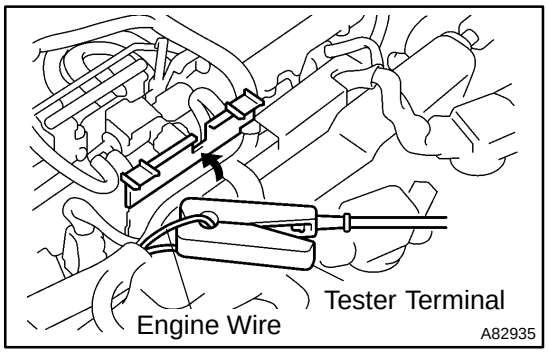


(c) When not using the hand-held tester or OBD II scan tool:
(1) Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.
SST 09843-18040

NOTICE:

- **Make sure of the terminal numbers before connecting them. Connecting wrong terminals can damage the engine.**
- **Turn OFF all electrical systems before connecting the terminals.**
- **Perform this inspection after the cooling fan motor is turned OFF.**

(2) Remove the V-bank cover.



(3) Pull out the engine wire colored by black and red as shown in the illustration.
(4) Connect the tester terminal of the timing light to the engine.

NOTICE:

Use a timing light which detects the first signal.

(5) Inspect the ignition timing at idle.
Ignition timing: 8 to 12°BTDC

NOTICE:

When checking the ignition timing, the transmission is in the neutral position.

HINT:

Run the engine at 1,000 to 1,300 rpm for 5 seconds, then check that the engine speed returns to the idle speed.

(6) Disconnect terminals 13 (TC) and 4 (CG) of the DLC3.
(7) Inspect the ignition timing at idle.
Ignition timing: 7 to 24°BTDC
(8) Confirm that the ignition timing advances when the engine speed is increased.
(9) Remove the timing light.

8. INSPECT ENGINE IDLE SPEED

(a) Warm up the engine.
(b) When using the hand-held tester or OBD II scan tool:
(1) Connect the hand-held tester or OBD II scan tool to the DLC3.
(2) Enter DATA LIST MODE on the hand-held tester or OBD II scan tool.
Idle speed: 630 to 730 rpm

NOTICE:

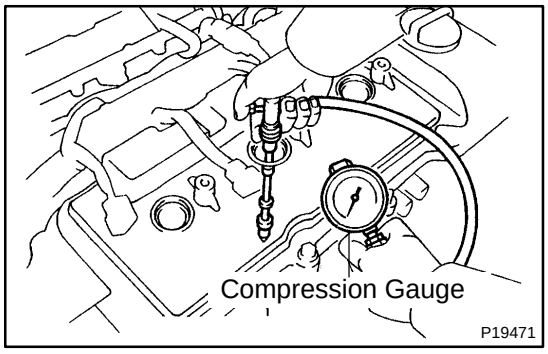
- **When checking the idle speed, the transmission is in the neutral position.**
- **Check the idle speed with the cooling fan OFF.**
- **Switch OFF all accessories and air conditioning before connecting the hand-held tester or OBD II scan tool.**

HINT:

Refer to the hand-held tester or OBD II scan tool operator's manual for further details.

9. INSPECT COMPRESSION

(a) Warm up and stop the engine.
(b) Remove the intake air surge tank (see page 11-13).
(c) Disconnect the injector connectors.
(d) Remove the ignition coils.
(e) Remove the spark plugs.



(f) Inspect the cylinder compression pressure.
(1) Insert a compression gauge into the spark plug hole.
SST 09992-00500
(2) Fully open the throttle.
(3) While cranking the engine, measure the compression pressure.
Compression pressure:
1.5 MPa (15.3 kgf/cm^2, 218 psi)
Minimum pressure:
1.0 MPa (10.2 kgf/cm^2, 145 psi)
Difference between each cylinder:
100 kPa (1.0 kgf/cm^2, 15 psi)

NOTICE:

- **Always use a fully-charged battery to obtain engine speed of 250 rpm or more.**
- **Check the other cylinder's compression pressure in the same way.**
- **This measurement must be done as quickly as possible.**

(4) If the cylinder compression is low, pour a small amount of engine oil into the cylinder through the spark plug hole, then inspect again.

HINT:

- If adding oil increases the compression, the piston rings and/or cylinder bore may be worn or damaged.
- If pressure stays low, the valve may be sticking or seated improperly, or there may be leakage past the gasket.

10. INSPECT CO/HC

HINT:
The ECM properly controls the CO/HC concentration in the emission gas.
(a) Start the engine.
(b) Run the engine at 2,500 rpm for approximately 180 seconds.
(c) Insert the CO/HC meter testing probe at least 40 cm (1.3 ft) into the tailpipe during idling.
(d) Check the CO/HC concentration at idle and/or at 2,500 rpm.
HINT:
When doing the 2 mode (with the engine is at idle and at 2,500 rpm) tests, these measuring order are prescribed by the applicable local regulations.
If the CO/HC concentration does not comply with the regulations, troubleshoot in the order given below.
(1) Check the heated oxygen sensor operation (see page 05-126).

(2) See the table below for possible causes, then inspect the applicable causes and repair them if necessary.

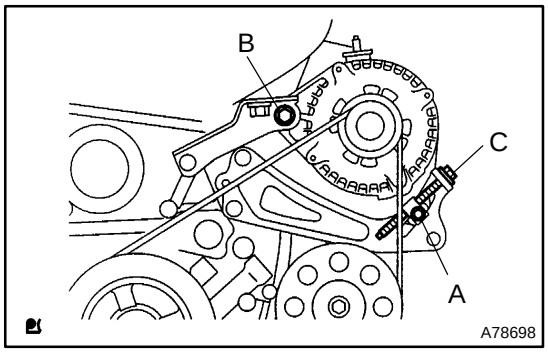
CO	HC	Problems	Causes
Normal	High	Rough idle	5. Faulty ignitions: • Incorrect timing • Fouled, shorted or improperly gapped plugs 6. Incorrect valve clearance 7. Leaks in intake and exhaust valves 8. Leaks in cylinders
Low	High	Rough idle (Fluctuating HC reading)	1. Vacuum leaks: • PCV hoses • Intake manifold • Throttle body • Brake booster line 2. Lean mixture causing misfire
High	High	Rough idle (Black smoke from exhaust)	1. Restricted air filter 2. Plugged PCV valve 3. Faulty SFI systems: • Faulty pressure regulator • Defective engine coolant temperature sensor • Defective mass air flow meter • Faulty ECM • Faulty injectors • Faulty throttle body

DRIVE BELT (3MZ-FE)

14193-03

REPLACEMENT

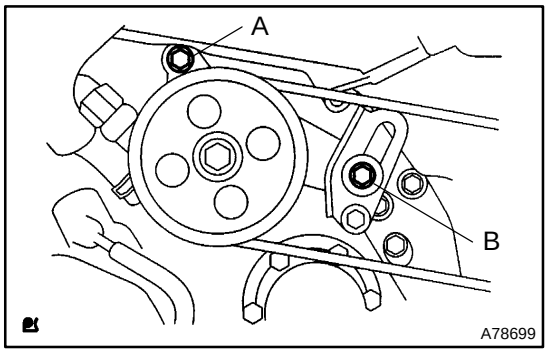
1. **REMOVE FRONT WHEEL RH**
2. **REMOVE FRONT FENDER APRON SEAL RH**



3. REMOVE V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1

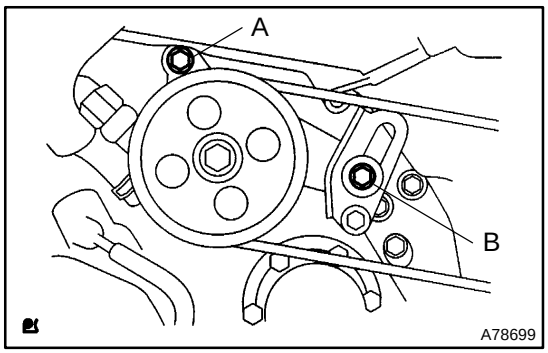
(a) Loosen bolts A and B.

(b) Loosen the adjusting bolt C, then remove the V-ribbed belt.



4. REMOVE VANE PUMP V BELT

(a) Loosen bolts A and B, then remove the V-ribbed belt.



5. INSTALL VANE PUMP V BELT

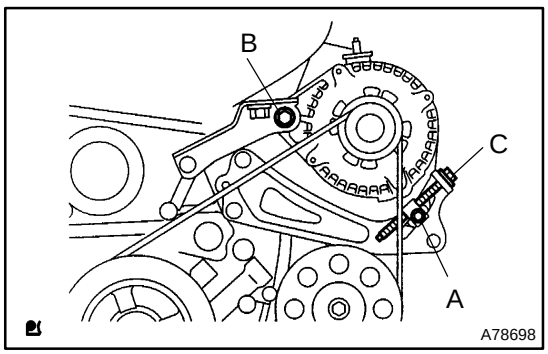
(a) Install the V-ribbed belt on each pulley.

(b) Using a bar, adjust the V-ribbed belt tension, then tighten bolt B.

Torque: 43 N·m (439 kgf·cm, 32 ft·lbf)

(c) Tighten bolt A.

Torque: 43 N·m (439 kgf·cm, 32 ft·lbf)



6. INSTALL V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1

(a) Install the V-ribbed belt on each pulley.

(b) Tighten the adjusting bolt C, then adjust the V-ribbed belt tension.

(c) First tighten bolt A, then tighten bolt B.

Torque:
18 N·m (178 kgf·cm, 13 ft·lbf) for bolt A
58 N·m (591 kgf·cm, 43 ft·lbf) for bolt B

7. INSPECT DRIVE BELT DEFLECTION AND TENSION (See page 14-1)

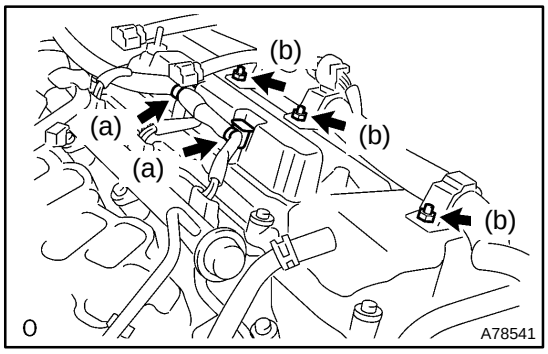
8. INSTALL FRONT WHEEL RH
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

VALVE CLEARANCE (3MZ-FE)

141J7-02

ADJUSTMENT

1. DISCONNECT BATTERY NEGATIVE TERMINAL
2. DRAIN ENGINE COOLANT (See page 16-9)
3. REMOVE FRONT FENDER APRON SEAL RH
4. REMOVE FRONT SUSPENSION UPPER BRACE CENTER (W/O TEMS) (See page 10-1 1)
5. REMOVE V-BANK COVER SUB-ASSY (See page 10-1 1)
6. REMOVE AIR CLEANER CAP SUB-ASSY (See page 10-1 1)
7. REMOVE EMISSION CONTROL VALVE SET (See page 11-13)
8. REMOVE INTAKE AIR SURGE TANK (See page 11-13)
9. REMOVE RADIATOR HOSE INLET
10. REMOVE IGNITION COIL ASSY

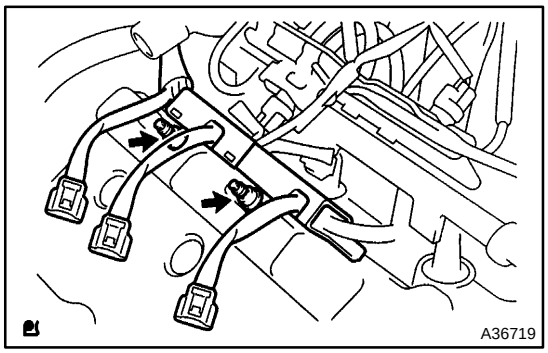


11. REMOVE CYLINDER HEAD COVER SUB-ASSY

(a) Remove the 2 engine wire harness clamps.

(b) Remove the 3 nuts, then disconnect the engine wire harness.

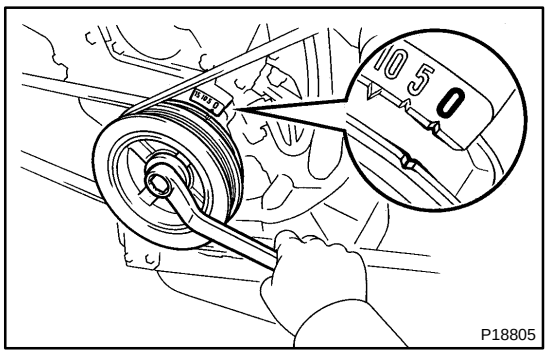
(c) Remove the 9 bolts and cylinder head cover.



12. REMOVE CYLINDER HEAD COVER SUB-ASSY LH

(a) Using an E6 Torx® socket wrench, remove the 2 bolts and disconnect the engine wire harness protector.

(b) Remove the 9 bolts and cylinder head cover.

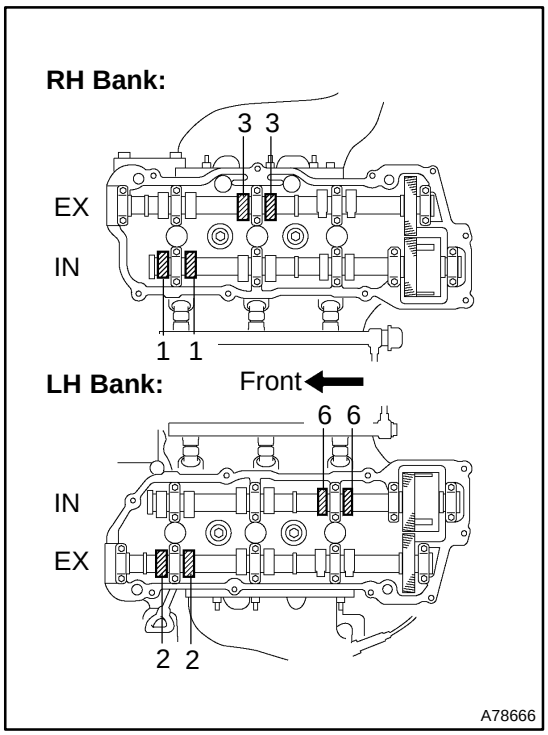


13. INSPECT VALVE CLEARANCE

(a) Turn the crankshaft pulley, then align the timing notch with the timing mark ”0” of the timing belt No. 1 cover.

(b) Check that the valve lifters on the intake side of the No. 1 cylinder are not pushed by the cam.

If the valve lifters are pushed, turn the crankshaft by 1 revolution (360❍) and align the marks as above.



(c) Inspect the valves indicated in the illustration on the left.

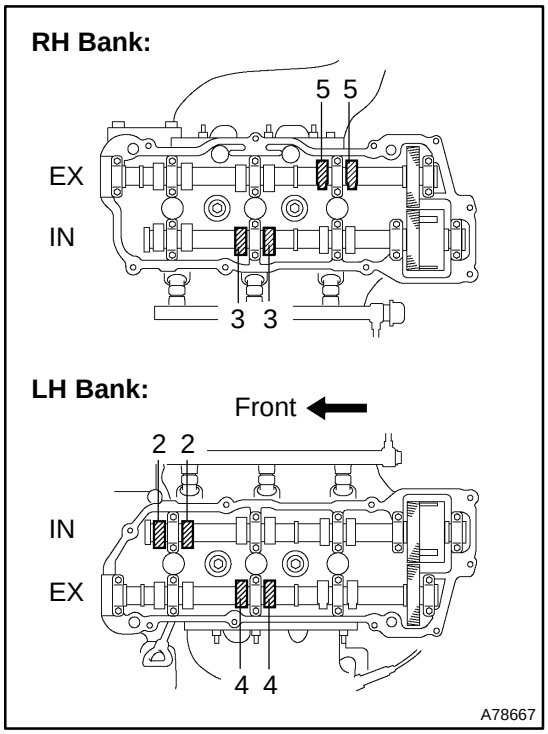
(1) Using a feeler gauge, measure the clearance between the valve lifter and camshaft.

Valve clearance (Cold):

0.15 to 0.25 mm (0.0059 to 0.0098 in.) for intake

0.25 to 0.35 mm (0.0098 to 0.0138 in.) for exhaust

(2) Record the out-of-specification valve clearance measurements. They will be used later to select an adjusting shim to replace.



(d) Turn the crankshaft by 2/3 of a revolution (240°), then inspect the valves indicated in the illustration on the left.

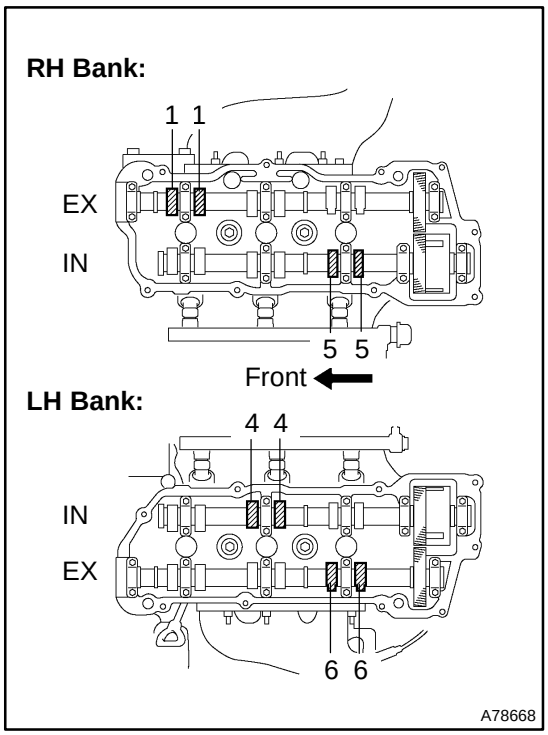
(1) Using a feeler gauge, measure the clearance between the valve lifter and camshaft.

Valve clearance (Cold):

0.15 to 0.25 mm (0.0059 to 0.0098 in.) for intake

0.25 to 0.35 mm (0.0098 to 0.0138 in.) for exhaust

(2) Record the out-of-specification valve clearance measurements. They will be used later to select an adjusting shim to replace.

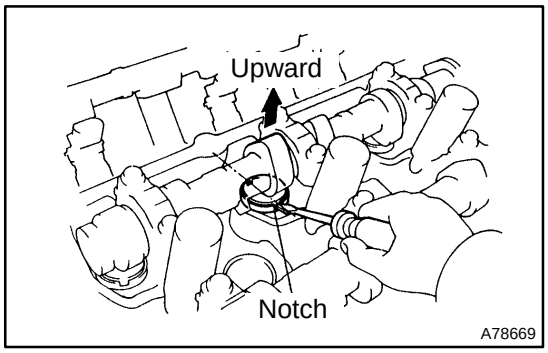


(e) Turn the crankshaft by 2/3 of a revolution (240°), then inspect the valves indicated in the illustration on the left.

(1) Using a feeler gauge, measure the clearance between the valve lifter and camshaft.

Valve clearance (Cold):
0.15 to 0.25 mm (0.0059 to 0.0098 in.) for intake
0.25 to 0.35 mm (0.0098 to 0.0138 in.) for exhaust

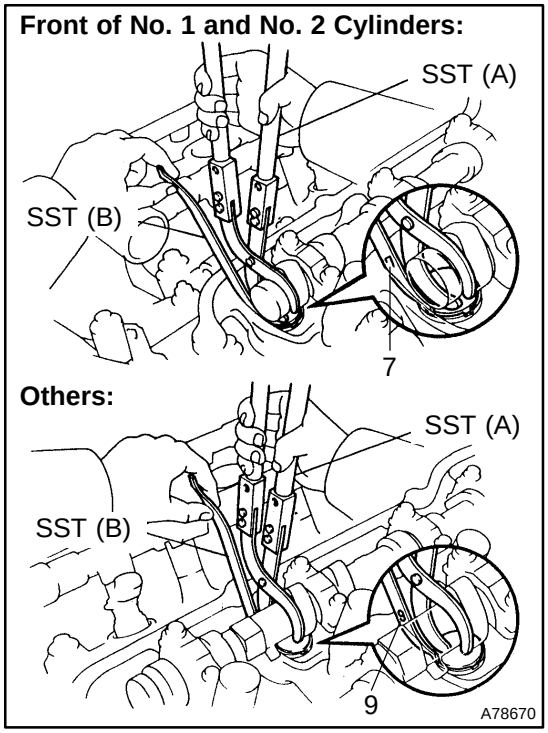
(2) Record the out-of-specification valve clearance measurements. They will be used later to select an adjusting shim to replace.



14. ADJUST VALVE CLEARANCE

(a) Turn the camshaft so that the cam lobe faces upward.

(b) Turn the valve lifter with a screwdriver so that the notches are perpendicular to the camshaft.



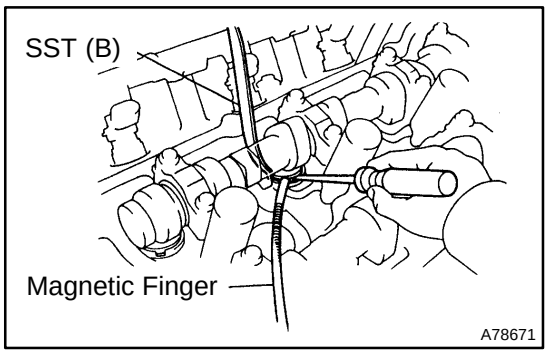
(c) Using SST (A), press down the valve lifter and place SST (B) between the camshaft and valve lifter. Remove SST (A).

SST 09248-55040 (09248-05410, 09248-05420)

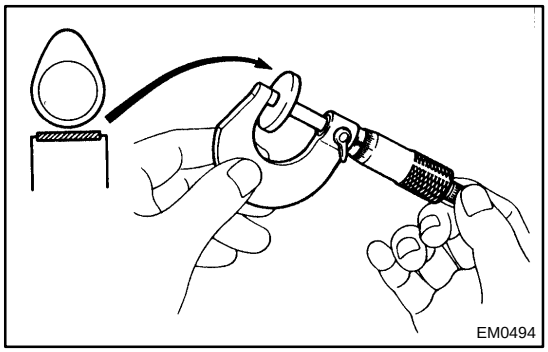
HINT:

- Apply SST (B) at a slight angle on the side marked with ”9” or ”7” at the position shown in the illustration.
- When SST (B) is inserted too deeply, it will get pinched by the shim. To prevent SST (B) from getting stuck, insert it gently from the intake side at a slight angle.

SST (A)	09248-05410
SST (B)	09248-05420



(d) Using a small screwdriver and magnetic finger, remove the adjusting shim.



(e) Using a micrometer, measure the thickness of the removed shim.

(f) Calculate the thickness of a new shim so that the valve clearance comes within the specified value.

A	Thickness of new shim
B	Thickness of used shim
C	Measured valve clearance

Specified value (Cold):
Intake A = B + (C - 0.20 mm (0.0079 in.))
Exhaust A = B + (C - 0.30 mm (0.0118 in.))

(g) Select a new shim with a thickness which is as close to the calculated values as possible.

EXAMPLE (Intake):
Measured valve clearance = 0.45 mm (0.0177 in.)
0.45 mm (0.0177 in.) - 0.20 mm (0.0079 in.) = 0.25 mm (0.0098 in.)
(Measured - Specification = Excess clearance)
Used shim measurement = 2.80 mm (0.1102 in.)
0.25 mm (0.0098 in.) + 2.80 mm (0.1102 in.) = 3.05 mm (0.1201 in.)
(Excess clearance + Used shim = Ideal new shim)
Closest new shim = 3.05 mm (0.1201 in.)
Select No. 12 shim

HINT:

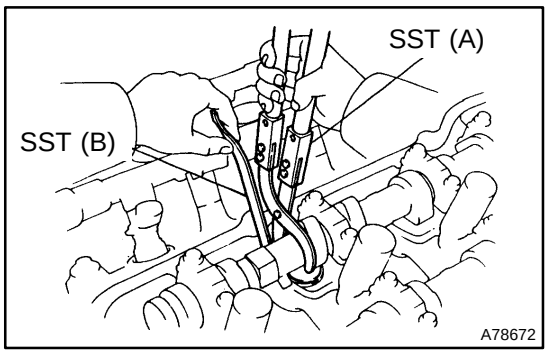
- Shims are available in 17 sizes in increments of 0.05 mm (0.0020 in.), from 2.50 mm (0.0984 in.) to 3.30 mm (0.1299 in.).
- Refer to New Shim Thickness table on the next 2 pages.

Adjusting Shim Selection Chart (Intake)

| Measured Clearance mm (in.) \ Installed Shim Thickness mm (in.) | 2.500 (0.0984) | 2.520 (0.0992) | 2.540 (0.1000) | 2.550 (0.1004) | 2.560 (0.1008) | 2.580 (0.1016) | 2.600 (0.1024) | 2.620 (0.1031) | 2.640 (0.1039) | 2.650 (0.1043) | 2.660 (0.1047) | 2.670 (0.1051) | 2.680 (0.1055) | 2.690 (0.1059) | 2.700 (0.1063) | 2.710 (0.1067) | 2.720 (0.1071) | 2.730 (0.1075) | 2.740 (0.1079) | 2.750 (0.1083) | 2.760 (0.1087) | 2.770 (0.1091) | 2.780 (0.1094) | 2.790 (0.1098) | 2.800 (0.1102) | 2.810 (0.1106) | 2.820 (0.1110) | 2.830 (0.1114) | 2.840 (0.1118) | 2.850 (0.1122) | 2.860 (0.1126) | 2.870 (0.1130) | 2.880 (0.1134) | 2.890 (0.1138) | 2.900 (0.1142) | 2.910 (0.1146) | 2.920 (0.1150) | 2.930 (0.1154) | 2.940 (0.1157) | 2.950 (0.1161) | 2.960 (0.1165) | 2.970 (0.1169) | 2.980 (0.1173) | 2.990 (0.1177) | 3.000 (0.1181) | 3.010 (0.1185) | 3.020 (0.1189) | 3.030 (0.1193) | 3.040 (0.1197) | 3.050 (0.1201) | 3.060 (0.1205) | 3.080 (0.1213) | 3.100 (0.1220) | 3.120 (0.1228) | 3.140 (0.1236) | 3.150 (0.1240) | 3.160 (0.1244) | 3.180 (0.1252) | 3.200 (0.1260) | 3.220 (0.1268) | 3.240 (0.1276) | 3.250 (0.1280) | 3.260 (0.1283) | 3.280 (0.1291) | 3.300 (0.1299) |
|---|---|---

Adjusting Shim Selection Chart (Exhaust)

| Measured Clearance mm (in.) \ Installed Shim Thickness mm (in.) | 2.500 (0.0984) | 2.520 (0.0992) | 2.540 (0.1000) | 2.550 (0.1004) | 2.560 (0.1008) | 2.580 (0.1016) | 2.600 (0.1024) | 2.620 (0.1031) | 2.640 (0.1039) | 2.650 (0.1043) | 2.660 (0.1047) | 2.670 (0.1051) | 2.680 (0.1055) | 2.690 (0.1059) | 2.700 (0.1063) | 2.710 (0.1067) | 2.720 (0.1071) | 2.730 (0.1075) | 2.740 (0.1079) | 2.750 (0.1083) | 2.760 (0.1087) | 2.770 (0.1091) | 2.780 (0.1094) | 2.790 (0.1098) | 2.800 (0.1102) | 2.810 (0.1106) | 2.820 (0.1110) | 2.830 (0.1114) | 2.840 (0.1118) | 2.850 (0.1122) | 2.860 (0.1126) | 2.870 (0.1130) | 2.880 (0.1134) | 2.890 (0.1138) | 2.900 (0.1142) | 2.910 (0.1146) | 2.920 (0.1150) | 2.930 (0.1154) | 2.940 (0.1157) | 2.950 (0.1161) | 2.960 (0.1165) | 2.970 (0.1169) | 2.980 (0.1173) | 2.990 (0.1177) | 3.000 (0.1181) | 3.010 (0.1185) | 3.020 (0.1189) | 3.030 (0.1193) | 3.040 (0.1197) | 3.050 (0.1201) | 3.060 (0.1205) | 3.070 (0.1213) | 3.080 (0.1220) | 3.100 (0.1228) | 3.120 (0.1236) | 3.140 (0.1240) | 3.150 (0.1244) | 3.160 (0.1252) | 3.180 (0.1260) | 3.200 (0.1268) | 3.220 (0.1276) | 3.240 (0.1280) | 3.250 (0.1280) | 3.260 (0.1283) | 3.280 (0.1291) | 3.300 (0.1299) |
|---|---|---

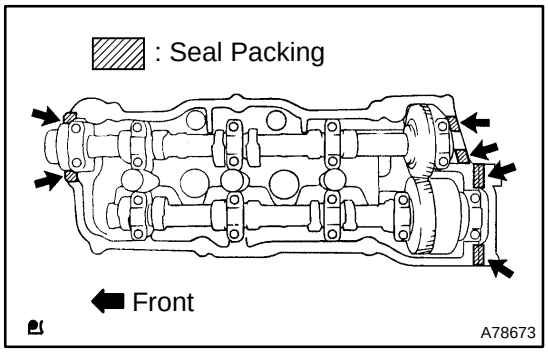


(h) Place a new adjusting shim on the valve lifter with the imprinted number facing down.

(i) Press down the valve lifter with SST (A), then remove SST (B).

SST 09248-55040 (09248-05410, 09248-05420)

(j) Recheck the valve clearance.



15. INSTALL CYLINDER HEAD COVER SUB-ASSY

(a) Apply seal packing to the cylinder head as shown in the illustration.

Seal packing: Part No. 08826-00080 or equivalent

NOTICE:

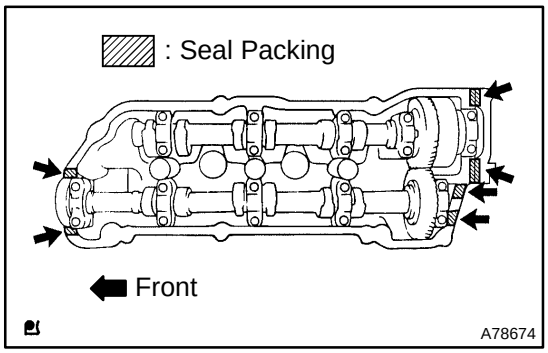
- **Remove any oil from the contact surface.**
- **Install the cylinder head cover within 3 minutes after applying seal packing.**
- **Do not start the engine within 2 hours after installing.**

(b) Install the cylinder head cover with the 9 bolts. Tighten the bolts uniformly in several steps.

Torque: 8.0 N·m (80 kgf·cm, 71 in.·lbf)

(c) Install the engine wire harness with the 3 nuts.

Torque: 8.4 N·m (85 kgf·cm, 74 in.·lbf)



16. INSTALL CYLINDER HEAD COVER SUB-ASSY LH

(a) Apply seal packing to the cylinder head as shown in the illustration.

Seal packing: Part No. 08826-00080 or equivalent

NOTICE:

- **Remove any oil from the contact surface.**
- **Install the cylinder head cover within 3 minutes after applying seal packing.**
- **Do not start the engine within 2 hours after installing.**

(b) Install the cylinder head cover with the 9 bolts. Tighten the bolts uniformly in several steps.

Torque: 8.0 N·m (80 kgf·cm, 71 in.·lbf)

(c) Using an E6 Torx® socket wrench, install the engine wire harness protector with the 2 bolts.

Torque: 8.4 N·m (85 kgf·cm, 74 in.·lbf)

17. INSTALL IGNITION COIL ASSY
Torque: 8.0 N·m (80 kgf·cm, 71 in.·lbf)

18. INSTALL INTAKE AIR SURGE TANK (See page 11-13)

19. INSTALL EMISSION CONTROL VALVE SET (See page 11-13)

20. INSTALL AIR CLEANER CAP SUB-ASSY (See page 10-1 1)

21. CHECK CONNECTION OF VACUUM HOSE (See page 14-29)

22. INSTALL V-BANK COVER SUB-ASSY (See page 10-1 1)

23. INSTALL FRONT SUSPENSION UPPER BRACE CENTER (W/O TEMS) (See page 10-1 1)

24. ADD ENGINE COOLANT (See page 16-9)

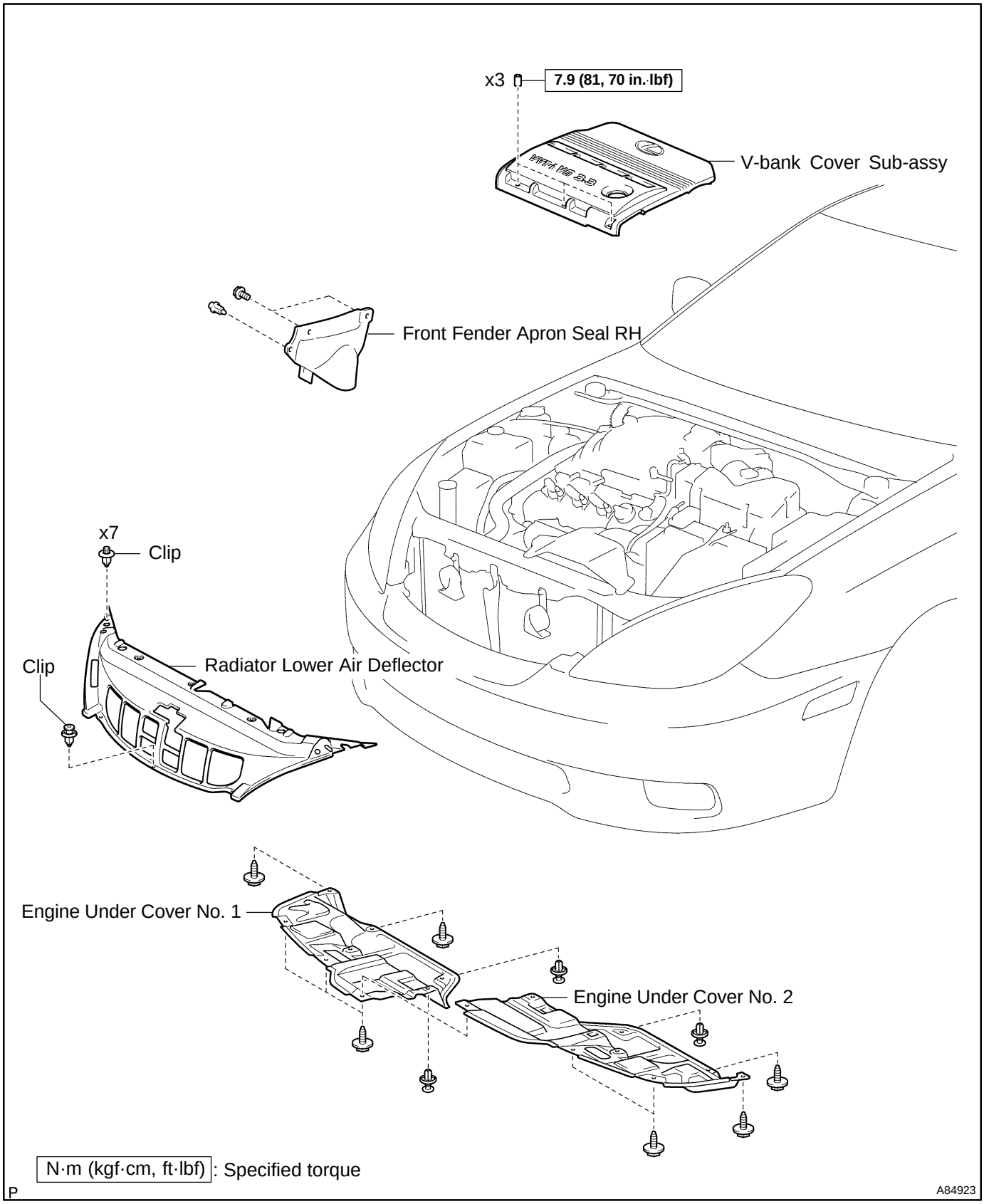
25. CHECK FOR ENGINE COOLANT LEAKS (See page 16-1)

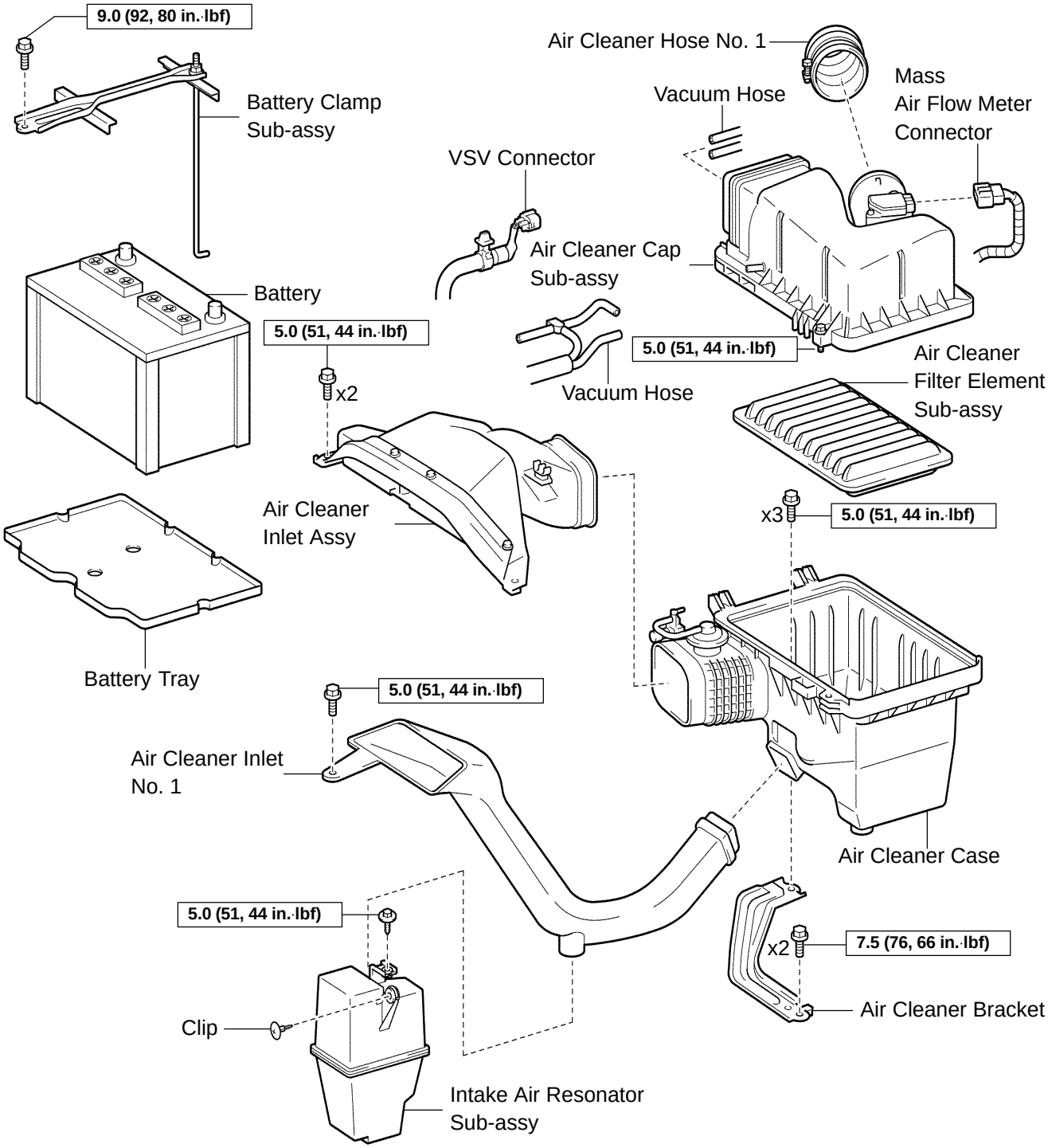
26. SYSTEM INITIALIZATION (See page 19-15)

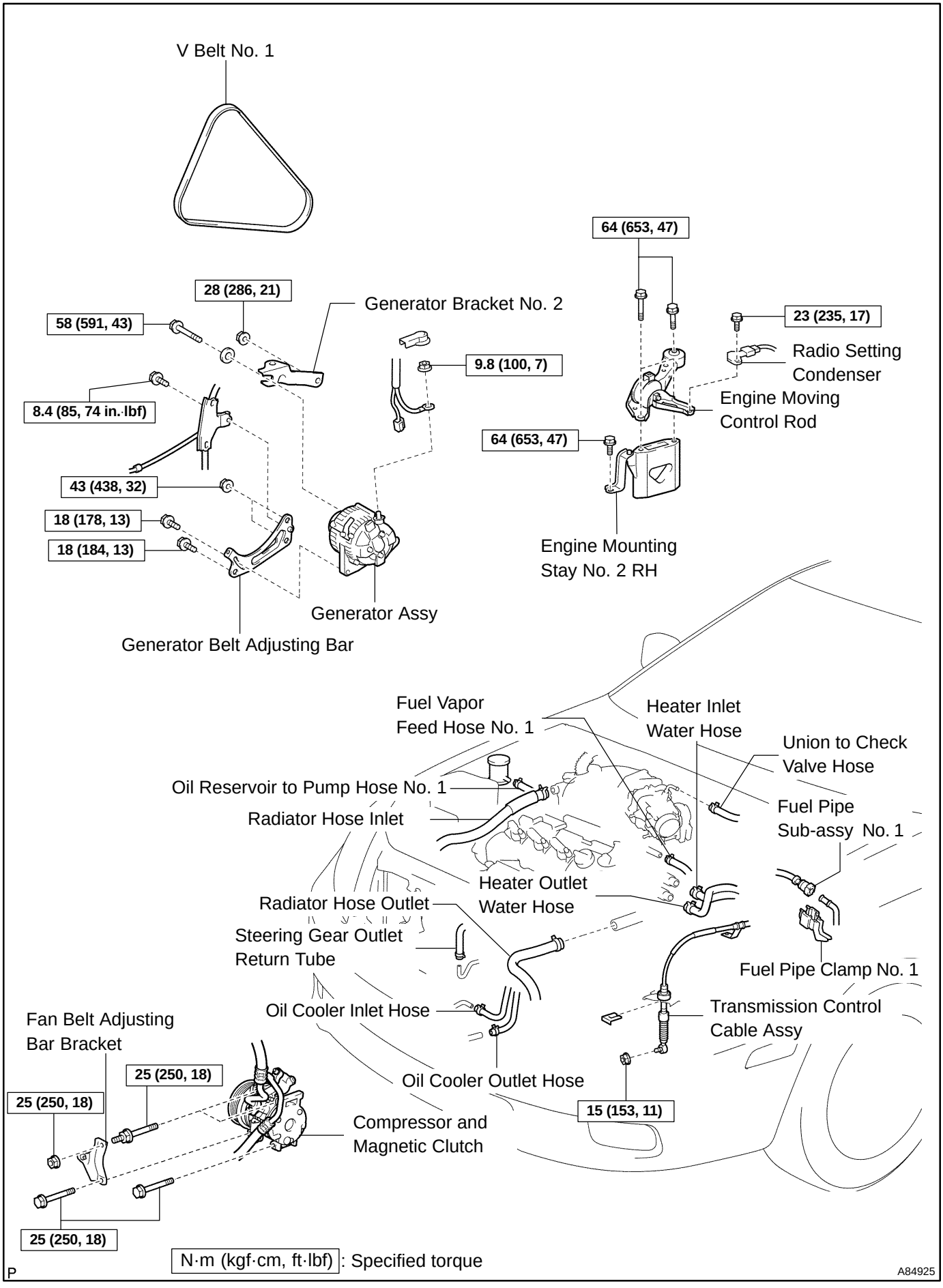
PARTIAL ENGINE ASSY (3MZ-FE)

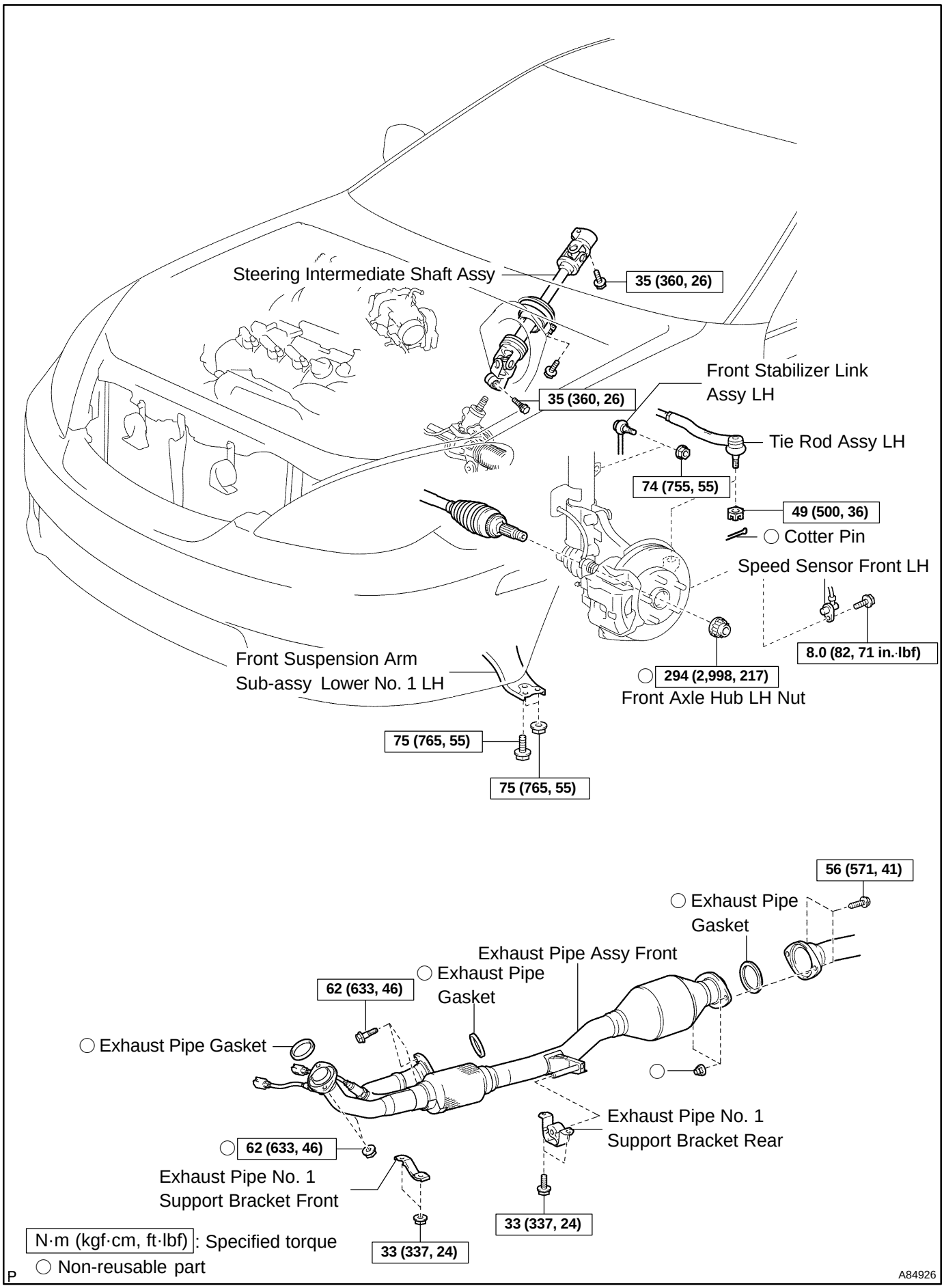
141J8-01

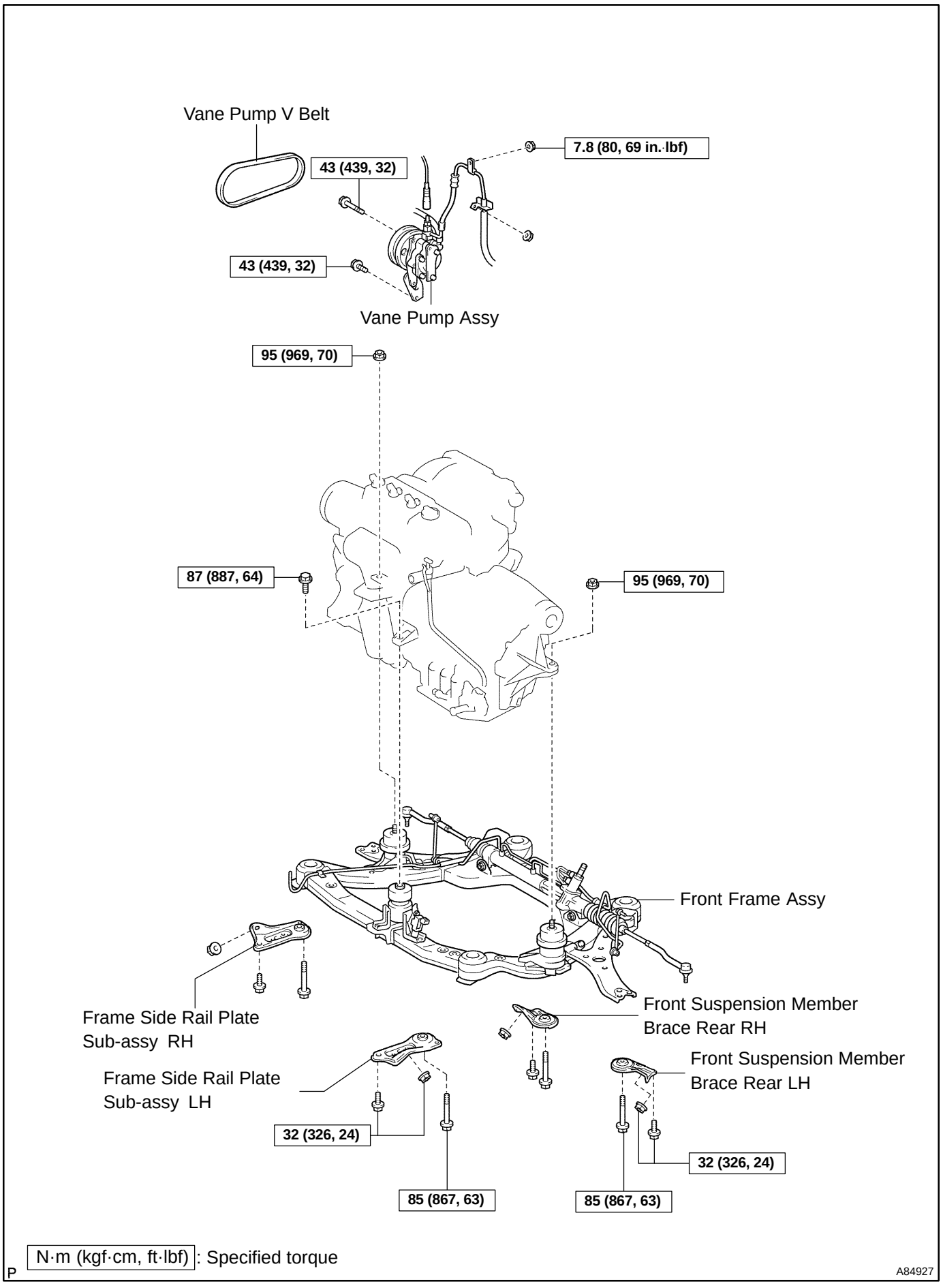
COMPONENTS

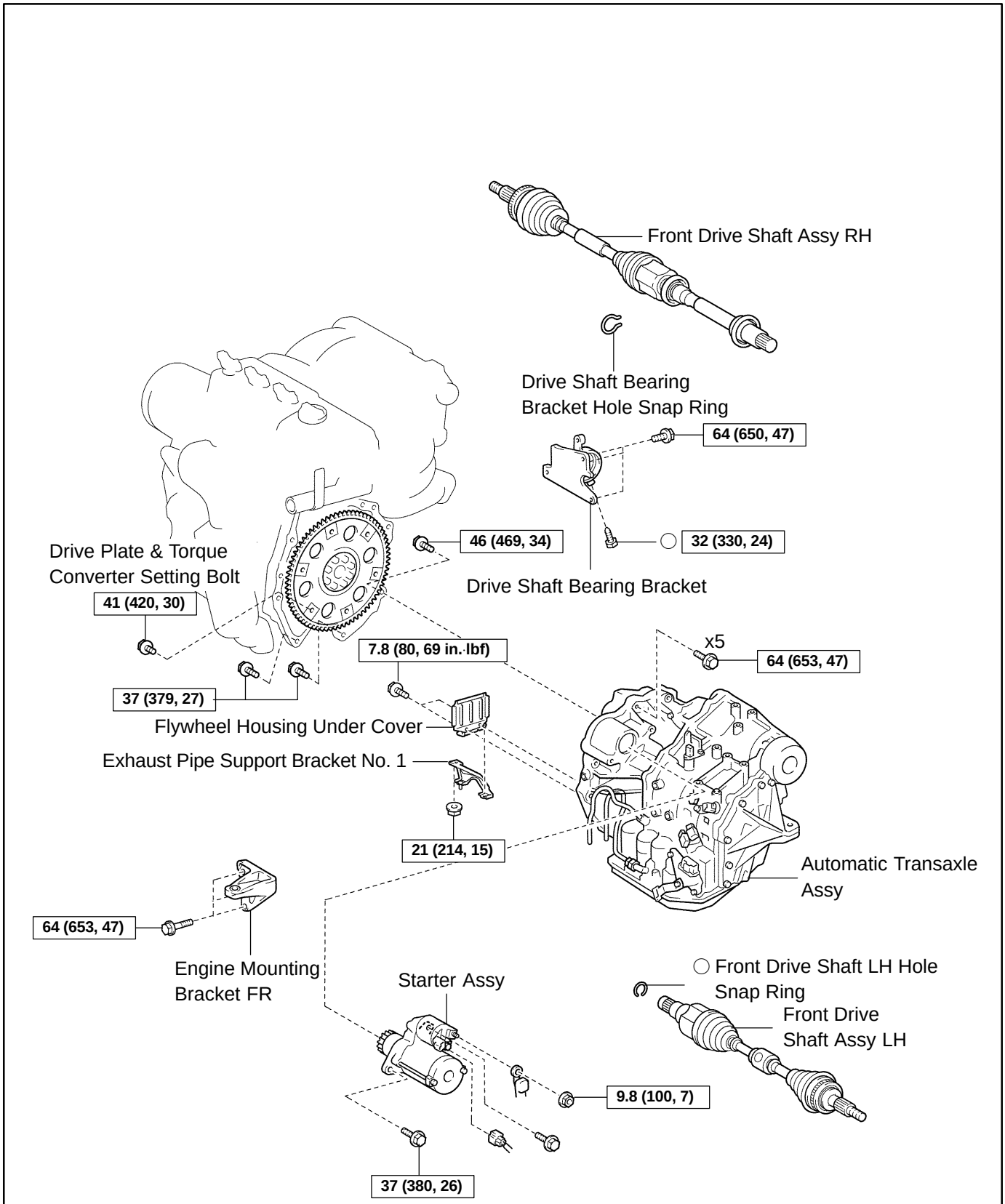


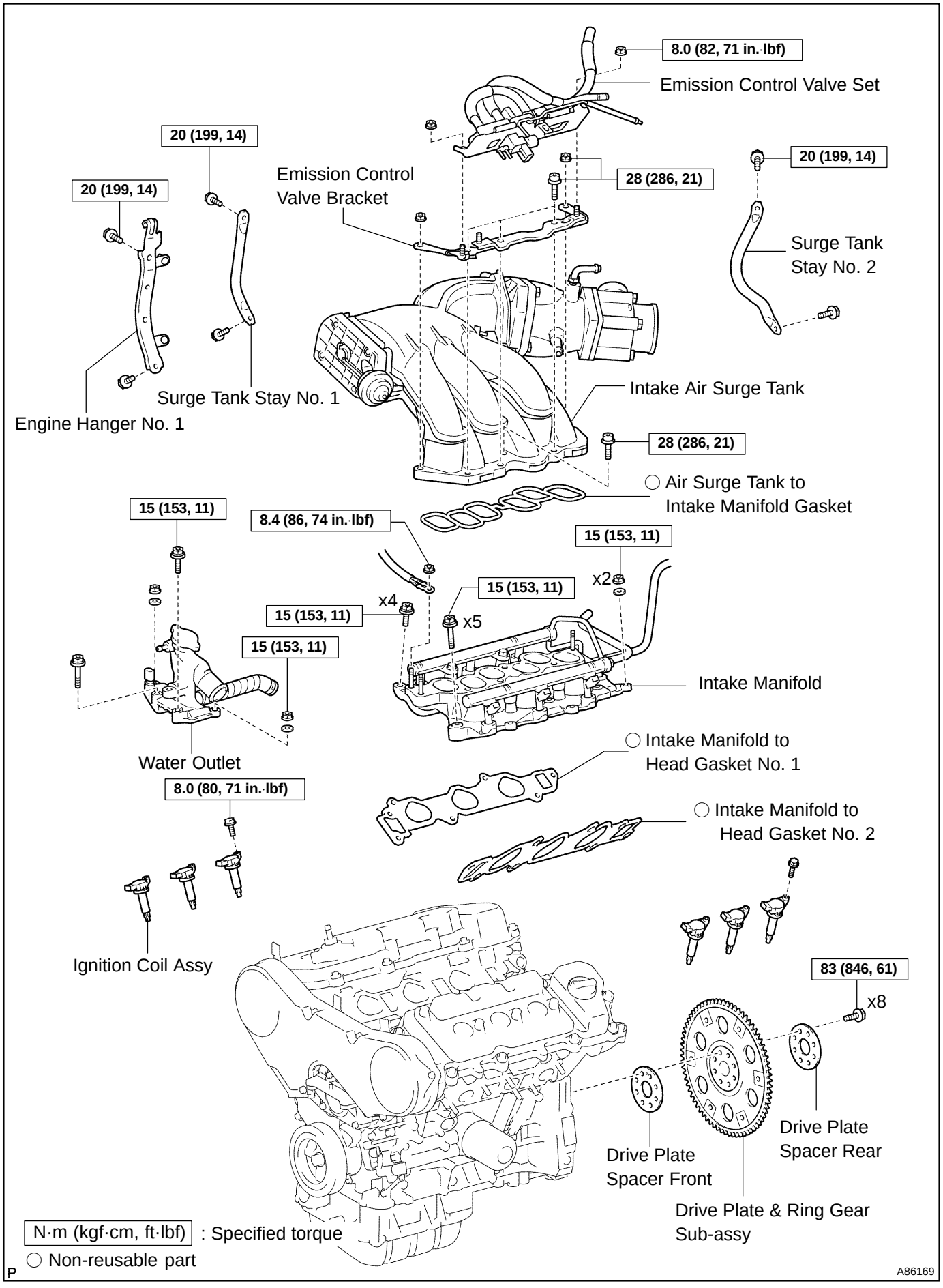

9.0 (92, 80 in.·lbf)
Battery Clamp Sub-assy
Battery
5.0 (51, 44 in.·lbf)
x2
Battery Tray
Air Cleaner Inlet Assy
Air Cleaner Hose No. 1
Vacuum Hose
Mass Air Flow Meter Connector
VSV Connector
Air Cleaner Cap Sub-assy
5.0 (51, 44 in.·lbf)
Vacuum Hose
Air Cleaner Filter Element Sub-assy
x3
5.0 (51, 44 in.·lbf)
5.0 (51, 44 in.·lbf)
Air Cleaner Inlet No. 1
Air Cleaner Case
5.0 (51, 44 in.·lbf)
x2
7.5 (76, 66 in.·lbf)
Air Cleaner Bracket
Clip
Intake Air Resonator Sub-assy
N·m (kgf·cm, ft·lbf): Specified torque
A84924

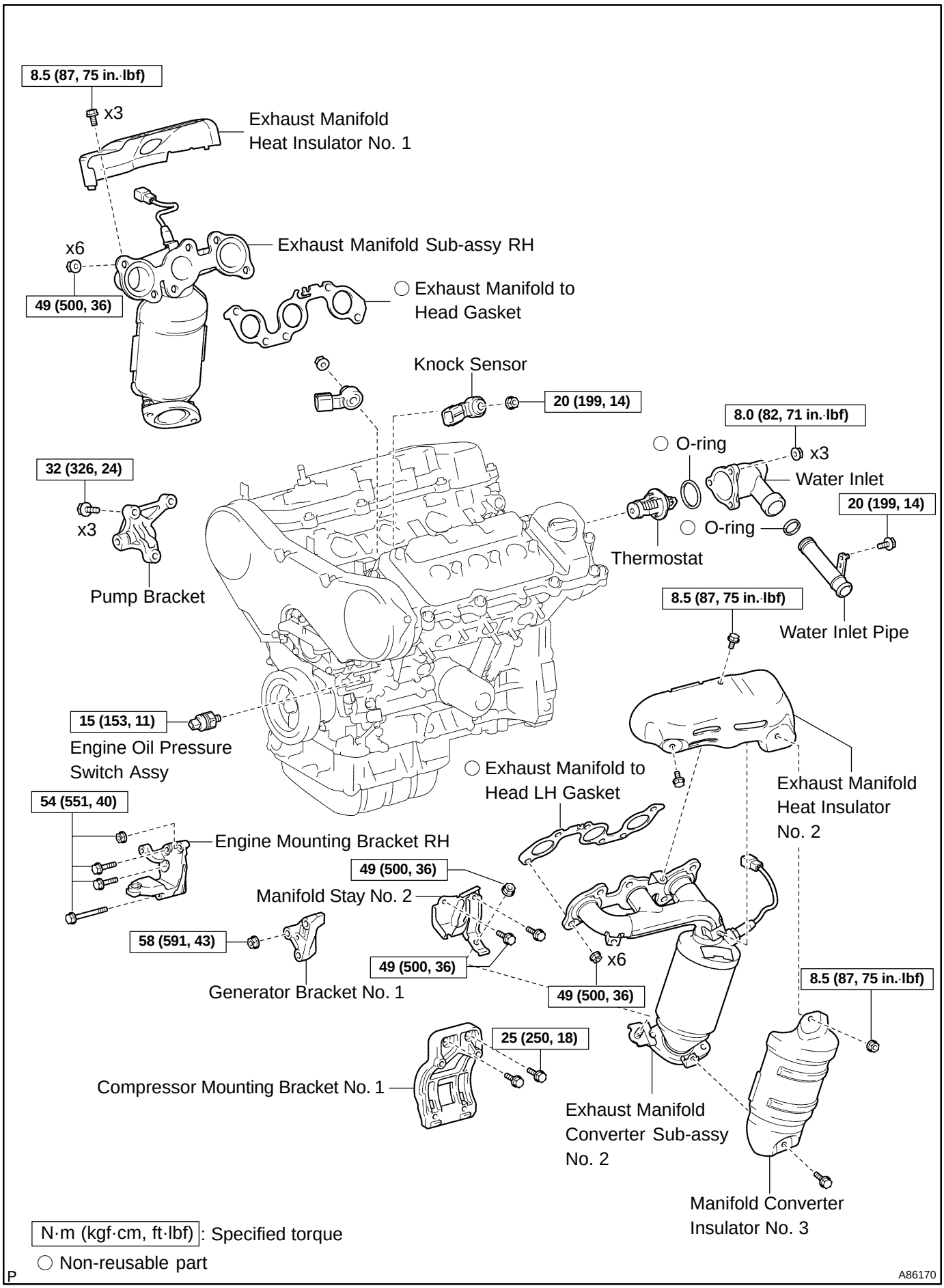

V Belt No. 1
64 (653, 47)
28 (286, 21)
Generator Bracket No. 2
58 (591, 43)
23 (235, 17)
Radio Setting Condenser
9.8 (100, 7)
8.4 (85, 74 in.·lbf)
Engine Moving Control Rod
64 (653, 47)
43 (438, 32)
18 (178, 13)
18 (184, 13)
Engine Mounting Stay No. 2 RH
Generator Assy
Generator Belt Adjusting Bar
Fuel Vapor Feed Hose No. 1
Heater Inlet Water Hose
Union to Check Valve Hose
Oil Reservoir to Pump Hose No. 1
Fuel Pipe Sub-assy No. 1
Radiator Hose Inlet
Heater Outlet Water Hose
Radiator Hose Outlet
Steering Gear Outlet Return Tube
Fuel Pipe Clamp No. 1
Oil Cooler Inlet Hose
Transmission Control Cable Assy
Fan Belt Adjusting Bar Bracket
25 (250, 18)
Oil Cooler Outlet Hose
25 (250, 18)
15 (153, 11)
Compressor and Magnetic Clutch
25 (250, 18)
N·m (kgf·cm, ft·lbf): Specified torque
P
A84925

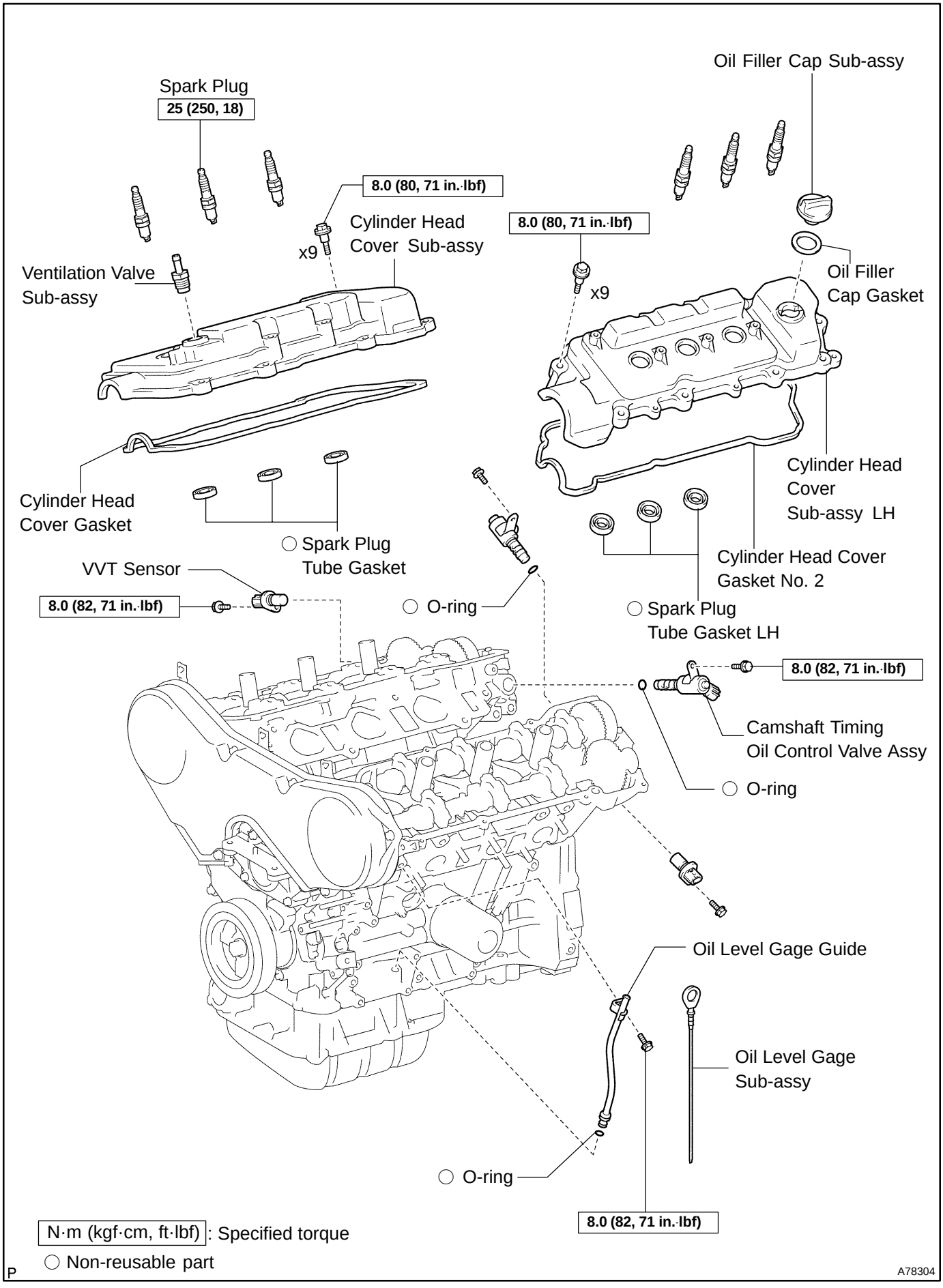

Steering Intermediate Shaft Assy
35 (360, 26)
35 (360, 26)
Front Stabilizer Link Assy LH
Tie Rod Assy LH
74 (755, 55)
49 (500, 36)
○ Cotter Pin
Speed Sensor Front LH
8.0 (82, 71 in.·lbf)
○ 294 (2,998, 217)
Front Axle Hub LH Nut
Front Suspension Arm Sub-assy Lower No. 1 LH
75 (765, 55)
75 (765, 55)
56 (571, 41)
○ Exhaust Pipe Gasket
Exhaust Pipe Assy Front
○ Exhaust Pipe Gasket
62 (633, 46)
○ Exhaust Pipe Gasket
Exhaust Pipe No. 1 Support Bracket Rear
○ 62 (633, 46)
Exhaust Pipe No. 1 Support Bracket Front
33 (337, 24)
33 (337, 24)
N·m (kgf·cm, ft·lbf): Specified torque
○ Non-reusable part
P
A84926

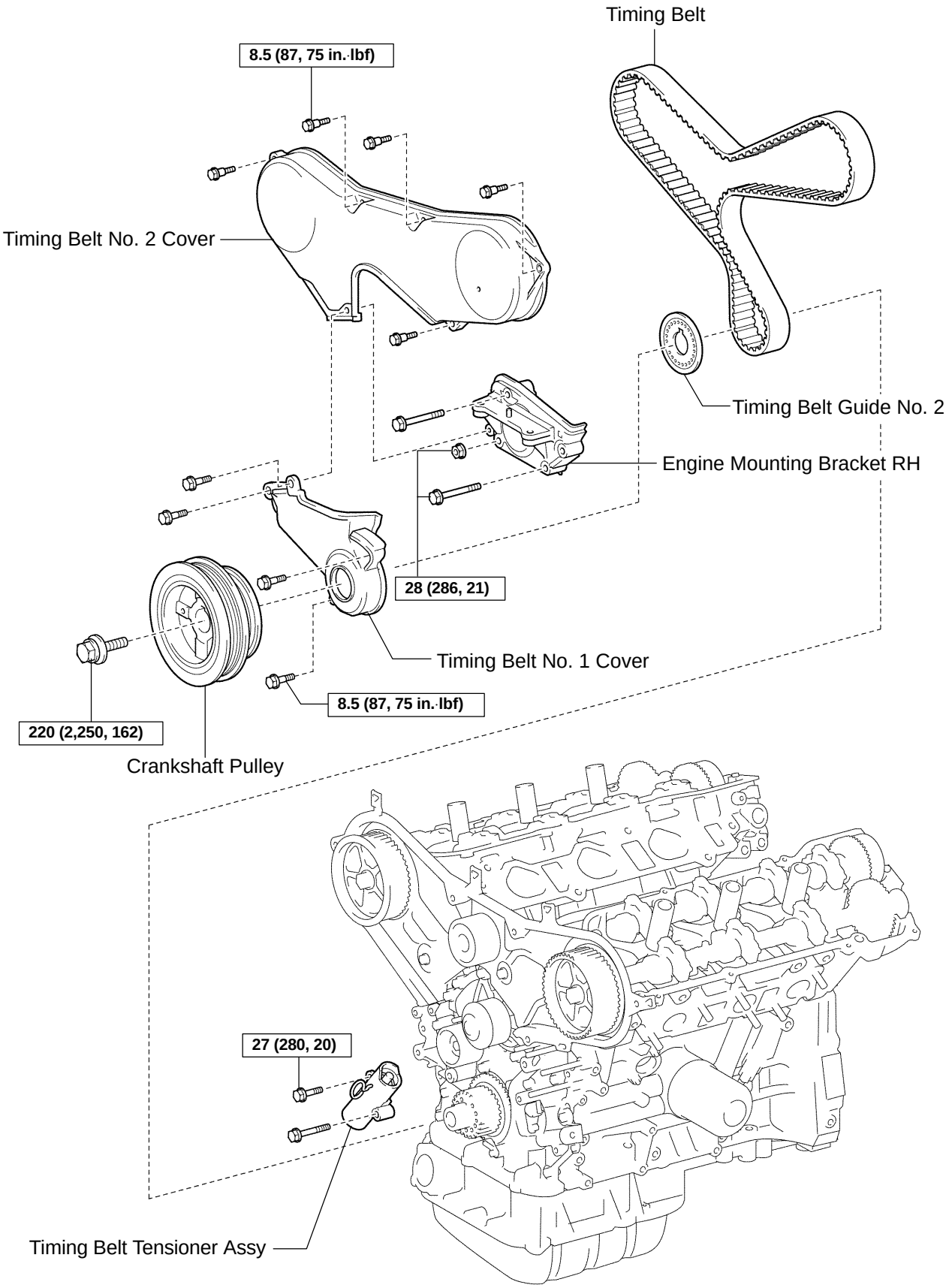

Vane Pump V Belt
43 (439, 32)
7.8 (80, 69 in.·lbf)
43 (439, 32)
Vane Pump Assy
95 (969, 70)
87 (887, 64)
95 (969, 70)
Front Frame Assy
Frame Side Rail Plate
Sub-assy RH
Front Suspension Member
Brace Rear RH
Front Suspension Member
Brace Rear LH
Frame Side Rail Plate
Sub-assy LH
32 (326, 24)
32 (326, 24)
85 (867, 63)
85 (867, 63)
N·m (kgf·cm, ft·lbf): Specified torque
P
A84927

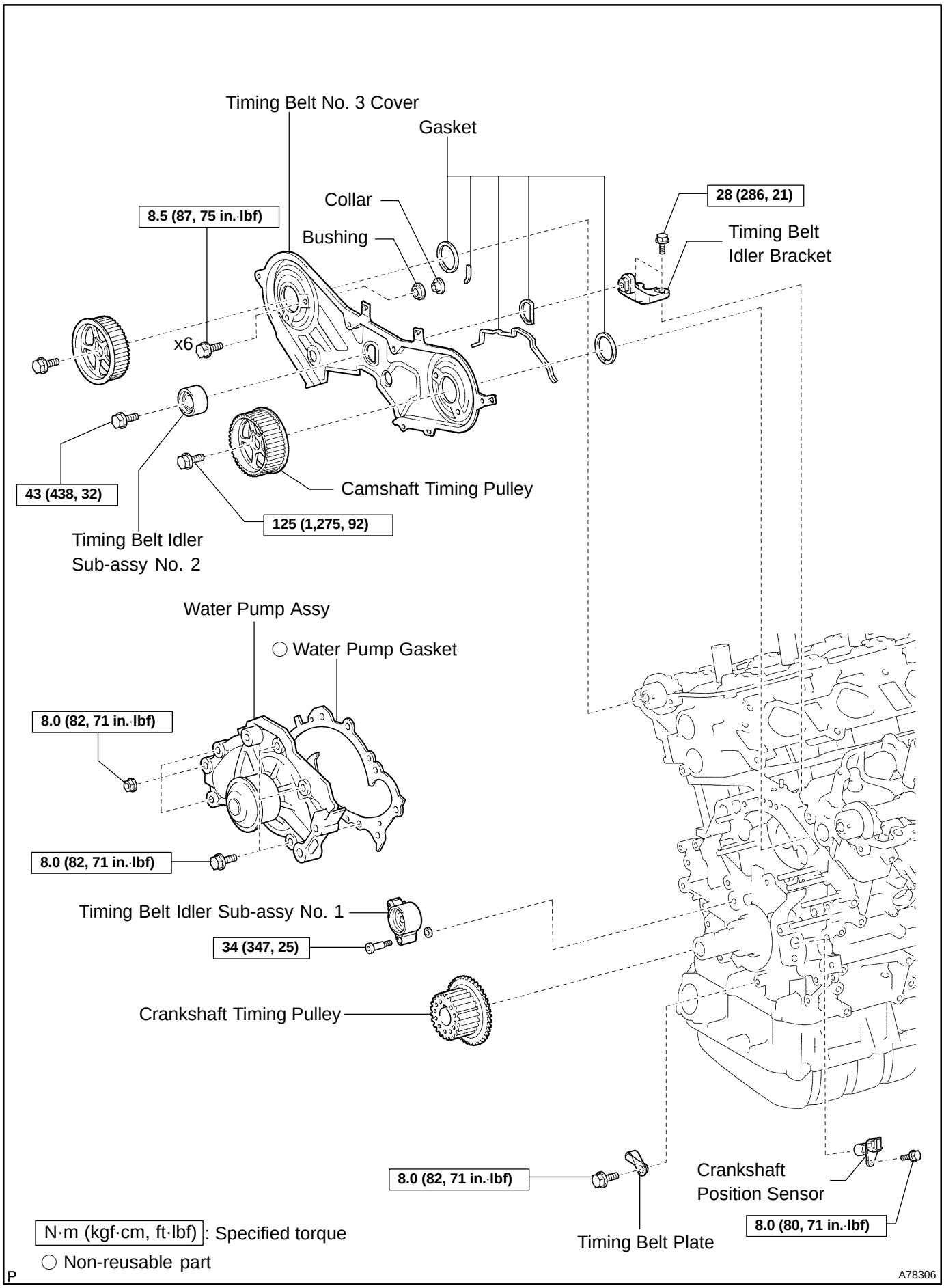

Front Drive Shaft Assy RH
Drive Shaft Bearing
Bracket Hole Snap Ring
64 (650, 47)
46 (469, 34)
○ 32 (330, 24)
Drive Plate & Torque
Converter Setting Bolt
Drive Shaft Bearing Bracket
41 (420, 30)
7.8 (80, 69 in.·lbf)
x5
64 (653, 47)
37 (379, 27)
Flywheel Housing Under Cover
Exhaust Pipe Support Bracket No. 1
21 (214, 15)
Automatic Transaxle
Assy
64 (653, 47)
Engine Mounting
Bracket FR
Starter Assy
○ Front Drive Shaft LH Hole
Snap Ring
Front Drive
Shaft Assy LH
9.8 (100, 7)
37 (380, 26)
N·m (kgf·cm, ft·lbf): Specified torque
○ Non-reusable part
P
A84928

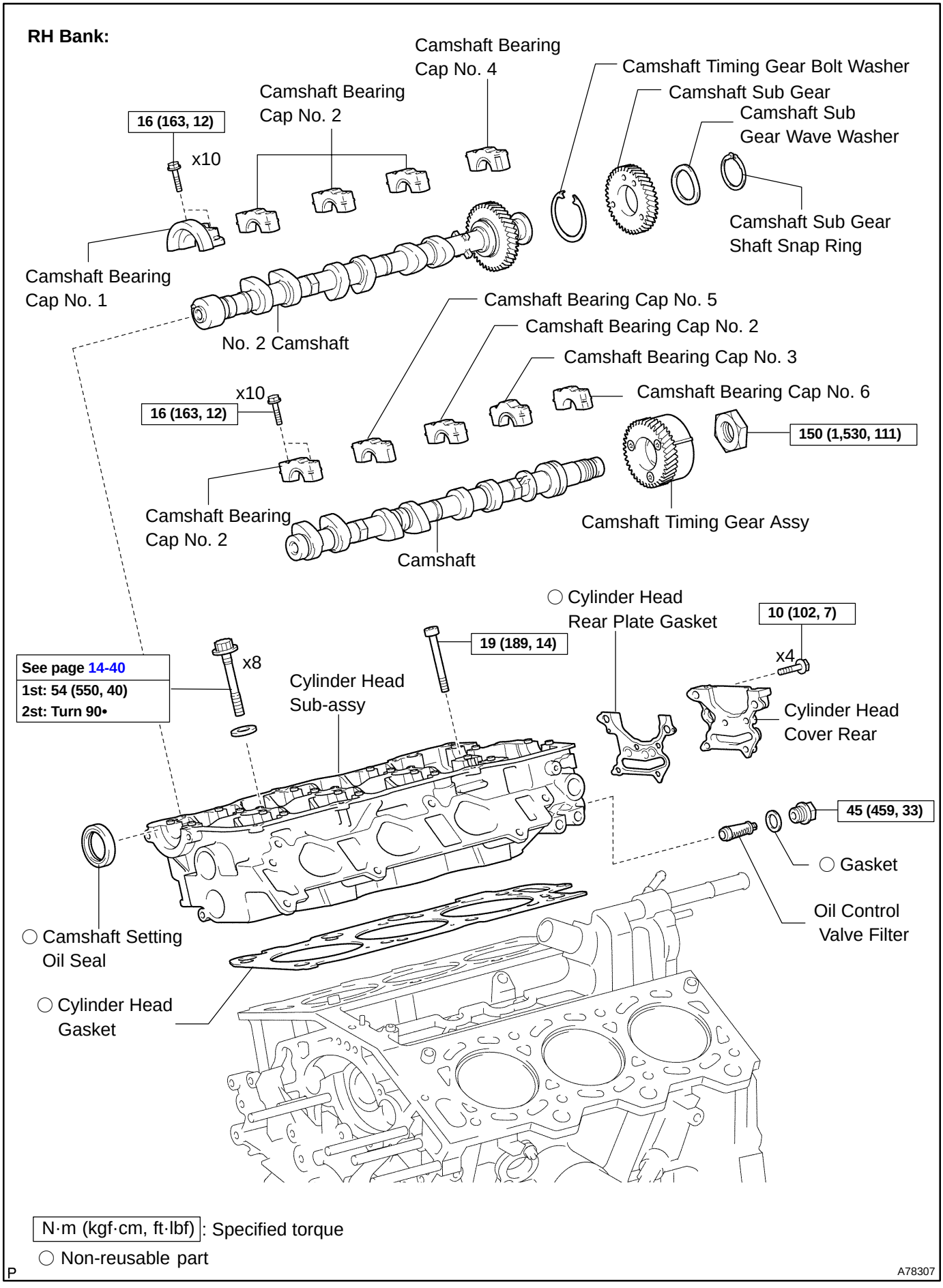

8.0 (82, 71 in.·lbf)
Emission Control Valve Set
20 (199, 14)
20 (199, 14)
Emission Control Valve Bracket
28 (286, 21)
20 (199, 14)
Surge Tank Stay No. 2
Surge Tank Stay No. 1
Engine Hanger No. 1
Intake Air Surge Tank
28 (286, 21)
○ Air Surge Tank to Intake Manifold Gasket
15 (153, 11)
8.4 (86, 74 in.·lbf)
15 (153, 11)
x2
15 (153, 11)
x4
15 (153, 11)
x5
15 (153, 11)
Intake Manifold
Water Outlet
○ Intake Manifold to Head Gasket No. 1
8.0 (80, 71 in.·lbf)
○ Intake Manifold to Head Gasket No. 2
Ignition Coil Assy
83 (846, 61)
x8
Drive Plate Spacer Rear
Drive Plate Spacer Front
Drive Plate & Ring Gear Sub-assy
N·m (kgf·cm, ft·lbf) : Specified torque
○ Non-reusable part
P
A86169

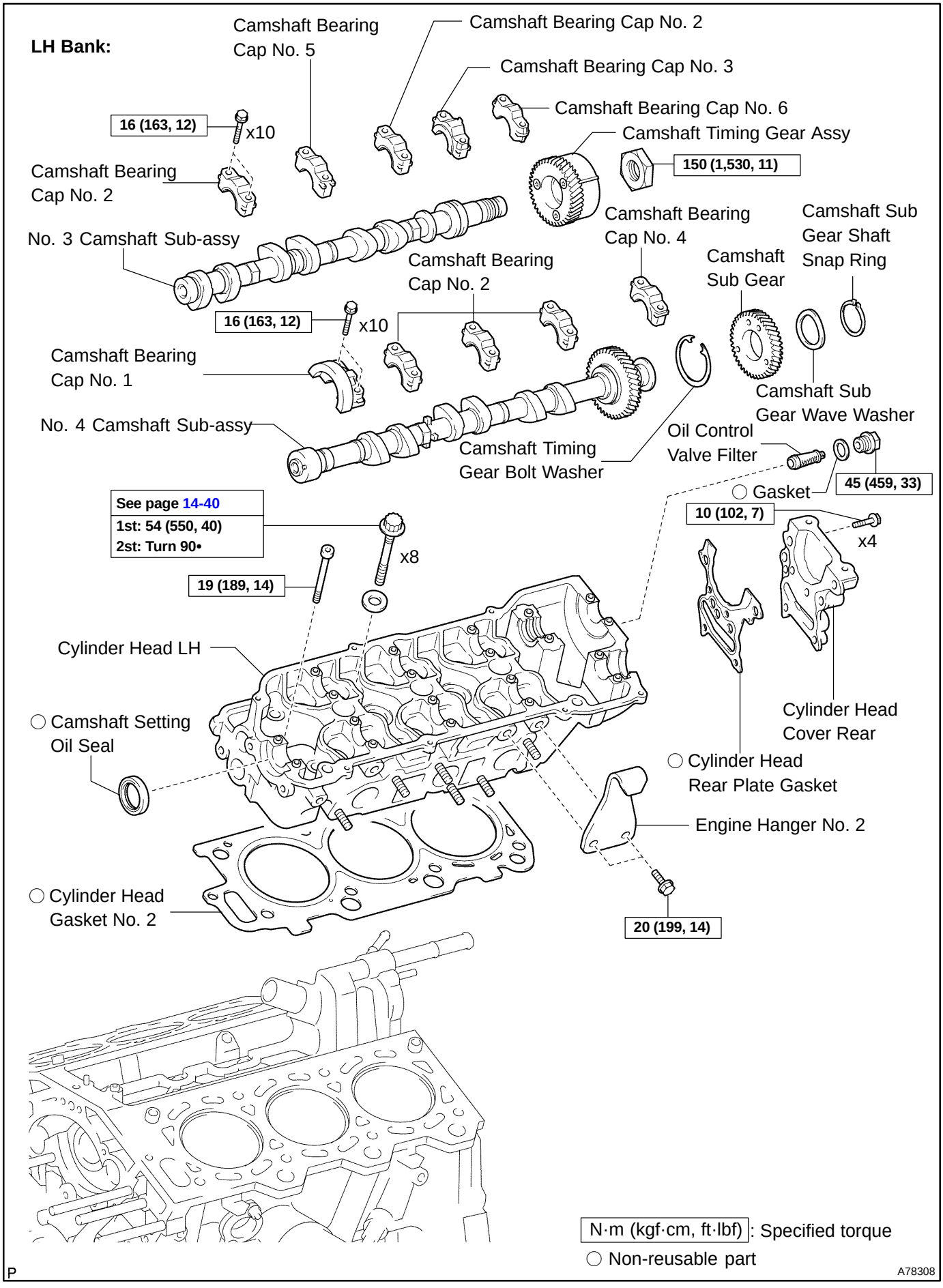

8.5 (87, 75 in.·lbf)
x3
Exhaust Manifold Heat Insulator No. 1
x6
Exhaust Manifold Sub-assy RH
49 (500, 36)
○ Exhaust Manifold to Head Gasket
Knock Sensor
20 (199, 14)
8.0 (82, 71 in.·lbf)
○ O-ring
x3
Water Inlet
32 (326, 24)
x3
Pump Bracket
Thermostat
○ O-ring
20 (199, 14)
Water Inlet Pipe
8.5 (87, 75 in.·lbf)
15 (153, 11)
Engine Oil Pressure Switch Assy
○ Exhaust Manifold to Head LH Gasket
Exhaust Manifold Heat Insulator No. 2
54 (551, 40)
Engine Mounting Bracket RH
49 (500, 36)
Manifold Stay No. 2
58 (591, 43)
Generator Bracket No. 1
49 (500, 36)
x6
49 (500, 36)
8.5 (87, 75 in.·lbf)
25 (250, 18)
Compressor Mounting Bracket No. 1
Exhaust Manifold Converter Sub-assy No. 2
Manifold Converter Insulator No. 3
N·m (kgf·cm, ft·lbf): Specified torque
○ Non-reusable part
P
A86170

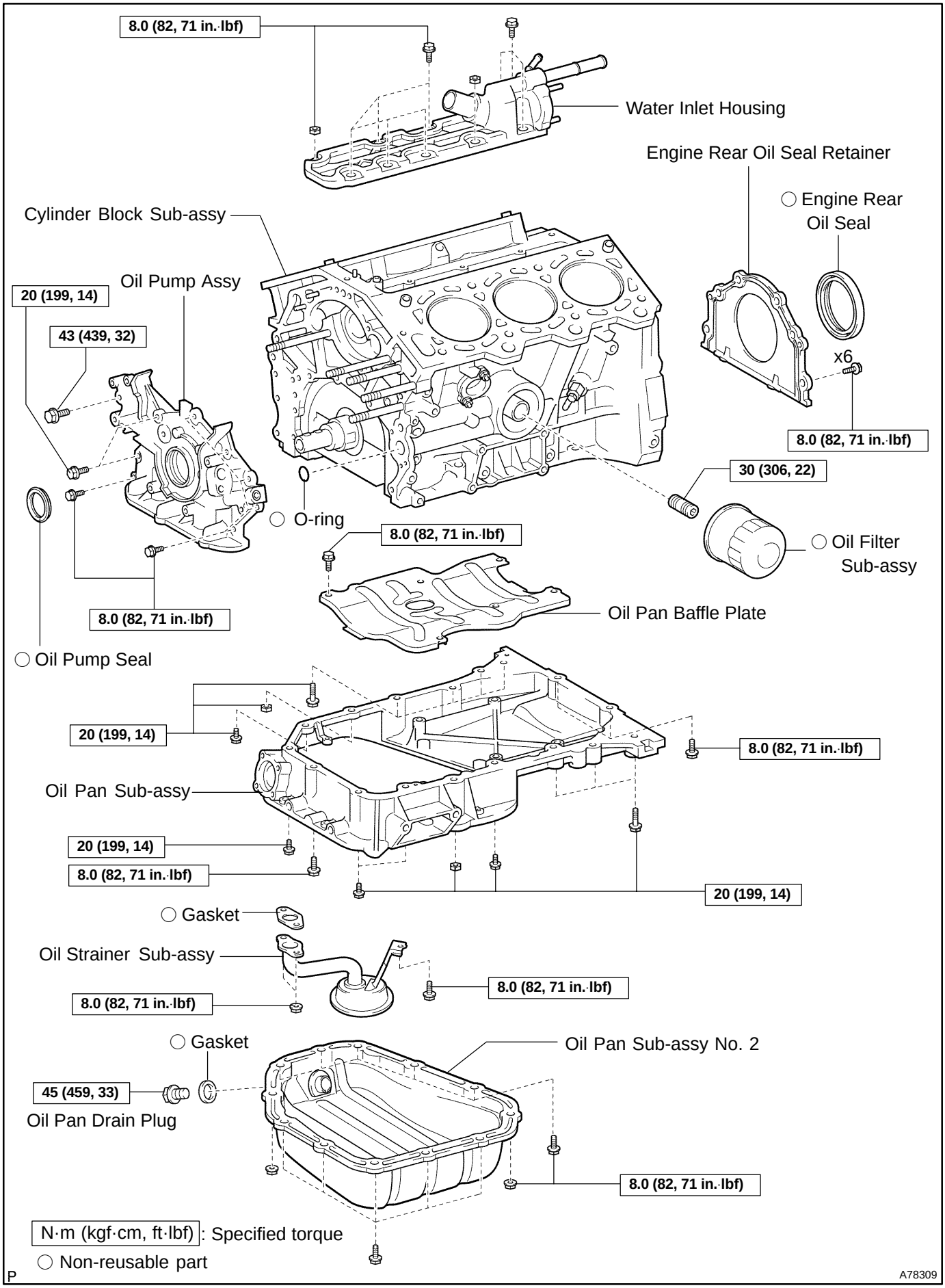

Oil Filler Cap Sub-assy
Spark Plug
25 (250, 18)
8.0 (80, 71 in.·lbf)
Cylinder Head Cover Sub-assy
x9
8.0 (80, 71 in.·lbf)
x9
Ventilation Valve Sub-assy
Oil Filler Cap Gasket
Cylinder Head Cover Gasket
Cylinder Head Cover Sub-assy LH
○ Spark Plug Tube Gasket
Cylinder Head Cover Gasket No. 2
VVT Sensor
8.0 (82, 71 in.·lbf)
○ O-ring
○ Spark Plug Tube Gasket LH
8.0 (82, 71 in.·lbf)
Camshaft Timing Oil Control Valve Assy
○ O-ring
Oil Level Gage Guide
Oil Level Gage Sub-assy
○ O-ring
8.0 (82, 71 in.·lbf)
N·m (kgf·cm, ft·lbf): Specified torque
○ Non-reusable part
P
A78304


Timing Belt
8.5 (87, 75 in.·lbf)
Timing Belt No. 2 Cover
Timing Belt Guide No. 2
Engine Mounting Bracket RH
28 (286, 21)
Timing Belt No. 1 Cover
8.5 (87, 75 in.·lbf)
220 (2,250, 162)
Crankshaft Pulley
27 (280, 20)
Timing Belt Tensioner Assy
N·m (kgf·cm, ft·lbf): Specified torque
P
A78305


Timing Belt No. 3 Cover
Gasket
Collar
Bushing
8.5 (87, 75 in.·lbf)
x6
28 (286, 21)
Timing Belt
Idler Bracket
43 (438, 32)
Timing Belt Idler
Sub-assy No. 2
Camshaft Timing Pulley
125 (1,275, 92)
Water Pump Assy
○ Water Pump Gasket
8.0 (82, 71 in.·lbf)
8.0 (82, 71 in.·lbf)
Timing Belt Idler Sub-assy No. 1
34 (347, 25)
Crankshaft Timing Pulley
8.0 (82, 71 in.·lbf)
Crankshaft
Position Sensor
8.0 (80, 71 in.·lbf)
Timing Belt Plate
N·m (kgf·cm, ft·lbf): Specified torque
○ Non-reusable part
P
A78306


RH Bank:
Camshaft Bearing Cap No. 4
Camshaft Timing Gear Bolt Washer
Camshaft Bearing Cap No. 2
Camshaft Sub Gear
Camshaft Sub Gear Wave Washer
16 (163, 12)
x10
Camshaft Sub Gear Shaft Snap Ring
Camshaft Bearing Cap No. 1
No. 2 Camshaft
Camshaft Bearing Cap No. 5
Camshaft Bearing Cap No. 2
Camshaft Bearing Cap No. 3
Camshaft Bearing Cap No. 6
x10
16 (163, 12)
150 (1,530, 111)
Camshaft Bearing Cap No. 2
Camshaft Timing Gear Assy
Camshaft
Cylinder Head Rear Plate Gasket
10 (102, 7)
19 (189, 14)
x4
See page 14-40
1st: 54 (550, 40)
2st: Turn 90•
x8
Cylinder Head Sub-assy
Cylinder Head Cover Rear
45 (459, 33)
Gasket
Oil Control Valve Filter
Camshaft Setting Oil Seal
Cylinder Head Gasket
N·m (kgf·cm, ft·lbf): Specified torque
Non-reusable part
P
A78307


LH Bank:
Camshaft Bearing Cap No. 5
Camshaft Bearing Cap No. 2
Camshaft Bearing Cap No. 3
Camshaft Bearing Cap No. 6
Camshaft Timing Gear Assy
16 (163, 12)
x10
150 (1,530, 11)
Camshaft Bearing Cap No. 2
No. 3 Camshaft Sub-assy
Camshaft Bearing Cap No. 4
Camshaft Sub Gear Shaft Snap Ring
Camshaft Sub Gear
Camshaft Bearing Cap No. 2
16 (163, 12)
x10
Camshaft Bearing Cap No. 1
Camshaft Sub Gear Wave Washer
No. 4 Camshaft Sub-assy
Oil Control Valve Filter
Camshaft Timing Gear Bolt Washer
45 (459, 33)
Gasket
See page 14-40
1st: 54 (550, 40)
2st: Turn 90•
10 (102, 7)
x4
x8
19 (189, 14)
Cylinder Head LH
Cylinder Head Cover Rear
Camshaft Setting Oil Seal
Cylinder Head Rear Plate Gasket
Engine Hanger No. 2
Cylinder Head Gasket No. 2
20 (199, 14)
N·m (kgf·cm, ft·lbf): Specified torque
Non-reusable part
P
A78308


8.0 (82, 71 in.·lbf)
Water Inlet Housing
Engine Rear Oil Seal Retainer
○ Engine Rear Oil Seal
Cylinder Block Sub-assy
Oil Pump Assy
20 (199, 14)
43 (439, 32)
x6
8.0 (82, 71 in.·lbf)
30 (306, 22)
○ O-ring
8.0 (82, 71 in.·lbf)
○ Oil Filter Sub-assy
Oil Pan Baffle Plate
8.0 (82, 71 in.·lbf)
○ Oil Pump Seal
20 (199, 14)
8.0 (82, 71 in.·lbf)
Oil Pan Sub-assy
20 (199, 14)
8.0 (82, 71 in.·lbf)
20 (199, 14)
○ Gasket
Oil Strainer Sub-assy
8.0 (82, 71 in.·lbf)
8.0 (82, 71 in.·lbf)
○ Gasket
Oil Pan Sub-assy No. 2
45 (459, 33)
Oil Pan Drain Plug
8.0 (82, 71 in.·lbf)
N·m (kgf·cm, ft·lbf): Specified torque
○ Non-reusable part
P
A78309

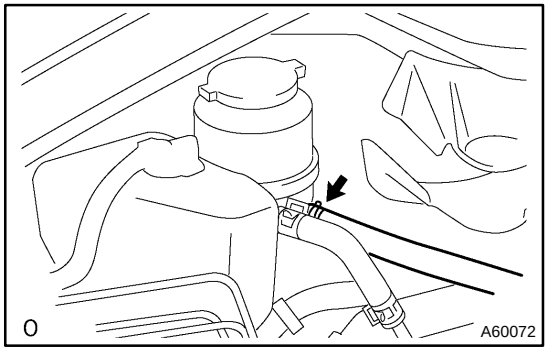
141J9-02

REPLACEMENT

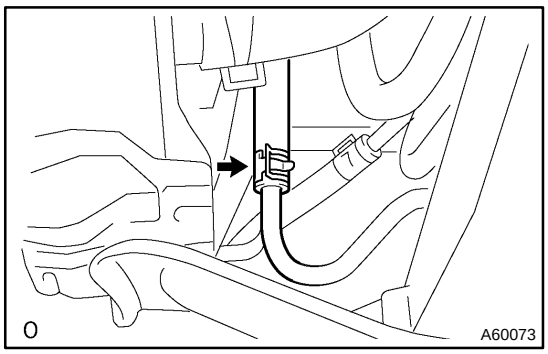
1. DISCHARGE FUEL SYSTEM PRESSURE (See page 11-1)
2. DISCONNECT BATTERY NEGATIVE TERMINAL
3. REMOVE FRONT WHEELS
4. REMOVE ENGINE UNDER COVER NO.1
5. REMOVE ENGINE UNDER COVER NO.2
6. REMOVE FRONT FENDER APRON SEAL RH
7. DRAIN ENGINE COOLANT (See page 16-9)
8. DRAIN ENGINE OIL (See page 17-20)
9. DRAIN AUTOMATIC TRANSAXLE FLUID (See page 30-8)
10. REMOVE V-BANK COVER SUB-ASSY (See page 10-1 1)
11. REMOVE RADIATOR LOWER AIR DEFLECTOR (See page 19-5)
12. REMOVE BATTERY
13. REMOVE BATTERY TRAY
14. REMOVE AIR CLEANER INLET ASSY (See page 19-5)
15. REMOVE AIR CLEANER ASSY (See page 19-5)
16. REMOVE AIR CLEANER BRACKET (See page 19-5)
17. REMOVE AIR CLEANER INLET NO.1 (See page 19-5)
18. REMOVE INTAKE AIR RESONATOR SUB-ASSY

(a) Remove the clip and bolt, then remove the intake air resonator.

19. REMOVE V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (See page 14-5)
20. REMOVE GENERATOR ASSY (See page 19-21)
21. REMOVE ENGINE MOVING CONTROL ROD (See page 14-79)
22. REMOVE ENGINE MOUNTING STAY NO.2 RH (See page 14-79)
23. REMOVE GENERATOR BRACKET NO.2 (See page 14-79)
24. REMOVE GENERATOR BELT ADJUSTING BAR (See page 17-9)
25. SEPARATE COMPRESSOR AND MAGNETIC CLUTCH (See page 17-9)
26. SEPARATE TRANSMISSION CONTROL CABLE ASSY (See page 40-44)
27. DISCONNECT UNION TO CHECK VALVE HOSE
28. DISCONNECT FUEL VAPOR FEED HOSE NO.1
29. DISCONNECT FUEL PIPE SUB-ASSY NO.1 (See page 11-1)
30. DISCONNECT HEATER INLET WATER HOSE
31. DISCONNECT HEATER OUTLET WATER HOSE
32. DISCONNECT RADIATOR HOSE INLET
33. DISCONNECT RADIATOR HOSE OUTLET
34. DISCONNECT OIL COOLER INLET HOSE
35. DISCONNECT OIL COOLER OUTLET HOSE



36. DISCONNECT OIL RESERVOIR TO PUMP HOSE NO.1

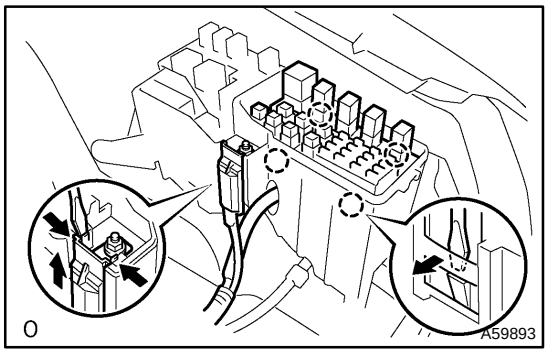


37. DISCONNECT STEERING GEAR OUTLET RETURN TUBE

38. REMOVE GLOVE COMPARTMENT DOOR ASSY (See page 10-22)

39. SEPARATE ENGINE WIRE

(a) Disconnect the engine wire harness from the ECM and junction block.



(b) Disconnect the engine wire harness from the engine room junction block.
  (1) Remove the nut, then separate the engine wire harness.
  (2) Using a screwdriver, release the engine room junction block. Separate the engine wire harness by pulling it upward.

(c) Remove the 2 nuts, then pull out the engine wire harness.

(d) Remove the body ground.

40. REMOVE EXHAUST PIPE NO.1 SUPPORT BRACKET FRONT (See page 15-2)

41. REMOVE EXHAUST PIPE NO.1 SUPPORT BRACKET REAR (See page 15-2)

42. REMOVE EXHAUST PIPE ASSY FRONT (See page 15-2)

43. DISCONNECT FRONT STABILIZER LINK ASSY LH (See page 30-8)

44. DISCONNECT FRONT STABILIZER LINK ASSY RH

HINT:

Perform the same procedure as above on the opposite side.

45. REMOVE FRONT AXLE HUB LH NUT (See page 30-8)

SST 09930-00010

46. REMOVE FRONT AXLE HUB RH NUT

SST 09930-00010

HINT:

Perform the same procedure as above on the opposite side.

47. SEPARATE SPEED SENSOR FRONT LH (See page 30-8)

48. SEPARATE SPEED SENSOR FRONT RH

HINT:

Perform the same procedure as above on the opposite side.

49. SEPARATE TIE ROD ASSY LH (See page 30-8)

SST 09628-6201 1

50. SEPARATE TIE ROD ASSY RH

SST 09628-6201 1

HINT:

Perform the same procedure as above on the opposite side.

51. SEPARATE FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH (See page 30-8)

52. SEPARATE FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 RH

HINT:

Perform the same procedure as above on the opposite side.

53. SEPARATE FRONT AXLE ASSY LH (See page 30-8)

54. SEPARATE FRONT AXLE ASSY RH

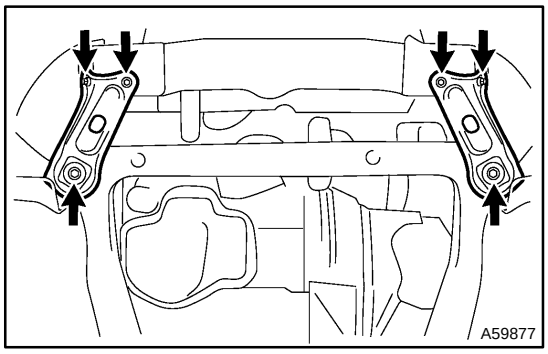
HINT:

Perform the same procedure as above on the opposite side.

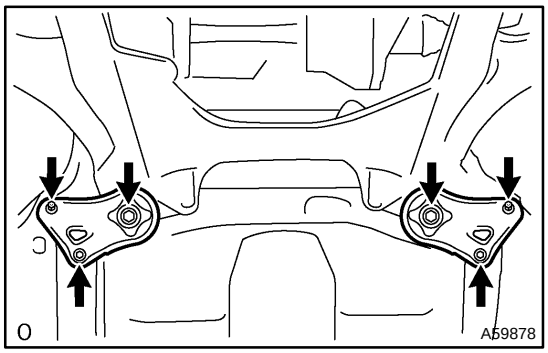
55. SEPARATE STEERING INTERMEDIATE SHAFT ASSY (See page 51-21)

56. REMOVE ENGINE ASSEMBLY WITH TRANSAXLE

(a) Set the engine lifter.

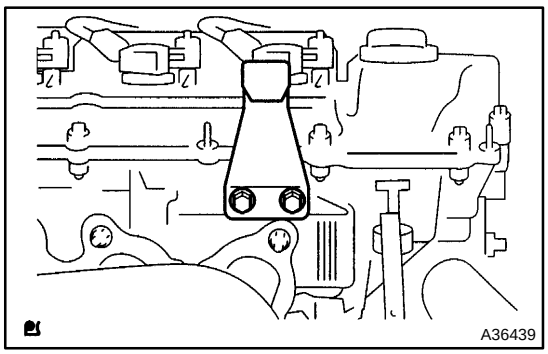


(b) Remove the 4 bolts and 2 nuts, then remove the frame side rail plate RH and LH.



(c) Remove the 4 bolts and 2 nuts, then remove the front suspension member brace rear RH and LH.

(d) Carefully remove the engine assembly from the vehicle.



(e) Install the engine hanger No. 2 in the correct direction as shown in the illustration.

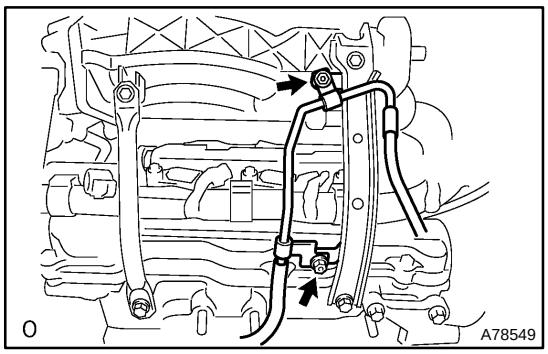
Torque: 20 N·m (199 kgf·cm, 14 ft·lbf)

HINT:

Engine hanger No. 2	12282-20020
Bolt	91621-60822

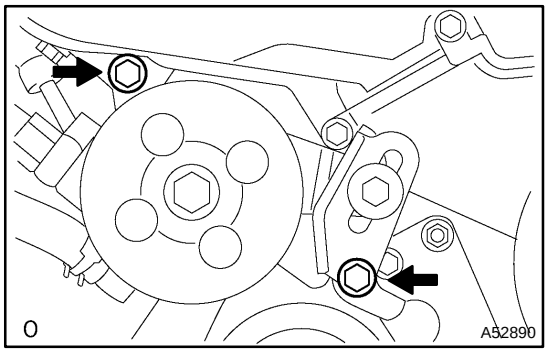
(f) Attach the engine sling and hang the engine assembly with the chain block.

57. REMOVE VANE PUMP V BELT (See page 14-5)

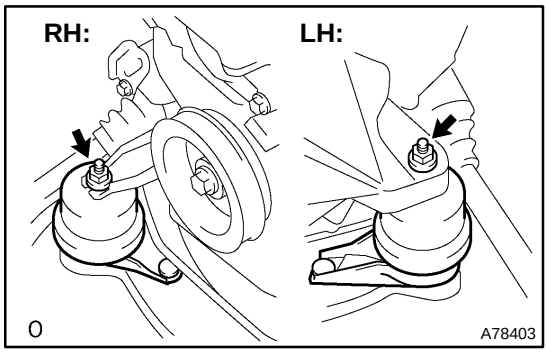


58. REMOVE VANE PUMP ASSY

(a) Remove the 2 nuts, then disconnect the power steering pressure tube.

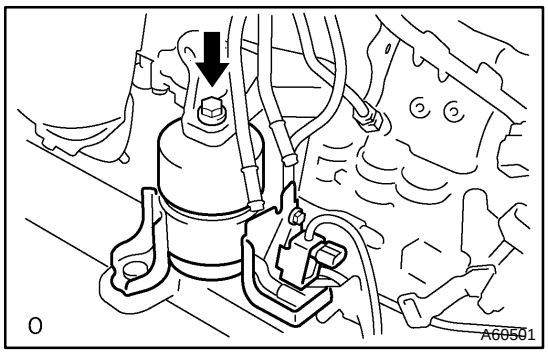


(b) Remove the 2 bolts and vane pump.



59. REMOVE FRONT FRAME ASSY

(a) Remove the 2 nuts, then separate the engine mounting insulator RH and LH.



(b) Remove the bolt, then separate the engine mounting insulator FR.

60. REMOVE FRONT DRIVE SHAFT ASSY LH (See page 30-8)
SST 09520-01010, 09520-24010 (09520-32040)

61. REMOVE FRONT DRIVE SHAFT ASSY RH (See page 30-8)

62. REMOVE STARTER ASSY (See page 19-5)

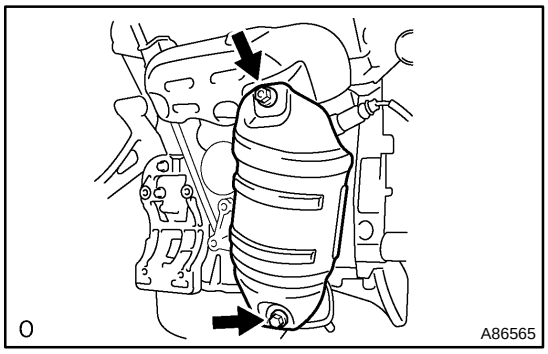
63. REMOVE ENGINE MOUNTING BRACKET FR (See page 40-9)

64. REMOVE EXHAUST PIPE SUPPORT BRACKET NO.1 (See page 40-9)

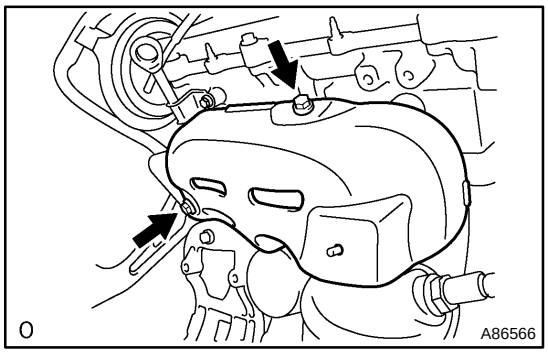
65. REMOVE AUTOMATIC TRANSAXLE ASSY (See page 40-9)

66. REMOVE DRIVE SHAFT BEARING BRACKET

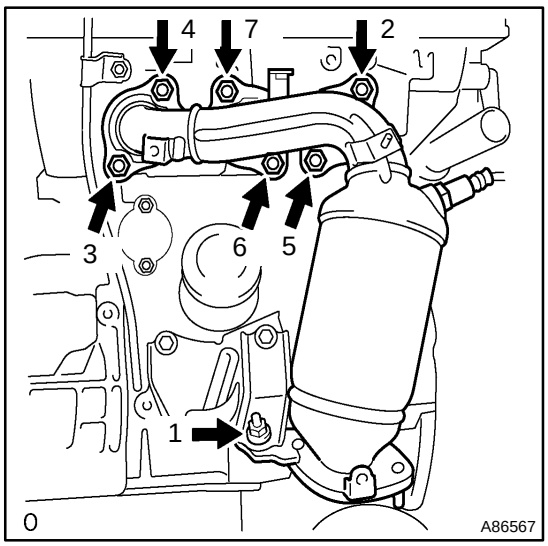
67. REMOVE DRIVE PLATE & RING GEAR SUB-ASSY (See page 14-140)
SST 09213-54015 (91651-60855), 09330-00021
68. INSTALL ENGINE STAND
69. REMOVE ENGINE HANGER NO.2
70. REMOVE EMISSION CONTROL VALVE SET (See page 11-13)
71. REMOVE INTAKE AIR SURGE TANK (See page 11-13)
72. REMOVE INTAKE MANIFOLD (See page 10-16)
73. REMOVE WATER OUTLET (See page 10-16)
74. REMOVE IGNITION COIL ASSY
75. REMOVE EXHAUST MANIFOLD HEAT INSULATOR NO.1 (See page 14-120)
76. REMOVE EXHAUST MANIFOLD SUB-ASSY RH (See page 14-120)



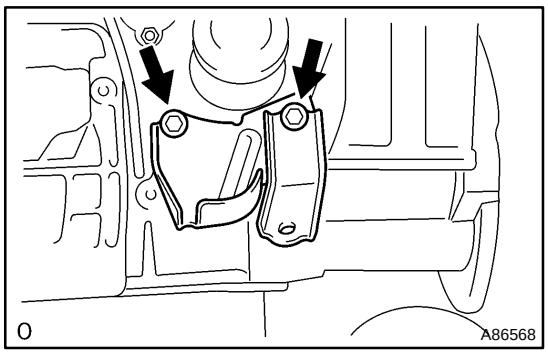
77. REMOVE MANIFOLD CONVERTER INSULATOR NO.3
(a) Remove the bolt and nut, then remove the insulator.



78. REMOVE EXHAUST MANIFOLD HEAT INSULATOR NO.2
(a) Remove the 2 bolts and insulator.



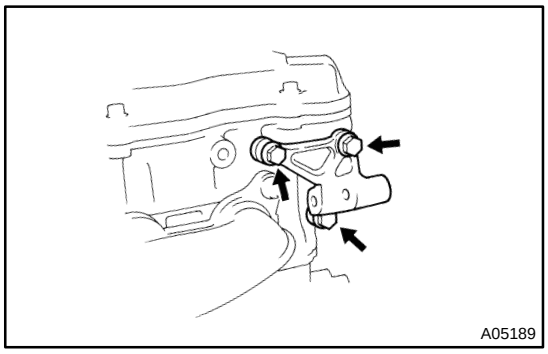
79. REMOVE EXHAUST MANIFOLD CONVERTER SUB-ASSY NO.2
(a) Using several steps, loosen and remove the 7 nuts in the sequence shown in the illustration.
(b) Remove the exhaust manifold converter No. 2 and gasket from the cylinder head LH.



80. REMOVE MANIFOLD STAY NO.2

(a) Remove the 2 bolts and manifold stay.

81. REMOVE ENGINE MOUNTING BRACKET RH (See page 17-9)



82. REMOVE PUMP BRACKET

(a) Remove the 3 bolts and pump bracket.

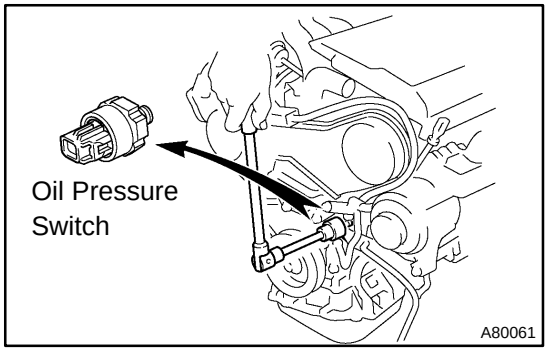
83. REMOVE GENERATOR BRACKET NO.1

84. REMOVE COMPRESSOR MOUNTING BRACKET NO.1 (See page 17-9)

85. REMOVE WATER INLET PIPE (See page 16-16)

86. REMOVE WATER INLET (See page 16-16)

87. REMOVE THERMOSTAT



88. REMOVE ENGINE OIL PRESSURE SWITCH ASSY

(a) Using a deep socket wrench 24 mm, remove the oil pressure switch.

89. REMOVE KNOCK SENSOR (See page 10-16)

90. REPLACE PARTIAL ENGINE ASSY

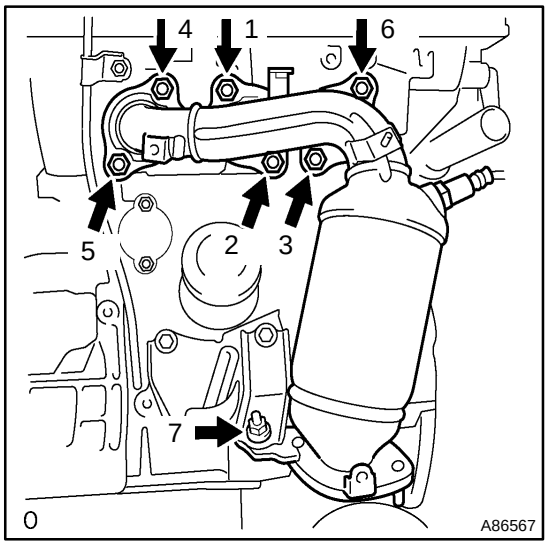
91. INSTALL KNOCK SENSOR (See page 10-16)

92. INSTALL ENGINE OIL PRESSURE SWITCH ASSY

(a) Apply adhesive to 2 or 3 threads of the oil pressure switch.
Adhesive:
Part No. 08833-00080 THREE BOND 1344,
LOCTITE 242 or equivalent

(b) Using a deep socket wrench 24 mm, install the oil pressure switch.
Torque: 15 N·m (153 kgf·cm, 11 ft·lbf)

93. INSTALL THERMOSTAT (See page 16-16)
94. INSTALL WATER INLET (See page 16-16)
95. INSTALL WATER INLET PIPE (See page 16-16)
96. INSTALL COMPRESSOR MOUNTING BRACKET NO.1 (See page 17-9)
97. INSTALL GENERATOR BRACKET NO.1
Torque: 58 N·m (591 kgf·cm, 43 ft·lbf)
98. INSTALL PUMP BRACKET
Torque: 32 N·m (326 kgf·cm, 24 ft·lbf)
99. INSTALL ENGINE MOUNTING BRACKET RH (See page 17-9)
100. INSTALL MANIFOLD STAY NO.2
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

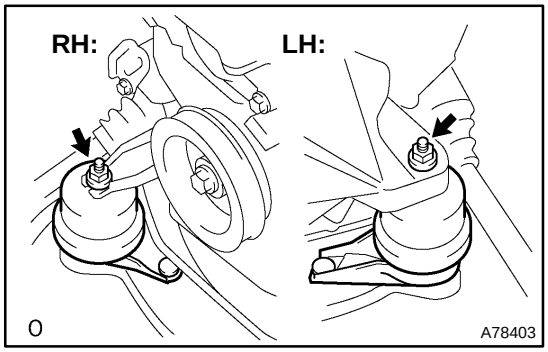


101. INSTALL EXHAUST MANIFOLD CONVERTER SUB-ASSY NO.2
(a) Install a new gasket and the exhaust manifold converter No. 2 with the 7 nuts. Using several steps, tighten the nuts uniformly in the sequence shown in the illustration.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)
(b) Retighten nuts 1 and 2 as shown in the illustration.

102. INSTALL EXHAUST MANIFOLD HEAT INSULATOR NO.2
Torque: 8.5 N·m (87 kgf·cm, 75 in.·lbf)
103. INSTALL MANIFOLD CONVERTER INSULATOR NO.3
Torque: 8.5 N·m (87 kgf·cm, 75 in.·lbf)
104. INSTALL EXHAUST MANIFOLD SUB-ASSY RH (See page 14-120)
105. INSTALL EXHAUST MANIFOLD HEAT INSULATOR NO.1 (See page 14-120)
106. INSTALL IGNITION COIL ASSY (See page 14-7)
107. INSTALL WATER OUTLET (See page 10-16)
108. INSTALL INTAKE MANIFOLD (See page 10-16)
109. INSTALL INTAKE AIR SURGE TANK (See page 11-13)
110. INSTALL EMISSION CONTROL VALVE SET (See page 11-13)
111. INSTALL DRIVE PLATE & RING GEAR SUB-ASSY (See page 14-140)
SST 09213-54015 (91651-60855), 09330-00021
112. INSTALL DRIVE SHAFT BEARING BRACKET
Torque: 64 N·m (650 kgf·cm, 47 in.·lbf)
113. INSTALL AUTOMATIC TRANSAXLE ASSY (See page 40-9)
114. INSTALL EXHAUST PIPE SUPPORT BRACKET NO.1 (See page 40-9)
115. INSTALL ENGINE MOUNTING BRACKET FR (See page 40-9)
116. INSTALL STARTER ASSY (See page 19-5)

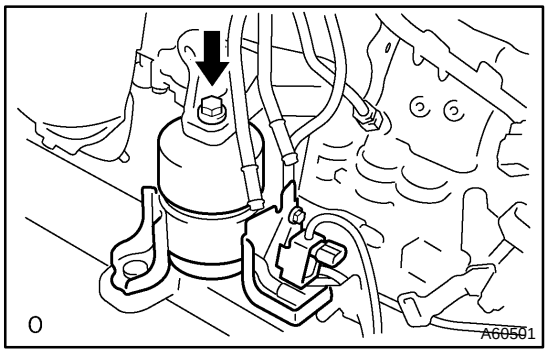
117. INSTALL FRONT DRIVE SHAFT ASSY LH (See page 30-8)

118. INSTALL FRONT DRIVE SHAFT ASSY RH (See page 30-8)

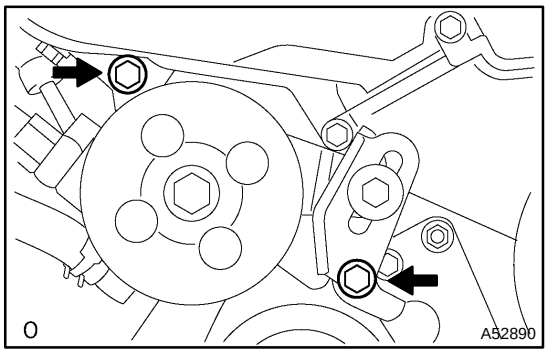


119. INSTALL FRONT FRAME ASSY

(a) Install the engine mounting insulator RH and LH with the 2 nuts.
Torque: 95 N·m (969 kgf·cm, 70 ft·lbf)

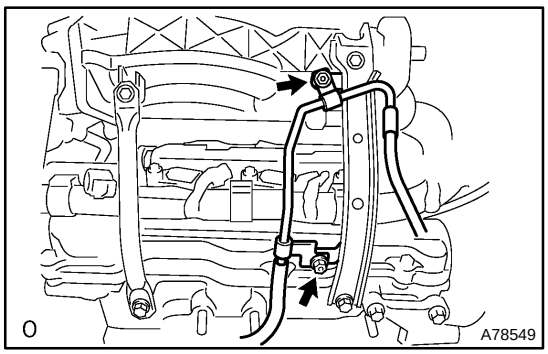


(b) Install the engine mounting insulator FR with the bolt.
Torque: 87 N·m (887 kgf·cm, 64 ft·lbf)



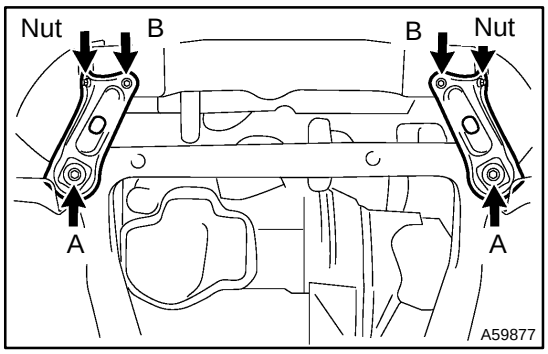
120. INSTALL VANE PUMP ASSY

(a) Temporarily tighten the bolt.
(b) Install the adjusting strut to the engine mounting bracket RH with the bolt.
Torque: 43 N·m (439 kgf·cm, 32 ft·lbf)



(c) Connect the power steering pressure tube with the 2 nuts.
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

121. INSTALL VANE PUMP V BELT (See page 14-5)



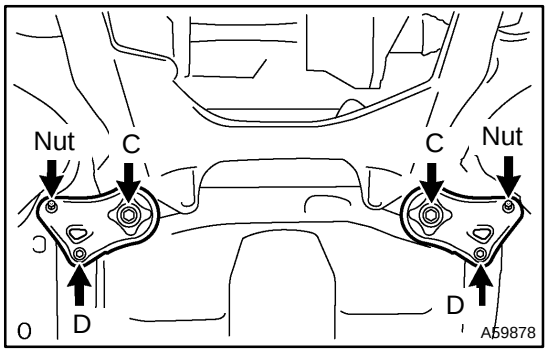
122. INSTALL ENGINE ASSEMBLY WITH TRANSAXLE

(a) Set the engine assembly with the transaxle on the engine lifter.

(b) Install the engine assembly to the vehicle.

(c) Install the frame side rail plate RH and LH with the 4 bolts and 2 nuts.

Torque:
85 N·m (867 kgf·cm, 63 ft·lbf) for bolt A
32 N·m (326 kgf·cm, 24 ft·lbf) for bolt B and nut



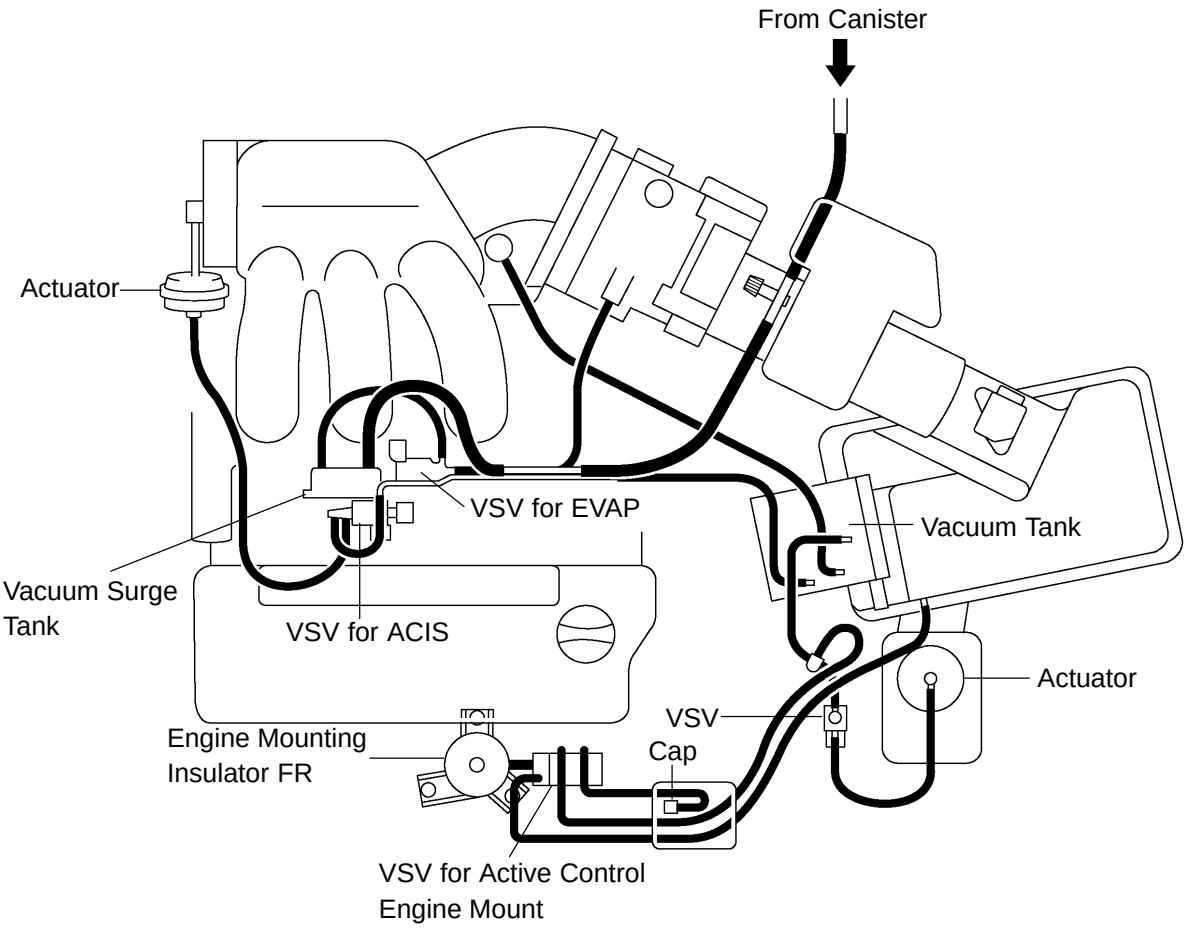
(d) Install the front suspension member brace rear RH and LH with the 4 bolts and 2 nuts.

Torque:
85 N·m (867 kgf·cm, 63 ft·lbf) for bolt C
32 N·m (326 kgf·cm, 24 ft·lbf) for bolt D and nut

123. CONNECT STEERING INTERMEDIATE SHAFT ASSY (See page 51-21)
124. INSTALL FRONT AXLE ASSY LH (See page 30-8)
125. INSTALL FRONT AXLE ASSY RH
HINT:
Perform the same procedure as above on the opposite side.
126. INSTALL FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH (See page 30-8)
127. INSTALL FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 RH
HINT:
Perform the same procedure as above on the opposite side.
128. INSTALL TIE ROD ASSY LH (See page 30-8)
129. INSTALL TIE ROD ASSY RH
HINT:
Perform the same procedure as above on the opposite side.
130. INSTALL SPEED SENSOR FRONT LH (See page 30-8)
131. INSTALL SPEED SENSOR FRONT RH
HINT:
Perform the same procedure as above on the opposite side.
132. INSTALL FRONT AXLE HUB LH NUT (See page 30-8)
133. INSTALL FRONT AXLE HUB RH NUT
HINT:
Perform the same procedure as above on the opposite side.
134. INSTALL FRONT STABILIZER LINK ASSY LH (See page 30-8)
135. INSTALL FRONT STABILIZER LINK ASSY RH
HINT:
Perform the same procedure as above on the opposite side.
136. INSTALL EXHAUST PIPE ASSY FRONT (See page 15-2)
137. INSTALL EXHAUST PIPE NO.1 SUPPORT BRACKET REAR (See page 15-2)
138. INSTALL EXHAUST PIPE NO.1 SUPPORT BRACKET FRONT (See page 15-2)
139. CONNECT FUEL PIPE SUB-ASSY NO.1 (See page 11-1)

140. CONNECT TRANSMISSION CONTROL CABLE ASSY (See page 40-44)
141. INSTALL COMPRESSOR AND MAGNETIC CLUTCH (See page 17-9)
142. INSTALL GENERATOR BELT ADJUSTING BAR (See page 17-9)
143. INSTALL GENERATOR BRACKET NO.2 (See page 14-79)
144. INSTALL ENGINE MOUNTING STAY NO.2 RH (See page 14-79)
145. INSTALL ENGINE MOVING CONTROL ROD (See page 14-79)
146. INSTALL GENERATOR ASSY (See page 19-21)
147. INSTALL V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (See page 14-5)
148. INSPECT DRIVE BELT DEFLECTION AND TENSION (See page 14-1)
149. INSTALL INTAKE AIR RESONATOR SUB-ASSY
Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)
150. INSTALL AIR CLEANER INLET NO.1 (See page 19-5)
151. INSTALL AIR CLEANER BRACKET (See page 19-5)
152. INSTALL AIR CLEANER ASSY (See page 19-5)
153. INSTALL AIR CLEANER INLET ASSY (See page 19-5)
154. CHECK CONNECTION OF VACUUM HOSE

Vacuum Hose Routing Diagram:



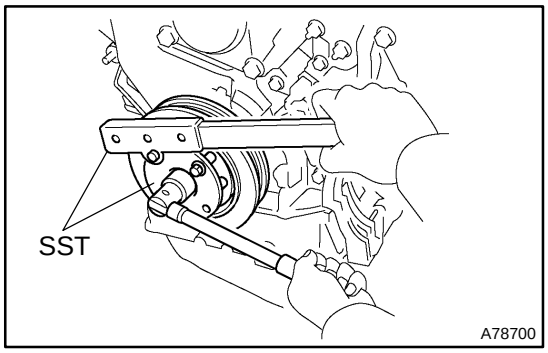
155. INSTALL V-BANK COVER SUB-ASSY (See page 10-1 1)
156. INSTALL FRONT WHEELS (See page 14-5)

157. ADD AUTOMATIC TRANSAXLE FLUID
158. ADD ENGINE OIL (See page 17-20)
159. ADD COOLANT (See page 16-9)
160. ADD POWER STEERING FLUID
161. BLEED POWER STEERING FLUID
162. INSPECT AUTOMATIC TRANSAXLE FLUID (See page 40-1)
163. CHECK FOR ENGINE OIL LEAKS
164. CHECK FOR ENGINE COOLANT LEAKS (See page 16-1)
165. CHECK POWER STEERING FLUID LEAKAGE
166. INSPECT FOR FUEL LEAKS
167. CHECK FOR EXHAUST GAS LEAKS
168. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT (See page 26-5)
169. INSPECT STEERING WHEEL CENTER POINT
170. INSPECT IGNITION TIMING (See page 14-1)
SST 09843-18040
171. INSPECT ENGINE IDLE SPEED (See page 14-1)
172. INSPECT CO/HC (See page 14-1)
173. CHECK ABS SPEED SENSOR SIGNAL (See page 05-420 , 05-471)
174. SYSTEM INITIALIZATION (See page 19-15)

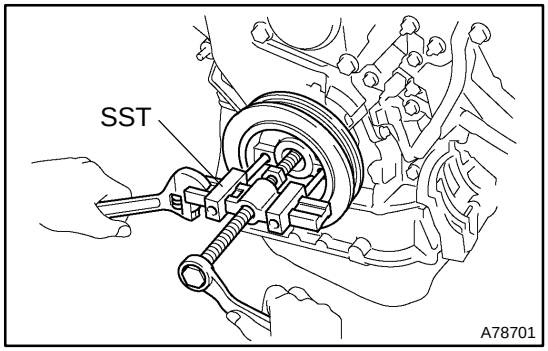
141CR-02

OVERHAUL

1. REMOVE SPARK PLUG
2. REMOVE OIL FILLER CAP SUB-ASSY
3. REMOVE OIL FILLER CAP GASKET
4. REMOVE CYLINDER HEAD COVER SUB-ASSY LH
5. REMOVE CYLINDER HEAD COVER GASKET NO.2
6. REMOVE CYLINDER HEAD COVER SUB-ASSY
7. REMOVE CYLINDER HEAD COVER GASKET
8. REMOVE VENTILATION VALVE SUB-ASSY
9. REMOVE CAMSHAFT TIMING OIL CONTROL VALVE ASSY
10. REMOVE VVT SENSOR
(a) Remove both the camshaft oil control valves.
(b) Remove the O-ring from each camshaft oil control valve.
11. REMOVE OIL LEVEL GAGE SUB-ASSY
12. REMOVE OIL LEVEL GAGE GUIDE



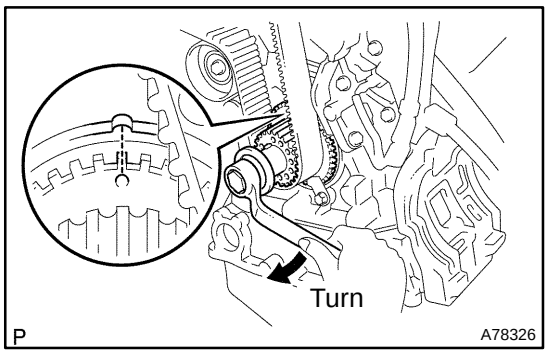
13. REMOVE CRANKSHAFT PULLEY
(a) Using SST, loosen the pulley bolt.
SST 09213-54015 (91651-60855), 09330-00021



(b) Using SST and the pulley bolt, remove the pulley.
SST 09950- 50013 (09951- 05010, 09952- 05010, 09953-05020, 09954-05031)

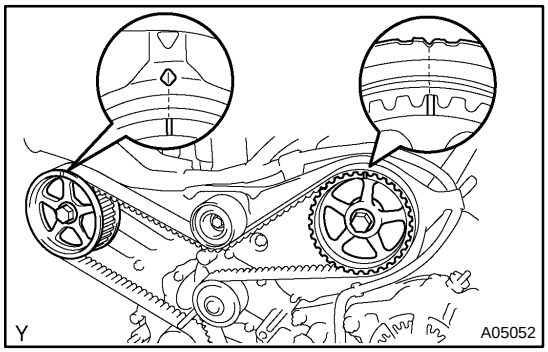
NOTICE:
Before using SST, apply lubricating oil to the threads and tip of the center bolt 150.

14. REMOVE TIMING BELT NO.1 COVER
15. REMOVE TIMING BELT NO.2 COVER
16. REMOVE ENGINE MOUNTING BRACKET RH
17. REMOVE TIMING BELT GUIDE NO.2



18. REMOVE TIMING BELT

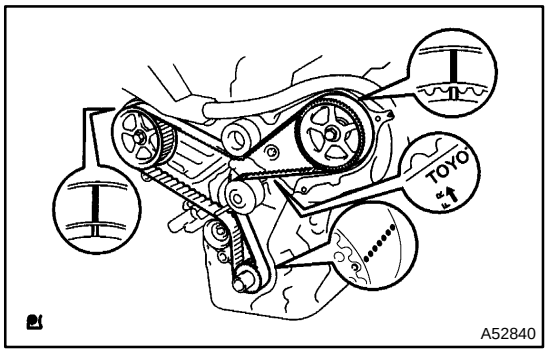
(a) Set the No. 1 cylinder to the TDC/compression.
  (1) Temporarily install the crankshaft pulley bolt and washer to the crankshaft.
  (2) Turn the crankshaft clockwise, then align the timing mark of the crankshaft timing pulley with the oil pump body.



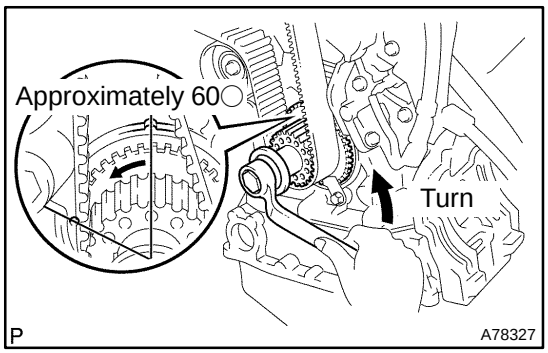
  (3) Check that the timing marks of the camshaft timing pulleys and the timing belt No. 3 cover are aligned.

If not, turn the crankshaft by 1 revolution (360○).

  (4) Remove the crankshaft pulley bolt.



(b) If reusing the timing belt, check that there are 3 installation marks on the timing belt as shown in the illustration.
  (1) If the installation marks have disappeared, put new installation marks on the timing belt before removing.



(c) Set the No. 1 cylinder to approximately 60○BTDC/compression.
  (1) Turn the crankshaft counterclockwise by approximately 60○.

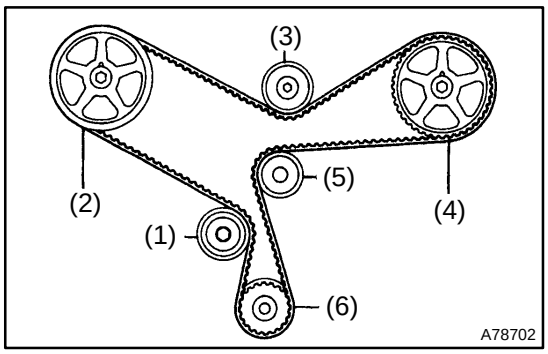
NOTICE:

If the timing belt is disengaged, having the crankshaft pulley set at the wrong angle can cause contact of the piston head with the valve head when removing the camshaft timing pulley and camshaft, which causes damage. So always set the crankshaft pulley at the correct angle.

(d) Remove the timing belt tensioner.

NOTICE:

Do not reinstall the tensioner with its plunger extended.



(e) Remove the timing belt in this order.

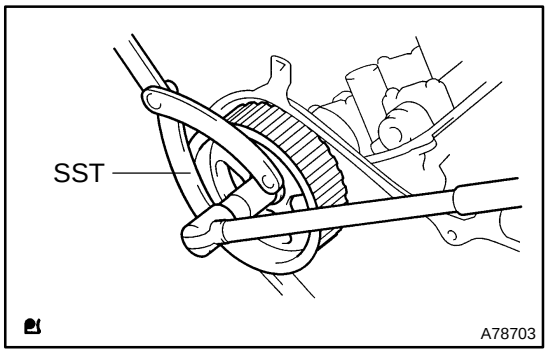
1st	No. 1 idler pulley
2nd	RH camshaft timing pulley
3rd	No. 2 idler pulley
4th	LH camshaft timing pulley
5th	Water pump pulley
6th	Crankshaft timing pulley

19. REMOVE TIMING BELT IDLER SUB-ASSY NO.1

(a) Using a socket hexagon wrench 10, remove the pivot bolt, timing belt idler No. 1 and plate washer.

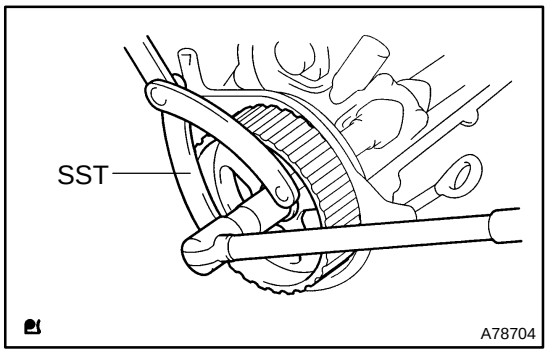
20. REMOVE TIMING BELT IDLER SUB-ASSY NO.2

21. REMOVE CRANKSHAFT POSITION SENSOR



22. REMOVE CAMSHAFT TIMING PULLEY

(a) Using SST, remove the bolt and RH timing pulley.
SST 09960-10010 (09962-01000, 09963-01000)



(b) Using SST, remove the bolt and LH timing pulley.
SST 09960-10010 (09962-01000, 09963-01000)

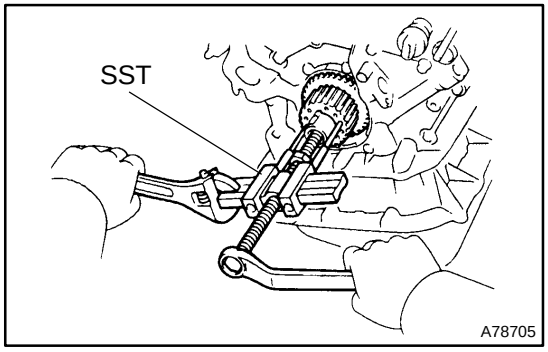
HINT:
Arrange the camshaft timing pulleys (RH and LH sides) so that they can be returned to the original locations when reassembling.

23. REMOVE TIMING BELT NO.3 COVER

24. REMOVE TIMING BELT IDLER BRACKET

25. REMOVE CRANKSHAFT TIMING PULLEY

(a) Remove the bolt and timing belt plate.

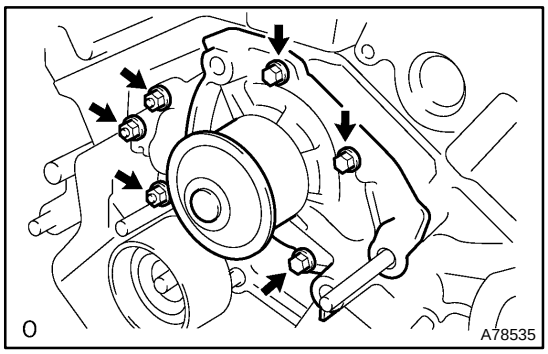


(b) Install the pulley bolt to the crankshaft.

(c) Using SST, remove the crankshaft timing pulley.
SST 09950- 50013 (09951- 05010, 09952- 05010, 09953-05020, 09954-05011)

NOTICE:

- **Do not scratch the sensor part of the crankshaft timing pulley.**
- **Before using SST, apply lubricating oil to the threads and tip of the center bolt 150.**



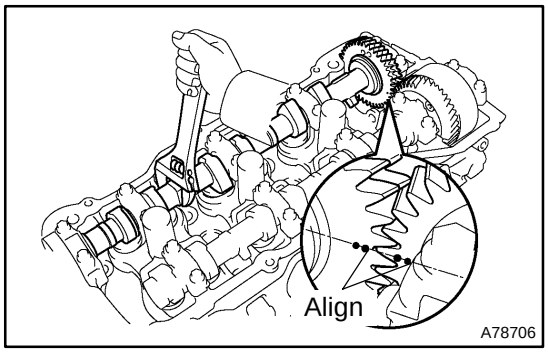
26. REMOVE WATER PUMP ASSY

(a) Remove the 3 bolts and 3 nuts, then remove the water pump and gasket.

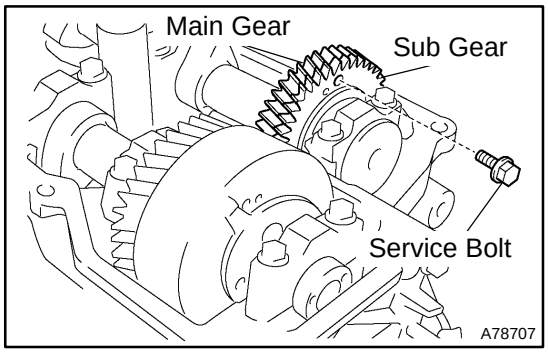
27. REMOVE CAMSHAFT

NOTICE:

Since the thrust clearance of the camshaft is small, the camshaft must be kept level while being removed. If the camshaft is not kept level, the cylinder head or camshaft may be damaged. To avoid this, the following steps must be carried out.



(a) Align the timing marks (2 dot marks) of the camshaft drive and driven gears by turning the camshaft with a wrench.



(b) Secure the exhaust camshaft sub gear to the main gear with a service bolt.

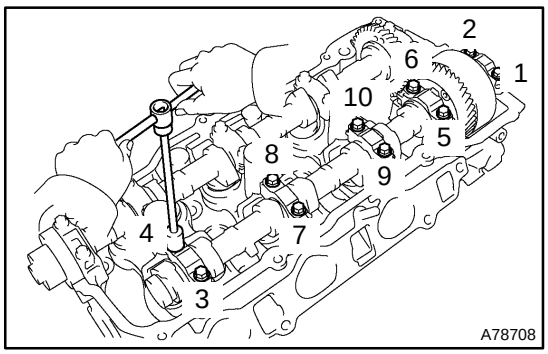
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

Recommended service bolt

Thread diameter	6 mm
Thread pitch	1.0 mm
Bolt length	16 to 20 mm

HINT:

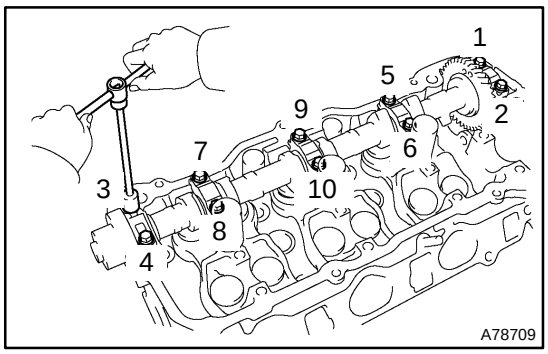
When removing the camshaft, make certain that the torsional spring force of the sub gear has been eliminated by installation of the service bolt.



(c) Using several steps, loosen and remove the 10 bearing cap bolts uniformly in the sequence shown in the illustration. Remove the 5 bearing caps and camshaft.

NOTICE:

- **Do not pry out the camshaft.**
- **Be careful not to damage the contact surface of the cylinder head that receives the shaft thrust.**



28. REMOVE NO.2 CAMSHAFT

(a) Using several steps, loosen and remove the 10 bearing cap bolts uniformly in the sequence shown in the illustration. Remove the 5 bearing caps and No. 2 camshaft.

NOTICE:

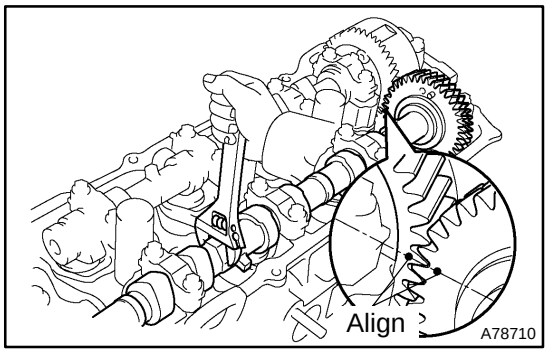
- **Do not pry out the camshaft.**
- **Be careful not to damage the contact surface of the cylinder head that receives the shaft thrust.**

(b) Remove the oil seal from the No. 2 camshaft.

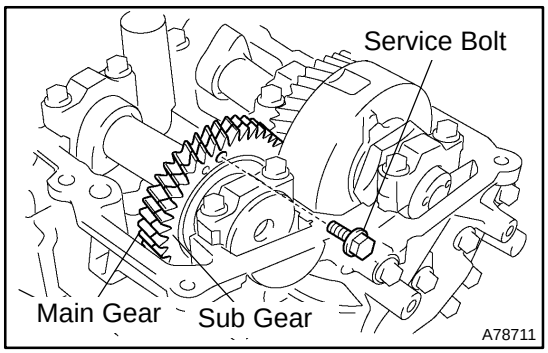
29. REMOVE NO.3 CAMSHAFT SUB-ASSY

NOTICE:

Since the thrust clearance of the camshaft is small, the camshaft must be kept level while being removed. If the camshaft is not kept level, the cylinder head or camshaft may be damaged. To avoid this, the following steps must be carried out.



(a) Align the timing marks (1 dot marks) of the camshaft drive and driven gears by turning the camshaft with a wrench.



(b) Secure the exhaust camshaft sub gear to the main gear with a service bolt.

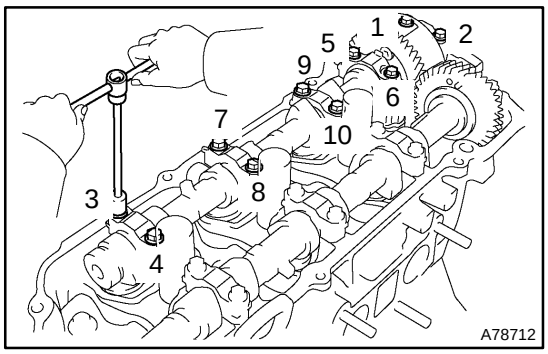
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

Recommended service bolt

Thread diameter	6 mm
Thread pitch	1.0 mm
Bolt length	16 to 20 mm

HINT:

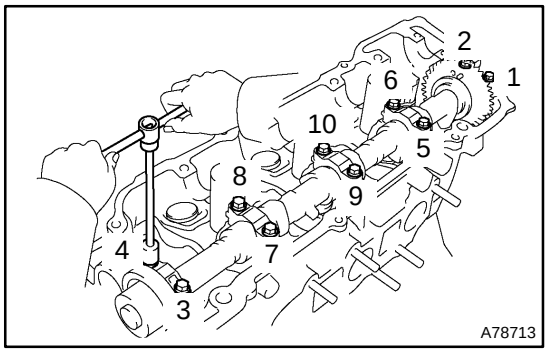
When removing the camshaft, make certain that the torsional spring force of the sub gear has been eliminated by installation of the service bolt.



(c) Using several steps, loosen and remove the 10 bearing cap bolts uniformly in the sequence shown in the illustration. Remove the 5 bearing caps and No. 3 camshaft.

NOTICE:

- **Do not pry out the camshaft.**
- **Be careful not to damage the contact surface of the cylinder head that receives the shaft thrust.**



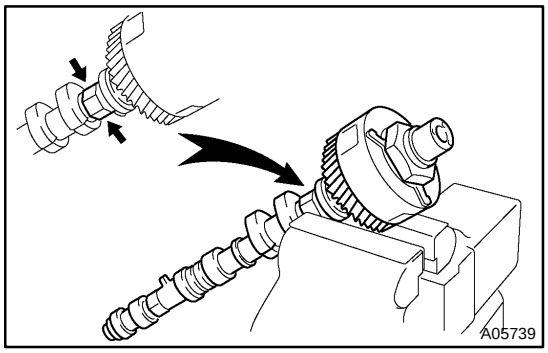
30. REMOVE NO.4 CAMSHAFT SUB-ASSY

(a) Using several steps, loosen and remove the 10 bearing cap bolts uniformly in the sequence shown in the illustration. Remove the 5 bearing caps and No. 4 camshaft.

NOTICE:

- **Do not pry out the camshaft.**
- **Be careful not to damage the contact surface of the cylinder head that receives the shaft thrust.**

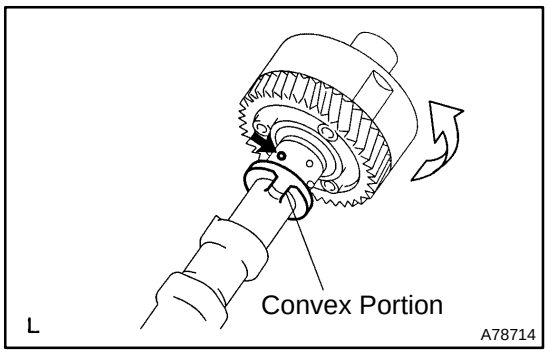
(b) Remove the oil seal from the No. 4 camshaft.



31. INSPECT CAMSHAFT TIMING GEAR ASSY

(a) Clamp the camshaft in a vise on the hexagonal lobe.

(b) Check that the VVT-i will not turn.



(c) Cover all the oil ports with vinyl tape except the port on the advance angle side (nearest to the convex portion) shown in the illustration.

(d) Using the air gun, apply about 100 kPa (1 kgf/cm^2, 14 psi) of air pressure to the port on the advance angle side.

NOTICE:

Some oil spraying will occur. Be prepared to catch the spray with a shop rag.

HINT:

This operation releases the lock pin for the most retard angle lock.

(e) Under the condition above, turn the VVT-i to the advance angle side (the direction of the white arrow in the illustration) by hand.

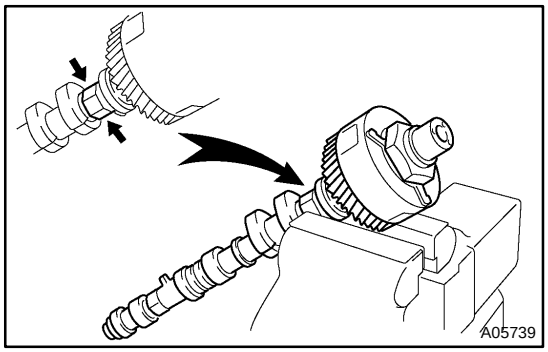
Standard: Must turn

HINT:

Depending on the air pressure, the VVT-i will turn to the advance angle side without applying force by hand. Also, if the pressure can be hardly applied because of the air leakage from the port, the lock pin might not be released easily.

(f) Check that the VVT-i moves freely within about 30○ range. Avoid moving the VVT-i unit to the most retard angle position as the lock pin will engage again.
Standard: Smooth movable range is about 30○

(g) Turn the VVT-i by hand, then lock it at the most retard angle position.



32. REMOVE CAMSHAFT TIMING GEAR ASSY

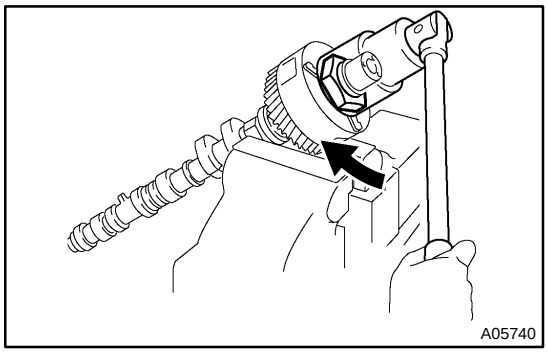
NOTICE:

Do not remove or install the camshaft timing gear (VVT-i) unless you are replacing the VVT-i or camshaft.

(a) Clamp the camshaft in a vise on the hexagonal lobe.

NOTICE:

Be careful not to damage the camshaft.



(b) Using a 46 mm socket wrench, remove the lock nut by turning it clockwise.

NOTICE:

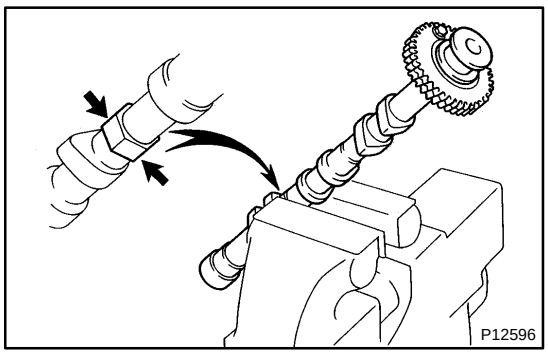
- **Remove it with the lock pin engaged and locked at the most retard angle position.**
- **The lock nut has LH threads.**
- **Never use any tools other than the socket wrench. Other tools will deform the cam angle rotor.**

(c) Remove the camshaft VVT-i.

NOTICE:

Never remove the 3 bolts on the gear.

If it is difficult to remove VVT-i, tap it lightly using a plastic-faced hammer, then remove it.

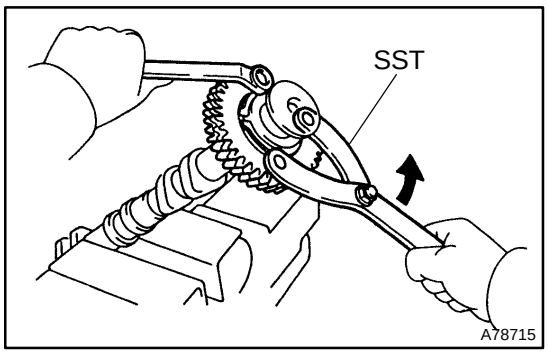


33. REMOVE CAMSHAFT SUB GEAR

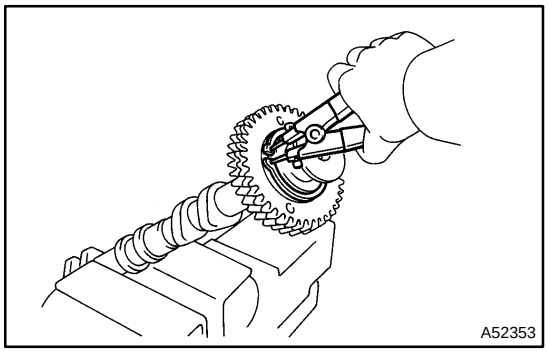
(a) Clamp the camshaft in a vise on the hexagonal lobe.

NOTICE:

Be careful not to damage the camshaft.



(b) Using SST, turn the sub gear counterclockwise, then remove the service bolt.
SST 09960-10010 (09962-01000, 09963-00500)

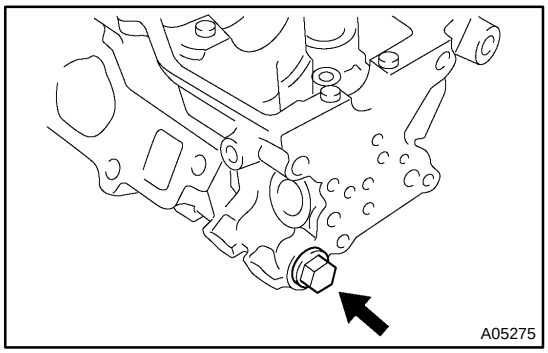


(c) Using snap ring pliers, remove the snap ring.
(d) Remove the wave washer, camshaft sub gear and camshaft gear bolt washer.

HINT:
Arrange the camshaft sub gears and gear bolt washers (RH and LH sides) so that they can be returned to the original locations when reassembling.

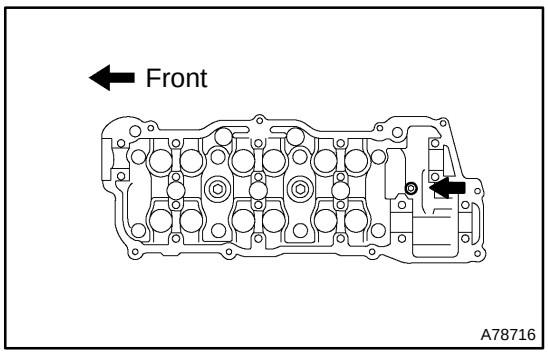
34. REMOVE ENGINE HANGER NO.2

35. REMOVE CYLINDER HEAD COVER REAR



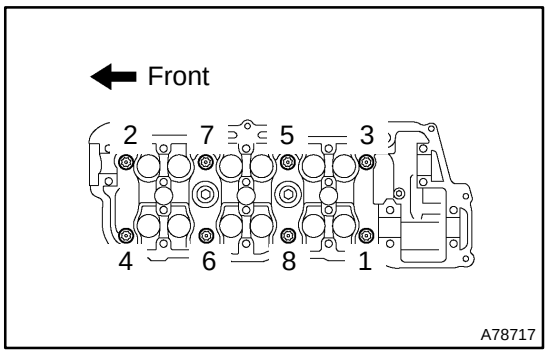
36. REMOVE OIL CONTROL VALVE FILTER

(a) Remove the plug, gasket and valve filter.



37. REMOVE CYLINDER HEAD SUB-ASSY

(a) Using a socket hexagon wrench 8, remove the hexagon bolt.

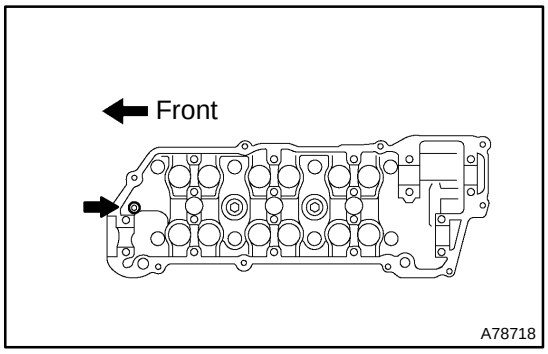


(b) Using several steps, loosen the 8 cylinder head bolts uniformly in the sequence shown in the illustration. Remove the 8 cylinder head bolts and plate washers.

NOTICE:

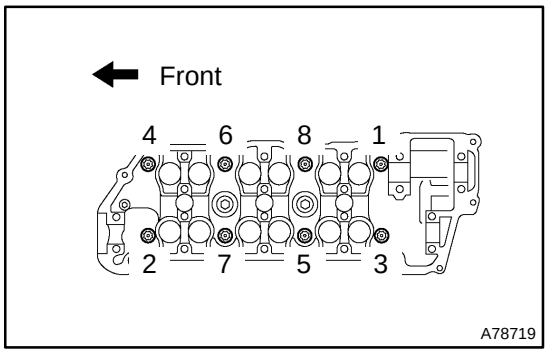
- **Be careful not to drop the washers into the cylinder head.**
- **Head warpage or cracking could result from removing the bolts in an incorrect order.**

38. REMOVE CYLINDER HEAD GASKET



39. REMOVE CYLINDER HEAD LH

(a) Using a socket hexagon wrench 8, remove the hexagon bolt.

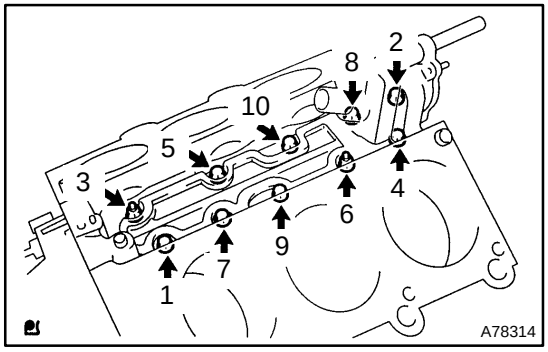


(b) Using several steps, loosen the 8 cylinder head bolts uniformly in the sequence shown in the illustration. Remove the 8 cylinder head bolts and plate washers.

NOTICE:

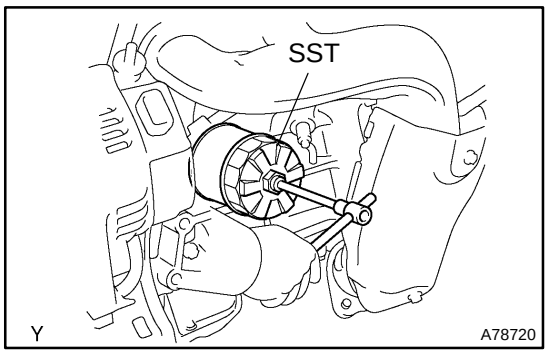
- **Be careful not to drop the washers into the cylinder head.**
- **Head warpage or cracking could result from removing the bolts in an incorrect order.**

40. REMOVE CYLINDER HEAD GASKET NO.2



41. REMOVE WATER INLET HOUSING

(a) Remove the 8 bolts and 2 nuts, then remove the water inlet housing.

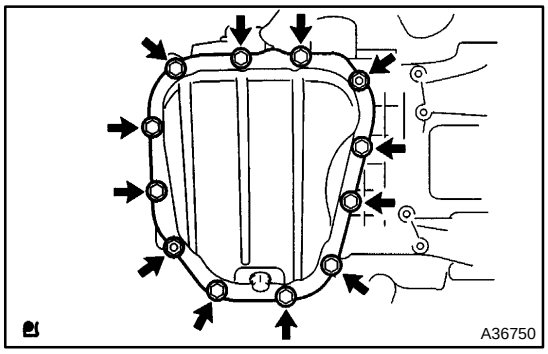


42. REMOVE OIL FILTER SUB-ASSY

(a) Using SST, remove the oil filter.
SST 09228-07501

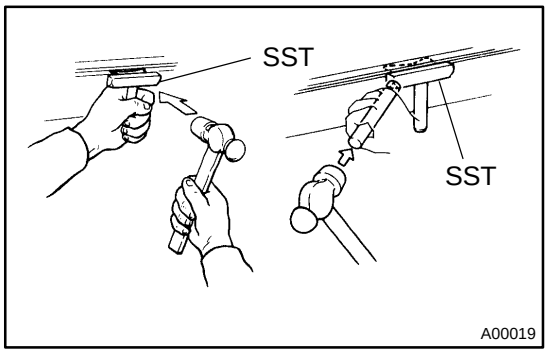
(b) Using a socket hexagon wrench 12, remove the oil filter union.

43. REMOVE OIL PAN DRAIN PLUG



44. REMOVE OIL PAN SUB-ASSY NO.2

(a) Remove the 10 bolts and 2 nuts.



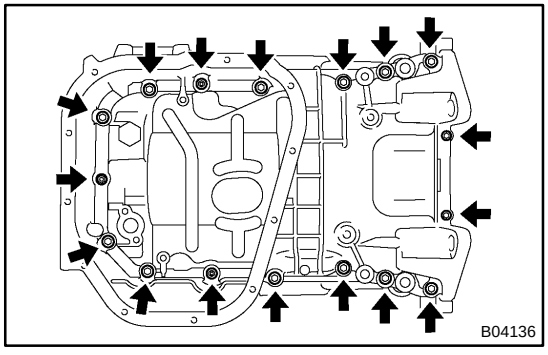
(b) Insert the blade of SST between the oil pan No. 1 and oil pan No. 2, then cut off the sealer and remove the oil pan No. 2.
SST 09032-00100

NOTICE:

- **Be careful not to damage the contact surface of the oil pan No. 1 where the oil pan No. 2 is mounted.**
- **Do not damage the flange portion of the oil pan No. 2 when removing.**

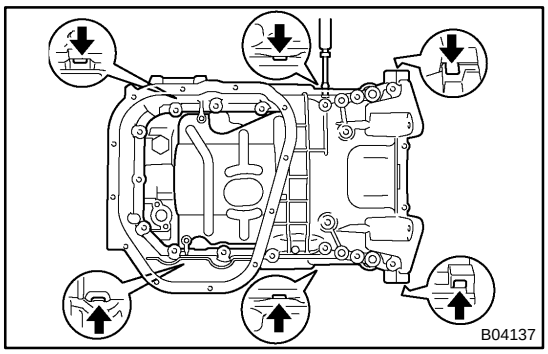
45. REMOVE OIL STRAINER SUB-ASSY

(a) Remove the bolt and 2 nuts, then remove the oil strainer and gasket.



46. REMOVE OIL PAN SUB-ASSY

(a) Loosen and remove the 15 bolts and 2 nuts uniformly.

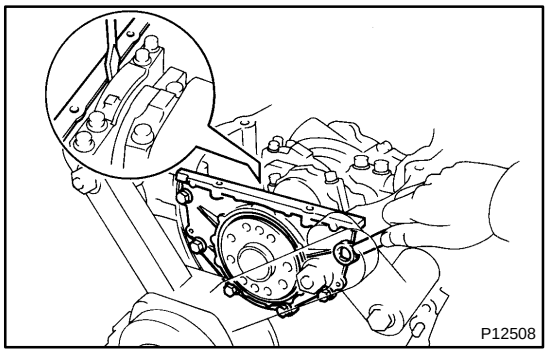


(b) Using a screwdriver, remove the oil pan by prying between the cylinder block and oil pan.

NOTICE:

Be careful not to damage the contact surfaces of the oil pan and cylinder block.

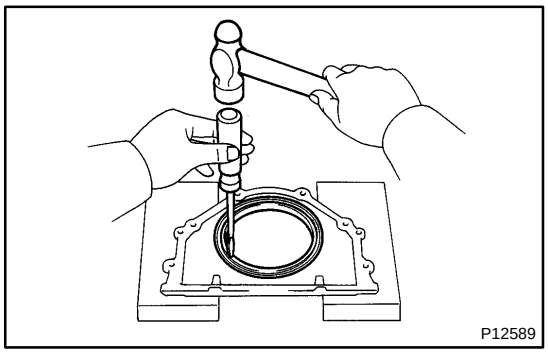
47. REMOVE OIL PAN BAFFLE PLATE



48. REMOVE ENGINE REAR OIL SEAL RETAINER

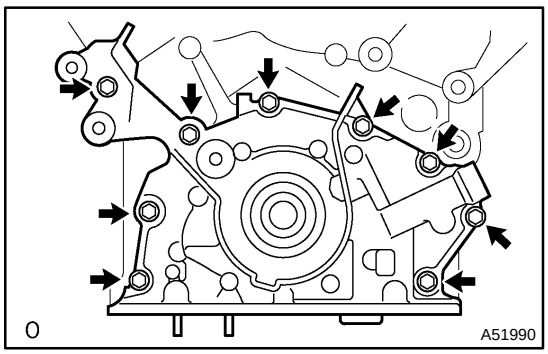
(a) Remove the 6 bolts.

(b) Using a screwdriver, remove the oil seal retainer by prying between the oil seal retainer and bearing cap.



49. REMOVE ENGINE REAR OIL SEAL

(a) Using a screwdriver and hammer, tap out the oil seal.

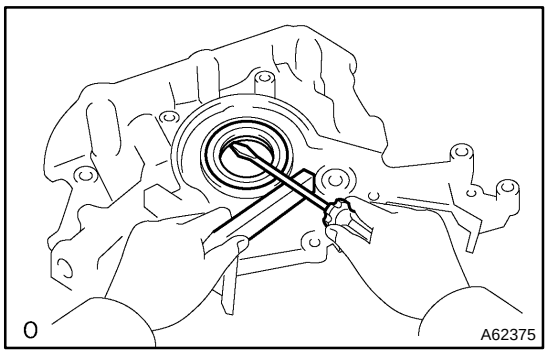


50. REMOVE OIL PUMP ASSY

(a) Remove the 9 bolts.

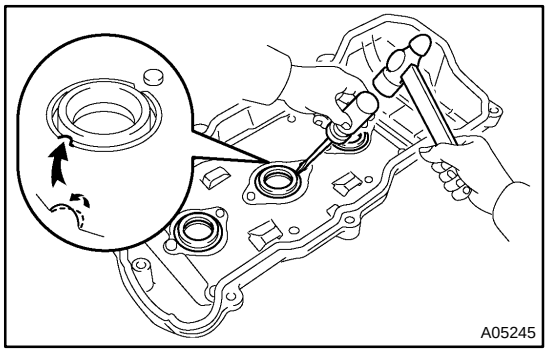
(b) Using a screwdriver, remove the oil pump by prying between the oil pump and bearing cap.

(c) Remove the O-ring.



51. REMOVE OIL PUMP SEAL

(a) Using a screwdriver, pry out the oil seal.



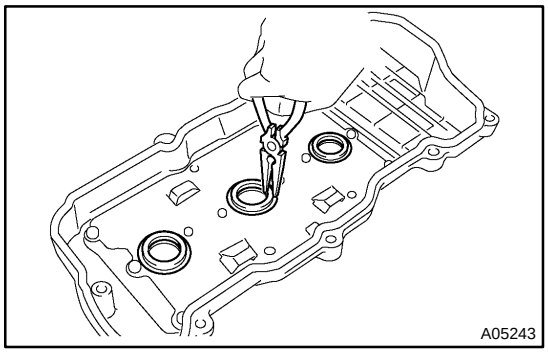
52. REMOVE SPARK PLUG TUBE GASKET

(a) Bend up the tab on the ventilation baffle plate which prevents the gasket from slipping out.

NOTICE:

Be careful not to damage the baffle plate of the cylinder head cover.

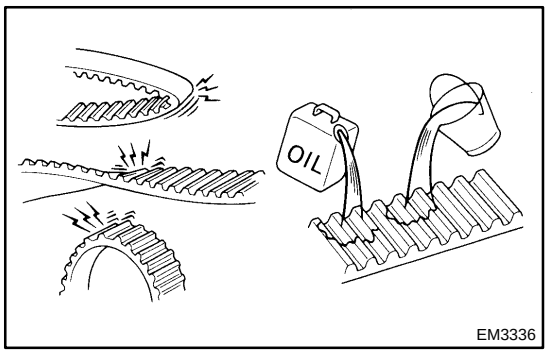
(b) Using a screwdriver and hammer, tap out the gasket.



(c) Using needle-nose pliers, pry out the gasket.

NOTICE:

Be careful not to damage the cylinder head cover.



53. INSPECT TIMING BELT

NOTICE:

- **Do not bend, twist or turn the timing belt inside out.**
- **Do not allow contact of the timing belt with oil, water or steam.**
- **Do not use the timing belt tension when installing or removing the mounting bolt of the camshaft timing pulley.**

Check the belt for any defects as shown in the illustrations. Also, check these points below.

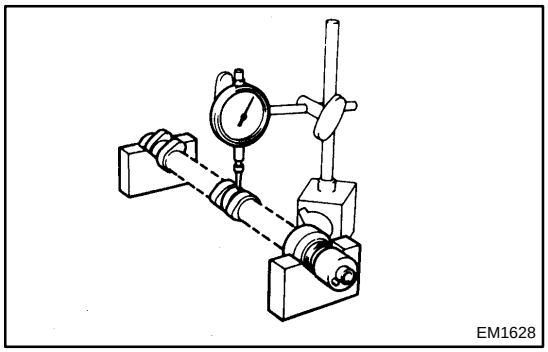
(a) If the belt tears in a short time:
- Check if the belt is installed properly.
- Check if the timing cover gasket is damaged and if it is installed properly.

(b) If the belt teeth are cracked or damaged, check if either camshaft is locked.

(c) If there is noticeable wear or cracks on the belt face, check if there are nicks on the side of the idler pulley lock and water pump.

(d) If there is wear or damage on only one side of the belt, check the belt guide and alignment of each pulley.
(e) If there is noticeable wear on the belt teeth:
- Check the timing cover for damage.
- Check that the gasket has been installed correctly.
- Check for foreign objects on the pulley teeth.

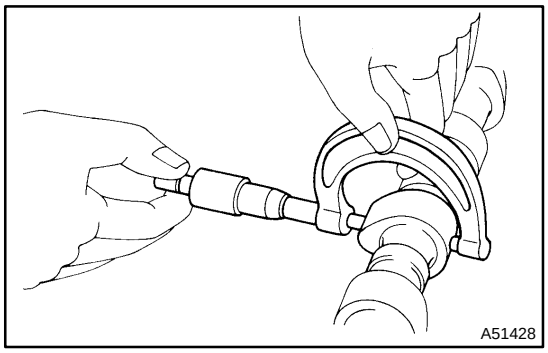
If there is any doubt about the belt condition, replace the timing belt.


EM1628

54. INSPECT CAMSHAFT

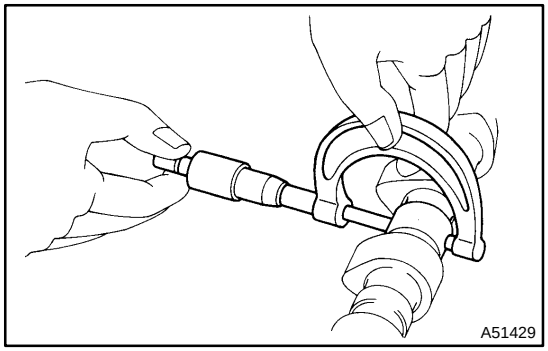
(a) Inspect the camshaft for runout.
(1) Place the camshaft on V-blocks.
(2) Using a dial indicator, measure the runout at the center journal.
Maximum circle runout: 0.06 mm (0.0024 in.)

If the runout is greater than maximum, replace the camshaft.


A51428

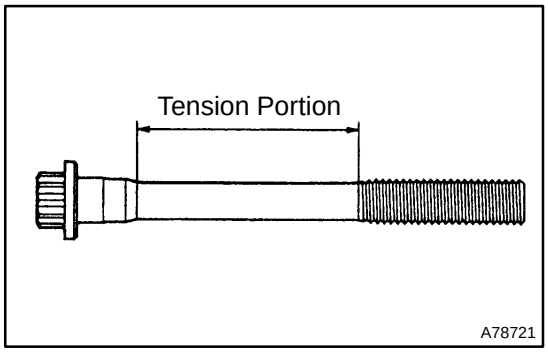
(b) Inspect the cam lobes.
(1) Using a micrometer, measure the cam lobe height.
Standard cam lobe height:
43.132 to 43.232 mm (1.6981 to 1.7020 in.) for intake
43.010 to 43.110 mm (1.6933 to 1.6972 in.) for exhaust
Minimum cam lobe height:
42.98 mm (1.6921 in.) for intake
42.86 mm (1.6874 in.) for exhaust

If the cam lobe height is less than minimum, replace the camshaft.


A51429

(c) Inspect the camshaft journals.
(1) Using a micrometer, measure the journal diameter.
Journal diameter:
26.959 to 26.975 mm (1.0614 to 1.0620 in.)

If the journal diameter is not as specified, check the oil clearance.

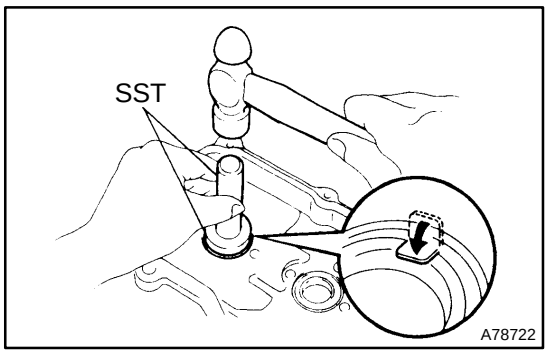


A78721

55. INSPECT CYLINDER HEAD SET BOLT

(a) Using vernier calipers, measure the tension portion diameter of the bolt.
Standard outside diameter:
8.95 to 9.05 mm (0.3524 to 0.3563 in.)
Minimum outside diameter: 8.75 mm (0.3445 in.)

If the diameter is less than minimum, replace the bolt.

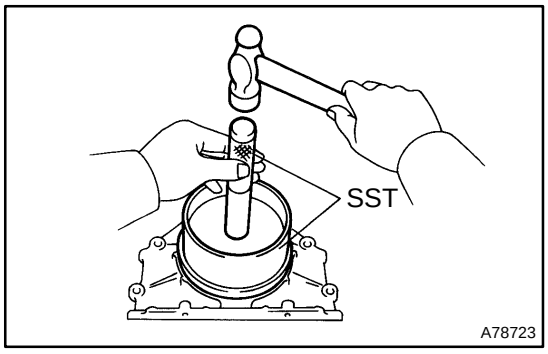


56. INSTALL SPARK PLUG TUBE GASKET

(a) Using SST and a hammer, tap in the new gasket until its surface is flush with the upper edge of the cylinder head cover.
SST 09950- 60010 (09951- 00430), 09950- 70010 (09951-07100)

(b) Return the ventilation plate tab to its original position.

(c) Apply a light coat of multi-purpose grease to the gasket lip.



57. INSTALL ENGINE REAR OIL SEAL

(a) Using SST and a hammer, tap in the new oil seal until its surface is flush with the rear oil seal retainer edge.
SST 09223-15030, 09950-70010 (09951-07100)

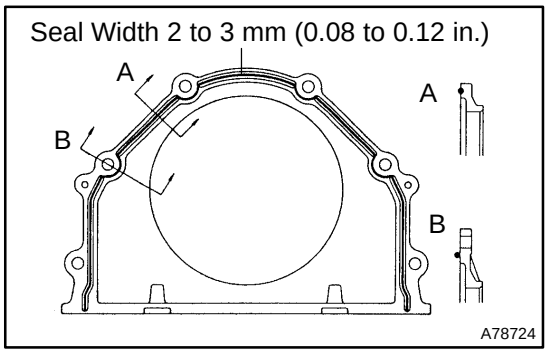
NOTICE:

- **Be careful not to tap the oil seal at an angle.**
- **Keep the lip free of foreign objects.**

(b) Apply multi-purpose grease to the oil seal lip.

58. INSTALL ENGINE REAR OIL SEAL RETAINER

(a) Remove any old packing material from the contact surface.

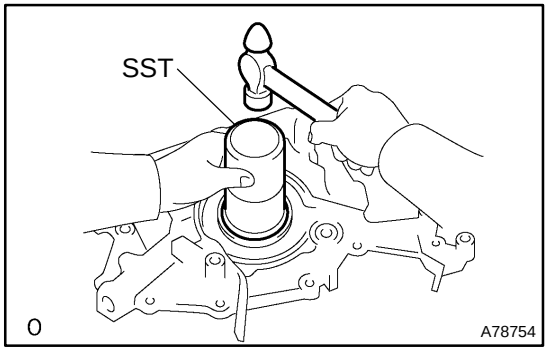


(b) Apply a continuous bead of seal packing (Diameter 2 to 3 mm (0.08 to 0.12 in.)) as shown in the illustration.
Seal packing: Part No. 08826-00080 or equivalent

NOTICE:

- **Remove any oil from the contact surface.**
- **Install the oil seal retainer within 3 minutes after applying seal packing.**
- **Do not expose the seal packing to engine oil within 2 hours after installing.**

(c) Install the oil seal retainer with the 6 bolts. Tighten the bolts uniformly in several steps.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)



59. INSTALL OIL PUMP SEAL

(a) Using SST and a hammer, tap in the new oil seal until its surface is flush with the oil pump body edge.
SST 09223-00010

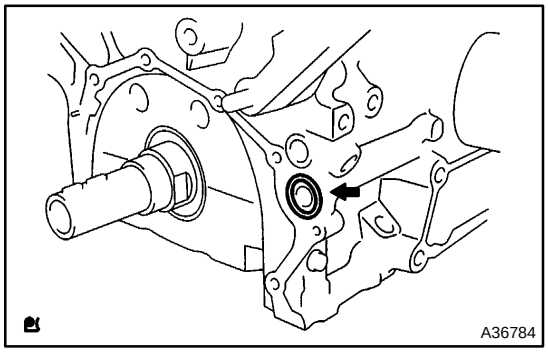
NOTICE:

- **Be careful not to tap the oil seal at an angle.**
- **Keep the lip free of foreign objects.**

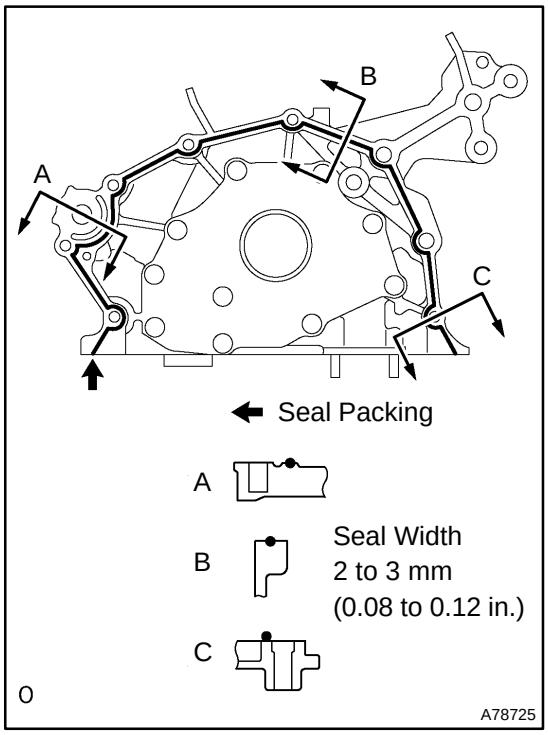
(b) Apply multi-purpose grease to the oil seal lip.

60. INSTALL OIL PUMP ASSY

(a) Remove any old packing material from the contact surface.



(b) Apply a light coat of engine oil to a new O-ring, then place it on the cylinder block.

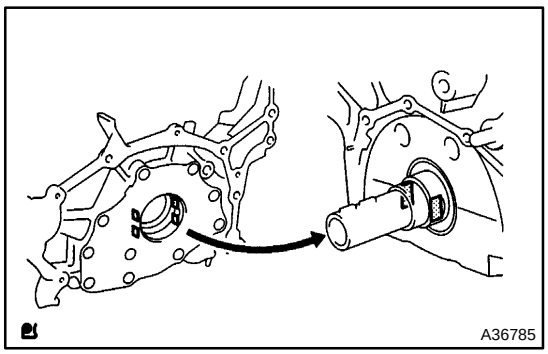


(c) Apply a continuous bead of seal packing (Diameter 2 to 3 mm (0.08 to 0.12 in.)) as shown in the illustration.

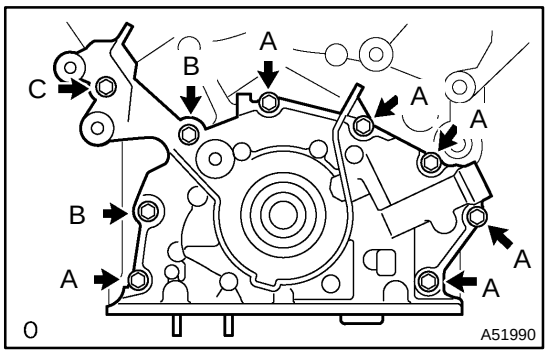
Seal packing: Part No. 08826-00080 or equivalent

NOTICE:

- **Remove any oil from contact surface.**
- **Apply seal packing to the inner side of the bolt holes.**
- **Install the oil pump within 3 minutes after applying seal packing.**
- **Do not expose the seal packing to engine oil within 2 hours after installing.**



(d) Align the key of the oil pump drive gear with the keyway located on the crankshaft, then slide the oil pump into place.



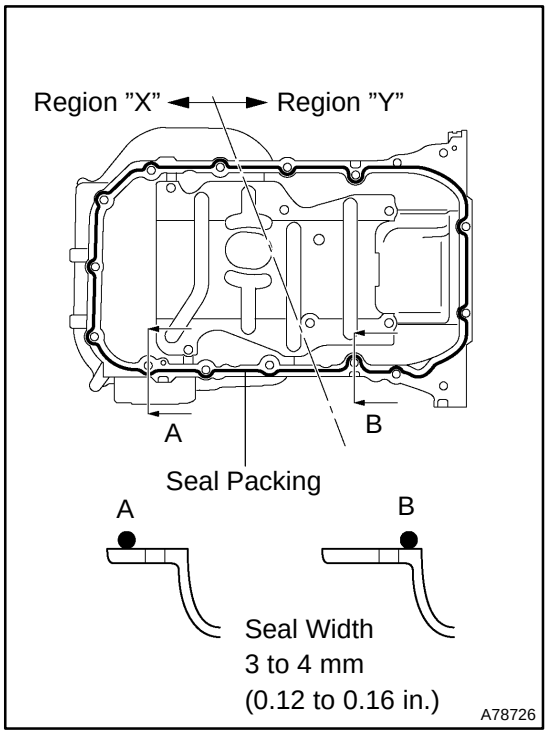
(e) Install the oil pump with the 9 bolts. Tighten the bolts uniformly in several steps.
Torque:
8.0 N·m (82 kgf·cm, 71 in.·lbf) for bolt A
20 N·m (199 kgf·cm, 14 ft·lbf) for bolt B
43 N·m (439 kgf·cm, 32 ft·lbf) for bolt C

61. INSTALL CRANKSHAFT POSITION SENSOR
Torque: 8.0 N·m (80 kgf·cm, 71 in.·lbf)

62. INSTALL OIL PAN BAFFLE PLATE
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

63. INSTALL OIL PAN SUB-ASSY

(a) Remove any old seal packing from the contact surface.



(b) Apply a continuous bead of seal packing (Diameter 3 to 4 mm (0.12 to 0.16 in.)) as shown in the illustration.
Seal packing: Part No. 08826-00080 or equivalent

NOTICE:
- **Remove any oil from the contact surface.**
- **Apply seal packing to the outer side of the bolt holes in the region "X".**
- **Apply seal packing to the inner side of the bolt holes in the region "Y".**
- **Install the oil pan within 3 minutes after applying seal packing.**
- **Do not expose the seal packing to engine oil within 2 hours after installing.**

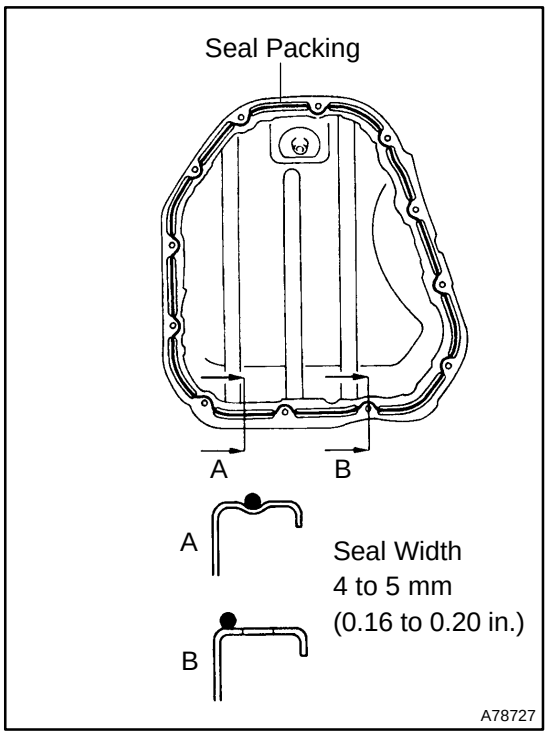
(c) Install the oil pan with the 15 bolts and 2 nuts. Tighten the bolts uniformly in several steps.
Torque:
8.0 N·m (82 kgf·cm, 71 in.·lbf) for 10 mm head
20 N·m (199 kgf·cm, 14 ft·lbf) for 12 mm head

64. INSTALL OIL STRAINER SUB-ASSY

(a) Install a new gasket and the oil strainer with the bolt and 2 nuts.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

65. INSTALL OIL PAN SUB-ASSY NO.2

(a) Remove any old seal packing from the contact surface.



(b) Apply a continuous bead of seal packing (Diameter 4 to 5 mm (0.16 to 0.20 in.)) as shown in the illustration.
Seal packing: Part No. 08826-00080 or equivalent

NOTICE:

- **Remove any oil from the contact surface.**
- **Apply seal packing to the inner side of the bolt holes.**
- **Install the oil pan within 3 minutes after applying seal packing.**
- **Do not expose the seal packing to engine oil within 2 hours after installing.**

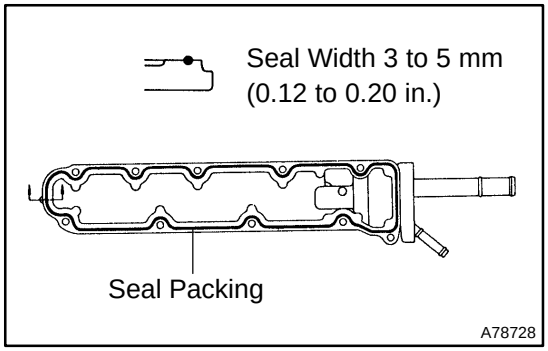
(c) Install the oil pan No. 2 with the 10 bolts and 2 nuts.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

66. INSTALL OIL PAN DRAIN PLUG

(a) Install the drain plug with a new gasket.
Torque: 45 N·m (459 kgf·cm, 33 ft·lbf)

67. INSTALL WATER INLET HOUSING

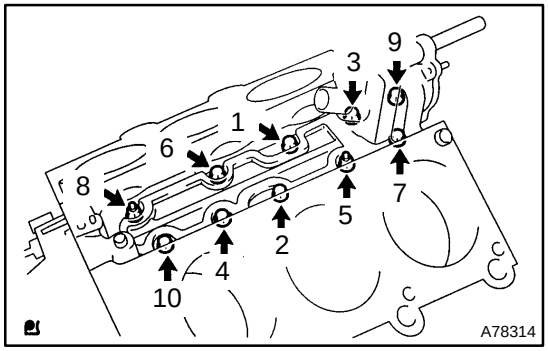
(a) Remove any old packing material from the contact surface.



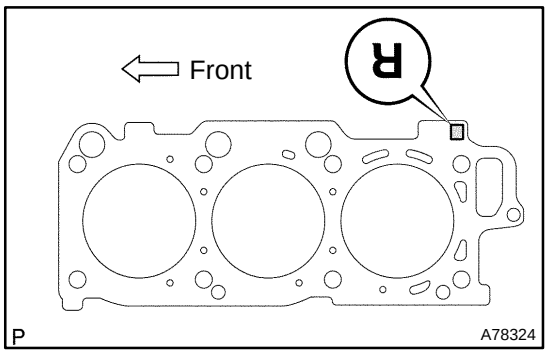
(b) Apply a continuous bead of seal packing (Diameter 3 to 5 mm (0.12 to 0.20 in.)) as shown in the illustration.
Seal packing: Part No. 08826-00100 or equivalent

NOTICE:

- **Remove any oil from the contact surface.**
- **Install the water inlet housing within 3 minutes after applying seal packing.**
- **Do not expose the seal packing to coolant within 2 hours after installing.**



(c) Install the water inlet housing with the 8 bolts and 2 nuts. Using several steps, tighten the bolts and nuts uniformly in the sequence shown in the illustration.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)



68. INSTALL CYLINDER HEAD GASKET

(a) Place a new cylinder head gasket on the cylinder block with the R mark upward.

NOTICE:

- **Remove any oil from the contact surface.**
- **Be careful of the installing orientation.**
- **Place the cylinder head on the gasket carefully in order not to damage the gasket at the bottom part of the head.**

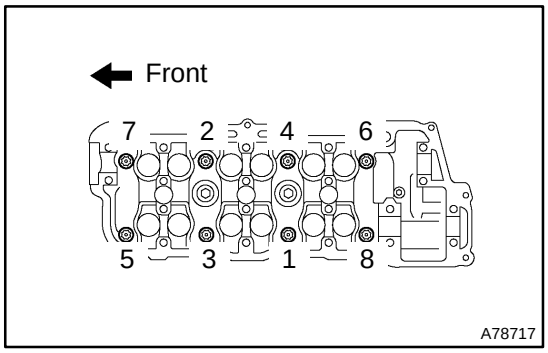
69. INSTALL CYLINDER HEAD SUB-ASSY

NOTICE:

The cylinder head bolts are tightened in 2 successive steps.

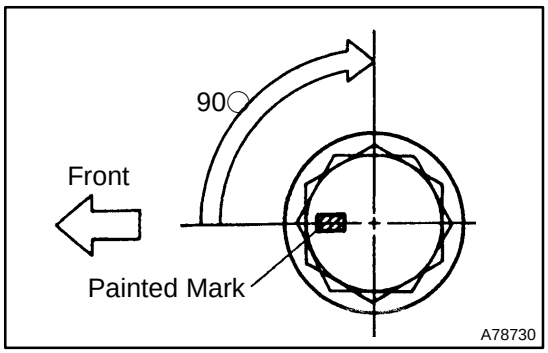
(a) Apply a light coat of engine oil to the threads of the cylinder head bolts.

(b) Install the plate washers to the cylinder head bolts.



(c) Using several steps, install and tighten the 8 cylinder head bolts uniformly in the sequence shown in the illustration.

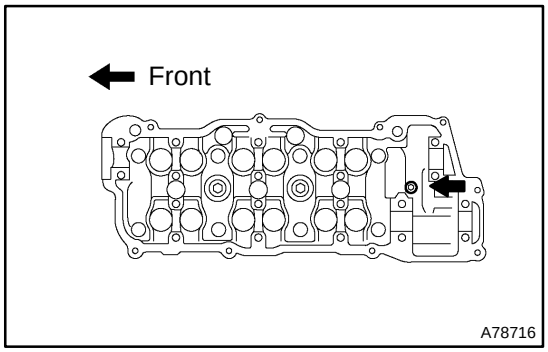
Torque: 54 N·m (550 kgf·cm, 40 ft·lbf)



(d) Mark the front side of each cylinder head bolt head with paint as shown in the illustration.

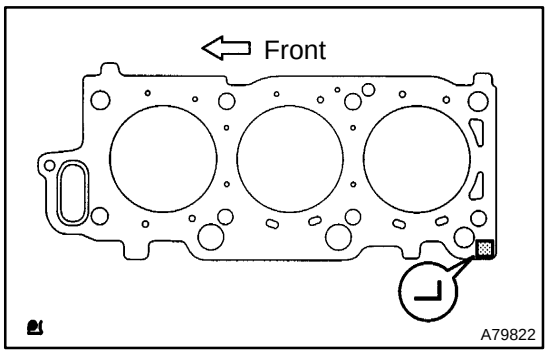
(e) Retighten the cylinder head bolts by 90° in the same sequence as step (c).

(f) Check that each painted mark is now at a 90° angle to the front.



(g) Using a socket hexagon wrench 8, install the hexagon bolt.

Torque: 19 N·m (189 kgf·cm, 14 ft·lbf)



70. INSTALL CYLINDER HEAD GASKET NO.2

(a) Place a new cylinder head gasket on the cylinder block with the L mark upward.

NOTICE:

- **Remove any oil from the contact surface.**
- **Be careful of the installing orientation.**
- **Place the cylinder head on the gasket carefully in order not to damage the gasket at the bottom part of the head.**

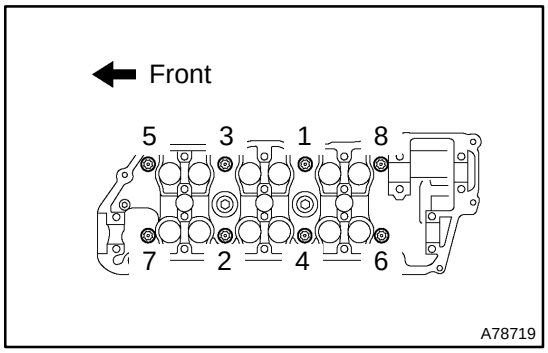
71. INSTALL CYLINDER HEAD LH

NOTICE:

The cylinder head bolts are tightened in 2 successive steps.

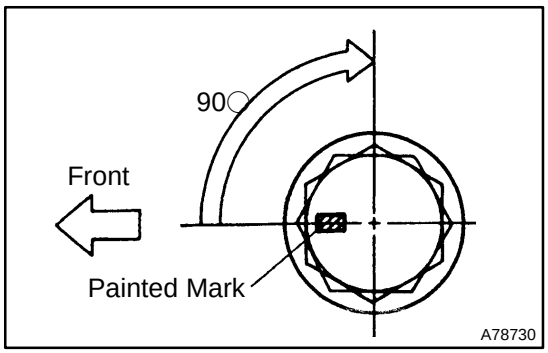
(a) Apply a light coat of engine oil to the threads of the cylinder head bolts.

(b) Install the plate washers to the cylinder head bolts.



(c) Using several steps, install and tighten the 8 cylinder head bolts uniformly in the sequence shown in the illustration.

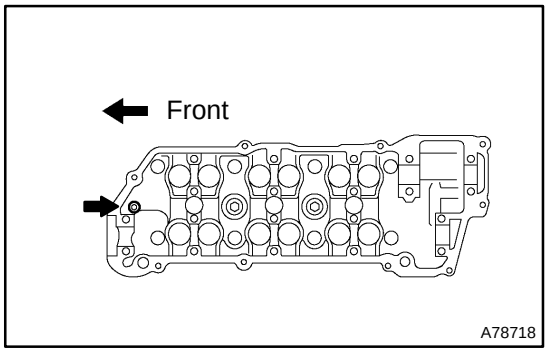
Torque: 54 N·m (550 kgf·cm, 40 ft·lbf)



(d) Mark the front side of each cylinder head bolt head with paint as shown in the illustration.

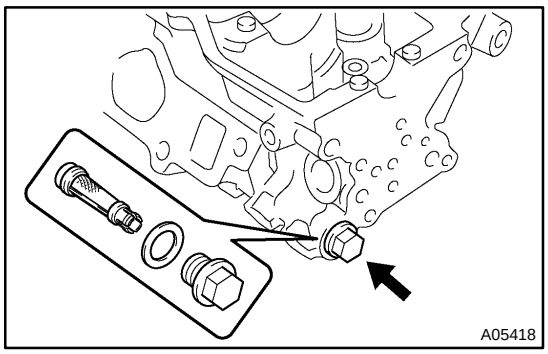
(e) Retighten the cylinder head bolts by 90° in the same sequence as step (c).

(f) Check that each painted mark is now at a 90° angle to the front.



(g) Using a socket hexagon wrench 8, install the hexagon bolt.

Torque: 19 N·m (189 kgf·cm, 14 ft·lbf)



72. INSTALL OIL CONTROL VALVE FILTER

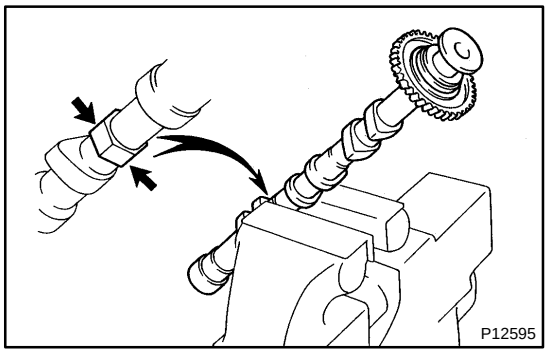
(a) Check that no foreign object is on the mesh part of the filter.

(b) Assemble the valve filter and plug.

(c) Install the plug with a new gasket.
Torque: 45 N·m (459 kgf·cm, 33 ft·lbf)

73. INSTALL CYLINDER HEAD COVER REAR

(a) Install the rear cover and a new gasket.
Torque: 10 N·m (102 kgf·cm, 7 ft·lbf)

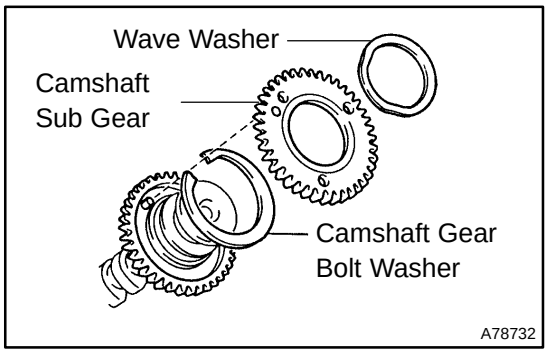


74. INSTALL CAMSHAFT SUB GEAR

(a) Clamp the camshaft in a vise on the hexagonal lobe.

NOTICE:

Be careful not to damage the camshaft.

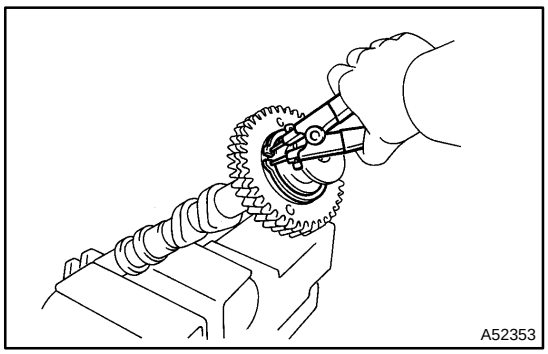


(b) Install the camshaft gear bolt washer and camshaft sub gear.

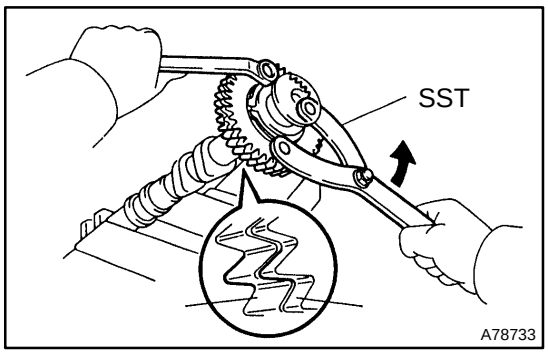
HINT:

Attach the pins on the gears to the gear bolt washer ends.

(c) Install the wave washer.



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

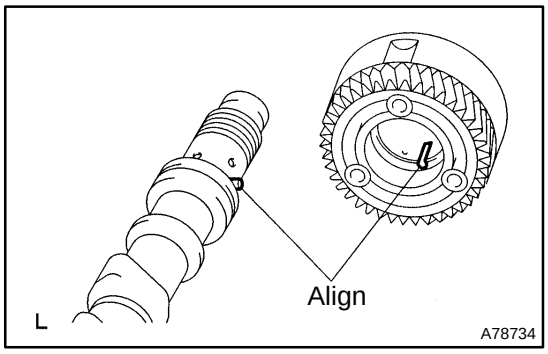


(e) Using SST, align the holes of the camshaft main gear and sub gear by turning the camshaft sub gear counterclockwise, then temporarily install a service bolt.
SST 09960-10010 (09962-01000, 09963-00500)

(f) Align the gear teeth of the main gear and sub gear, then tighten the service bolt.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

NOTICE:
Be careful not to damage the camshaft journals.

HINT:
When installing the camshaft, make certain that the torsional spring force of the sub gear has been eliminated by installation of the service bolt.



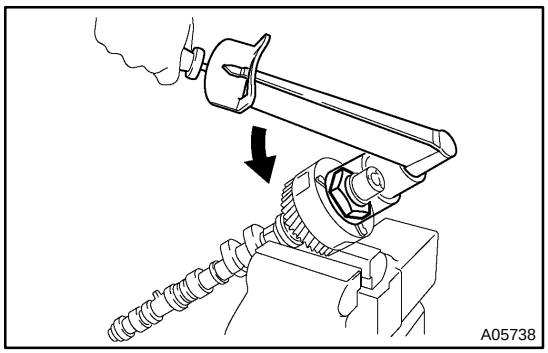
75. INSTALL CAMSHAFT TIMING GEAR ASSY

(a) Align the alignment pin with the alignment pin groove, then install the VVT-i into the camshaft.

NOTICE:
Install it with the lock pin engaged and locked at the most retard angle position.

(b) Apply engine oil to the nut, mounting surface of the VVT-i and screw threads.

NOTICE:
- **Be sure to apply the oil, otherwise the specified torque cannot be obtained.**
- **New nuts must be used when replacing the VVT-i unit.**



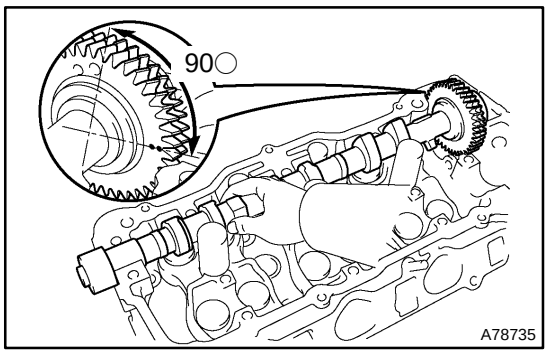
(c) Using a 46 mm socket wrench, install and tighten a lock nut by turning it counterclockwise.
Torque: 150 N·m (1,530 kgf·cm, 111 ft·lbf)

NOTICE:
- **The lock nut has LH threads.**
- **Never use any tools other than the socket wrench. Other tools will deform the cam angle rotor.**

76. INSTALL NO.2 CAMSHAFT

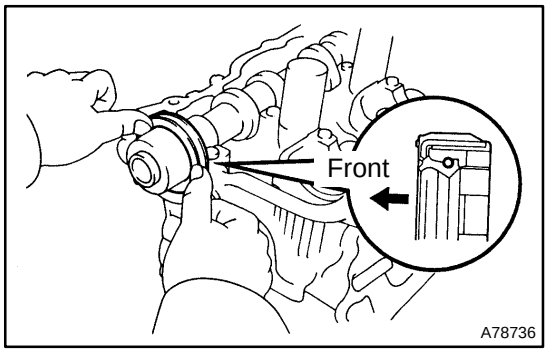
NOTICE:
Since the thrust clearance of the camshaft is small, the camshaft must be kept level while being installed. If the camshaft is not kept level, the cylinder head or camshaft may be damaged. To avoid this, the following steps must be carried out.

(a) Apply new engine oil to the thrust portion and journal of the camshaft.



(b) Place the No. 2 camshaft at a 90○angle of the timing mark (2 dot marks) on the cylinder head.

(c) Apply multi-purpose grease to a new oil seal lip.

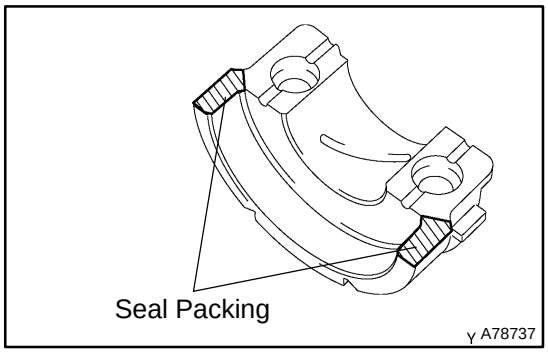


(d) Install the oil seal to the camshaft.

NOTICE:

- **Do not turn over the oil seal lip.**
- **Insert the oil seal until it stops.**

(e) Remove any old packing material from the contact surface.

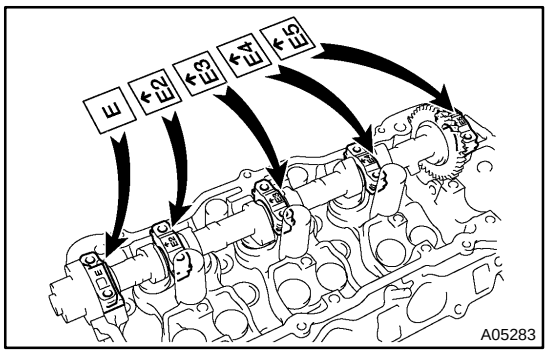


(f) Apply seal packing to the bearing cap No. 1 as shown in the illustration.

Seal packing: Part No. 08826-00080 or equivalent

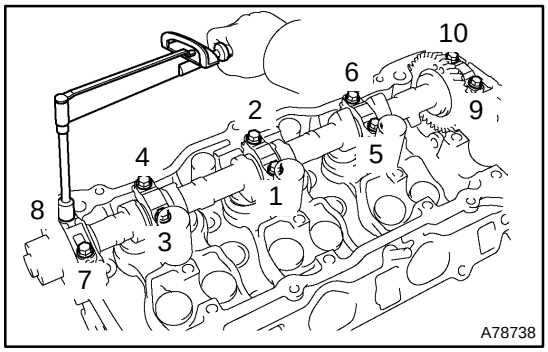
NOTICE:

- **Install the bearing cap No. 1 within 5 minutes after applying seal packing.**
- **Do not expose the seal packing to engine oil within 2 hours after installing.**



(g) Install the 5 bearing caps in their proper locations.

(h) Apply a light coat of engine oil to the threads of the bearing cap bolts.



(i) Using several steps, tighten the 10 bearing cap bolts uniformly in the sequence shown in the illustration.

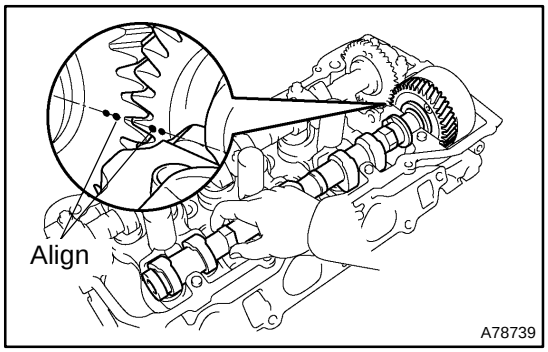
Torque: 16 N·m (163 kgf·cm, 12 ft·lbf)

77. INSTALL CAMSHAFT

NOTICE:

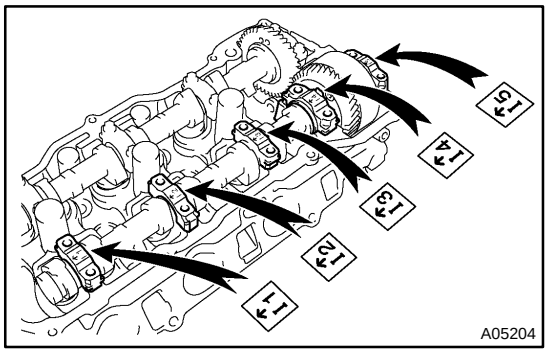
Since the thrust clearance of the camshaft is small, the camshaft must be kept level while being installed. If the camshaft is not kept level, the cylinder head or camshaft may be damaged. To avoid this, the following steps must be carried out.

(a) Apply new engine oil to the thrust portion and journal of the camshaft.



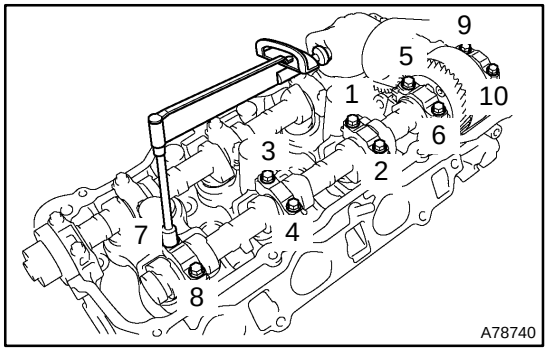
(b) Align the timing marks (2 dot marks) of the camshaft drive and driven gears.

(c) Place the camshaft on the cylinder head.



(d) Install the 5 bearing caps in their proper locations.

(e) Apply a light coat of engine oil to the threads of the bearing cap bolts.



(f) Using several steps, tighten the 10 bearing cap bolts uniformly in the sequence shown in the illustration.
Torque: 16 N·m (163 kgf·cm, 12 ft·lbf)

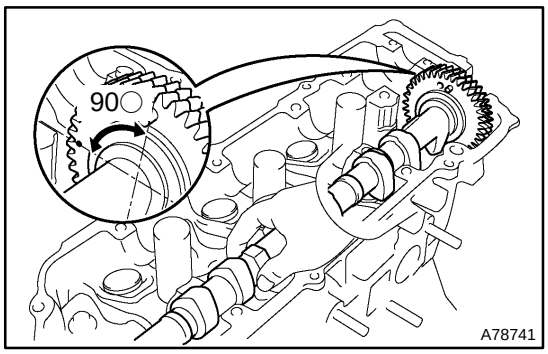
(g) Remove the service bolt.

78. INSTALL NO.4 CAMSHAFT SUB-ASSY

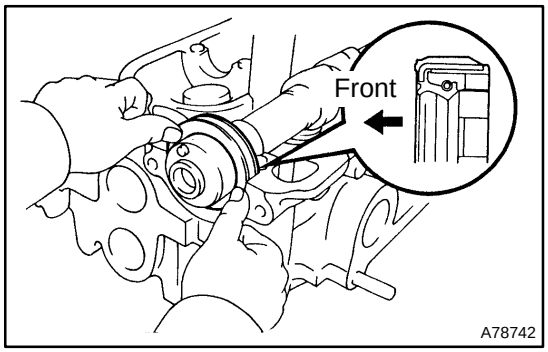
NOTICE:

Since the thrust clearance of the camshaft is small, the camshaft must be kept level while being installed. If the camshaft is not kept level, the cylinder head or camshaft may be damaged. To avoid this, the following steps must be carried out.

(a) Apply new engine oil to the thrust portion and journal of the camshaft.



(b) Place the No. 4 camshaft at a 90○angle of the timing mark (1 dot marks) on the cylinder head.
(c) Apply multi-purpose grease to a new oil seal lip.

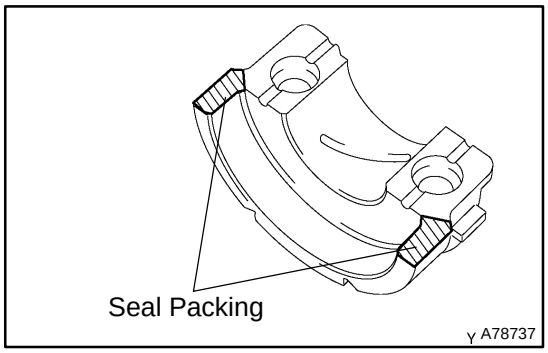


(d) Install the oil seal to the camshaft.

NOTICE:

- **Do not turn over the oil seal lip.**
- **Insert the oil seal until it stops.**

(e) Remove any old packing material from the contact surface.

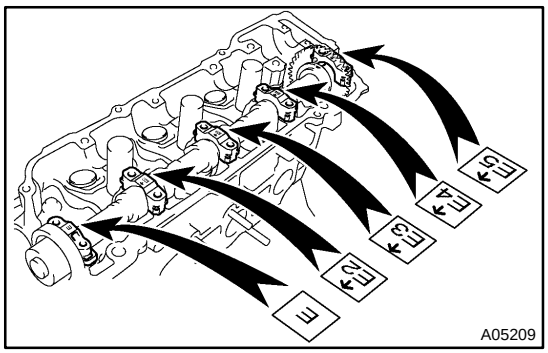


(f) Apply seal packing to the bearing cap No. 1 as shown in the illustration.

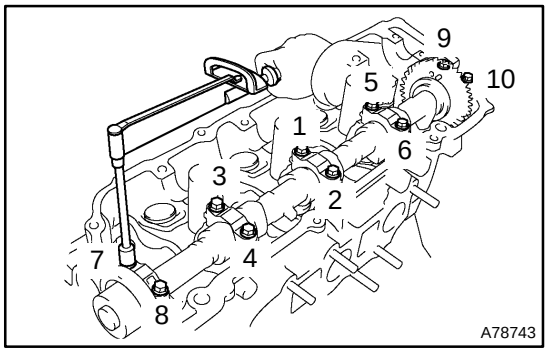
Seal packing: Part No. 08826-00080 or equivalent

NOTICE:

- **Install the bearing cap No. 1 within 5 minutes after applying seal packing.**
- **Do not expose the seal packing to engine oil within 2 hours after installing.**



(g) Install the 5 bearing caps in their proper locations.
(h) Apply a light coat of engine oil to the threads of the bearing cap bolts.



(i) Using several steps, tighten the 10 bearing cap bolts uniformly in the sequence shown in the illustration.

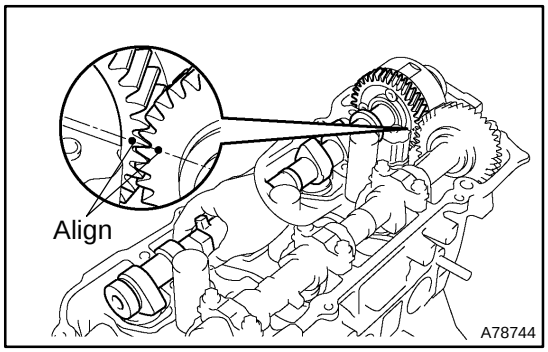
Torque: 16 N·m (163 kgf·cm, 12 ft·lbf)

79. INSTALL NO.3 CAMSHAFT SUB-ASSY

NOTICE:

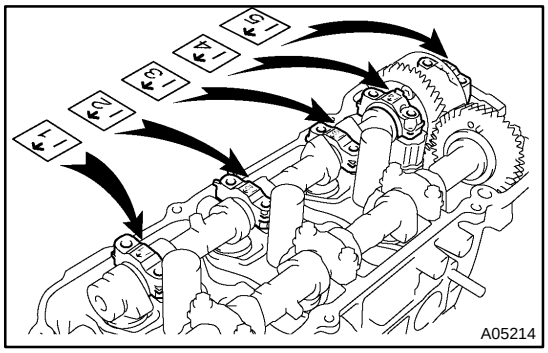
Since the thrust clearance of the camshaft is small, the camshaft must be kept level while being installed. If the camshaft is not kept level, the cylinder head or camshaft may be damaged. To avoid this, the following steps must be carried out.

(a) Apply new engine oil to the thrust portion and journal of the camshaft.



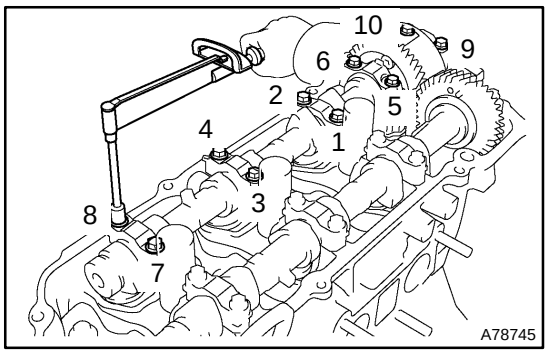
(b) Align the timing marks (1 dot marks) of the camshaft drive and driven gears.

(c) Place the camshaft on the cylinder head.



(d) Install the 5 bearing caps in their proper locations.

(e) Apply a light coat of engine oil to the threads of the bearing cap bolts.



(f) Using several steps, tighten the 10 bearing cap bolts uniformly in the sequence shown in the illustration.
Torque: 16 N·m (163 kgf·cm, 12 ft·lbf)

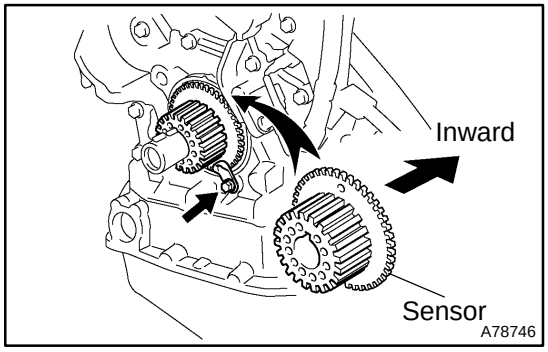
(g) Remove the service bolt.

80. INSTALL CRANKSHAFT TIMING PULLEY

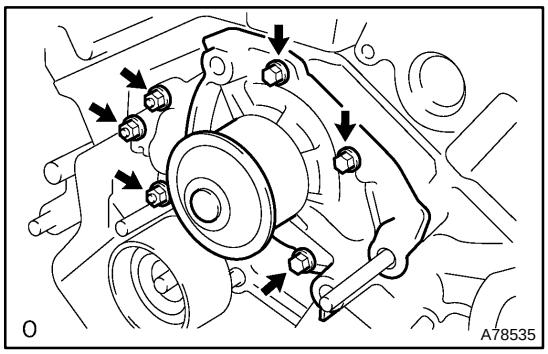
(a) Align the keyway of the timing pulley with the key located on the crankshaft, then slide the timing pulley into place.

NOTICE:

Do not scratch the sensor area of the crankshaft timing pulley.



(b) Install the timing belt plate with the bolt.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)



81. INSTALL WATER PUMP ASSY

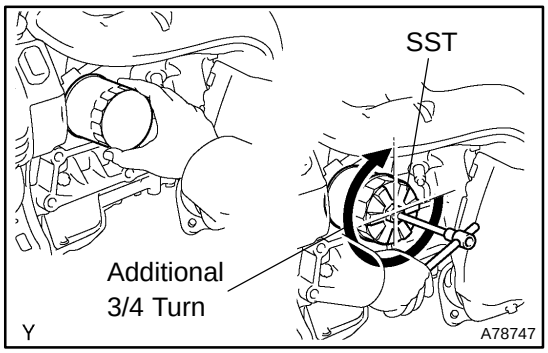
(a) Install a new gasket and the water pump with the 3 bolts and 3 nuts.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

82. INSTALL OIL LEVEL GAGE GUIDE

(a) Apply a light coat of engine oil to a new O-ring, then install it to the level gage guide.
(b) Install the level gage guide.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

83. INSTALL OIL FILTER SUB-ASSY

(a) Using a socket hexagon wrench 12, install the oil filter union.
Torque: 30 N·m (306 kgf·cm, 22 ft·lbf)
(b) Check and clean the oil filter installation surface.
(c) Apply clean engine oil to the gasket of a new oil filter.
(d) Lightly screw the oil filter into place, then tighten it until the gasket contacts the seat.



(e) Using SST, tighten it by an additional 3/4 turn.
SST 09228-07501

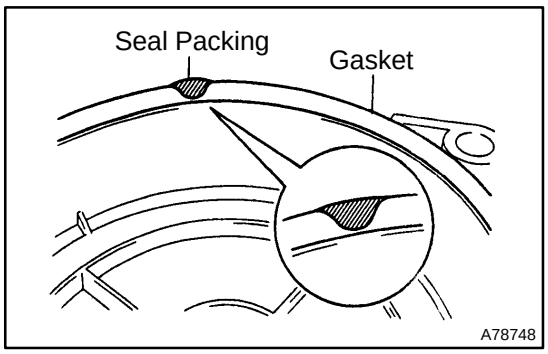
84. INSTALL TIMING BELT IDLER BRACKET
Torque: 28 N·m (286 kgf·cm, 21 ft·lbf)

85. INSTALL TIMING BELT NO.3 COVER

(a) Visually check for cracks and breaks on the gasket of the timing belt cover.

HINT:

If there is a trace of water intrusion when checking visually, repair the gasket with seal packing when the crack length is within 2 to 3 cm (0.79 to 1.18 in.). Replace the gasket when the crack length is 3 to 4 cm (1.18 to 1.57 in.) or longer.



(b) If the timing belt cover gasket is needed to repair, follow the procedure below.

(1) Repair the cracks and breaks by applying seal packing to the damaged area.

Seal packing: Part No. 08826-00080 or equivalent

NOTICE:

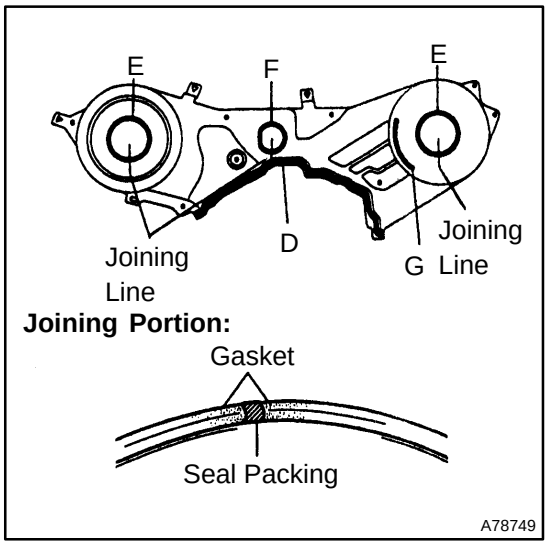
When applying the seal packing, apply it as wide and high as the gasket.

(c) If the timing belt cover gasket is needed to replace, follow the procedure below.

(1) Using a screwdriver and gasket scraper, remove the remaining gasket.

NOTICE:

Be careful not to damage the timing belt cover.



(2) Remove the backing paper from a new gasket, then affix the gasket along the groove of the timing belt cover as shown in the illustration.

NOTICE:

- **Affix the gasket in the center of the groove.**
- **At the corners, try to keep the gasket thickness uniform.**

HINT:

Gasket	D	E	F	G
Length	335 mm (13.19 in.)	180 mm (7.09 in.)	133 mm (5.24 in.)	72 mm (2.83 in.)

(3) If there is a gap between the ends of the gasket, apply seal packing to close the gap.

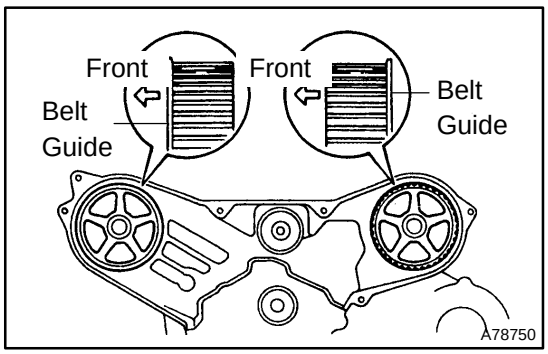
Seal packing: Part No. 08826-00080 or equivalent

NOTICE:

When applying the seal packing, apply it as wide and high as the gasket.

(d) Install the timing belt cover with the 6 bolts.

Torque: 8.5 N·m (87 kgf·cm, 75 in.·lbf)

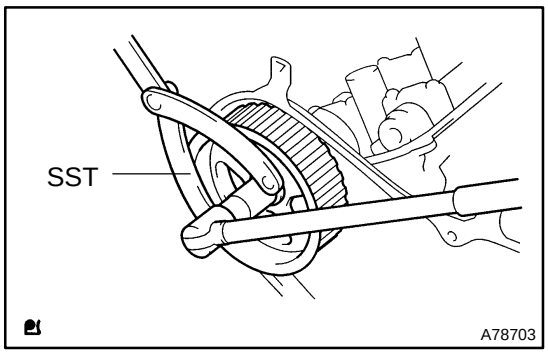


86. INSTALL CAMSHAFT TIMING PULLEY

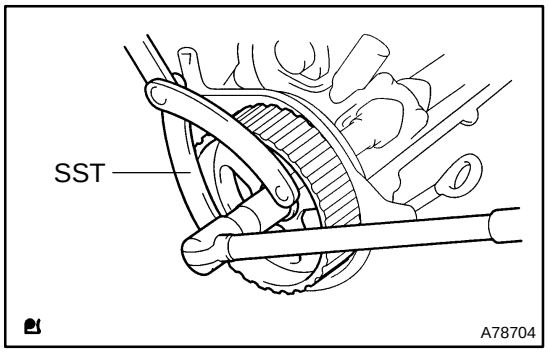
(a) Pay attention to the orientation of the belt guide. Install the camshaft timing pulley with the belt guide properly oriented, then tighten the bolt temporarily.

HINT:

- Align the belt guide of the RH timing pulley so it faces the front of the engine as illustrated.
- Align the belt guide of the LH timing pulley so it faces the rear of the engine as illustrated.



(b) Using SST, tighten the RH pulley bolt.
SST 09960-10010 (09962-01000, 09963-01000)
Torque: 125 N·m (1,275 kgf·cm, 92 ft·lbf)



(c) Using SST, tighten the LH pulley bolt.
SST 09960-10010 (09962-01000, 09963-01000)
Torque: 125 N·m (1,275 kgf·cm, 92 ft·lbf)

87. INSTALL TIMING BELT IDLER SUB-ASSY NO.2
Torque: 43 N·m (438 kgf·cm, 32 ft·lbf)

88. INSTALL TIMING BELT IDLER SUB-ASSY NO.1

(a) Using a socket hexagon wrench 10, install the plate washer and timing belt idler No. 1 with the pivot bolt.
Torque: 34 N·m (347 kgf·cm, 25 ft·lbf)

89. INSTALL TIMING BELT

(a) Remove any oil or water on the pulleys, then keep them clean.

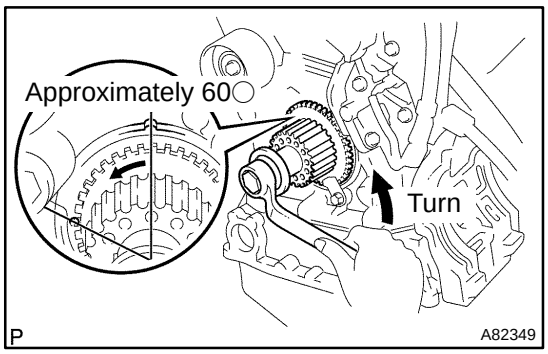
NOTICE:

- **If there is a trace of water and/or oil on the timing belt, repair the leakage and install a new timing belt.**
- **Only wipe the pulleys; do not use any cleaning agent.**

(b) Check the idler pulleys.
  (1) Check that the idler pulley turns smoothly.
  (2) Visually check the seal portion of the idler pulley for oil leakage.

(c) Check the water pump.
  (1) Turn the pulley, then check that water pump bearing moves smoothly and does not make a noise.
  (2) Visually check the drain hole for coolant leakage.

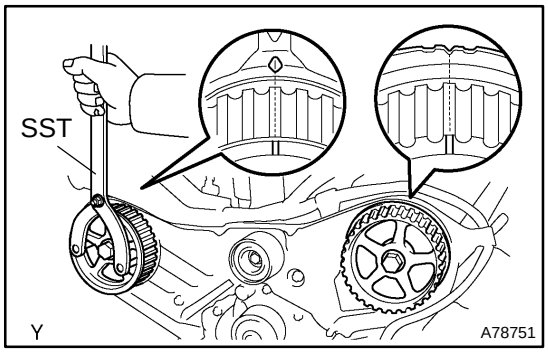
(d) Temporarily install the crankshaft pulley bolt and washer to the crankshaft.



(e) Turn the crankshaft counterclockwise by approximately 60○.

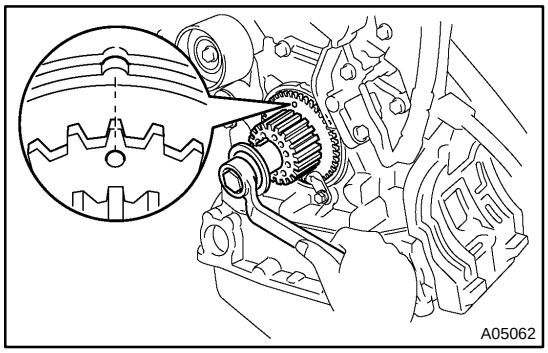
NOTICE:

To prevent contact of the piston head with the valve head, set the crankshaft pulley at the 60○BTDC/compression position.

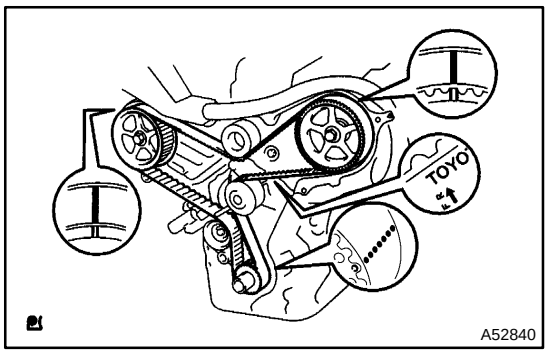


(f) Using SST, turn the crankshaft pulley, then align the timing marks of the timing pulley with the timing belt No. 3 cover.

SST 09960-10010 (09962-01000, 09963-01000)



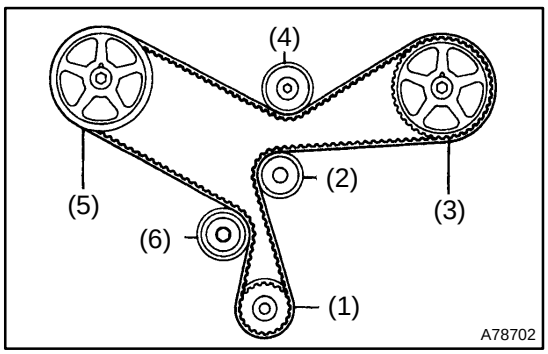
(g) Turn the crankshaft, then align the timing mark of the crankshaft timing pulley with the oil pump body.



(h) Align the front mark on the timing belt so it faces forward.

(i) Align the installation mark on the timing belt with the timing mark of the crankshaft timing pulley.

(j) Align the installation marks on the timing belt with the timing marks of the camshaft timing pulleys.

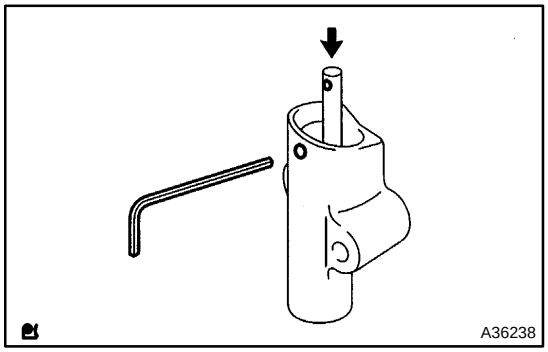


(k) Install the timing belt in this order.

1st	Crankshaft timing pulley
2nd	Water pump pulley
3rd	LH camshaft timing pulley
4th	No. 2 idler pulley
5th	RH camshaft timing pulley
6th	No. 1 idler pulley

90. INSTALL TIMING BELT TENSIONER ASSY

(a) Set the timing belt tensioner upright on the press.



(b) Slowly press in the push rod.

NOTICE:

Do not apply pressure more than 9.8 kN (1,000 kgf, 2,205 lbf) to the rod.

(c) Align the holes of the push rod and housing, then pass a 1.5 mm hexagon wrench through the holes to keep the setting position of the push rod.

(d) Release the press.

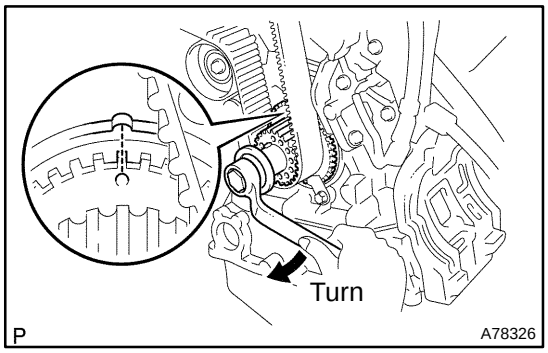
(e) Temporarily install the tensioner with the 2 bolts. Alternately tighten the 2 bolts.

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

NOTICE:

Be sure to tighten the bolts uniformly. Installing the tensioner at an angle may cause failure of its proper operation.

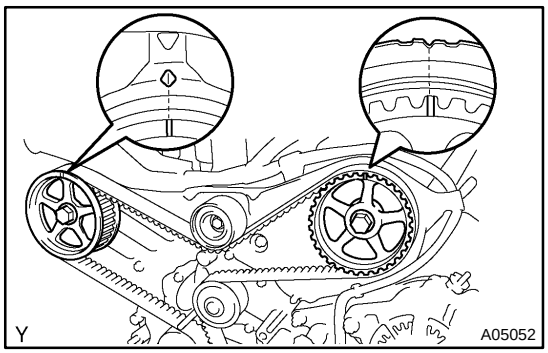
(f) Remove the 1.5 mm hexagon wrench from the tensioner.



(g) Turn the crankshaft 2 revolutions slowly, then align the timing mark of the crankshaft timing pulley with the oil pump body.

NOTICE:

Always turn the crankshaft clockwise.

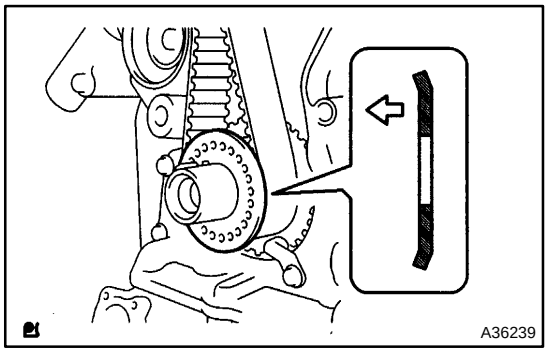


(h) Check that the timing marks of the RH and LH timing pulleys are aligned with the timing marks of the timing belt No. 3 cover as shown in the illustration.

If the marks are not aligned, remove the timing belt and reinstall it.

(i) Remove the crankshaft pulley bolt.

91. INSTALL TIMING BELT GUIDE NO.2



(a) Install the timing belt guide with the cup side facing the engine front.

92. INSTALL ENGINE MOUNTING BRACKET RH
Torque: 28 N·m (286 kgf·cm, 21 ft·lbf)

93. INSTALL TIMING BELT NO.2 COVER

(a) Visually check for cracks and breaks on the gasket of the timing belt cover.

If there is a trace of water intrusion when checking visually, replace the timing belt cover.

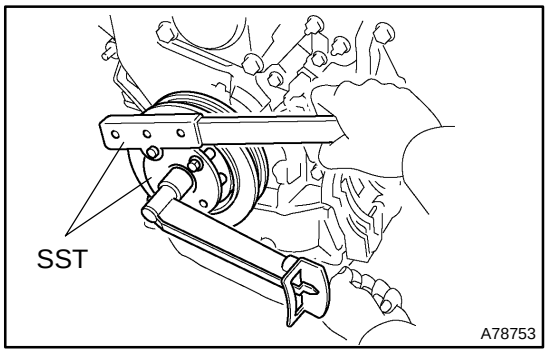
(b) Install the timing belt cover.
Torque: 8.5 N·m (87 kgf·cm, 75 in.·lbf)

94. INSTALL TIMING BELT NO.1 COVER

(a) Visually check for cracks and breaks on the gasket of the timing belt cover.

If there is a trace of water intrusion when checking visually, replace the timing belt cover.

(b) Install the timing belt cover.
Torque: 8.5 N·m (87 kgf·cm, 75 in.·lbf)



95. INSTALL CRANKSHAFT PULLEY

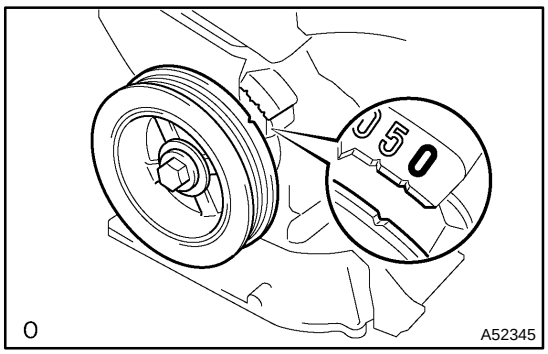
(a) Align the keyway of the pulley with the key located on the crankshaft, then slide the pulley into place.

(b) Using SST, install the pulley bolt.
SST 09213-54015 (91651-60855), 09330-00021
Torque: 220 N·m (2,250 kgf·cm, 162 ft·lbf)

96. INSTALL VVT SENSOR
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

97. INSTALL CAMSHAFT TIMING OIL CONTROL VALVE ASSY
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

98. INSTALL ENGINE HANGER NO.2
Torque: 20 N·m (199 kgf·cm, 14 ft·lbf)

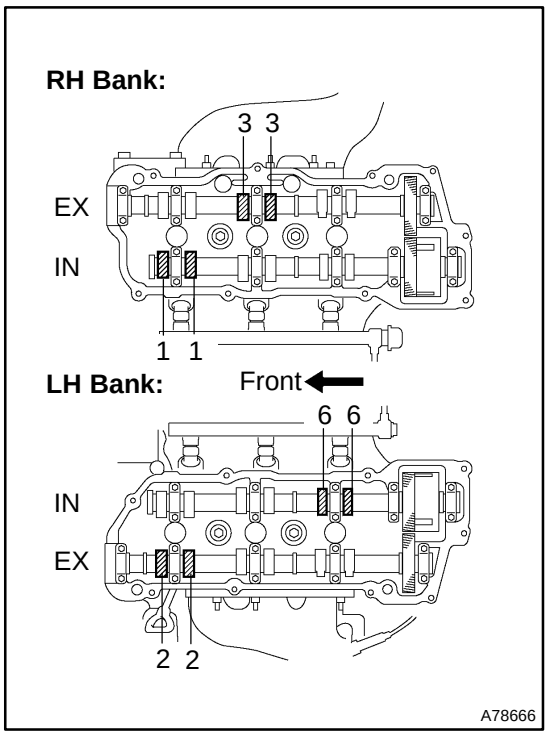


99. INSPECT VALVE CLEARANCE

(a) Turn the crankshaft pulley, then align the timing notch with the timing mark ”0” of the timing belt No. 1 cover.

(b) Check that the valve lifters on the intake side of the No. 1 cylinder are not pushed by the cam.

If the valve lifters are pushed, turn the crankshaft 1 revolution (360°) and align the marks as above.



(c) Inspect the valves indicated in the illustration on the left.

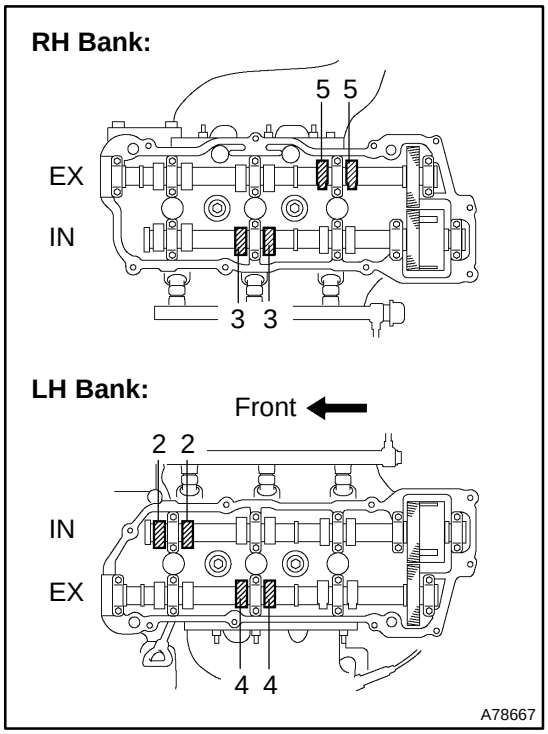
(1) Using a feeler gauge, measure the clearance between the valve lifter and camshaft.

Valve clearance (Cold):

0.15 to 0.25 mm (0.0059 to 0.0098 in.) for intake

0.25 to 0.35 mm (0.0098 to 0.0138 in.) for exhaust

(2) Record the out-of-specification valve clearance measurements. They will be used later to select an adjusting shim to replace.



(d) Turn the crankshaft by 2/3 of a revolution (240°), then inspect the valves indicated in the illustration on the left.

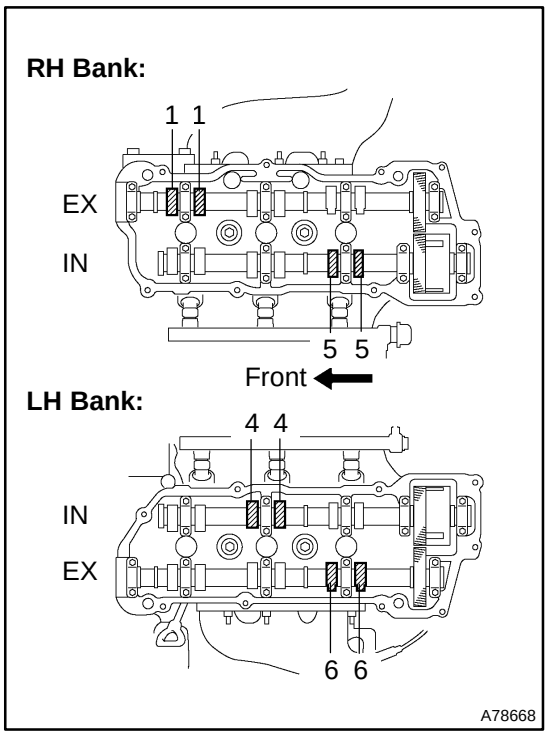
(1) Using a feeler gauge, measure the clearance between the valve lifter and camshaft.

Valve clearance (Cold):

0.15 to 0.25 mm (0.0059 to 0.0098 in.) for intake

0.25 to 0.35 mm (0.0098 to 0.0138 in.) for exhaust

(2) Record the out-of-specification valve clearance measurements. They will be used later to select an adjusting shim to replace.



(e) Turn the crankshaft by 2/3 of a revolution (240°), then inspect the valves indicated in the illustration on the left.

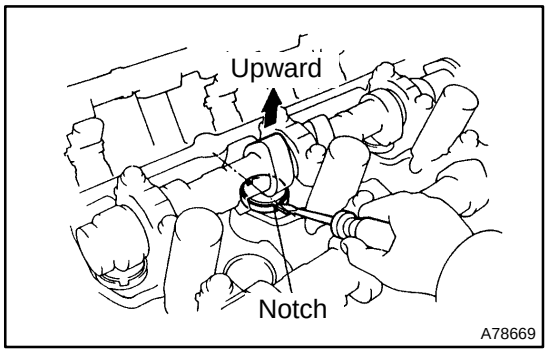
(1) Using a feeler gauge, measure the clearance between the valve lifter and camshaft.

Valve clearance (Cold):

0.15 to 0.25 mm (0.0059 to 0.0098 in.) for intake

0.25 to 0.35 mm (0.0098 to 0.0138 in.) for exhaust

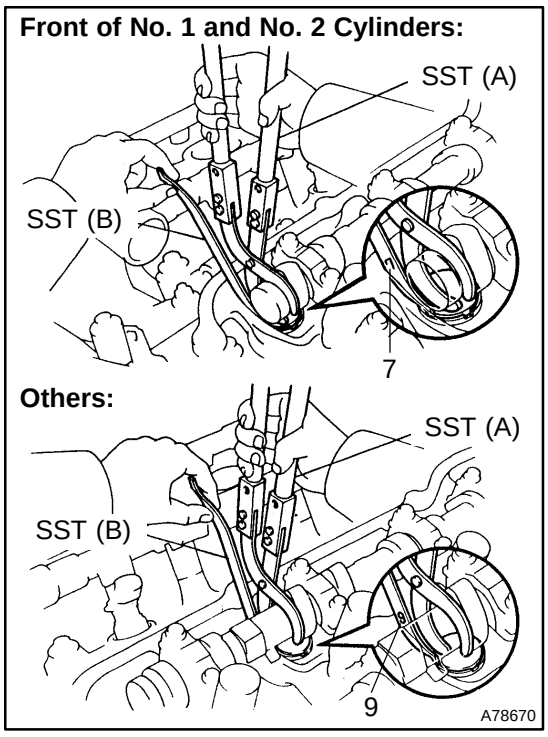
(2) Record the out-of-specification valve clearance measurements. They will be used later to select an adjusting shim to replace.



100. ADJUST VALVE CLEARANCE

(a) Turn the camshaft so that the cam lobe faces upward.

(b) Turn the valve lifter with a screwdriver so that the notches are perpendicular to the camshaft.



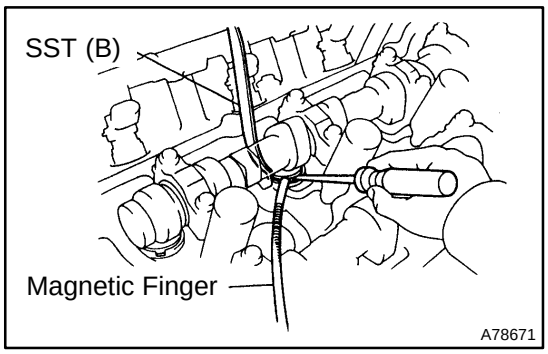
(c) Using SST (A), press down the valve lifter and place SST (B) between the camshaft and valve lifter. Remove SST (A).

SST 09248-55040 (09248-05410, 09248-05420)

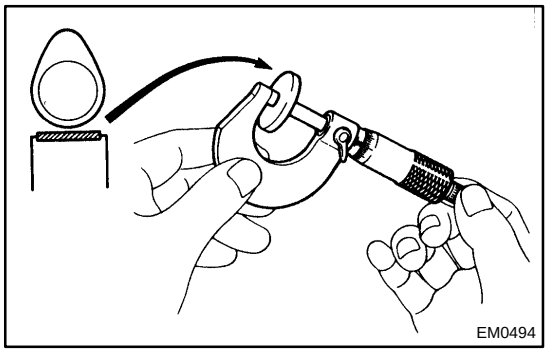
HINT:

- Apply SST (B) at a slight angle on the side marked with ”9” or ”7” at the position shown in the illustration.
- When SST (B) is inserted too deeply, it will get pinched by the shim. To prevent SST(B) from getting stuck, insert it gently from the intake side at a slight angle.

SST (A)	09248-05410
SST (B)	09248-05420



(d) Using a small screwdriver and magnetic finger, remove the adjusting shim.



(e) Using a micrometer, measure the thickness of the removed shim.

(f) Calculate the thickness of a new shim so that the valve clearance comes within the specified value.

A	Thickness of new shim
B	Thickness of used shim
C	Measured valve clearance

Specified value (Cold):
Intake A = B + (C - 0.20 mm (0.0079 in.))
Exhaust A = B + (C - 0.30 mm (0.0118 in.))

(g) Select a new shim with a thickness which is as close to the calculated values as possible.

EXAMPLE (Intake):
Measured valve clearance = 0.45 mm (0.0177 in.)
0.45 mm (0.0177 in.) - 0.20 mm (0.0079 in.) = 0.25 mm (0.0098 in.)
(Measured - Specification = Excess clearance)
Used shim measurement = 2.80 mm (0.1102 in.)
0.25 mm (0.0098 in.) + 2.80 mm (0.1102 in.) = 3.05 mm (0.1201 in.)
(Excess clearance + Used shim = Ideal new shim)
Closest new shim = 3.05 mm (0.1201 in.)
Select No. 12 shim

HINT:

- Shims are available in 17 sizes in increments of 0.05 mm (0.0020 in.), from 2.50 mm (0.0984 in.) to 3.30 mm (0.1299 in.).
- Refer to New Shim Thickness table on the next 2 pages.

Adjusting Shim Selection Chart (Intake)

| Measured Clearance mm (in.) \ Installed Shim Thickness mm (in.) | 2.500 (0.0984) | 2.520 (0.0992) | 2.540 (0.1000) | 2.550 (0.1004) | 2.560 (0.1008) | 2.580 (0.1016) | 2.600 (0.1024) | 2.620 (0.1031) | 2.640 (0.1039) | 2.650 (0.1043) | 2.660 (0.1047) | 2.670 (0.1051) | 2.680 (0.1055) | 2.690 (0.1059) | 2.700 (0.1063) | 2.710 (0.1067) | 2.720 (0.1071) | 2.730 (0.1075) | 2.740 (0.1079) | 2.750 (0.1083) | 2.760 (0.1087) | 2.770 (0.1091) | 2.780 (0.1094) | 2.790 (0.1098) | 2.800 (0.1102) | 2.810 (0.1106) | 2.820 (0.1110) | 2.830 (0.1114) | 2.840 (0.1118) | 2.850 (0.1122) | 2.860 (0.1126) | 2.870 (0.1130) | 2.880 (0.1134) | 2.890 (0.1138) | 2.900 (0.1142) | 2.910 (0.1146) | 2.920 (0.1150) | 2.930 (0.1154) | 2.940 (0.1157) | 2.950 (0.1161) | 2.960 (0.1165) | 2.970 (0.1169) | 2.980 (0.1173) | 2.990 (0.1177) | 3.000 (0.1181) | 3.010 (0.1185) | 3.020 (0.1189) | 3.030 (0.1193) | 3.040 (0.1197) | 3.050 (0.1201) | 3.060 (0.1205) | 3.080 (0.1213) | 3.100 (0.1220) | 3.120 (0.1228) | 3.140 (0.1236) | 3.150 (0.1240) | 3.160 (0.1244) | 3.180 (0.1252) | 3.200 (0.1260) | 3.220 (0.1268) | 3.240 (0.1276) | 3.250 (0.1280) | 3.260 (0.1283) | 3.280 (0.1291) | 3.300 (0.1299) |
|---|---|---

Adjusting Shim Selection Chart (Exhaust)

Measured Clearance mm (in.) \ Installed Shim Thickness mm (in.)	2.500 (0.0984)	2.520 (0.0992)	2.540 (0.1000)	2.560 (0.1004)	2.580 (0.1008)	2.600 (0.1016)	2.620 (0.1024)	2.640 (0.1031)	2.660 (0.1039)	2.680 (0.1047)	2.700 (0.1055)	2.720 (0.1063)	2.740 (0.1071)	2.760 (0.1079)	2.780 (0.1087)	2.790 (0.1094)	2.800 (0.1098)	2.820 (0.1102)	2.840 (0.1110)	2.860 (0.1118)	2.880 (0.1122)	2.890 (0.1126)	2.900 (0.1134)	2.910 (0.1138)	2.920 (0.1142)	2.930 (0.1146)	2.940 (0.1150)	2.950 (0.1154)	2.960 (0.1157)	2.970 (0.1161)	2.980 (0.1165)	2.990 (0.1169)	3.000 (0.1173)	3.010 (0.1177)	3.020 (0.1181)	3.030 (0.1185)	3.040 (0.1189)	3.050 (0.1193)	3.060 (0.1197)	3.080 (0.1201)	3.100 (0.1213)	3.120 (0.1220)	3.140 (0.1228)	3.150 (0.1236)	3.160 (0.1240)	3.180 (0.1244)	3.200 (0.1252)	3.220 (0.1260)	3.240 (0.1268)	3.250 (0.1276)	3.260 (0.1280)	3.280 (0.1283)	3.300 (0.1291)	3.300 (0.1299)
0.000 – 0.020 (0.0000 – 0.0008)														1	1	1	1	1	2	2	2	2	3	3	3	4	4	4	4	5	5	5	5	5	6	6	6	6	6	7	7	7	8	8	8	9	9	9	10	10	10	10	11	11
0.021 – 0.040 (0.0008 – 0.0016)													1	1	1	1	1	1	2	2	2	3	3	3	4	4	4	4	5	5	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	10	10	10	11	11	11	12	
0.041 – 0.060 (0.0016 – 0.0024)												1	1	1	1	1	2	2	2	2	3	3	3	4	4	4	4	5	5	5	5	6	6	6	6	7	7	7	8	8	8	9	9	9	10	10	10	11	11	12	12	
0.061 – 0.080 (0.0024 – 0.0031)											1	1	1	1	1	2	2	2	2	3	3	3	4	4	4	4	5	5	5	6	6	6	6	7	7	7	8	8	8	9	9	9	10	10	10	11	11	12	12	12	
0.081 – 0.100 (0.0032 – 0.0039)										1	1	1	1	1	2	2	2	2	3	3	3	4	4	4	5	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	10	10	10	11	11	12	12	12	13	
0.101 – 0.120 (0.0040 – 0.0047)									1	1	1	1	1	2	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	10	10	10	11	11	11	12	12	12	13	13		
0.121 – 0.140 (0.0048 – 0.0055)								1	1	1	1	1	2	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	10	10	10	11	11	11	12	12	12	13	13	14	
0.141 – 0.160 (0.0056 – 0.0063)							1	1	1	1	1	2	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	10	10	10	11	11	11	12	12	12	13	13	14	14		
0.161 – 0.180 (0.0063 – 0.0071)						1	1	1	1	2	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	10	10	10	11	11	11	12	12	12	13	13	14	14	14		
0.181 – 0.200 (0.0071 – 0.0079)					1	1	1	1	2	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	10	10	10	11	11	11	12	12	12	13	13	14	14	14	15	
0.201 – 0.220 (0.0079 – 0.0087)				1	1	1	1	2	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	10	10	10	11	11	11	12	12	12	13	13	14	14	14	15	
0.221 – 0.240 (0.0087 – 0.0094)			1	1	1	1	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	10	10	10	11	11	11	12	12	12	13	13	13	14	14	14	15	15	
0.241 – 0.249 (0.0095 – 0.0098)			1	1	1	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	10	10	10	11	11	11	12	12	12	13	13	13	14	14	14	15	15	16	
0.250 – 0.350 (0.0098 – 0.0138)																																																				
0.351 – 0.360 (0.0138 – 0.0142)	2	3	3	3	3	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	9	10	10	10	10	11	11	11	11	12	12	12	12	13	13	13	13	14	14	14	15	15	15	16	16	16	17	17	17	
0.361 – 0.380 (0.0142 – 0.0150)	2	3	3	4	4	4	5	5	5	6	6	6	6	7	7	7	8	8	8	8	9	9	9	9	10	10	10	10	11	11	11	11	12	12	12	12	13	13	13	13	14	14	14	15	15	15	16	16	16	17	17	
0.381 – 0.400 (0.0150 – 0.0157)	3	3	4	4	4	4	5	5	6	6	6	6	7	7	7	7	8	8	8	8	9	9	9	9	10	10	10	10	11	11	11	11	12	12	12	12	13	13	13	13	14	14	14	14	15	15	15	16	16	16	17	17	
0.401 – 0.420 (0.0158 – 0.0165)	3	4	4	4	5	5	6	6	6	7	7	7	7	8	8	8	8	9	9	9	9	10	10	10	10	11	11	11	11	12	12	12	12	13	13	13	13	14	14	14	14	15	15	15	15	16	16	16	16	17	17	
0.421 – 0.440 (0.0166 – 0.0173)	4	4	5	5	5	6	6	6	7	7	7	7	8	8	8	8	9	9	9	9	10	10	10	10	11	11	11	11	12	12	12	12	13	13	13	13	14	14	14	14	15	15	15	15	16	16	16	16	17	17	17	
0.441 – 0.460 (0.0174 – 0.0181)	4	4	5	5	6	6	6	7	7	7	8	8	8	8	9	9	9	9	10	10	10	10	11	11	11	11	12	12	12	12	13	13	13	13	14	14	14	14	15	15	15	15	16	16	16	16	17	17	17	17		
0.461 – 0.480 (0.0181 – 0.0189)	4	5	5	6	6	6	7	7	7	8	8	8	8	9	9	9	9	10	10	10	10	11	11	11	11	12	12	12	12	13	13	13	13	14	14	14	14	15	15	15	15	16	16	16	16	17	17	17	17			
0.481 – 0.500 (0.0189 – 0.0197)	5	5	6	6	6	7	7	8	8	8	8	9	9	9	9	10	10	10	10	11	11	11	11	12	12	12	12	13	13	13	13	14	14	14	14	15	15	15	15	16	16	16	16	17	17	17	17					
0.501 – 0.520 (0.0197 – 0.0205)	5	6	6	6	7	7	8	8	8	9	9	9	9	10	10	10	10	11	11	11	11	12	12	12	12	13	13	13	13	14	14	14	14	15	15	15	15	16	16	16	16	17	17	17	17							
0.521 – 0.540 (0.0205 – 0.0213)	6	6	7	7	7	8	8	8	9	9	9	9	10	10	10	10	11	11	11	11	12	12	12	12	13	13	13	13	14	14	14	14	15	15	15	15	16	16	16	16	17	17	17	17								
0.541 – 0.560 (0.0213 – 0.0220)	6	6	7	7	7	8	8	8	9	9	9	9	10	10	10	10	11	11	11	11	12	12	12	12	13	13	13	13	14	14	14	14	15	15	15	15	16	16	16	16	17	17	17	17								
0.561 – 0.580 (0.0221 – 0.0228)	6	7	7	7	8	8	8	9	9	9	9	10	10	10	10	11	11	11	11	12	12	12	12	13	13	13	13	14	14	14	14	15	15	15	15	16	16	16	16	17	17	17	17									
0.581 – 0.600 (0.0229 – 0.0236)	7	7	8	8	8	8	9	9	10	10	10	10	11	11	11	11	12	12	12	12	13	13	13	13	14	14	14	14	15	15	15	15	16	16	16	16	17	17	17	17	17	17										
0.601 – 0.620 (0.0237 – 0.0244)	7	8	8	8	8	9	9	10	10	10	10	11	11	11	11	12	12	12	12	13	13	13	13	14	14	14	14	15	15	15	15	16	16	16	16	17	17	17	17	17	17	17										
0.621 – 0.640 (0.0244 – 0.0252)	8	8	8	9	9	9	10	10	10	10	11	11	11	11	12	12	12	12	13	13	13	13	14	14	14	14	15	15	15	15	16	16	16	16	17	17	17	17	17	17	17											
0.641 – 0.660 (0.0252 – 0.0260)	8	8	9	9	9	10	10	10	11	11	11	11	12	12	12	12	13	13	13	13	14	14	14	14	15	15	15	15	16	16	16	16	17	17	17	17	17	17	17	17												
0.661 – 0.680 (0.0260 – 0.0268)	8	9	9	9	10	10	10	10	11	11	11	12	12	12	12	12	13	13	13	13	14	14	14	14	15	15	15	15	16	16	16	16	17	17	17	17	17	17	17	17												
0.681 – 0.700 (0.0268 – 0.0276)	9	9	10	10	10	10	11	11	11	12	12	12	12	13	13	13	13	14	14	14	14	15	15	15	15	16	16	16	16	17	17	17	17	17	17	17	17	17														
0.701 – 0.720 (0.0276 – 0.0283)	9	10	10	10	10	11	11	11	12	12	12	12	13	13	13	13	14	14	14	14	15	15	15	15	16	16	16	16	17	17	17	17	17	17	17	17	17															
0.721 – 0.740 (0.0284 – 0.0291)	10	10	10	11	11	11	12	12	12	13	13	13	13	14	14	14	14	15	15	15	15	16	16	16	16	17	17	17	17	17	17	17	17	17	17	17																
0.741 – 0.760 (0.0292 – 0.0299)	10	10	11	11	11	12	12	12	13	13	13	13	14	14	14	14	15	15	15	15	16	16	16	16	17	17	17	17	17	17	17	17	17	17	17																	
0.761 – 0.780 (0.0300 – 0.0307)	10	11	11	11	12	12	12	13	13	13	14	14	14	14	15	15	15	15	16	16	16	16	17	17	17	17	17	17	17	17	17	17	17	17																		
0.781 – 0.800 (0.0307 – 0.0315)	11	11	12	12	12	13	13	14	14	14	15	15	15	15	16	16	16	16	17	17	17	17	17	17	17	17	17	17	17	17	17	17																			
0.801 – 0.820 (0.0315 – 0.0323)	11	12	12	12	13	13	14	14	14	15	15	15	15	16	16	16	16	17	17	17	17	17	17	17	17	17	17	17	17	17																				
0.821 – 0.840 (0.0323 – 0.0331)	12	12	12	13	13	14	14	14	15	15	15	16	16	16	16	17	17	17	17	17	17	17	17	17	17	17	17	17																					
0.841 – 0.860 (0.0331 – 0.0339)	12	12	13	13	14	14	14	15	15	15	16	16	16	16	17	17	17	17	17	17	17	17	17	17	17	17	17																						
0.861 – 0.880 (0.0339 – 0.0346)	12	13	13	13	14	14	14	15	15	15	16	16	16	17	17	17	17	17	17	17	17	17	17	17	17	17																						
0.881 – 0.900 (0.0347 – 0.0354)	13	13	14	14	14	15	15	16	16	16	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17																							
0.901 – 0.920 (0.0355 – 0.0362)	13	14	14	14	15	15	16	16	16	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17																								
0.921 – 0.940 (0.0363 – 0.0370)	14	14	15	15	15	16	16	16	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17																									
0.941 – 0.960 (0.0370 – 0.0378)	14	15	15	15	16	16	16	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17																										
0.961 – 0.980 (0.0378 – 0.0386)	14	15	15	15	16	16	16	17	17	17	17	17	17	17	17	17	17	17	17	17	17																											
0.981 – 1.000 (0.0386 – 0.0394)	15	15	16	16	16	16	17	17	17	17	17	17	17	17	17	17	17	17	17	17																												
1.001 – 1.020 (0.0394 – 0.0402)	15	16	16	16	16	17	17	17	17	17	17	17	17	17	17	17	17	17	17																													
1.021 – 1.040 (0.0402 – 0.0409)	16	16	16	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17																														
1.041 – 1.060 (0.0410 – 0.0417)	16	16	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17																															
1.061 – 1.080 (0.0418 – 0.0425)	16	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17																																
1.081 – 1.100 (0.0426 – 0.0433)	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17																																
1.101 – 1.120 (0.0433 – 0.0441)	17	17	17	17	17	17	17	17	17	17	17	17	17	17																																
1.121 – 1.140 (0.0441 – 0.0449)	17	17	17	17	17	17	17	17	17	17	17	17	17																																
1.141 – 1.150 (0.0449 – 0.0453)	17																																													

Exhaust valve clearance (Cold):
0.25 to 0.35 mm (0.0098 to 0.0138 in.)

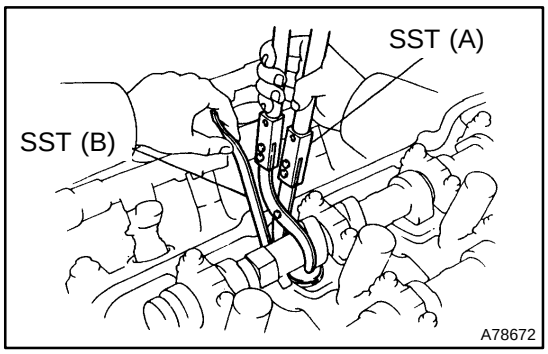
EXAMPLE: The 2.800 mm (0.1102 in.) shim is installed, and the measured clearance is 0.450 mm (0.0177 in.).
Replace the 2.800 mm (0.1102 in.) shim with a new No. 10 shim.

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.

V00720



(h) Place a new adjusting shim on the valve lifter with the imprinted number facing down.

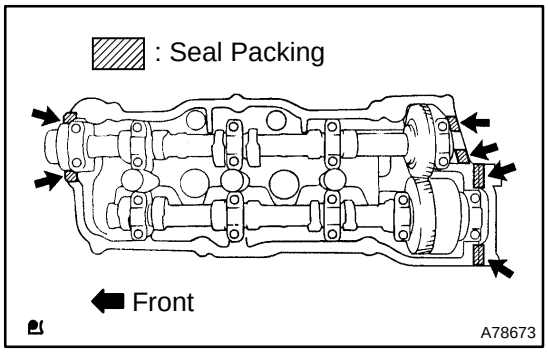
(i) Press down the valve lifter with SST (A), then remove SST (B).

SST 09248-55040 (09248-05410, 09248-05420)

(j) Recheck the valve clearance.

101. INSTALL CYLINDER HEAD COVER SUB-ASSY

(a) Install the gasket to the cylinder head cover.



(b) Apply seal packing to the cylinder head as shown in the illustration.

Seal packing: Part No. 08826-00080 or equivalent

NOTICE:

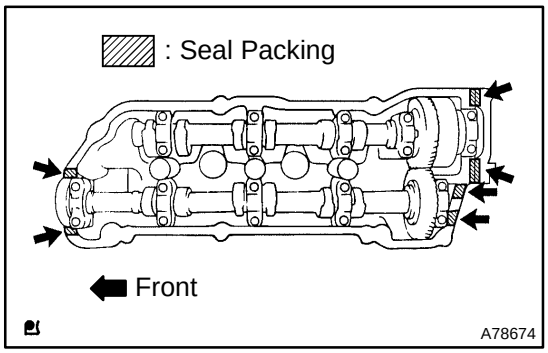
- **Remove any oil from the contact surface.**
- **Install the cylinder head cover within 3 minutes after applying seal packing.**
- **Do not start the engine within 2 hours after installing.**

(c) Install the cylinder head cover with the 9 bolts. Tighten the bolts uniformly in several steps.

Torque: 8.0 N·m (80 kgf·cm, 71 in.·lbf)

102. INSTALL CYLINDER HEAD COVER SUB-ASSY LH

(a) Install the gasket to the cylinder head cover.



(b) Apply seal packing to the cylinder head as shown in the illustration.

Seal packing: Part No. 08826-00080 or equivalent

NOTICE:

- **Remove any oil from the contact surface.**
- **Install the cylinder head cover within 3 minutes after applying seal packing.**
- **Do not start the engine within 2 hours after installing.**

(c) Install the cylinder head cover with the 9 bolts. Tighten the bolts uniformly in several steps.

Torque: 8.0 N·m (80 kgf·cm, 71 in.·lbf)

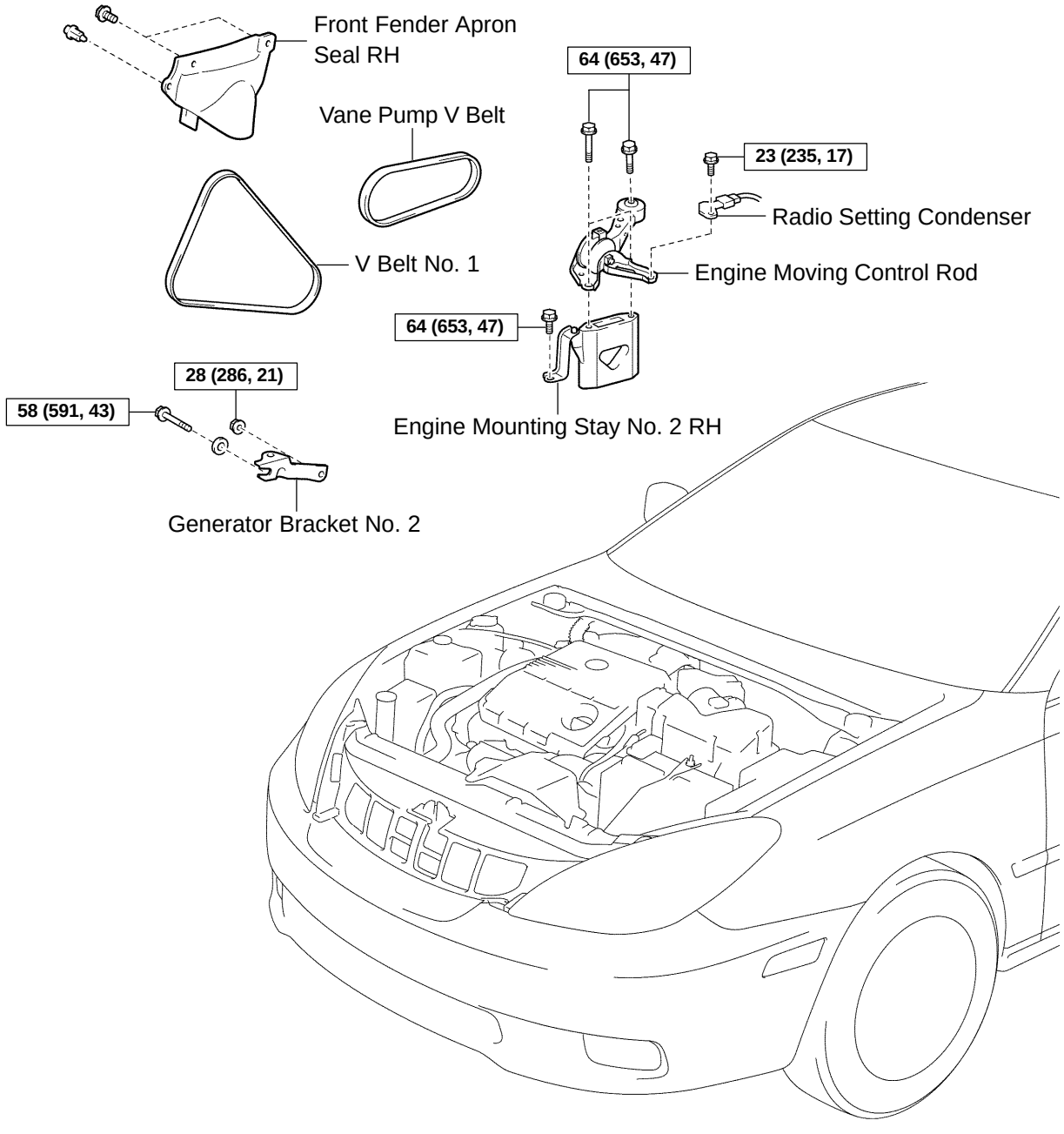
103. INSTALL SPARK PLUG

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

TIMING BELT (3MZ-FE)

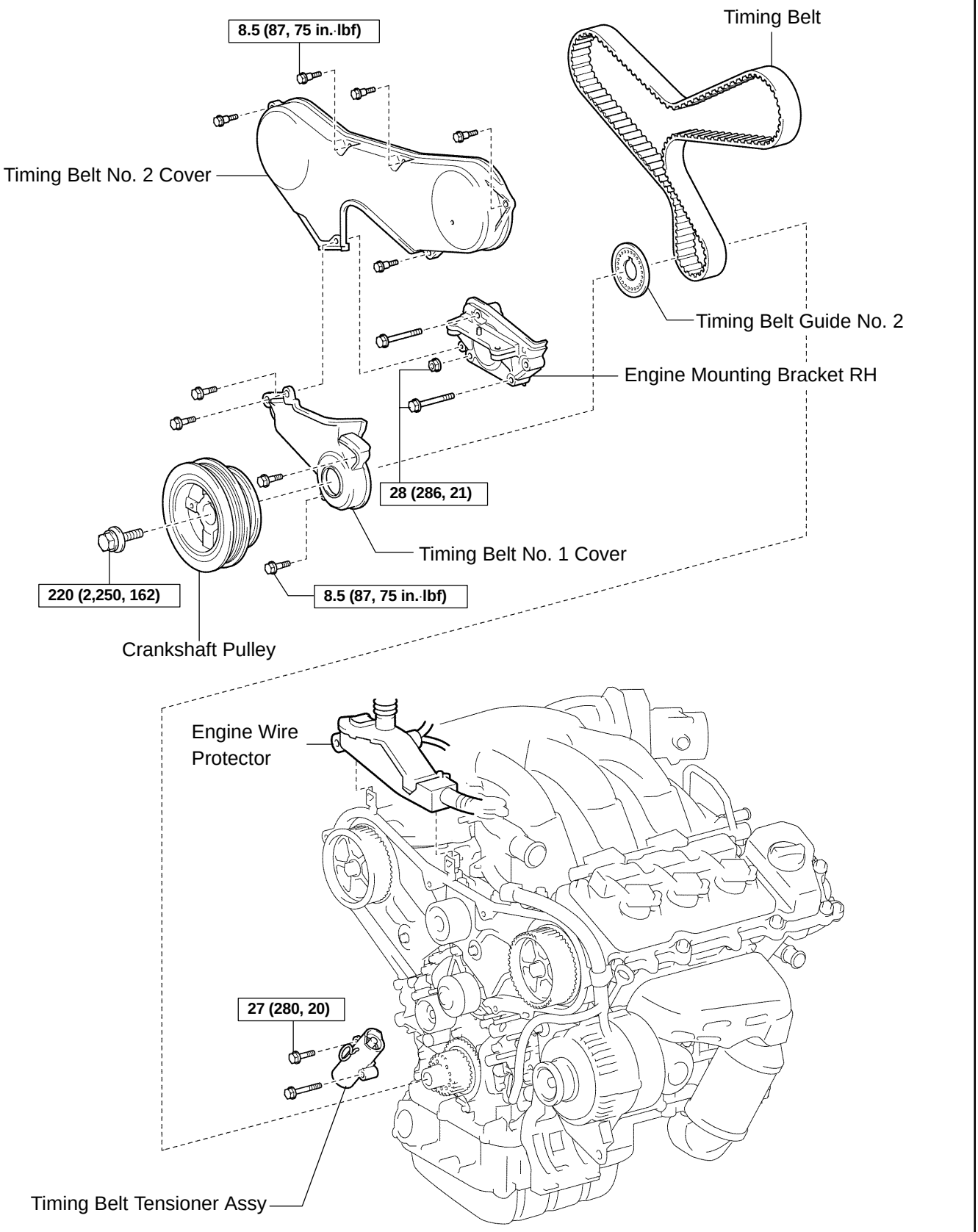
COMPONENTS

141JA-01



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

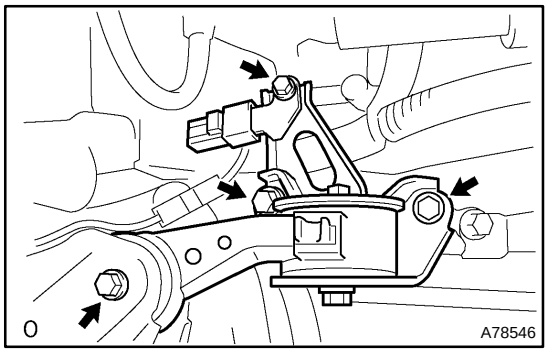
A84916


8.5 (87, 75 in.·lbf)
Timing Belt
Timing Belt No. 2 Cover
Timing Belt Guide No. 2
Engine Mounting Bracket RH
28 (286, 21)
Timing Belt No. 1 Cover
220 (2,250, 162)
8.5 (87, 75 in.·lbf)
Crankshaft Pulley
Engine Wire Protector
27 (280, 20)
Timing Belt Tensioner Assy
N·m (kgf·cm, ft·lbf): Specified torque
P
A78353

141JB-01

REPLACEMENT

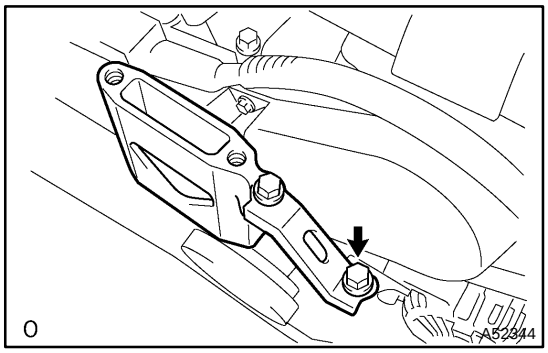
1. REMOVE FRONT WHEEL RH
2. REMOVE FRONT FENDER APRON SEAL RH
3. REMOVE V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (See page 14-5)
4. REMOVE VANE PUMP V BELT (See page 14-5)



5. REMOVE ENGINE MOVING CONTROL ROD

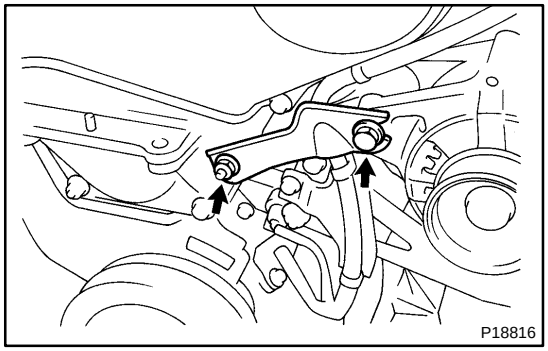
(a) Remove the reserve tank cap.

(b) Remove the 4 bolts, engine moving control rod and bracket.



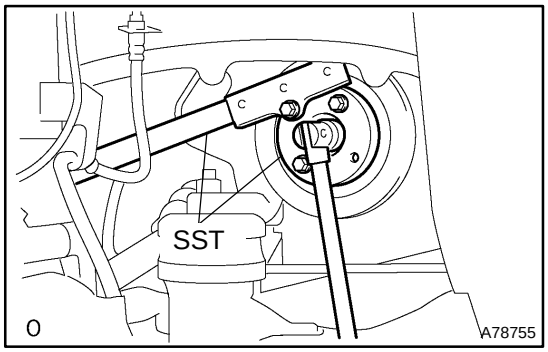
6. REMOVE ENGINE MOUNTING STAY NO.2 RH

(a) Remove the bolt, engine mounting stay No. 2 and engine mounting bracket No. 2.



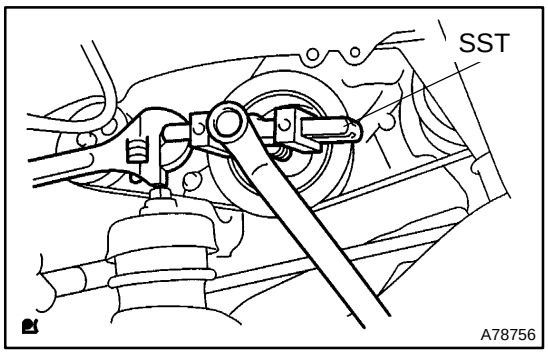
7. REMOVE GENERATOR BRACKET NO.2

(a) Remove the nut and generator bracket.



8. REMOVE CRANKSHAFT PULLEY

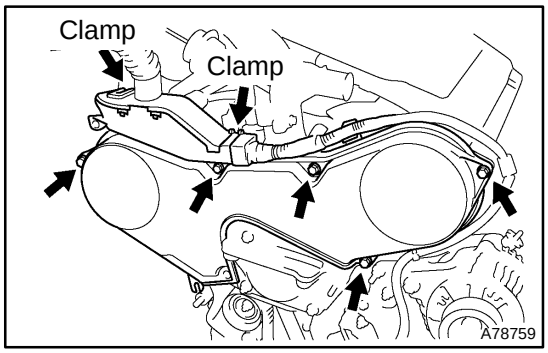
(a) Using SST, loosen the pulley bolt.
SST 09213-54015 (91651-60855), 09330-00021



(b) Using SST and the pulley bolt, remove the pulley.
SST 09950- 50013 (09951- 05010, 09952- 05010, 09953-05020, 09954-05031)

NOTICE:
Before using SST, apply lubricating oil to the threads and tip of the center bolt 150.

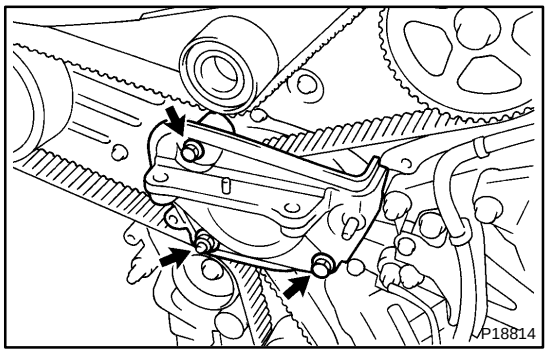
9. REMOVE TIMING BELT NO.1 COVER



10. REMOVE TIMING BELT NO.2 COVER

(a) Disconnect the 2 engine wire protector clamps from the timing belt No. 3 cover.

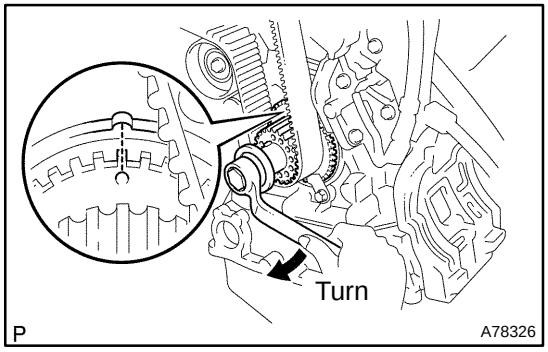
(b) Remove the 5 bolts and timing belt cover.



11. REMOVE ENGINE MOUNTING BRACKET RH

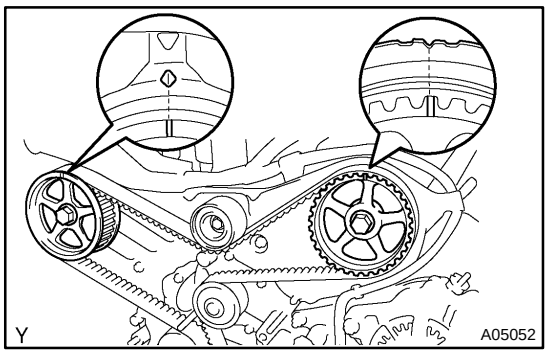
(a) Remove the 2 bolts, nut and engine mounting bracket RH.

12. REMOVE TIMING BELT GUIDE NO.2



13. REMOVE TIMING BELT

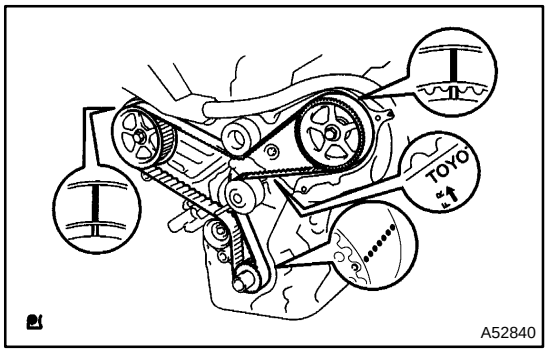
(a) Set the No. 1 cylinder to the TDC/compression.
(1) Temporarily install the crankshaft pulley bolt and washer to the crankshaft.
(2) Turn the crankshaft clockwise, then align the timing mark of the crankshaft timing pulley with the oil pump body.



(3) Check that the timing marks of the camshaft timing pulleys and the timing belt No. 3 cover are aligned.

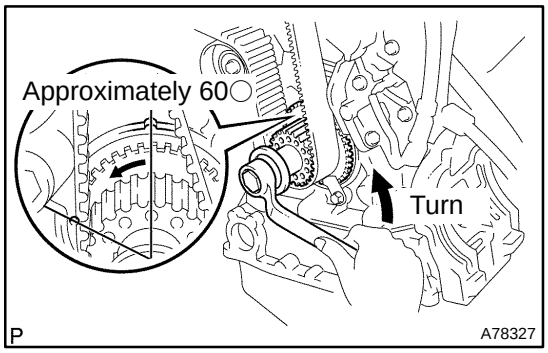
If not, turn the crankshaft by 1 revolution (360○).

(4) Remove the crankshaft pulley bolt.



(b) If reusing the timing belt, check that there are 3 installation marks on the timing belt as shown in the illustration.

(1) If the installation marks have disappeared, put new installation marks on the timing belt before removing.



(c) Set the No. 1 cylinder to approximately 60○BTDC/compression.

(1) Turn the crankshaft counterclockwise by approximately 60○.

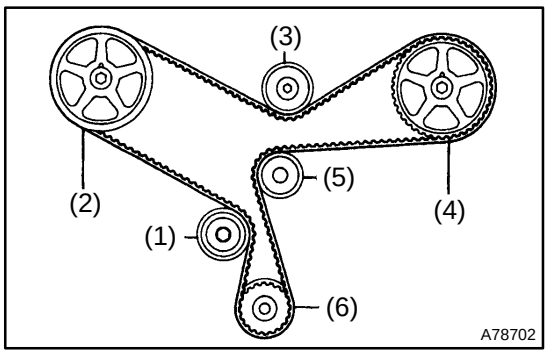
NOTICE:

If the timing belt is disengaged, having the crankshaft pulley set at the wrong angle can cause contact of the piston head with the valve head when removing the camshaft timing pulley and camshaft, which causes damage. So always set the crankshaft pulley at the correct angle.

(d) Remove the timing belt tensioner.

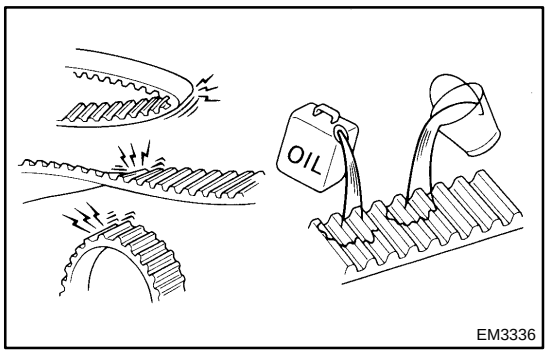
NOTICE:

Do not reinstall the tensioner with its plunger extended.



(e) Remove the timing belt in this order.

1st	No. 1 idler pulley
2nd	RH camshaft timing pulley
3rd	No. 2 idler pulley
4th	LH camshaft timing pulley
5th	Water pump pulley
6th	Crankshaft timing pulley



14. INSPECT TIMING BELT

NOTICE:

- **Do not bend, twist or turn the timing belt inside out.**
- **Do not allow contact of the timing belt with oil, water or steam.**
- **Do not use the timing belt tension when installing or removing the mounting bolt of the camshaft timing pulley.**

Check the belt for any defects as shown in the illustrations. Also, check these points below.

(a) If the belt tears in a short time:
- Check if the belt is installed properly.
- Check if the timing cover gasket is damaged and if it is installed properly.

(b) If the belt teeth are cracked or damaged, check if either camshaft is locked.

(c) If there is noticeable wear or cracks on the belt face, check if there are nicks on the side of the idler pulley lock and water pump.

(d) If there is wear or damage on only one side of the belt, check the belt guide and alignment of each pulley.

(e) If there is noticeable wear on the belt teeth:
- Check the timing cover for damage.
- Check that the gasket has been installed correctly.
- Check for foreign objects on the pulley teeth.

If there is any doubt about the belt condition, replace the timing belt.

15. INSTALL TIMING BELT

(a) Remove any oil or water on the pulleys, then keep them clean.

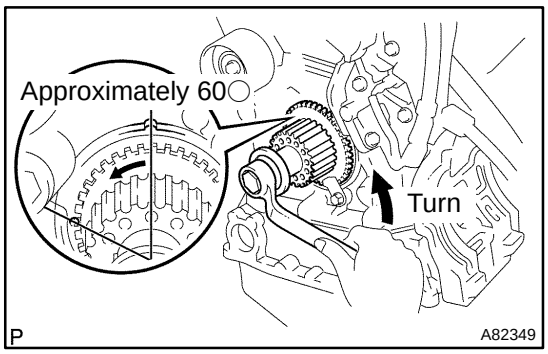
NOTICE:

- **If there is a trace of water and/or oil on the timing belt, repair the leakage and install a new timing belt.**
- **Only wipe the pulleys; do not use any cleaning agent.**

(b) Check the idler pulleys.
(1) Check that the idler pulley turns smoothly.
(2) Visually check the seal portion of the idler pulley for oil leakage.

(c) Check the water pump.
(1) Turn the pulley, then check that water pump bearing moves smoothly and does not make a noise.
(2) Visually check the drain hole for coolant leakage.

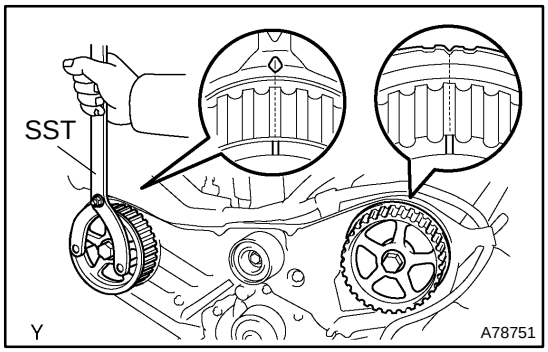
(d) Temporarily install the crankshaft pulley bolt and washer to the crankshaft.



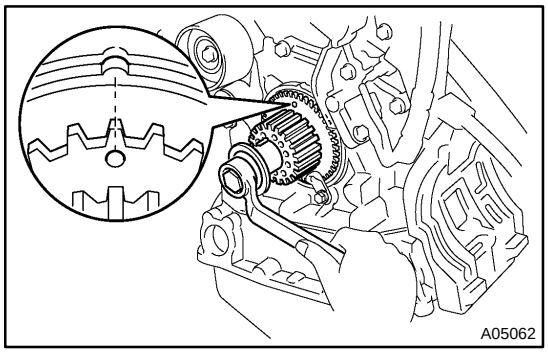
(e) Turn the crankshaft counterclockwise by approximately 60○.

NOTICE:

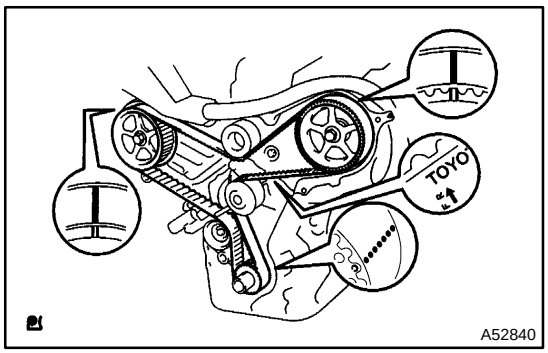
To prevent contact of the piston head with the valve head, set the crankshaft pulley at the 60○BTDC/compression position.



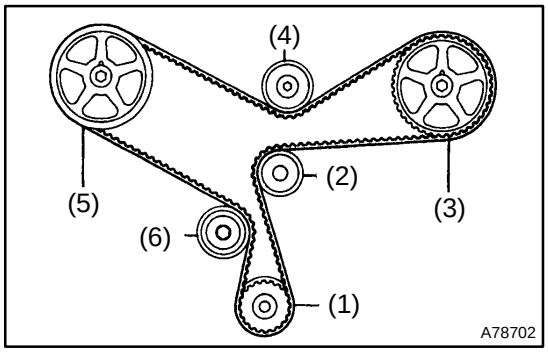
(f) Using SST, turn the timing pulleys, then align the timing marks of the timing pulleys with the timing belt No. 3 cover.
SST 09960-10010 (09962-01000, 09963-01000)



(g) Turn the crankshaft, then align the timing mark of the crankshaft timing pulley with the oil pump body.



(h) Align the front mark on the timing belt so it faces forward.
(i) Align the installation mark on the timing belt with the timing mark of the crankshaft timing pulley.
(j) Align the installation marks on the timing belt with the timing marks of the camshaft timing pulleys.

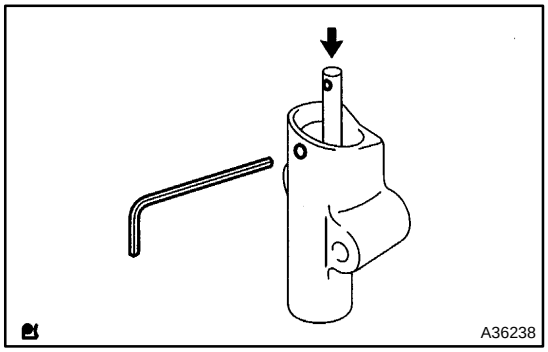


(k) Install the timing belt in this order.

1st	Crankshaft timing pulley
2nd	Water pump pulley
3rd	LH camshaft timing pulley
4th	No. 2 idler pulley
5th	RH camshaft timing pulley
6th	No. 1 idler pulley

16. INSTALL TIMING BELT TENSIONER ASSY

(a) Set the timing belt tensioner upright on the press.



(b) Slowly press in the push rod.

NOTICE:

Do not apply pressure more than 9.8 kN (1,000 kgf, 2,205 lbf) to the rod.

(c) Align the holes of the push rod and housing, then pass a 1.5 mm hexagon wrench through the holes to keep the setting position of the push rod.

(d) Release the press.

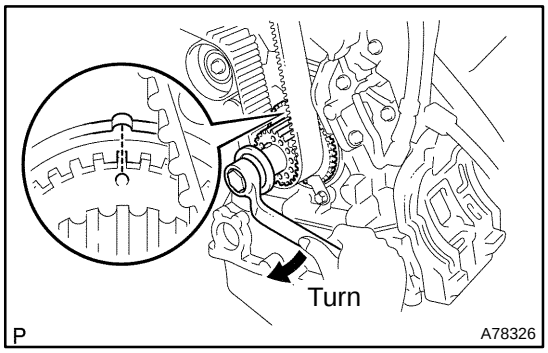
(e) Temporarily install the tensioner with the 2 bolts. Alternately tighten the 2 bolts.

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

NOTICE:

Be sure to tighten the bolts uniformly. Installing the tensioner at an angle may cause failure of its proper operation.

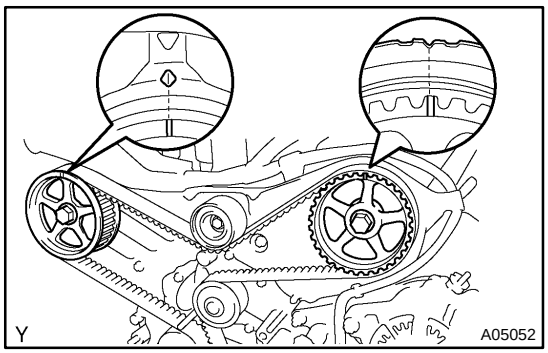
(f) Remove the 1.5 mm hexagon wrench from the tensioner.



(g) Turn the crankshaft 2 revolutions slowly, then align the timing mark of the crankshaft timing pulley with the oil pump body.

NOTICE:

Always turn the crankshaft clockwise.

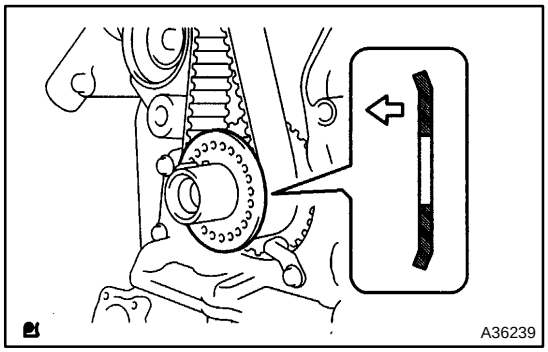


(h) Check that the timing marks of the RH and LH timing pulleys are aligned with the timing marks of the timing belt No. 3 cover as shown in the illustration.

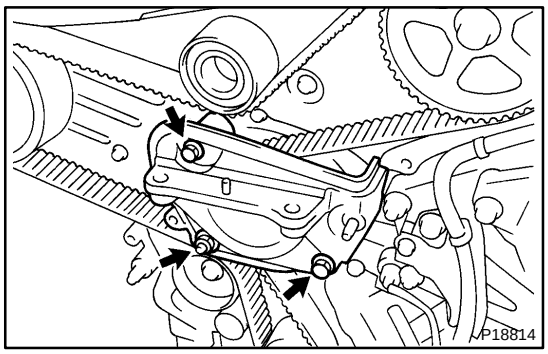
If the marks are not aligned, remove the timing belt and reinstall it.

(i) Remove the crankshaft pulley bolt.

17. INSTALL TIMING BELT GUIDE NO.2



(a) Install the timing belt guide with the cup side facing the engine front.



18. INSTALL ENGINE MOUNTING BRACKET RH

(a) Install the engine mounting bracket RH with the 2 bolts and nut.
Torque: 28 N·m (286 kgf·cm, 21 ft·lbf)

19. INSTALL TIMING BELT NO.2 COVER

(a) Visually check for cracks and breaks on the gasket of the timing belt cover.

If there is a trace of water intrusion when checking visually, replace the timing belt cover.

(b) Install the timing belt cover.
Torque: 8.5 N·m (87 kgf·cm, 75 in.·lbf)

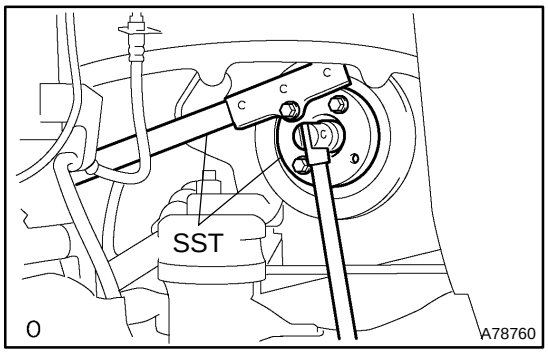
20. INSTALL TIMING BELT NO.1 COVER

(a) Visually check for cracks and breaks on the gasket of the timing belt cover.

If there is a trace of water intrusion when checking visually, replace the timing belt cover.

(b) Install the timing belt cover.
Torque: 8.5 N·m (87 kgf·cm, 75 in.·lbf)

(c) Install the 2 engine wire protector clamps to the timing belt No. 3 cover.

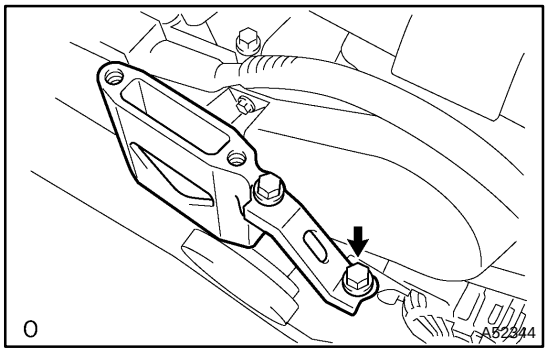


21. INSTALL CRANKSHAFT PULLEY

(a) Align the keyway of the pulley with the key located on the crankshaft, then slide the pulley into place.

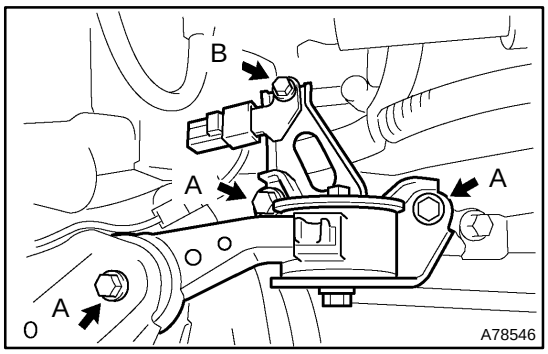
(b) Using SST, install the pulley bolt.
SST 09213-54015 (91651-60855), 09330-00021
Torque: 220 N·m (2250 kgf·cm, 162 ft·lbf)

22. INSTALL GENERATOR BRACKET NO.2
Torque: 28 N·m (286 kgf·cm, 21 ft·lbf)



23. INSTALL ENGINE MOUNTING STAY NO.2 RH

(a) Install the engine mounting stay No. 2 and engine mounting bracket No. 2 with the bolt.
Torque: 64 N·m (653 kgf·cm, 47 ft·lbf)



24. INSTALL ENGINE MOVING CONTROL ROD

(a) Install the engine moving control rod and bracket with the 4 bolts.

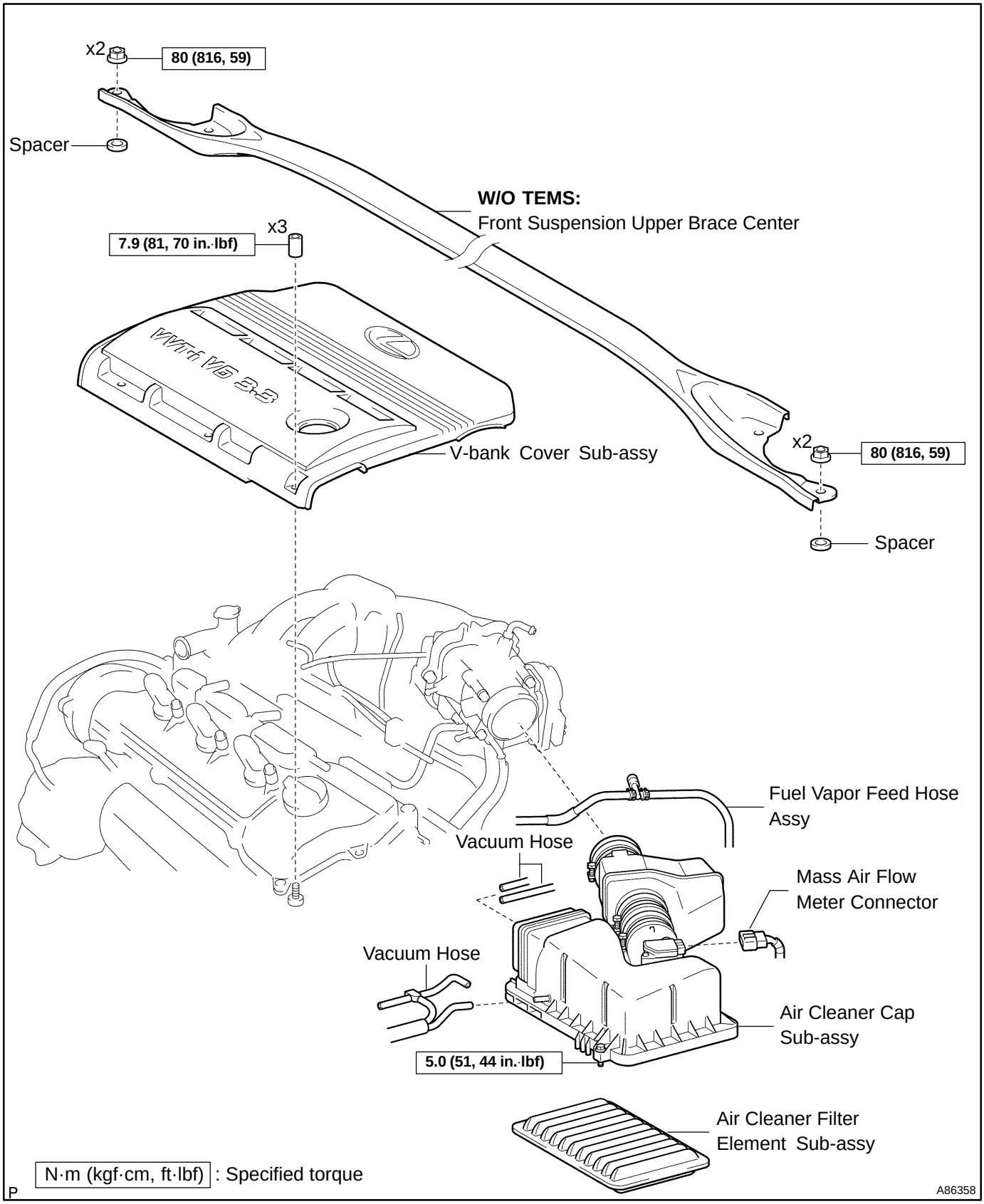
Torque:
64 N·m (653 kgf·cm, 47 ft·lbf) for bolt A
23 N·m (235 kgf·cm, 17 ft·lbf) for bolt B

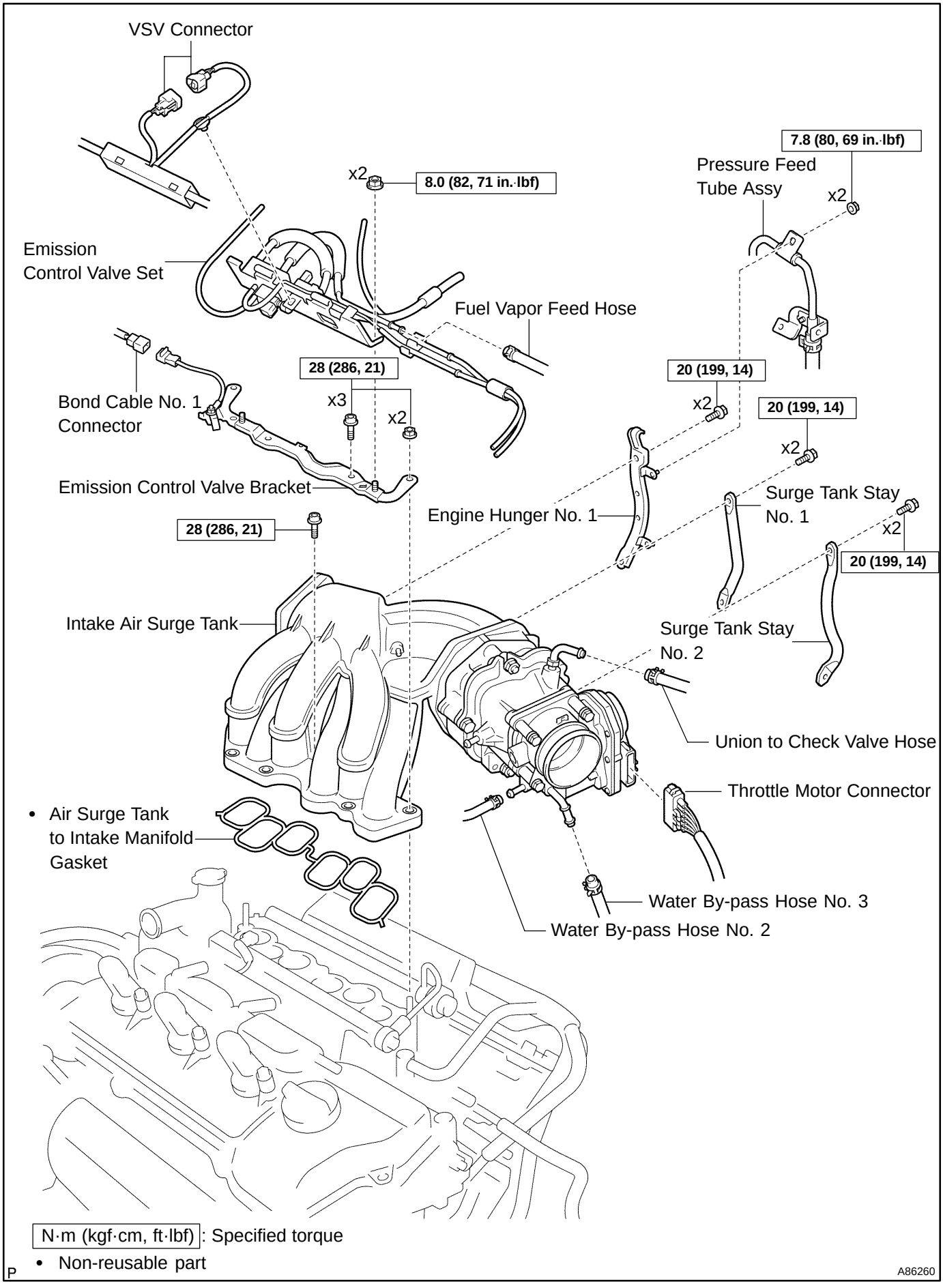
25. INSTALL VANE PUMP V BELT (See page 14-5)
26. INSTALL V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (See page 14-5)
27. INSPECT DRIVE BELT DEFLECTION AND TENSION (See page 14-1)
28. INSTALL FRONT WHEEL RH (See page 14-5)

CAMSHAFT (RH BANK) (3MZ-FE)

141JC-01

COMPONENTS



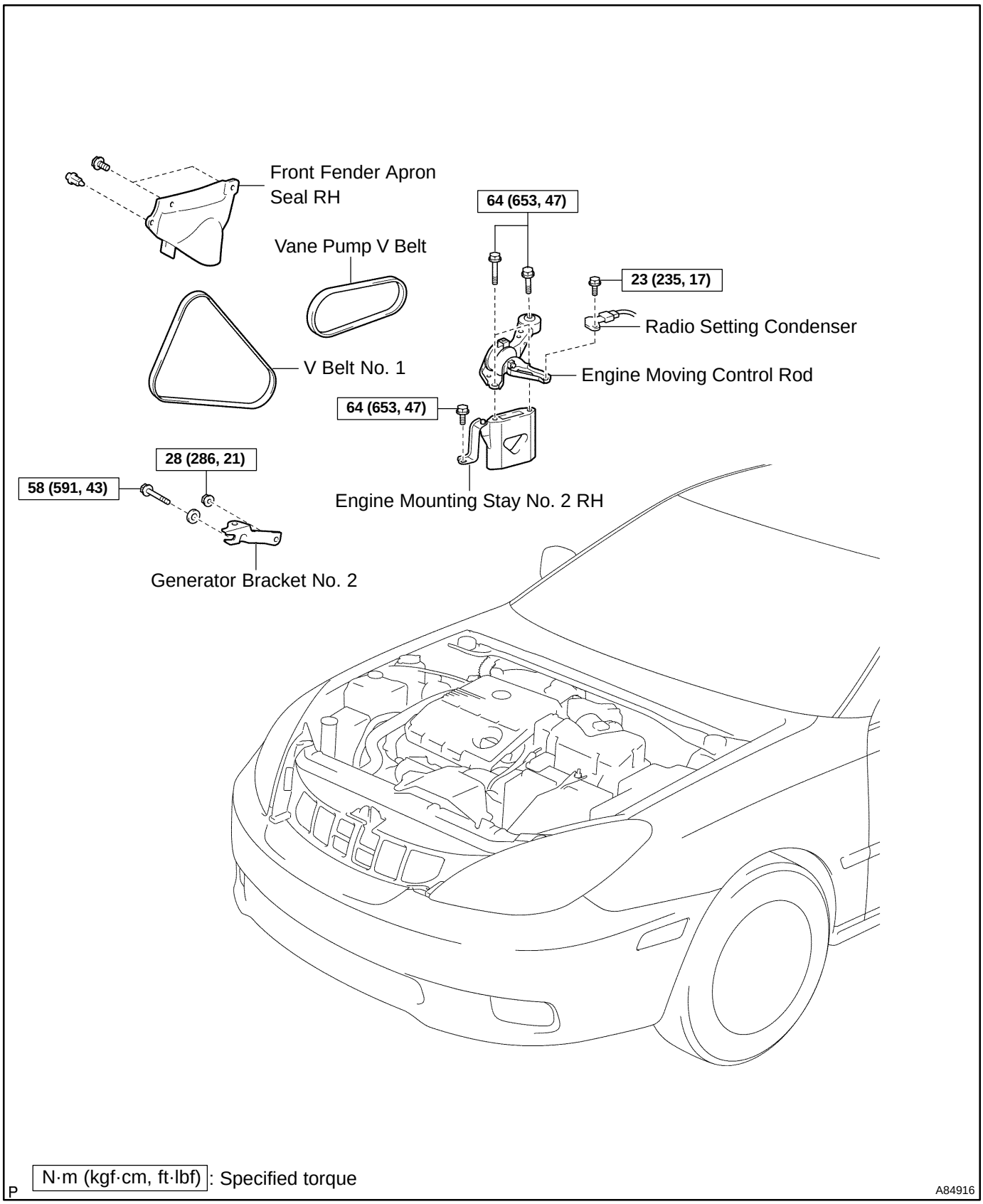


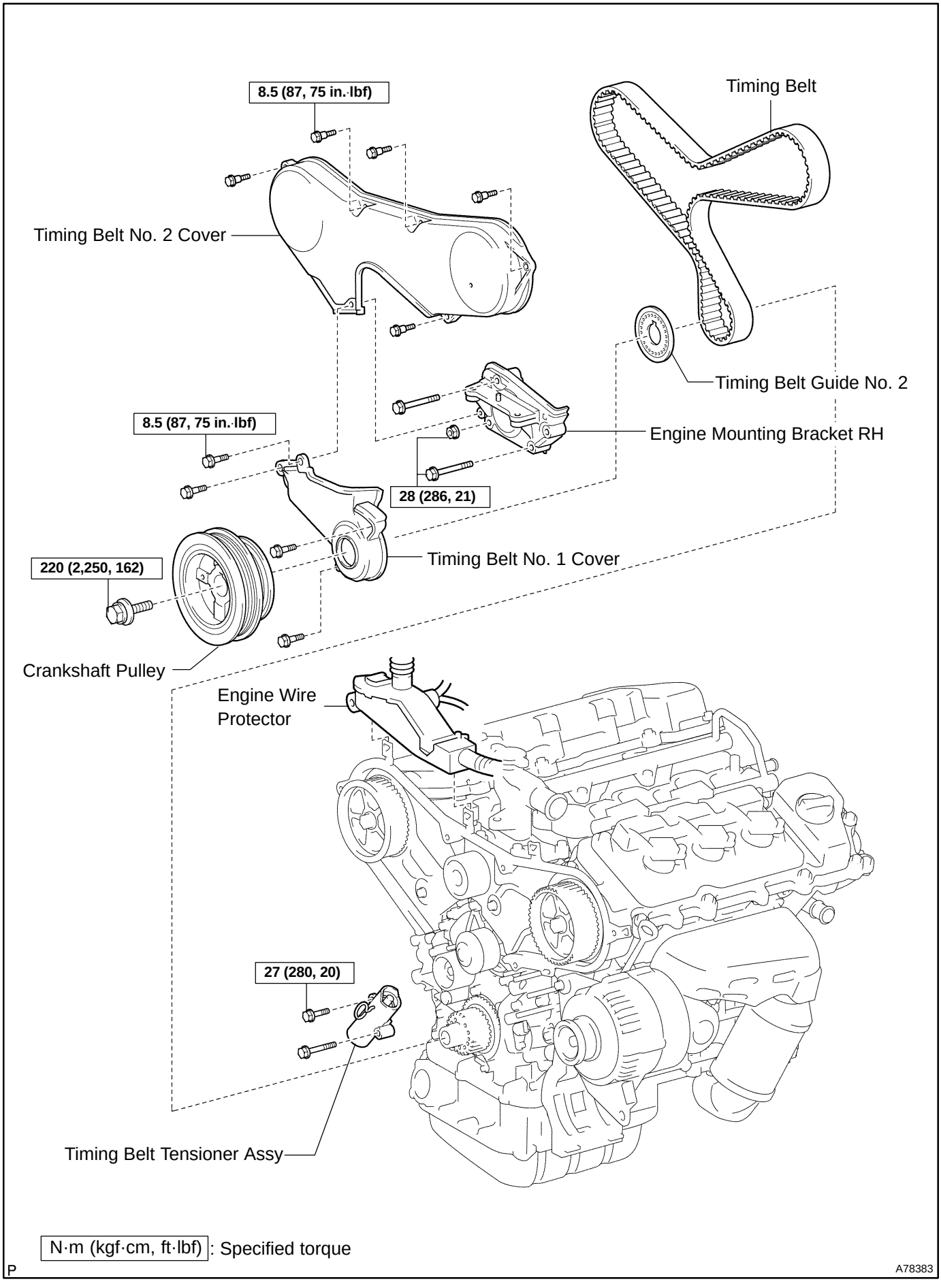
N·m (kgf·cm, ft·lbf): Specified torque

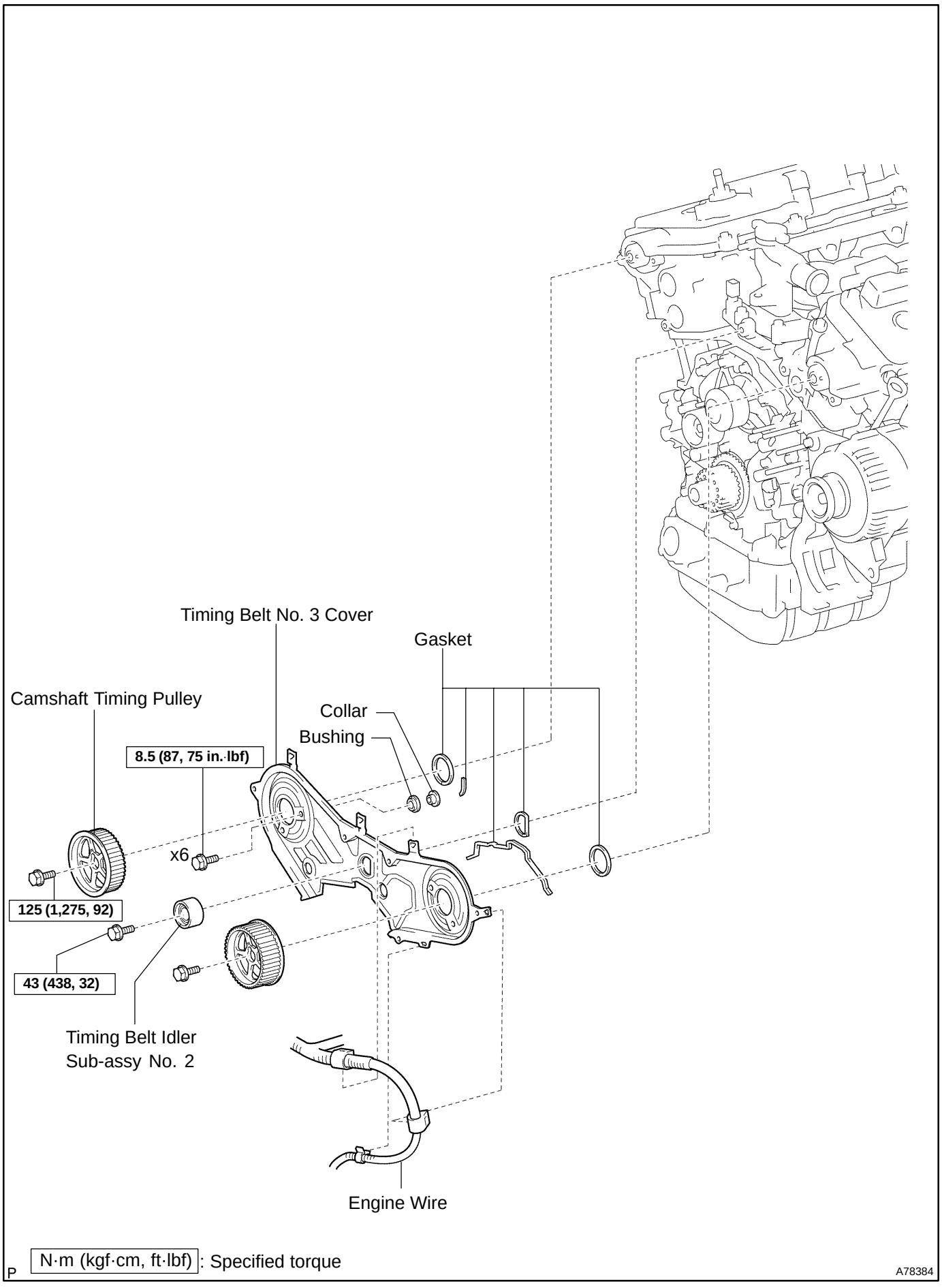
• Non-reusable part

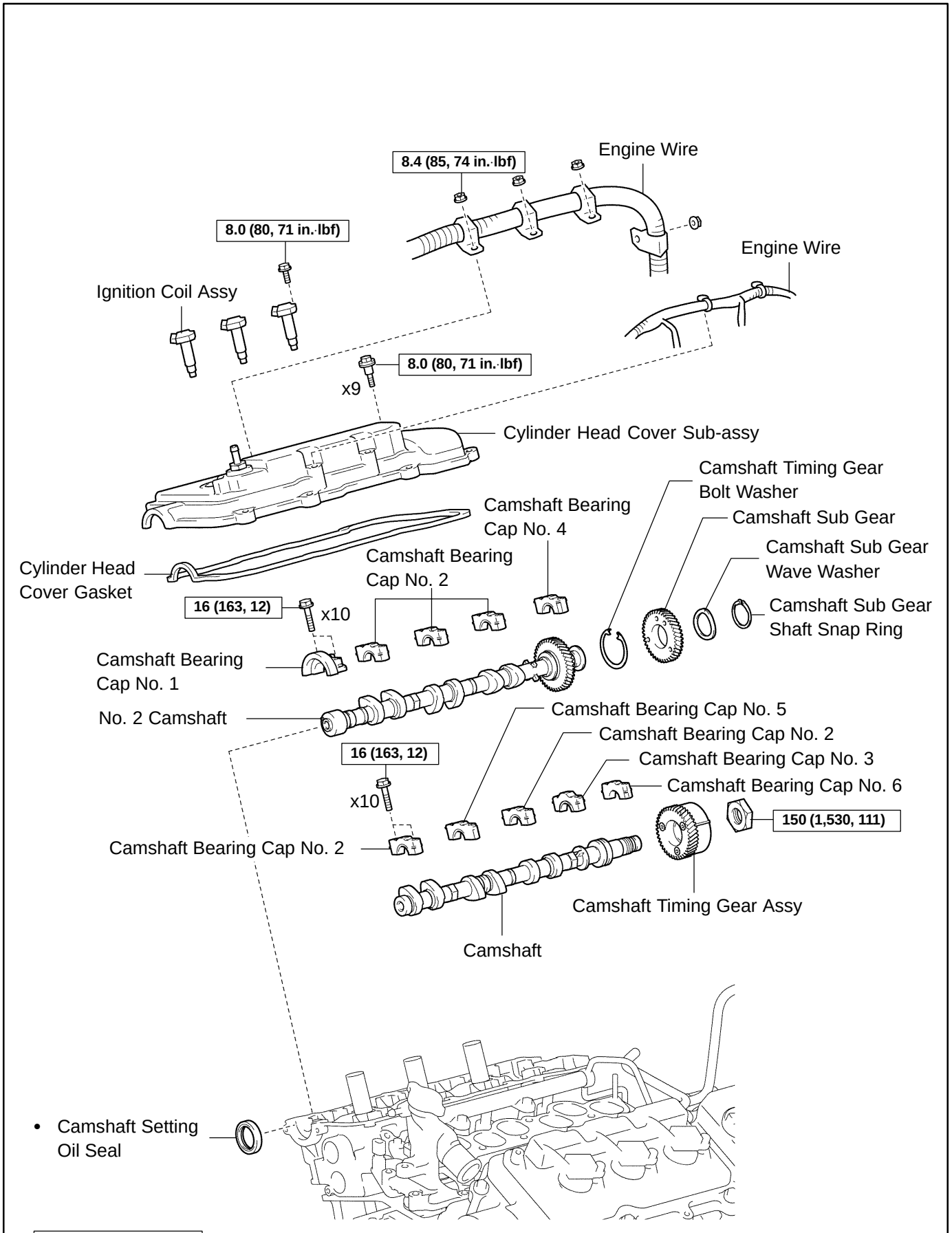
P

A86260


Front Fender Apron Seal RH
Vane Pump V Belt
V Belt No. 1
64 (653, 47)
23 (235, 17)
Radio Setting Condenser
Engine Moving Control Rod
64 (653, 47)
Engine Mounting Stay No. 2 RH
28 (286, 21)
58 (591, 43)
Generator Bracket No. 2
N·m (kgf·cm, ft·lbf): Specified torque
P
A84916


8.5 (87, 75 in.·lbf)
Timing Belt
Timing Belt No. 2 Cover
Timing Belt Guide No. 2
8.5 (87, 75 in.·lbf)
Engine Mounting Bracket RH
28 (286, 21)
Timing Belt No. 1 Cover
220 (2,250, 162)
Crankshaft Pulley
Engine Wire Protector
27 (280, 20)
Timing Belt Tensioner Assy
N·m (kgf·cm, ft·lbf): Specified torque
P
A78383

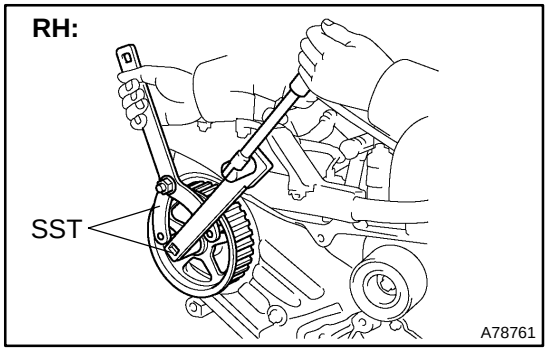

Timing Belt No. 3 Cover
Gasket
Camshaft Timing Pulley
Collar
Bushing
8.5 (87, 75 in.·lbf)
x6
125 (1,275, 92)
43 (438, 32)
Timing Belt Idler
Sub-assy No. 2
Engine Wire
P
N·m (kgf·cm, ft·lbf): Specified torque
A78384


8.4 (85, 74 in.·lbf)
Engine Wire
8.0 (80, 71 in.·lbf)
Engine Wire
Ignition Coil Assy
8.0 (80, 71 in.·lbf)
x9
Cylinder Head Cover Sub-assy
Camshaft Timing Gear Bolt Washer
Camshaft Bearing Cap No. 4
Camshaft Sub Gear
Camshaft Sub Gear Wave Washer
Camshaft Bearing Cap No. 2
Cylinder Head Cover Gasket
16 (163, 12)
x10
Camshaft Sub Gear Shaft Snap Ring
Camshaft Bearing Cap No. 1
No. 2 Camshaft
Camshaft Bearing Cap No. 5
Camshaft Bearing Cap No. 2
Camshaft Bearing Cap No. 3
16 (163, 12)
Camshaft Bearing Cap No. 6
x10
150 (1,530, 111)
Camshaft Bearing Cap No. 2
Camshaft Timing Gear Assy
Camshaft
• Camshaft Setting Oil Seal
N·m (kgf·cm, ft·lbf): Specified torque
• Non-reusable part
P
A78385

141JD-01

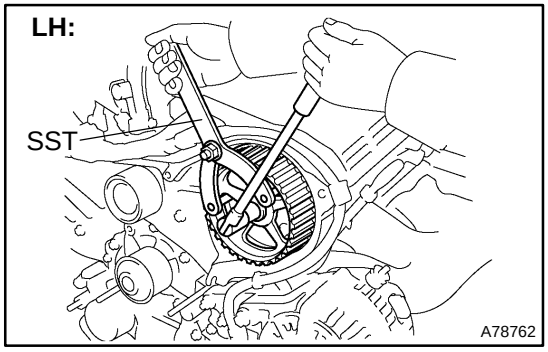
REPLACEMENT

1. **DISCONNECT BATTERY NEGATIVE TERMINAL**
2. **DRAIN ENGINE COOLANT (See page 16-9)**
3. **REMOVE FRONT WHEEL RH**
4. **REMOVE FRONT SUSPENSION UPPER BRACE CENTER (W/O TEMS) (See page 10-1 1)**
5. **REMOVE V-BANK COVER SUB-ASSY (See page 10-1 1)**
6. **REMOVE AIR CLEANER CAP SUB-ASSY (See page 10-1 1)**
7. **REMOVE EMISSION CONTROL VALVE SET (See page 11-13)**
8. **REMOVE INTAKE AIR SURGE TANK (See page 11-13)**
9. **REMOVE IGNITION COIL ASSY**
10. **REMOVE CYLINDER HEAD COVER SUB-ASSY (See page 14-7)**
11. **REMOVE FRONT FENDER APRON SEAL RH**
12. **REMOVE V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (See page 14-5)**
13. **REMOVE VANE PUMP V BELT (See page 14-5)**
14. **REMOVE ENGINE MOVING CONTROL ROD (See page 14-79)**
15. **REMOVE ENGINE MOUNTING STAY NO.2 RH (See page 14-79)**
16. **REMOVE GENERATOR BRACKET NO.2 (See page 14-79)**
17. **REMOVE CRANKSHAFT PULLEY (See page 14-79)**
    SST 09213-54015 (91651-60855), 09330-00021, 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05031)
18. **REMOVE TIMING BELT NO.1 COVER**
19. **REMOVE TIMING BELT NO.2 COVER (See page 14-79)**
20. **REMOVE ENGINE MOUNTING BRACKET RH (See page 14-79)**
21. **REMOVE TIMING BELT GUIDE NO.2**
22. **REMOVE TIMING BELT (See page 14-79)**
23. **REMOVE TIMING BELT IDLER SUB-ASSY NO.2**



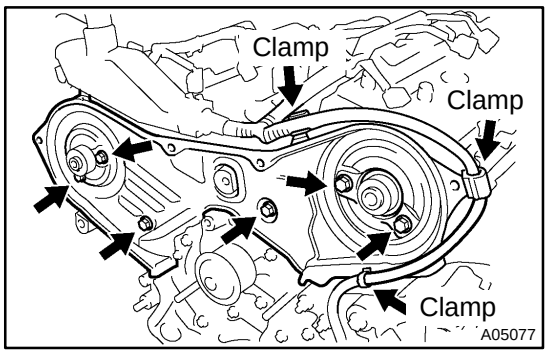
24. REMOVE CAMSHAFT TIMING PULLEY

(a) Using SST, remove the bolt and RH timing pulley.
SST 09960- 10010 (09962- 01000, 09963- 01000), 09249-63010



(b) Using SST, remove the bolt and LH timing pulley.
SST 09960-10010 (09962-01000, 09963-01000)

HINT:
Arrange the camshaft timing pulleys (RH and LH sides) so that they can be returned to the original locations when reassembling.



25. REMOVE TIMING BELT NO.3 COVER

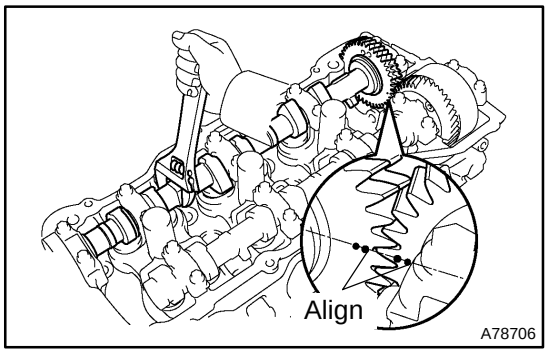
(a) Disconnect the 3 engine wire harness clamps from the timing belt No. 3 cover.

(b) Remove the 6 bolts and timing belt cover.

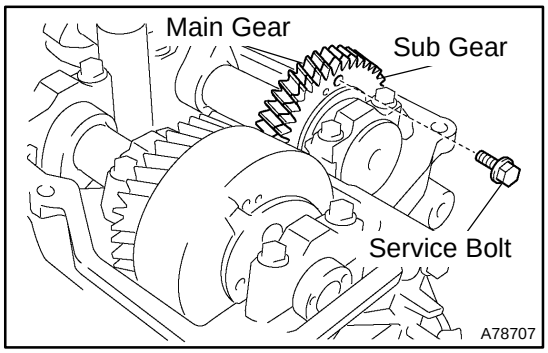
26. REMOVE CAMSHAFT

NOTICE:

Since the thrust clearance of the camshaft is small, the camshaft must be kept level while being removed. If the camshaft is not kept level, the cylinder head or camshaft may be damaged. To avoid this, the following steps must be carried out.



(a) Align the timing marks (2 dot marks) of the camshaft drive and driven gears by turning the camshaft with a wrench.



(b) Secure the exhaust camshaft sub gear to the main gear with a service bolt.

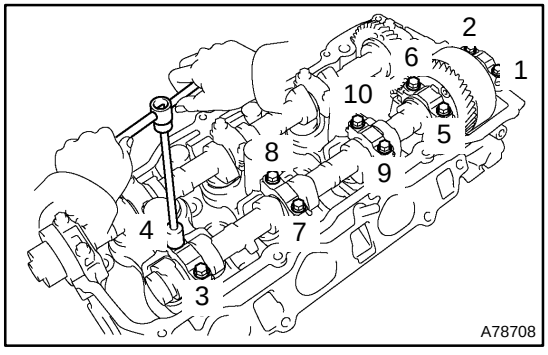
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

Recommended service bolt

Thread diameter	6 mm
Thread pitch	1.0 mm
Bolt length	16 to 20 mm

HINT:

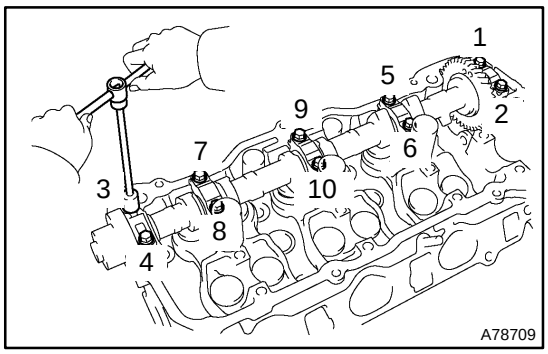
When removing the camshaft, make certain that the torsional spring force of the sub gear has been eliminated by installation of the service bolt.



(c) Using several steps, loosen and remove the 10 bearing cap bolts uniformly in the sequence shown in the illustration. Remove the 5 bearing caps and camshaft.

NOTICE:

- **Do not pry out the camshaft.**
- **Be careful not to damage the contact surface of the cylinder head that receives the shaft thrust.**



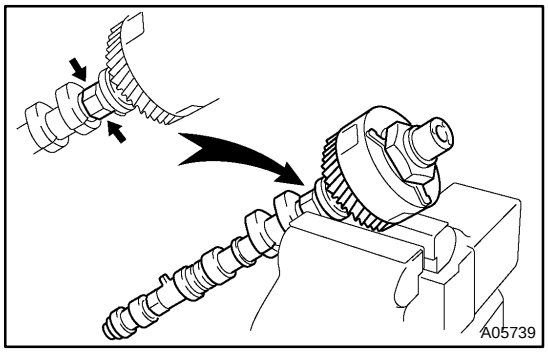
27. REMOVE NO.2 CAMSHAFT

(a) Using several steps, loosen and remove the 10 bearing cap bolts uniformly in the sequence shown in the illustration. Remove the 5 bearing caps and No. 2 camshaft.

NOTICE:

- **Do not pry out the camshaft.**
- **Be careful not to damage the contact surface of the cylinder head that receives the shaft thrust.**

(b) Remove the oil seal from the No. 2 camshaft.



28. REMOVE CAMSHAFT TIMING GEAR ASSY

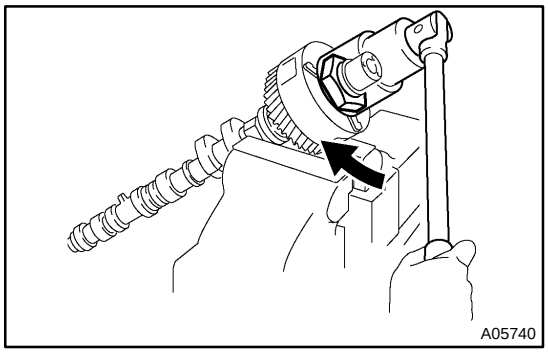
NOTICE:

Do not remove or install the camshaft timing gear (VVT-i) unless you are replacing the VVT-i or camshaft.

(a) Clamp the camshaft in a vise on the hexagonal lobe.

NOTICE:

Be careful not to damage the camshaft.



(b) Using a 46 mm socket wrench, remove the lock nut by turning it clockwise.

NOTICE:

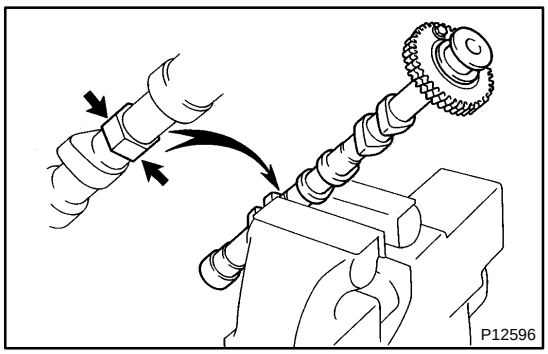
- **Remove it with the lock pin engaged and locked at the most retard angle position.**
- **The lock nut has LH threads.**
- **Never use any tools other than the socket wrench. Other tools will deform the cam angle rotor.**

(c) Remove the camshaft VVT-i.

NOTICE:

Never remove the 3 bolts on the gear.

If it is difficult to remove VVT-i, tap it lightly using a plastic-faced hammer, then remove it.

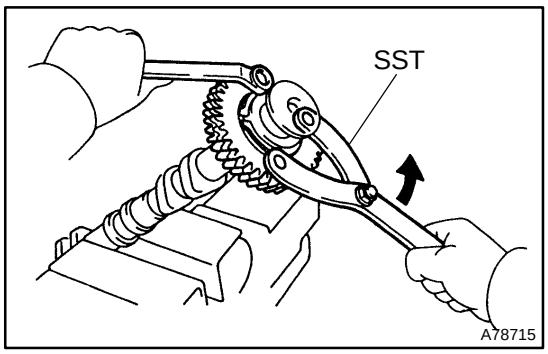


29. REMOVE CAMSHAFT SUB GEAR

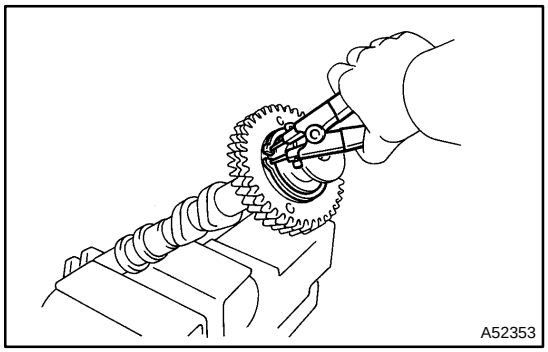
(a) Clamp the camshaft in a vise on the hexagonal lobe.

NOTICE:

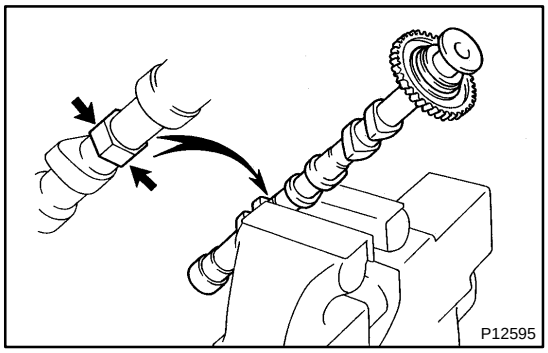
Be careful not to damage the camshaft.



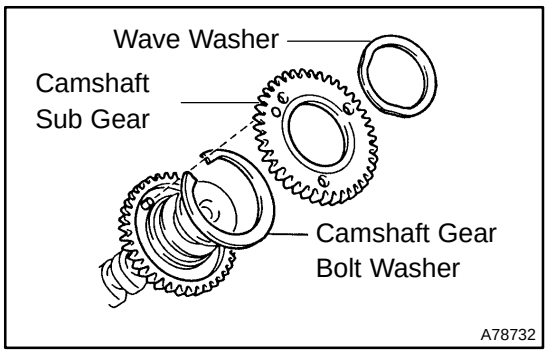
(b) Using SST, turn the sub gear counterclockwise, then remove the service bolt.
SST 09960-10010 (09962-01000, 09963-00500)



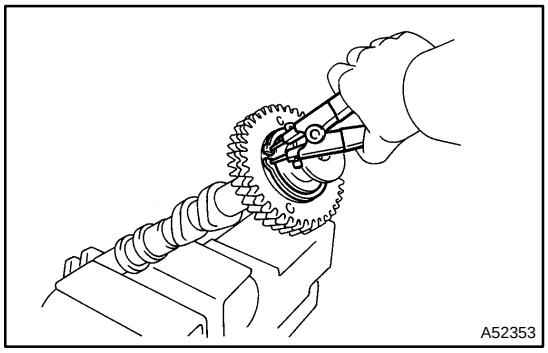
(c) Using snap ring pliers, remove the snap ring.
(d) Remove the wave washer, camshaft sub gear and camshaft gear bolt washer.



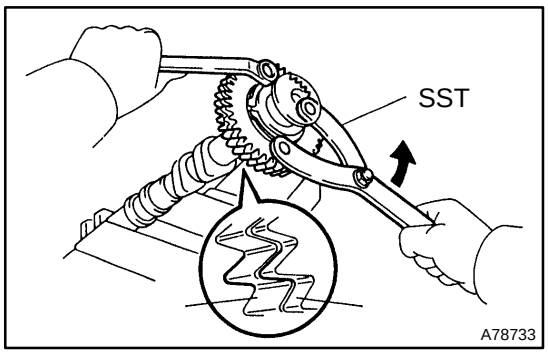
30. INSTALL CAMSHAFT SUB GEAR
(a) Clamp the camshaft in a vise on the hexagonal lobe.
NOTICE:
Be careful not to damage the camshaft.



(b) Install the camshaft gear bolt washer and camshaft sub gear.
HINT:
Attach the pins on the gears to the gear bolt washer ends.
(c) Install the wave washer.



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

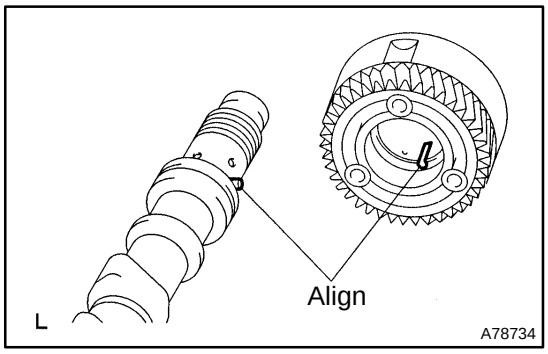


(e) Using SST, align the holes of the camshaft main gear and sub gear by turning the camshaft sub gear counterclockwise, then temporarily install a service bolt.
SST 09960-10010 (09962-01000, 09963-00500)

(f) Align the gear teeth of the main gear and sub gear, then tighten the service bolt.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

NOTICE:
Be careful not to damage the camshaft journals.

HINT:
When installing the camshaft, make certain that the torsional spring force of the sub gear has been eliminated by installation of the service bolt.



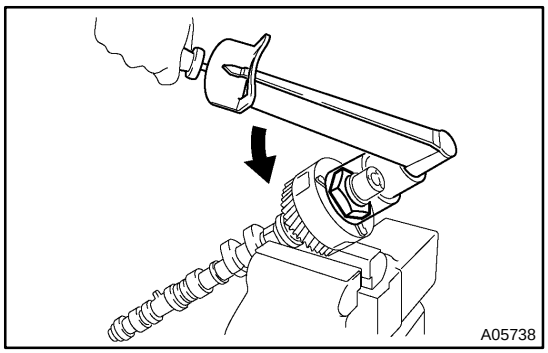
31. INSTALL CAMSHAFT TIMING GEAR ASSY

(a) Align the alignment pin with the alignment pin groove, then install the VVT-i on the camshaft.

NOTICE:
Install it with the lock pin engaged and locked at the most retard angle position.

(b) Apply engine oil to the nut, mounting surface of the VVT-i and screw threads.

NOTICE:
- **Be sure to apply the oil, otherwise the specified torque cannot be obtained.**
- **New nut must be used when replacing the VVT-i unit.**



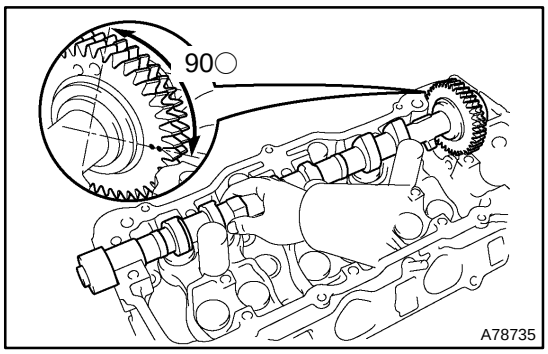
(c) Using a 46 mm socket wrench, install and tighten a lock nut by turning it counterclockwise.
Torque: 150 N·m (1,530 kgf·cm, 111 ft·lbf)

NOTICE:
- **The lock nut has LH threads.**
- **Never use any tools other than the socket wrench. Other tools will deform the cam angle rotor.**

32. INSTALL NO.2 CAMSHAFT

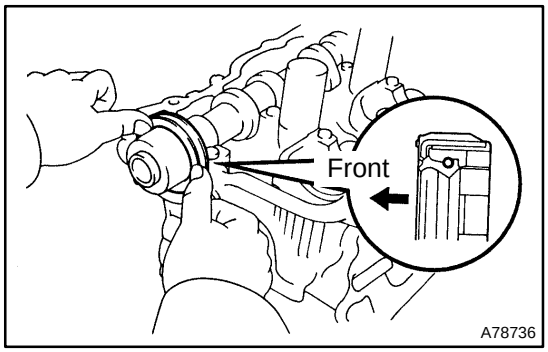
NOTICE:
Since the thrust clearance of the camshaft is small, the camshaft must be kept level while being installed. If the camshaft is not kept level, the cylinder head or camshaft may be damaged. To avoid this, the following steps must be carried out.

(a) Apply new engine oil to the thrust portion and journal of the camshaft.



(b) Place the No. 2 camshaft at a 90○angle of the timing mark (2 dot marks) on the cylinder head.

(c) Apply multi-purpose grease to a new oil seal lip.

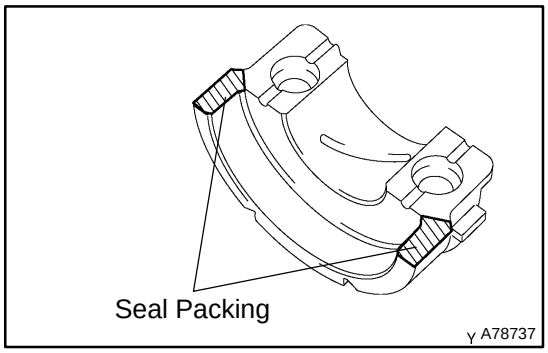


(d) Install the oil seal to the camshaft.

NOTICE:

- **Do not turn over the oil seal lip.**
- **Insert the oil seal until it stops.**

(e) Remove any old packing material from the contact surface.

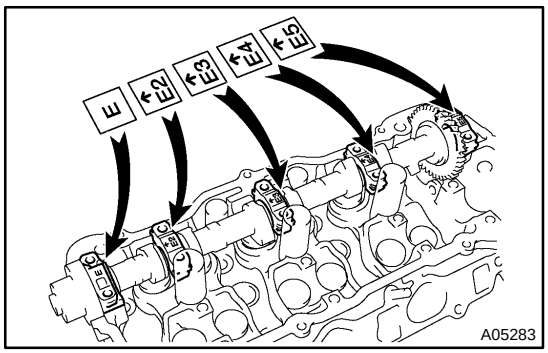


(f) Apply seal packing to the bearing cap No. 1 as shown in the illustration.

Seal packing: Part No. 08826-00080 or equivalent

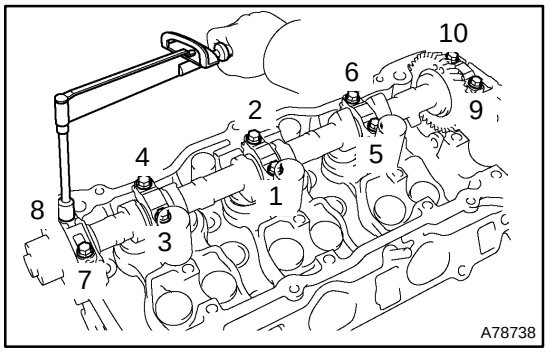
NOTICE:

- **Install the bearing cap No. 1 within 5 minutes after applying seal packing.**
- **Do not expose the seal packing to engine oil within 2 hours after installing.**



(g) Install the 5 bearing caps in their proper locations.

(h) Apply a light coat of engine oil to the threads of the bearing cap bolts.



(i) Using several steps, tighten the 10 bearing cap bolts uniformly in the sequence shown in the illustration.

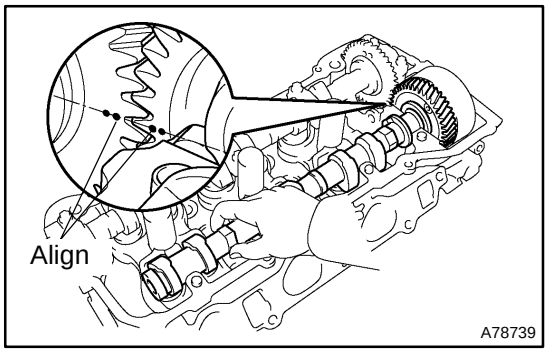
Torque: 16 N·m (163 kgf·cm, 12 ft·lbf)

33. INSTALL CAMSHAFT

NOTICE:

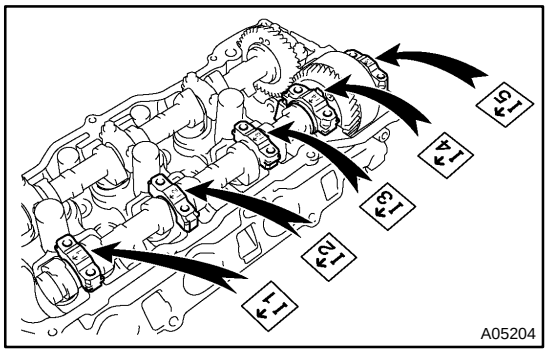
Since the thrust clearance of the camshaft is small, the camshaft must be kept level while being installed. If the camshaft is not kept level, the cylinder head or camshaft may be damaged. To avoid this, the following steps must be carried out.

(a) Apply new engine oil to the thrust portion and journal of the camshaft.



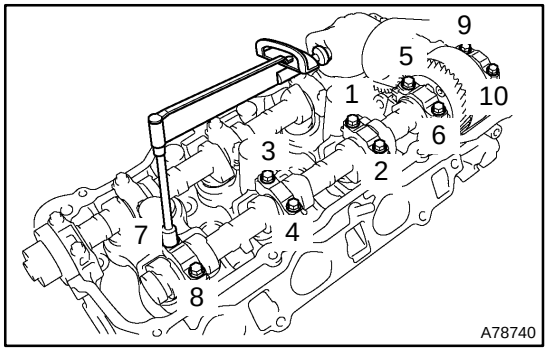
(b) Align the timing marks (2 dot marks) of the camshaft drive and driven gears.

(c) Place the camshaft on the cylinder head.



(d) Install the 5 bearing caps in their proper locations.

(e) Apply a light coat of engine oil to the threads of the bearing cap bolts.



(f) Using several steps, tighten the 10 bearing cap bolts uniformly in the sequence shown in the illustration.

Torque: 16 N·m (163 kgf·cm, 12 ft·lbf)

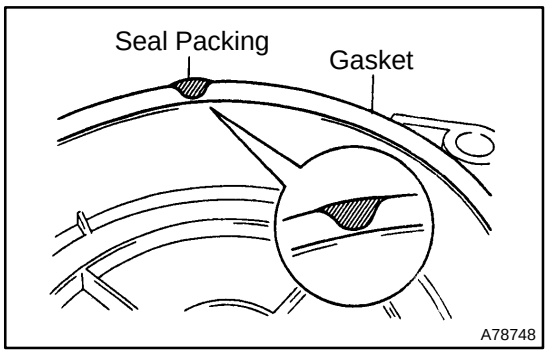
(g) Remove the service bolt.

34. INSTALL TIMING BELT NO.3 COVER

(a) Visually check for cracks and breaks on the gasket of the timing belt cover.

HINT:

If there is a trace of water intrusion when checking visually, repair the gasket with seal packing when the crack length is within 2 to 3 cm (0.79 to 1.18 in.). Replace the gasket when the crack length is 3 to 4 cm (1.18 to 1.57 in.) or longer.



(b) If the timing belt cover gasket is needed to repair, follow the procedure below.

(1) Repair the cracks and breaks by applying seal packing to the damaged area.

Seal packing: Part No. 08826-00080 or equivalent

NOTICE:

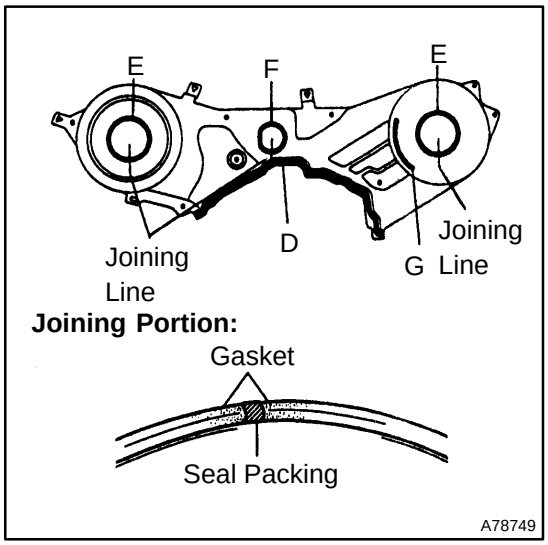
When applying the seal packing, apply it as wide and high as the gasket.

(c) If the timing belt cover gasket is needed to replace, follow the procedure below.

(1) Using a screwdriver and gasket scraper, remove the remaining gasket.

NOTICE:

Be careful not to damage the timing belt cover.



(2) Remove the backing paper from a new gasket, then affix the gasket along the groove of the timing belt cover as shown in the illustration.

NOTICE:

- **Affix the gasket in the center of the groove.**
- **At the corners, try to keep the gasket thickness uniform.**

HINT:

Gasket	D	E	F	G
Length	335 mm (13.19 in.)	180 mm (7.09 in.)	133 mm (5.24 in.)	72 mm (2.83 in.)

(3) If there is a gap between the ends of the gasket, apply seal packing to close the gap.

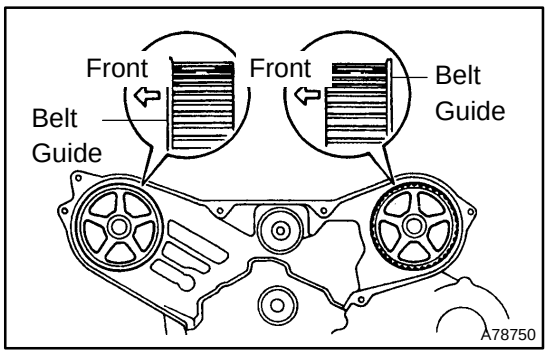
Seal packing: Part No. 08826-00080 or equivalent

NOTICE:

When applying the seal packing, apply it as wide and high as the gasket.

(d) Install the timing belt cover with the 6 bolts.

Torque: 8.5 N·m (87 kgf·cm, 75 in.·lbf)

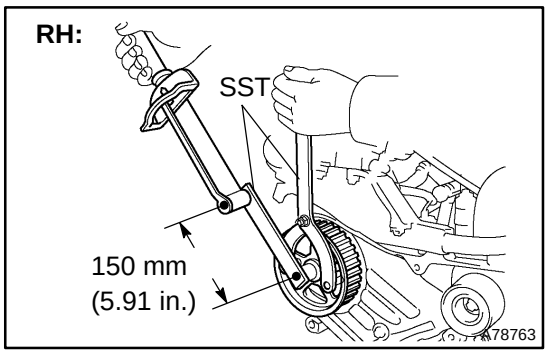


35. INSTALL CAMSHAFT TIMING PULLEY

(a) Pay attention to the orientation of the belt guide. Install the camshaft timing pulley with the belt guide properly oriented, then tighten the bolt temporarily.

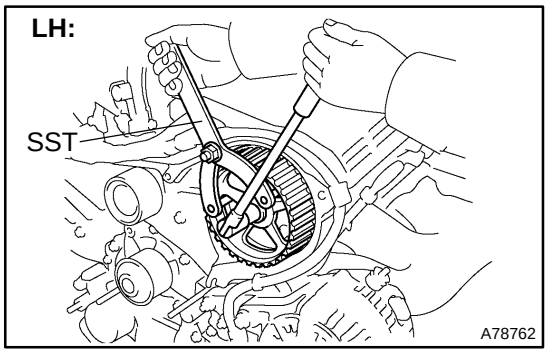
HINT:

- Align the belt guide of the RH timing pulley so it faces the front of the engine as illustrated.
- Align the belt guide of the LH timing pulley so it faces the rear of the engine as illustrated.



(b) Using SST, tighten the RH pulley bolt.
SST 09960- 10010 (09962- 01000, 09963- 01000), 09249-63010
Torque: 125 N·m (1,275 kgf·cm, 92 ft·lbf)

NOTICE:
The torque indicated above is used without SST on the extension tool. If you are using the extension tool, find the reading of the torque wrench by the formula (see page 01-5).
Extended length:
SST (09249-63010) 150mm (5.91 in.)



(c) Using SST, tighten the LH pulley bolt.
SST 09960-10010 (09962-01000, 09963-01000)
Torque: 125 N·m (1275 kgf·cm, 92 ft·lbf)

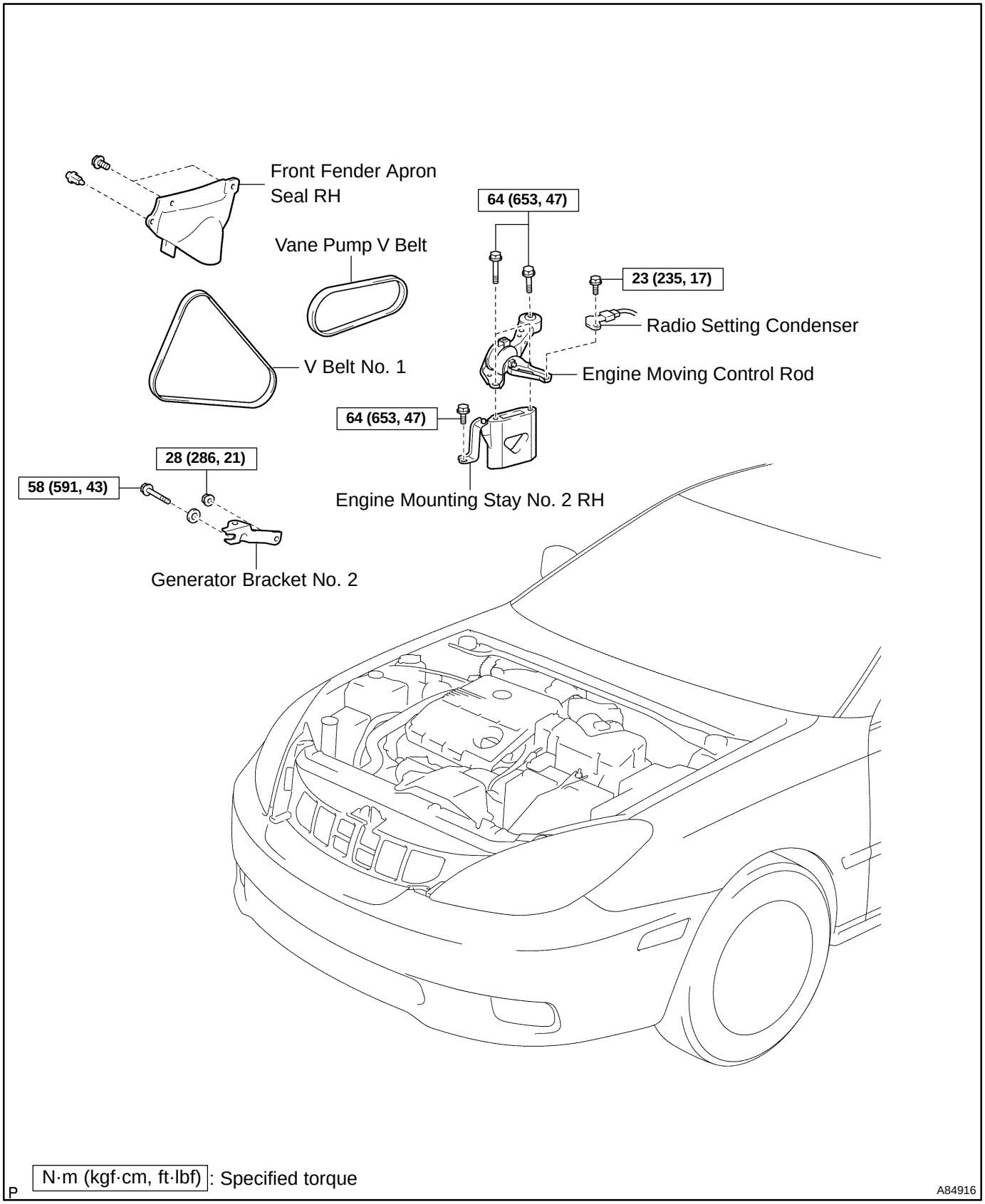
36. INSTALL TIMING BELT IDLER SUB-ASSY NO.2
Torque: 43 N·m (438 kgf·cm, 32 ft·lbf)
37. INSPECT TIMING BELT (See page 14-79)
38. INSTALL TIMING BELT (See page 14-79)
SST 09960-10010 (09962-01000, 09963-01000)
39. INSTALL TIMING BELT TENSIONER ASSY (See page 14-79)
40. INSTALL TIMING BELT GUIDE NO.2 (See page 14-79)
41. INSTALL ENGINE MOUNTING BRACKET RH (See page 14-79)
42. INSTALL TIMING BELT NO.2 COVER (See page 14-79)
43. INSTALL TIMING BELT NO.1 COVER (See page 14-79)
44. INSTALL CRANKSHAFT PULLEY (See page 14-79)
SST 09213-54015 (91651-60855), 09330-00021
45. INSTALL GENERATOR BRACKET NO.2 (See page 14-79)
46. INSTALL ENGINE MOUNTING STAY NO.2 RH (See page 14-79)
47. INSTALL ENGINE MOVING CONTROL ROD (See page 14-79)
48. INSPECT VALVE CLEARANCE (See page 14-7)
49. ADJUST VALVE CLEARANCE (See page 14-7)
SST 09248-55040 (09248-05410, 09248-05420)
50. INSTALL VANE PUMP V BELT (See page 14-5)
51. INSTALL V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (See page 14-5)
52. INSPECT DRIVE BELT DEFLECTION AND TENSION (See page 14-1)
53. INSTALL CYLINDER HEAD COVER SUB-ASSY (See page 14-7)
54. INSTALL IGNITION COIL ASSY (See page 14-7)

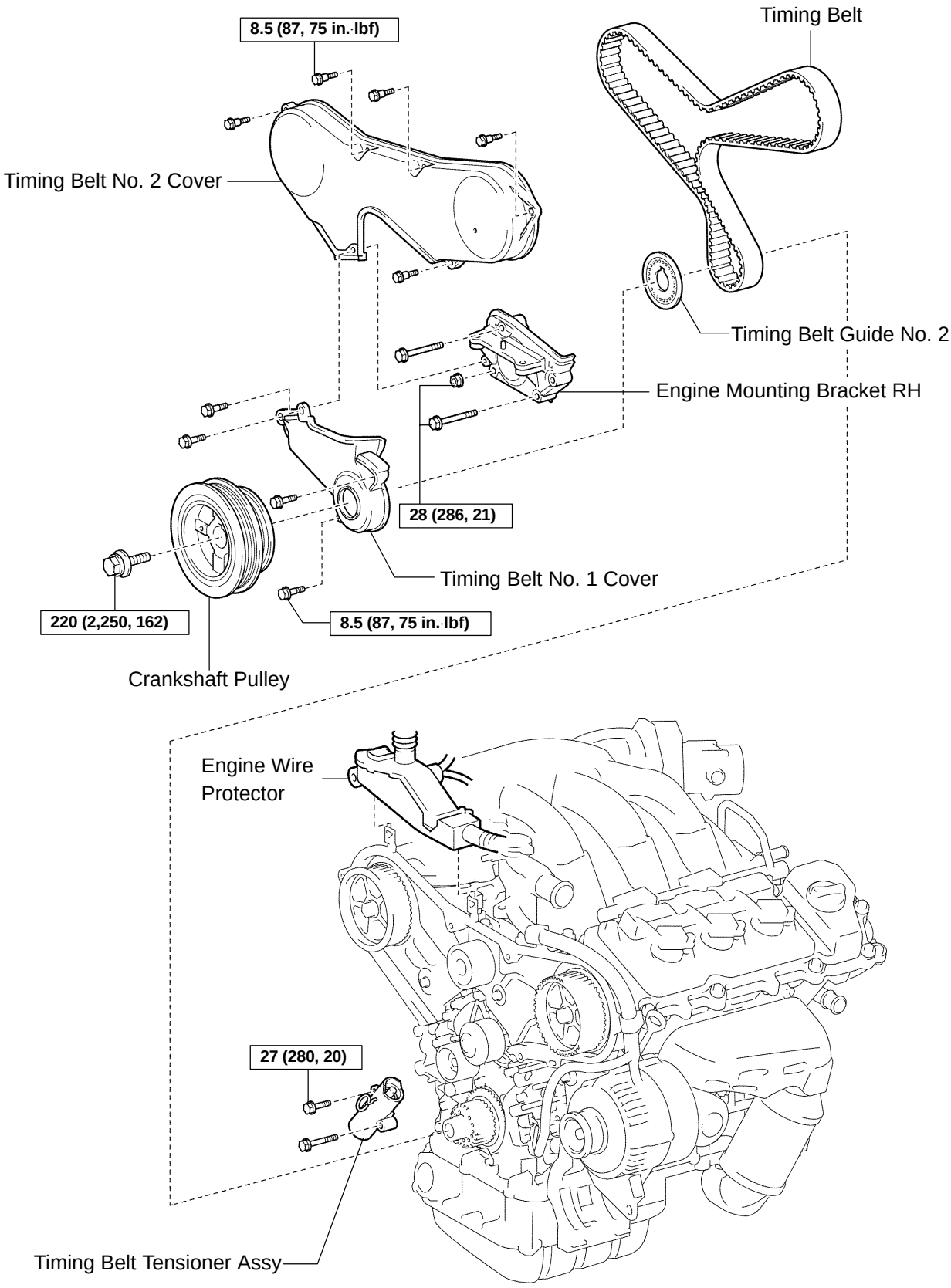
55. INSTALL INTAKE AIR SURGE TANK (See page 11-13)
56. INSTALL EMISSION CONTROL VALVE SET (See page 11-13)
57. INSTALL AIR CLEANER CAP SUB-ASSY (See page 10-1 1)
58. CHECK CONNECTION OF VACUUM HOSE (See page 14-29)
59. INSTALL V-BANK COVER SUB-ASSY (See page 10-1 1)
60. INSTALL FRONT SUSPENSION UPPER BRACE CENTER (W/O TEMS) (See page 10-1 1)
61. INSTALL FRONT WHEEL RH (See page 14-5)
62. ADD ENGINE COOLANT (See page 16-9)
63. CHECK FOR ENGINE COOLANT LEAKS (See page 16-1)
64. SYSTEM INITIALIZATION (See page 19-15)

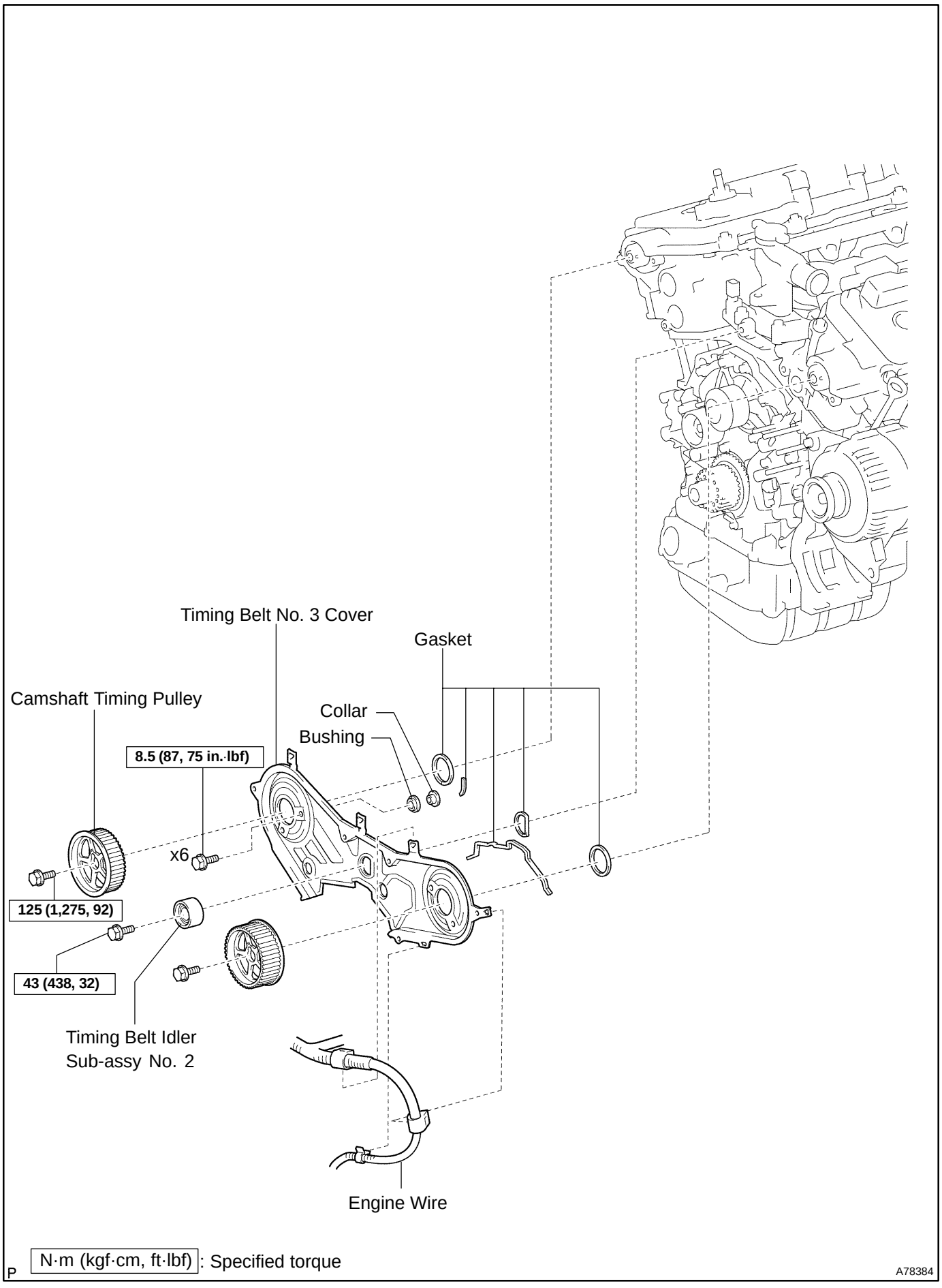
CAMSHAFT (LH BANK) (3MZ-FE)

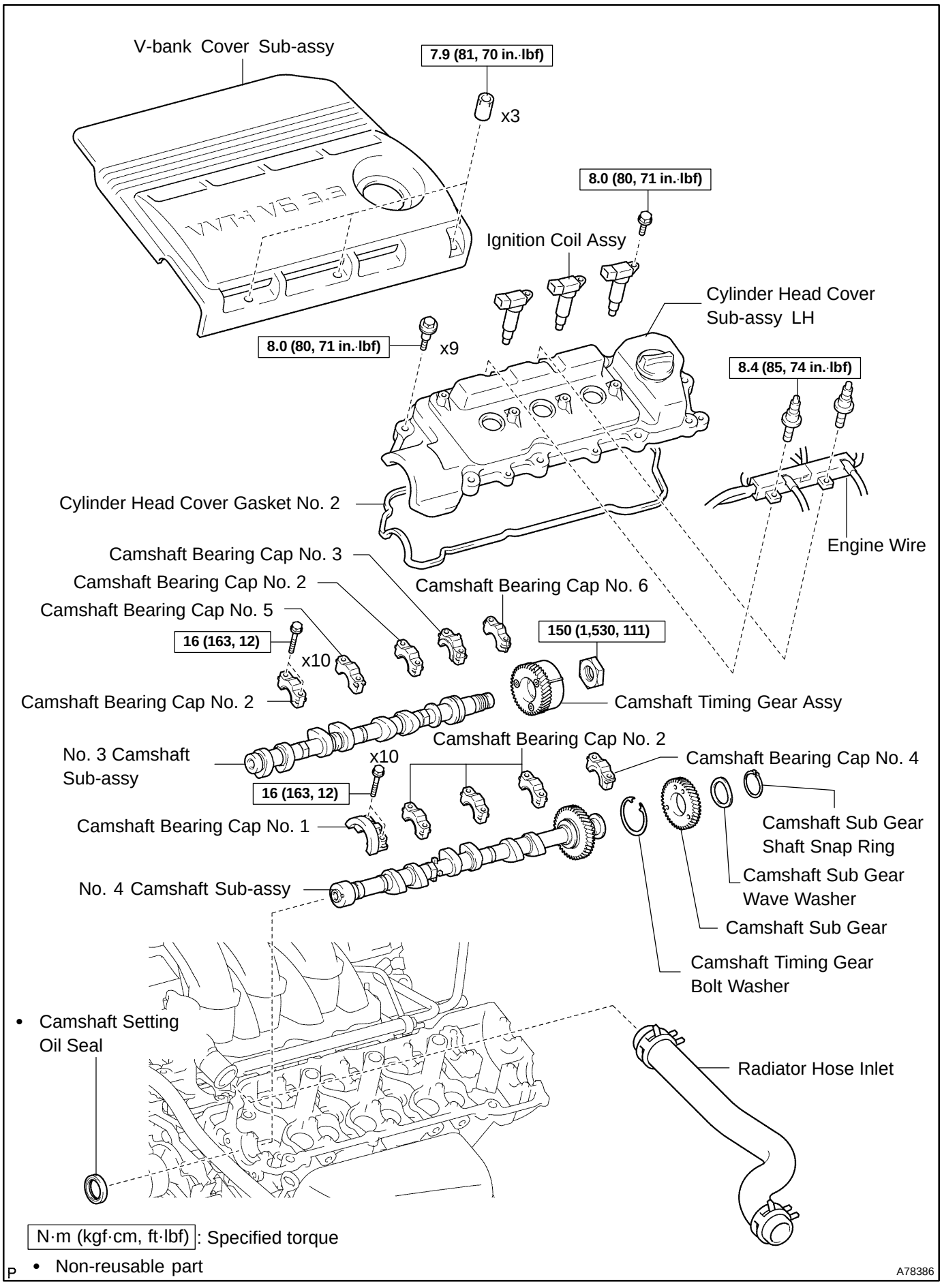
COMPONENTS

141JE-01




8.5 (87, 75 in.·lbf)
Timing Belt
Timing Belt No. 2 Cover
Timing Belt Guide No. 2
Engine Mounting Bracket RH
28 (286, 21)
Timing Belt No. 1 Cover
220 (2,250, 162)
8.5 (87, 75 in.·lbf)
Crankshaft Pulley
Engine Wire Protector
27 (280, 20)
Timing Belt Tensioner Assy
N·m (kgf·cm, ft·lbf): Specified torque
P
A78353


Timing Belt No. 3 Cover
Gasket
Camshaft Timing Pulley
Collar
Bushing
8.5 (87, 75 in.·lbf)
x6
125 (1,275, 92)
43 (438, 32)
Timing Belt Idler
Sub-assy No. 2
Engine Wire
P
N·m (kgf·cm, ft·lbf): Specified torque
A78384


V-bank Cover Sub-assy
7.9 (81, 70 in.·lbf)
x3
8.0 (80, 71 in.·lbf)
Ignition Coil Assy
Cylinder Head Cover Sub-assy LH
8.0 (80, 71 in.·lbf)
x9
8.4 (85, 74 in.·lbf)
Cylinder Head Cover Gasket No. 2
Engine Wire
Camshaft Bearing Cap No. 3
Camshaft Bearing Cap No. 2
Camshaft Bearing Cap No. 5
Camshaft Bearing Cap No. 6
16 (163, 12)
x10
150 (1,530, 111)
Camshaft Bearing Cap No. 2
Camshaft Timing Gear Assy
No. 3 Camshaft Sub-assy
Camshaft Bearing Cap No. 2
x10
Camshaft Bearing Cap No. 4
16 (163, 12)
Camshaft Bearing Cap No. 1
Camshaft Sub Gear Shaft Snap Ring
Camshaft Sub Gear Wave Washer
No. 4 Camshaft Sub-assy
Camshaft Sub Gear
Camshaft Timing Gear Bolt Washer
• Camshaft Setting Oil Seal
Radiator Hose Inlet
N·m (kgf·cm, ft·lbf): Specified torque
• Non-reusable part
A78386

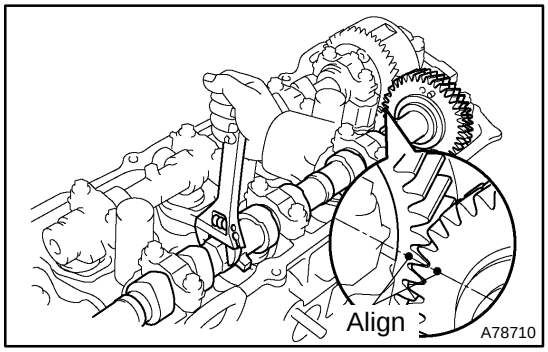
141JF-01

REPLACEMENT

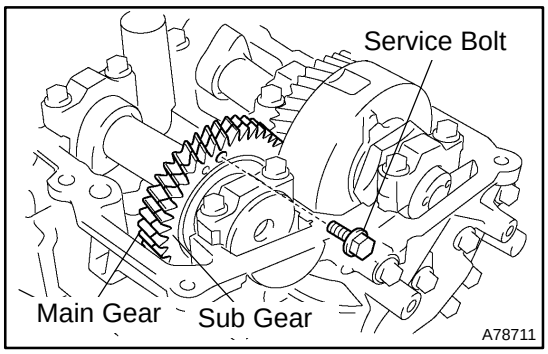
1. **DISCONNECT BATTERY NEGATIVE TERMINAL**
2. **DRAIN ENGINE COOLANT (See page 16-9)**
3. **REMOVE FRONT WHEEL RH**
4. **REMOVE V-BANK COVER SUB-ASSY (See page 10-1 1)**
5. **REMOVE RADIATOR HOSE INLET**
6. **REMOVE IGNITION COIL ASSY**
7. **REMOVE CYLINDER HEAD COVER SUB-ASSY LH (See page 14-7)**
8. **REMOVE FRONT FENDER APRON SEAL RH**
9. **REMOVE V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (See page 14-5)**
10. **REMOVE VANE PUMP V BELT (See page 14-5)**
11. **REMOVE ENGINE MOVING CONTROL ROD (See page 14-79)**
12. **REMOVE ENGINE MOUNTING STAY NO.2 RH (See page 14-79)**
13. **REMOVE GENERATOR BRACKET NO.2 (See page 14-79)**
14. **REMOVE CRANKSHAFT PULLEY (See page 14-79)**
    SST 09213-54015 (91651-60855), 09330-00021, 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05031)
15. **REMOVE TIMING BELT NO.1 COVER**
16. **REMOVE TIMING BELT NO.2 COVER (See page 14-79)**
17. **REMOVE ENGINE MOUNTING BRACKET RH (See page 14-79)**
18. **REMOVE TIMING BELT GUIDE NO.2**
19. **REMOVE TIMING BELT (See page 14-79)**
20. **REMOVE TIMING BELT IDLER SUB-ASSY NO.2**
21. **REMOVE CAMSHAFT TIMING PULLEY (See page 14-93)**
    SST 09960-10010 (09962-01000, 09963-01000), 09249-63010
22. **REMOVE TIMING BELT NO.3 COVER (See page 14-93)**
23. **REMOVE NO.3 CAMSHAFT SUB-ASSY**

NOTICE:

Since the thrust clearance of the camshaft is small, the camshaft must be kept level while being removed. If the camshaft is not kept level, the cylinder head or camshaft may be damaged. To avoid this, the following steps must be carried out.



(a) Align the timing marks (1 dot marks) of the camshaft drive and driven gears by turning the camshaft with a wrench.



(b) Secure the exhaust camshaft sub gear to the main gear with a service bolt.

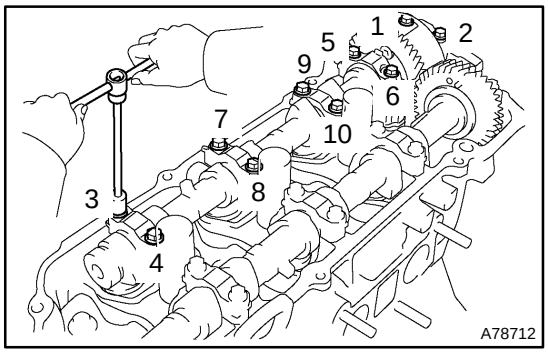
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

Recommended service bolt

Thread diameter	6 mm
Thread pitch	1.0 mm
Bolt length	16 to 20 mm

HINT:

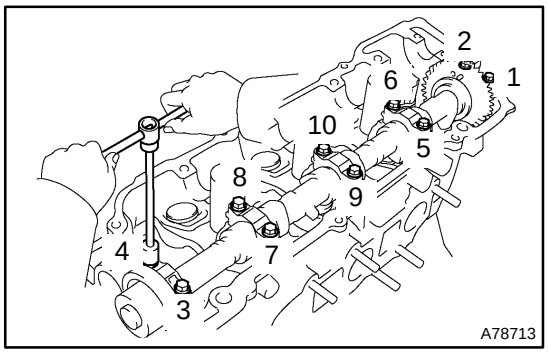
When removing the camshaft, make certain that the torsional spring force of the sub gear has been eliminated by installation of the service bolt.



(c) Using several steps, loosen and remove the 10 bearing cap bolts uniformly in the sequence shown in the illustration. Remove the 5 bearing caps and No. 3 camshaft.

NOTICE:

- **Do not pry out the camshaft.**
- **Be careful not to damage the contact surface of the cylinder head that receives the shaft thrust.**



24. REMOVE NO.4 CAMSHAFT SUB-ASSY

(a) Using several steps, loosen and remove the 10 bearing cap bolts uniformly in the sequence shown in the illustration. Remove the 5 bearing caps and No. 4 camshaft.

NOTICE:

- **Do not pry out the camshaft.**
- **Be careful not to damage the contact surface of the cylinder head that receives the shaft thrust.**

(b) Remove the oil seal from the No. 4 camshaft.

25. REMOVE CAMSHAFT TIMING GEAR ASSY (See page 14-93)

26. REMOVE CAMSHAFT SUB GEAR NO.3 (See page 14-93)

SST 09960-10010 (09962-01000, 09963-00500)

27. INSTALL CAMSHAFT SUB GEAR NO.3 (See page 14-93)

SST 09960-10010 (09962-01000, 09963-00500)

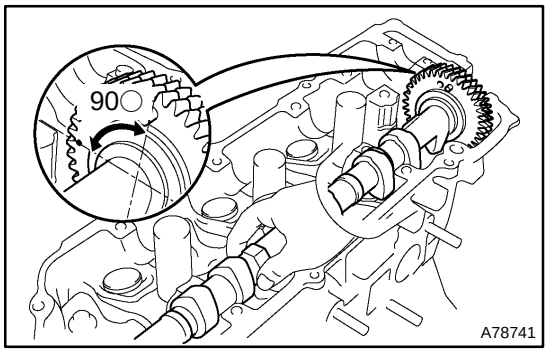
28. INSTALL CAMSHAFT TIMING GEAR ASSY (See page 14-93)

29. INSTALL NO.4 CAMSHAFT SUB-ASSY

NOTICE:

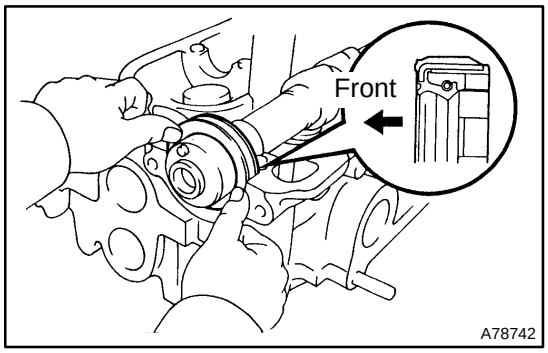
Since the thrust clearance of the camshaft is small, the camshaft must be kept level while being installed. If the camshaft is not kept level, the cylinder head or camshaft may be damaged. To avoid this, the following steps must be carried out.

(a) Apply new engine oil to the thrust portion and journal of the camshaft.



(b) Place the No. 4 camshaft at a 90○angle of the timing mark (1 dot marks) on the cylinder head.

(c) Apply multi-purpose grease to a new oil seal lip.

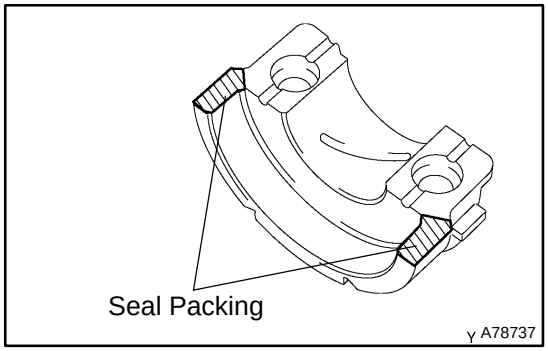


(d) Install the oil seal to the camshaft.

NOTICE:

- **Do not turn over the oil seal lip.**
- **Insert the oil seal until it stops.**

(e) Remove any old packing material from the contact surface.

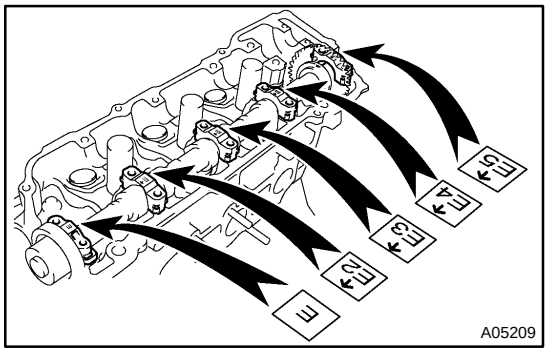


(f) Apply seal packing to the bearing cap No. 1 as shown in the illustration.

Seal packing: Part No. 08826-00080 or equivalent

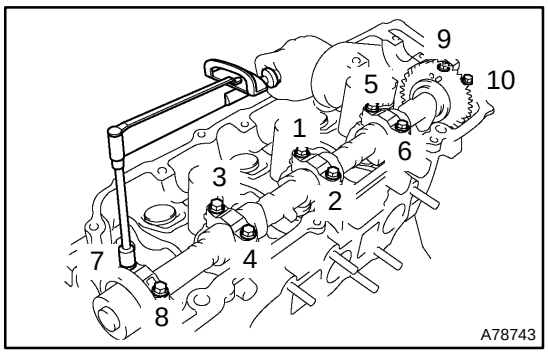
NOTICE:

- **Install the bearing cap No. 1 within 5 minutes after applying seal packing.**
- **Do not expose the seal packing to engine oil within 2 hours after installing.**



(g) Install the 5 bearing caps in their proper locations.

(h) Apply a light coat of engine oil to the threads of the bearing cap bolts.



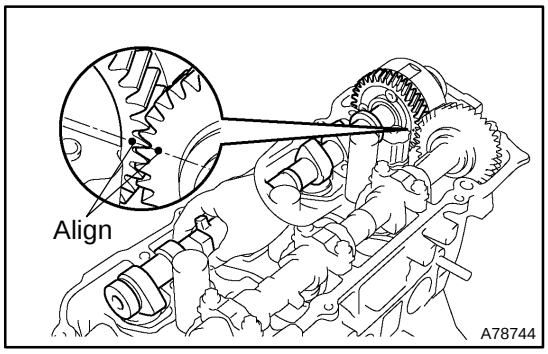
(i) Using several steps, install and tighten the 10 bearing cap bolts uniformly in the sequence shown in the illustration.
Torque: 16 N·m (163 kgf·cm, 12 ft·lbf)

30. INSTALL NO.3 CAMSHAFT SUB-ASSY

NOTICE:

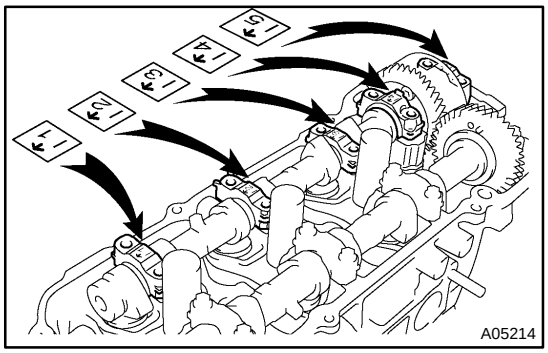
Since the thrust clearance of the camshaft is small, the camshaft must be kept level while being installed. If the camshaft is not kept level, the cylinder head or camshaft may be damaged. To avoid this, the following steps must be carried out.

(a) Apply new engine oil to the thrust portion and journal of the camshaft.



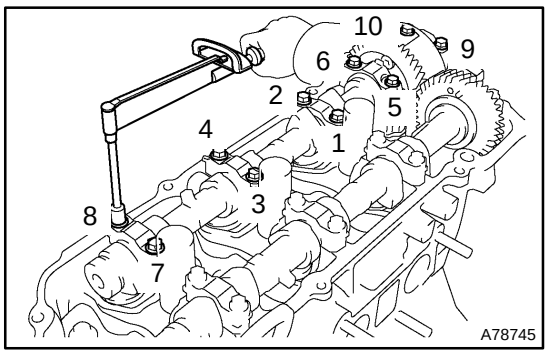
(b) Align the timing marks (1 dot marks) of the camshaft drive and driven gears.

(c) Place the camshaft to the cylinder head.



(d) Install the 5 bearing caps in their proper locations.

(e) Apply a light coat of engine oil to the threads of the bearing cap bolts.



(f) Using several steps, install and tighten the 10 bearing cap bolts uniformly in the sequence shown in the illustration.
Torque: 16 N·m (163 kgf·cm, 12 ft·lbf)

(g) Remove the service bolt.

31. INSTALL TIMING BELT NO.3 COVER (See page 14-93)

32. INSTALL CAMSHAFT TIMING PULLEY (See page 14-93)

SST 09960-10010 (09962-01000, 09963-01000), 09249-63010

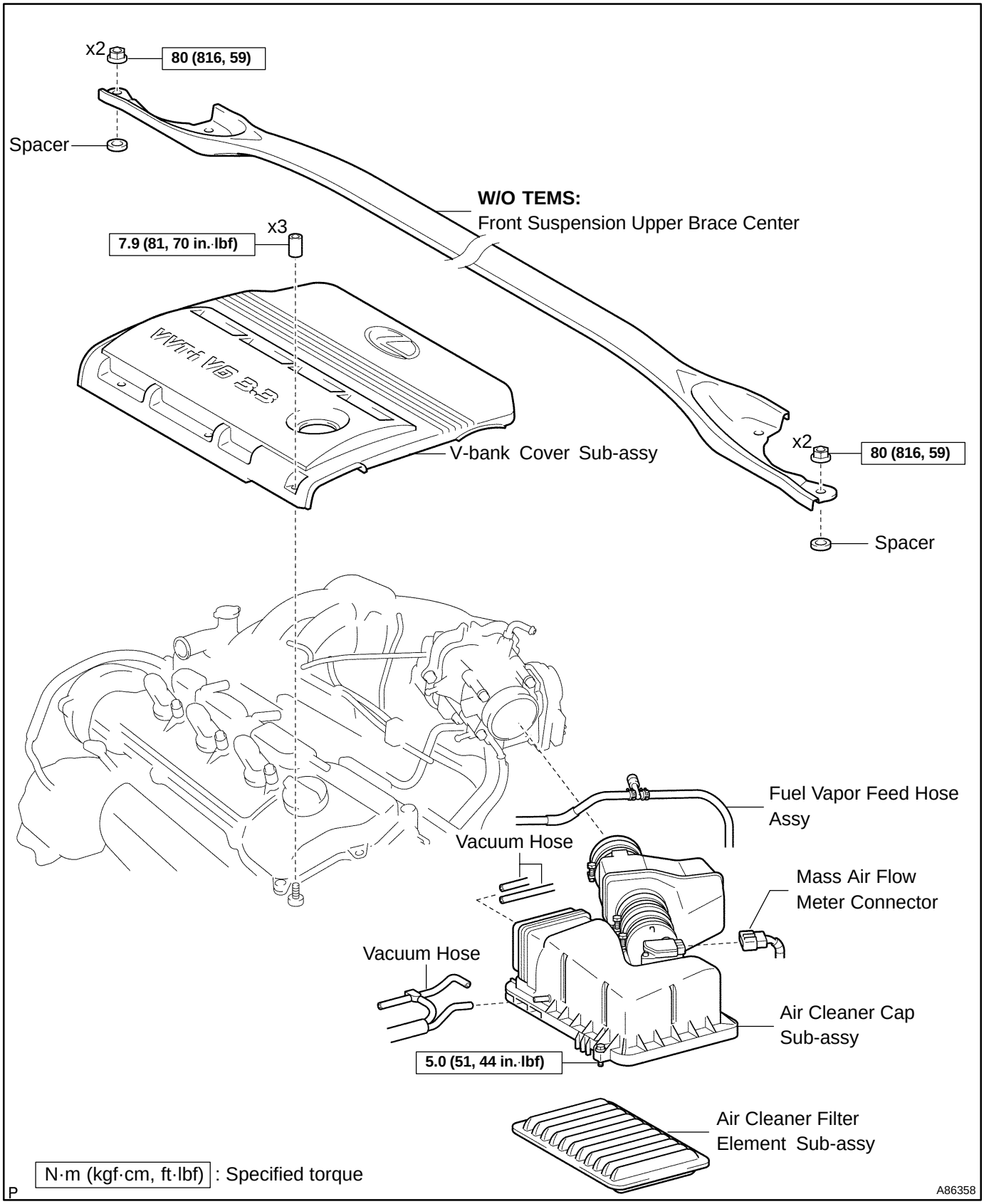
33. INSTALL TIMING BELT IDLER SUB-ASSY NO.2 (See page 14-93)

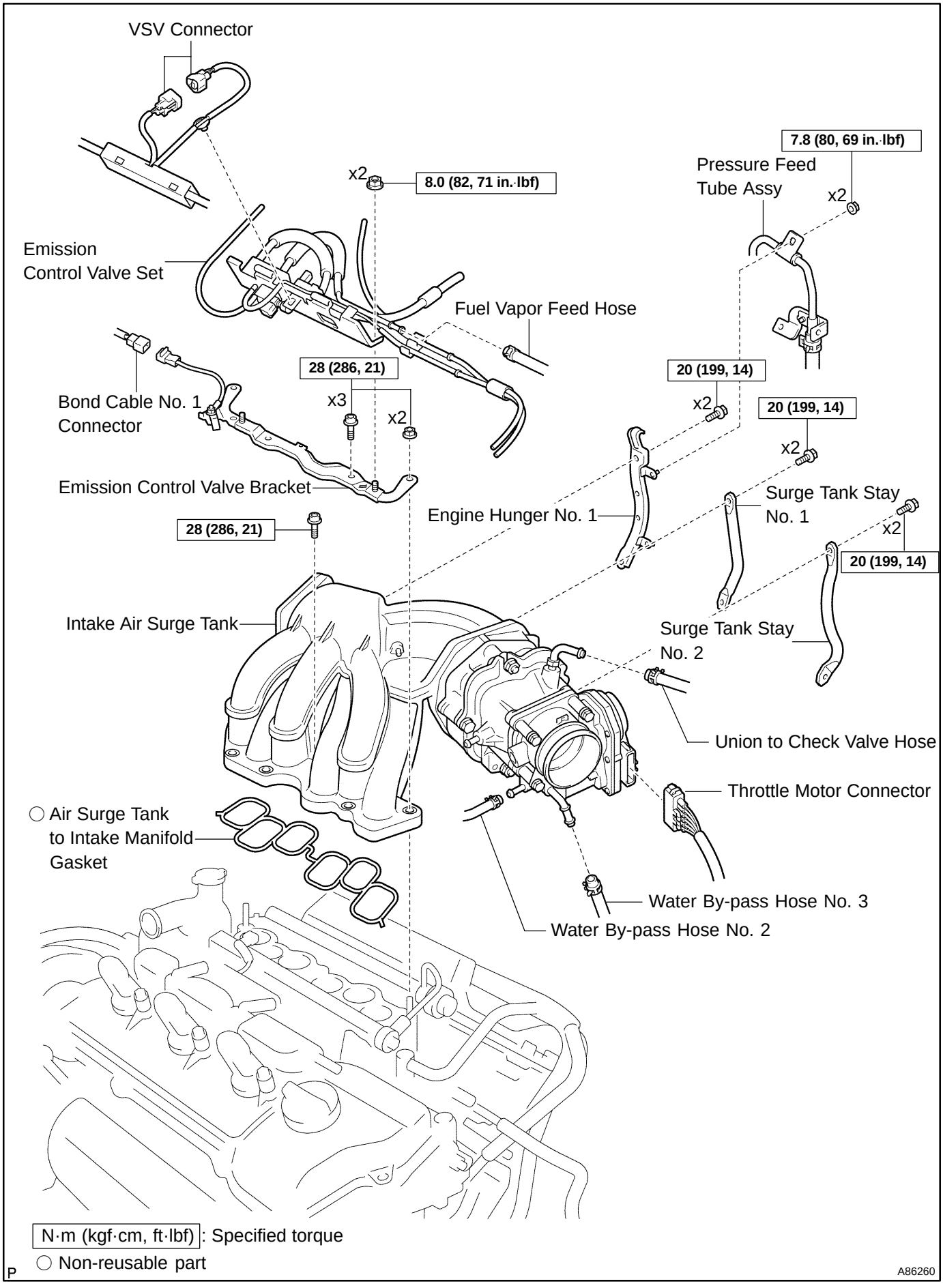
34. **INSPECT TIMING BELT (See page 14-79)**
35. **INSTALL TIMING BELT (See page 14-79)**
    SST 09960-10010 (09962-01000, 09963-01000)
36. **INSTALL TIMING BELT TENSIONER ASSY (See page 14-79)**
37. **INSTALL TIMING BELT GUIDE NO.2 (See page 14-79)**
38. **INSTALL ENGINE MOUNTING BRACKET RH (See page 14-79)**
39. **INSTALL TIMING BELT NO.2 COVER (See page 14-79)**
40. **INSTALL TIMING BELT NO.1 COVER (See page 14-79)**
41. **INSTALL CRANKSHAFT PULLEY (See page 14-79)**
    SST 09213-54015 (91651-60855), 09330-00021
42. **INSTALL GENERATOR BRACKET NO.2 (See page 14-79)**
43. **INSTALL ENGINE MOUNTING STAY NO.2 RH (See page 14-79)**
44. **INSTALL ENGINE MOVING CONTROL ROD (See page 14-79)**
45. **INSPECT VALVE CLEARANCE (See page 14-7)**
46. **ADJUST VALVE CLEARANCE (See page 14-7)**
    SST 09248-55040 (09248-05410, 09248-05420)
47. **INSTALL VANE PUMP V BELT (See page 14-5)**
48. **INSTALL V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (See page 14-5)**
49. **INSPECT DRIVE BELT DEFLECTION AND TENSION (See page 14-1)**
50. **INSTALL CYLINDER HEAD COVER SUB-ASSY LH (See page 14-7)**
51. **INSTALL IGNITION COIL ASSY (See page 14-7)**
52. **INSTALL V-BANK COVER SUB-ASSY (See page 10-1 1)**
53. **INSTALL FRONT WHEEL RH (See page 14-5)**
54. **ADD ENGINE COOLANT (See page 16-9)**
55. **CHECK FOR ENGINE COOLANT LEAKS (See page 16-1)**
56. **SYSTEM INITIALIZATION (See page 19-15)**

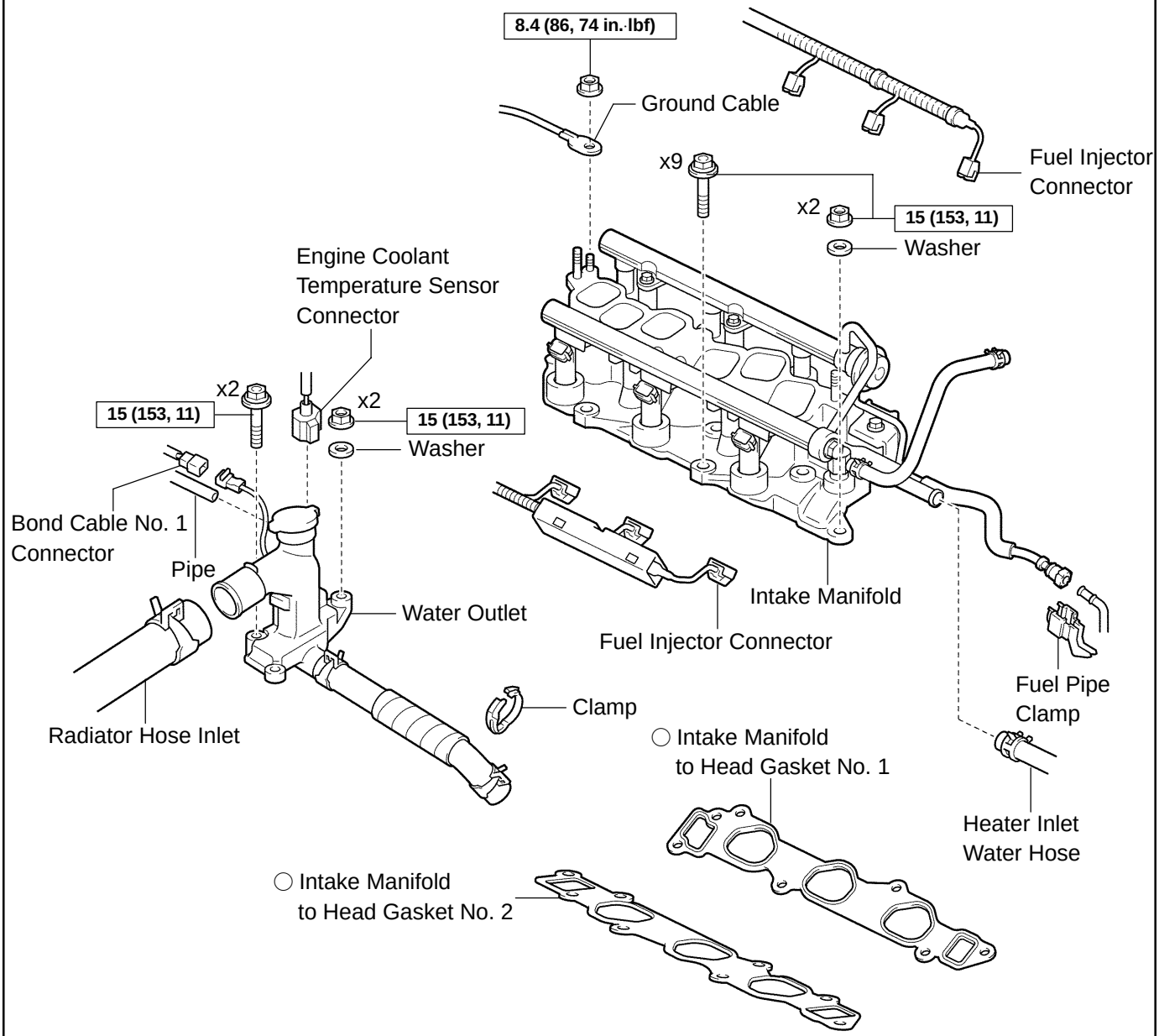
CYLINDER HEAD GASKET (3MZ-FE)

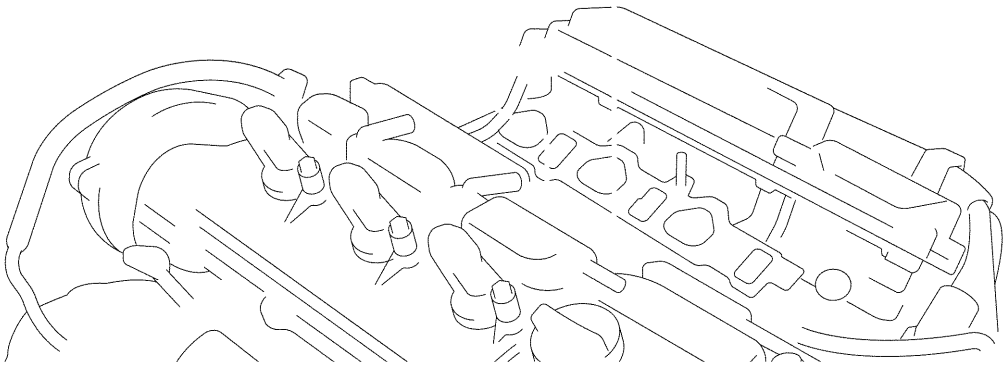
141JG-01

COMPONENTS



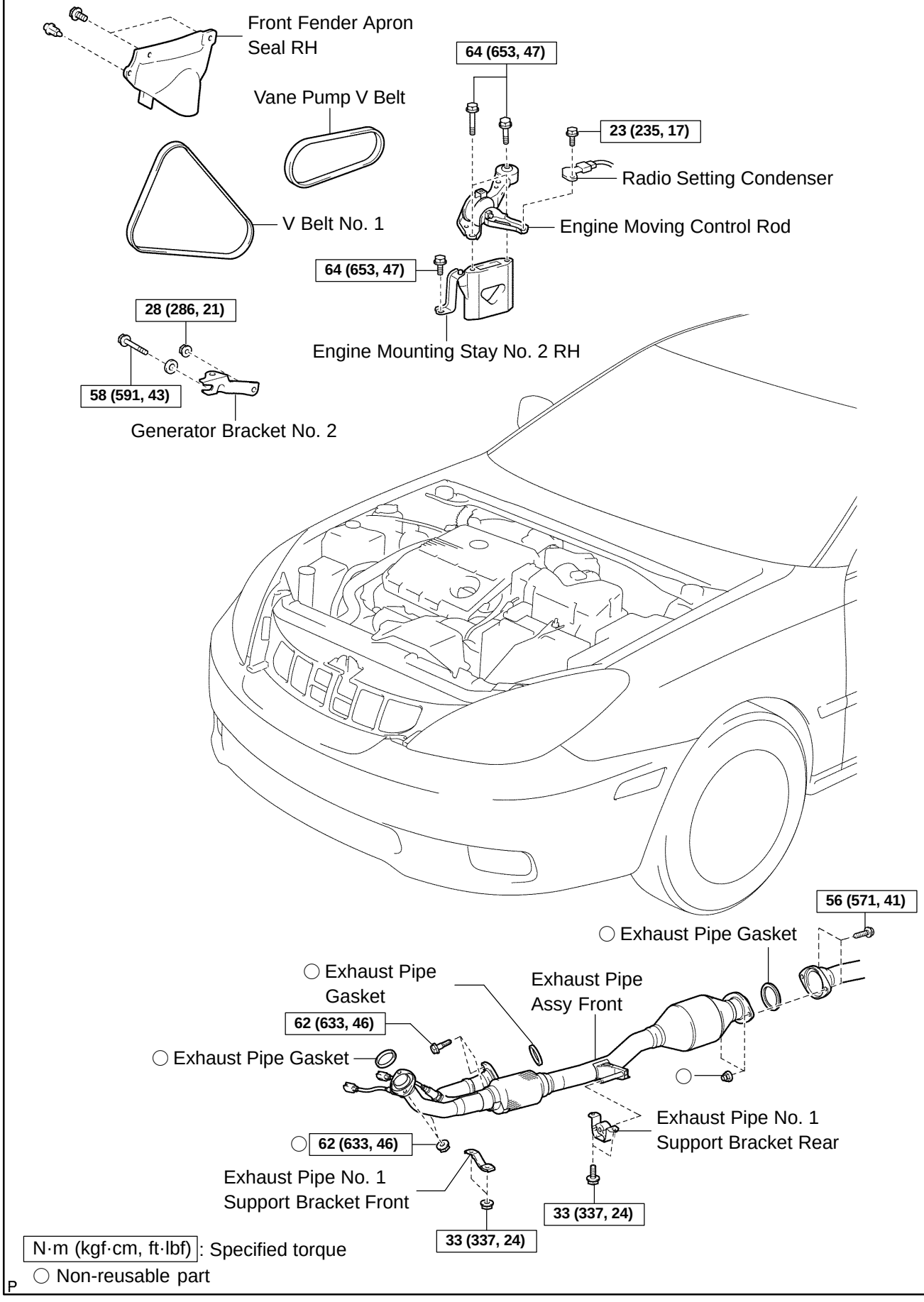

VSV Connector
x2
8.0 (82, 71 in.·lbf)
7.8 (80, 69 in.·lbf)
Pressure Feed Tube Assy
x2
Emission Control Valve Set
Fuel Vapor Feed Hose
28 (286, 21)
x3
x2
20 (199, 14)
x2
20 (199, 14)
x2
Bond Cable No. 1 Connector
Emission Control Valve Bracket
Engine Hunger No. 1
Surge Tank Stay No. 1
28 (286, 21)
x2
20 (199, 14)
Intake Air Surge Tank
Surge Tank Stay No. 2
Union to Check Valve Hose
Throttle Motor Connector
○ Air Surge Tank to Intake Manifold Gasket
Water By-pass Hose No. 3
Water By-pass Hose No. 2
N·m (kgf·cm, ft·lbf): Specified torque
○ Non-reusable part
P
A86260

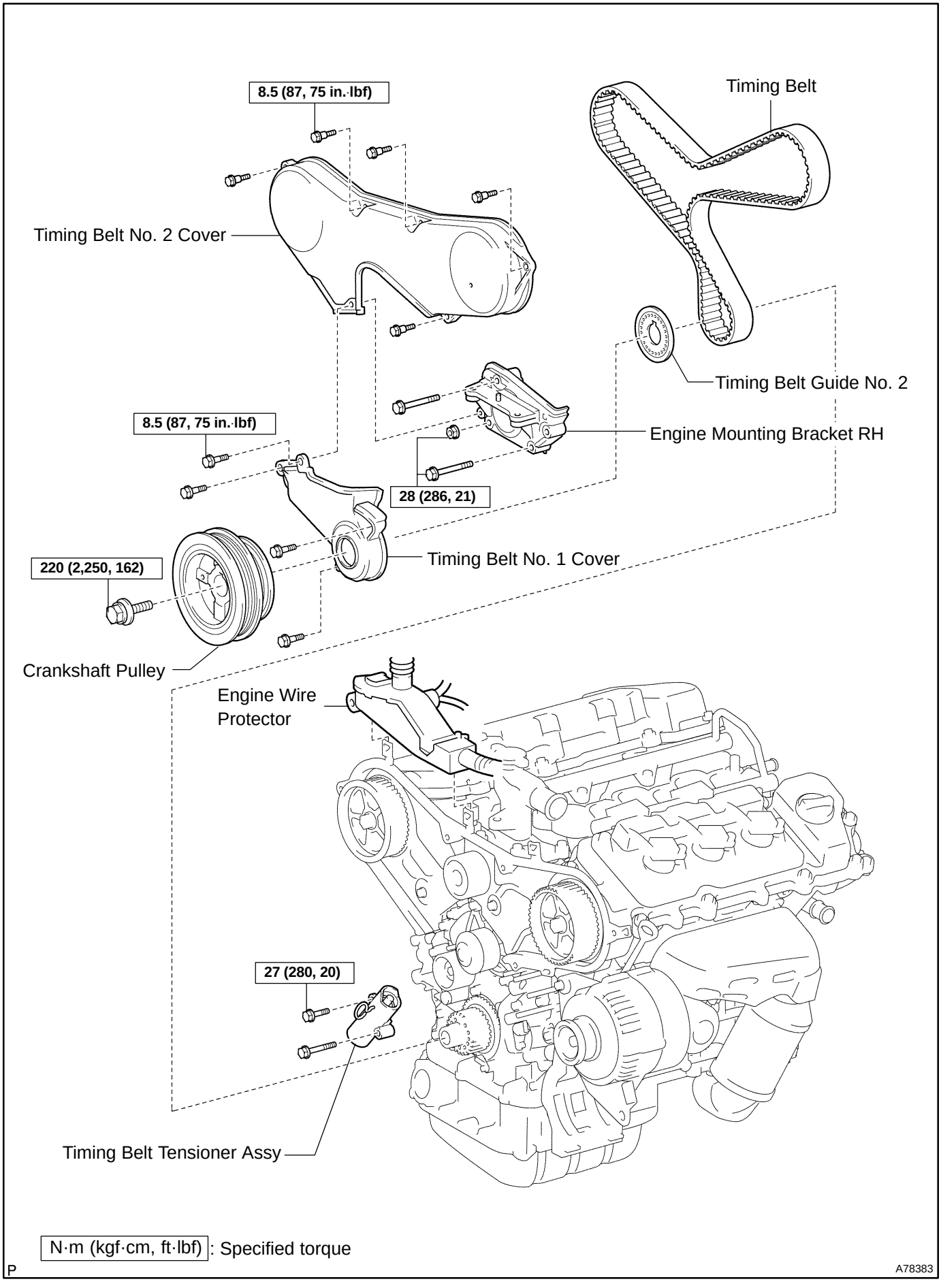


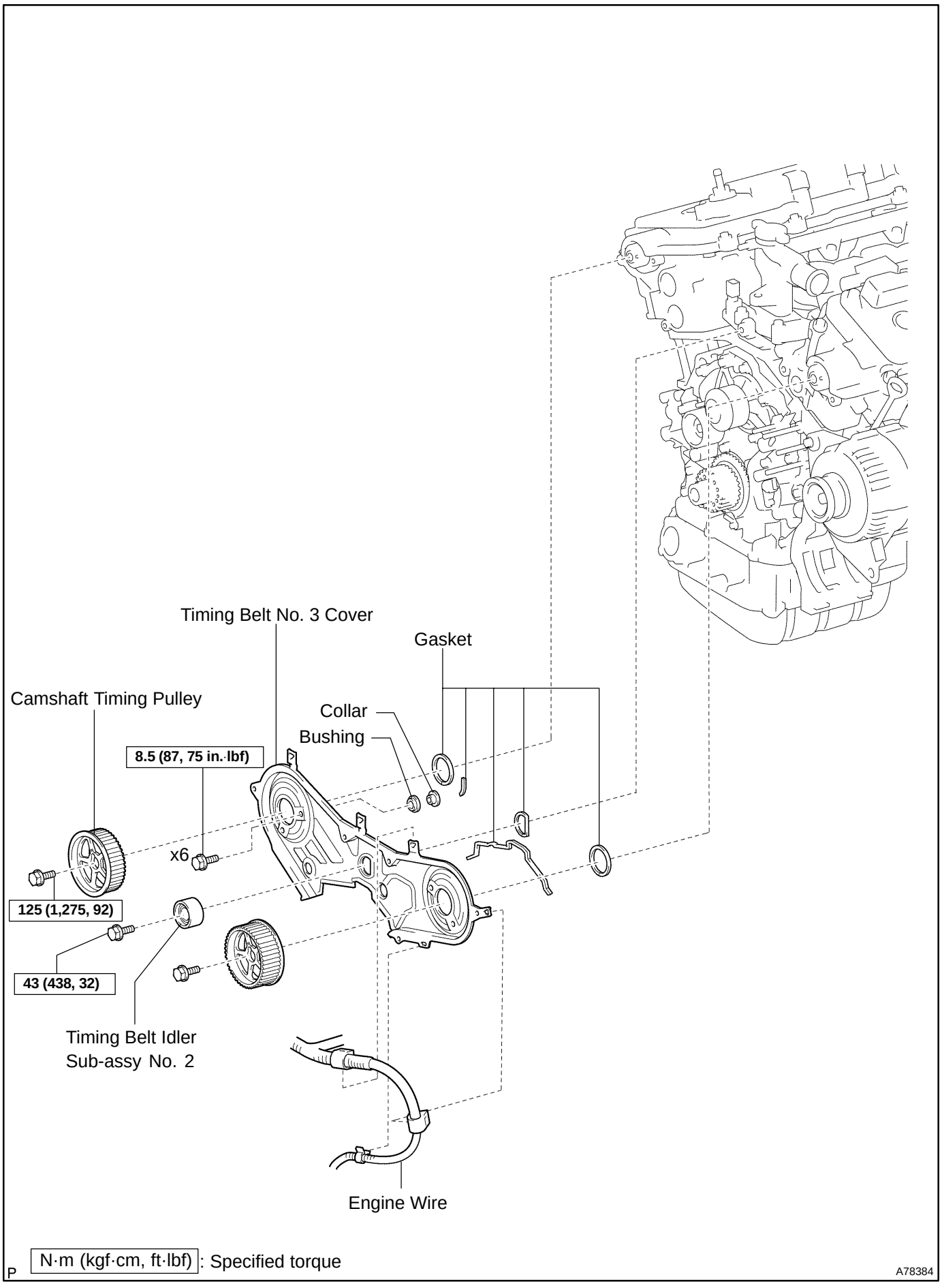


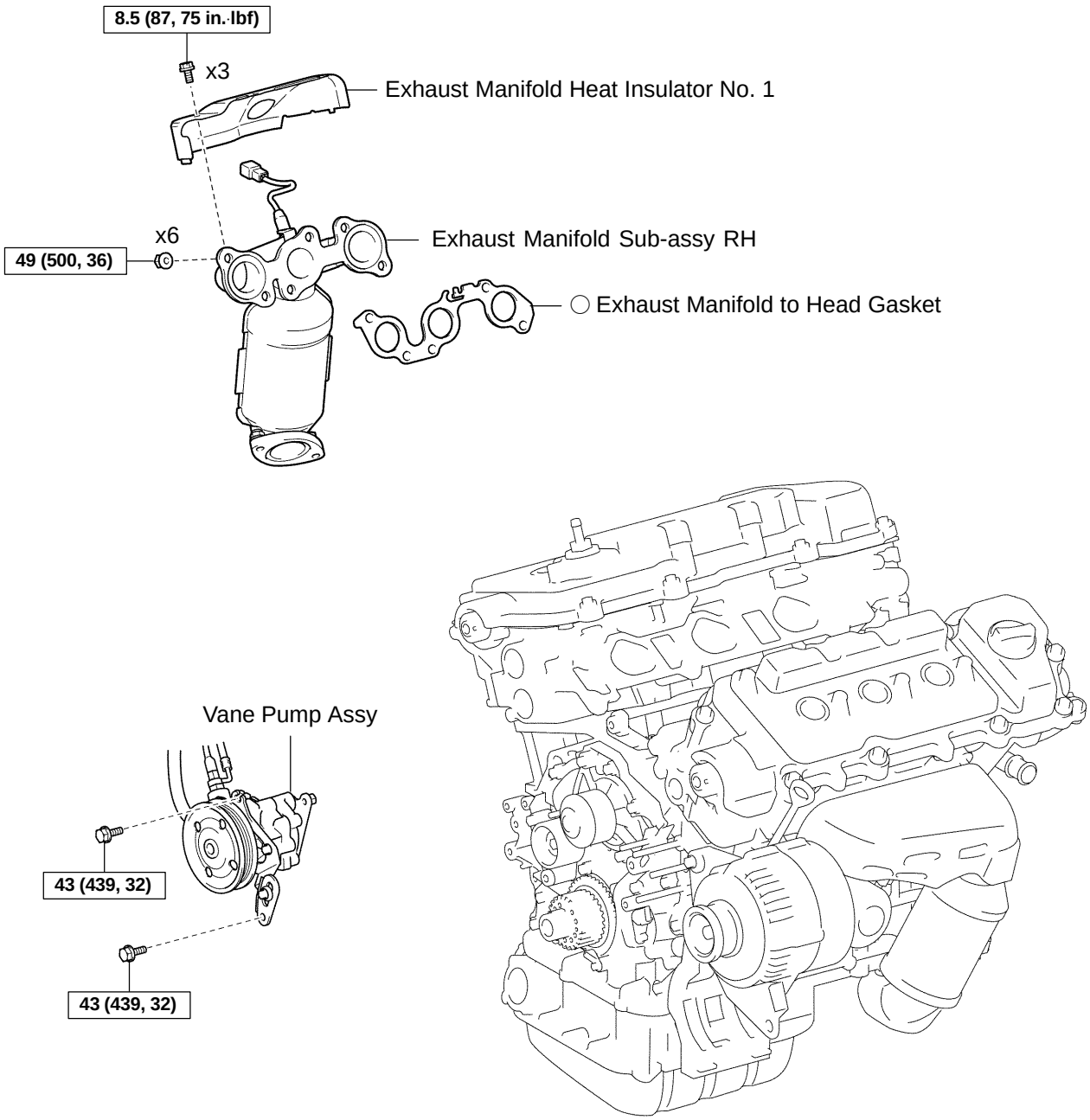
N·m (kgf·cm, ft·lbf): Specified torque
○ Non-reusable part

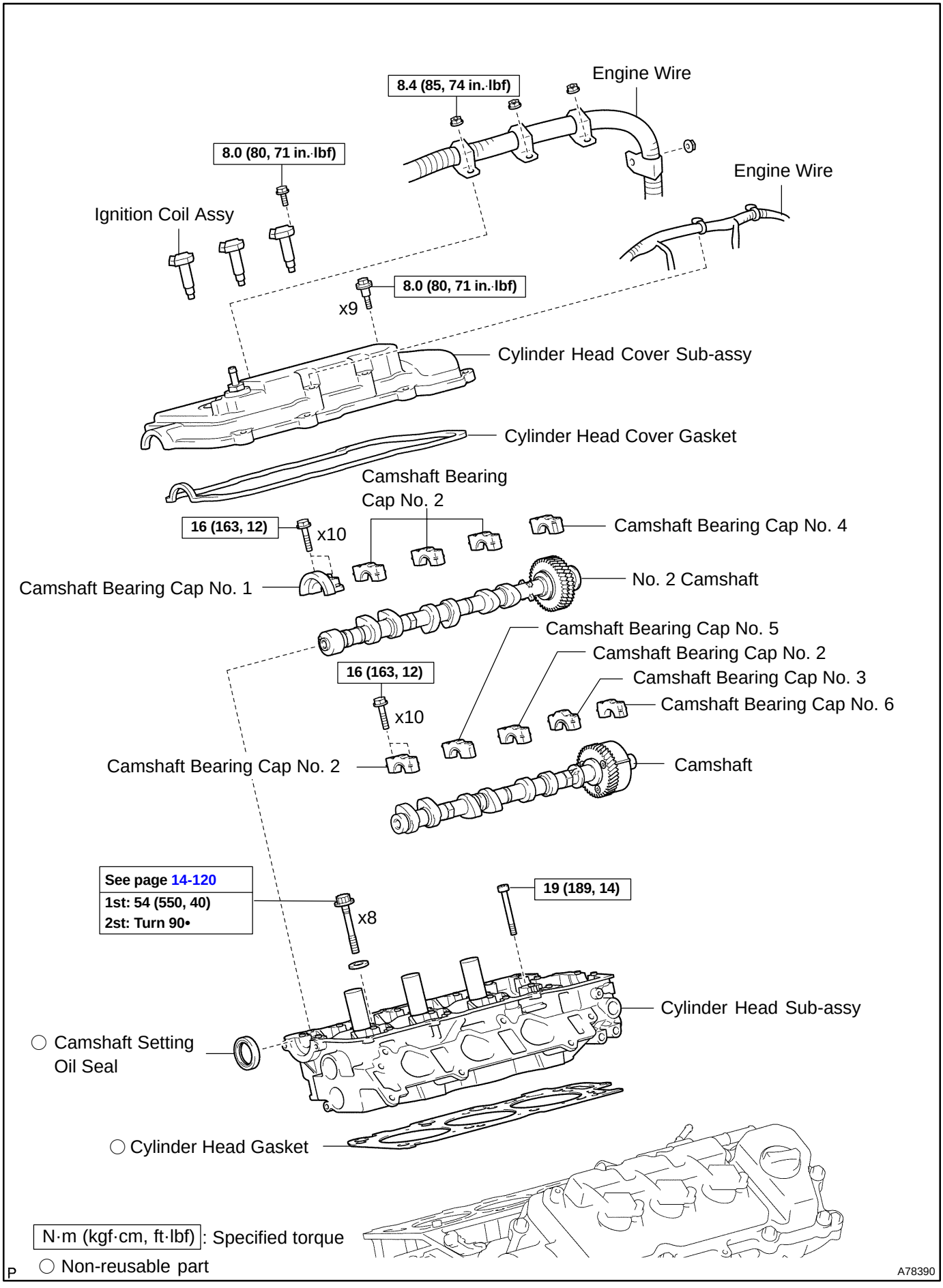
P A86583


Front Fender Apron Seal RH
Vane Pump V Belt
V Belt No. 1
64 (653, 47)
23 (235, 17)
Radio Setting Condenser
Engine Moving Control Rod
64 (653, 47)
Engine Mounting Stay No. 2 RH
28 (286, 21)
58 (591, 43)
Generator Bracket No. 2
56 (571, 41)
○ Exhaust Pipe Gasket
○ Exhaust Pipe Gasket
Exhaust Pipe Assy Front
62 (633, 46)
○ Exhaust Pipe Gasket
Exhaust Pipe No. 1 Support Bracket Rear
○ 62 (633, 46)
Exhaust Pipe No. 1 Support Bracket Front
33 (337, 24)
33 (337, 24)
N·m (kgf·cm, ft·lbf): Specified torque
○ Non-reusable part
P
A84917


8.5 (87, 75 in.·lbf)
Timing Belt
Timing Belt No. 2 Cover
Timing Belt Guide No. 2
8.5 (87, 75 in.·lbf)
Engine Mounting Bracket RH
28 (286, 21)
Timing Belt No. 1 Cover
220 (2,250, 162)
Crankshaft Pulley
Engine Wire Protector
27 (280, 20)
Timing Belt Tensioner Assy
N·m (kgf·cm, ft·lbf): Specified torque
P
A78383


Timing Belt No. 3 Cover
Gasket
Camshaft Timing Pulley
Collar
Bushing
8.5 (87, 75 in.·lbf)
x6
125 (1,275, 92)
43 (438, 32)
Timing Belt Idler
Sub-assy No. 2
Engine Wire
P
N·m (kgf·cm, ft·lbf): Specified torque
A78384


8.5 (87, 75 in.·lbf)
x3
Exhaust Manifold Heat Insulator No. 1
x6
49 (500, 36)
Exhaust Manifold Sub-assy RH
○ Exhaust Manifold to Head Gasket
Vane Pump Assy
43 (439, 32)
43 (439, 32)
N·m (kgf·cm, ft·lbf): Specified torque
○ Non-reusable part
P
A84918


8.4 (85, 74 in.·lbf)
Engine Wire
8.0 (80, 71 in.·lbf)
Engine Wire
Ignition Coil Assy
8.0 (80, 71 in.·lbf)
x9
Cylinder Head Cover Sub-assy
Cylinder Head Cover Gasket
Camshaft Bearing Cap No. 2
16 (163, 12)
x10
Camshaft Bearing Cap No. 4
Camshaft Bearing Cap No. 1
No. 2 Camshaft
Camshaft Bearing Cap No. 5
Camshaft Bearing Cap No. 2
Camshaft Bearing Cap No. 3
Camshaft Bearing Cap No. 6
16 (163, 12)
x10
Camshaft Bearing Cap No. 2
Camshaft
See page 14-120
1st: 54 (550, 40)
2st: Turn 90•
x8
19 (189, 14)
Cylinder Head Sub-assy
○ Camshaft Setting Oil Seal
○ Cylinder Head Gasket
N·m (kgf·cm, ft·lbf): Specified torque
○ Non-reusable part
P
A78390

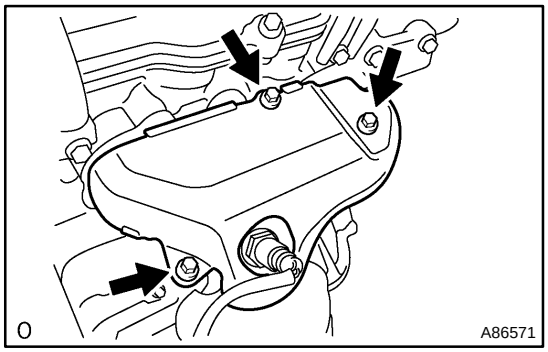
141JH-01

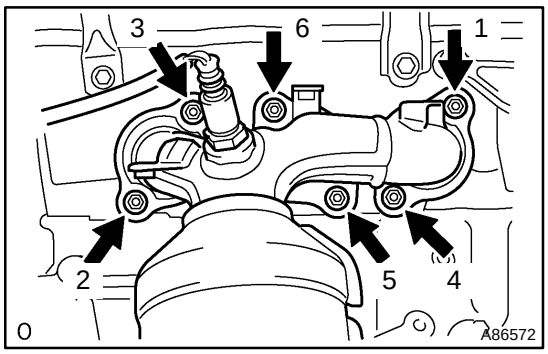
REPLACEMENT

1. **DISCHARGE FUEL SYSTEM PRESSURE (See page 11-1)**
2. **DISCONNECT BATTERY NEGATIVE TERMINAL**
3. **DRAIN ENGINE COOLANT (See page 16-9)**
4. **DRAIN ENGINE OIL (See page 17-20)**
5. **REMOVE FRONT WHEEL RH**
6. **REMOVE FRONT SUSPENSION UPPER BRACE CENTER (W/O TEMS) (See page 10-1 1)**
7. **REMOVE V-BANK COVER SUB-ASSY (See page 10-1 1)**
8. **REMOVE AIR CLEANER CAP SUB-ASSY (See page 10-1 1)**
9. **REMOVE EMISSION CONTROL VALVE SET (See page 11-13)**
10. **REMOVE INTAKE AIR SURGE TANK (See page 11-13)**
11. **REMOVE INTAKE MANIFOLD (See page 10-16)**
12. **REMOVE WATER OUTLET (See page 10-16)**
13. **REMOVE FRONT FENDER APRON SEAL RH**
14. **REMOVE V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (See page 14-5)**
15. **REMOVE VANE PUMP V BELT (See page 14-5)**
16. **REMOVE ENGINE MOVING CONTROL ROD (See page 14-79)**
17. **REMOVE ENGINE MOUNTING STAY NO.2 RH (See page 14-79)**
18. **REMOVE GENERATOR BRACKET NO.2 (See page 14-79)**
19. **REMOVE CRANKSHAFT PULLEY (See page 14-79)**
    SST 09213-54015 (91651-60855), 09330-00021, 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05031)
20. **REMOVE TIMING BELT NO.1 COVER**
21. **REMOVE TIMING BELT NO.2 COVER (See page 14-79)**
22. **REMOVE ENGINE MOUNTING BRACKET RH (See page 14-79)**
23. **REMOVE TIMING BELT GUIDE NO.2**
24. **REMOVE TIMING BELT (See page 14-79)**
25. **REMOVE TIMING BELT IDLER SUB-ASSY NO.2**
26. **REMOVE CAMSHAFT TIMING PULLEY (See page 14-93)**
    SST 09960-10010 (09962-01000, 09963-01000), 09249-63010
27. **REMOVE TIMING BELT NO.3 COVER (See page 14-93)**
28. **SEPARATE VANE PUMP ASSY**
29. **REMOVE EXHAUST PIPE NO.1 SUPPORT BRACKET FRONT (See page 15-2)**
30. **REMOVE EXHAUST PIPE NO.1 SUPPORT BRACKET REAR (See page 15-2)**
31. **REMOVE EXHAUST PIPE ASSY FRONT (See page 15-2)**
32. **REMOVE EXHAUST MANIFOLD HEAT INSULATOR NO.1**

(a) Disconnect the air fuel ratio sensor connector.

(b) Remove the 3 bolts and exhaust manifold heat insulator.





33. REMOVE EXHAUST MANIFOLD SUB-ASSY RH

(a) Using several steps, loosen and remove the 6 nuts in the sequence shown in the illustration.

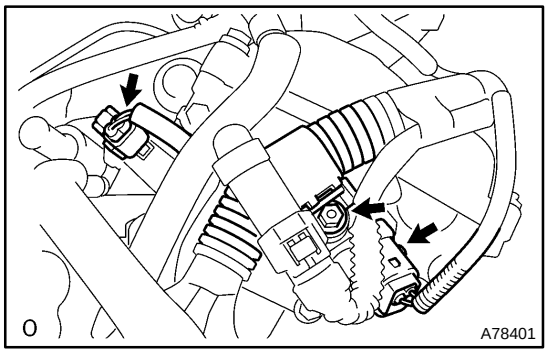
(b) Remove the exhaust manifold RH and gasket from the cylinder head RH.

34. REMOVE IGNITION COIL ASSY

35. REMOVE CYLINDER HEAD COVER SUB-ASSY (See page 14-7)

36. REMOVE CAMSHAFT (See page 14-93)

37. REMOVE NO.2 CAMSHAFT (See page 14-93)

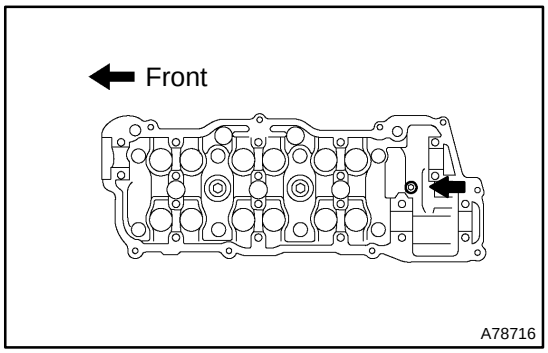


38. REMOVE CYLINDER HEAD SUB-ASSY

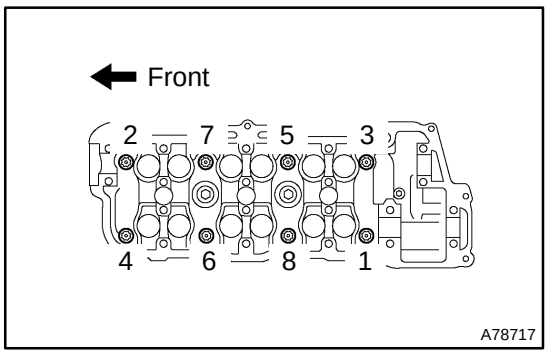
(a) Disconnect the VVT sensor connector.

(b) Disconnect the camshaft timing oil control valve connector.

(c) Remove the nut, then disconnect the engine wire harness clamp.



(d) Using a socket hexagon wrench 8, remove the hexagon bolt.

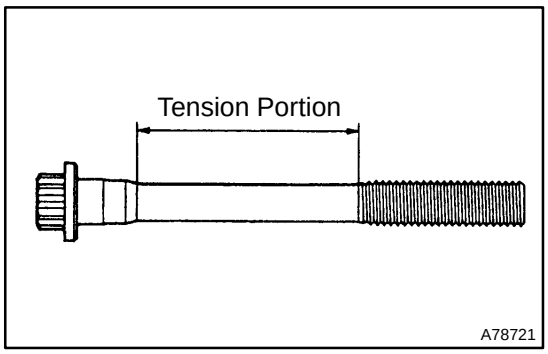


(e) Using several steps, loosen the 8 cylinder head bolts uniformly in the sequence shown in the illustration. Remove the 8 cylinder head bolts and plate washers.

NOTICE:

- **Be careful not to drop the washers into the cylinder head.**
- **Head warpage or cracking could result from removing the bolts in an incorrect order.**

39. REMOVE CYLINDER HEAD GASKET

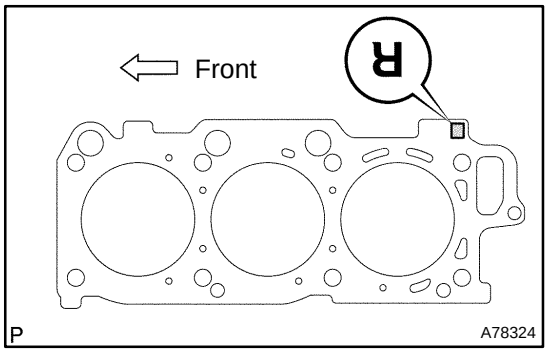


40. INSPECT CYLINDER HEAD SET BOLT

(a) Using vernier calipers, measure the tension portion diameter of the bolt.

Standard outside diameter:
8.95 to 9.05 mm (0.3524 to 0.3563 in.)
Minimum outside diameter: 8.75 mm (0.3445 in.)

If the diameter is less than minimum, replace the bolt.



41. INSTALL CYLINDER HEAD GASKET

(a) Place a new cylinder head gasket on the cylinder block with the R mark upward.

NOTICE:

- **Remove any oil from the contact surface.**
- **Be careful of the installing orientation.**
- **Place the cylinder head on the gasket carefully in order not to damage the gasket at the bottom part of the head.**

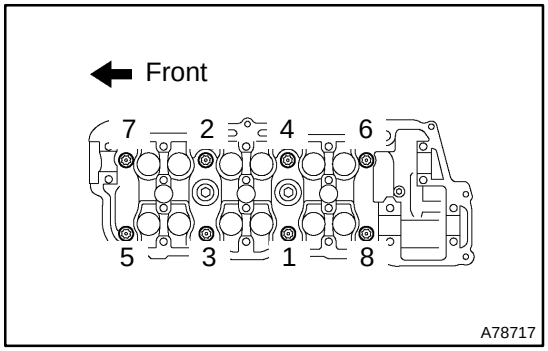
42. INSTALL CYLINDER HEAD SUB-ASSY

NOTICE:

The cylinder head bolts are tightened in 2 successive steps.

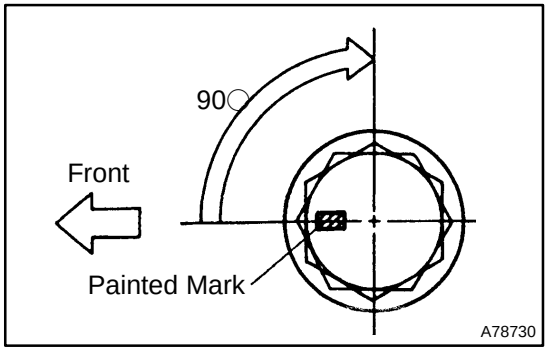
(a) Apply a light coat of engine oil to the threads of the cylinder head bolts.

(b) Install the plate washers to the cylinder head bolts.



(c) Using several steps, install and tighten the 8 cylinder head bolts uniformly in the sequence shown in the illustration.

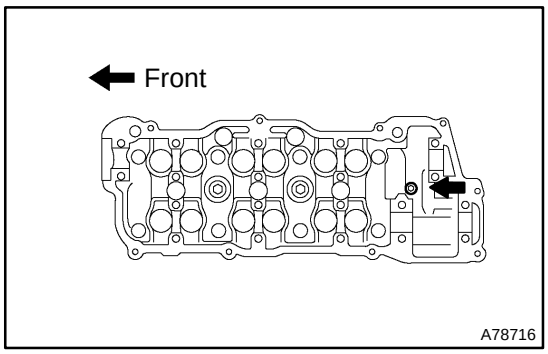
Torque: 54 N·m (550 kgf·cm, 40 ft·lbf)



(d) Mark the front side of each cylinder head bolt head with paint as shown in the illustration.

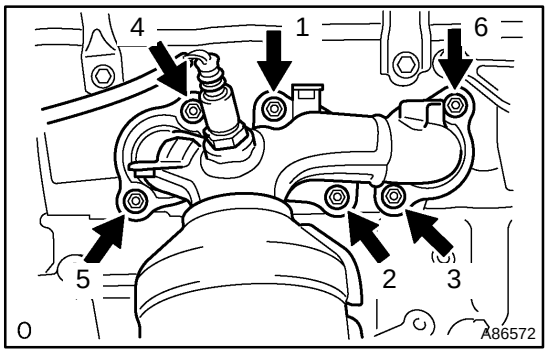
(e) Retighten the cylinder head bolts by 90° in the same sequence as step (c).

(f) Check that each painted mark is now at a 90° angle to the front.



(g) Using a socket hexagon wrench 8, install the hexagon bolt.
Torque: 19 N·m (189 kgf·cm, 14 ft·lbf)
(h) Connect the engine wire harness clamp with the nut.
Torque: 8.4 N·m (85 kgf·cm, 74 in.·lbf)

43. INSTALL NO.2 CAMSHAFT (See page 14-93)
44. INSTALL CAMSHAFT (See page 14-93)
45. INSTALL CYLINDER HEAD COVER SUB-ASSY (See page 14-7)
46. INSTALL IGNITION COIL ASSY (See page 14-7)



47. INSTALL EXHAUST MANIFOLD SUB-ASSY RH
(a) Install a new gasket and the exhaust manifold RH with the 6 nuts. Using several steps, tighten the nuts uniformly in the sequence shown in the illustration.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)
(b) Retighten nuts 1 and 2 shown in the illustration.

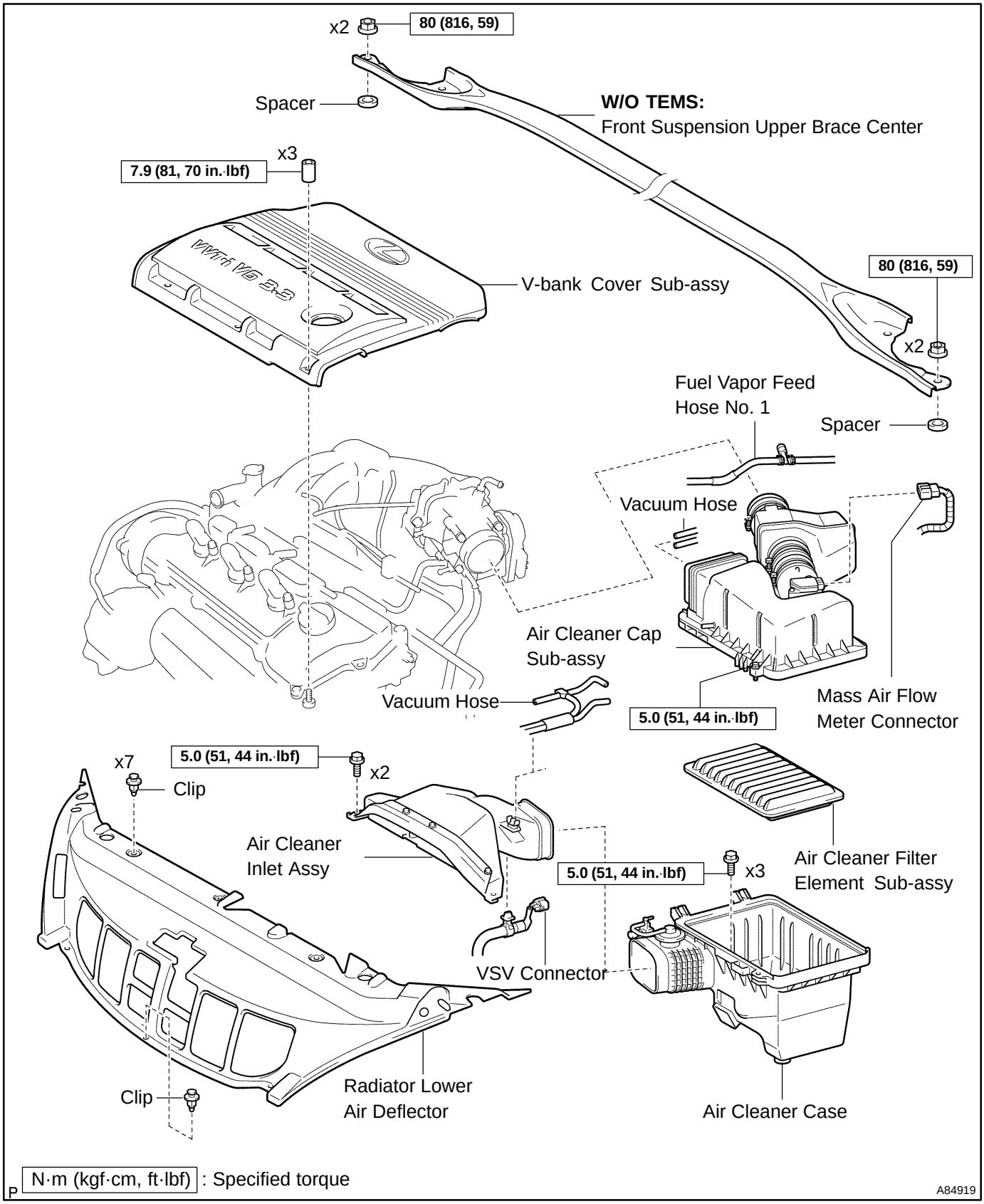
48. INSTALL EXHAUST MANIFOLD HEAT INSULATOR NO.1
Torque: 8.5 N·m (87 kgf·cm, 75 ft·lbf)
49. INSTALL EXHAUST PIPE ASSY FRONT (See page 15-2)
50. INSTALL EXHAUST PIPE NO.1 SUPPORT BRACKET REAR (See page 15-2)
51. INSTALL EXHAUST PIPE NO.1 SUPPORT BRACKET FRONT (See page 15-2)
52. INSTALL VANE PUMP ASSY (See page 14-29)
53. INSTALL TIMING BELT NO.3 COVER (See page 14-93)
54. INSTALL CAMSHAFT TIMING PULLEY (See page 14-93)
SST 09960-10010 (09962-01000, 09963-01000), 09249-63010
55. INSTALL TIMING BELT IDLER SUB-ASSY NO.2 (See page 14-93)
56. INSPECT TIMING BELT (See page 14-79)
57. INSTALL TIMING BELT (See page 14-79)
SST 09960-10010 (09962-01000, 09963-01000)
58. INSTALL TIMING BELT TENSIONER ASSY (See page 14-79)
59. INSTALL TIMING BELT GUIDE NO.2 (See page 14-79)
60. INSTALL ENGINE MOUNTING BRACKET RH (See page 14-79)
61. INSTALL TIMING BELT NO.2 COVER (See page 14-79)
62. INSTALL TIMING BELT NO.1 COVER (See page 14-79)
63. INSTALL CRANKSHAFT PULLEY (See page 14-79)
SST 09213-54015 (91651-60855), 09330-00021
64. INSTALL GENERATOR BRACKET NO.2 (See page 14-79)
65. INSTALL ENGINE MOUNTING STAY NO.2 RH (See page 14-79)
66. INSTALL ENGINE MOVING CONTROL ROD (See page 14-79)
67. INSTALL VANE PUMP V BELT (See page 14-5)

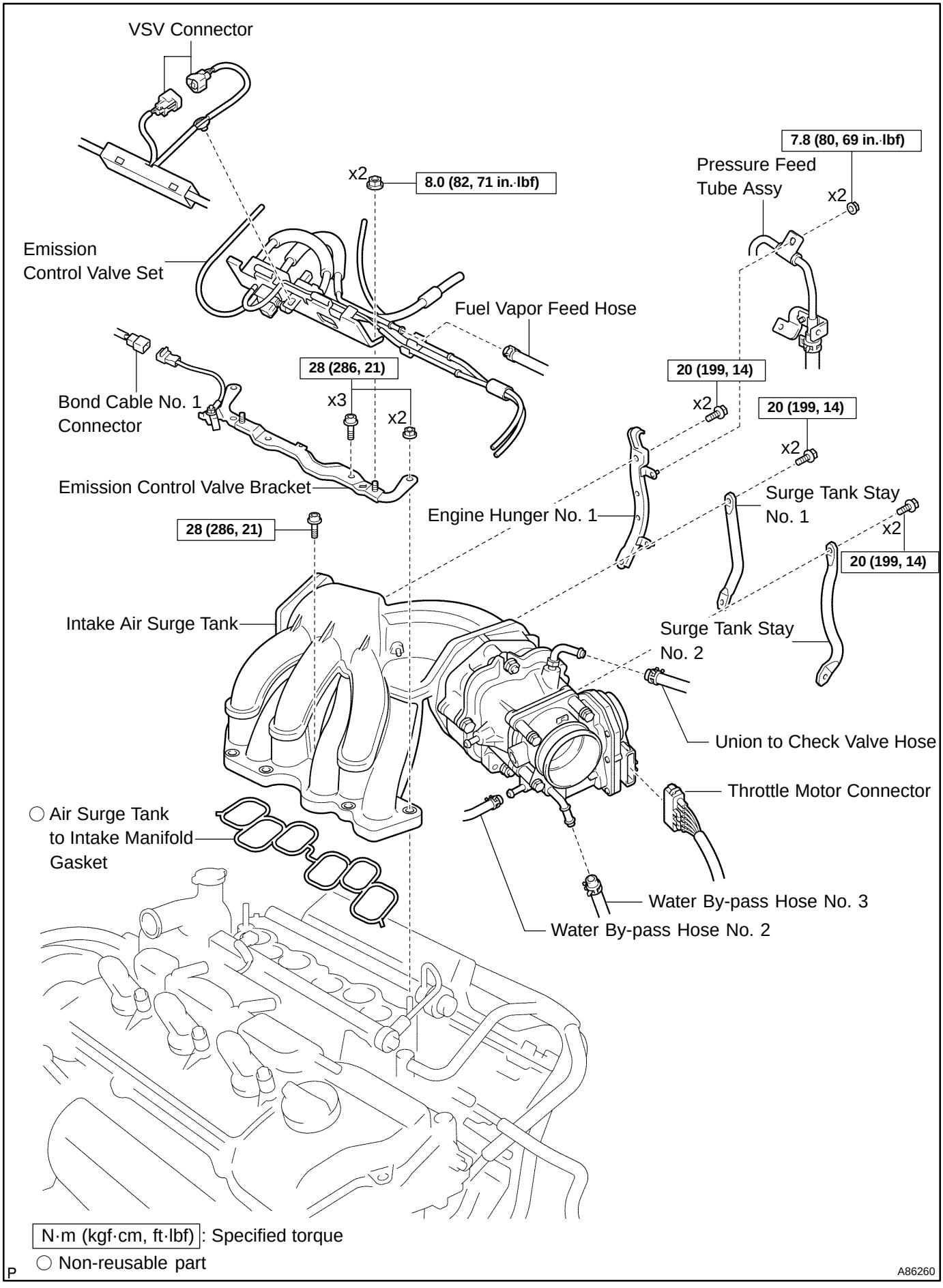
68. **INSTALL V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (See page 14-5)**
69. **INSPECT DRIVE BELT DEFLECTION AND TENSION (See page 14-1)**
70. **INSTALL WATER OUTLET (See page 10-16)**
71. **INSTALL INTAKE MANIFOLD (See page 10-16)**
72. **INSTALL INTAKE AIR SURGE TANK (See page 11-13)**
73. **INSTALL EMISSION CONTROL VALVE SET (See page 11-13)**
74. **INSTALL AIR CLEANER CAP SUB-ASSY (See page 10-1 1)**
75. **CHECK CONNECTION OF VACUUM HOSE (See page 14-29)**
76. **INSTALL V-BANK COVER SUB-ASSY (See page 10-1 1)**
77. **INSTALL FRONT SUSPENSION UPPER BRACE CENTER (W/O TEMS) (See page 10-1 1)**
78. **INSTALL FRONT WHEEL RH (See page 14-5)**
79. **ADD ENGINE OIL (See page 17-20)**
80. **ADD ENGINE COOLANT (See page 16-9)**
81. **CHECK FOR ENGINE OIL LEAKS**
82. **CHECK FOR ENGINE COOLANT LEAKS (See page 16-1)**
83. **INSPECT FOR FUEL LEAKS**
84. **CHECK FOR EXHAUST GAS LEAKS**
85. **INSPECT IGNITION TIMING (See page 14-1)**
    SST 09843-18040
86. **INSPECT ENGINE IDLE SPEED (See page 14-1)**
87. **INSPECT COMPRESSION (See page 14-1)**
    SST 09992-00500
88. **INSPECT CO/HC (See page 14-1)**
89. **SYSTEM INITIALIZATION (See page 19-15)**

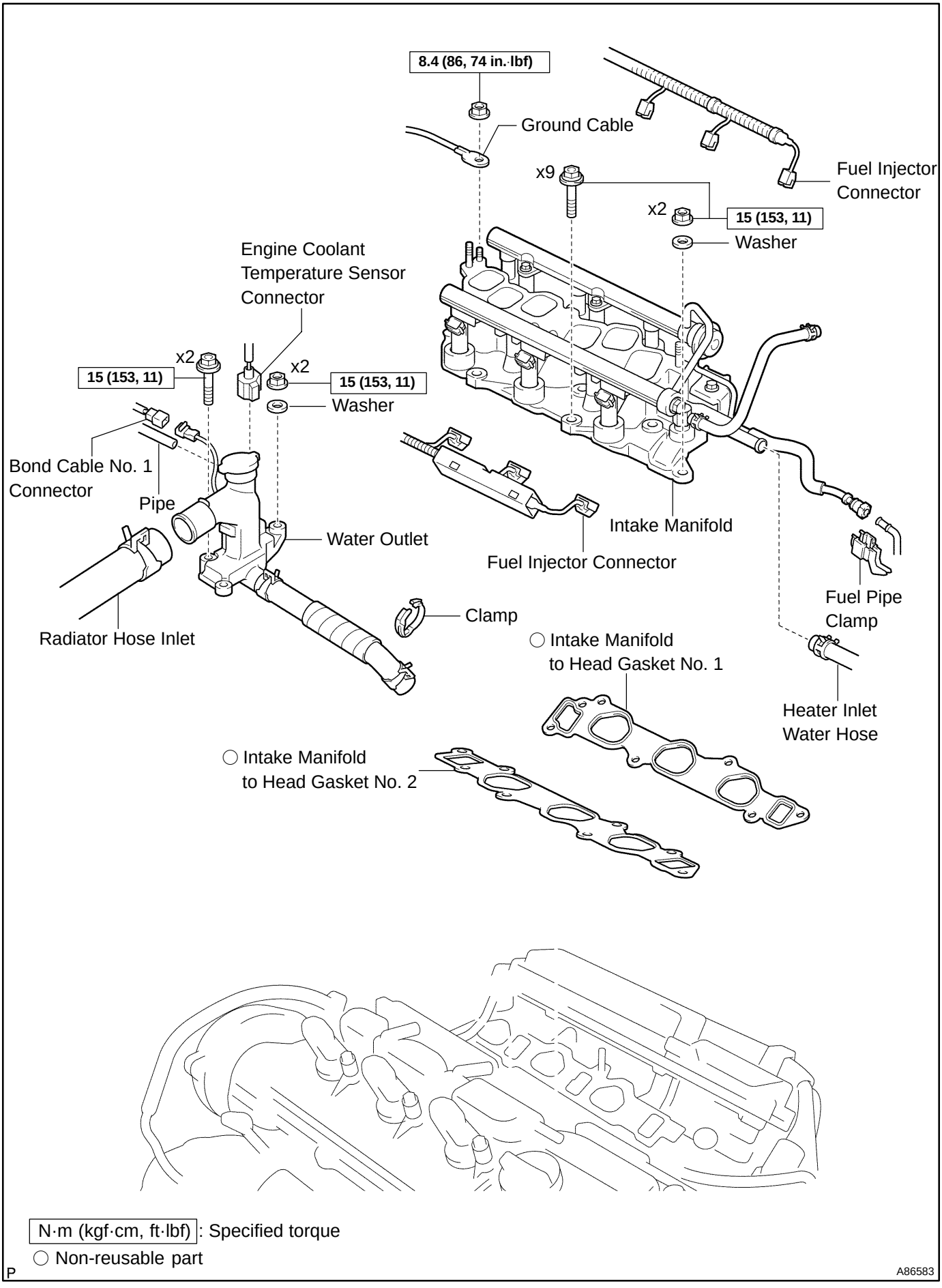
CYLINDER HEAD GASKET NO.2 (3MZ-FE)

141JI-01

COMPONENTS

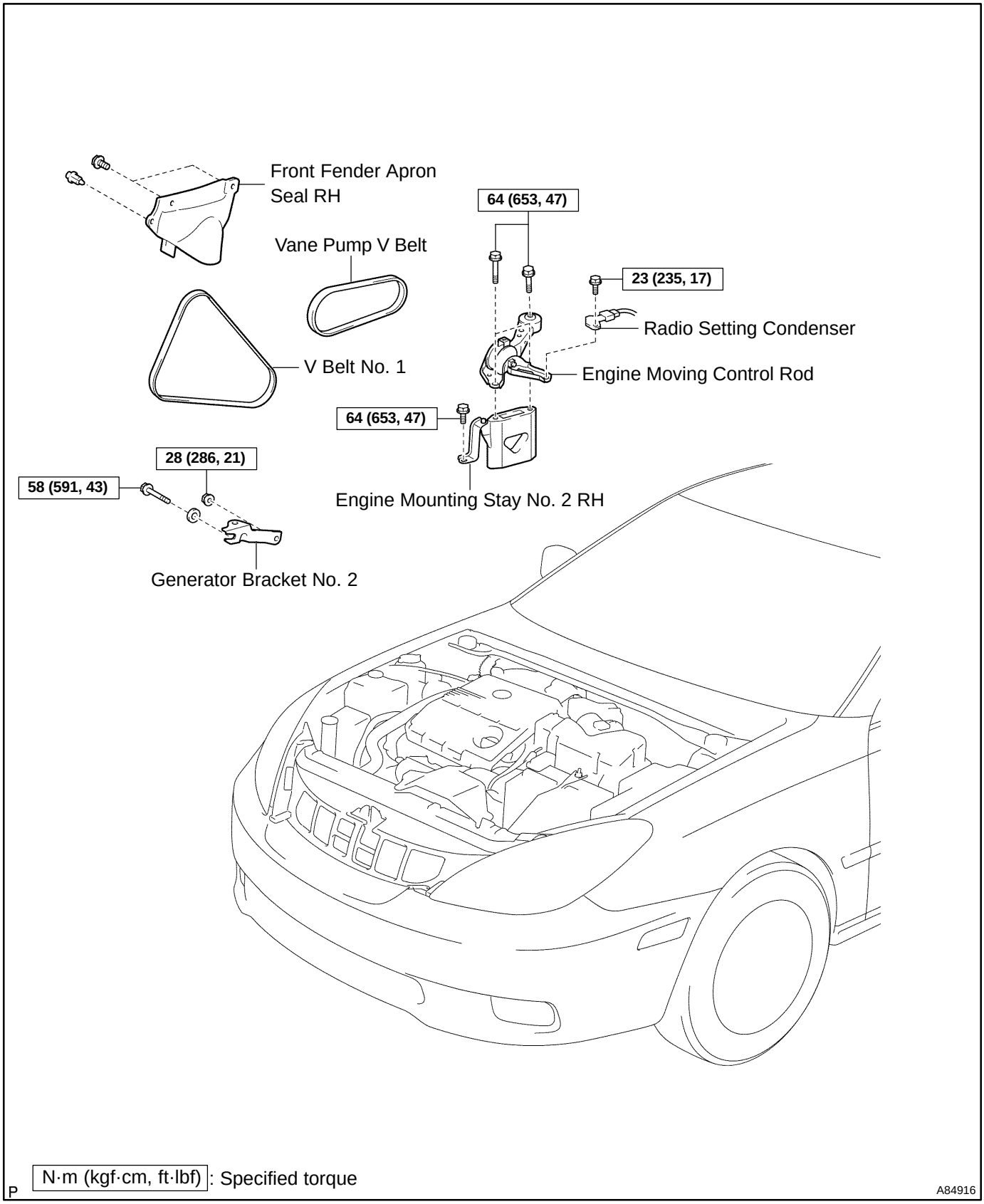


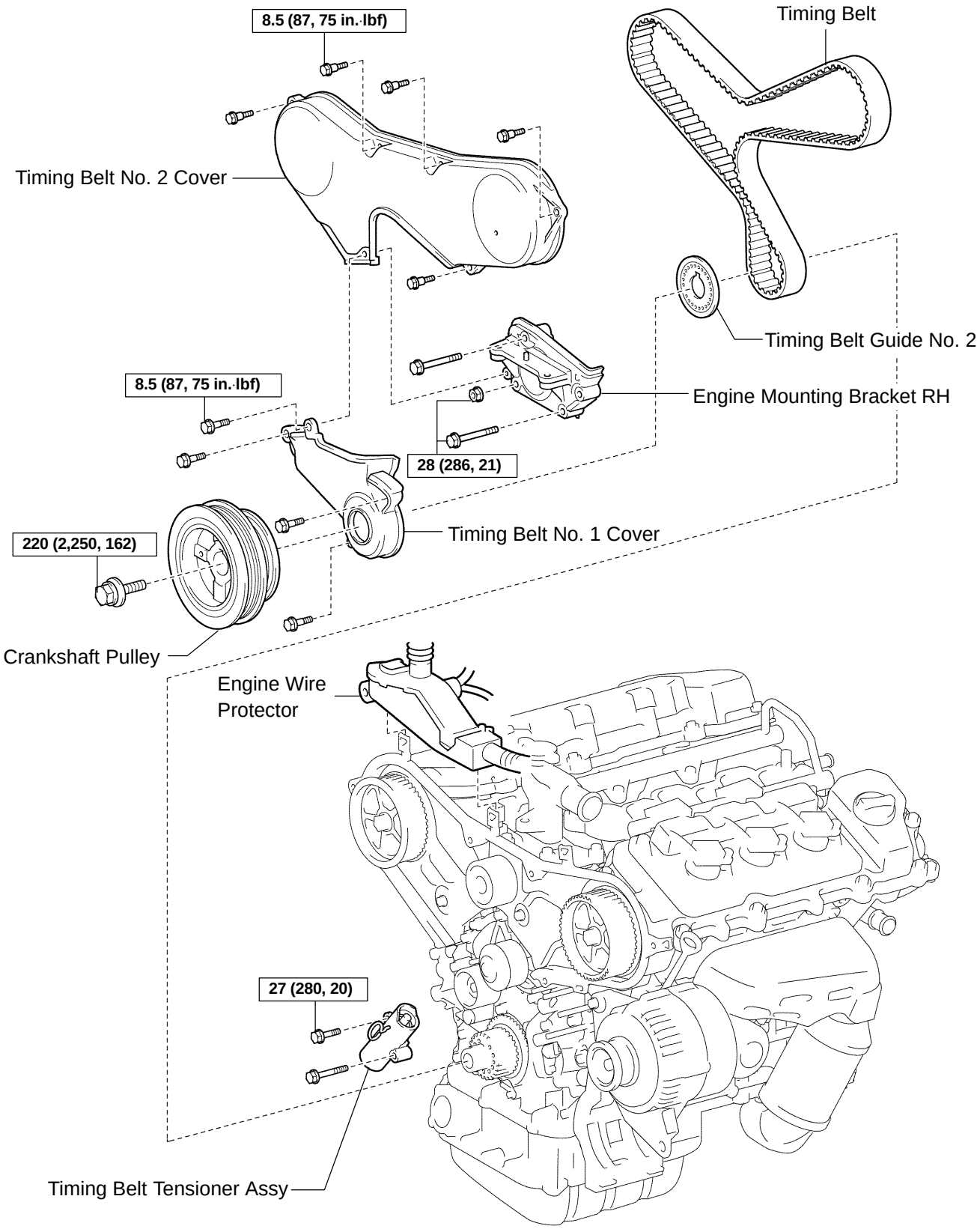

VSV Connector
x2
8.0 (82, 71 in.·lbf)
7.8 (80, 69 in.·lbf)
Pressure Feed Tube Assy
x2
Emission Control Valve Set
Fuel Vapor Feed Hose
28 (286, 21)
x3
x2
20 (199, 14)
x2
20 (199, 14)
x2
Bond Cable No. 1 Connector
Emission Control Valve Bracket
Engine Hunger No. 1
Surge Tank Stay No. 1
28 (286, 21)
x2
20 (199, 14)
Intake Air Surge Tank
Surge Tank Stay No. 2
Union to Check Valve Hose
Throttle Motor Connector
○ Air Surge Tank to Intake Manifold Gasket
Water By-pass Hose No. 3
Water By-pass Hose No. 2
N·m (kgf·cm, ft·lbf): Specified torque
○ Non-reusable part
P
A86260

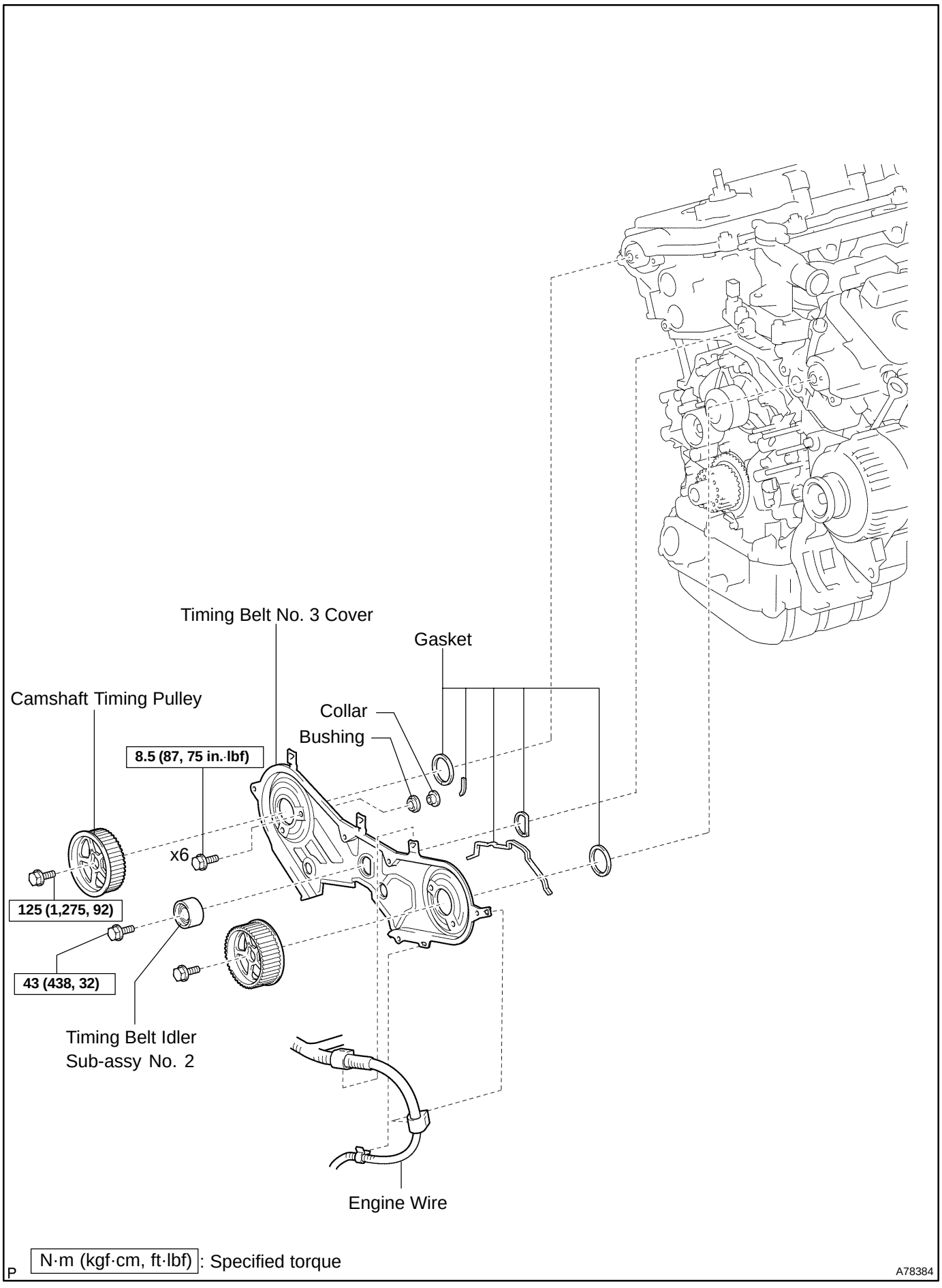


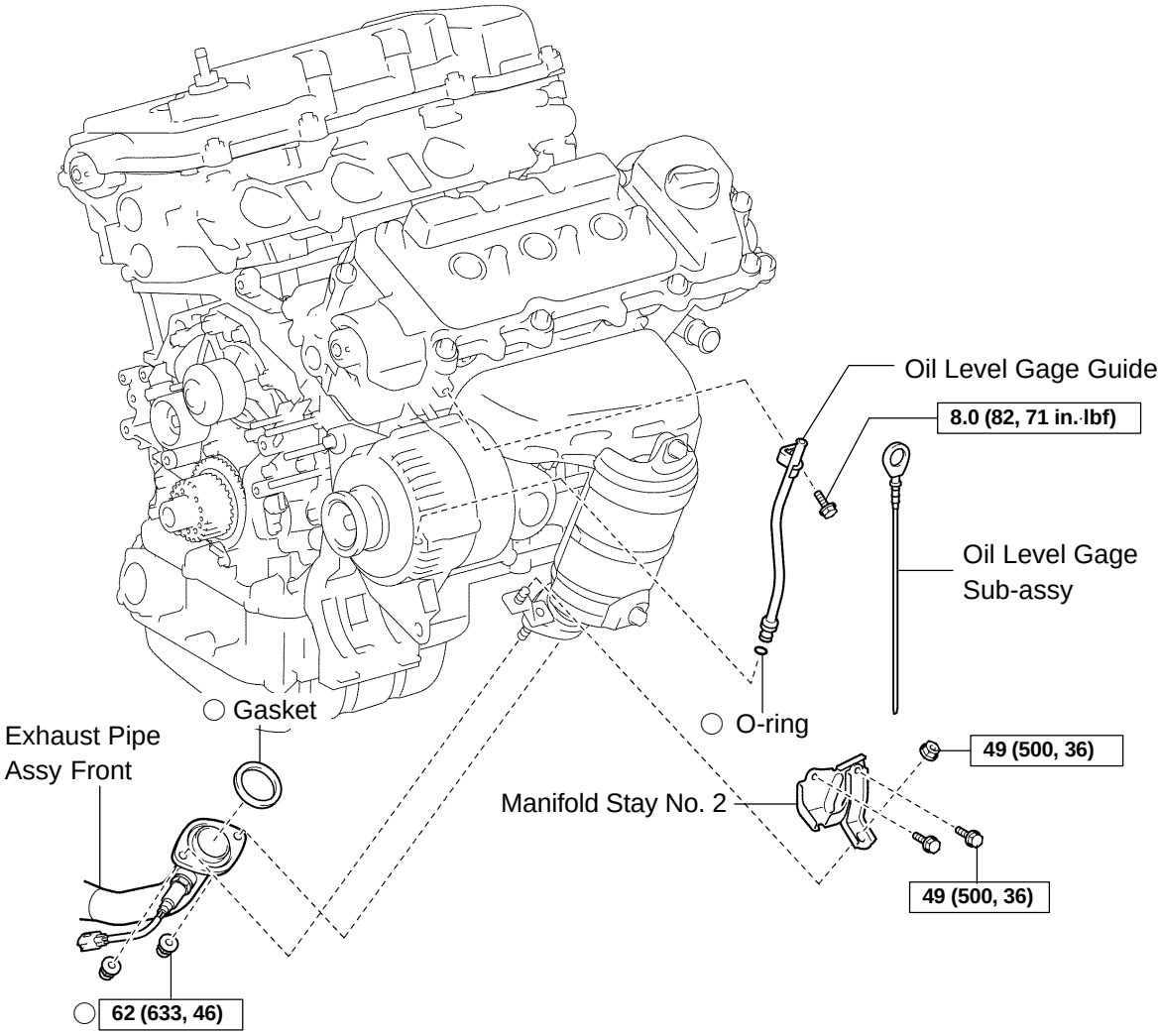
N·m (kgf·cm, ft·lbf): Specified torque
○ Non-reusable part

P A86583


Front Fender Apron Seal RH
Vane Pump V Belt
V Belt No. 1
64 (653, 47)
23 (235, 17)
Radio Setting Condenser
Engine Moving Control Rod
64 (653, 47)
Engine Mounting Stay No. 2 RH
28 (286, 21)
58 (591, 43)
Generator Bracket No. 2
N·m (kgf·cm, ft·lbf): Specified torque
A84916

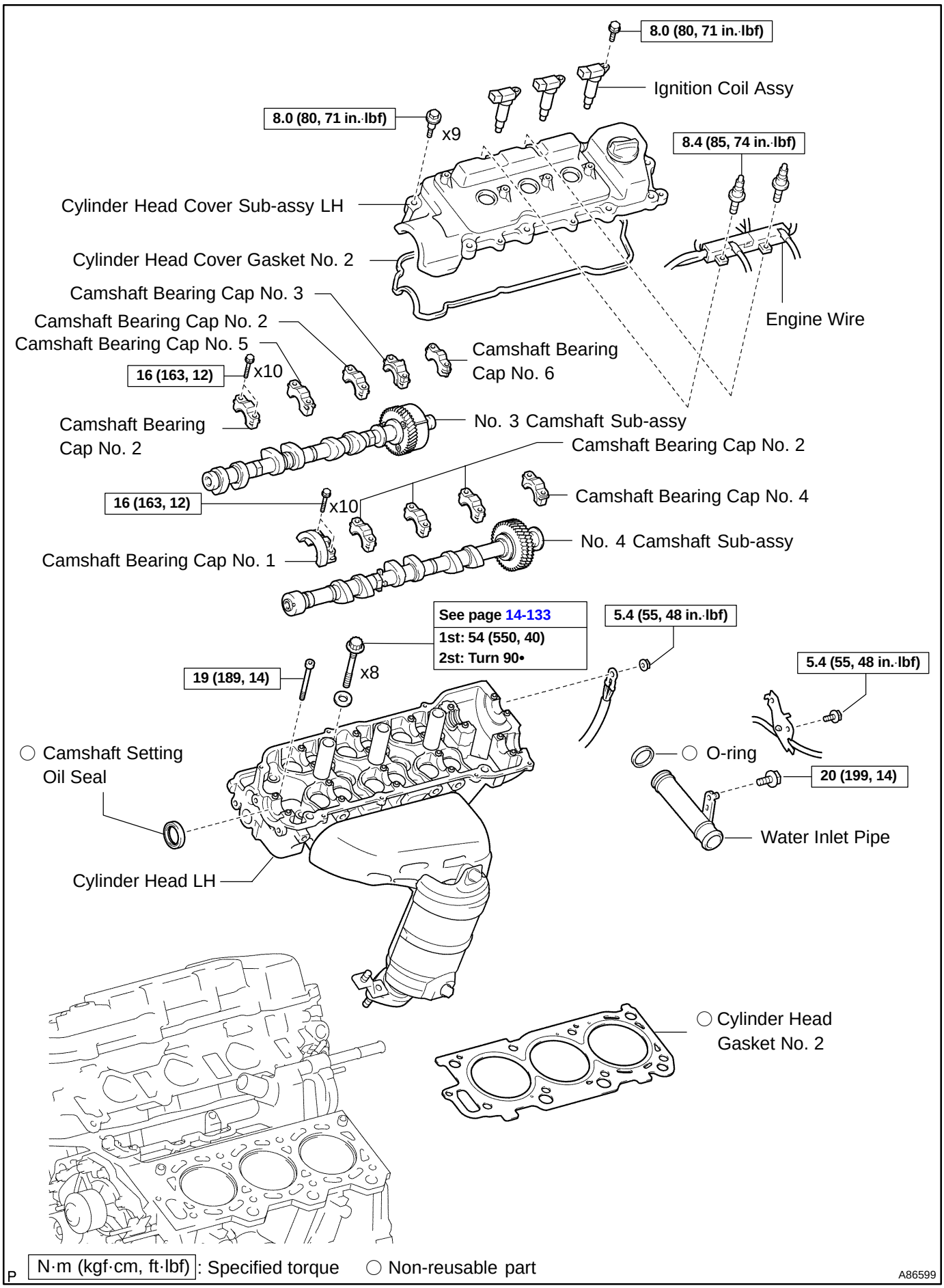

8.5 (87, 75 in.·lbf)
Timing Belt
Timing Belt No. 2 Cover
Timing Belt Guide No. 2
8.5 (87, 75 in.·lbf)
Engine Mounting Bracket RH
28 (286, 21)
Timing Belt No. 1 Cover
220 (2,250, 162)
Crankshaft Pulley
Engine Wire Protector
27 (280, 20)
Timing Belt Tensioner Assy
N·m (kgf·cm, ft·lbf): Specified torque
P
A78383


Timing Belt No. 3 Cover
Gasket
Camshaft Timing Pulley
Collar
Bushing
8.5 (87, 75 in.·lbf)
x6
125 (1,275, 92)
43 (438, 32)
Timing Belt Idler
Sub-assy No. 2
Engine Wire
P
N·m (kgf·cm, ft·lbf): Specified torque
A78384



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

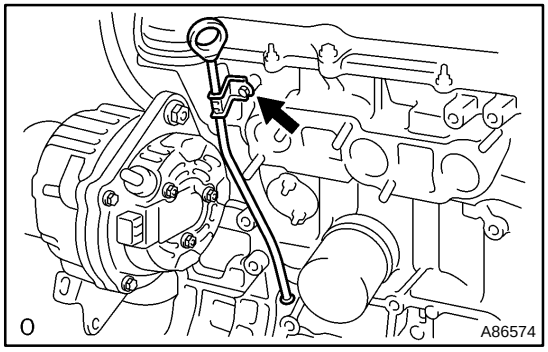
A84920


8.0 (80, 71 in.·lbf)
Ignition Coil Assy
8.0 (80, 71 in.·lbf)
x9
8.4 (85, 74 in.·lbf)
Cylinder Head Cover Sub-assy LH
Cylinder Head Cover Gasket No. 2
Camshaft Bearing Cap No. 3
Camshaft Bearing Cap No. 2
Camshaft Bearing Cap No. 5
Engine Wire
Camshaft Bearing Cap No. 6
16 (163, 12)
x10
Camshaft Bearing Cap No. 2
No. 3 Camshaft Sub-assy
Camshaft Bearing Cap No. 2
16 (163, 12)
x10
Camshaft Bearing Cap No. 4
Camshaft Bearing Cap No. 1
No. 4 Camshaft Sub-assy
See page 14-133
1st: 54 (550, 40)
2st: Turn 90•
5.4 (55, 48 in.·lbf)
19 (189, 14)
x8
5.4 (55, 48 in.·lbf)
○ Camshaft Setting Oil Seal
○ O-ring
20 (199, 14)
Water Inlet Pipe
Cylinder Head LH
○ Cylinder Head Gasket No. 2
P
N·m (kgf·cm, ft·lbf): Specified torque
○ Non-reusable part
A86599

141JJ-01

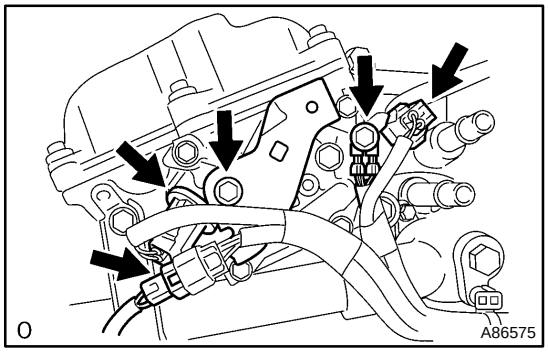
REPLACEMENT

1. DISCHARGE FUEL SYSTEM PRESSURE (See page 11-1)
2. DISCONNECT BATTERY NEGATIVE TERMINAL
3. DRAIN ENGINE COOLANT (See page 16-9)
4. DRAIN ENGINE OIL (See page 17-20)
5. REMOVE FRONT WHEEL RH
6. REMOVE RADIATOR LOWER AIR DEFLECTOR (See page 19-5)
7. REMOVE FRONT SUSPENSION UPPER BRACE CENTER (W/O TEMS) (See page 10-1 1)
8. REMOVE V-BANK COVER SUB-ASSY (See page 10-1 1)
9. REMOVE AIR CLEANER INLET ASSY (See page 19-5)
10. REMOVE AIR CLEANER CAP SUB-ASSY (See page 10-1 1)
11. REMOVE AIR CLEANER CASE (See page 19-5)
12. REMOVE EMISSION CONTROL VALVE SET (See page 11-13)
13. REMOVE INTAKE AIR SURGE TANK (See page 11-13)
14. REMOVE INTAKE MANIFOLD (See page 10-16)
15. REMOVE WATER OUTLET (See page 10-16)
16. REMOVE FRONT FENDER APRON SEAL RH
17. REMOVE V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (See page 14-5)
18. REMOVE VANE PUMP V BELT (See page 14-5)
19. REMOVE ENGINE MOVING CONTROL ROD (See page 14-79)
20. REMOVE ENGINE MOUNTING STAY NO.2 RH (See page 14-79)
21. REMOVE GENERATOR BRACKET NO.2 (See page 14-79)
22. REMOVE CRANKSHAFT PULLEY (See page 14-79)
    SST 09213-54015 (91651-60855), 09330-00021, 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05031)
23. REMOVE TIMING BELT NO.1 COVER
24. REMOVE TIMING BELT NO.2 COVER (See page 14-79)
25. REMOVE ENGINE MOUNTING BRACKET RH (See page 14-79)
26. REMOVE TIMING BELT GUIDE NO.2
27. REMOVE TIMING BELT (See page 14-79)
28. REMOVE TIMING BELT IDLER SUB-ASSY NO.2
29. REMOVE CAMSHAFT TIMING PULLEY (See page 14-93)
    SST 09960-10010 (09962-01000, 09963-01000), 09249-63010
30. REMOVE TIMING BELT NO.3 COVER (See page 14-93)
31. REMOVE MANIFOLD STAY NO.2 (See page 14-29)
32. SEPARATE EXHAUST PIPE ASSY FRONT (See page 15-2)

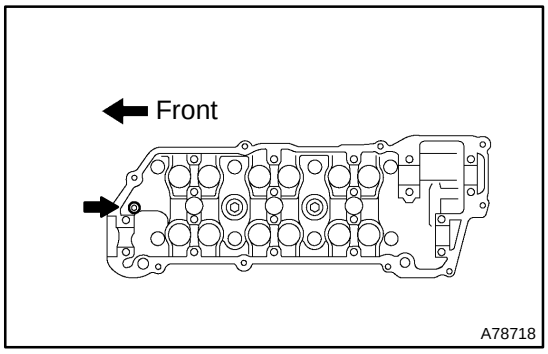


33. REMOVE OIL LEVEL GAGE GUIDE
(a) Remove the bolt which secures the oil level gage guide from the cylinder head LH.
(b) Pull out the oil level gage guide and oil level gage together from the cylinder block.
(c) Remove the O-ring from the oil level gage guide.

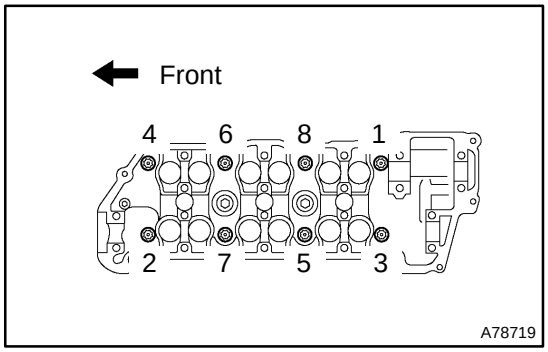
34. REMOVE WATER INLET PIPE (See page 16-16)
35. REMOVE IGNITION COIL ASSY
36. REMOVE CYLINDER HEAD COVER SUB-ASSY LH (See page 14-7)
37. REMOVE NO.3 CAMSHAFT SUB-ASSY (See page 14-107)
38. REMOVE NO.4 CAMSHAFT SUB-ASSY (See page 14-107)



39. REMOVE CYLINDER HEAD LH
(a) Disconnect the VVT sensor connector.
(b) Disconnect the camshaft timing oil control valve connector.
(c) Disconnect the air fuel ratio sensor connector.
(d) Remove the bolt, then disconnect the ground cable.
(e) Remove the bolt and wire harness clamp bracket.



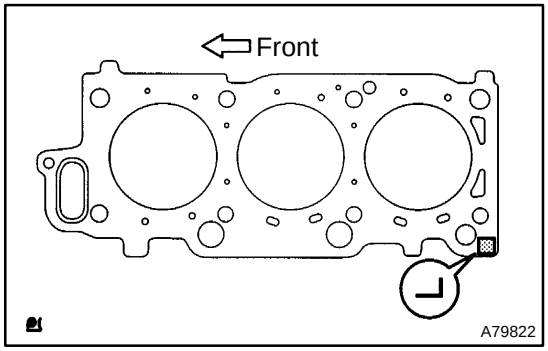
(f) Using a socket hexagon wrench 8, remove the hexagon bolt.



(g) Using several steps, loosen the 8 cylinder head bolts uniformly in the sequence shown in the illustration. Remove the 8 cylinder head bolts and plate washers.

NOTICE:
- **Be careful not to drop the washers into the cylinder head.**
- **Head warpage or cracking could result from removing the bolts in an incorrect order.**

40. REMOVE CYLINDER HEAD GASKET NO.2
41. INSPECT CYLINDER HEAD SET BOLT (See page 14-120)



42. INSTALL CYLINDER HEAD GASKET NO.2
(a) Place a new cylinder head gasket on the cylinder block with the L mark upward.

NOTICE:
- **Remove any oil from the contact surface.**
- **Be careful of the installing orientation.**
- **Place the cylinder head on the gasket carefully in order not to damage the gasket at the bottom part of the head.**

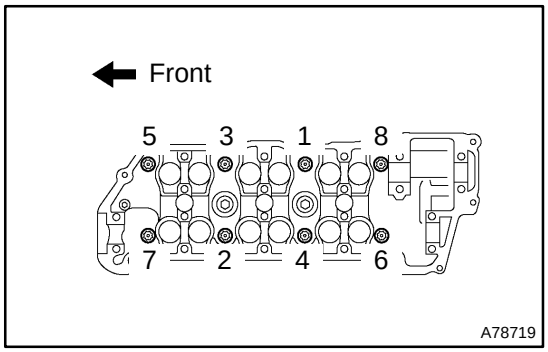
43. INSTALL CYLINDER HEAD LH

NOTICE:

The cylinder head bolts are tightened in 2 successive steps.

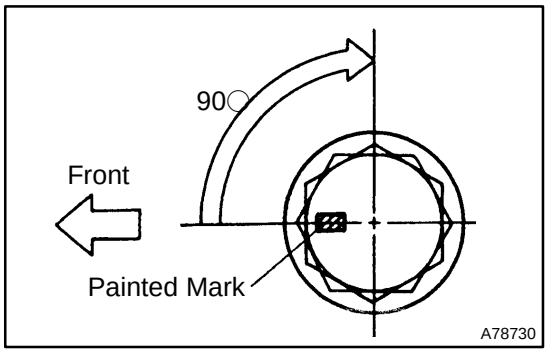
(a) Apply a light coat of engine oil to the threads of the cylinder head bolts.

(b) Install the plate washer to the cylinder head bolt.



(c) Using several steps, install and tighten the 8 cylinder head bolts uniformly in the sequence shown in the illustration.

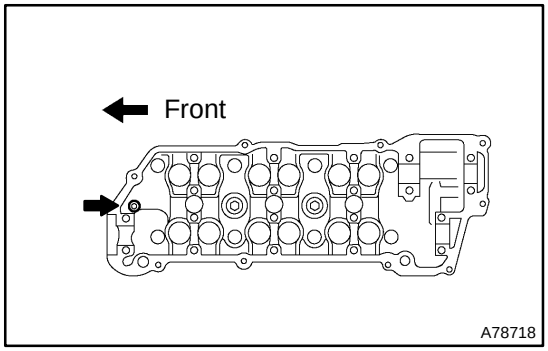
Torque: 54 N·m (550 kgf·cm, 40 ft·lbf)



(d) Mark the front side of each cylinder head bolt head with paint as shown in the illustration.

(e) Retighten the cylinder head bolts by 90° in the same sequence as step (c).

(f) Check that each painted mark is now at a 90° angle to the front.



(g) Using a socket hexagon wrench 8, install the hexagon bolt.

Torque: 19 N·m (189 kgf·cm, 14 ft·lbf)

(h) Install the wire harness clamp bracket with the bolt.

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

(i) Connect the ground cable with the bolt.

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

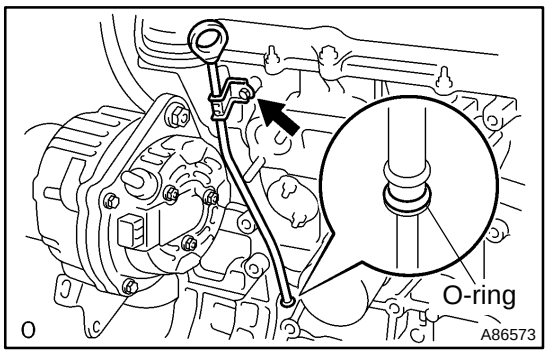
44. INSTALL NO.4 CAMSHAFT SUB-ASSY (See page 14-107)

45. INSTALL NO.3 CAMSHAFT SUB-ASSY (See page 14-107)

46. INSTALL CYLINDER HEAD COVER SUB-ASSY LH (See page 14-7)

47. INSTALL IGNITION COIL ASSY (See page 14-7)

48. INSTALL WATER INLET PIPE (See page 16-16)



49. INSTALL OIL LEVEL GAGE GUIDE

(a) Install a new O-ring to the oil level gage guide.
(b) Apply soapy water to the O-ring.
(c) Push in the oil level gage guide end into the guide hole of the cylinder block.
(d) Install the oil level gage guide with the bolt.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)
(e) Install the oil level gage.

50. INSTALL EXHAUST PIPE ASSY FRONT (See page 15-2)
51. INSTALL MANIFOLD STAY NO.2 (See page 14-29)
52. INSTALL TIMING BELT NO.3 COVER (See page 14-93)
53. INSTALL CAMSHAFT TIMING PULLEY (See page 14-93)
SST 09960-10010 (09962-01000, 09963-01000), 09249-63010
54. INSTALL TIMING BELT IDLER SUB-ASSY NO.2 (See page 14-93)
55. INSPECT TIMING BELT (See page 14-79)
56. INSTALL TIMING BELT (See page 14-79)
SST 09960-10010 (09962-01000, 09963-01000)
57. INSTALL TIMING BELT TENSIONER ASSY (See page 14-79)
58. INSTALL TIMING BELT GUIDE NO.2 (See page 14-79)
59. INSTALL ENGINE MOUNTING BRACKET RH (See page 14-79)
60. INSTALL TIMING BELT NO.2 COVER (See page 14-79)
61. INSTALL TIMING BELT NO.1 COVER (See page 14-79)
62. INSTALL CRANKSHAFT PULLEY (See page 14-79)
SST 09213-54015 (91651-60855), 09330-00021
63. INSTALL GENERATOR BRACKET NO.2 (See page 14-79)
64. INSTALL ENGINE MOUNTING STAY NO.2 RH (See page 14-79)
65. INSTALL ENGINE MOVING CONTROL ROD (See page 14-79)
66. INSTALL VANE PUMP V BELT (See page 14-5)
67. INSTALL V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (See page 14-5)
68. INSPECT DRIVE BELT DEFLECTION AND TENSION (See page 14-1)
69. INSTALL WATER OUTLET (See page 10-16)
70. INSTALL INTAKE MANIFOLD (See page 10-16)
71. INSTALL INTAKE AIR SURGE TANK (See page 11-13)
72. INSTALL EMISSION CONTROL VALVE SET (See page 11-13)
73. INSTALL AIR CLEANER CASE (See page 19-5)
74. INSTALL AIR CLEANER CAP SUB-ASSY (See page 10-1 1)
75. INSTALL AIR CLEANER INLET ASSY (See page 19-5)
76. CHECK CONNECTION OF VACUUM HOSE (See page 14-29)
77. INSTALL V-BANK COVER SUB-ASSY (See page 10-1 1)
78. INSTALL FRONT SUSPENSION UPPER BRACE CENTER (W/O TEMS) (See page 10-1 1)
79. INSTALL FRONT WHEEL RH (See page 14-5)
80. ADD ENGINE OIL (See page 17-20)
81. ADD ENGINE COOLANT (See page 16-9)
82. CHECK FOR ENGINE OIL LEAKS
83. CHECK FOR ENGINE COOLANT LEAKS (See page 16-1)
84. INSPECT FOR FUEL LEAKS

85. CHECK FOR EXHAUST GAS LEAKS

86. INSPECT IGNITION TIMING (See page 14-1)

SST 09843-18040

87. INSPECT ENGINE IDLE SPEED (See page 14-1)

88. INSPECT COMPRESSION (See page 14-1)

SST 09992-00500

89. INSPECT CO/HC (See page 14-1)

90. SYSTEM INITIALIZATION (See page 19-15)

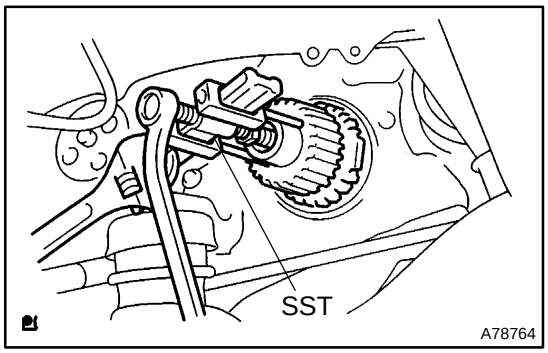
OIL PUMP SEAL (3MZ-FE)

141JK-01

REPLACEMENT

1. **REMOVE FRONT WHEEL RH**
2. **REMOVE FRONT FENDER APRON SEAL RH**
3. **REMOVE V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (See page 14-5)**
4. **REMOVE VANE PUMP V BELT (See page 14-5)**
5. **REMOVE ENGINE MOVING CONTROL ROD (See page 14-79)**
6. **REMOVE ENGINE MOUNTING STAY NO.2 RH (See page 14-79)**
7. **REMOVE GENERATOR BRACKET NO.2 (See page 14-79)**
8. **REMOVE CRANKSHAFT PULLEY (See page 14-79)**
   SST 09213-54015 (91651-60855), 09330-00021, 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05031)
9. **REMOVE TIMING BELT NO.1 COVER**
10. **REMOVE TIMING BELT NO.2 COVER (See page 14-79)**
11. **REMOVE ENGINE MOUNTING BRACKET RH (See page 14-79)**
12. **REMOVE TIMING BELT GUIDE NO.2**
13. **REMOVE TIMING BELT (See page 14-79)**
14. **REMOVE CRANKSHAFT TIMING PULLEY**

(a) Remove the bolt and timing belt plate.

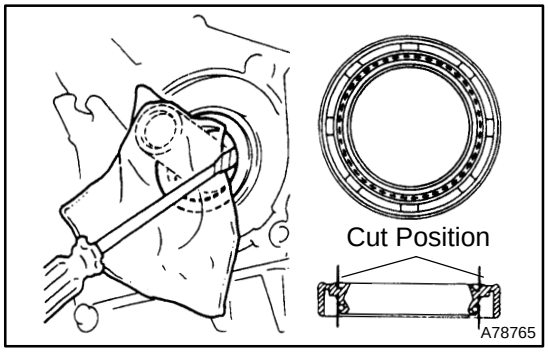


(b) Install the pulley bolt to the crankshaft.

(c) Using SST, remove the crankshaft timing pulley.
SST 09950- 50013 (09951- 05010, 09952- 05010, 09953-05020, 09954-05011)

NOTICE:

- **Do not scratch the sensor part of the crankshaft timing pulley.**
- **Before using SST, apply lubricating oil to the threads and tip of the center bolt 150.**



15. **REMOVE OIL PUMP SEAL**

(a) Using a knife, cut off the oil seal lip.

(b) Using a screwdriver with the tip wrapped in tape, pry out the oil seal.

NOTICE:

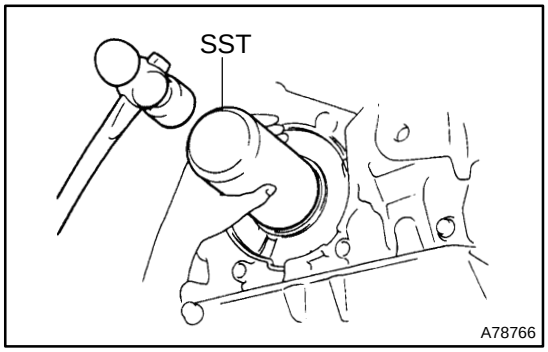
After removing, check the crankshaft for damage. If damaged, smooth the surface with 400-grit sandpaper.

16. INSTALL OIL PUMP SEAL

(a) Apply multi-purpose grease to a new oil seal lip.

NOTICE:

Keep the lip free of foreign objects.

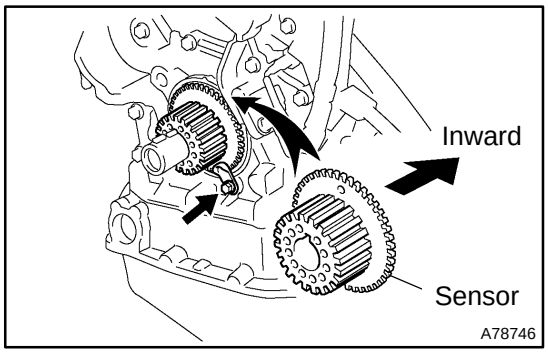


(b) Using SST and a hammer, tap in the new oil seal until its surface is flush with the oil pump edge.

SST 09223-00010

NOTICE:

- **Be careful not to tap the oil seal at an angle.**
- **Wipe off extra grease on the crankshaft.**



17. INSTALL CRANKSHAFT TIMING PULLEY

(a) Align the keyway of the pulley with the key located on the crankshaft, then slide the pulley into place.

NOTICE:

Do not scratch the sensor area of the crankshaft timing pulley.

(b) Install the timing belt plate with the bolt.

Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

18. INSPECT TIMING BELT (See page 14-79)

19. INSTALL TIMING BELT (See page 14-79)

SST 09960-10010 (09962-01000, 09963-01000)

20. INSTALL TIMING BELT TENSIONER ASSY (See page 14-79)

21. INSTALL TIMING BELT GUIDE NO.2 (See page 14-79)

22. INSTALL ENGINE MOUNTING BRACKET RH (See page 14-79)

23. INSTALL TIMING BELT NO.2 COVER (See page 14-79)

24. INSTALL TIMING BELT NO.1 COVER (See page 14-79)

25. INSTALL CRANKSHAFT PULLEY (See page 14-79)

SST 09213-54015 (91651-60855), 09330-00021

26. INSTALL GENERATOR BRACKET NO.2 (See page 14-79)

27. INSTALL ENGINE MOUNTING STAY NO.2 RH (See page 14-79)

28. INSTALL ENGINE MOVING CONTROL ROD (See page 14-79)

29. INSTALL VANE PUMP V BELT (See page 14-5)

30. INSTALL V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (See page 14-5)

31. INSPECT DRIVE BELT DEFLECTION AND TENSION (See page 14-1)

32. INSTALL FRONT WHEEL RH (See page 14-5)

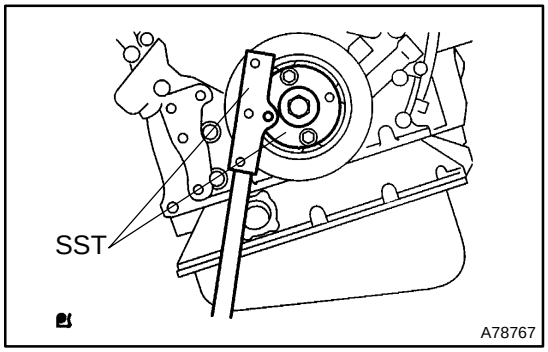
33. CHECK FOR ENGINE OIL LEAKS

ENGINE REAR OIL SEAL (3MZ-FE)

141JL-02

REPLACEMENT

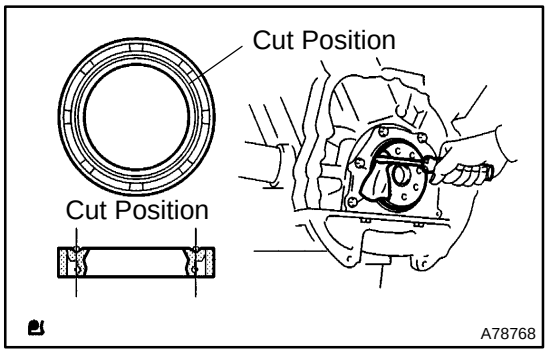
1. REMOVE AUTOMATIC TRANSAXLE ASSY (See page 40-9)



2. REMOVE DRIVE PLATE & RING GEAR SUB-ASSY

(a) Using SST, hold the crankshaft.
SST 09213-54015 (91651-60855), 09330-00021

(b) Remove the 8 bolts, rear spacer, drive plate and front spacer.



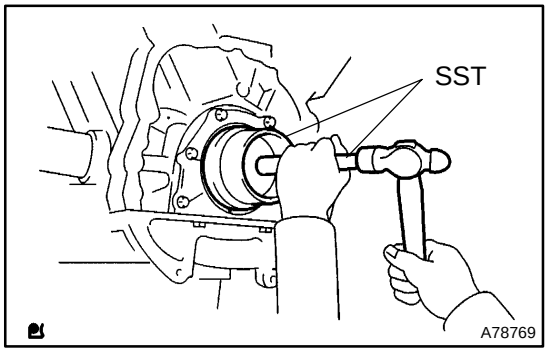
3. REMOVE ENGINE REAR OIL SEAL

(a) Using a knife, cut off the oil seal lip.

(b) Using a screwdriver with the tip wrapped in tape, pry out the oil seal.

NOTICE:

After removing, check the crankshaft for damage. If damaged, smooth the surface with 400-grit sandpaper.



4. INSTALL ENGINE REAR OIL SEAL

(a) Apply multi-purpose grease to a new oil seal lip.

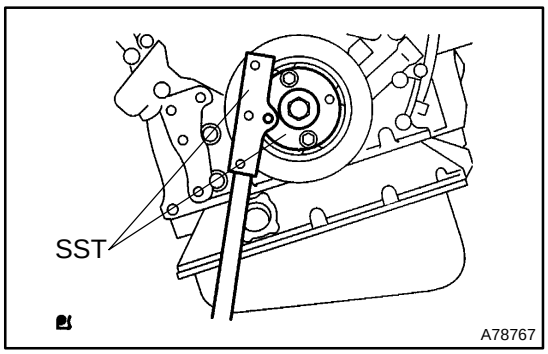
NOTICE:

Keep the lip free of foreign materials.

(b) 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)

NOTICE:

- **Be careful not to tap the oil seal at an angle.**
- **Wipe off extra grease on the crankshaft.**



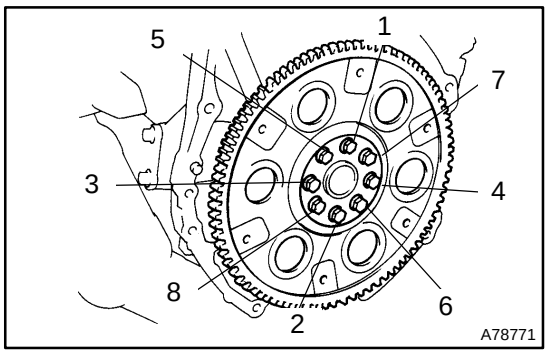
5. INSTALL DRIVE PLATE & RING GEAR SUB-ASSY

(a) Using SST, hold the crankshaft.
SST 09213-54015 (91651-60855), 09330-00021

(b) Clean the 8 bolts and 8 bolt holes.

(c) Apply adhesive to 2 or 3 threads of the 8 bolts.
Adhesive: Part No. 08833-00070, THREE BOND 1324 or equivalent

(d) Install the front spacer, drive plate and rear spacer on the crankshaft.



(e) Using several steps, install and tighten the 8 bolts uniformly in the sequence shown in the illustration.
Torque: 83 N·m (846 kgf·cm, 61 ft·lbf)

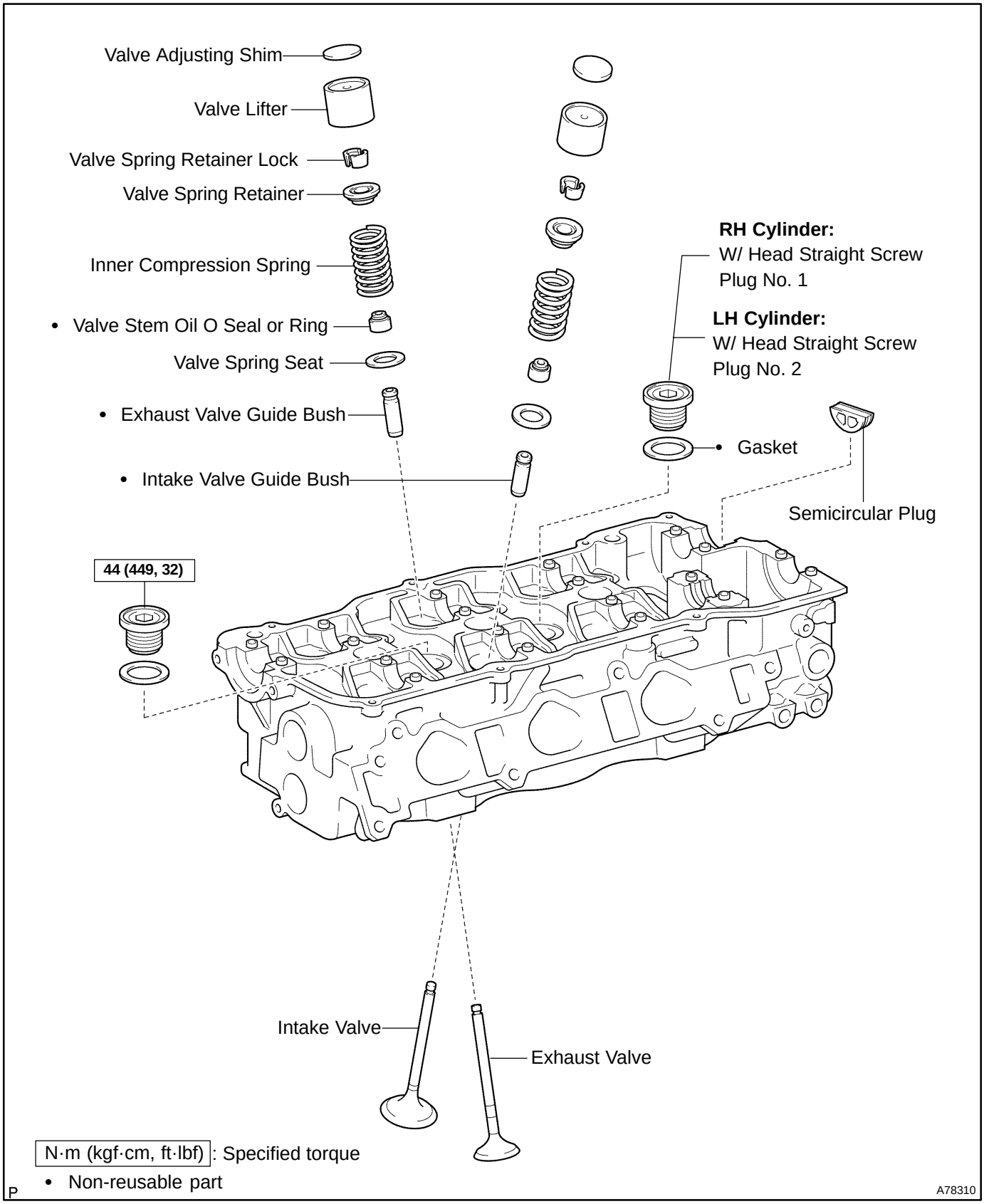
NOTICE:
Do not start the engine within 1 hour after installing.

6. INSTALL AUTOMATIC TRANSAXLE ASSY (See page 40-9)

CYLINDER HEAD ASSY (3MZ-FE)

1419J-03

COMPONENTS



1419K-03

OVERHAUL

1. REMOVE W/HEAD STRAIGHT SCREW PLUG NO.1 (RH CYLINDER)

(a) Using a straight hexagon wrench 14, remove the 2 screw plugs.

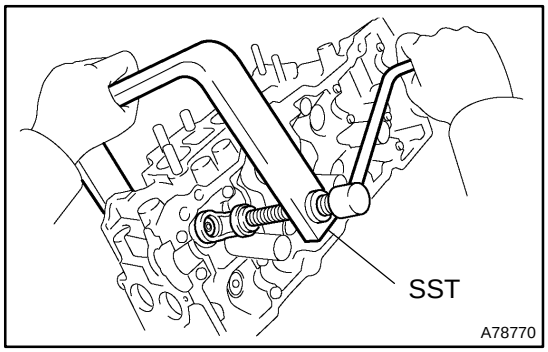
2. REMOVE W/HEAD STRAIGHT SCREW PLUG NO.2 (LH CYLINDER)

(a) Using a straight hexagon wrench 14, remove the 2 screw plugs.

3. REMOVE VALVE LIFTER

HINT:

Store the lifters in the correct order so that they can be returned to the original locations when reassembling.



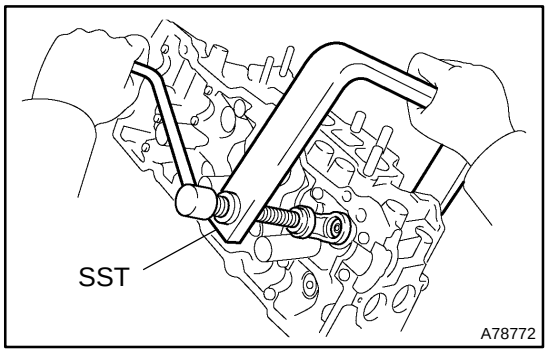
4. REMOVE INTAKE VALVE

(a) Using SST, compress the spring, then remove the 2 retainer locks, retainer, spring and valve.

SST 09202-70020 (09202-00010)

HINT:

Store the valves, springs, seats and retainers in the correct order so that they can be returned to the original locations when reassembling.



5. REMOVE EXHAUST VALVE

(a) Using SST, compress the spring, then remove the 2 retainer locks, retainer, spring and valve.

SST 09202-70020 (09202-00010)

HINT:

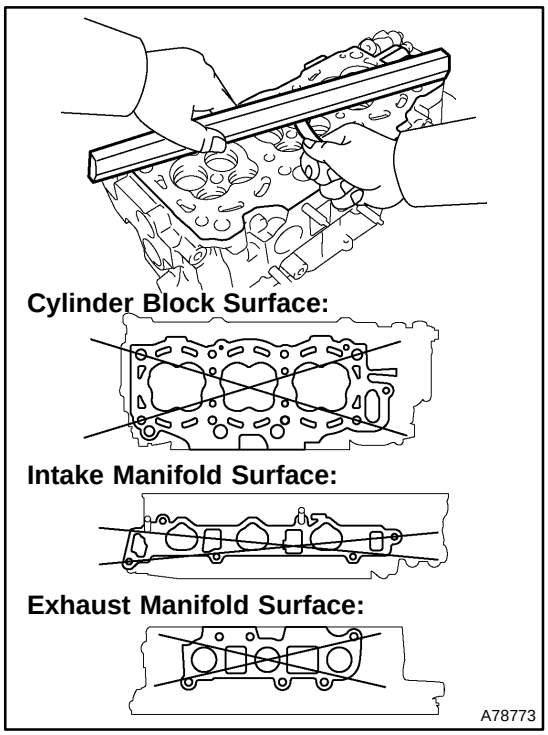
Store the valves, springs, seats and retainers in the correct order so that they can be returned to the original locations when reassembling.

6. REMOVE VALVE STEM OIL O SEAL OR RING

(a) Using needle-nose pliers, remove the oil seal.

7. REMOVE VALVE SPRING SEAT

8. REMOVE SEMICIRCULAR PLUG

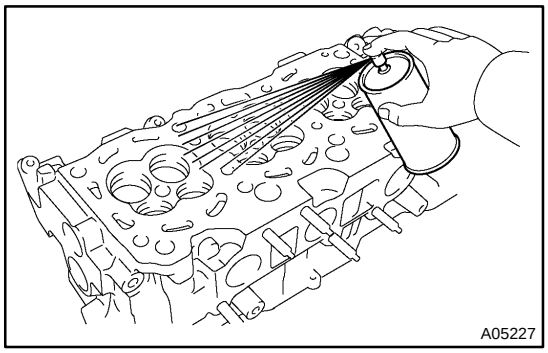


9. INSPECT CYLINDER HEAD FOR FLATNESS

(a) Using a precision straight edge and feeler gauge, measure the warpage on the surfaces which contacts the cylinder block and manifolds.

Maximum warpage:
0.05 mm (0.0020 in.) for cylinder block surface
0.10 mm (0.0039 in.) for intake manifold surface
0.10 mm (0.0039 in.) for exhaust manifold surface

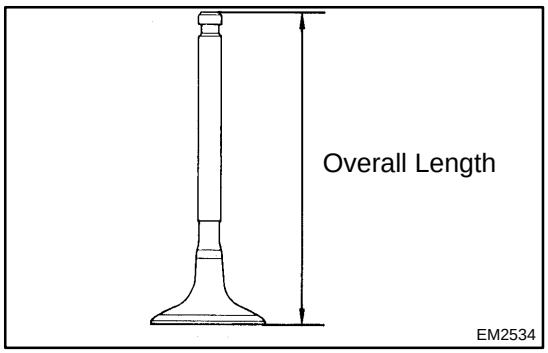
If the warpage is greater than maximum, replace the cylinder head.



10. INSPECT CYLINDER HEAD FOR CRACKS

(a) Using a dye penetrate, check the combustion chamber, intake ports, exhaust ports and cylinder block surface for cracks.

If cracked, replace the cylinder head.

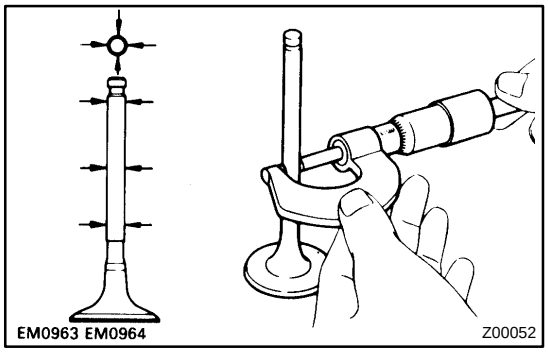


11. INSPECT INTAKE VALVE

(a) Inspect the valve overall length.

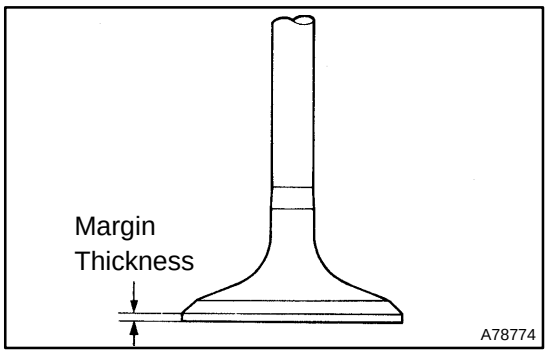
Standard overall length: 95.45 mm (3.7579 in.)
Minimum overall length: 94.95 mm (3.7382 in.)

If the overall length is less than minimum, replace the valve.

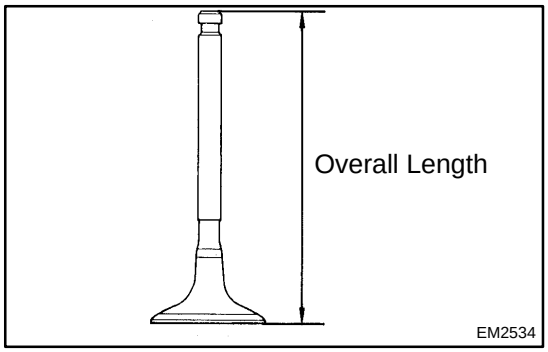


(b) Using a micrometer, measure the diameter of the valve stem.

Valve stem diameter:
5.470 to 5.485 mm (0.2154 to 0.2159 in.)

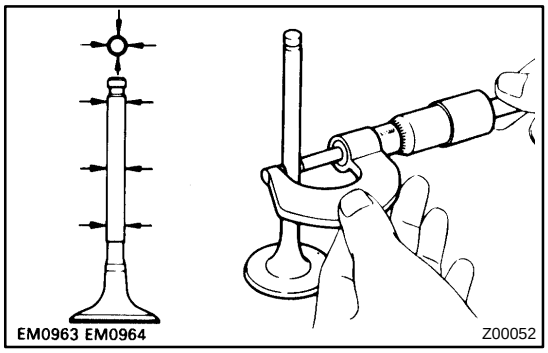


(c) Inspect the valve head margin thickness.
Standard margin thickness: 1.0 mm (0.039 in.)
Minimum margin thickness: 0.5 mm (0.020 in.)
If the margin thickness is less than minimum, replace the valve.

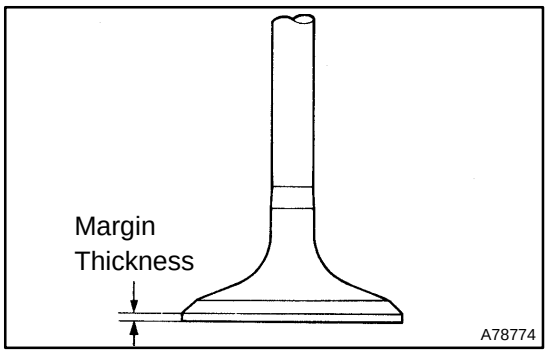


12. INSPECT EXHAUST VALVE

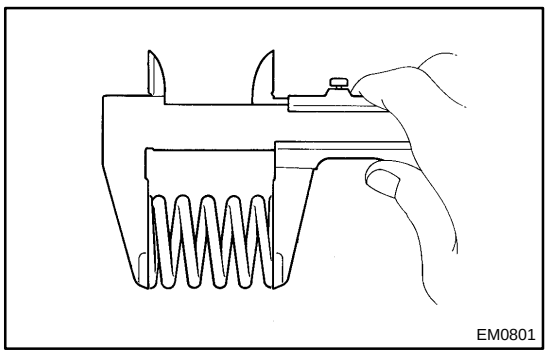
(a) Inspect the valve overall length.
Standard overall length: 95.40 mm (3.7559 in.)
Minimum overall length: 94.90 mm (3.7362 in.)
If the overall length is less than minimum, replace the valve.



(b) Using a micrometer, measure the diameter of the valve stem.
Valve stem diameter:
5.465 to 5.480 mm (0.2152 to 0.2157 in.)

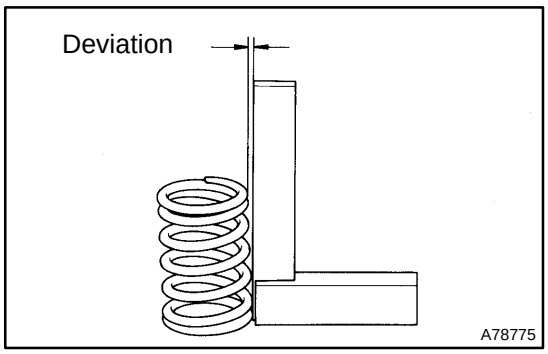


(c) Inspect the valve head margin thickness.
Standard margin thickness: 1.0 mm (0.039 in.)
Minimum margin thickness: 0.5 mm (0.020 in.)
If the margin thickness is less than minimum, replace the valve.



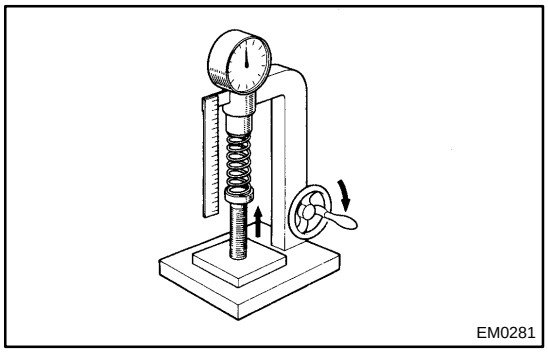
13. INSPECT INNER COMPRESSION SPRING

(a) Using vernier calipers, measure the free length of the spring.
Free length: 45.50 mm (1.7913 in.)
If the free length is not as specified, replace the spring.



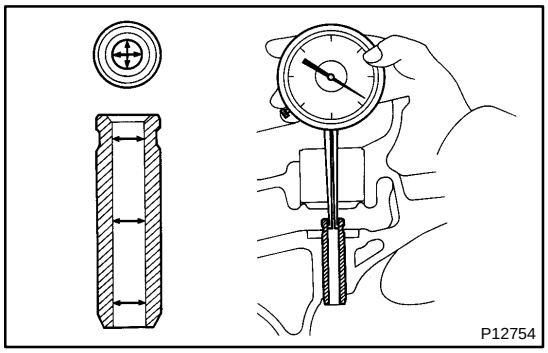
(b) Using a steel square, measure the deviation of the spring.
Maximum deviation: 2.0 mm (0.079 in.)

If the deviation is greater than maximum, replace the spring.



(c) Using a spring tester, measure the tension of the spring when the spring is the specified installed length.
Installed tension:
186 to 206 N (19.0 to 21.0 kgf, 41.9 to 46.3 lbf)
at 33.8 mm (1.331 in.)

If the installed tension is not as specified, replace the spring.

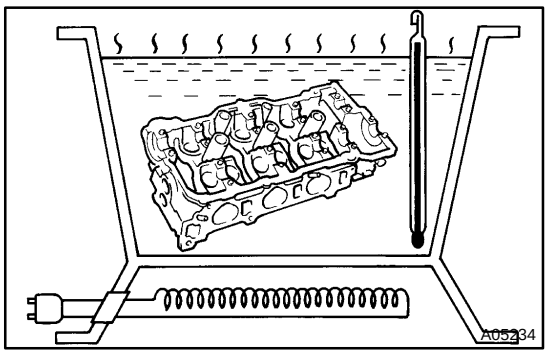


14. INSPECT VALVE GUIDE BUSH OIL CLEARANCE

(a) Using a caliper gauge, measure the inside diameter of the valve guide bush.
Bush inside diameter:
5.510 to 5.530 mm (0.2169 to 0.2177 in.)

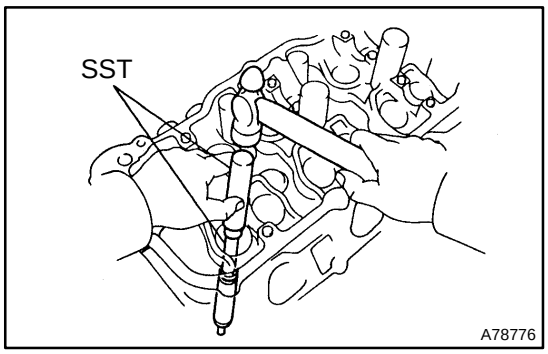
(b) Subtract the valve stem diameter measurement from the valve guide bush inside diameter measurement.
Standard oil clearance:
0.025 to 0.060 mm (0.0010 to 0.0024 in.) for intake
0.030 to 0.065 mm (0.0012 to 0.0026 in.) for exhaust
Maximum oil clearance:
0.08 mm (0.0031 in.) for intake
0.10 mm (0.0039 in.) for exhaust

If the clearance is greater than maximum, replace the valve and valve guide bush.

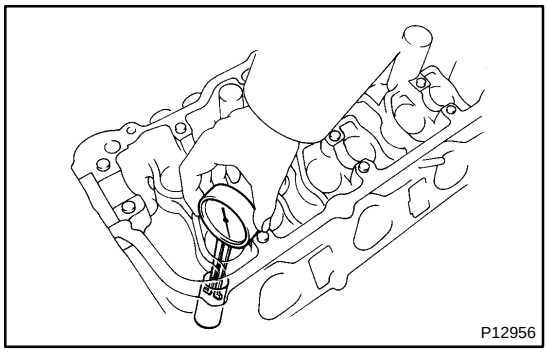


15. REMOVE VALVE GUIDE BUSH

(a) Heat the cylinder head up to 80 to 100 ℃ (176 to 212 ℉).



(b) Using SST and a hammer, tap out the valve guide bush.
SST 09201-10000, 09201-01055, 09950-70010 (09951-07100)



16. INSTALL VALVE GUIDE BUSH

(a) Using a caliper gauge, measure the bush bore diameter of the cylinder head.
Diameter: 10.295 to 10.313 mm (0.4053 to 0.4060 in.)

If the bush bore diameter of the cylinder head is greater than 10.313 mm (0.4060 in.), machine the bush bore to the dimension of 10.345 to 10.363 mm (0.4073 to 0.4080 in.).

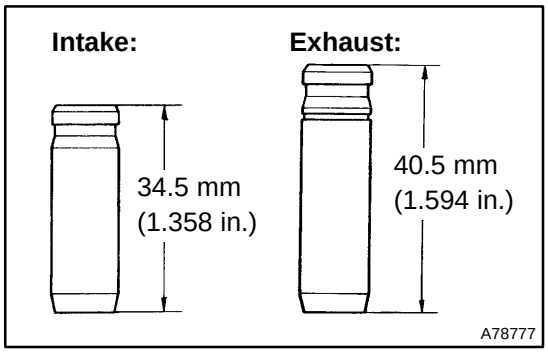
HINT:

Bush diameter:

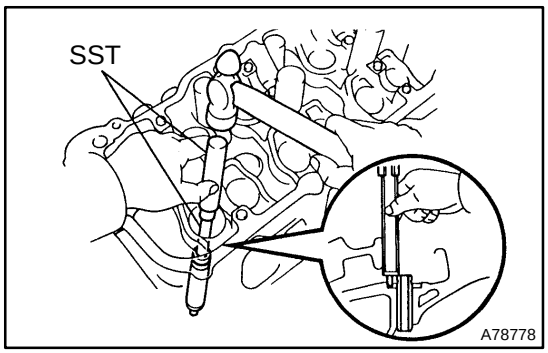
STD	10.333 to 10.344 mm (0.4068 to 0.4072 in.)
O/S	10.383 to 10.394 mm (0.4088 to 0.4092 in.)

Bush length:

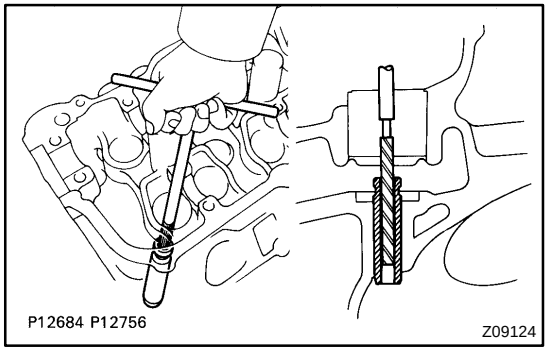
Intake	34.5 mm (1.358 in.)
Exhaust	40.5 mm (1.594 in.)



(b) Heat the cylinder head up to 80 to 100 °C (176 to 212 °F).



(c) Using SST and a hammer, tap in a new valve guide bush to the specified protrusion height.
SST 09201-10000, 09201-01055, 09950-70010 (09951-07100)
Protrusion height:
11.1 to 11.5 mm (0.437 to 0.453 in.) for intake
8.9 to 9.3 mm (0.350 to 0.366 in.) for exhaust



(d) Using a sharp 5.5 mm reamer, ream the valve guide bush to obtain the standard specified clearance between the valve guide bush and valve stem.
Standard oil clearance:
0.025 to 0.060 mm (0.0010 to 0.0024 in.) for intake
0.030 to 0.065 mm (0.0012 to 0.0026 in.) for exhaust

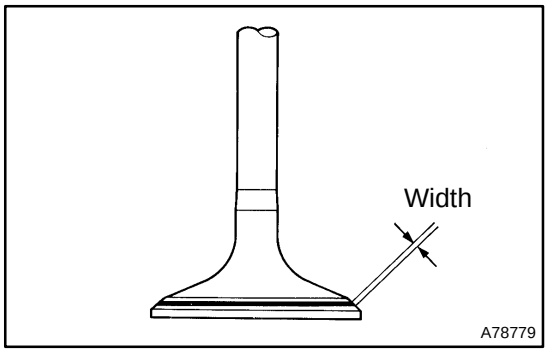
17. INSPECT VALVE SEATS

(a) Apply a light coat of prussian blue (or white lead) to the valve face.

(b) Lightly press the valve against the seat.

NOTICE:

Do not rotate the valve.

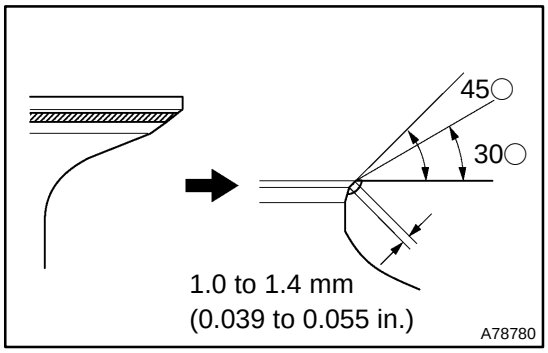


(c) Check the valve face and seat according to the following procedure.

(1) If blue appears 360○around the face, the valve is concentric. If not, replace the valve.

(2) If blue appears 360○around the valve seat, the guide and face are concentric. If not, resurface the seat.

(3) Check that the seat contact is in the middle of the valve face with the width between 1.0 and 1.4 mm (0.039 to 0.055 in.).

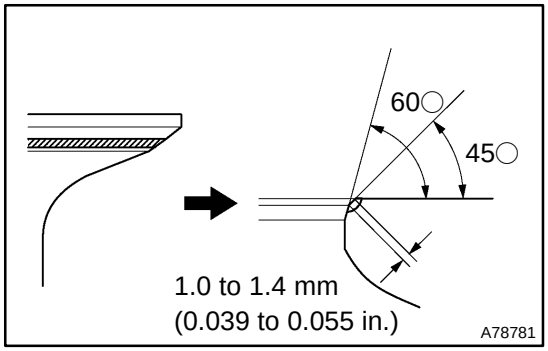


18. REPAIR VALVE SEATS

NOTICE:

Releasing the seat cutter pressure gradually helps to make smoother valve seat faces.

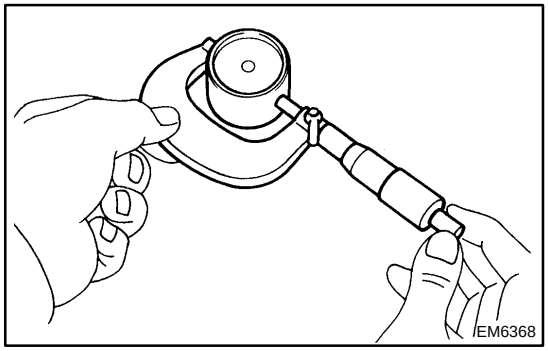
(a) If the seating is too high on the valve face, use the 30○and 45○cutters to correct the seat.



(b) If the seating is too low on the valve face, use the 60○and 45○cutters to correct the seat.

(c) Lap the valve and valve seat by hand with an abrasive compound.

(d) Recheck the valve seating position.

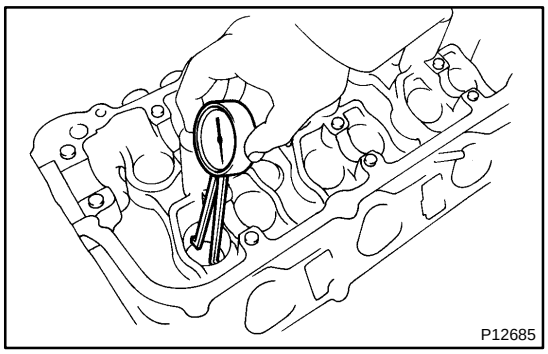


19. INSPECT VALVE LIFTER

(a) Using a micrometer, measure the lifter diameter.

Lifter diameter:

30.966 to 30.976 mm (1.2191 to 1.2195 in.)



20. INSPECT VALVE LIFTER OIL CLEARANCE

(a) Using a caliper gauge, measure the lifter bore diameter of the cylinder head.

Lifter bore diameter:
31.009 to 31.025 mm (1.2208 to 1.2215 in.)

(b) Subtract the lifter diameter measurement from the lifter bore diameter measurement.

Standard oil clearance:
0.033 to 0.059 mm (0.0013 to 0.0023 in.)
Maximum oil clearance: 0.07 mm (0.0028 in.)

- If the oil clearance is greater than maximum, replace the valve lifter.
- If necessary, replace the cylinder head.

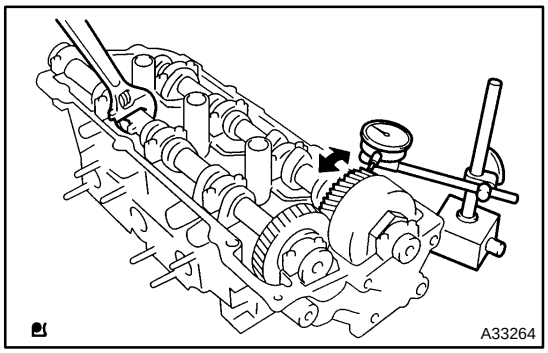
21. INSPECT CAMSHAFT GEAR BACKLASH

(a) Install the camshaft timing gear.

(b) Install the camshafts to the cylinder head.

NOTICE:

- **Install the camshafts with the valves and sub gear removed.**
- **Install the camshafts with their timing marks matched.**



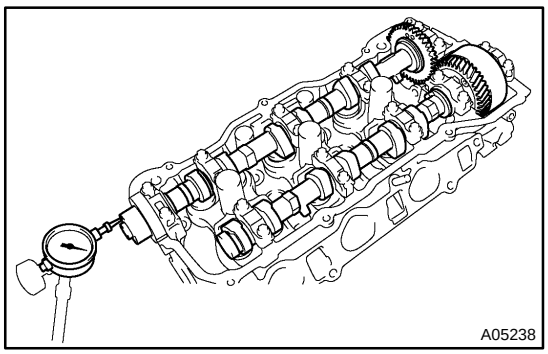
(c) Set the dial indicator to the teeth of the intake camshaft at a right angle (90°).

(d) Measure the backlash of the camshaft timing gear at least 4 positions.

Standard backlash:
0.020 to 0.200 mm (0.0008 to 0.0079 in.)
Maximum backlash: 0.30 mm (0.0118 in.)

22. INSPECT CAMSHAFT THRUST CLEARANCE

(a) Install the camshafts.



(b) Using a dial indicator, measure the thrust clearance while moving the camshaft back and forth.

Standard thrust clearance:
0.040 to 0.090 mm (0.0016 to 0.0035 in.)
Maximum thrust clearance: 0.12 mm (0.0047 in.)

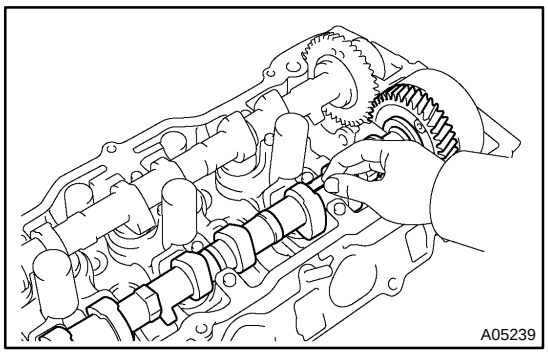
- If the thrust clearance is greater than maximum, replace the camshaft.
- If necessary, replace the bearing caps and cylinder head together.

23. INSPECT CAMSHAFT OIL CLEARANCE

(a) Clean the bearing caps and camshaft journals.

(b) Clean the camshafts.

(c) Place the camshafts on the cylinder head.



(d) Lay a strip of Plastigage across each of the camshaft journals.

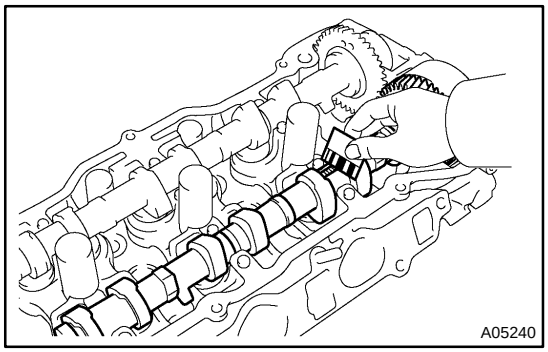
(e) Install the bearing caps.

Torque: 16 N·m (163 kgf·cm, 12 ft·lbf)

NOTICE:

Do not turn the camshaft.

(f) Remove the bearing caps.



(g) Measure the Plastigage at its widest point.

Standard oil clearance:

Intake #4, #5 journals

0.025 to 0.057 mm (0.0010 to 0.0022 in.)

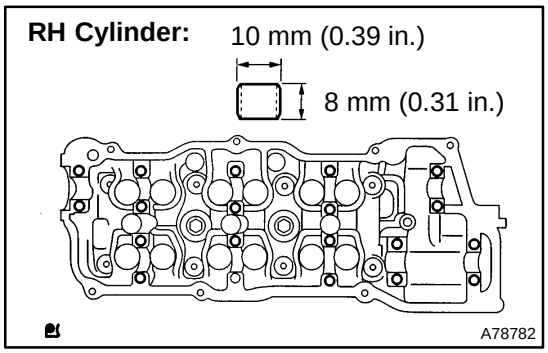
Other journals 0.025 to 0.062 mm (0.0010 to 0.0024 in.)

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 together.

NOTICE:

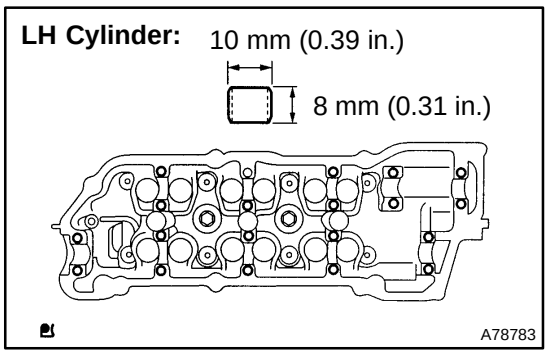
Completely remove the Plastigage.



24. INSTALL RING W/HEAD PIN (RH CYLINDER)

(a) Using a plastic-faced hammer, tap in a new ring pin to the specified protrusion height.

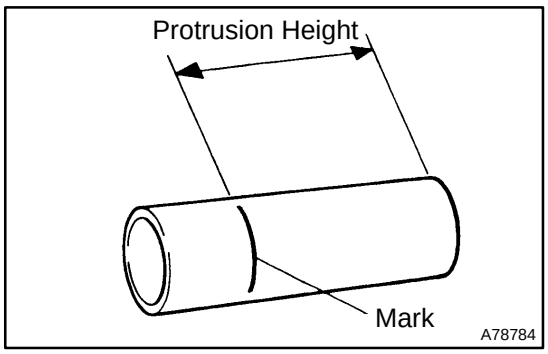
Protrusion height: 3 mm (0.12 in.)



25. INSTALL RING PIN (LH CYLINDER)

(a) Using a plastic-faced hammer, tap in a new ring pin to the specified protrusion height.

Protrusion height: 3 mm (0.12 in.)



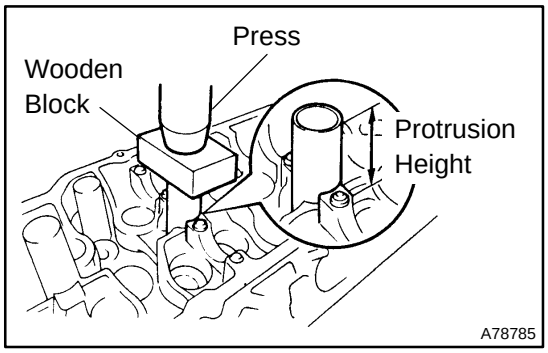
26. INSTALL SPARK PLUG TUBE

(a) Using paint, mark the standard height from the edge.
Standard protrusion height:
42.4 to 43.4 mm (1.669 to 1.709 in.)

HINT:
Use either end of the spark plug tube.

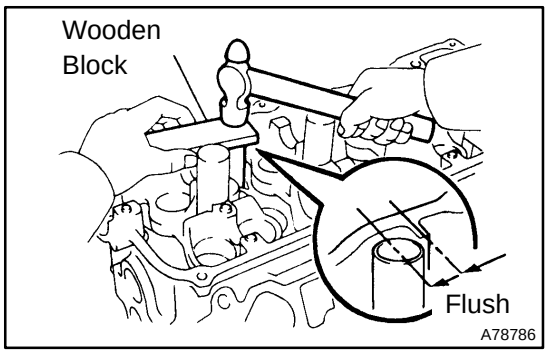
(b) Apply adhesive to the end of the spark plug tube which will be pressed into the cylinder head.
Adhesive: Part No. 08833-00070 THREE BOND 1324 or equivalent

NOTICE:
- **Install the spark plug tube within 3 minutes after applying adhesive.**
- **Do not deform the spark plug tube.**
- **Do not expose the spark plug tube to coolant within 1 hour after installing.**



(c) Using a press and wooden block, install the spark plug tube to the required protrusion height.

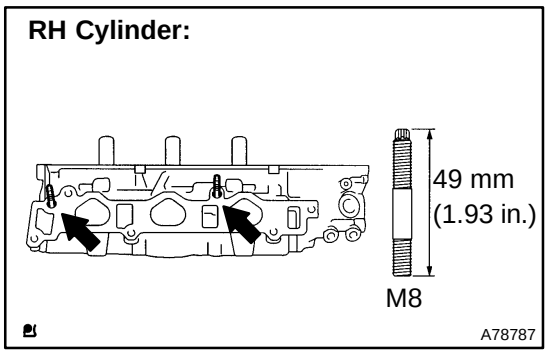
NOTICE:
Be careful not to drip the adhesive.



27. INSTALL PCV PIPE (RH CYLINDER)

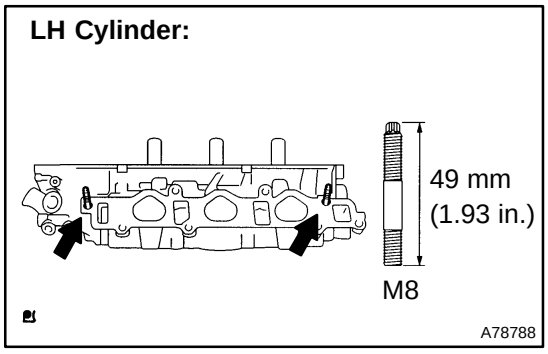
(a) Using a wooden block and hammer, tap in 2 new PCV pipes until their top edges are flush with the cylinder head edge.

NOTICE:
Be careful not to damage the cylinder head edge.



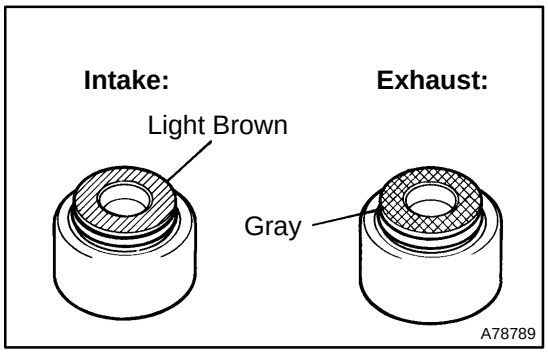
28. INSTALL STUD BOLT

(a) Install the stud bolts on the intake side.
Torque: 7.5 N·m (76 kgf·cm, 66 in.·lbf)



29. INSTALL STUD BOLT

(a) Install the stud bolts on the exhaust side.
Torque: 15 N·m (153 kgf·cm, 11 ft·lbf)



30. INSTALL VALVE STEM OIL O SEAL OR RING

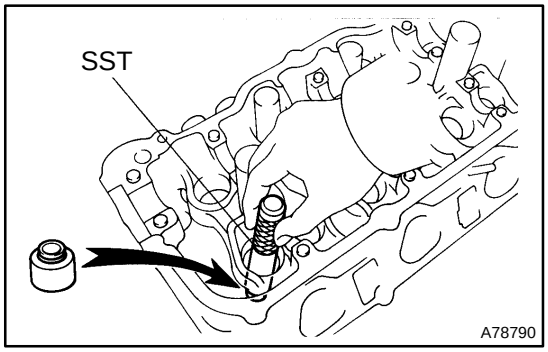
(a) Apply a light coat of engine oil to the valve stem.

NOTICE:

Installing the oil seals for intake and exhaust to the opposite valve guide bush may cause an improper installation.

HINT:

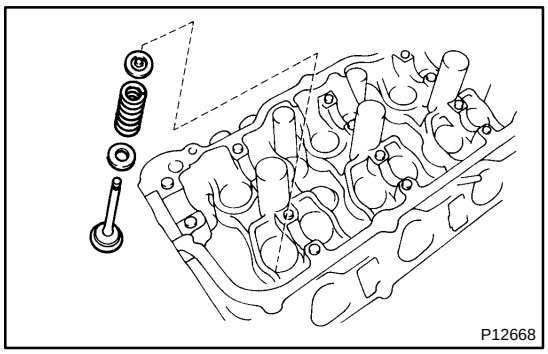
The intake valve oil seal is light brown and the exhaust valve oil seal is gray.



(b) Using SST, push in a new oil seal.
SST 09201-41020

NOTICE:

Failure to use SST will cause the seal to be damaged or improperly seated.

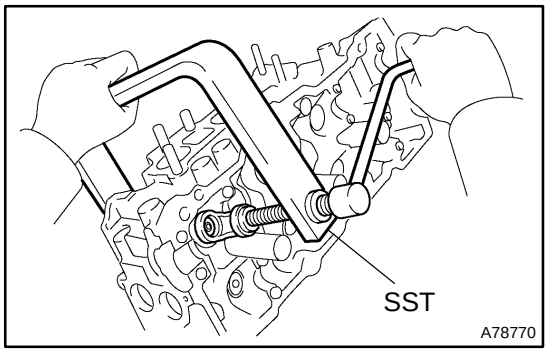


31. INSTALL INTAKE VALVE

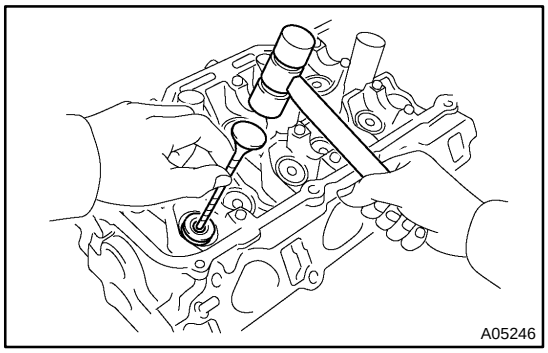
(a) Install the valve, seat, spring, and retainer.

NOTICE:

Install the same parts in the same combination to the original locations.



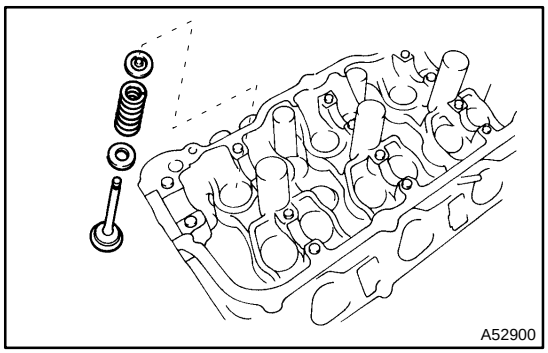
(b) Using SST, compress the spring and place the 2 retainer locks around the valve stem.
SST 09202-70020 (09202-00010)



(c) Using a plastic-faced hammer and discarded valve (the tip is wrapped with tape), lightly tap the installed valve to fit into place.

NOTICE:

Be careful not to damage the installed valve stem tip.

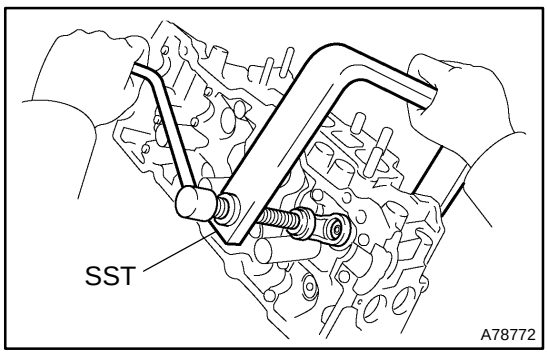


32. INSTALL EXHAUST VALVE

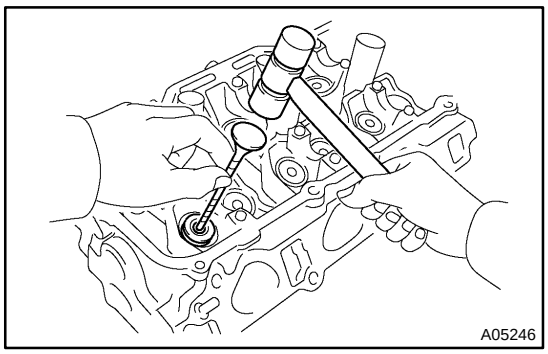
(a) Install the valve, seat, spring, and retainer.

NOTICE:

Install the same parts in the same combination to the original locations.



(b) Using SST, compress the spring and place the 2 retainer locks around the valve stem.
SST 09202-70020 (09202-00010)



(c) Using a plastic-faced hammer and discarded valve (the tip is wrapped with tape), lightly tap the installed valve to fit into place.

NOTICE:

Be careful not to damage the installed valve stem tip.

33. INSTALL VALVE LIFTER

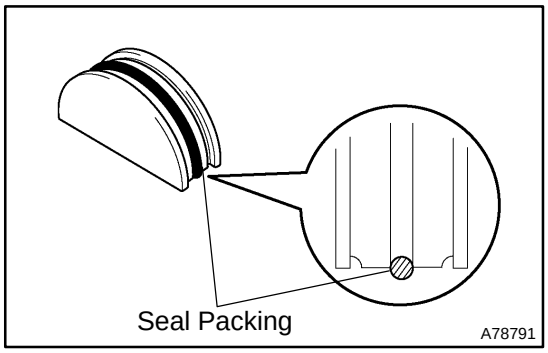
(a) Apply a light coat of engine oil to the valve lifter.

NOTICE:

Install the same parts in the same combination to the original locations.

(b) Install the valve lifter.

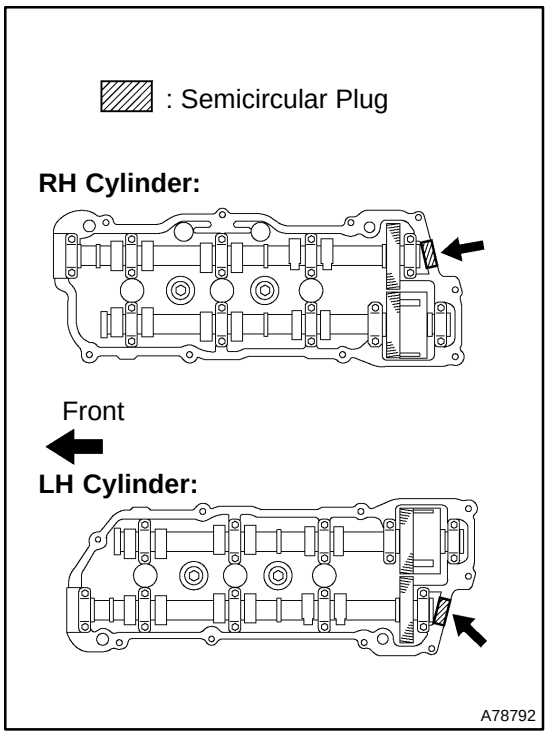
(c) Check that the valve lifter is rotated smoothly by hand.



34. INSTALL SEMICIRCULAR PLUG

(a) Remove any old seal packing material.

(b) Apply seal packing to the plug grooves.
Seal packing: Part No. 08826-00080 or equivalent



(c) Install the 2 plugs to the cylinder heads.

NOTICE:

- **Install the plugs so that they are flush with the top of the cylinder head.**
- **Install the plugs within 3 minutes after applying seal packing.**
- **Do not expose the seal packing to engine oil within 2 hours after installing.**

35. INSTALL W/HEAD STRAIGHT SCREW PLUG NO.1 (RH CYLINDER)

(a) Using a straight hexagon wrench 14, install 2 new gaskets and the 2 screw plugs.
Torque: 44 N·m (449 kgf·cm, 32 ft·lbf)

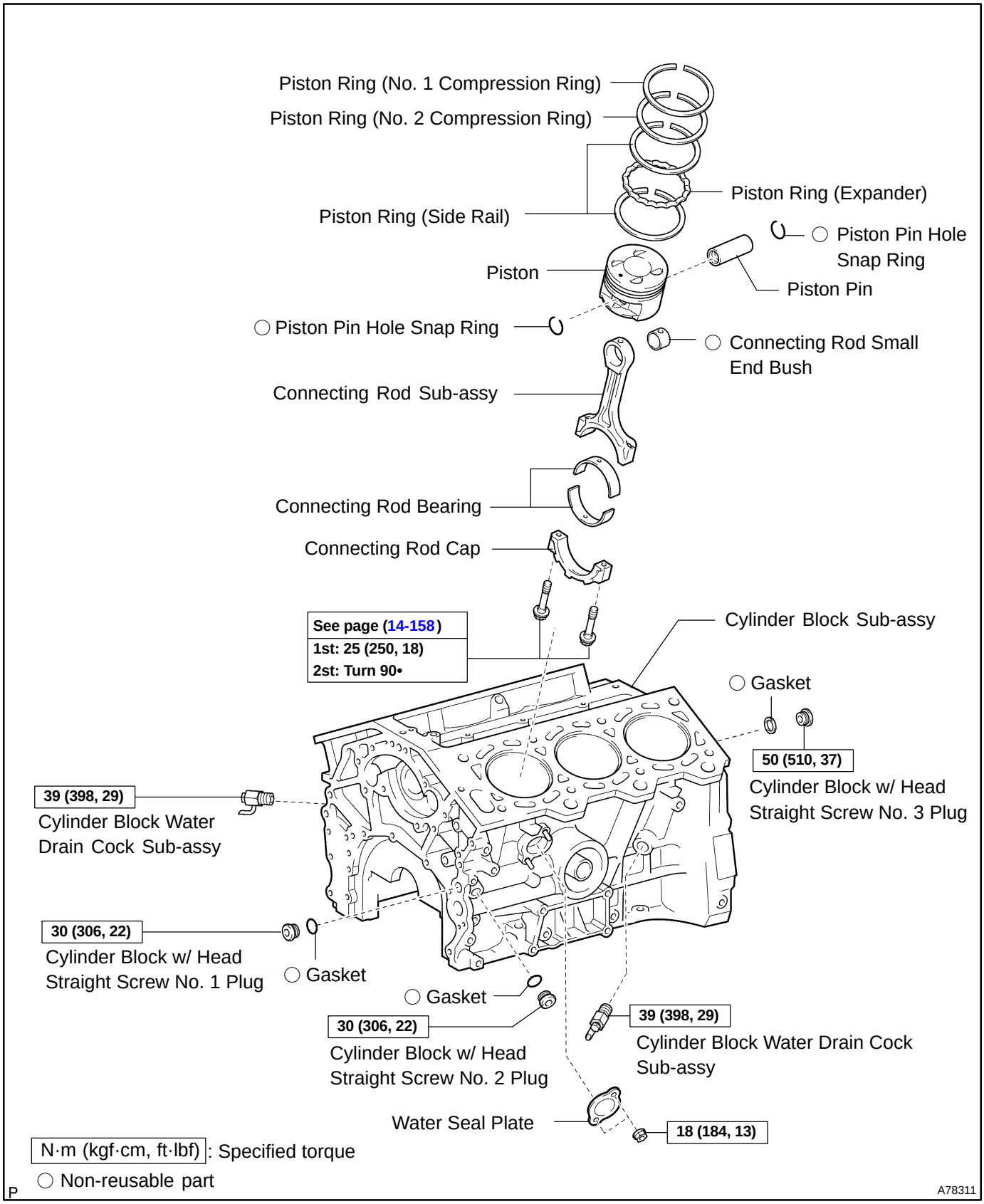
36. INSTALL W/HEAD STRAIGHT SCREW PLUG NO.2 (LH CYLINDER)

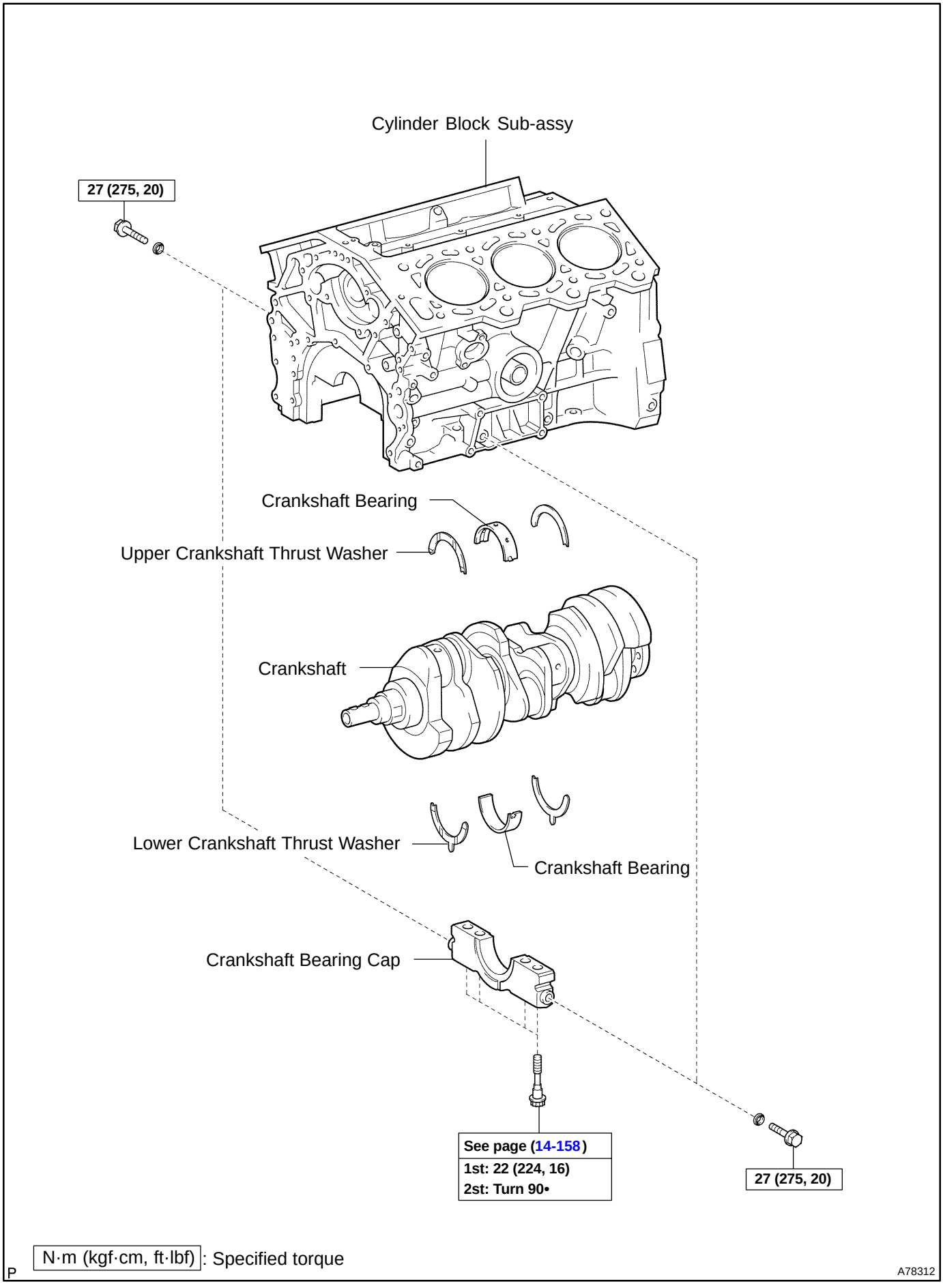
(a) Using a straight hexagon wrench 14, install 2 new gaskets and the 2 screw plugs.
Torque: 44 N·m (449 kgf·cm, 32 ft·lbf)

CYLINDER BLOCK ASSY (3MZ-FE)

COMPONENTS

1419L-03




Cylinder Block Sub-assy
27 (275, 20)
Crankshaft Bearing
Upper Crankshaft Thrust Washer
Crankshaft
Lower Crankshaft Thrust Washer
Crankshaft Bearing
Crankshaft Bearing Cap
See page (14-158)
1st: 22 (224, 16)
2st: Turn 90•
27 (275, 20)
N·m (kgf·cm, ft·lbf): Specified torque
P
A78312

1419M-03

OVERHAUL

1. REMOVE CYLINDER BLOCK WATER DRAIN COCK SUB-ASSY

2. REMOVE WATER SEAL PLATE

3. REMOVE CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.1 PLUG

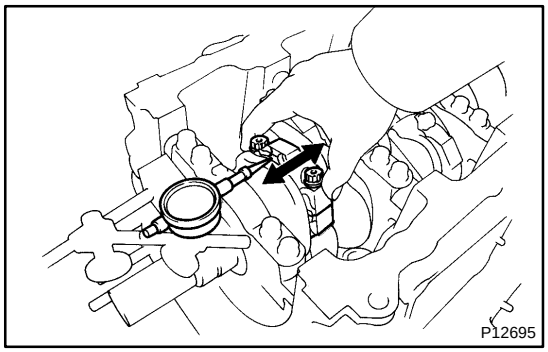
(a) Using a socket hexagon wrench 10, remove the screw plug.

4. REMOVE CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.2 PLUG

(a) Using a socket hexagon wrench 10, remove the screw plug.

5. REMOVE CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.3 PLUG

(a) Using a socket hexagon wrench 10, remove the screw plug.



6. INSPECT CONNECTING ROD THRUST CLEARANCE

(a) Using a dial indicator, measure the thrust clearance while moving the connecting rod back and forth.

Standard thrust clearance:
0.15 to 0.30 mm (0.0059 to 0.0118 in.)
Maximum thrust clearance: 0.35 mm (0.0138 in.)

- If the thrust clearance is greater than maximum, replace the connecting rod.
- If necessary, replace the crankshaft.

7. INSPECT CONNECTING ROD OIL CLEARANCE

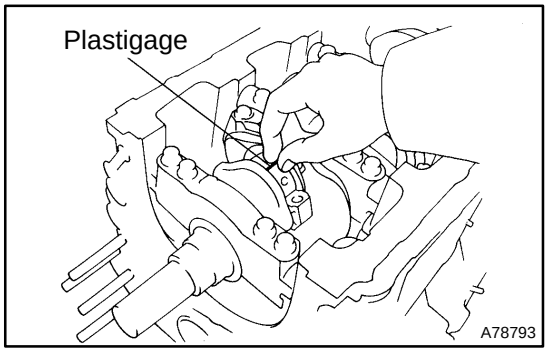
(a) Check that the matchmarks on the connecting rod and cap are aligned to ensure correct reassembly.

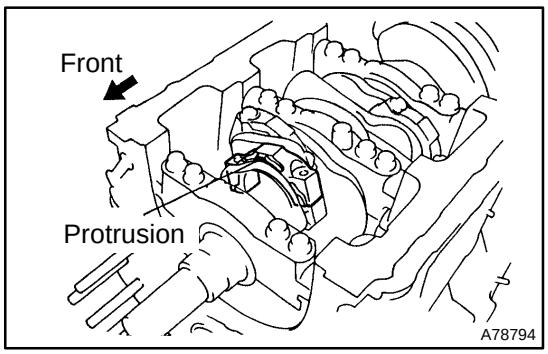
(b) Remove the cap bolts.

(c) Clean the crank pin, bearing and connecting rod.

(d) Check the crank pin and bearing for pitting and scratches.

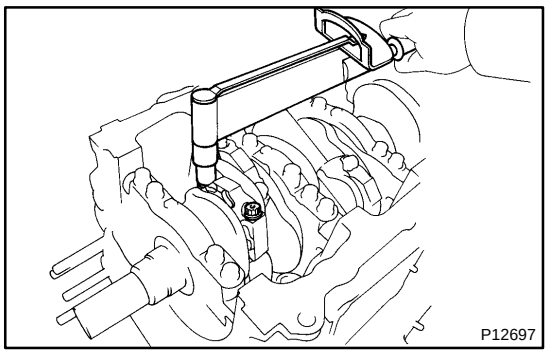
(e) Lay a strip of Plastigage across the crank pin.



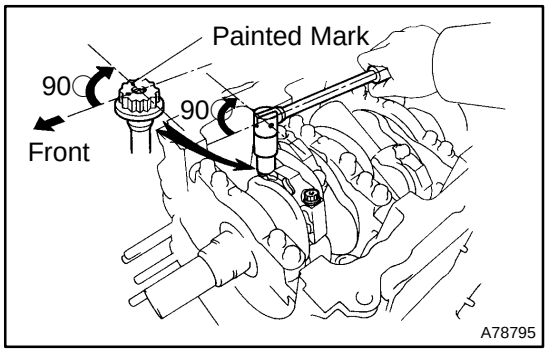


(f) Check that the protrusion of the cap is facing the correct direction.

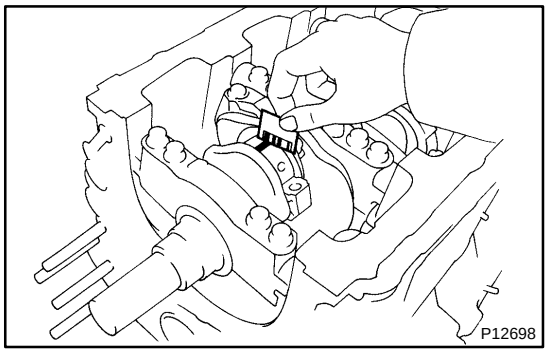
(g) Apply a light coat of engine oil to the threads of the cap bolts.



(h) Tighten the cap bolts in several steps by the specified torque.
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)



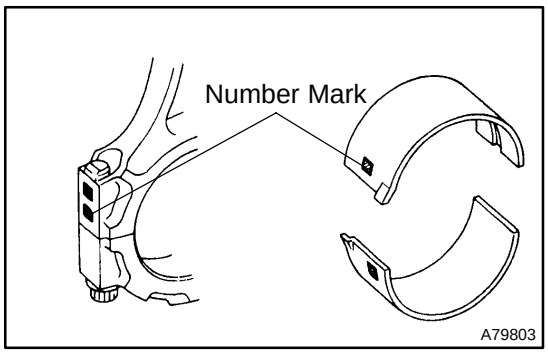
(i) Mark the front side of each cap bolt with paint.
(j) Retighten the cap bolts by 90° as shown in the illustration.
NOTICE:
Do not turn the crankshaft.
(k) Remove the cap bolts, cap and lower bearing.



(l) Measure the Plastigage at its widest point.
Standard oil clearance:
0.038 to 0.066 mm (0.0015 to 0.0026 in.)
Maximum oil clearance: 0.08 mm (0.0031 in.)
NOTICE:
Completely remove the Plastigage.

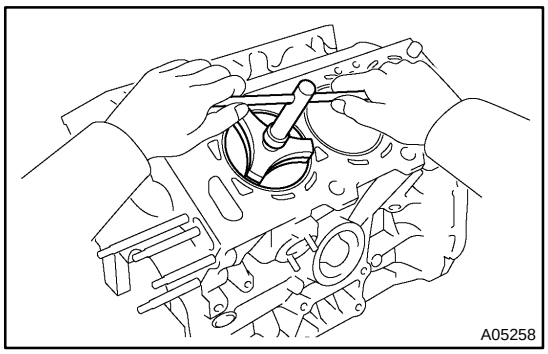
- If the oil clearance is greater than maximum, replace the bearing.
- If necessary, grind or replace the crankshaft.

HINT:
If replacing the bearing, replace it with one having the same number as marked on the connecting rod. There are 4 sizes of standard bearings, marked ”1 ”, ”2”, ”3” and ”4” accordingly.



Reference:
Standard bearing center wall thickness:

Mark	mm (in.)
”1”	1.484 to 1.487 (0.0584 to 0.0585)
”2”	1.487 to 1.490 (0.0585 to 0.0587)
”3”	1.490 to 1.493 (0.0587 to 0.0588)
”4”	1.493 to 1.496 (0.0588 to 0.0589)



8. REMOVE PISTON SUB-ASSY W/CONNECTING ROD

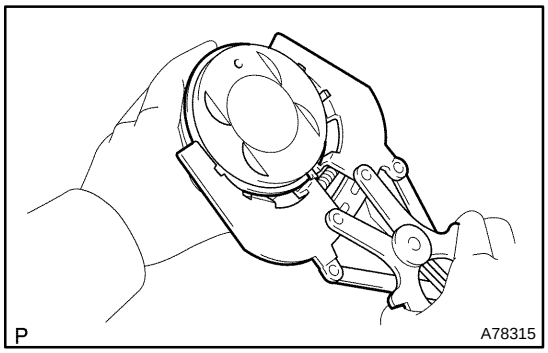
(a) Using a ridge reamer, remove all the carbon from the top of the cylinder.

(b) Push out the piston and connecting rod assembly from the top of the cylinder block.

HINT:

- Keep the bearings, connecting rod and cap together.
- Arrange the piston and connecting rod assemblies in the correct order so they can be returned to the original locations when reassembling.

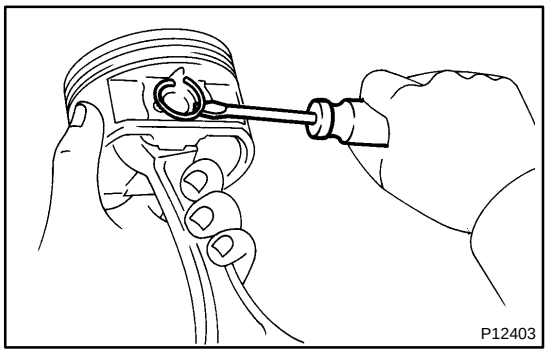
9. REMOVE CONNECTING ROD BEARING



10. REMOVE PISTON RING SET

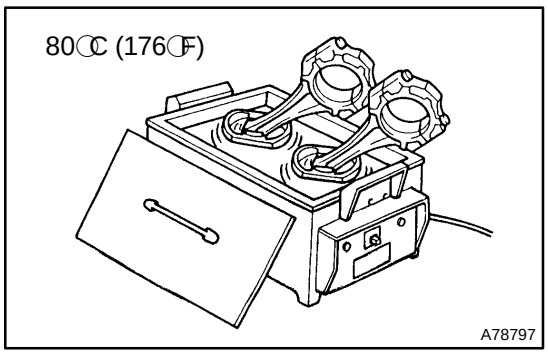
(a) Using a piston ring expander, remove the 2 compression rings.

(b) Remove the 2 side rails and expander by hand.



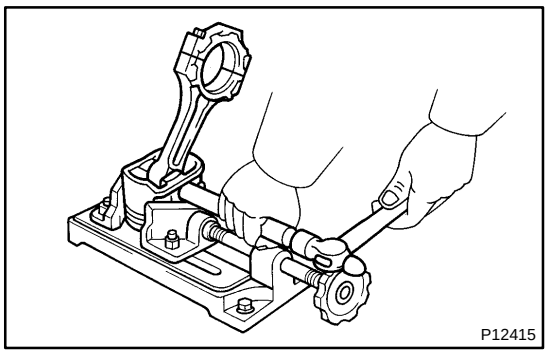
11. REMOVE PISTON PIN HOLE SNAP RING

(a) Using a small screwdriver, pry out the 2 snap rings.



12. REMOVE W/PIN PISTON SUB-ASSY

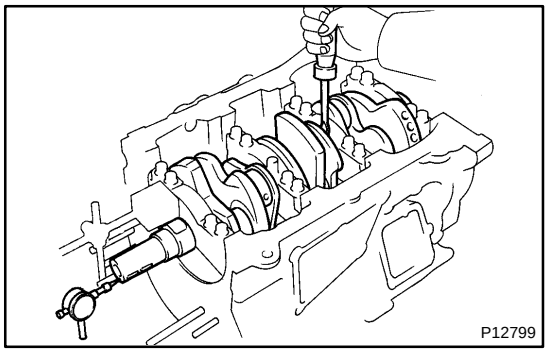
(a) Gradually heat the piston up to approximately 80°C (176°F).



(b) Using a plastic-faced hammer and brass bar, lightly tap out the piston pin, then remove the connecting rod.

HINT:

- The piston and piston pin are a matched set.
- Store the pistons, piston pins, rings, connecting rods and bearings in the correct order so that they can be returned to the original locations when reassembling.



13. INSPECT CRANKSHAFT THRUST CLEARANCE

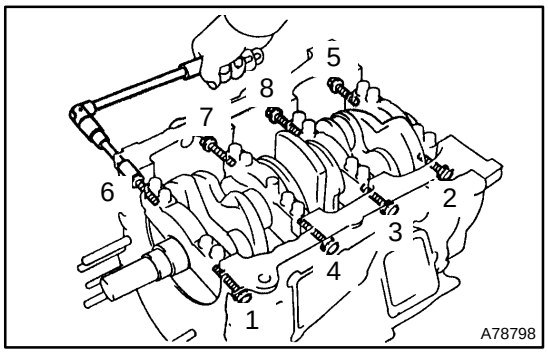
(a) Using a dial indicator, measure the thrust clearance while prying the crankshaft back and forth with a screwdriver.

Standard thrust clearance:
0.04 to 0.24 mm (0.0016 to 0.0094 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.

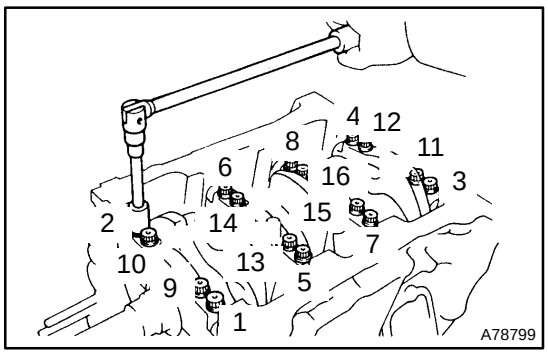
HINT:

The thrust washer thickness is 1.93 to 1.98 mm (0.0760 to 0.0780 in.).

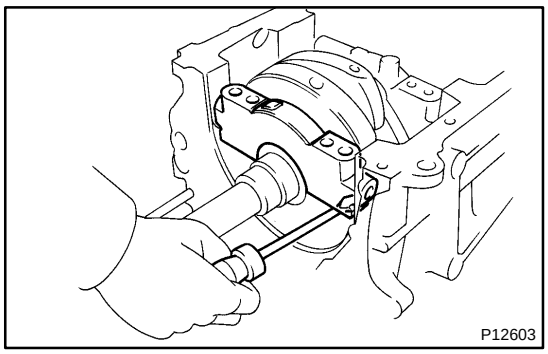


14. REMOVE CRANKSHAFT

(a) Using several steps, loosen and remove the 8 bearing cap bolts and 8 seal washers uniformly in the sequence shown in the illustration.



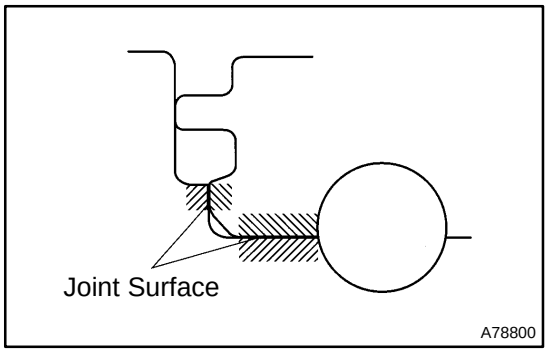
(b) Using several steps, loosen and remove the 16 bearing cap bolts uniformly in the sequence shown in the illustration.



(c) Using a screwdriver, pry out the bearing caps. Remove the 4 bearing caps and 4 lower bearings.

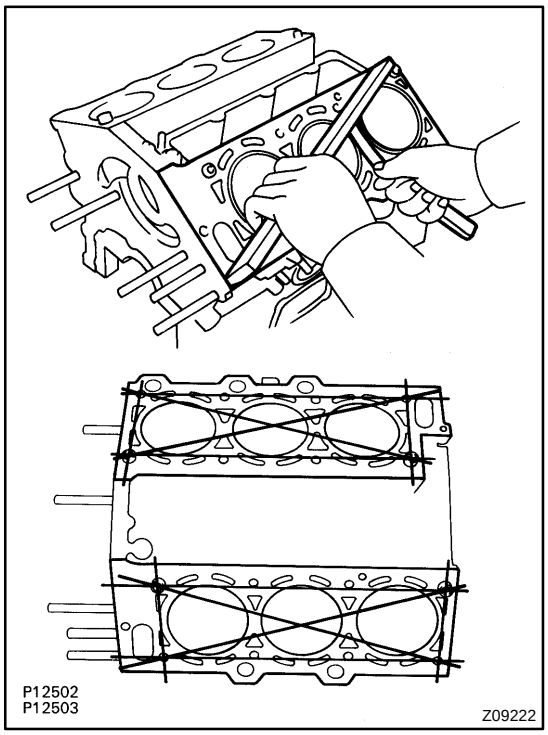
NOTICE:

- **Carefully pry out the main bearing cap by alternately lifting each end of the bearing cap little by little.**
- **Be careful not to damage the joint surface of the cylinder block and bearing cap.**



15. REMOVE CRANKSHAFT THRUST WASHER SET

16. REMOVE CRANKSHAFT BEARING

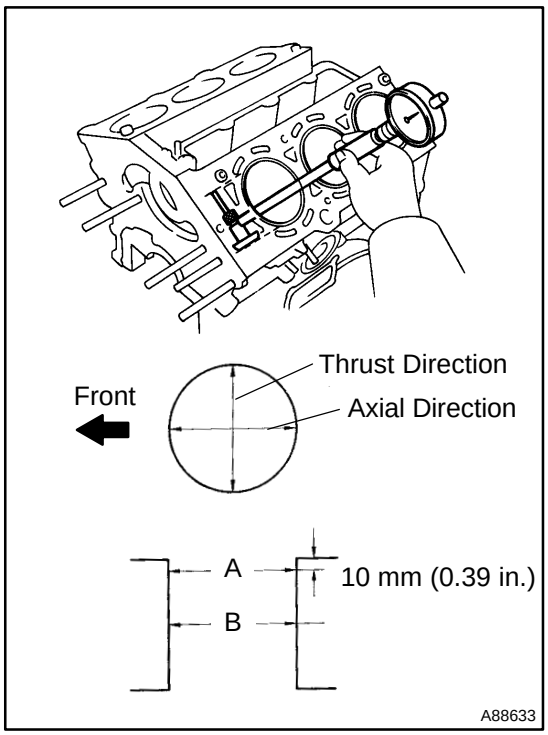


17. INSPECT CYLINDER BLOCK FOR FLATNESS

(a) Using a precision straight edge and feeler gauge, measure the warpage on the surface which contacts the cylinder head gasket.

Maximum warpage: 0.05 mm (0.0020 in.)

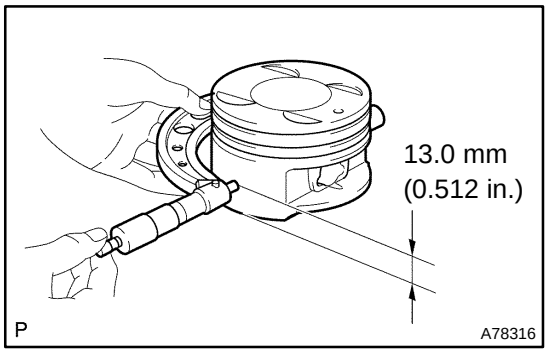
If the warpage is greater than maximum, replace the cylinder block.



18. INSPECT CYLINDER BORE

(a) Using a cylinder gauge, measure the cylinder bore diameter at positions A and B in the thrust and axial directions.
Standard diameter:
92.000 to 92.012 mm (3.6220 to 3.6225 in.)
Maximum diameter: 92.132 mm (3.6272 in.)

If the average diameter of 4 positions is greater than maximum, replace the cylinder block.



19. INSPECT W/PIN PISTON SUB-ASSY

(a) Using a micrometer, measure the diameter of the piston. Align the micrometer so it is 13.0 mm (0.512 in.) from the bottom of the piston and at a right angle (90°) to the piston pin holes as illustrated.
Piston diameter:
91.953 to 91.967 mm (3.6202 to 3.6207 in.)

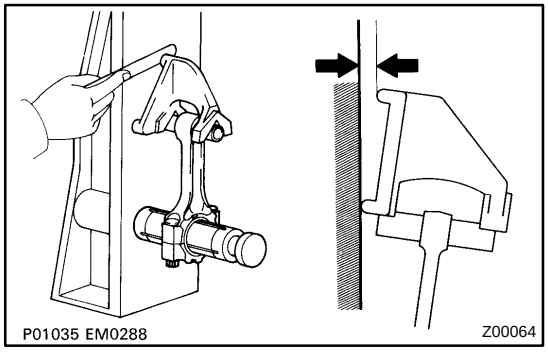
20. INSPECT PISTON OIL CLEARANCE

(a) Subtract the piston diameter measurement from the cylinder bore diameter measurement.
Standard oil clearance: 0.033 to 0.059 mm (0.0013 to 0.0023 in.)
Maximum oil clearance: 0.13 mm (0.0051 in.)

- If the oil clearance is greater than maximum, replace all the 6 pistons.
- If necessary, replace the cylinder block.

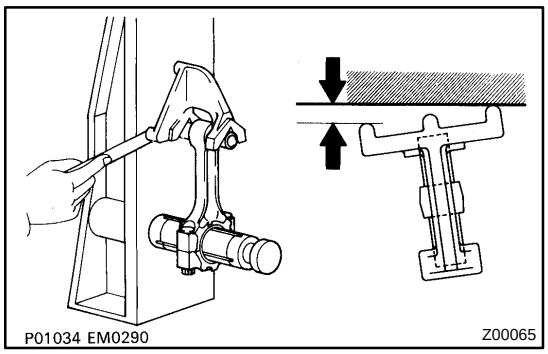
21. INSPECT CONNECTING ROD SUB-ASSY

(a) Using a rod aligner and feeler gauge, check the connecting rod alignment.



(1) Inspect for misalignment.
Maximum misalignment:
0.05 mm (0.0020 in.) per 100 mm (3.94 in.)

If misalignment is greater than maximum, replace the connecting rod assembly.

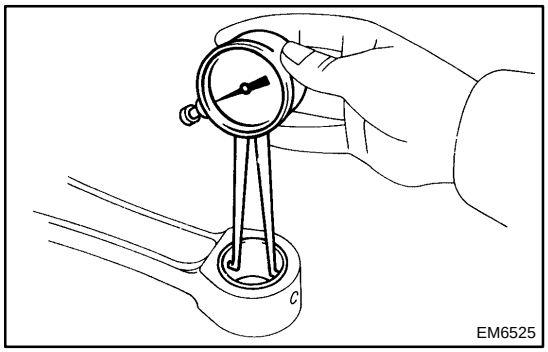


(2) Inspect for twist.

Maximum twist:

0.15 mm (0.0059 in.) per 100 mm (3.94 in.)

If the twist is greater than maximum, replace the connecting rod assembly.

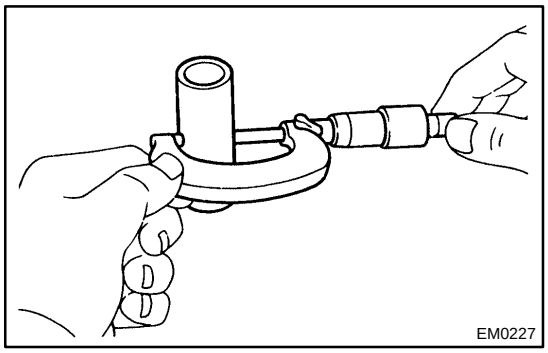


22. INSPECT PISTON PIN OIL CLEARANCE

(a) Using a caliper gauge, measure the inside diameter of the bush.

Bush inside diameter:

22.005 to 22.014 mm (0.8663 to 0.8667 in.)



(b) Using a micrometer, measure the piston pin diameter.

Piston pin diameter:

21.997 to 22.006 mm (0.8660 to 0.8664 in.)

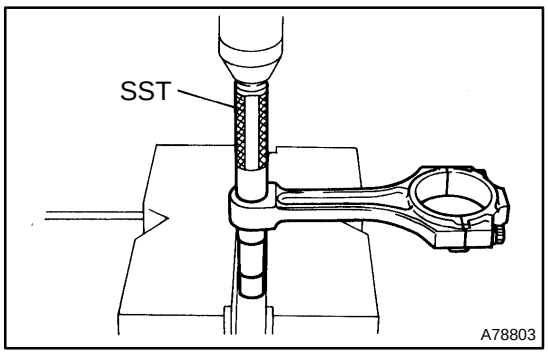
(c) Subtract the piston pin diameter measurement from the bush inside diameter measurement.

Standard oil clearance:

0.005 to 0.011 mm (0.0002 to 0.0004 in.)

Maximum oil clearance: 0.05 mm (0.0020 in.)

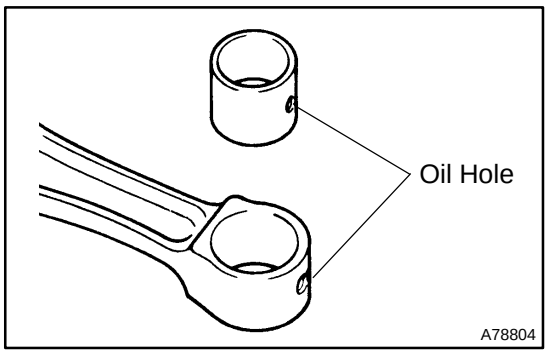
- If the oil clearance is greater than maximum, replace the bush.
- If necessary, replace the piston and piston pin together.



23. REMOVE CONNECTING ROD SMALL END BUSH

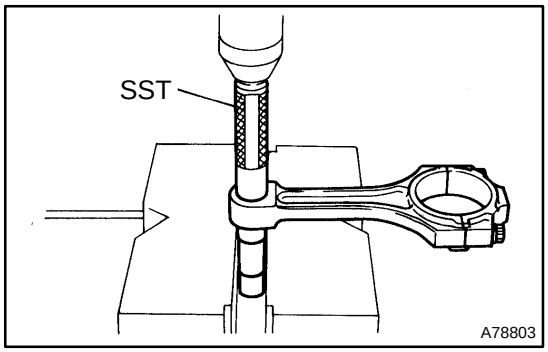
(a) Using SST and a press, press out the bush.

SST 09222-30010

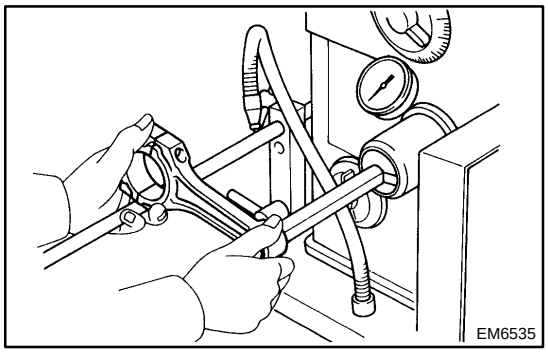


24. INSTALL CONNECTING ROD SMALL END BUSH

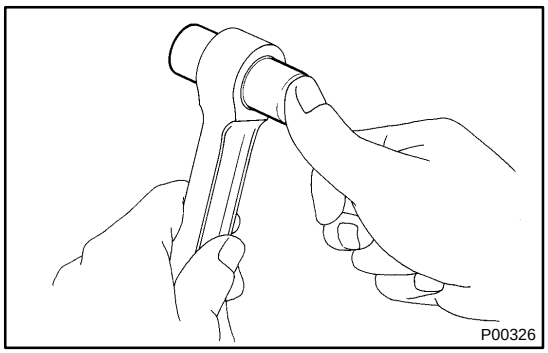
(a) Align the oil holes of a new bush and the connecting rod.



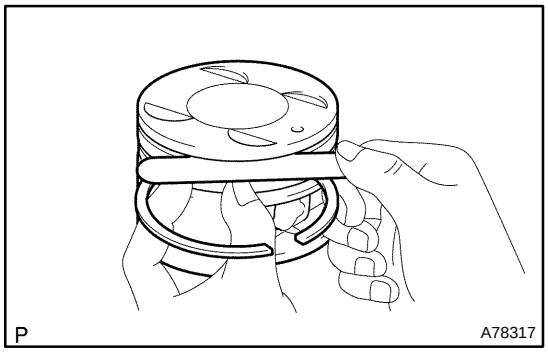
(b) Using SST and a press, press in the bushing.
SST 09222-30010



(c) Using a pin hole grinder, hone the bush to obtain the standard specified clearance between the bush and piston pin.
Standard oil clearance:
0.005 to 0.011 mm (0.0002 to 0.0004 in.)



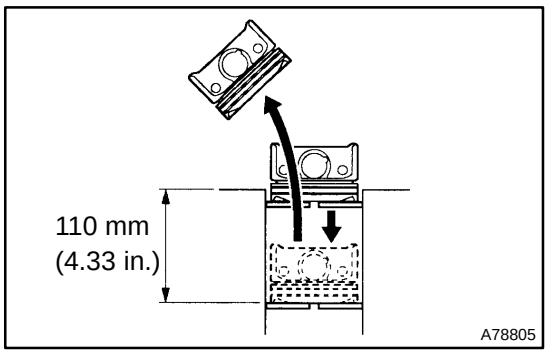
(d) Check the piston pin fit at normal room temperature. Coat the piston pin with engine oil, then push it into the connecting rod with your thumb.



25. INSPECT RING GROOVE CLEARANCE

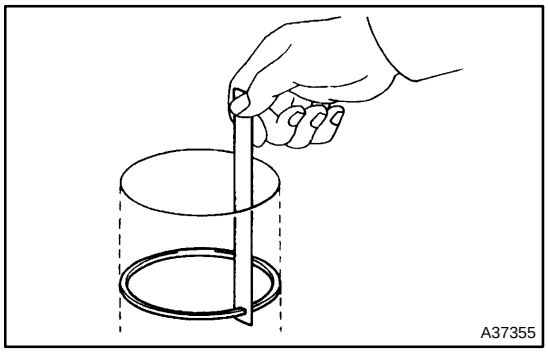
(a) Using a feeler gauge, measure the clearance between the new piston ring and wall of the ring groove.
Ring groove clearance:
0.03 to 0.08 mm (0.0012 to 0.0031 in.) for No. 1 ring
0.02 to 0.06 mm (0.0008 to 0.0024 in.) for No. 2 ring
0.03 to 0.11 mm (0.0012 to 0.0043 in.) for oil ring

If the groove clearance is not as specified, replace the piston ring.



26. INSPECT PISTON RING END GAP

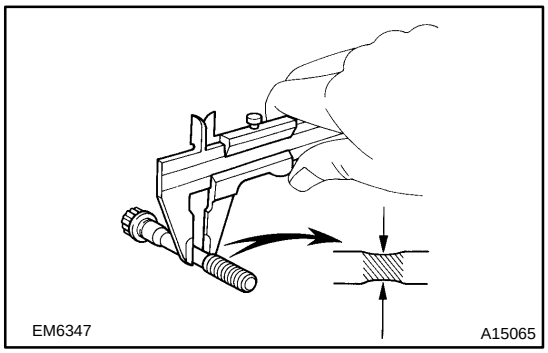
(a) Using a piston, push the piston ring which it is a little below the bottom of the ring travel, where is 110 mm (4.33 in.) from the top of the cylinder block.



(b) Using a feeler gauge, measure the end gap.

Standard end gap:
0.30 to 0.40 mm (0.0118 to 0.0157 in.) for No. 1 ring
0.50 to 0.60 mm (0.0197 to 0.0236 in.) for No. 2 ring
0.15 to 0.40 mm (0.0059 to 0.0157 in.) for oil (side rail) ring
Maximum end gap:
0.95 mm (0.0374 in.) for No. 1 ring
1.05 mm (0.0413 in.) for No. 2 ring
1.00 mm (0.0394 in.) for oil (side rail) ring

- 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.

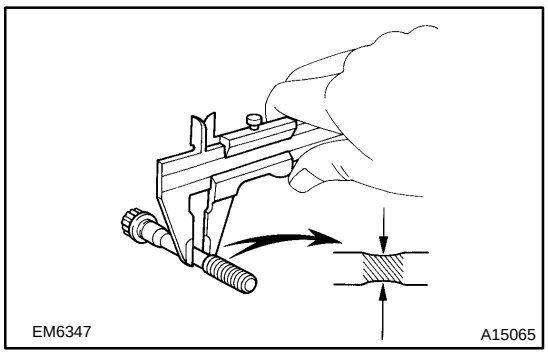


27. INSPECT CONNECTING ROD BOLT

(a) Using vernier calipers, measure the tension portion diameter of the bolt.

Standard diameter: 7.2 to 7.3 mm (0.283 to 0.287 in.)
Minimum diameter: 7.0 mm (0.276 in.)

If the diameter is less than minimum, replace the bolt.

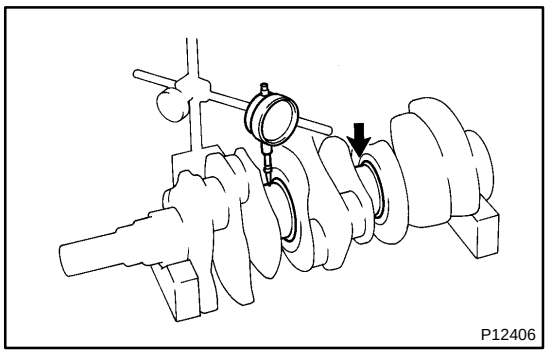


28. INSPECT CRANKSHAFT BEARING CAP SET BOLT

(a) Using vernier calipers, measure the tension portion diameter of the bolt.

Standard diameter: 7.5 to 7.6 mm (0.295 to 0.299 in.)
Minimum diameter: 7.2 mm (0.283 in.)

If the diameter is less than minimum, replace the bolt.

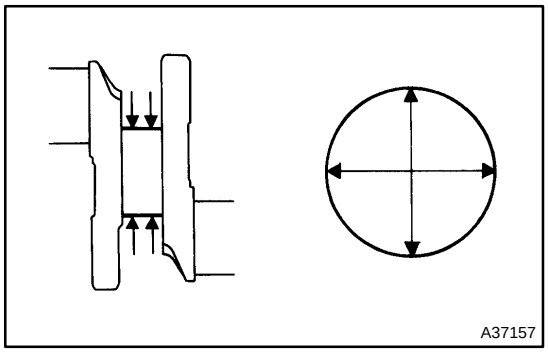

P12406

29. INSPECT CRANKSHAFT

(a) Using a dial indicator and V-blocks, measure the circle runout as shown in the illustration.

Maximum circle runout: 0.06 mm (0.0024 in.)

If the circle runout is greater than maximum, replace the crankshaft.


A37157

(b) Using a micrometer, measure the diameter of each main journal.

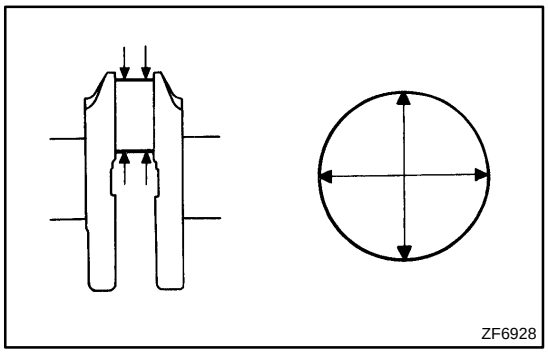
Diameter: 60.988 to 61.000 mm (2.4011 to 2.4016 in.)

If the diameter is not as specified, check the crankshaft oil clearance

(c) Check each main journal for taper and out-of-round as shown.

Maximum taper and out-of-round:
0.02 mm (0.0008 in.)

If the taper and out-of-round is greater than maximum, replace the crankshaft.


ZF6928

(d) Using a micrometer, measure the diameter of each crank pin.

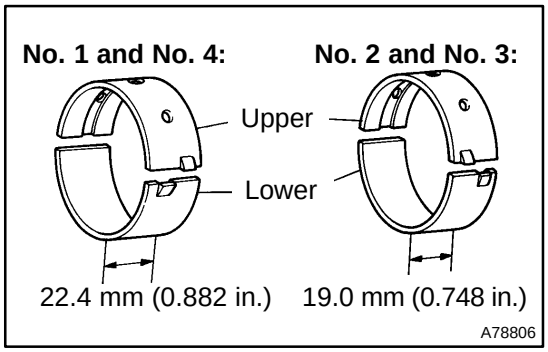
Diameter: 52.992 to 53.000 mm (2.0863 to 2.0866 in.)

If the diameter is not as specified, check the connecting rod oil clearance.

(e) Check each crank pin for taper and out-of-round as shown.

Maximum taper and out-of-round:
0.02 mm (0.0008 in.)

If the taper and out-of-round is greater than maximum, replace the crankshaft.



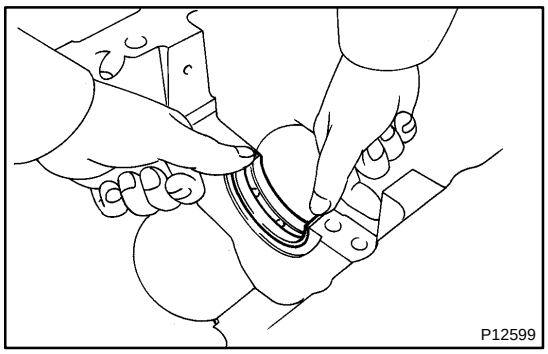
A78806

30. INSPECT CRANKSHAFT OIL CLEARANCE

HINT:

Crankshaft bearings come in widths of 22.4 mm (0.882 in.) and 19.0 mm (0.748 in.). Install the 22.4 mm (0.882 in.) bearings in the No. 1 and No. 4 cylinder block journal positions with the bearing caps. Install the 19.0 mm (0.748 in.) bearings in the No. 2 and No. 3 positions.

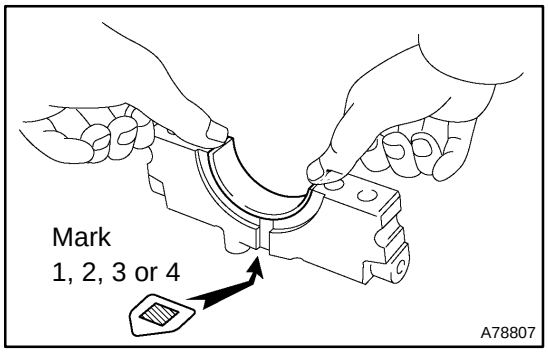
(a) Clean each main journal and bearing.



(b) Align the key of the bearing with the keyway of the cylinder block, then push in the 4 upper bearings.

NOTICE:

Do not apply engine oil to the bearing and its contact surface.



(c) Align the key of the bearing with the keyway of the bearing cap, then push in the 4 lower bearings.

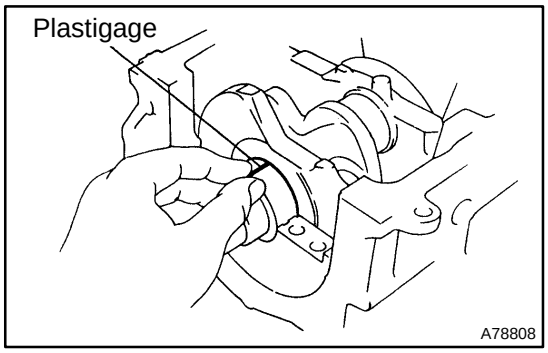
NOTICE:

Do not apply engine oil to the bearing and its contact surface.

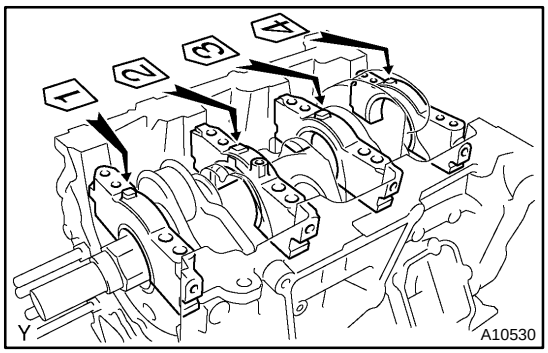
HINT:

A number is marked on each bearing cap to indicate the installation position.

(d) Place the crankshaft on the cylinder block.

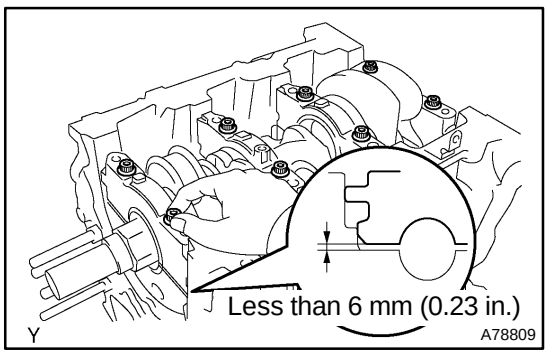


(e) Lay a strip of Plastigage across each journal.



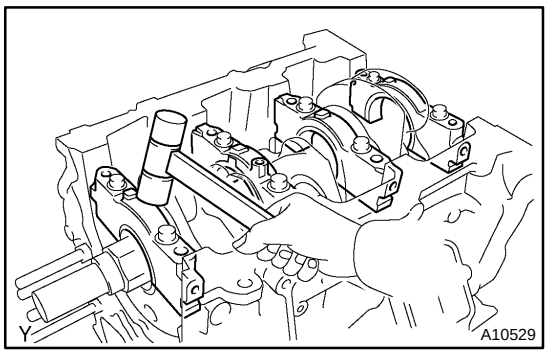
(f) Examine the front marks and numbers, then install the bearing caps on the cylinder block.

(g) Apply a light coat of engine oil to the threads of the bearing cap bolts.



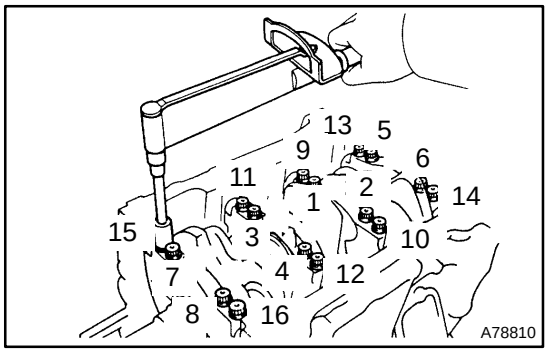
(h) Temporarily install the 8 bearing cap bolts to the inside positions.

(i) Install the bearing cap by hand using the inner bolt as a guide. Stop when the bearing cap is about 6 mm (0.23 in.) away from contact with the cylinder block.

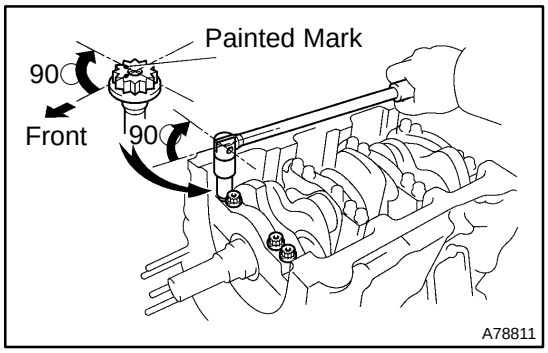


(j) Using a plastic-faced hammer, lightly tap the bearing cap to ensure proper fit.

(k) Apply a light coat of engine oil to the threads of the bearing cap bolts.



(l) Using several steps, install and tighten the 16 bearing cap bolts uniformly in the sequence shown in the illustration.
Torque: 22 N·m (224 kgf·cm, 16 ft·lbf)

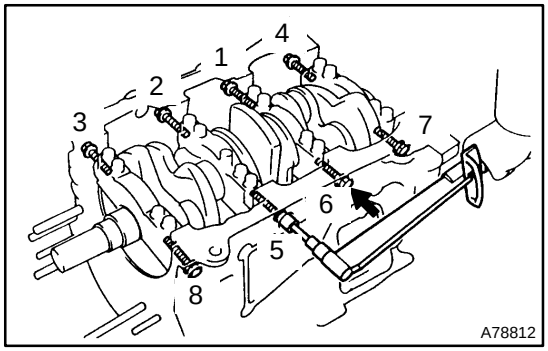


(m) Mark the front side of the bearing cap bolts with paint.

(n) Retighten the bearing cap bolts by 90° in the same sequence as step (l).

(o) Check that each painted mark is now at a 90° angle to the front.

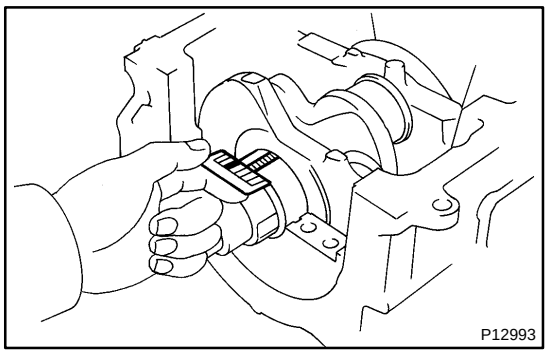
NOTICE:
Do not turn the crankshaft.



(p) Using several steps, install and tighten the 8 bearing cap bolts uniformly in the sequence shown in the illustration.
Torque: 27 N·m (275 kgf·cm, 20 ft·lbf)

HINT:
Use the short bolt for the position marked with the arrow.

(q) Remove the bearing caps.



(r) Measure the Plastigage at its widest point.

Standard oil clearance:

0.014 to 0.034 mm (0.0006 to 0.0013 in.) for No. 1 and No. 2 journals

0.026 to 0.046 mm (0.0010 to 0.0018 in.) for No. 3 and No. 4 journals

Maximum clearance:

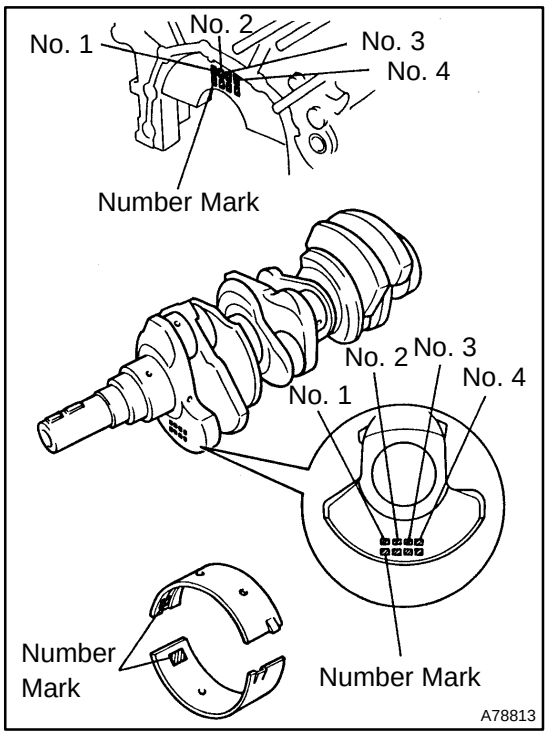
0.05 mm (0.0020 in.) for No. 1 and No. 2 journals

0.06 mm (0.0024 in.) for No. 3 and No. 4 journals

- If the oil clearance is greater than maximum, replace the bearings.
- If necessary, replace the crankshaft.

NOTICE:

Completely remove the Plastigage.



(s) If replacing a bearing, replace it with one having the same number. If the number of the bearing cannot be determined, select the correct bearing by adding together the numbers imprinted on the cylinder block and crankshaft, then refer to the table below for the appropriate bearing number. The No. 1 and No. 2 journal bearing come in 5 sizes, marked ”3”, ”4”, ”5”, ”6” and ”7”. The No. 3 and No. 4 journal bearings come in 5 standard bearing sizes, marked ”1”, ”2”, ”3”, ”4” and ”5”.

No. 1 and No. 2 journal bearings:

Cylinder block + Crankshaft =	0 to 5	6 to 11	12 to 17	18 to 23	24 to 28
Replacement Bearing	”3”	”4”	”5”	”6”	”7”

HINT:
EXAMPLE
Imprinted number on the cylinder block is 06
Imprinted number on the crankshaft is 08
6 + 8 = 14
Select the bearing marked ”5”

No. 3 and No. 4 journal bearings:

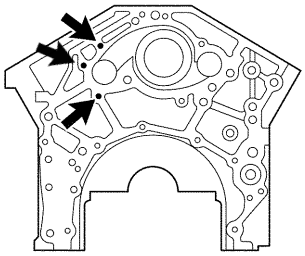
Cylinder block + Crankshaft =	0 to 5	6 to 11	12 to 17	18 to 23	24 to 28
Replacement Bearing	”1”	”2”	”3”	”4”	”5”

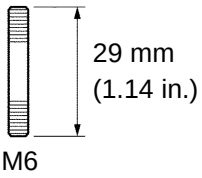
HINT:
EXAMPLE
Imprinted number on the cylinder block is 06
Imprinted number on the crankshaft is 08
6 + 8 = 14
Select the bearing marked ”3”

Item	Mark	mm (in.)
Cylinder block main journal bore diameter (A)	”00”	66.000 (2.5984)
	”01”	66.001 (2.5985)
	”02”	66.002 (2.5985)
	”03”	66.003 (2.5985)
	”04”	66.004 (2.5986)
	”05”	66.005 (2.5986)
	”06”	66.006 (2.5987)
	”07”	66.007 (2.5987)
	”08”	66.008 (2.5987)
	”09”	66.009 (2.5988)
	”10”	66.010 (2.5988)
	”11”	66.011 (2.5989)
	”12”	66.012 (2.5989)
	”13”	66.013 (2.5989)
	”14”	66.014 (2.5990)
	”15”	66.015 (2.5990)
	”16”	66.016 (2.5990)
Crankshaft main journal diameter (B)	”00”	61.000 (2.4016)
	”01”	60.999 (2.4015)
	”02”	60.998 (2.4015)
	”03”	60.997 (2.4015)
	”04”	60.996 (2.4014)
	”05”	60.995 (2.4014)
	”06”	60.994 (2.4013)
	”07”	60.993 (2.4012)
	”08”	60.992 (2.4012)
	”09”	60.991 (2.4012)
	”10”	60.990 (2.4012)
	”11”	60.989 (2.4011)
	”12”	60.988 (2.4011)
Standard bearing center wall thickness	”1”	2.486 to 2.489 (0.0979 to 0.0980)
	”2”	2.489 to 2.492 (0.0980 to 0.0981)
	”3”	2.492 to 2.495 (0.0981 to 0.0982)
	”4”	2.495 to 2.498 (0.0982 to 0.0983)
	”5”	2.498 to 2.501 (0.0983 to 0.0985)
	”6”	2.501 to 2.504 (0.0985 to 0.0986)
	”7”	2.504 to 2.507 (0.0986 to 0.0987)

31. INSTALL STUD BOLT

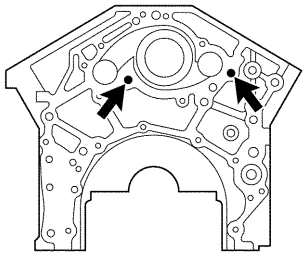
Front Side:

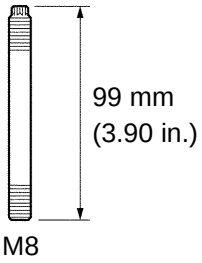




Torque: 6.0 N·m (60 kgf·cm, 53 in.·lbf)

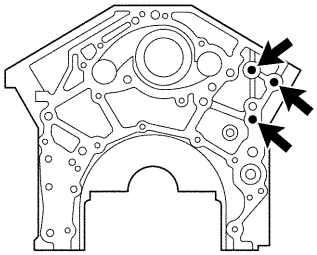
Front Side:

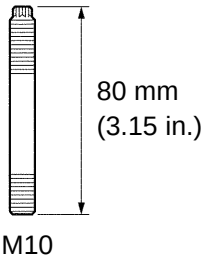




Torque: 15 N·m (145 kgf·cm, 11 ft·lbf)

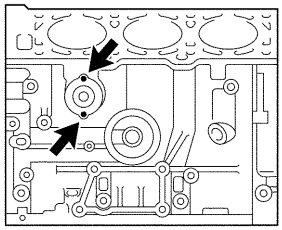
Front Side:

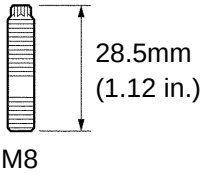




Torque: 21 N·m (220 kgf·cm, 15 ft·lbf)

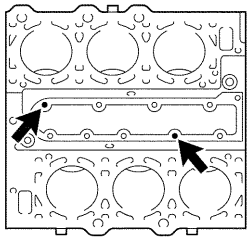
Left Side:

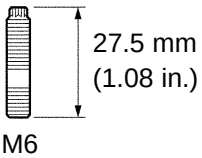




Torque: 7.0 N·m (70 kgf·cm, 62 in.·lbf)

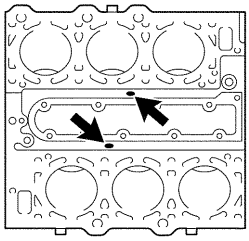
Upper Side:

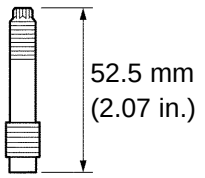




Torque: 4.0 N·m (40 kgf·cm, 35 in.·lbf)

Upper Side:





Torque: 12 N·m (122 kgf·cm, 9 ft·lbf)

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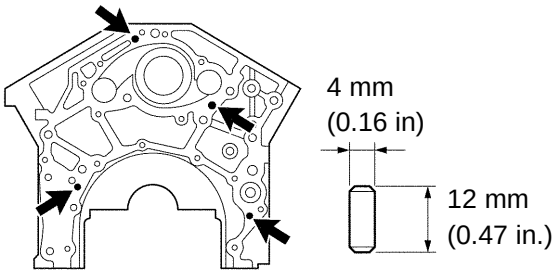
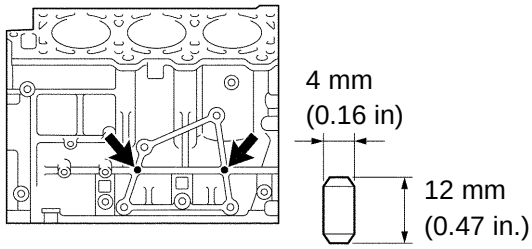
32. INSTALL STRAIGHT PIN

Front Side:



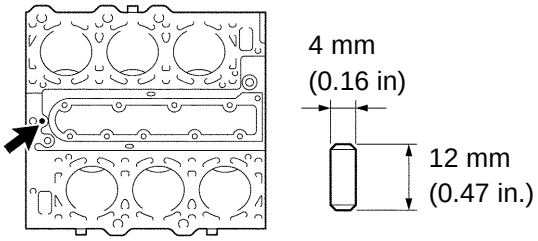
Protrusion Height: 6 mm (0.24 in.)

Right Side:



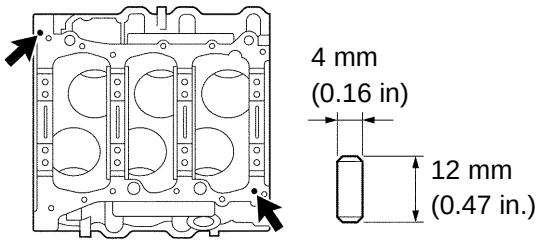
Protrusion Height: 6 mm (0.24 in.)

Upper Side:



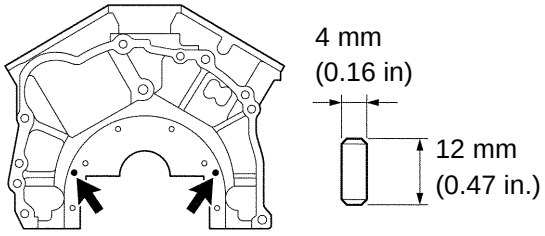
Protrusion Height: 6 mm (0.24 in.)

Lower Side:



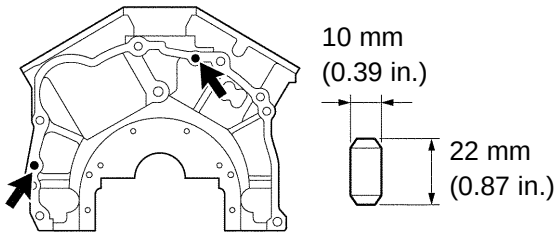
Protrusion Height: 6 mm (0.24 in.)

Back Side:



Protrusion Height: 6 mm (0.24 in.)

Back Side:



Protrusion Height: 11 mm (0.43 in.)

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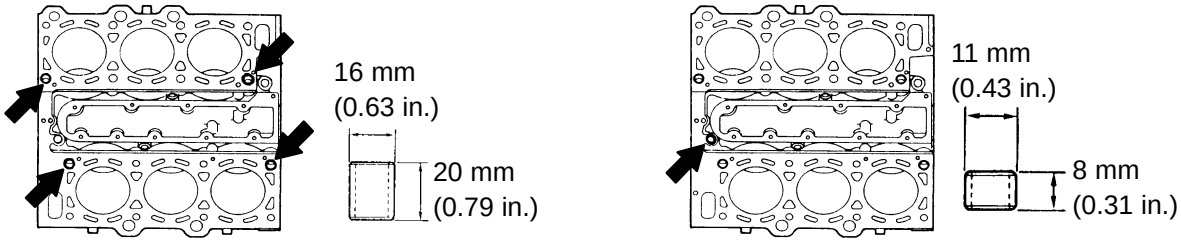
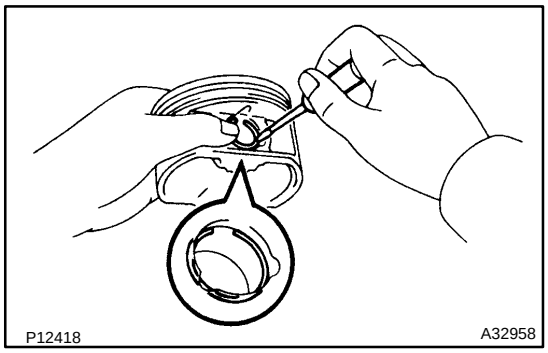
33. INSTALL RING PIN

Upper Side:



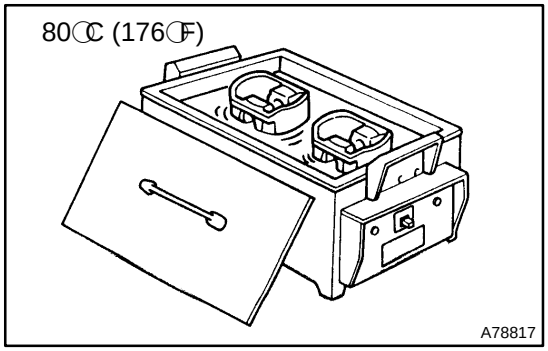


34. INSTALL PISTON PIN HOLE SNAP RING

(a) Using a small screwdriver, install a new snap ring at one end of the piston pin hole.

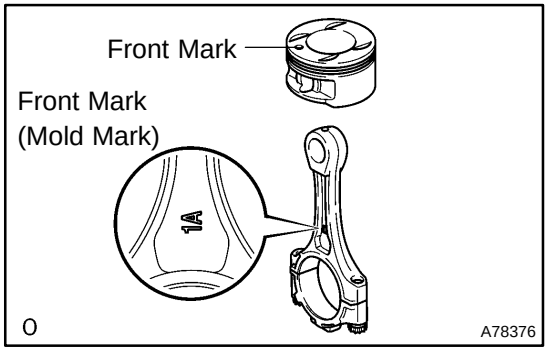
HINT:

Be sure that the end gap of the snap ring is not aligned with the pin hole cutout of the piston.



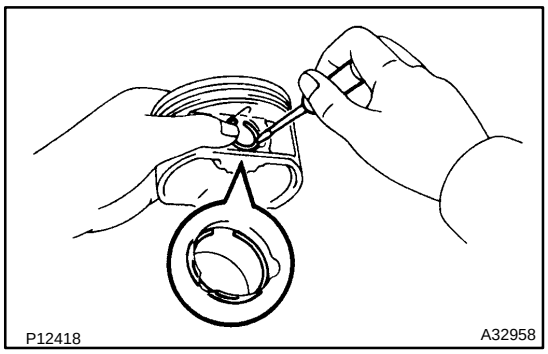
35. INSTALL W/PIN PISTON SUB-ASSY

(a) Gradually heat the piston up to approximately 80°C (176°F).



(b) Coat the piston pin with engine oil.

(c) Align the front marks of the piston and connecting rod, then push in the piston pin with your thumb until the pin contacts the snap ring.



36. INSTALL PISTON PIN HOLE SNAP RING

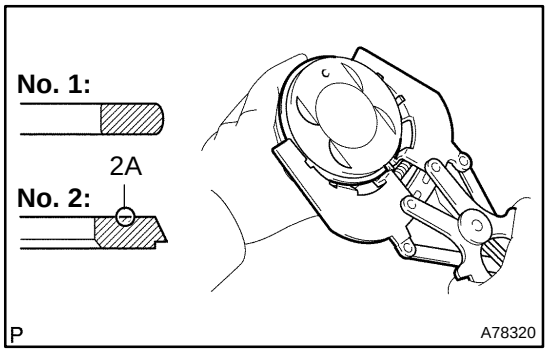
(a) Using a small screwdriver, install a new snap ring on the other end of the piston pin hole.

HINT:

Be sure that the end of gap of the snap ring is not aligned with the pin hole cutout of the piston.

37. INSTALL PISTON RING SET

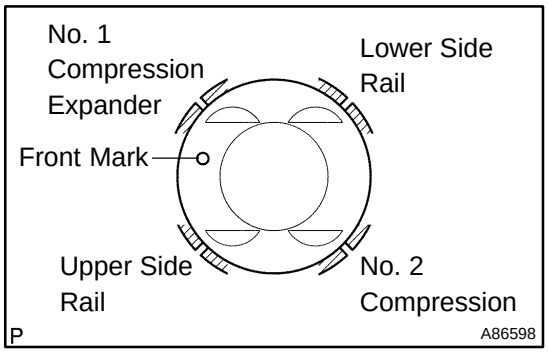
(a) Install the expander and 2 side rails by hand.



(b) Using a piston ring expander, install the 2 compression rings.

HINT:

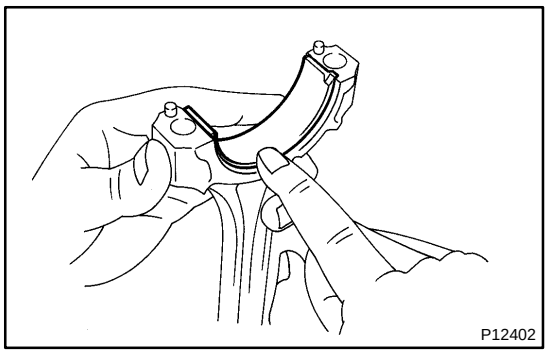
The No. 2 compression ring is installed with the code mark ”2A” facing upward as shown in the illustration.



(c) Position the piston rings so that the ring ends are arranged as shown in the illustration.

NOTICE:

Do not align the ring ends.

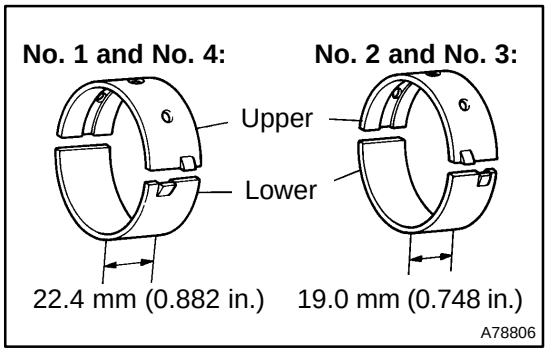


38. INSTALL CONNECTING ROD BEARING

(a) Align the key of the bearing with the keyway of the connecting rod or cap.

NOTICE:

Clean the backside of the bearing and bearing surface of the connecting rod. The surface should be free of dust and oils.

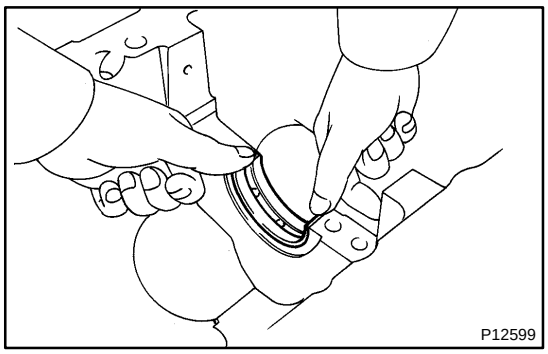


39. INSTALL CRANKSHAFT BEARING

HINT:

Crankshaft bearings come in widths of 22.4 mm (0.882 in.) and 19.0 mm (0.748 in.). Install the 22.4 mm (0.882 in.) bearings in the No. 1 and No. 4 cylinder block journal positions with the main bearing caps. Install the 19.0 mm (0.748 in.) bearings in the No. 2 and No. 3 positions.

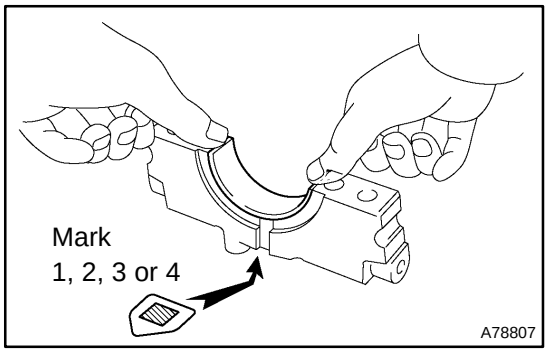
(a) Clean each main journal and the bearing.



(b) Align the key of the bearing with the keyway of the cylinder block, then push in the 4 upper bearings.

NOTICE:

Do not apply engine oil to the bearing and its contact surface.



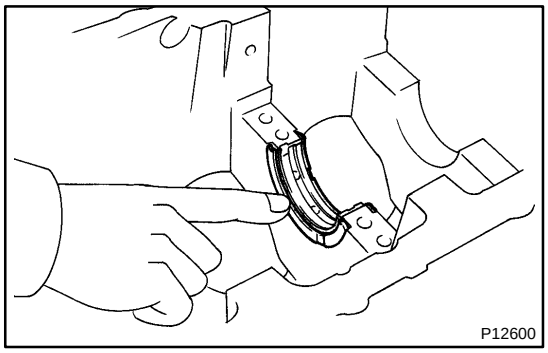
(c) Align the key of the bearing with the keyway of the bearing cap, then push in the 4 lower bearings.

NOTICE:

Do not apply engine oil to the bearing and its contact surface.

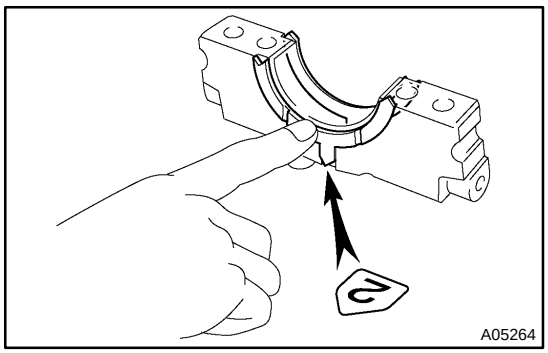
HINT:

A number is marked on each bearing cap to indicate the installation position.



40. INSTALL CRANKSHAFT THRUST WASHER SET

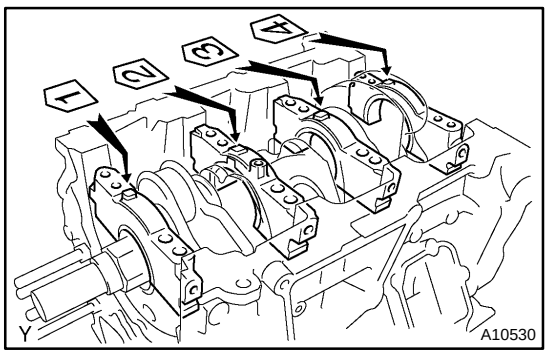
(a) Install the 2 thrust washers under the No. 2 journal position of the cylinder block with the oil grooves facing outward.



(b) Install the 2 thrust washers on the No. 2 bearing cap with the grooves facing outward.

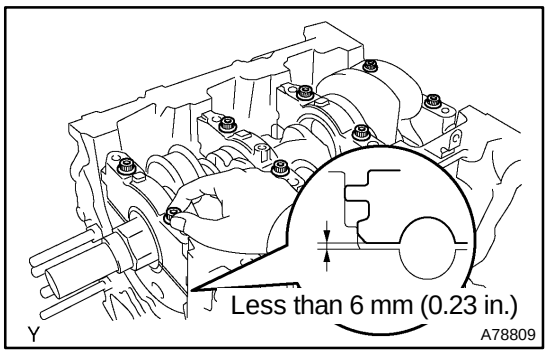
41. INSTALL CRANKSHAFT

(a) Apply engine oil to the upper bearing, then install the crankshaft on the cylinder block.



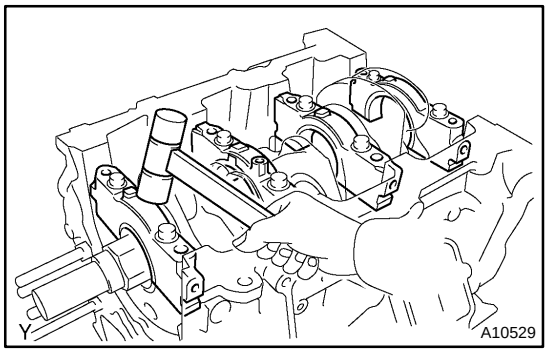
(b) Examine the front marks and numbers, then install the bearing caps on the cylinder block.

(c) Apply a light coat of engine oil to the threads of the bearing cap bolts.



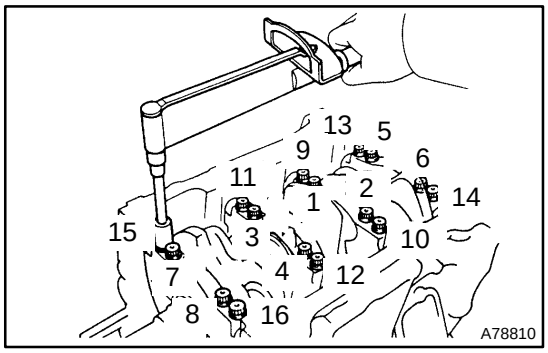
(d) Temporarily install the 8 bearing cap bolts to the inside positions.

(e) Install the bearing cap by hand using the inner bolt as a guide. Stop when the bearing cap is about 6 mm (0.23 in.) away from contact with the cylinder block.

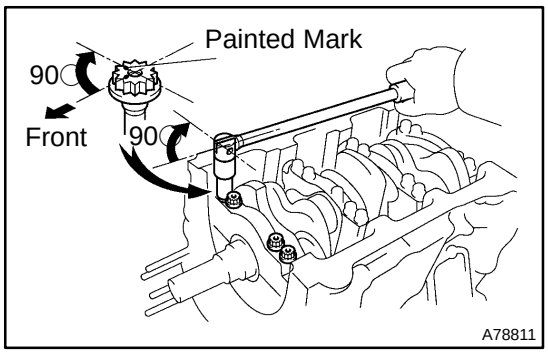


(f) Using a plastic-faced hammer, lightly tap the bearing cap to ensure proper fit.

(g) Apply a light coat of engine oil to the threads of the bearing cap bolts.



(h) Using several steps, install and tighten the 16 bearing cap bolts uniformly in the sequence shown in the illustration.
Torque: 22 N·m (224 kgf·cm, 16 ft·lbf)

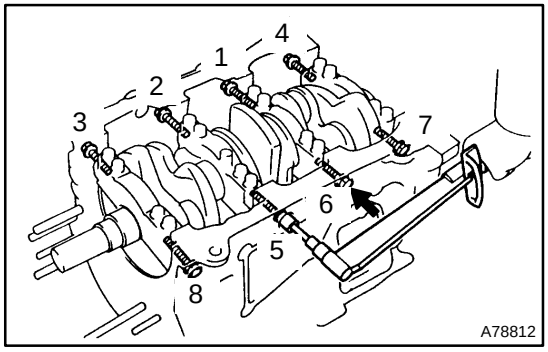


(i) Mark the front side of the bearing cap bolts with paint.

(j) Retighten the bearing cap bolts by 90° in the same sequence as step (h).

(k) Check that each painted mark is now at a 90° angle to the front.

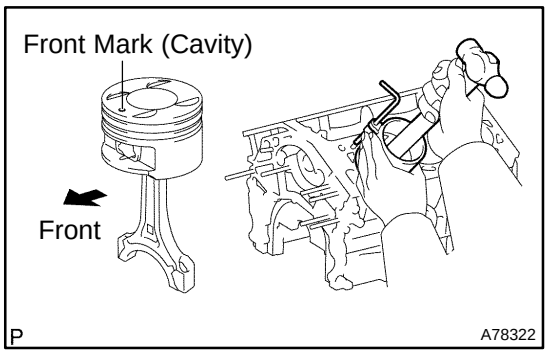
(l) Check that the crankshaft turns smoothly.



(m) Using several steps, install and tighten the 8 bearing cap bolts uniformly in the sequence shown in the illustration.
Torque: 27 N·m (275 kgf·cm, 20 ft·lbf)

HINT:

Use the short bolt for the position marked with the arrow.



42. INSTALL PISTON SUB-ASSY W/CONNECTING ROD

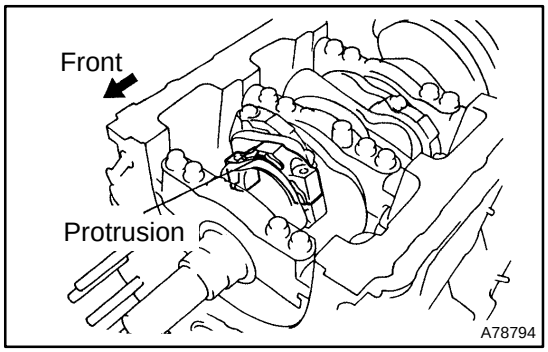
(a) Apply engine oil to the cylinder walls, pistons, and surfaces of the connecting rod bearings.

(b) Check the position of the piston ring ends.

(c) Using a piston ring compressor, push the numbered piston and connecting rod assemblies correctly into each cylinder with the front mark of the piston facing forward.

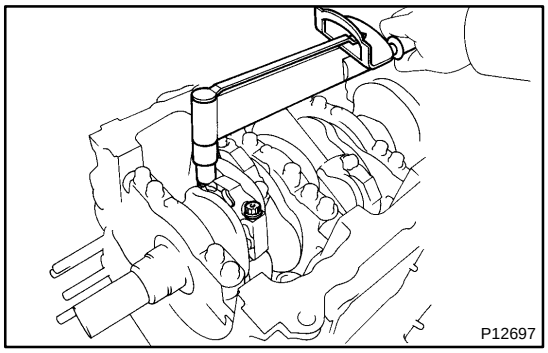
NOTICE:

Match the numbered connecting rod cap with the connecting rod.



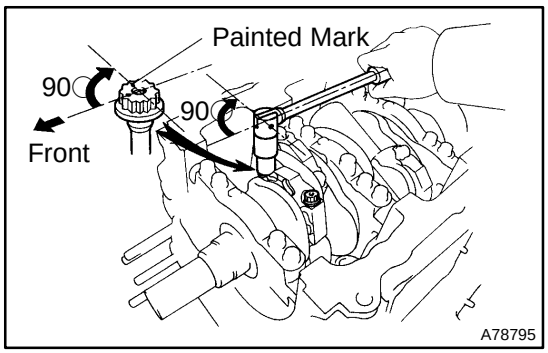
(d) Check that the protrusion of the cap is facing the correct direction.

(e) Apply a light coat of engine oil to the threads of the cap bolts.



(f) Tighten the cap bolts in several steps by the specified torque.

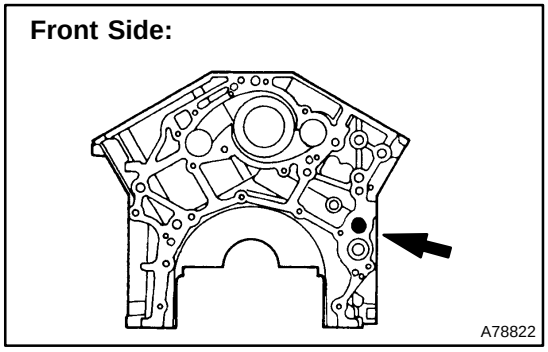
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)



(g) Mark the front side of each cap bolt with paint.

(h) Retighten the cap bolts by 90° as shown in the illustration.

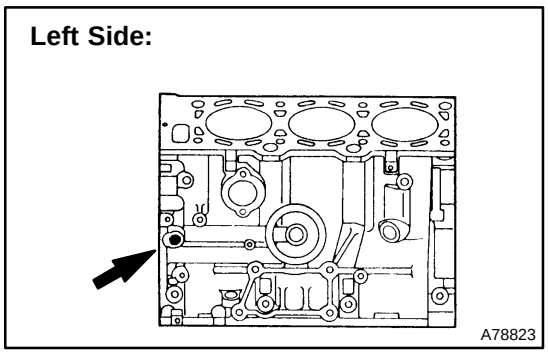
(i) Check that the crankshaft turns smoothly.



43. INSTALL CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.1 PLUG

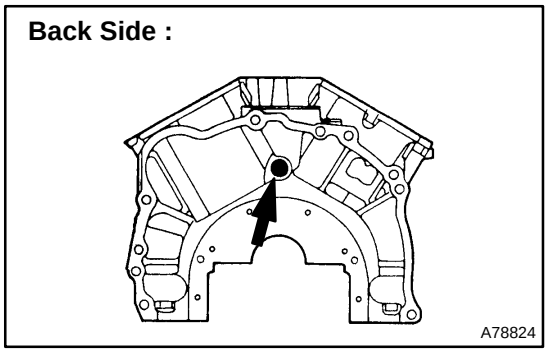
(a) Using a socket hexagon wrench 10, install a new gasket and the screw plug.

Torque: 30 N·m (306 kgf·cm, 22 ft·lbf)



44. INSTALL CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.2 PLUG

(a) Using a socket hexagon wrench 10, install a new gasket and the screw plug.
Torque: 30 N·m (306 kgf·cm, 22 ft·lbf)

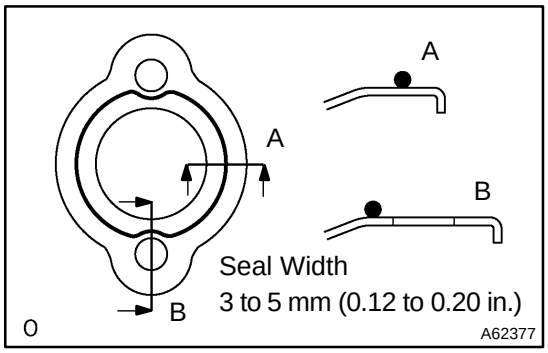


45. INSTALL CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.3 PLUG

(a) Using a socket hexagon wrench 10, install a new gasket and the screw plug.
Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

46. INSTALL WATER SEAL PLATE

(a) Remove any old seal packing from the contact surface.



(b) Apply a continuous bead of seal packing (Diameter 3 to 5 mm (0.12 to 0.20 in.)) as shown in the illustration.
Seal packing: Part No. 08826-00100 or equivalent

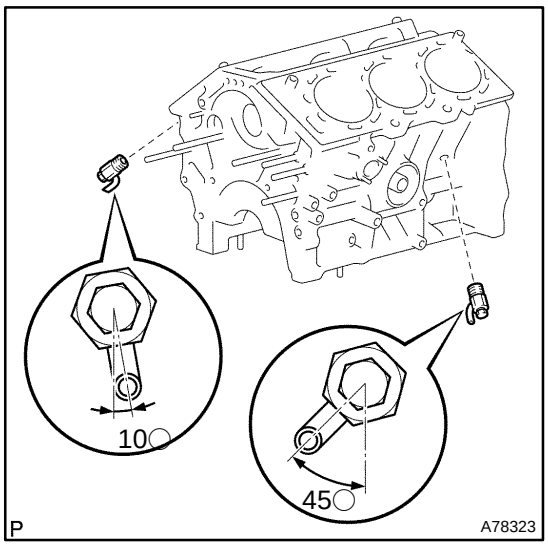
NOTICE:

- **Remove any oil from the contact surface.**
- **Install the seal plate within 3 minutes after applying seal packing.**
- **Do not expose the seal packing to engine oil within 2 hours after installing.**

(c) Install the seal plate with the 2 nuts.
Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)

47. INSTALL CYLINDER BLOCK WATER DRAIN COCK SUB-ASSY

(a) Apply adhesive to 2 or 3 threads of the drain cock end.
Adhesive: Part No. 08833-00070, THREE BOND 1324 or equivalent



(b) After applying the specified torque, rotate the drain cock clockwise as shown in the illustration.
Torque: 39 N·m (398 kgf·cm, 29 ft·lbf)

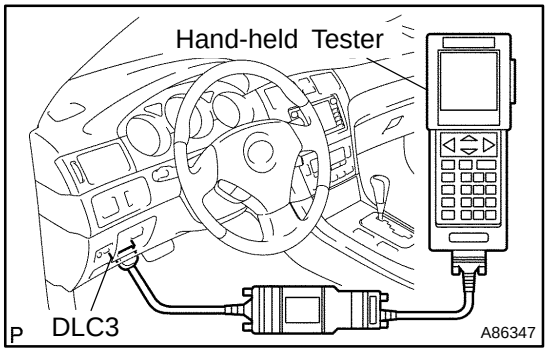
NOTICE:

- **Install the drain cock within 3 minutes after applying adhesive.**
- **Do not expose the drain cock to coolant within 1 hour after installing.**
- **Do not rotate the drain cock by more than 1 revolution (360°) after tightening the drain cock with the specified torque.**
- **Do not loosen the drain cock after setting it correctly.**

SFI SYSTEM (3MZ-FE)

ON-VEHICLE INSPECTION

100IZ-01



1. INSPECT CAMSHAFT TIMING OIL CONTROL VALVE ASSY

(a) Check the operation.

(1) Connect the hand-held tester to the DLC3.

(2) Turn the ignition switch ON.

(3) Start the engine and allow it to warm up.

(4) Connect the hand-held tester, then select VVT from the ACTIVE TEST menu.

(5) Check the engine speed when the OCV is operated with the hand-held tester.

Standard:

Tester Operation	Specified Condition
OCV is OFF	Normal engine speed
OCV is ON	Rough idle or engine stall

If the operation is not as specified, inspect the camshaft timing oil control valve (see page 10-2).

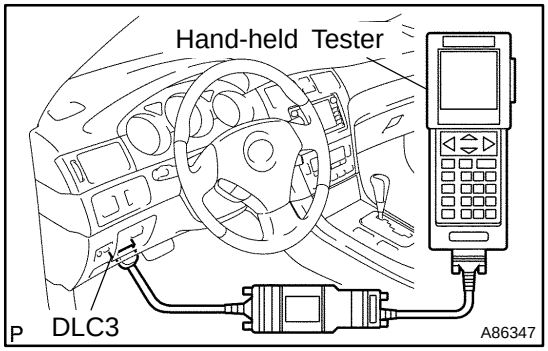
2. INSPECT THROTTLE BODY ASSY

(a) Check the operation (throttle control motor).

(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 the operation is not as specified, inspect the throttle body (see page 10-2).



(b) Check the operation (throttle position sensor).

(1) Connect the hand-held tester to the DLC3.

(2) Turn the ignition switch ON.

(3) Check that the check engine warning light does not light up.

(4) Check that the throttle valve opening percentage (THROTTLE POS) of CURRENT DATA showns the standard value.

Standard throttle valve opening percentage:

60 % or more

NOTICE:

When checking the standard throttle valve opening percentage, the transmission is in the neutral position.

3. INSPECT ACCELERATOR PEDAL POSITION SENSOR

(a) Inspect the voltage.

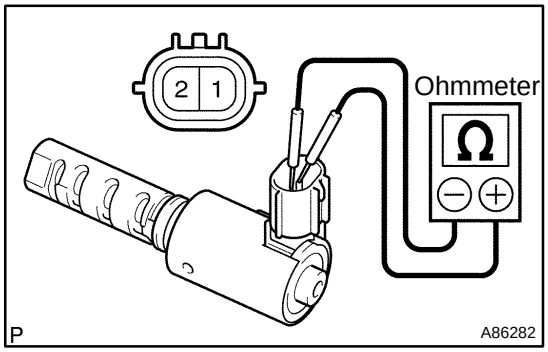
(1) After turning the ignition switch ON, check CURRENT DATA, then verify that the throttle position sensor voltage is within the standard value.

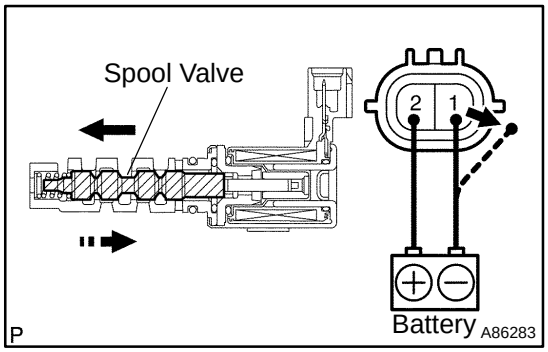
Standard voltage: 0.6 to 1.0 V

If the voltage is not as specified, inspect the accelerator pedal (see page 10-2).

100J0-01

INSPECTION





1. INSPECT CAMSHAFT TIMING OIL CONTROL VALVE ASSY

(a) Inspect the resistance.

(1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
1 (-) - 2 (+)	6.9 to 7.9 Ω at 20•C (68•F)

If the resistance is not as specified, replace the camshaft timing oil control valve.

(b) Check the operation.

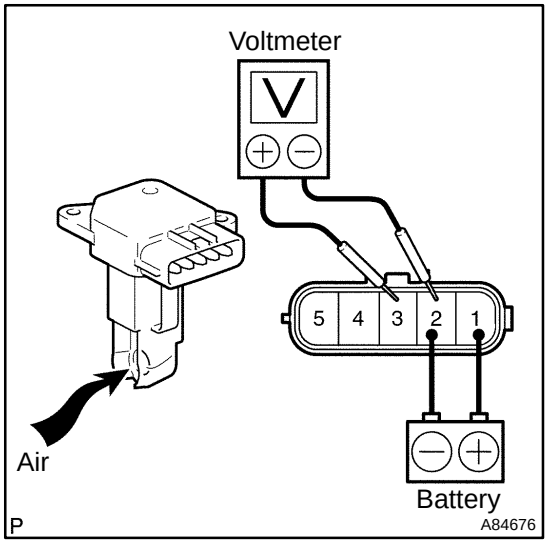
(1) Connect the positive (+) lead from the battery to terminal 2 (+) and negative (-) lead to terminal 1 (-), then check the movement of the spool valve.

NOTICE:

Confirm that the spool valve moves freely and does not get stuck in any position.

HINT:

Bad returning of the spool valve resulted from catching foreign objects causes subtle pressure leak to the advanced direction. In that case, DTC can be detected.



2. INSPECT MASS AIR FLOW METER

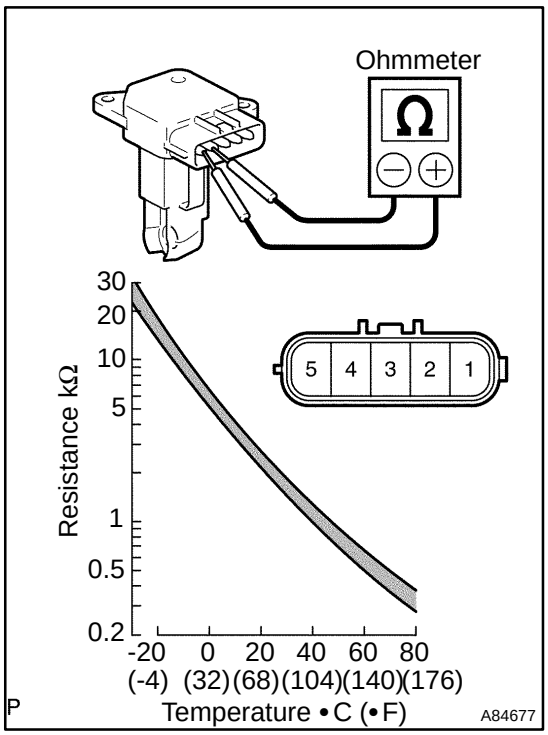
(a) Check the operation.

(1) Apply battery voltage across terminals 1 (+B) and 2 (E2G).

(2) Using voltmeter, connect the positive (+) tester probe to terminal 3 (VC), and negative (-) tester probe to terminal 2 (E2G).

(3) Blow air into the mass air flow sensor, then check that the voltage fluctuates.

If the operation is not as specified, replace the mass air flow sensor.



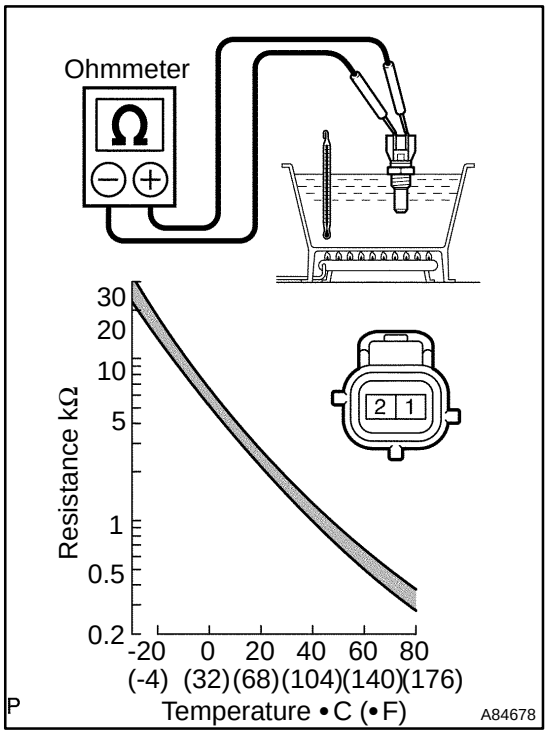
(b) Inspect the resistance.

(1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
4 (THA) - 5 (E2)	13.6 to 18.4 kΩ at -20•C (-4•F)
4 (THA) - 5 (E2)	2.21 to 2.69 kΩ at 20•C (68•F)
4 (THA) - 5 (E2)	0.493 to 0.667 kΩ at 60•C (140•F)

If the resistance is not as specified, replace the mass air flow sensor.



3. INSPECT ENGINE COOLANT TEMPERATURE SENSOR

(a) Inspect the resistance.

(1) Using an ohmmeter, measure the resistance between the terminals.

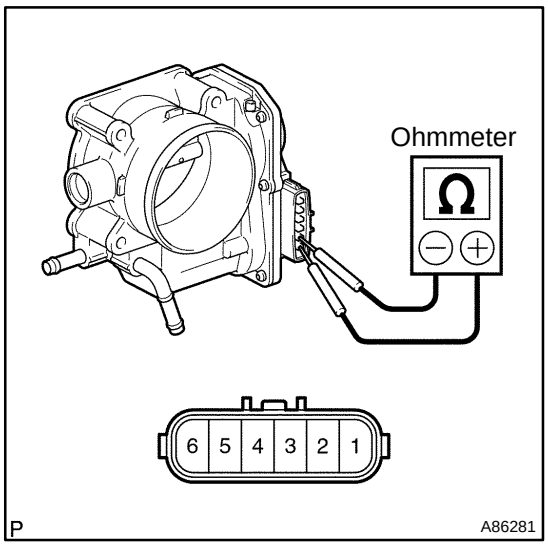
Standard:

Tester Connection	Specified Condition
1 (E2) - 2 (THW)	2.32 to 2.59 kΩ at 20•C (68•F)
1 (E2) - 2 (THW)	0.310 to 0.326 kΩ at 80•C (176•F)

NOTICE:

When checking the engine coolant temperature sensor in water, be careful not to allow water to intrude into the terminals. Then dry the engine coolant temperature sensor after checking.

If the resistance is not as specified, replace the engine coolant temperature sensor.



4. INSPECT THROTTLE BODY ASSY

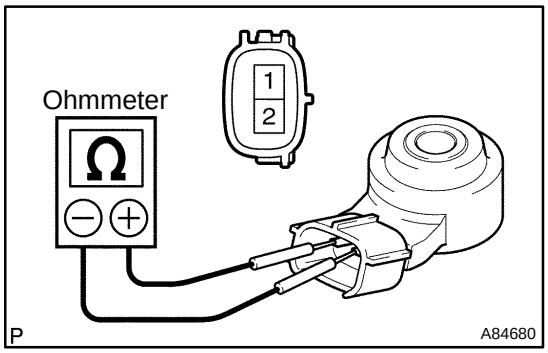
(a) Inspect the resistance.

(1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
1 (M-) - 2 (M+)	0.3 to 100 Ω at 20•C (68•F)
3 (E2) - 5 (VC)	1.2 to 3.2 kΩ at 20•C (68•F)

If the resistance is not as specified, replace the throttle body.



5. INSPECT KNOCK SENSOR

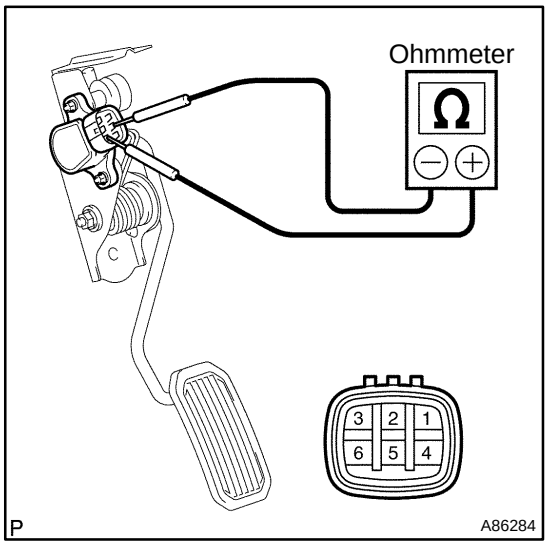
(a) Inspect the resistance.

(1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
1 (Output)- 2 (Ground)	120 to 280 Ω at 20•C (68•F)

If the resistance is not specified, replace the knock sensor.



6. INSPECT ACCELERATOR PEDAL ASSY (NORMAL PEDAL)

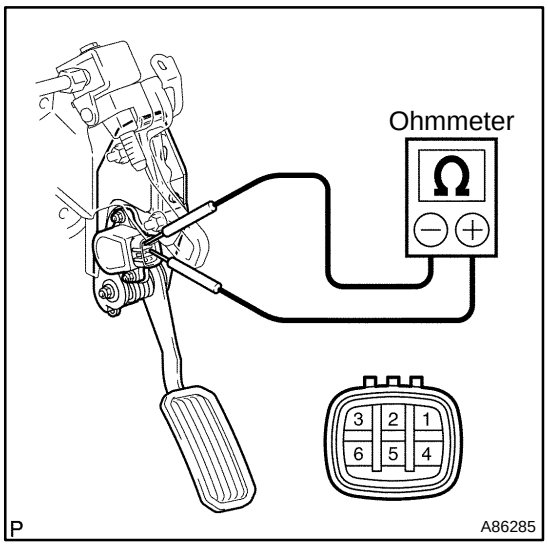
(a) Inspect the resistance.

(1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
2 (VPA2) - 3 (EP1)	5.0 kΩ or less
1 (EP2) - 5 (VPA1)	5.0 kΩ or less
3 (EP1) - 6 (VCP1)	2.25 to 4.75 kΩ
1 (EP2) - 4 (VCP2)	2.25 to 4.75 kΩ

If the resistance is not specified, replace the accelerator pedal.



7. INSPECT ACCELERATOR & BRAKE PEDAL ASSY (POWER PEDAL)

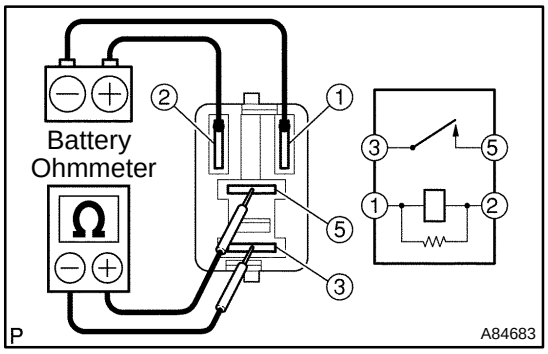
(a) Inspect the resistance.

(1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
3 (EP1) - 5 (VPA1)	5.0 kΩ or less
1 (EP2) - 2 (VPA2)	5.0 kΩ or less
3 (EP1) - 6 (VCP1)	2.25 to 4.75 kΩ
1 (EP2) - 4 (VCP2)	2.25 to 4.75 kΩ

If the resistance is not specified, replace the accelerator & brake pedal.



8. INSPECT MAIN RELAY

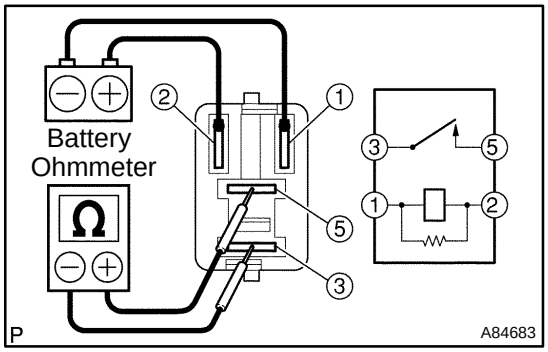
(a) Inspect the resistance.

(1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1Ω (Apply battery voltage to terminals 1 and 2

If the result is not as specified, replace the main relay.



9. INSPECT CIRCUIT OPENING RELAY

(a) Inspect the resistance.

(1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1Ω (Apply battery voltage to terminals 1 and 2

If the result is not as specified, replace the circuit opening relay.

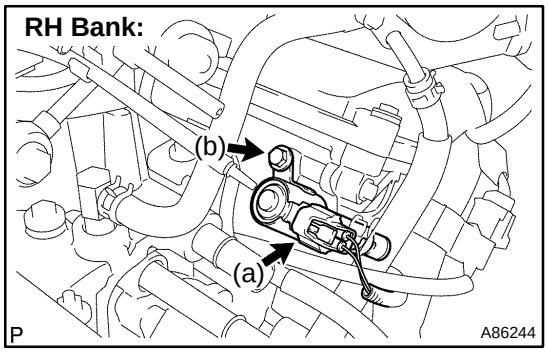
CAMSHAFT TIMING OIL CONTROL VALVE ASSY (3MZ-FE)

100J1-01

REPLACEMENT

1. DISCONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)

2. REMOVE V-BANK COVER SUB-ASSY (See page 10-1 1)



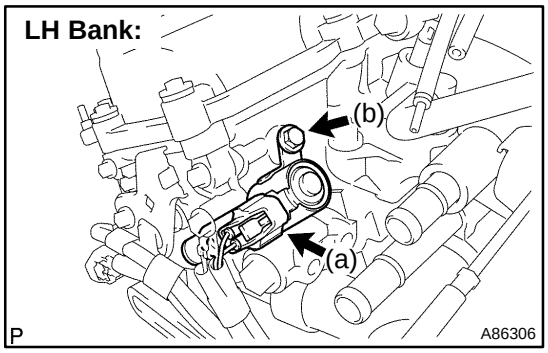
3. REMOVE CAMSHAFT TIMING OIL CONTROL VALVE ASSY

(a) Disconnect the 2 camshaft timing oil control valve connectors.

(b) Remove the 2 bolts, then remove the 2 camshaft timing oil control valves.

HINT:

The camshaft timing oil control valve is installed with the bolt.



4. INSTALL CAMSHAFT TIMING OIL CONTROL VALVE ASSY

(a) Apply a light coat of engine oil to the O-ring on each camshaft timing oil control valve.

(b) Install the 2 camshaft timing oil control valves with the 2 bolts.

Torque: 8.0 N·m (80 kgf·cm, 71 in.·lbf)

NOTICE:

Be careful not to twist the O-ring.

(c) Connect the 2 camshaft timing oil control valve connectors.

5. INSTALL V-BANK COVER SUB-ASSY (See page 10-1 1)

6. CONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)

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

7. CHECK FOR ENGINE OIL LEAKS

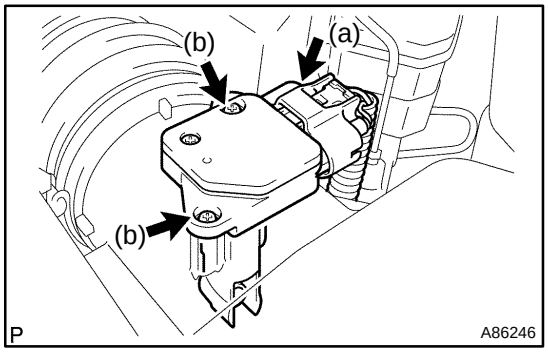
8. SYSTEM INITIALIZATION (See page 19-15)

MASS AIR FLOW METER (3MZ-FE)

100J2-02

REPLACEMENT

1. DISCONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)



2. REMOVE MASS AIR FLOW METER

(a) Disconnect the mass air flow meter connector.

(b) Remove the 2 screws, then remove the mass air flow meter.

3. INSTALL MASS AIR FLOW METER

4. CONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

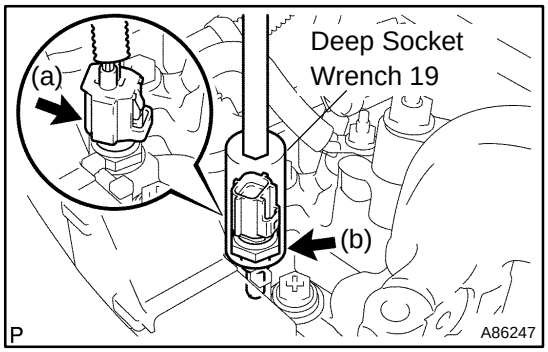
5. SYSTEM INITIALIZATION (See page 19-15)

ENGINE COOLANT TEMPERATURE SENSOR (3MZ-FE)

100J3-02

REPLACEMENT

1. **DISCONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)**
2. **REMOVE RADIATOR LOWER AIR DEFLECTOR (See page 19-5)**
3. **DRAIN ENGINE COOLANT (See page 16-9)**



4. **REMOVE ENGINE COOLANT TEMPERATURE SENSOR**

(a) Disconnect the engine coolant temperature sensor connector.

(b) Using a deep socket wrench 19, remove the engine coolant temperature sensor and gasket.

5. **INSTALL ENGINE COOLANT TEMPERATURE SENSOR**

(a) Using a deep socket wrench 19, install a new gasket and the engine coolant temperature sensor.
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

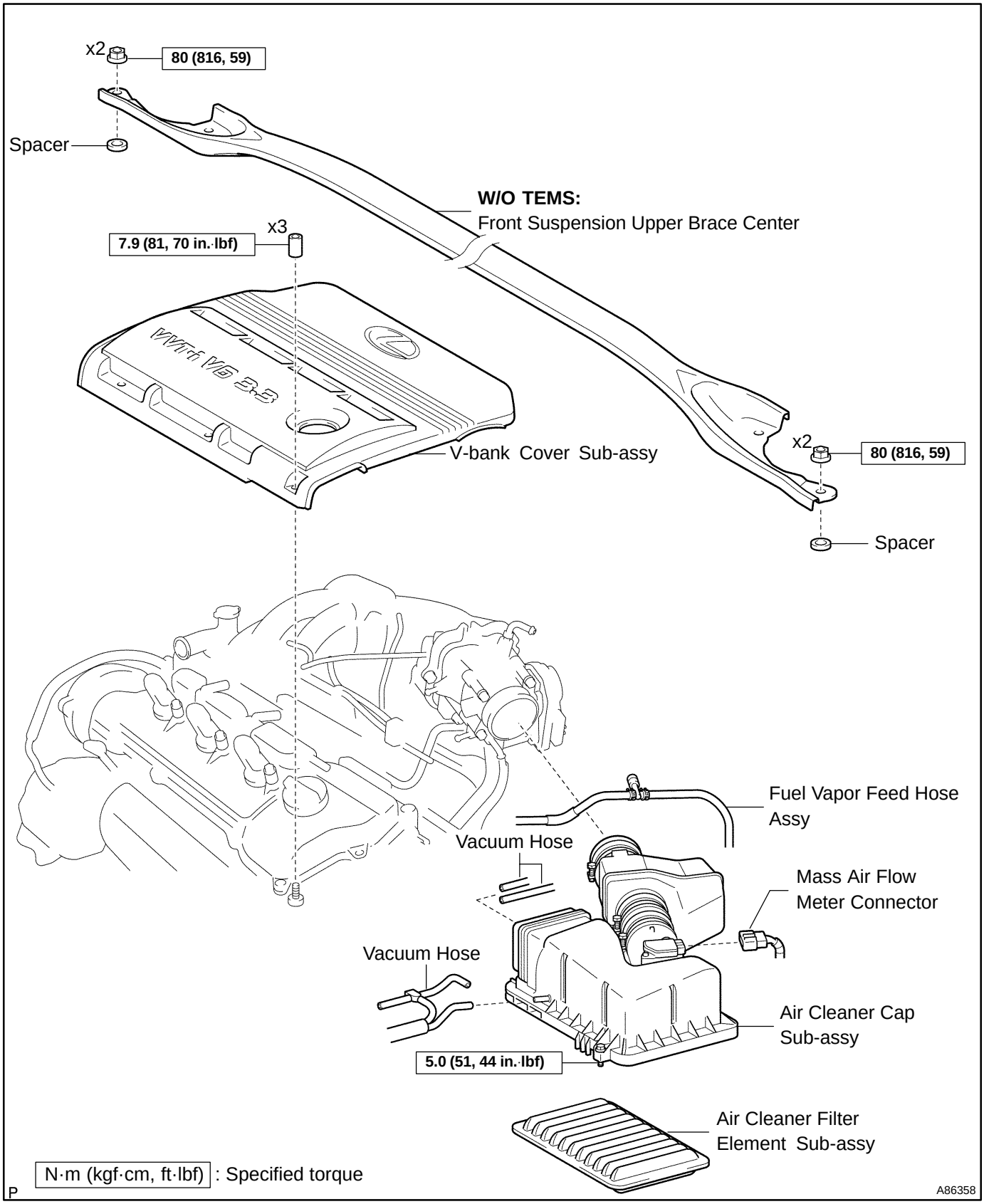
(b) Connect the engine coolant temperature sensor connector.

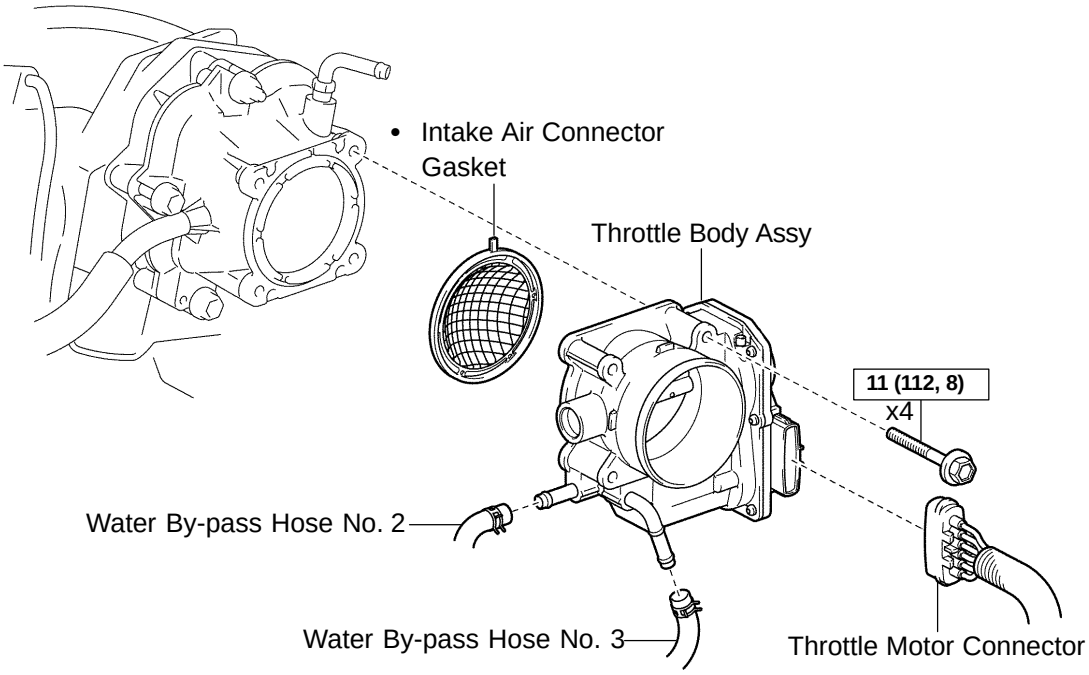
6. **CONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)**
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
7. **ADD ENGINE COOLANT (See page 16-9)**
8. **CHECK FOR ENGINE COOLANT LEAKS (See page 16-1)**
9. **INSTALL RADIATOR LOWER AIR DEFLECTOR**
10. **SYSTEM INITIALIZATION (See page 19-15)**

THROTTLE BODY ASSY (3MZ-FE)

COMPONENTS

100J4-01





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

P

A86249

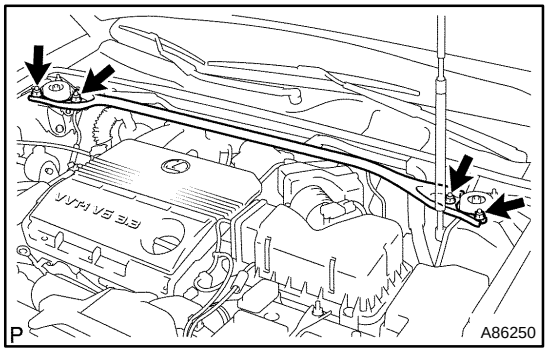
100J5-01

REPLACEMENT

1. DISCONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)

2. REMOVE RADIATOR LOWER AIR DEFLECTOR (See page 19-5)

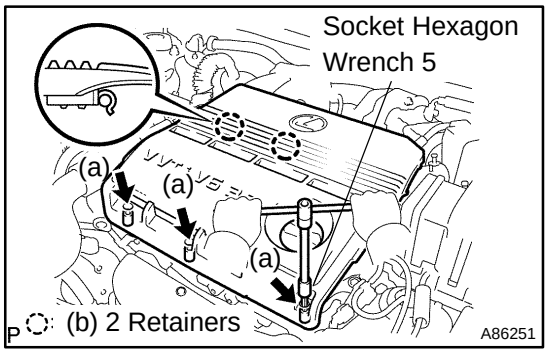
3. DRAIN ENGINE COOLANT (See page 19-5)



4. REMOVE FRONT SUSPENSION UPPER BRACE CENTER (W/O TEMS)

(a) Remove the 4 nuts, then remove the front suspension upper brace center and 4 spacers.

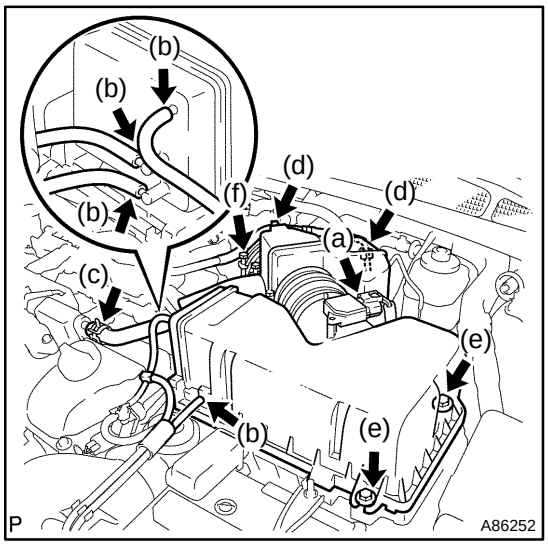
(b) Temporarily tighten the 4 nuts.



5. REMOVE V-BANK COVER SUB-ASSY

(a) Using a socket hexagon wrench 5, remove the 3 nuts.

(b) Unfasten the 2 retainers, then remove the V-bank cover.



6. REMOVE AIR CLEANER CAP SUB-ASSY

(a) Disconnect the mass air flow meter connector.

(b) Disconnect the 4 vacuum hoses.

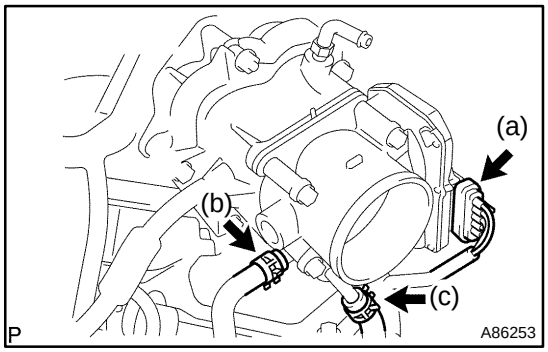
(c) Disconnect the ventilation hose No. 2.

(d) Disconnect the fuel vapor feed hose from the 2 hose clamps.

(e) Loosen the 2 air cleaner cap bolts.

(f) Loosen the air cleaner hose clamp bolt, then remove the air cleaner cap.

(g) Remove the air cleaner filter element.

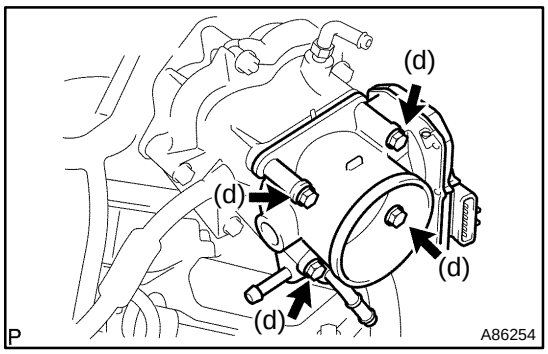


7. REMOVE THROTTLE BODY ASSY

(a) Disconnect the throttle motor connector.

(b) Disconnect the water by-pass hose No. 2.

(c) Disconnect the water by-pass hose No. 3.



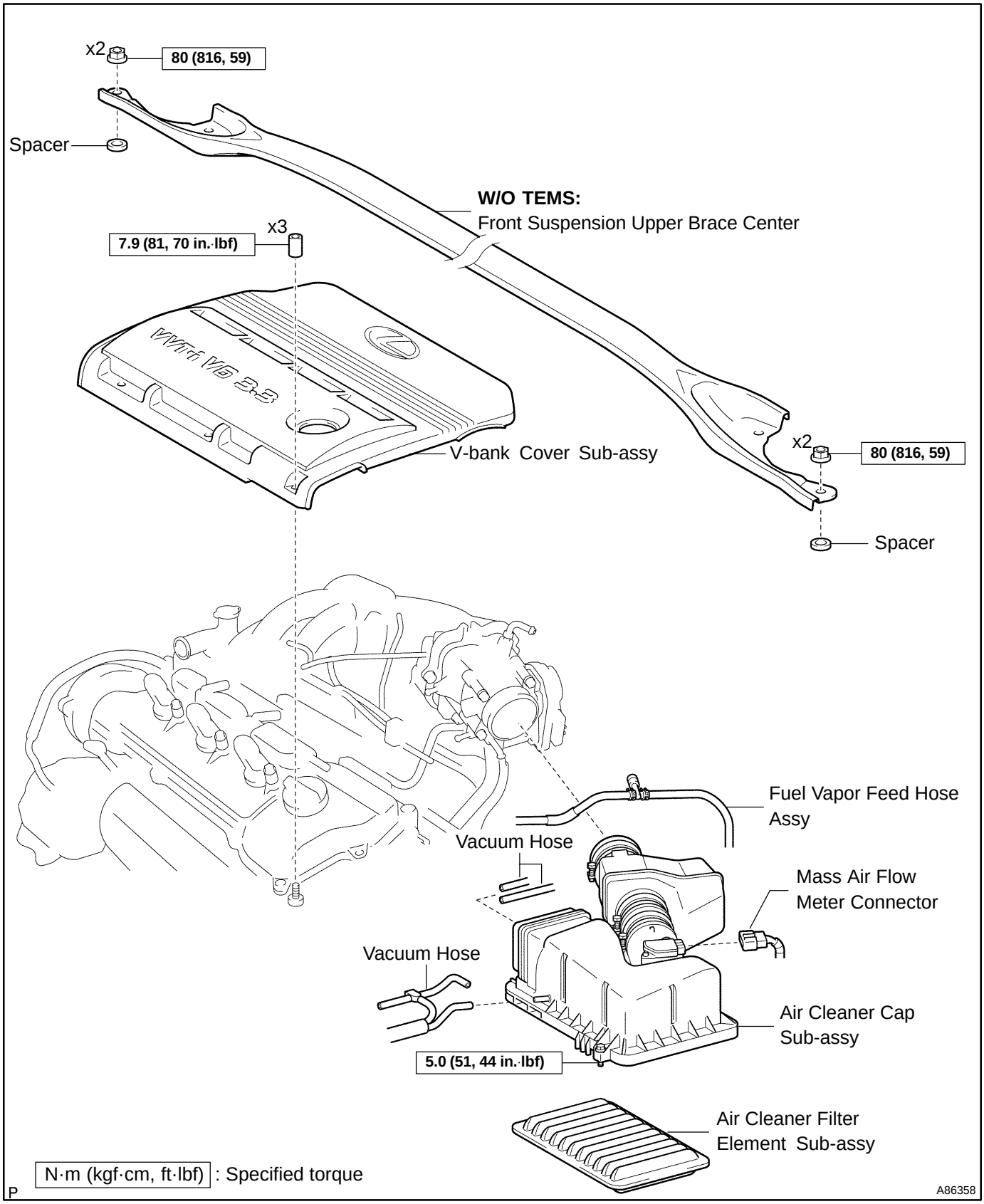
(d) Remove the 4 bolts, then remove the throttle body.
(e) Remove the gasket from the intake air connector.

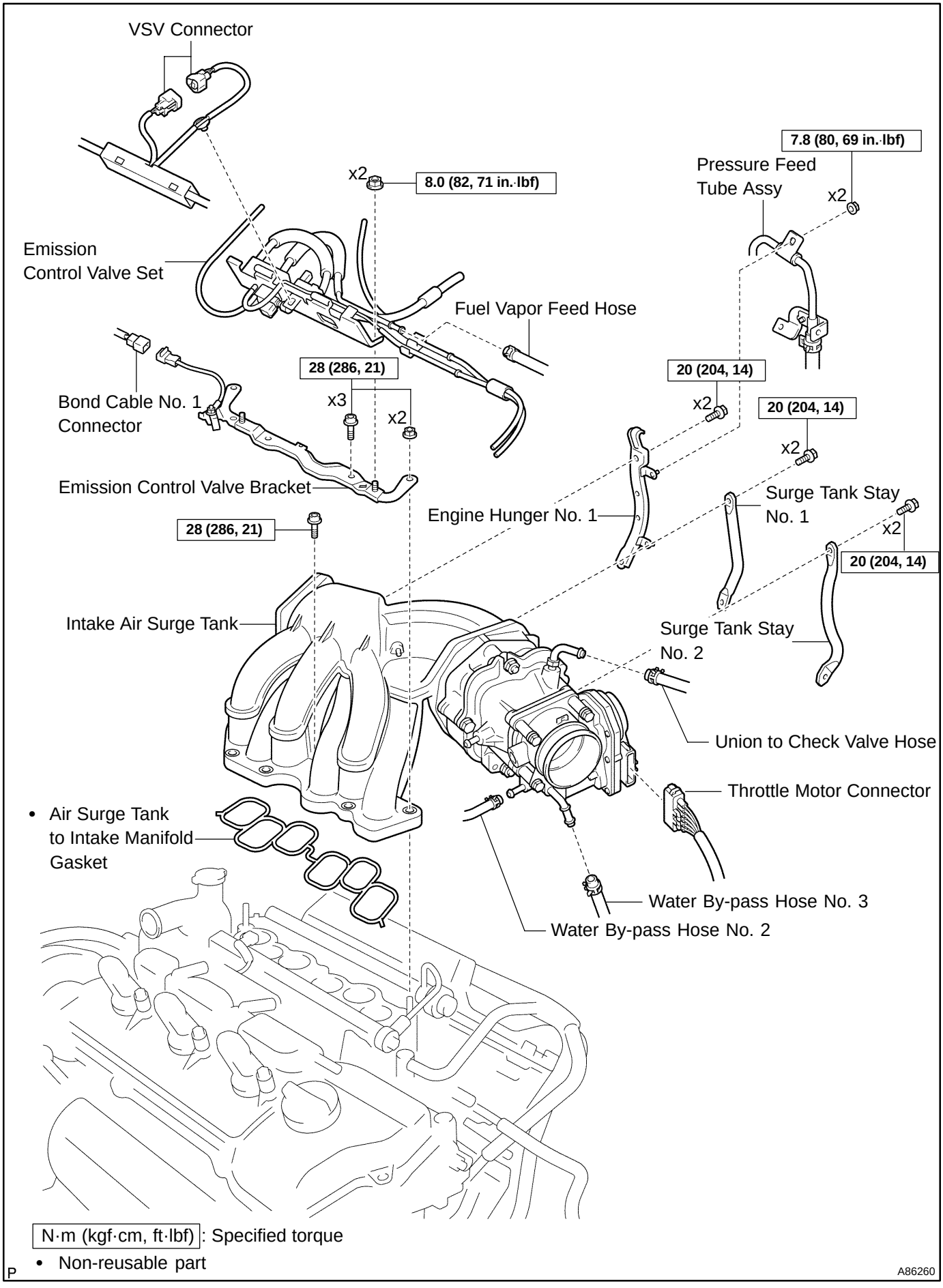
8. INSTALL THROTTLE BODY ASSY
(a) Install a new gasket to the intake air connector.
(b) Install the throttle body with the 4 bolts.
Torque: 11 N·m (112 kgf·cm, 8 ft·lbf)
(c) Connect the water by-pass hose No. 3.
(d) Connect the water by-pass hose No. 2.
(e) Connect the throttle motor connector.
9. INSTALL AIR CLEANER CAP SUB-ASSY
Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)
10. CHECK CONNECTION OF VACUUM HOSE (See page 14-29)
11. CONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
12. ADD ENGINE COOLANT (See page 16-9)
13. CHECK FOR ENGINE COOLANT LEAKS (See page 16-1)
14. INSTALL V-BANK COVER SUB-ASSY
(a) Fit the 2 retainers, then install the V-bank cover.
(b) Using a socket hexagon wrench 5, tighten the 3 nuts.
Torque: 7.9 N·m (81 kgf·cm, 70 in.·lbf)
15. INSTALL FRONT SUSPENSION UPPER BRACE CENTER (W/O TEMS)
Torque: 80 N·m (816 kgf·cm, 59 ft·lbf)
16. INSTALL RADIATOR LOWER AIR DEFLECTOR
17. SYSTEM INITIALIZATION (See page 19-15)

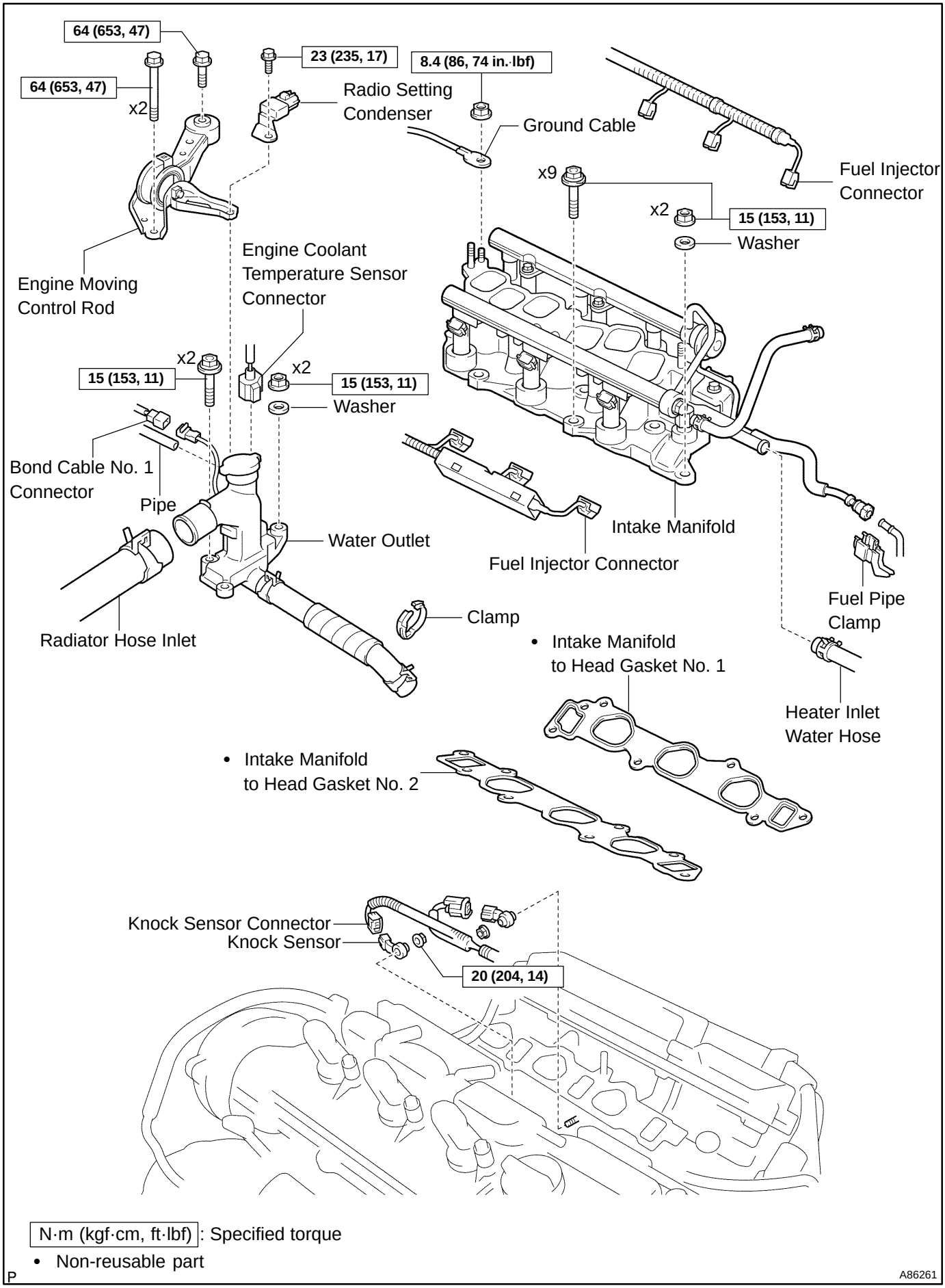
KNOCK SENSOR (3MZ-FE)

COMPONENTS

100J6-02




VSV Connector
x2
8.0 (82, 71 in.·lbf)
7.8 (80, 69 in.·lbf)
Pressure Feed Tube Assy
x2
Emission Control Valve Set
Fuel Vapor Feed Hose
28 (286, 21)
x3
x2
20 (204, 14)
x2
20 (204, 14)
x2
Bond Cable No. 1 Connector
Emission Control Valve Bracket
Engine Hunger No. 1
Surge Tank Stay No. 1
28 (286, 21)
x2
20 (204, 14)
Intake Air Surge Tank
Surge Tank Stay No. 2
Union to Check Valve Hose
Throttle Motor Connector
• Air Surge Tank to Intake Manifold Gasket
Water By-pass Hose No. 3
Water By-pass Hose No. 2
N·m (kgf·cm, ft·lbf): Specified torque
• Non-reusable part
P
A86260



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

• Non-reusable part

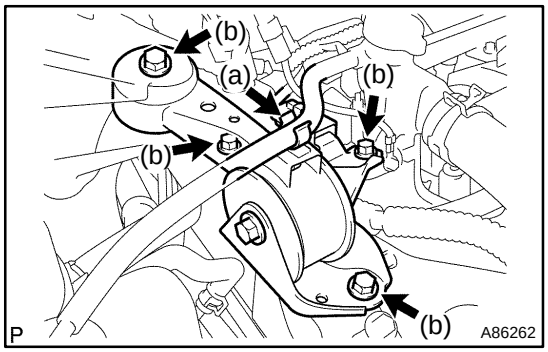
P

A86261

100J7-02

REPLACEMENT

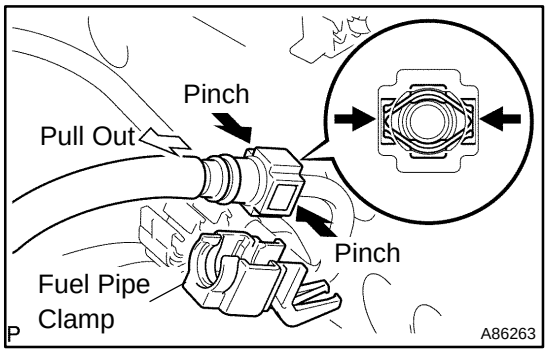
1. **DISCHARGE FUEL SYSTEM PRESSURE (See page 11-1)**
2. **DISCONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)**
3. **DRAIN ENGINE COOLANT (See page 16-9)**
4. **REMOVE FRONT SUSPENSION UPPER BRACE CENTER (W/O TEMS) (See page 10-1 1)**
5. **REMOVE V-BANK COVER SUB-ASSY (See page 10-1 1)**
6. **REMOVE AIR CLEANER CAP SUB-ASSY (See page 10-1 1)**
7. **REMOVE EMISSION CONTROL VALVE SET (See page 11-13)**
8. **REMOVE INTAKE AIR SURGE TANK (See page 11-13)**



9. REMOVE ENGINE MOVING CONTROL ROD

(a) Remove the pipe from the clamp.

(b) Remove the 4 bolts, then remove the engine moving control rod and radio setting condenser.



10. REMOVE INTAKE MANIFOLD

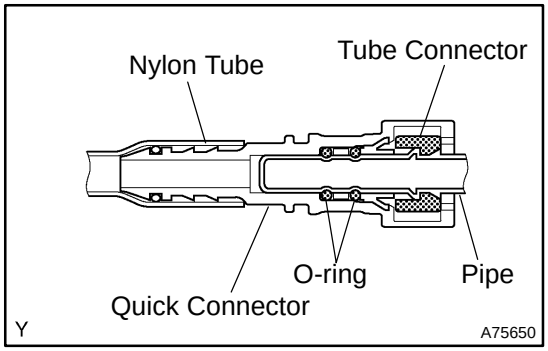
(a) Disconnect the fuel pipe No. 1.

(1) Remove the fuel pipe clamp.

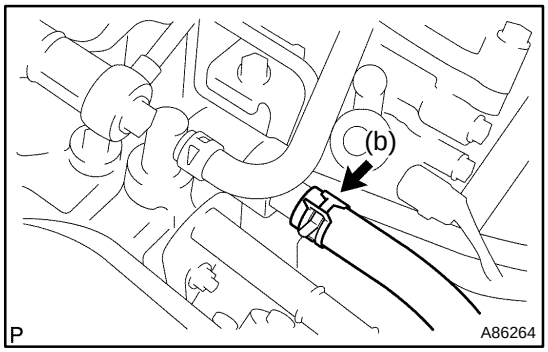
(2) Pinch the tube connector, then pull out the fuel pipe No. 1.

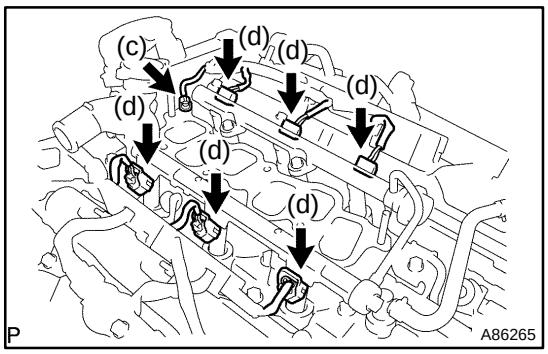
NOTICE:

- **Check around the quick connector for dirt or mud before this operation. Remove the dirt if necessary.**
- **Be careful of mud because the quick connector has an O-ring which seals the pipe and quick connector that can be contaminated.**
- **Do not use any tools in this operation.**
- **Do not bend or twist the nylon tube. Protect the quick connector by covering it with a vinyl or plastic bag.**
- **When the pipe and quick connector are stuck, push and pull the quick connector to release and pull the quick connector out carefully.**

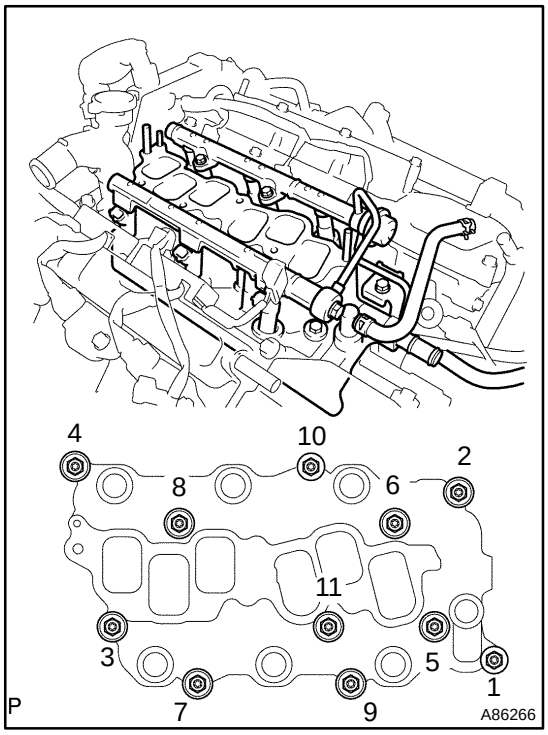


(b) Disconnect the heater inlet water hose.

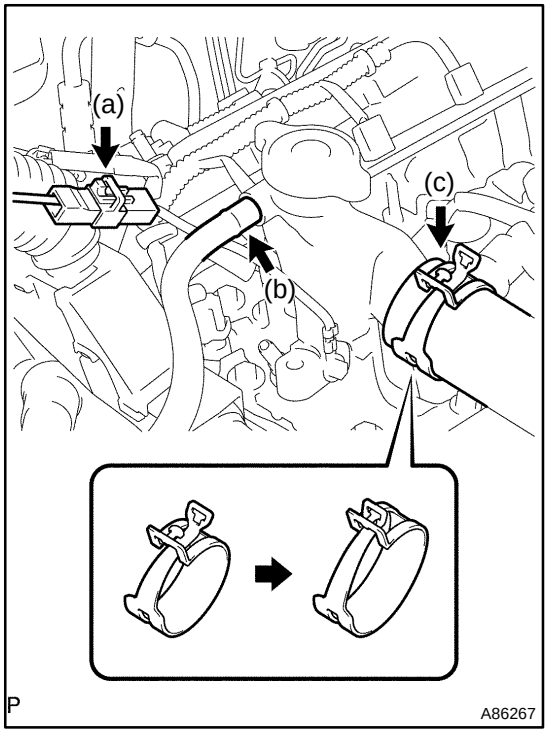




(c) Remove the nut, then disconnect the ground cable.
(d) Disconnect the 6 fuel injector connectors.

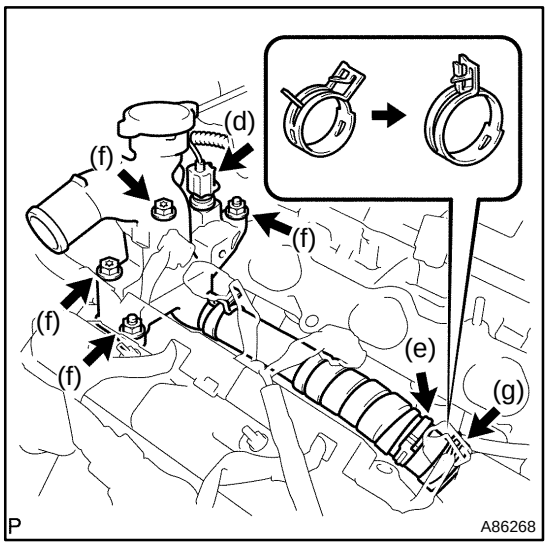


(e) In order to remove the intake manifold, using several steps, remove the 9 bolts and 2 nuts in the sequence shown in the illustration.

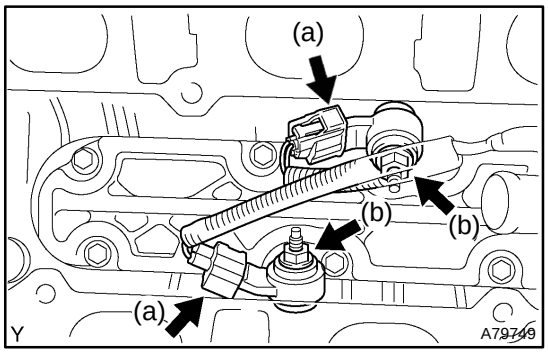


11. REMOVE WATER OUTLET

(a) Disconnect the bond cable No. 1 connector.
(b) Disconnect the pipe of the radiator reserve tank.
(c) Lock the hose clamp as shown in the illustration, then disconnect the radiator hose inlet.

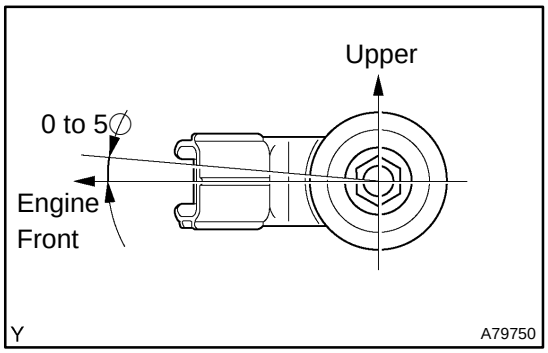


(d) Disconnect the engine coolant temperature sensor connector.
(e) Remove the clamp.
(f) Remove the 2 bolts, 2 nuts and 2 washers.
(g) Lock the hose clamp as shown in the illustration. Then remove the water outlet together with water by-pass hose No. 1.
(h) Remove the 2 gaskets from the 2 cylinder heads.



12. REMOVE KNOCK SENSOR

(a) Disconnect the 2 knock sensor connectors.
(b) Remove the 2 nuts, then remove the 2 knock sensors.

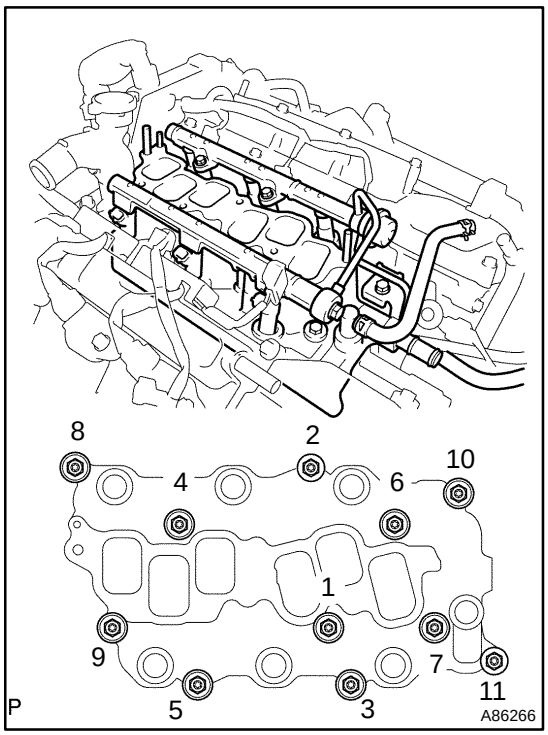


13. INSTALL KNOCK SENSOR

(a) Install the 2 knock sensors with the 2 nuts as shown in the illustration.
Torque: 20 N·m (204 kgf·cm, 14 ft·lbf)
(b) Connect the 2 knock sensor connectors.

14. INSTALL WATER OUTLET

(a) Install 2 new gaskets to the 2 cylinder heads.
(b) Install the water outlet together with water by-pass hose No. 1, then unlock the hose clamp.
(c) Tighten the 2 bolts, 2 nuts and 2 washers.
Torque: 15 N·m (153 kgf·cm, 11 ft·lbf)
(d) Install the clamp.
(e) Connect the engine coolant temperature sensor connector.
(f) Connect the bond cable No. 3 connector.
(g) Connect the pipe of the radiator reserve tank.
(h) Connect the radiator hose inlet, then unlock the hose clamp.



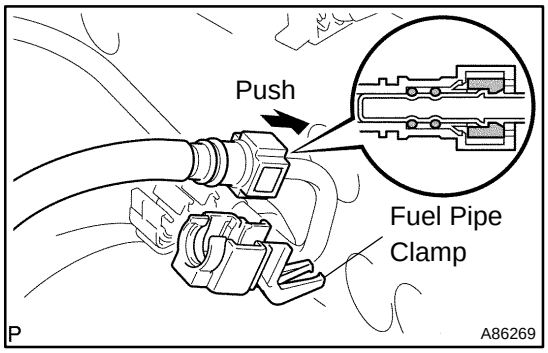
15. INSTALL INTAKE MANIFOLD

(a) Install the intake manifold with the 9 bolts, 2 nuts and 2 washers. Using several steps, tighten the 9 bolts and 2 nuts uniformly in the sequence shown in the illustration.
Torque: 15 N·m (153 kgf·cm, 11 ft·lbf)

(b) Retighten the 9 water outlet mounting bolts and 2 nuts.
Torque: 15 N·m (153 kgf·cm, 11 ft·lbf)

(c) Install the ground cable with the nut.
Torque: 8.4 N·m (86 kgf·cm, 74 in.·lbf)

(d) Connect the heater inlet water hose.



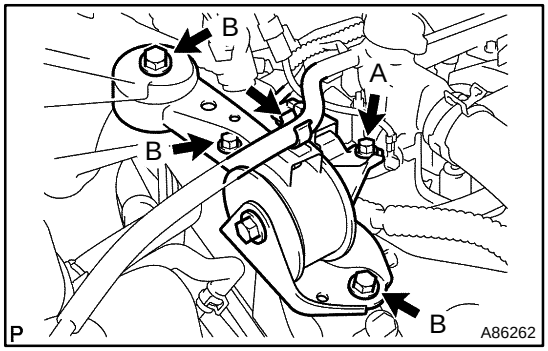
(e) Connect the fuel pipe No. 1.

(1) Push in the quick connector to the pipe until it makes a ”click” sound.

NOTICE:

- **Check the connected part for damage or foreign objects.**
- **After connecting, check if the quick connector and pipe are securely connected by pulling them.**

(2) Install the fuel pipe clamp.



16. INSTALL ENGINE MOVING CONTROL ROD
Torque:
23 N·m (235 kgf·cm, 17 ft·lbf) for bolt A
64 N·m (653 kgf·cm, 47 ft·lbf) for bolt B

17. INSTALL INTAKE AIR SURGE TANK (See page 11-13)
18. INSTALL EMISSION CONTROL VALVE SET (See page 11-13)
19. INSTALL AIR CLEANER CAP SUB-ASSY (See page 10-1 1)
20. CHECK CONNECTION OF VACUUM HOSE (See page 14-29)
21. CONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
22. ADD ENGINE COOLANT (See page 16-9)
23. CHECK FOR ENGINE COOLANT LEAKS (See page 16-1)
24. CHECK FOR FUEL LEAKS (See page 11-5)
25. INSTALL V-BANK COVER SUB-ASSY (See page 10-1 1)

26. INSTALL FRONT SUSPENSION UPPER BRACE CENTER (W/O TEMS) (See page 10-1 1)

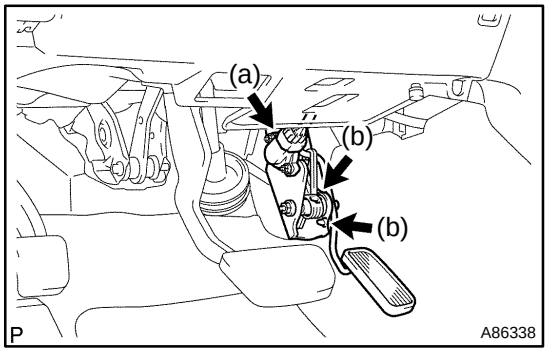
27. SYSTEM INITIALIZATION (See page 19-15)

ACCELERATOR PEDAL ASSY (3MZ-FE (NORMAL PEDAL))

100J8-01

REPLACEMENT

1. DISCONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)



2. REMOVE ACCELERATOR PEDAL ASSY

(a) Disconnect the accelerator position sensor connector.

(b) Remove the 2 bolts, then remove the accelerator pedal rod.

3. INSTALL ACCELERATOR PEDAL ASSY
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

4. CONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

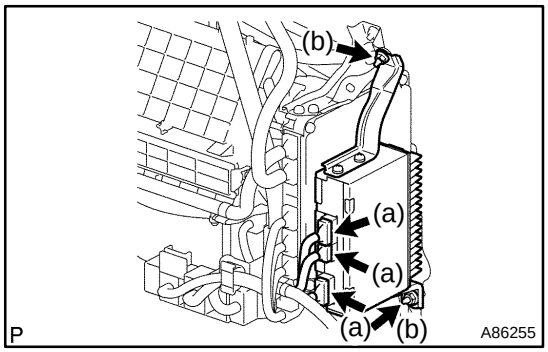
5. SYSTEM INITIALIZATION (See page 19-15)

ECM (3MZ-FE)

100J9-02

REPLACEMENT

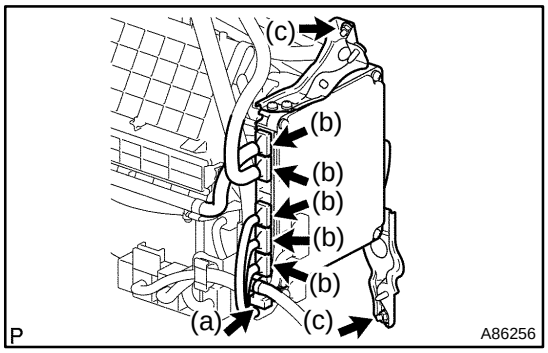
1. DISCONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)
2. REMOVE FRONT DOOR SCUFF PLATE RH (See page 71-1 1)
3. REMOVE INSTRUMENT PANEL UNDER COVER SUB-ASSY NO.1 (See page 71-1 1)
4. REMOVE INSTRUMENT PANEL SUB-ASSY LOWER (See page 71-1 1)



5. REMOVE STEREO COMPONENT AMPLIFIER ASSY

(a) Disconnect the 3 stereo component amplifier connectors.

(b) Remove the 2 nuts, then remove the stereo component amplifier.

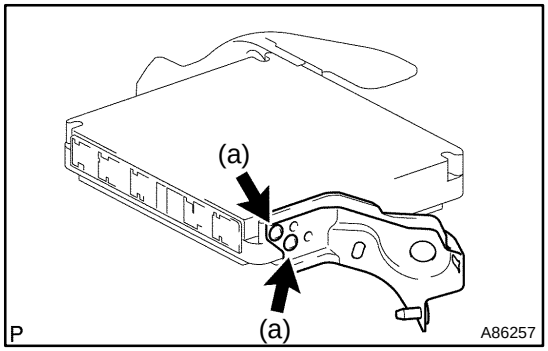


6. REMOVE ECM

(a) Remove the wire harness clamp.

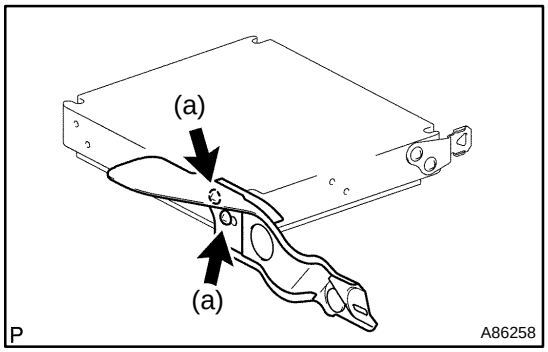
(b) Disconnect the 5 ECM connectors.

(c) Remove the 2 nuts, then remove the ECM.



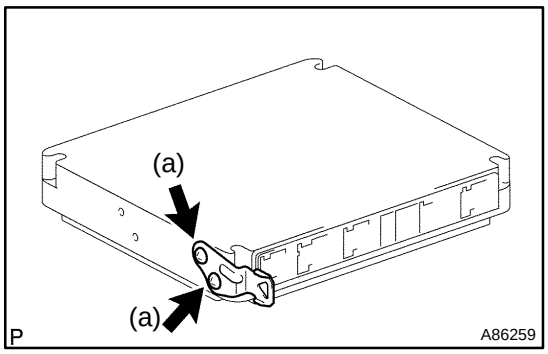
7. REMOVE ECM BRACKET

(a) Remove the 2 screws, then remove the ECM bracket.



8. REMOVE ECM BRACKET NO.2

(a) Remove the 2 screws, then remove the ECM bracket No. 2.



9. REMOVE ECM BRACKET NO.3

(a) Remove the 2 screws, then remove the ECM bracket No 3.

10. INSTALL ECM BRACKET NO.3
11. INSTALL ECM BRACKET NO.2
12. INSTALL ECM BRACKET
13. INSTALL ECM
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)
14. INSTALL STEREO COMPONENT AMPLIFIER ASSY
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)
15. INSTALL INSTRUMENT PANEL SUB-ASSY LOWER
16. INSTALL INSTRUMENT PANEL UNDER COVER SUB-ASSY NO.1
17. INSTALL FRONT DOOR SCUFF PLATE RH
18. CONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
19. RESET MEMORY (See page 05-604)
20. SYSTEM INITIALIZATION (See page 19-15)

FUEL SYSTEM (3MZ-FE)

110XR-01

PRECAUTION

1. PRECAUTION

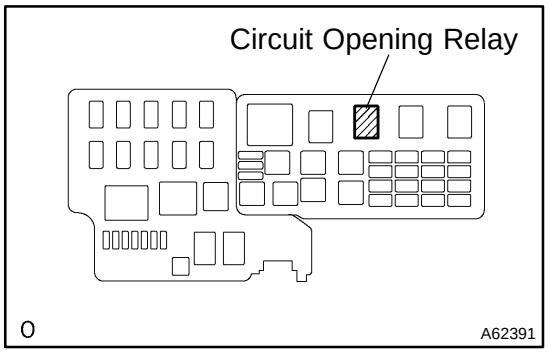
(a) Before working on the fuel system, disconnect the engine wire No. 3 (battery negative terminal) from battery.
(b) Do not smoke or work near open flame when working on the fuel system.
(c) Keep gasoline away from the rubber or leather parts.

2. DISCHARGE FUEL SYSTEM PRESSURE

CAUTION:

- **Do not disconnect any parts of the fuel system pressure until you have discharging the fuel system pressure.**
- **Even after discharge the fuel pressure, place a shop rag over fittings as you separate them in order to reduce risk of fuel spray on yourself or in the engine compartment.**

(a) Disconnect the engine wire No. 3 (battery negative terminal).



(b) Remove the circuit opening relay from the engine room relay block.
(c) Connect the engine wire No. 3 (battery negative terminal).
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
(d) Start the engine. After the engine has stopped on its own, turn the ignition switch OFF.

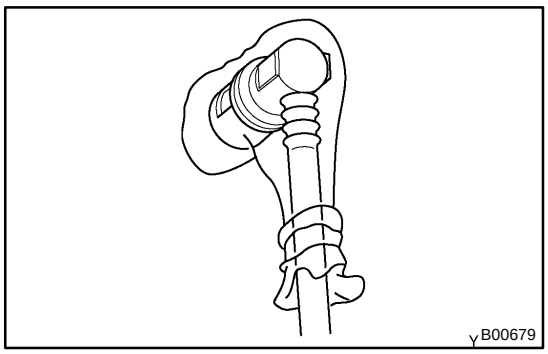
HINT:

There is a case that DTC P0171 (system to lean) is output.

(e) Check that the engine does not start.
(f) Remove the fuel tank cap, then let the air out of the fuel tank.
(g) Disconnect battery negative terminal.
(h) Reinstall the circuit opening relay.

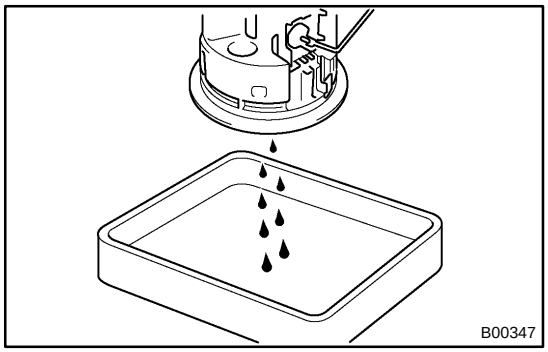
3. FUEL SYSTEM

(a) When disconnecting the high fuel pressure line, a large amount of gasoline will spill out. So observe these procedures.
  (1) Work in order to prevent gasoline from spilling out.
  (2) Disconnect the fuel pump tube (see page 11-20).
  (3) Drain the fuel remaining inside the fuel pump tube.

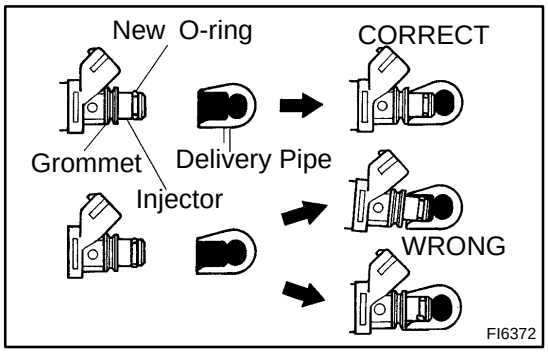


(4) In order to prevent the disconnected fuel pump tube from being damaged and foreign objects from being introduced, cover the disconnected fuel pump tube with a vinyl or plastic bag.

(5) Place a tray under the vehicle or point of disconnection to catch any fuel that may spill.



(6) Put a container under the connection.



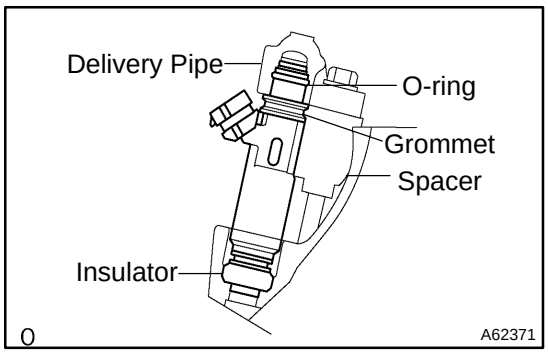
(b) Take the following precautions when removing and installing the fuel injectors.

NOTICE:

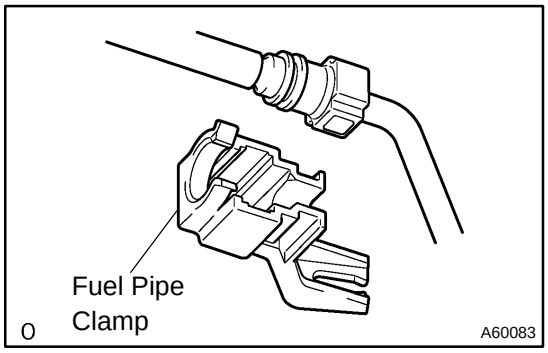
Never reuse the O-ring.

(1) When installing a new O-ring on the fuel injector, be careful not to damage it.

(2) Coat a new O-ring with spindle oil or gasoline before installing. Never use engine oil, gear oil or brake oil.



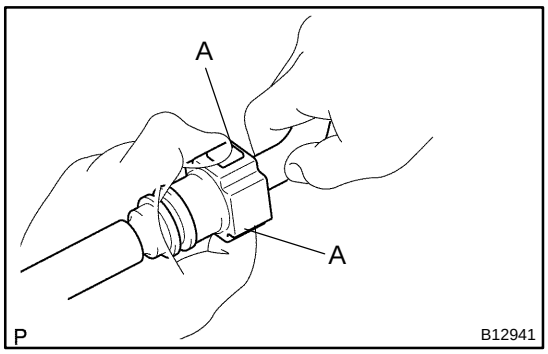
(c) Install the fuel injector to the fuel delivery pipe and intake manifold as shown in the illustration. Before installing the fuel injector, be sure to apply spindle oil or gasoline to the place where the fuel delivery pipe or intake manifold touches the O-ring of the fuel injector.



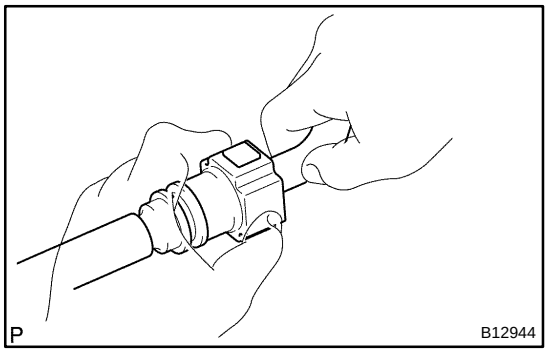
(d) Take the following precautions when disconnecting the quick connector.

(1) Remove the fuel pipe clamp.

(2) Check the pipe and around the quick connector for dirt or mud before disconnecting them. Remove the dirt if necessary.



(3) Disconnect the quick connector from the pipe while pinching portion A with your fingers as shown in the illustration.

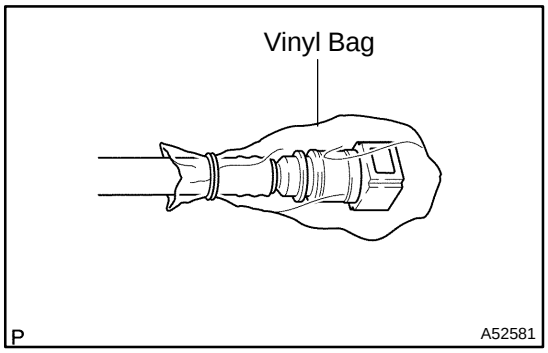


(4) If the quick connector and pipe are stuck, pinch the pipe, then push and pull the quick connector to release and pull it out.

NOTICE:

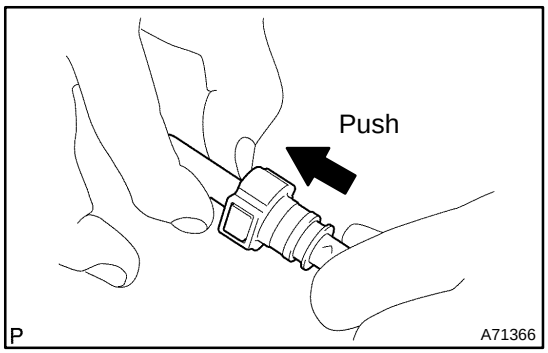
Do not use any tools.

(5) If there is dirt or any other substances on the sealing surface that might interfere with the seal, clean the area thoroughly before assembling.



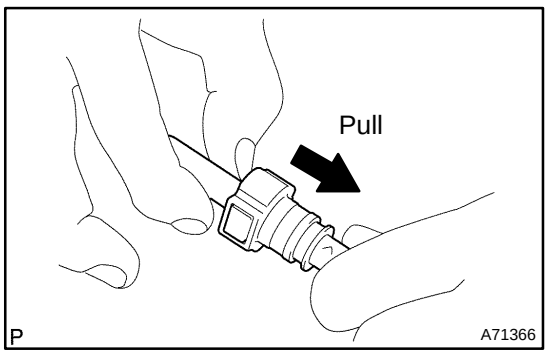
(6) In order to prevent the disconnected pipe and quick connector from damage or dirt, cover them with a vinyl or plastic bag.

(e) Take the following precautions when connecting the quick connector.



(1) Check the connected part of the pipe for damage or foreign objects.

(2) Align the axis of the quick connector with the axis of the pipe, then push into the quick connector until the quick connector makes a ”click” sound. In case that the connection is tight, apply a little amount of fresh engine oil to the tip of the pipe.



(3) After connecting, check if the pipe and quick connector are securely connected by pulling on them.

(4) Install the fuel pipe clamp.

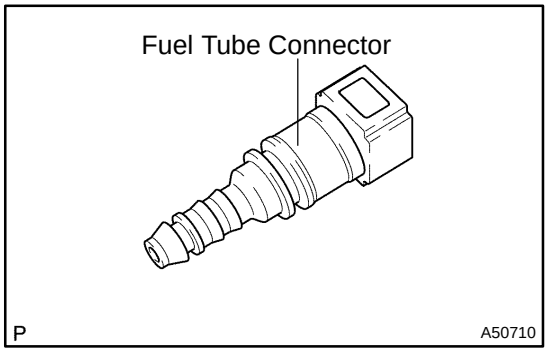
(5) Check if there is any leakage.

4. CHECK FOR FUEL LEAKS

(a) Check that there are no fuel leaks after doing maintenance anywhere on the fuel system (see page 11-5).

110XS-01

ON-VEHICLE INSPECTION



1. CHECK FUEL PRESSURE

(a) Discharge the fuel pressure and take precautions against possible fuel spillage (see page 11-1).

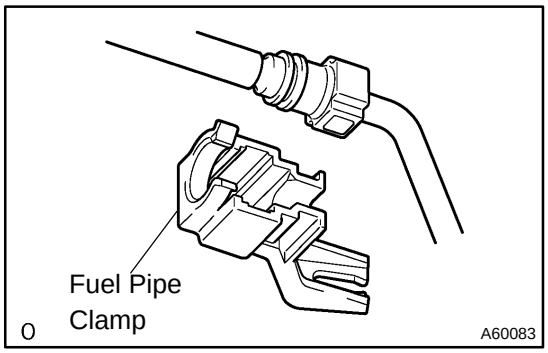
(b) Check that tha battery voltage is above 12 V.

(c) Disconnect the engine wire No. 3 (battery negative terminal).

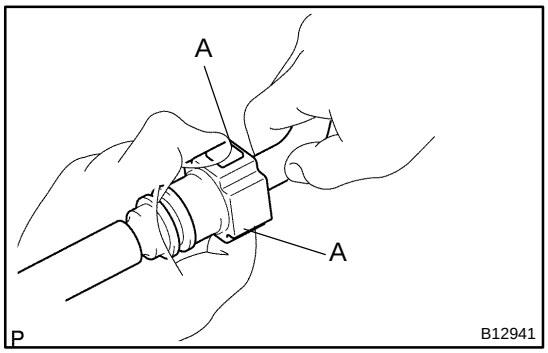
(d) Pull out the fuel tube connector from a new fuel tube.

HINT:

Part No. 23801-20190



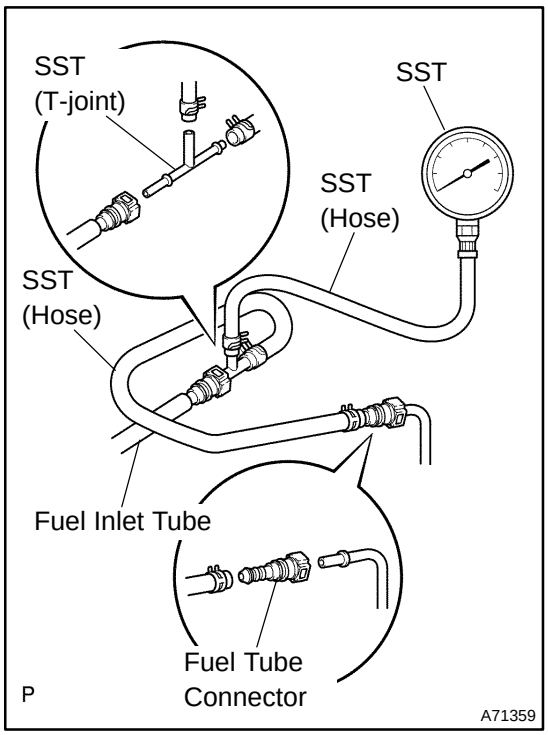
(e) Remove the fuel pipe clamp.



(f) Disconnect the quick connector from the fuel pipe by pinching portion A with your fingers as shown in the illustration.

CAUTION:

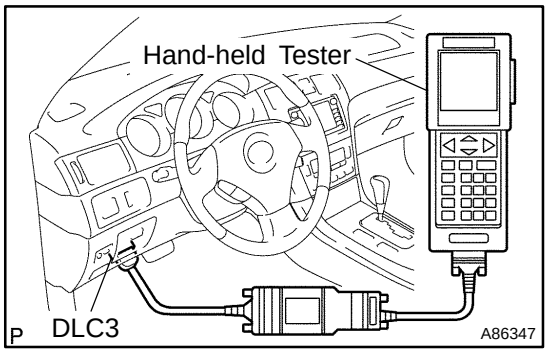
- **After taking the precautions, disconnect the quick connector.**
- **As pressure remains in the fuel line, prevent it from splashing inside the engine compartment.**



(g) Install SST (a pressure gauge) and fuel tube connector using SST as shown in the illustration.
SST 09268-41047 (95336-08070), 09268-45014 (09268-41250, 09268-41200, 09268-41220)

(h) Wipe up any gasoline.

(i) Reconnect the engine wire No. 3 (battery negative terminal).



(j) Connect the hand-hand tester to the DLC3.

(k) Measure the fuel pressure.
Fuel pressure:
304 to 343 kPa (3.1 to 3.5 kgf/cm^2, 44 to 50 psi)

If the pressure is high, replace the fuel pressure regulator.
If the pressure is low, check the fuel hose connections, fuel pump, fuel filter and fuel pressure regulator.

(l) Disconnect the hand-held tester from the DLC3.

(m) Start the engine.

(n) Measure the fuel pressure at idle.
Fuel pressure:
304 to 343 kPa (3.1 to 3.5 kgf/cm^2, 44 to 50 psi)

(o) Stop the engine.

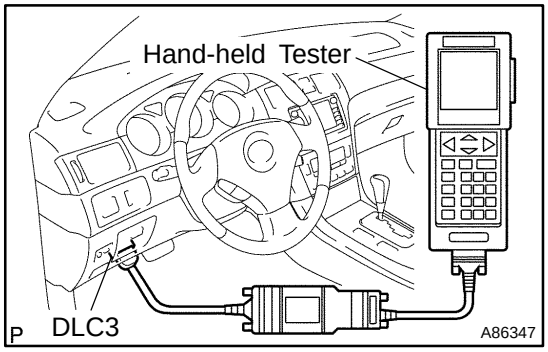
(p) Check that the fuel pressure remains as specified for 5 minutes after the engine has stopped.
Fuel pressure: 147 kPa (1.5 kgf/cm^2, 21 psi) or more

If the pressure is not as specified, check the fuel pump, pressure regulator and/or fuel injectors.

(q) After checking the fuel pressure, disconnect the battery negative terminal and carefully remove SST and the fuel tube connector to prevent gasoline splash.

(r) Reconnect the No. 1 fuel pipe (the fuel tube connector).

CAUTION:
After taking the precautions, connect the quick connector.



2. CHECK FUEL PUMP OPERATION AND FUEL LEAK

(a) When using the hand-held tester.

(1) Connect the hand-held tester to the DLC3.

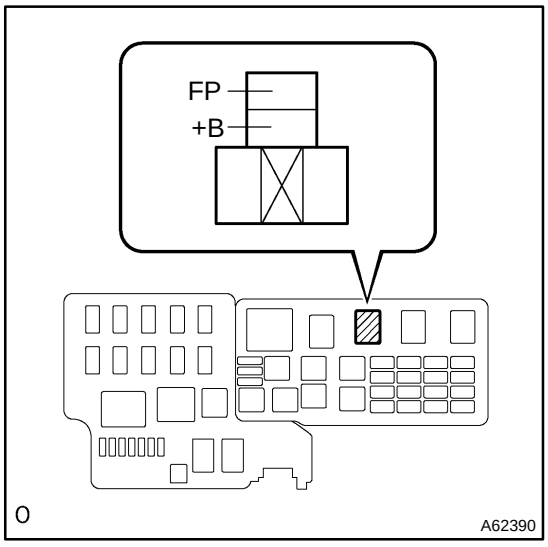
(2) Turn the ignition switch ON and the hand-held tester ON.

NOTICE:

Do not start the engine.

(3) Select the ACTIVE TEST mode on the hand-held tester.

(4) If you need help to select the ACTIVE TEST mode on the hand-held tester, refer to the hand-held tester operator's manual.



(b) When not using the hand-held tester.

(1) Remove the circuit opening relay.

(2) Using a service wire, connect terminals FP and +B of the engine room relay block.

NOTICE:

Pay due attention to the terminal connecting position to avoid a malfunction.

(3) Turn the ignition switch ON, and check that the fuel pump operates.

NOTICE:

Do not start the engine.

(c) Check that there are no fuel leaks after doing maintenance anywhere on the fuel system.

110XT-02

INSPECTION

1. INSPECT FUEL INJECTOR ASSY

(a) Inspect the resistance.

(1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

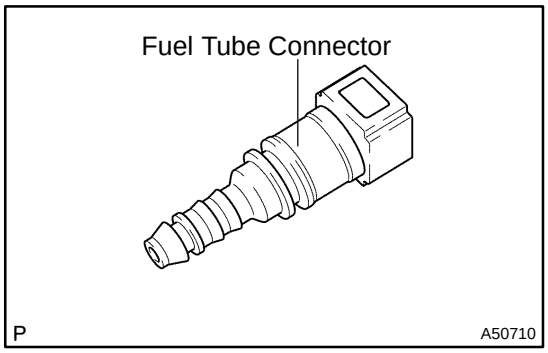
Tester Connection	Specified Condition
1 - 2	13.4 to 14.2 Ω at 20℃ (68℉)

If the resistance is not as specified, replace the fuel injector.

(b) Check the operation.

CAUTION:

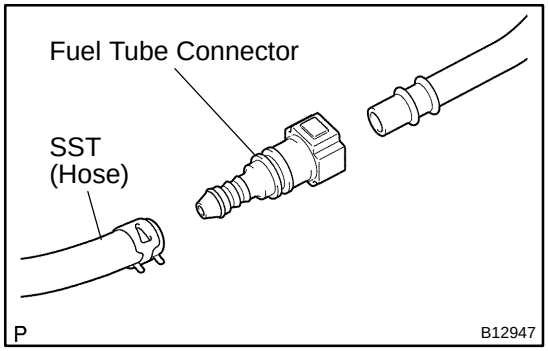
- **This test involves high-pressure fuel and electricity. Keep the injector free of sparks during the test.**
- **Take every precaution regarding safe handling of both the fuel and electricity.**
- **Perform this test in a safe area, and avoid any sparks or flame.**
- **Do not smoke.**



(1) Pull out the fuel tube connector from a new fuel tube.

HINT:

Part No. 23801 - 20190

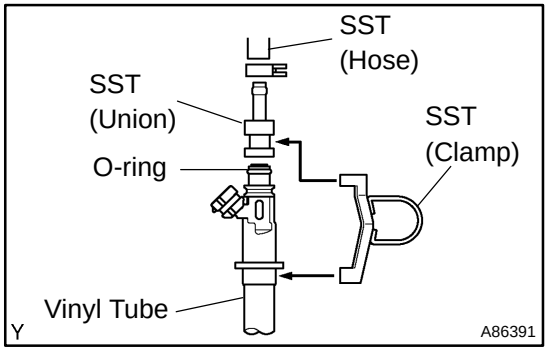


(2) Connect SST and the fuel tube connector to the fuel pipe.

SST 09268-41047 (95336-08070)

CAUTION:

After taking the precautions, connect the quick connector.



(3) Install the grommet and O-ring to the fuel injector.

(4) Connect SST (a union and hose) to the fuel injector, then hold the fuel injector and union with SST (a clamp).

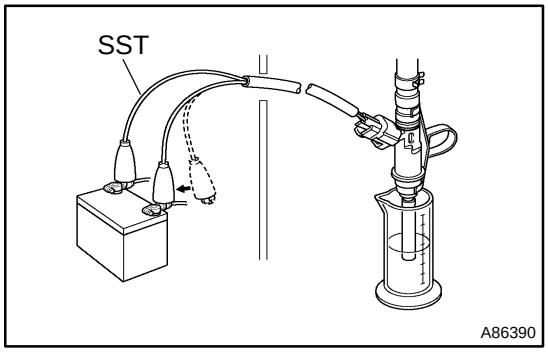
SST 09268- 41047 (09268- 41110, 09268- 41300, 95336-08070)

(5) Put the fuel injector into a graduated cylinder.

HINT:

Install a suitable vinyl tube to the fuel injector to contain the gasoline spray.

(6) Operate the fuel pump (see page 11-5).



(7) Connect SST (a wire) to the fuel injector and battery for 15 seconds, then measure the injection volume with the graduated cylinder. Test each fuel injector 2 or 3 times.

SST 09842-30070

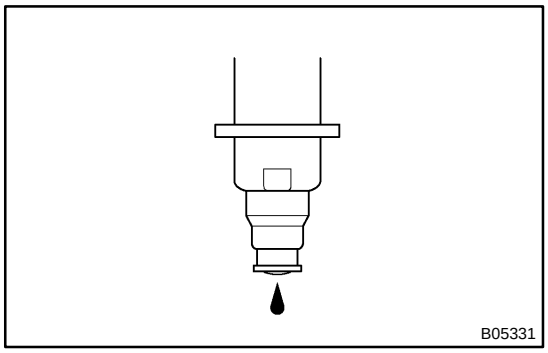
Standard:

Injection Volume	Difference between Cylenders
60 to 73 cm^3 (3.7 to 4.5 cu in.) per 15 seconds	13 cm^3 (0.8 cu in.) or less

NOTICE:

Always do the switching at the battery side.

If the injection volume is not as specified, replace the fuel injector.

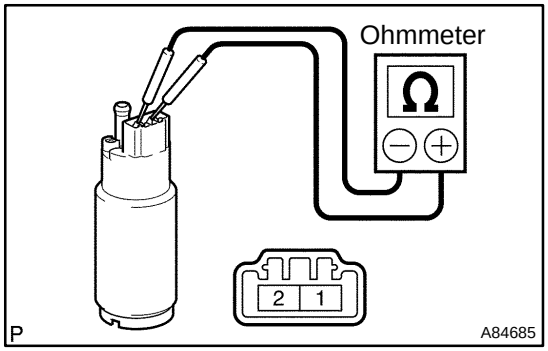


(c) Inspect the leakage.

(1) In the condition of step (7), disconnect the test probes of SST (a wire) from the battery, then check the fuel leakage from the fuel injector.

Fuel drop: 1 drop or less per 12 minutes

If the fuel drop is not as specified, replace the fuel injector.



2. INSPECT FUEL PUMP

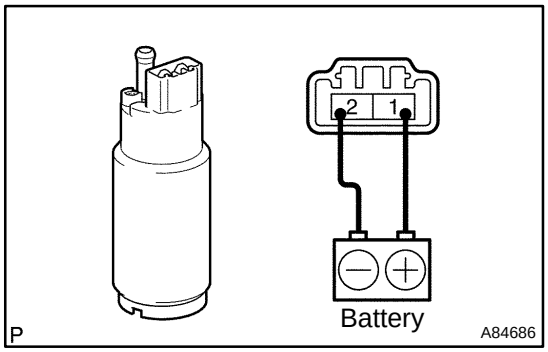
(a) Inspect the resistance.

(1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
1 - 2	0.2 to 3.0 Ω at 20°C (68°F)

If the resistance is not as specified, replace the fuel pump.



(b) Check the operation.

(1) Apply battery positive voltage across the terminals.

(2) Check that the fuel pump operates.

NOTICE:

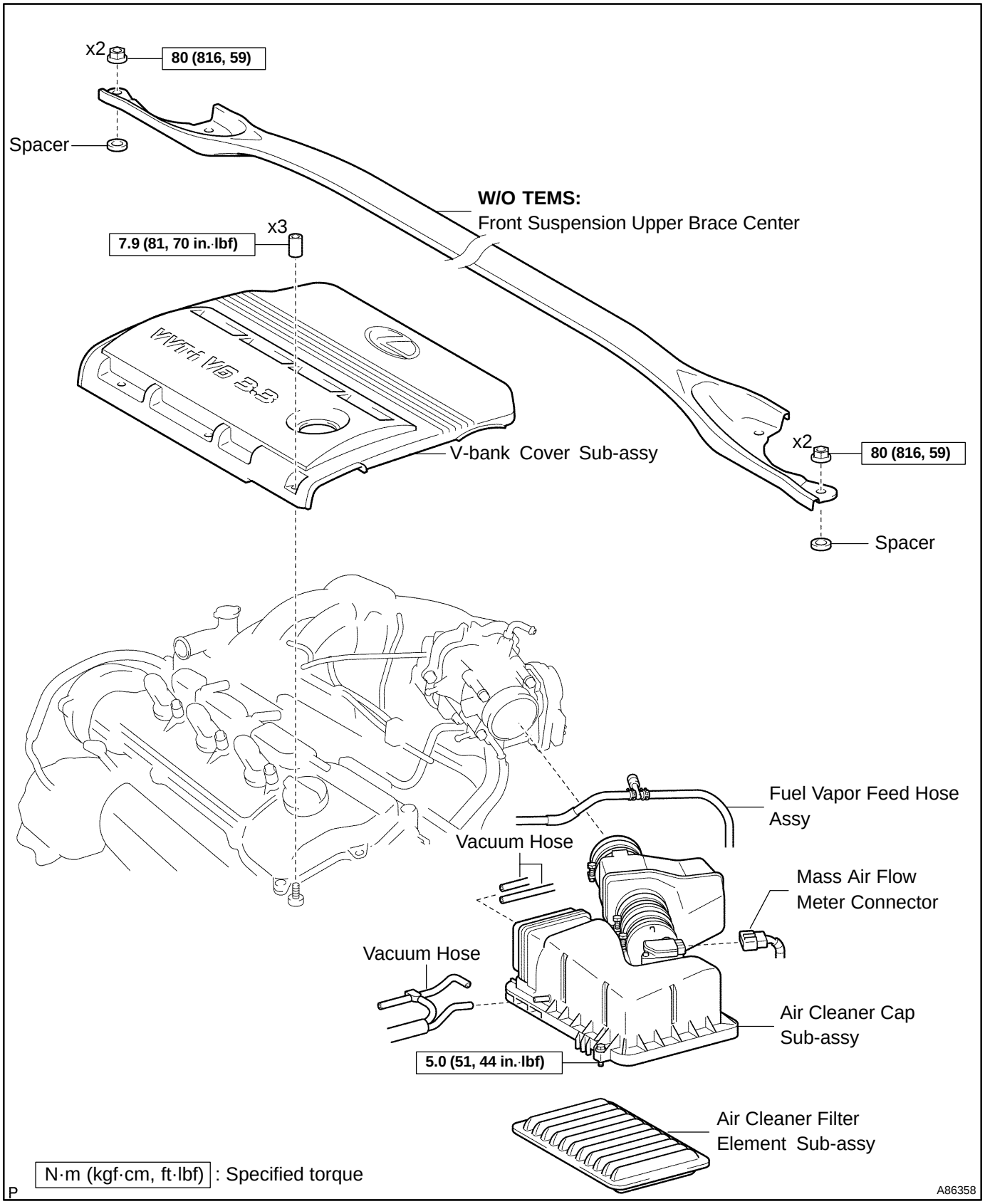
- **These tests must be performed quickly (within 10 seconds) to prevent burnout of the coil.**
- **Keep the fuel pump as far away from the battery as possible.**
- **Always do the switching at the battery side.**

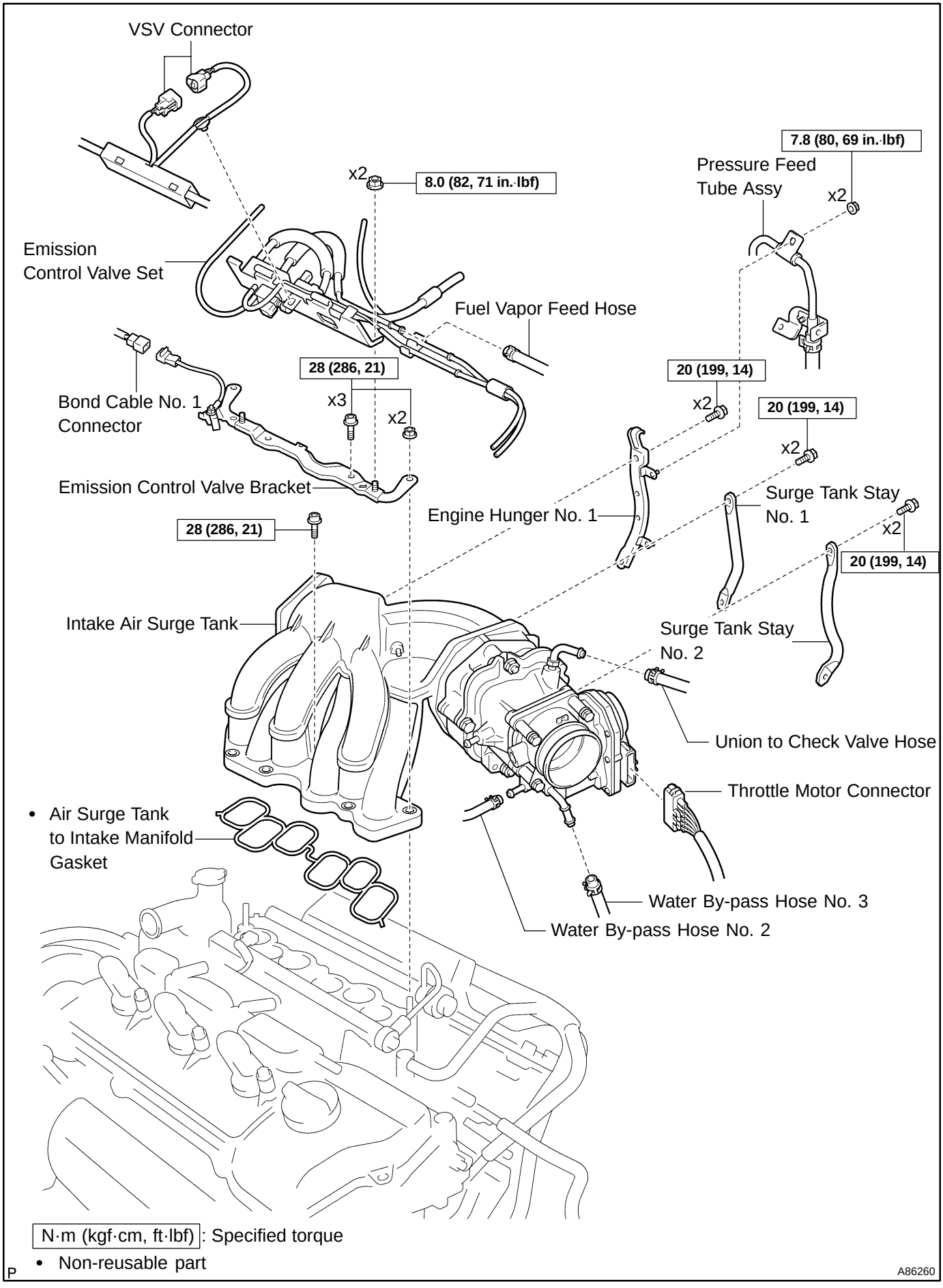
If the operation is not as specified, replace the fuel pump.

FUEL INJECTOR ASSY (3MZ-FE)

110XU-01

COMPONENTS



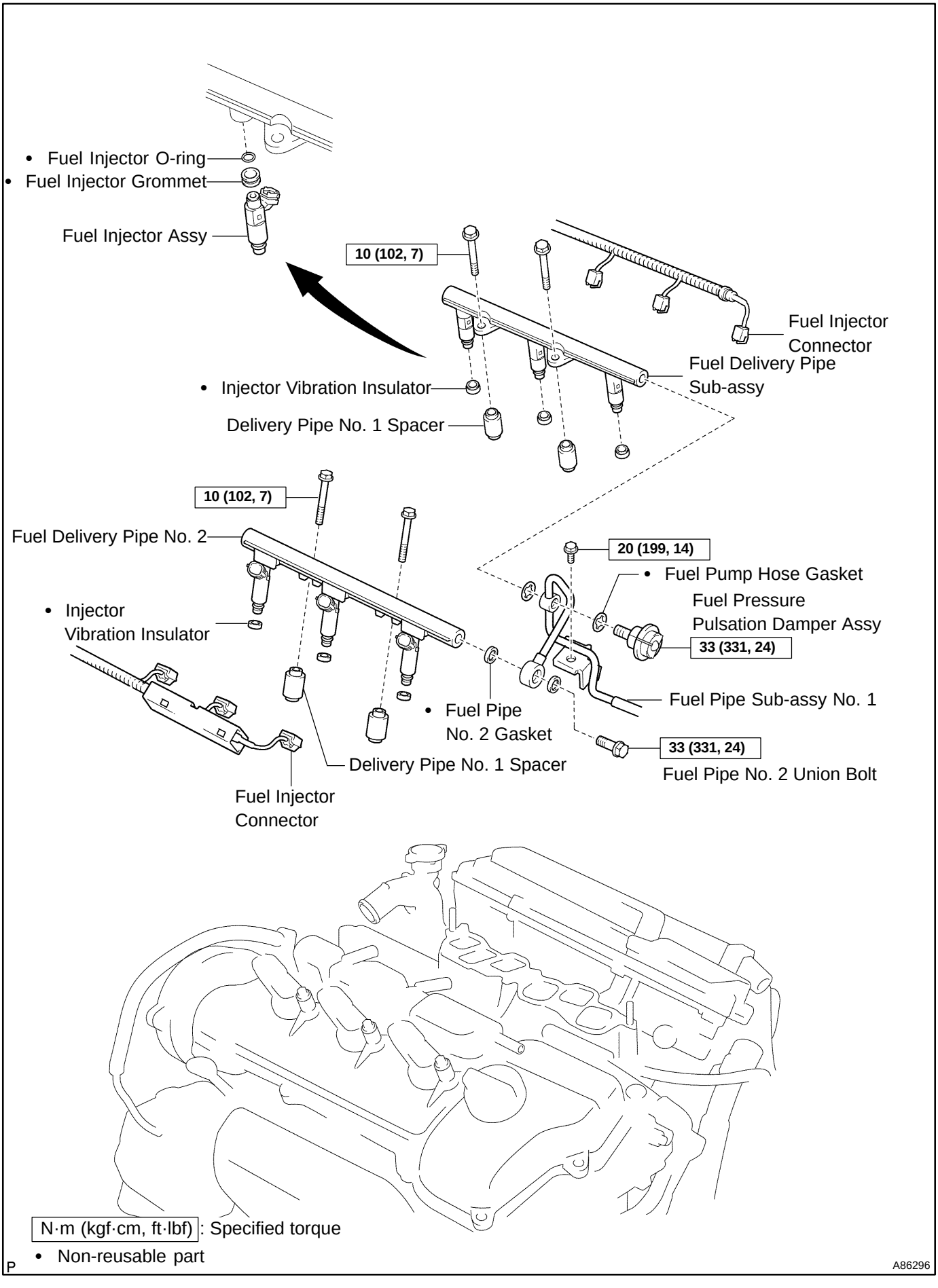


N·m (kgf·cm, ft·lbf): Specified torque

• Non-reusable part

P

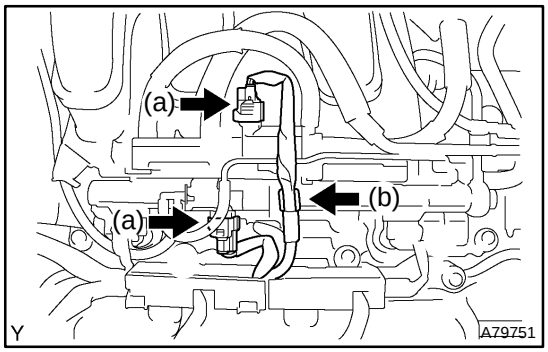
A86260


• Fuel Injector O-ring
• Fuel Injector Grommet
Fuel Injector Assy
10 (102, 7)
Fuel Injector Connector
Fuel Delivery Pipe Sub-assy
• Injector Vibration Insulator
Delivery Pipe No. 1 Spacer
10 (102, 7)
Fuel Delivery Pipe No. 2
20 (199, 14)
• Fuel Pump Hose Gasket
Fuel Pressure Pulsation Damper Assy
33 (331, 24)
• Injector Vibration Insulator
Fuel Pipe Sub-assy No. 1
• Fuel Pipe No. 2 Gasket
33 (331, 24)
Delivery Pipe No. 1 Spacer
Fuel Pipe No. 2 Union Bolt
Fuel Injector Connector
N·m (kgf·cm, ft·lbf) : Specified torque
• Non-reusable part
P
A86296

110XV-01

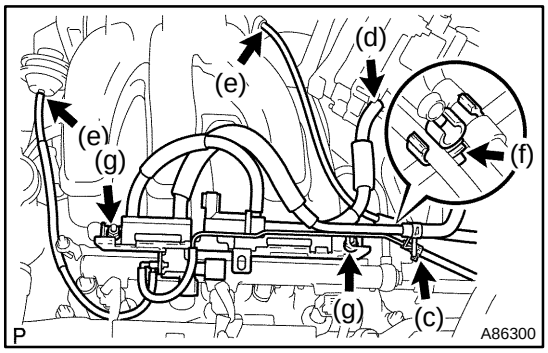
REPLACEMENT

1. **DISCHARGE FUEL SYSTEM PRESSURE (See page 11-1)**
2. **DISCONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)**
3. **DRAIN ENGINE COOLANT (See page 16-9)**
4. **REMOVE FRONT SUSPENSION UPPER BRACE CENTER (W/O TEMS) (See page 10-1 1)**
5. **REMOVE V-BANK COVER SUB-ASSY (See page 10-1 1)**
6. **REMOVE AIR CLEANER CAP SUB-ASSY (See page 10-1 1)**

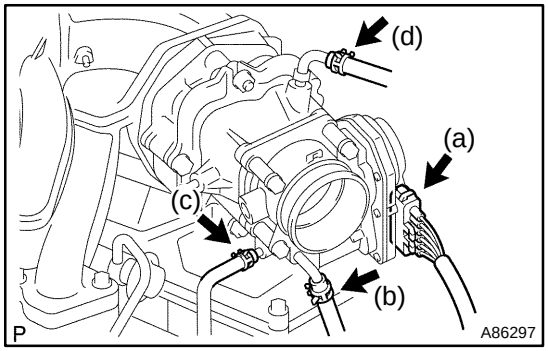


7. REMOVE EMISSION CONTROL VALVE SET

(a) Disconnect the 2 VSV connectors.
(b) Remove the wire harness clamp.

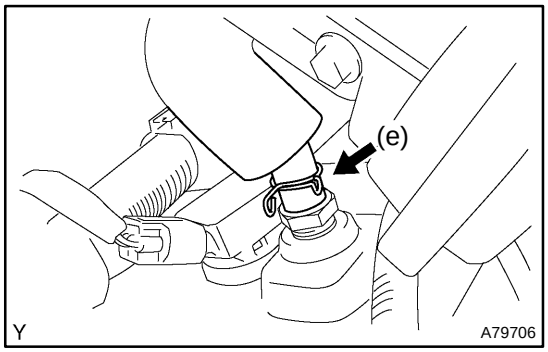


(c) Disconnect the fuel vapor feed hose No. 1.
(d) Disconnect the fuel vapor feed hose No. 2.
(e) Disconnect the 2 vacuum hoses.
(f) Remove the clamp.
(g) Remove the 2 nuts, then remove the emission control valve set.

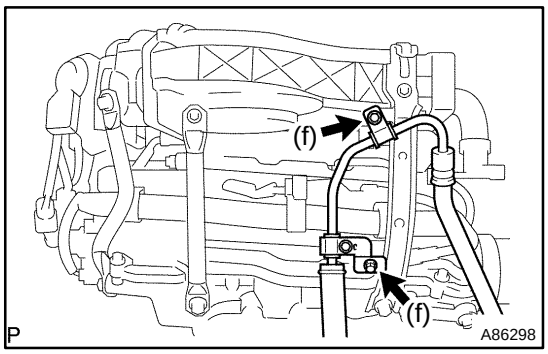


8. REMOVE INTAKE AIR SURGE TANK

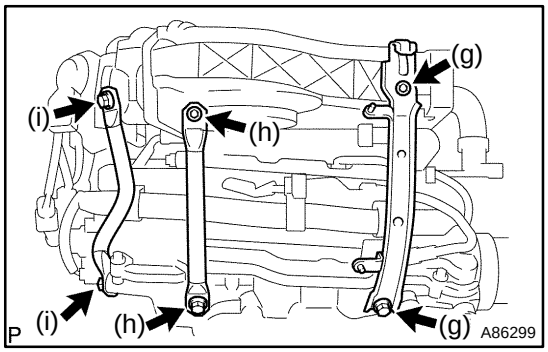
(a) Disconnect the throttle motor connector.
(b) Disconnect the water by-pass hose No. 3.
(c) Disconnect the water by-pass hose No. 2.
(d) Disconnect the union to check valve hose.



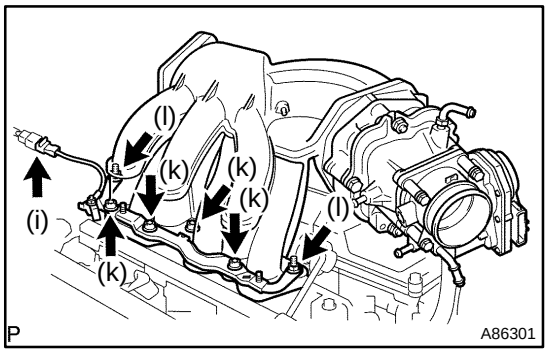
(e) Disconnect the ventilation hose.



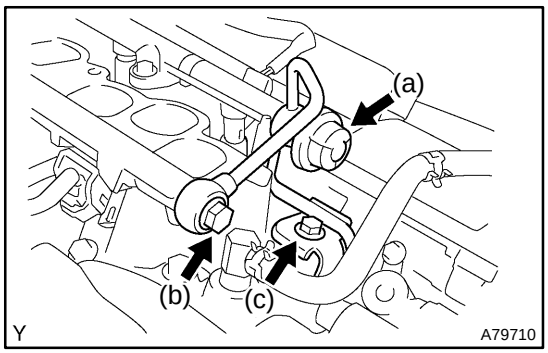
(f) Remove the 2 nuts, then remove the pressure feed tube.



(g) Remove the 2 bolts, then remove the engine hunger No. 1.
(h) Remove the 2 bolts, then remove the surge tank stay No. 1.
(i) Remove the 2 bolts, then remove the surge tank stay No. 2.

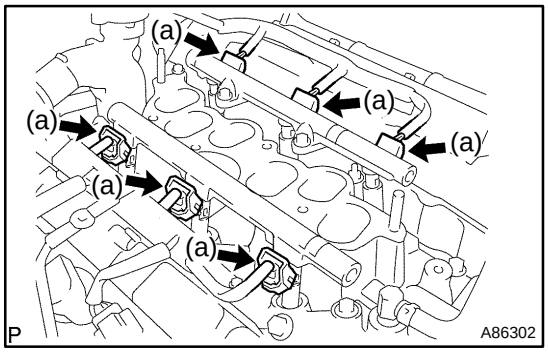


(j) Disconnect the bond cable No. 1 connector.
(k) Using a socket hexagon wrench 8, remove the 4 bolts.
(l) Remove the 2 nuts, then remove the emission control valve bracket and intake air surge tank.
(m) Remove the gasket from the intake air surge tank.



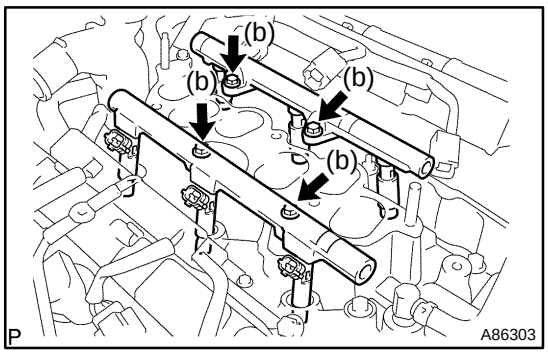
9. SEPARATE FUEL PIPE SUB-ASSY NO.1

(a) Remove the fuel pressure pulsation damper and 2 gaskets.
(b) Remove the fuel pipe No. 2 union bolt and 2 gaskets.
(c) Remove the bolt, then separate the fuel pipe No. 1.



10. REMOVE FUEL INJECTOR ASSY

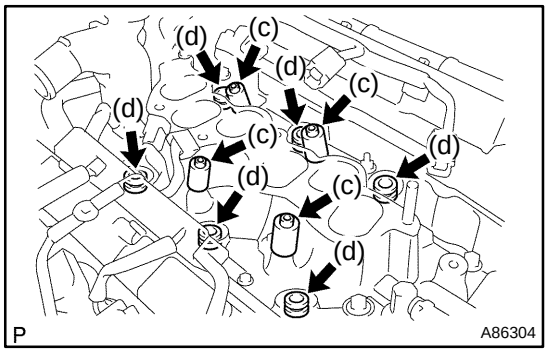
(a) Disconnect the 6 fuel injector connectors.



(b) Remove the 4 bolts, then remove the 2 fuel delivery pipes together with the 6 fuel injectors.

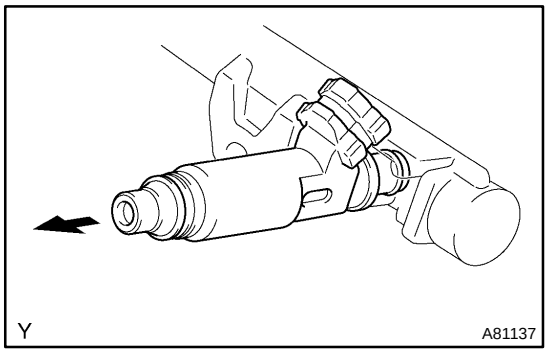
NOTICE:

Be careful not to drop the fuel injectors when removing the fuel delivery pipe.

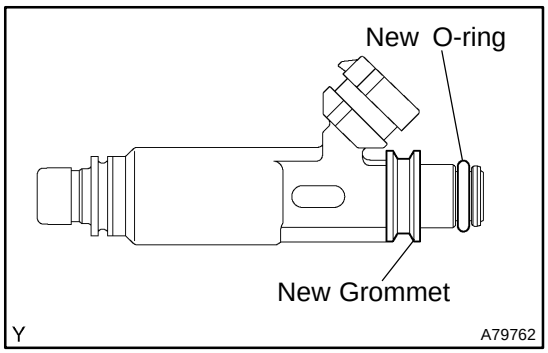


(c) Remove the 4 delivery pipe No. 1 spacers from the intake manifold.

(d) Remove the 6 insulators from the intake manifold.



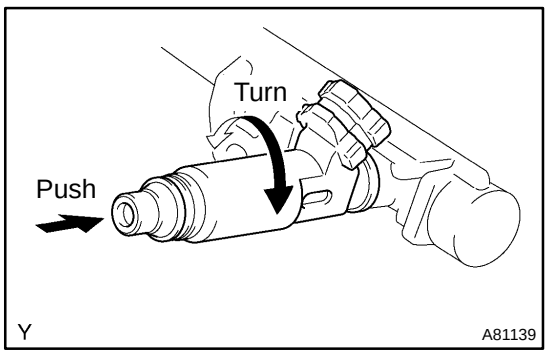
(e) Pull out the fuel injector from the fuel delivery pipe.



11. INSTALL FUEL INJECTOR ASSY

(a) Install new grommets to each fuel injector.

(b) Apply a light coat of spindle oil or gasoline to new O-rings, then install them to each fuel injector.



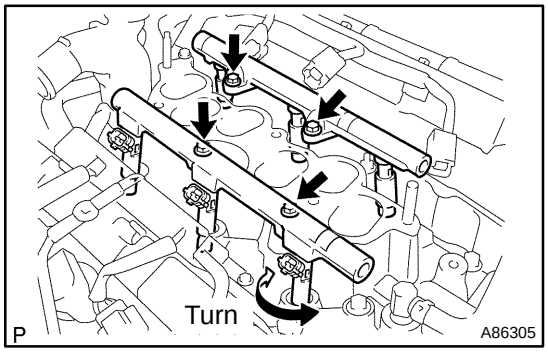
(c) Apply a light coat of spindle oil or gasoline to the place where the fuel delivery pipe contacts the O-ring.

(d) Push the fuel injector while twisting it back and forth to install it in the fuel delivery pipe.

NOTICE:

- **Be careful not to twist the O-ring.**
- **After installing the fuel injectors, check that they turn smoothly. If not, replace O-ring with a new O-ring.**

(e) Install 6 new insulators and the 4 delivery pipe No. 1 spacers to the intake manifold.



(f) Place the 2 fuel delivery pipes together with the 6 fuel injectors to the intake manifold.

NOTICE:

Be careful not to drop the fuel injectors when installing the fuel delivery pipe.

(g) Temporarily install the 4 bolts which attach the fuel delivery pipe to the intake manifold.

(h) Check that the fuel injectors rotate smoothly.

If the fuel injectors do not rotate smoothly, the probable cause is incorrect installation of the O-ring. Replace it with a new one.

(i) Tighten the 4 bolts.
Torque: 10 N·m (102 kgf·cm, 7 ft·lbf)

(j) Connect the 6 fuel injector connectors.

12. INSTALL FUEL PIPE SUB-ASSY NO.1

(a) Install 2 new gaskets and fuel pipe No. 2 union bolt.
Torque: 33 N·m (331 kgf·cm, 24 ft·lbf)

(b) Install 2 new gaskets and fuel pressure pulsation damper.
Torque: 33 N·m (331 kgf·cm, 24 ft·lbf)

(c) Install the fuel pipe No. 1 with the bolt.
Torque: 20 N·m (199 kgf·cm, 14 ft·lbf)

13. INSTALL INTAKE AIR SURGE TANK

(a) Install a new gasket to the intake air surge tank.

(b) Install the intake air surge tank and emission control valve bracket with the 2 nuts.
Torque: 28 N·m (286 kgf·cm, 21 ft·lbf)

(c) Using a socket hexagon wrench 8, tighten the 4 bolts.
Torque: 28 N·m (286 kgf·cm, 21 ft·lbf)

(d) Install the surge tank stay No. 2 with the 2 bolts.
Torque: 20 N·m (199 kgf·cm, 14 ft·lbf)

(e) Install the surge tank stay No. 1 with the 2 bolts.
Torque: 20 N·m (199 kgf·cm, 14 ft·lbf)

(f) Install the engine hunger No. 1 with the 2 bolts.
Torque: 20 N·m (199 kgf·cm, 14 ft·lbf)

(g) Install the pressure feed tube with the 2 nuts.
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

(h) Connect the ventilation hose.

(i) Connect the union to check valve hose.

(j) Connect the water by-pass hose No. 2.

(k) Connect the water by-pass hose No. 3.

(l) Connect the throttle motor connector.

14. INSTALL EMISSION CONTROL VALVE SET
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

15. INSTALL AIR CLEANER CAP SUB-ASSY (See page 10-1 1)

16. CHECK CONNECTION OF VACUUM HOSE (See page 14-29)

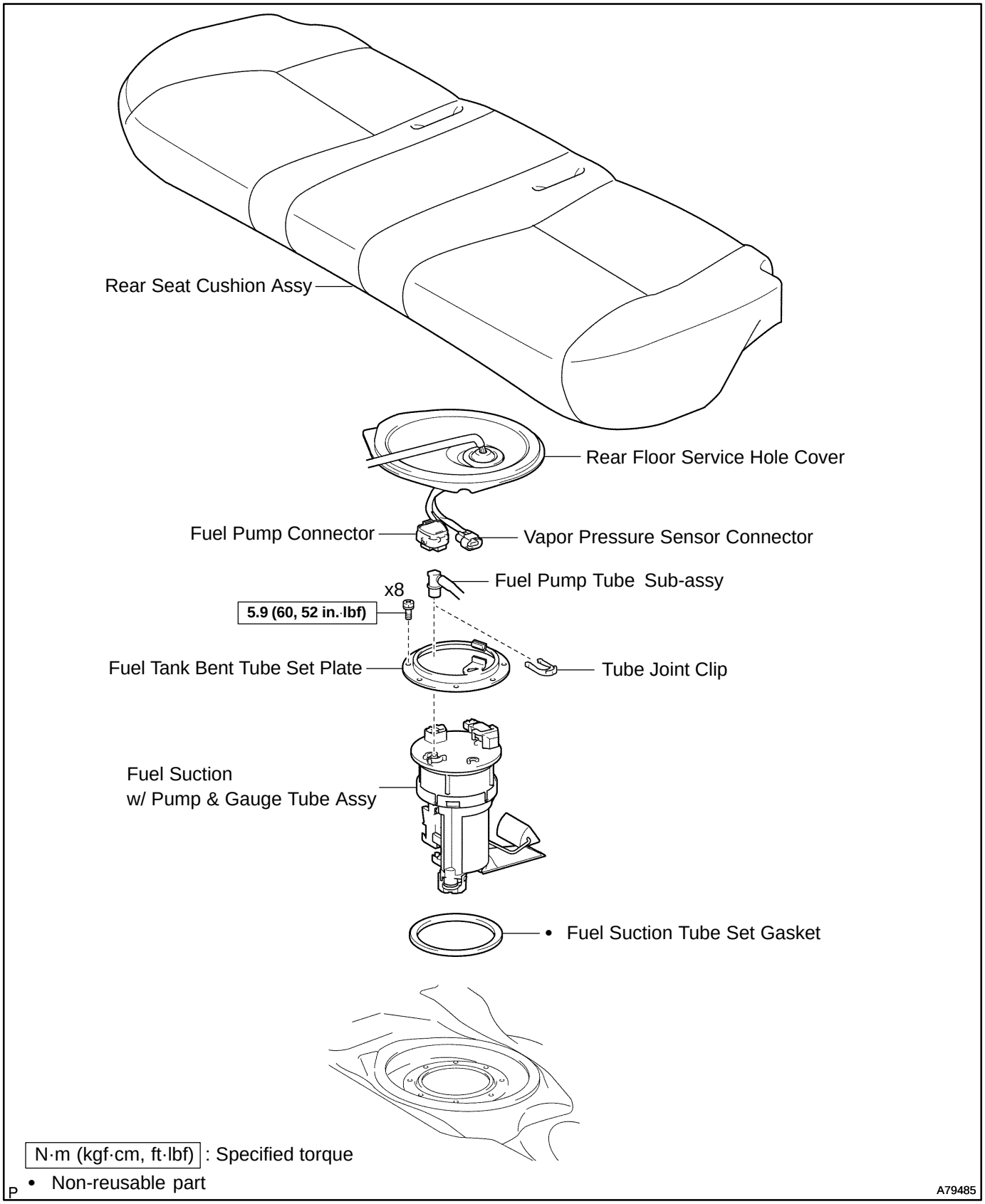
17. CONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

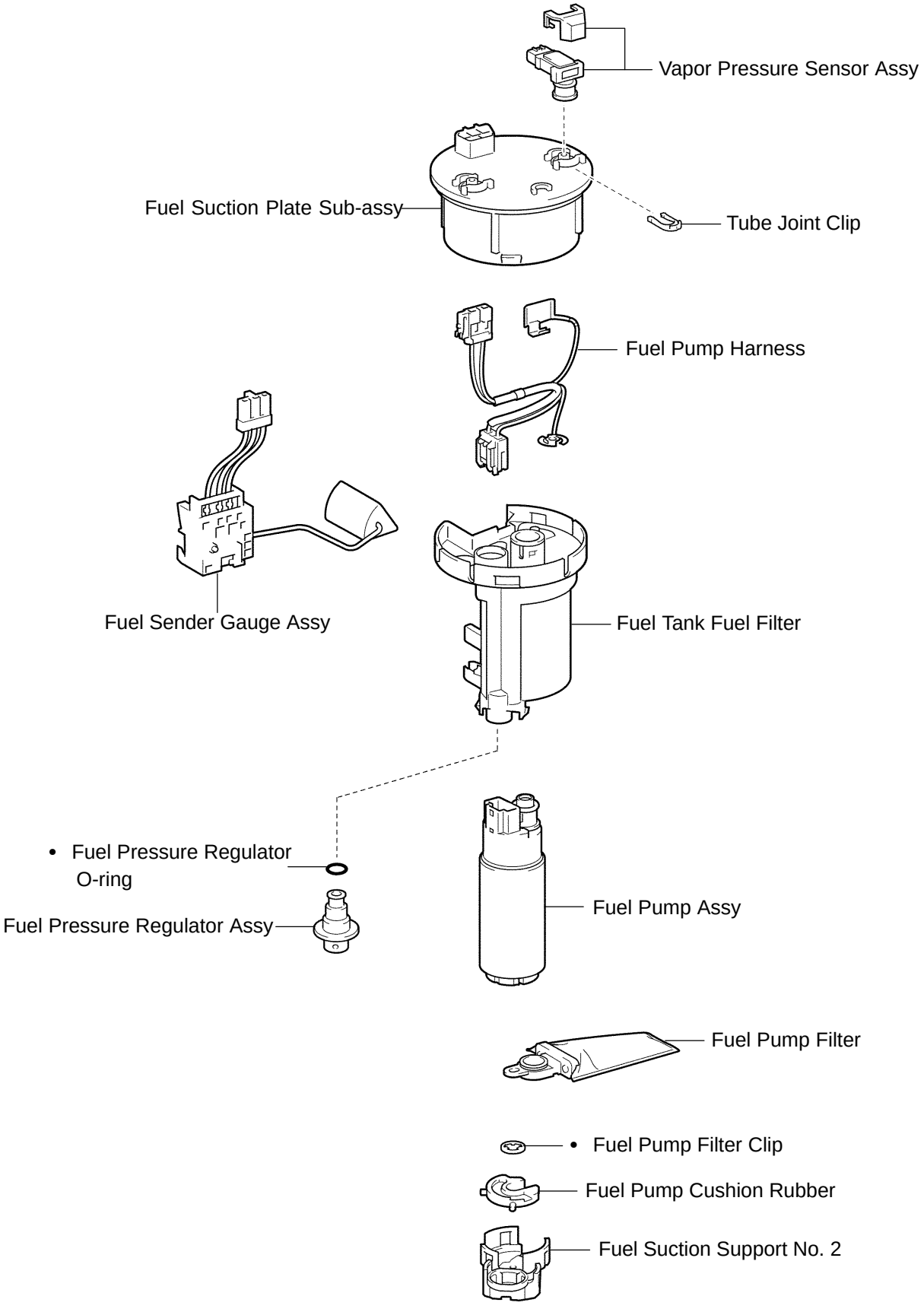
18. **ADD ENGINE COOLANT (See page 16-9)**
19. **CHECK FOR ENGINE COOLANT LEAKS (See page 16-1)**
20. **CHECK FOR FUEL LEAKS (See page 11-5)**
21. **INSTALL V-BANK COVER SUB-ASSY (See page 10-1 1)**
22. **INSTALL FRONT SUSPENSION UPPER BRACE CENTER (W/O TEMS) (See page 10-1 1)**
23. **SYSTEM INITIALIZATION (See page 19-15)**

FUEL SUCTION W/ PUMP & GAUGE TUBE ASSY (3MZ-FE)

110XW-02

COMPONENTS




Vapor Pressure Sensor Assy
Fuel Suction Plate Sub-assy
Tube Joint Clip
Fuel Pump Harness
Fuel Sender Gauge Assy
Fuel Tank Fuel Filter
• Fuel Pressure Regulator O-ring
Fuel Pressure Regulator Assy
Fuel Pump Assy
Fuel Pump Filter
• Fuel Pump Filter Clip
Fuel Pump Cushion Rubber
Fuel Suction Support No. 2
P • Non-reusable part
A79486

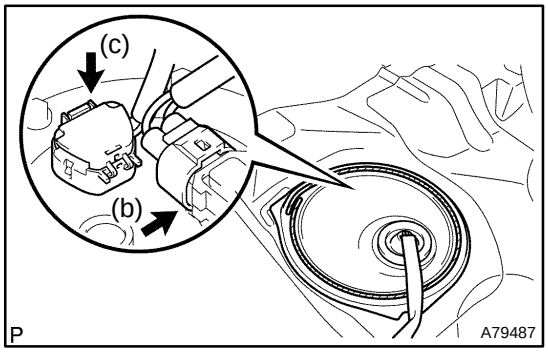
110XX-02

Removal & Installation and Disassembly & Reassembly

1. DISCHARGE FUEL SYSTEM PRESSURE (See page 11-1)

2. DISCONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)

3. REMOVE REAR SEAT CUSHION ASSY (See page 72-39)

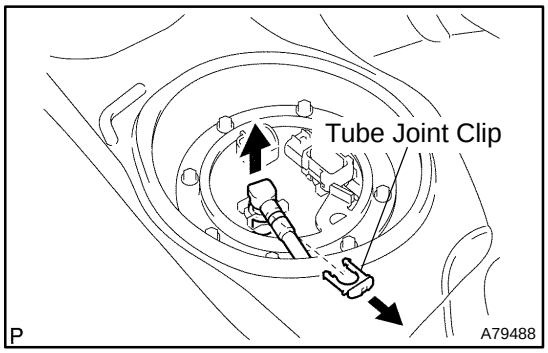


4. REMOVE REAR FLOOR SERVICE HOLE COVER

(a) Remove the rear floor service hole cover.

(b) Disconnect the vapor pressure sensor connector.

(c) Disconnect the fuel pump connector.

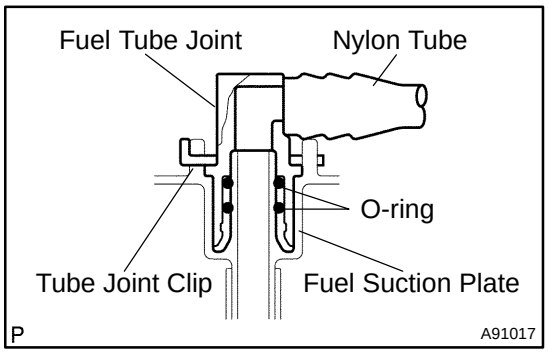


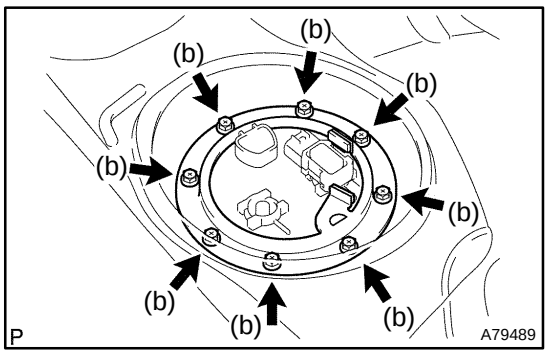
5. REMOVE FUEL SUCTION W/ PUMP & GAUGE TUBE ASSY

(a) Remove the tube joint clip, then pull out the fuel pump tube.

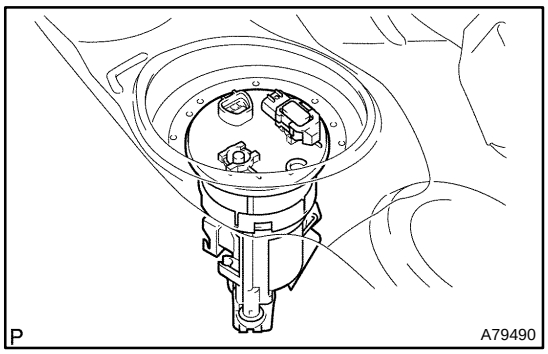
NOTICE:

- **Check around the connector for dirt or mud before this operation. Remove the dirt if necessary.**
- **Be careful of mud because the fuel tube joint has an O-ring which seals the pipe and connector that can be contaminated.**
- **Do not use any tools in this operation.**
- **Do not bend or twist the nylon tube. Protect the connector by covering it with a vinyl or plastic bag.**
- **When the pipe and connector are stuck, push and pull the connector to release. Pull the connector carefully.**





(b) Remove the 8 bolts, then remove the fuel tank vent tube set plate.

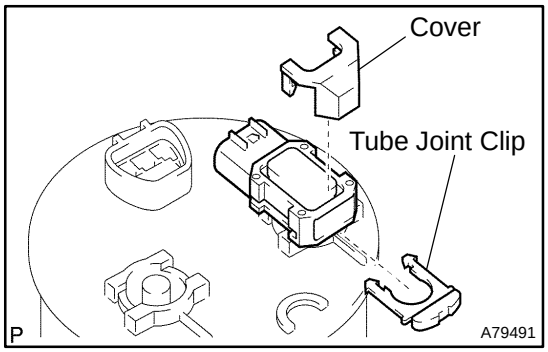


(c) Remove the fuel suction tube w/ pump & gauge from the fuel tank.

NOTICE:

- **Do not damage the fuel pump filter.**
- **Do not bend the arm of the fuel sender gauge.**

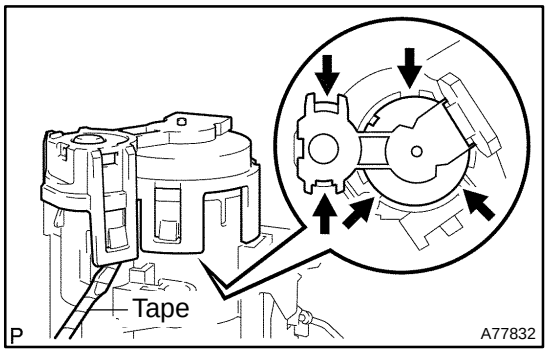
(d) Remove the gasket from the fuel suction tube w/ pump & gauge.



6. REMOVE VAPOR PRESSURE SENSOR ASSY

(a) Remove the cover.

(b) Remove the tube joint clip, then pull out the vapor pressure sensor.

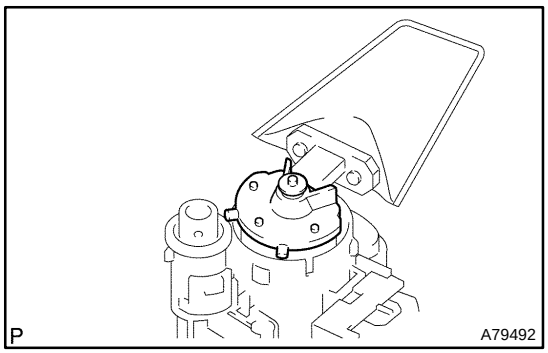


7. REMOVE FUEL SUCTION SUPPORT NO.2

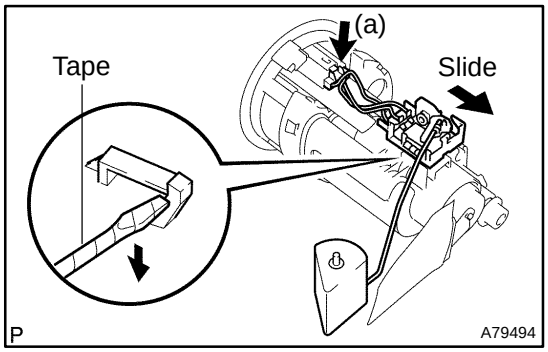
(a) Using a screwdriver with the tip wrapped in tape, unfasten the 5 claws. Then remove the fuel suction support No. 2.

NOTICE:

Do not damage the fuel suction support No. 2.



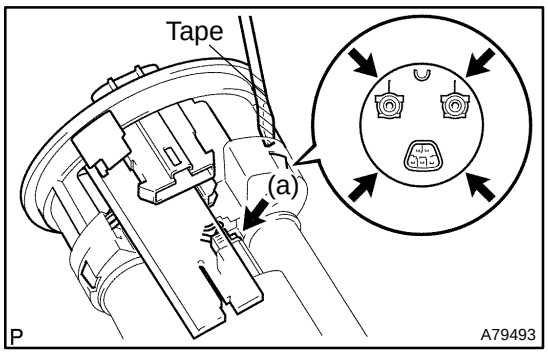
8. REMOVE FUEL PUMP CUSHION RUBBER



9. REMOVE FUEL SENDER GAUGE ASSY

(a) Disconnect the fuel sender gauge connector.

(b) Using a screwdriver with the tip wrapped in tape, unfasten the clamp to release the fuel sender gauge. Then slide the fuel sender gauge to remove it from the fuel pump.



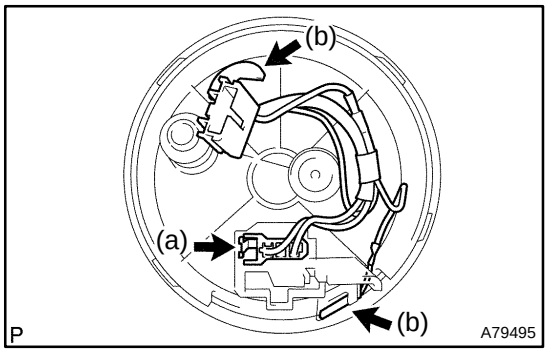
10. REMOVE FUEL SUCTION PLATE SUB-ASSY

(a) Disconnect the fuel pump connector.

(b) Using a screwdriver with the tip wrapped in tape, unfasten the 4 claws. Then pull out the fuel suction plate.

NOTICE:

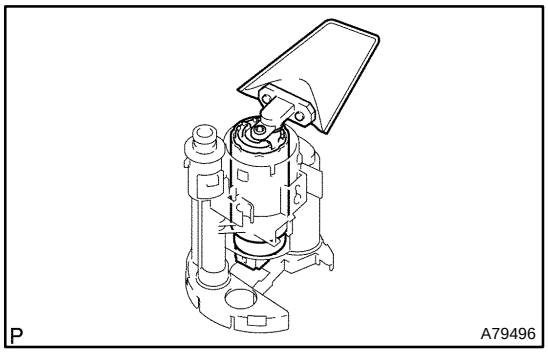
Do not damage the fuel suction plate.



11. REMOVE FUEL PUMP HARNESS

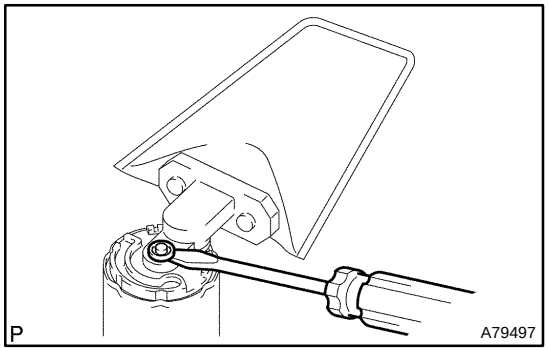
(a) Disconnect the connector.

(b) Using a small screwdriver, pry out the fuel pump harness.



12. REMOVE FUEL PUMP

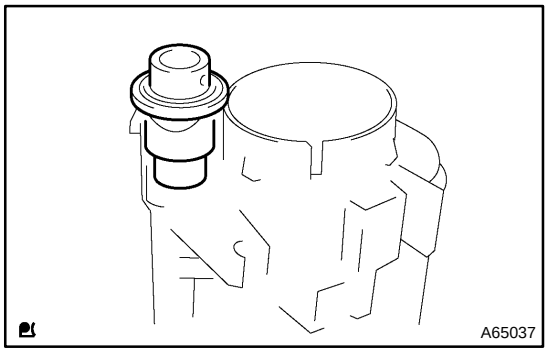
(a) Pull out the fuel pump from the fuel tank fuel filter.



13. REMOVE FUEL PUMP FILTER

(a) Using a small screwdriver, pry out the clip.

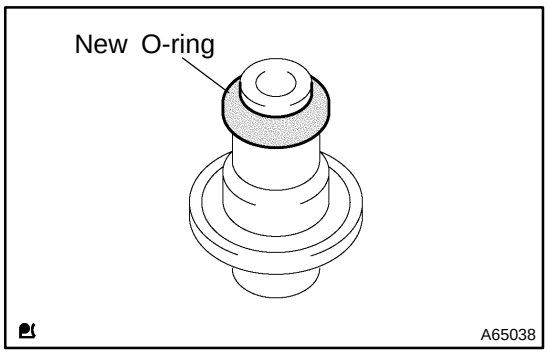
(b) Pull out the fuel pump filter from the fuel pump.



14. REMOVE FUEL PRESSURE REGULATOR ASSY

(a) Pull out the fuel pressure regulator from the fuel tank fuel filter.

(b) Remove the O-ring from the fuel pressure regulator.



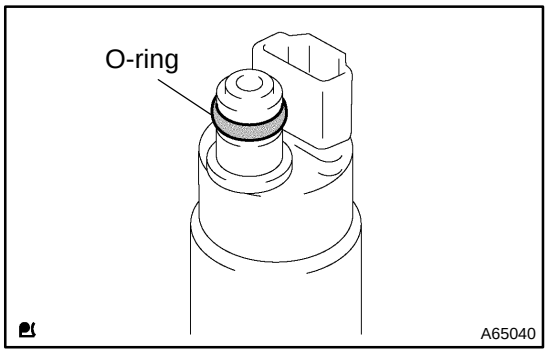
15. INSTALL FUEL PRESSURE REGULATOR ASSY

(a) Apply a light coat of spindle oil or gasoline to a new O-ring, then install it to the fuel pressure regulator.

(b) Push in the fuel pressure regulator to the fuel tank fuel filter.

16. INSTALL FUEL PUMP FILTER

(a) Install the fuel pump filter with a new clip.



17. INSTALL FUEL PUMP

(a) Apply a light coat of gasoline or spindle oil to the O-ring on the fuel pump.

(b) Push in the fuel pump to the fuel tank fuel filter.

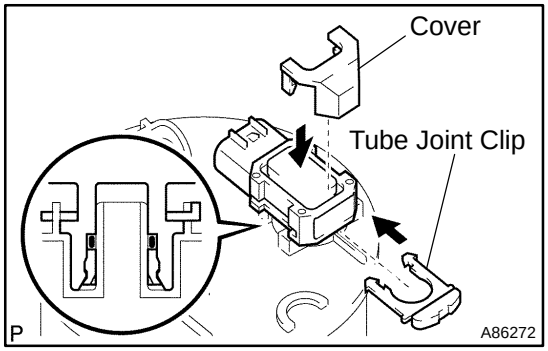
18. INSTALL FUEL PUMP HARNESS

19. INSTALL FUEL SUCTION PLATE SUB-ASSY

20. INSTALL FUEL SENDER GAUGE ASSY

21. INSTALL FUEL PUMP CUSHION RUBBER

22. INSTALL FUEL SUCTION SUPPORT NO.2



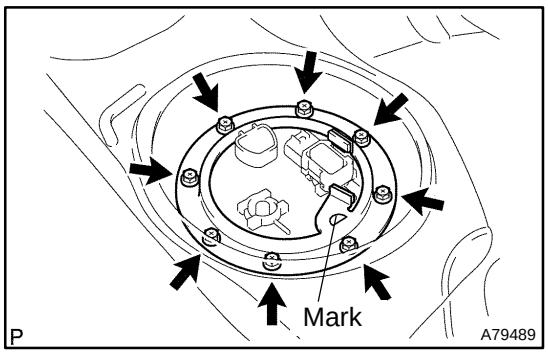
23. INSTALL VAPOR PRESSURE SENSOR ASSY

(a) Install the vapor pressure sensor with the tube joint clip.

NOTICE:

- **Check the connected part for scratch or foreign objects.**
- **Check that the vapor pressure sensor is inserted securely.**
- **Check that the tube joint clip is on the collar of the vapor pressure sensor.**
- **After installing the tube joint clip, check that the vapor pressure sensor has not been pulled off.**

(b) Install the cover.



24. INSTALL FUEL SUCTION W/ PUMP & GAUGE TUBE ASSY

(a) Install a new gasket to the fuel suction tube w/ pump & gauge.

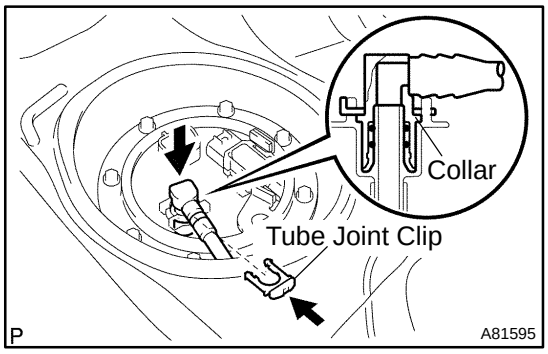
(b) Install the fuel suction tube w/ pump & gauge to the fuel tank.

NOTICE:

- **Do not damage the fuel pump filter.**
- **Do not bend the arm of the fuel sender gauge.**

(c) Align the mark of the fuel tank vent tube set plate with the fuel suction tube w/ pump & gauge.

(d) Install the fuel tank bent tube set plate with the 8 bolts.
Torque: 5.9 N·m (60 kgf·cm, 52 in.·lbf)



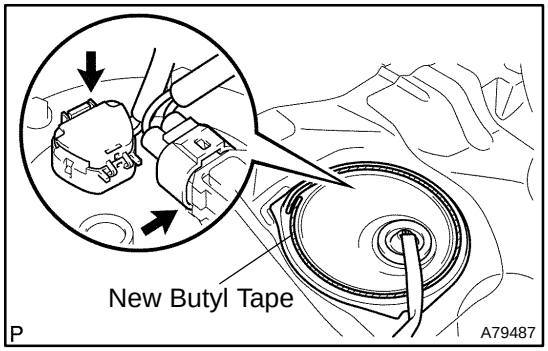
(e) Install the fuel pump tube with the tube joint clip.

NOTICE:

- **Check the connected part for scratch or foreign objects.**
- **Check that the fuel tube joint is inserted securely.**
- **Check that the tube joint clip is on the collar of the fuel tube joint.**
- **After installing the tube joint clip, check that the fuel tube joint has not been pulled off.**

25. CONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

26. CHECK FOR FUEL LEAKS (See page 11-5)



27. INSTALL REAR FLOOR SERVICE HOLE COVER

(a) Connect the fuel pump connector.

(b) Connect the vapor pressure sensor connector.

(c) Using new butyl tape, install the rear floor service hole cover.

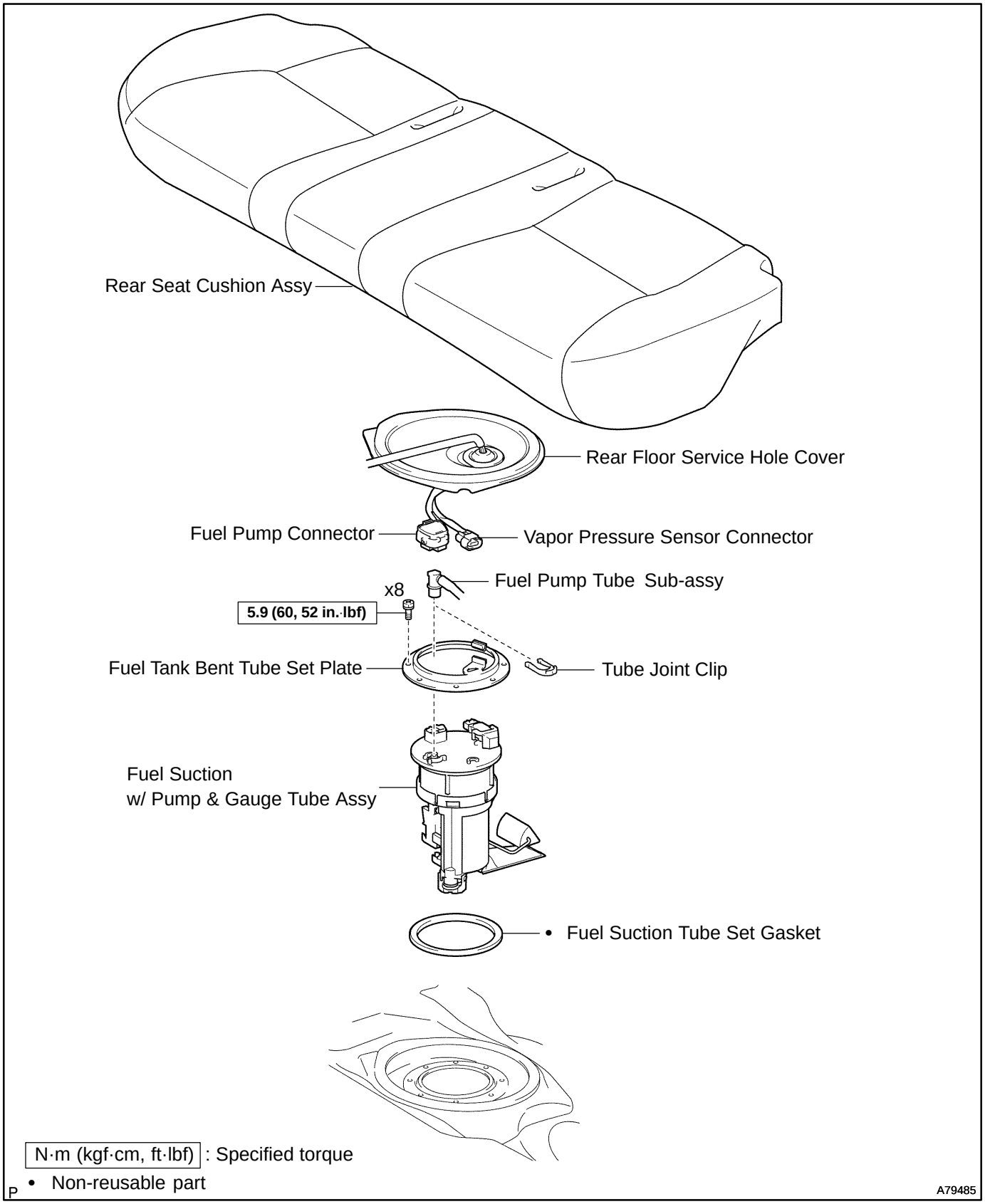
28. INSTALL REAR SEAT CUSHION ASSY

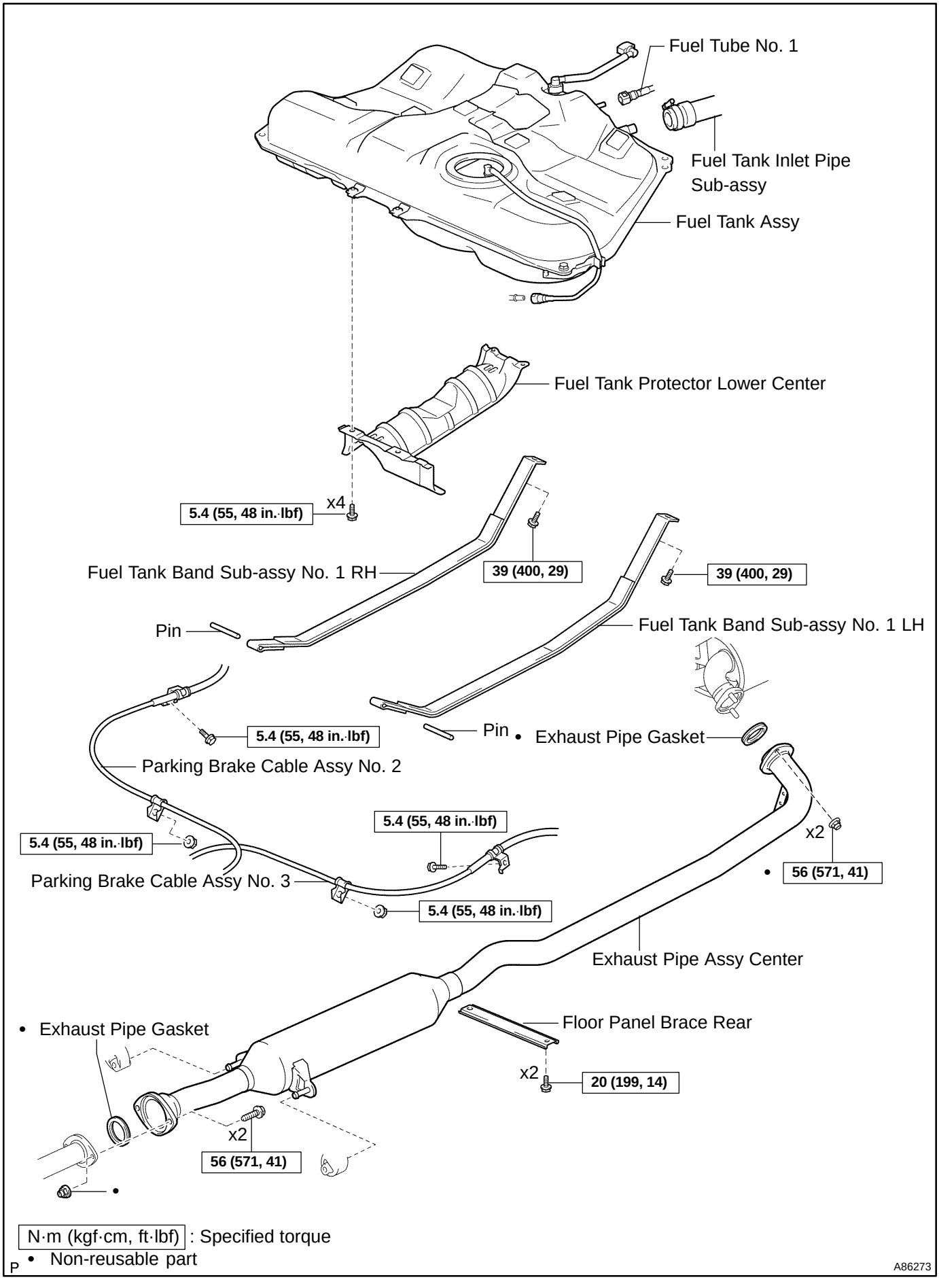
29. SYSTEM INITIALIZATION (See page 19-15)

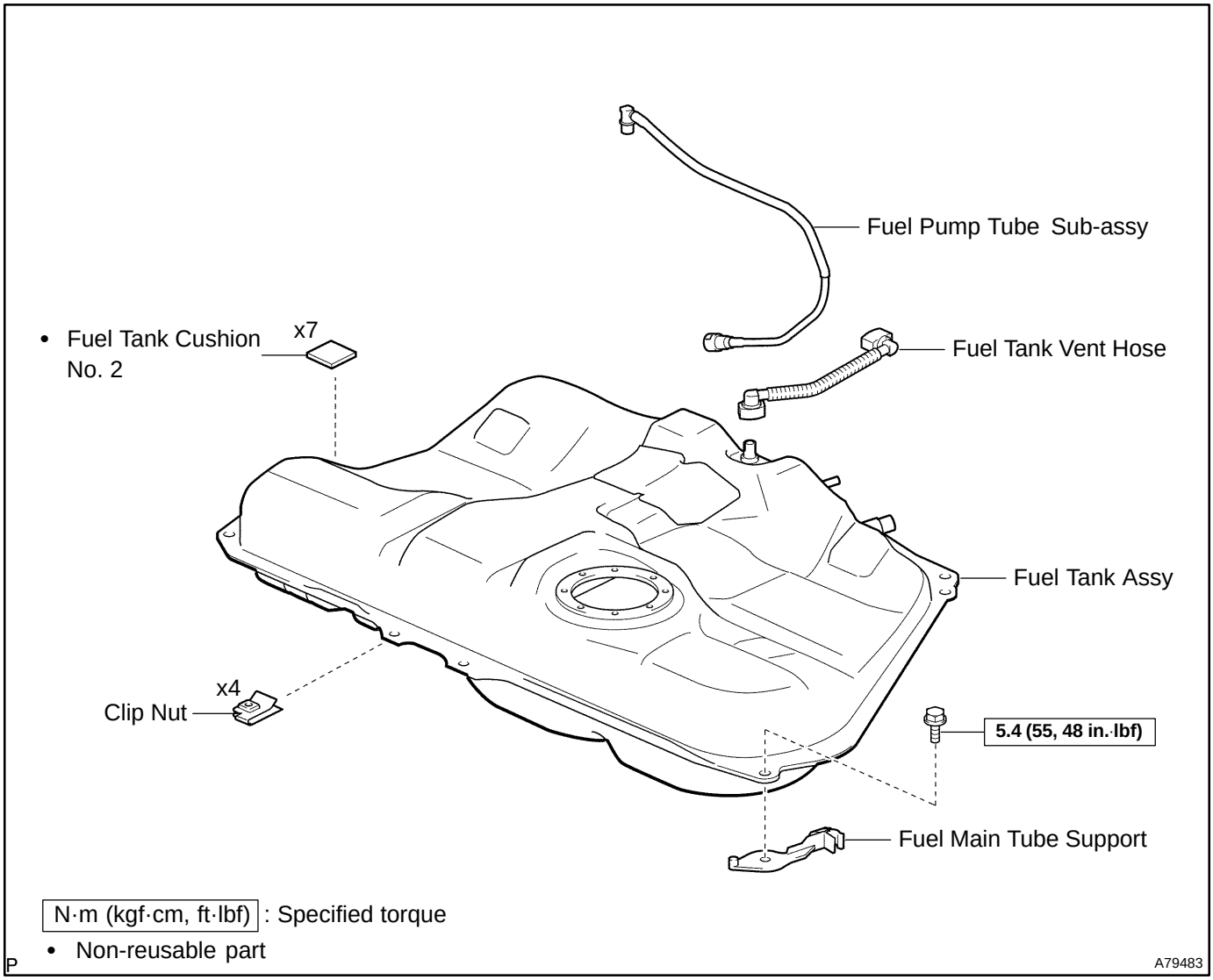
FUEL TANK ASSY (3MZ-FE)

110XY-01

COMPONENTS




Fuel Tube No. 1
Fuel Tank Inlet Pipe Sub-assy
Fuel Tank Assy
Fuel Tank Protector Lower Center
5.4 (55, 48 in.·lbf)
x4
Fuel Tank Band Sub-assy No. 1 RH
39 (400, 29)
39 (400, 29)
Pin
Fuel Tank Band Sub-assy No. 1 LH
5.4 (55, 48 in.·lbf)
Pin
• Exhaust Pipe Gasket
Parking Brake Cable Assy No. 2
5.4 (55, 48 in.·lbf)
5.4 (55, 48 in.·lbf)
x2
• 56 (571, 41)
Parking Brake Cable Assy No. 3
5.4 (55, 48 in.·lbf)
Exhaust Pipe Assy Center
• Exhaust Pipe Gasket
Floor Panel Brace Rear
x2
20 (199, 14)
x2
56 (571, 41)
•
N·m (kgf·cm, ft·lbf) : Specified torque
• Non-reusable part
P
A86273


Fuel Pump Tube Sub-assy
• Fuel Tank Cushion No. 2
x7
Fuel Tank Vent Hose
Fuel Tank Assy
x4
Clip Nut
5.4 (55, 48 in.·lbf)
Fuel Main Tube Support
N·m (kgf·cm, ft·lbf) : Specified torque
• Non-reusable part
P
A79483

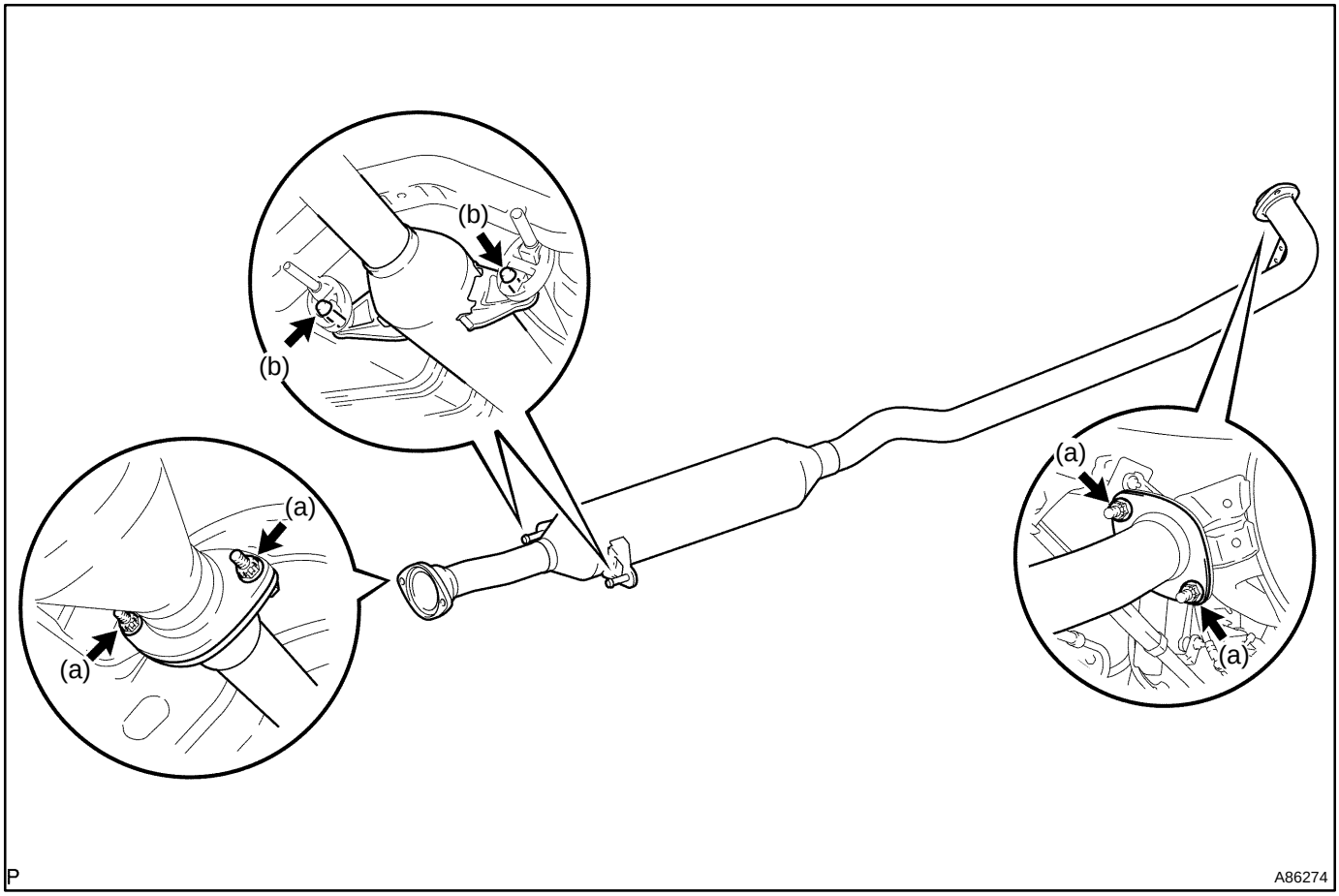
110XZ-01

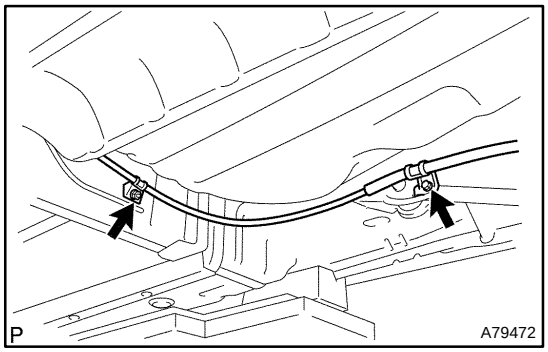
Removal & Installation and Disassembly & Reassembly

1. **DISCHARGE FUEL SYSTEM PRESSURE (See page 11-1)**
2. **DISCONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)**
3. **REMOVE REAR SEAT CUSHION ASSY (See page 72-39)**
4. **REMOVE REAR FLOOR SERVICE HOLE COVER (See page 11-20)**
5. **REMOVE FUEL SUCTION W/ PUMP & GAUGE TUBE ASSY (See page 11-20)**
6. **DRAIN FUEL**
7. **REMOVE FLOOR PANEL BRACE REAR (See page 15-2)**
8. **REMOVE EXHAUST PIPE ASSY CENTER**

(a) Remove the 2 bolts and 4 nuts.

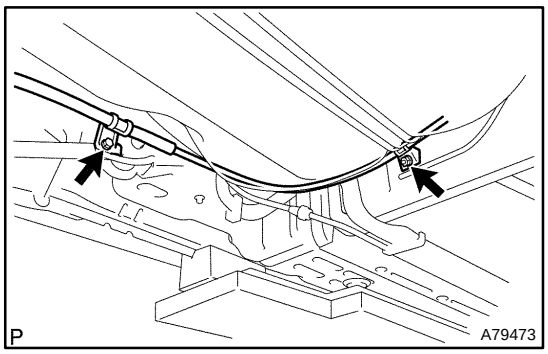
(b) Remove the exhaust pipe center and 2 gaskets from the 2 exhaust pipe supports.





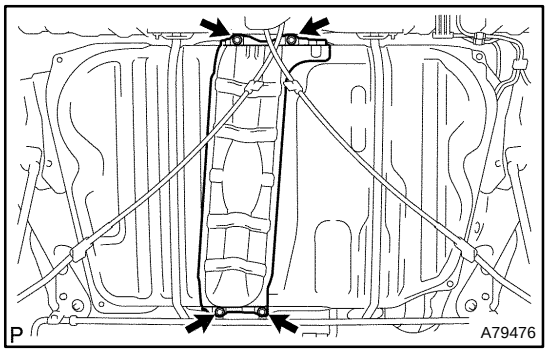
9. **DISCONNECT PARKING BRAKE CABLE ASSY NO.2**

(a) Remove the bolt and nut, then disconnect the parking brake cable No. 2.



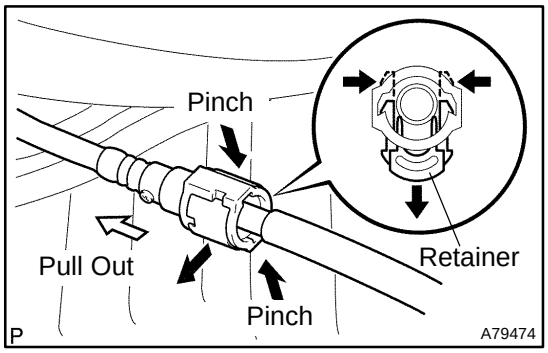
10. DISCONNECT PARKING BRAKE CABLE ASSY NO.3

(a) Remove the bolt and nut, then disconnect the parking brake cable No. 3.



11. REMOVE FUEL TANK PROTECTOR LOWER CENTER

(a) Remove the 4 bolts, then remove the fuel tank protector lower center.



12. REMOVE FUEL TANK ASSY

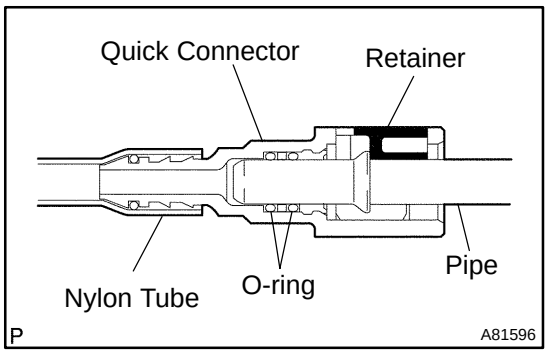
(a) Disconnect the fuel pump tube.

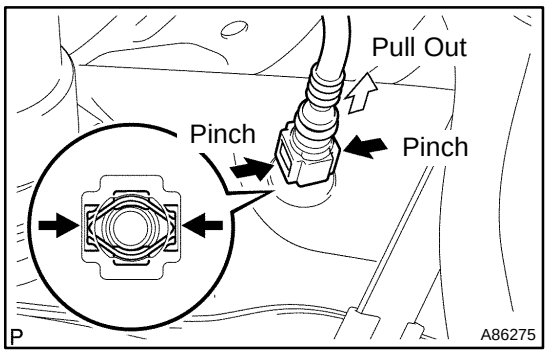
(1) Pinch the projection of the retainer to remove the lock claws, then pull it down as shown in the illustration.

(2) Pull out the fuel pump tube.

NOTICE:

- **Check around the quick connector for dirt or mud before this operation. Remove the dirt if necessary.**
- **Be careful of mud because the quick connector has an O-ring which seals the pipe and quick connector that can be contaminated.**
- **Do not use any tools in this operation.**
- **Do not bend or twist the nylon tube. Protect the quick connector by covering it with a vinyl or plastic bag.**
- **When the pipe and quick connector are stuck, push and pull the quick connector to release. Pull out the quick connector from the pipe.**

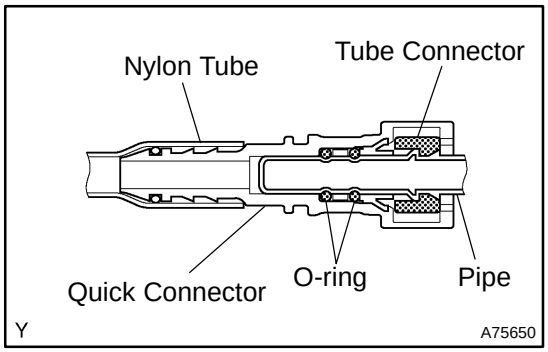




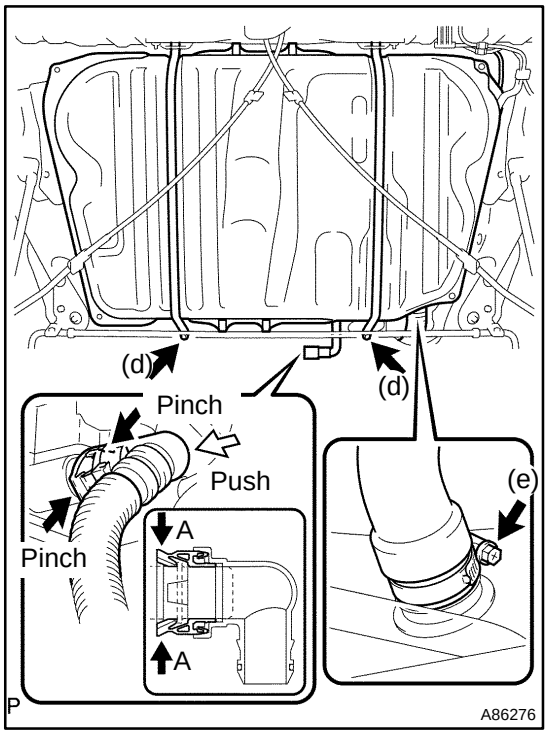
(b) Disconnect the fuel tube No. 1.
   (1) Pinch the tube connector, then pull out the fuel tube No. 1.

NOTICE:

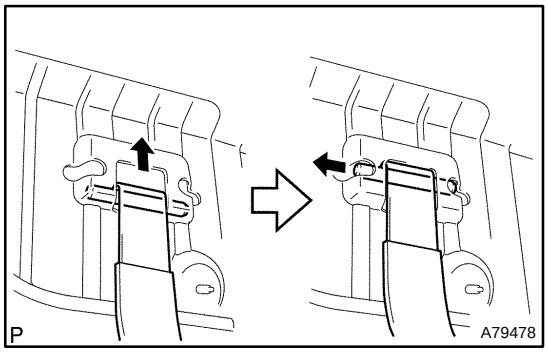
- **Check around the quick connector for dirt or mud before this operation. Remove the dirt if necessary.**
- **Be careful of mud because the quick connector has an O-ring which seals the pipe and quick connector that can be contaminated.**
- **Do not use any tools in this operation.**
- **Do not bend or twist the nylon tube. Protect the quick connector by covering it with a vinyl or plastic bag.**
- **When the pipe and quick connector are stuck, push and pull the quick connector to release. Pull out the quick connector carefully.**

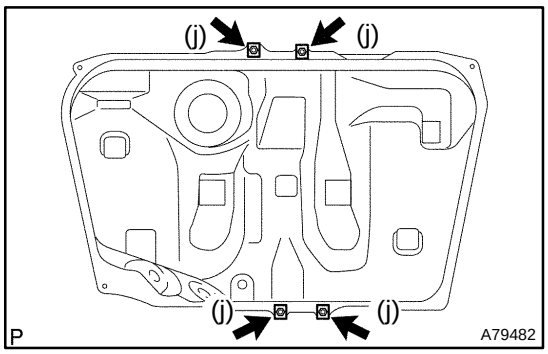


(c) Set up a transmission jack underneath the fuel tank.
(d) Remove the 2 bolts which hold the fuel tank bands.
(e) Loosen the clamp bolt.
(f) Operate the transmission jack, then disconnect the fuel tank inlet pipe.
(g) Disconnect the fuel tank vent hose from the charcoal canister.
   (1) Deeply push the quick connector to release the lock pin.
   (2) Pinch portion A.
   (3) Pull out the fuel tank vent hose.
(h) Operate the transmission jack, then remove the fuel tank.

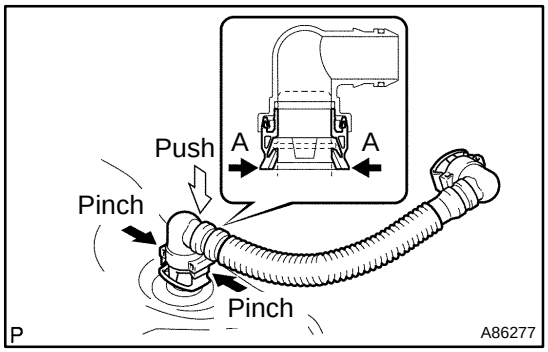


(i) Remove the 2 pins, then remove the 2 fuel tank bands as shown in the illustration.



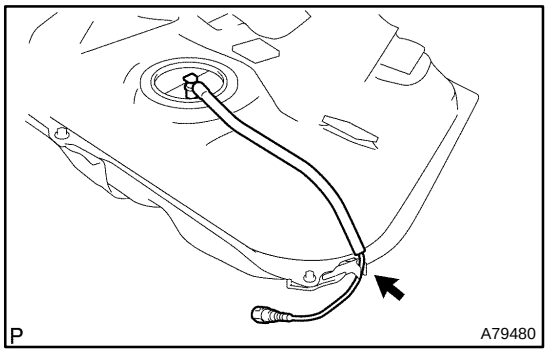


(j) Remove the 4 clip nuts.



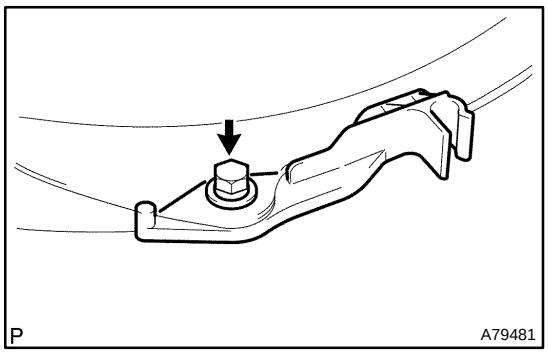
13. REMOVE FUEL TANK VENT HOSE

(a) Deeply push the quick connector to release the lock pin.
(b) Pinch portion A.
(c) Pull out the fuel tank vent hose.



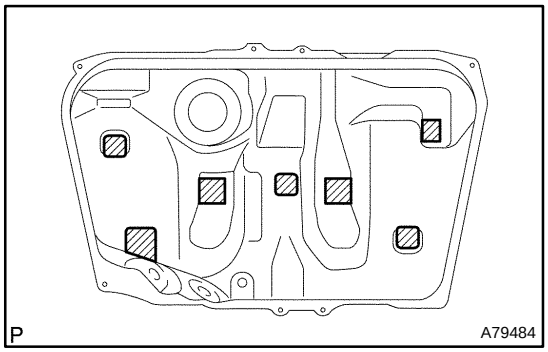
14. REMOVE FUEL PUMP TUBE SUB-ASSY

(a) Remove the fuel pump tube from the fuel main tube support.



15. REMOVE FUEL MAIN TUBE SUPPORT

(a) Remove the bolt, then remove the fuel main tube support.



16. REMOVE FUEL TANK CUSHION NO.2

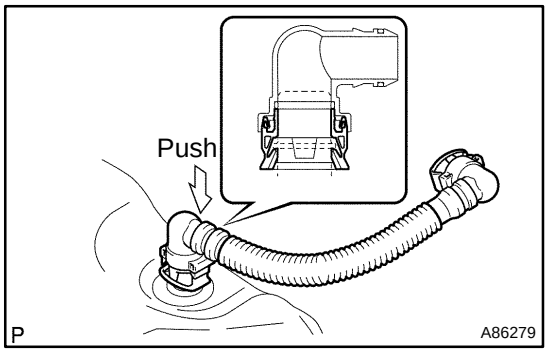
(a) Remove the 7 fuel tank cushions from the fuel tank.

17. INSTALL FUEL TANK CUSHION NO.2

(a) Install 7 new fuel tank cushions to the fuel tank.

18. INSTALL FUEL MAIN TUBE SUPPORT
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

19. INSTALL FUEL PUMP TUBE SUB-ASSY

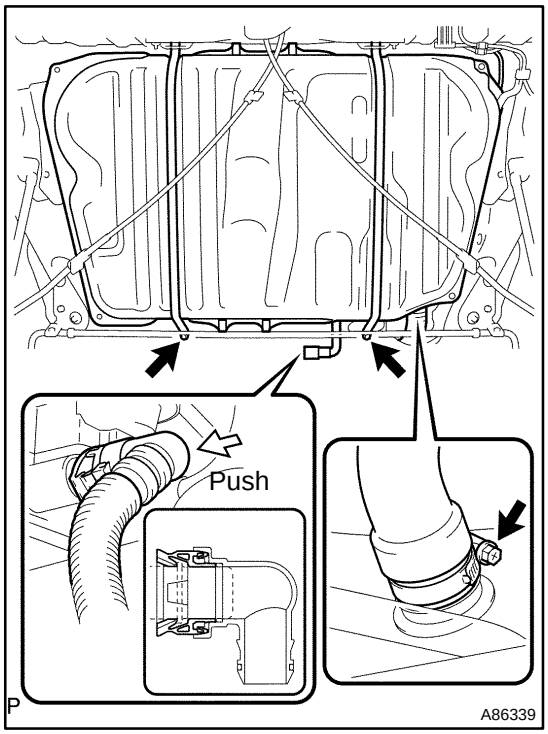


20. INSTALL FUEL TANK VENT HOSE

(a) Push in the quick connector to the pipe until the quick connector makes a ”click” sound.

NOTICE:

- **Check the connected part for damage or foreign objects.**
- **After connecting, check if the quick connector and pipe are securely connected by pulling on them.**



21. INSTALL FUEL TANK ASSY

(a) Install the 4 clip nuts.

(b) Install the 2 fuel tank bands with the 2 pins.

(c) Set up the fuel tank to the transmission jack.

(d) Connect the fuel tank vent hose to the charcoal canister.

(1) Push in the quick connector to the pipe until the quick connector makes a ”click” sound.

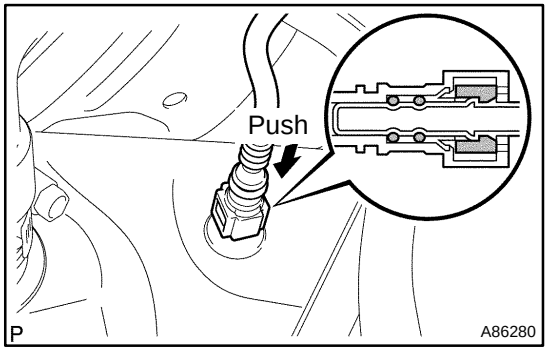
NOTICE:

- **Check the connected part for damage or foreign objects.**
- **After connecting, check if the connector and pipe are securely connected by pulling on them.**

(e) Operate the transmission jack, then connect the fuel tank filler pipe.

(f) Tighten the clamp bolt.

(g) Tighten the 2 bolts which hold the fuel tank bands.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

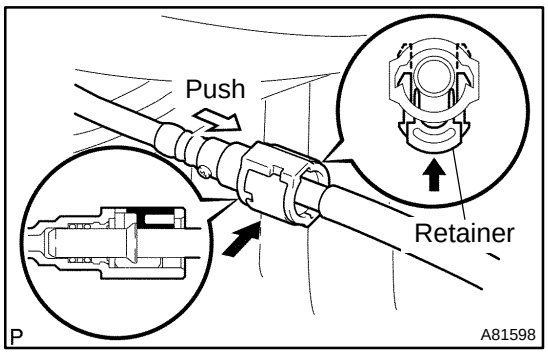


(h) Connect the fuel tube No. 1.

(1) Push in the quick connector to the pipe until the quick connector makes a ”click” sound.

NOTICE:

- **Check the connected part for damage or foreign objects.**
- **After connecting, check if the quick connector and pipe are securely connected by pulling on them.**



(i) Connect the fuel pump tube.
(1) Push in the quick connector to the pipe until the quick connector makes a ”click” sound, then push up the retainer until the claws lock.

NOTICE:

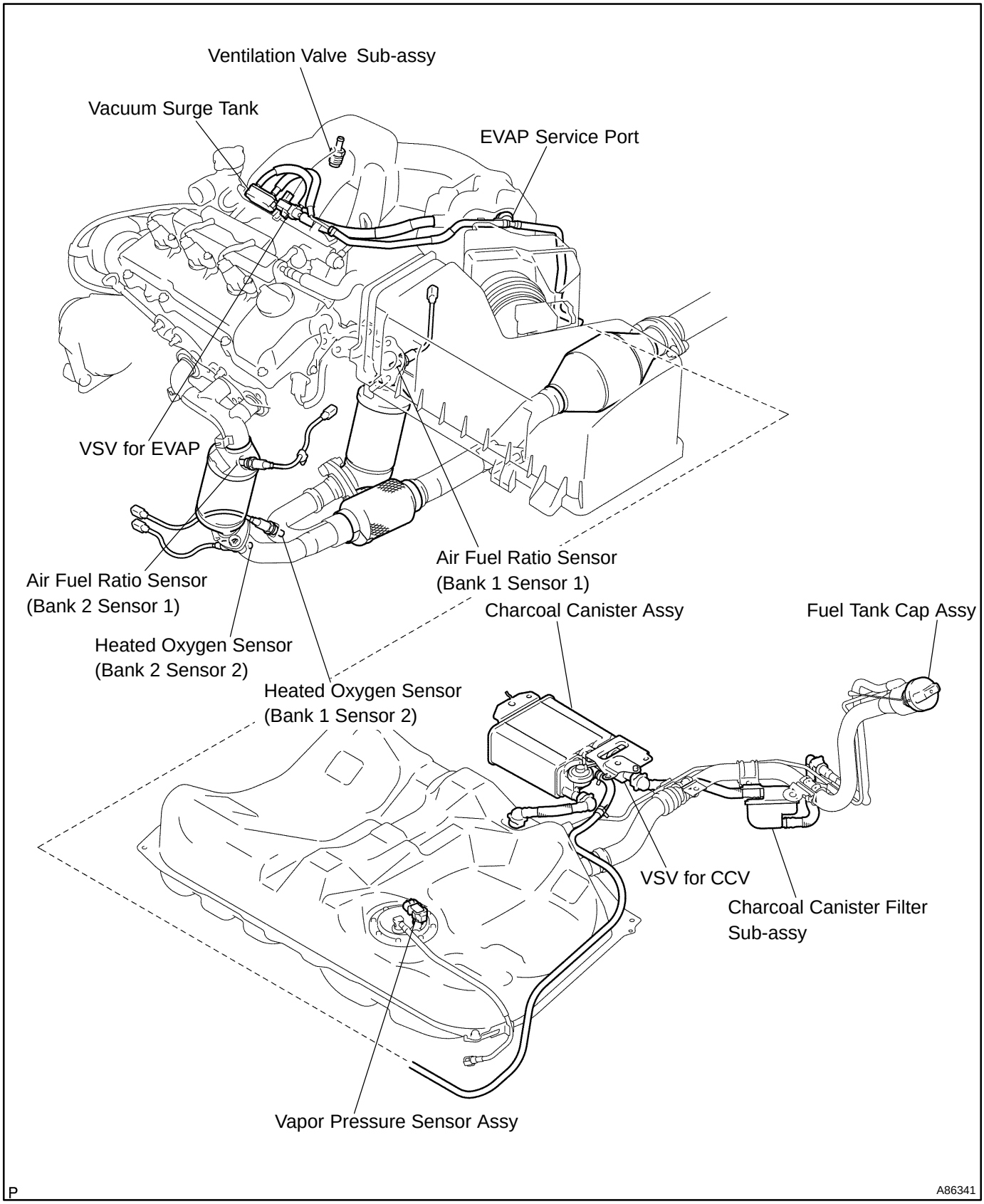
- **Check the connected part for damage or foreign objects.**
- **After connecting, check if the connector and pipe are securely connected by pulling on them.**

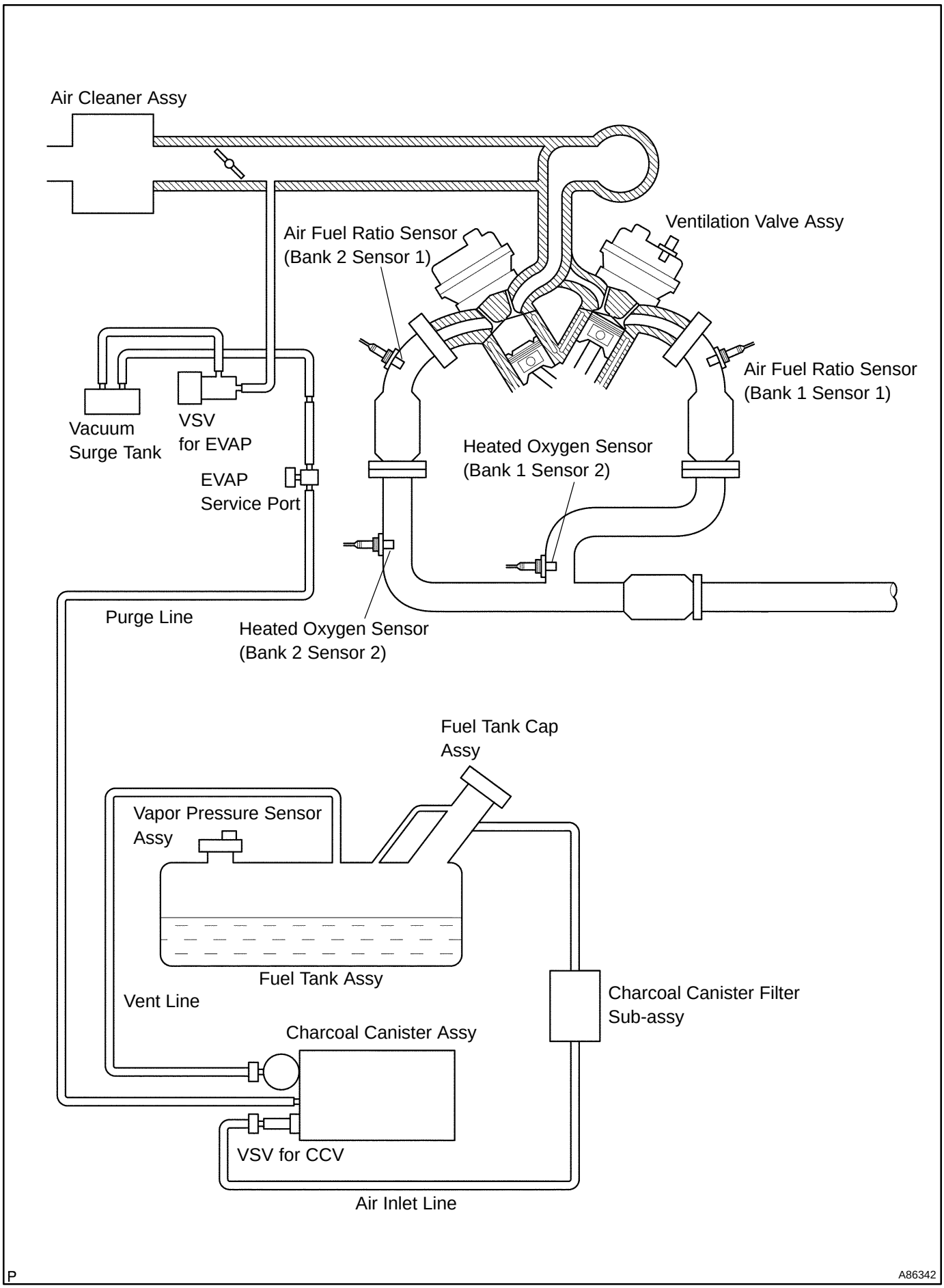
22. INSTALL FUEL TANK PROTECTOR LOWER CENTER
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
23. INSTALL PARKING BRAKE CABLE ASSY NO.3
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
24. INSTALL PARKING BRAKE CABLE ASSY NO.2
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
25. INSTALL EXHAUST PIPE ASSY CENTER
(a) Install 2 new gaskets and the exhaust pipe center to the 2 exhaust pipe supports.
(b) Tighten the 2 bolts and 4 new nuts.
Torque: 56 N·m (571 kgf·cm, 41 ft·lbf)
26. INSTALL FUEL SUCTION W/ PUMP & GAUGE TUBE ASSY (See page 11-20)
27. ADD FUEL
28. CONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
29. CHECK FOR FUEL LEAKS (See page 11-5)
30. CHECK FOR EXHAUST GAS LEAKS
31. INSTALL REAR FLOOR SERVICE HOLE COVER (See page 11-20)
32. INSTALL REAR SEAT CUSHION ASSY
33. INSTALL FLOOR PANEL BRACE REAR (See page 15-2)
34. SYSTEM INITIALIZATION (See page 19-15)

EMISSION CONTROL SYSTEM (3MZ-FE)

120C0-01

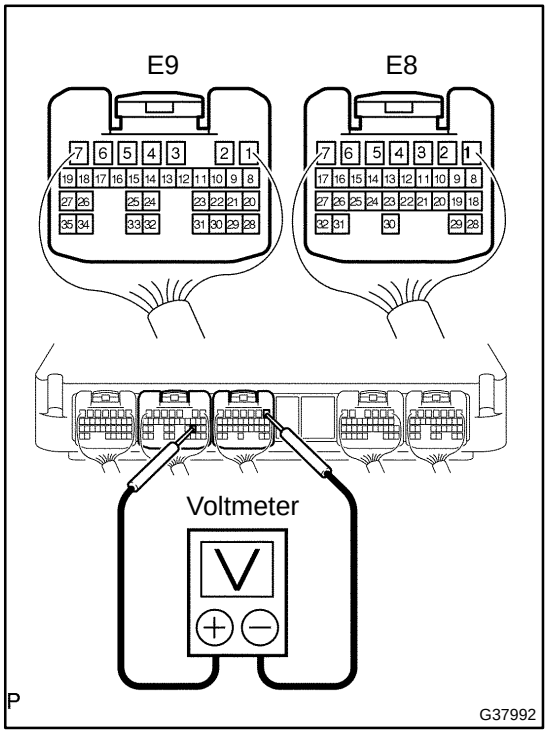
LOCATION




Air Cleaner Assy
Air Fuel Ratio Sensor
(Bank 2 Sensor 1)
Ventilation Valve Assy
Air Fuel Ratio Sensor
(Bank 1 Sensor 1)
Vacuum
Surge Tank
VSV
for EVAP
EVAP
Service Port
Heated Oxygen Sensor
(Bank 1 Sensor 2)
Purge Line
Heated Oxygen Sensor
(Bank 2 Sensor 2)
Fuel Tank Cap
Assy
Vapor Pressure Sensor
Assy
Fuel Tank Assy
Vent Line
Charcoal Canister Filter
Sub-assy
Charcoal Canister Assy
VSV for CCV
Air Inlet Line
P
A86342

120C1-02

ON-VEHICLE INSPECTION



1. INSPECT AIR FUEL RATIO COMPENSATION SYSTEM

(a) Inspect the voltage.

(1) Turn the ignition switch ON.

(2) Using a voltmeter, measure the voltage between the terminals of the ECM.

Standard:

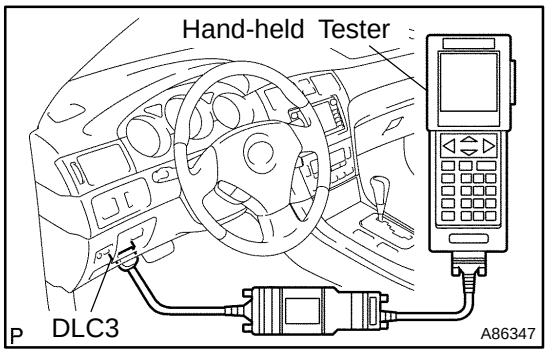
Tester Connection	Specified Condition
A1A+ (E9-22) - E1 (E8-1)	3.3 V
A1A- (E9-30) - E1 (E8-1)	3.0 V
A2A+ (E9-23) - E1 (E8-1)	3.3 V
A2A- (E9-31) - E1 (E8-1)	3.0 V

CAUTION:

Connect the test leads from the back side of the ECM connector to the terminals.

HINT:

The voltage between the terminals of the ECM is constant regardless of the voltage output from the air fuel ratio sensor (A/F sensor).

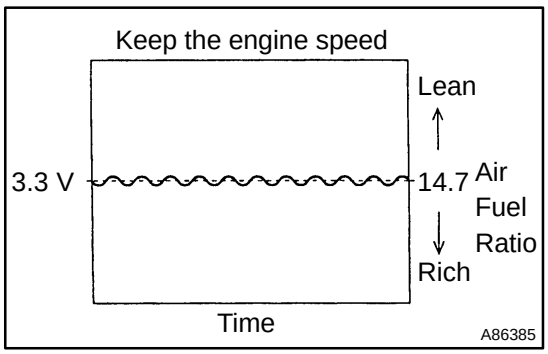


(b) Check the operation.

(1) Connect the hand-held tester to the DLC3.

(2) Enter "DIAGNOSIS/ENHANCED OBD II/DATA LIST", then select "AFS B1 S1" and "AFS B2 S1" to display the monitor.

(3) Warm up the A/F sensor with the engine speed at 2,500 rpm for approximately 2 minutes.



(4) Keep the engine speed at 2,500 rpm, then confirm that the waveform of "AFS B1 S1" and "AFS B2 S1" are similar as shown in the illustration.

HINT:

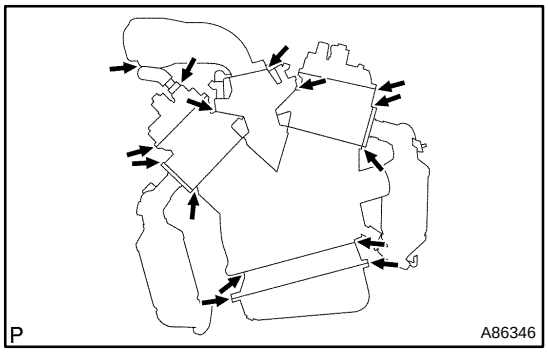
- The waveform in the illustration is a sample.
- Only the hand-held tester displays the waveform of the A/F sensor.

(c) Confirm that the display of "DATA LIST" - "O2S B1 S2" and "O2S B2 S2" fluctuates up and down between 0 V and 1 V with the engine speed at 2,500 rpm.

2. INSPECT FUEL CUT OFF RPM

(a) Check the operation.
   (1) Increase the engine speed to at least 3,500 rpm.
   (2) Use a sound scope to check the fuel injector operating noise.
   (3) Check that when the throttle lever is released, the fuel injector operation noise stops momentarily at 2,500 rpm and then resumes at 1,200 rpm.

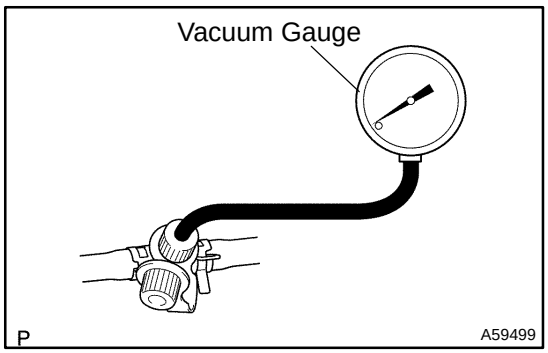
2,500 rpm: Fuel cut off rpm
1,200 rpm: Fuel return rpm



3. VISUALLY INSPECT HOSES, CONNECTIONS AND GASKETS

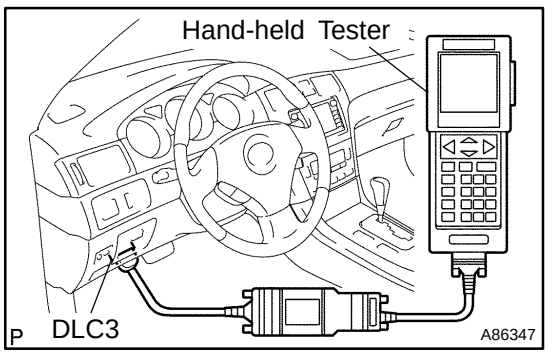
(a) Check the appearance.
   (1) Check the engine assembly to see if the indicated portions by the arrows have cracks, leaks or damage.

HINT:
Separation of the engine oil level gauge, oil filler cap, PCV hose, etc. may cause the engine to run improperly. Disconnection, looseness or cracks in the parts of the air induction system between the throttle body and cylinder head will allow air suction and cause the engine to run improperly.
If necessary, repair the engine assembly.

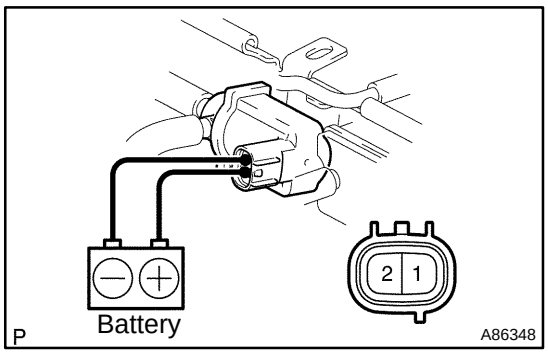


4. INSPECT EVAP SYSTEM LINE

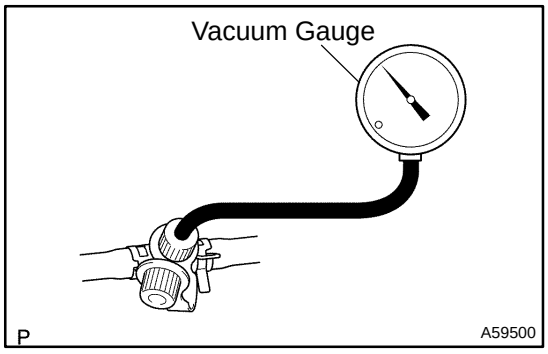
(a) Warm up the engine to the normal operating temperature.
(b) Connect the vacuum gauge (EVAP control system test equipment vacuum gauge) to the EVAP service port on the purge line. Then stop the engine.



(c) If you have the hand-held tester:
Force the VSV for EVAP to operate.
   (1) Connect the hand-held tester to the DLC3.
   (2) Start the engine.
   (3) Turn the hand-held tester ON.
   (4) Use the ACTIVE TEST mode on the hand-held tester to operate the VSV for EVAP.



(d) If you have no hand-held tester:
Force the VSV for EVAP to operate.
(1) Disconnect the VSV for EVAP connector.
(2) Connect the positive (+) and negative (-) leads of the battery to the VSV for EVAP terminals.
(3) Start the engine.



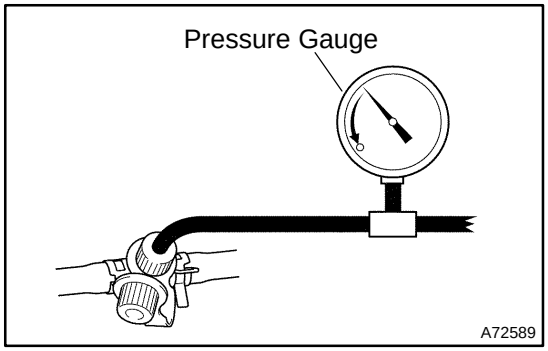
(e) Check the vacuum at idle.
Vacuum:
Maintain at 0.368 to 19.713 in.Hg (5 to 268 in.Aq) for over 5 seconds.

HINT:
If the vacuum does not change, it can be concluded that the hose which connects the VSV to the service port is loose or blocked, or the VSV is malfunctioning.

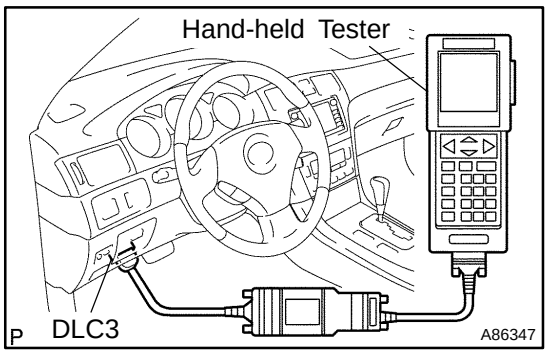
(f) If you have the hand-held tester:
Return to the normal VSV for EVAP.
(1) Stop the engine.
(2) Disconnect the hand-held tester from the DLC3.

(g) If you have no hand-held tester:
Return to the normal VSV for EVAP.
(1) Stop the engine.
(2) Disconnect the positive (+) and negative (-) leads of the battery from the VSV for EVAP terminals.
(3) Reconnect the VSV for EVAP connector.

(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.



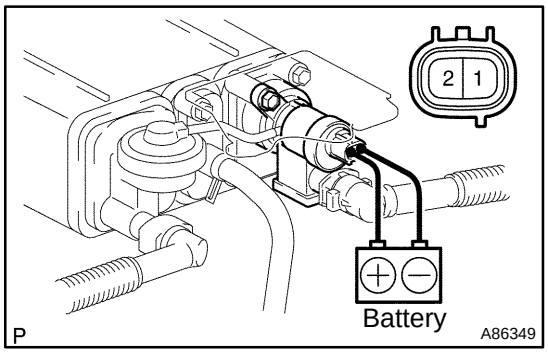
(j) If you have the hand-held tester:
Force the VSV for CCV to operate.
(1) Connect the hand-held tester to the DLC3.
(2) Turn the ignition switch ON.
(3) Turn the hand-held tester ON.
(4) Use the ACTIVE TEST mode on the hand-held tester to operate the VSV for CCV.

NOTICE:

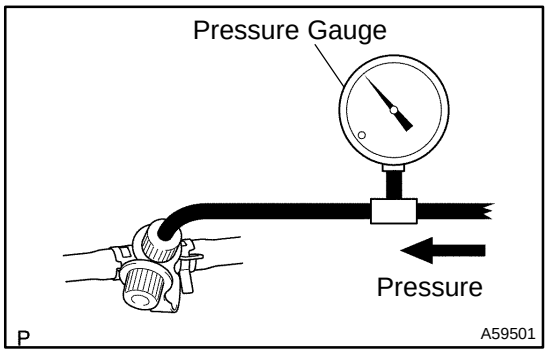
Do not start the engine during this operation.

HINT:

If the check is not completed within 10 minutes, the forced close of the VSV for CCV will be tested.



(k) If you have no hand-held tester:
Force the VSV for CCV to operate.
(1) Disconnect the VSV for CCV connector.
(2) Connect the positive (+) and negative (-) leads of the battery to the VSV for CCV terminals.



(l) Check the pressure.
(1) Add the pressure (13.5 to 15.5 in.Aq) from the EVAP service port.

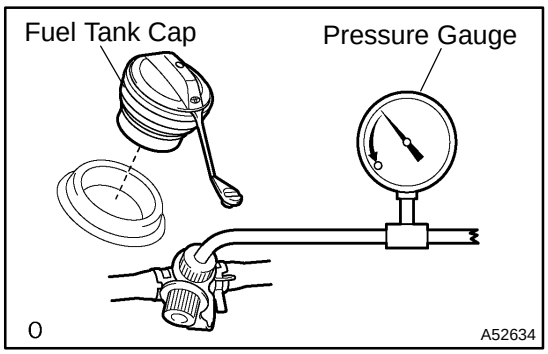
Pressure:

2 minutes after the pressure is added, the gauge should be over 7.7 to 8.8 in.Aq.

HINT:

If you cannot add the pressure, it can be concluded that the hose which connects the VSV for EVAP canister fuel tank is slipped off or the VSV is open.

(2) Check if the pressure decreases when the fuel tank cap is removed while adding the pressure.



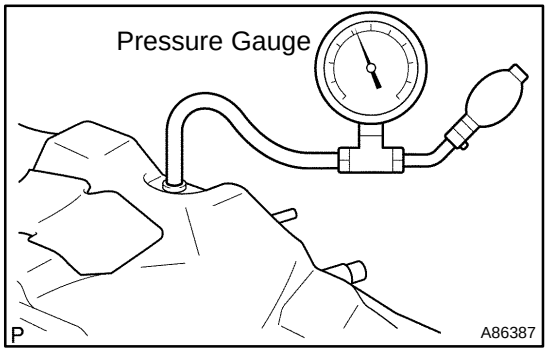
HINT:

If the pressure does not decrease when the filler cap is removed, it can be concluded that the hose which connects the service port to the fuel tank is blocked, etc.

(m) If you have the hand-held tester:
Return to the normal VSV for CCV operation.
(1) Turn the ignition switch ON.
(2) Disconnect the hand-held tester from the DLC3.

(n) If you have no hand-held tester:
Return to the normal VSV for CCV operation.
(1) Disconnect the positive (+) and negative (-) leads of the battery to the VSV for CCV terminals.
(2) Reconnect the VSV for CCV connector.

(o) Disconnect the pressure gauge from the EVAP service port on the purge line.



5. CHECK AIR TIGHTNESS IN FUEL TANK AND FILLER PIPE

(a) Check the operation.

(1) Remove the fuel tank (see page 11-28).

(2) Remove the fuel tank vent hose from the fuel tank (see page 11-28).

(3) Connect the pressure gauge to the fuel tank vent hose port of the fuel tank.

(4) Apply pressure to the fuel tank, so that the internal pressure of the fuel tank is 4 kPa (41 gf/cm^2, 0.58 psi).

(5) Check that the internal fuel tank pressure is maintained for 1 minute.

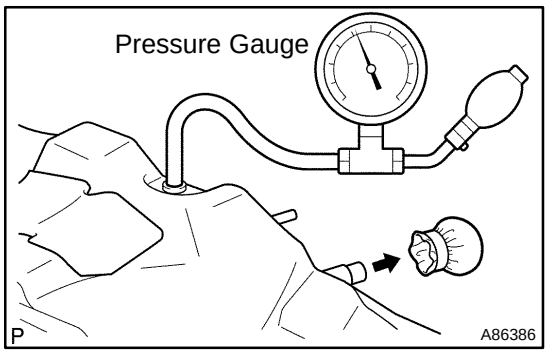
(6) Check the connected portions of each hose and pipe.

(7) Check the installed parts on the fuel tank.

If there is no abnormality, replace the fuel tank and fuel tank filler pipe.

(8) Reinstall the fuel tank vent hose to the fuel tank (see page 11-28).

(9) Reinstall fuel tank (see page 11-28).



6. INSPECT FUEL CUT OFF VALVE AND FILL CHECK VALVE

(a) Check the operation.

(1) Remove the fuel tank (see page 11-28).

(2) Remove the fuel tank vent hose from the fuel tank (see page 11-28).

(3) Connect the pressure gauge to the fuel tank vent hose port of the fuel tank.

(4) Fully fill the fuel tank with fuel.

HINT:

In the condition that the fuel is full, there is no ventilation as the float valve of the fill check valve is closed.

(5) Install the fuel suction w/ pump & gauge tube (see page 11-20).

(6) Securely cover the fuel pump tube, fuel tube No. 1 port and fuel tank to filler pipe port with vinyl or plastic bags to perform the accurate pressure test.

(7) Apply 4 kPa (41 gf/cm^2, 0.58 psi) of pressure to the fuel tank vent hose port of the fuel tank.

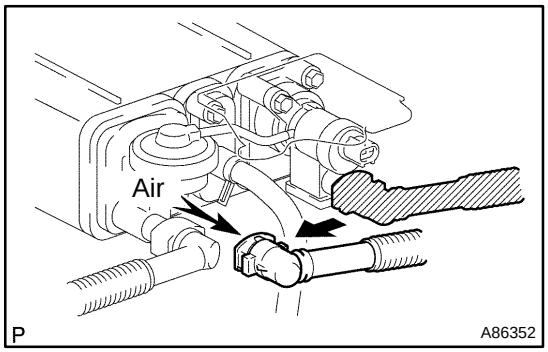
(8) Remove the vinyl or plastic bag from the fuel tank to filler pipe port, then check that the pressure drops.

If the pressure does not drop, replace the fuel tank.

(9) Drain fuel from the fuel tank.

(10) Reinstall the fuel tank vent hose to the fuel tank (see page 11-28).

(11) Reinstall the fuel tank (see page 11-28).



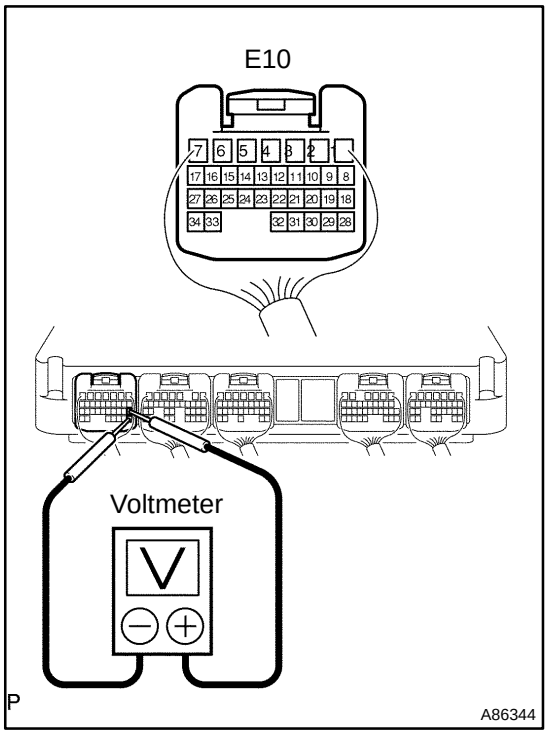
7. CHECK AIR INLET LINE

(a) Disconnect the fuel tank vent hose (see page 12-18).

(b) Check that there is ventilation in fuel tank vent hose.

If necessary, replace the charcoal canister filter.

(c) Reconnect the fuel tank vent hose (see page 12-18).



8. INSPECT VAPOR PRESSURE SENSOR

(a) Inspect the voltage (power source).

(1) Turn the ignition switch ON.

(2) Using a voltmeter, measure the voltage between the terminals of the ECM.

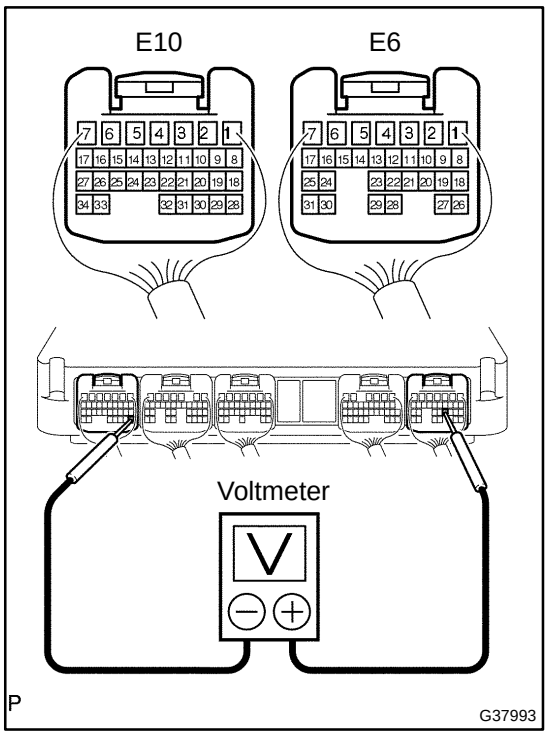
Voltage:

Tester Connection	Specified Condition
VC (E10-18) - E2 (E10-28)	4.5 to 5.5 V

CAUTION:

Connect the test leads from the back side of the ECM connector to the terminals.

(3) Turn the ignition switch OFF.



(b) Inspect the voltage (power output).
   (1) Turn the ignition switch ON.
   (2) Remove the fuel tank cap.
   (3) Using a voltmeter, measure the voltage between the terminals of the ECM.

Voltage:

Tester Connection	Specified Condition
PTNK (E6-21) - E2 (E10-28)	3.0 to 3.6 V

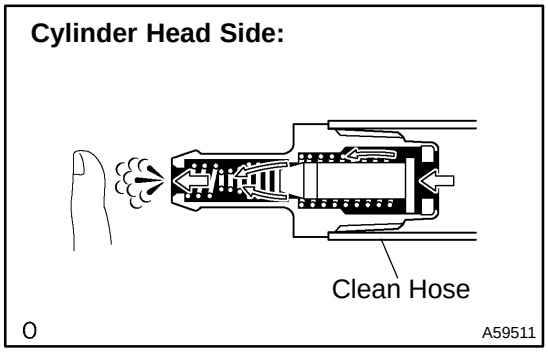
CAUTION:

Connect the test leads from the back side of the ECM connector to the terminals.

   (4) Reinstall the fuel tank cap.
   (5) Turn the ignition switch OFF.

120C2-01

INSPECTION



1. INSPECT VENTILATION VALVE SUB-ASSY

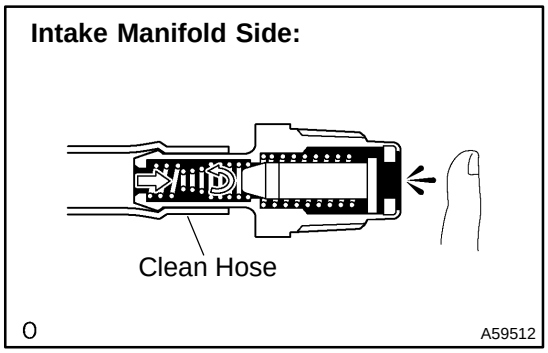
(a) Check the operation.

(1) Install a clean hose as shown in the illustration.

(2) Blow air into the cylinder head side, then check that air passes through easily.

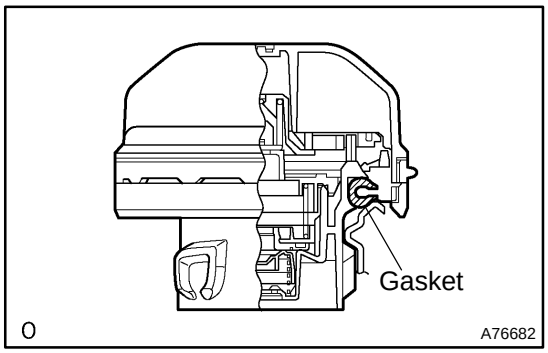
CAUTION:

Do not suck air through the ventilation valve. Petroleum substances inside the ventilation valve are harmful.



(3) Blow air into the intake manifold side, then check that air passes through with difficulty.

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

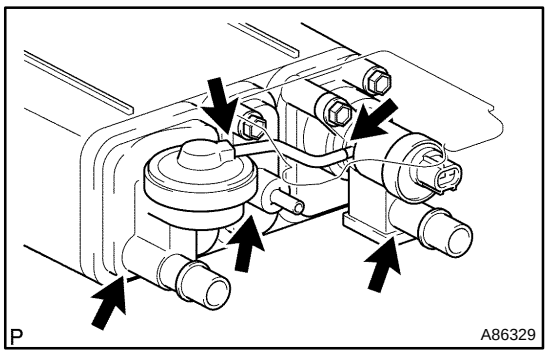


2. INSPECT FUEL TANK CAP ASSY

(a) Check the appearance.

(1) Visually check if the fuel tank cap and gasket are deformed or damaged.

If necessary, replace the fuel tank cap.

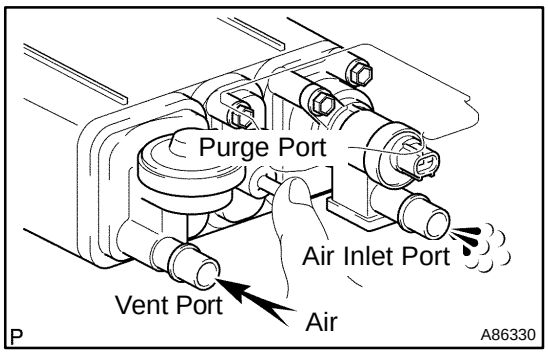


3. INSPECT CHARCOAL CANISTER ASSY

(a) Check the appearance.

(1) Visually check the charcoal canister to see if the indicated portions by the arrows are cracked or damaged.

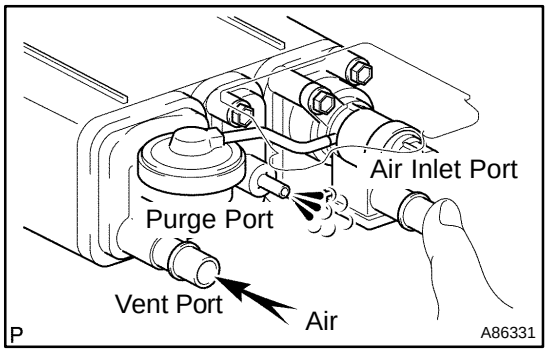
If necessary, replace the charcoal canister.



(b) Check the operation.

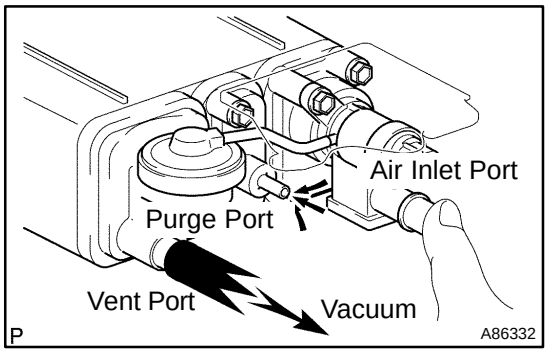
(1) While holding the purge port closed, blow air (0.39 kPa (4.0 gf/cm^2, 0.06 psi)) into the vent port, then check that the air flows from the air inlet port.

If the operation is not as specified, replace the charcoal canister.



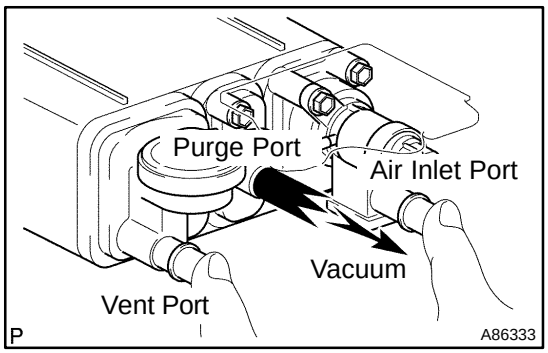
(2) While holding the air inlet port closed, blow air (0.39 kPa (4.0 gf/cm^2, 0.06 psi)) into the vent port, then check that the air flows from the purge port.

If the operation is not as specified, replace the charcoal canister.



(3) While holding the air inlet port closed, apply vacuum (3.43 kPa (25.7 mm/Hg, 1.01 in.Hg)) to the vent port, then check that the air is sucked from the purge port.

If the operation is not as specified, replace the charcoal canister.



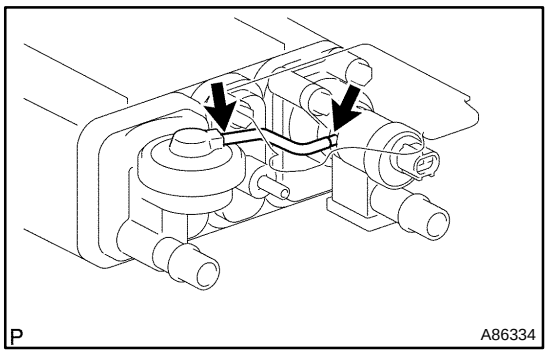
(c) Check the air tightness.

(1) While holding the vent and air inlet ports closed, apply vacuum (3.43 kPa (25.7 mmHg, 1.01 in.Hg)) to the purge port, then check that the vacuum is maintained for 1 minute.

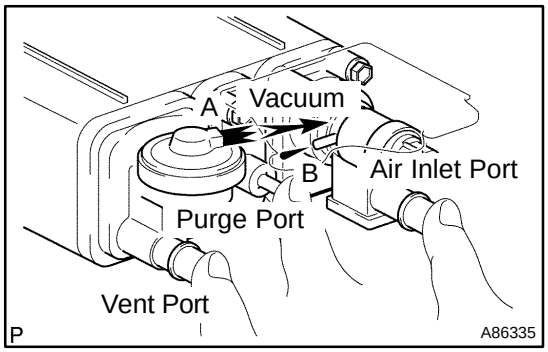
HINT:

In order to maintain air tightness, the check should be performed with the VSV (for CCV) terminal port held closed by your finger.

If the operation is not as specified, replace the charcoal canister.

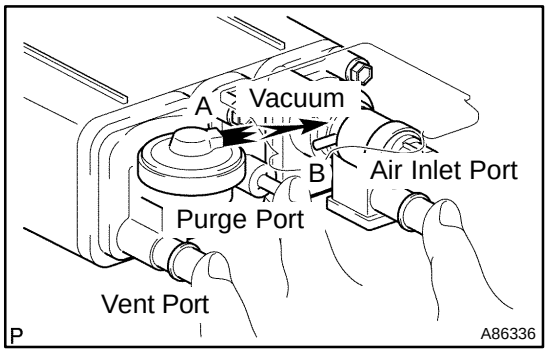


(d) Inspect the diaphragm.
(1) Remove the air hose.



(2) While holding the vent, purge and air inlet ports closed, apply vacuum (1.42 kPa (11 mmHg, 0.42 in.Hg)) into port A, then check that the air is sucked from port B.

If the operation is not as specified, replace the charcoal canister.

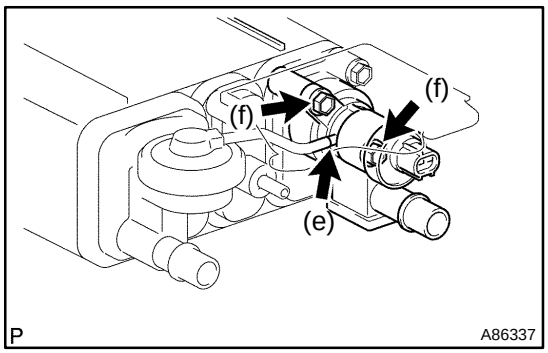


(3) While holding the vent, purge and air inlet ports closed, apply vacuum (1.42 kPa (11 mmHg, 0.42 in.Hg)) into port A, then measure how long it takes for vacuum to drop.

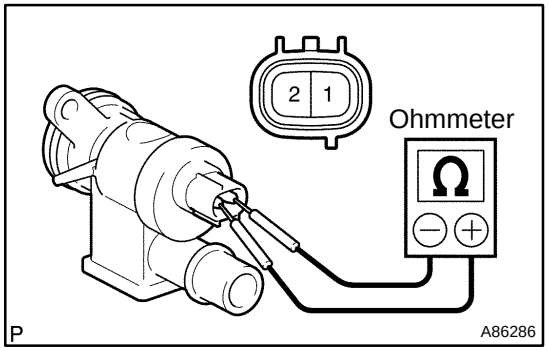
Vacuum drop time: 10 seconds or longer

If the operation is not as specified, replace the charcoal canister.

(4) Reinstall the air hose.



(e) Disconnect the air hose.
(f) Remove the 2 bolts, then remove the VSV.

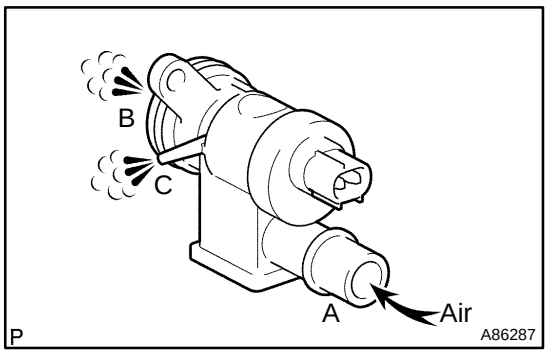


(g) Inspect the resistance.
(1) Using an ohmmeter, measure the resistance between the terminals.

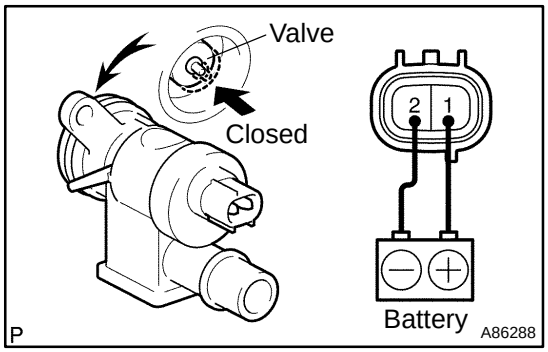
Standard:

Tester Connection	Specified Condition
1 - 2	25 to 30 Ω at 20•C (68•F)
1 - 2	32 to 40 Ω at 100•C (212•F)

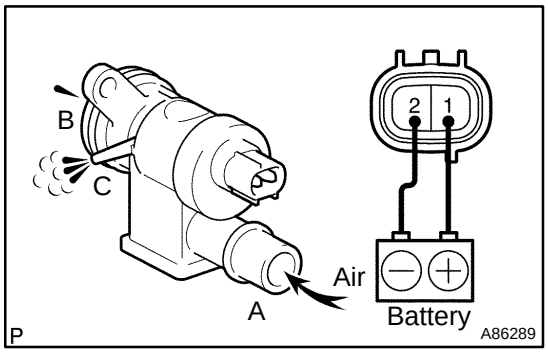
If the resistance is not as specified, replace the charcoal canister.



(h) Check the operation.
(1) Check that air flows from port A to B and C.



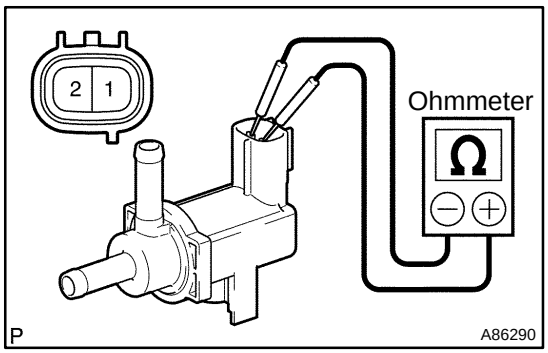
(2) Apply battery voltage across the terminals.
(3) Check that the valve is closed.



(4) Check that air does not flow from port A to B.
(5) Check that air flows from port A to C.

If the operation is not as specified, replace the charcoal canister.

(i) Install the VSV with the 2 bolts.
(j) Connect the air hose.



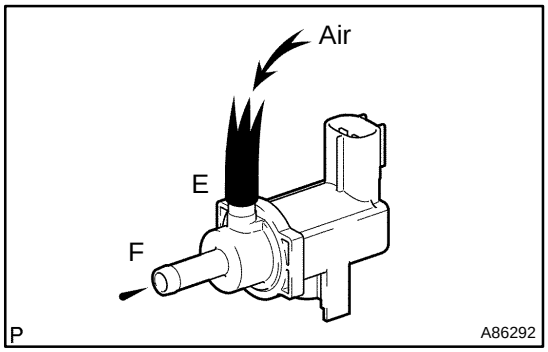
4. INSPECT VACUUM SWITCHING VALVE ASSY NO.1

(a) Inspect the resistance.
(1) Using an ohmmeter, measure the resistance between the terminals.

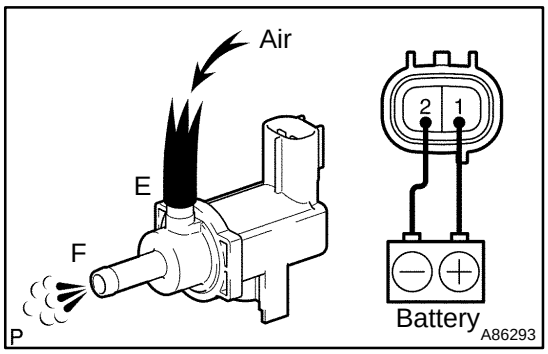
Standard:

Tester Connection	Specified Condition
1 - 2	26 to 30 Ω at 20•C (68•F)

If the resistance is not as specified, replace the vacuum switching valve No. 1.

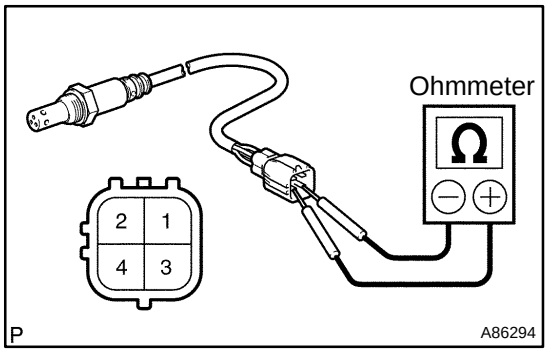


(b) Check the operation.
(1) Check that air does not flow from port E to F.



(2) Apply battery voltage across the terminals.
(3) Check that air flows from port E to F.

If the operation is not as specified, replace the vacuum switching valve No. 1.



5. INSPECT AIR FUEL RATIO SENSOR

(a) Inspect the resistance.
(1) Using an ohmmeter, measure the resistance between the terminals.

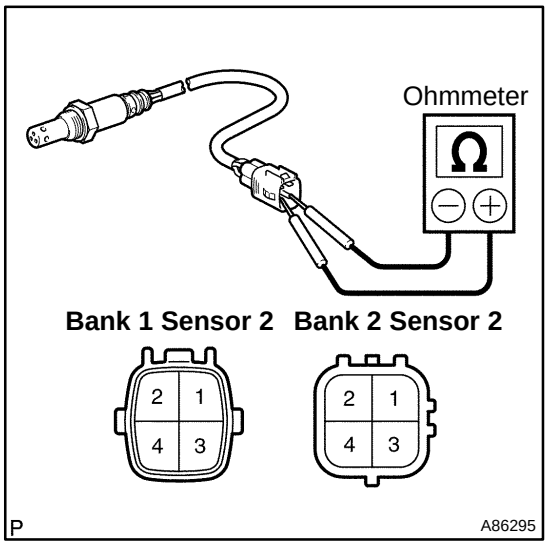
Standard:

Tester Connection	Specified Condition
1 (HT) - 2 (+B)	1.8 to 3.4 Ω at 20•C (68•F)

If the resistance is not as specified, replace the air fuel ratio sensor.

(b) Check the continuity.
(1) Using an ohmmeter, check that there is no continuity between terminals 2 (+B) and 4 (AF-).

If there is continuity, replace the air fuel ratio sensor.



6. INSPECT HEATED OXYGEN SENSOR

(a) Inspect the resistance.
(1) Using an ohmmeter, measure the resistance between the terminals.

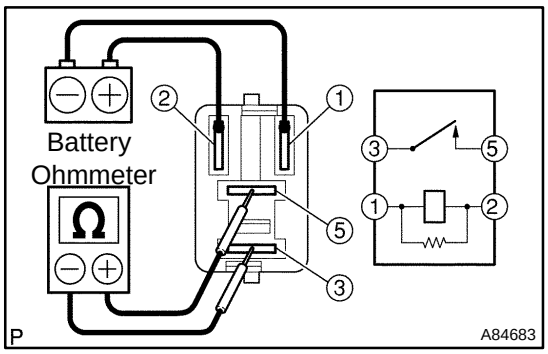
Standard:

Tester Connection	Specified Condition
1 (HT) - 2 (+B)	11 to 16 Ω at 20•C (68•F)

If the resistance is not as specified, replace the heated oxygen sensor.

(b) Check the continuity.
(1) Using an ohmmeter, check that there is no continuity between terminals 1 (HT) and 4 (E).

If there is continuity, replace the heated oxygen sensor.



7. INSPECT AIR FUEL RATIO SENSOR HEATER RELAY

(a) Inspect the resistance.

(1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1Ω (Apply battery voltage to terminals 1 and 2

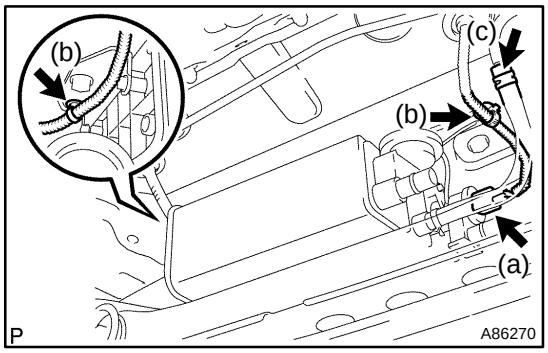
If the result is not as specified, replace the air fuel ratio sensor heater relay.

CHARCOAL CANISTER ASSY (3MZ-FE)

120BT-01

REPLACEMENT

1. DISCHARGE FUEL SYSTEM PRESSURE (See page 11-1)
2. DISCONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)
3. REMOVE REAR SEAT CUSHION ASSY (See page 72-39)
4. REMOVE REAR FLOOR SERVICE HOLE COVER (See page 11-20)
5. REMOVE FUEL SUCTION W/ PUMP & GAUGE TUBE ASSY (See page 11-20)
6. DRAIN FUEL
7. REMOVE FLOOR PANEL BRACE REAR (See page 15-2)
8. REMOVE EXHAUST PIPE ASSY CENTER (See page 11-28)
9. DISCONNECT PARKING BRAKE CABLE ASSY NO.2 (See page 11-28)
10. DISCONNECT PARKING BRAKE CABLE ASSY NO.3 (See page 11-28)
11. REMOVE FUEL TANK PROTECTOR LOWER CENTER (See page 11-28)
12. REMOVE FUEL TANK ASSY (See page 11-28)

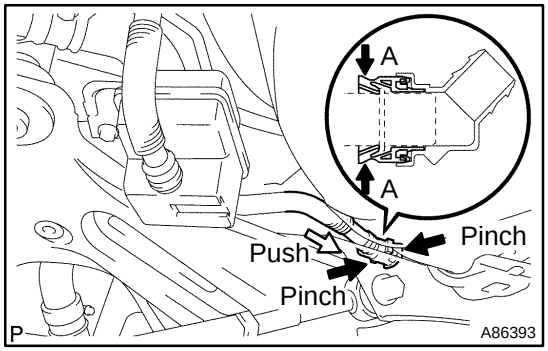


13. REMOVE CHARCOAL CANISTER ASSY

(a) Disconnect the VSV connector.

(b) Remove the 2 wire harness clamps.

(c) Disconnect the fuel hose No. 1.

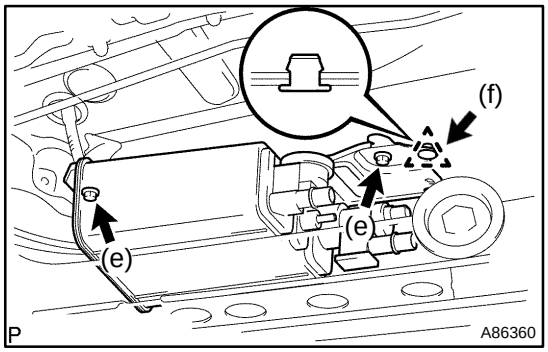


(d) Disconnect the fuel tank vent hose.

(1) Deeply push the quick connector to release the lock pin.

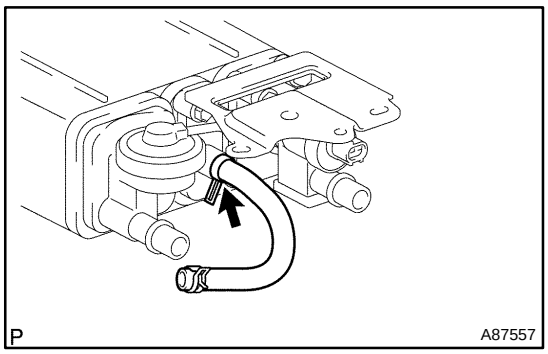
(2) Pinch portion A.

(3) Pull out the fuel tank vent hose.



(e) Remove the 2 bolts.

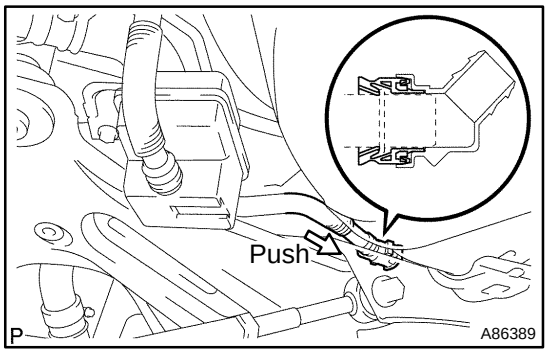
(f) Unfasten the claw, then remove the charcoal canister.



14. REMOVE FUEL EMISSION TUBE FUEL HOSE

(a) Remove the fuel emission tube fuel hose.

15. INSTALL FUEL EMISSION TUBE FUEL HOSE



16. INSTALL CHARCOAL CANISTER ASSY

(a) Install the charcoal canister with the 2 bolts.
Torque: 40 N·m (400 kgf·cm, 29 ft·lbf)

(b) Connect the fuel tank vent hose.
(1) Push in the quick connector to the pipe until the quick connector makes a ”click” sound.

NOTICE:

- **Check the connected part for damage or foreign objects.**
- **After connecting, check if the quick connector and pipe are securely connected by pulling on them.**

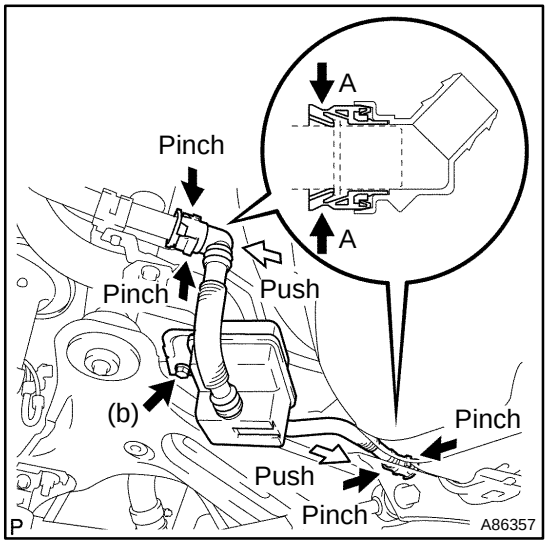
(c) Connect the fuel hose No. 1.
(d) Install the 3 wire harness clamps.
(e) Connect the VSV connector.

17. INSTALL FUEL TANK ASSY (See page 11-28)
18. INSTALL FUEL TANK PROTECTOR LOWER CENTER (See page 11-28)
19. INSTALL PARKING BRAKE CABLE ASSY NO.3 (See page 11-28)
20. INSTALL PARKING BRAKE CABLE ASSY NO.2 (See page 11-28)
21. INSTALL EXHAUST PIPE ASSY CENTER (See page 11-28)
22. INSTALL FUEL SUCTION W/ PUMP & GAUGE TUBE ASSY (See page 11-20)
23. CONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
24. ADD FUEL
25. CHECK FOR FUEL LEAKS (See page 11-5)
26. CHECK FOR EXHAUST GAS LEAKS
27. INSTALL REAR FLOOR SERVICE HOLE COVER (See page 11-20)
28. INSTALL REAR SEAT CUSHION ASSY
29. INSTALL FLOOR PANEL BRACE REAR (See page 15-2)
30. SYSTEM INITIALIZATION (See page 19-15)

CHARCOAL CANISTER FILTER SUB-ASSY (3MZ-FE)

120BW-01

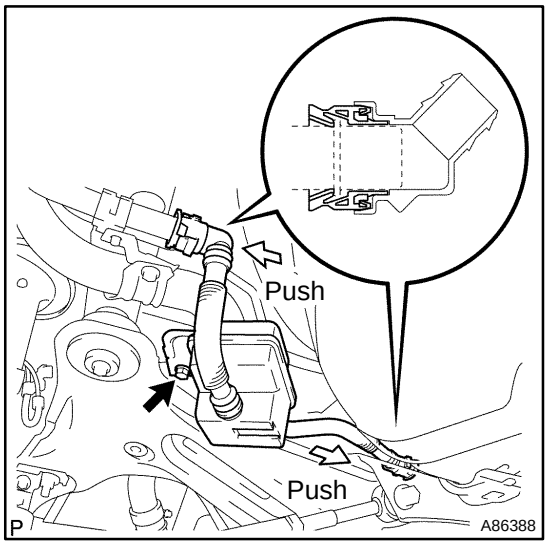
REPLACEMENT



1. REMOVE CHARCOAL CANISTER FILTER SUB-ASSY

(a) Disconnect the 2 fuel tank vent hoses.
  (1) Deeply push the quick connector to release the lock pin.
  (2) Pinch portion A.
  (3) Pull out the 2 fuel tank vent hoses.

(b) Remove the bolt, then remove the charcoal canister filter.



2. INSTALL CHARCOAL CANISTER FILTER SUB-ASSY

(a) Install the charcoal canister filter with the bolt.
Torque: 7.5 N·m (76 kgf·cm, 66 in.·lbf)

(b) Connect the 2 fuel tank vent hoses.
  (1) Push in the quick connector to the pipe until the quick connector makes a ”click” sound.

NOTICE:

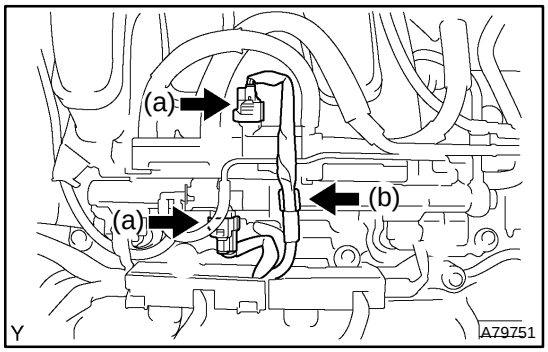
- **Check the connected part for damage or foreign objects.**
- **After connecting, check if the quick connector and pipe are securely connected by pulling on them.**

DUTY VACUUM SWITCHING VALVE (3MZ-FE)

120BU-01

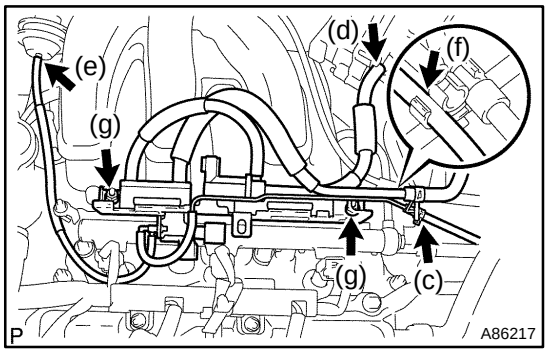
REPLACEMENT

1. **DISCONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)**
2. **REMOVE V-BANK COVER SUB-ASSY (See page 10-11)**

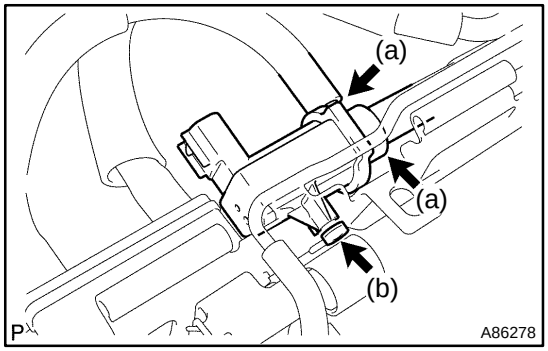


3. **REMOVE EMISSION CONTROL VALVE SET**

(a) Disconnect the 2 VSV connectors.
(b) Remove the wire harness clamp.



(c) Disconnect the fuel vapor feed hose No. 1.
(d) Disconnect the fuel vapor feed hose No. 2.
(e) Disconnect the vacuum hose.
(f) Remove the vacuum hose from the clamp.
(g) Remove the 2 nuts, then remove the emission control valve set.



4. **REMOVE DUTY VACUUM SWITCHING VALVE**

(a) Disconnect the 2 vacuum hoses.
(b) Remove the screw, then remove the duty vacuum switching valve.

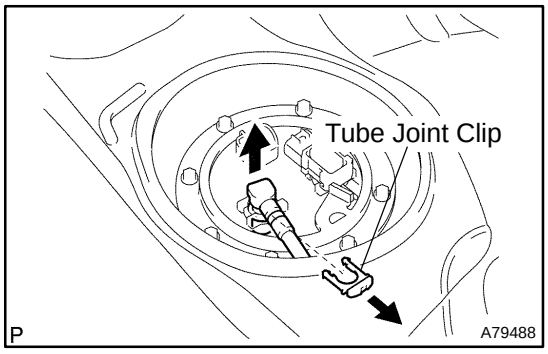
5. **INSTALL DUTY VACUUM SWITCHING VALVE**
6. **INSTALL EMISSION CONTROL VALVE SET**
   Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)
7. **CHECK CONNECTION OF VACUUM HOSE (See page 14-29)**
8. **INSTALL V-BANK COVER SUB-ASSY (See page 10-11)**
9. **CONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)**
   Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
10. **SYSTEM INITIALIZATION (See page 19-15)**

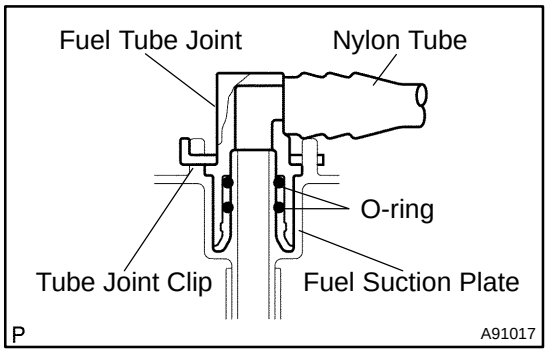
VAPOR PRESSURE SENSOR ASSY (3MZ-FE)

120BV-02

REPLACEMENT

1. **DISCHARGE FUEL SYSTEM PRESSURE (See page 11-1)**
2. **DISCONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)**
3. **REMOVE REAR SEAT CUSHION ASSY (See page 72-39)**
4. **REMOVE REAR FLOOR SERVICE HOLE COVER (See page 11-20)**



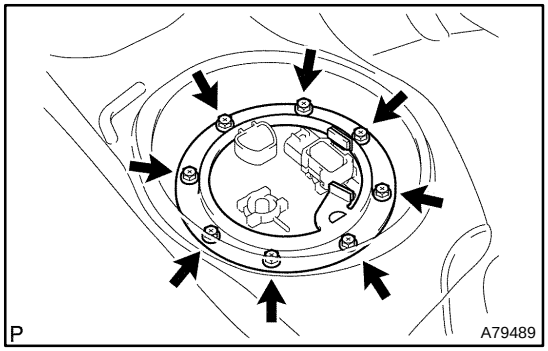


5. DISCONNECT FUEL PUMP TUBE SUB-ASSY

(a) Remove the tube joint clip, then pull out the fuel pump tube.

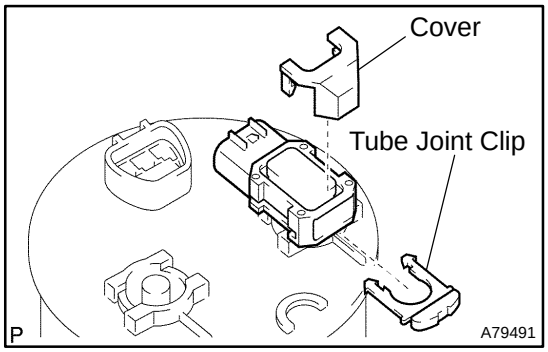
NOTICE:

- **Check around the quick connector for dirt or mud before this operation. Remove the dirt if necessary.**
- **Be careful of mud because the quick connector has an O-ring which seals the pipe and quick connector that can be contaminated.**
- **Do not use any tools in this operation.**
- **Do not bend or twist the nylon tube. Protect the quick connector by covering it with a vinyl or plastic bag.**
- **When the pipe and quick connector are stuck, push and pull the quick connector to release. Pull the quick connector carefully.**



6. REMOVE FUEL TANK VENT TUBE SET PLATE

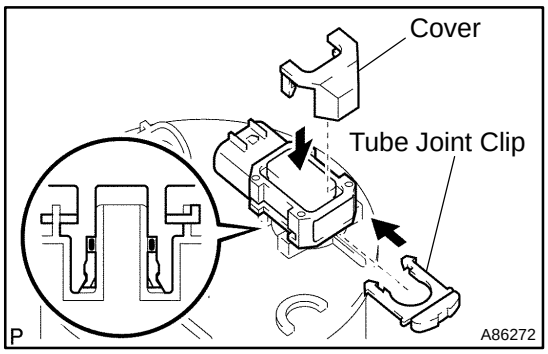
(a) Remove the 8 bolts, then remove the fuel tank vent tube set plate.



7. REMOVE VAPOR PRESSURE SENSOR ASSY

(a) Remove the cover.

(b) Remove the tube joint clip, then pull out the vapor pressure sensor.



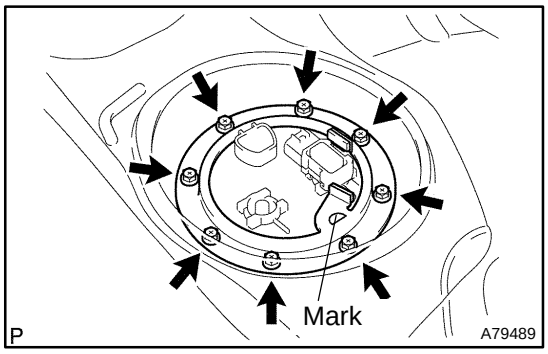
8. INSTALL VAPOR PRESSURE SENSOR ASSY

(a) Install the vapor pressure sensor with the tube joint clip.

NOTICE:

- **Check the connected part for scratch or foreign objects.**
- **Check that the vapor pressure sensor is inserted securely.**
- **Check that the tube joint clip is on the collar of the vapor pressure sensor.**
- **After installing the tube joint clip, check that the vapor pressure sensor has not been pulled off.**

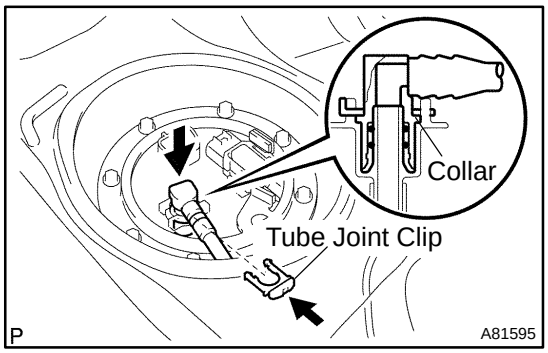
(b) Install the cover.



9. INSTALL FUEL TANK VENT TUBE SET PLATE

(a) Align the mark of the fuel tank vent tube set plate with the fuel suction tube w/ pump & gauge.

(b) Install the fuel tank vent tube set plate with the 8 bolts.
Torque: 5.9 N·m (60 kgf·cm, 52 in.·lbf)



10. CONNECT FUEL PUMP TUBE SUB-ASSY

(a) Install the fuel pump tube with the tube joint clip.

NOTICE:

- **Check the connected part for scratch or foreign objects.**
- **Check that the fuel tube joint is inserted securely.**
- **Check that the tube joint clip is on the collar of the fuel tube joint.**
- **After installing the tube joint clip, check that the fuel tube joint has not been pulled off.**

11. CONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

12. CHECK FOR FUEL LEAKS (See page 11-5)

13. INSTALL REAR FLOOR SERVICE HOLE COVER (See page 11-20)

14. INSTALL REAR SEAT CUSHION ASSY

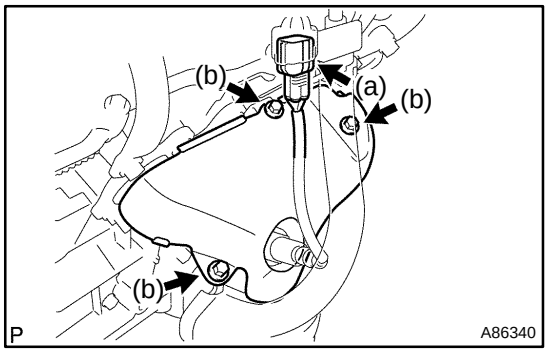
15. SYSTEM INITIALIZATION (See page 19-15)

AIR FUEL RATIO SENSOR (3MZ-FE (RH BANK))

120BY-01

REPLACEMENT

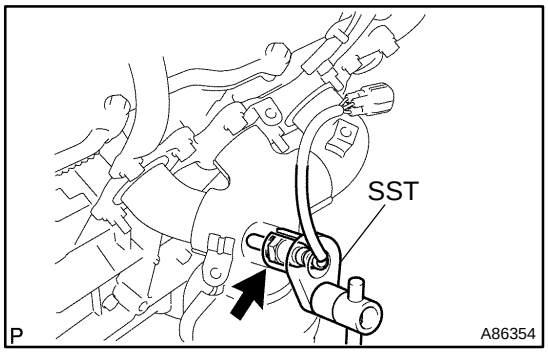
1. DISCONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)
2. REMOVE EXHAUST PIPE NO.1 SUPPORT BRACKET FRONT (See page 15-2)
3. REMOVE EXHAUST PIPE NO.1 SUPPORT BRACKET REAR (See page 15-2)
4. REMOVE EXHAUST PIPE ASSY FRONT (See page 15-2)



5. REMOVE EXHAUST MANIFOLD HEAT INSULATOR NO.1

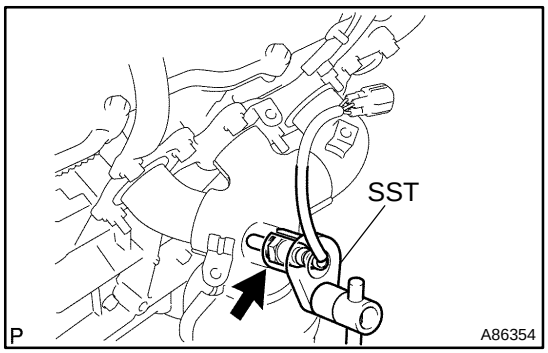
(a) Disconnect the air fuel ratio sensor connector.

(b) Remove the 3 bolts, then remove the exhaust manifold heat insulator No. 1.



6. REMOVE AIR FUEL RATIO SENSOR

(a) Using SST, remove the air fuel ratio sensor.
SST 09224-00010



7. INSTALL AIR FUEL RATIO SENSOR

(a) Using SST, install the air fuel ratio sensor.
SST 09224-00010
Torque: 44 N·m (449 kgf·cm, 32 ft·lbf)

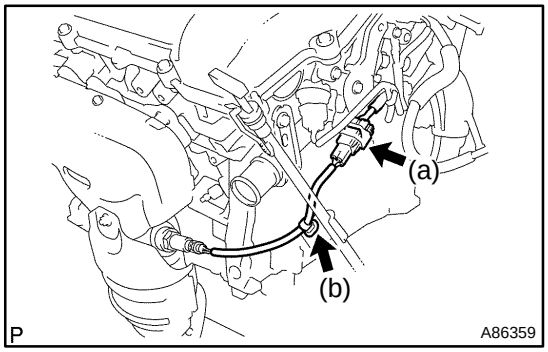
8. INSTALL EXHAUST MANIFOLD HEAT INSULATOR NO.1
Torque: 8.5 N·m (87 kgf·cm, 75 in.·lbf)
9. INSTALL EXHAUST PIPE ASSY FRONT (See page 15-2)
10. INSTALL EXHAUST PIPE NO.1 SUPPORT BRACKET REAR (See page 15-2)
11. INSTALL EXHAUST PIPE NO.1 SUPPORT BRACKET FRONT (See page 15-2)
12. CONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
13. CHECK FOR EXHAUST GAS LEAKS
14. SYSTEM INITIALIZATION (See page 19-15)

AIR FUEL RATIO SENSOR (3MZ-FE (LH BANK))

120BZ-01

REPLACEMENT

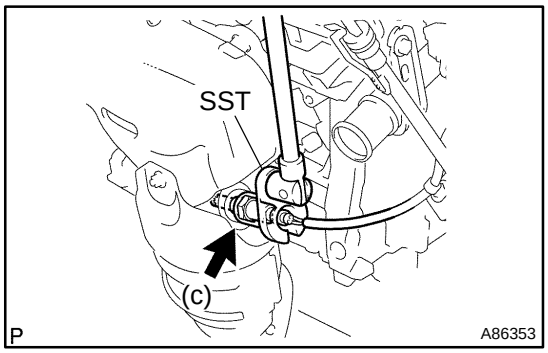
1. DISCONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)



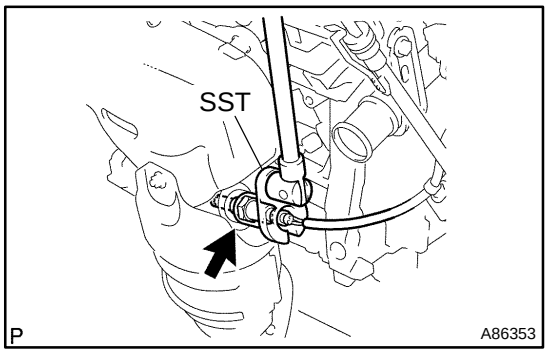
2. REMOVE AIR FUEL RATIO SENSOR

(a) Disconnect the air fuel ratio sensor connector.

(b) Remove the wire harness clamp.



(c) Using SST, remove the air fuel ratio sensor.
SST 09224-00010



3. INSTALL AIR FUEL RATIO SENSOR

(a) Using SST, install the air fuel ratio sensor.
SST 09224-00010
Torque: 44 N·m (449 kgf·cm, 32 ft·lbf)

(b) Install the wire harness clamp.

(c) Connect the air fuel ratio sensor connector.

4. CONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

5. CHECK FOR EXHAUST GAS LEAKS

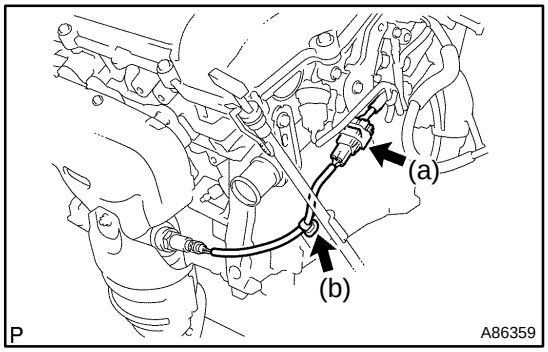
6. SYSTEM INITIALIZATION (See page 19-15)

AIR FUEL RATIO SENSOR (3MZ-FE (LH BANK))

120BZ-01

REPLACEMENT

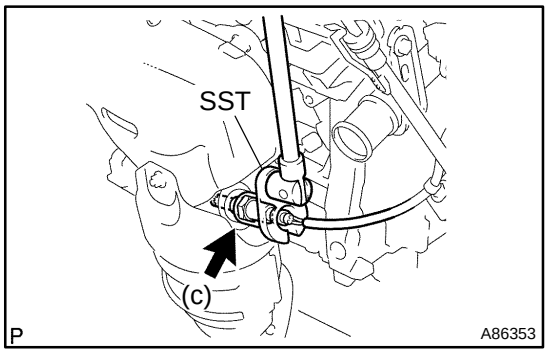
1. DISCONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)



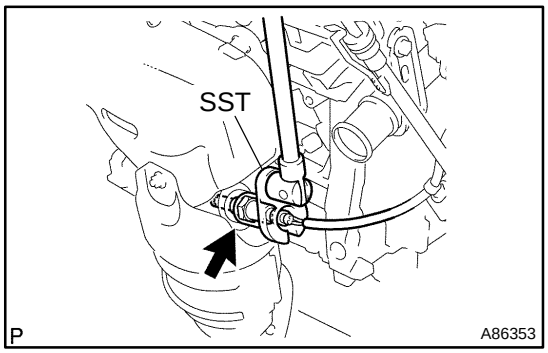
2. REMOVE AIR FUEL RATIO SENSOR

(a) Disconnect the air fuel ratio sensor connector.

(b) Remove the wire harness clamp.



(c) Using SST, remove the air fuel ratio sensor.
SST 09224-00010



3. INSTALL AIR FUEL RATIO SENSOR

(a) Using SST, install the air fuel ratio sensor.
SST 09224-00010
Torque: 44 N·m (449 kgf·cm, 32 ft·lbf)

(b) Install the wire harness clamp.

(c) Connect the air fuel ratio sensor connector.

4. CONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

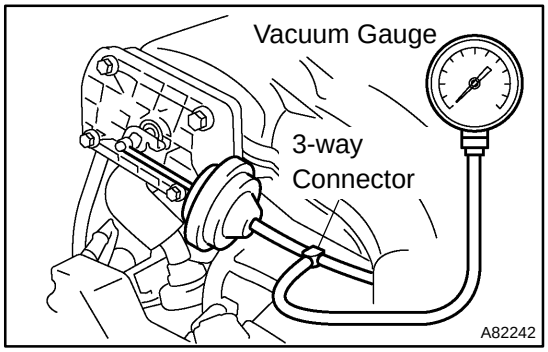
5. CHECK FOR EXHAUST GAS LEAKS

6. SYSTEM INITIALIZATION (See page 19-15)

INTAKE AIR CONTROL SYSTEM (3MZ-FE)

1307V-01

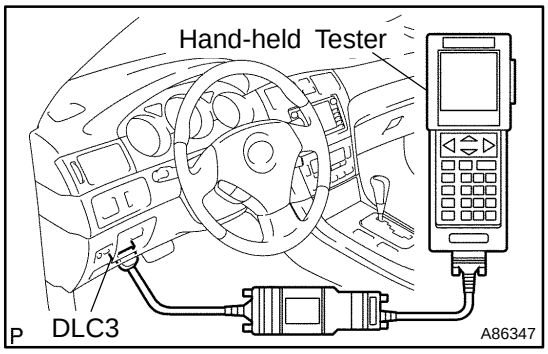
ON-VEHICLE INSPECTION



1. INSPECT INTAKE CONTROL VALVE ASSY NO. 2

(a) Check the operation.

(1) Using a 3-way connector, connect the vacuum gauge to the actuator hose as shown in the illustration.



(2) Connect the hand-held tester to the DLC3.

(3) Start the engine.

(4) Turn the hand-held tester switch ON.

(5) Select the item ”DIAGNOSIS/ENHANCED OBD II/ ACTIVE TEST/INTAKE CTL VSV1” and operate the VSV for AICS.

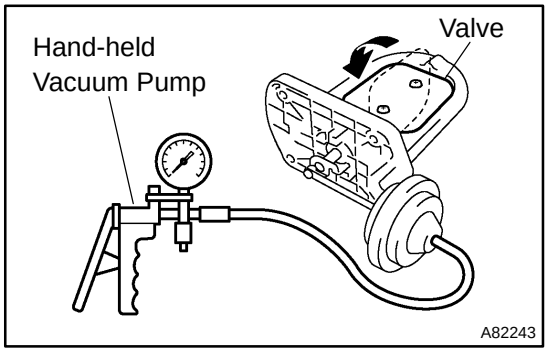
Vacuum:

Tester Operation	Specified Condition
VSV is ON	Approximately 27.6 kpa (200 mmHg, 7.9 in.Hg)
VSV is OFF	0 kPa (0 mmHg, 0 in.Hg)

If the operation is not as specified, replace the intake air control valve No. 2.

1307W-01

INSPECTION



1. INSPECT INTAKE AIR CONTROL VALVE ASSY NO.2

(a) Check the operation.

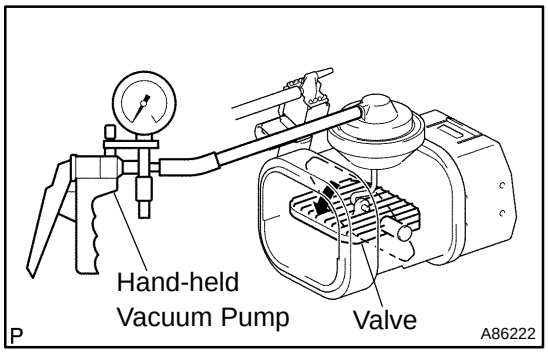
(1) With vacuum of 26.7 kPa (200 mmHg, 7.9 in.Hg) applied to the actuator, check that the valve closes.

(2) 1 minute after applying the vacuum, check that the valve remains closed.

NOTICE:

Do not adjust the adjust screw.

If the operation is not as specified, replace the intake air control valve No. 2.



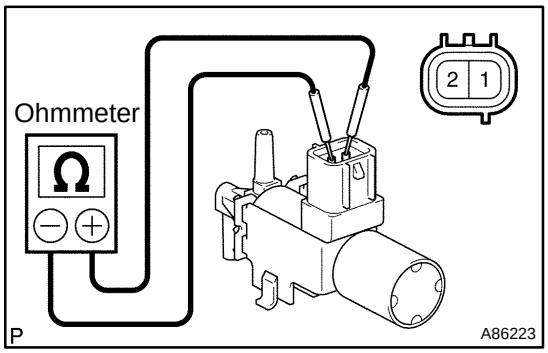
2. INSPECT INTAKE AIR CONTROL VALVE ASSY NO.3

(a) Check the operation.

(1) With vacuum of 26.7 kPa (200 mmHg, 7.9 in.Hg) applied to the actuator, check that the valve opens.

(2) 1 minute after applying the vacuum, check that the valve remains opened.

If the operation is not as specified, replace the intake air control valve No. 3.



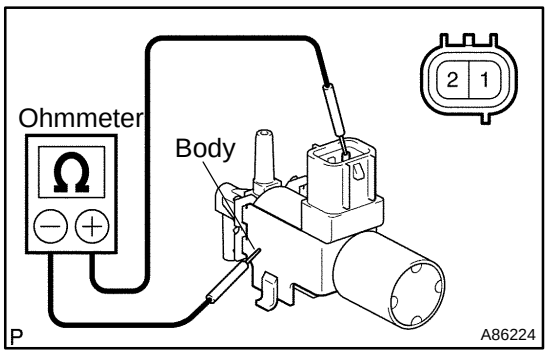
(b) Inspect the resistance.

(1) Using an ohmmeter, measure the resistance between the terminals.

Resistance:

Tester Connection	Specified Condition
1 - 2	37 to 44Ω at 20•C (68• F)

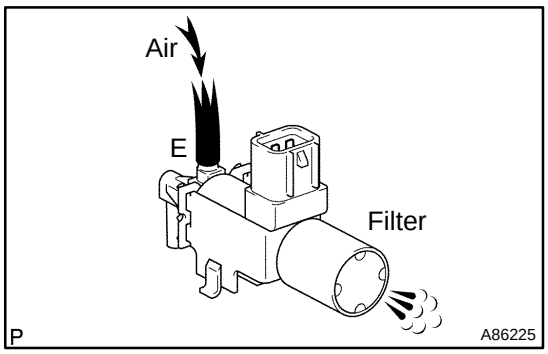
If the resistance is not as specified, replace the intake air control valve No. 3.



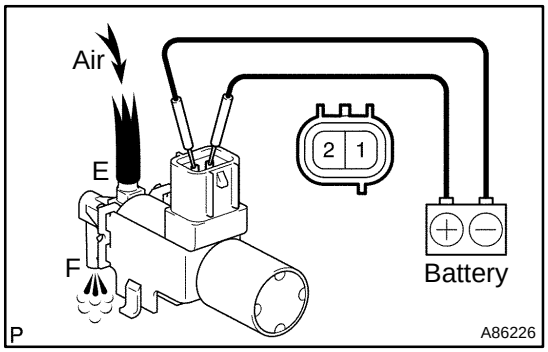
(c) Check the continuity.

(1) Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the intake air control valve No. 3.

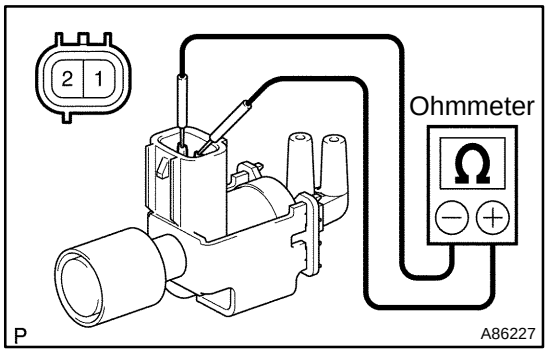


(d) Check the operation.
(1) Check that air flows from port E to the filter.



(2) Apply battery voltage across the terminals.
(3) Check that air flows from port E to F.

If the operation is not as specified, replace the intake air control valve No. 3.



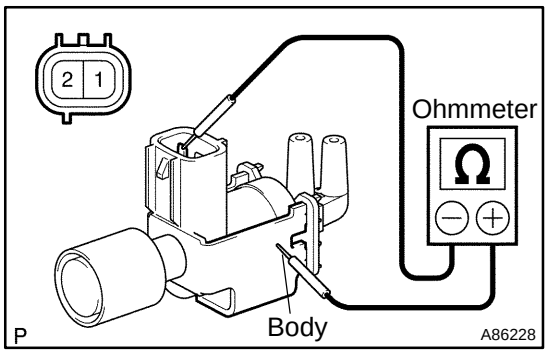
3. INSPECT VACUUM SWITCHING VALVE ASSY NO.1

(a) Inspect the resistance.
(1) Using an ohmmeter, measure the resistance between the terminals.

Resistance:

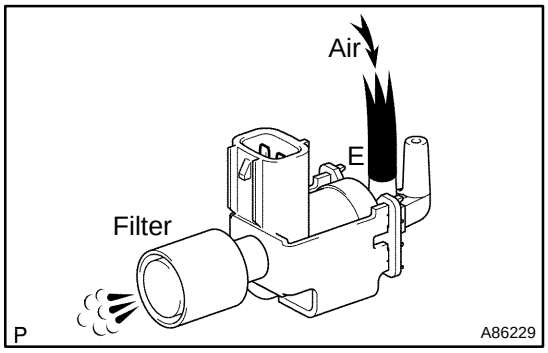
Tester Connection	Specified Condition
1 - 2	33 to 39Ω at 20•C (68•F)

If the resistance is not as specified, replace the vacuum switching valve No. 1.

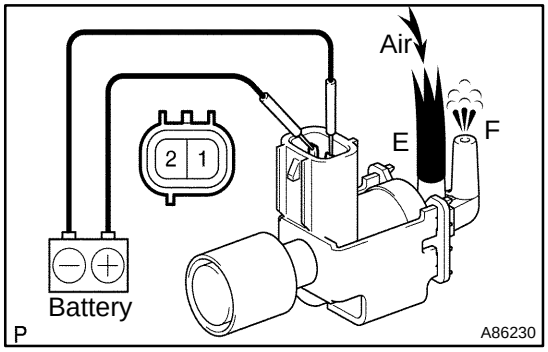


(b) Check the continuity.
(1) Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the vacuum switching valve No. 1.

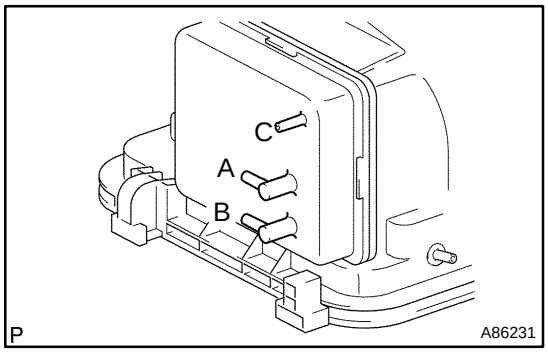


(c) Check the operation.
(1) Check that air flows from port E to the filter.



(2) Apply battery voltage across the terminals.
(3) Check that air flows from port E to F.

If the operation is not as specified, replace the vacuum switching valve No. 1.



4. INSPECT AIR CLEANER CAP SUB-ASSY

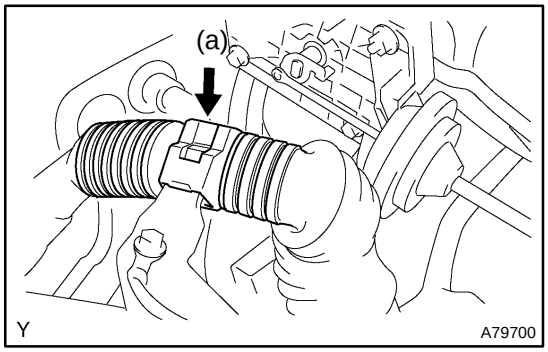
(a) Check the operation.
(1) Cover port C with your finger, then check that the air flow from port B to A.
(2) Cover port C with your finger, then check that the air does not flow from port A to B.
(3) Cover ports A and C with your fingers, then apply 60 kPa (450 mmHg, 18 in.Hg) of vacuum to port B. Check that there is no vacuum change after 1 minute.

If the operation is not as specified, replace the air cleaner cap.

INTAKE AIR CONTROL VALVE ASSY NO.2 (3MZ-FE)

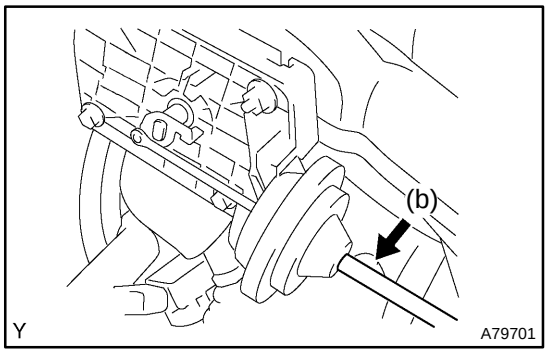
1307X-01

REPLACEMENT

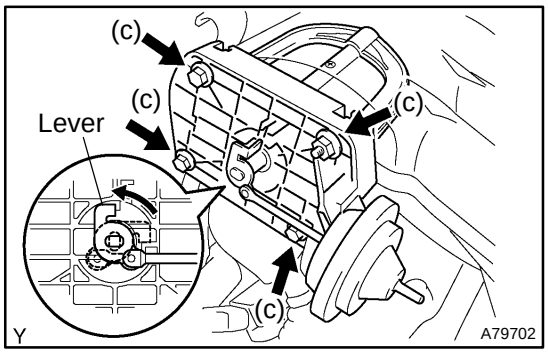


1. REMOVE INTAKE AIR CONTROL VALVE ASSY NO.2

(a) Remove the wire harness clamp.



(b) Disconnect the vacuum hose.



(c) Remove the 3 bolts and nut.

(d) Rotate the lever to the closed position as shown in the illustration, then pull out the intake air control valve No. 2.

(e) Remove the gasket from the intake air surge tank.

2. INSTALL INTAKE AIR CONTROL VALVE ASSY NO.2

(a) Install a new gasket to the intake air surge tank.

(b) Install the intake air control valve No. 2 with the 3 bolts and nut.

Torque: 10 N·m (102 kgf·cm, 7 ft·lbf)

(c) Connect the vacuum hose.

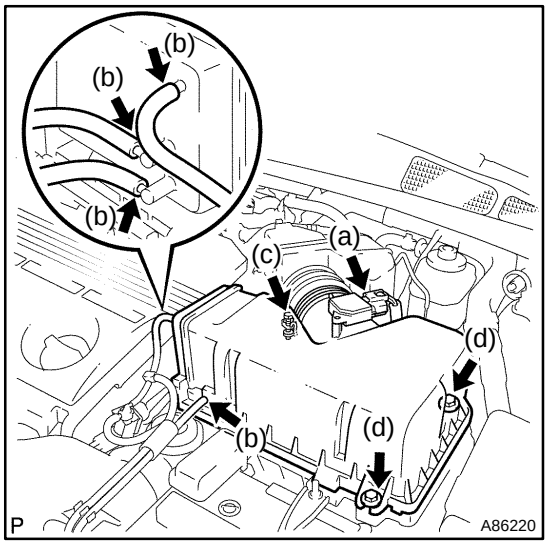
(d) Install the wire harness clamp.

INTAKE AIR CONTROL VALVE ASSY NO.3 (3MZ-FE)

1307Y-01

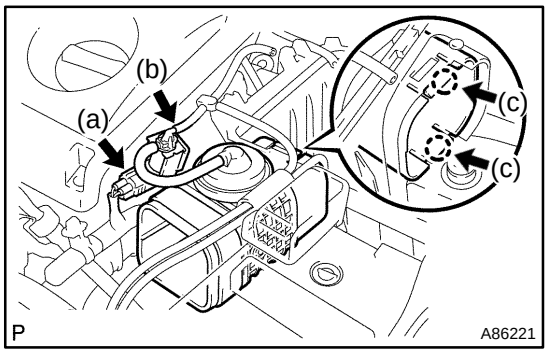
REPLACEMENT

1. **DISCONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)**
2. **REMOVE RADIATOR LOWER AIR DEFLECTOR (See page 19-5)**
3. **REMOVE AIR CLEANER INLET ASSY (See page 19-5)**



4. REMOVE AIR CLEANER CAP SUB-ASSY

(a) Disconnect the mass air flow meter connector.
(b) Disconnect the 4 vacuum hoses.
(c) Loosen the hose clamp bolt.
(d) Loosen the 2 bolts, then remove the air cleaner cap.
(e) Remove the air cleaner filter element.



5. REMOVE INTAKE AIR CONTROL VALVE ASSY NO.3

(a) Disconnect the VSV connector.
(b) Disconnect the vacuum hose.
(c) Unfasten the 2 claws, then remove the intake air control valve No. 3.

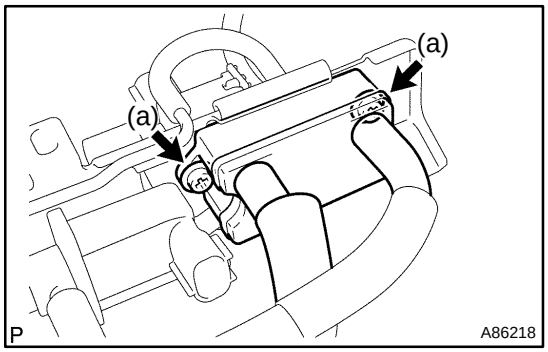
6. **INSTALL INTAKE AIR CONTROL VALVE ASSY NO.3**
7. **INSTALL AIR CLEANER CAP SUB-ASSY**
   Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)
8. **INSTALL AIR CLEANER INLET ASSY (See page 19-5)**
9. **CHECK CONNECTION OF VACUUM HOSE (See page 14-29)**
10. **INSTALL RADIATOR LOWER AIR DEFLECTOR**
11. **CONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)**
    Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
12. **SYSTEM INITIALIZATION (See page 19-15)**

VACUUM SWITCHING VALVE ASSY NO.1 (3MZ-FE)

1307Z-01

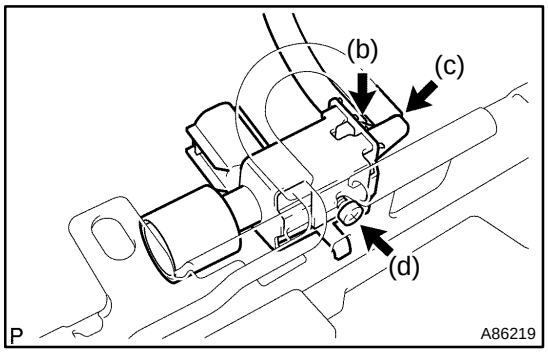
REPLACEMENT

1. **DISCONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)**
2. **REMOVE V-BANK COVER SUB-ASSY (See page 10-1 1)**
3. **REMOVE EMISSION CONTROL VALVE SET (See page 12-19)**



4. **REMOVE VACUUM SWITCHING VALVE ASSY NO.1**

(a) Remove the 2 screws, then remove the vacuum surge tank.



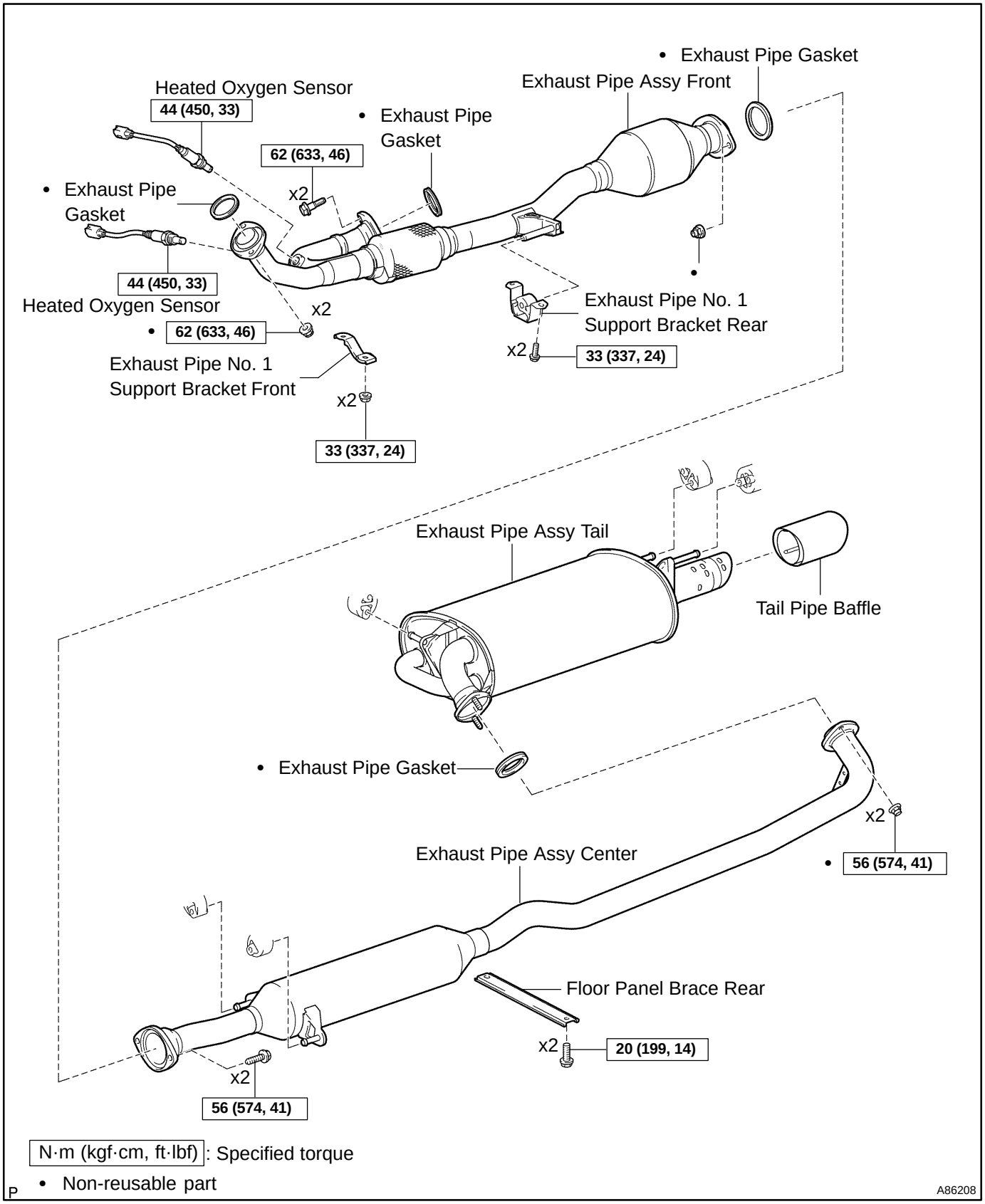
(b) Disconnect the vacuum hose.
(c) Remove the vacuum hose.
(d) Remove the screw, then remove the vacuum switching valve No. 1.

5. **INSTALL VACUUM SWITCHING VALVE ASSY NO.1**
6. **INSTALL EMISSION CONTROL VALVE SET (See page 12-19)**
7. **CHECK CONNECTION OF VACUUM HOSE (See page 14-29)**
8. **INSTALL V-BANK COVER SUB-ASSY (See page 10-1 1)**
9. **CONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)**
   Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
10. **SYSTEM INITIALIZATION (See page 19-15)**

EXHAUST PIPE ASSY (3MZ-FE)

150B7-01

COMPONENTS



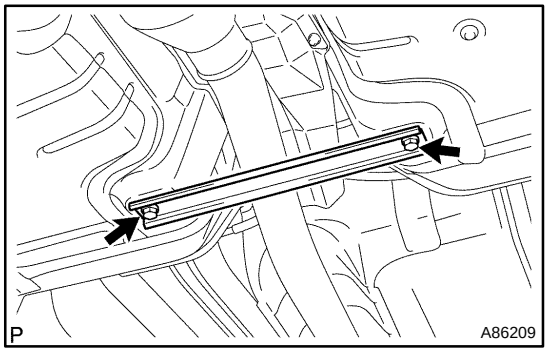
150B8-01

Removal & Installation and Disassembly & Reassembly

1. DISCONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)

2. REMOVE HEATED OXYGEN SENSOR (See page 12-24)

SST 09224-00010



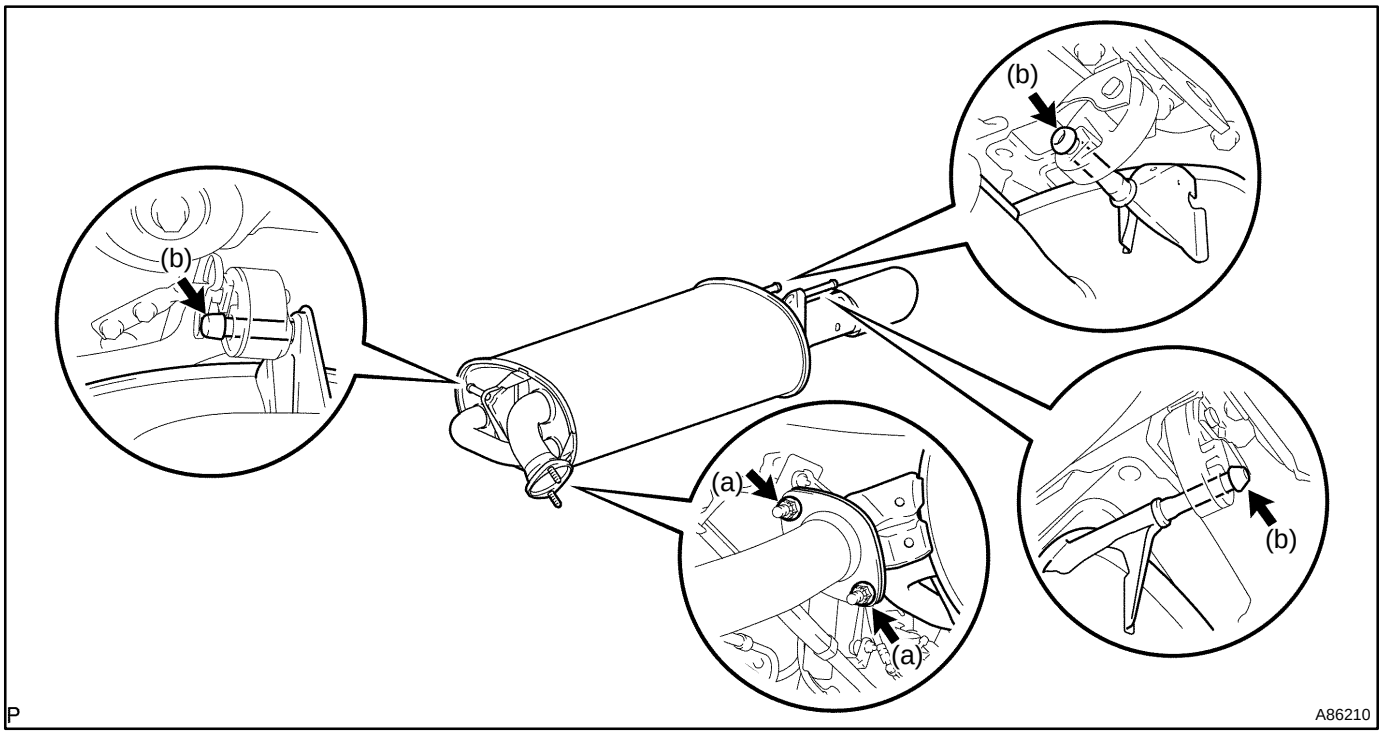
3. REMOVE FLOOR PANEL BRACE REAR

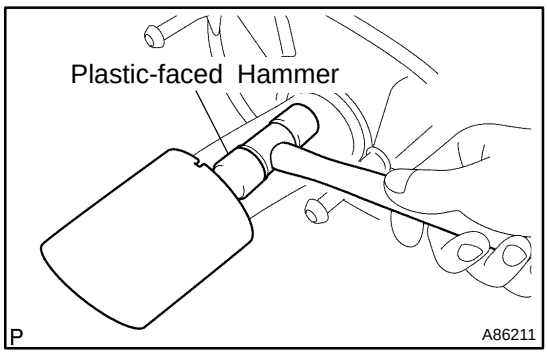
(a) Remove the 2 bolts, then remove the floor panel brace rear.

4. REMOVE EXHAUST PIPE ASSY TAIL

(a) Remove the 2 nuts.

(b) Remove the exhaust pipe tail and gasket from the 3 exhaust pipe supports.





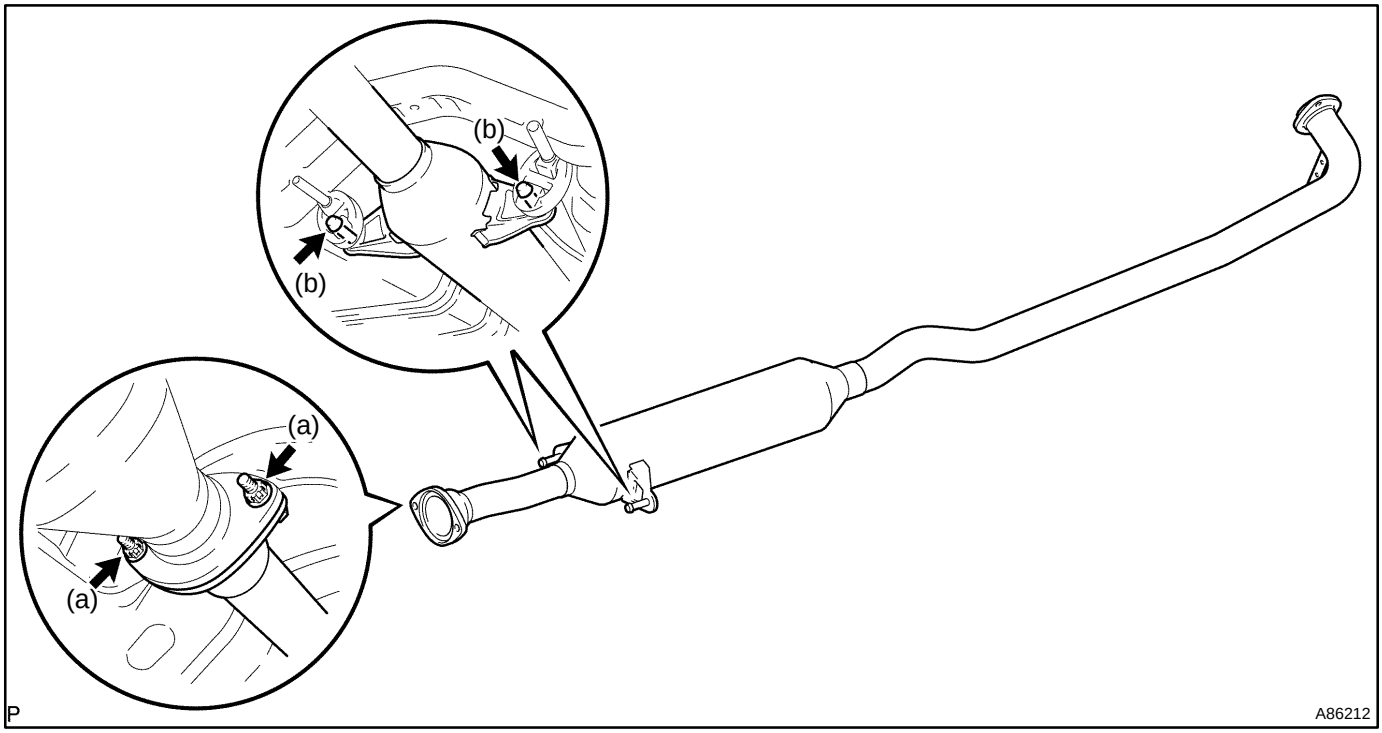
5. REMOVE TAIL PIPE BAFFLE

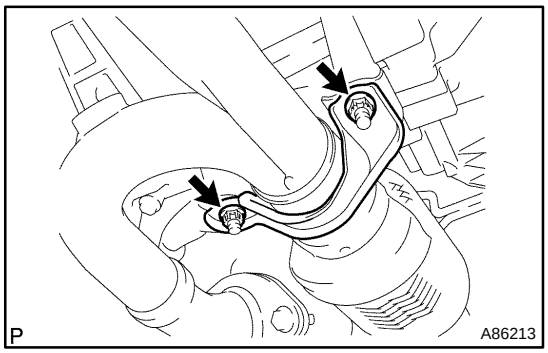
(a) Using a plastic-faced hammer, uniformly tap the tail pipe baffle to remove.

6. REMOVE EXHAUST PIPE ASSY CENTER

(a) Remove the 2 bolts and 2 nuts.

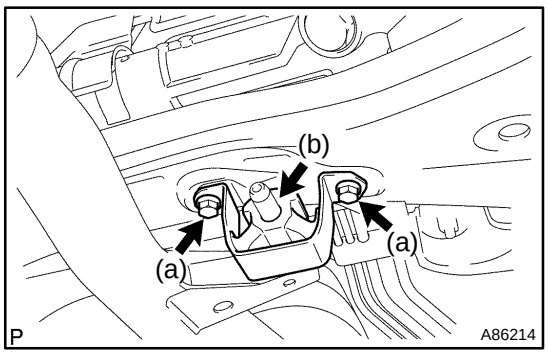
(b) Remove the exhaust pipe center and gasket from the 2 exhaust pipe supports.





7. REMOVE EXHAUST PIPE NO.1 SUPPORT BRACKET FRONT

(a) Remove the 2 nuts, then remove the exhaust pipe No. 1 support bracket front.



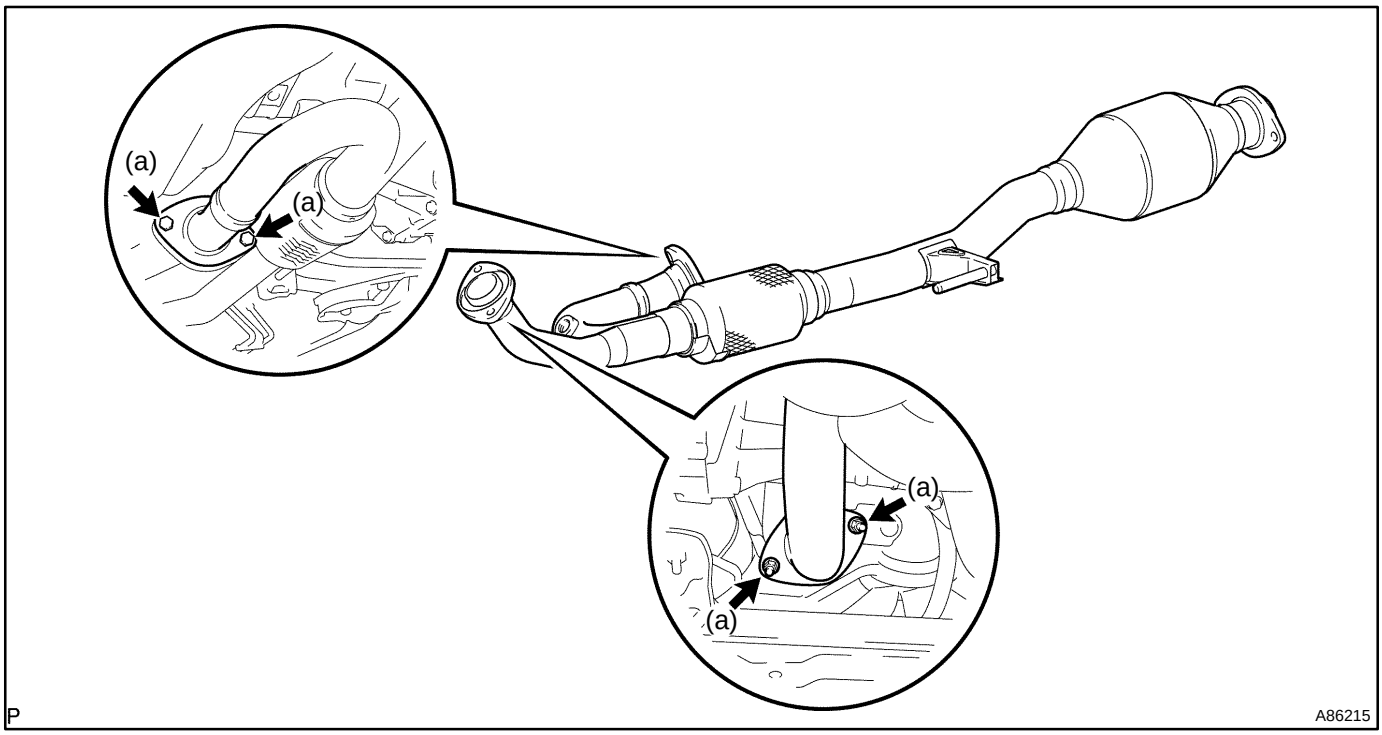
8. REMOVE EXHAUST PIPE NO.1 SUPPORT BRACKET REAR

(a) Remove the 2 bolts.

(b) Remove the exhaust pipe No. 1 support bracket rear from the exhaust pipe front.

9. REMOVE EXHAUST PIPE ASSY FRONT

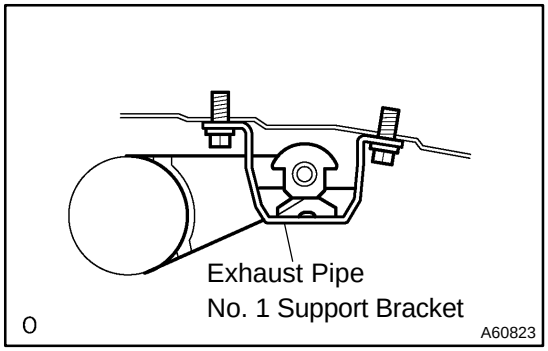
(a) Remove the 2 bolts and 2 nuts, then remove the exhaust pipe front and 2 gaskets.



10. INSTALL EXHAUST PIPE ASSY FRONT

(a) Install 2 new gaskets and the exhaust pipe front with the 2 bolts.
Torque: 62 N·m (633 kgf·cm, 46 ft·lbf)

(b) Tighten 2 new nuts.
Torque: 62 N·m (633 kgf·cm, 46 ft·lbf)



11. INSTALL EXHAUST PIPE NO.1 SUPPORT BRACKET REAR
Torque: 33 N·m (337 kgf·cm, 24 ft·lbf)

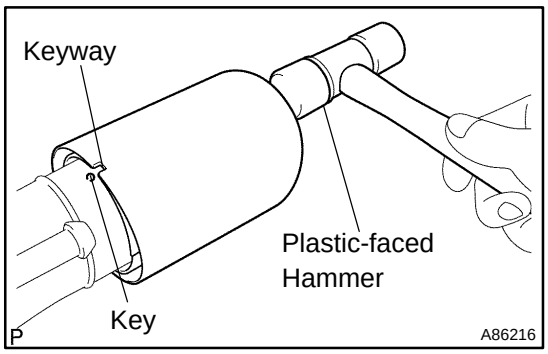
HINT:
Be careful not to install the exhaust pipe No. 1 support bracket rear in the wrong direction.

12. INSTALL EXHAUST PIPE NO.1 SUPPORT BRACKET FRONT
Torque: 33 N·m (337 kgf·cm, 24 ft·lbf)

13. INSTALL EXHAUST PIPE ASSY CENTER

(a) Install a new gasket and the exhaust pipe center to the 2 exhaust pipe supports.

(b) Tighten the 2 bolts and 2 new nuts.
Torque: 56 N·m (574 kgf·cm, 41 ft·lbf)



14. INSTALL TAIL PIPE BAFFLE

(a) Align the keyway of the tail pipe baffle with the key on the exhaust pipe tail.

(b) Using a plastic-faced hammer, tap the tail pipe baffle to install.

15. INSTALL EXHAUST PIPE ASSY TAIL

(a) Install a new gasket and the exhaust pipe tail to the 3 exhaust pipe supports.

(b) Tighten the 2 new nuts.

Torque: 56 N·m (574 kgf·cm, 41 ft·lbf)

16. INSTALL HEATED OXYGEN SENSOR (See page 12-24)

SST 09224-00010

17. CONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)

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

18. CHECK FOR EXHAUST GAS LEAKS

19. INSTALL FLOOR PANEL BRACE REAR

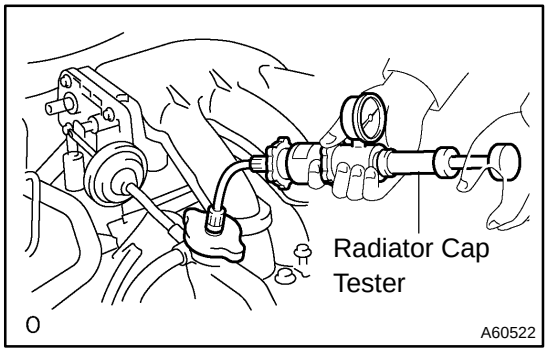
Torque: 20 N·m (199 kgf·cm, 14 ft·lbf)

20. SYSTEM INITIALIZATION (See page 19-15)

COOLING SYSTEM (3MZ-FE)

160QB-01

ON-VEHICLE INSPECTION



1. INSPECT COOLING SYSTEM FOR LEAKS

(a) Remove the water outlet cap.

CAUTION:

To avoid the danger of being burned, do not remove the water outlet cap while the engine and radiator are still hot. Thermal expansion will cause hot engine coolant and steam to blow out from the radiator.

(b) Fill the radiator with coolant, then attach a radiator cap tester.

(c) Warm up the engine.

(d) Pump it to 118 kPa (1.2 kgf/cm^2, 17.1 psi), then check that the pressure does not drop.

If the pressure drops, check the hoses, radiator and water pump for leaks. If there are no signs or traces of external coolant leaks, check the heater core, cylinder block and head.

(e) Reinstall the water outlet cap.

2. CHECK ENGINE COOLANT LEVEL AT RESERVOIR

(a) The engine coolant should be between the ”LOW” and ”FULL” lines when the engine is cold.

If low, check for leaks and add ”Toyota Super Long Life Coolant” or similar high quality ethylene glycol based non-silicate, non-amine, non-nitrite, and non-borate coolant with long-life hybrid organic acid technology up to the ”FULL” line.

3. CHECK ENGINE COOLANT QUALITY

(a) Remove the water outlet cap.

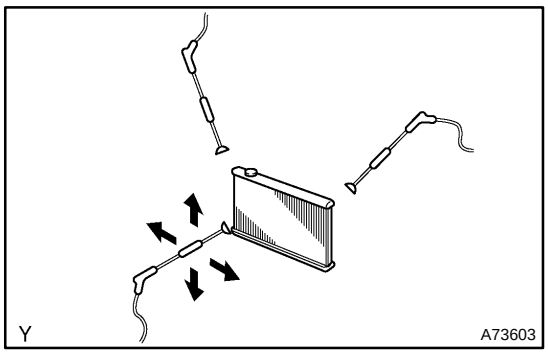
CAUTION:

To avoid the danger of being burned, do not remove the water outlet cap while the engine and radiator are still hot. Thermal expansion will cause hot engine coolant and steam to blow out from the radiator.

(b) Check if there are any excessive deposits of rust or scale around the water outlet cap and water outlet filler hole; the coolant should free of oil.

If excessively dirty, replace the coolant.

(c) Reinstall the water outlet cap.



4. INSPECT FIN BLOCKAGE

(a) If the fins are clogged, wash them with water or a steam cleaner, then dry with compressed air.

NOTICE:

- **If the distance between the steam cleaner and core is too close, there is a possibility of damaging the fins, so keep the following injection distance.**

Injection Pressure kPa (kgf/cm^2, psi)	Injection Distance mm (in.)
2,942 to 4,903 (30 to 50, 427 to 711)	300 (11.811)
4,903 to 7,845 (50 to 80, 711 to 1,138)	500 (19.685)

- **If the fins are bent, straighten them with a screwdriver or pliers.**
- **Be careful not to expose electronic components to water.**

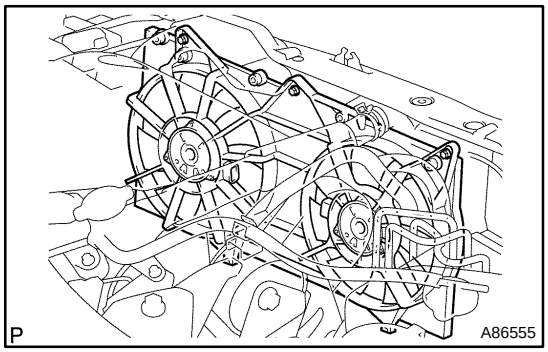
COOLING FAN SYSTEM (3MZ-FE)

160QD-01

ON-VEHICLE INSPECTION

1. CHECK COOLING FAN OPERATION AT LOW TEMPERATURE (Below 83•C (181•F))

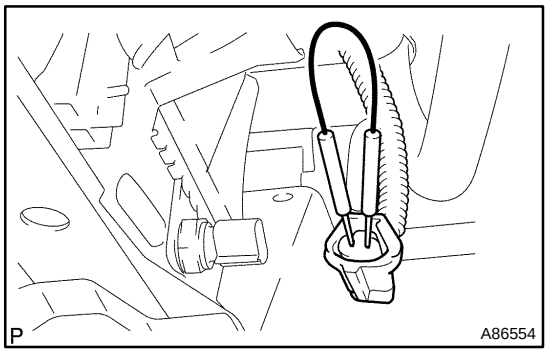
(a) Turn the ignition switch ON.



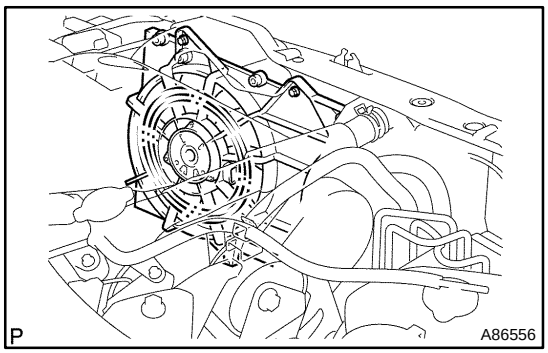
(b) Check that the fan and fan No. 2 stops.

If not, check the cooling fan relays and temperature detect switches.

(c) Disconnect the temperature detect switch connector.



(d) Connect the terminals of the temperature detect switch wire connector.

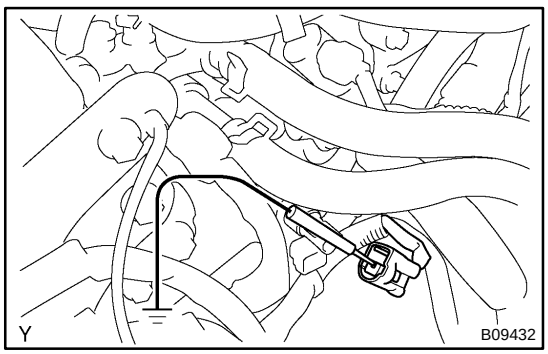


(e) Check that the fan rotates at high speed.

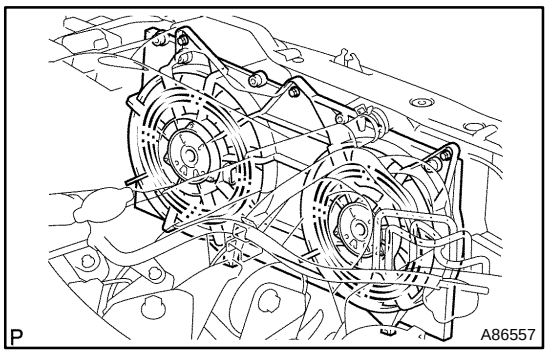
If not, check the cooling fan relay and fan.

(f) Reconnect the temperature detect switch connector.

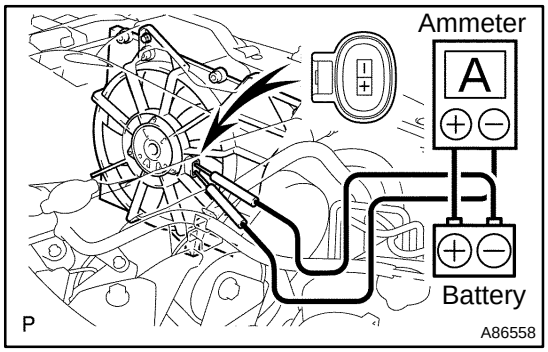
(g) Disconnect the temperature detect switch No. 2 connector.



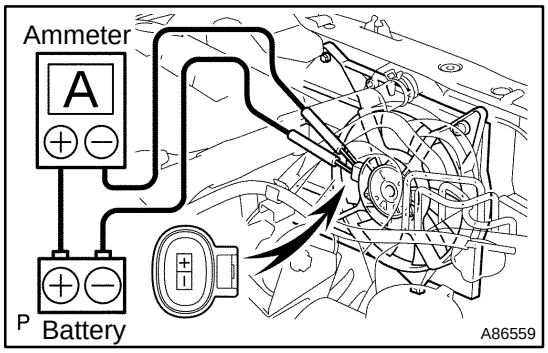
(h) Ground the terminal on the temperature detect switch No. 2 wire harness side connector.



(i) Check that the fan and fan No. 2 rotates at low speed.
If not, check the cooling fan relay No. 2, cooling fan relay No. 3 and No. 2 fan.
(j) Reconnect the temperature detect switch No. 2 connector.



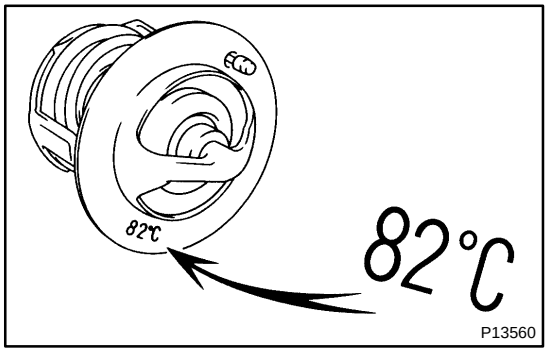
2. INSPECT FAN
(a) Disconnect the fan connector.
(b) Connect battery and ammeter to the fan connector.
(c) Check that the fan rotates smoothly, then check the reading on the ammeter.
Standard amperage: 10.2 to 16.2 A at 20•C (68•F)
(d) Reconnect the fan connector.



3. INSPECT NO. 2 FAN
(a) Disconnect the No. 2 fan connector.
(b) Connect the battery and ammeter to the No. 2 fan connector.
(c) Check that the No. 2 fan rotates smoothly, then check the reading on the ammeter.
Standard amperage: 10.2 to 16.2 A at 20•C (68•F)
(d) Reconnect the No. 2 fan connector.

160QC-01

INSPECTION

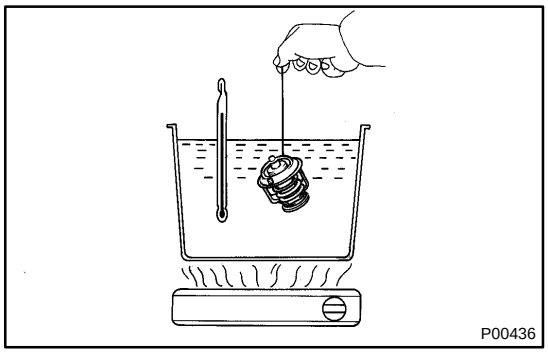


P13560

1. INSPECT THERMOSTAT

HINT:

The thermostat is inscribed with the valve opening temperature.

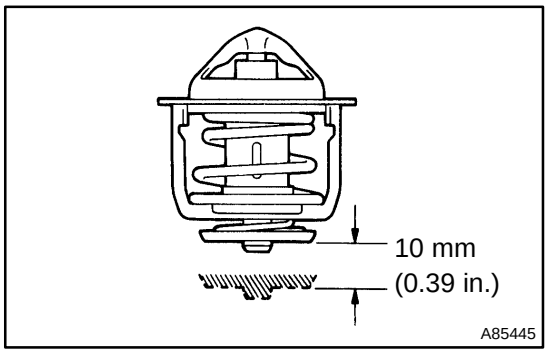

P00436

(a) Immerse the thermostat in water, then gradually heat the water.

(b) Inspect the valve opening temperature of the thermostat.

Valve opening temperature:
80 to 84°C (176 to 183°F)

If the valve opening temperature is not as specified, replace the thermostat.



A85445

(c) Inspect the valve lift.

Valve lift: 10 mm (0.39 in.) or more at 95°C (203°F)

If the valve lift is not as specified, replace the thermostat.

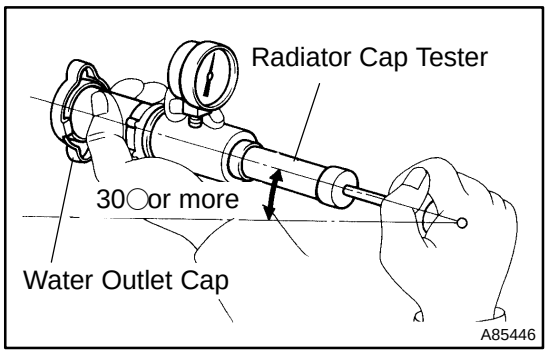
(d) Check that the valve is fully closed when the thermostat is at low temperature (below 77°C (171°F)).

If not fully closed, replace the thermostat.

2. INSPECT WATER OUTLET CAP SUB-ASSY

NOTICE:

- **If the water outlet cap is contaminated, rinse it with water.**
- **Before using a radiator cap tester, wet the relief valve and pressure valve with engine coolant or water.**
- **When performing the following steps (a) and (b), keep the tester at an angle of over 30° above 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 water outlet cap.

(b) Pump the tester, then measure the relief valve opening pressure.

Pump speed: 1 push within 1 second

NOTICE:

The above pump speed is for the first pump only (in order to close the vacuum valve). After the first pump, the pump speed can be reduced.

Standard opening pressure:
83 to 113 kPa (0.85 to 1.15 kgf/cm^2, 12.1 to 16.4 psi)
Minimum opening pressure:
69 kPa (0.7 kgf/cm^2, 10.0 psi)

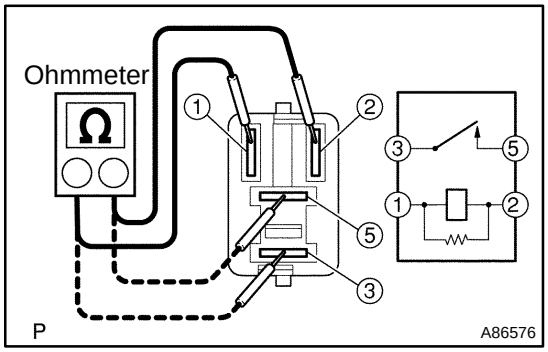
HINT:

Use the tester's maximum reading as the opening pressure.

If the opening pressure is less than minimum, replace the water outlet cap.

160QE-01

INSPECTION



1. INSPECT COOLING FAN RELAY

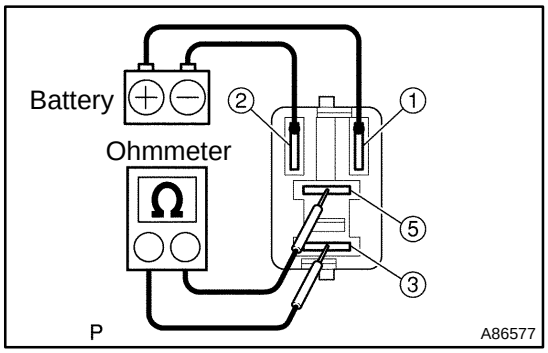
(a) Check the continuity.

(1) Using an ohmmeter, check for continuity between the terminals.

Standard:

Tester Connection	Specified Condition
1 - 2	Continuity
3 - 5	No continuity

If the result is not as specified, replace the cooling fan relay.

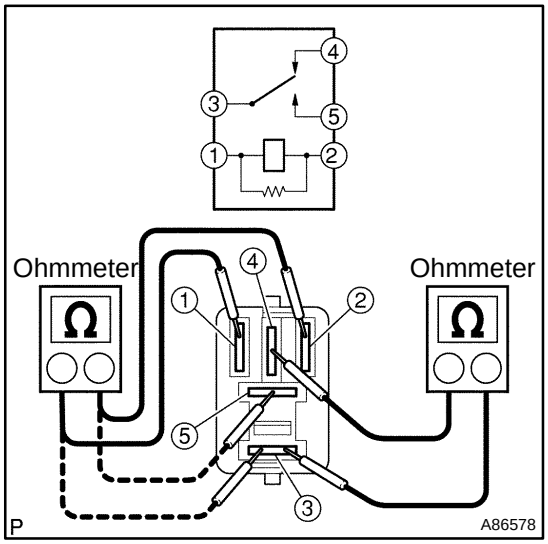


(b) Check the operation.

(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 cooling fan relay.



2. INSPECT COOLING FAN RELAY NO.2

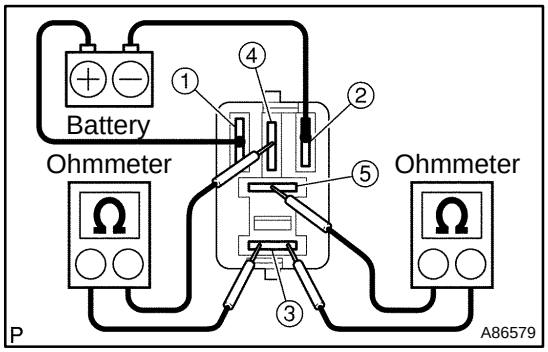
(a) Check the continuity.

(1) Using an ohmmeter, check for continuity between the terminals.

Standard:

Tester Connection	Specified Condition
1 - 2	Continuity
3 - 4	Continuity
3 - 5	No continuity

If the result is not as specified, replace the cooling fan relay.



(b) Check the operation.

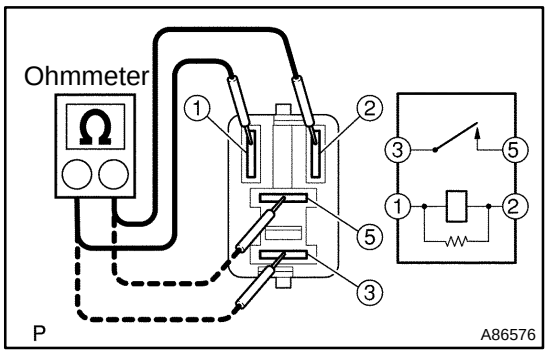
(1) Apply battery positive voltage across terminals 1 and 2.

(2) Using an ohmmeter, check that there is no continuity between terminals 3 and 4.

If there is continuity, replace the cooling fan relay.

(3) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

If there is no continuity, replace the cooling fan relay.



3. INSPECT COOLING FAN RELAY NO.3

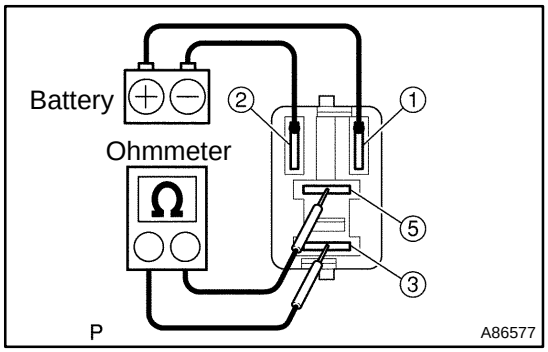
(a) Check the continuity.

(1) Using an ohmmeter, check for continuity between the terminals.

Standard:

Tester Connection	Specified Condition
1 - 2	Continuity
3 - 5	No continuity

If the result is not as specified, replace the cooling fan relay.

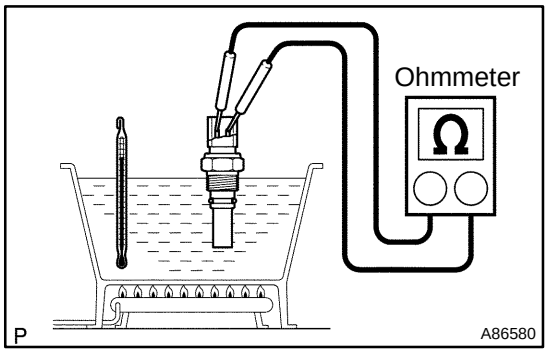


(b) Check the operation.

(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 cooling fan relay.



4. INSPECT TEMPERATURE DETECT SWITCH

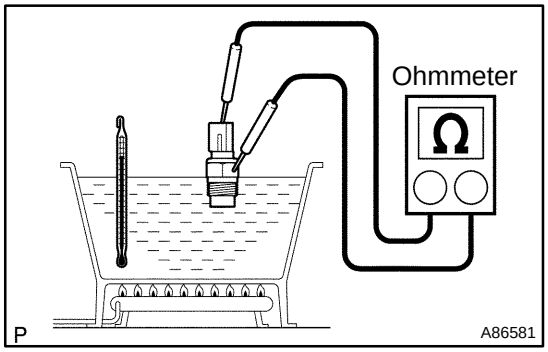
(a) Check the continuity.

(1) Using an ohmmeter, check for continuity between the terminals.

Standard:

Coolant Temperature	Specified Condition
Above 98•C (208•F)	Continuity
Below 88•C (190•F)	No continuity

If the result is not as specified, replace the temperature detect switch.



5. INSPECT TEMPERATURE DETECT SWITCH NO.2

(a) Check the continuity.

(1) Using an ohmmeter, check for continuity between the terminals.

Standard:

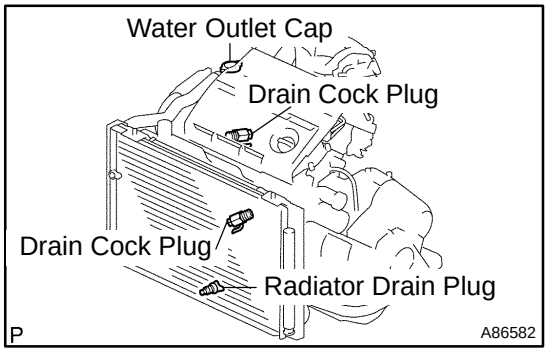
Coolant Temperature	Specified Condition
Above 93•C (199•F)	Continuity
Below 83•C (181•F)	No continuity

If the result is not as specified, replace the temperature detect switch.

ENGINE COOLANT (3MZ-FE)

160QF-01

REPLACEMENT



1. DRAIN ENGINE COOLANT

(a) Remove the water outlet cap from the water outlet.

CAUTION:

To avoid the danger of being burned, do not remove the water outlet cap while the engine and radiator are still hot. Thermal expansion will cause hot engine coolant and steam to blow out from the radiator.

(b) Loosen the radiator drain plug and 2 drain cock plugs, then drain the coolant.

(c) Close the radiator drain plug.

(d) Tighten the 2 drain cock plugs.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

2. ADD ENGINE COOLANT

(a) Slowly fill the cooling system with coolant.

Capacity: 9.2 liters (9.7 US qts, 8.1 lmp. qts)

HINT:

- Use of improper coolants may damage the engine cooling system.
- Use ”Toyota Super Long Life Coolant” or similar high quality ethylene glycol based non-silicate, non-amine, non-nitrite, and non-borate coolant with long-life hybrid organic acid technology.
- New Toyota vehicles are filled with Toyota Super Long Life Coolant (color is pink, premixed ethylene-glycol concentration is approximately 50% and freezing temperature is -35℃ (-31℉)). When replacing the coolant, Toyota Super Long Life Coolant is recommended.
- Observe the coolant level inside the radiator by pressing the inlet and outlet radiator hoses several times by hand. If the coolant level goes down, add the coolant.

NOTICE:

Do not use plain water alone.

3. CHECK FOR ENGINE COOLANT LEAKS

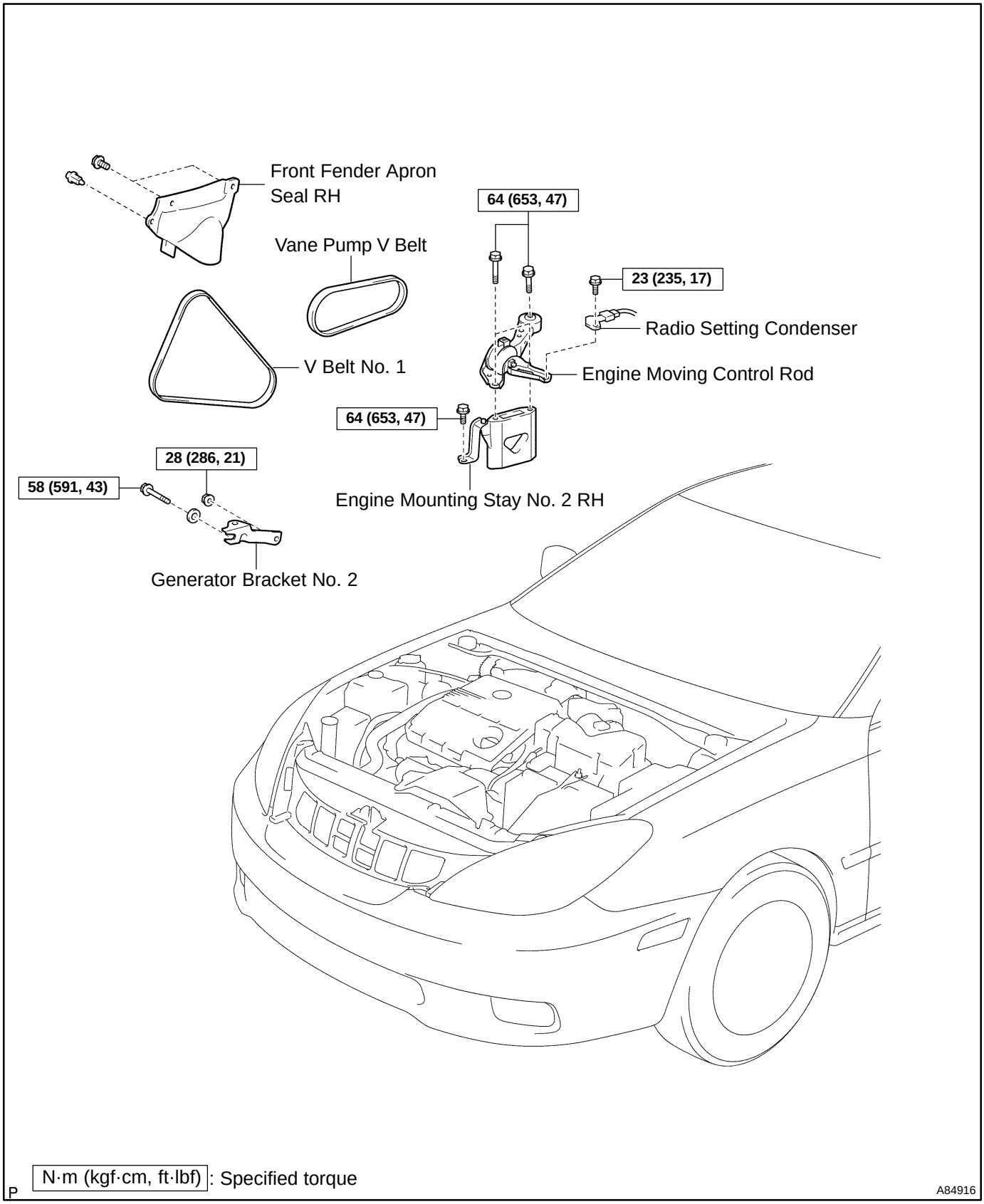
(a) Fill the radiator with coolant, then attach a radiator cap tester.

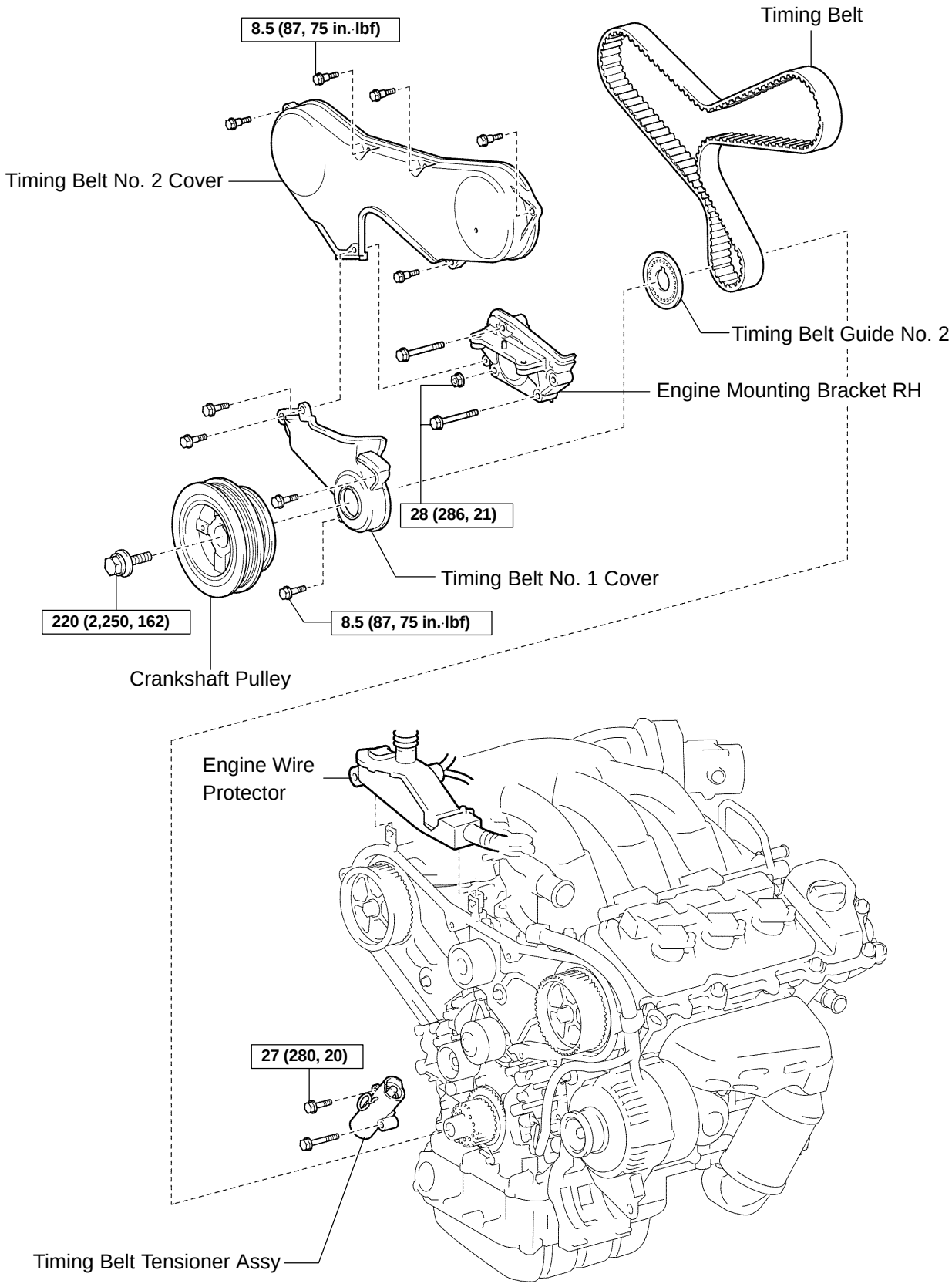
(b) Pump it to 118 kPa (1.2 kgf/cm^2 17.1 psi), then check for leakage.

WATER PUMP ASSY (3MZ-FE)

COMPONENTS

160QG-01

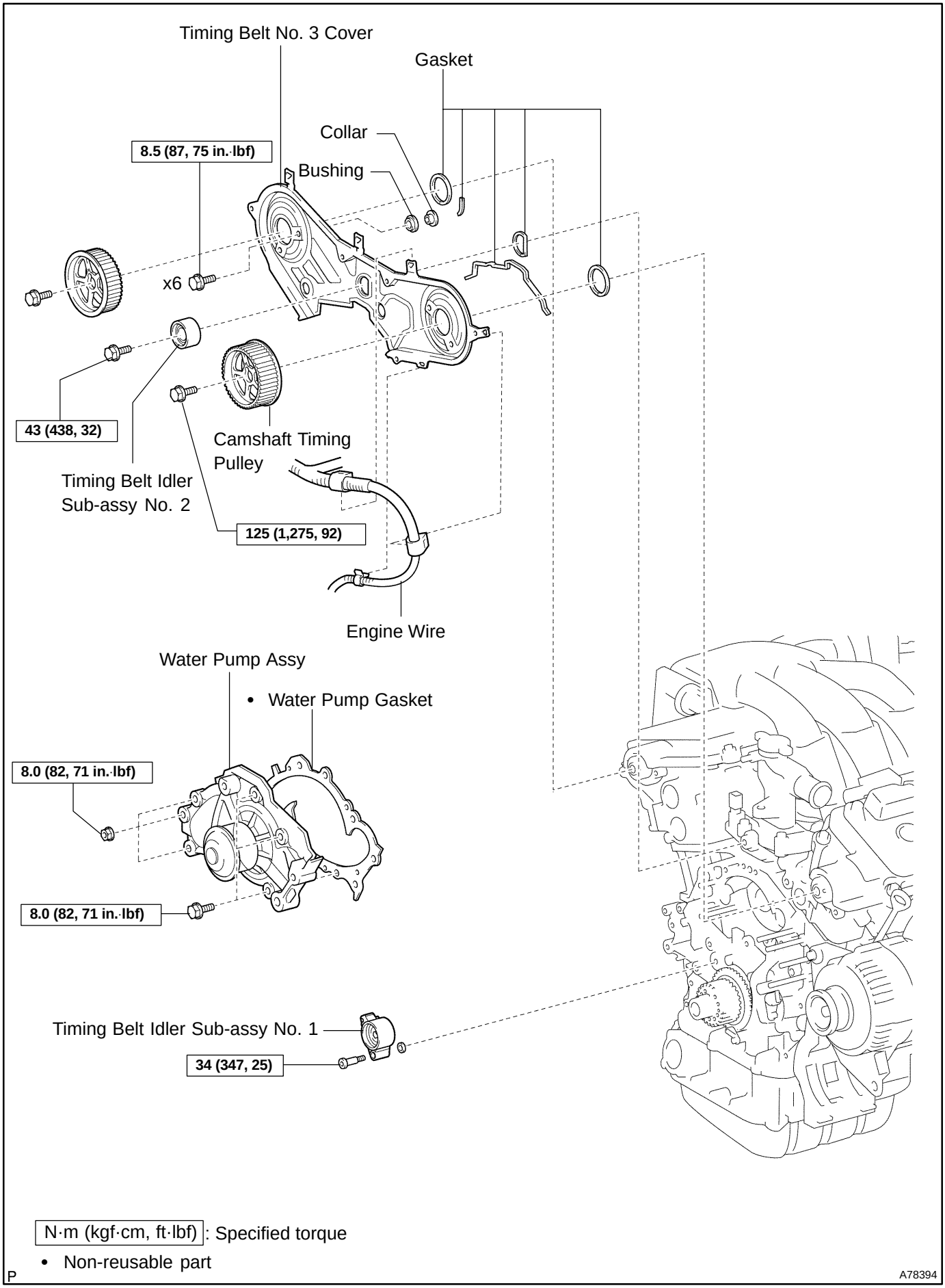




N·m (kgf·cm, ft·lbf): Specified torque

P

A78353

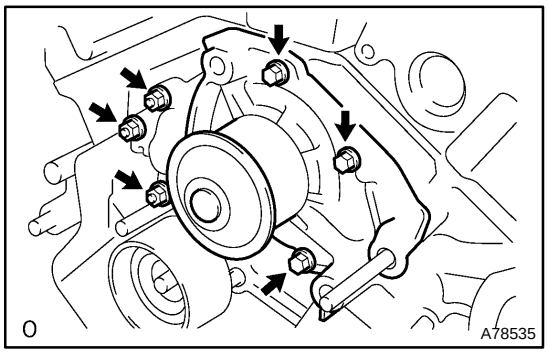

Timing Belt No. 3 Cover
Gasket
Collar
8.5 (87, 75 in.·lbf)
Bushing
x6
43 (438, 32)
Camshaft Timing Pulley
Timing Belt Idler Sub-assy No. 2
125 (1,275, 92)
Engine Wire
Water Pump Assy
• Water Pump Gasket
8.0 (82, 71 in.·lbf)
8.0 (82, 71 in.·lbf)
Timing Belt Idler Sub-assy No. 1
34 (347, 25)
N·m (kgf·cm, ft·lbf): Specified torque
• Non-reusable part
P
A78394

160QH-01

REPLACEMENT

1. **DRAIN ENGINE COOLANT (See page 16-9)**
2. **REMOVE FRONT WHEEL RH**
3. **REMOVE FRONT FENDER APRON SEAL RH**
4. **REMOVE V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (See page 14-5)**
5. **REMOVE VANE PUMP V BELT (See page 14-5)**
6. **REMOVE ENGINE MOVING CONTROL ROD (See page 14-79)**
7. **REMOVE ENGINE MOUNTING STAY NO.2 RH (See page 14-79)**
8. **REMOVE GENERATOR BRACKET NO.2 (See page 14-79)**
9. **REMOVE CRANKSHAFT PULLEY (See page 14-79)**
   SST 09213-54015 (91651-60855), 09330-00021, 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05031)
10. **REMOVE TIMING BELT NO.1 COVER**
11. **REMOVE TIMING BELT NO.2 COVER (See page 14-79)**
12. **REMOVE ENGINE MOUNTING BRACKET RH (See page 14-79)**
13. **REMOVE TIMING BELT GUIDE NO.2**
14. **REMOVE TIMING BELT (See page 14-79)**
15. **REMOVE TIMING BELT IDLER SUB-ASSY NO.2**
16. **REMOVE CAMSHAFT TIMING PULLEY (See page 14-93)**
    SST 09960-10010 (09962-01000, 09963-01000), 09249-63010
17. **REMOVE TIMING BELT NO.3 COVER (See page 14-93)**
18. **REMOVE TIMING BELT IDLER SUB-ASSY NO.1**

(a) Using a socket hexagon wrench 10, remove the pivot bolt, timing belt idler No. 1 and plate washer.



19. **REMOVE WATER PUMP ASSY**

(a) Remove the 3 bolts and 3 nuts, then remove the water pump and gasket.

20. **INSTALL WATER PUMP ASSY**

(a) Install a new gasket and the water pump with the 3 bolts and 3 nuts.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

21. **INSTALL TIMING BELT IDLER SUB-ASSY NO.1**

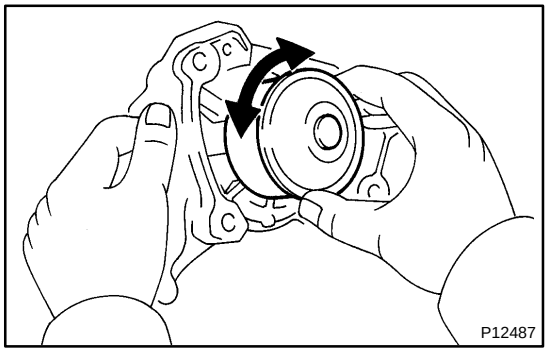
(a) Using a socket hexagon wrench 10, install the plate washer and timing belt idler No.1 with the pivot bolt.
Torque: 34 N·m (347 kgf·cm, 25 ft·lbf)

22. **INSTALL TIMING BELT NO.3 COVER (See page 14-93)**
23. **INSTALL CAMSHAFT TIMING PULLEY (See page 14-93)**
    SST 09960-10010 (09962-01000, 09963-01000), 09249-63010
24. **INSTALL TIMING BELT IDLER SUB-ASSY NO.2 (See page 14-93)**
25. **INSPECT TIMING BELT (See page 14-79)**
26. **INSTALL TIMING BELT (See page 14-79)**
    SST 09960-10010 (09962-01000, 09963-01000)

27. **INSTALL TIMING BELT TENSIONER ASSY (See page 14-79)**
28. **INSTALL TIMING BELT GUIDE NO.2 (See page 14-79)**
29. **INSTALL ENGINE MOUNTING BRACKET RH (See page 14-79)**
30. **INSTALL TIMING BELT NO.2 COVER (See page 14-79)**
31. **INSTALL TIMING BELT NO.1 COVER (See page 14-79)**
32. **INSTALL CRANKSHAFT PULLEY (See page 14-79)**
    SST 09213-54015 (91651-60855), 09330-00021
33. **INSTALL GENERATOR BRACKET NO.2 (See page 14-79)**
34. **INSTALL ENGINE MOUNTING STAY NO.2 RH (See page 14-79)**
35. **INSTALL ENGINE MOVING CONTROL ROD (See page 14-79)**
36. **INSTALL VANE PUMP V BELT (See page 14-5)**
37. **INSTALL V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (See page 14-5)**
38. **INSPECT DRIVE BELT DEFLECTION AND TENSION (See page 14-1)**
39. **INSTALL FRONT WHEEL RH (See page 14-5)**
40. **ADD ENGINE COOLANT (See page 16-9)**
41. **CHECK FOR ENGINE COOLANT LEAKS (See page 16-1)**

160LM-03

INSPECTION



1. INSPECT WATER PUMP ASSY

(a) Visually check the drain hole for coolant leakage.

(b) Turn the pulley, then check that the water pump bearing moves smoothly without making a niose.

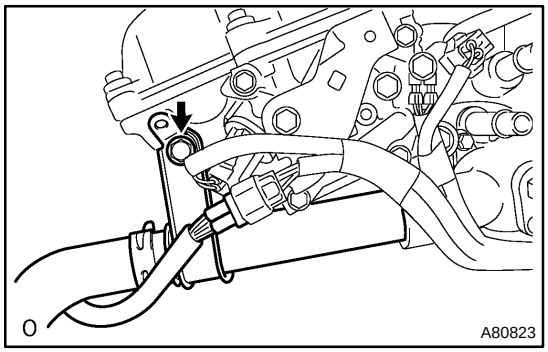
If not, replace the water pump.

THERMOSTAT (3MZ-FE)

160QI-01

REPLACEMENT

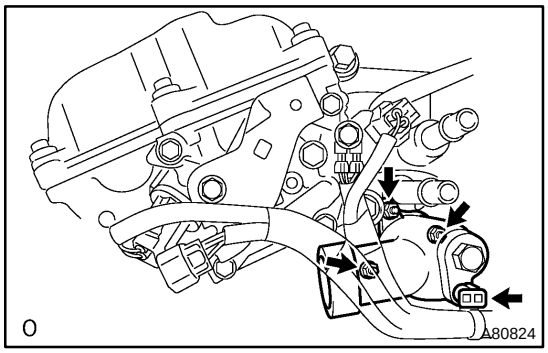
1. DISCONNECT BATTERY NEGATIVE TERMINAL
2. DRAIN ENGINE COOLANT (See page 16-9)
3. REMOVE RADIATOR LOWER AIR DEFLECTOR (See page 19-5)
4. REMOVE AIR CLEANER INLET ASSY (See page 19-5)
5. REMOVE AIR CLEANER ASSY (See page 19-5)



6. REMOVE WATER INLET PIPE

(a) Remove the bolt and water inlet pipe.

(b) Remove the O-ring from the water inlet pipe.

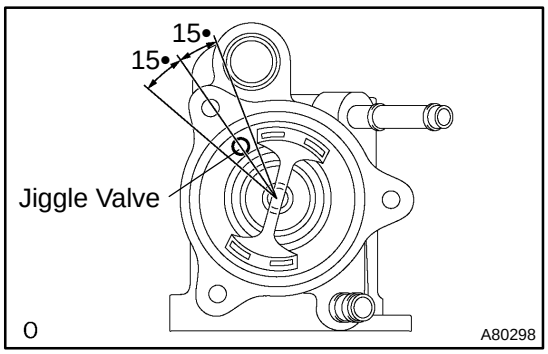


7. REMOVE WATER INLET

(a) Disconnect the wire harness clamp.

(b) Remove the 3 nuts and water inlet.

8. REMOVE THERMOSTAT



9. INSTALL THERMOSTAT

(a) Install a new gasket to the thermostat.

(b) Align the thermostat jiggle valve with the upper stud bolt, then insert the thermostat in the water inlet housing.

HINT:

The jiggle valve may be set within 15 • of either side of the prescribed position.

10. INSTALL WATER INLET

Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

11. INSTALL WATER INLET PIPE

(a) Install a new O-ring to the water inlet pipe.

(b) Apply soapy water to the O-ring.

(c) Connect the water inlet pipe to the water inlet.

(d) Install the bolt which is used to fixes the water inlet pipe to the cylinder head.

Torque: 20 N·m (199 kgf·cm, 14 ft·lbf)

12. INSTALL AIR CLEANER ASSY (See page 19-5)

13. INSTALL AIR CLEANER INLET ASSY (See page 19-5)

14. CHECK CONNECTION OF VACUUM HOSE (See page 14-29)

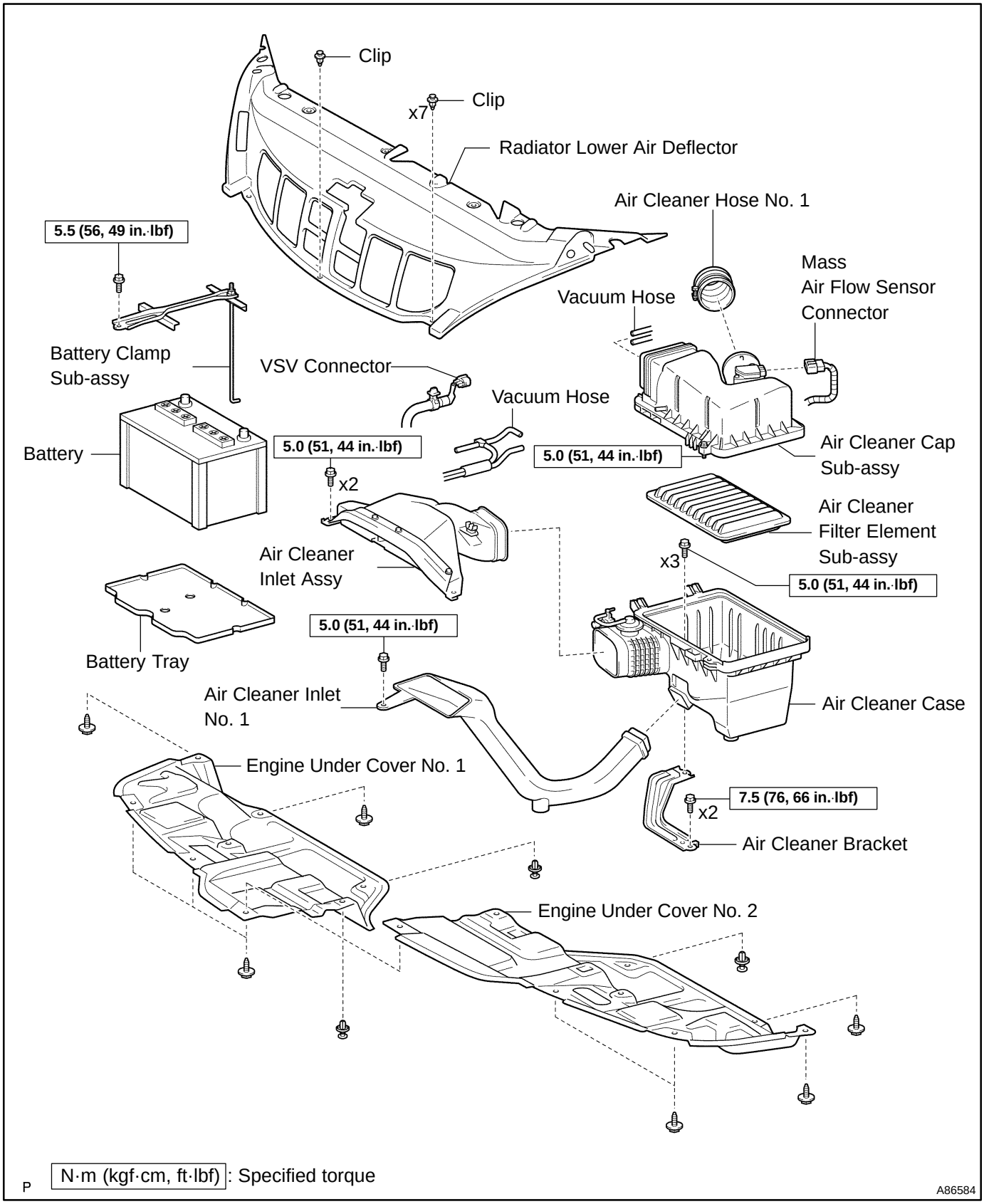
15. ADD ENGINE COOLANT (See page 16-9)

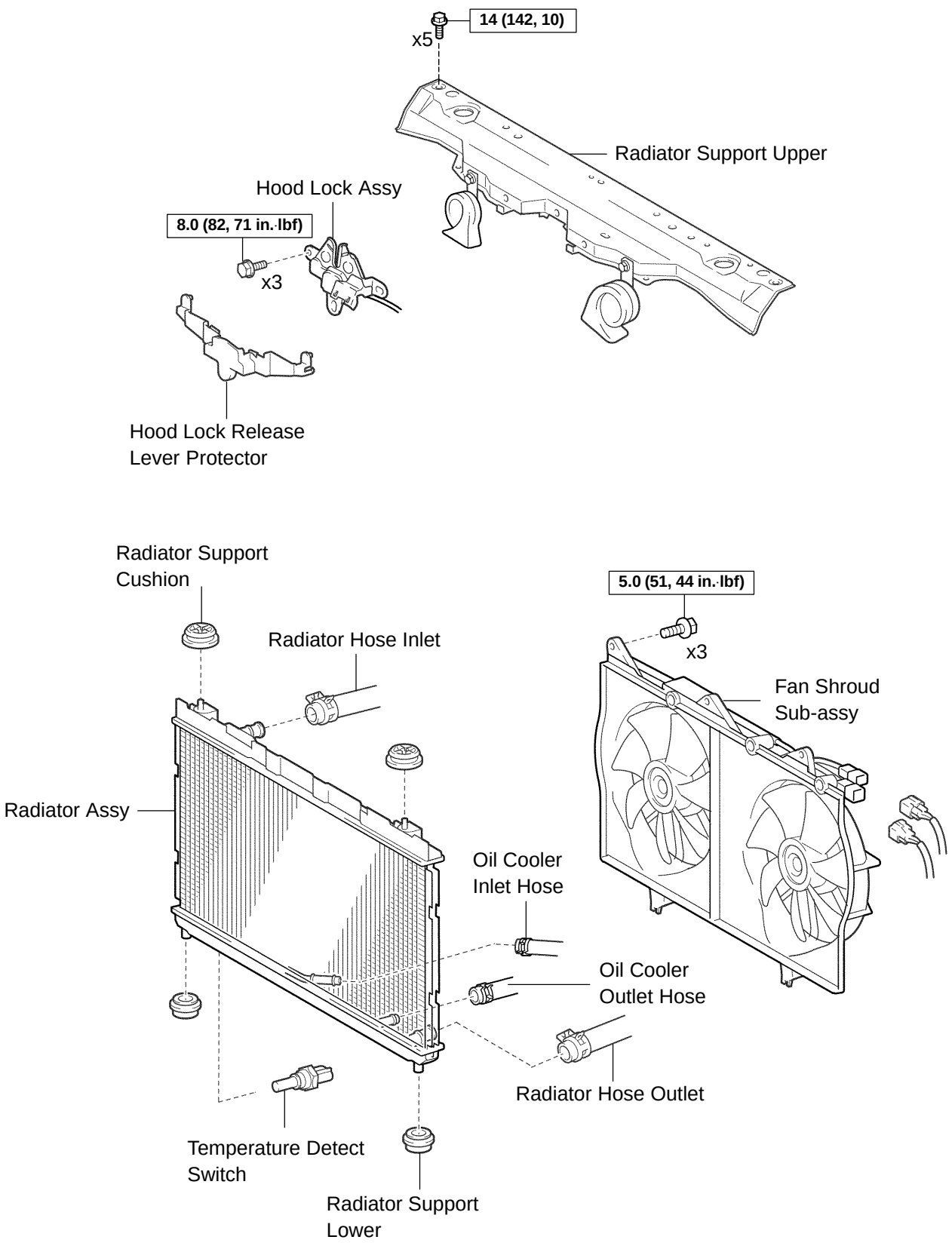
16. CHECK FOR ENGINE COOLANT LEAKS (See page 16-1)

RADIATOR ASSY (3MZ-FE)

160QJ-01

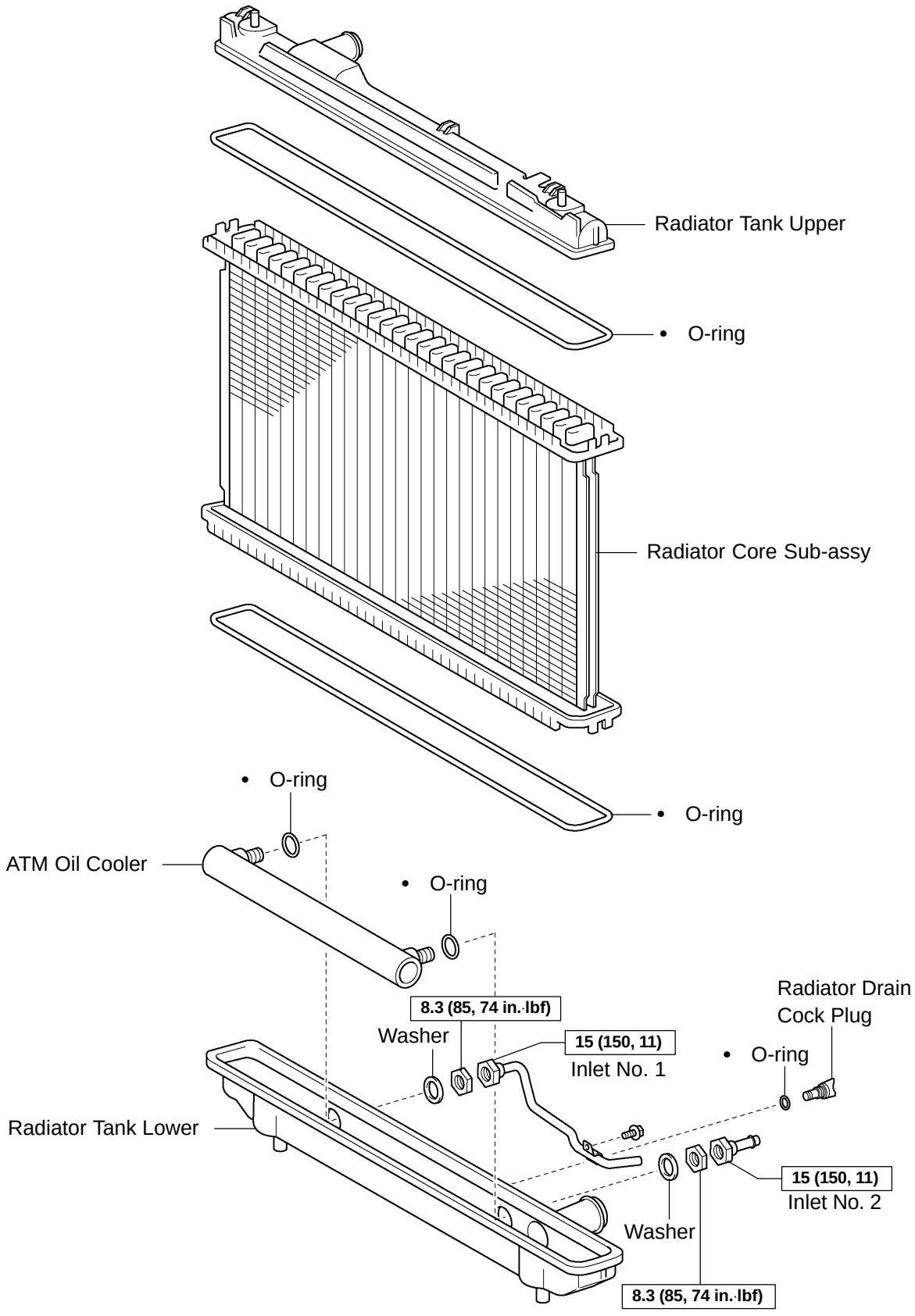
COMPONENTS





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

P A86585



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

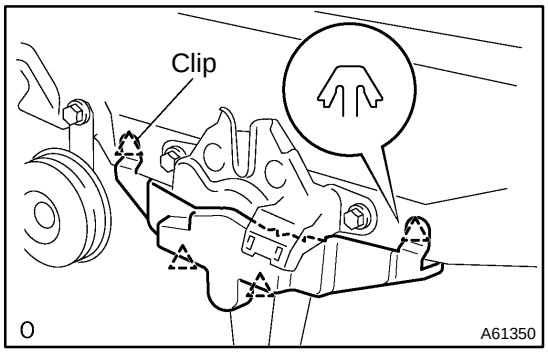
Y • Non-reusable part

A86586

160QK-01

REPLACEMENT

1. DISCONNECT BATTERY NEGATIVE TERMINAL
2. DRAIN ENGINE COOLANT (See page 16-9)
3. REMOVE ENGINE UNDER COVER NO.1
4. REMOVE ENGINE UNDER COVER NO.2
5. REMOVE RADIATOR LOWER AIR DEFLECTOR (See page 19-5)
6. REMOVE BATTERY
7. REMOVE BATTERY TRAY
8. REMOVE AIR CLEANER INLET ASSY (See page 19-5)
9. REMOVE AIR CLEANER ASSY (See page 19-5)
10. REMOVE AIR CLEANER BRACKET (See page 19-5)
11. REMOVE AIR CLEANER INLET NO.1 (See page 19-5)
12. DISCONNECT RADIATOR HOSE INLET
13. DISCONNECT RADIATOR HOSE OUTLET
14. DISCONNECT OIL COOLER INLET HOSE
15. DISCONNECT OIL COOLER OUTLET HOSE

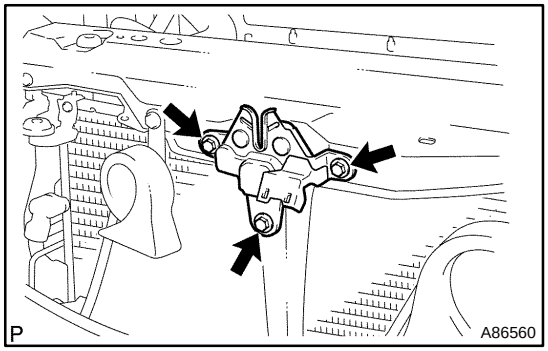


16. REMOVE HOOD LOCK RELEASE LEVER PROTECTOR

(a) Using a screwdriver with the tip wrapped in tape, remove the protector.

NOTICE:

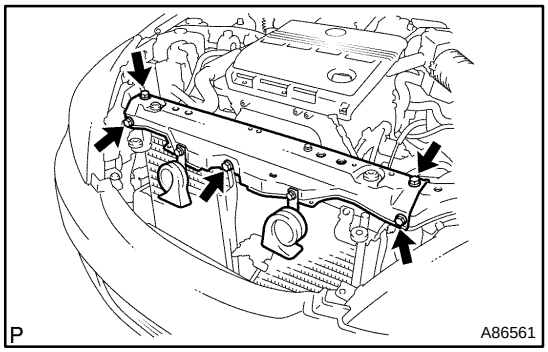
Removing the protector damages the clips inside the protector, therefore it is necessary to use a new protector when installing.



17. SEPARATE HOOD LOCK ASSY

(a) Disconnect the hood switch connector.

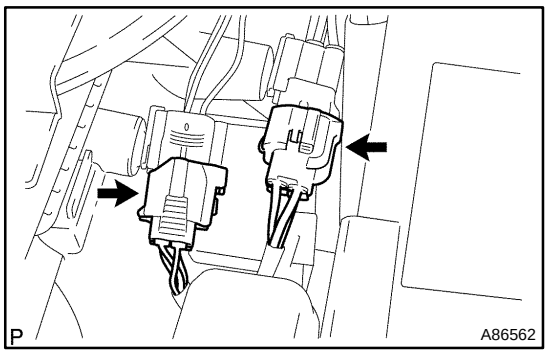
(b) Remove the 3 bolts, then separate the hood lock.



18. REMOVE RADIATOR SUPPORT UPPER

(a) Disconnect the horn connectors.

(b) Remove the 5 bolts, then remove the radiator support upper.



19. REMOVE RADIATOR ASSY

(a) Disconnect the 2 wire harness connectors.

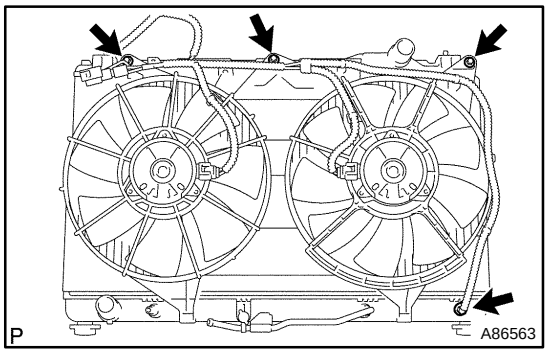
(b) Remove the radiator from the vehicle.

20. REMOVE RADIATOR SUPPORT CUSHION

(a) Remove the 2 radiator support cushions from the radiator.

21. REMOVE RADIATOR SUPPORT LOWER

(a) Remove the 2 radiator support lowers from the radiator.



22. REMOVE FAN SHROUD SUB-ASSY

(a) Disconnect the temperature detect switch connector.

(b) Remove the 3 bolts, then remove the fan shroud with motor.

23. REMOVE TEMPERATURE DETECT SWITCH

24. REPLACE RADIATOR ASSY

25. INSTALL FAN SHROUD SUB-ASSY
Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)

26. INSTALL RADIATOR SUPPORT UPPER
Torque: 14 N·m (142 kgf·cm, 10 ft·lbf)

27. INSTALL HOOD LOCK ASSY
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

28. INSTALL AIR CLEANER INLET NO.1 (See page 19-5)

29. INSTALL AIR CLEANER BRACKET (See page 19-5)

30. INSTALL AIR CLEANER ASSY (See page 19-5)

31. INSTALL AIR CLEANER INLET ASSY (See page 19-5)

32. CHECK CONNECTION OF VACUUM HOSE (See page 14-29)

33. ADD ENGINE COOLANT (See page 16-9)

34. CHECK FOR ENGINE COOLANT LEAKS (See page 16-1)

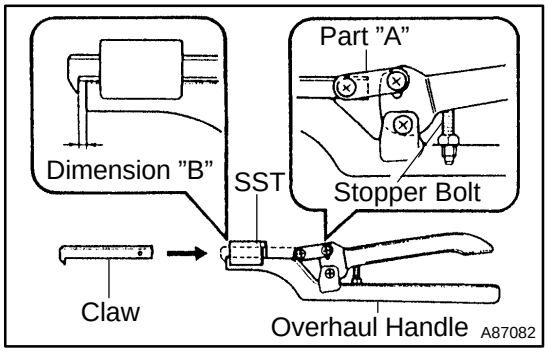
160QL-01

OVERHAUL

1. REMOVE RADIATOR DRAIN COCK PLUG

(a) Remove the drain cock plug.

(b) Remove the O-ring from the drain cock plug.



2. ASSEMBLE SST

SST 09230-01010 (09231-01010, 09231-01030)

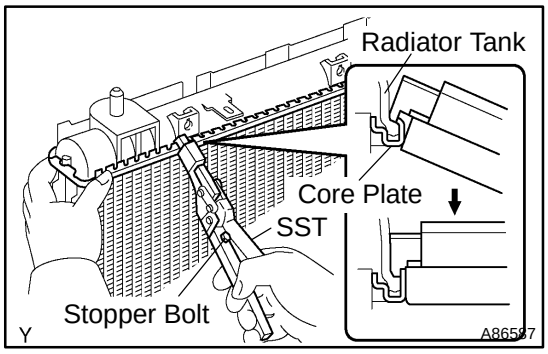
(a) Install the claw to the overhaul handle by inserting it in the hole in part "A" as shown in the illustration.

(b) While gripping the handle, adjust the stopper bolt so that dimension "B" is as shown in the illustration.

Dimension "B": 0.2 to 0.3 mm (0.008 to 0.012 in)

NOTICE:

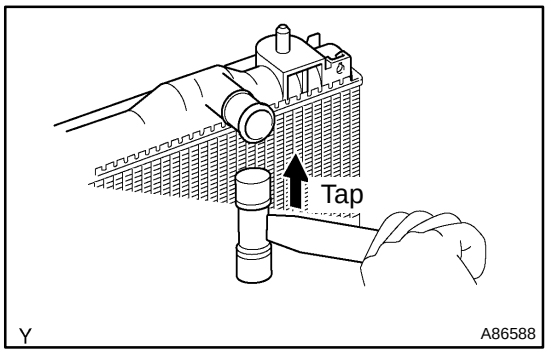
If the stopper bolt is not adjusted, the claw may be damaged.



3. UNCAULK CORE PLATE

(a) Using SST to release the core plate, grip the handle until stopped by the stopper bolt.

SST 09230-01010 (09231-01010, 09231-01030)



4. REMOVE RADIATOR TANK UPPER

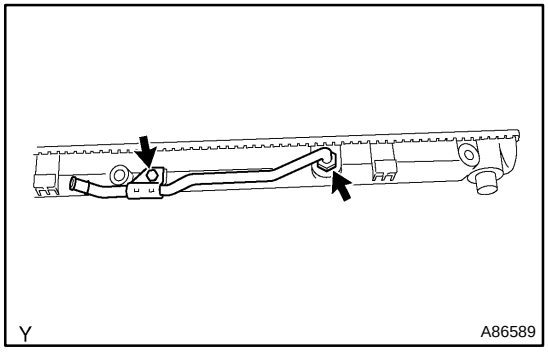
(a) Lightly tap the bracket of the radiator tank (or radiator tank pipe) with a soft-faced hammer, then remove the radiator tank.

(b) Remove the O-ring.

5. REMOVE RADIATOR TANK LOWER

HINT:

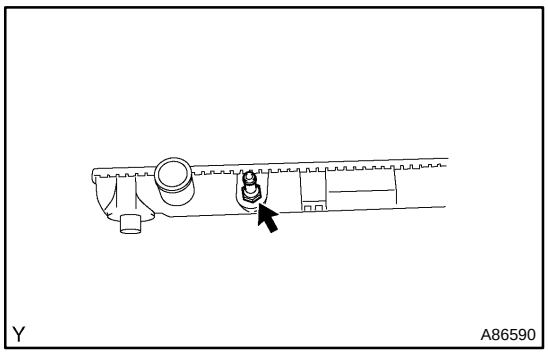
Perform the same procedures as the radiator tank upper.



6. REMOVE INLET NO.1

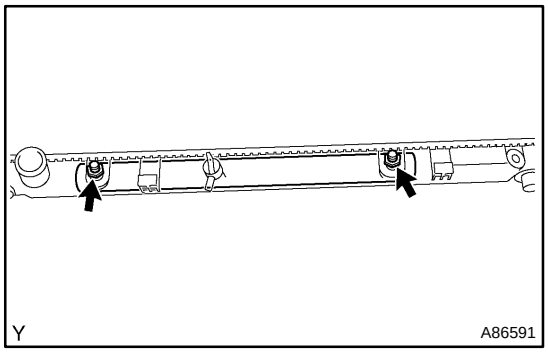
(a) Remove the bolt.

(b) Remove the nut and inlet No. 1.



7. REMOVE INLET NO.2

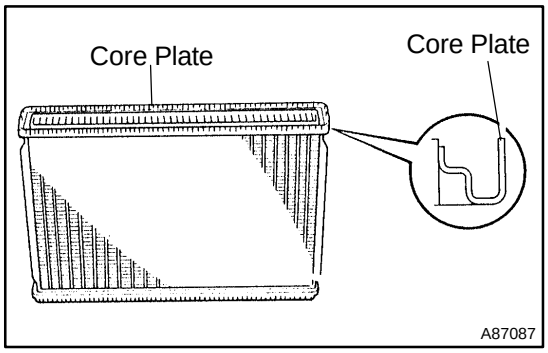
(a) Remove the nut and inlet No. 2.



8. REMOVE ATM OIL COOLER

(a) Remove the 2 nuts and 2 washers, then remove the oil cooler from the radiator tank.

(b) Remove the 2 O-rings from the oil cooler.



9. INSPECT RADIATOR CORE SUB-ASSY

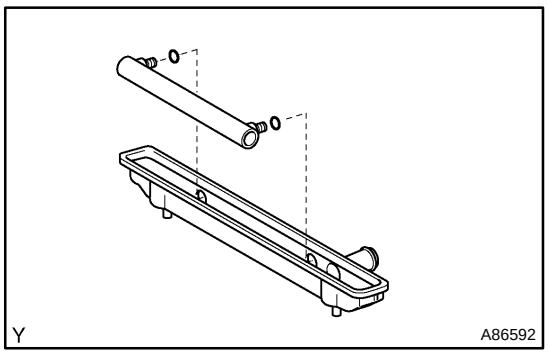
Check the core plate for damage.

HINT:

- If the sides of the core plate groove are deformed, it will be impossible to reassemble the radiator tank. Therefore, first correct any deformation with pliers or a similar tool.
- Water leakage will result if the bottom of the core plate groove is damaged or dented. Repair or replace if necessary.

NOTICE:

The radiator can only be recaulked 2 times. After being recaulked 2 times, the radiator core must be replaced.



10. INSTALL ATM OIL COOLER

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

(b) Install the oil cooler to the radiator tank.

(c) Install the 2 nuts and 2 washers.

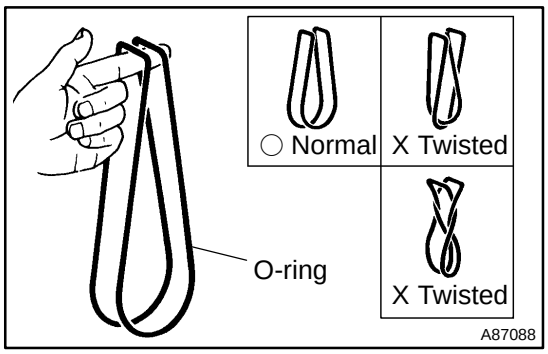
Torque: 8.3 N·m (85 kgf·cm, 74 in.·lbf)

11. INSTALL INLET NO.2

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

12. INSTALL INLET NO.1

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

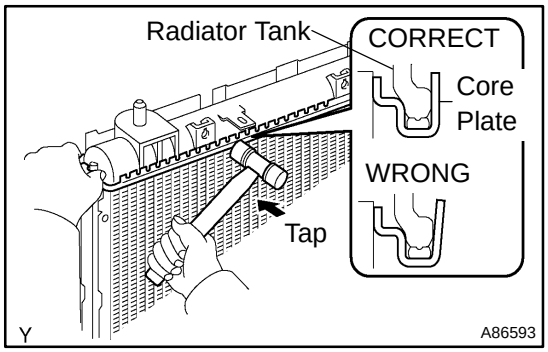


13. INSTALL RADIATOR TANK UPPER

(a) After checking that there are no foreign objects in the core plate groove, install a new O-ring without twisting it.

HINT:

When cleaning the core plate groove, lightly rub it with sandpaper without scratching it.



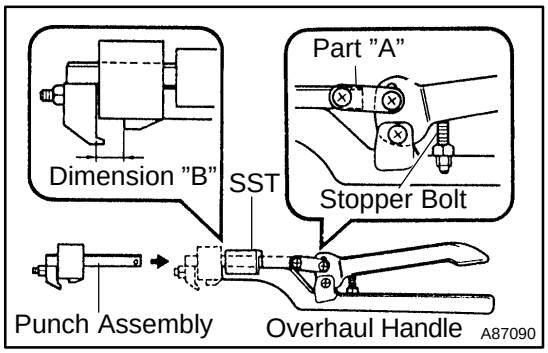
(b) Install the radiator tank without damaging the O-ring.

(c) Tap the core plate with a soft-faced hammer so that there is no gap between the core plate and radiator tank.

14. INSTALL RADIATOR TANK LOWER

HINT:

Perform the same procedures as the radiator tank upper.



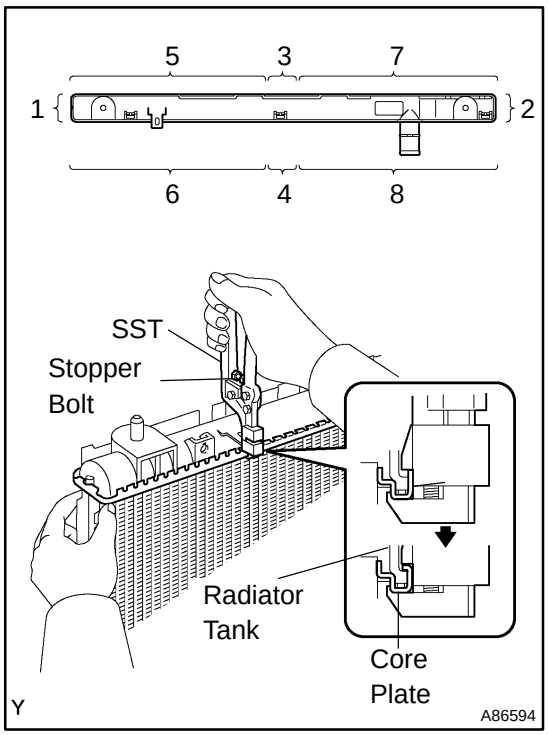
15. ASSEMBLE SST

SST 09230-01010 (09231-01010, 09231-01020)

(a) Install the punch assembly to the overhaul handle by inserting it in the hole in part "A" as shown in the illustration.

(b) While gripping the handle, adjust the stopper bolt so that dimension "B" is as shown in the illustration.

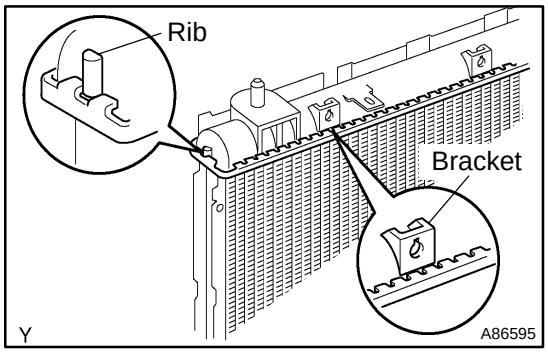
Dimension "B": 8.4 mm (0.341 in.)



16. CAULK CORE PLATE

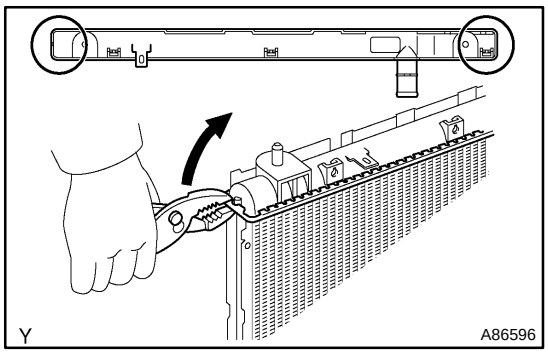
(a) Lightly press SST against the core plate in the order shown in the illustration. After repeating this a few times, fully caulk the core plate by gripping the handle until stopped by the stopper bolt.

SST 09230-01010 (09231-01010, 09231-01020)

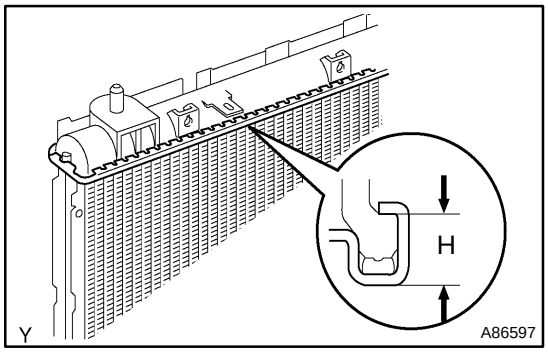


HINT:

- Do not tap the areas protruding around the pipes, brackets or tank ribs.



- The points shown in the illustration and oil cooler near here cannot be tapped with the SST. Use pliers or a similar tool and be careful not to damage the core plate.



(b) Check the core plate height (H) after completing the caulking.

Plate height (H): 7.40 to 7.80 mm (0.2913 to 0.3071 in.)

If the height is not as specified, adjust the stopper bolt of the handle again, then caulk again.

17. INSTALL RADIATOR DRAIN COCK PLUG

(a) Install a new O-ring to the drain cock plug.

(b) Install the drain cock plug.

LUBRICATION SYSTEM (3MZ-FE)

170FZ-02

ON-VEHICLE INSPECTION

1. CHECK ENGINE OIL LEVEL

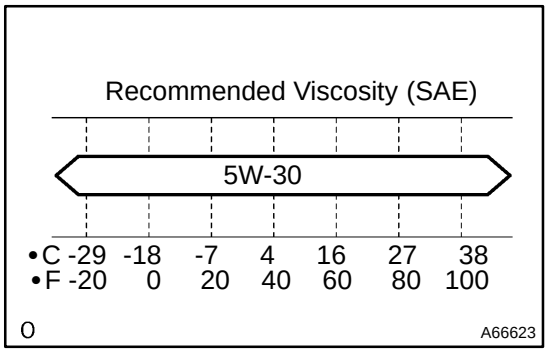
(a) Warm up the engine, then stop the engine and wait for 5 minutes.

(b) Check that the engine oil level is between the low and full level marks on the level gage.

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.



2. CHECK ENGINE OIL QUALITY

(a) Check the oil for deterioration, water intrusion, discoloring or thinning.

If the quality is visibly poor, replace the oil.

Oil grade:

Use API grade SL "Energy-Conserving", or ILSAC multigrade engine oil.

SAE 5W-30 is the best choice for good fuel economy, and good starting in cold weather.

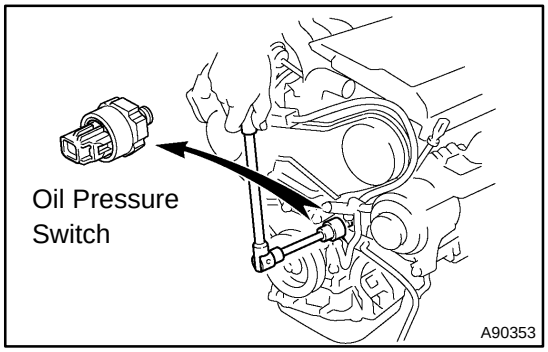
If SAE 5W-30 is not available, SAE 10W-30 may be used.

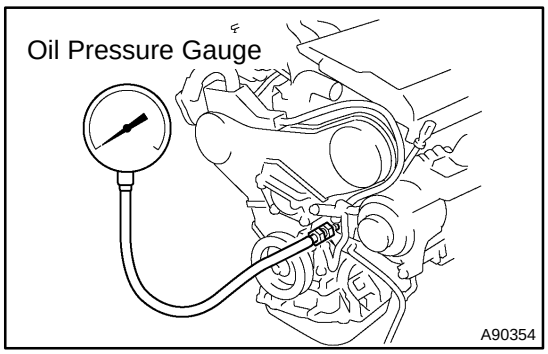
However, it should be replaced with SAE 5W-30 at the next oil replacement.

3. INSPECT OIL PRESSURE

(a) Disconnect the oil pressure switch connector.

(b) Using a deep socket wrench 24 mm, remove the oil pressure switch.





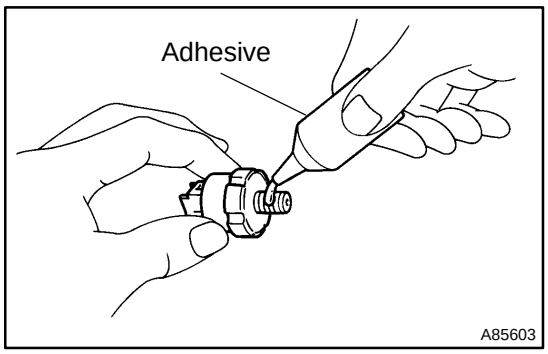
(c) Install the oil pressure gauge.

(d) Warm up the engine.

(e) Inspect the oil pressure.

Oil pressure:

At idle	29 kPa (0.3 kgf/cm^2, 4.3 psi) or more
At 3,000 rpm	245 to 539 kPa (2.5 to 5.5 kgf/cm^2, 36 to 78 psi)



(f) Apply adhesive to 2 or 3 threads of the oil pressure switch.
Adhesive:
Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(g) Using a deep socket wrench 24 mm, install the oil pressure switch.
Torque: 15 N·m (153 kgf·cm, 11 ft·lbf)

NOTICE:
Do not start the engine within 1 hour of installation.

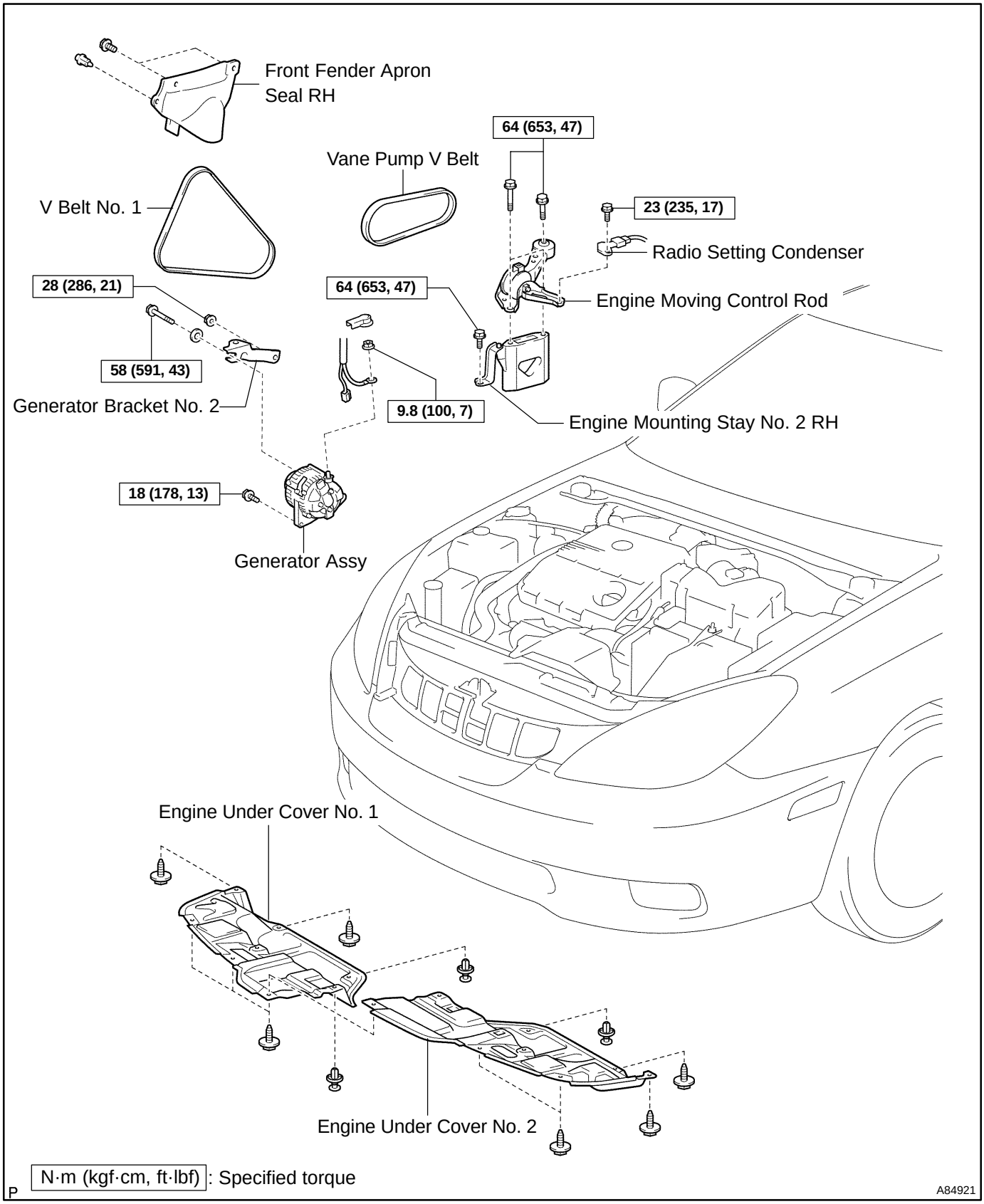
(h) Connect the oil pressure switch connector.

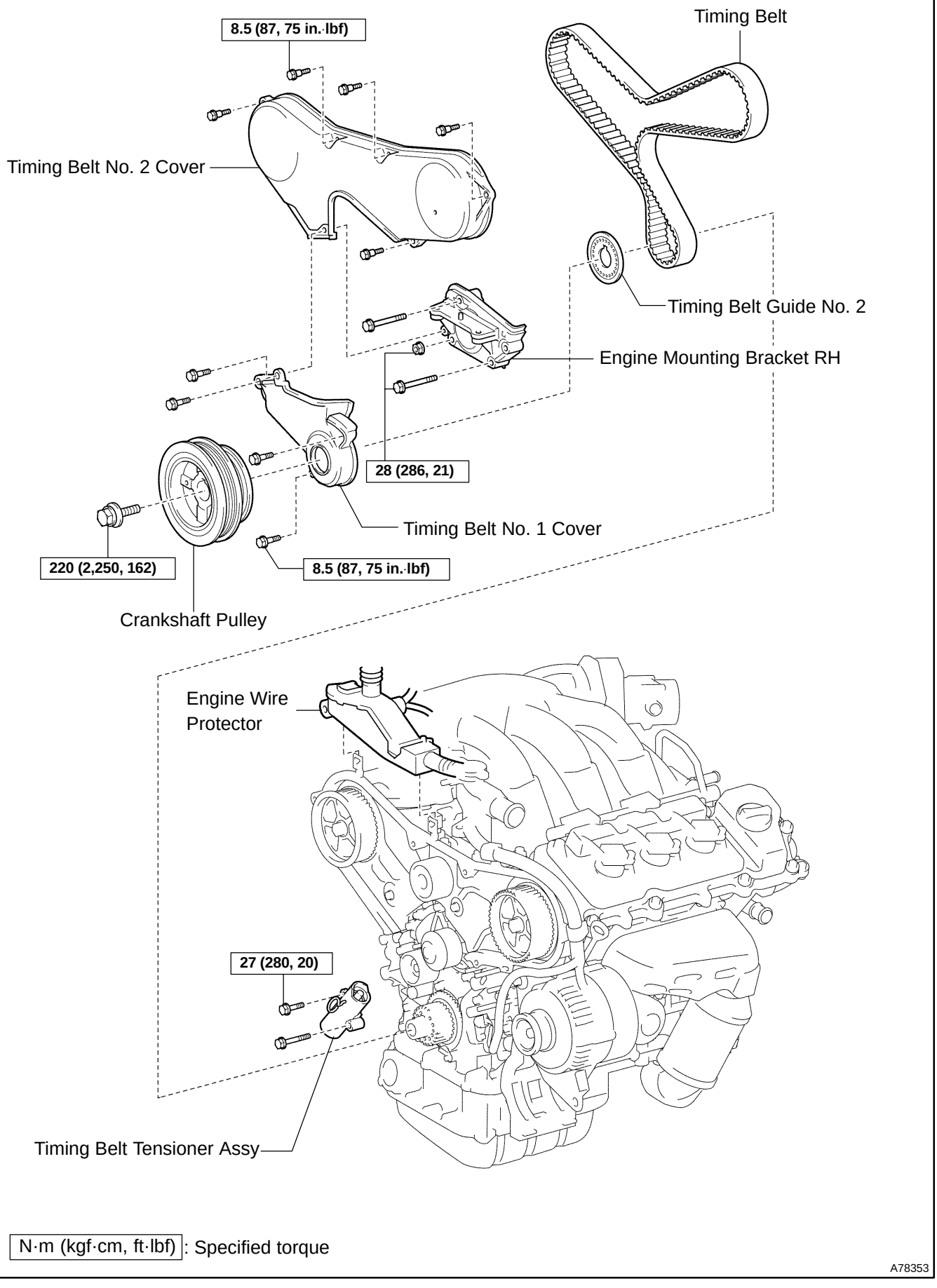
(i) Check for the engine oil leaks.

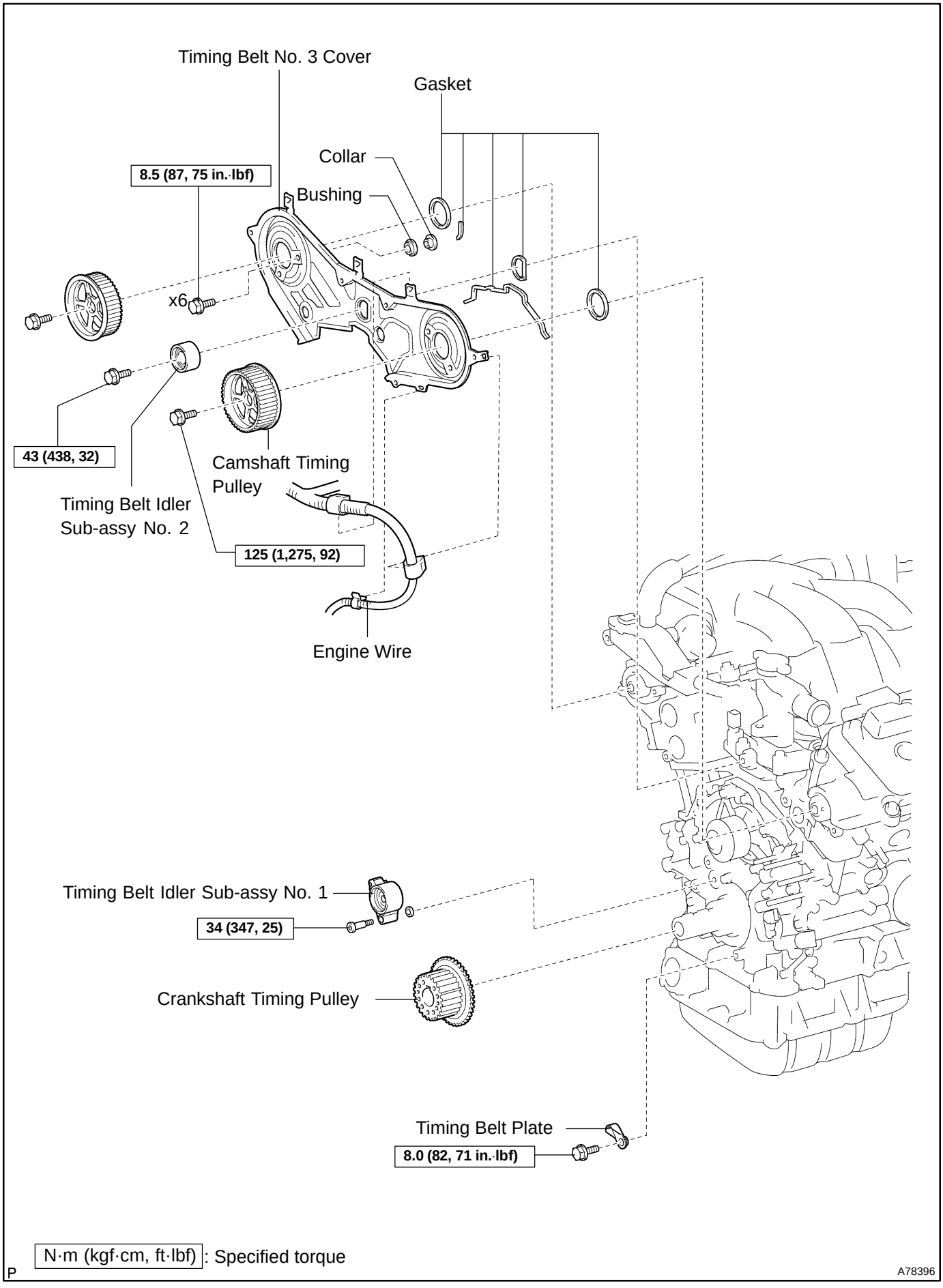
OIL PUMP ASSY (3MZ-FE)

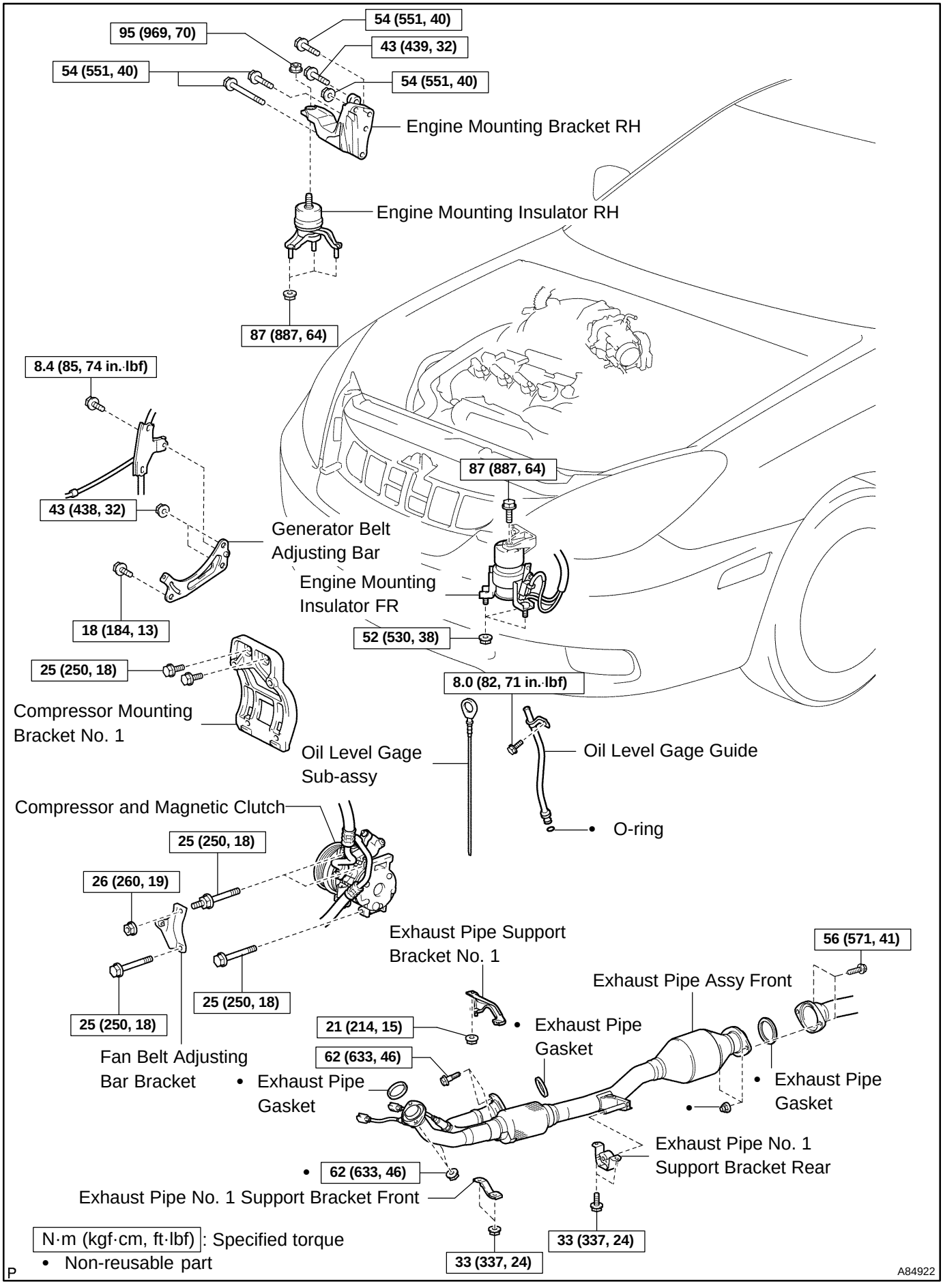
170HM-01

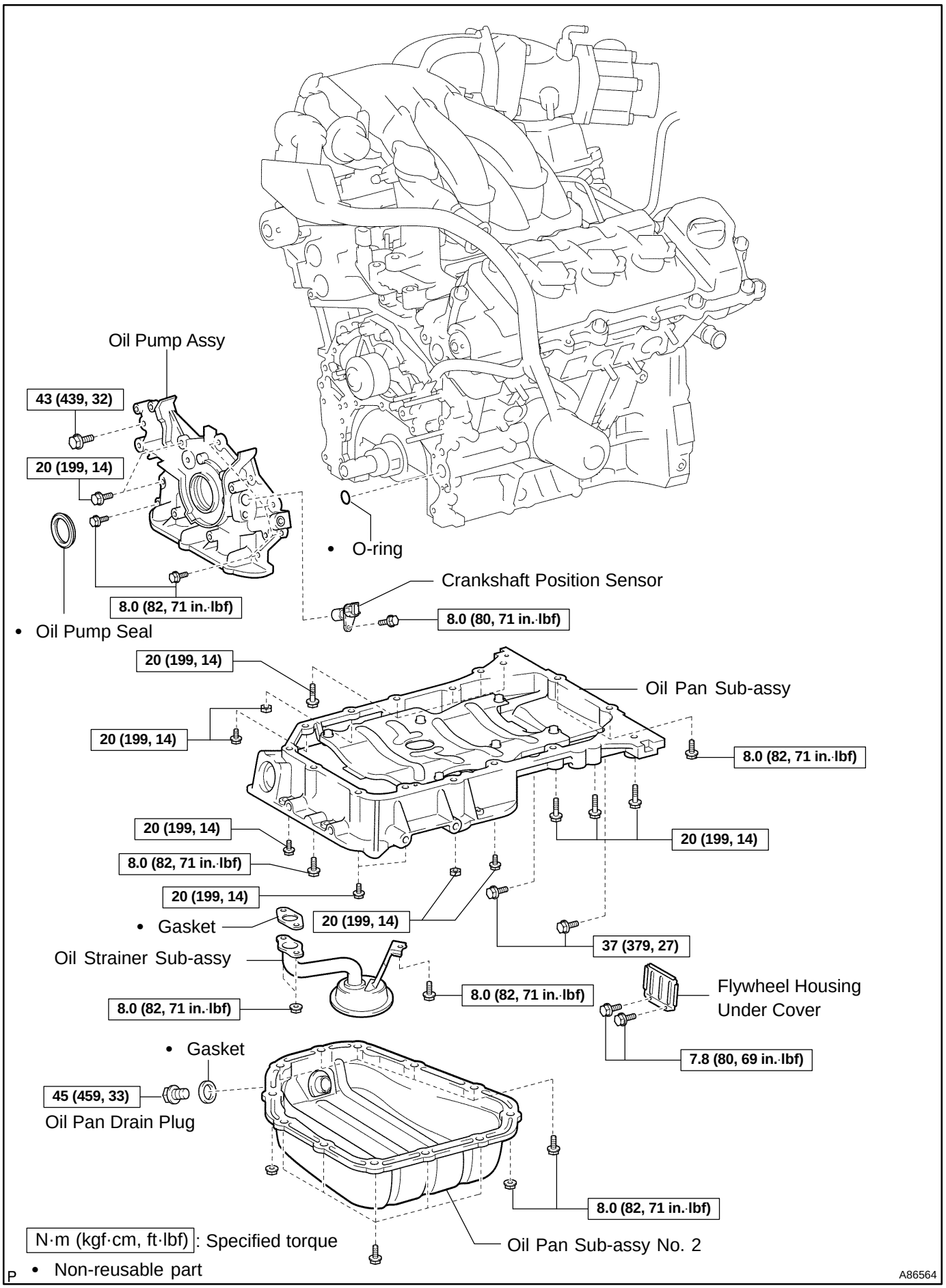
COMPONENTS

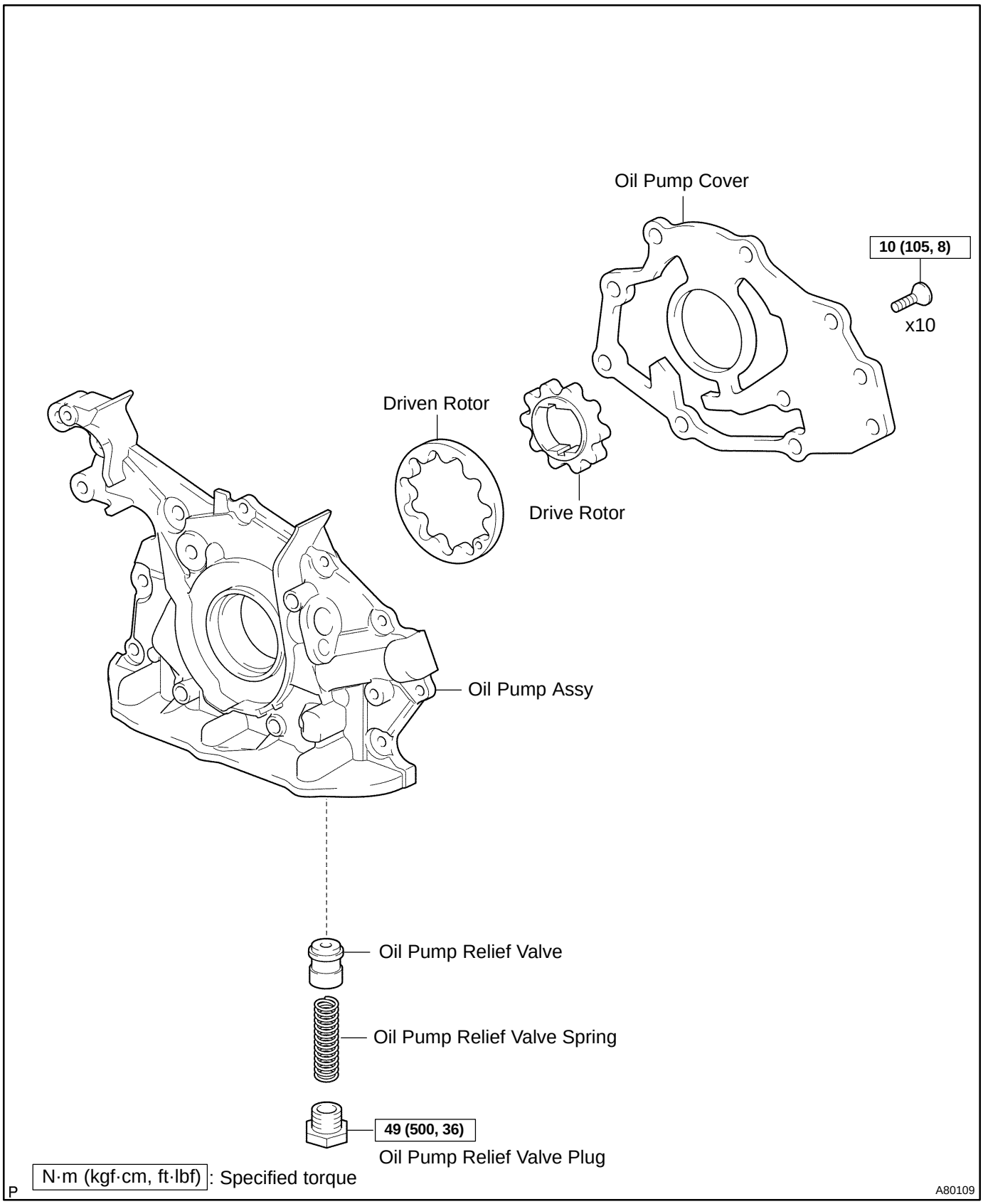



8.5 (87, 75 in.·lbf)
Timing Belt
Timing Belt No. 2 Cover
Timing Belt Guide No. 2
Engine Mounting Bracket RH
28 (286, 21)
Timing Belt No. 1 Cover
220 (2,250, 162)
8.5 (87, 75 in.·lbf)
Crankshaft Pulley
Engine Wire Protector
27 (280, 20)
Timing Belt Tensioner Assy
N·m (kgf·cm, ft·lbf): Specified torque
P
A78353


Timing Belt No. 3 Cover
Gasket
Collar
8.5 (87, 75 in.·lbf)
Bushing
x6
43 (438, 32)
Camshaft Timing Pulley
Timing Belt Idler Sub-assy No. 2
125 (1,275, 92)
Engine Wire
Timing Belt Idler Sub-assy No. 1
34 (347, 25)
Crankshaft Timing Pulley
Timing Belt Plate
8.0 (82, 71 in.·lbf)
N·m (kgf·cm, ft·lbf): Specified torque
P
A78396


95 (969, 70)
54 (551, 40)
43 (439, 32)
54 (551, 40)
54 (551, 40)
Engine Mounting Bracket RH
Engine Mounting Insulator RH
87 (887, 64)
8.4 (85, 74 in.·lbf)
43 (438, 32)
Generator Belt Adjusting Bar
18 (184, 13)
87 (887, 64)
Engine Mounting Insulator FR
52 (530, 38)
25 (250, 18)
Compressor Mounting Bracket No. 1
8.0 (82, 71 in.·lbf)
Oil Level Gage Sub-assy
Oil Level Gage Guide
O-ring
Compressor and Magnetic Clutch
25 (250, 18)
26 (260, 19)
25 (250, 18)
25 (250, 18)
Fan Belt Adjusting Bar Bracket
Exhaust Pipe Support Bracket No. 1
56 (571, 41)
Exhaust Pipe Assy Front
21 (214, 15)
Exhaust Pipe Gasket
62 (633, 46)
Exhaust Pipe Gasket
Exhaust Pipe Gasket
Exhaust Pipe No. 1 Support Bracket Rear
62 (633, 46)
Exhaust Pipe No. 1 Support Bracket Front
33 (337, 24)
33 (337, 24)
N·m (kgf·cm, ft·lbf): Specified torque
• Non-reusable part
P
A84922

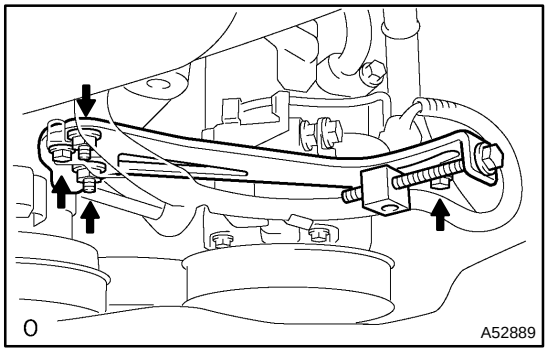

Oil Pump Assy
43 (439, 32)
20 (199, 14)
8.0 (82, 71 in.·lbf)
• Oil Pump Seal
• O-ring
Crankshaft Position Sensor
8.0 (80, 71 in.·lbf)
20 (199, 14)
20 (199, 14)
Oil Pan Sub-assy
8.0 (82, 71 in.·lbf)
20 (199, 14)
8.0 (82, 71 in.·lbf)
20 (199, 14)
20 (199, 14)
• Gasket
20 (199, 14)
37 (379, 27)
Oil Strainer Sub-assy
8.0 (82, 71 in.·lbf)
8.0 (82, 71 in.·lbf)
Flywheel Housing Under Cover
7.8 (80, 69 in.·lbf)
• Gasket
45 (459, 33)
Oil Pan Drain Plug
8.0 (82, 71 in.·lbf)
N·m (kgf·cm, ft·lbf): Specified torque
Oil Pan Sub-assy No. 2
• Non-reusable part
A86564


Oil Pump Cover
10 (105, 8)
x10
Driven Rotor
Drive Rotor
Oil Pump Assy
Oil Pump Relief Valve
Oil Pump Relief Valve Spring
49 (500, 36)
Oil Pump Relief Valve Plug
N·m (kgf·cm, ft·lbf): Specified torque
P
A80109

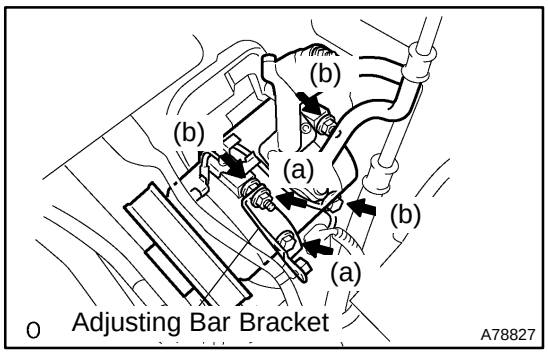
170HN-02

REPLACEMENT

1. **DISCONNECT BATTERY NEGATIVE TERMINAL**
2. **DRAIN ENGINE OIL (See page 17-20)**
3. **REMOVE FRONT WHEEL RH**
4. **REMOVE ENGINE UNDER COVER NO.1**
5. **REMOVE ENGINE UNDER COVER NO.2**
6. **REMOVE FRONT FENDER APRON SEAL RH**
7. **REMOVE V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (See page 14-5)**
8. **REMOVE GENERATOR ASSY (See page 19-21)**
9. **REMOVE VANE PUMP V BELT (See page 14-5)**
10. **REMOVE ENGINE MOVING CONTROL ROD (See page 14-79)**
11. **REMOVE ENGINE MOUNTING STAY NO.2 RH (See page 14-79)**
12. **REMOVE GENERATOR BRACKET NO.2 (See page 14-79)**
13. **REMOVE CRANKSHAFT PULLEY (See page 14-79)**
    SST 09213-54015 (91651-60855), 09330-00021, 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05031)
14. **REMOVE TIMING BELT NO.1 COVER**
15. **REMOVE TIMING BELT NO.2 COVER (See page 14-79)**
16. **REMOVE ENGINE MOUNTING BRACKET RH (See page 14-79)**
17. **REMOVE TIMING BELT GUIDE NO.2**
18. **REMOVE TIMING BELT (See page 14-79)**
19. **REMOVE TIMING BELT IDLER SUB-ASSY NO.2**
20. **REMOVE CAMSHAFT TIMING PULLEY (See page 14-93)**
    SST 09960-10010 (09962-01000, 09963-01000), 09249-63010
21. **REMOVE TIMING BELT NO.3 COVER (See page 14-93)**
22. **REMOVE TIMING BELT IDLER SUB-ASSY NO.1 (See page 16-13)**
23. **REMOVE CRANKSHAFT TIMING PULLEY (See page 14-138)**
    SST 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05011)
24. **REMOVE EXHAUST PIPE NO.1 SUPPORT BRACKET FRONT (See page 15-2)**
25. **REMOVE EXHAUST PIPE NO.1 SUPPORT BRACKET REAR (See page 15-2)**
26. **REMOVE EXHAUST PIPE ASSY FRONT (See page 15-2)**
27. **REMOVE EXHAUST PIPE SUPPORT BRACKET NO.1 (See page 40-9)**
28. **REMOVE OIL LEVEL GAGE GUIDE (See page 14-133)**



29. **REMOVE GENERATOR BELT ADJUSTING BAR**
    (a) Remove the 2 bolts and 2 nuts, then remove the adjusting bar.



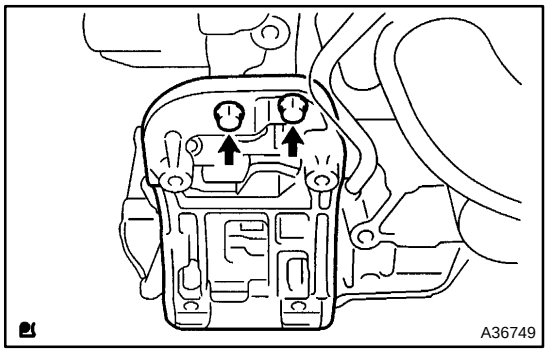
30. SEPARATE COMPRESSOR AND MAGNETIC CLUTCH

(a) Remove the bolt and nut, then remove the adjusting bar bracket.

(b) Remove the 3 bolts and compressor.

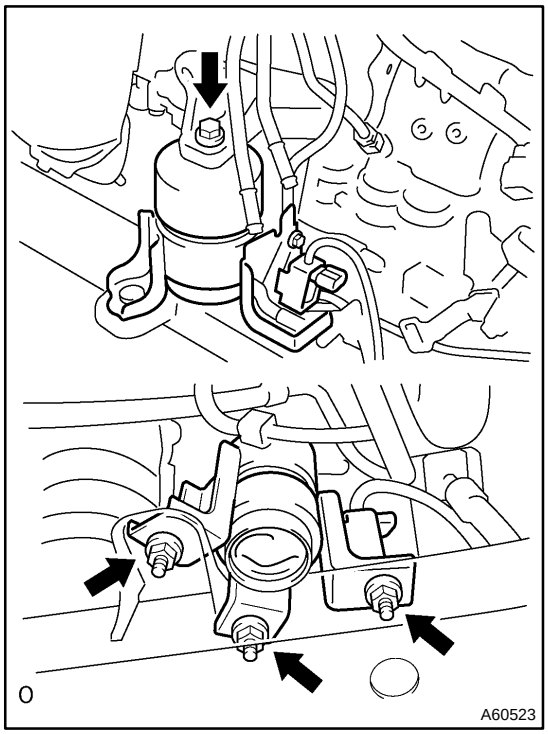
HINT:

Secure the hoses off to the side instead of detaching.



31. REMOVE COMPRESSOR MOUNTING BRACKET NO.1

(a) Remove the 2 bolts and compressor mounting bracket.



32. SEPARATE ENGINE MOUNTING INSULATOR FR

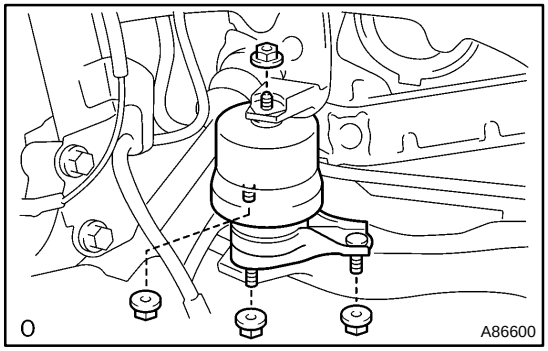
(a) Remove the 3 nuts and bolt, then separate the engine mounting insulator FR.

NOTICE:

Do not remove the engine mounting insulator FR.

33. REMOVE ENGINE MOUNTING INSULATOR RH

(a) Remove the bolt, then disconnect the power steering return hose clamp from the frame.



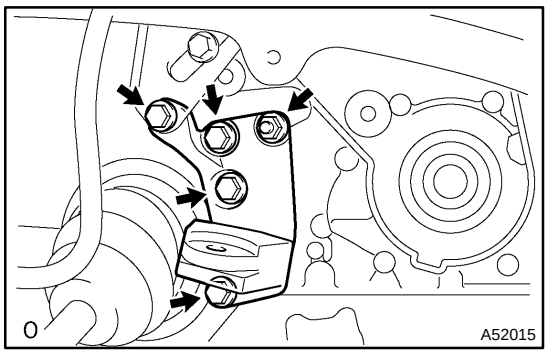
(b) Remove the 4 nuts.

(c) Place a wooden block on a jack underneath the engine.

(d) Jack up the engine, then remove the engine mounting insulator RH.

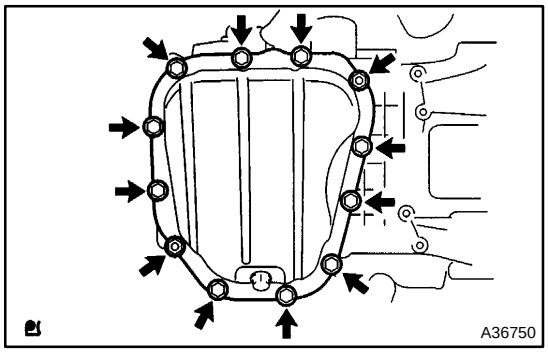
NOTICE:

Be careful not to damage the oil pan.



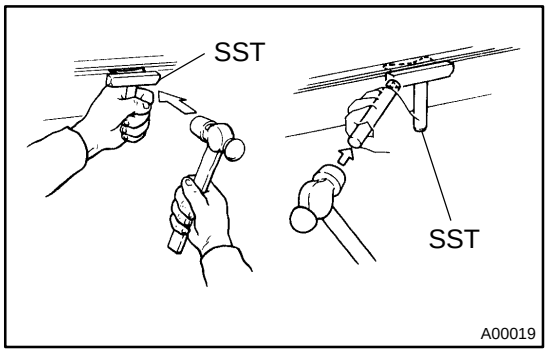
34. REMOVE ENGINE MOUNTING BRACKET RH

(a) Remove the 4 bolts and nut, then remove the bracket.



35. REMOVE OIL PAN SUB-ASSY NO.2

(a) Remove the 10 bolts and 2 nuts.



(b) Insert the blade of SST between the oil pan No. 1 and oil pan No. 2, then cut off the sealer and remove the oil pan No. 2.

SST 09032-00100

NOTICE:

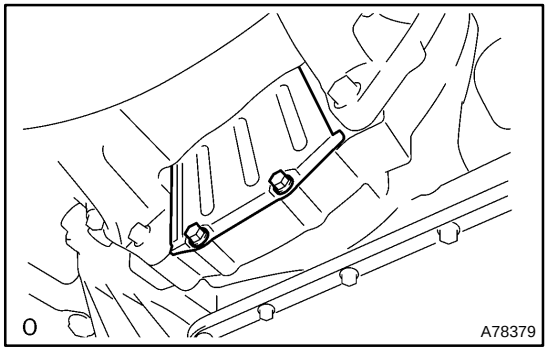
- **Be careful not to damage the contact surface of the oil pan No. 1 where the oil pan No. 2 is mounted.**
- **Do not damage the flange portion of the oil pan No. 2 when removing.**

36. REMOVE OIL STRAINER SUB-ASSY

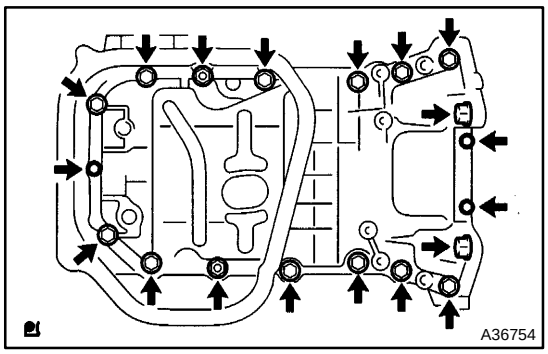
(a) Remove the bolt and 2 nuts, then remove the oil strainer and gasket.

37. REMOVE OIL PAN SUB-ASSY

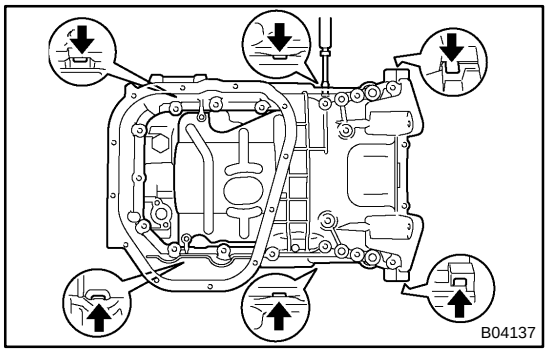
(a) Remove the 2 bolts and nut, then disconnect the engine oil level sensor connector.



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



(c) Loosen and remove the 17 bolts and 2 nuts uniformly.



(d) Using a screwdriver, remove the oil pan by prying between the cylinder block and oil pan.

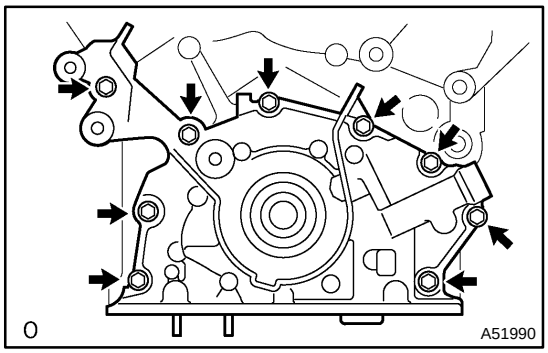
NOTICE:

Be careful not to damage the contact surfaces of the oil pan and cylinder block.

38. REMOVE CRANKSHAFT POSITION SENSOR

(a) Disconnect the crankshaft position sensor connector.

(b) Remove the bolt and crankshaft position sensor.

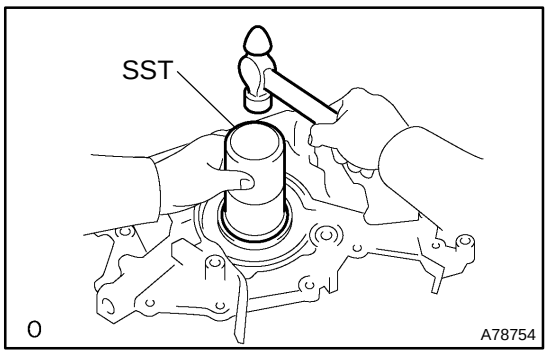


39. REMOVE OIL PUMP ASSY

(a) Remove the 9 bolts.

(b) Using a screwdriver, remove the oil pump by prying between the oil pump and bearing cap.

(c) Remove the O-ring.



40. INSTALL OIL PUMP SEAL

(a) Using SST and a hammer, tap in the new oil seal until its surface is flush with the oil pump body edge.

SST 09223-00010

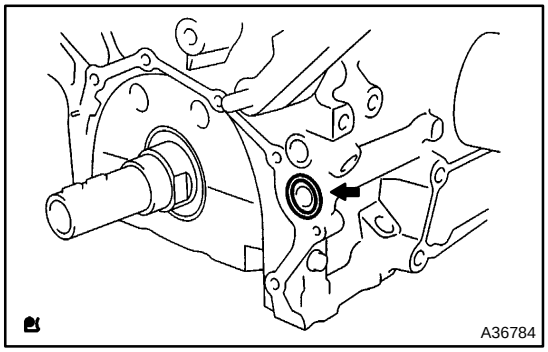
NOTICE:

- **Be careful not to tap the oil seal at an angle.**
- **Keep the lip free of foreign objects.**

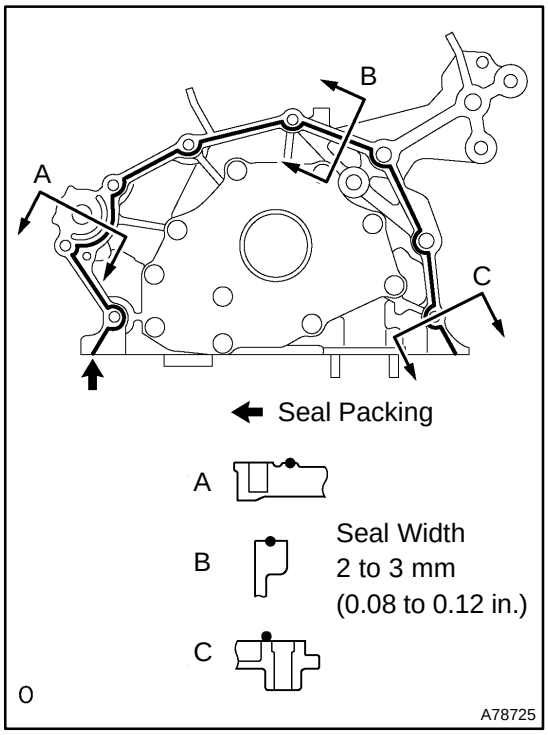
(b) Apply multi-purpose grease to the oil seal lip.

41. INSTALL OIL PUMP ASSY

(a) Remove any old seal packing material from the contact surface.



(b) Apply a light coat of engine oil to a new O-ring, then place it on the cylinder block.

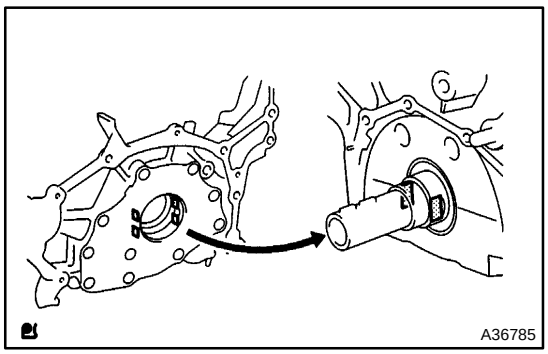


(c) Apply a continuous bead of seal packing (Diameter 2 to 3 mm (0.08 to 0.12 in.)) as shown in the illustration.

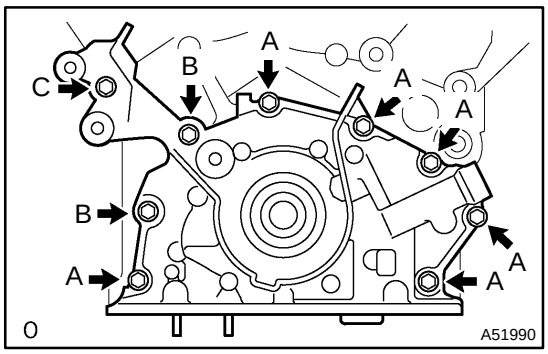
Seal packing: Part No. 08826-00080 or equivalent

NOTICE:

- **Remove any oil from contact surface.**
- **Apply seal packing to the inner side of the bolt holes.**
- **Install the oil pump within 3 minutes after applying seal packing.**
- **Do not expose the seal packing to engine oil within 2 hours after installing.**



(d) Align the key of the oil pump drive gear with the keyway located on the crankshaft, then slide the oil pump into place.

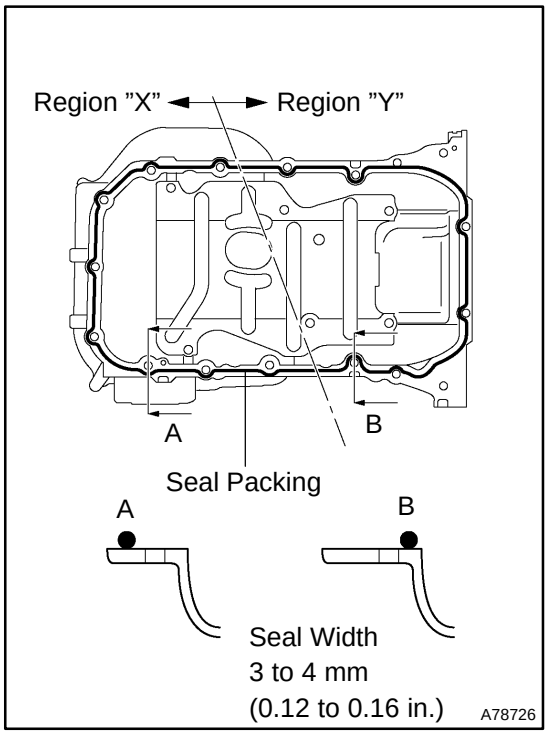


(e) Install the oil pump with the 9 bolts. Tighten the bolts uniformly in several steps.
Torque:
8.0 N·m (82 kgf·cm, 71 in.·lbf) for bolt A
20 N·m (199 kgf·cm, 14 ft·lbf) for bolt B
43 N·m (439 kgf·cm, 32 ft·lbf) for bolt C

42. INSTALL CRANKSHAFT POSITION SENSOR
Torque: 8.0 N·m (80 kgf·cm, 71 in.·lbf)

43. INSTALL OIL PAN SUB-ASSY

(a) Remove any old seal packing from the contact surface.



(b) Apply a continuous bead of seal packing (Diameter 3 to 4 mm (0.12 to 0.16 in.)) as shown in the illustration.
Seal packing: Part No. 08826-00080 or equivalent

NOTICE:
- **Remove any oil from the contact surface.**
- **Apply seal packing to the outer side of the bolt holes in the region "X".**
- **Apply seal packing to the inner side of the bolt holes in the region "Y".**
- **Install the oil pan within 3 minutes after applying seal packing.**
- **Do not expose the seal packing to engine oil within 2 hours after installing.**

(c) Install the oil pan with the 17 bolts and 2 nuts. Tighten the bolts uniformly in several steps.
Torque:
8.0 N·m (82 kgf·cm, 71 in.·lbf) for 10 mm head
20 N·m (199 kgf·cm, 14 ft·lbf) for 12 mm head
37 N·m (379 kgf·cm, 27 ft·lbf) for 14 mm head

(d) Install the flywheel housing under cover with the 2 bolts.
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

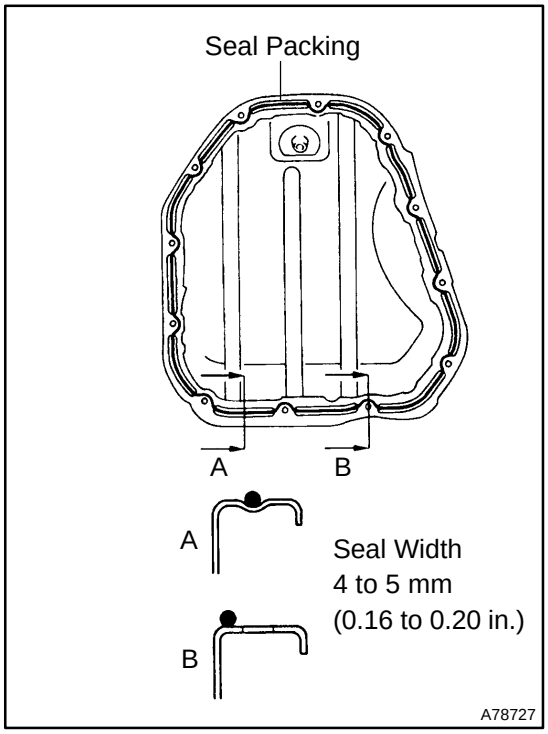
(e) Install the engine oil level sensor connector with the 2 bolts and nut.
Torque: 8.4 N·m (85 kgf·cm, 74 in.·lbf)

44. INSTALL OIL STRAINER SUB-ASSY

(a) Install a new gasket and the oil strainer with the bolt and 2 nuts.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

45. INSTALL OIL PAN SUB-ASSY NO.2

(a) Remove any old seal packing from the contact surface.

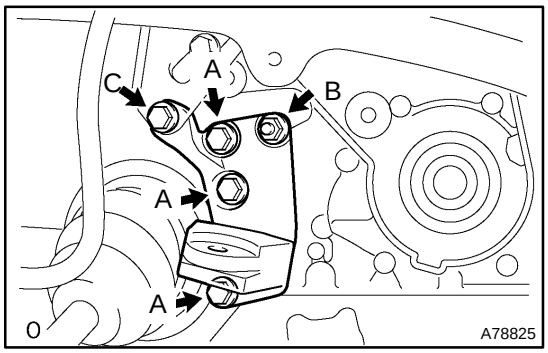


(b) Apply a continuous bead of seal packing (Diameter 4 to 5 mm (0.16 to 0.20 in.)) as shown in the illustration.
Seal packing: Part No. 08826-00080 or equivalent

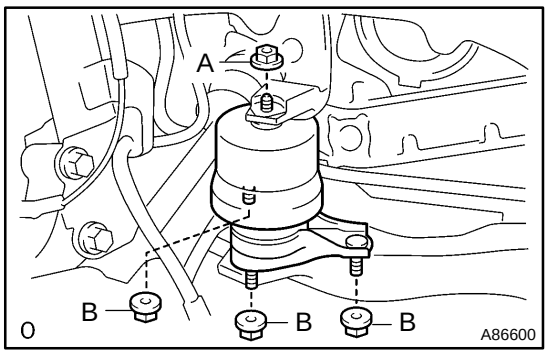
NOTICE:

- **Remove any oil from the contact surface.**
- **Apply seal packing to the inner side of the bolt holes.**
- **Install the oil pan within 3 minutes after applying seal packing.**
- **Do not expose the seal packing to engine oil within 2 hours after installing.**

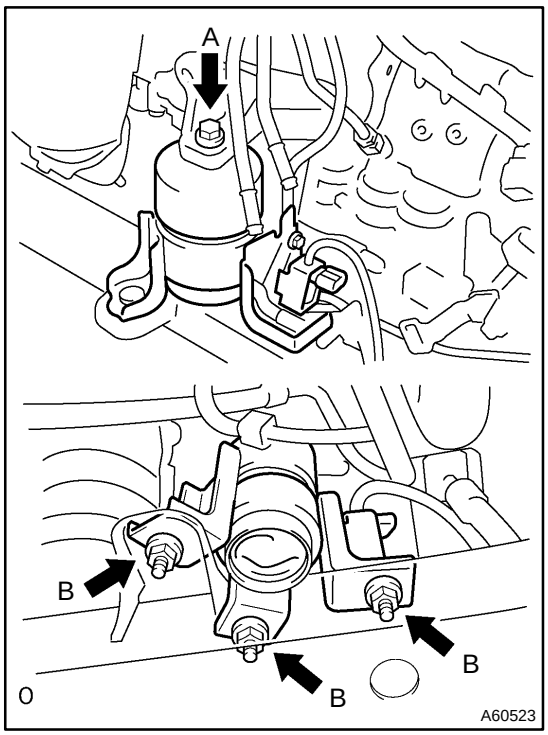
(c) Install the oil pan No. 2 with the 10 bolts and 2 nuts.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)



46. INSTALL ENGINE MOUNTING BRACKET RH
Torque:
54 N·m (551 kgf·cm, 40 ft·lbf) for bolt A
54 N·m (551 kgf·cm, 40 ft·lbf) for nut B
43 N·m (439 kgf·cm, 32 ft·lbf) for bolt C

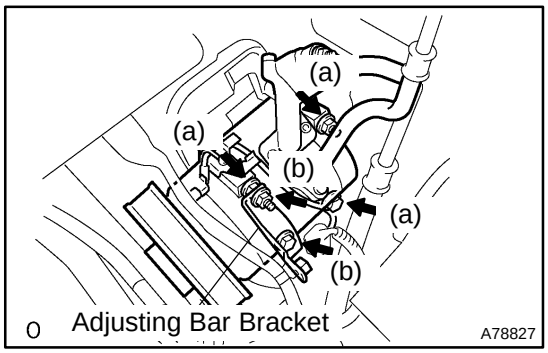


47. INSTALL ENGINE MOUNTING INSULATOR RH
Torque:
95 N·m (969 kgf·cm, 70 ft·lbf) for nut A
87 N·m (887 kgf·cm, 64 ft·lbf) for nut B

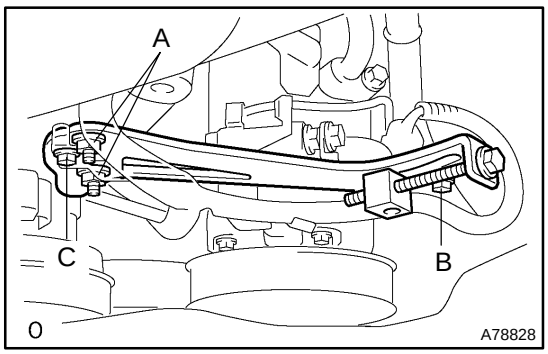


48. INSTALL ENGINE MOUNTING INSULATOR FR
Torque:
87 N·m (887 kgf·cm, 64 ft·lbf) for bolt A
52 N·m (530 kgf·cm, 38 ft·lbf) for nut B

49. INSTALL COMPRESSOR MOUNTING BRACKET NO.1
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)



50. INSTALL COMPRESSOR AND MAGNETIC CLUTCH
(a) Install the compressor with the 3 bolts.
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)
(b) Install the adjusting bar bracket with the bolt and nut.
Torque:
25 N·m (250 kgf·cm, 18 ft·lbf) for bolt
26 N·m (260 kgf·cm, 19 ft·lbf) for nut



51. INSTALL GENERATOR BELT ADJUSTING BAR
(a) Install the adjusting bar with the 2 bolts and 2 nuts.
Torque:
43 N·m (438 kgf·cm, 32 ft·lbf) for nut A
18 N·m (184 kgf·cm, 13 ft·lbf) for bolt B
8.4 N·m (85 kgf·cm, 74 in.·lbf) for bolt C

52. INSTALL OIL LEVEL GAGE GUIDE (See page 14-133)
53. INSTALL EXHAUST PIPE SUPPORT BRACKET NO.1 (See page 40-9)
54. INSTALL EXHAUST PIPE ASSY FRONT (See page 15-2)
55. INSTALL EXHAUST PIPE NO.1 SUPPORT BRACKET REAR (See page 15-2)

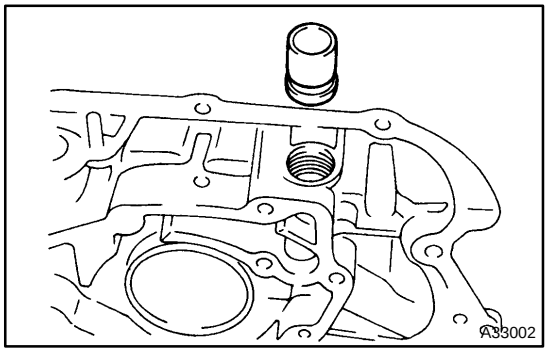
56. **INSTALL EXHAUST PIPE NO.1 SUPPORT BRACKET FRONT (See page 15-2)**
57. **INSTALL CRANKSHAFT TIMING PULLEY (See page 14-138)**
58. **INSTALL TIMING BELT IDLER SUB-ASSY NO.1 (See page 16-13)**
59. **INSTALL TIMING BELT NO.3 COVER (See page 14-93)**
60. **INSTALL CAMSHAFT TIMING PULLEY (See page 14-93)**
    SST 09960-10010 (09962-01000, 09963-01000), 09249-63010
61. **INSTALL TIMING BELT IDLER SUB-ASSY NO.2 (See page 14-93)**
62. **INSPECT TIMING BELT (See page 14-79)**
63. **INSTALL TIMING BELT (See page 14-79)**
    SST 09960-10010 (09962-01000, 09963-01000)
64. **INSTALL TIMING BELT TENSIONER ASSY (See page 14-79)**
65. **INSTALL TIMING BELT GUIDE NO.2 (See page 14-79)**
66. **INSTALL ENGINE MOUNTING BRACKET RH (See page 14-79)**
67. **INSTALL TIMING BELT NO.2 COVER (See page 14-79)**
68. **INSTALL TIMING BELT NO.1 COVER (See page 14-79)**
69. **INSTALL CRANKSHAFT PULLEY (See page 14-79)**
    SST 09213-54015 (91651-60855), 09330-00021
70. **INSTALL GENERATOR BRACKET NO.2 (See page 14-79)**
71. **INSTALL ENGINE MOUNTING STAY NO.2 RH (See page 14-79)**
72. **INSTALL ENGINE MOVING CONTROL ROD (See page 14-79)**
73. **INSTALL VANE PUMP V BELT (See page 14-5)**
74. **INSTALL GENERATOR ASSY (See page 19-21)**
75. **INSTALL V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (See page 14-5)**
76. **INSPECT DRIVE BELT DEFLECTION AND TENSION (See page 14-1)**
77. **INSTALL FRONT WHEEL RH (See page 14-5)**
78. **ADD ENGINE OIL (See page 17-20)**
79. **CHECK FOR ENGINE OIL LEAKS**
80. **CHECK FOR EXHAUST GAS LEAKS**
81. **SYSTEM INITIALIZATION (See page 19-15)**

170F4-03

OVERHAUL

1. REMOVE OIL PUMP RELIEF VALVE

(a) Remove the plug, spring and relief valve.



2. INSPECT OIL PUMP RELIEF VALVE

(a) Apply a light coat of engine oil to the relief valve.

(b) Check that the relief valve falls smoothly into the valve hole by its own weight.

3. INSPECT OIL PUMP ASSY

(a) Remove the oil pump cover.

(1) Remove the 10 screws and oil pump cover.

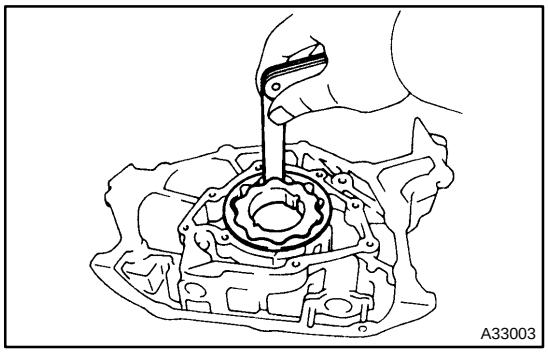
(b) Remove the oil pump rotor set.

NOTICE:

Do not change the combination or turn over the 2 removed rotors.

(c) Inspect the oil pump rotor set.

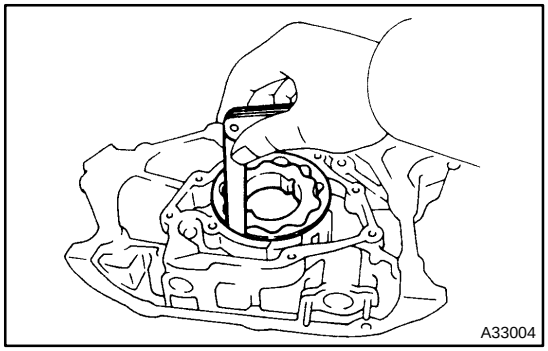
(1) Apply a light coat of engine oil to the oil pump rotor set, then place them into the oil pump body. Check that the rotors revolve smoothly.



(d) Inspect the tip clearance.

(1) Using a feeler gauge, measure the clearance between the drive and driven rotor tips.

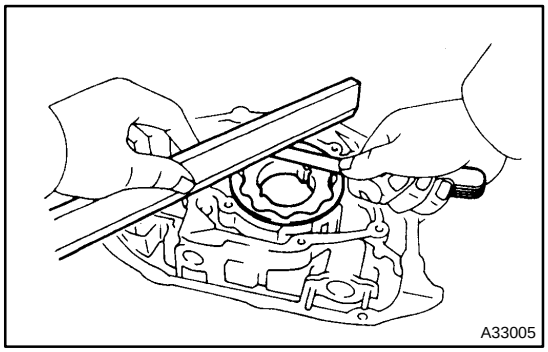
Standard tip clearance:
0.06 to 0.18 mm (0.0024 to 0.0071 in.)
Maximum tip clearance: 0.35 mm (0.0138 in.)



(e) Inspect the body clearance.

(1) Using a feeler gauge, measure the clearance between the driven rotor and body.

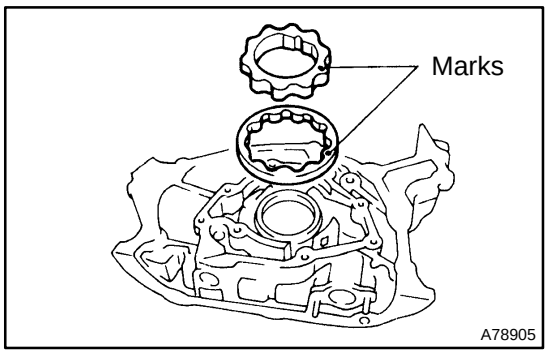
Standard body clearance:
0.250 to 0.325 mm (0.0098 to 0.0128 in.)
Maximum body clearance: 0.30 mm (0.0118 in.)



(f) Inspect the side clearance.

(1) Using a feeler gauge and precision straight edge, measure the clearance between the rotors and precision straight edge.

Standard side clearance:
0.03 to 0.09 mm (0.0012 to 0.0035 in.)
Maximum side clearance: 0.15 mm (0.0059 in.)



(g) Install the oil pump rotor set.
  (1) Apply a light coat of engine oil to the oil pump gear set, then place it into the pump body with the marks facing the pump body cover side.

(h) Install the oil pump cover.
  (1) Install the 10 screws and oil pump cover.
  Torque: 10 N·m (105 kgf·cm, 8 ft·lbf)

4. INSTALL OIL PUMP RELIEF VALVE

(a) Apply a light coat of engine oil to the relief valve, then insert the relief valve and spring into the pump body hole.

(b) Install the oil pump relief valve plug.
  Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

OIL FILTER SUB-ASSY (3MZ-FE)

170F5-03

REPLACEMENT

CAUTION:

- **Prolonged and repeated contact with engine oil will cause removal of natural oils from the skin, leading to dryness, irritation and dermatitis. In addition, used engine oil contains potentially harmful contaminants which may cause skin cancer.**
- **Precautions should be taken when replacing engine oil to minimize the risk of your skin making contact with used engine 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.**
- **For environmental protection used oil and used oil filter must be disposed of at designated disposal sites.**

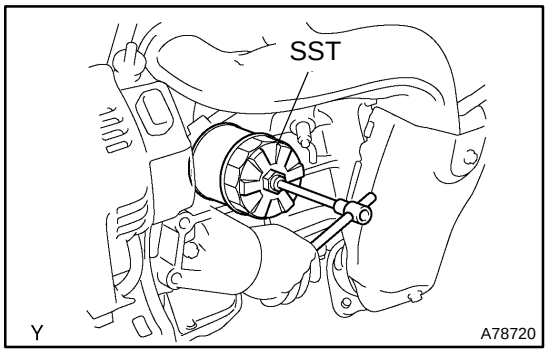
1. REMOVE ENGINE UNDER COVER NO.1

2. DRAIN ENGINE OIL

(a) Remove the oil filler cap.

(b) Remove the oil drain plug, then drain the oil into a container.

(c) Clean and install the oil drain plug with a new gasket.
Torque: 45 N·m (459 kgf·cm, 33 ft·lbf)



3. REMOVE OIL FILTER SUB-ASSY

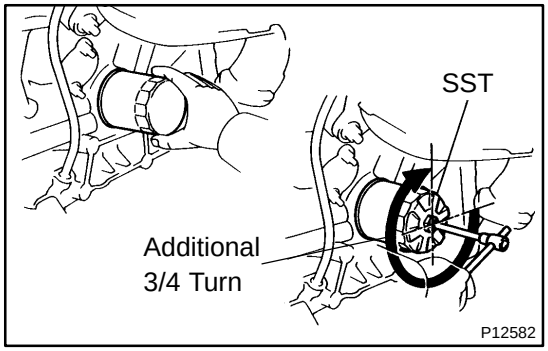
(a) Using SST, remove the oil filter.
SST 09228-07501

4. INSTALL OIL FILTER SUB-ASSY

(a) Check and clean the oil filter installation surface.

(b) Apply clean engine oil to the gasket of a new oil filter.

(c) Lightly screw the oil filter into place, then tighten it until the gasket contacts the seat.



(d) Using SST, tighten it an additional 3/4 turn.
SST 09228-07501

5. ADD ENGINE OIL

(a) Fill with fresh engine oil.
Capacity:

Drain and refill with oil filter change	4.7 liters (5.0 US qts, 4.1 lmp. qts)
Drain and refill without oil filter change	4.5 liters (4.8 US qts, 4.0 lmp. qts)
Dry fill	5.5 liters (5.8 US qts, 4.8 lmp. qts)

6. CHECK FOR ENGINE OIL LEAKS

IGNITION SYSTEM (3MZ-FE)

1809A-01

ON-VEHICLE INSPECTION

NOTICE:

"Cold" and "Hot" in this section mean temperature of the coils themselves. "Cold" is from -10°C (14°F) to 50°C (122°F) and "Hot" is from 50°C (122°F) to 100°C (212°F).

1. INSPECT IGNITION COIL AND SPARK TEST

(a) Check the DTCs.

NOTICE:

If a DTC is present, perform troubleshooting in accordance with a procedure for that DTC.

(b) Check that a spark occurs.

(1) Remove the 6 ignition coils (see page 18-7).

(2) Using a spark plug wrench 16 mm, remove the 6 spark plugs.

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

(3) Install the spark plugs to each ignition coil, then connect the ignition coil connectors.

(4) Disconnect the 6 fuel injector connectors.

(5) Ground the spark plugs.

(6) Check that the spark plug occurs at each spark plug while the engine is being cranked.

NOTICE:

- **Be sure to ground the spark plugs when checking.**
- **Replace the ignition coil if physical impact is felt.**
- **Do not crank the engine for more than 2 seconds.**

If a spark does not occur, perform the following test.

1	**SPARK TEST**

NG

2	**CHECK CONNECTION OF IGNITION COIL CONNECTOR**

NG → **CONNECT SECURELY**

OK

3	**REPLACE IT WITH NORMAL IGNITION COIL AND PERFORM SPARK TEST AGAIN**

OK → **REPLACE IGNITION COIL ASSY (See page 18-7)**

NG

4	**CHECK POWER SUPPLY TO IGNITION COIL**

(a) Turn the ignition switch ON.

(b) Check that there is battery voltage at the ignition coil positive (+) terminal.

NG → **CHECK WIRE HARNESS (BETWEEN IGNITION (START) SWITCH ASSY AND IGNITION COIL ASSY)**

OK

5	INSPECT VVT SENSOR (See page 18-3)

NG → REPLACE VVT SENSOR (See page 18-5)

OK

6	INSPECT CRANKSHAFT POSITION SENSOR (See page 18-3)

NG → REPLACE CRANKSHAFT POSITION SENSOR (See page 18-6)

OK

7	INSPECT IGT SIGNAL FROM ECM (See page 05-34)

NG → REPLACE ECM (See page 10-22)

OK

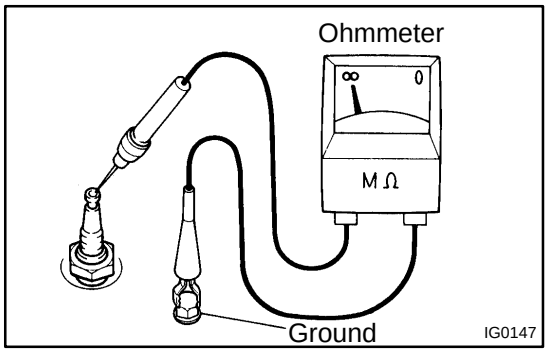
REPAIR WIRE HARNESS (BETWEEN IGNITION COIL ASSY AND IGNITION (START) SWITCH ASSY)

INSPECTION

1. INSPECT SPARK PLUG

NOTICE:

- **Do not use a wire brush to clean the spark plug.**
- **Do not try to adjust the electrode gap of a used spark plug.**

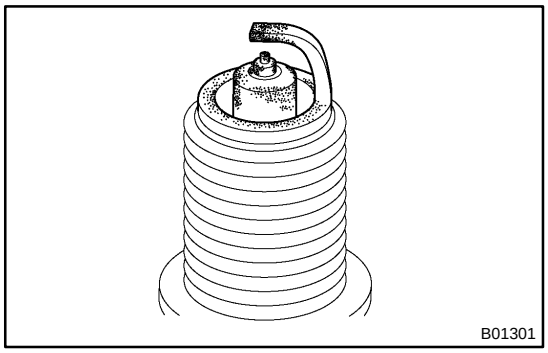


(a) Inspect the resistance.

(1) Using an ohmmeter, measure the resistance between the insulation and body ground.

Resistance: 10 MΩ or more

If the resistance is not as specified, check the electrode gap.



(b) Alternative inspection method.

(1) Quickly accelerate the engine speed to 4,000 rpm 5 times.

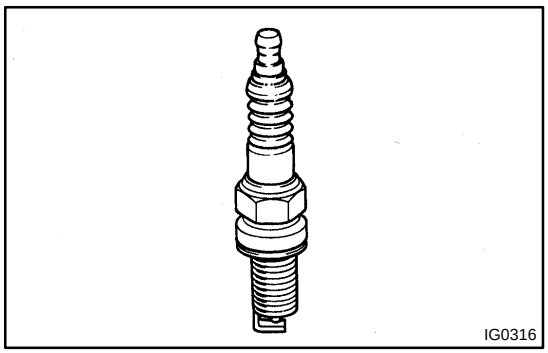
(2) Remove the spark plug.

(3) Visually check the spark plug.

(4) If the electrode is dry...OK.

(5) If the electrode is wet...Proceed to step (c).

(6) Reinstall the spark plug.



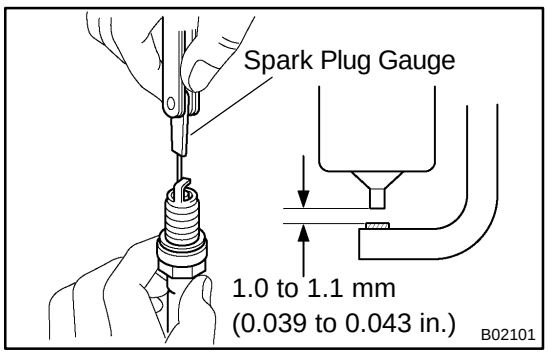
(c) Check the appearance.

(1) Check the thread and insulator of the spark plug for damage.

If damaged, replace the spark plug.

Recommended spark plug:

Supplier	Type
DENSO	SK20R11
NGK	IFR6A11



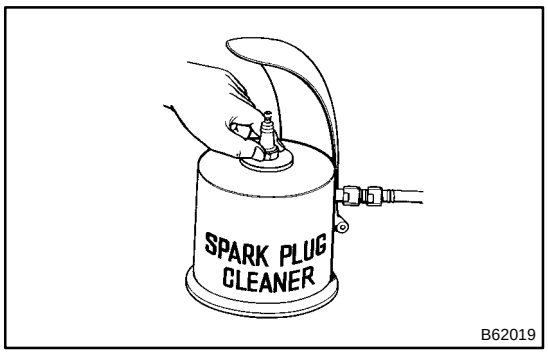
(d) Inspect the electrode gap.

(1) Using a spark plug gauge, measure the electrode gap.

Maximum electrode gap of used spark plug:
1.3 mm (0.051 in.)

If the electrode gap is greater than maximum, replace the spark plug.

Electrode gap of new spark plug:
1.0 to 1.1 mm (0.039 to 0.043 in.)



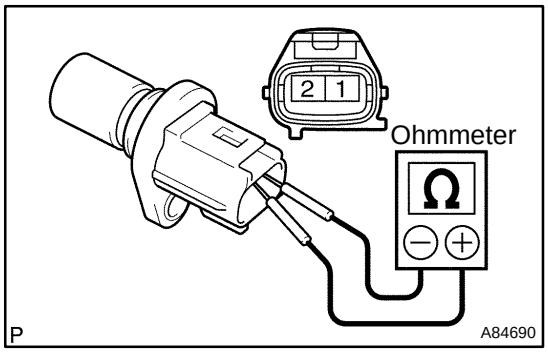
(e) Clean the spark plugs.

If the electrode has traces of wet carbon, clean the electrode with a spark plug cleaner, then dry it.

Air pressure: Blow 588 kPa (6 kgf/cm^2, 85 psi)

Duration: 20 seconds or shorter

If there are traces of oil, remove it with gasoline before using the spark plug cleaner.



2. INSPECT VVT SENSOR

(a) Inspect the resistance.

(1) Using an ohmmeter, measure the resistance between the terminals.

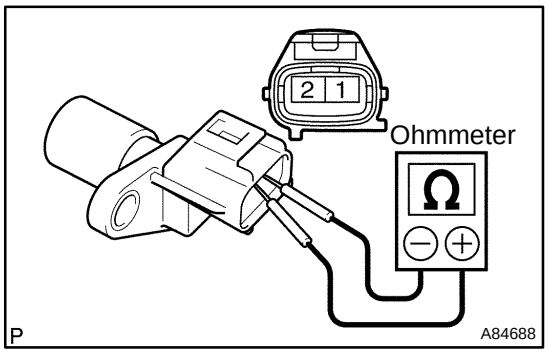
Resistance:

Tester Connection	Specified Condition
1 (G+) - 2 (G-)	835 to 1,400 Ω at cold
1 (G+) - 2 (G-)	1,060 to 1,645 Ω at hot

NOTICE:

"Cold" and "Hot" mean temperature of the coils themselves. "Cold" is from -10°C (14°F) to 50°C (122°F) and "Hot" is from 50°C (122°F) to 100°C (212°F).

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



3. INSPECT CRANKSHAFT POSITION SENSOR

(a) Inspect the resistance.

(1) Using an ohmmeter, measure the resistance between the terminals.

Resistance:

Tester Connection	Specified Condition
1 (NE+) - 2 (NE-)	1,630 to 2,740 Ω at cold
1 (NE+) - 2 (NE-)	2,065 to 3,225 Ω at hot

NOTICE:

"Cold" and "Hot" mean temperature of the coils themselves. "Cold" is from -10°C (14°F) to 50°C (122°F) and "Hot" is from 50°C (122°F) to 100°C (212°F).

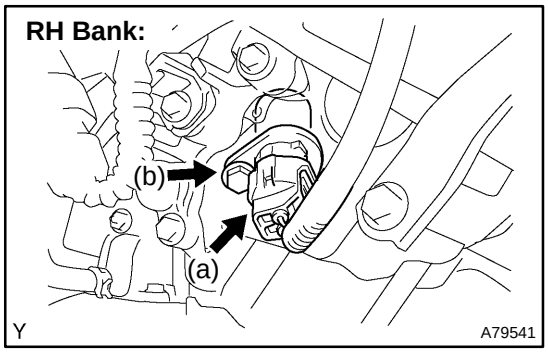
If the resistance is not as specified, replace the crankshaft position sensor.

VVT SENSOR (3MZ-FE)

1809C-01

REPLACEMENT

1. **DISCONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)**
2. **REMOVE RADIATOR LOWER AIR DEFLECTOR (See page 19-5)**
3. **REMOVE AIR CLEANER INLET ASSY (See page 19-5)**
4. **REMOVE AIR CLEANER ASSY (See page 19-5)**



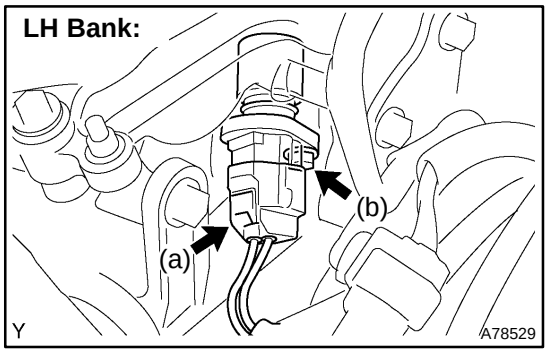
5. **REMOVE VVT SENSOR**

(a) Remove the 2 VVT sensor connectors.

(b) Remove the 2 bolts, then remove the 2 VVT sensors.

HINT:

The VVT sensor is installed with the bolt.



6. **INSTALL VVT SENSOR**

(a) Apply a light coat of engine oil to the O-ring on each VVT sensor.

(b) Install the 2 VVT sensors with the 2 bolts.

Torque: 8.0 N·m (80 kgf·cm, 71 in.·lbf)

NOTICE:

Be careful not to twist the O-ring.

(c) Connect the 2 VVT sensor connectors.

7. **INSTALL AIR CLEANER ASSY (See page 19-5)**
8. **INSTALL AIR CLEANER INLET ASSY (See page 19-5)**
9. **INSTALL RADIATOR LOWER AIR DEFLECTOR**
10. **CHECK CONNECTION OF VACUUM HOSE (See page 14-29)**
11. **CONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)**

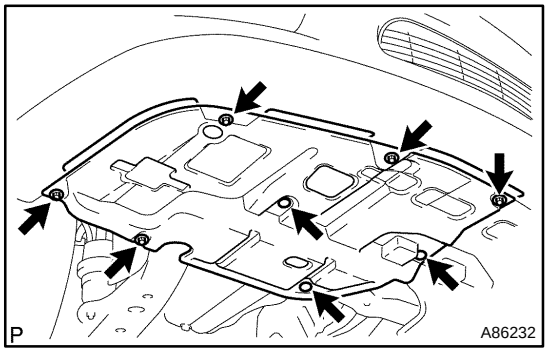
    Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
12. **CHECK FOR ENGINE OIL LEAKS**
13. **SYSTEM INITIALIZATION (See page 19-15)**

CRANKSHAFT POSITION SENSOR (3MZ-FE)

1809D-01

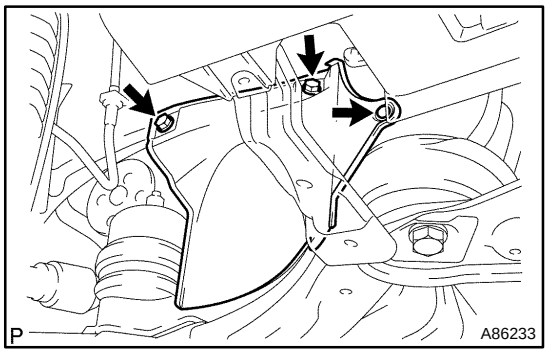
REPLACEMENT

1. DISCONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)



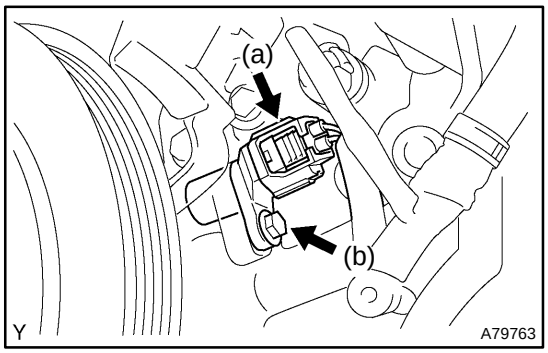
2. REMOVE ENGINE UNDER COVER NO.1

(a) Remove the 3 clips and 5 screws, then remove the engine under cover No. 1.



3. REMOVE FRONT FENDER APRON SEAL RH

(a) Remove the clip and 2 bolts, then remove the front fender apron seal.



4. REMOVE CRANKSHAFT POSITION SENSOR

(a) Remove the crankshaft position sensor connector.

(b) Remove the bolt, then remove the crankshaft position sensor.

5. INSTALL CRANKSHAFT POSITION SENSOR
Torque: 8.0 N·m (80 kgf·cm, 71 in.·lbf)

6. INSTALL FRONT FENDER APRON SEAL RH

7. INSTALL ENGINE UNDER COVER NO.1

8. CONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

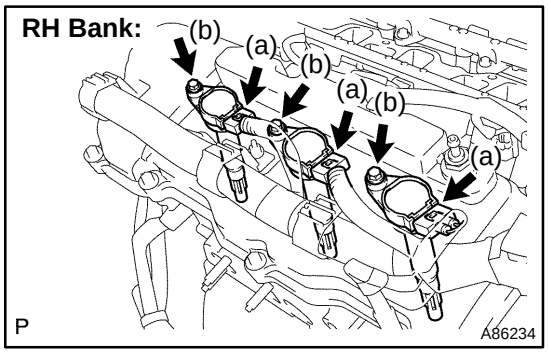
9. SYSTEM INITIALIZATION (See page 19-15)

IGNITION COIL ASSY (3MZ-FE)

1809E-02

REPLACEMENT

1. DISCONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)
2. DRAIN ENGINE COOLANT (RH BANK) (See page 10-1 1)
3. REMOVE FRONT SUSPENSION UPPER BRACE CENTER (W/O TEMS, RH BANK) (See page 16-9)
4. REMOVE V-BANK COVER SUB-ASSY (See page 16-9)
5. REMOVE AIR CLEANER CAP SUB-ASSY (RH BANK) (See page 16-9)
6. REMOVE EMISSION CONTROL VALVE SET (RH BANK) (See page 11-13)
7. REMOVE INTAKE AIR SURGE TANK (RH BANK) (See page 11-13)



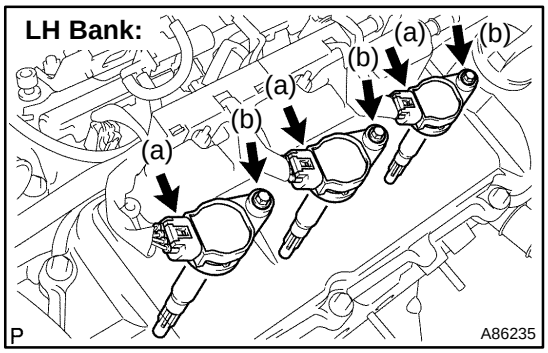
8. REMOVE IGNITION COIL ASSY

(a) Disconnect the 6 connectors.

(b) Remove the 6 bolts, then remove the 6 ignition coils.

HINT:

The ignition coil is installed with the bolt.



9. INSTALL IGNITION COIL ASSY
   Torque: 8.0 N·m (80 kgf·cm, 71 in.·lbf)
10. INSTALL INTAKE AIR SURGE TANK (RH BANK) (See page 11-13)
11. INSTALL EMISSION CONTROL VALVE SET (RH BANK) (See page 11-13)
12. INSTALL AIR CLEANER CAP SUB-ASSY (RH BANK) (See page 16-9)
13. CHECK CONNECTION OF VACUUM HOSE (RH BANK) (See page 14-29)
14. CONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)
    Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
15. ADD ENGINE COOLANT (RH BANK) (See page 10-1 1)
16. CHECK FOR ENGINE COOLANT LEAKS (RH BANK) (See page 16-1)
17. INSTALL V-BANK COVER SUB-ASSY (See page 16-9)
18. INSTALL FRONT SUSPENSION UPPER BRACE CENTER (W/O TEMS, RH BANK) (See page 16-9)
19. SYSTEM INITIALIZATION (See page 19-15)

FRONT SUSPENSION SYSTEM

2601D-09

PROBLEM SYMPTOMS TABLE

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

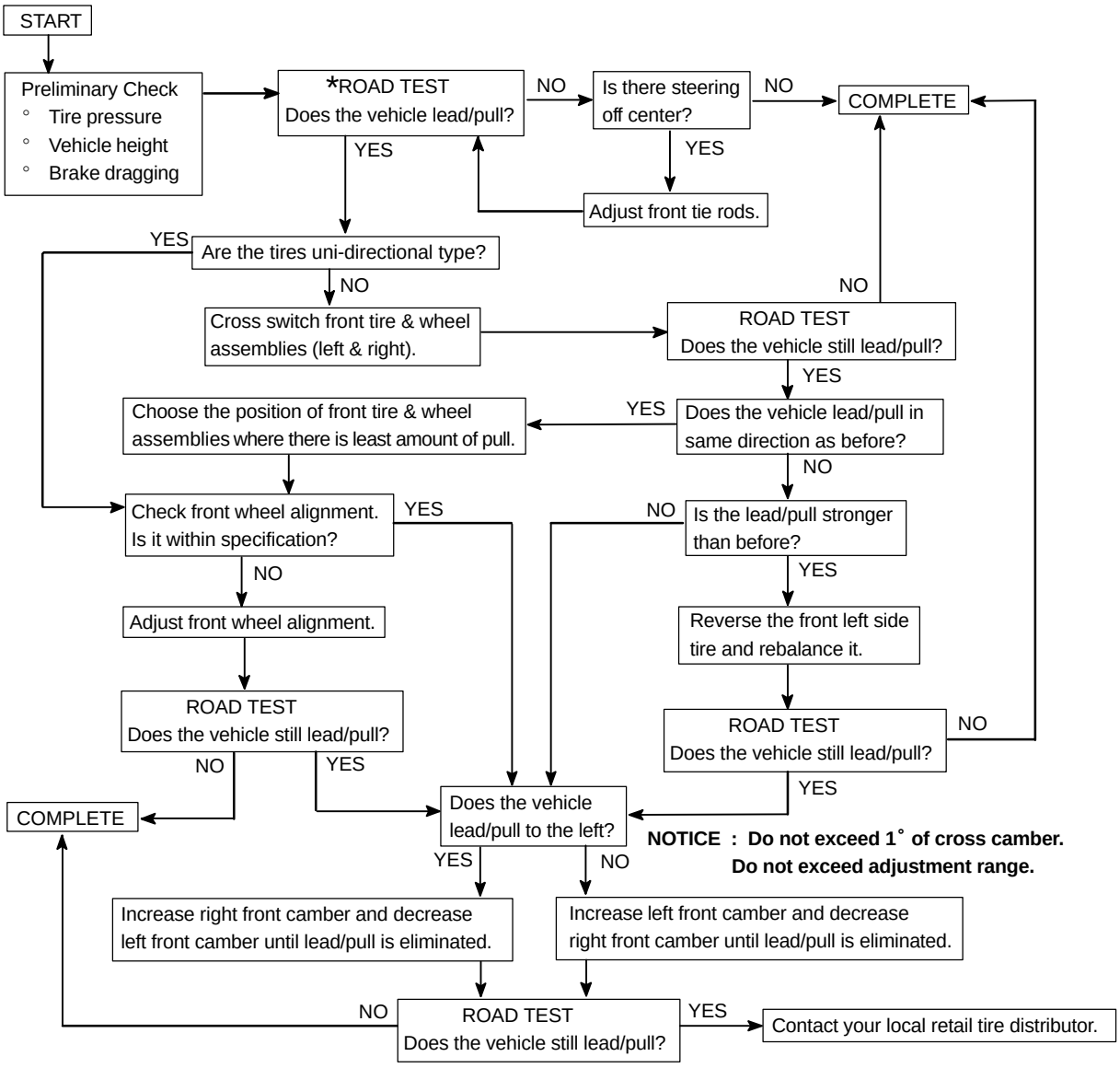
Symptom	Suspect Area	See page
Bottoming	1. Vehicle (Overloaded)	-
	2. Spring (Weak)	26-8
	3. Shock absorber (Worn)	26-8
Sways/pitches	1. Tire (Worn or improperly inflated)	28-1
	2. Stabilizer bar (Bent or broken)	26-8
	3. Shock absorber (Worn)	26-8
Front wheel shimmy	1. Tire (Worn or improperly inflated)	28-1
	2. Wheel (Out of balance)	28-1
	3. Shock absorber (Worn)	26-8
	4. Wheel alignment (Incorrect)	26-5 27-3
	5. Ball joint (Worn)	26-16
	6. Hub bearing (Worn)	30-2
	7. Steering linkage (Loose or worn)	-
Abnormal tire wear	1. Tire (Worn or improperly inflated)	28-1
	2. Wheel alignment (Incorrect)	26-5 27-3
	3. Shock absorber (Worn)	26-8
	4. Suspension parts (Worn)	-

2606R-02

REPAIR

HINT:

This is the repair procedure for vehicle pull.



*Select a flat road where the vehicle can be driven in a straight line for 100 meters at a constant speed of 35mph. Please confirm safety and set the steering wheel to its straight position. Drive the vehicle in a straight line for 100 meters at a constant speed of 35mph without holding the steering wheel.

(1) The vehicle can keep straight but the steering wheel has some angle.

→STEERING OFF CENTER (See page 50-4)

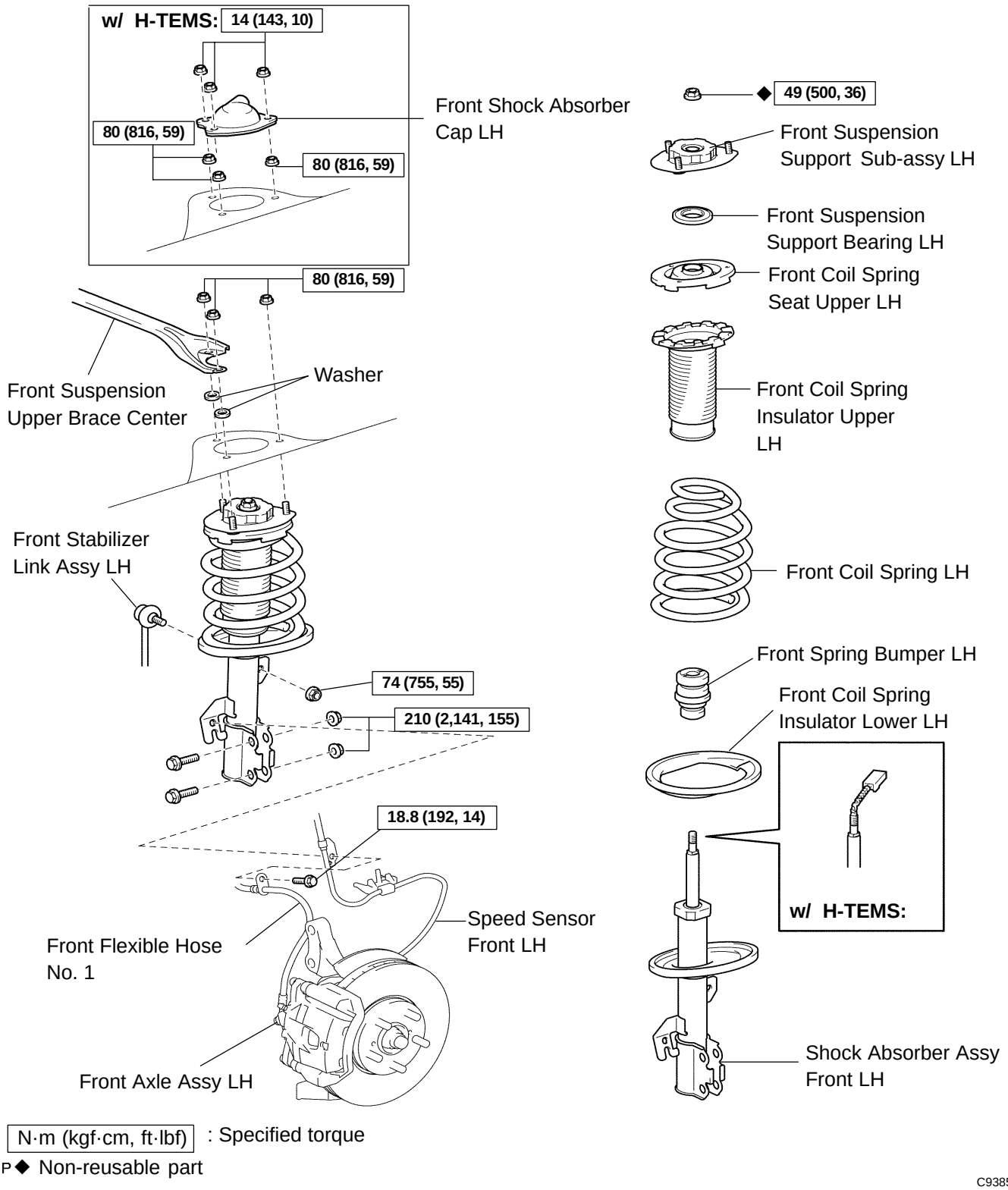
(2) The vehicle cannot keep straight.

→STEERING PULL

FRONT SUSPENSION (From July, 2003)

COMPONENTS

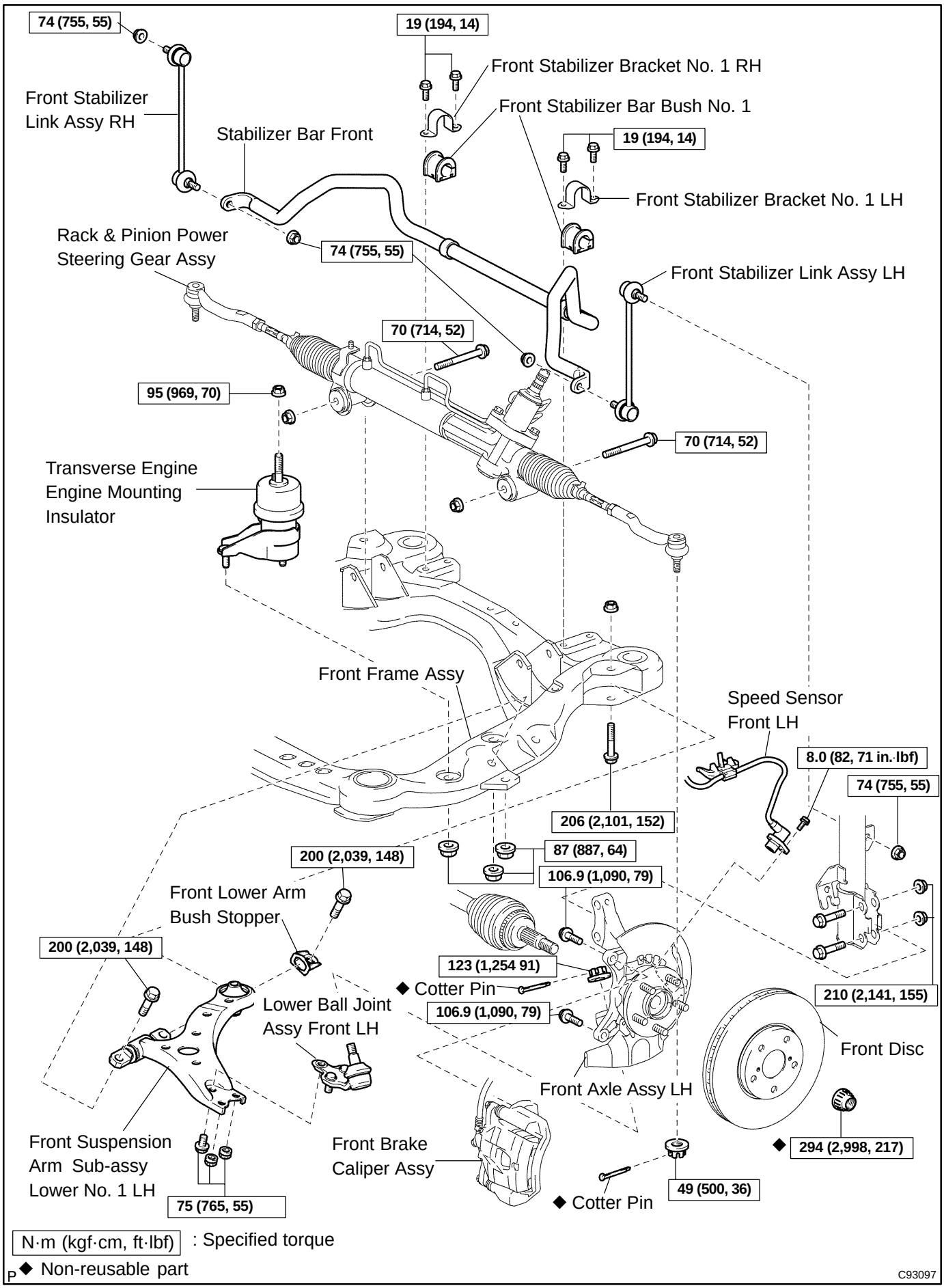
2601C-06



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

P◆ Non-reusable part

C93850

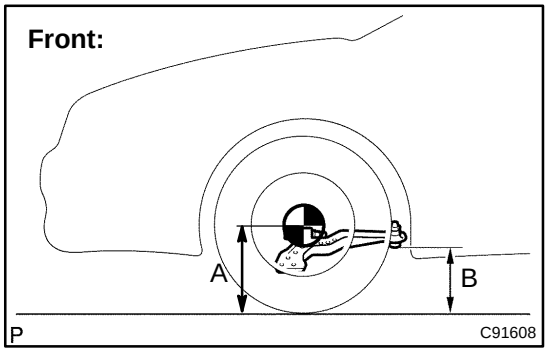

74 (755, 55)
19 (194, 14)
Front Stabilizer Bracket No. 1 RH
Front Stabilizer Link Assy RH
Front Stabilizer Bar Bush No. 1
Stabilizer Bar Front
19 (194, 14)
Front Stabilizer Bracket No. 1 LH
Rack & Pinion Power Steering Gear Assy
74 (755, 55)
Front Stabilizer Link Assy LH
70 (714, 52)
95 (969, 70)
70 (714, 52)
Transverse Engine Engine Mounting Insulator
Front Frame Assy
Speed Sensor Front LH
8.0 (82, 71 in.·lbf)
74 (755, 55)
206 (2,101, 152)
200 (2,039, 148)
87 (887, 64)
106.9 (1,090, 79)
Front Lower Arm Bush Stopper
200 (2,039, 148)
123 (1,254 91)
◆ Cotter Pin
210 (2,141, 155)
Lower Ball Joint Assy Front LH
106.9 (1,090, 79)
Front Disc
Front Axle Assy LH
Front Suspension Arm Sub-assy Lower No. 1 LH
Front Brake Caliper Assy
◆ 294 (2,998, 217)
49 (500, 36)
◆ Cotter Pin
75 (765, 55)
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
C93097

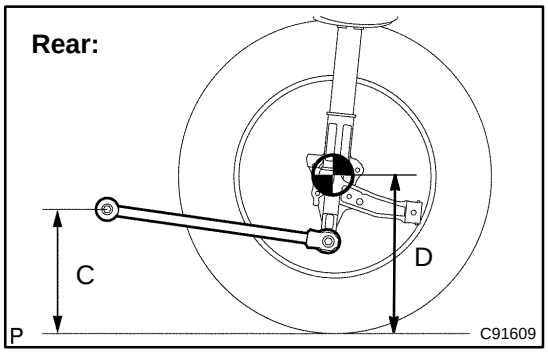
FRONT WHEEL ALIGNMENT (From July, 2003)

2605T-05

ADJUSTMENT

1. INSPECT TIRE (See page 26-5)





2. MEASURE VEHICLE HEIGHT

Vehicle height:

Front	A - B: 120 mm (4.72 in.)
Rear	D - C: 52 mm (2.05 in.)

Measuring points:

A: Ground clearance of front wheel center

B: Ground clearance of lower suspension arm No. 2 set bolt center

C: Ground clearance of strut rod set bolt center

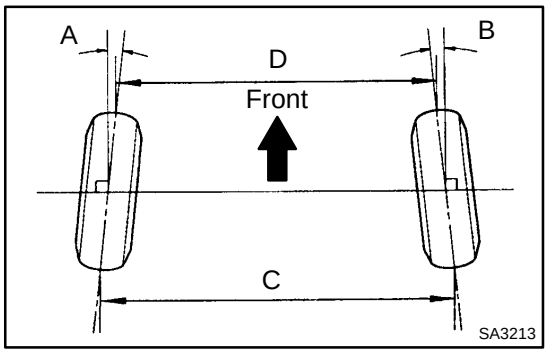
D: Ground clearance of rear wheel center

NOTICE:

Before inspecting the wheel alignment, adjust the vehicle height to the specified value.

HINT:

Bounce the vehicle at the corners up and down to stabilize the suspension and inspect the vehicle height.



3. INSPECT TOE-IN

Toe-in:

Toe-in (total)	A + B: 0° ± 12' (0° ± 0.2°) C - D: 0 ± 2 mm (0 ± 0.08 in.)

If the toe-in is not within the specified value, adjust it at the rack ends.

4. ADJUST TOE-IN

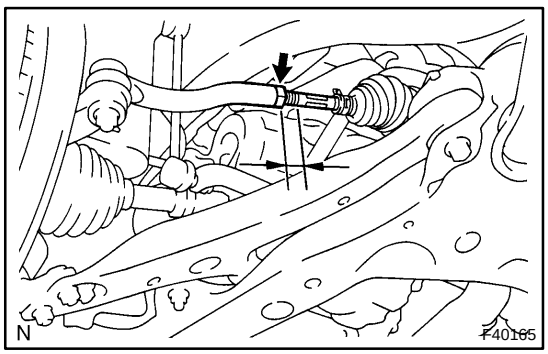
(a) Remove the rack boot set clips.

(b) Loosen the tie rod end lock nuts.

(c) Turn the right and left rack ends by an equal amount to adjust the toe-in.

HINT:

Try to adjust the toe-in to the center of the specified value.



(d) Make sure that the lengths of the right and left rack ends are the same.

(e) Torque the tie rod end lock nuts.

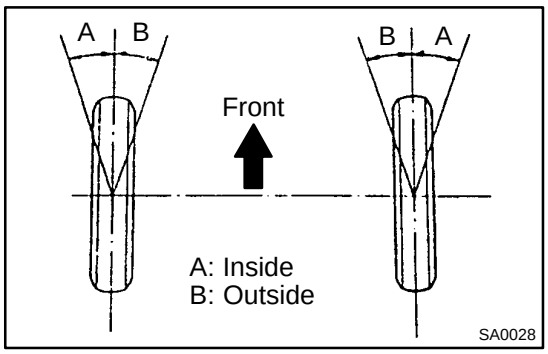
Torque: 74 N·m (755 kgf·cm, 55 ft·lbf)

(f) Place the boots on the seats and install the clips.

HINT:

Make sure that the boots are not twisted.

(g) Perform VSC system calibration. (See page 05-471)



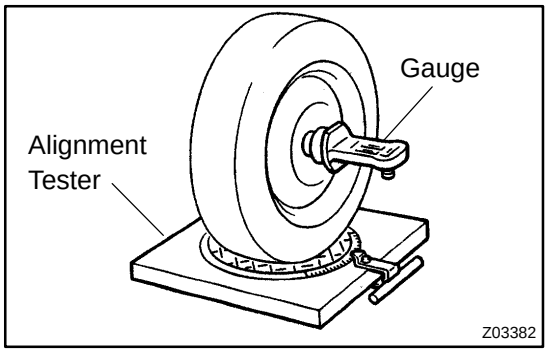
5. INSPECT WHEEL ANGLE

(a) Turn the steering wheel fully left and right, and measure the turning angle.

Wheel turning angle:

Inside wheel	36˚39' ± 2˚ (36.65˚ ± 2˚)
Outside wheel: Reference	32˚11' (32.18˚)

If the right and left inside wheel angles differ from the specified value, check the right and left rack end lengths.



6. INSPECT CAMBER, CASTER AND STEERING AXIS INCLINATION

(a) Put the front wheel on the center of the alignment tester.

(b) Set the camber - caster - kingpin gauge at the center of the axle hub or drive shaft.

Camber, caster and steering axis inclination:

Camber	-0 ˚43' ± 45' (-0.72˚ ± 0.75˚)
Left-right error	45' (0.75˚) or less
Caster	2˚46' ± 45' (2.77˚ ± 0.75˚)
Left-right error	45' (0.75˚) or less
Steering axis inclination	11˚27' (11.45˚)

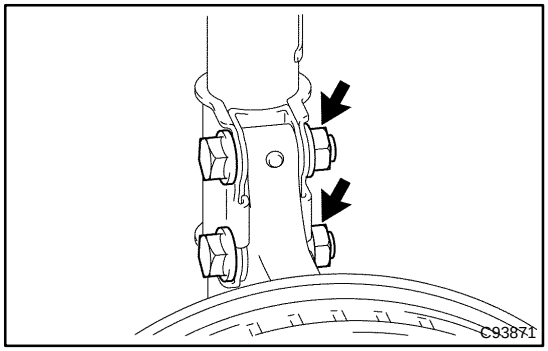
If the caster and steering axis inclination are not within the specification, after the camber has been correctly adjusted, recheck the suspension parts for damage and/or worn out parts.

7. ADJUST CAMBER

NOTICE:

After the camber has been adjusted, inspect the toe-in.

(a) Remove the front wheel.



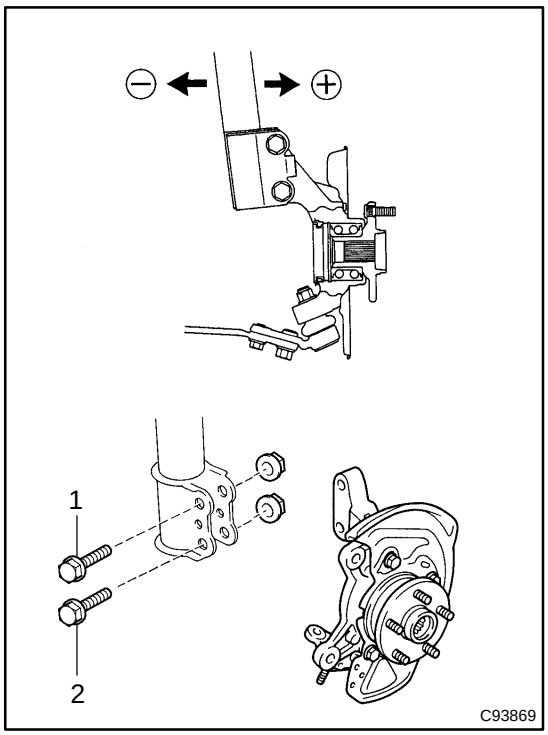
(b) Remove the 2 nuts on the lower side of the shock absorber.

HINT:

When removing nuts, stop the bolt from rotating and loosen the nut.

(c) Clean the installation surfaces of the shock absorber and the steering knuckle.

(d) Temporarily install the 2 nuts.



(e) Adjust the camber by pushing or pulling the lower side of the shock absorber in the direction in which the camber adjustment is required.

(f) Tighten the nuts.

Torque: 210 N·m (2,141 kgf·cm, 155 ft·lbf)

NOTICE:

When installing the nuts, keep the bolts from rotating and then torque the nut.

(g) Install the front wheel.

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

(h) Check the camber.

HINT:

- Try to adjust the camber to the center of the specified value.
- Adjusting value for the set bolts is 6' to 30' (0.1° to 0.5°).

If the camber is not within the specified valve, estimate how much additional camber adjustment will be required, and select the camber adjusting bolt.

NOTICE:

Tighten the adjusting bolt with a new nut.

Bolt / Adjusting Value	Set Bolt		Adjusting Bolt					
	90105-17008		90105-17009		90105-17010		90105-17011	
	11		1 Dot •11		2 Dots •11		3 Dots •11	
	1	2	1	2	1	2	1	2
15'	●			●				
30'	●					●		
45'	●							●
1°00'			●					●
1°15'					●			●
1°30'							●	●

(i) Do the steps mentioned above again. At step (b), replace 1 or 2 selected bolts.

HINT:

When replacing the 2 bolts, replace 1 bolt for each time.

FRONT SHOCK ABSORBER WITH COIL SPRING

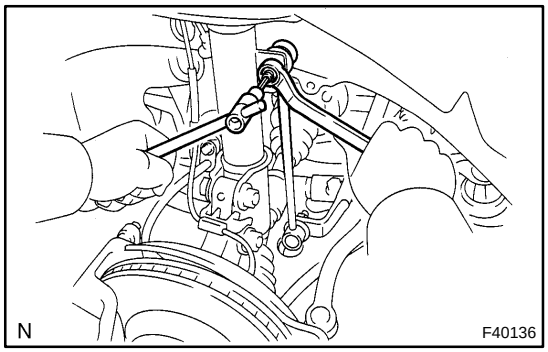
2606S-02

OVERHAUL

HINT:

COMPONENTS: See page 26-3 .

1. REMOVE FRONT WHEEL

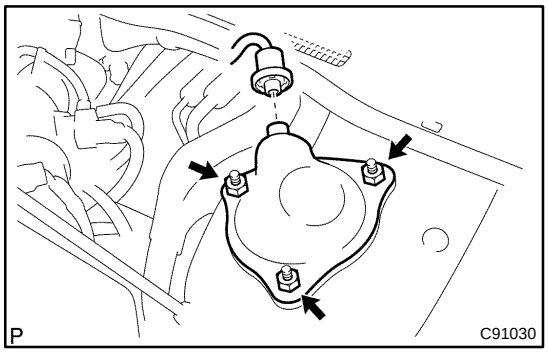


2. DISCONNECT FRONT STABILIZER LINK ASSY LH

(a) Remove the nut and disconnect the front stabilizer link assy LH from the shock absorber assy front LH.

HINT:

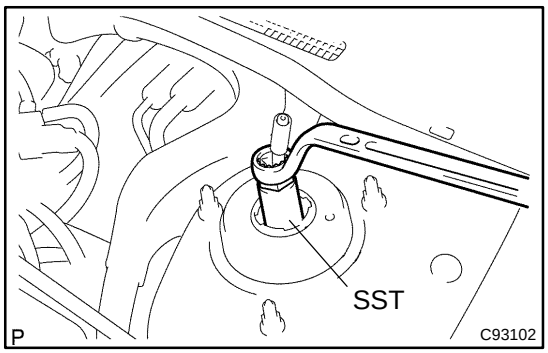
If the ball joint turns together with the nut, use a hexagon (6 mm) wrench to hold the stud.



3. REMOVE FRONT SHOCK ABSORBER CAP LH (H-TEMS SUSPENSION)

(a) Disconnect the connector.

(b) Remove the 3 nuts, harness clamp and the front shock absorber cap LH.



4. REMOVE FRONT SHOCK ABSORBER WITH COIL SPRING

(a) w/ H-TEMS:

Using SST, loosen the lock nut.

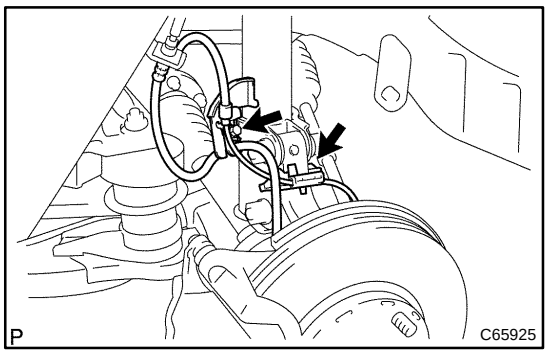
SST 09817-33190

(b) w/o H-TEMS:

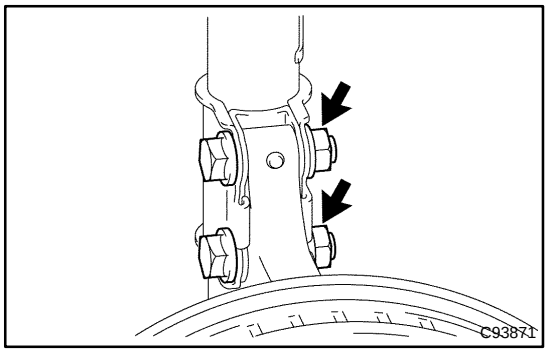
Loosen the lock nut.

NOTICE:

- **Do not loosen except for the case with disassembling the shock absorber assy front LH with coil spring.**
- **Do not remove the lock nut.**



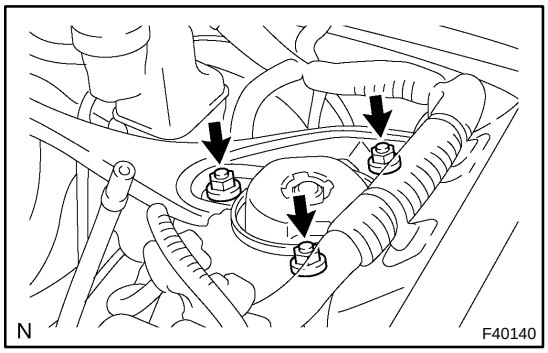
(c) Remove the bolt, disconnect the front flexible hose No. 1 and speed sensor front LH.



(d) Remove the 2 nuts and 2 bolts on the lower side of front shock absorber with coil spring.

NOTICE:

When removing bolt, stop the bolt from rotating and loosen the nut.

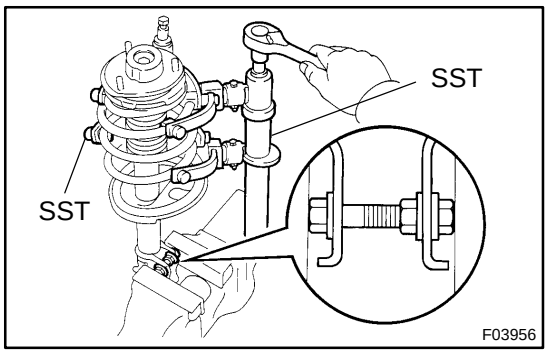


(e) Remove the 3 nuts on the upper side of the front shock absorber with coil spring.

(f) Remove the front shock absorber with the coil spring.

NOTICE:

Be careful not to drop the 2 washers in the case that there is front suspension upper brace center.



5. FIX FRONT SHOCK ABSORBER WITH COIL SPRING

(a) Install 2 nuts and a bolt to the bracket at the lower side of the front shock absorber with coil spring and secure it in a vise.

6. REMOVE SHOCK ABSORBER ASSY FRONT LH

(a) Using SST, compress the front coil spring LH.

SST 09727-30021

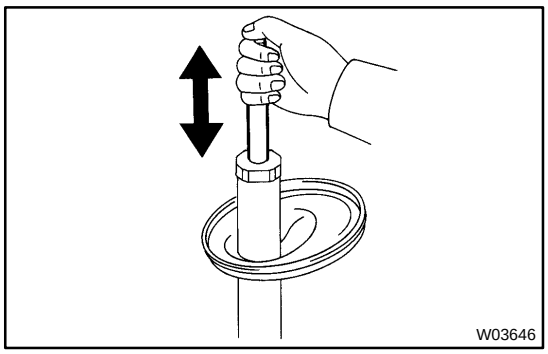
NOTICE:

Do not use an impact wrench. It will damage the SST.

HINT:

Use 2 of the same type of SST.

(b) Remove the front suspension support sub-assy LH, front suspension support bearing LH, front coil spring seat upper LH, front coil spring insulator upper LH, front coil spring LH, front spring bumper LH and front coil spring insulator upper LH.



7. INSPECT SHOCK ABSORBER ASSY FRONT LH

(a) Compress and extend the shock absorber rod and check that there is no abnormal resistance or unusual sound during operation.

If there is any abnormality, replace the shock absorber assy front LH with a new one.

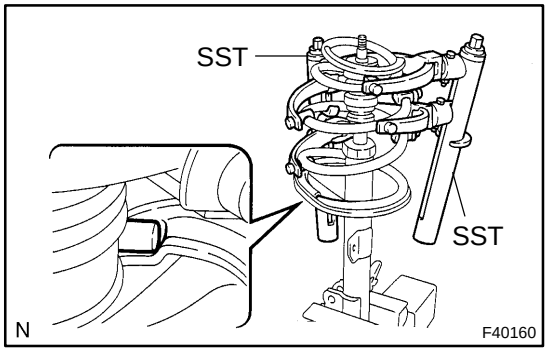
NOTICE:

When disposing of the shock absorber assy front LH, see DISPOSAL on page 26-13 .

8. INSTALL SHOCK ABSORBER ASSY FRONT LH

(a) Install the front coil spring insulator lower LH onto the shock absorber assy front LH.

(b) Install the front spring bumper LH to the piston rod.



(c) Using SST, compress the front coil spring LH.
SST 09727-30021

NOTICE:

Do not use an impact wrench. It will damage the SST.

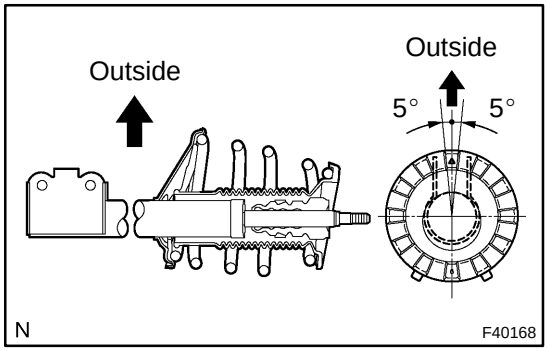
HINT:

Use 2 of the same type of SST.

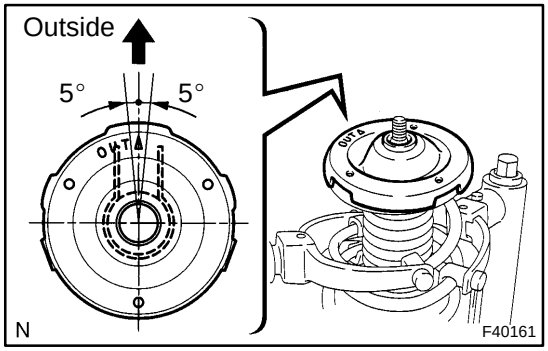
(d) Install the front coil spring LH to the shock absorber assy front LH.

HINT:

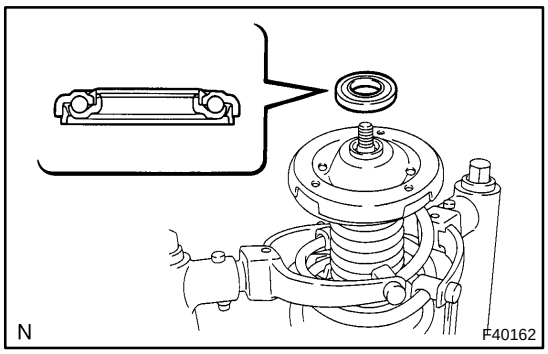
Fit the lower end of the front coil spring LH into the gap of the spring lower seat.



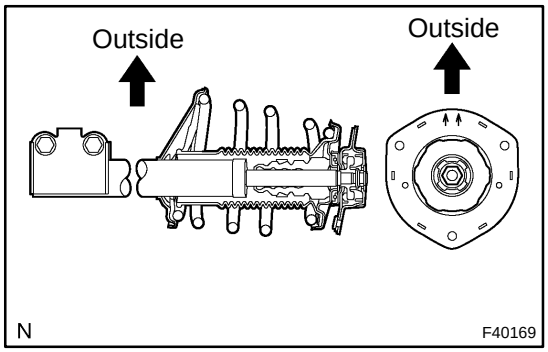
(e) Install the front coil spring insulator upper LH as shown in the illustration.



(f) Install the front coil spring seat upper LH to the shock absorber assy front LH with the mark facing to the outside of the vehicle.



(g) Install a new front suspension support bearing LH.

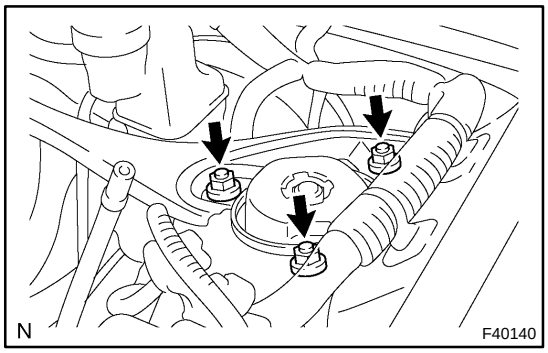


(h) Install the front suspension support sub-assy LH with the mark facing to the outside of the vehicle.

(i) Temporarily tighten the new lock nut.

9. INSTALL FRONT SHOCK ABSORBER WITH COIL SPRING

(a) Install the front shock absorber with coil spring as shown in the illustration.

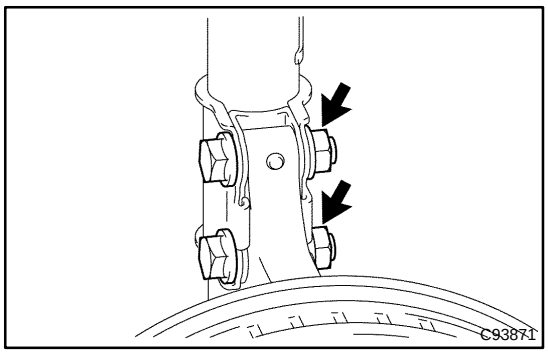


(b) Install the 3 nuts to the upper side of front shock absorber with coil spring.

Torque: 80 N·m (816 kgf·cm, 59 ft·lbf)

NOTICE:

Be careful not to drop the 2 washers in the case that there is front suspension upper brace center.

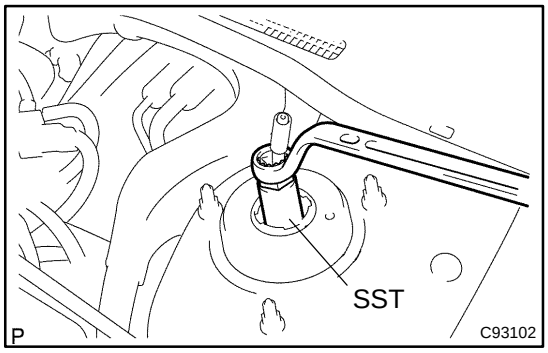


(c) Install the 2 bolts and 2 nuts to the lower side of front shock absorber with coil spring.

Torque: 210 N·m (2,141 kgf·cm, 155 ft·lbf)

NOTICE:

When installing bolt, stop the bolt from rotating and torque the nut.



(d) w/ H-TEMS:

Using SST, fully tighten the lock nut.

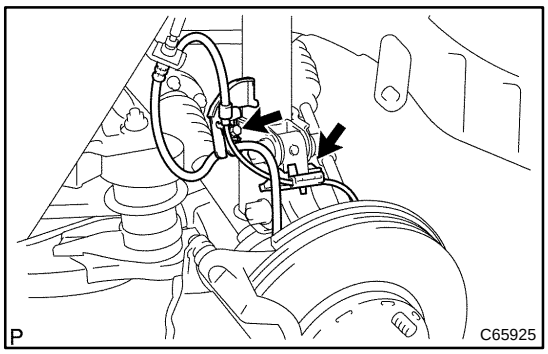
SST 09817-33190

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

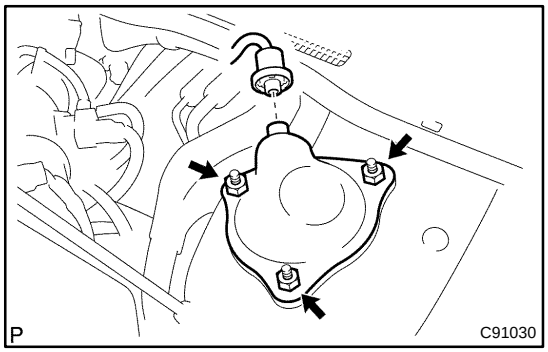
(e) w/o H-TEMS:

Fully tighten the lock nut.

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



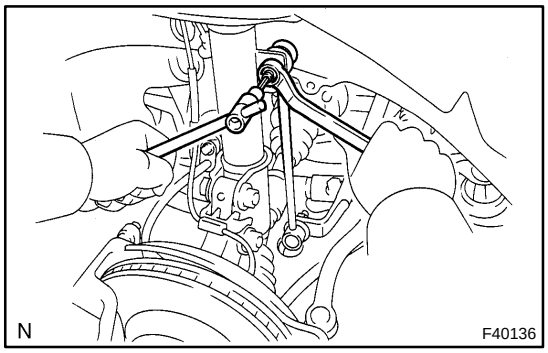
(f) Install the front flexible hose No. 1 and speed sensor front LH with the bolt.
Torque: 18.8 N·m (192 kgf·cm, 14 ft·lbf)



10. INSTALL FRONT SHOCK ABSORBER CAP LH (H-TEMS SUSPENSION)

(a) Install the front shock absorber cap LH with the 3 nuts.
Torque: 14 N·m (143 kgf·cm, 10 ft·lbf)

(b) Disconnect the connector, install the harness clamp.



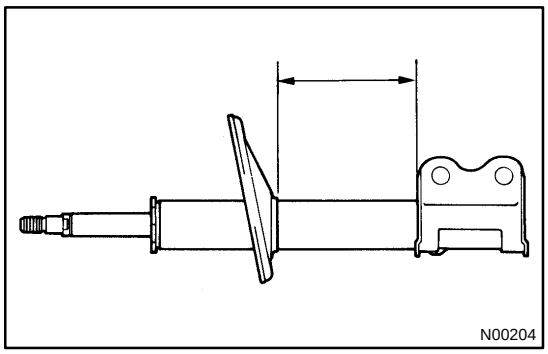
11. INSTALL FRONT STABILIZER LINK ASSY LH

(a) Install the front stabilizer link assy LH with the nut.
Torque: 74 N·m (755 kgf·cm, 55 ft·lbf)

HINT:
If the ball joint turns together with the nut, use a hexagon (6 mm) wrench to hold the stud.

12. INSTALL FRONT WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

13. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT (See page 26-5)



DISPOSAL

HINT:

Dispose the RH side by the same procedures with the LH side.

1. DISPOSE OF SHOCK ABSORBER ASSY FRONT LH

(a) Fully extend the shock absorber rod. 2601G-11

(b) Using a drill, make a hole in the cylinder as shown in the illustration to discharge the gas inside.

CAUTION:

- **When drilling, chips may fly out, work carefully.**
- **The gas is colorless, odorless and non-poisonous.**

FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH (From July, 2003)

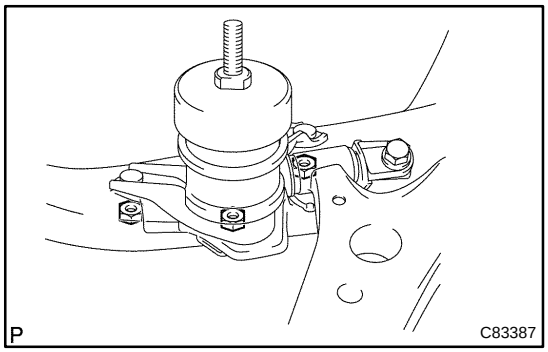
2601H-09

REPLACEMENT

HINT:

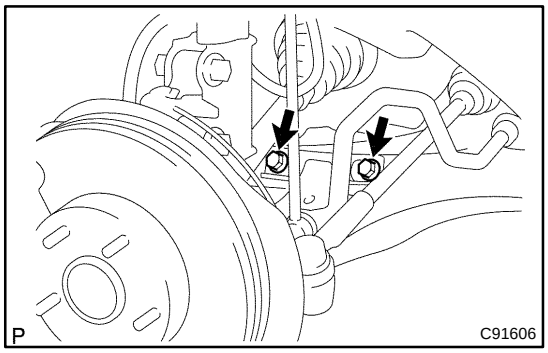
COMPONENTS: See page 26-3 .

1. REMOVE ENGINE ASSEMBLY WITH TRANSAXLE (See page 14-29)



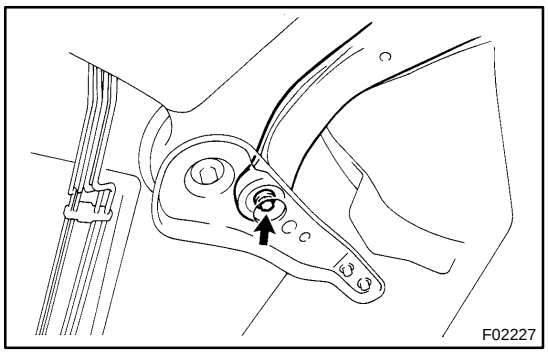
2. REMOVE TRANSVERSE ENGINE ENGINE MOUNTING INSULATOR

(a) Remove the 3 nuts and the transverse engine engine mounting insulator.



3. REMOVE FRONT SUSPENSION ARM SUB- ASSY LOWER NO.1 LH

(a) Remove the 2 bolts on the front side of the front suspension arm sub-assy lower No. 1 LH.



(b) Remove the bolt and nut on the rear side of the front suspension arm sub-assy lower No. 1 LH.

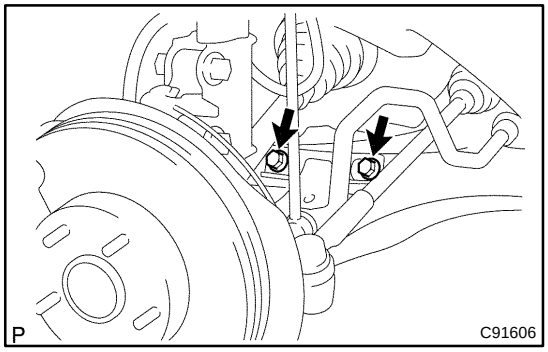
(c) Remove the front suspension arm sub-assy lower No. 1 LH.

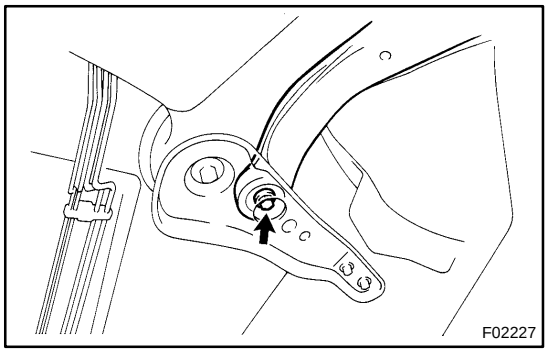
(d) Remove the front lower arm bush stopper from the front suspension arm sub-assy lower No. 1 LH.

4. INSTALL FRONT SUSPENSION ARM SUB- ASSY LOWER NO.1 LH

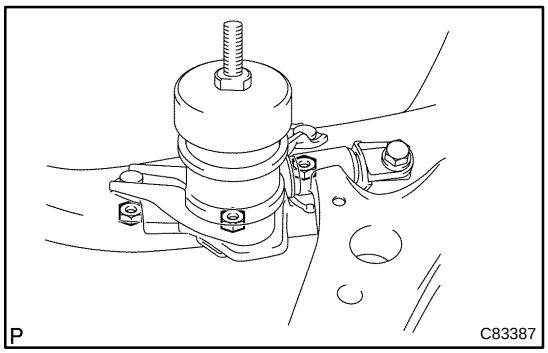
(a) Install the front lower arm bush stopper to the front suspension arm sub-assy lower No. 1 LH.

(b) Install the front suspension arm sub-assy lower No. 1 LH with the 2 bolts to the front side.
Torque: 200 N·m (2,039 kgf·cm, 148 ft·lbf)





(c) Install the front suspension arm sub-assy lower No. 1 LH with the bolt and nut to the rear side.
Torque: 206 N·m (2,101 kgf·cm, 152 ft·lbf)



5. INSTALL TRANSVERSE ENGINE ENGINE MOUNTING INSULATOR

(a) Install the transverse engine engine mounting insulator with the 3 nuts.
Torque: 87 N·m (887 kgf·cm, 64 ft·lbf)

6. INSTALL ENGINE ASSEMBLY WITH TRANSAXLE (See page 14-29)

LOWER BALL JOINT ASSY FRONT LH

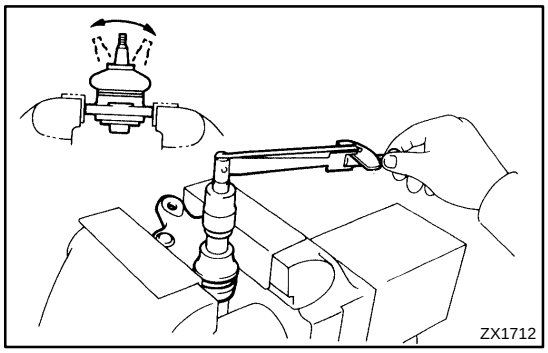
2601I-09

REPLACEMENT

HINT:

CONPONENTS: See page 26-3 .

1. **REMOVE FRONT WHEEL**
2. **REMOVE FRONT AXLE HUB LH NUT (See page 30-8)**
   SST 09930-00010
3. **DISCONNECT SPEED SENSOR FRONT LH (See page 30-8)**
4. **DISCONNECT FRONT DISC BRAKE CALIPER ASSY LH (See page 30-19)**
5. **REMOVE FRONT DISC**
6. **DISCONNECT TIE ROD ASSY LH (See page 30-8)**
   SST 09628-6201 1
7. **DISCONNECT FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH (See page 30-8)**
8. **REMOVE FRONT AXLE ASSY LH (See page 30-19)**
9. **REMOVE LOWER BALL JOINT ASSY FRONT LH (See page 30-19)**
   SST 09628-6201 1



10. **INSPECT LOWER BALL JOINT ASSY FRONT LH**
(a) As shown in the illustration, flip the ball joint stud back and forth 5 times, before installing the nut.
(b) Using a torque wrench, turn the nut continuously at a rate of 3 - 5 seconds per 1 turn and take the torque reading on the 5th turn.
Turning torque:
0.98 - 3.43 N·m (10 - 35 kgf·cm, 8.7 - 30 in.·lbf)

11. **INSTALL LOWER BALL JOINT ASSY FRONT LH (See page 30-19)**
12. **INSTALL FRONT AXLE ASSY LH (See page 30-19)**
13. **INSTALL FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH (See page 30-8)**
14. **INSTALL TIE ROD ASSY LH (See page 30-8)**
15. **INSTALL FRONT DISC**
16. **INSTALL FRONT DISC BRAKE CALIPER ASSY LH (See page 30-19)**
17. **INSTALL SPEED SENSOR FRONT LH (See page 30-8)**
18. **INSTALL FRONT AXLE HUB LH NUT (See page 30-8)**
19. **INSTALL FRONT WHEEL**
    Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
20. **INSPECT AND ADJUST FRONT WHEEL ALIGNMENT (See page 26-5)**
21. **CHECK ABS SPEED SENSOR SIGNAL**
    w/ VSC (See page 05-471)
    w/o VSC (See page 05-420)

STABILIZER BAR FRONT

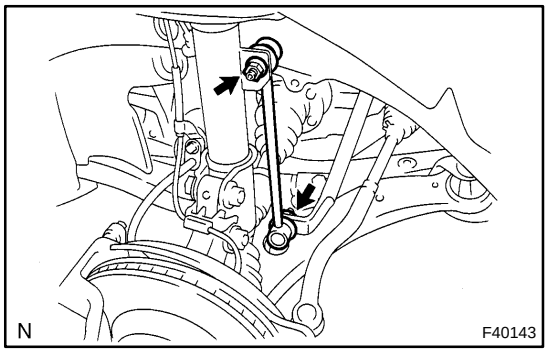
REPLACEMENT

2601J-17

HINT:

COMPONENTS: See page 26-3 .

1. REMOVE FRONT WHEEL



2. REMOVE FRONT STABILIZER LINK ASSY LH

(a) Remove the 2 nuts and front stabilizer link assy LH.

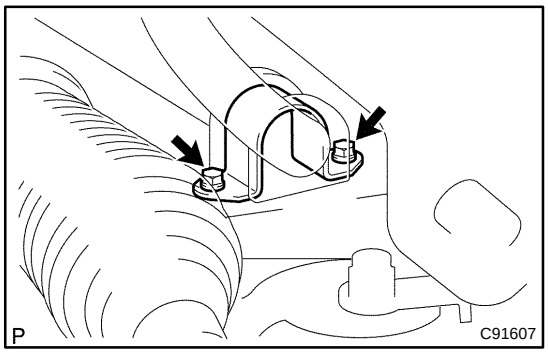
HINT:

If the ball joint turns together with the nut, use a hexagon (6 mm) wrench to hold the stud.

3. REMOVE FRONT STABILIZER LINK ASSY RH

HINT:

Remove the RH side by the same procedures with the LH side.



4. REMOVE FRONT STABILIZER BRACKET NO.1 LH

(a) Remove the 2 bolts and 2 front stabilizer brackets No. 1 LH.

5. REMOVE FRONT STABILIZER BRACKET NO.1 RH

HINT:

Remove the RH side by the same procedures with the LH side.

6. DISCONNECT TIE ROD ASSY LH (See page 30-8)

SST 09628-6201 1

7. DISCONNECT TIE ROD ASSY RH

SST 09628-6201 1

HINT:

Separate the RH side by the same procedures with the LH side.

8. DISCONNECT STEERING GEAR OUTLET RETURN TUBE (See page 51-21)

SST 09023-00101

9. DISCONNECT PRESSURE FEED TUBE ASSY (See page 51-21)

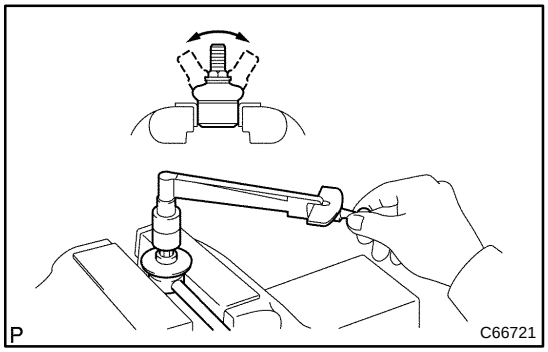
SST 09023-00101

10. DISCONNECT STEERING INTERMEDIATE SHAFT SUB-ASSY (See page 51-21)

11. REMOVE RACK & PINION POWER STEERING GEAR ASSY (See page 51-21)

12. REMOVE STABILIZER BAR FRONT

13. REMOVE FRONT STABILIZER BAR BUSH NO.1

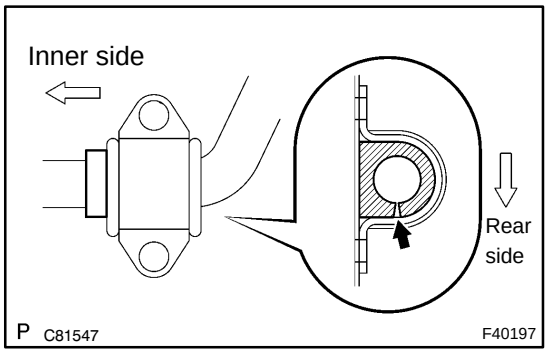


14. INSPECT FRONT STABILIZER LINK ASSY LH

(a) As shown in the illustration, flip the ball joint stud back and forth 5 times, before installing the nut.

(b) Using a torque wrench, turn the nut continuously at a rate of 2 - 4 seconds per 1 turn and take the torque reading on the 5th turn.

Turning torque:
0.05 - 1.96 N·m (0.5 - 20 kgf·cm, 0.4 - 17.4 in.·lbf)



15. INSTALL FRONT STABILIZER BAR BUSH NO.1

HINT:
Install the bushing to the inner side of the bushing stopper on the stabilizer bar.

16. INSTALL STABILIZER BAR FRONT

17. INSTALL RACK & PINION POWER STEERING GEAR ASSY (See page 51-21)

18. INSTALL STEERING INTERMEDIATE SHAFT SUB-ASSY (See page 51-21)

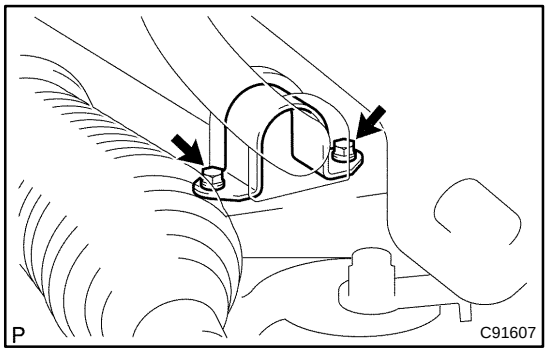
19. INSTALL PRESSURE FEED TUBE ASSY (See page 51-21)
SST 09023-00101

20. INSTALL STEERING GEAR OUTLET RETURN TUBE (See page 51-21)
SST 09023-00101

21. INSTALL TIE ROD ASSY LH (See page 30-8)

22. INSTALL TIE ROD ASSY RH

HINT:
Install the RH side by the same procedures with the LH side.



23. INSTALL FRONT STABILIZER BRACKET NO.1 LH

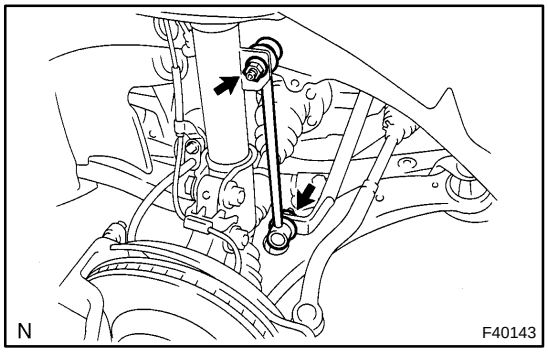
(a) Install the 2 front stabilizer brackets No. 1 LH with the 2 bolts.

Torque: 19 N·m (194 kgf·cm, 14 ft·lbf)

24. INSTALL FRONT STABILIZER BRACKET NO.1 RH

HINT:

Install the RH side by the same procedures with the LH side.



25. INSTALL FRONT STABILIZER LINK ASSY LH

(a) Install the front stabilizer link assy LH with the 2 nuts.

Torque: 74 N·m (755 kgf·cm, 55 ft·lbf)

HINT:

If the ball joint turns together with the nut, use a hexagon (6 mm) wrench to hold the stud.

26. INSTALL FRONT STABILIZER LINK ASSY RH

HINT:

Install the RH side by the same procedures with the LH side.

27. INSTALL FRONT WHEEL

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

28. BLEED POWER STEERING FLUID (See page 51-3)

29. CHECK POWER STEERING FLUID LEAKAGE

30. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT (See page 26-5)

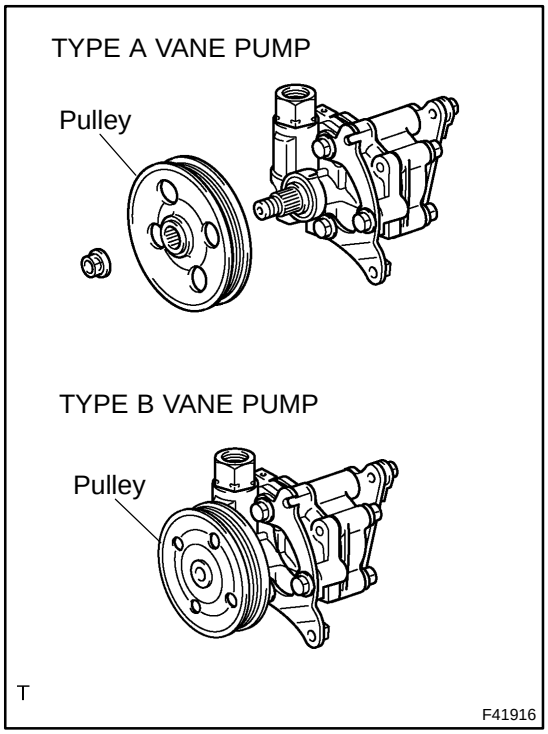
POWER STEERING SYSTEM

PRECAUTION

51067-03

1. HANDLING PRECAUTIONS ON STEERING SYSTEM

(a) Care must be taken to when replacing parts. Incorrect replacement could affect the performance of the steering system and result in a driving hazard.



(b) 1MZ-FE engine has 2 types of vane pump assy.

HINT:

TYPE A VANE PUMP

Vane pump pulley can be removed from the vane pump shaft (See page 51-7).

TYPE B VANE PUMP

Vane pump pulley cannot be removed from the vane pump shaft (See page 51-7).

2. HANDLING PRECAUTIONS ON SRS AIRBAG SYSTEM

(a) The LEXUS ES330 is equipped with SRS (Supplemental Restraint System) such as the driver airbag and front passenger airbag. Failure to carry out service operation in 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 notice for the supplemental restraint system (See page 60-1).

51017-12

PROBLEM SYMPTOMS TABLE

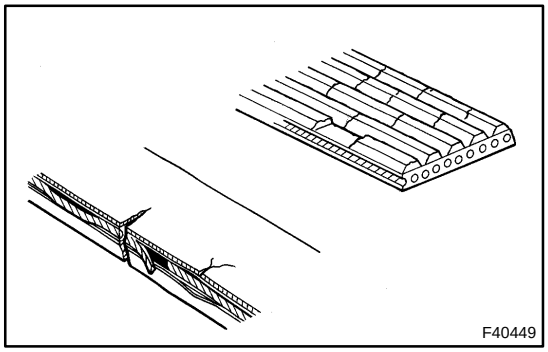
HINT:

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in the order shown. If necessary, repair or replace these parts.

Symptom	Suspect Area	See page
Hard steering	1. Tires (Improperly inflated)	28-1
	2. Power steering fluid level (Low)	51-3
	3. Drive belt (Loose)	14-1
	4. Front wheel alignment (Incorrect)	26-5
	5. Steering system joints (Worn)	-
	6. Suspension arm ball joints (Worn)	26-16
	7. Steering column (Binding)	-
	8. Vane pump assy	51-9
	9. Rack & pinion power steering gear assy	51-21
Poor return	1. Tires (Improperly inflated)	28-1
	2. Front wheel alignment (Incorrect)	26-5
	3. Steering column (Binding)	-
	4. Rack & pinion power steering gear assy	51-21
Excessive play	1. Steering system joints (Worn)	-
	2. Suspension arm ball joints (Worn)	26-16
	3. Steering intermediate shaft sub-assy (Worn)	-
	4. Sliding yoke (Worn)	-
	5. Front wheel bearing (Worn)	30-2
	6. Rack & pinion power steering gear assy	51-21
Abnormal noise	1. Power steering fluid level (Low)	51-3
	2. Steering system joints (Worn)	-
	3. Vane pump assy	51-9
	4. Rack & pinion power steering gear assy	51-21

51018-15

ON-VEHICLE INSPECTION



1. INSPECT DRIVE BELT

(a) Visually check the belt for excessive wear, frayed cords, etc.

If any defect is found, replace the drive belt.

HINT:

Cracks on the rib side of a belt are considered acceptable. If the missing chunks from the ribs are found on the belt, it should be replaced.

2. BLEED POWER STEERING SYSTEM

(a) Check the fluid level.

(b) Jack up the front of the vehicle and support it with the stands.

(c) Turn the steering wheel.

(1) With the engine stopped, turn the wheel slowly from lock to lock several times.

(d) Lower the vehicle.

(e) Start the engine.

(1) Run the engine at idle for a few minutes.

(f) Turn the steering wheel.

(1) With the engine idling, turn the wheel to left or right full lock position and keep it there for 2 - 3 seconds, then turn the wheel to the opposite full lock position and keep it there for 2 - 3 seconds.

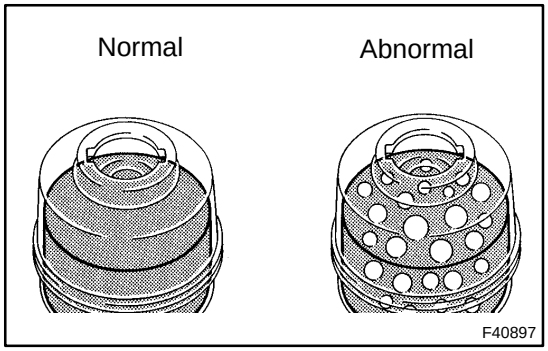
(2) Repeat (1) several times.

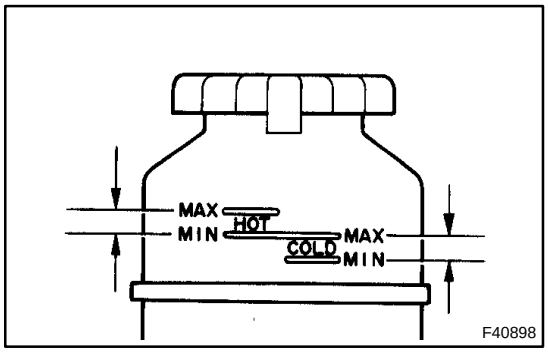
(g) Stop the engine.

(h) Check for forming or emulsification.

Especially, if the system has to be bled twice because of foaming or emulsification, check for fluid leaks in the system.

(i) Check the fluid level.





3. CHECK FLUID LEVEL

(a) Keep the vehicle level.

(b) With the engine stopped, check the fluid level in the oil reservoir.

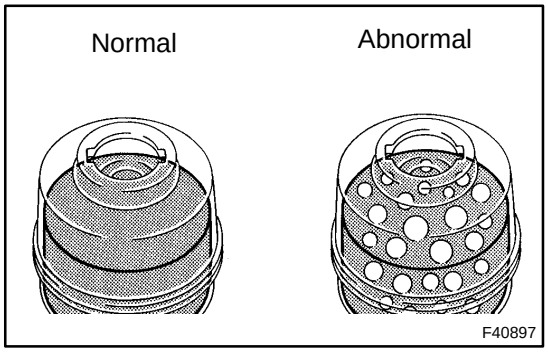
If necessary, add fluid.

Fluid: ATF DEXRON® II or III

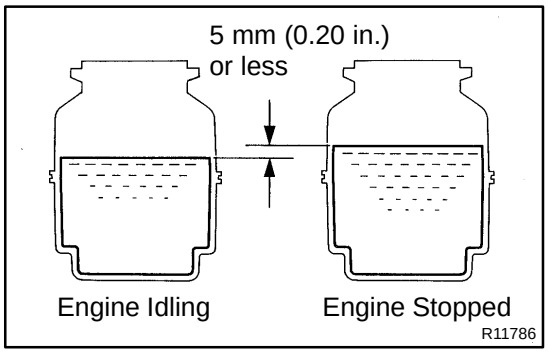
HINT:

Check that the fluid level is within the HOT LEVEL range on the reservoir cap. If the fluid is cold, check that it is within the COLD LEVEL range.

(c) Start the engine and run it at idle.
(d) Turn the steering wheel from lock to lock several times to raise fluid temperature.
Fluid temperature: 75 - 80˚C (167 - 176˚F)



(e) Check for foaming or emulsification.
If foaming or emulsification is identified, bleed the power steering system.



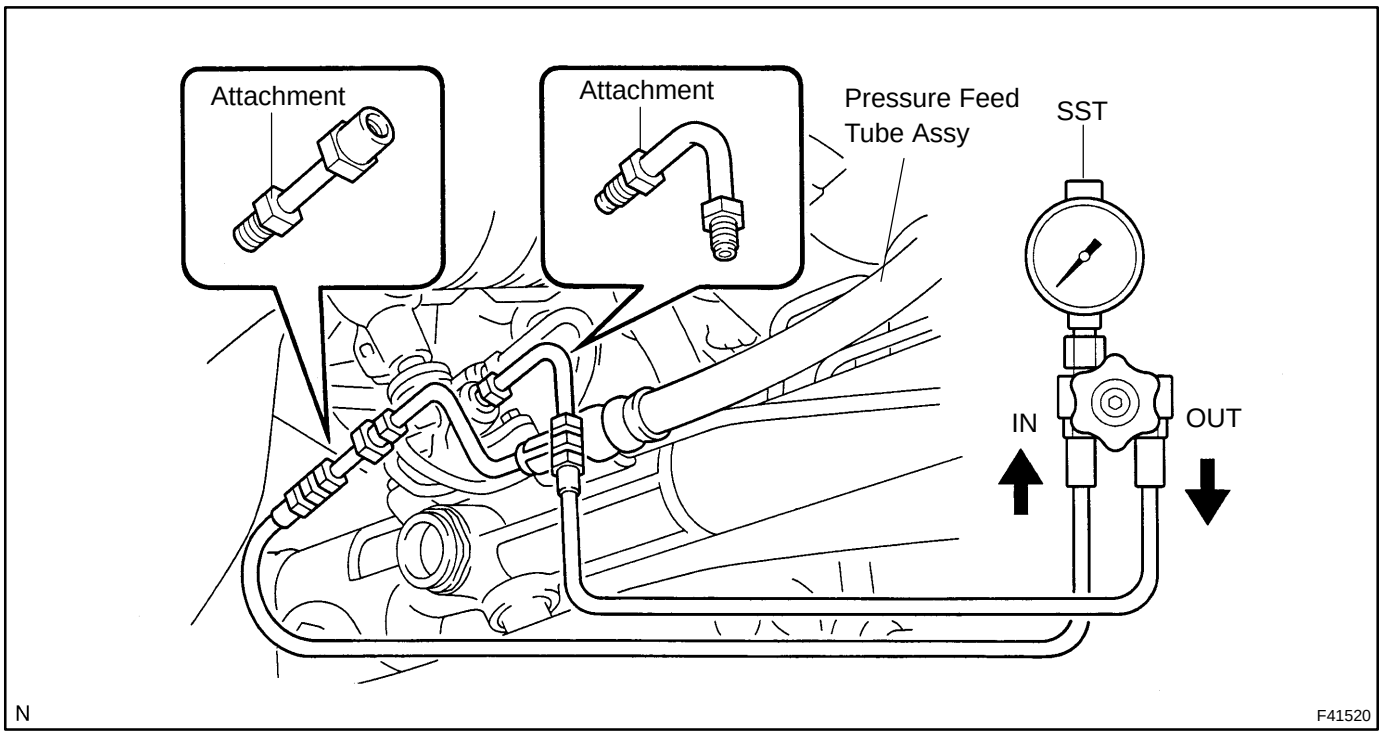
(f) With the engine idling, measure the fluid level in the oil reservoir.
(g) Stop the engine.
(h) Wait a few minutes and remeasure the fluid level in the oil reservoir.
Maximum fluid level rise: 5 mm (0.20 in.)
If a problem is found, bleed the power steering system.
(i) Check the fluid level.

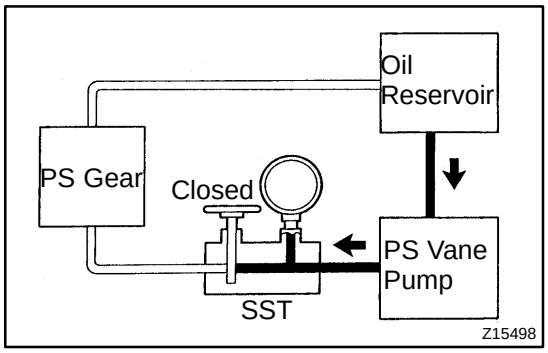
4. CHECK STEERING FLUID PRESSURE

(a) Disconnect the pressure feed tube assy from the rack & pinion power steering gear assy (See page 51-21).
(b) Connect SST, as shown in the illustration.
SST 09640-10010 (09641-01010, 09641-01020, 09641-01030)

NOTICE:
Check that the valve of the SST is in the open position.

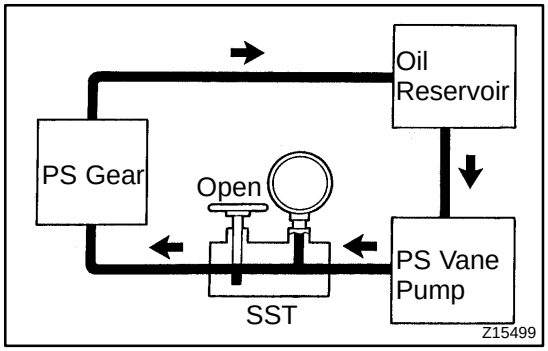
(c) Bleed the power steering system.
(d) Start the engine and run it at idle.
(e) Turn the steering wheel from lock to lock several times to raise fluid temperature.
Fluid temperature: 75 - 80 ˚C (167 - 176 ˚F)





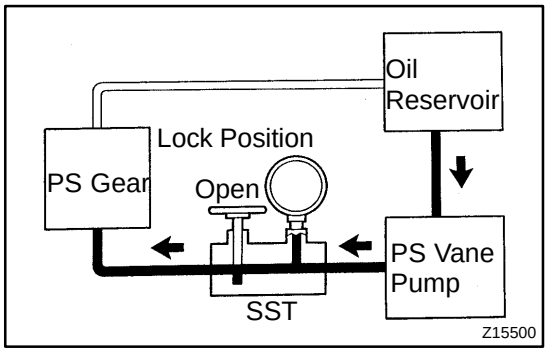
(f) With the engine idling, close the valve of the SST and observe the reading on the SST.
Fluid pressure:
7,800 - 8,300 kPa (80 - 85 kgf/cm^2, 1,138 - 1,209 psi)

NOTICE:
- ★ **Do not keep the valve closed for more than 10 seconds.**
- ★ **Do not let the fluid temperature become too high.**



(g) With the engine idling, open the valve fully.
(h) Measure the fluid pressure at engine speeds of 1,000 rpm and 3,000 rpm.
Fluid pressure difference:
490 kPa (5 kgf/cm^2, 71 psi) or less

NOTICE:
Do not turn the steering wheel.



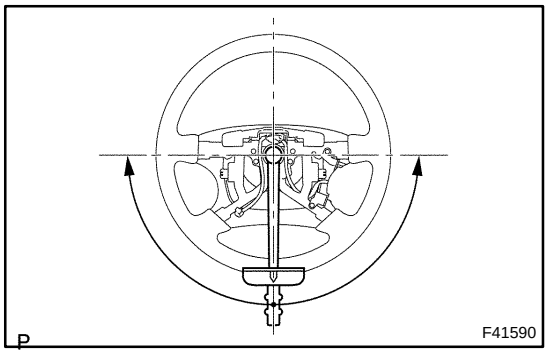
(i) With the engine idling and valve fully opened, turn the steering wheel to full lock position.
Fluid pressure:
7,800 - 8,300 kPa (80 - 85 kgf/cm^2, 1,138 - 1,209 psi)

NOTICE:
- ★ **Do not maintain lock position for more than 10 seconds.**
- ★ **Do not let the fluid temperature become too high.**

(j) Disconnect the SST.
SST 09640- 10010 (09641- 01010, 09641- 01020, 09641-01030)

(k) Connect the pressure feed tube assy to the rack & pinion power steering gear assy (See page 51-21).

(l) Bleed the power steering system.



5. CHECK STEERING EFFORT

(a) Center the steering wheel assy.

(b) Remove the horn button assy (See page 60-22).

(c) Start the engine and run it at idle.

(d) Using a torque wrench, measure the steering effort in both directions.
Steering effort (Reference):
6 N·m (60 kgf·cm, 53 in.·lbf) or less

HINT:
Take the tire type, pressure and contact surface into consideration before making your diagnosis.

(e) Install the steering wheel assy set nut.
Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

(f) Install the horn button assy (See page 60-22).

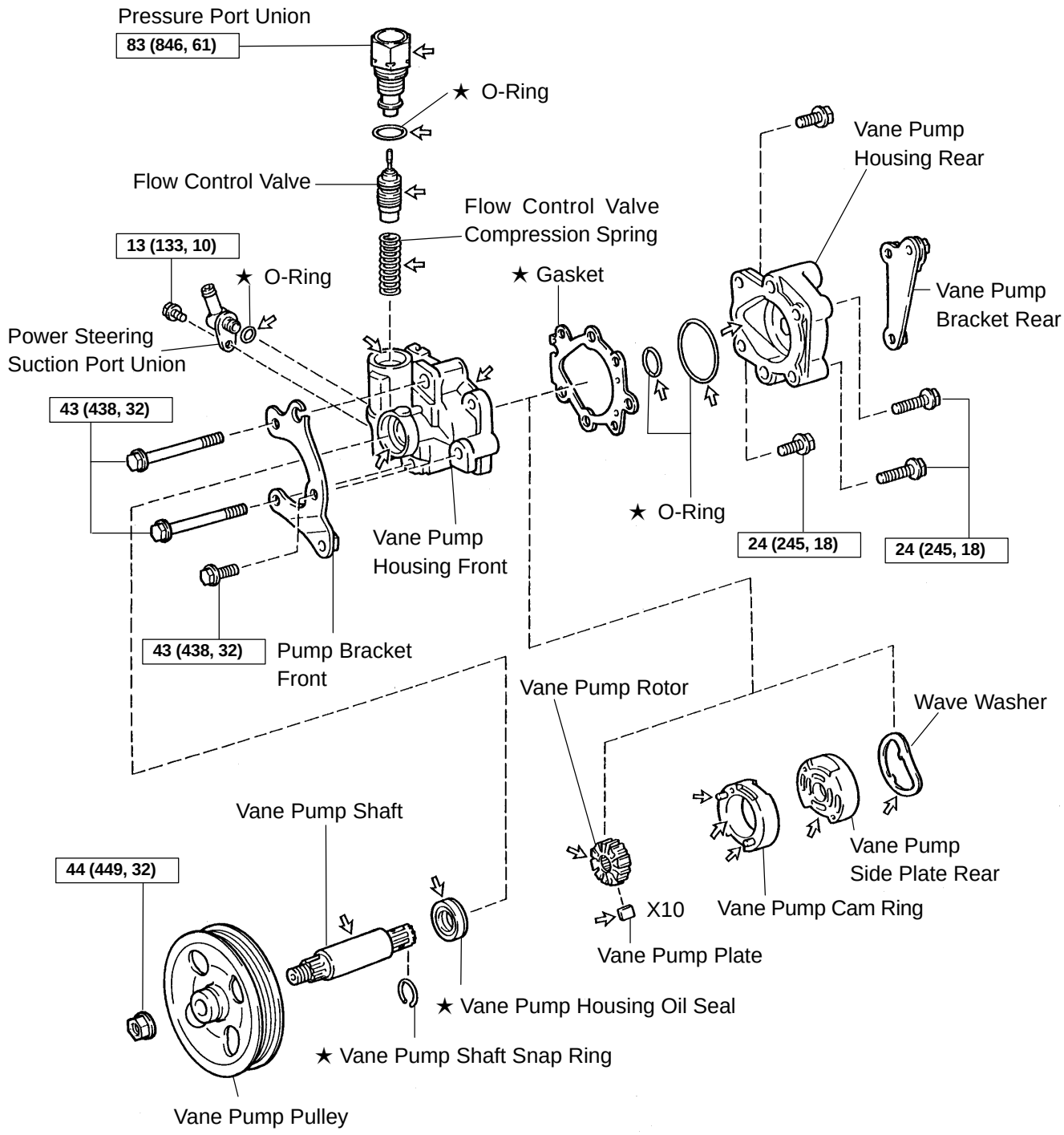
(g) Inspect SRS warning light (See page 05-818).

VANE PUMP ASSY

COMPONENTS

51068-01

TYPE A VANE PUMP:



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

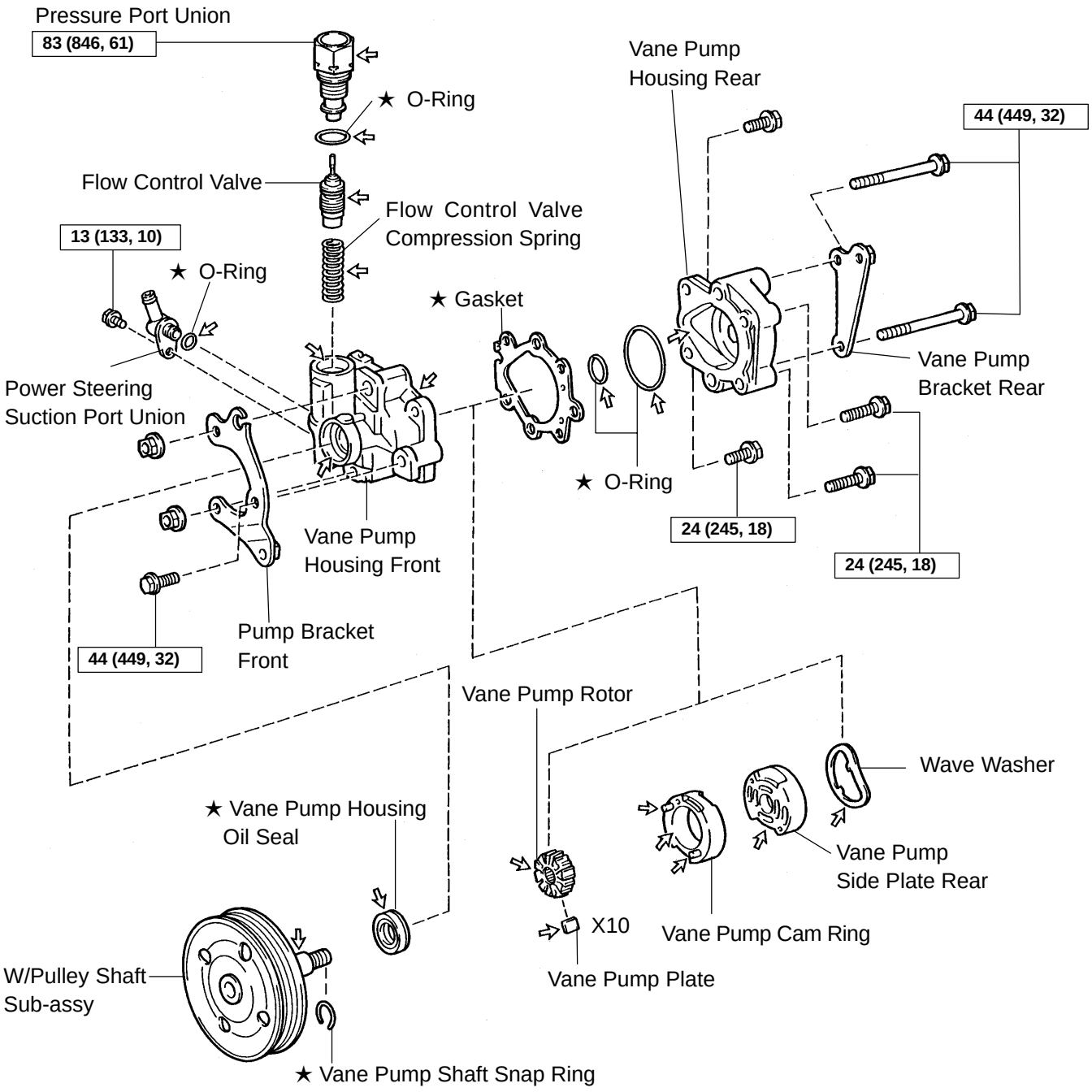
★ Non-reusable part

⇦ Power steering fluid

N

F41597

TYPE B VANE PUMP:



N·m (kgf·cm, ft·lbf) : Specified torque
★ Non-reusable part
⇦ Power steering fluid

N

F41589

51069-02

OVERHAUL

NOTICE:

- ★ **When using a vise, do not over tighten.**
- ★ **When installing, coat the parts indicated by the arrows with power steering fluid (See page 51-7).**

1. REMOVE FRONT WHEEL RH

2. DRAIN POWER STEERING FLUID

3. REMOVE FRONT FENDER LINER RH

4. REMOVE FRONT FENDER APRON SEAL RH

5. DISCONNECT OIL RESERVOIR TO PUMP HOSE NO.1

(a) Remove the clip and disconnect the oil reservoir to pump hose No.1.

NOTICE:

Take care not to spill fluid on the V belt.

6. REMOVE POWER STEERING OIL PRESSURE SWITCH

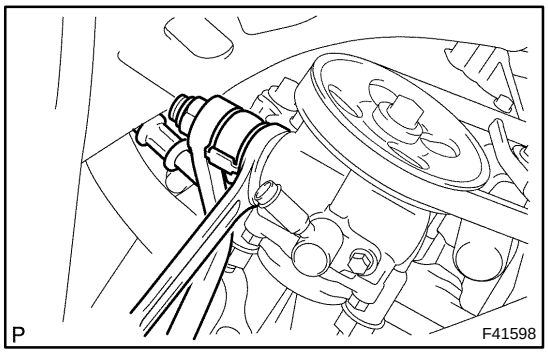
(a) Disconnect the connector.

(b) Remove the oil power steering pressure switch from the union bolt.

NOTICE:

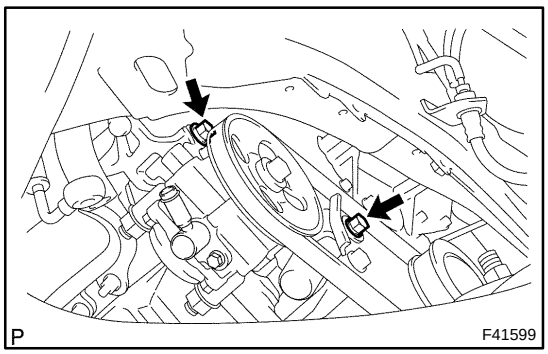
Be careful not to drop the oil power steering pressure switch.

If the oil power steering pressure switch is dropped or strongly damaged, replace it with a new one.



7. DISCONNECT PRESSURE FEED HOSE

(a) Using a spanner (22 mm) to hold the pressure port union, remove the union bolt and gasket.

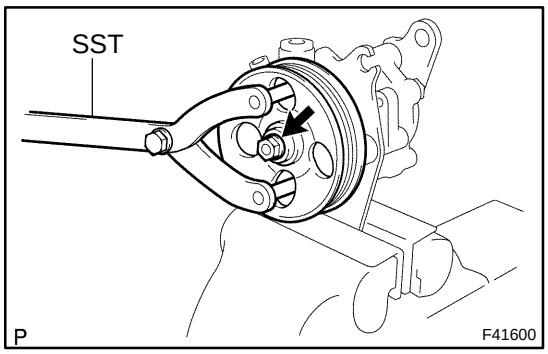


8. REMOVE VANE PUMP V BELT

(a) Loosen the 2 bolts and remove the vane pump V belt.

9. REMOVE VANE PUMP ASSY

(a) Remove the 2 bolts and vane pump assy.



10. REMOVE VANE PUMP PULLEY(TYPE A VANE PUMP)

(a) Using SST, stop the vane pump pulley rotation and loosen the nut.
SST 09960-10010 (09962-01000, 09963-01000)
(b) Remove the nut and vane pump pulley from the vane pump shaft.

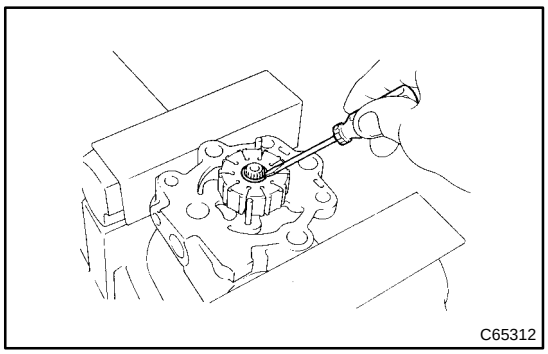
11. REMOVE POWER STEERING SUCTION PORT UNION

(a) Remove the bolt and power steering suction port union.
(b) Remove the O-ring from the power steering suction port union.

12. REMOVE PRESSURE PORT UNION
(a) Remove the pressure port union.
(b) Remove the O-ring from the pressure port union.
13. REMOVE FLOW CONTROL VALVE
14. REMOVE FLOW CONTROL VALVE COMPRESSION SPRING
15. REMOVE VANE PUMP BRACKET REAR(TYPE A VANE PUMP)

(a) Remove the 2 bolts and vane pump bracket rear from the vane pump assy.
16. REMOVE VANE PUMP BRACKET REAR(TYPE B VANE PUMP)

(a) Remove the 2 bolts, 2 nuts and vane pump bracket rear from the vane pump assy.
17. REMOVE VANE PUMP HOUSING REAR
(a) Remove the 4 bolts and vane pump housing rear from the vane pump housing front.
(b) Remove the gasket.
(c) Remove the 2 O-rings from the vane pump housing rear.
18. REMOVE VANE PUMP SIDE PLATE REAR
(a) Remove the wave washer from the vane pump side plate rear.
(b) Remove the vane pump side plate rear.
19. REMOVE VANE PUMP CAM RING

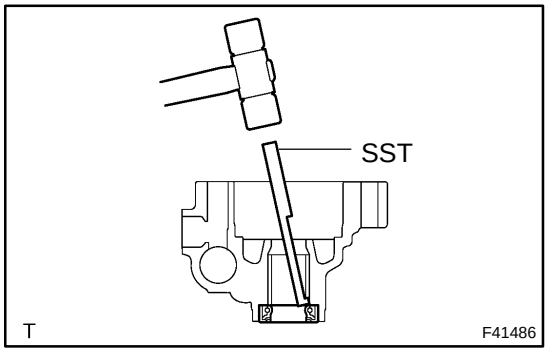


20. REMOVE VANE PUMP ROTOR
(a) Remove the 10 vane pump plates from the vane pump rotor.
(b) Using a screwdriver, remove the vane pump shaft snap ring.
(c) Remove the vane pump rotor.

21. REMOVE VANE PUMP SHAFT(TYPE A VANE PUMP)
22. REMOVE W/PULLEY SHAFT SUB-ASSY(TYPE B VANE PUMP)

23. REMOVE PUMP BRACKET FRONT

(a) Remove the bolt and pump bracket front from the vane pump housing front.

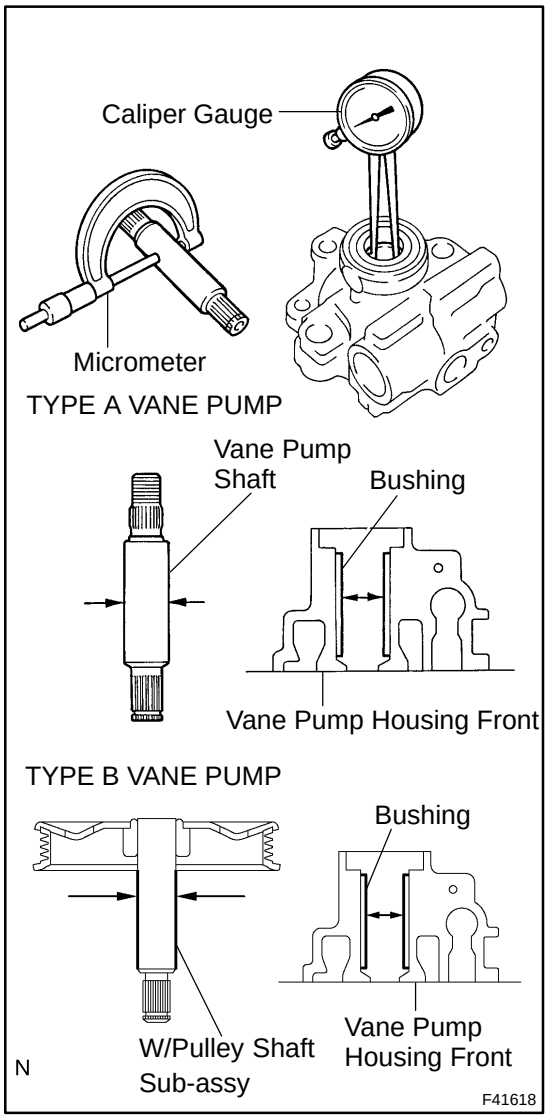


24. REMOVE VANE PUMP HOUSING OIL SEAL

(a) Using SST and a hammer, tap out the vane pump housing oil seal from the vane pump housing front.
SST 09631-10030

NOTICE:

Be careful not to damage the bushing of the vane pump housing front.

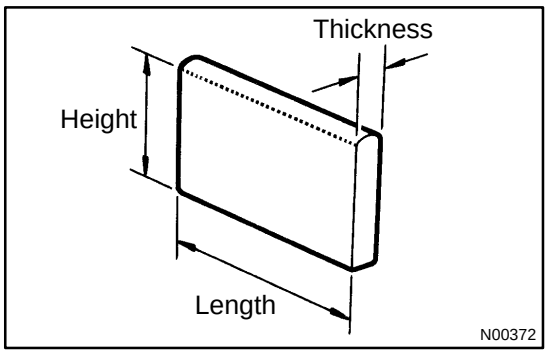


25. INSPECT OIL CLEARANCE

(a) Using a micrometer and a caliper gauge, measure the oil clearance.

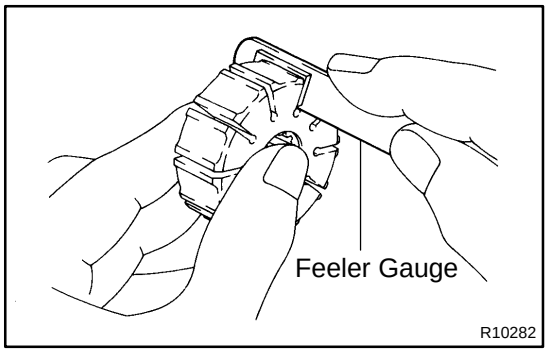
Standard clearance:
0.027 - 0.054 mm (0.00106 - 0.00213 in.)
Maximum clearance: 0.07 mm (0.0028 in.)

If it is more than the maximum, replace the vane pump assy.



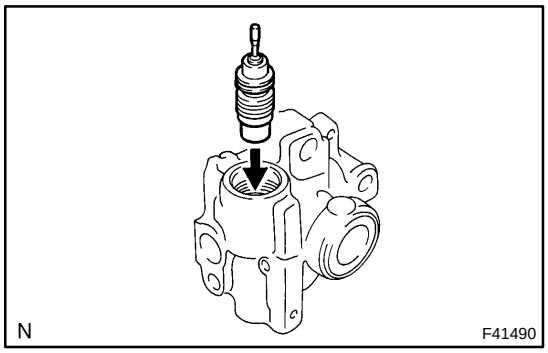
26. INSPECT VANE PUMP ROTOR AND VANE PUMP PLATES

(a) Using a micrometer, measure the height, thickness and length of the vane pump plates.
Minimum height: 8.6 mm (0.339 in.)
Minimum thickness: 1.397 mm (0.05500 in.)
Minimum length: 14.991 mm (0.59020 in.)



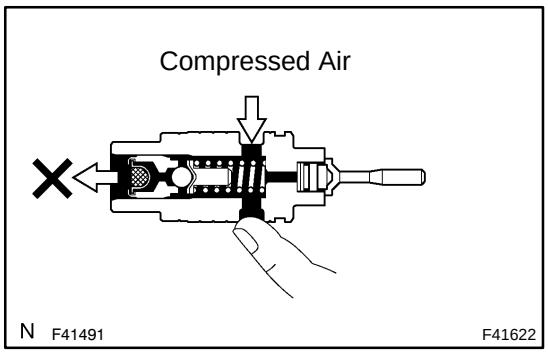
(b) Using a feeler gauge, measure the clearance between the vane pump rotor groove and vane pump plate.
Maximum clearance: 0.03 mm (0.0012 in.)

If it is more than the maximum, replace the vane pump assy.



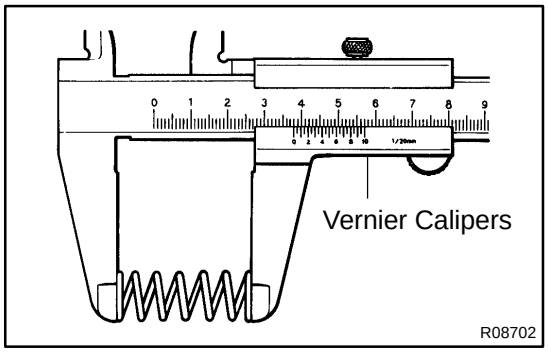
27. INSPECT FLOW CONTROL VALVE

(a) Coat the flow control valve with power steering fluid and check that it falls smoothly into the flow control valve hole by its own weight.



(b) Check the flow control valve for leakage. Close one of the holes and apply compressed air of 392 - 490 kPa (4 - 5 kgf/cm^2, 57 - 71 psi) into the opposite side hole, and confirm that air does not come out from the end holes.

If necessary, replace the vane pump assy.



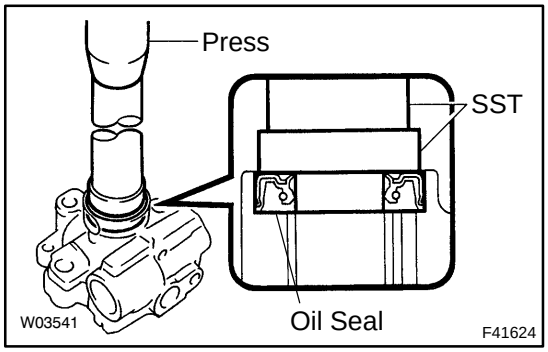
28. INSPECT FLOW CONTROL VALVE COMPRESSION SPRING

(a) Using vernier calipers, measure the free length of the flow control valve compression spring.
Minimum free length: 32.24 mm (1.2693 in.)

If it is not within the specification, replace the vane pump assy.

29. INSPECT PRESSURE PORT UNION

If the union seat in the pressure port union is remarkably damaged and it may cause fluid leakage, replace the vane pump assy.



30. INSTALL VANE PUMP HOUSING OIL SEAL

(a) Coat a new vane pump housing oil seal lip with power steering fluid.

(b) Using SST and a press, install the new vane pump housing oil seal.

SST 09950-60010 (09951-00330), 09950-70010 (09951-07100)

NOTICE:

Make sure that the vane pump housing oil seal is installed facing the correct direction.

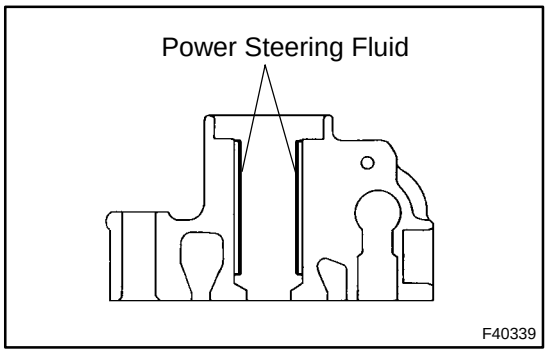
31. INSTALL PUMP BRACKET FRONT

(a) Install the pump bracket front with the bolt.

Torque:

Type A Vane Pump: 43 N·m (438 kgf·cm, 32 ft·lbf)

Type B Vane Pump: 44 N·m (449 kgf·cm, 32 ft·lbf)



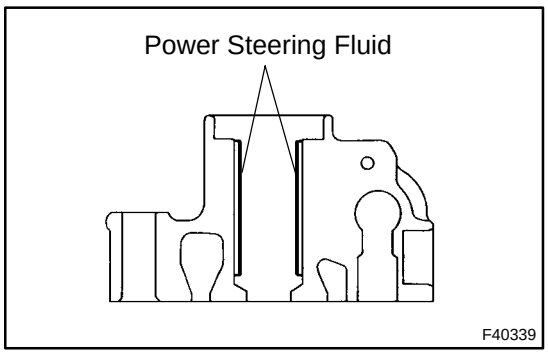
32. INSTALL VANE PUMP SHAFT(TYPE A VANE PUMP)

(a) Coat inside bushing surface of the vane pump housing front with power steering fluid.

(b) Gradually insert the vane pump shaft from the pulley side.

NOTICE:

Do not damage the vane pump housing oil seal lip in the vane pump housing front.



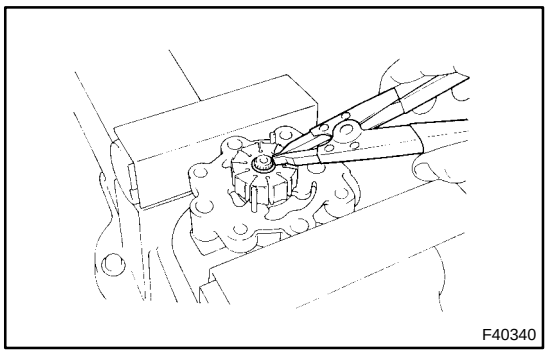
33. INSTALL W/PULLEY SHAFT SUB- ASSY(TYPE B VANE PUMP)

(a) Coat inside bushing surface of the vane pump housing front with power steering fluid.

(b) Gradually insert the w/pulley shaft sub-assy from the pulley side.

NOTICE:

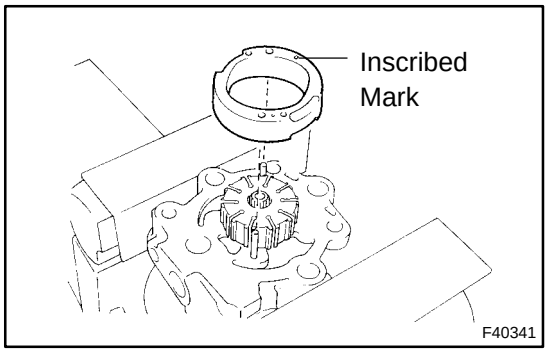
Do not damage the vane pump housing oil seal lip in the vane pump housing front.



34. INSTALL VANE PUMP ROTOR

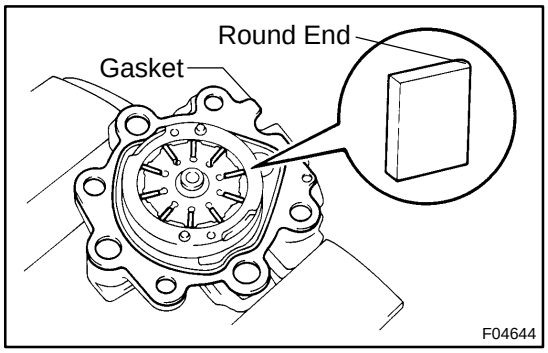
(a) Install the vane pump rotor.

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



35. INSTALL VANE PUMP CAM RING

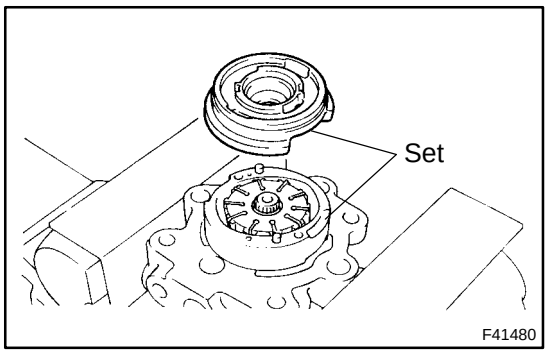
(a) Align the holes of the vane pump cam ring with 2 straight pins, and install the vane pump cam ring with inscribed mark facing outward.



(b) Coat 10 vane pump plates with power steering fluid.

(c) Install the vane pump plates with the round end facing outward.

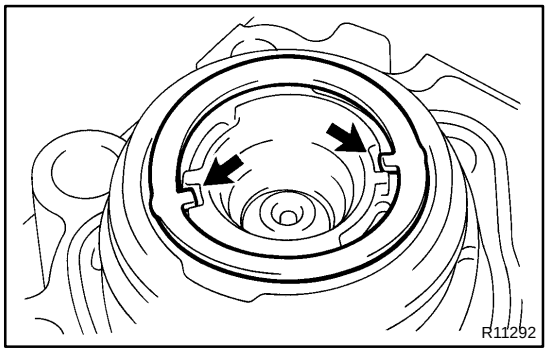
(d) Install a new gasket.



36. INSTALL VANE PUMP SIDE PLATE REAR

(a) Coat a new O-ring with power steering fluid and install it to the vane pump side plate rear.

(b) Align the groove of the vane pump cam ring with that of the vane pump side plate rear, install the vane pump side plate rear.

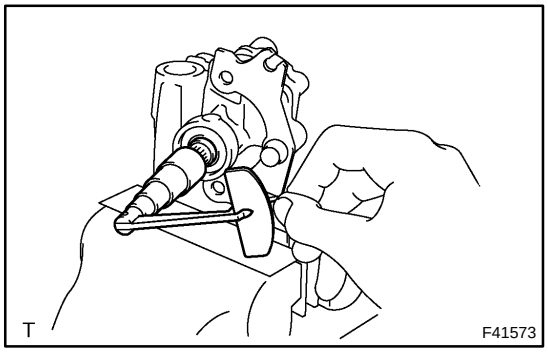


(c) Install the wave washer so that its protrusions fit into the slots in the vane pump side plate rear.

37. INSTALL VANE PUMP HOUSING REAR

(a) Coat a new O-ring with power steering fluid and install it to the vane pump housing rear.

(b) Install the vane pump housing rear with the 4 bolts.
Torque: 24 N·m (245 kgf·cm, 18 ft·lbf)

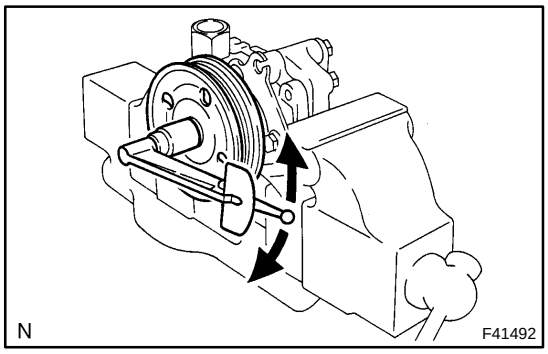


38. MEASURE VANE PUMP ROTATION TORQUE(TYPE A VANE PUMP)

(a) Check that the vane pump rotates smoothly without abnormal noise.

(b) Temporarily install the pulley set nut.

(c) Using a torque wrench, check the vane pump rotating torque.
Rotating torque:
0.27 N·m (2.8 kgf·cm, 2.4 in.·lbf) or less



39. MEASURE VANE PUMP ROTATION TORQUE(TYPE B VANE PUMP)

(a) Check that the vane pump rotates smoothly without abnormal noise.

(b) Temporarily install the service bolt.
Recommended service bolt:
Thread diameter: 10 mm (0.39 in.)
Thread pitch: 1.25 mm (0.0492 in.)
Bolt length: 50 mm (1.97 in.)

(c) Using a torque wrench, check the vane pump rotating torque.
Rotating torque:
0.27 N·m (2.8 kgf·cm, 2.4 in.·lbf) or less

40. INSTALL VANE PUMP BRACKET REAR(TYPE A VANE PUMP)

(a) Install the vane pump bracket rear with the 2 bolts.
Torque: 43 N·m (438 kgf·cm, 32 ft·lbf)

41. INSTALL VANE PUMP BRACKET REAR(TYPE B VANE PUMP)

(a) Install the vane pump bracket rear with the 2 bolts and 2 nuts.
Torque: 44 N·m (449 kgf·cm, 32 ft·lbf)

42. INSTALL FLOW CONTROL VALVE COMPRESSION SPRING

(a) Coat the flow control valve compression spring with power steering fluid and install it.

(b) Install the flow control valve compression spring.

43. INSTALL FLOW CONTROL VALVE

(a) Coat the flow control valve with power steering fluid.

(b) Install the flow control valve.

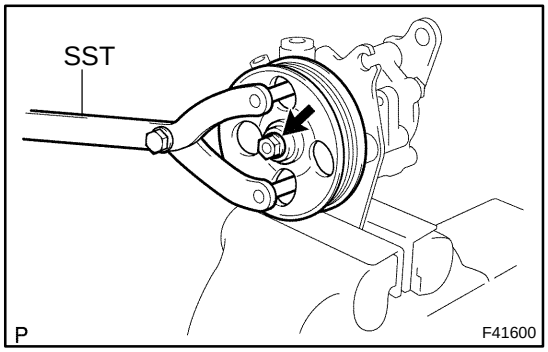
44. INSTALL PRESSURE PORT UNION

(a) Coat a new O-ring with power steering fluid and install it to the pressure port union.

(b) Install the pressure port union.
Torque: 83 N·m (846 kgf·cm, 61 ft·lbf)

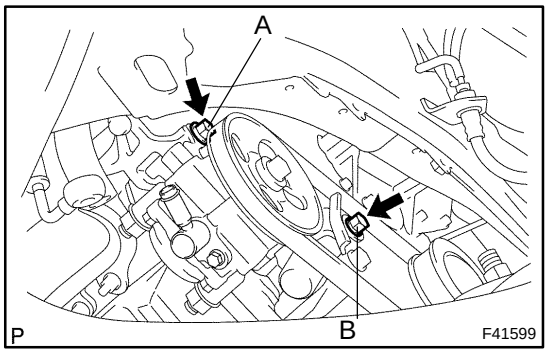
45. INSTALL POWER STEERING SUCTION PORT UNION

(a) Coat a new O-ring with power steering fluid and install it to the power steering suction port union.
(b) Install the power steering suction port union with the bolt.
Torque: 13 N·m (133 kgf·cm, 10 ft·lbf)



46. INSTALL VANE PUMP PULLEY(TYPE A VANE PUMP)

(a) Install the vane pump pulley to the vane pump shaft.
(b) Using SST, stop the vane pump pulley rotation and install the nut.
SST 09960-10010 (09962-01000, 09963-01000)
Torque: 44 N·m (449 kgf·cm, 32 ft·lbf)

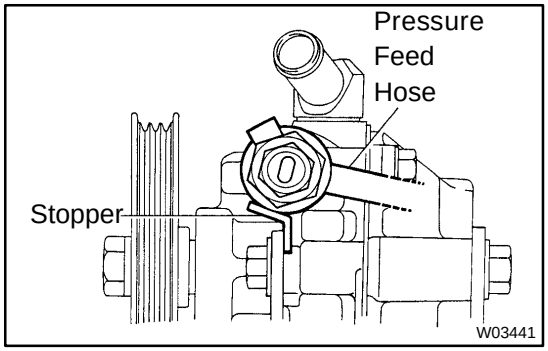


47. INSTALL VANE PUMP ASSY

(a) Temporarily install the vane pump assy with the 2 (A and B) bolts.

48. INSTALL VANE PUMP V BELT

(a) Install the vane pump V belt and adjust the V belt tension (See page 14-1).
(b) Torque the bolt A.
Torque: 43 N·m (438 kgf·cm, 32 ft·lbf)
(c) Torque the bolt B.
Torque: 43 N·m (438 kgf·cm, 32 ft·lbf)



49. CONNECT PRESSURE FEED HOSE

(a) Using a spanner (22 mm) to hold the pressure port union, connect the pressure feed hose with the union bolt and a new gasket.
Torque: 51.5 N·m (525 kgf·cm, 38 ft·lbf)

HINT:
Make sure the stopper of the pressure feed hose touches the pump bracket front as shown in the illustration, then install the union bolt.

50. INSTALL POWER STEERING OIL PRESSURE SWITCH

(a) Install the power steering oil pressure switch to the union bolt.
Torque: 21 N·m (214 kgf·cm, 15 ft·lbf)

NOTICE:
Be careful not to allow oil from being attached to the connector.

(b) Connect the connector.

51. CONNECT OIL RESERVOIR TO PUMP HOSE NO.1

(a) Connect the oil reservoir to pump hose No.1.
(b) Install the clip.

52. INSTALL FRONT FENDER APRON SEAL RH

53. INSTALL FRONT FENDER LINER RH

54. INSTALL FRONT WHEEL RH
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

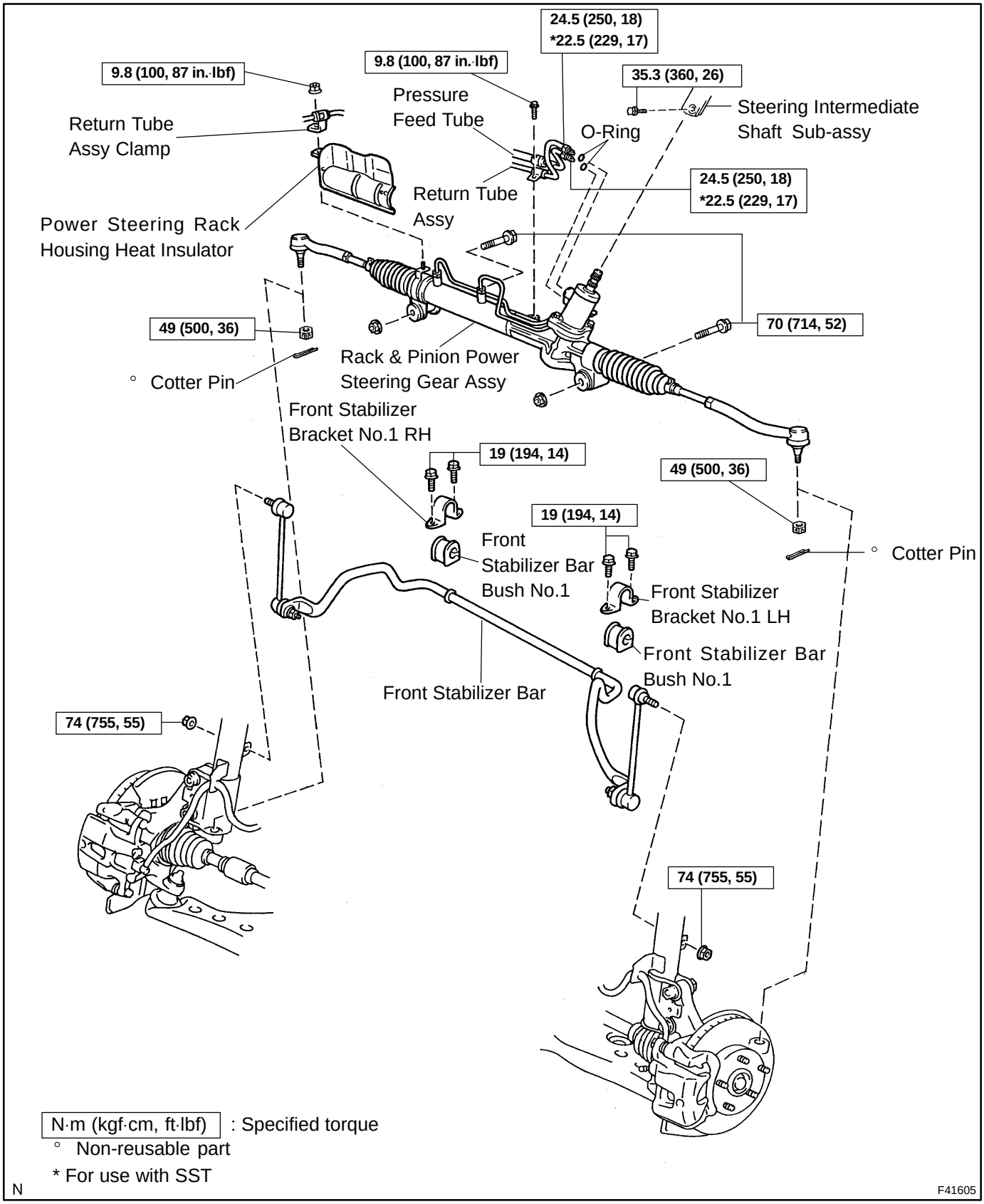
55. BLEED POWER STEERING FLUID (See page 51-3)

56. INSPECT FLUID LEAK

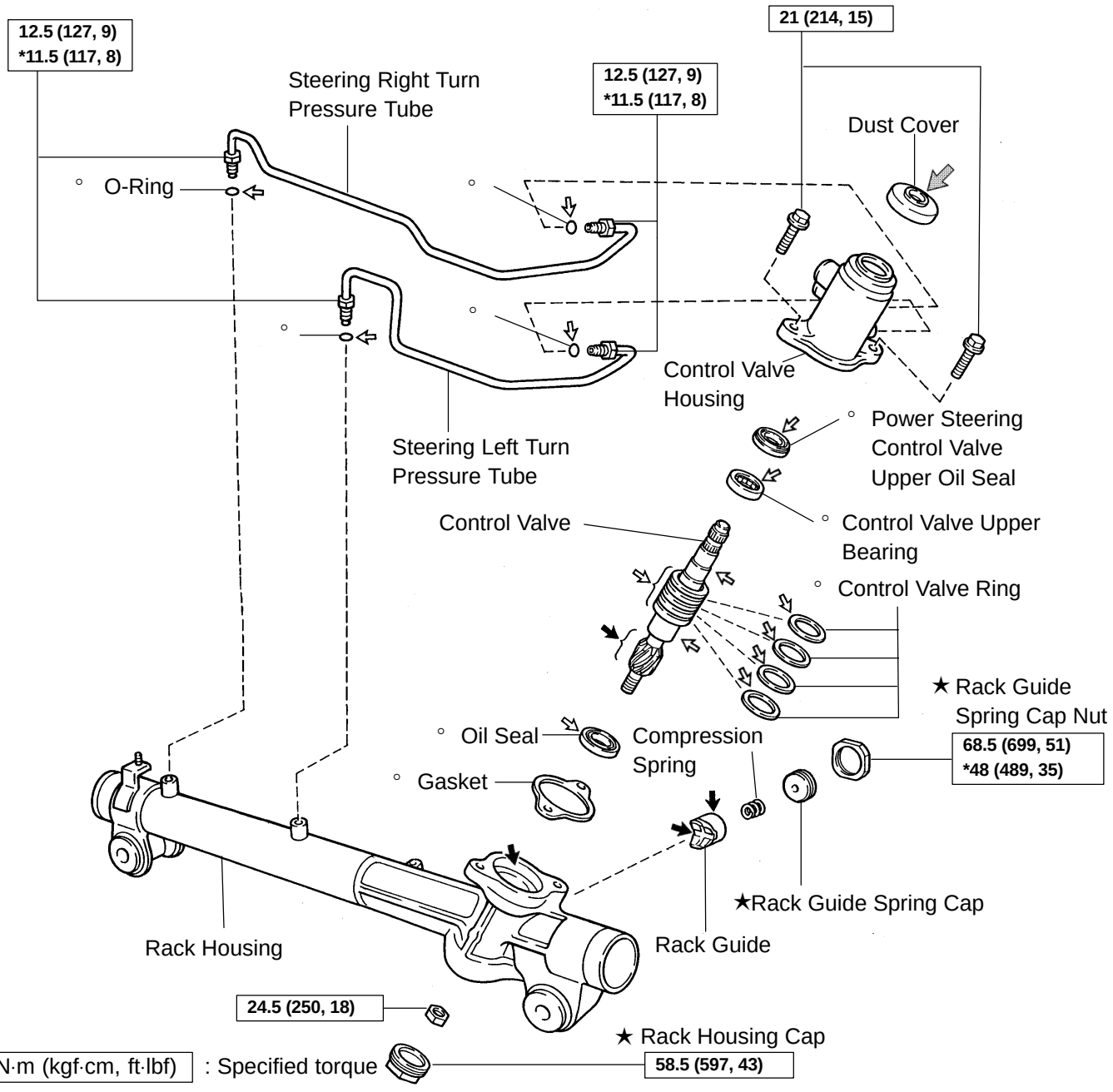
RACK & PINION POWER STEERING GEAR ASSY

5106A-01

COMPONENTS



RACK & PINION POWER STEERING GEAR ASSY:



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

° Non-reusable part

★ Precoated part

⬅ Molybdenum disulfide lithium base grease

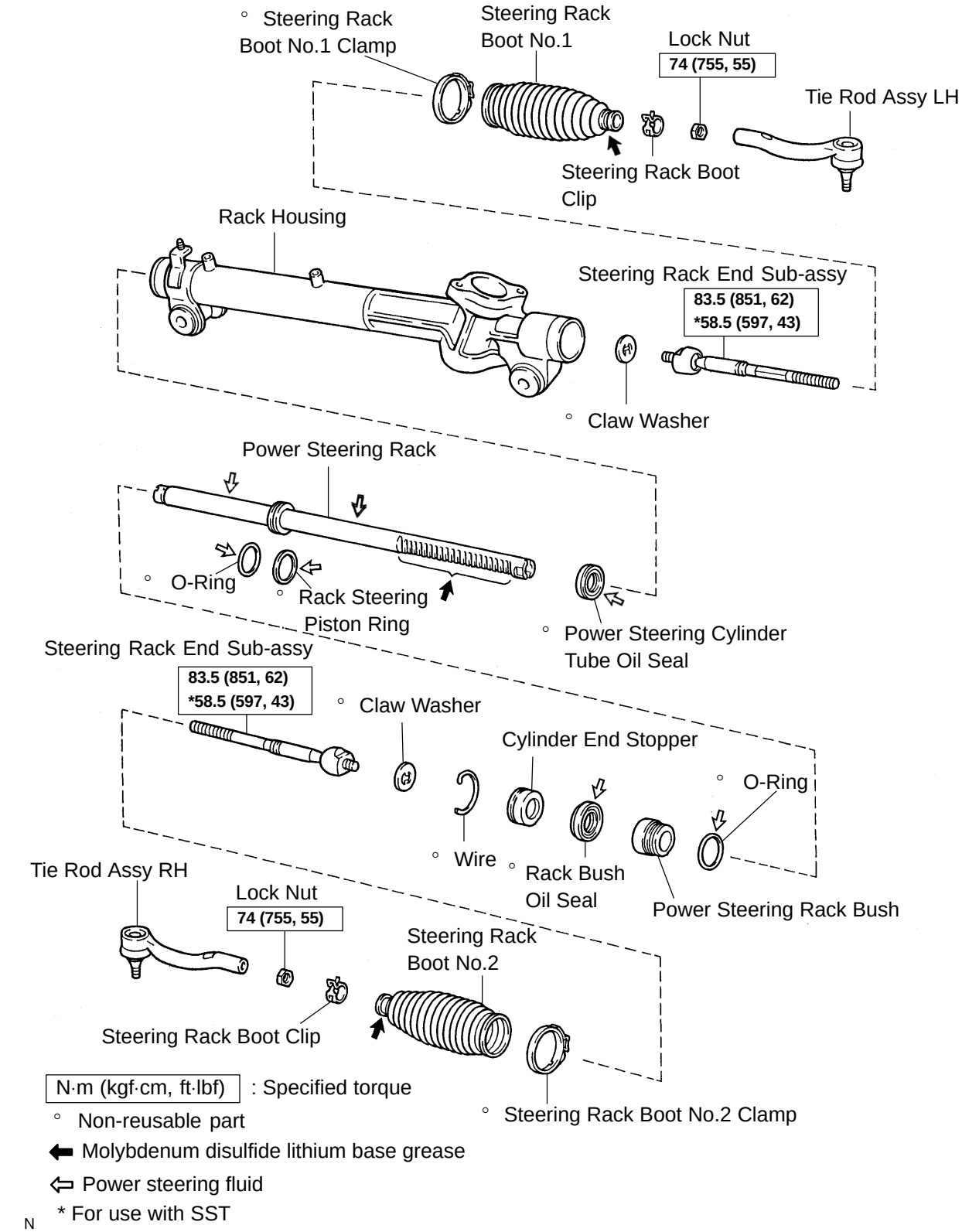
⇦ Power steering fluid

⇦ MP grease

* For use with SST

N F41889

RACK & PINION GEAR POWER STEERING GEAR ASSY:



N F41890

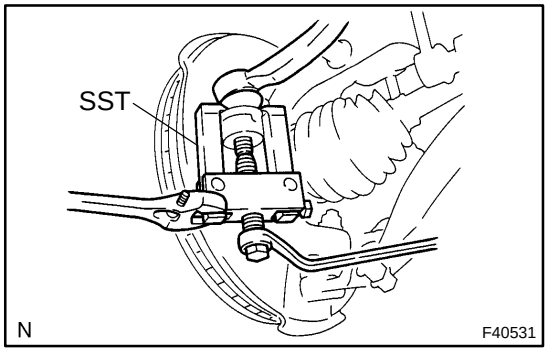
5106B-04

OVERHAUL

NOTICE:

When installing , coat the parts indicated by the arrow with power steering fluid or molybdenum disulfide lithium base grease (See page 51-18).

1. **PRECAUTION(See page 60-1)**
2. **DISCONNECT BATTERY NEGATIVE TERMINAL**
3. **REMOVE HORN BUTTON ASSY**
   (See page 60-22)
4. **REMOVE STEERING WHEEL ASSY**
   (See page 50-8)
   SST 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05021)
5. **REMOVE FRONT WHEEL**
6. **REMOVE SPIRAL CABLE SUB-ASSY**
   (See page 50-8)



7. **DISCONNECT TIE ROD ASSY LH**

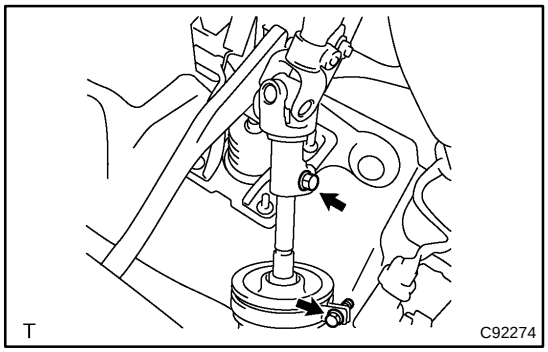
(a) Remove the cotter pin and nut.
(b) Using SST, remove the tie rod assy LH from the steering knuckle.
SST 09628-6201 1

8. **DISCONNECT TIE ROD ASSY RH**

SST 09628-6201 1

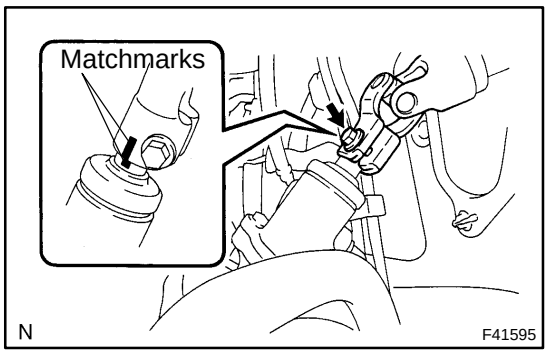
HINT:

Remove the RH side by the same procedures with LH side.

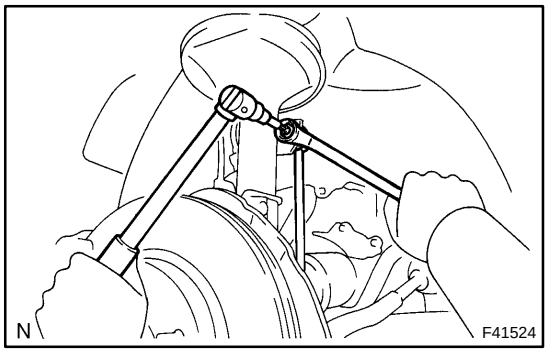


9. **DISCONNECT STEERING INTERMEDIATE SHAFT SUB-ASSY**

(a) Loosen the bolt and remove the clamp from the steering column hole cover No.1.
(b) Disconnect the steering column hole cover No.2 from the steering column hole cover No.1.
(c) Loosen the bolt.



(d) Place matchmarks on the steering intermediate shaft sub-assy and rack & pinion power steering gear assy.
(e) Remove the bolt and disconnect the steering intermediate shaft sub-assy.



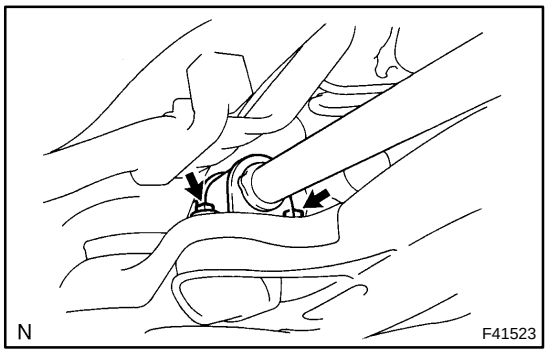
10. DISCONNECT FRONT STABILIZER LINK ASSY LH

(a) Remove the nut and disconnect the front stabilizer link assy LH from the shock absorber assy front LH.

HINT:
If the ball joint turns together with the nut, use a hexagon wrench (6 mm) to hold the stud.

11. DISCONNECT FRONT STABILIZER LINK ASSY RH

HINT:
Remove the RH side by the same procedures with LH side.

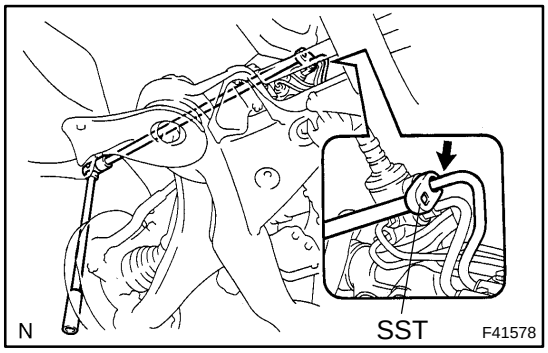


12. REMOVE FRONT STABILIZER BRACKET NO.1 LH

(a) Remove the 2 bolts and disconnect the front stabilizer bracket No.1 LH.

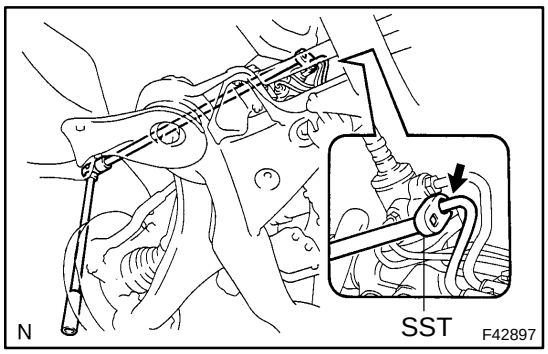
13. REMOVE FRONT STABILIZER BRACKET NO.1 RH

HINT:
Remove the RH side by the same procedures with LH side.

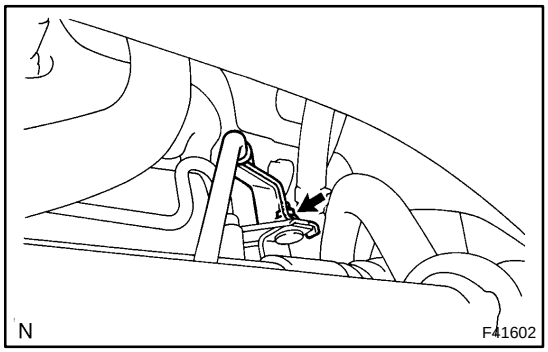


14. DISCONNECT PRESSURE FEED TUBE ASSY

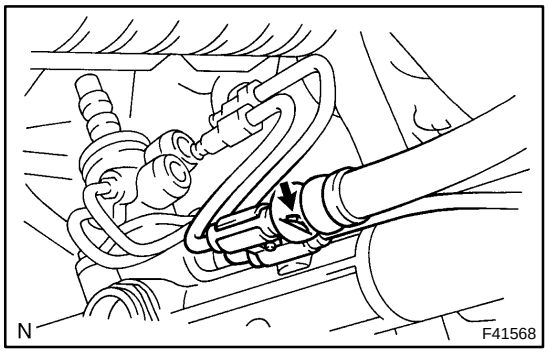
(a) Using SST, disconnect the return tube assy from the rack & pinion power steering gear assy.
SST 09023-12701



(b) Using SST, disconnect the pressure feed tube assy from the rack & pinion power steering gear assy.
SST 09023-12701

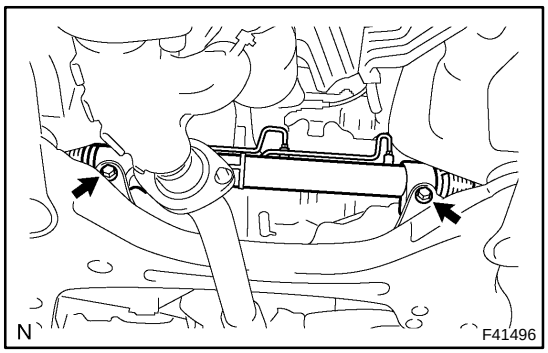


(c) Remove the nut and disconnect the return tube assy clamp.



15. REMOVE RACK & PINION POWER STEERING GEAR ASSY

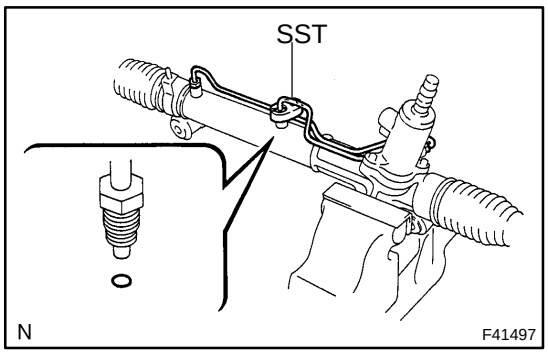
(a) Remove the bolt and disconnect the tube clamp.



(b) Remove the 2 bolts, 2 nuts and rack & pinion power steering gear assy.

16. REMOVE POWER STEERING RACK HOUSING HEAT INSULATOR

(a) Remove the power steering rack housing heat insulator.



17. REMOVE STEERING LEFT TURN PRESSURE TUBE

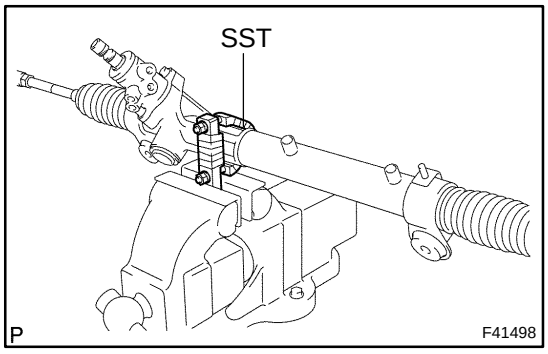
(a) Using SST, remove the steering left turn pressure tube.
SST 09023-38201

(b) Remove the 2 O-rings from the steering left turn pressure tube.

18. REMOVE STEERING RIGHT TURN PRESSURE TUBE

(a) Using SST, remove the steering right turn pressure tube.
SST 09023-38201

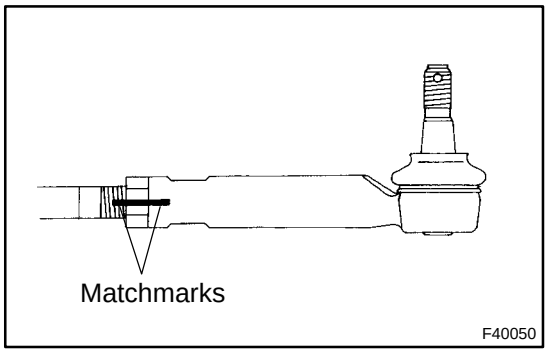
(b) Remove the 2 O-rings from the steering right turn pressure tube.



19. FIX RACK & PINION POWER STEERING GEAR ASSY

(a) Using SST, secure the rack & pinion power steering gear assy.
SST 09612-00012

HINT:
Tape the SST before use.



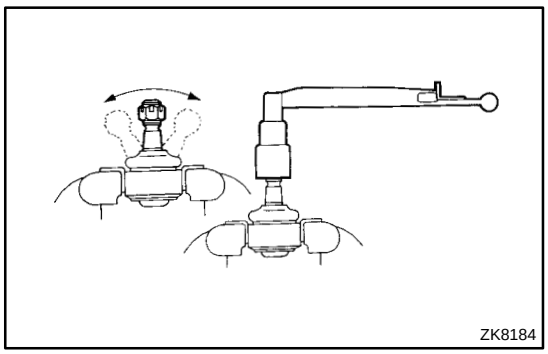
20. REMOVE TIE ROD ASSY LH

(a) Place matchmarks on the tie rod assy LH and steering rack end sub-assy.

(b) Loosen the lock nut, and remove the tie rod assy LH and lock nut.

21. REMOVE TIE ROD ASSY RH

HINT:
Remove the RH side by the same procedures with LH side.



22. INSPECT TIE ROD ASSY LH

(a) Secure the tie rod assy LH in a vise.

(b) Install the nut to the stud bolt.

(c) Flip the ball joint stud back and forth 5 times.

(d) Using a torque wrench, turn the nut continuously at a rate of 2 - 4 seconds per 1 turn and take the torque reading of the 5th turn.
Turning torque:
0.83 - 3.43 N·m (8.5 - 35.0 kgf·cm, 7.3 - 30.4 in.·lbf)

23. INSPECT TIE ROD ASSY RH

HINT:
Remove the RH side by the same procedures with LH side.

24. REMOVE STEERING RACK BOOT CLIP

(a) Remove the 2 steering rack boot clips.

25. REMOVE STEERING RACK BOOT NO.2 CLAMP

(a) Using pliers, remove the steering rack boot No.2 clamp.

NOTICE:

Be careful not to damage the steering rack boot No.2.

26. REMOVE STEERING RACK BOOT NO.1 CLAMP

HINT:

Remove the steering rack boot No.1 clamp by the same procedures with the steering rack boot No.2 clamp.

NOTICE:

Be careful not to damage the steering rack boot No.1.

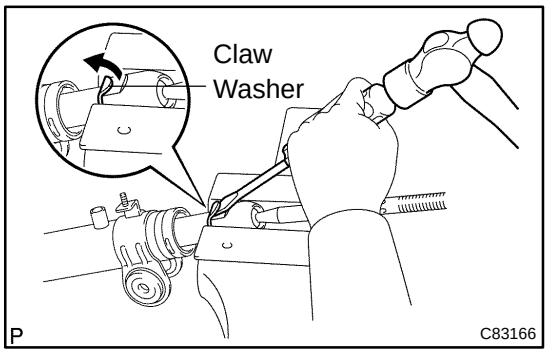
27. REMOVE STEERING RACK BOOT NO.2

(a) Remove the steering rack boot No.2.

28. REMOVE STEERING RACK BOOT NO.1

HINT:

Remove the steering rack boot No.1 by the same procedures with the steering rack boot No.2.

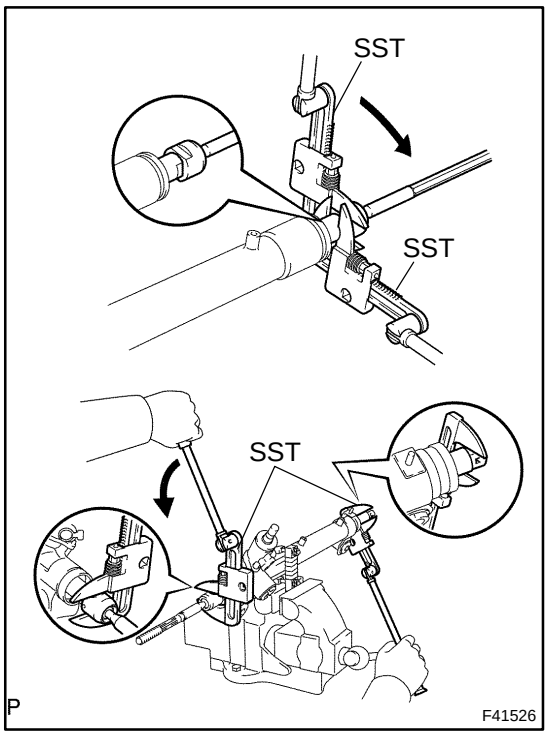


29. REMOVE STEERING RACK END SUB-ASSY

(a) Using a screwdriver and a hammer, unstake the claw washer.

NOTICE:

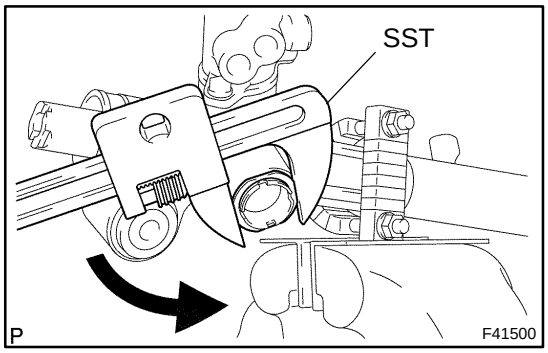
Avoid any impact to the power steering rack.



(b) Using 2 SSTs, remove the 2 steering rack ends sub-assy and 2 claw washers.
SST 09922-10010

NOTICE:

- ★ **Use SST 09922-10010 in the direction shown in the illustration.**
- ★ **Securely hold the steering rack end sub-assy with a SST.**

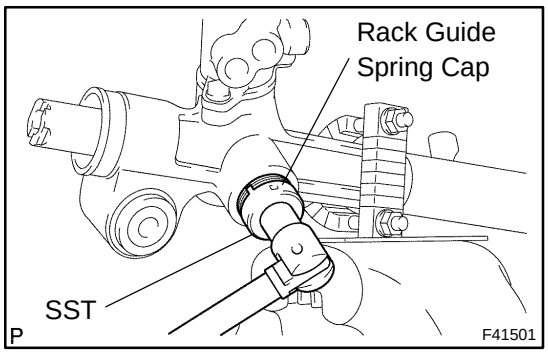


30. REMOVE RACK GUIDE

(a) Using SST, remove the rack guide spring cap nut.
SST 09922-10010

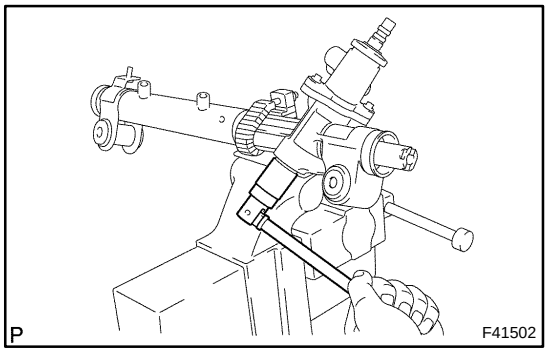
NOTICE:

Use SST 09922-10010 in the direction shown in the illustration.



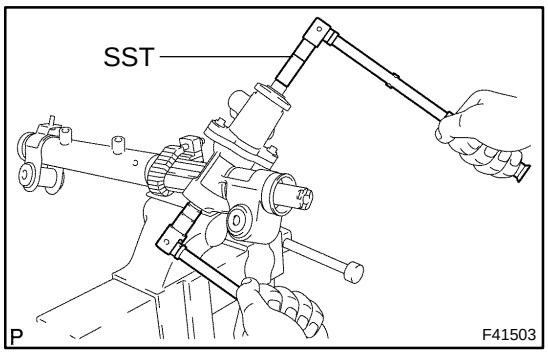
(b) Using SST, remove the rack guide spring cap.
SST 09631-10021

(c) Remove the compression spring and rack guide.

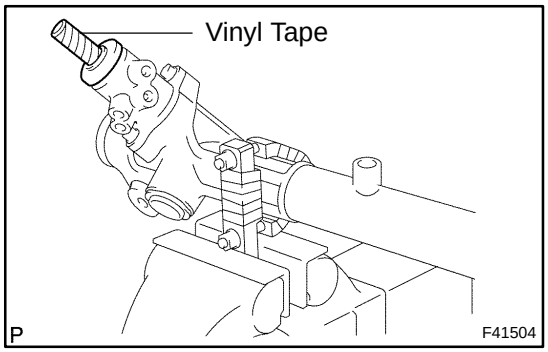


31. REMOVE POWER STEERING CONTROL VALVE

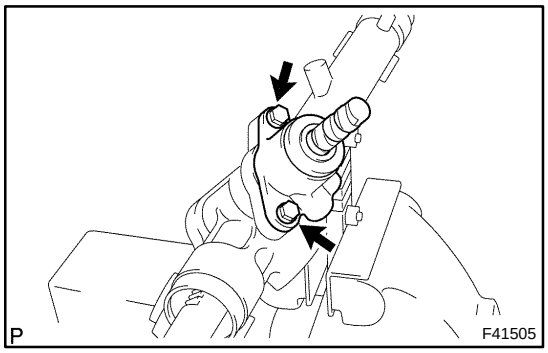
(a) Using a socket wrench (27 mm), remove the rack housing cap.



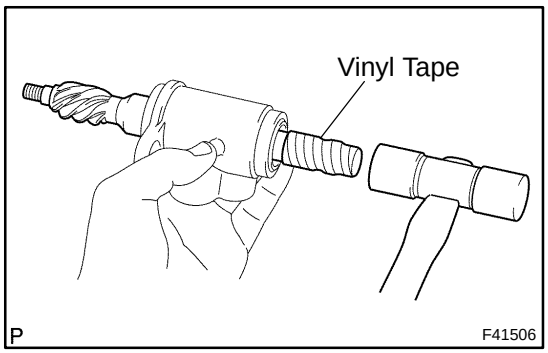
(b) Using SST, hold the control valve and remove the nut.
SST 09616-0001 1



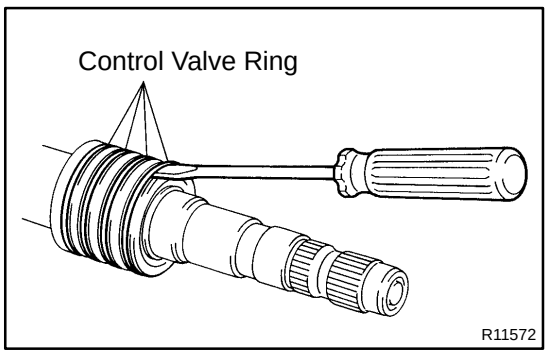
(c) Wind vinyl tape around the serrated part of the control valve.
(d) Remove the dust cover from the control valve housing.



(e) Remove the 2 bolts and control valve housing.
(f) Remove the gasket.



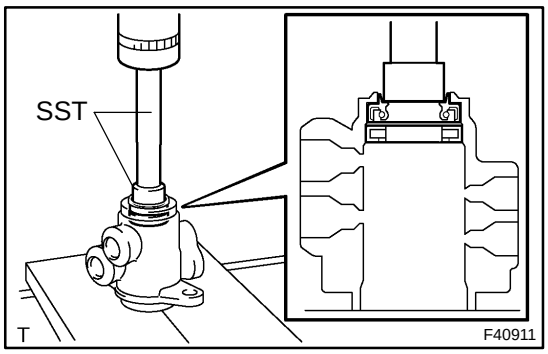
(g) To prevent oil seal lip damage, wind vinyl tape around the serrated part of the control valve.
(h) Using a plastic hammer, remove the control valve with oil seal from the control valve housing.
(i) Remove the oil seal from the control valve.



(j) Using a screwdriver, remove the 4 control valve rings.

NOTICE:

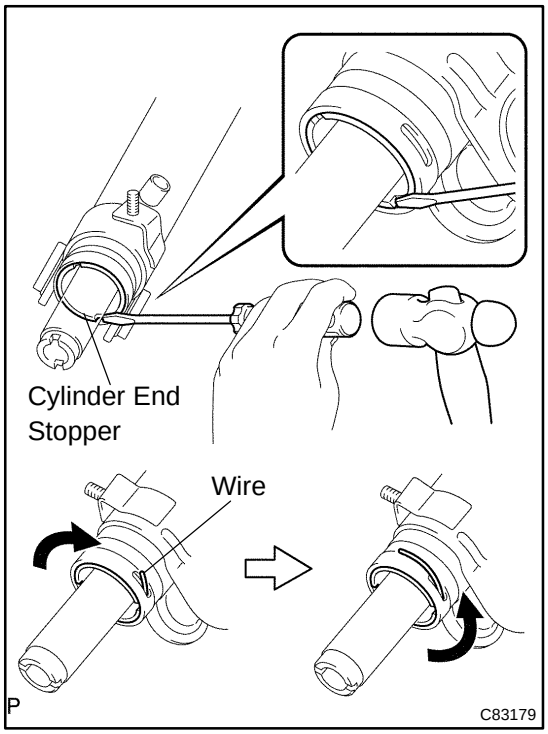
Be careful not to damage the grooves for the control valve ring.



32. REMOVE POWER STEERING CONTROL VALVE UPPER OIL SEAL

(a) Using SST and a press, remove the control valve upper bearing and power steering control valve upper oil seal from the control valve housing.

SST 09950- 70010 (09951- 07150), 09950- 60010 (09951-00250)



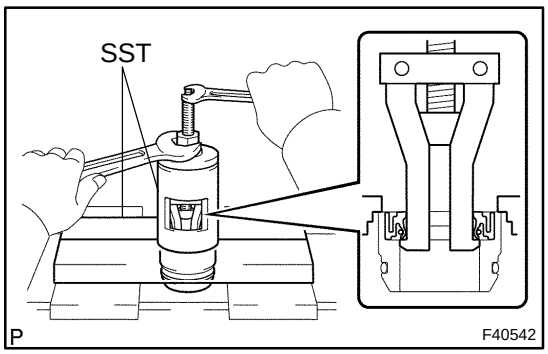
33. REMOVE CYLINDER END STOPPER

(a) Using a screwdriver and a hammer, turn the cylinder end stopper clockwise until the wire end is visible through the service hole.

(b) Using a screwdriver and a hammer, turn the cylinder end stopper counterclockwise, and remove the wire and cylinder end stopper.

34. REMOVE POWER STEERING RACK

(a) Remove the power steering rack and power steering rack bush.



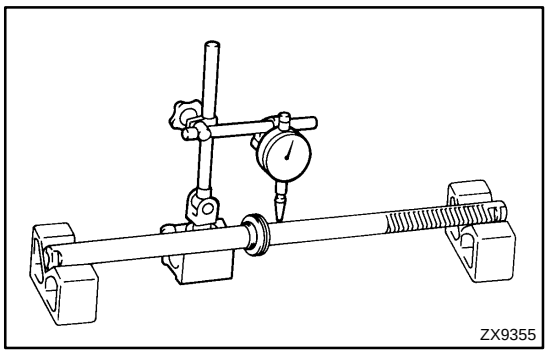
35. REMOVE POWER STEERING RACK BUSH

(a) Remove the power steering rack bush from the power steering rack.

(b) Using SST, remove the rack bush oil seal.

SST 09527-2101 1, 09612-24014 (09613-22011)

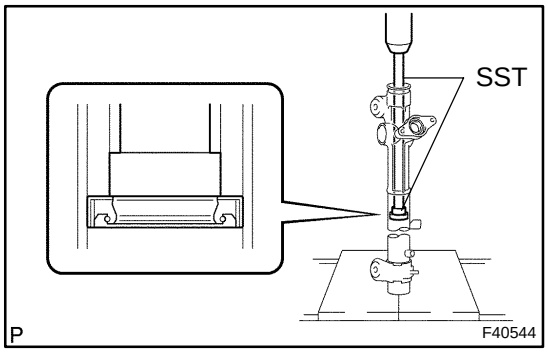
(c) Using a screwdriver, remove the O-ring from the power steering rack bush.



36. INSPECT POWER STEERING RACK

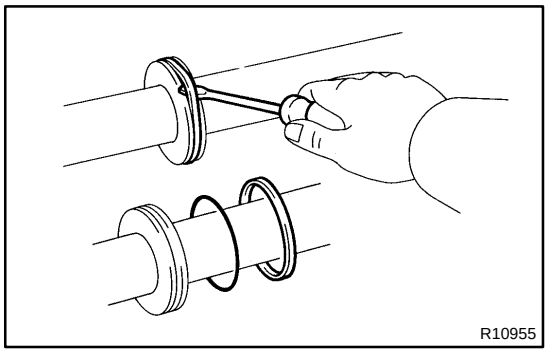
(a) Using a dial indicator, check the power steering rack for runout and for teeth wear and damage.
Maximum runout: 0.3 mm (0.012 in.)

(b) Check the back surface for wear and damage.



37. REMOVE POWER STEERING CYLINDER TUBE OIL SEAL

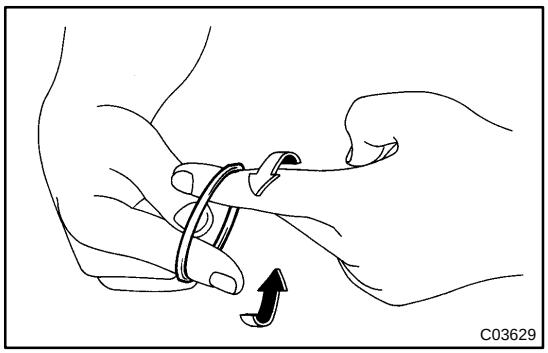
(a) Using SST and a press, remove the power steering cylinder tube oil seal.
SST 09950- 70010 (09951- 07360), 09950- 60010 (09951-00290)



38. REMOVE RACK STEERING PISTON RING

(a) Using a screwdriver, remove the rack steering piston ring and O-ring.

NOTICE:
Be careful not to damage the grooves for rack steering piston ring.



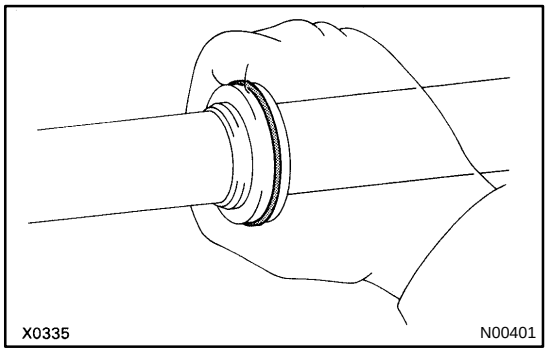
39. INSTALL RACK STEERING PISTON RING

(a) Coat a new O-ring with power steering fluid and install it to the power steering rack.

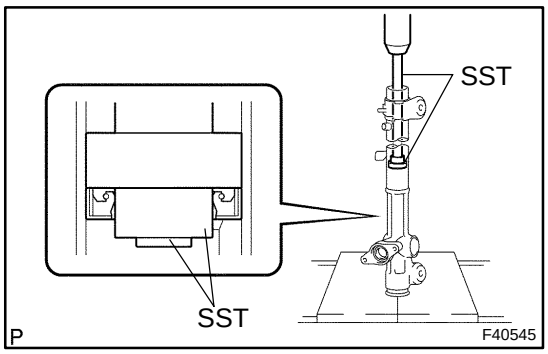
(b) Expand a new rack steering piston ring with your fingers.

NOTICE:
Be careful not to over expand the rack steering piston ring.

(c) Coat the new rack steering piston ring with power steering fluid.



(d) Install the rack steering piston ring to the power steering rack, and settle it down with your fingers.



40. INSTALL POWER STEERING CYLINDER TUBE OIL SEAL

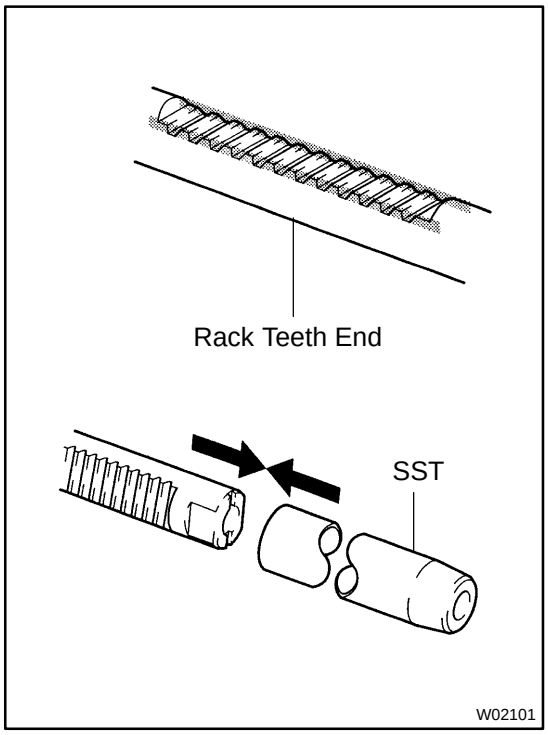
(a) Coat a new power steering cylinder tube oil seal lip with power steering fluid.
SST 09950- 60010 (09951- 00420, 09951- 00250, 09952-06010), 09950-70010 (09951-07360)

(b) Using SST and a press, install the power steering cylinder tube oil seal.

NOTICE:

★ **Make sure that the power steering cylinder tube oil seal is installed facing in the correct direction.**

★ **Take care so that the power steering cylinder tube oil seal will not be reversed as you install it.**



41. INSTALL POWER STEERING RACK

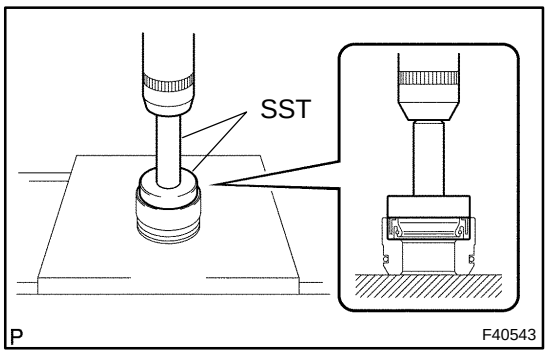
(a) Install SST to the power steering rack.
SST 09631-33010

HINT:
If necessary, scrape the burrs off the power steering rack teeth end and burnish.

(b) Coat the SST with power steering fluid.

(c) Install the power steering rack into the rack housing.

(d) Remove the SST.



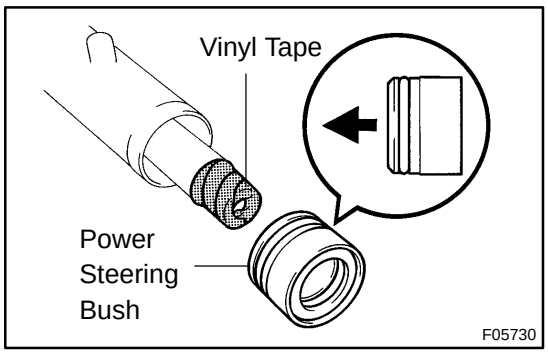
42. INSTALL POWER STEERING RACK BUSH

(a) Using SST and a press, install the rack bush oil seal to the power steering rack bush.
SST 09950- 60010 (09951- 00400), 09950- 70010 (09951-07100)

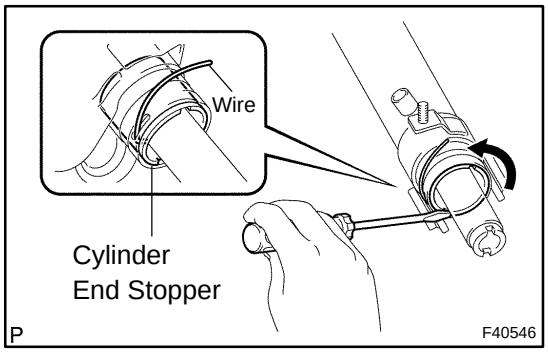
NOTICE:

Make sure that the rack bush oil seal is installed facing in the correct direction.

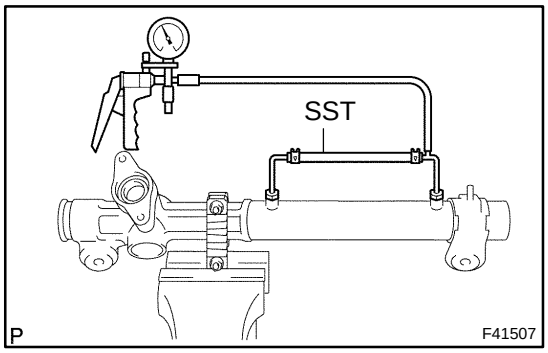
(b) Coat a new O-ring with power steering fluid and install it to the power steering rack bush.



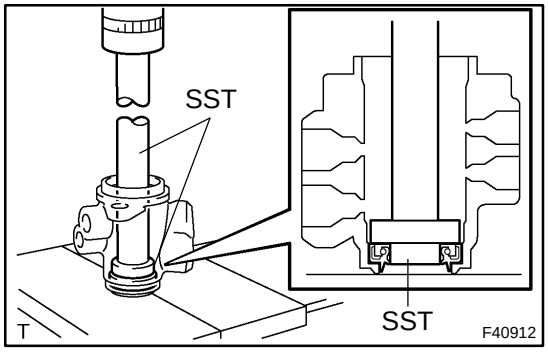
(c) To prevent rack bush oil seal lip damage, wind vinyl tape around the power steering rack end, and apply power steering fluid.
(d) Install the power steering rack bush to the power steering rack.



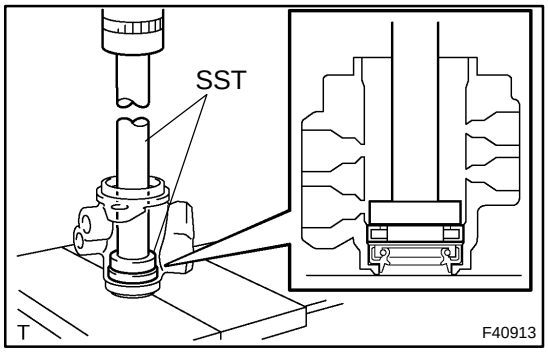
43. INSTALL CYLINDER END STOPPER
(a) Align the installation hole for the wire of the cylinder end stopper with the slot of the rack housing.
(b) Install a new wire into the cylinder end stopper.
(c) Using a screwdriver, turn the cylinder end stopper clockwise by 450 ± 50°.



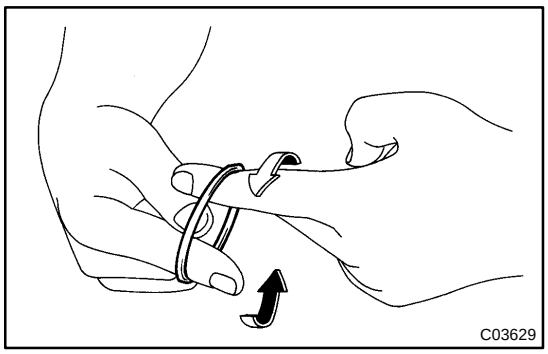
44. AIR TIGHTNESS TEST
(a) Install SST to the rack housing.
SST 09631-12071 (09633-00010)
(b) Apply vacuum of 53 kPa (400 mmHg, 15.75 in.Hg) for about 30 seconds.
(c) Check that there is no change in the vacuum.
If there is a change in the vacuum, check the installation of the oil seals.



45. INSTALL POWER STEERING CONTROL VALVE UPPER OIL SEAL
(a) Coat a control valve upper bearing and a new power steering control valve upper oil seal with power steering fluid.
(b) Using SST and a press, install the power steering control valve upper oil seal.
SST 09950- 70010 (09951- 07150), 09950- 60010 (09951-00180, 09952-06010, 09951-00320)



(c) Using SST and a press, install the control valve upper bearing.
SST 09950- 70010 (09951- 07150), 09950- 60010 (09951-00180, 09952-06010, 09951-00340)



46. INSTALL POWER STEERING CONTROL VALVE

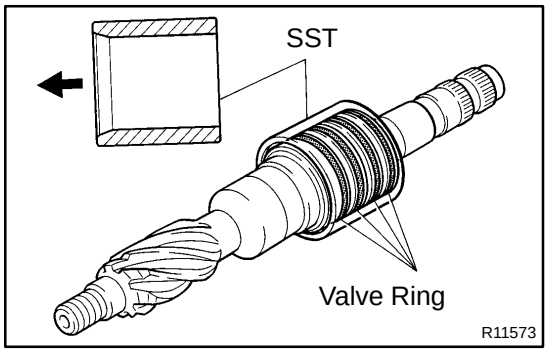
(a) Expand 4 new control valve rings with your fingers.

NOTICE:

Be careful not to over expand the control valve ring.

(b) Coat the 4 control valve rings with power steering fluid.

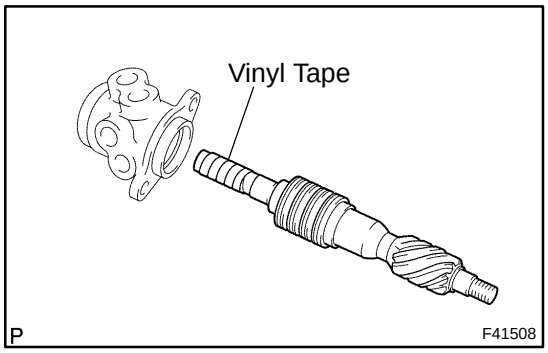
(c) Install the 4 control valve rings to the control valve, and settle them down with your fingers.



(d) Carefully slide the tapered end of SST over the control valve rings until they fit to the control valve.
SST 09631-20081

NOTICE:

Be careful not to damage the control valve rings.



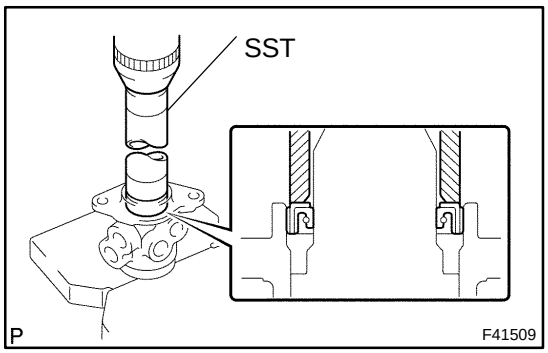
(e) To prevent power steering control valve upper oil seal lip damage, wind vinyl tape around the serrated part of the control valve.

(f) Coat the power steering control valve upper oil seal lip with power steering fluid.

(g) Install the control valve to the control valve housing.

NOTICE:

Be careful not to damage the control valve ring and power steering control valve upper oil seal lip.

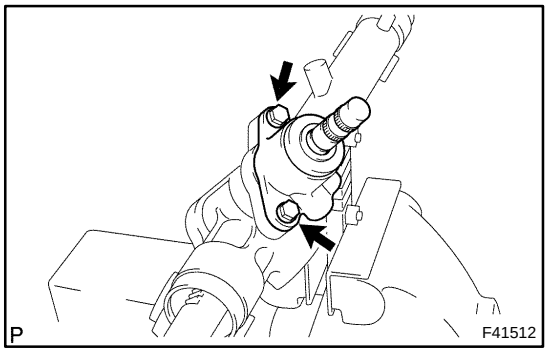


(h) Coat a new oil seal lip with power steering fluid.

(i) Using SST and a press, install the oil seal.
SST 09612-2201 1

NOTICE:

Make sure that the oil seal is installed facing in the correct direction.

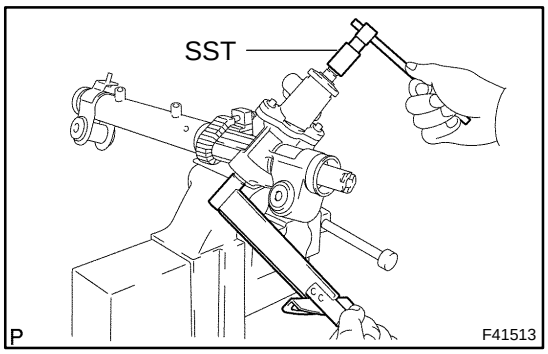


(j) Apply grease to the needle bearing.

(k) Install a new gasket to the control valve housing.

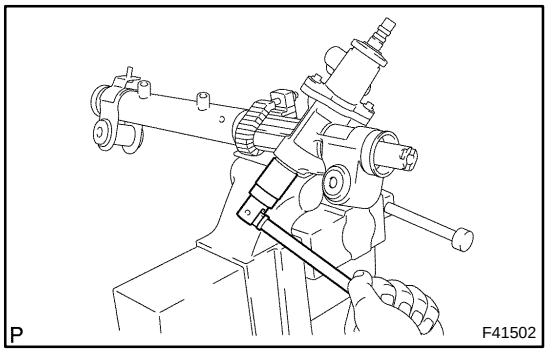
(l) Wind vinyl tape around the serration part of the control valve.

(m) Install the control valve housing to the rack housing with the 2 bolts.
Torque: 21 N·m (214 kgf·cm, 15 ft·lbf)

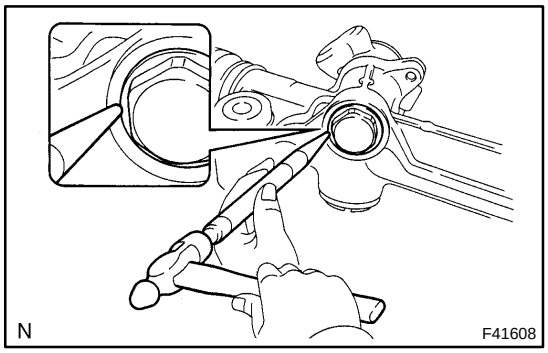


(n) Using SST, stop the control valve rotation and install a new lock nut.
Torque: 24.5 N·m (250 kgf·cm, 18 ft·lbf)
SST 09616-0001 1

(o) Apply sealant to 2 or 3 threads of the rack housing cap.
Sealant:
Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent



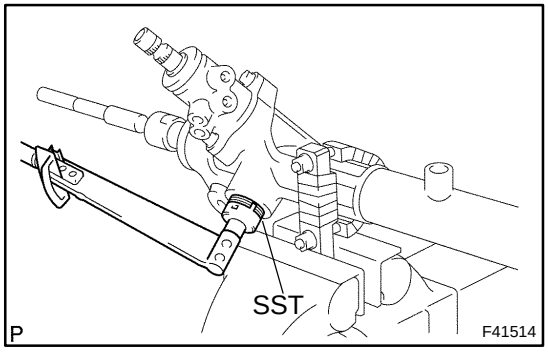
(p) Using a socket wrench (27 mm), install the rack housing cap.
Torque: 58.5 N·m (597 kgf·cm, 43 ft·lbf)



(q) Using a punch and a hammer, stake the rack housing cap and rack housing.

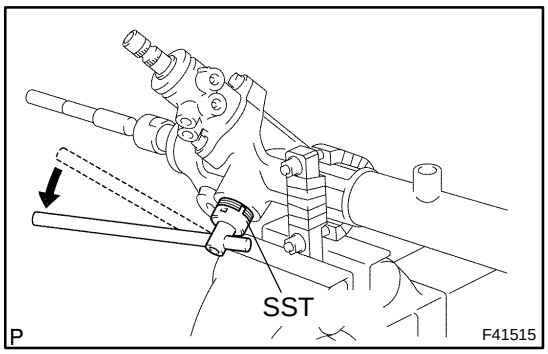
47. INSTALL RACK GUIDE

(a) Apply molybdenum disulfide lithium base grease to the rack guide.
(b) Install the rack guide.
(c) Install the compression spring.
(d) Apply sealant to 2 or 3 threads of the rack guide spring cap.
Sealant:
Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent
(e) Temporarily install the rack guide spring cap.

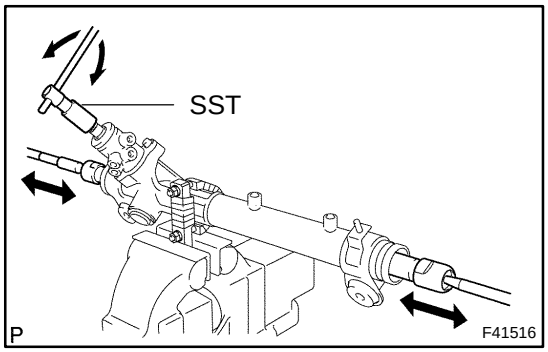


48. ADJUST TOTAL PRELOAD

(a) To prevent the steering rack teeth from damaging the oil seal lip, temporarily install the RH and LH steering rack ends sub-assy.
(b) Using SST, torque the rack guide spring cap.
SST 09631-10021
Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)

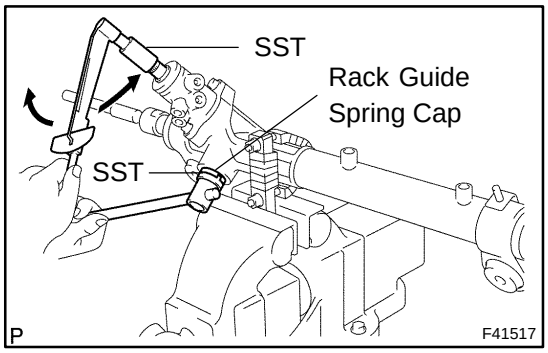


(c) Using SST, loosen the rack guide spring cap.
SST 09631-10021



(d) Using SST, turn the control valve to the right and left 1 or 2 times.
SST 09616-0001 1

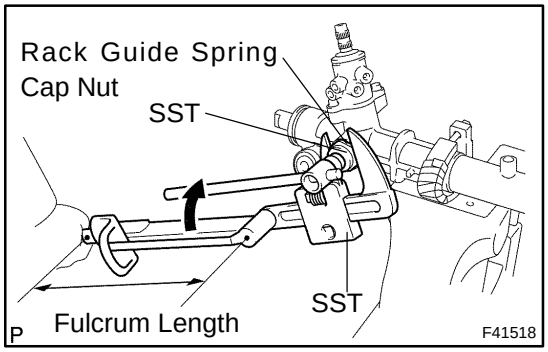
(e) Using SST, loosen the rack guide spring cap until the compression spring is not functioning.
SST 09631-10021



(f) Using SST and a torque wrench, tighten the rack guide spring cap until the preload is within specification.
SST 09616-0001 1, 09631-10021
Preload (turning):
1.2 - 1.5 N·m (12.2 - 15.3 kgf·cm, 10.6 - 13.3 in.·lbf)

(g) Apply sealant to 2 or 3 threads of the rack guide spring cap nut.
Sealant:
Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(h) Temporarily install the rack guide spring cap nut.



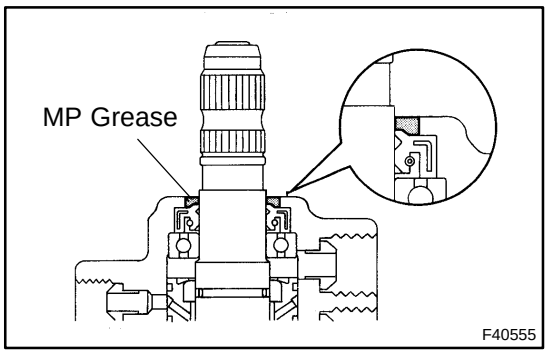
(i) Using SST, hold the rack guide spring cap and using another SST, tighten the rack guide spring cap nut.
SST 09616-0001 1, 09922-10010
Torque: 48 N·m (489 kgf·cm, 35 ft·lbf)

NOTICE:
Use SST 09922-10010 in the direction shown in the illustration.

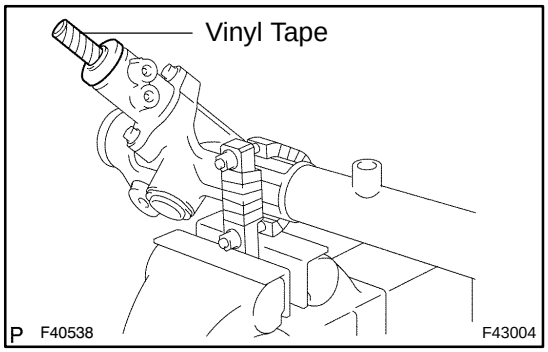
HINT:
Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).

(j) Precheck the total preload.
Preload (turning):
1.2 - 1.5 N·m (12.2 - 15.3 kgf·cm, 10.6 - 13.3 in.·lbf)

(k) Remove the RH and LH steering rack ends sub-assy.

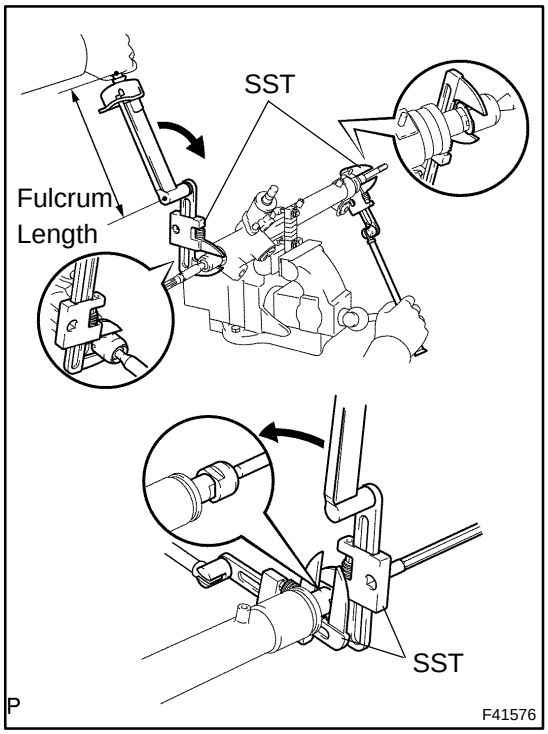


(l) Apply MP grease into the control valve, as shown in the illustration.



(m) Wind vinyl tape around the serration part of the control valve.

(n) Install the dust cover to the control valve housing.



49. INSTALL STEERING RACK END SUB-ASSY

(a) Install a new 2 claw washers, and temporarily install the 2 steering rack ends sub-assy.

HINT:

Align the claws of the claw washer with the power steering rack grooves.

(b) Using 2 SSTs, install the 2 steering rack ends sub-assy.
SST 09922-10010
Torque: 58.5 N·m (597 kgf·cm, 43 ft·lbf)

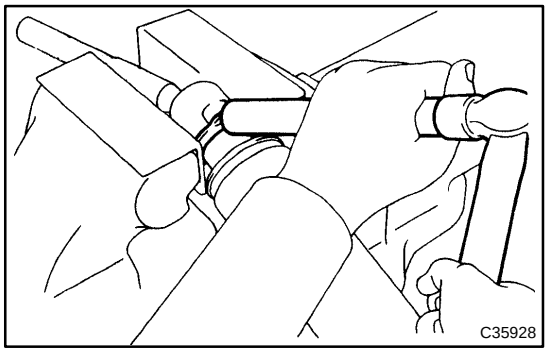
NOTICE:

Use SST 09922-10010 in the direction shown in the illustration.

HINT:

★ Using SST, hold the power steering rack and install the steering rack end sub-assy.

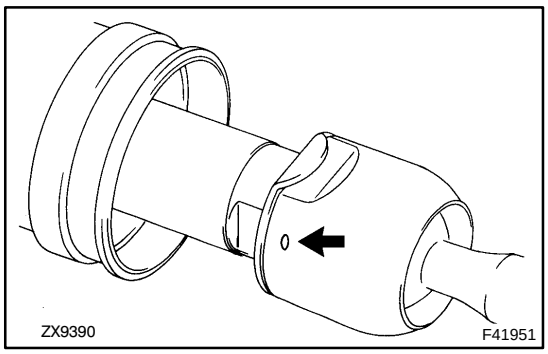
★ Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).



(c) Using a brass bar and a hammer, stake the claw washer.

NOTICE:

Avoid any impact to the power steering rack.



50. INSPECT STEERING RACK END SUB-ASSY

(a) Ensure that the steering rack end sub-assy hole is not clogged with grease.

HINT:

If the hole is clogged, the pressure inside the boot will change after it is assembled and steering wheel is turned.

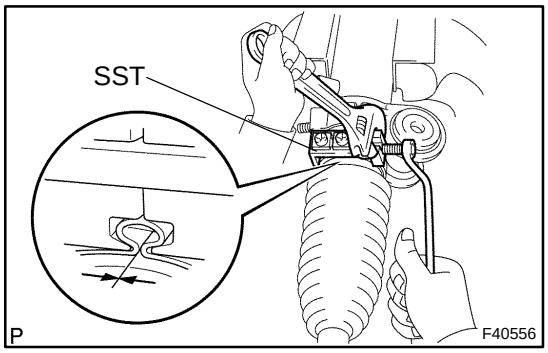
51. INSTALL STEERING RACK BOOT NO.2

(a) Install the steering rack boot No.2.

52. INSTALL STEERING RACK BOOT NO.1

HINT:

Remove the steering rack boot No.1 by the same procedures with steering rack boot No.2.



53. INSTALL STEERING RACK BOOT NO.2 CLAMP

(a) Using SST, tighten the steering rack boot No.2 clamp, as shown in the illustration.

SST 09521-24010

Clearance: 3.0 mm (0.118 in.) or less

NOTICE:

Be careful not to damage the steering rack boot No.2.

54. INSTALL STEERING RACK BOOT NO.1 CLAMP

SST 09521-24010

NOTICE:

Be careful not to damage the steering rack boot No.1.

HINT:

Install the steering rack boot No.1 clamp by the same procedures with steering rack boot No.2 clamp.

55. INSTALL STEERING RACK BOOT CLIP

(a) Using pliers, install the 2 steering rack boot clips.

56. INSTALL TIE ROD ASSY LH

(a) Screw the lock nut and tie rod assy LH onto the steering rack end sub-assy until the matchmarks are aligned.

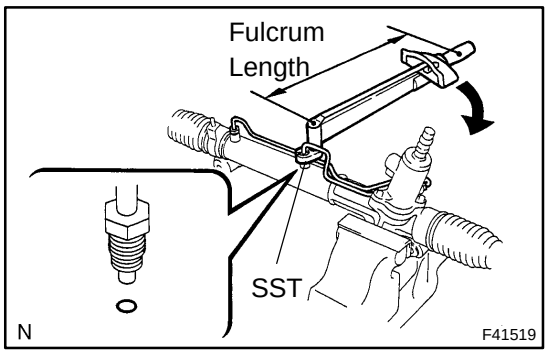
HINT:

After adjusting toe-in, torque the lock nut.

57. INSTALL TIE ROD ASSY RH

HINT:

Install the RH side by the same procedures with LH side.



58. INSTALL STEERING LEFT TURN PRESSURE TUBE

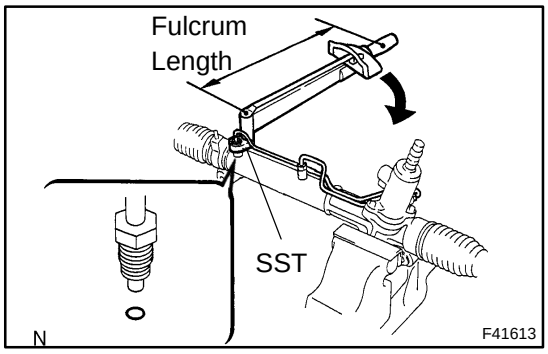
(a) Coat 2 new O-rings with power steering fluid and install them to the steering left turn pressure tube.

(b) Using SST, install the steering left turn pressure tube to the rack & pinion power steering gear assy.
SST 09023-38201
Torque: 11.5 N·m (117 kgf·cm, 8 ft·lbf)

HINT:

★ Use a torque wrench with a fulcrum length of 345 mm (9.84 in.).

★ This torque value is effective in the case that SST is parallel to a torque wrench.



59. INSTALL STEERING RIGHT TURN PRESSURE TUBE

(a) Coat 2 new O-rings with power steering fluid and install them to the steering right turn pressure tube.

(b) Using SST, install the steering right turn pressure tube to the rack & pinion power steering gear assy.
SST 09023-38201
Torque: 11.5 N·m (117 kgf·cm, 8 ft·lbf)

HINT:

★ Use a torque wrench with a fulcrum length of 345 mm (11.81 in.).

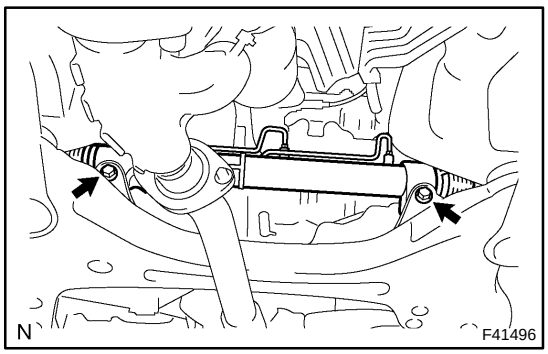
★ This torque value is effective in the case that SST is parallel to a torque wrench.

60. INSTALL POWER STEERING RACK HOUSING HEAT INSULATOR

(a) Install the power steering rack housing heat insulator.

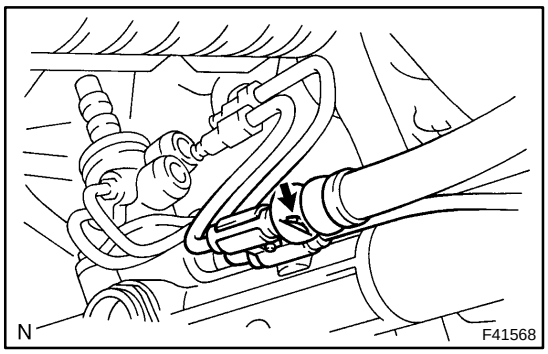
HINT:

Install nut when installing the return clamp.

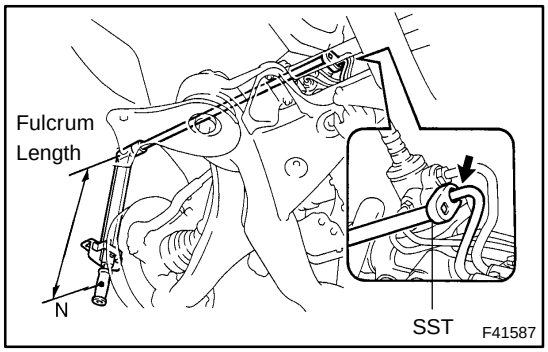


61. INSTALL RACK & PINION POWER STEERING GEAR ASSY

(a) Install the rack & pinion power steering gear assy with the 2 bolts and 2 nuts.
Torque: 70 N·m (714 kgf·cm, 52 ft·lbf)



(b) Connect the tube clamp with the bolt.
Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf)



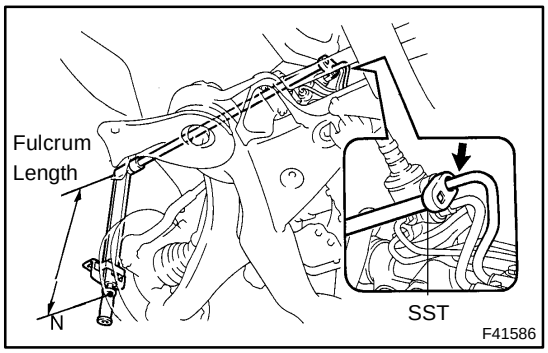
62. CONNECT PRESSURE FEED TUBE ASSY

(a) Using SST, connect the pressure feed tube assy to the rack & pinion power steering gear assy.
SST 09023-12701
Torque: 22.5 N·m (229 kgf·cm, 17 ft·lbf)

HINT:

★ Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).

★ This torque value is effective in the case that SST is parallel to a torque wrench.

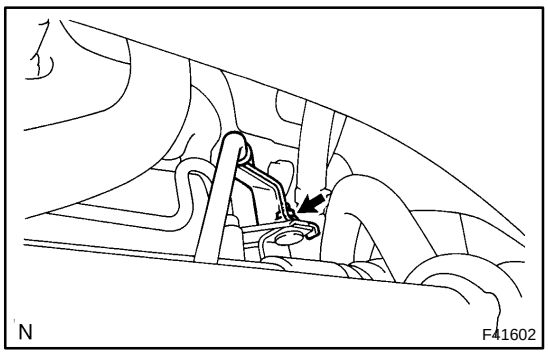


(b) Using SST, connect the return tube assy to the rack & pinion power steering gear assy.
SST 09023-12701
Torque: 22.5 N·m (229 kgf·cm, 17 ft·lbf)

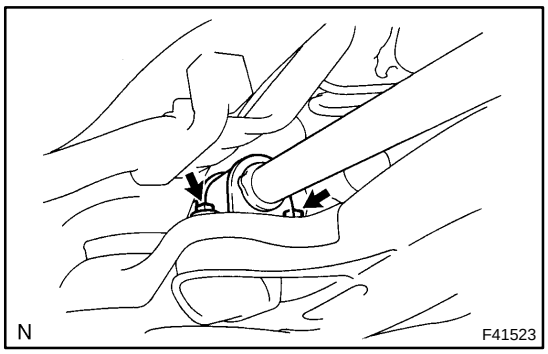
HINT:

★ Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).

★ This torque value is effective in the case that SST is parallel to a torque wrench.



(c) Install the return tube assy clamp with the nut.
Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf)

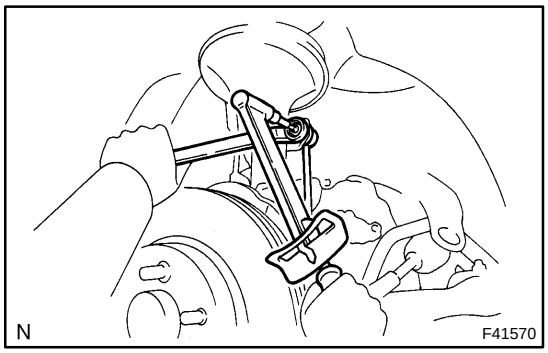


63. INSTALL FRONT STABILIZER BRACKET NO.1 LH

(a) Install the front stabilizer bracket No. 1 LH with the 2 bolts.
Torque: 19 N·m (194 kgf·cm, 14 ft·lbf)

64. INSTALL FRONT STABILIZER BRACKET NO.1 RH

HINT:
Remove the RH side by the same procedures with LH side.



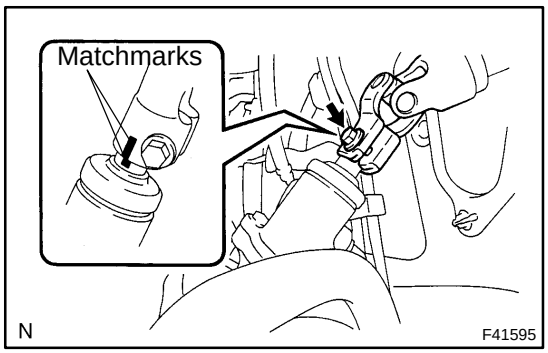
65. CONNECT FRONT STABILIZER LINK ASSY LH

(a) Connect the front stabilizer link assy LH to the shock absorber assy front LH with the nut.
Torque: 74 N·m (755 kgf·cm, 55 ft·lbf)

HINT:
If the ball joint turns together with the nut, use a hexagon wrench (6 mm) to hold the stud.

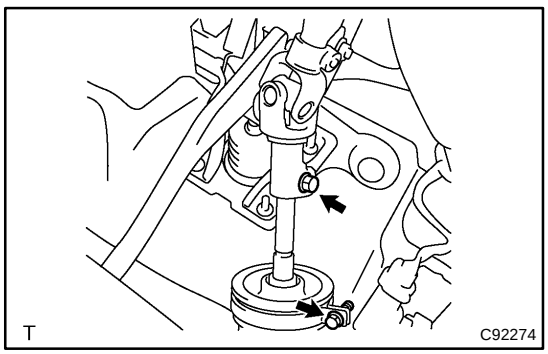
66. CONNECT FRONT STABILIZER LINK ASSY RH

HINT:
Connect the RH side by the same procedures with LH side.



67. CONNECT STEERING INTERMEDIATE SHAFT SUB-ASSY

(a) Align the matchmarks on the steering intermediate shaft sub-assy and rack & pinion power steering gear assy.
(b) Install the bolt.
Torque: 35.3 N·m (360 kgf·cm, 26 ft·lbf)



(c) Tighten the bolt.
Torque: 35.3 N·m (360 kgf·cm, 26 ft·lbf)
(d) Install the steering column hole cover No.2 to the steering hole cover No.1.
(e) Connect the clamp to the steering column hole cover No.1 and tighten the bolt.

68. CONNECT TIE ROD ASSY LH

(a) Connect the tie rod assy LH with the nut.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)
(b) Install a new cotter pin.
NOTICE:
If the holes for a new cotter pin are not aligned, tighten the nut further up 60°.

69. CONNECT TIE ROD ASSY RH

HINT:
Install the RH side by the same procedures with LH side.

70. INSTALL FRONT WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
71. BLEED POWER STEERING FLUID (See page 51-3)
72. CHECK POWERSTEERING FLUID LEAKAGE
73. INSTALL SPIRAL CABLE SUB-ASSY
(See page 50-8)
74. CENTER SPIRAL CABLE(See page 50-8)
75. INSTALL STEERING WHEEL ASSY
(See page 50-8)
76. INSTALL HORN BUTTON ASSY
(See page 60-22)
77. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT(See page 26-5)
78. INSPECT STEERING WHEEL CENTER POINT
79. INSPECT SRS WARNING LIGHT(See page 05-826)

REAR SUSPENSION SYSTEM

2701I-09

PROBLEM SYMPTOMS TABLE

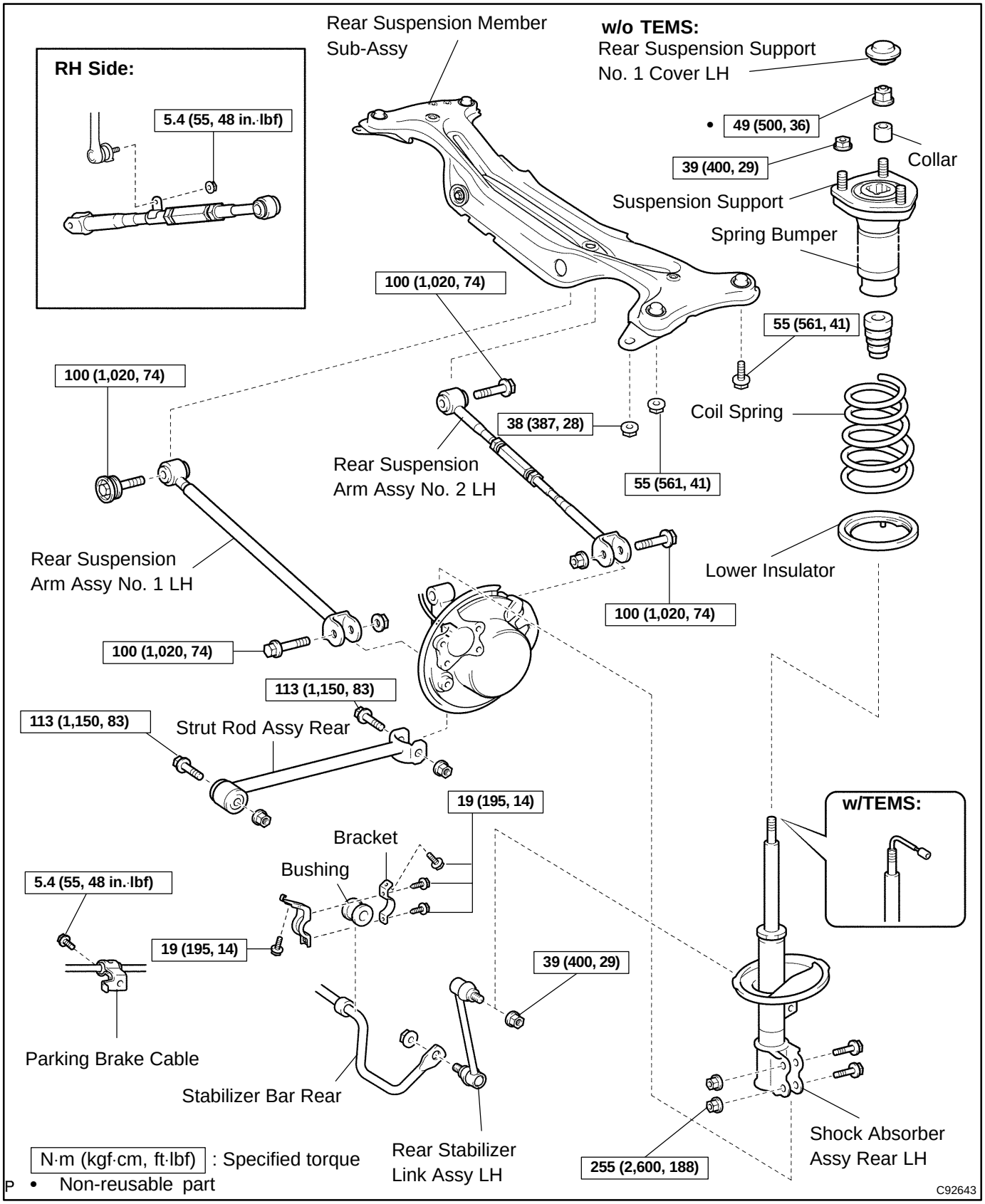
Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Bottoming	1. Vehicle (Overloaded) 2. Spring (Weak) 3. Shock absorber (Worn)	- 27-4 27-4
Sways/pitches	1. Tire (Worn or improperly inflated) 2. Stabilizer bar (Bent or broken) 3. Shock absorber (Worn)	28-1 27-16 27-4
Rear wheel shimmy	1. Tire (Worn or improperly inflated) 2. Wheel (Out of balance) 3. Shock absorber (Worn) 4. Wheel alignment (Incorrect) 5. Hub bearing (Worn)	28-1 28-1 27-4 26-5 27-3 30-2
Abnormal tire wear	1. Tire (Worn or improperly inflated) 2. Wheel alignment (Incorrect) 3. Shock absorber (Worn) 4. Suspension parts (Worn)	28-1 26-5 27-3 27-4 -

REAR SUSPENSION

COMPONENTS

2704V-06



REAR WHEEL ALIGNMENT

2704P-06

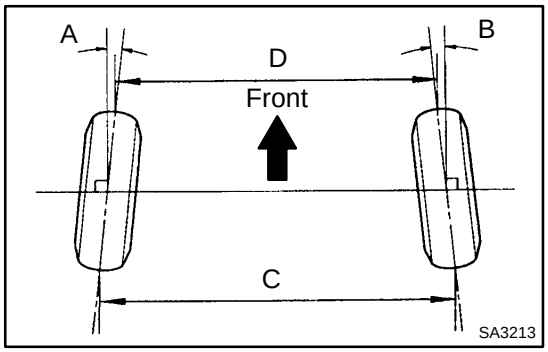
ADJUSTMENT

1. INSPECT TIRE (See page 28-1)

2. MEASURE VEHICLE HEIGHT (See page 26-5)

NOTICE:

Before inspecting the wheel alignment, adjust the vehicle height to the specified value.

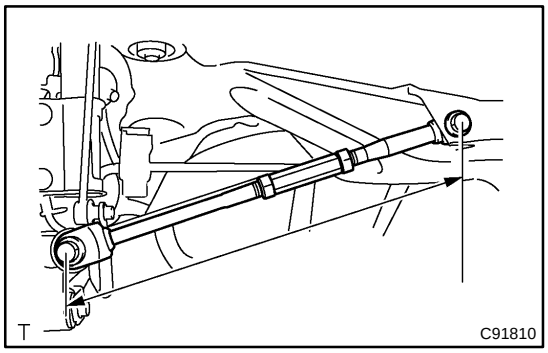


3. INSPECT TOE-IN

Toe-in:

Toe-in (total)	A + B: 0°22' ± 11' (0.4° ± 0.2°) C - D: 4 ± 2 mm (0.16 ± 0.08 in.)

If the toe-in is not within the specified value, inspect and replace the suspension parts if necessary.

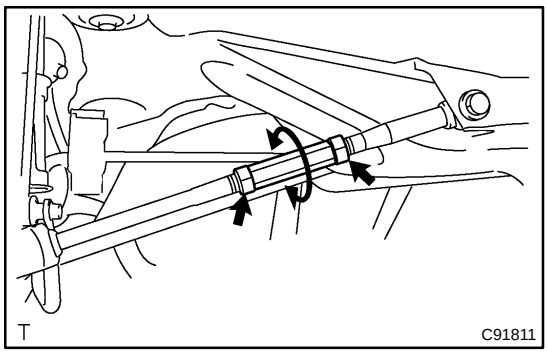


4. ADJUST TOE-IN

(a) Measure the lengths of the right and left No. 2 lower suspension arms.

No. 2 lower suspension arm length difference:
1.0 mm (0.039 in.) or less

If the left-right difference is larger than 1.0 mm (0.039 in.), adjust it by following the procedures below.



(b) Loosen the lock nuts.

(c) Turn the right and left adjusting tube by an equal amount to adjust toe-in.

HINT:

- Try to adjust the toe-in to the center value.
- One turn of the each adjusting tube will adjust the toe-in by approximately 67' (1°12', 10.8 mm, 0.425 in.).

(d) Torque the lock nut.

Torque: 56 N·m (570 kgf·cm, 41 ft·lbf)

5. INSPECT CAMBER

Camber	-1°23' ± 45' (-1.38° ± 0.75°)
Right-left error	45' (0.75°) or less

HINT:

Camber is not adjustable. If the measurement is not within the specification, inspect the suspension parts for damaged and/or worn-out parts and replace them if necessary.

SHOCK ABSORBER ASSY REAR LH

2706G-03

REPLACEMENT

HINT:

COMPONENTS: See page 27-2

1. **REMOVE REAR WHEEL**
2. **REMOVE REAR SEAT CUSHION ASSY (See page 72-39)**
3. **REMOVE REAR SEATBACK ASSY (See page 72-39)**
4. **REMOVE ROOF SIDE GARNISH INNER RH (See page 76-25)**
5. **REMOVE ROOF SIDE GARNISH INNER LH**

HINT:

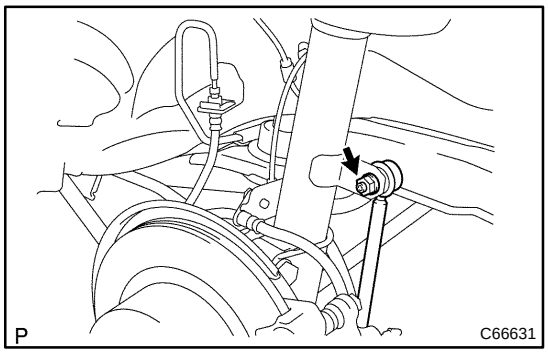
Remove the LH side by the same procedures with the RH side.

6. **REMOVE REAR DOOR OPENING TRIM WEATHERSTRIP RH (See page 72-39)**
7. **REMOVE REAR DOOR OPENING TRIM WEATHERSTRIP LH**

HINT:

Remove the LH side by the same procedures with the RH side.

8. **REMOVE CENTER STOP LAMP ASSY (W/O SUN SHADE) (See page 65-31)**
9. **REMOVE REAR SEAT SHOULDER BELT COVER (See page 61-15)**
10. **REMOVE PACKAGE TRAY TRIM PANEL ASSY (W/ SUN SHADE) (See page 61-15)**
11. **REMOVE PACKAGE TRAY TRIM PANEL ASSY (W/O SUN SHADE) (See page 61-15)**
12. **REMOVE REAR SEAT 3 POINT TYPE BELT ASSY OUTER (See page 61-15)**



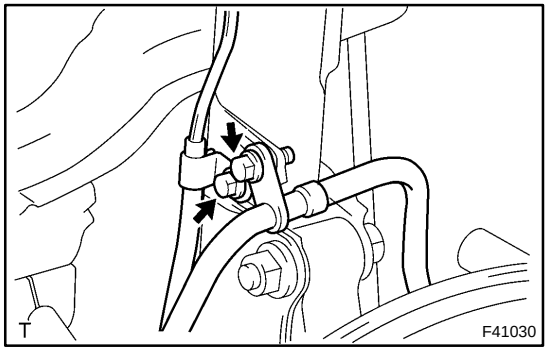
13. **SEPARATE REAR STABILIZER LINK ASSY LH**

(a) Remove the nut and disconnect the stabilizer bar link from the shock absorber.

HINT:

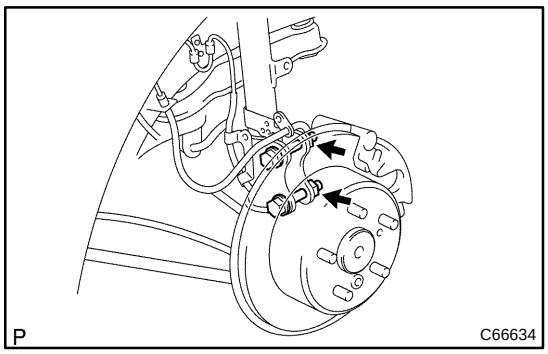
If the ball joint turns together with the nut, use a hexagon (5 mm) wrench to hold the stud.

14. **REMOVE REAR SUSPENSION SUPOPORT NO.1 COVER LH (W/O H-TEMS SUSPENSION)**



15. **REMOVE REAR SHOCK ABSORBER WITH COIL SPRING**

(a) Remove the 2 bolts, disconnect the flexible hose and ABS speed sensor wire harness from shock absorber.

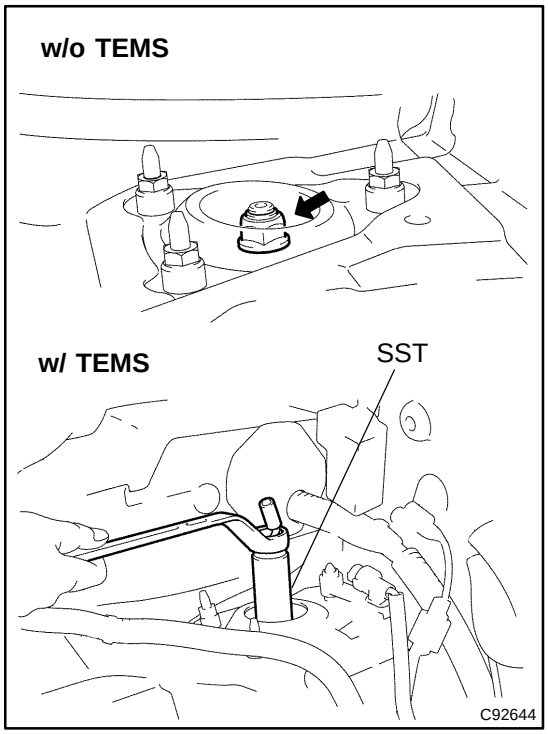


(b) Loosen the 2 bolts on the lower side of the shock absorber.

HINT:

Do not remove the 2 bolts.

(c) Support the rear axle carrier with a jack.



(d) w/o TEMS:
Loosen the suspension support center nut.

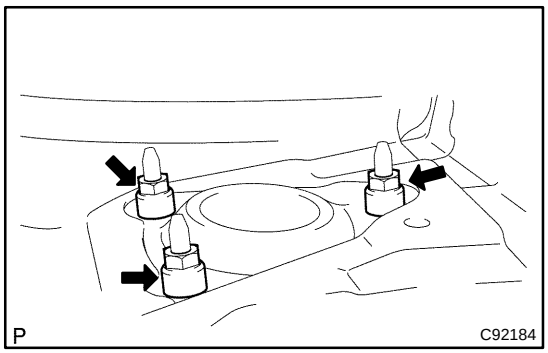
(e) w/ TEMS:
Loosen the suspension support center nut.
SST 09817-33190

NOTICE:

Do not remove the nut.

HINT:

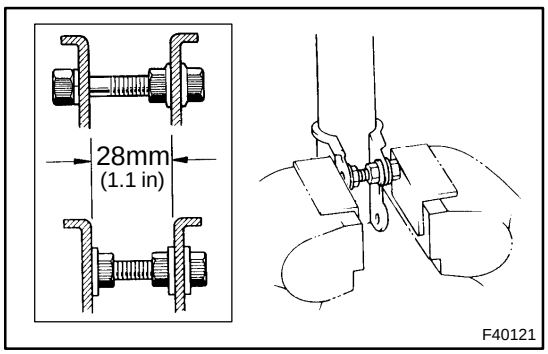
If not disassembling the rear shock absorber, it is not necessary to loosen the nut.



(f) Remove the 3 nuts of the suspension support.

(g) Lower the rear axle carrier and remove the 2 nuts and bolts on the lower side of the shock absorber.

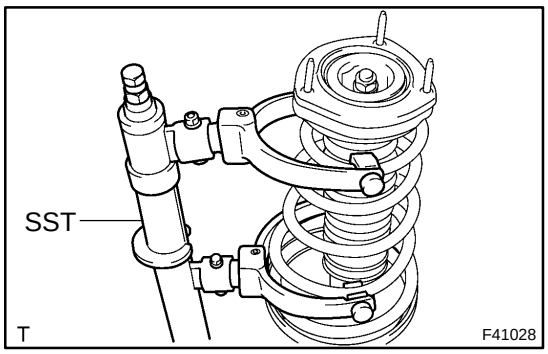
(h) Remove the shock absorber with the coil spring.



16. FIX REAR SHOCK ABSORBER WITH COIL SPRING

17. REMOVE SHOCK ABSORBER ASSY REAR LH

(a) Install 2 nuts and a bolt to the bracket at the lower part of the shock absorber, and secure it in a vise.



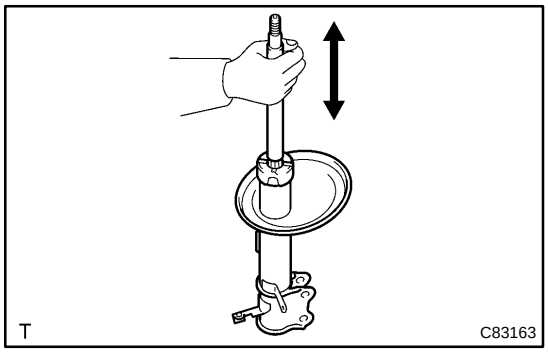
(b) Using SST, compress the coil spring.
SST 09727-30021

NOTICE:

Do not use an impact wrench. It will damage the SST.

(c) Remove the nut, collar and susupension support.

(d) Remove the coil spring, spring bumper and lower insulator.



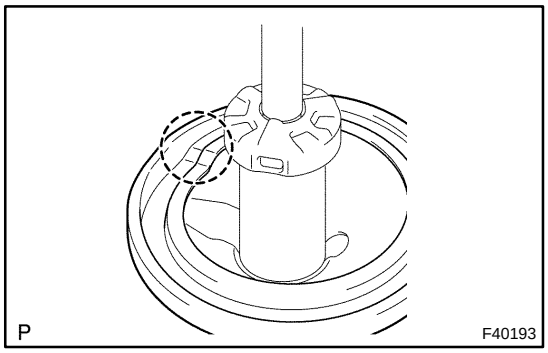
18. INSPECT SHOCK ABSORBER ASSY REAR LH

(a) Compress and extend the shock absorber rod, and check that there is no abnormal resistance or unusual operation sound.

If there is any abnormality, replace the shock absorber with a new one.

NOTICE:

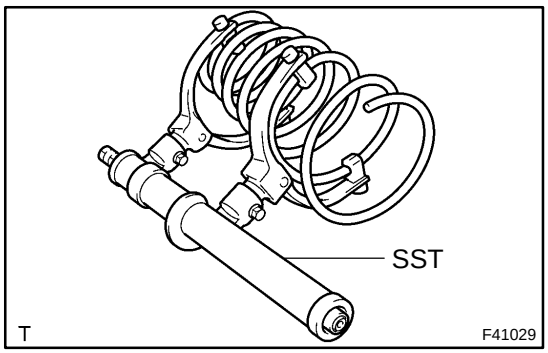
When disposing the shock absorber, see DISPOSAL on page 27-9 .



19. INSTALL SHOCK ABSORBER ASSY REAR LH

(a) Install the spring bumper.

(b) Install the lower insulator, as shown in the illustration.



(c) Using SST, compress the coil spring.
SST 09727-30021

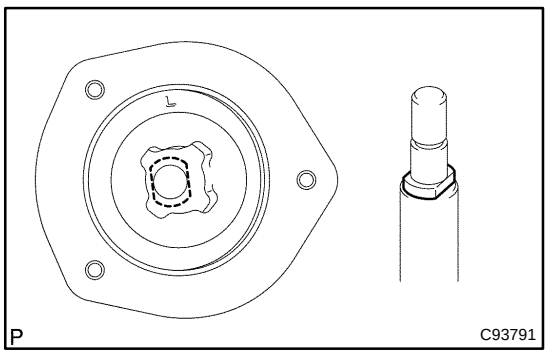
NOTICE:

Do not use an impact wrench. It will damage the SST.

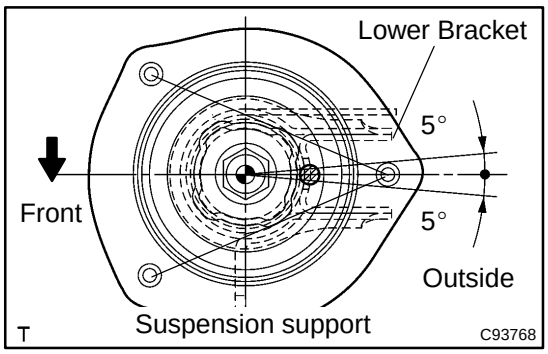
(d) Install the coil spring to the shock absorber.

HINT:

- Fit the lower end of the coil spring into the gap of the lower seat.



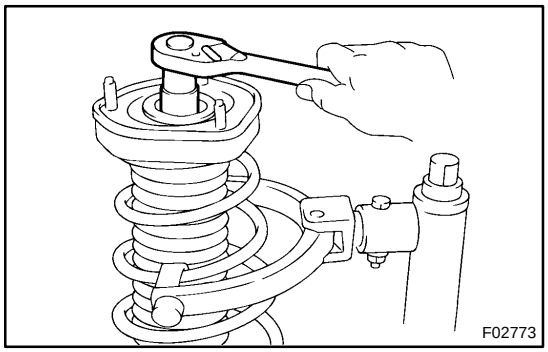
- Check that the 2 flat faces of the piston rod are position in parallel with the 2 flat faces of the rear suspension support.



(e) Align the suspension support with the shock absorber lower bracket, as shown in the illustration.

HINT:

Set the suspension support so that the ribbed part of the suspension support faces out side.



(f) Install the collar to the piston rod.

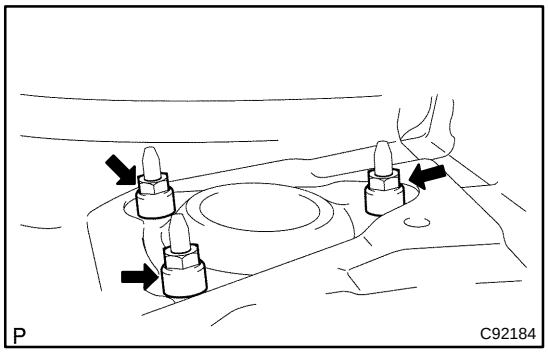
(g) Temporarily install a new nut.

(h) Remove the SST.

SST 09727-30021

HINT:

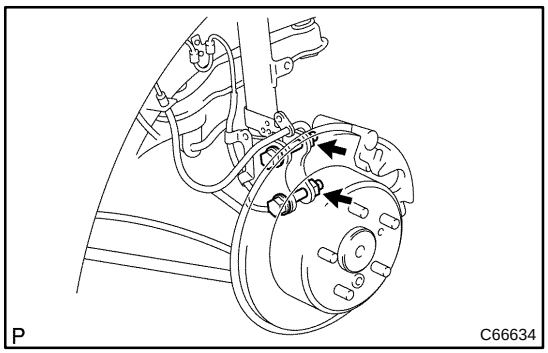
After removing SST, recheck the direction of the suspension support.



20. INSTALL REAR SHOCK ABSORBER WITH COIL SPRING

(a) Install the shock absorber with the coil spring and 3 nuts.

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

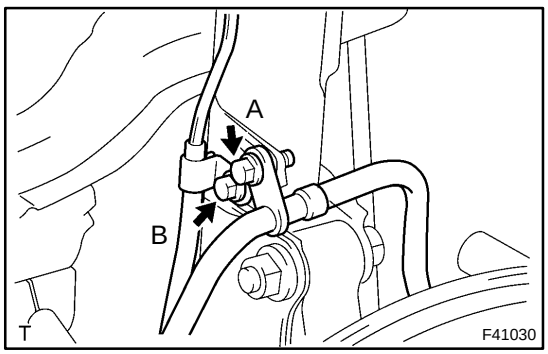


(b) Install the shock absorber with the coil spring, 2 bolts and nuts.

Torque: 255 N·m (2,600 kgf·cm, 188 ft·lbf)

HINT:

Keep the bolt fixed while tightening the nut.



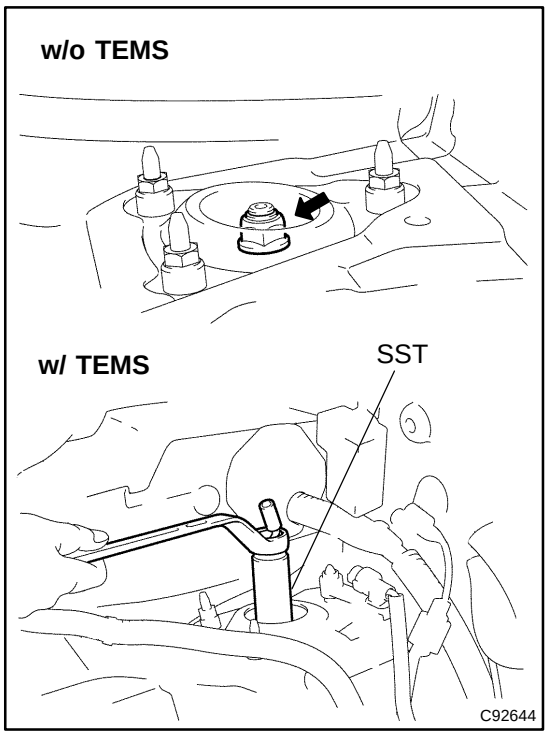
(c) Install the flexible hose and ABS speed sensor wire harness with the 2 bolts.

Torque:

A: Flexible hose: 19 N·m (194 kgf·cm, 14 ft·lbf)

B: ABS speed sensor wire harness:

5.5 N·m (56 kgf·cm, 49 in·lbf)



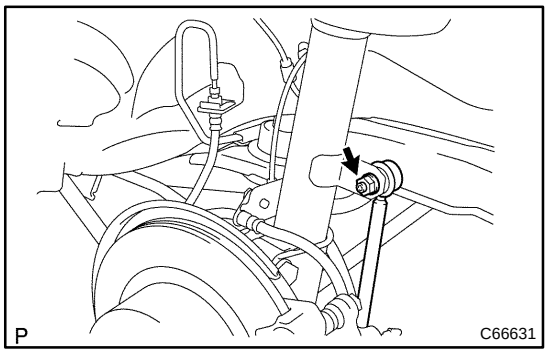
(d) w/o TEMS:
Tighten the nut in the center of suspension support.

(e) w/ TEMS:
Tighten the nut in the center of suspension support.
SST 09817-33190
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

HINT:
If the shock absorber has not been disassembled, it is necessary to tighten the nut.

21. INSTALL REAR SUSPENSION SUPOPORT NO.1 COVER LH (W/O H-TEMS SUSPENSION)

22. INSTALL REAR SEAT 3 POINT TYPE BELT ASSY OUTER (See page 61-15)



23. INSTALL REAR STABILIZER LINK ASSY LH

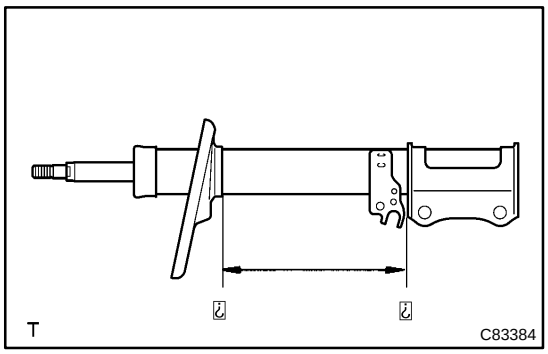
(a) Install the stabilizer bar link to the shock absorber with the nut.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

HINT:
If the ball joint turns together with the nut, use a hexagon (5 mm) wrench to hold the stud.

24. INSTALL REAR WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

25. INSPECT REAR WHEEL ALIGNMENT (See page 27-3)

2701L-09



DISPOSAL

1. DISPOSE OF SHOCK ABSORBER ASSY REAR LH

(a) Fully extend the shock absorber rod.

(b) Using a drill, make a hole in the cylinder as shown in the illustration to discharge the gas inside.

CAUTION:

- **When drilling, chips may fly out. Work carefully.**
- **The gas is colorless, odorless and non-poisonous.**

REAR SUSPENSION ARM ASSY NO.1 LH

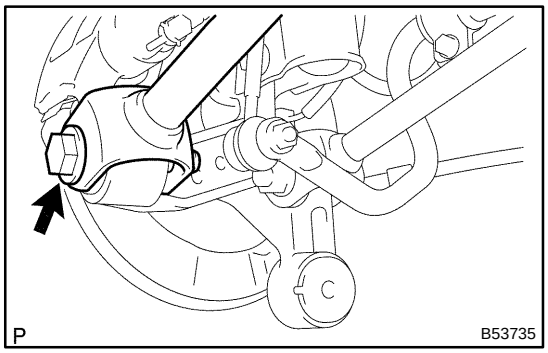
2706H-02

REPLACEMENT

HINT:

COMPONENTS: See page 27-2

1. **REMOVE REAR WHEEL**
2. **REMOVE EXHAUST PIPE ASSY CENTER (See page 15-2)**
3. **REMOVE STABILIZER BAR REAR (See page 27-16)**
4. **SEPARATE STRUT ROD ASSY REAR (See page 27-18)**
5. **SEPARATE HEIGHT CONTROL SENSOR SUB-ASSY REAR RH (See page 65-33)**



6. **SEPARATE REAR SUSPENSION ARM ASSY NO.2 LH**

(a) Remove the bolt, nut and rear suspension arm No. 2 (outer side) from the rear carrier.

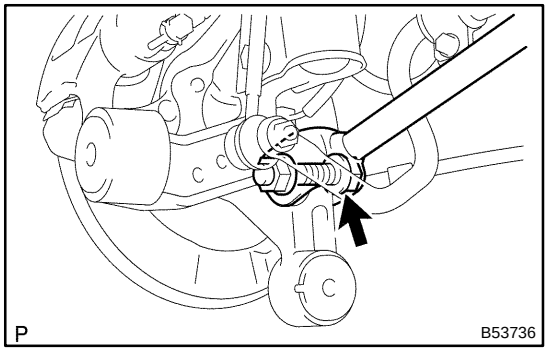
HINT:

Keep the nut fixed while loosening and removing the bolt.

7. **SEPARATE REAR SUSPENSION ARM ASSY NO.2 RH**

HINT:

Separate the RH side by the procedures with the LH side.



8. **SEPARATE REAR SUSPENSION ARM ASSY NO.1 LH**

(a) Remove the bolt, nut and rear suspension arm No. 1 (outer side) from rear axle carrier.

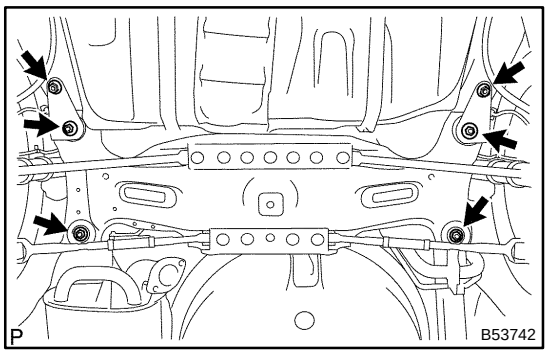
HINT:

Keep the nut fixed while loosening and removing the bolt.

9. **SEPARATE REAR SUSPENSION ARM ASSY NO.1 RH**

HINT:

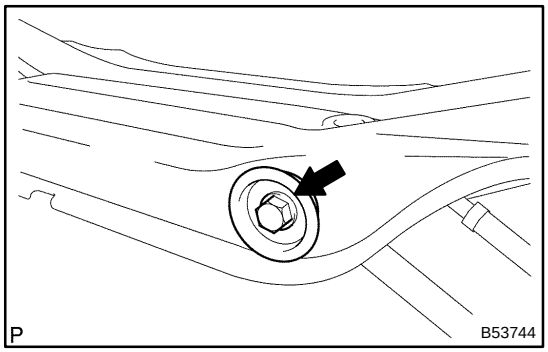
Separate the RH side by the procedures with the LH side.



10. REMOVE REAR SUSPENSION MEMBER SUB-ASSY

(a) Support the rear suspension member with a jack.

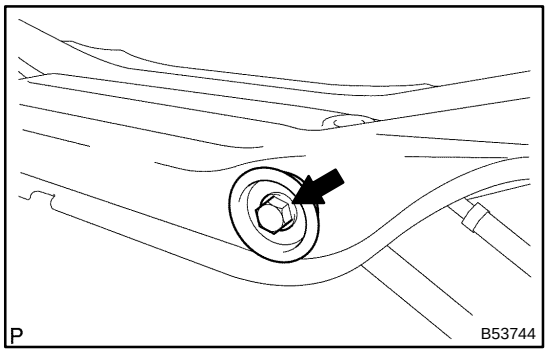
(b) Remove the 4 nuts, 2 bolts and 4 retainers from the rear suspension member.



11. REMOVE REAR SUSPENSION ARM ASSY NO.1 LH

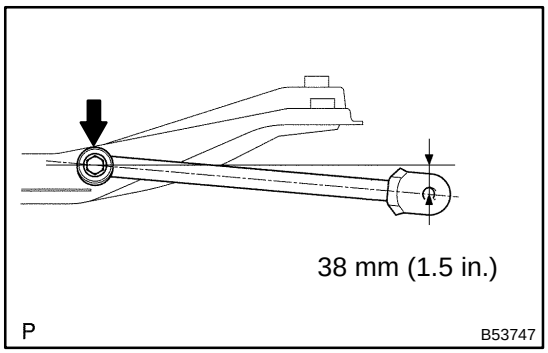
(a) Lower the rear suspension member.

(b) Remove the bolt, nut and lower suspension arm No. 1.



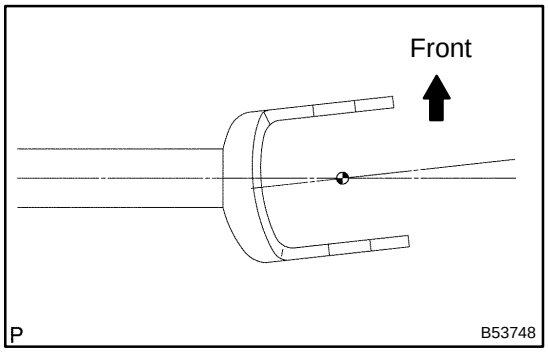
12. INSTALL REAR SUSPENSION ARM ASSY NO.1 LH

(a) Install the lower suspension No. 1 with the bolt, nut and temporarily tighten the bolt.



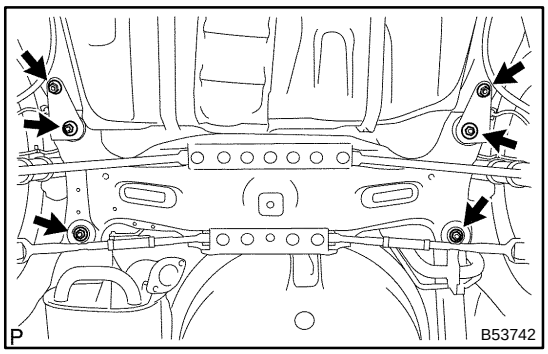
(b) Set suspension arm in the position shown in the illustration and fully tighten the bolt.

Torque: 100 N·m (1,020 kgf·cm, 74 ft·lbf)



HINT:

Install the lower suspension No. 1 so that the bracket leans toward the front of the vehicle, as shown in illustration.

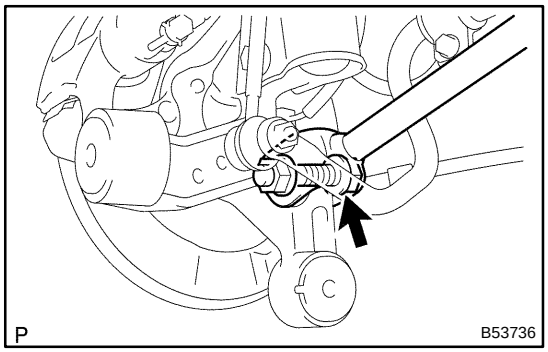


13. INSTALL REAR SUSPENSION MEMBER SUB-ASSY

(a) Support the rear suspension member with a jack.

(b) Install the rear suspension member with the 4 nuts, 2 bolts and 4 retainers.

Torque:
A, B: 55 N·m (561 kgf·cm, 41 ft·lbf)
C: 38 N·m (387 kgf·cm, 28 ft·lbf)



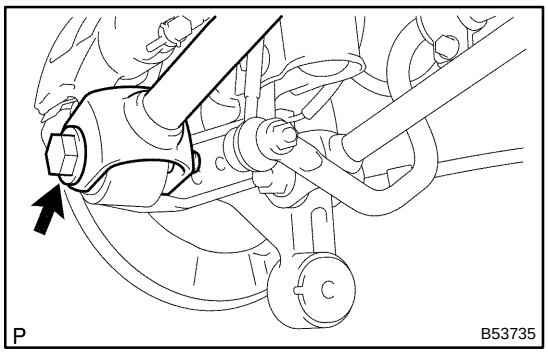
14. TEMPORARILY TIGHTEN REAR SUSPENSION ARM ASSY NO.1 LH

(a) Connect the rear suspension arm No. 1 (outer side) to the rear axle carrier with the bolt and nut, and temporarily tighten the bolt and nut.

HINT:
Insert the bolt from the front side of the vehicle and temporarily install the bolt.

15. TEMPORARILY TIGHTEN REAR SUSPENSION ARM ASSY NO.1 RH

HINT:
Temporarily tighten the RH side by the procedures with the LH side.



16. TEMPORARILY TIGHTEN REAR SUSPENSION ARM ASSY NO.2 LH

(a) Connect the rear suspension arm No. 2 (outer side) to the rear axle carrier with the bolt and nut, and temporarily tighten the bolt.

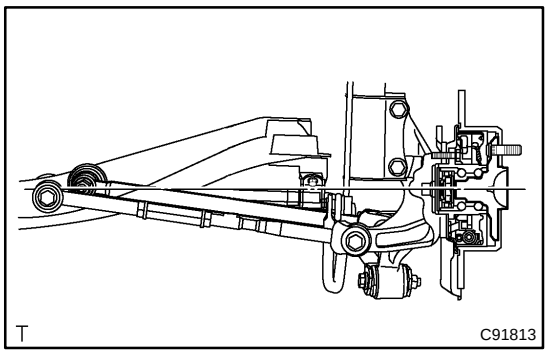
HINT:
Insert the bolt from the rear side of the vehicle and temporarily install the bolt.

17. TEMPORARILY TIGHTEN REAR SUSPENSION ARM ASSY NO.2 RH

HINT:
Temporarily tighten the RH side by the procedures with the LH side.

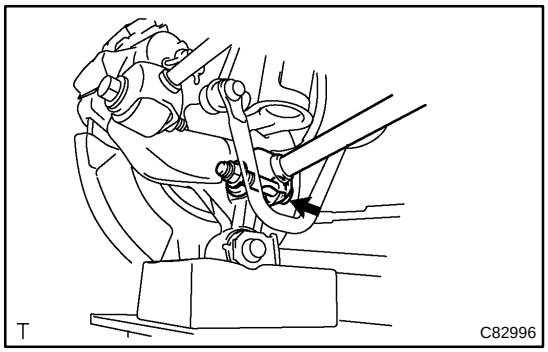
18. CONNECT HEIGHT CONTROL SENSOR SUB-ASSY REAR RH (See page 65-33)

19. TEMPORARILY TIGHTEN STRUT ROD ASSY REAR (See page 27-18)



20. STABILIZE SUSPENSION

(a) Jack up the rear axle carrier, placing a wooden block between them. Apply load to the suspension so that the installed bolt of the suspension arm assy No. 1 (vehicle side) is horizontally aligned with the center of the rear axle hub.



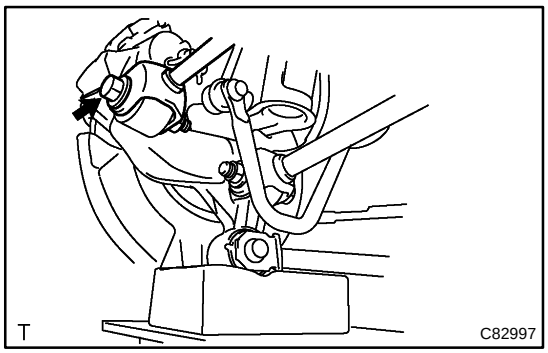
21. FULLY TIGHTEN REAR SUSPENSION ARM ASSY NO.1 LH

(a) Fully tighten the bolt.
Torque: 100 N·m (1,020 kgf·cm, 74 ft·lbf)

HINT:
While fixing the nut, turn the bolt.

22. FULLY TIGHTEN REAR SUSPENSION ARM ASSY NO.1 RH

HINT:
Fully tighten the RH side by the procedures with the LH side.



23. FULLY TIGHTEN REAR SUSPENSION ARM ASSY NO.2 LH

(a) Fully tighten the bolt.
Torque: 100 N·m (1,020 kgf·cm, 74 ft·lbf)

HINT:
While fixing the nut, turn the bolt.

24. FULLY TIGHTEN REAR SUSPENSION ARM ASSY NO.2 RH

HINT:
Fully tighten the RH side by the procedures with the LH side.

25. FULLY TIGHTEN STRUT ROD ASSY REAR (See page 27-18)
26. INSTALL STABILIZER BAR REAR (See page 27-16)
27. INSTALL EXHAUST PIPE ASSY CENTER (See page 15-2)
28. INSTALL REAR WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
29. INSPECT REAR WHEEL ALIGNMENT (See page 27-3)
30. HEADLIGHT AIM ONLY (See page 65-15)

REAR SUSPENSION ARM ASSY NO.2 LH

2706I-02

REPLACEMENT

HINT:

COMPONENTS: See page 27-2

1. REMOVE REAR WHEEL

2. REMOVE EXHAUST PIPE ASSY CENTER (See page 15-2)

3. REMOVE STABILIZER BAR REAR (See page 27-16)

4. SEPARATE STRUT ROD ASSY REAR (See page 27-18)

5. SEPARATE HEIGHT CONTROL SENSOR SUB-ASSY REAR RH (See page 65-33)

6. SEPARATE REAR SUSPENSION ARM ASSY NO.2 LH (See page 27-10)

7. SEPARATE REAR SUSPENSION ARM ASSY NO.2 RH

HINT:

Separate the RH side by the procedures with the LH side.

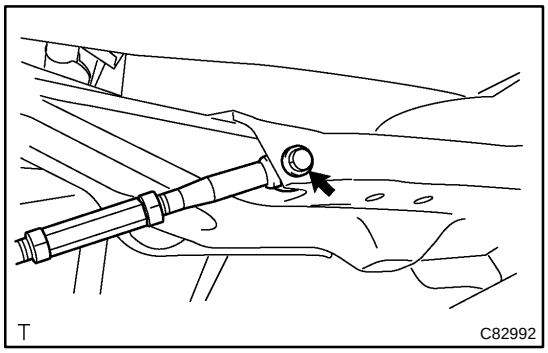
8. SEPARATE REAR SUSPENSION ARM ASSY NO.1 LH (See page 27-10)

9. SEPARATE REAR SUSPENSION ARM ASSY NO.1 RH

HINT:

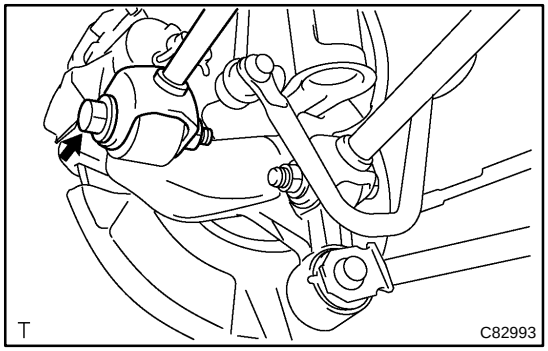
Separate the RH side by the procedures with the LH side.

10. REMOVE REAR SUSPENSION MEMBER SUB-ASSY (See page 27-10)



11. REMOVE REAR SUSPENSION ARM ASSY NO.2 LH

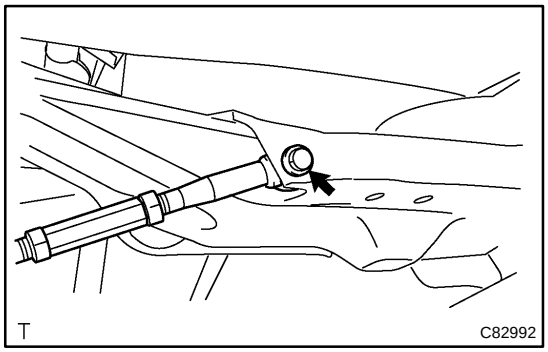
(a) Remove the bolt and rear suspension arm No. 2 (inner side).



(b) Remove the bolt, nut and disconnect the rear suspension arm No. 2 (outer side) from rear axle carrier.

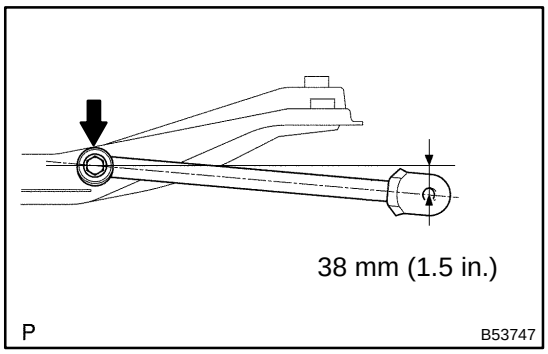
HINT:

Keep the nut fixed while loosening and removing the bolt.



12. INSTALL REAR SUSPENSION ARM ASSY NO.2 LH

(a) Install the rear suspension arm No. 2 (inner side) with the bolt and temporarily tighten the bolt.



(b) Set the suspension arm in the position in the illustration and fully tighten the bolt.
Torque: 100 N·m (1,020 kgf·cm, 74 ft·lbf)

13. INSTALL REAR SUSPENSION MEMBER SUB-ASSY (See page 27-10)
14. TEMPORARILY TIGHTEN REAR SUSPENSION ARM ASSY NO.1 LH (See page 27-10)
15. TEMPORARILY TIGHTEN REAR SUSPENSION ARM ASSY NO.1 RH
HINT:
Temporarily tighten the RH side by the procedures with the LH side.
16. TEMPORARILY TIGHTEN REAR SUSPENSION ARM ASSY NO.2 LH (See page 27-10)
17. TEMPORARILY TIGHTEN REAR SUSPENSION ARM ASSY NO.2 RH
HINT:
Temporarily tighten the RH side by the procedures with the LH side.
18. TEMPORARILY TIGHTEN STRUT ROD ASSY REAR (See page 27-18)
19. CONNECT HEIGHT CONTROL SENSOR SUB-ASSY REAR RH (See page 65-33)
20. STABILIZE SUSPENSION (See page 27-10)
21. FULLY TIGHTEN REAR SUSPENSION ARM ASSY NO.1 LH (See page 27-10)
22. FULLY TIGHTEN REAR SUSPENSION ARM ASSY NO.1 RH
HINT:
Fully tighten the RH side by the procedures with the LH side.
23. FULLY TIGHTEN REAR SUSPENSION ARM ASSY NO.2 LH (See page 27-10)
24. FULLY TIGHTEN REAR SUSPENSION ARM ASSY NO.2 RH
HINT:
Fully tighten the RH side by the procedures with the LH side.
25. FULLY TIGHTEN STRUT ROD ASSY REAR (See page 27-18)
26. INSTALL STABILIZER BAR REAR (See page 27-16)
27. INSTALL EXHAUST PIPE ASSY CENTER (See page 15-2)
28. INSTALL REAR WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
29. INSPECT REAR WHEEL ALIGNMENT (See page 27-3)
30. HEADLIGHT AIM ONLY (See page 65-15)

STABILIZER BAR REAR

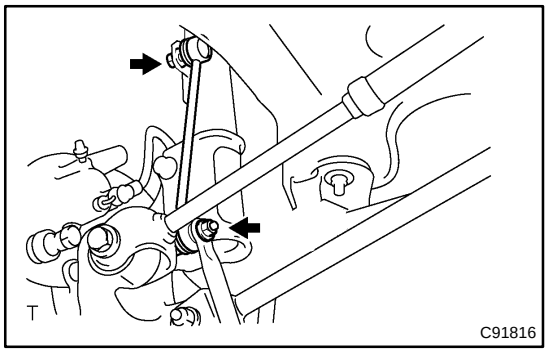
REPLACEMENT

2701O-06

HINT:

COMPONENTS: See page 27-2

1. REMOVE REAR WHEEL



2. REMOVE REAR STABILIZER LINK ASSY LH

(a) Remove the 2 nuts and stabilizer bar link.

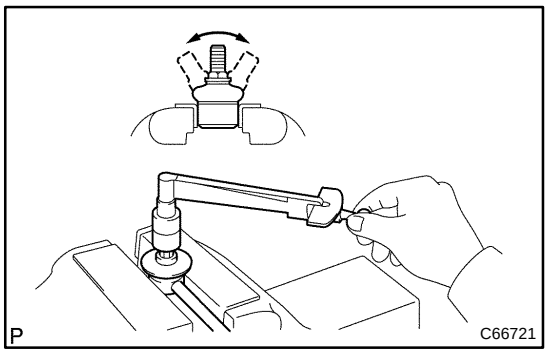
HINT:

If the ball joint turns together with the nut, use a hexagon wrench (5 mm) to hold the stud.

3. REMOVE REAR STABILIZER LINK ASSY RH

HINT:

Remove the RH side by the same procedures with the LH side.



4. INSPECT REAR STABILIZER LINK ASSY LH

(a) As shown in the illustration, flip the ball joint stud back and forth 5 times, before installing the nut.

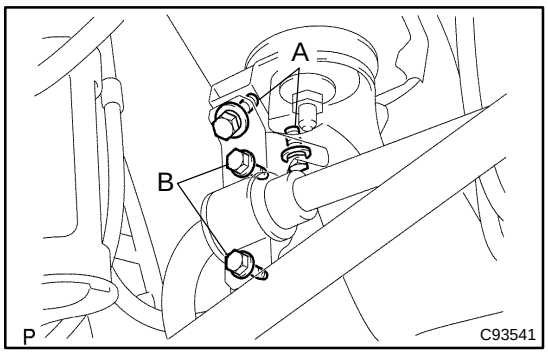
(b) Using a torque wrench, turn the nut continuously at a rate of 2 - 4 seconds per 1 turn and take the torque reading on the 5th turn.

Turning torque:

0.05 - 1.0 N·m (0.5 - 10 kgf·cm, 0.4 - 8.7 in.·lbf)

5. REMOVE STABILIZER BAR REAR

(a) Remove the 8 bolts, 2 No. 1 brackets and 2 bushings.

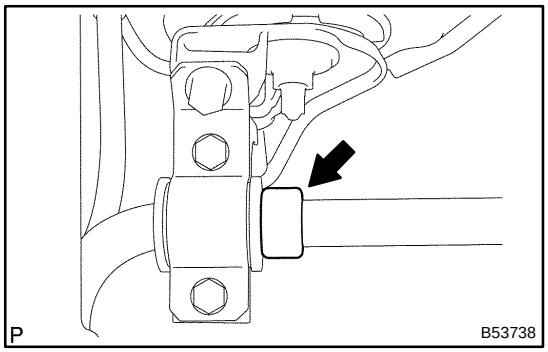


6. INSTALL STABILIZER BAR REAR

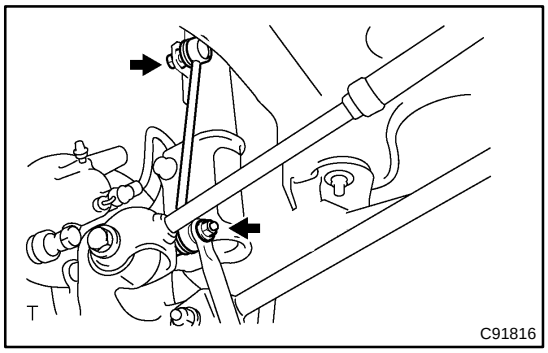
(a) Install the bushing and bracket with the 2 bolts (LH side).
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

HINT:

- 2 types of bolts (A, B) are used, so make sure the correct bolts are installed.



- Install the bushing to the inner side of the bushing stopper on the stabilizer bar.



7. INSTALL REAR STABILIZER LINK ASSY LH

(a) Remove the 2 nuts and stabilizer bar link.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

HINT:

If the ball joint turns together with the nut, use a hexagon (5 mm) wrench to hold the stud.

8. INSTALL REAR STABILIZER LINK ASSY RH

HINT:

Install the RH side by the same procedures with the LH side.

9. INSTALL REAR WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

10. INSPECT REAR WHEEL ALIGNMENT (See page 27-3)

STRUT ROD ASSY REAR

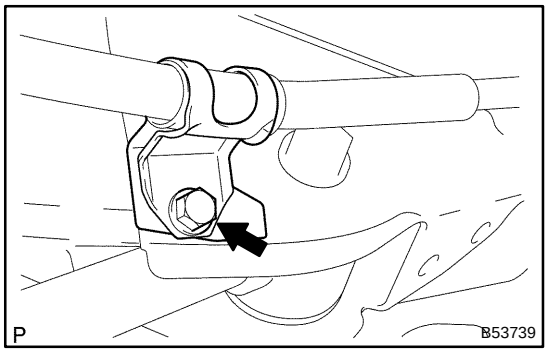
REPLACEMENT

2706J-02

HINT:

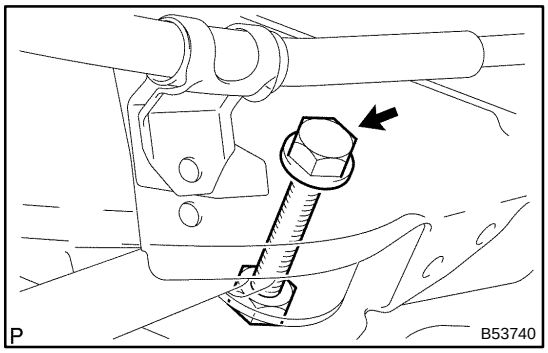
COMPONENTS: See page 27-2

1. REMOVE REAR WHEEL



2. REMOVE STRUT ROD ASSY REAR

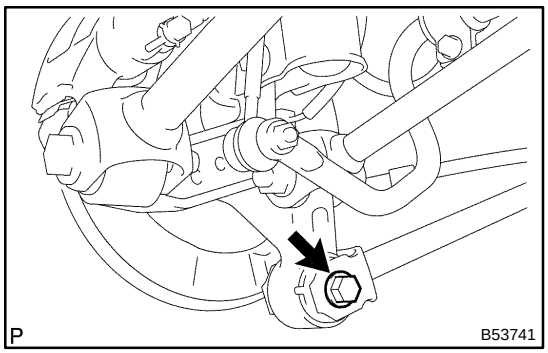
(a) Remove the bolt, nut and disconnect the parking brake cable.



(b) Remove the bolt, nut and disconnect the strut rod (front side).

HINT:

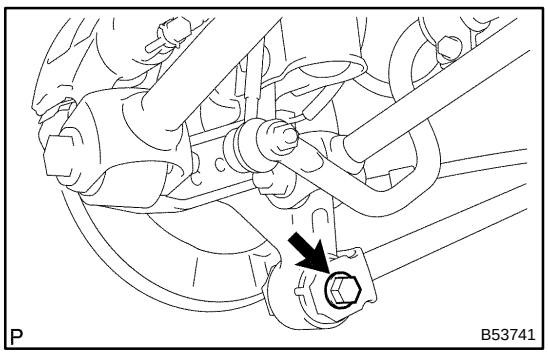
Keep the nut fixed while loosening and removing the bolt.



(c) Remove the bolt, nut and strut rod from rear axle carrier.

HINT:

Keep the nut fixed while loosening and removing the bolt.

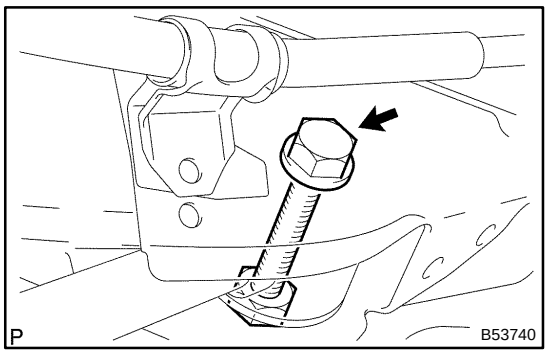


3. TEMPORARILY TIGHTEN STRUT ROD ASSY REAR

(a) Install the strut rod (rear side), bolt nut and temporarily tighten the bolt.

HINT:

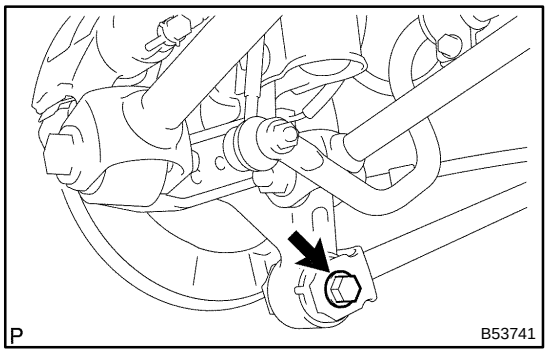
- Insert the bolt from the inner side of the vehicle and temporarily install the bolt.
- While fixing the nut, turn the bolt.



(b) Connect the strut rod (inner side) with the bolt.
Torque: 113 N·m (1,150 kgf·cm, 83 ft·lbf)

HINT:
While fixing the nut, turn the bolt.

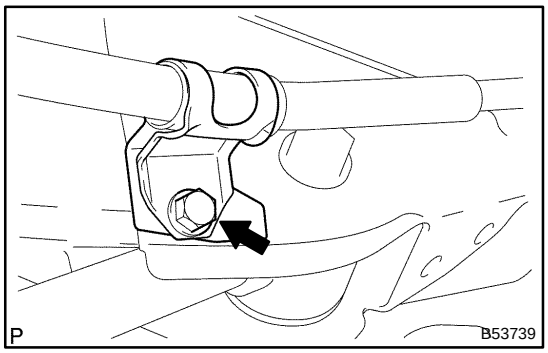
4. STABILIZE SUSPENSION (See page 27-10)



5. FULLY TIGHTEN STRUT ROD ASSY REAR

(a) Fully tighten the bolt.
Torque: 113 N·m (1,152 kgf·cm, 83 ft·lbf)

HINT:
While fixing the nut, turn the bolt.



(b) Install the parking brake cable with the bolt and nut.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

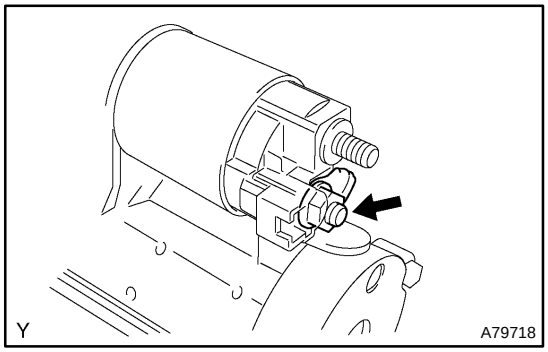
6. INSTALL REAR WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

7. INSPECT REAR WHEEL ALIGNMENT (See page 27-3)

STARTING SYSTEM (3MZ-FE)

190SE-01

INSPECTION



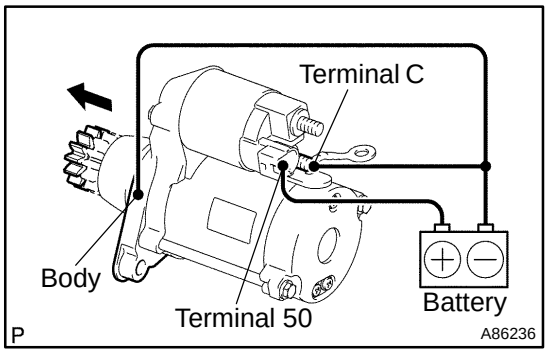
1. INSPECT STARTER ASSY

NOTICE:

These tests must be performed within 3 to 5 seconds to prevent burnout of the coil.

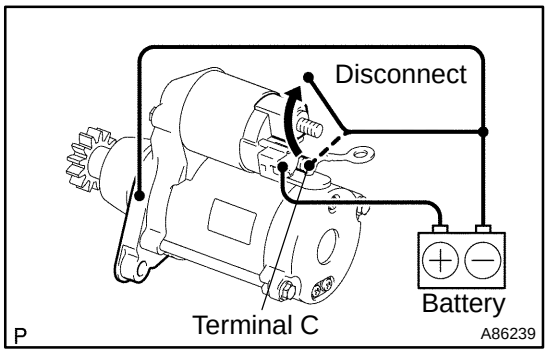
(a) Perform the pull-in test.

(1) Remove the nut, then disconnect the lead wire from terminal C.



(2) Connect the battery to the repair service starter kit as shown in the illustration. Check that the clutch pinion gear is extended.

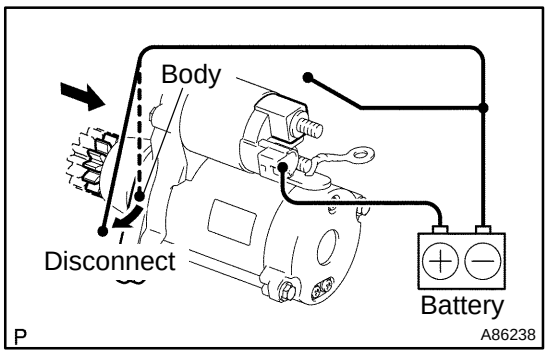
If the clutch pinion gear does not move, replace the starter magnetic switch.



(b) Perform the hold-in test.

(1) Disconnect the negative (-) lead from terminal C with the lead wire disconnected from terminal C. Check that the clutch pinion gear remains extended.

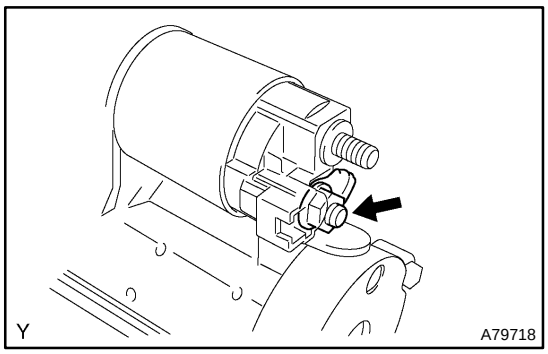
If the clutch pinion gear returns inward, replace the starter magnetic switch.



(c) Check the operation.

(1) Disconnect the negative (-) lead from the switch body. Check that the clutch pinion gear returns.

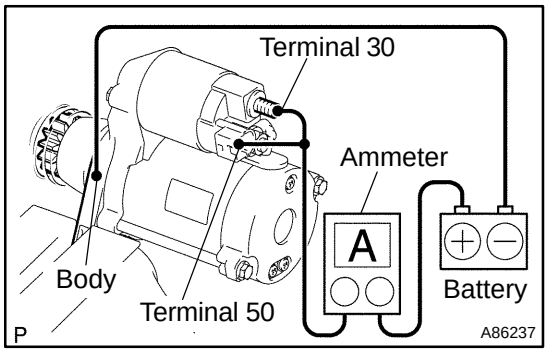
If the clutch pinion gear does not return inward, replace the starter magnetic switch.



(d) Perform the no-load performance test.

(1) Connect the lead wire to terminal C. Make sure that the lead is not grounded.

Torque: 10 N·m (102 kgf·cm, 7 ft·lbf)



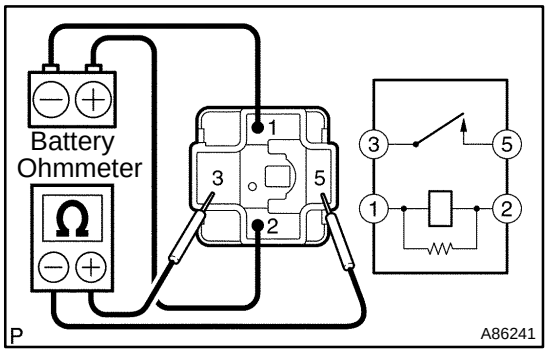
(2) Clamp the starter in a vise.

(3) Connect the battery and an ammeter to the starter as shown in the illustration.

(4) Check that the starter rotates smoothly and steadily with the clutch pinion gear extended. Check that the ammeter reads the specified current.

Specified current: 90 A or less at 11.5 V

If the current is not as specified, replace the starter.



2. INSPECT STARTER RELAY ASSY

(a) Inspect the resistance.

(1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

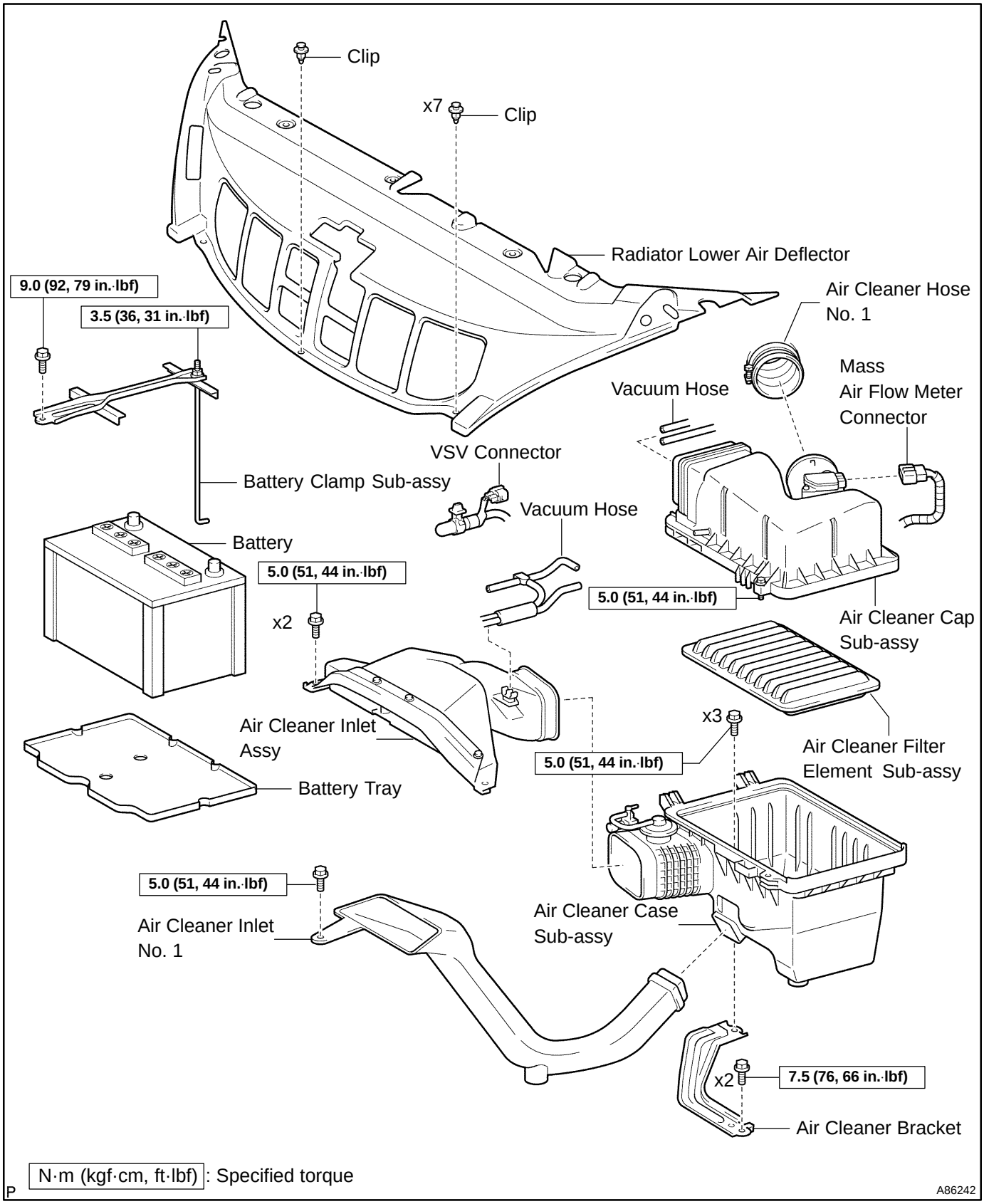
Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1Ω (Apply battery voltage to terminals 1 and 2

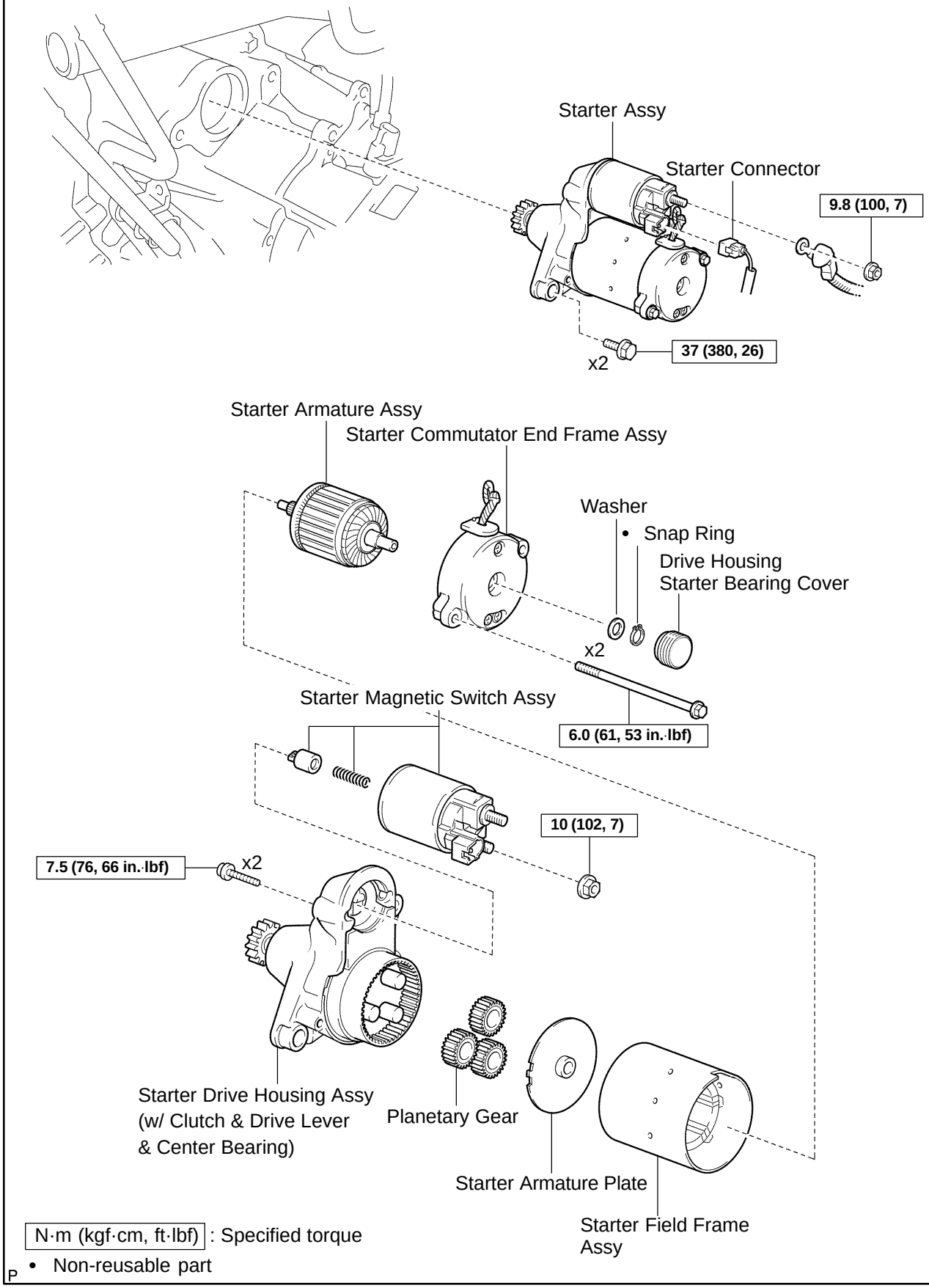
If the result is not as specified, replace the starter relay.

STARTER ASSY (3MZ-FE)

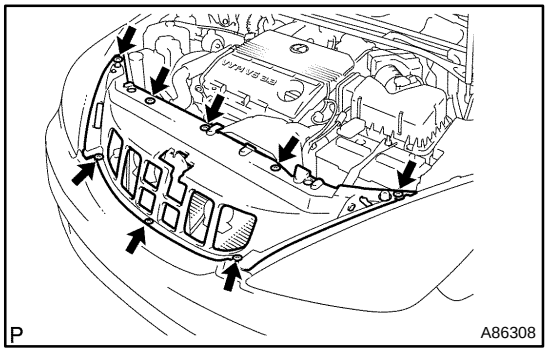
COMPONENTS

190SF-01



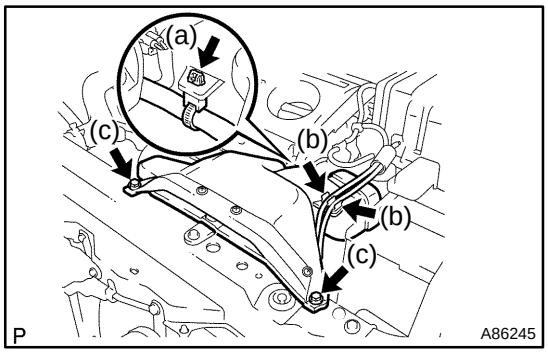

Starter Assy
Starter Connector
9.8 (100, 7)
37 (380, 26)
x2
Starter Armature Assy
Starter Commutator End Frame Assy
Washer
• Snap Ring
Drive Housing
Starter Bearing Cover
x2
Starter Magnetic Switch Assy
6.0 (61, 53 in.·lbf)
10 (102, 7)
7.5 (76, 66 in.·lbf)
x2
Starter Drive Housing Assy
(w/ Clutch & Drive Lever
& Center Bearing)
Planetary Gear
Starter Armature Plate
Starter Field Frame
Assy
N·m (kgf·cm, ft·lbf) : Specified torque
• Non-reusable part
P
A86243

REPLACEMENT



1. REMOVE RADIATOR SIDE DEFLECTOR RH

(a) Remove the 8 clips, then remove the radiator lower air deflector.

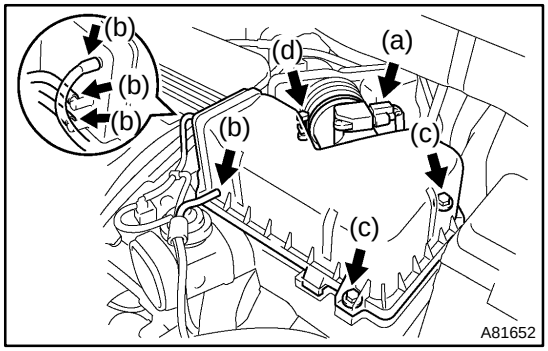


2. REMOVE AIR CLEANER INLET ASSY

(a) Remove the wire harness clamp.
(b) Remove the 2 vacuum hoses from the hose clamp.
(c) Remove the 2 bolts, then remove the air cleaner inlet.

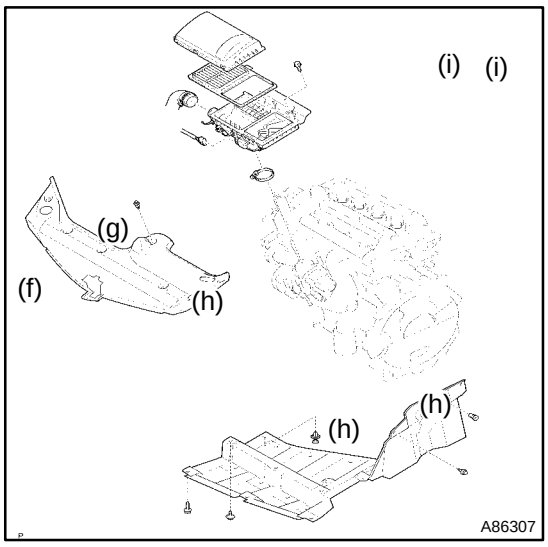
3. REMOVE BATTERY

4. REMOVE BATTERY TRAY

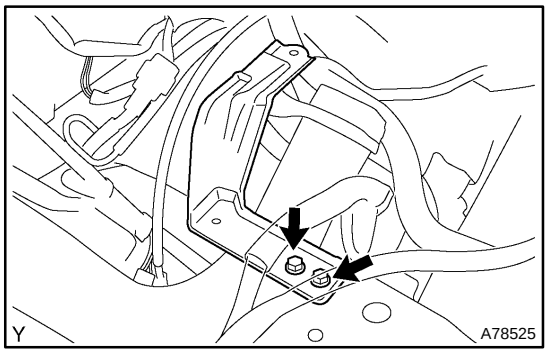


5. REMOVE AIR CLEANER ASSY

(a) Disconnect the mass air flow meter connector.
(b) Disconnect the 4 vacuum hoses.
(c) Loosen the 2 air cleaner cap bolts.
(d) Loosen the air cleaner hose clamp bolt, then remove the air cleaner cap.
(e) Remove the air cleaner filter element.

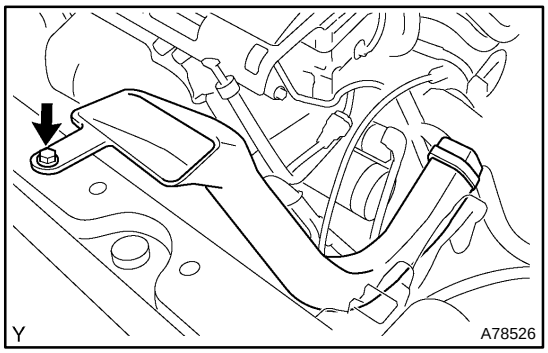


(f) Disconnect the VSV connector.
(g) Disconnect the vacuum hose.
(h) Remove the 3 bolts.
(i) Remove the wire harness from the 2 wire harness clamps, then remove the air cleaner case.



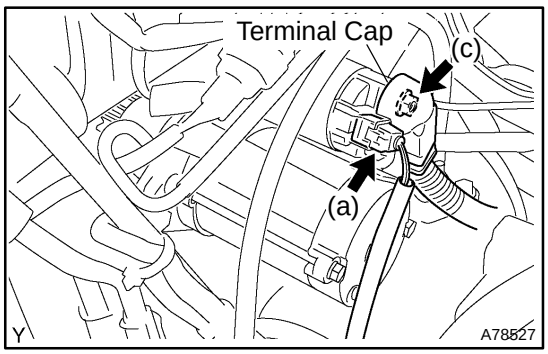
6. REMOVE AIR CLEANER BRACKET

(a) Remove the 2 bolts, then remove the air cleaner bracket.



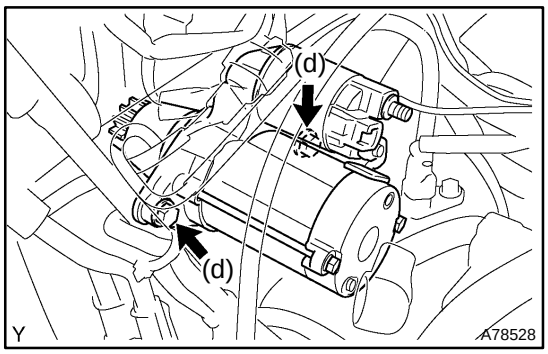
7. REMOVE AIR CLEANER INLET NO.1

(a) Remove the bolt, then remove the air cleaner inlet No. 1.



8. REMOVE STARTER ASSY

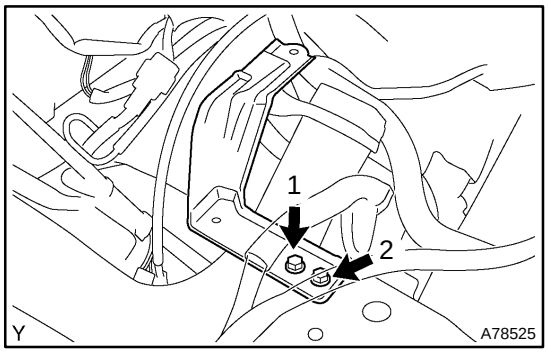
(a) Disconnect the starter connector.
(b) Open the terminal cap.
(c) Remove the nut, then disconnect the starter wire.



(d) Remove the 2 bolts, then remove the starter.

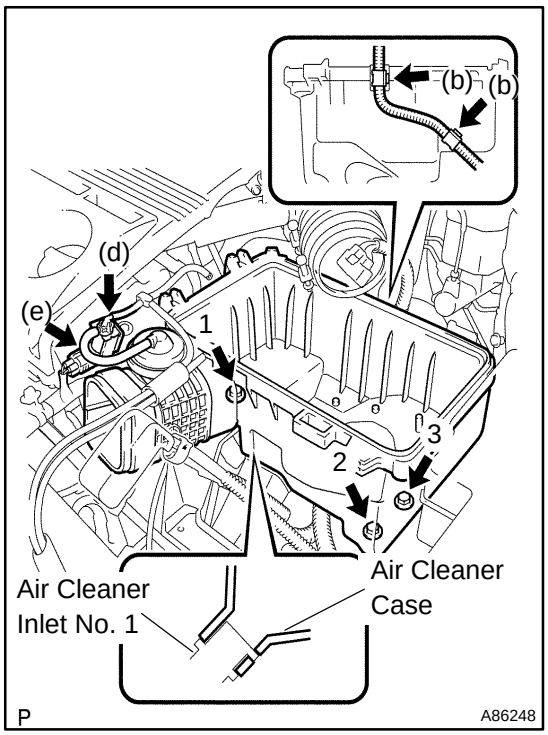
9. INSTALL STARTER ASSY
Torque:
37 N·m (380 kgf·cm, 26 ft·lbf) for bolt
9.8 N·m (100 kgf·cm, 7 ft·lbf) for nut

10. INSTALL AIR CLEANER INLET NO.1
Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)



11. INSTALL AIR CLEANER BRACKET

(a) Install the air cleaner bracket with the 2 bolts. Using several steps, tighten the bolts uniformly in the sequence shown in the illustration.
Torque: 7.5 N·m (76 kgf·cm, 66 in.·lbf)



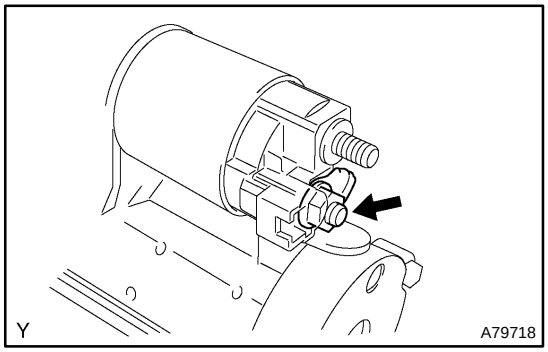
12. INSTALL AIR CLEANER ASSY

(a) Install the air cleaner case to the air cleaner inlet No. 1 as shown in the illustration.
(b) Install the wire harness to the 2 wire harness clamps.
(c) Using several steps, tighten the 3 bolts uniformly in the sequence shown in the illustration.
Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)
(d) Connect the vacuum hose.
(e) Connect the VSV connector.
(f) Install the air cleaner filter element.
(g) Install the air cleaner cap, then tighten the air cleaner hose clamp bolt.
(h) Tighten the 2 air cleaner cap bolts.
Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)
(i) Connect the 4 vacuum hoses.
(j) Connect the mass air flow meter connector.

13. INSTALL BATTERY TRAY
14. INSTALL BATTERY
Torque:
9.0 N·m (92 kgf·cm, 79 in.·lbf) for bolt
3.5 N·m (36 kgf·cm, 31 in.·lbf) for nut
5.4 N·m (55 kgf·cm, 48 in.·lbf) for terminal
15. INSTALL AIR CLEANER INLET ASSY
Torque: 5.0 N·m (55 kgf·cm, 44 in.·lbf)
16. CHECK CONNECTION OF VACUUM HOSE (See page 14-29)
17. INSTALL RADIATOR SIDE DEFLECTOR RH
18. SYSTEM INITIALIZATION (See page 19-15)

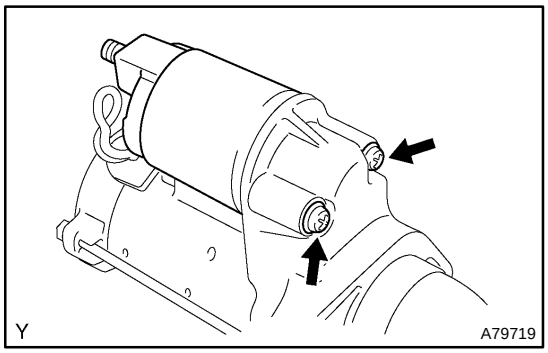
190SH-01

OVERHAUL



1. REMOVE STARTER MAGNETIC SWITCH ASSY

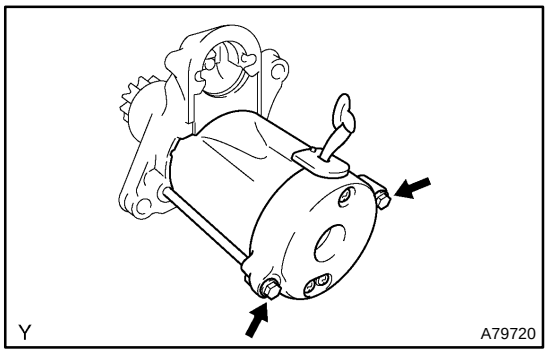
(a) Remove the nut, then disconnect the lead wire from terminal C.



(b) Remove the 2 screws which secure the starter magnetic switch to the starter drive housing.

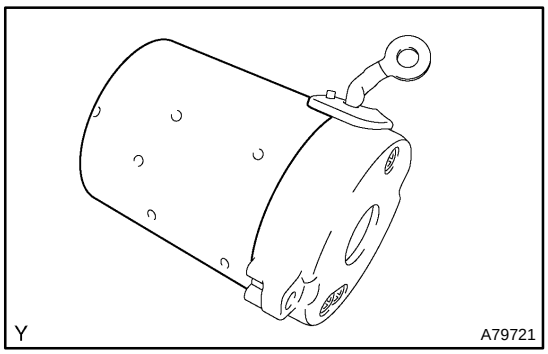
(c) Remove the starter magnetic switch.

(d) Remove the return spring and plunger from the starter drive housing.

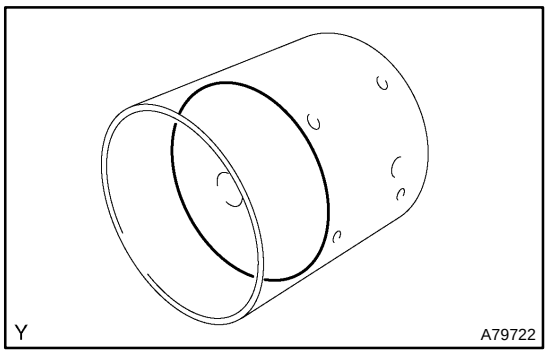


2. REMOVE STARTER FIELD FRAME ASSY

(a) Remove the 2 through bolts, then pull out the field frame together with the starter commutator end frame.

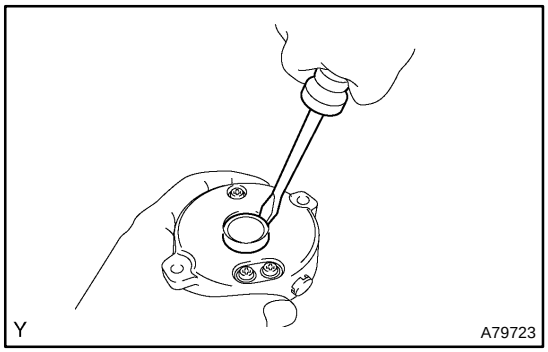


(b) Remove the starter field frame from the starter commutator end frame.



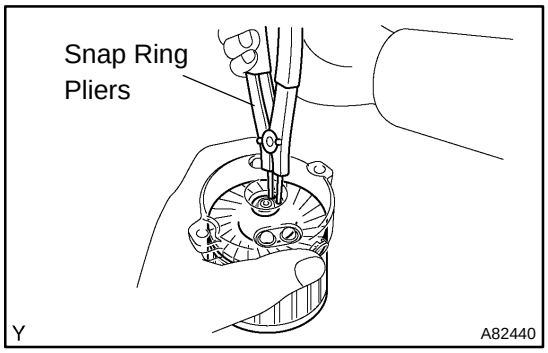
3. REMOVE STARTER ARMATURE PLATE

(a) Remove the starter armature plate from the starter field frame.



4. REMOVE STARTER COMMUTATOR END FRAME COVER

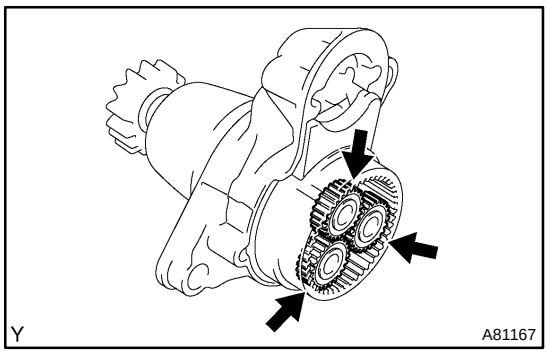
(a) Using a screwdriver, remove the starter commutator end frame cover.



5. REMOVE STARTER ARMATURE ASSY

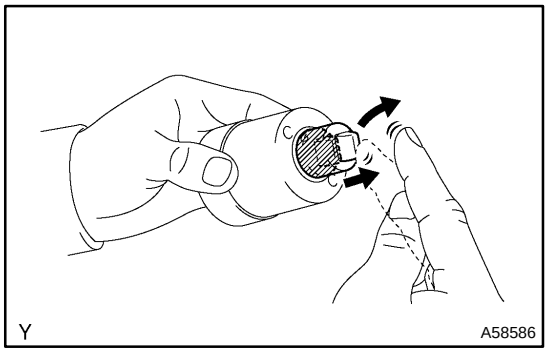
(a) Using snap ring pliers, remove the snap ring and plate washer.

(b) Remove the starter armature from the commutator end frame.



6. REMOVE PLANETARY GEAR

(a) Remove the 3 planetary gears from the starter drive housing.

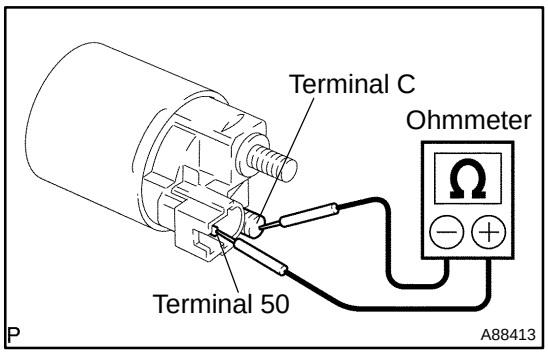


7. INSPECT STARTER MAGNETIC SWITCH ASSY

(a) Check the operation.

(1) Push in the plunger, then check that it returns quickly to its original position.

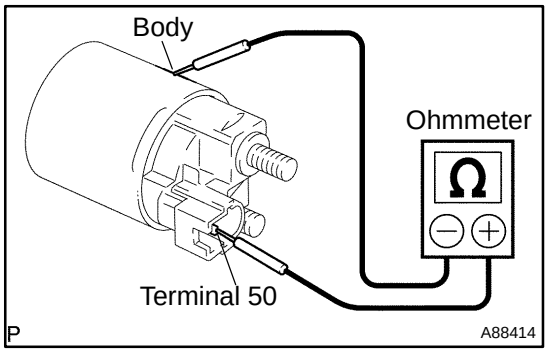
If necessary, replace the starter magnetic switch.



(b) Check the continuity.

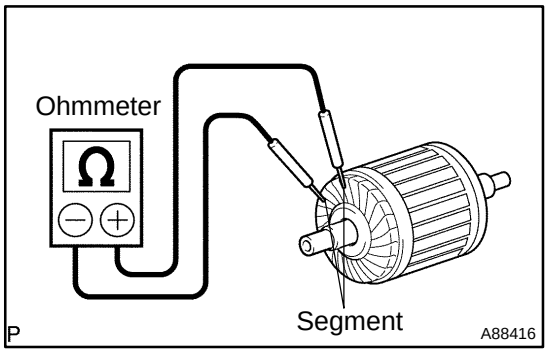
(1) Using an ohmmeter, check that there is continuity between terminals 50 and C.

If there is no continuity, replace the starter magnetic switch.



(2) Using an ohmmeter, check that there is continuity between terminal 50 and the body.

If there is no continuity, replace the starter magnetic switch.

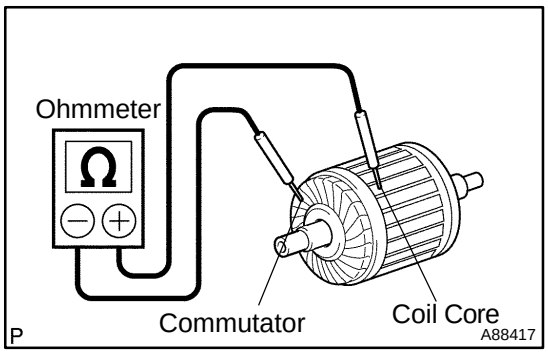


8. INSPECT STARTER ARMATURE ASSY

(a) Check the continuity.

(1) Using an ohmmeter, check that there is continuity between the segments of the commutator.

If there is no continuity between any segments, replace the starter armature.



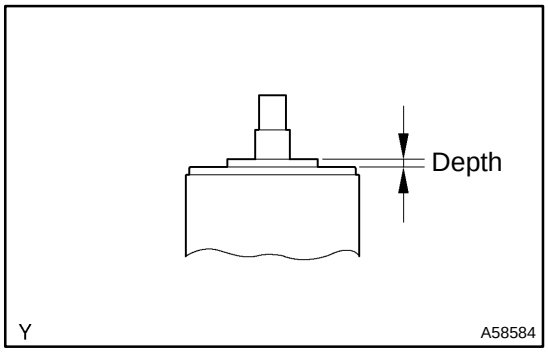
(2) Using an ohmmeter, check that there is no continuity between the commutator and armature coil core.

If there is continuity, replace the starter armature.

(b) Check the appearance.

(1) Check the commutator surface for dirt or burn.

If the surface is dirty or burnt, smooth the surface with 400-grit sandpaper or a lathe.



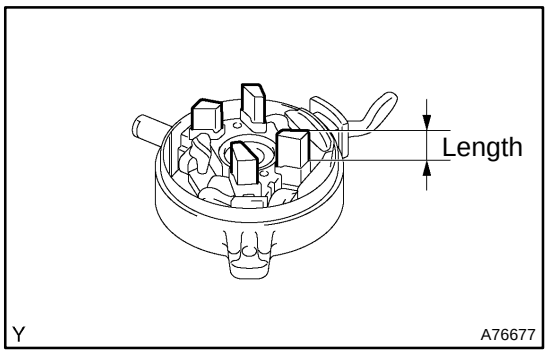
(c) Inspect the depth.

(1) Using vernier calipers, measure the commutator depth.

Standard depth: 3.1 mm (0.122 in.)

Maximum depth: 3.8 mm (0.150 in.)

If the depth is greater than maximum, replace the starter armature.



9. INSPECT STARTER COMMUTATOR END FRAME ASSY

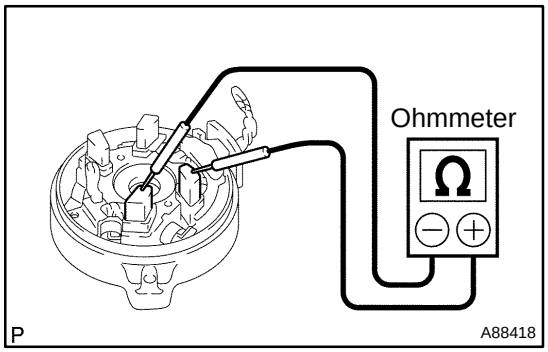
(a) Inspect the length.

(1) Using vernier calipers, measure the brush length.

Standard length: 9.0 mm (0.354 in.)

Minimum length: 4.0 mm (0.158 in.)

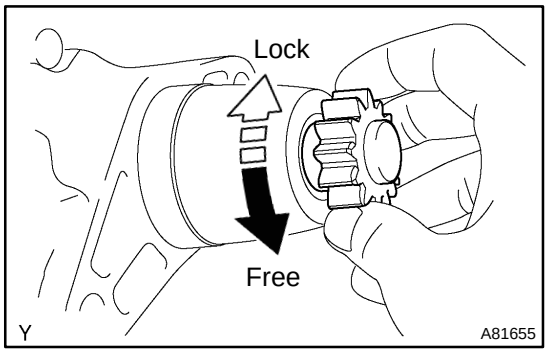
If the length is less than minimum, replace the starter commutator end frame.



(b) Check the continuity.

(1) Using an ohmmeter, check that there is no continuity between the positive (+) and negative (-) brushes.

If there is continuity, repair or replace the starter commutator end frame.

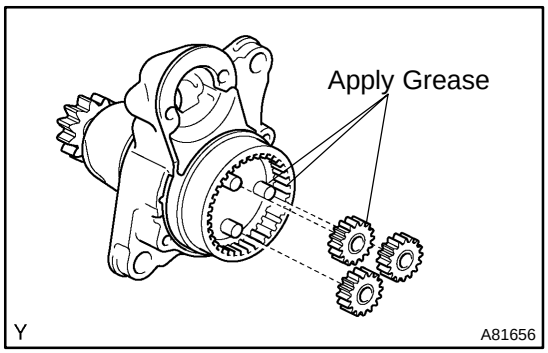


10. INSPECT STARTER DRIVE HOUSING ASSY (W/ CLUTCH & DRIVE LEVER & CENTER BEARING)

(a) Check the operation.

(1) Rotate the clutch pinion gear counterclockwise, then check that it turns freely. Try to rotate the clutch pinion gear clockwise and check that it locks.

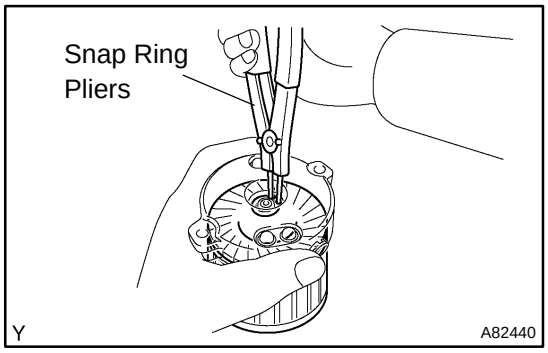
If necessary, replace the starter drive housing.



11. INSTALL PLANETARY GEAR

(a) Apply grease to the planetary gears and pin parts of the planetary shaft.

(b) Install the 3 planetary gears to the starter drive housing.

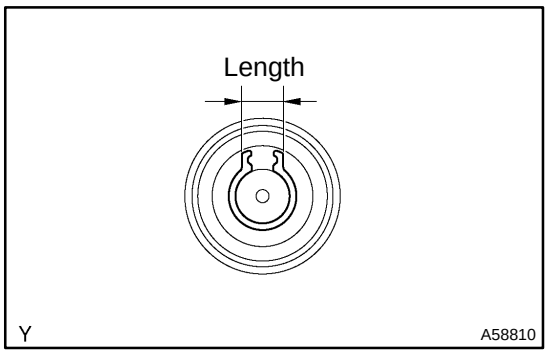


12. INSTALL STARTER ARMATURE ASSY

(a) Apply grease to the plate washer and armature shaft.

(b) Install the starter armature to the starter commutator end frame.

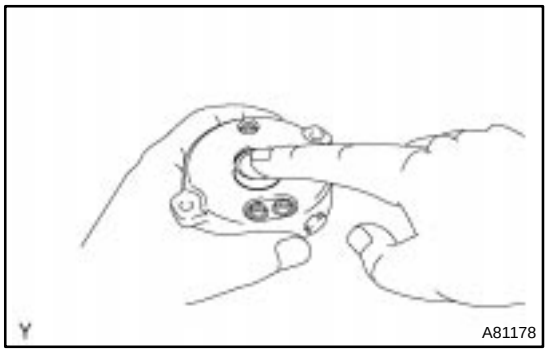
(c) Using snap ring pliers, install the plate washer and a new snap ring.



(d) Inspect the length.
(1) Using vernier calipers, measure the snap ring length.

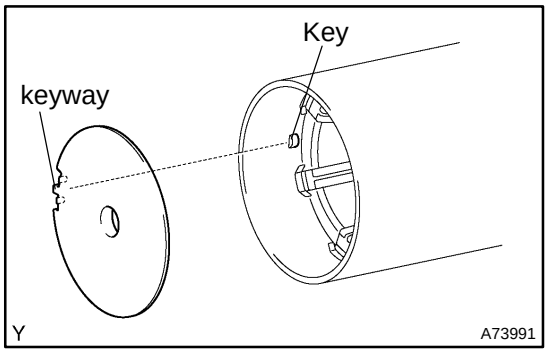
Maximum length: 5.0 mm (0.197 in.)

If the length is greater than maximum, replace it with a new snap ring.



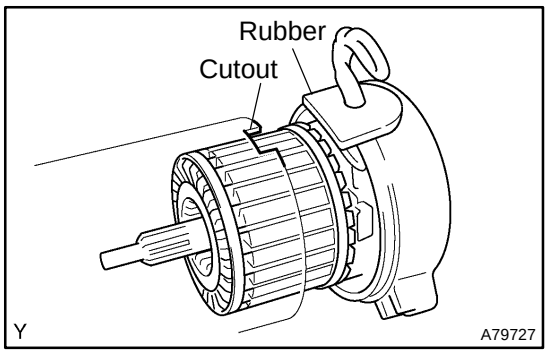
13. INSTALL STARTER COMMUTATOR END FRAME COVER

(a) Install the starter commutator end frame cover to the starter commutator end frame.



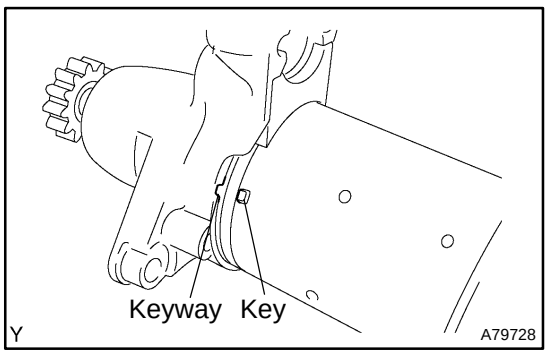
14. INSTALL STARTER ARMATURE PLATE

(a) Insert the starter armature plate to the starter field frame.
(b) Align the keyway of the starter plate with the key inside the starter yoke, then install the starter plate.



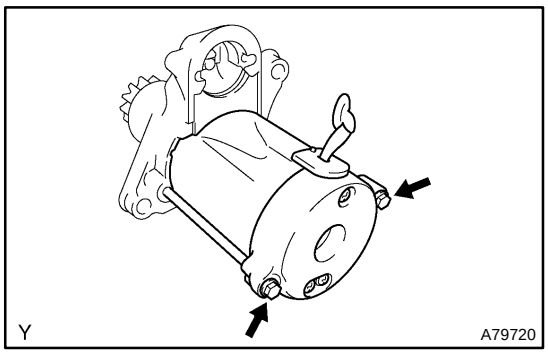
15. INSTALL STARTER COMMUTATOR END FRAME ASSY

(a) Align the rubber with the cutout of the starter field frame.
(b) Install the starter commutator end frame to the starter field frame.

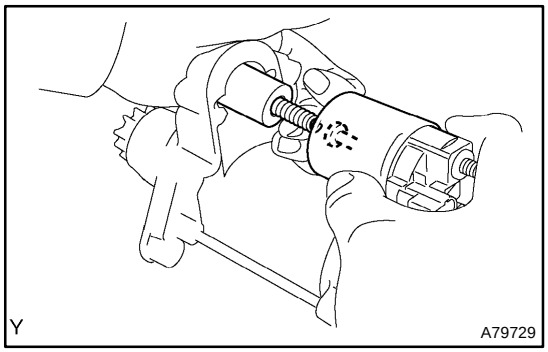


16. INSTALL STARTER FIELD FRAME ASSY

(a) Align the key of the starter field frame with the keyway of the starter drive housing.



(b) Install the starter field frame with the 2 through bolts.
Torque: 6.0 N·m (61 kgf·cm, 53 in.·lbf)

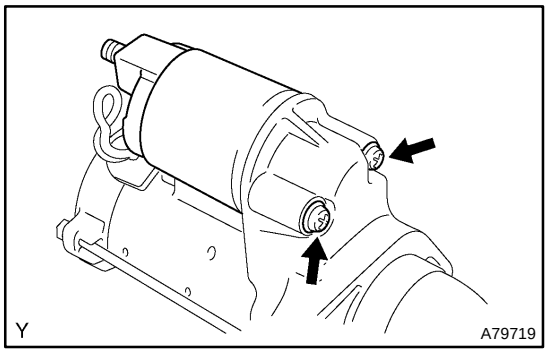


17. INSTALL STARTER MAGNETIC SWITCH ASSY

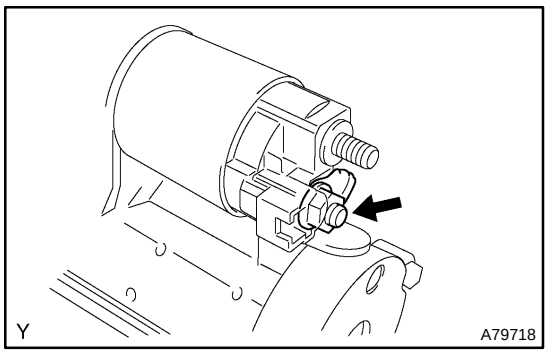
(a) Apply grease to the plunger and hook.

(b) Hook the plunger hook of the starter magnetic switch on the drive lever.

(c) Install the plunger and return spring.



(d) Install the starter magnetic switch with the 2 screws.
Torque: 7.5 N·m (76 kgf·cm, 66 in.·lbf)



(e) Connect the lead wire to terminal C with the nut.
Torque: 10 N·m (102 kgf·cm, 7 ft·lbf)

CHARGING SYSTEM (3MZ-FE)

190SI-01

PRECAUTION

1. SYSTEM INITIALIZATION

NOTICE:

When disconnecting the negative (-) battery terminal, initialize the following systems after the terminal is reconnected.

System Name	See Page
Power Window Control System	05-1470
Sliding Roof System	74-8

2. Check that the battery cables are connected to the correct terminals.

3. Disconnect the battery cables if a quick charge is given to the battery.

4. Do not perform tests with a high voltage insulation resistance tester.

5. Never disconnect the battery while the engine is running.

6. Check that the charging cable is tightened on terminal B of the generator and the fuse box.

7. Do not check whether the alternator generates current or not with terminal F connected to the other terminals.

190SJ-01

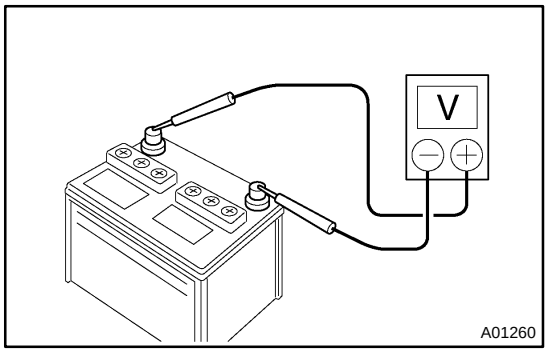
ON-VEHICLE INSPECTION

1. INSPECT BATTERY (MAINTENANCE- FREE BATTERY)

(a) Check the battery electrolyte level.

(1) Check the electrolyte quantity of each cell.

If the electrolyte quantity is below the recommended amount, replace the battery.



(b) Check the battery voltage.

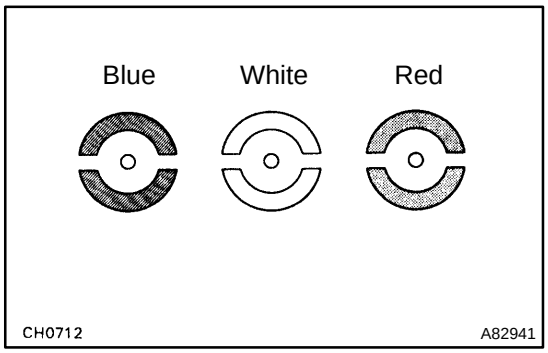
(1) If it has been less than 20 minutes since you stopped driving the vehicle or since the engine was stopped, turn the ignition switch and electrical systems (headlight, blower motor, rear defogger etc.) to the ON position for 60 seconds. This will remove the surface charge on the battery.

(2) Turn the ignition switch and electrical systems OFF.

(3) Using a voltmeter, measure the battery voltage between the negative (-) and positive (+) terminals of the battery.

Standard voltage: 12.5 to 12.9 V at 20°C (68°F)

If the voltage is less than the specification, charge the battery.



(c) Check the indicator as shown in the illustration.

HINT:

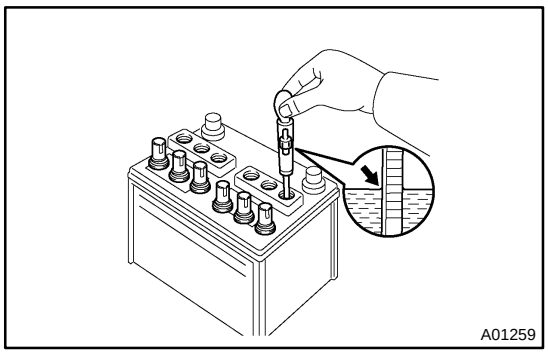
- Blue: OK
- White: Charging Necessary
- Red: Insufficient Water

2. INSPECT BATTERY (EXCEPT MAINTENANCE-FREE BATTERY)

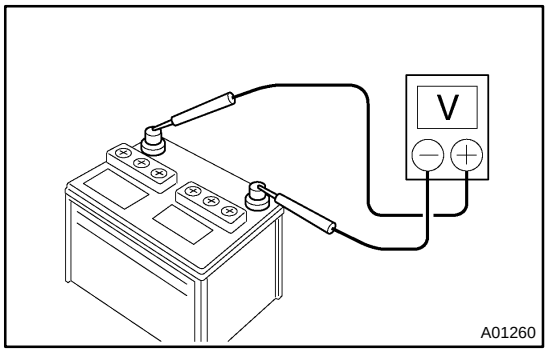
(a) Check the battery electrolyte level.

(1) Check the electrolyte quantity of each cell.

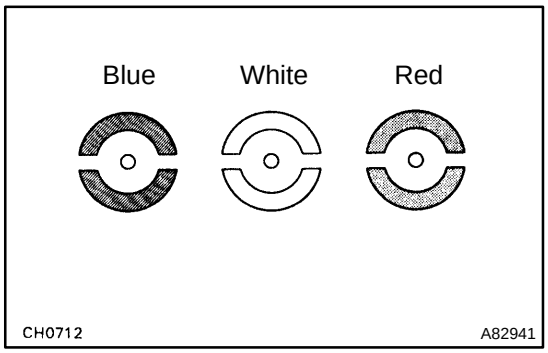
If the electrolyte quantity is below the recommended amount, add distilled water.



(b) Check the battery specific gravity.
(1) Check the specific gravity of each cell.
Standard specific gravity: 1.25 to 1.29 at 20°C (68°F)
If the specific gravity is less than specification, charge the battery.

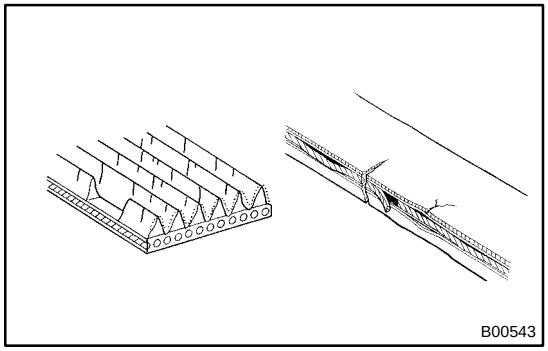


(c) Check the battery voltage.
(1) If it has been less than 20 minutes since you stopped driving the vehicle or since the engine was stopped, turn the ignition switch and electrical systems (headlight, blower motor, rear defogger etc.) to the ON position for 60 seconds. This will remove the surface charge on the battery.
(2) Turn the ignition switch and electrical systems OFF.
(3) Using a voltmeter, measure the battery voltage between the negative (-) and positive (+) terminals of the battery.
Standard voltage: 12.5 to 12.9 V at 20°C (68°F)
If the voltage is less than the specification, charge the battery.

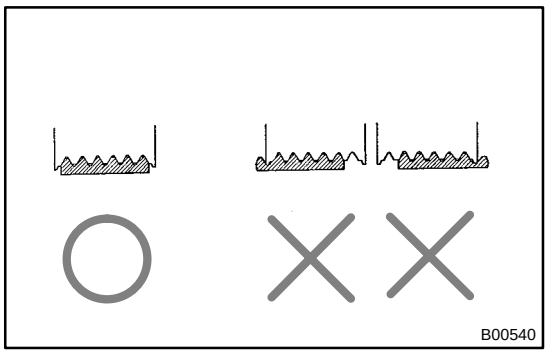


(d) Check the indicator as shown in the illustration.
HINT:
- Blue: OK
- White: Charging Necessary
- Red: Insufficient Water

3. INSPECT BATTERY TERMINALS, FUSIBLE LINK AND FUSES
(a) Visually check the battery terminals.
(1) Check that the battery terminals are not loosened or corroded.
(b) Visually check the fusible link and fuses.
(1) Check that there is continuity of the fusible links, high current fuses and regular fuses.



4. INSPECT V-RIBBED BELT
(a) Visually check the belt for excessive wear, frayed cords, etc.
- If any defects are found, replace the v-ribbed belt.
- Cracks on the rib side of the belt are considered acceptable.
  If the belt has chunks missing from the ribs, it should be replaced.



(b) Check that the belt fits properly in the ribbed grooves. Confirm that the belt has not slipped out of the groove on the bottom of the pulley by hand.

5. INSPECT GENERATOR WIRING

(a) Visually check the generator wiring.
  (1) Check that the wiring is in good condition.

6. INSPECT ABNORMAL NOISES

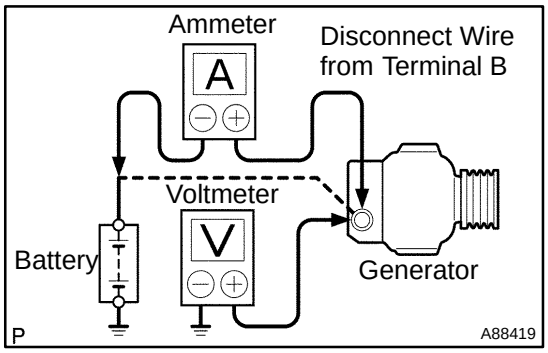
(a) Listen to abnormal noises from generator.
  (1) Check that no abnormal noise is heard from the generator while the engine is running.

7. INSPECT CHARGE WARNING LIGHT CIRCUIT

(a) Turn the ignition switch ON. Check that the charge warning light comes on.

(b) Start the engine, then check that the light goes off.

If the light does not operate as specified, troubleshoot the charge warning light circuit.



8. INSPECT CHARGING CIRCUIT WITHOUT LOAD

(a) If a tester is not available, connect a voltmeter to the charging circuit as follows.
  (1) Disconnect the wire from terminal B of the generator, then connect it to the negative (-) lead of the ammeter.
  (2) Connect the positive (+) lead of the ammeter to terminal B of the generator.
  (3) Connect the positive (+) lead of the voltmeter to terminal B of the generator.
  (4) Ground the negative (-) lead of the voltmeter.

(b) Check the charging circuit.
  (1) Keep the engine speed at 2,000 rpm, then check the reading on the ammeter and voltmeter.

  Standard amperage: 10 A or less

  Standard voltage: 13.2 to 14.8 V

9. INSPECT CHARGING CIRCUIT WITH LOAD

(a) With the engine running at 2,000 rpm, turn the high beam headlights ON and turn the heater blower switch to the ”HI” position.

(b) Check the reading on the ammeter.

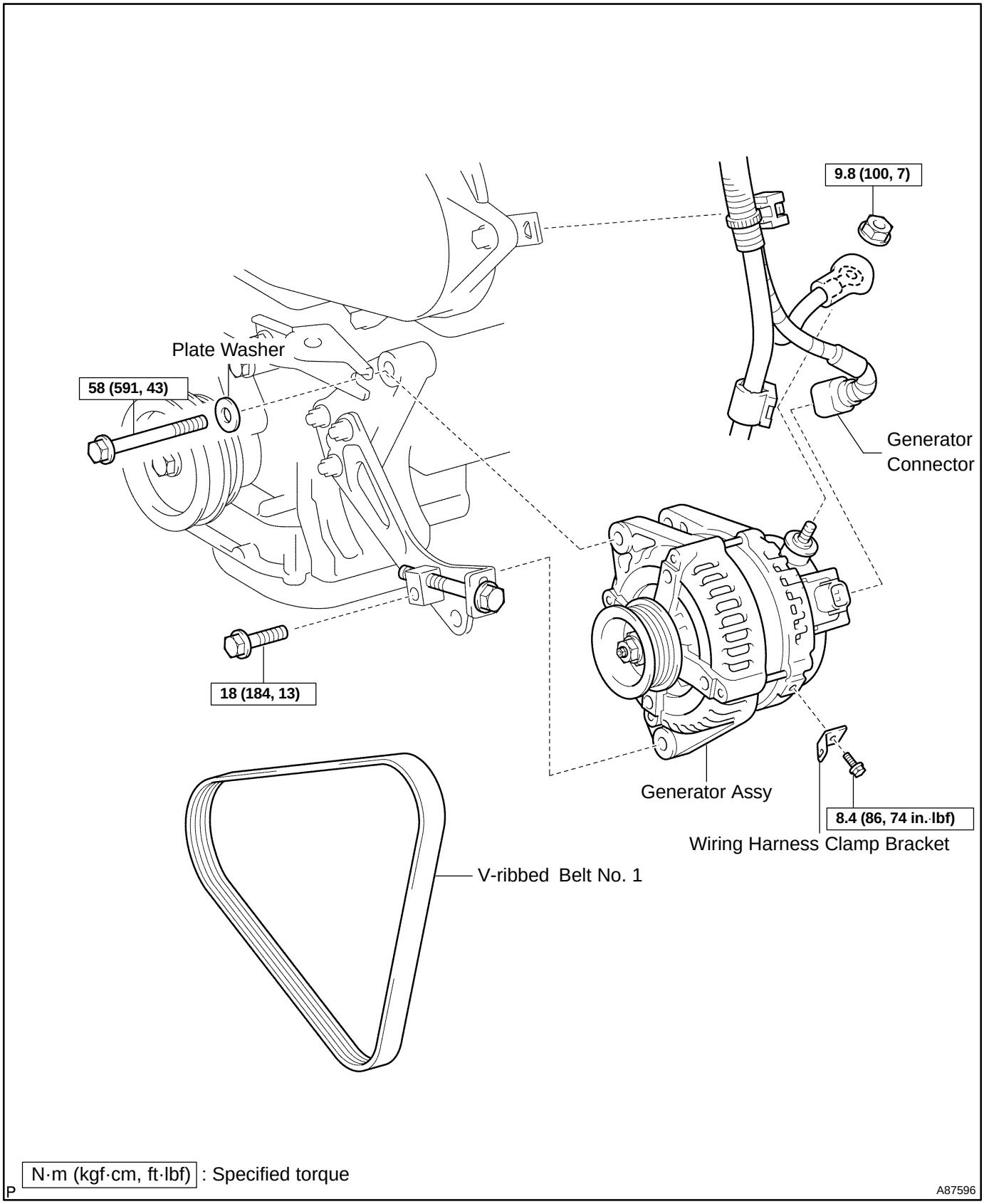
  Standard amperage: 30 A or more

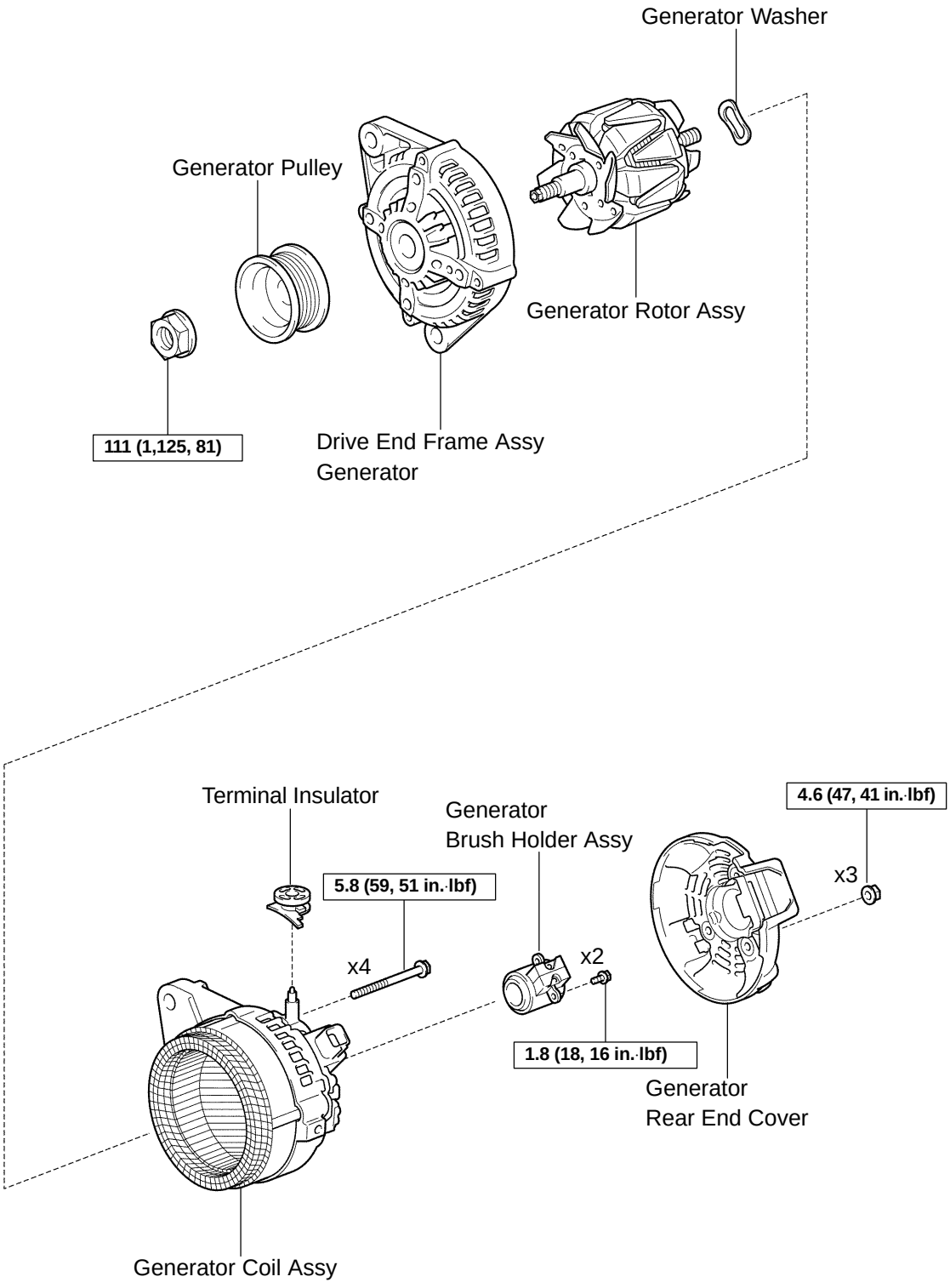
- If the ammeter reading is less than the standard amperage, repair the generator.
- If the battery is fully charged, the indication will sometimes be less than the standard amperage.

GENERATOR ASSY (3MZ-FE)

190SK-01

COMPONENTS





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

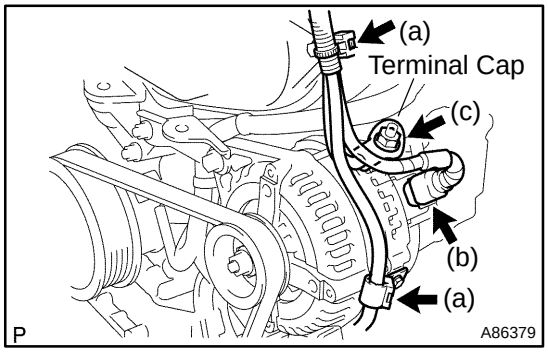
P • Non-reusable part

A86392

190SL-01

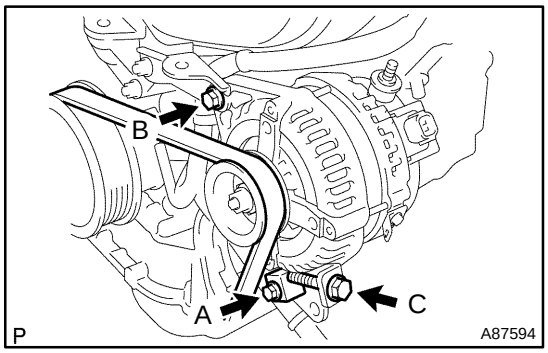
REPLACEMENT

1. DISCONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)

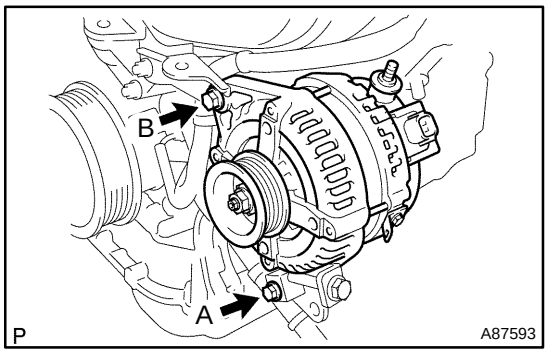


2. REMOVE GENERATOR ASSY

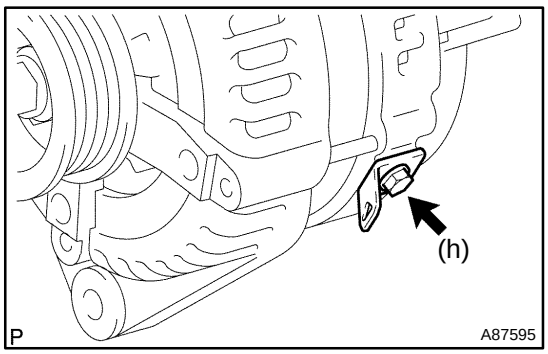
(a) Remove the 2 wire harness clamps.
(b) Disconnect the generator connector.
(c) Open the terminal cap.
(d) Remove the nut, then disconnect the generator wire.



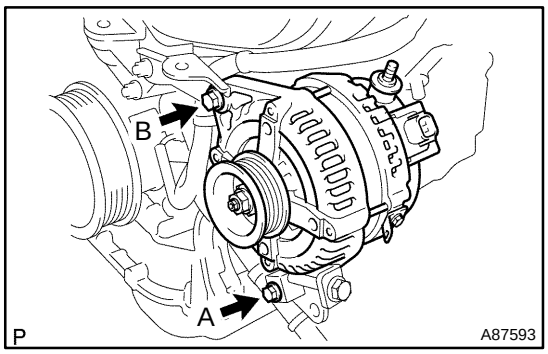
(e) Loosen bolts A and B.
(f) Loosen bolt C to lessen the tension of the V-ribbed belt No.1.



(g) Remove bolts A and B, then remove the generator.



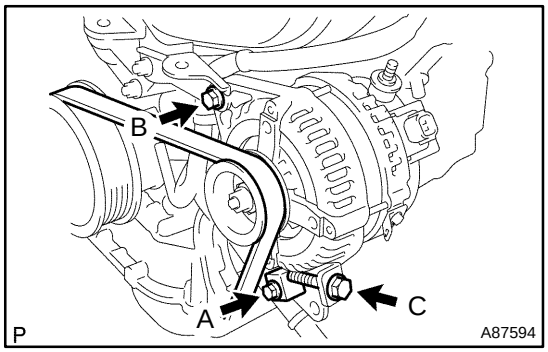
(h) Remove the bolt, then remove the wiring harness clamp bracket.



3. INSTALL GENERATOR ASSY

(a) Install the wiring harness clamp bracket with the bolt.
Torque: 8.4 N·m (86 kgf·cm, 74 in.·lbf)

(b) Temporarily install the generator with bolts A and B.



(c) Adjust the V-ribbed belt No. 1 tension by tightening bolt C (see page 14-1).

(d) Tighten bolts A and B.
Torque:
18 N·m (180 kgf·cm, 13 ft·lbf) for bolt A
58 N·m (591 kgf·cm, 43 ft·lbf) for bolt B

(e) Install the generator wire with the nut.
Torque: 9.8 N·m (100 kgf·cm, 7 ft·lbf)

(f) Connect the generator connector.

(g) Install the wire harness clamp.

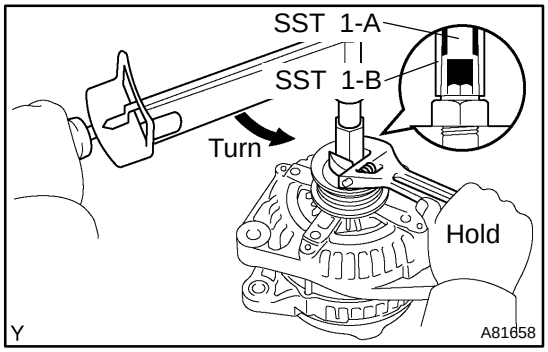
4. INSPECT DRIVE BELT (See page 14-1)

5. CONNECT ENGINE WIRE NO. 3 (BATTERY NEGATIVE TERMINAL)
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

6. SYSTEM INITIALIZATION (See page 19-15)

190SM-01

OVERHAUL



1. REMOVE GENERATOR PULLEY

SST 09820-6301 1 (09820-06010, 09820-06020)

HINT:

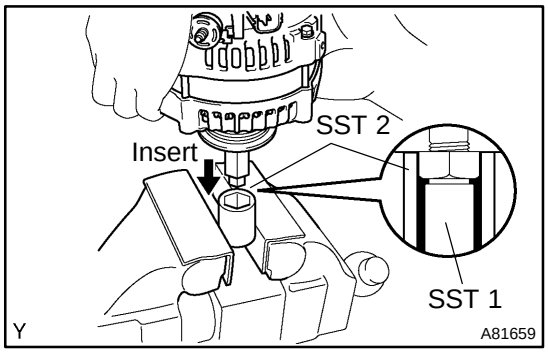
SST 1-A and B	09820 - 06010
SST 2	09820 - 06020

(a) Hold SST 1-A with a torque wrench, then tighten SST 1-B clockwise with the specified torque.

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

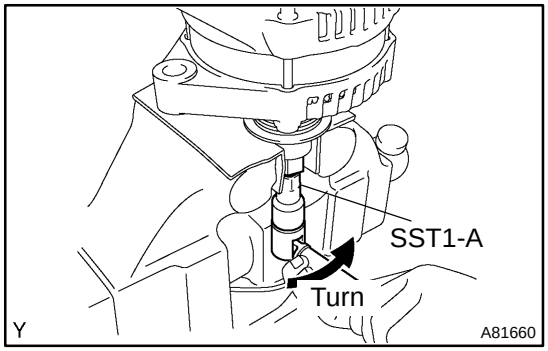
NOTICE:

Check that SST is secured to the rotor shaft.



(b) Clamp SST 2 in a vise.

(c) Insert SST 1-A and B into SST 2, then attach the pulley nut to SST 2.

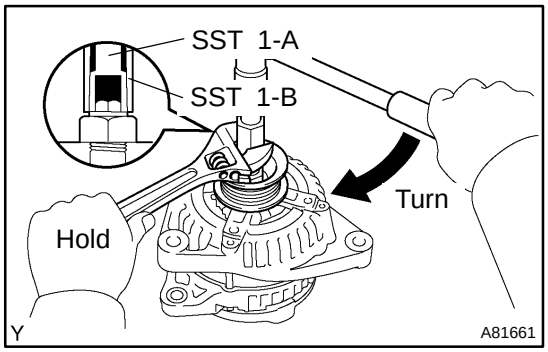


(d) To loosen the pulley nut, turn SST 1-A in the direction shown in the illustration.

NOTICE:

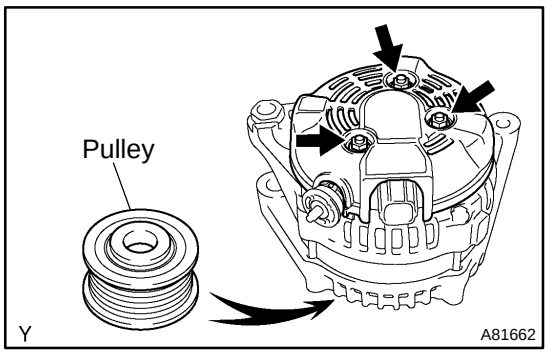
To prevent damage to the rotor shaft, do not loosen the pulley nut more than a half turn.

(e) Remove the generator from SST 2.



(f) Turn SST 1-B, then remove SST 1-A and B.

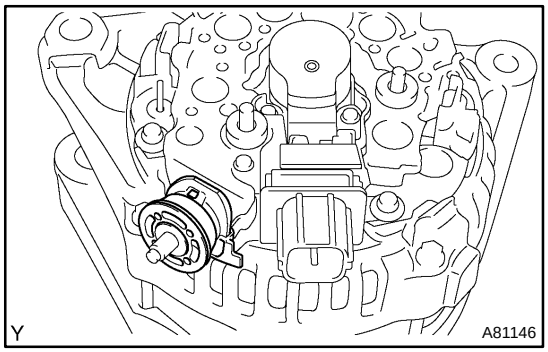
(g) Remove the pulley nut, then remove the generator pulley.



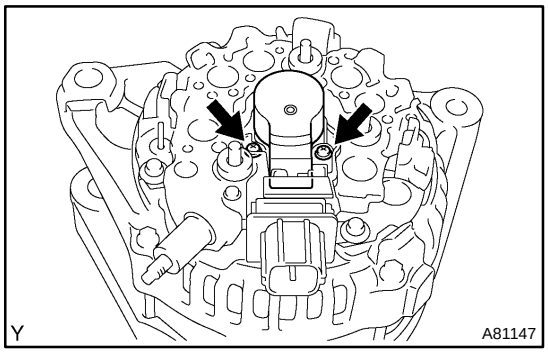
2. REMOVE GENERATOR BRUSH HOLDER ASSY

(a) Place the generator on the generator pulley.

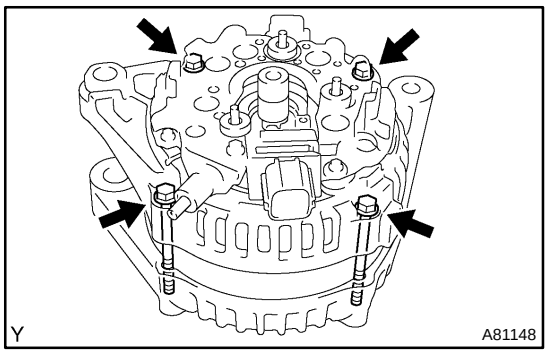
(b) Remove the 3 nuts, then remove the generator rear end cover.



(c) Remove the terminal insulator from the generator coil.

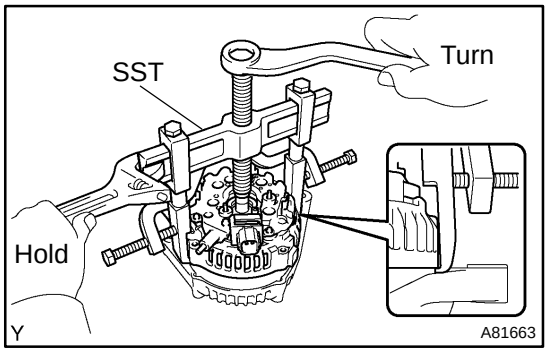


(d) Remove the 2 screws, then remove the generator brush holder.



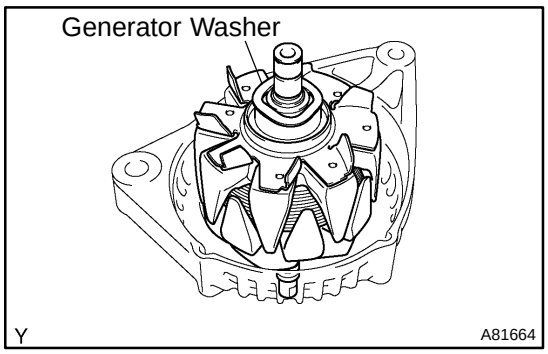
3. REMOVE GENERATOR COIL ASSY

(a) Remove the 4 bolts.



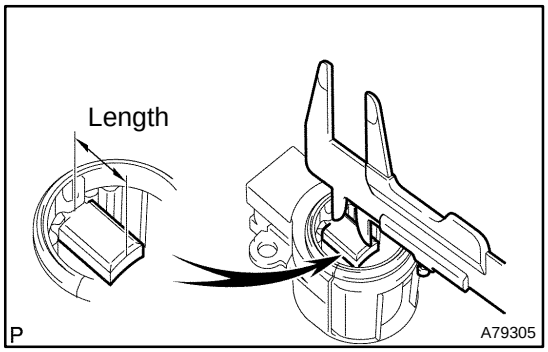
(b) Using SST, remove the generator coil.

SST 09950- 40011 (09951- 04020, 09952- 04010, 09953- 04020, 09954- 04010, 09955- 04071, 09957-04010, 09958-04011)



4. REMOVE GENERATOR ROTOR ASSY

(a) Remove the generator washer and generator rotor.



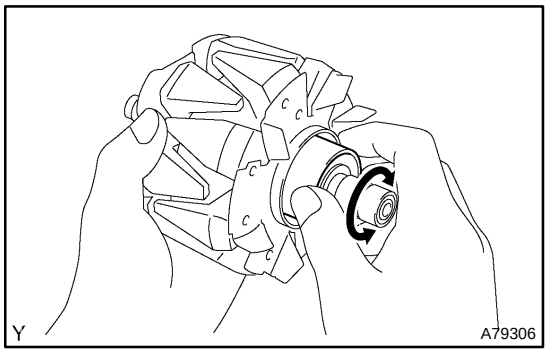
5. INSPECT GENERATOR BRUSH HOLDER ASSY

(a) Inspect the length.

(1) Using vernier calipers, measure the exposed brush length.

Standard exposed brush length: 10.5 mm (0.413 in.)
Minimum exposed brush length: 4.5 mm (0.177 in.)

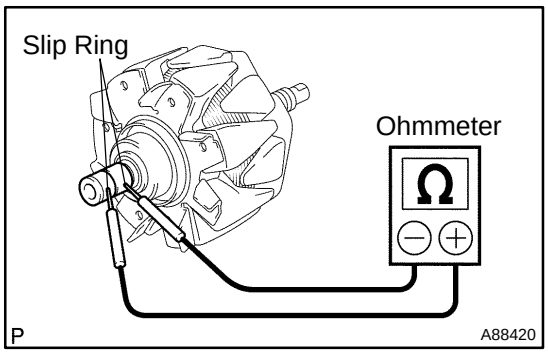
If the exposed brush length is less than minimum, replace the generator brush holder.



6. INSPECT GENERATOR ROTOR ASSY

(a) Check that the bearing is not rough or worn.

If necessary, replace the generator rotor.

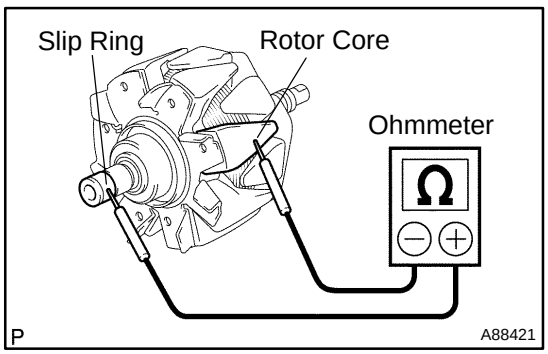


(b) Inspect the resistance.

(1) Using an ohmmeter, measure the resistance between the slip rings.

Resistance: 2.3 to 2.7Ω at 20•C (68•F)

If the resistance is not as specified, replace the generator rotor.



(c) Check the continuity.

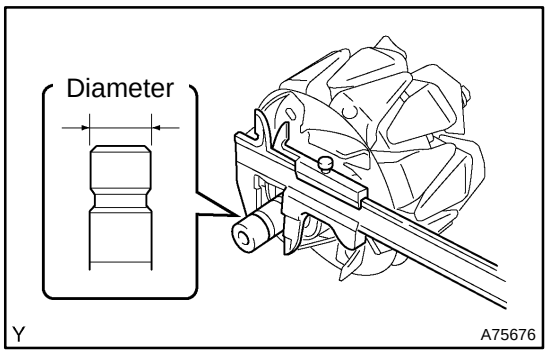
(1) Using an ohmmeter, check that there is no continuity between the slip ring and rotor core.

If there is continuity, replace the generator rotor.

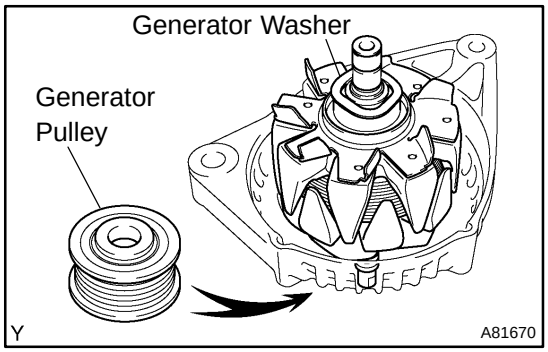
(d) Check the appearance.

(1) Check that the slip rings are not rough or scored.

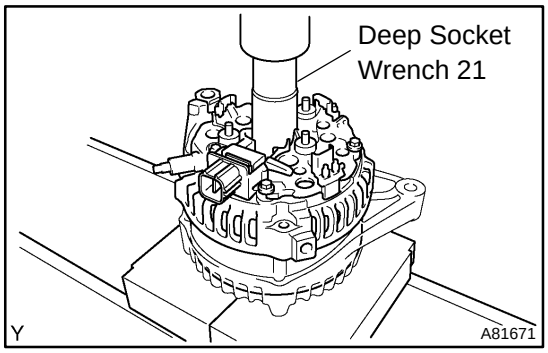
If rough or scored, replace the generator rotor.



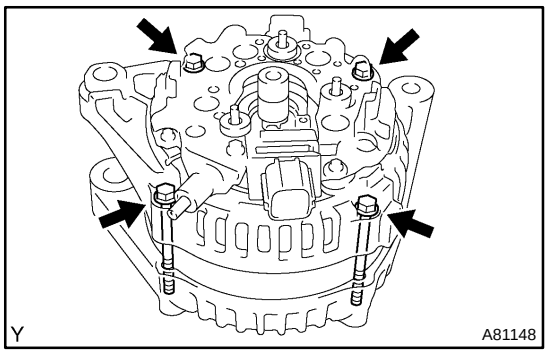
(e) Inspect the diameter.
(1) Using vernier calipers, measure the slip ring diameter.
Standard diameter:
14.2 to 14.4 mm (0.559 to 0.567 in.)
Minimum diameter: 14.0 mm (0.551 in.)
If the diameter is less than minimum, replace the generator rotor.



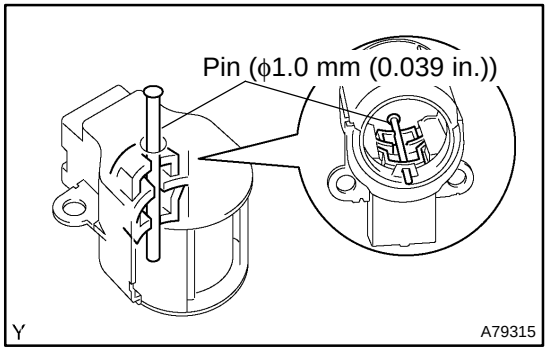
7. INSTALL GENERATOR ROTOR ASSY
(a) Place the generator drive end frame on the generator pulley.
(b) Install the generator rotor and generator washer.



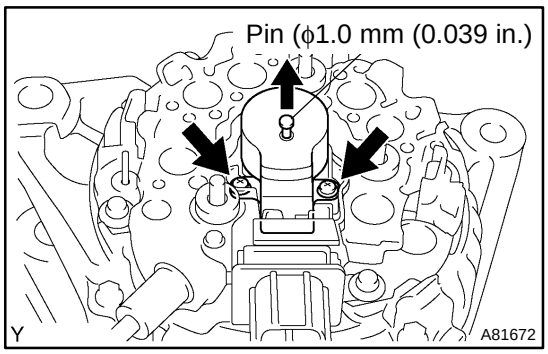
8. INSTALL GENERATOR COIL ASSY
(a) Using a deep socket wrench 21 and press, press in the generator coil carefully.



(b) Tighten the 4 bolts.
Torque: 5.8 N·m (59 kgf·cm, 51 in.·lbf)

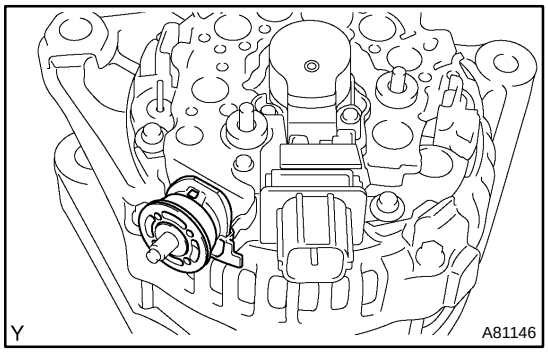


9. INSTALL GENERATOR BRUSH HOLDER ASSY
(a) While pushing the 2 brushes to inside the brush holder, insert a pin (ϕ1.0 mm (0.039 in.)) into the brush holder hole.



(b) Install the generator brush holder with the 2 screws.
Torque: 1.8 N·m (18 kgf·cm, 16 in.·lbf)

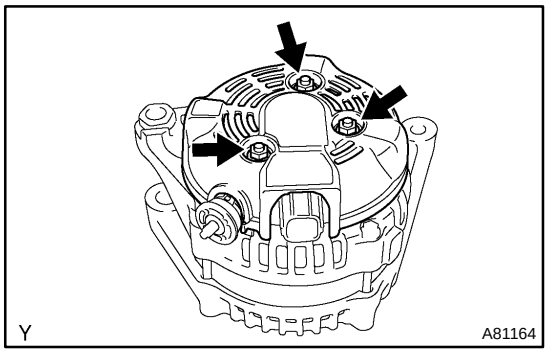
(c) Pull out the pin (ϕ1.0 mm (0.039 in.)) from the generator brush holder.



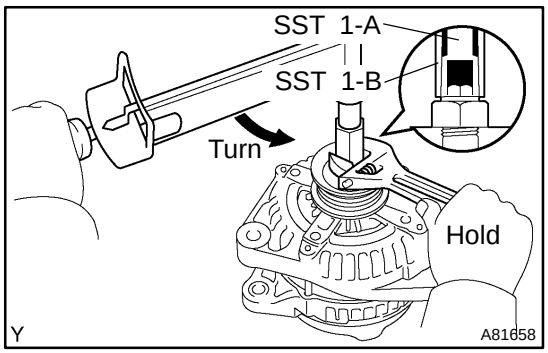
(d) Install the terminal insulator.

NOTICE:

Pay attention to the mounting orientation of the terminal insulator.



(e) Install the generator rear end cover with the 3 nuts.
Torque: 4.6 N·m (47 kgf·cm, 41 in.·lbf)



10. INSTALL GENERATOR PULLEY

SST 09820-6301 1 (09820-06010, 09820-06020)

HINT:

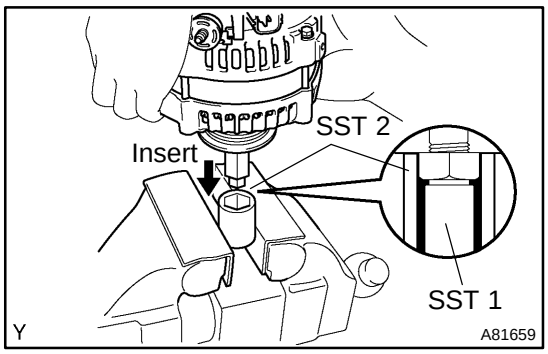
SST 1-A and B	09820 - 06010
SST 2	09820 - 06020

(a) Install the generator pulley to the rotor shaft by tightening the generator pulley nut by hand.

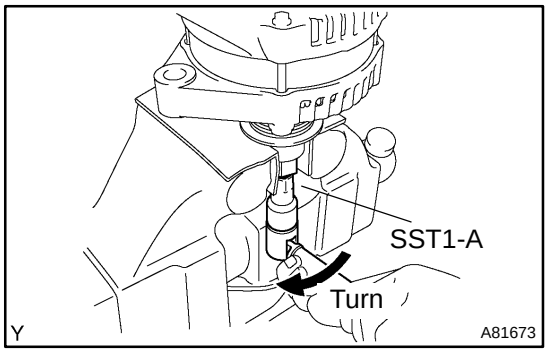
(b) Hold SST 1-A with a torque wrench, then tighten SST 1-B clockwise with the specified torque.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

NOTICE:

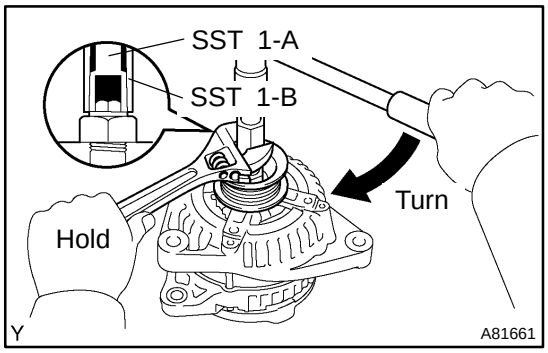
Check that SST is secured to the rotor shaft.



(c) Clamp SST 2 in a vise.
(d) Insert SST 1-A and B into SST 2, then attach the generator pulley nut to SST 2.



(e) Tighten the generator pulley nut by turning SST 1-A in the direction shown in the illustration.
Torque: 111 N·m (1,125 kgf·cm, 81 ft·lbf)
(f) Remove the generator from SST 2.



(g) Turn SST 1-B, then remove SST 1-A and B.
(h) Turn the generator pulley, then check that the generator pulley moves smoothly.

STEERING

5002J-08

PRECAUTION

1. HANDLING PRECAUTIONS ON STEERING SYSTEM

(a) Care must be taken when replacing parts. Incorrect replacement they could affect the performance of the steering system and result in a driving hazard.

2. HANDLING PRECAUTIONS ON SRS AIRBAG SYSTEM

(a) The LEXUS ES330 is equipped with SRS (Supplemental Restraint System) such as the driver airbag and front passenger airbag. Failure to carry out service operation in 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 notice for the supplemental restraint system (See page 60-1).

5002K-07

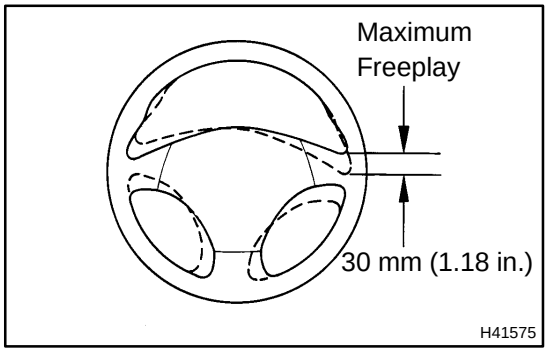
PROBLEM SYMPTOMS TABLE

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in the order shown. If necessary, repair or replace these parts.

Symptom	Suspect Area	See page
Hard steering	1. Tires (Improperly inflated)	28-1
	2. Power steering fluid level (Low)	51-3
	3. Drive belt (Loose)	51-3
		51-3
	4. Front wheel alignment (Incorrect)	26-5
	5. Steering system joints (Worn)	-
	6. Suspension arm ball joints (Worn)	26-16
	7. Steering column (Binding)	-
	8. Power steering vane pump	51-9
	9. Power steering gear	51-21
Poor return	1. Tires (Improperly inflated)	28-1
	2. Front wheel alignment (Incorrect)	26-5
	3. Steering column (Binding)	-
	4. Power steering gear	51-21
Excessive play	1. Steering system joints (Worn)	-
	2. Suspension arm ball joints (Worn)	26-16
	3. Intermediate shaft, Sliding yoke (Worn)	-
	4. Front wheel bearing (Worn)	30-19
	5. Power steering gear	51-21
Abnormal noise	1. Power steering fluid level (Low)	51-3
	2. Steering system joints (Worn)	-
	3. Power steering vane pump	51-9
	4. Power steering gear	51-21

5002L-03

ON-VEHICLE INSPECTION



1. CHECK STEERING WHEEL FREEPLAY

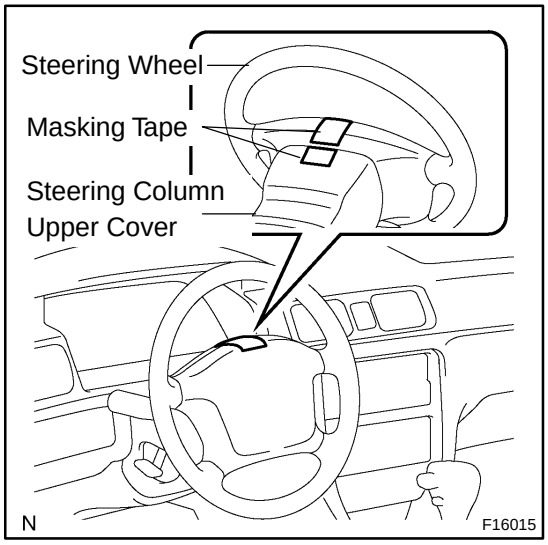
(a) Stop the vehicle and face the tires straight ahead.

(b) Rock the steering wheel gently up and down with your hand, check the steering wheel freeplay.

Maximum freeplay: 30 mm (1.18 in.)

5002V-03

REPAIR

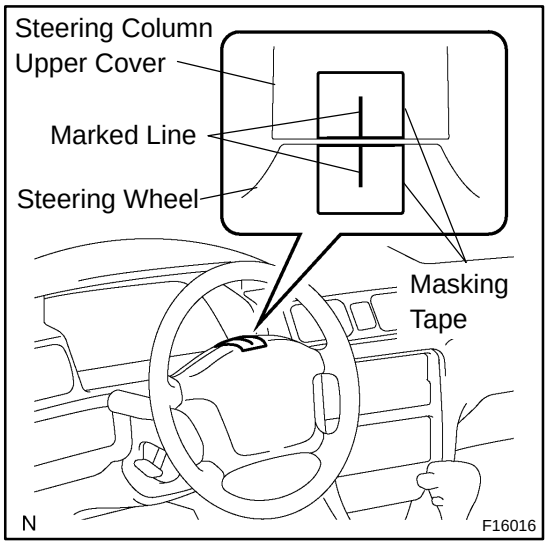


1. STEERING OFF CENTER REPAIR PROCEDURE

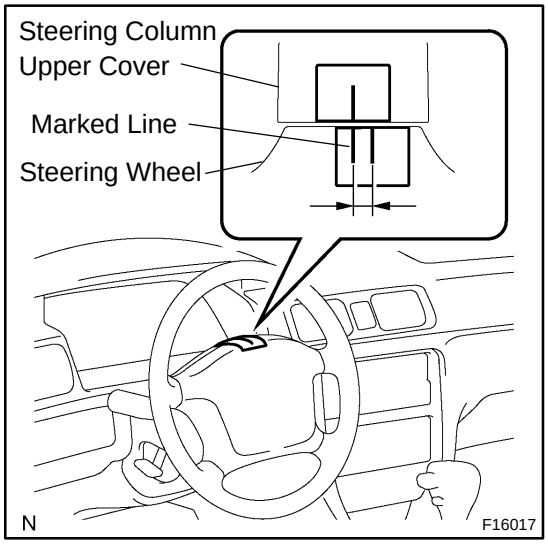
(a) Inspect steering wheel off center.

(1) Apply masking tape on the top center of the steering wheel and steering column upper cover.

(2) Drive the vehicle in a straight line for 100 meters at a constant speed of 35 mph (56 km/h), and hold the steering wheel to maintain the course.



(3) Draw a line on the masking tape as shown in the illustration.



(4) Turn the steering wheel to its straight position.

HINT:

Refer to the upper surface of the steering wheel, steering spoke and SRS airbag line for the straight position.

(5) Draw a new line on the masking tape or the steering wheel as shown in the illustration.

(6) Measure the distance between the 2 lines on the masking tape of the steering wheel.

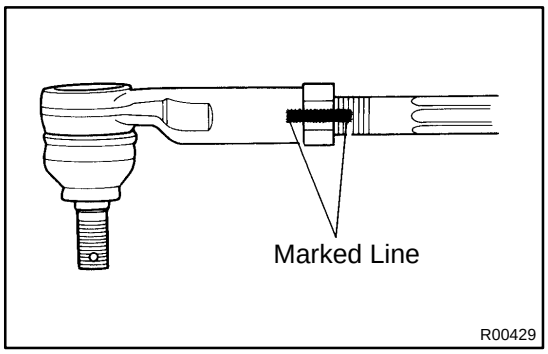
(7) Convert the measured distance to steering angle.

Measured distance 1 mm (0.04 in.) = Steering angle approximately 1 deg.

HINT:

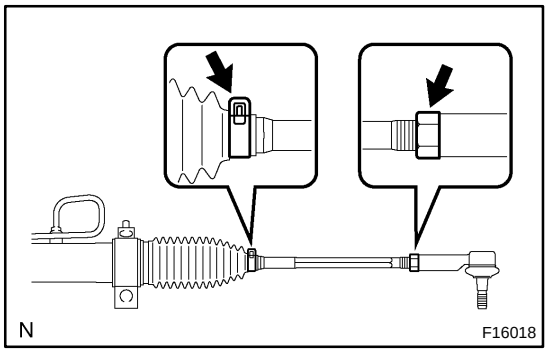
Make a note of the steering angle.

(b) Adjust steering angle.



(1) Draw a line on the RH and LH tie rod and rack ends where it can easily be seen.
(2) Using a paper gauge, measure the distance from RH and LH tie rod ends to the rack end screws.

HINT:
- Measure the RH side and LH side.
- Make a note of the measured values.



(3) Remove the RH and LH boot clips from the rack boots.
(4) Loosen the RH and LH lock nuts.
(5) Turn the RH and LH rack end by the same amount (but in different directions) according to the steering angle.

1 turn 360 deg. of rack end (1.5 mm (0.059 in.) horizontal movement) - 12 deg. of steering angle.

(6) Tighten the RH and LH lock nuts.

Torque: 74 N·m (755 kgf·cm, 55 ft·lbf)

NOTICE:

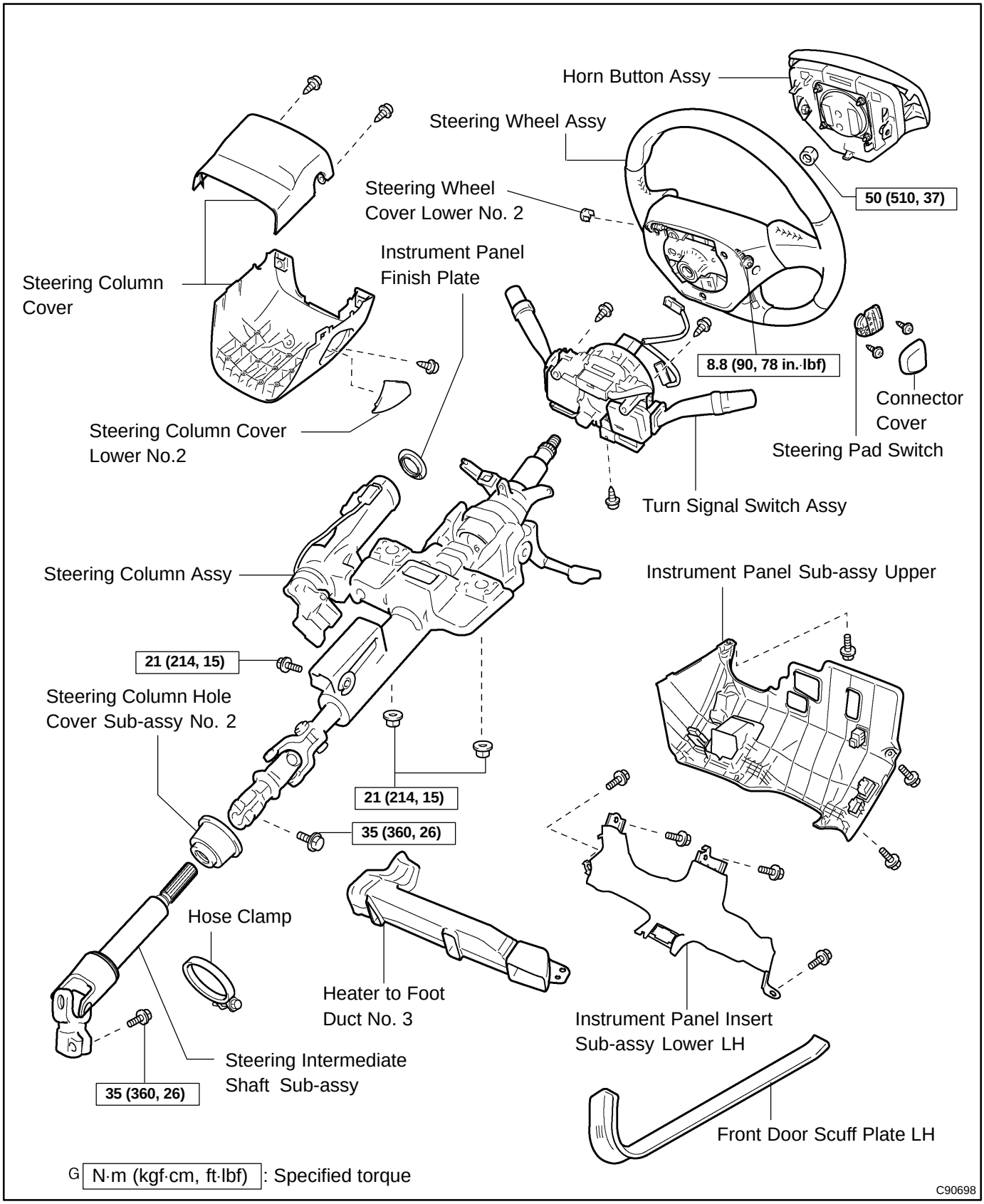
Make sure that the difference in length between RH and LH tie rod ends and rack end screws are within 1.5 mm (0.059 in.).

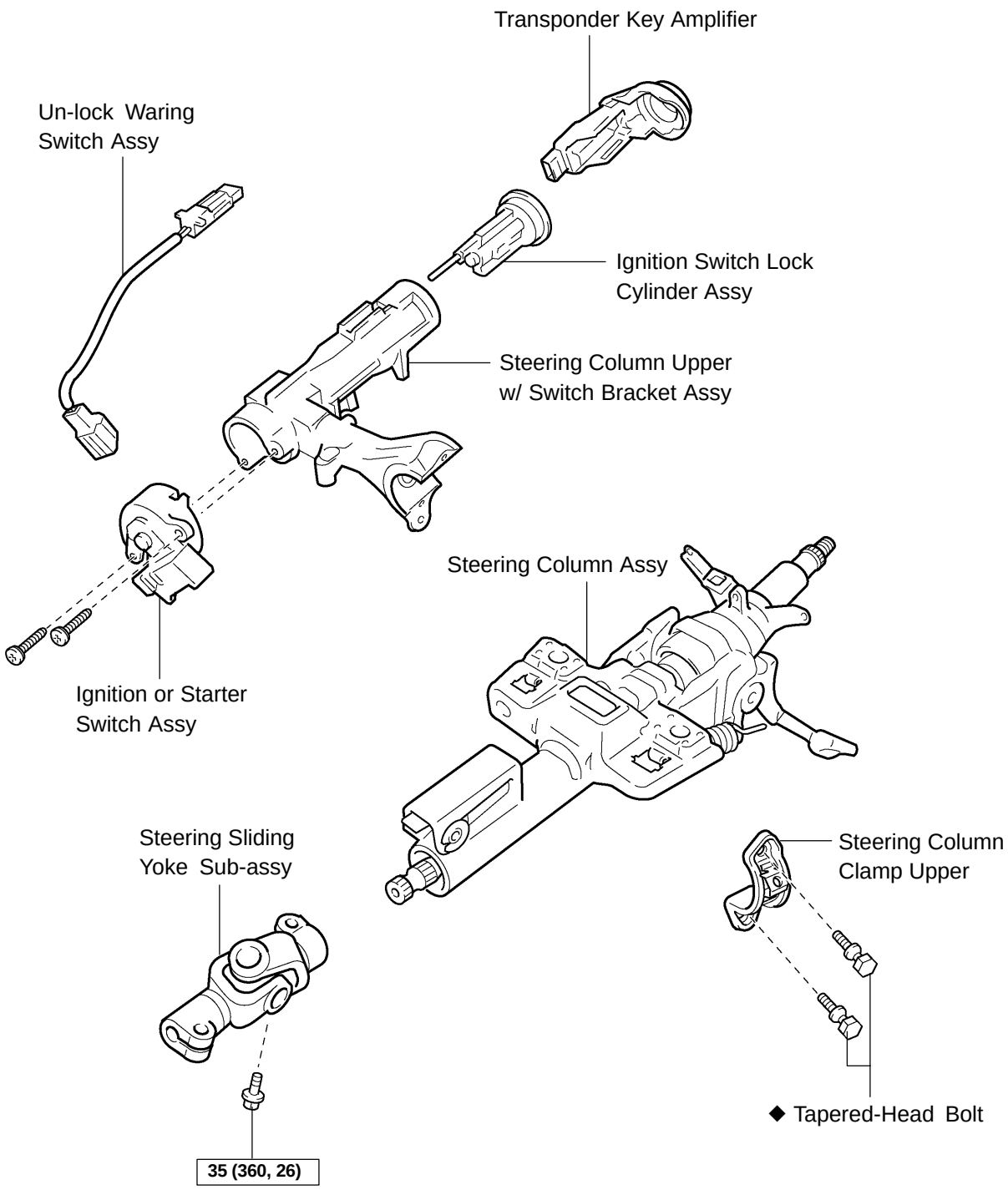
(7) Install the RH and LH boot clips.

STEERING COLUMN ASSY

COMPONENTS

5002H-02





G

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

C92308

5002I-04

OVERHAUL

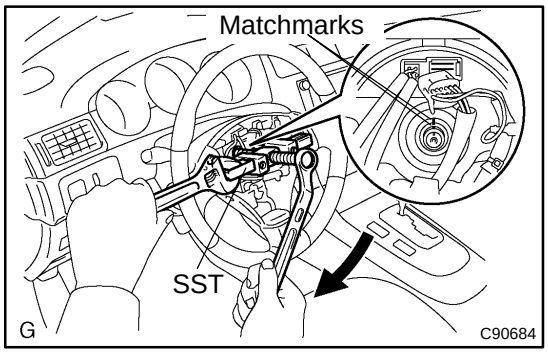
1. **PRECAUTION(See page 60-1)**
2. **DISCONNECT BATTERY NEGATIVE TERMINAL(See page 60-1)**
3. **PLACE FRONT WHEELS FACING STRAIGHT AHEAD**
4. **REMOVE STEERING WHEEL COVER LOWER NO.2**
5. **REMOVE CONNECTOR COVER**
6. **REMOVE STEERING PAD SWITCH**

(a) Remove the 2 screws.

(b) Disconnect the connector and remove the steering pad switch.

7. **REMOVE HORN BUTTON ASSY(See page 60-22)**
8. **REMOVE STEERING WHEEL ASSY**

(a) Remove the steering wheel assy set nut.

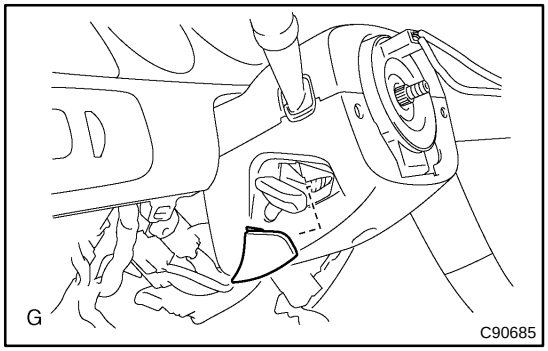


(b) Place matchmarks on the steering wheel assy and steering main shaft assy.

(c) Using SST, remove the steering wheel assy.

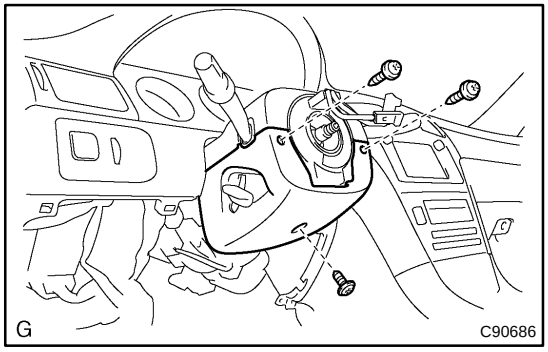
SST 09950- 50013 (09951- 05010, 09952- 05010, 09953-05020, 09954-05021)

9. **REMOVE FRONT DOOR SCUFF PLATE LH(See page 71-1 1)**
10. **REMOVE INSTRUMENT PANEL SUB-ASSY UPPER(See page 71-1 1)**
11. **REMOVE INSTRUMENT PANEL INSERT SUB-ASSY LOWER LH(See page 71-1 1)**
12. **REMOVE HEATER TO FOOT DUCT NO.3(See page 71-1 1)**



13. **REMOVE STEERING COLUMN COVER LWR NO.2**

(a) Remove the steering column cover lwr No.2.



14. **REMOVE STEERING COLUMN COVER**

(a) Remove the 3 screws and steering column cover.

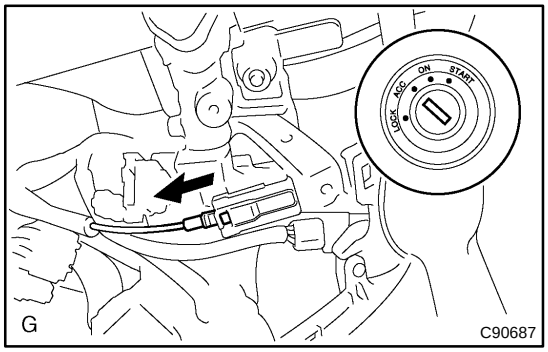
15. REMOVE TURN SIGNAL SWITCH ASSY

(a) Disconnect the 3 connectors.

(b) Disconnect the airbag connector.

(c) Remove the 3 screws and turn signal switch assy.

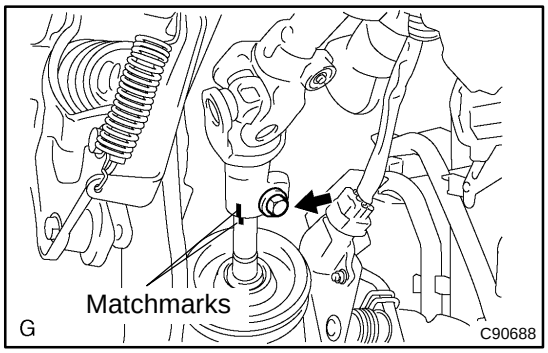
16. REMOVE INSTRUMENT PANEL FINISH PLATE(See page 71-1 1)



17. DISCONNECT FLOOR SHIFT PARKING LOCK CABLE ASSY

(a) Place the ignition switch lock cylinder assy at the key ACC position.

(b) Remove the cable cap claw from the key interlock and pull out the floor shift parking lock cable assy.



18. DISCONNECT STEERING SLIDING YOKE SUB-ASSY

(a) Place the matchmarks on the steering sliding yoke sub-assy and intermediate shaft sub-assy.

(b) Remove the bolt and disconnect the steering sliding yoke sub-assy .

19. REMOVE STEERING COLUMN HOLE COVER SUB-ASSY NO.2

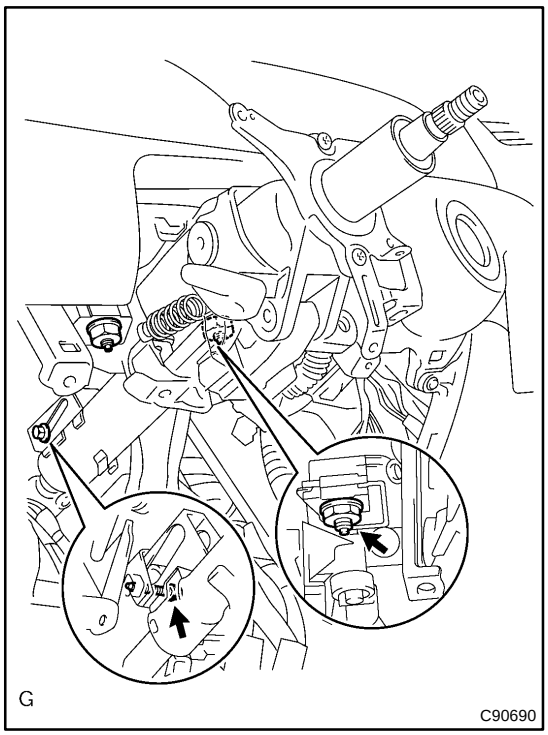
(a) Remove the hose clamp.

(b) Remove the steering column hole cover sub-assy No.2.

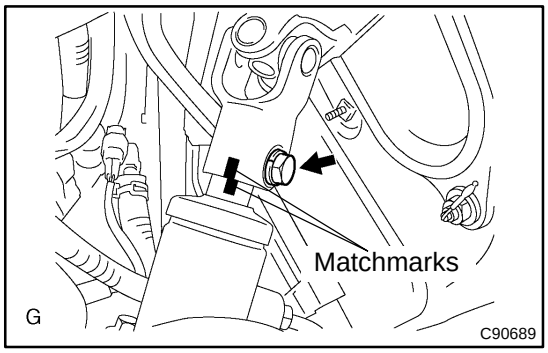
20. REMOVE STEERING COLUMN ASSY

(a) Disconnect the connectors and wire harness clamps.

(b) Disconnect the driver side junction block.



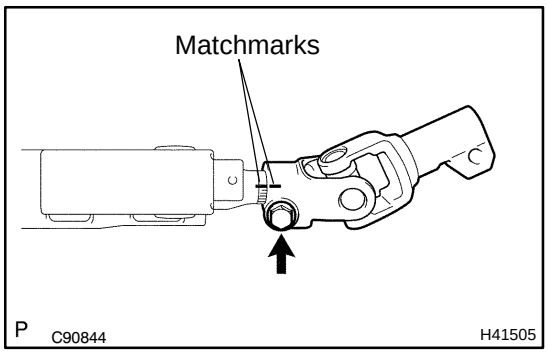
(c) Remove the 2 nuts, bolt and steering column assy from the instrument panel reinforcement assy.



21. REMOVE STEERING INTERMEDIATE SHAFT SUB-ASSY

(a) Place the matchmarks on the steering intermediate shaft sub-assy and steering gear assy.

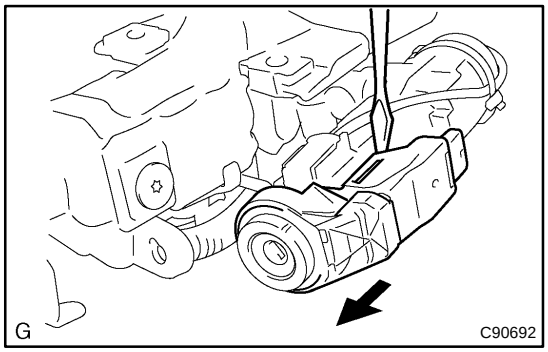
(b) Remove the bolt and steering intermediate shaft sub-assy.



22. REMOVE STEERING SLIDING YOKE SUB-ASSY

(a) Place the matchmarks on the steering sliding yoke sub-assy and steering main shaft assy.

(b) Remove the bolt and steering yoke sub-assy.



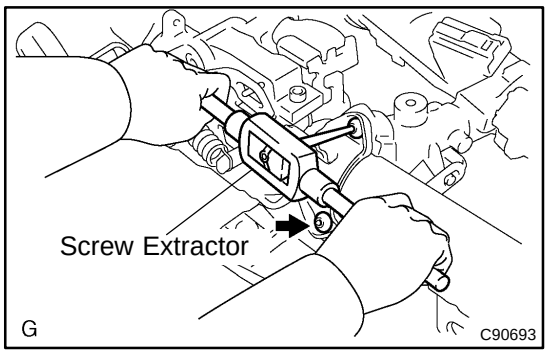
23. REMOVE TRANSPONDER KEY AMPLIFIER

(a) Widen the claw hung on the upper bracket by approx. 1.0 mm (0.039 in.) using a screwdriver.

(b) Pull the transponder key amplifier toward the rear of the vehicle with the claw open.

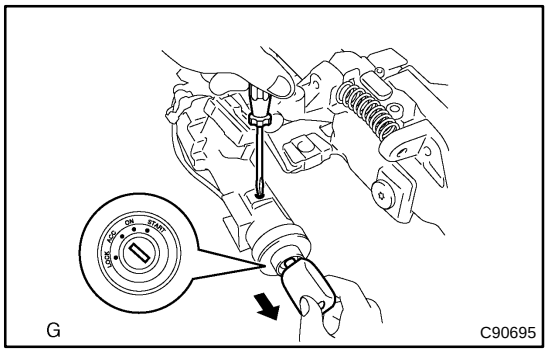
NOTICE:

Take care not to use excessive force to prevent the case from being damage.



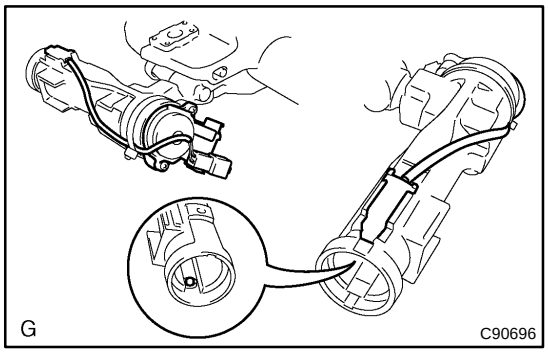
24. REMOVE STEERING COLUMN UPPER W/SWITCH BRACKET ASSY

(a) Using a centering punch, mark the center of the 2 tapered-head bolts.
(b) Using a 3 - 4 mm (0.12 - 0.16 in.) drill, drill in to the 2 bolts.
(c) Using a screw extractor, remove the 2 bolts and steering column upper w/switch bracket assy.



25. REMOVE IGNITION SWITCH LOCK CYLINDER ASSY

(a) Place the ignition switch lock cylinder assy at the ACC position.
(b) Push down the stop pin with a screwdriver, and pull out the ignition switch lock cylinder assy.



26. REMOVE UN-LOCK WARNING SWITCH ASSY

(a) Disconnect the un-lock warning switch assy connector from the ignition or starter switch assy.
(b) Remove the un-lock warning switch assy by pushing up the center part and releasing the 2 screws.

27. REMOVE IGNITION OR STARTER SWITCH ASSY

(a) Remove the 2 screws and ignition or starter switch assy from the steering column upper w/switch bracket assy.

28. INSTALL IGNITION OR STARTER SWITCH ASSY

(a) Install the ignition switch assy to the steering column upper w/switch bracket assy with the 2 screws.

29. INSTALL UN-LOCK WARNING SWITCH ASSY

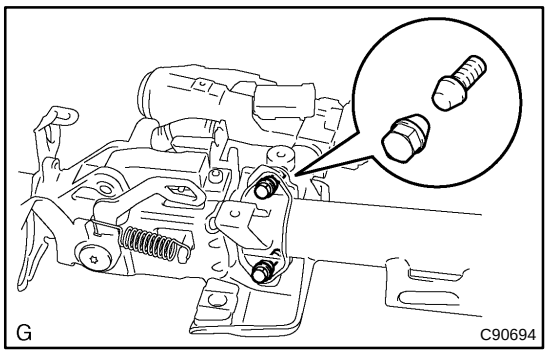
(a) Install the un-lock warning switch assy.
(b) Connect the un-lock warning switch assy connector to the ignition or starter switch assy.

30. INSTALL IGNITION SWITCH LOCK CYLINDER ASSY

(a) Make sure the ignition switch lock cylinder assy at the ACC position.
(b) Install the ignition switch lock cylinder assy.

31. INSPECT STEERING LOCK OPERATION

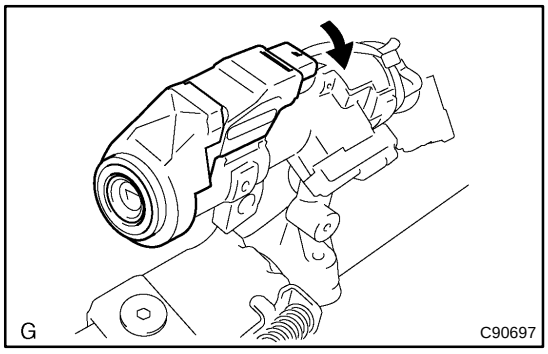
(a) Check that the steering lock mechanism is activated when removing the key.
(b) Check that the steering lock mechanism is deactivated when inserting the key and turning it to ACC position.



32. INSTALL STEERING COLUMN UPPER W/SWITCH BRACKET ASSY

(a) Temporarily install the steering column upper w/switch bracket assy and steering column upper clamp with 2 new tapered-head bolts.

(b) Tighten the 2 tapered-head bolts until the bolt heads break off.



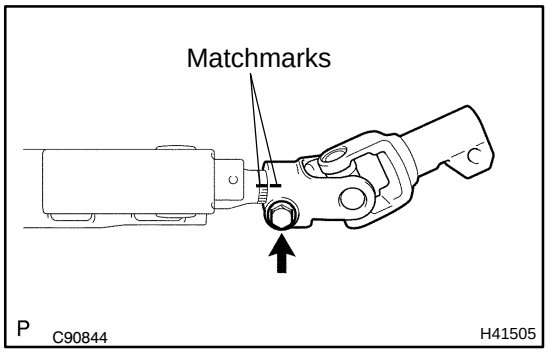
33. INSTALL TRANSPONDER KEY AMPLIFIER

(a) Align the transponder key amplifier with the installation position of the upper bracket with the amplifier inclined.

(b) Push the transponder key amplifier up and connect it to the upper bracket.

NOTICE:

Take care not to push the amplifier up with excessive force to prevent it from being damaged.



34. INSTALL STEERING SLIDING YOKE SUB-ASSY

(a) Align the matchmarks on the steering sliding yoke sub-assy and steering main shaft assy.

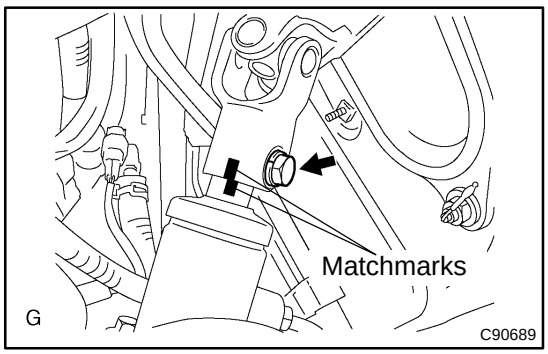
(b) Install the steering sliding yoke sub-assy with the bolt.

Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

35. INSTALL STEERING COLUMN HOLE COVER SUB-ASSY NO.2

(a) Install the steering column hole cover sub-assy No.2.

(b) Install the hose clamp.

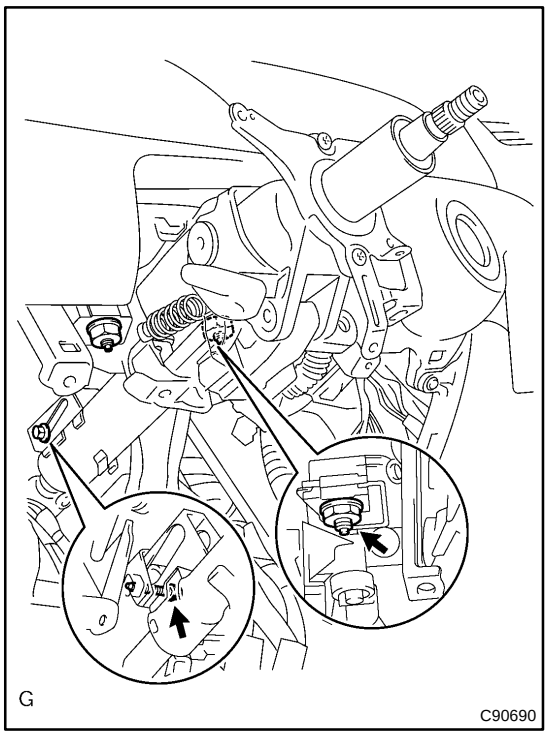


36. INSTALL STEERING INTERMEDIATE SHAFT SUB-ASSY

(a) Align the matchmarks on the intermediate shaft sub-assy and steering gear assy.

(b) Install the steering intermediate shaft sub-assy with the bolt.

Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

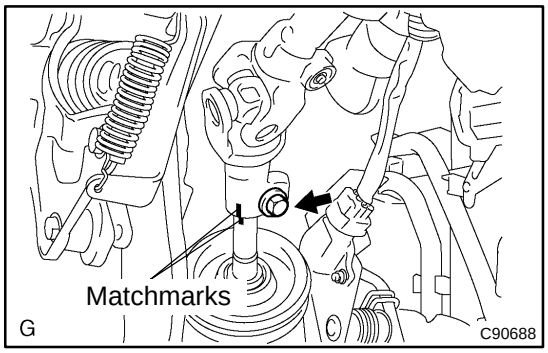


37. INSTALL STEERING COLUMN ASSY

(a) Install the steering column assy with the 2 nuts and bolt.
Torque: 21 N·m (214 kgf·cm, 15 ft·lbf)

(b) Connect the driver side junction block.

(c) Connect the connectors and wire harness clamps.



38. CONNECT STEERING SLIDING YOKE SUB-ASSY

(a) Align the matchmarks on the steering sliding yoke sub-assy and steering intermediate shaft sub-assy.

(b) Connect the steering sliding yoke sub-assy with the bolt.
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

39. CONNECT FLOOR SHIFT PARKING LOCK CABLE ASSY

(a) Place the ignition switch lock cylinder assy at the key ACC position.

(b) Install the floor shift parking lock cable assy.

40. INSPECT CHECK KEY INTERLOCK OPERATION(See page 40-31)

41. INSTALL INSTRUMENT PANEL FINISH PLATE(See page 71-1 1)

42. INSTALL TURN SIGNAL SWITCH ASSY

(a) Install the turn signal switch assy with the 3 screws.

(b) Connect the airbag connector.

(c) Connect the 3 connectors.

43. INSPECT SPIRAL CABLE SUB-ASSY(See page 60-31)

44. INSTALL STEERING COLUMN COVER

(a) Install the steering column cover with the 3 screws.

45. INSTALL STEERING COLUMN COVER LWR NO.2

46. INSTALL HEATER TO FOOT DUCT NO.3(See page 71-1 1)

47. INSTALL INSTRUMENT PANEL INSERT SUB-ASSY LOWER LH

48. INSTALL INSTRUMENT PANEL SUB-ASSY UPPER

49. INSTALL FRONT DOOR SCUFF PLATE LH

50. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

51. INSTALL STEERING WHEEL ASSY

(a) Align the matchmarks on the steering wheel assy and steering main shaft assy.

(b) Install the steering wheel assy set nut.

Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

52. INSPECT HORN BUTTON ASSY(See page 60-22)

53. INSTALL HORN BUTTON ASSY(See page 60-22)

54. INSTALL STEERING PAD SWITCH

(a) Connect the connector.

(b) Install the steering pad switch with the 2 screws.

55. INSTALL CONNECTOR COVER

56. INSTALL STEERING WHEEL COVER LOWER NO.2

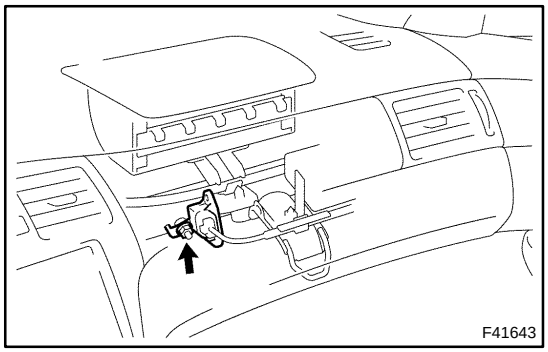
57. INSPECT SRS WARNING LIGHT(See page 05-818)

FRONT ACCELERATION SENSOR

2500O-02

REPLACEMENT

1. **REMOVE FRONT DOOR SCUFF PLATE RH (See page 71-1 1)**
2. **REMOVE INSTRUMENT PANEL UNDER COVER SUB-ASSY NO.1 (See page 71-1 1)**
3. **REMOVE INSTRUMENT PANEL SUB-ASSY LOWER (See page 71-1 1)**



4. **REMOVE ACCELERATION SENSOR ASSY**

(a) Disconnect the acceleration sensor connector.

(b) Remove the nut and acceleration sensor from the instrument panel reinforcement.

5. **INSTALL ACCELERATION SENSOR ASSY**

(a) Install the acceleration sensor with the nut.

Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

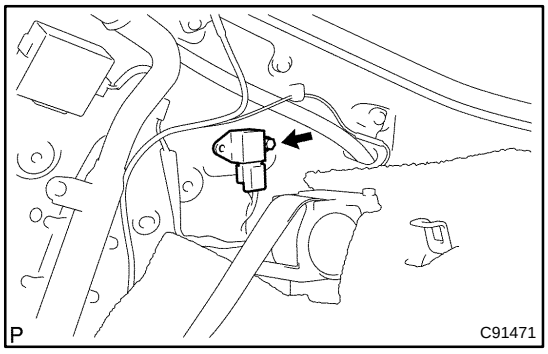
(b) Connect the acceleration sensor connector.

REAR ACCELERATION SENSOR

2500P-02

REPLACEMENT

1. **REMOVE REAR SEAT CUSHION ASSY (See page 72-39)**
2. **REMOVE REAR SEATBACK ASSY (See page 72-39)**
3. **REMOVE ROOF SIDE GARNISH INNER RH (See page 74-10)**



4. REMOVE ACCELERATION SENSOR

(a) Disconnect the acceleration sensor connector.

(b) Remove the bolt and acceleration sensor from the side pillar RH.

5. INSTALL ACCELERATION SENSOR

(a) Install the acceleration sensor with the bolt.

Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

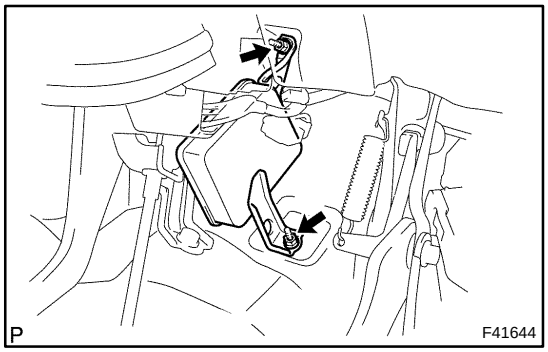
(b) Connect the acceleration sensor connector.

ABSORBER CONTROL ECU

2500Q-02

REPLACEMENT

1. **REMOVE FRONT DOOR SCUFF PLATE LH (See page 71-1 1)**
2. **REMOVE INSTRUMENT PANEL SUB-ASSY UPPER (See page 71-1 1)**
3. **REMOVE INSTRUMENT PANEL INSERT SUB-ASSY LOWER LH (See page 71-1 1)**



4. **REMOVE ABSORBER CONTROL ECU**

(a) Disconnect the 2 absorber control ECU connectors.

(b) Remove the 2 nuts and absorber control ECU.

5. **INSTALL ABSORBER CONTROL ECU**

(a) Install the absorber control ECU with the 2 nuts.

Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

(b) Connect the 2 absorber control ECU connectors.

Technical Service Information Bulletin
December 16, 2004

Title:

SENSOR INSPECTION FOR AIR CONDITIONING SYSTEM

Models:

'90 – Current All Models

Introduction

This service bulletin contains inspection procedures to more precisely confirm proper operation of the following temperature sensors of the air conditioning system. Follow the procedures in this service bulletin when inspecting these sensors. These contents will be reflected in future repair manuals.

- Room Temperature Sensor
- Ambient Temperature Sensor
- Air Duct Sensor
- Evaporator Temperature Sensor
- Solar Sensor
- Room Humidity Sensor

Applicable Vehicles

- **All 1990 – Current** model year **Lexus** vehicles.

Warranty Information

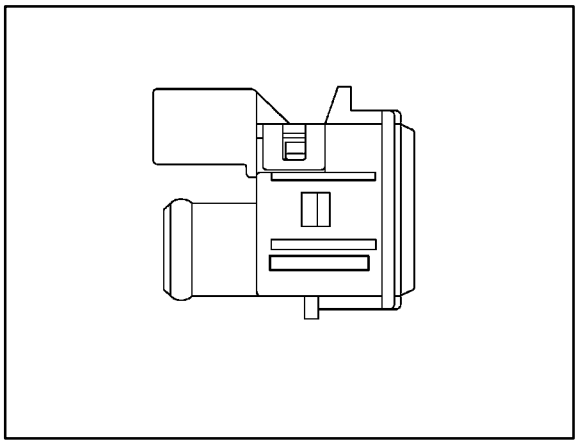
OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Inspection Procedure

1. Inspect Room Temperature Sensor.

A. Measure the sensor resistance.

Resistance Value at 77°F (25°C)	1700 +/– 85Ω



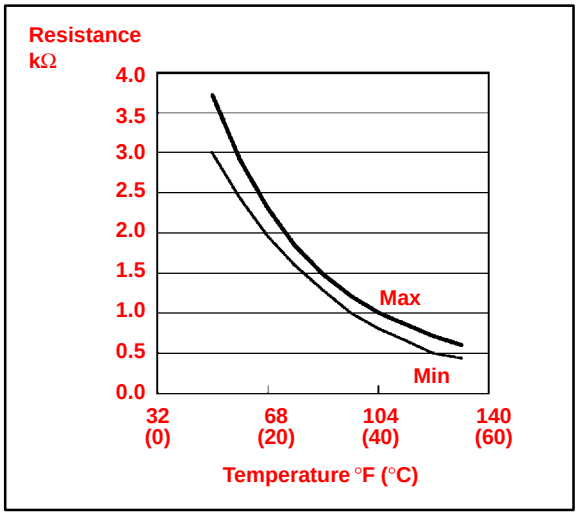
NOTE:

- **Even slightly touching the sensor may change the resistance value. Be sure to hold the connector of the sensor.**
- **When measuring, the sensor temperature must be the same as the ambient temperature.**

HINT:

As the temperature increases, the resistance decreases.

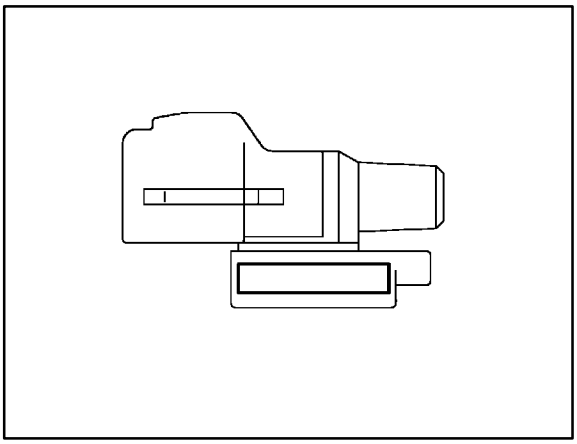
TEMPERATURE °F (°C)	SPECIFICATION kΩ
50 (10)	3.00 to 3.73
59 (15)	2.45 to 2.88
68 (20)	1.95 to 2.30
77 (25)	1.60 to 1.80
86 (30)	1.28 to 1.47
95 (35)	1.00 to 1.22
104 (40)	0.80 to 1.00
113 (45)	0.65 to 0.85
122 (50)	0.50 to 0.70
131 (55)	0.44 to 0.60
140 (60)	0.36 to 0.50



Inspection Procedure (Continued)

2. Inspect Ambient Temperature Sensor.

A. Measure the sensor resistance according to the selected graph (specification).



Resistance Value at 77°F (25°C)	1700 +/– 85Ω

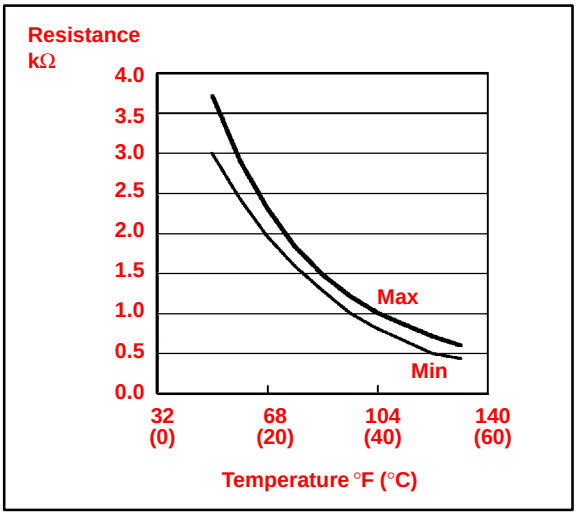
NOTE:

- **Even slightly touching the sensor may change the resistance value. Be sure to hold the connector of the sensor.**
- **When measuring, the sensor temperature must be the same as the ambient temperature.**

HINT:

As the temperature increases, the resistance decreases.

TEMPERATURE °F (°C)	SPECIFICATION kΩ
50 (10)	3.00 to 3.73
59 (15)	2.45 to 2.88
68 (20)	1.95 to 2.30
77 (25)	1.60 to 1.80
86 (30)	1.28 to 1.47
95 (35)	1.00 to 1.22
104 (40)	0.80 to 1.00
113 (45)	0.65 to 0.85
122 (50)	0.50 to 0.70
131 (55)	0.44 to 0.60
140 (60)	0.36 to 0.50



Inspection Procedure (Continued)

3. Inspect Air Duct Sensor.

A. Measure the sensor resistance according to the table and graph (specification).

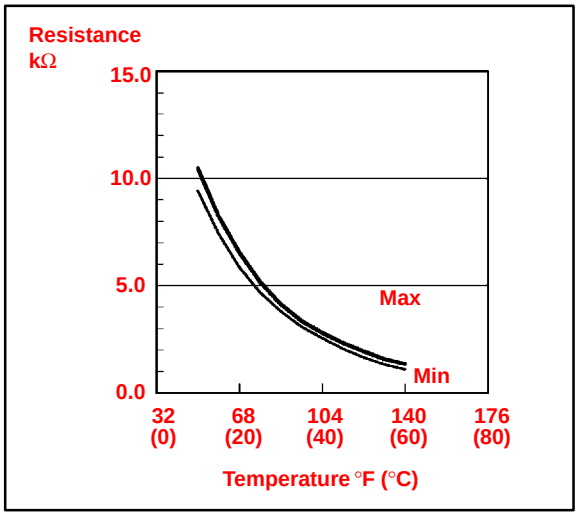
NOTE:

- **Even slightly touching the sensor may change the resistance value. Be sure to hold the connector of the sensor.**
- **When measuring, the sensor temperature must be the same as the ambient temperature.**

HINT:

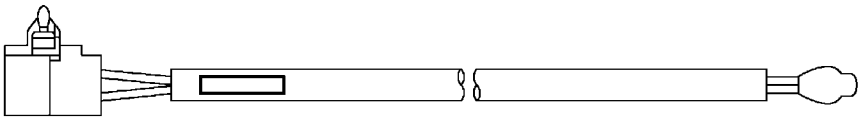
As the temperature increases, the resistance decreases.

TEMPERATURE °F (°C)	SPECIFICATION kΩ
50 (10)	9.48 to 10.49
59 (15)	7.50 to 8.28
68 (20)	5.95 to 6.57
77 (25)	4.77 to 5.25
86 (30)	3.85 to 4.21
95 (35)	3.12 to 3.40
104 (40)	2.53 to 2.79
113 (45)	2.06 to 2.30
122 (50)	1.69 to 1.91
131 (55)	1.39 to 1.59
140 (60)	1.15 to 1.33



Inspection Procedure (Continued)

4. Inspect Evaporator Temperature Sensor.



Select the appropriate graph (specification) using the following table.

NOTE:

Please inspect the sensors for model years not indicated by this bulletin, according to the instructions in the applicable repair manual.

MODEL	MODEL YEAR	COMMENTS	PART NUMBER	GRAPH
ES 300	1992 – 2001		88625–33070	2
ES 300/330	2002 – 2003		88625–17130	2
	2003		88625–33170	3
GS 300	1993 – 1997		88625–3A020	2
GS 300/400/430	1998 – 2002		88625–3A120	2
GX 470	2003 – 2005	Thermistor No. 1	88625–35050	3
		Thermistor No. 2	88625–16210	2
IS 300	2000 – 2001		88625–48010	2
LS 400	1990 – 1992		88625–32040	2
	1993 – 1994		88625–50100	2
	1995 – 2000		88625–50140	2
LS 430	2001 – 2005		88625–50160	2
LX 450	1996 – 1997		88625–60060	2
LX 470	1998 – 2000	Thermistor No. 2	88625–60140	2
	1998 – 2002	Thermistor No. 1	88625–60130	2
	2003 – 2005		88625–47011	2
RX 300	1998 – 2003		88625–48010	2
RX 330	2004	CBU	88625–48050	1
	2004 – 2005	CBU	88625–48060	3
		NAP		
SC 300/400	1991 – 2000		88625–32040	2

Inspection Procedure (Continued)

A. Measure the sensor resistance according to the selected graph (specification).

NOTE:

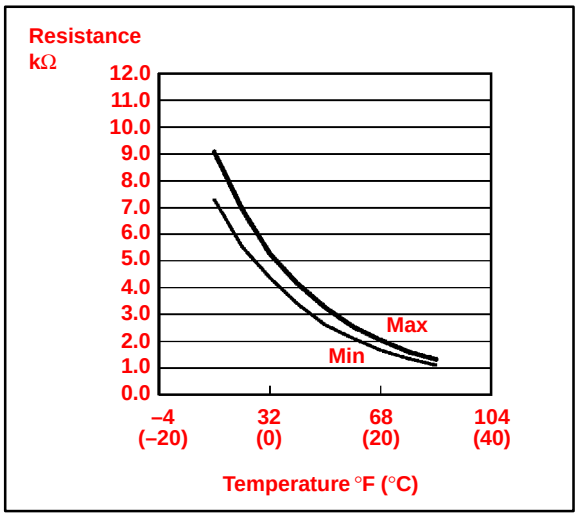
- **Even slightly touching the sensor may change the resistance value. Be sure to hold the connector of the sensor.**
- **When measuring, the sensor temperature must be the same as the ambient temperature.**

HINT:

As the temperature increases, the resistance decreases.

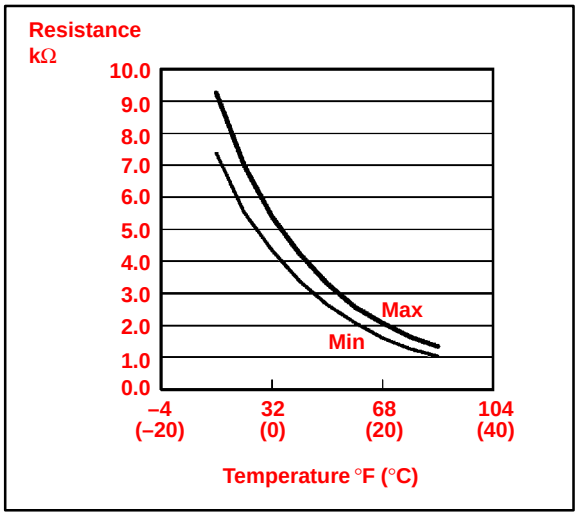
Graph 1:

TEMPERATURE °F (°C)	SPECIFICATION kΩ
14 (–10)	7.30 to 9.10
23 (–5)	5.65 to 6.95
32 (0)	4.40 to 5.35
41 (5)	3.40 to 4.15
50 (10)	2.70 to 3.25
59 (15)	2.14 to 2.58
68 (20)	1.71 to 2.05
77 (25)	1.38 to 1.64
86 (30)	1.11 to 1.32



Graph 2:

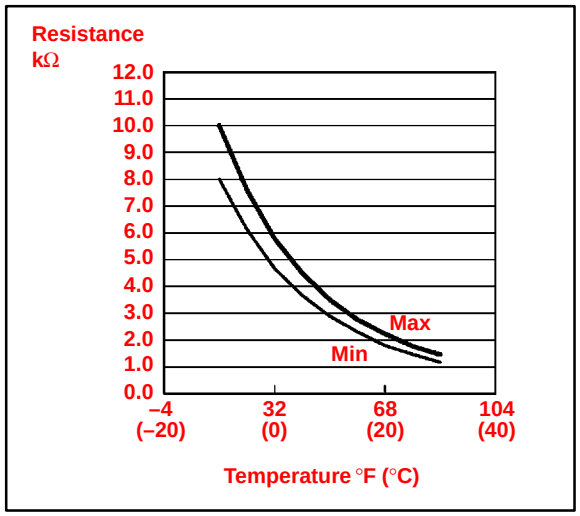
TEMPERATURE °F (°C)	SPECIFICATION kΩ
14 (–10)	7.40 to 9.20
23 (–5)	5.65 to 7.00
32 (0)	4.35 to 5.40
41 (5)	3.40 to 4.20
50 (10)	2.68 to 3.30
59 (15)	2.10 to 2.60
68 (20)	1.66 to 2.10
77 (25)	1.32 to 1.66
86 (30)	1.05 to 1.35



Inspection Procedure (Continued)

Graph 3:

TEMPERATURE °F (°C)	SPECIFICATION kΩ
14 (–10)	8.00 to 10.00
23 (–5)	6.15 to 7.65
32 (0)	4.75 to 5.85
41 (5)	3.70 to 4.55
50 (10)	2.91 to 3.55
59 (15)	2.32 to 2.80
68 (20)	1.85 to 2.22
77 (25)	1.48 to 1.77
86 (30)	1.20 to 1.43



Inspection Procedure (Continued)

5. Inspect Solar Sensor.

Four types of solar sensors are used on Lexus vehicles depending on the vehicle specifications. The inspection procedure for each type of sensor differs from the others. Select the appropriate inspection procedure from the table below according to vehicle specifications and perform the inspection.

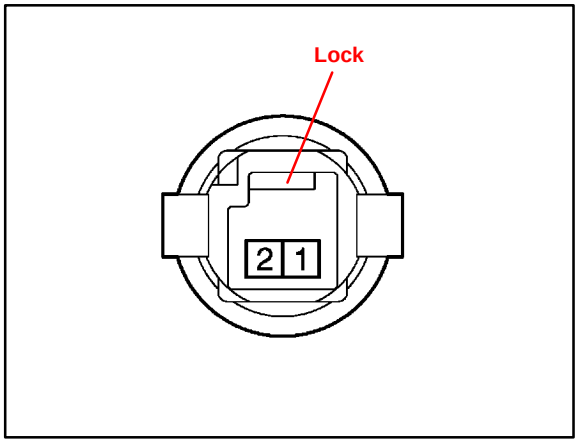
EQUIPPED WITH AUTOMATIC LIGHT CONTROL SYSTEM	A/C SYSTEM WITH RIGHT/LEFT INDEPENDENT TEMPERATURE CONTROL	INSPECTION PROCEDURE
No	No	A
No	Yes	B
Yes	Yes	C
Yes	No	D

Procedure A:

a. Disconnect the solar sensor connector.

b. Measure the resistance between terminals 1 and 2 of the solar sensor under the following conditions:

- Cover the sensor with a cloth to avoid direct light.
- Expose the sensor to light from a distance of 300 mm (11.81 in.) or less with an inspection light.



NOTE:

- **Terminal 1 of the sensor is always on the right, when the lock is facing up.**
- **When using an analog tester, connect the positive (+) lead to terminal 2 and negative (–) lead to terminal 1 of the solar sensor.**

HINT:

If the light is weak, the sensor may not react. Be sure to use an incandescent light for an inspection light.

Standard:

CONDITION	SPECIFICATION
When the sensor is covered with a cloth (to avoid direct light)	Infinite ohms
When the sensor is exposed to light	Less than infinite resistance

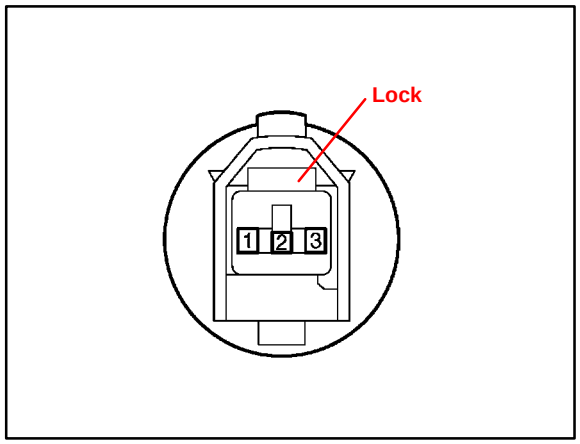
Inspection Procedure (Continued)

Procedure B:

a. Disconnect the solar sensor connector.

b. Measure the resistance between terminals 2 and 3 of the solar sensor under the following conditions:

- Cover the sensor with a cloth to avoid direct light.
- Expose the sensor to light from a distance of 300 mm (11.81 in.) or less with an inspection light.



NOTE:

When using an analog tester, connect the positive (+) lead to terminal 3 and negative (–) lead to terminal 2 of the solar sensor.

HINT:

If the light is weak, the sensor may not react. Be sure to use an incandescent light for an inspection light.

Standard:

CONDITION	SPECIFICATION
When the sensor is covered with a cloth (to avoid direct light)	Infinite ohms
When the sensor is exposed to light	Less than infinite resistance

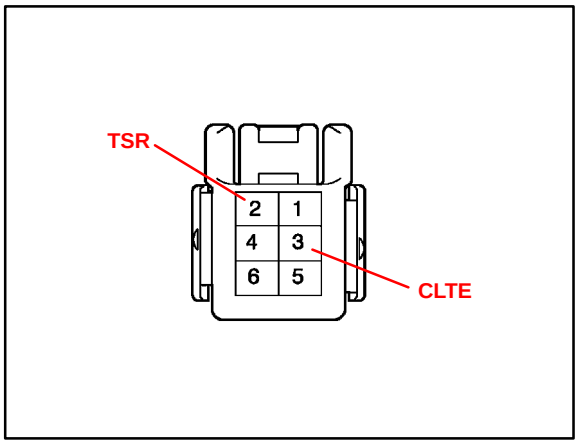
Inspection Procedure (Continued)

Procedure C:

a. Turn the ignition switch ON.

b. Measure the voltage between terminals TSR (+) and CLTE (–) of the connector under the following conditions:

- Cover the sensor with a cloth to avoid direct light.
- Expose the sensor to light from a distance of 300 mm (11.81 in.) or less with an inspection light.



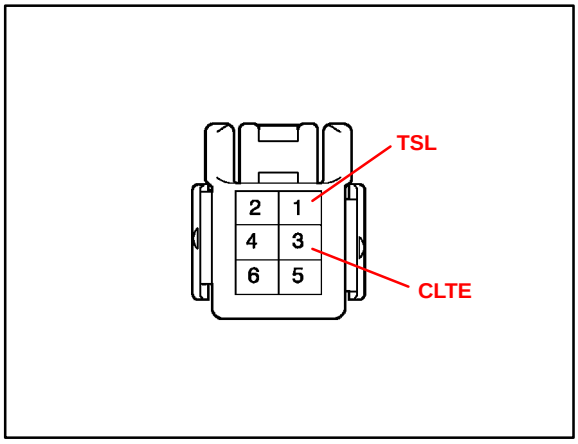
HINT:
- **If the light is weak, the sensor may not react. Be sure to use an incandescent light for an inspection light.**
- **Do not disconnect the solar sensor connector.**

Standard:

CONDITION	SPECIFICATION
When the sensor is covered with a cloth (to avoid direct light)	Below 0.8 V
When the sensor is exposed to light	4.3 +/– 0.3 V

c. Measure the voltage between terminals TSL (+) and CLTE (–) of the connector under the following conditions:

- Cover the sensor with a cloth to avoid direct light.
- Expose the sensor to light from a distance of 300 mm (11.81 in.) or less with an inspection light.



HINT:
- **If the light is weak, the sensor may not react. Be sure to use an incandescent light for an inspection light.**
- **Do not disconnect the solar sensor connector.**

Standard:

CONDITION	SPECIFICATION
When the sensor is covered with a cloth (to avoid direct light)	Below 0.8 V
When the sensor is exposed to light	4.3 +/– 0.3 V

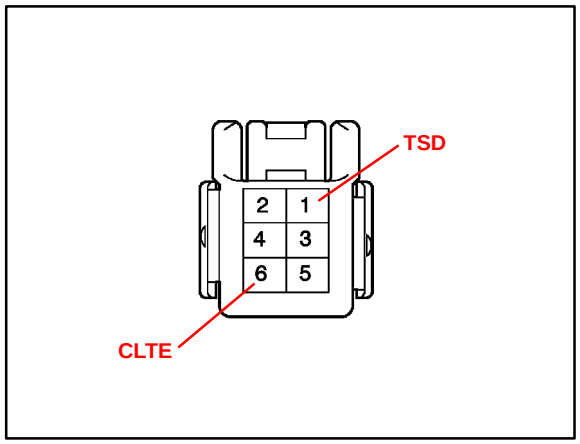
Inspection Procedure (Continued)

Procedure D:

a. Turn the ignition switch ON.

b. Using the tester, measure the voltage between terminals TSD (+) and CLTE (–) of the connector under the following conditions:

- Cover the sensor with a cloth to avoid direct light.
- Expose the sensor to light from a distance of 300 mm (11.81 in.) or less with an inspection light.



HINT:

- **If the light is weak, the sensor may not react. Be sure to use an incandescent light for an inspection light.**
- **Do not disconnect the solar sensor connector.**

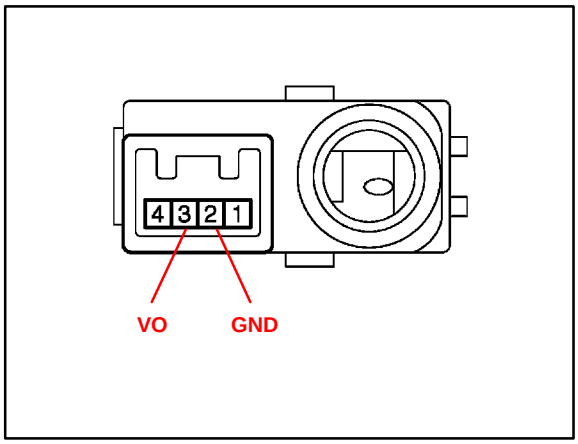
Standard:

CONDITION	SPECIFICATION
When the sensor is covered with a cloth (to avoid direct light)	Below 0.8 V
When the sensor is exposed to light	4.3 +/– 0.3 V

Inspection Procedure (Continued)

6. Inspect Room Humidity Sensor.

Measure the humidity and output voltage of the humidity sensor when the sensor is installed on the vehicle and the temperature at the humidity sensor position (room temperature sensor position) is 77°F (25°C).
If the output voltage is within the specifications according to the graph and table below, the sensor is normal.



HINT:

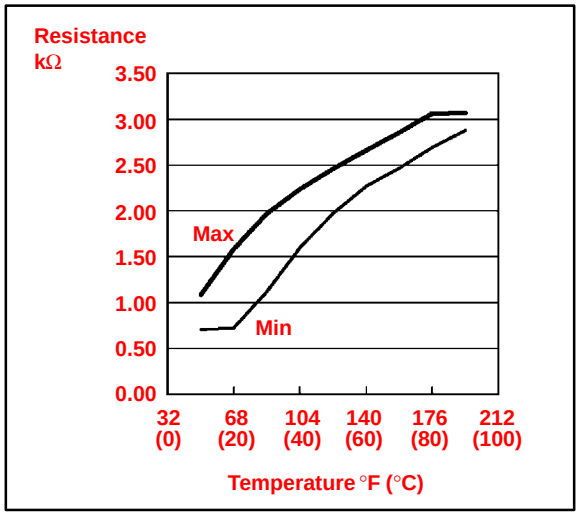
For the inspection procedure of the room temperature sensor, refer to "Room Temperature Sensor Inspection Procedure" in this bulletin.

A. Turn the ignition switch to the ON position.

B. Measure the voltage between terminal VO (3) and GND (2) of the room humidity sensor.

C. Measure the humidity and voltage when the room temperature (humidity sensor position) is 77°F (25°C). According to the result, determine whether the sensor is normal or not.

HUMIDITY (% RH)	OUTPUT VOLTAGE AT 77°F (25°C)
10	0.70 to 1.08 V
20	0.72 to 1.57 V
30	1.13 to 1.95 V
40	1.61 to 2.24 V
50	1.99 to 2.46 V
60	2.26 to 2.66 V
70	2.48 to 2.85 V
80	2.68 to 3.04 V
90	2.87 to 3.05 V



LEXUS

Technical Service Information Bulletin

July 13, 2005

Title:

WINDSHIELD WIPER BLADE MAINTENANCE AND CLEANING

Models:

'98 – '06 All Models

TSIB

Introduction

The following procedures are recommended to maintain windshield wiper blade performance.

Applicable Vehicles

- **1998 – 2006** model year **Lexus** vehicles.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Maintenance, Cleaning & Use

Recommendations for Windshield Wiper Maintenance, Cleaning, and Use:

1. Scheduled Maintenance
   - Check wiper rubber blades every 4 – 6 months or 7,500 miles for wear, cracking, and contamination.
   - Clean glass and rubber wiper blades if blades are not clearing glass adequately. If this does not correct the problem, then replace the rubber elements.
2. Cleaning Procedure
   - **Wiper Rubber:** Bugs, dirt, sap, and road grime on blades will cause streaking. Clean wiper rubber of road and environmental debris using cloth or paper towel soaked with windshield washer fluid or mild detergent.
   - **DO NOT USE** fuel, kerosene, or petroleum based products to clean rubber wiper blades.
   - **Windshield:** Bugs, sap, road grime, and car wash wax treatments decrease wiper performance.
   - Rinse windshield with water and apply non–abrasive cleaner, such as Bon–Ami (www.faultless.com), with a sponge.

NOTE:

Make sure to use plenty of water with all powder based cleaners so the glass is not scratched.

Maintenance, Cleaning & Use (Continued)

3. Contributors to Poor Performance/Decreased Rubber Blade Life (require rubber replacement)
   - Dusty areas cause the rubber edge to wear quickly.
   - Sand and salt used for road conditioning during winter causes the edge to wear quickly, so areas with significant snowfall require more frequent wiper replacement.
   - Heat and time cause the rubber to become excessively “permanent set,” so the rubber does not turn over, resulting in streaking and/or unwiped areas on the glass.
   - Rubber is easily cut or torn while using ice scrapers on the glass.
   - Rubber can be torn when pulling blades off a frozen windshield.
   - Using wipers instead of an ice scraper to remove frost and ice from the windshield during a car warm up can dull, nick, or tear the rubber.
   - Banging wiper on the glass to remove ice & snow can cause the blade to bend and rubber to come out of the blade providing the potential to scratch the glass.
   - Ice forms in wiper blade pin joints, which causes streaking and unwiped areas. To remove ice from pin joints, compress the blade and rubber with your hand to loosen the frozen joints. To prevent this condition, use winter blades with a rubber cover.

LEXUS

Technical Service Information Bulletin

September 29, 2004

Title:

SEAT BELT EXTENDER

Models:

'03 – '05 Model Year

TSIB

REVISED BODY BO009-04

TSIB REVISION NOTICE:

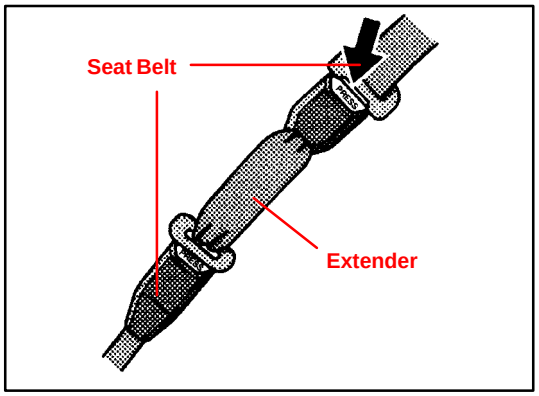
- **December 9, 2005: The "Rear Seat Belt Extender Applications" section has been updated. In the Part Number Information table, the part numbers for series Q–6 have been updated.**
- **June 28, 2005: In the "Rear Seat Belt Extender Applications" section, the series number for the '05 ES 330 has been updated to R–7.**

Previous versions of this TSIB should be discarded.

Introduction

Lexus customers who find it necessary to increase the length of their seat belts may obtain Seat Belt Extenders at **no cost** through their local Lexus dealer.

- The extender is available in 6 inch, 9 inch, 12 inch, 15 inch, and 18 inch lengths.
- The extender is available **only in black.**
- Owners are informed of the Seat Belt Extender availability through the Lexus Owner's Manual included in each vehicle.



The customer (individual requiring the extender) must visit a Lexus dealership to have the required measurements made and to complete the Seat Belt Extender Worksheet. The worksheet will allow the proper fitting and selection of a Seat Belt Extender for the customer. The dealership personnel should then determine the applicable part number and place an order through ***Dealer Daily.***

The dealership service department should complete the affixed Seat Belt Extender Customer Information Label on the part and review the "Owner Instruction Sheet" with the customer. The dealership should give a copy of the completed worksheet to the customer and keep the original in the customer's file.

To assure utmost owner satisfaction, it is recommended that a dealership designate one person to coordinate all activities related to the Seat Belt Extender issue.

It is recommended that dealerships **do NOT stock** Seat Belt Extenders due to the need for proper fitting to individual customers.

This bulletin contains the following information:

Procedure and Sample Label . . . . . Page 2
Application Charts . . . . . Page 3
Part Number Information . . . . . Page 4
Owner Instructions . . . . . Page 5
Seat Belt Extender Worksheet . . . . . Page 6

Applicable Vehicles

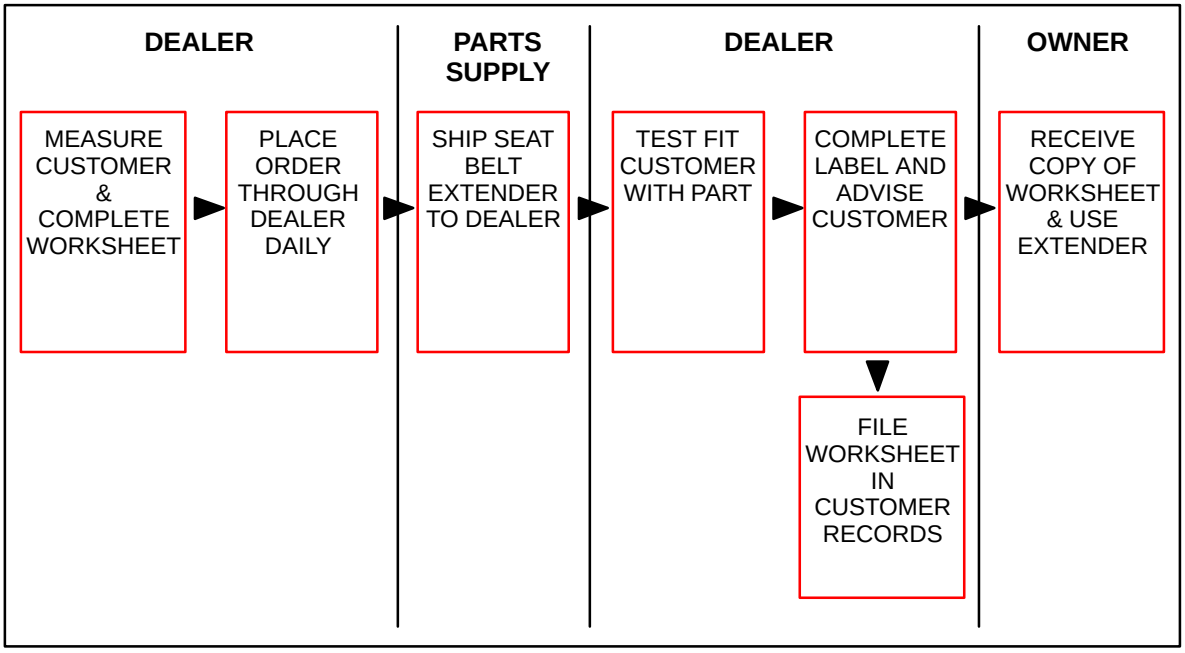
- **2003** – **2005** model year **Lexus** vehicles.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Procedure

1. Customer requests a Seat Belt Extender from dealer.
2. Dealer verifies the need for a Seat Belt Extender and obtains a current copy of this TSIB and copies the Worksheet.
3. Dealer measures the customer and completes the Worksheet. Dealer determines the correct part number and places an order for the part through Dealer Daily.
4. Dealer receives Seat Belt Extender and calls the customer to check the fit of the part.
5. If the Seat Belt Extender fit is good, dealership personnel completes the Customer Information Label on the part, explains usage of the part, and gives the customer a copy of the completed Worksheet.
6. Dealer places copy of the completed Worksheet in the customer's records.



Sample Seat Belt Extender Customer Information Label

CAUTION

THIS SEAT BELT EXTENDER IS TO BE USED ONLY BY: _____

ON VEHICLE: _____

VIN: _____

SEATING POSITION: _____

USE BY OTHERS, OR IN ANOTHER SEATING POSITION, OR IN ANOTHER VEHICLE COULD REDUCE SEAT BELT RESTRAINT IN AN ACCIDENT AND RESULT IN PERSONAL INJURY.

Front Seat Belt Extender Applications

FRONT SEAT – EXTENDER APPLICATION				
MODEL	**TYPE**	**'05**	**'04**	**'03**
ES 300	All Models	–	–	R–5
ES 330		R–6	R–6	–
GS 300		R–3	R–3	R–3
GS 430		R–3	R–3	R–3
GX 470		K–6	K–6	K–6
IS 300		K–6	K–6	K–6
LS 430		R–3	R–3	R–3
LX 470		K–6	K–6	K–6
RX 300		–	–	R–5
RX 330		R–7	R–7	–
SC 430		R–3	R–3	R–3

Rear Seat Belt Extender Applications

REAR SEAT – EXTENDER APPLICATION				
MODEL	**TYPE**	**'05**	**'04**	**'03**
ES 300	All Models	–	–	R–5
ES 330		R–7	R–5	–
GS 300		K–5	K–5	K–5
GS 430		K–5	K–5	K–5
GX 470		K–5	K–5	K–5
IS 300		R–5	R–5	R–5
LS 430	RH, LH	R–3	R–3	R–3
LX 470	All Models	K–5	K–5	K–5
RX 300		–	–	R–5
RX 330	RH, LH	R–6 or Q–5	R–6 or Q–5	–
SC 430	All Models	R–5	R–5	R–5

NOTE:

The extender must NOT be used for the center rear seat belt.

Part Number Information

PART NUMBER PREFIX: 73399–					
SERIES	**LENGTH**				
	6 INCH	**9 INCH**	**12 INCH**	**15 INCH**	**18 INCH**
R–3	–50010	–50020	–50030	–50040	–50050
R–5	–16060	–16070	–16080	–16090	–16100
R–6	–35110	–35120	–35130	–35140	–35150
R–7	–48010	–48020	–48030	–48040	–48050
N–6	–20160	–20170	–20180	–20190	–20200
K–5	–35010	–35020	–35030	–35040	–35050
K–6	–35060	–35070	–35080	–35090	–35100
Q–5	–AE010	–AE020	–AE030	–AE040	–AE050
Q–6	–AE061	–AE071	–AE081	–AE091	–AE101

Owner Instructions

Failure to follow the recommendations indicated below could result in reduced effectiveness of the seat belt restraint system in case of vehicle collision, causing personal injury.

If your seat belt cannot be fastened securely because it is not long enough, a personalized Seat Belt Extender is available from your Lexus dealer free of charge.

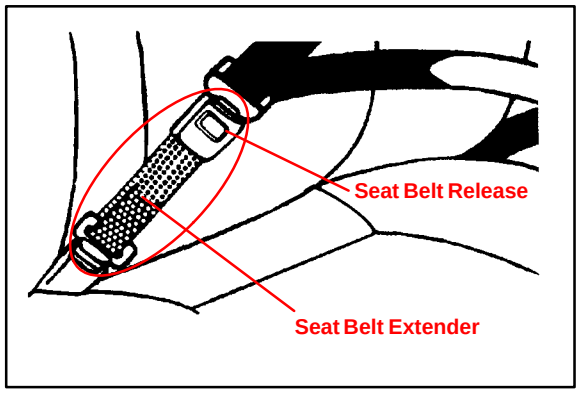
Please visit your local Lexus dealer so that the dealer can order the proper required length extender. Bring the heaviest coat you expect to wear for proper measurement and selection of length. Additional ordering information is available at your Lexus dealer.

When the Seat Belt Extender is provided for rear seat positions (with automatic locking retractor), make sure that the retractor is locked when in use.

To connect the extender to the seat belt, insert the tab into the seat belt buckle so that the buckle-release buttons of the extender and the seat belt are both facing outward as shown.

You will hear a click when the tab locks into the buckle.

When not in use, remove the extender and store in the vehicle for future use.



CAUTION:

On vehicles equipped with SRS – Occupant Classification System (OCS)*, it is critical that the extender tab be buckled into the buckle AFTER the occupant sits down in the seat.

Leaving extender installed in the buckle before sitting down will cause the OCS to be in the "airbag off" or disarmed state.

* OCS will enable or disable the passenger front and side airbags based on passenger weight and seat belt latch position classifying the passenger as a child or adult.

CAUTION:

When using the Seat Belt Extender, observe the following. Failure to follow these instructions could result in reduced effectiveness of the seat belt restraint system in case of vehicle accident, increasing the chance of personal injury.

- **Never use the Seat Belt Extender if you can COMFORTABLY fasten the seat belt without it.**
- **The Seat Belt Extender must never be used with any child safety seats.**
- **Remember that the extender provided for you may not be safe when used on a different vehicle, for another person or for a different seating position than the one originally intended.**

SEAT BELT EXTENDER WORKSHEET

PLEASE COPY THIS ORIGINAL WORKSHEET FOR EACH EXTENDER NEEDED

CAUTIONS:

- **To minimize the chance and/or severity of injury in an accident, the Seat Belt Extender must only be used:**
  1 By the person for whom it was provided.
  2 In the seat position for which it was provided.
- **The Seat Belt Extender must never be used with any child safety seats.**
- **When the Seat Belt Extender is provided for rear seat positions (with automatic locking retractor), make sure the retractor is locked when extender belt is in use.**

DEALER		SEAT BELT EXTENDER APPLICATION		APPLICANT		
DEALER CODE	DEALER NAME			APPLICANT NAME		
ADDRESS				ADDRESS		
CITY & STATE		ZIP		CITY & STATE	ZIP	PHONE
EMPLOYEE NAME	MODEL YEAR	BODY TYPE		SEATING POSITION	VEHICLE IDENTIFICATION NUMBER	

DIRECTIONS FOR DETERMINING PROPER EXTENDER LENGTH

1. **Place the seat in the position the applicant normally uses.**
2. **With the applicant in the seat, wearing the thickest coat expected to be worn, pull belt all the way out and try to buckle belt.**
   - **If belt latches into buckle and feels comfortable against upper chest area, an extender is not needed.**
   - **If belt does not buckle, continue with Step 3.**
   - **If buckle latches but belt has no slack remaining, continue with Step 3.**
3. **Measure distance between applicant's navel and seat belt buckle (Dimension A) and enter on Worksheet.**
4. **With belt all the way out, measure distance between latch tip and buckle tip (Dimension B) and enter on Worksheet.**
   NOTE: If belt latches but there is no slack enter zero as Dimension B.
5. **Subtract Dimension B from Dimension A and record number in Check Number box on Worksheet.**
6. **Seat Belt Extender length is Dimension B rounded up to next extender length (without exceeding Check Number).**

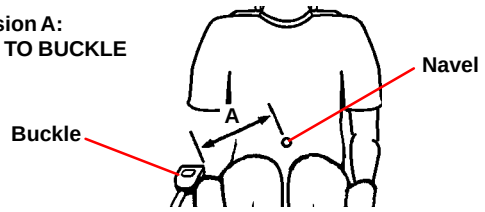
NOTE: If extender length exceeds Check Number, an extender <u>cannot</u> be provided to the customer.

CAUTION:

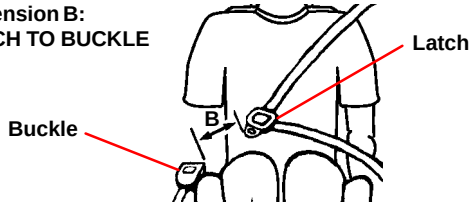
On vehicles equipped with SRS — Occupant Classification System (OCS), it is critical that the extender tab be buckled into the buckle AFTER the occupant sits down in the seat.

Leaving extender installed in the buckle before sitting down will cause the OCS to be in the "airbag off" or disarmed state.

Dimension A:
NAVEL TO BUCKLE



Dimension B:
LATCH TO BUCKLE



SEAT BELT EXTENDER CALCULATION

DIMENSION A:	DIMENSION B:	CHECK NUMBER:

SEAT BELT EXTENDER AUTHORIZATION

- ***The same Seat Belt Extender can be used for right and left seating applications.*** **Each Seat Belt Extender will have a label identifying the owner, VIN and seating position.**
- **Applicant's Signature:**_____ **Date:**_____
  (Actual user of Seat Belt Extender)

LEXUS

Technical Service Information Bulletin

November 9, 2005

Title:

REAR BUCKLE EASE OF USE IMPROVEMENT

Models:

'05 ES 330

TSIB

BODY

REVISED

BO011-05

TSIB REVISION NOTICE:

- **November 10, 2005: The second Op Code has been updated in Warranty Information (Combo A for "Opposite Side").**

Previous versions of this TSIB should be discarded.

Introduction

The rear seat belt buckle tether strap has been modified to improve the ease of use for the customer.

Applicable Vehicles

- **2005** model year **ES 330** vehicles produced **BEFORE** the Production Change Effective VINs shown below.

Production Change Information

MODEL	PART NAME	PART NUMBER	PRODUCTION CHANGE EFFECTIVE VIN
ES 330	Belt Assembly, RR Seat Inner w/ CTR, RH	73470–33040–A0	JTHBA30G955128105
		73470–33040–B0	JTHBA30G455128366
		73470–33040–C0	JTHBA30G855128774
	Belt Assembly, RR Seat Inner w/ CTR, LH	73480–33130–A0	JTHBA30G955128220
		73480–33130–B0	JTHBA30G755128247
		73480–33130–C0	JTHBA30G755128409

Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME	QTY
73470–33040–A0	Same	Belt Assembly, RR Seat Inner w/ CTR, RH	1
73470–33040–B0			
73470–33040–C0			
73480–33130–A0		Belt Assembly, RR Seat Inner w/ CTR, LH	1
73480–33130–B0			
73480–33130–C0			

Warranty Information

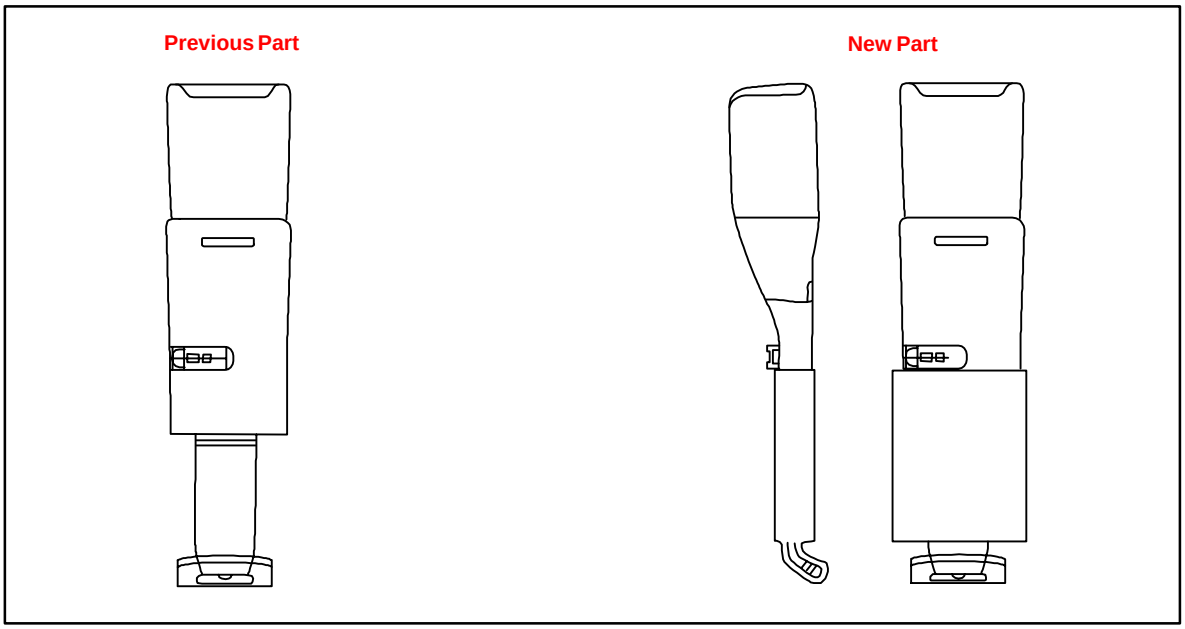
OP CODE	DESCRIPTION	TIME	OFP	T1	T2
711511	R & R Rear Seat Belt Buckle	0.4	73470–33040–#0 73480–33130–#0	9A	99
Combo A	Opposite Side	0.2			

Applicable Warranty*:

This repair is covered under the Lexus Powertrain Warranty. This warranty is in effect for 72 months or 70,000 miles, whichever occurs first, from the vehicle's in-service date.

* Warranty application is limited to correction of a problem based upon a customer's specific complaint.

Parts Identification



Repair Procedure

HINT:

Use the same procedure for the LH side and RH side.

NOTE:

For removal of rear seat, refer to the Technical Information System (TIS), 2005 model year ES 330 Repair Manual: *Seat: Rear Seat Assy: Overhaul.*

1. Remove the rear seat cushion assembly.
2. Remove the rear seatback assembly.
3. Remove the rear door opening trim weatherstrip LH.
4. Remove the rear door opening trim weatherstrip RH.
5. Remove the roof side garnish inner LH.
6. Remove the roof side garnish inner RH.
7. Remove the center stop lamp assembly (without sun shade).
8. Remove the child restraint seat tether anchor cover.

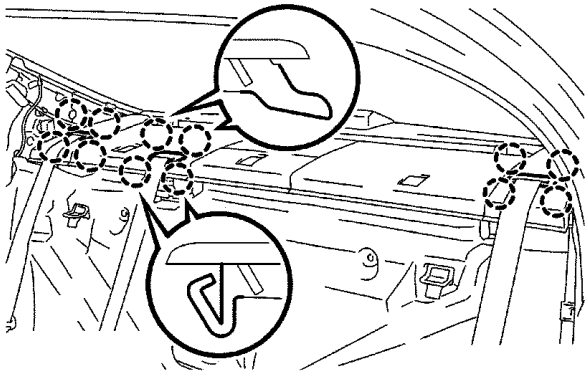
Repair Procedure (Continued)

9. Remove the rear seat shoulder belt cover.

   Using a screwdriver, disengage the 12 claws and remove the 3 rear seat shoulder belt covers.

HINT:

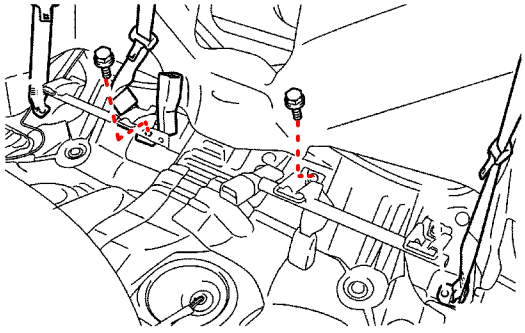
Tape the screwdriver tip before use.



: **Claw**

10. Remove the package tray trim panel assembly.

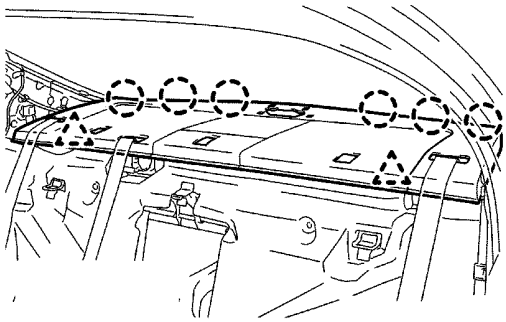
    A. Remove the 2 bolts and release the floor anchors of the seat belts.



Repair Procedure (Continued)

B. **Without Sun Shade:**

Disengage the 6 claws and 2 clips and remove the package tray trim panel assembly.

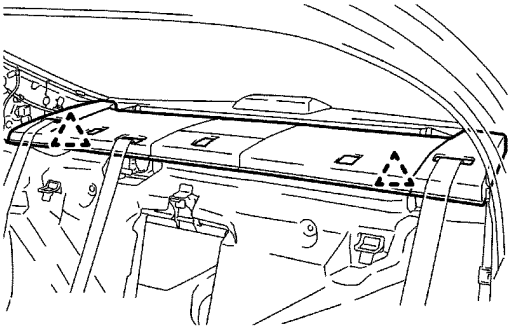


: Claw

: Clip

C. **With Sun Shade:**

Disengage the 2 clips and remove the package tray trim panel assembly.



: Clip

11. Remove the rear seat center belt assembly RH.

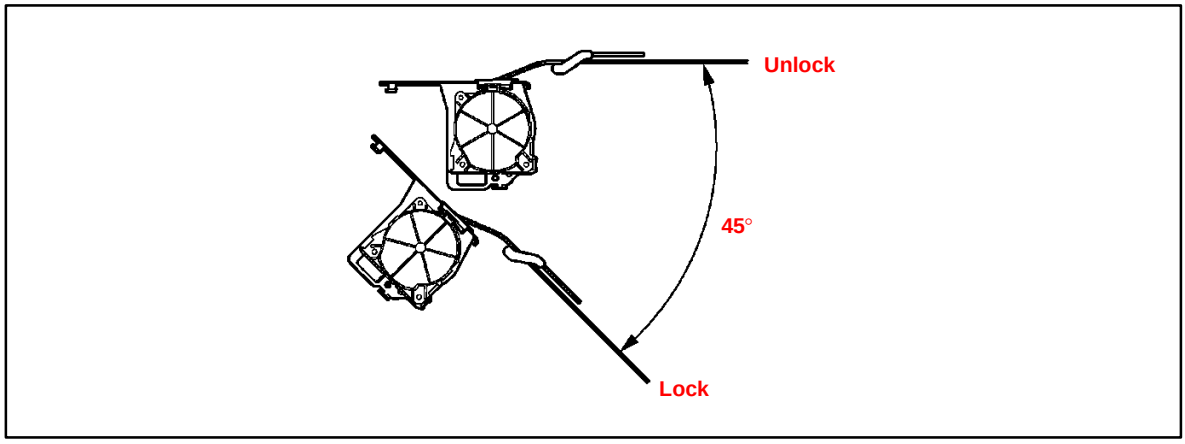
Remove the bolt holding the retractor and disengage the claws of the stopper to remove the rear seat center belt assembly RH.

Repair Procedure (Continued)

12. Install the rear seat center belt assembly RH.

A. Check the degree of tilt when the ELR begins to lock.

Check that the belt does NOT lock at less then 15® of tilt in any direction but locks at over 45® of tilt when gently moving the installed retractor.



B. Install the retractor of the rear seat center belt assembly RH and torque the bolt.

Torque: 42 N•m (420 kgf•cm, 31 ft•lbf)

C. Check the ELR lock.

Check that the belt locks when pulled out quickly.

D. Check the fastening function for the child restraint system.

NOTE:

Check should be done with the assembly installed.

a. Check that the belt cannot be pulled out any more but can be rewound after being pulled out.

b. Check that the belt can be pulled out and rewound after being fully rewound.

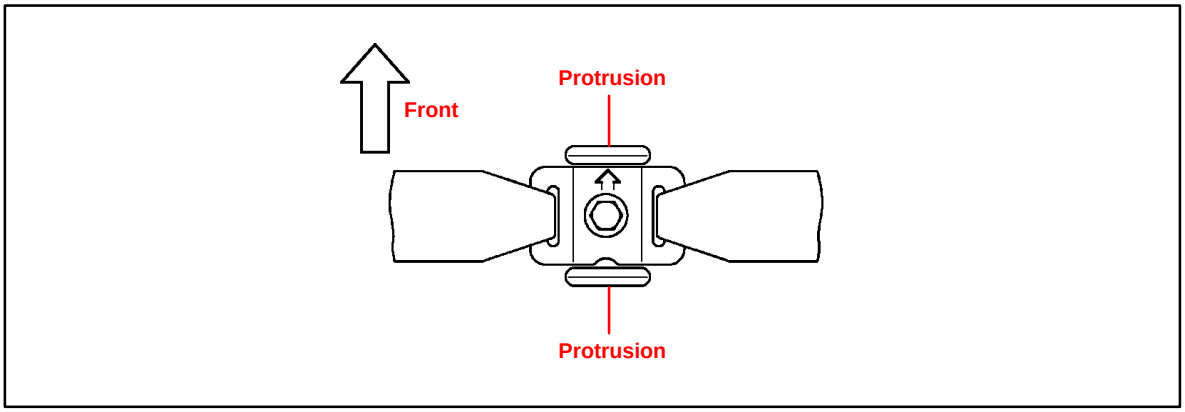
Repair Procedure (Continued)

E. Install the floor anchor of the rear seat center belt assembly RH with the bolt facing the arrow mark on the plate toward the front of the vehicle.

Torque: 42 N•m (420 kgf•cm, 31 ft•lbf)

NOTE:

Ensure that the anchor does NOT run into any protrusions on the floor panel.



F. Check the ELR lock.

Check that the belt locks when pulled out quickly.

13. Remove the rear seat center belt assembly LH.

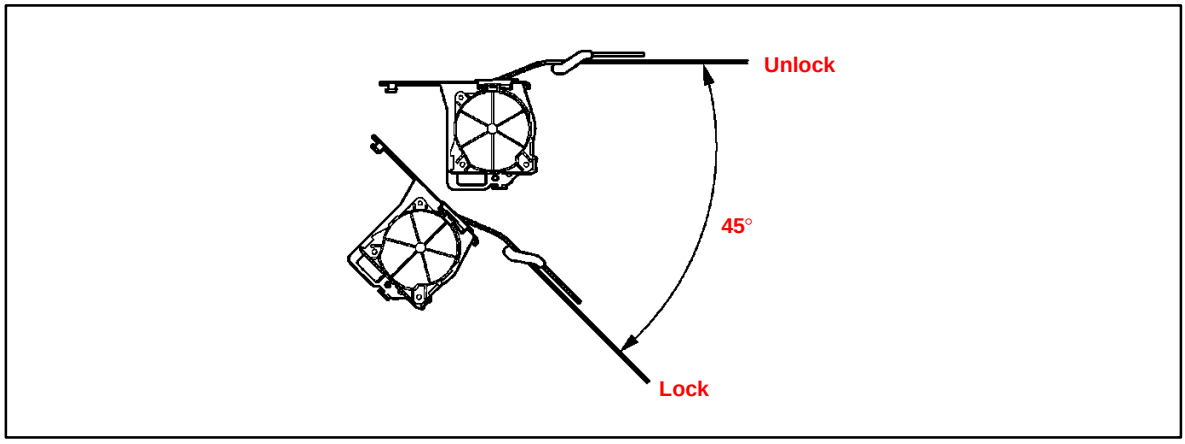
Remove the bolt and remove the rear seat center belt assembly LH.

Repair Procedure (Continued)

14. Install the rear seat center belt assembly LH.

A. Check the degree of tilt when the ELR begins to lock.

Check that the belt does NOT lock at less then 15® of tilt in any direction but locks at over 45® of tilt when gently moving the installed retractor.



B. Install the retractor of the rear seat center belt assembly LH and torque the bolt.

Torque: 42 N•m (420 kgf•cm, 31 ft•lbf)

C. Check the ELR lock.

Check that the belt locks when pulled out quickly.

D. Check the fastening function for the child restraint system.

NOTE:

Check should be done with the assembly installed.

a. Check that the belt cannot be pulled out any more but can be rewound after being pulled out.

b. Check that the belt can be pulled out and rewound after being fully rewound.

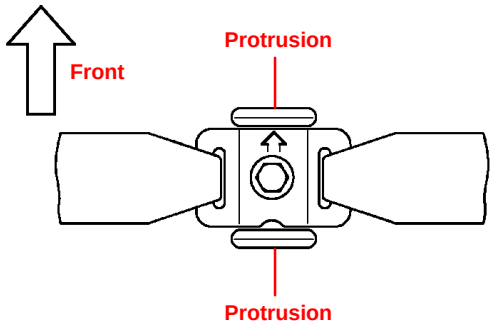
Repair Procedure (Continued)

E. Install the floor anchor of the rear seat center belt assembly LH with the bolt facing the arrow mark on the plate toward the front of the vehicle.

Torque: 42 N•m (420 kgf•cm, 31 ft•lbf)

NOTE:

Ensure that the anchor does NOT run into any protrusions on the floor panel.



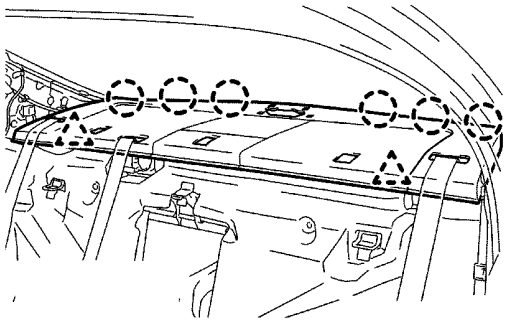
F. Check the ELR lock.

Check that the belt locks when pulled out quickly.

15. Install the package tray trim panel assembly.

A. **Without Sun Shade:**

Engage the 6 claws and 2 clips to install the package tray trim panel assembly.



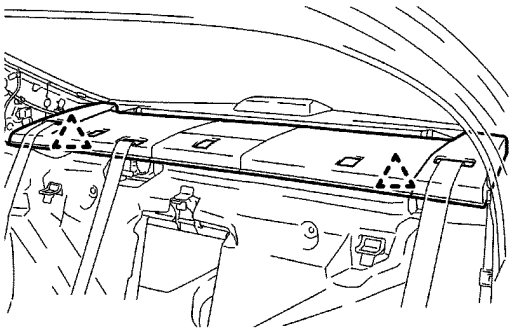
: Claw

: Clip

Repair Procedure (Continued)

B. **With Sun Shade:**

Engage the 2 clips to install the package tray trim panel assembly.



: **Clip**

16. Reinstall the seat cushions in the reverse order of removal.

17. Dispose of the old seat belt appropriately. For proper disposal procedures, refer to TIS, 2005 model year ES 330 Repair Manual: *Seat Belt: Rear Seat Belt: Disposal.*

LEXUS

Technical Service Information Bulletin

December 22, 2004

Title:

CENTER CONSOLE LATCH IMPROVEMENT

Models:

'02 – '05 ES 300 & ES 330

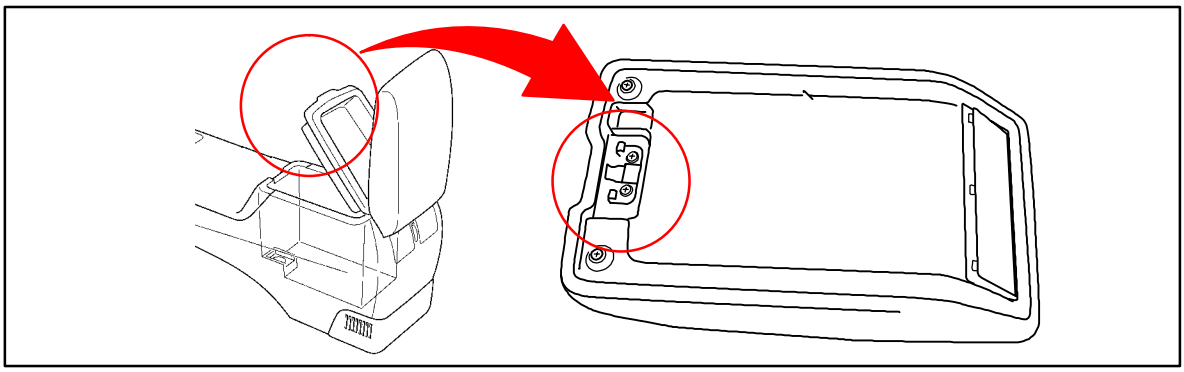
TSIB

BODY

BO012-04

Introduction

For improved durability, the center console door lock opener for ES 300 and ES 330 vehicles are now made from metal, instead of the previous plastic material. This improved lock is available as a service part and will not require replacement of the entire console lid.



Applicable Vehicles

- **2002 – 2005** model year **ES 300** and **ES 330** vehicles produced **BEFORE** the Production Change Effective VINs shown below.

Production Change Information

PLANT	PRODUCTION CHANGE EFFECTIVE VIN
Tsutsumi	JTHBA30G#50024455
Kanto	JTHBA30G#55077938

Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME	QTY
58908–32050	58908–32020	Lock Assembly, Console Compartment Door	1

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
BD4024	Replace Center Console Lock	0.2	58908–32050	62	12

Applicable Warranty*:

This repair is covered under the Lexus Comprehensive Warranty. This warranty is in effect for 48 months or 50,000 miles, whichever occurs first, from the vehicle's in-service date.

* Warranty application is limited to correction of a problem based upon a customer's specific complaint.

LEXUS

Technical Service Information Bulletin

November 10, 2005

Title:

SEAT COVER REPLACEMENT FOR SIDE AIRBAG EQUIPPED VEHICLES

Models:

'97 – '06 All Lexus Models

TSIB UPDATE NOTICE:

The information contained in this TSIB supercedes TSIB No. BO004-98. TSIB No. BO004-98 is now obsolete and should be discarded.

Introduction

Beginning in 1997, Lexus introduced side airbags for the LS 400. Starting with 1998, all Lexus vehicles are equipped with side airbags as standard equipment.

Lexus does **NOT** recommend replacement of original seat covers* with non-Lexus leather or other seat cover materials due to the following:

- Seat covers NOT recommended by Lexus may affect side airbag performance, in general or in part, during an accident.
- Modifications that negatively affect side airbag performance can result in severe occupant injuries.
- Seat covers are an integral part of this safety system. Replacing original seat covers* with non-Lexus leather or other seat cover materials may compromise the effectiveness of this safety system.
- The design of the seat is complex, integrating safety and strength with comfort and luxury.

***NOTE:**

Lexus original seat covers that were NOT designed for side airbag equipped seats cannot be used due to the effect on proper airbag performance.

Lexus strongly discourages modifying original equipment seats that have side airbags.

Additionally, Lexus strongly advises against the installation or use of aftermarket seat covers, which could impair the performance of the side airbags in the event of an accident.

Applicable Vehicles

- All **1997 – 2006** model year **Lexus** vehicles.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

LEXUS

Technical Service Information Bulletin

February 16, 2005

Title:

M.I.L. "ON" DTC P0031, P0051, P2238, AND/OR P2241

Models:

'04 – '05 ES 330

TSIB

Introduction

Under certain driving conditions, some 2004 and 2005 model year ES 330 vehicles may exhibit a M.I.L. "ON" with at least one of the following DTCs:

- P0031 (Oxygen Sensor Heater Control Circuit Low [Bank 1, Sensor 1])
- P0051 (Oxygen Sensor Heater Control Circuit Low [Bank 2, Sensor 1])
- P2238 (Oxygen Sensor Pumping Current Circuit Low (for A/F Sensor) [Bank 1, Sensor 1])
- P2241 (Oxygen Sensor Pumping Current Circuit Low (for A/F Sensor) [Bank 2, Sensor 1])

The A/F sensor manufacturing process and the Engine Control Module (ECM) (SAE term: Powertrain Control Module/PCM) logic have been modified to improve these conditions.

NOTE:

- **Version 12.01a or later Diagnostic Tester software is required to perform this procedure.**
- **Before proceeding, verify the ECM (PCM) calibration has NOT been updated by checking for the Authorized Modifications Label (shown in step 2 of the Repair Procedure).**

Applicable Vehicles

- **2004** model year **ES 330** vehicles.
- **2005** model year **ES 330** vehicles produced **BEFORE** the Production Change Effective VIN shown below.

Production Change Information

MODEL	PRODUCTION CHANGE EFFECTIVE VIN
2005 ES 330	JTHBA30G*55086805

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
EG4029	Recalibrate ECM (PCM) Engine, R & R Both A/F Sensors	1.6	89661–33A40 89661–33A41 89661–33B30	8A	99

Applicable Warranty*:

This repair is covered under the Lexus Federal Emissions Warranty. This warranty is in effect for 96 months or 80,000 miles, whichever occurs first, from the vehicle's in-service date.

* Warranty application is limited to correction of a problem based upon a customer's specific complaint.

Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME	QTY
89467–33110	Same	Sensor, Air Fuel Ratio, Rear (Bank 1)	1
89467–33100	Same	Sensor, Air Fuel Ratio, Front (Bank 2)	1
N/A	00451–00001–LBL	Authorized Modifications Label	1

NOTE:

Authorized Modification Labels may be ordered in packages of 25 from the Materials Distribution Center (MDC) through Dealer Daily Dealer Support Materials System or by calling the MDC at 1–800–622–2033.

Required SSTs

SPECIAL SERVICE TOOLS (SSTs)		PART NUMBER	QUANTITY
Lexus Diagnostic Tester Kit*		01001270	1
12 Megabyte Diagnostic Tester Program Card with version 12.01a Software (or later)*		01002593-005	1

* Essential SSTs.

NOTE:

Additional Diagnostic Tester Kits, Program Cards, or other SSTs may be ordered by calling SPX/OTC at 1-800-933-8335.

Calibration Identification Chart

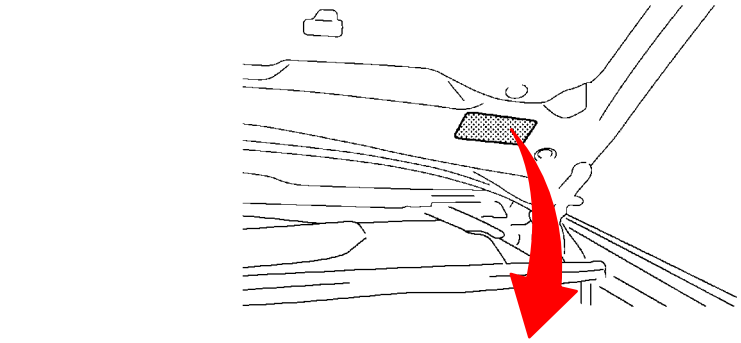
ENGINE	ECM (CPU)	PREVIOUS CALIBRATION ID	NEW CALIBRATION ID
3MZ–FE	Main	33350000 33350100 33360000	33360100
	Sub	53334000	53340000

NOTE:

- **Although the calibration description in the Calibration Update Wizard and on the Diagnostic Tester reads "04 ES 330," these calibrations apply to 2004 and 2005 model year ES 330 vehicles produced before the Production Change Effective VIN shown on page 1 of this TSIB.**
- **2004 model year ES 330 vehicles, which have been flash reprogrammed using the procedures in this TSIB, will contain upgraded 2005 model year OBD II logic. Refer to the 2005 model year ES 330 Repair Manual information on the Technical Information System (TIS) when checking Powertrain Diagnostic Trouble Codes (DTCs) on 2004 model year vehicles that have been reprogrammed.**

Repair Procedure

1. Replace both Bank 1, Sensor 1 and Bank 2, Sensor 1 air fuel ratio sensors.
2. Check for the Authorized Modifications Label affixed to the vehicle in the location shown in Figure 1. Confirm if ECM (PCM) calibration has been updated. If not the latest ECM (PCM) calibration — go to step 3.



Replacement ECM (PCM) Part Number

Calibration ID(s)

TOYOTA MOTOR CORPORATION
AUTHORIZED MODIFICATIONS
THE FOLLOWING MODIFICATIONS HAVE BEEN MADE:
89661–33A40
33360100, 53340000
THESE MODIFICATIONS HAVE BEEN APPROVED AS APPROPRIATE BY EPA AND CARB
DEALER CODE: DATE:
CHANGE AUTHORITY: *TSIB EG003–05*

Date Completed

Dealer Code

TSIB Number

Figure 1. Location of Authorized Modifications Label on 2004 ES 330

Repair Procedure (Continued)

3. Connect the Diagnostic Tester to the vehicle and select CURRENT ECU CAL from the ECU REPROGRAM MAIN MENU. Determine the vehicle's current ECU calibration (see Figure 2).
   – The sample screen prints seen below are the 12.01a software version and may differ from subsequent software versions.

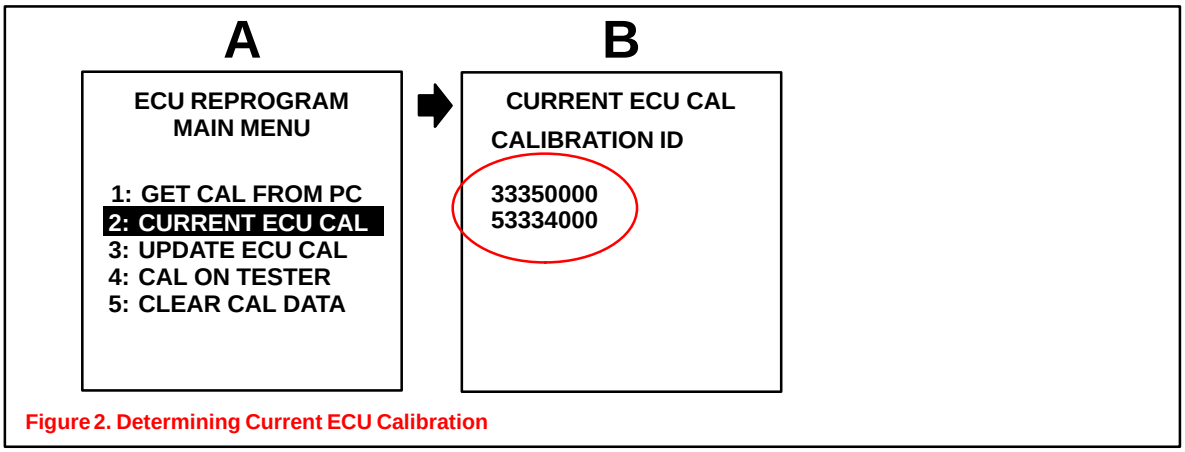


Figure 2. Determining Current ECU Calibration

NOTE:
- **If Calibration ID matches "Previous Calibration ID" as shown in Calibration Identification Chart on page 2, proceed with flash reprogramming.**
- **If Calibration ID matches "New Calibration ID" as shown in Calibration Identification Chart, this vehicle has already been programmed. Refer to TIS for diagnostic procedures applicable to any stored DTCs.**

4. If ECU calibration ID is not the same as the "New Calibration ID" listed previously, proceed to Flash Reprogram ECM (PCM).

5. Flash Reprogram ECM (PCM)

A. Follow the procedures outlined in TSIB No. SS001–01, *"ECU Flash Reprogramming Process,"* and flash the ECM (PCM) with the new calibration file update.

B. Enter the required information on the Authorized Modifications Label and affix it to the vehicle at the location shown in Figure 1 (page 3). The Authorized Modifications Label is available through the MDC, P/N 00451–00001–LBL.

6. Follow the procedures outlined in TSIB No. EG012–04, *"Entering VIN During ECM (PCM) Replacement and/or DTC P0630,"* and write the VIN to the ECM (PCM).

7. The repair is complete. Test drive vehicle to confirm normal operation.

LEXUS

Technical Service Information Bulletin

March 15, 2005

Title:

M.I.L. "ON" DTC P0346

Models:

'04 – '05 ES 330

TSIB

ENGINE

EG006-05

Introduction

Under certain driving conditions, some 2004 and 2005 model year ES 330 vehicles may exhibit a M.I.L. "ON" with the following DTC:

- P0346 (Camshaft Position Sensor "A" Circuit Range/Performance [Bank 2])

The Engine Control Module (ECM) (SAE term: Powertrain Control Module/PCM) logic have been modified to change this condition.

NOTE:

- **Version 12.01a or later Diagnostic Tester software is required to perform this procedure.**
- **Before proceeding, verify the ECM (PCM) calibration has NOT been updated by checking for the Authorized Modifications Label (shown in step 1 of the Repair Procedure).**

Applicable Vehicles

- **2004** model year **ES 330** vehicles.
- **2005** model year **ES 330** vehicles produced **BEFORE** the Production Change Effective VIN shown below.

Production Change Information

MODEL	PRODUCTION CHANGE EFFECTIVE VIN
2005 ES 330	JTHBA30G*55086805

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
EG5013	Recalibrate ECM (PCM) Engine	0.8	89661–33A40 89661–33A41 89661–33B30	8A	99

Applicable Warranty*:

This repair is covered under the Lexus Federal Emissions Warranty. This warranty is in effect for 96 months or 80,000 miles, whichever occurs first, from the vehicle's in-service date.

* Warranty application is limited to correction of a problem based upon a customer's specific complaint.

Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME	QTY
N/A	00451–00001–LBL	Authorized Modifications Label	1

NOTE:

Authorized Modification Labels may be ordered in packages of 25 from the Materials Distribution Center (MDC) through Dealer Daily Dealer Support Materials System or by calling the MDC at 1–800–622–2033.

Required SSTs

SPECIAL SERVICE TOOLS (SSTs)	PART NUMBER	QUANTITY
Lexus Diagnostic Tester Kit*	01001270	1
12 Megabyte Diagnostic Tester Program Card with version 12.01a Software (or later)*	01002593-005	1

* Essential SSTs.

NOTE:

Additional Diagnostic Tester Kits, Program Cards, or other SSTs may be ordered by calling SPX/OTC at 1-800-933-8335.

Calibration Identification Chart

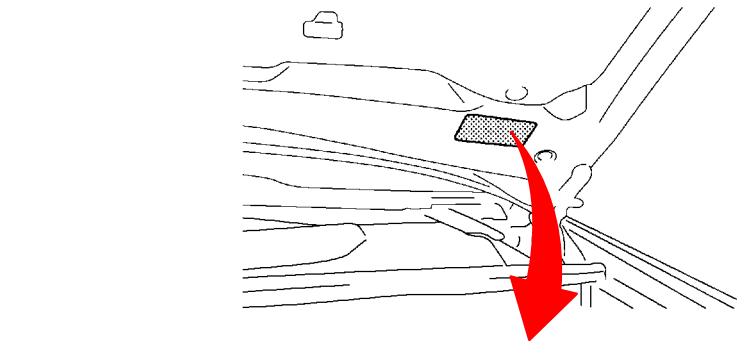
ENGINE	ECM (CPU)	PREVIOUS CALIBRATION ID	NEW CALIBRATION ID
3MZ–FE	Main	33350000 33350100 33360000	33360100
	Sub	53334000	53340000

NOTE:

- **Although the calibration description in the Calibration Update Wizard and on the Diagnostic Tester reads "04 ES 330," these calibrations apply to 2004 and 2005 model year ES 330 vehicles produced before the Production Change Effective VIN shown on page 1 of this TSIB.**
- **2004 model year ES 330 vehicles, which have been flash reprogrammed using the procedures in this TSIB, will contain upgraded 2005 model year OBD II logic. Refer to the 2005 model year ES 330 Repair Manual information on the Technical Information System (TIS) when checking Powertrain Diagnostic Trouble Codes (DTCs) on 2004 model year vehicles that have been reprogrammed.**

Repair Procedure

1. Check for the Authorized Modifications Label affixed to the vehicle in the location shown in Figure 1. Confirm if ECM (PCM) calibration has been updated. If not the latest ECM (PCM) calibration — go to step 2.



Replacement ECM (PCM) Part Number

Calibration ID(s)

TOYOTA MOTOR CORPORATION
AUTHORIZED MODIFICATIONS
THE FOLLOWING MODIFICATIONS HAVE BEEN MADE:
89661–33A40
33360100, 53340000
THESE MODIFICATIONS HAVE BEEN APPROVED AS APPROPRIATE BY EPA AND CARB
DEALER CODE: DATE:
CHANGE AUTHORITY: *TSIB EG006–05*

Date Completed

Dealer Code

TSIB Number

Figure 1. Location of Authorized Modifications Label on 2004 ES 330

Repair Procedure (Continued)

2. Connect the Diagnostic Tester to the vehicle and select CURRENT ECU CAL from the ECU REPROGRAM MAIN MENU. Determine the vehicle's current ECU calibration (see Figure 2).
   – The sample screen prints seen below are the 12.01a software version and may differ from subsequent software versions.

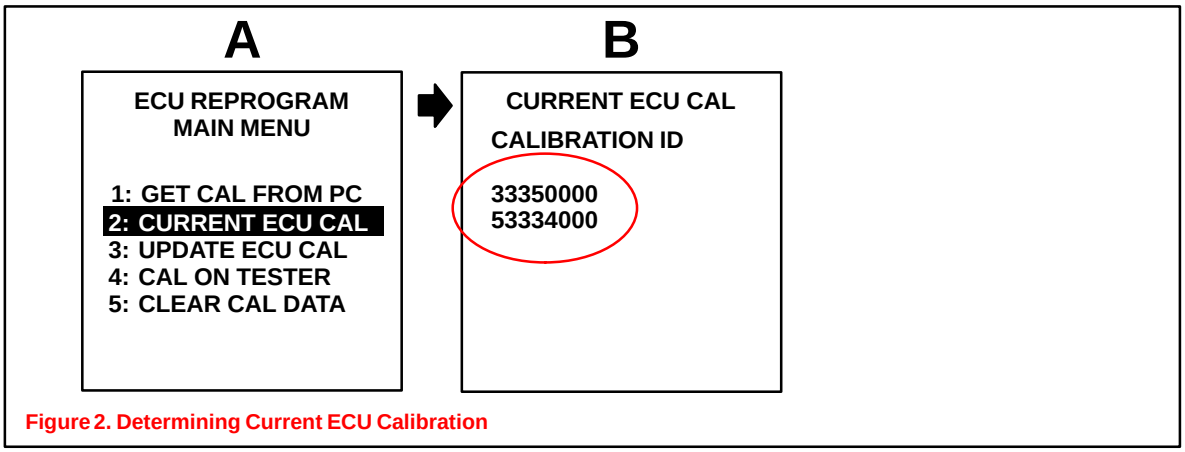


Figure 2. Determining Current ECU Calibration

NOTE:
- **If Calibration ID matches "Previous Calibration ID" as shown in Calibration Identification Chart on page 2, proceed with flash reprogramming.**
- **If Calibration ID matches "New Calibration ID" as shown in Calibration Identification Chart, this vehicle has already been programmed. Refer to TIS for diagnostic procedures applicable to any stored DTCs.**

3. If ECU calibration ID is not the same as the "New Calibration ID" listed previously, proceed to Flash Reprogram ECM (PCM).

4. **Flash Reprogram ECM (PCM)**
   A. Follow the procedures outlined in TSIB No. SS001–01, *"ECU Flash Reprogramming Process,"* and flash the ECM (PCM) with the new calibration file update.
   B. Enter the required information on the Authorized Modifications Label and affix it to the vehicle at the location shown in Figure 1 (page 3). The Authorized Modifications Label is available through the MDC, P/N 00451–00001–LBL.

5. Follow the procedures outlined in TSIB No. EG012–04, *"Entering VIN During ECM (PCM) Replacement and/or DTC P0630,"* and write the VIN to the ECM (PCM).

6. The repair is complete. Test drive vehicle to confirm normal operation.

Technical Service Information Bulletin
March 28, 2005

Title:
RADIATOR CAP INSPECTION

Models:
All Models

TSIB

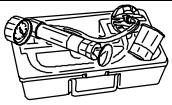
Introduction

The procedure for inspecting the radiator cap has been revised. Please refer to the following procedures when inspecting the radiator cap on all Lexus models.

Applicable Vehicles

- **All Lexus models.**

Required Equipment

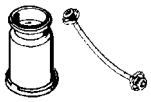
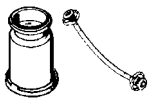
MANUFACTURER	EQUIPMENT	QTY
Snap–On/Sun SVTS262A (or equivalent)	Cooling System Tester (Radiator Cap Tester) 	1

NOTE:
Additional Lexus Approved Dealer Equipment may be ordered by calling Lexus Approved Dealer Equipment at 1–800–368–6787.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Required SSTs

ITEM NO.	SPECIAL SERVICE TOOLS (SSTs)	PART NUMBER	QTY	DRW**
1	**Radiator Cap Test Set*** 	09230–00030–02	1	7
2	**Radiator Cap Test Set (Small)*** 	09230–00020–02	1	7

* Essential SSTs.

** Refers to drawer number in SST Storage System.

NOTE:

Additional SSTs may be ordered by calling SPX/OTC at 1-800-933-8335.

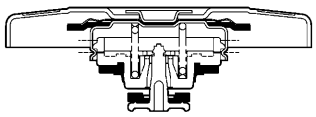
Radiator Cap Identification Procedure

1. Use the illustration below to identify the vehicle's radiator cap type and kPa rating.
2. Proceed to the required inspection procedure for the radiator cap and kPa rating.

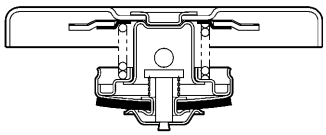
Radiator Cap Identification

kPa Rating

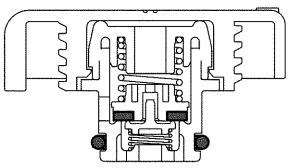
N–Cap



Compact Cap

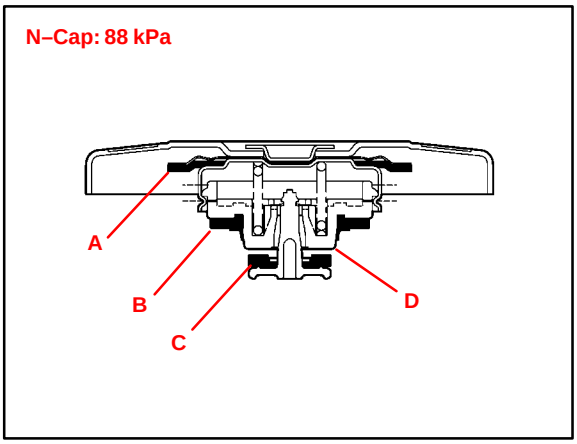


Plastic Cap



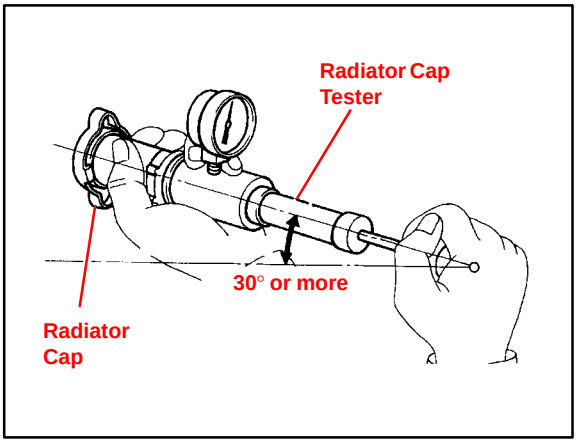
Radiator Cap Inspection Procedure

Type: N–cap, 88 kPa



1. Remove coolant and any foreign material on rubber points "A," "B," and "C."
2. Check that points "A," "B," and "C" are not deformed, cracked, or swollen.
3. Check that points "C" and "D" are not stuck together.
4. Apply engine coolant to points "B" and "C" before using the radiator cap tester.
   - Radiator Cap Tester: Snap–On/Sun P/N SVTS262A (or equivalent)
5. Before installing the radiator cap tester, use the applicable radiator cap adaptor provided in the following SST kits in conjunction with the radiator cap tester:
   - SST P/N 09230–00030–02 (09231–10080–01) or 09230–00020–02 (09231–10060–01)
6. When using the radiator cap tester, tilt it more than 30 degrees.
7. Pump the radiator cap tester several times, and check the maximum pressure.

   Pumping speed: 1 pump/second



HINT:

Stop pumping when the valve opens and read the gauge. The gauge must be within the standard values listed below when the pressure valve opens. The cap is considered OK when the pressure holds steady or falls very slowly, but holds within the standard values listed below for one minute.

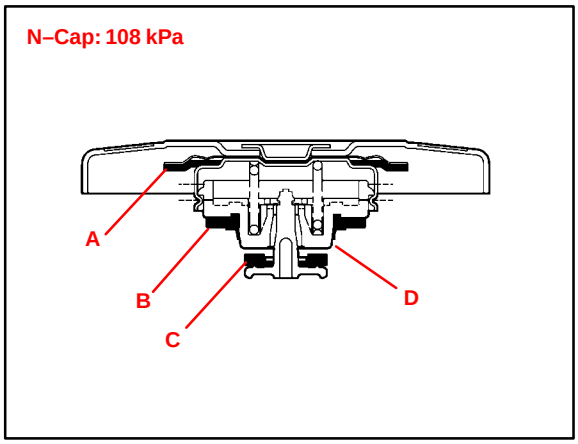
Specification:

VALVE OPENING PRESSURE	SPECIFIED CONDITION
Standard value (for brand–new cap)	74.0 to 103.0 kPa (0.75 to 1.05 kgf/cm^2, 10.7 to 14.9 psi)
Minimum standard value (for in–service cap)	59 kPa (0.60 kgf/cm^2, 8.53 psi)

If the maximum pressure is less than the minimum standard value, replace the radiator cap sub–assembly.

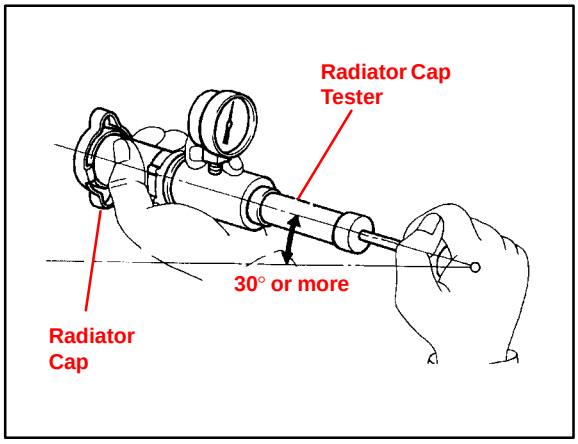
Radiator Cap Inspection Procedure (Continued)

Type: N–cap, 108 kPa



1. Remove coolant and any foreign material on rubber points "A," "B," and "C."
2. Check that points "A," "B," and "C" are not deformed, cracked, or swollen.
3. Check that points "C" and "D" are not stuck together.
4. Apply engine coolant to points "B" and "C" before using the radiator cap tester.
   - Radiator Cap Tester: Snap–On/Sun P/N SVTS262A (or equivalent)
5. Before installing the radiator cap tester, use the applicable radiator cap adaptor provided in the following SST kits in conjunction with the radiator cap tester:
   - SST P/N 09230–00030–02 (09231–10080–01) or 09230–00020–02 (09231–10060–01)
6. When using the radiator cap tester, tilt it more than 30 degrees.
7. Pump the radiator cap tester several times, and check the maximum pressure.

   Pumping speed: 1 pump/second



HINT:

Stop pumping when the valve opens and read the gauge. The gauge must be within the standard values listed below when the pressure valve opens. The cap is considered OK when the pressure holds steady or falls very slowly, but holds within the standard values listed below for one minute.

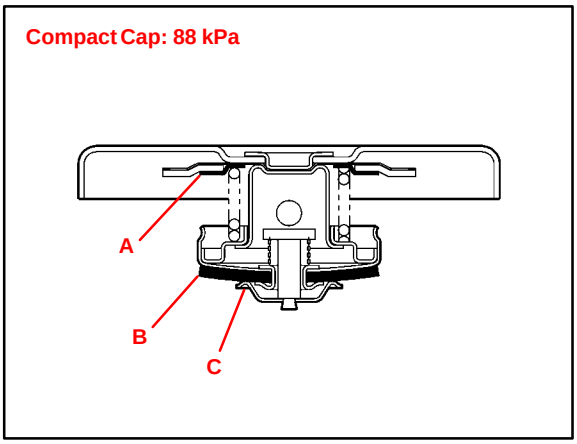
Specification:

VALVE OPENING PRESSURE	SPECIFIED CONDITION
Standard value (for brand–new cap)	93.3 to 122.7 kPa (0.95 to 1.25 kgf/cm^2, 13.5 to 17.8 psi)
Minimum standard value (for in–service cap)	78.5 kPa (0.80 kgf/cm^2, 11.38 psi)

If the maximum pressure is less than the minimum standard value, replace the radiator cap sub–assembly.

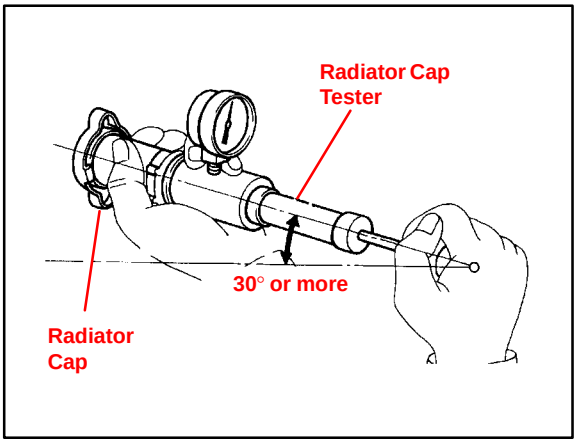
Radiator Cap Inspection Procedure (Continued)

Type: Compact Cap, 88 kPa



1. Remove coolant and any foreign material on rubber points "A," "B," and "C."
2. Check that points "A" and "B" are not deformed, cracked, or swollen.
3. Check that points "B" and "C" are not stuck together.
4. Apply engine coolant to point "B" before using the radiator cap tester.
   - Radiator Cap Tester: Snap–On/Sun P/N SVTS262A (or equivalent)
5. Before installing the radiator cap tester, use the applicable radiator cap adaptor provided in the following SST kits in conjunction with the radiator cap tester:
   - SST P/N 09230–00030–02 (09231–10080–01) or 09230–00020–02 (09231–10060–01)
6. When using the radiator cap tester, tilt it more than 30 degrees.
7. Pump the radiator cap tester several times, and check the maximum pressure.

   Pumping speed: 1 pump/second



HINT:

Stop pumping when the valve opens and read the gauge. The gauge must be within the standard values listed below when the pressure valve opens. The cap is considered OK when the pressure holds steady or falls very slowly, but holds within the standard values listed below for one minute.

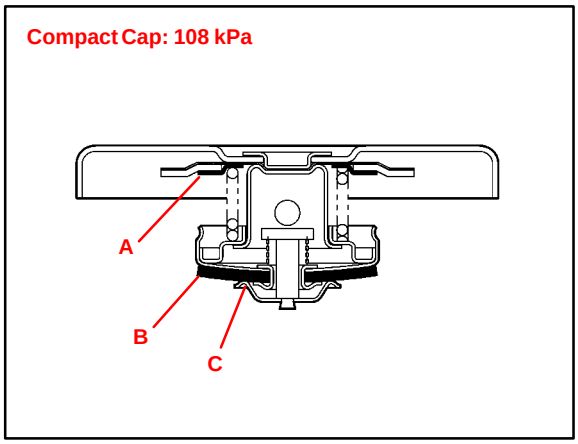
Specification:

VALVE OPENING PRESSURE	SPECIFIED CONDITION
Standard value (for brand–new cap)	74.0 to 103.0 kPa (0.75 to 1.05 kgf/cm^2, 10.7 to 14.9 psi)
Minimum standard value (for in–service cap)	59 kPa (0.60 kgf/cm^2, 8.53 psi)

If the maximum pressure is less than the minimum standard value, replace the radiator cap sub–assembly.

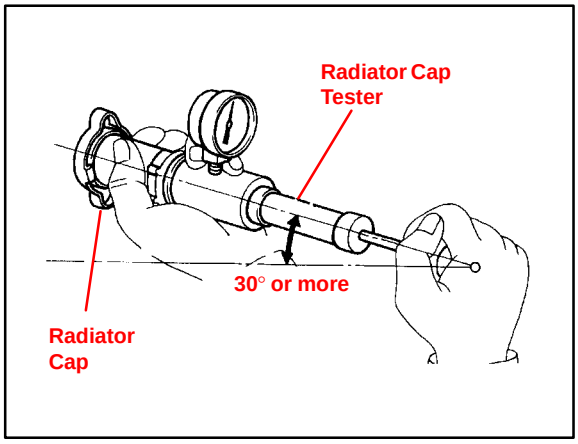
Radiator Cap Inspection Procedure (Continued)

Type: Compact Cap, 108 kPa



1. Remove coolant and any foreign material on rubber points "A," "B," and "C."
2. Check that points "A" and "B" are not deformed, cracked, or swollen.
3. Check that points "B" and "C" are not stuck together.
4. Apply engine coolant to point "B" before using the radiator cap tester.
   - Radiator Cap Tester: Snap–On/Sun P/N SVTS262A (or equivalent)
5. Before installing the radiator cap tester, use the applicable radiator cap adaptor provided in the following SST kits in conjunction with the radiator cap tester:
   - SST P/N 09230–00030–02 (09231–10080–01) or 09230–00020–02 (09231–10060–01)
6. When using the radiator cap tester, tilt it more than 30 degrees.
7. Pump the radiator cap tester several times, and check the maximum pressure.

   Pumping speed: 1 pump/second



HINT:

Stop pumping when the valve opens and read the gauge. The gauge must be within the standard values listed below when the pressure valve opens. The cap is considered OK when the pressure holds steady or falls very slowly, but holds within the standard values listed below for one minute.

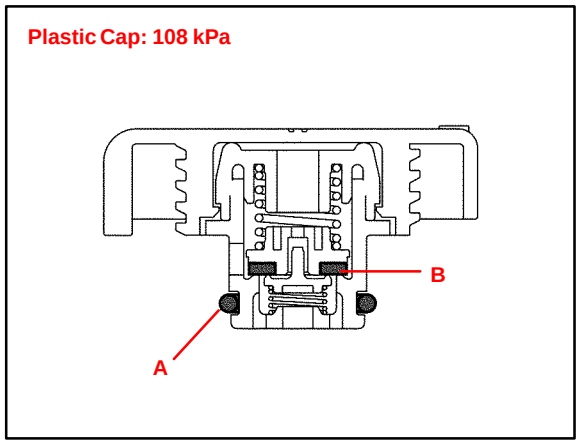
Specification:

VALVE OPENING PRESSURE	SPECIFIED CONDITION
Standard value (for brand–new cap)	93.3 to 122.7 kPa (0.95 to 1.25 kgf/cm^2, 13.5 to 17.8 psi)
Minimum standard value (for in–service cap)	78.5 kPa (0.80 kgf/cm^2, 11.38 psi)

If the maximum pressure is less than the minimum standard value, replace the radiator cap sub–assembly.

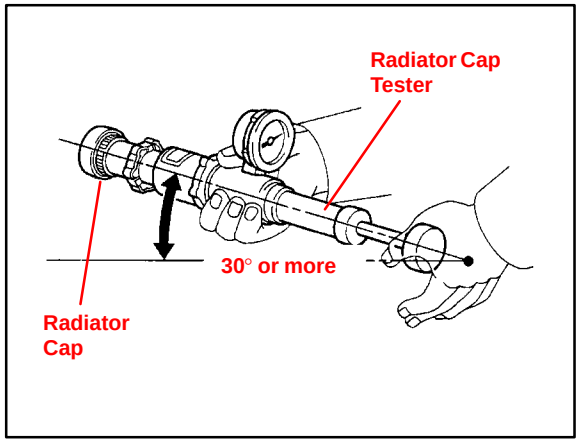
Radiator Cap Inspection Procedure (Continued)

Type: Plastic Cap, 108 kPa



1. Remove coolant and any foreign material on O–ring "A."
2. Check that O–ring "A" is not deformed, cracked, or swollen.
3. Apply engine coolant to O–ring "A" and rubber point "B" before using the radiator cap tester.
   - Radiator Cap Tester: Snap–On/Sun P/N SVTS262A (or equivalent)
4. Before installing the radiator cap tester, use the applicable radiator cap adaptor provided in the following SST kits in conjunction with the radiator cap tester:
   - SST P/N 09230–00030–02 (09231–10080–01) or 09230–00020–02 (09231–10060–01)
5. When using the radiator cap tester, tilt it more than 30 degrees.
6. Pump the radiator cap tester several times, and check the maximum pressure.

   Pumping speed: 1 pump/second



HINT:

Stop pumping when the valve opens and read the gauge. The gauge must be within the standard values listed below when the pressure valve opens. The cap is considered OK when the pressure holds steady or falls very slowly, but holds within the standard values listed below for one minute.

Specification:

VALVE OPENING PRESSURE	SPECIFIED CONDITION
Standard value (for brand–new cap)	93.3 to 122.7 kPa (0.95 to 1.25 kgf/cm^2, 13.5 to 17.8 psi)
Minimum standard value (for in–service cap)	78.5 kPa (0.80 kgf/cm^2, 11.38 psi)

If the maximum pressure is less than the minimum standard value, replace the radiator cap sub–assembly.

LEXUS

Technical Service Information Bulletin

October 14, 2004

Title:

MAIN BEARING JOURNAL DIAMETER STAMPING LOCATION REVISION

Models:

'04 – '05 ES 330 & RX 330

TSIB

Introduction

The main bearing journal diameter stamp location has been changed on some 2004 and 2005 model year vehicles with 3MZ–FE engines. The stamping on the front of the block has been discontinued. Review this TSB for the stamping location.

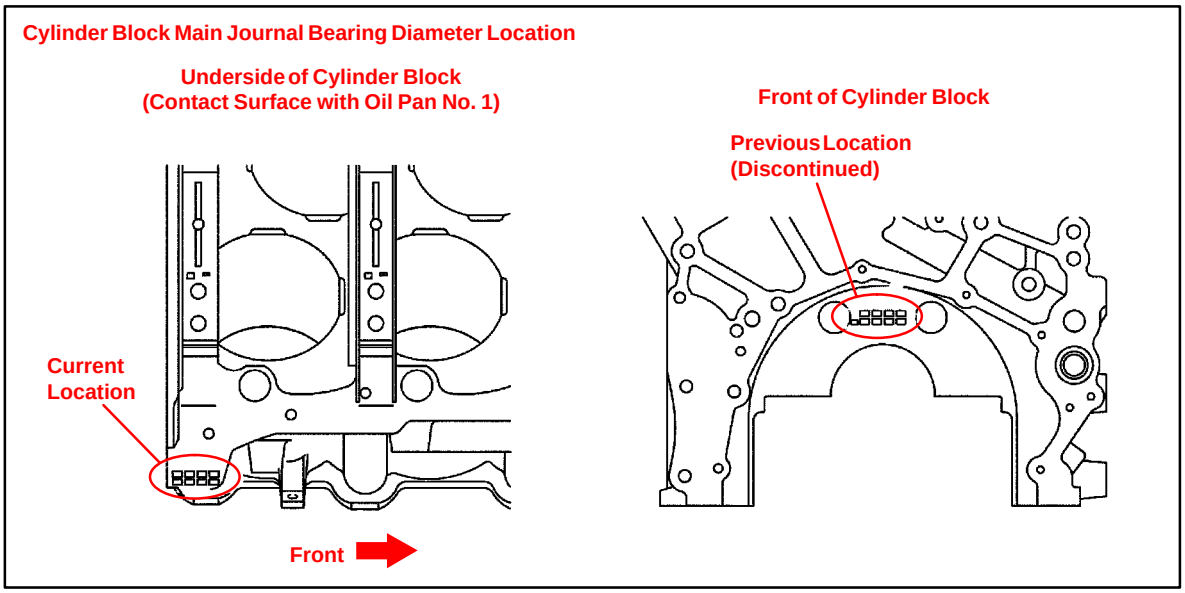
Applicable Vehicles

- **2004 – 2005** model year **ES 330** and **RX 330** vehicles meeting the following specifications:
  - **3MZ–FE** equipped vehicles with **engine serial numbers starting after 0138096**.

Warranty Information

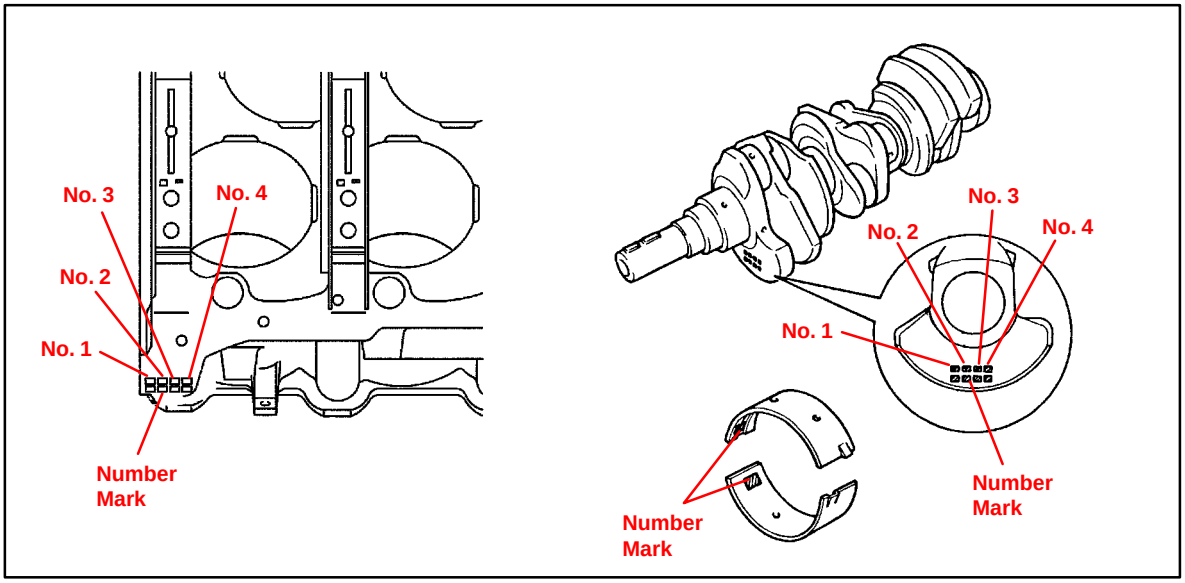
OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Main Bearing Location



HINT:

If replacing a bearing, replace it with one that has 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 on the bottom of this page for the appropriate bearing number. The No. 1 and No. 4 journal bearings have 5 standard bearing sizes, marked 3, 4, 5, 6, and 7 accordingly.
The No. 2 and No. 3 journal bearings have 5 standard bearing sizes, marked 1, 2, 3, 4, and 5 accordingly.



Cylinder Block + Crankshaft =	0 to 5	6 to 11	12 to 17	18 to 23	24 to 28
Replacement Bearing	3	4	5	6	7

EXAMPLE:
Cylinder block imprinted number mark is “06.”
Crankshaft imprinted number mark is “08.”
6 + 8 = 14
Select the bearing marked “5.”

LEXUS

Technical Service Information Bulletin

October 14, 2004

Title:

ENTERING VIN DURING ECM (PCM) REPLACEMENT AND/OR DTC P0630

Models:

All '04 – '06 Models

TSIB

REVISED EG012-04 ENGINE

TSIB REVISION NOTICE:

- **June 3, 2005: Content has been updated to include 2004 and 2006 model year vehicles. Step 4 of the VIN Write Procedure (page 2) and step 3 of the VIN Read Procedure (page 3) have been clarified to include RX 400h vehicles.**

Previous versions of this TSB should be discarded.

Introduction

All 2005 and subsequent model year Lexus vehicles have the VIN (Vehicle Identification Number) stored in the Electronic Control Module (ECM) (SAE term: Powertrain Control Module/PCM) non–volatile memory. The VIN is accessible on the data stream using the Lexus Diagnostic Tester and can also be written to a new ECM (PCM) using a "VIN Read/Write" utility.

Service ECMs (supply parts) are shipped without the VIN; therefore, as part of the ECM (PCM) replacement procedure, the VIN must be written to the replacement ECM (PCM) using the Diagnostic Tester utility function. Failure to write the VIN to the ECM (PCM) will result in a M.I.L. "ON" condition and set DTC P0630: VIN Not Programmed or Mismatch – ECM (PCM).

It is very important to remember to enter the VIN on these vehicles. Vehicles with missing VINs are subject to failing some state and local vehicle emissions Inspection and Maintenance programs.

NOTE:

2004 model year vehicles which have been flash reprogrammed may contain updated 2005 model year OBD II logic. These vehicles will require VIN entry into the ECM (PCM) after reprogramming.

Applicable Vehicles

- **2004** model year vehicles that have been **flash reprogrammed.**
- **All 2005 – 2006** model year vehicles.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Required SSTs

ITEM NO.	SPECIAL SERVICE TOOLS (SSTs)	PART NUMBER	QTY	DRW**
1	**Lexus Diagnostic Tester Kit*** NOTE: • All components from this kit/set are required • 12 Megabyte Diagnostic Tester Program Card (P/N 01002593–005) with version 12.2a Software (or later) is required	LEX220036	1	8
2	**CAN Interface Module Kit*** NOTE: • All components from this kit/set are required	01002744	1	8

* Essential SSTs.

** Refers to drawer number in SST Storage System.

NOTE:

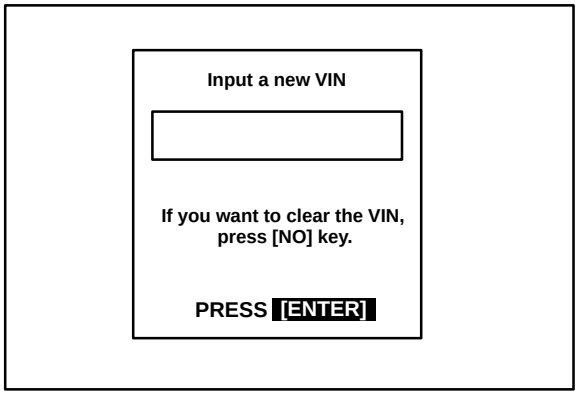
Additional Diagnostic Tester Kits, CAN Interface Modules, Program Cards, or other SSTs may be ordered by calling SPX/OTC at 1-800-933-8335.

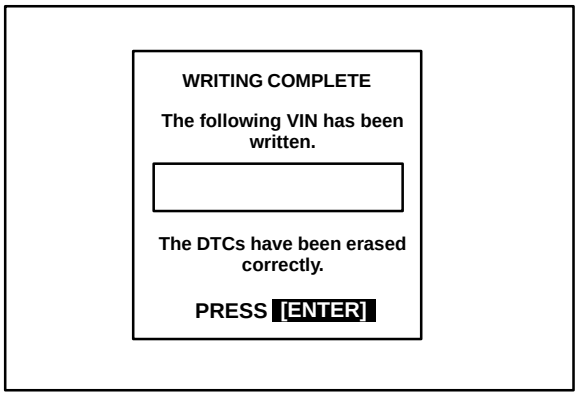
VIN Write Procedure

To write a VIN to a replacement ECM (PCM), use the following process:

1. Confirm the VIN. It is located on the front left of the instrument panel.
2. Connect the Diagnostic Tester to DLC3.
3. Turn the ignition switch and Diagnostic Tester switch ON.
4. **All vehicles except RX 400h:** Select from the Diagnostic Tester menus: DIAGNOSIS, ENHANCED OBDII, VIN, and VIN WRITE.

   RX 400h vehicles: Select from the Diagnostic Tester menus: DIAGNOSIS, OBD/MOBD, HV ECU, VIN, and VIN WRITE.
5. Write the VIN in accordance with the Diagnostic Tester display.
6. Compare the VIN displayed on the Diagnostic Tester with the VIN on the instrument panel. If these are not the same, write the VIN again after turning the ignition switch OFF.

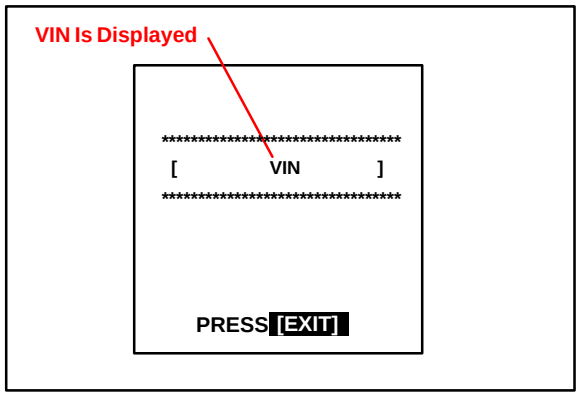




VIN Read Procedure

1. Connect the Diagnostic Tester to DLC3.
2. Turn the ignition switch and Diagnostic Tester switch ON.
3. **All vehicles except RX 400h:**
   Select from the Diagnostic Tester menus: DIAGNOSIS, ENHANCED OBDII, VIN, and VIN READ.

   RX 400h vehicles:
   Select from the Diagnostic Tester menus: DIAGNOSIS, OBD/MOBD, HV ECU, VIN, and VIN READ.
4. Check the VIN displayed on the Diagnostic Tester.



HINT:

For further explanations, refer to the Technical Information System (TIS), appropriate model repair manual: ***Diagnostics: SFI System: Registration.***

LEXUS

Technical Service Information Bulletin

November 17, 2005

Title:

M.I.L. "ON" DTC P0171, P0174, P2195, OR P2197

Models:

'05 – '06 ES 330

TSIB

Introduction

Under certain driving conditions, some 2005 and 2006 model year ES 330 vehicles may exhibit a M.I.L. "ON" condition with at least one of the following DTCs:

- P0171 (System Too Lean [Bank 1])
- P0174 (System Too Lean [Bank 2])
- P2195 (Oxygen [A/F] Sensor Signal Stuck Lean [Bank 1, Sensor 1])
- P2197 (Oxygen [A/F] Sensor Signal Stuck Lean [Bank 2, Sensor 1])

The Air Fuel (A/F) sensor manufacturing process has been improved to correct this condition. The following repair procedures should be used to properly diagnose and repair the affected vehicles.

Applicable Vehicles

- **2005 – 2006** model year **ES 330** vehicles produced **BEFORE** the Production Change Effective VIN shown below.

Production Change Information

MODEL	ENGINE	PRODUCTION CHANGE EFFECTIVE VIN
ES 330	3MZ–FE	JTHBA3#G#65148433

Parts Information

MODEL	ENGINE	PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME	QTY
ES 330	3MZ–FE	89467–33100	Same	Sensor, Air Fuel Ratio (Bank 1)	1
		89467–33110	Same	Sensor, Air Fuel Ratio (Bank 2)	1

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
895131	R & R A/F Sensor	0.6	89467–33100 89467–33110	8A	71

Applicable Warranty*:

This repair is covered under the Lexus Comprehensive Warranty. This warranty is in effect for 48 months or 50,000 miles, whichever occurs first, from the vehicle's in-service date.

* Warranty application is limited to correction of a problem based upon a customer's specific complaint.

Required SSTs

ITEM NO.	SPECIAL SERVICE TOOLS (SSTs)	PART NUMBER	QTY	DRW**
1	**Lexus Diagnostic Tester Kit*** NOTE: • All components from this kit/set are required • 12 Megabyte Diagnostic Tester Program Card (P/N 01002593–005) with version 13.0a Software (or later) is required	LEX220036	1	8
2	**CAN Interface Module Kit*** NOTE: • All components from this kit/set are required	01002744	1	8

* Essential SSTs.

** Refers to drawer number in SST Storage System.

NOTE:

Additional Diagnostic Tester Kits, CAN Interface Modules, Program Cards, or other SSTs may be ordered by calling SPX/OTC at 1-800-933-8335.

Repair Procedure

DTC P0171 or P0174

Refer to the Technical Information System (TIS), 2005 or 2006 model year ES 330 Repair Manual: *Diagnostics: SFI System (3MZ–FE): P0171, P0174.*

NOTE:

Only replace the A/F sensor indicated by the M.I.L. "ON" DTC(s).

DTC P2195 or P2197

Refer to TIS, 2005 or 2006 model year ES 330 Repair Manual: *Diagnostics: SFI System (3MZ–FE): P2195, P2197.*

NOTE:

Only replace the A/F sensor indicated by the M.I.L. "ON" DTC(s).

Technical Service Information Bulletin
February 22, 2005

Title:
PASSENGER AIRBAG INDICATOR LAMP

Models:
'04 – '05 ES 330 & RX 330

TSIB

ELECTRICAL
EL002-05

Introduction

The passenger airbag indicator lamp may switch from ON to OFF for front seat passengers weighing approximately less than 100 pounds, depending on their seating position. It is important for the front seat passengers to know that proper operation of the advanced frontal airbag system is highly dependent on the pressure placed on the seat bottom. Situations that add or subtract sensed weight can result in occupant misclassification. To minimize this situation:

- Check seating posture.
  - Passengers should be seated upright with their back against the seatback and feet on the floor.
- Check loading conditions.
  - Extra weight from items such as bags or groceries or toys hanging on the seatback can add to the sensed weight of the front seat passenger.
  - A rear seat passenger lifting the front seat with their legs, objects placed under the front seat, or the front seatback in contact with the rear seat can subtract from the sensed weight of the front seat passenger.

If the passenger airbag indicator lamp continues to switch ON to OFF after checking the above conditions, perform the following repair procedure.

NOTE:

<u>The safest place for children is in the rear seat.</u> Please note that Lexus recommends that you <u>NEVER</u> install a rear–facing child restraint in the front passenger seat, even if the passenger "Airbag OFF" lamp is illuminated. Please refer to the Owner's Manual for additional details.

Applicable Vehicles

- **2004 – 2005** model year **ES 330** and **RX 330** vehicles produced **BEFORE** the Production Change Effective VINs shown on the following page.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
EL4014	R & R Occupant Detection ECU	0.7	89952–33010 89952–48010	8A	74

Applicable Warranty*:

This repair is covered under the Lexus Comprehensive Warranty. This warranty is in effect for 48 months or 50,000 miles, whichever occurs first, from the vehicle's in-service date.

* Warranty application is limited to correction of a problem based upon a customer's specific complaint.

Production Change Information

MODEL	PLANT	DRIVETRAIN	PRODUCTION CHANGE EFFECTIVE VIN
ES 330	Tsutsumi	2WD	JTHBA30G#50024130
	Kanto		JTHBA30G#55068000
RX 330	TMK	2WD	JTJGA3#U#50046500
		4WD	JTJHA3#U#50076003
	TMMC	2WD	2T2GA3#U#5C021700
		4WD	2T2HA3#U#5C046800

Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME	QTY
89952–33010	89952–33011	Occupant Detection Computer	1
89952–48010	89952–48011		1

Required SSTs

SPECIAL SERVICE TOOLS (SSTs)	PART NUMBER	QUANTITY
Lexus Diagnostic Tester Kit*	01001270	1
12 Megabyte Diagnostic Tester Program Card with version 12.01a Software (or later)*	01002593-005	1
Occupant Seat Weight Set*	00002–09077–01	1

* Essential SSTs.

NOTE:

Additional Diagnostic Tester Kits, Program Cards, or other SSTs may be ordered by calling SPX/OTC at 1-800-933-8335.

Repair Procedure

1. Unfasten passenger seat and rock the assembly back providing access to the underside of the seat. For information to unfasten the passenger seat, refer to the Technical Information System (TIS): 2004 – 2005 model year ES 330 or RX 330 Repair Manual: *Seat: Front Seat Assembly LH: Overhaul.*
2. Disconnect the negative terminal of the vehicle battery.
3. Disconnect electrical connectors from Occupant Detection ECU.
4. Remove and replace the Occupant Detection ECU.
5. Reinstall the seat assembly. For more information, refer to TIS: 2004 – 2005 model year ES 330 or RX 330 Repair Manual: *Seat: Front Seat Assembly LH: Overhaul.*

   Torque: 36.8 N•m (375 kgf•cm, 27 ft•lbf)
6. Reconnect the negative terminal of the vehicle battery.
7. Perform Zero Point Calibration and Sensitivity Check following prompts in the Diagnostic tool found under the Occupant Detect menu item (refer to TSIB No. EL007–03, "*Occupancy Classification System Calibration (DTC B1150 & B1650)*."
8. Reinitialize systems affected by the disconnection of the vehicle battery.

LEXUS

Technical Service Information Bulletin

January 31, 2003

Title:

PAINT STAINS UNDER RAPGARD™

Models:

'02 – '06 All Models

TSIB

PAINT

REVISED

PA001-03

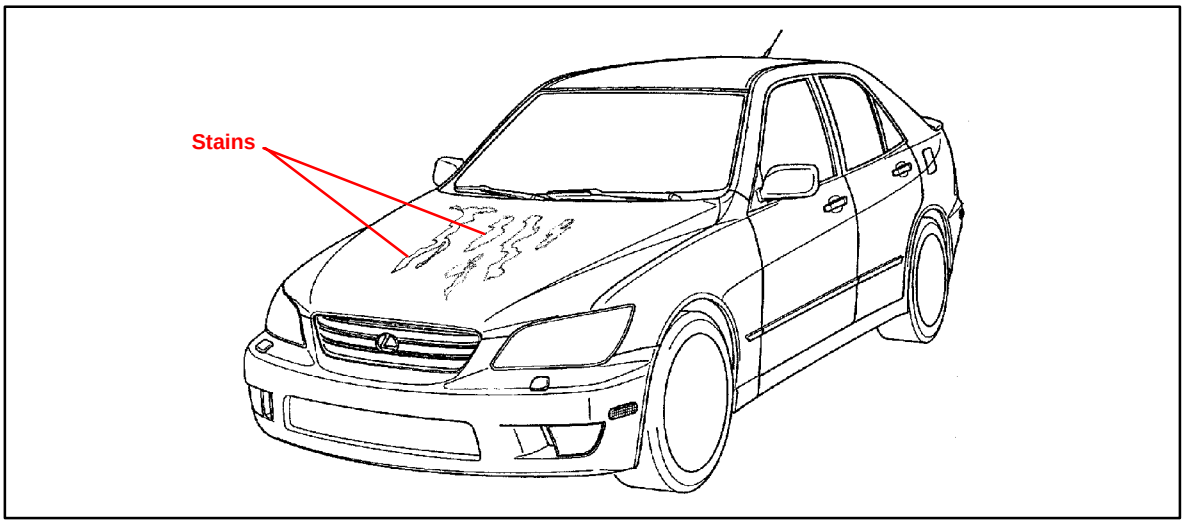
TSIB REVISION NOTICE:

- **May 11, 2005: Applicable Vehicles has been updated to include 2004 – 2006 model years.**

The previous TSB should be discarded.

Introduction

On some vehicles, when Rapgard™ is removed, the paint may have a stained appearance under the clear coat. These stains should not be considered a defect in the paint (clear coat or color coat). Wrinkles in the Rapgard™ sometimes trap water and cause the paint to stain from the trapped moisture, especially on horizontal surfaces, such as the hood, roof, and trunk. Stains can be removed by heating the stained surface to remove the trapped moisture.



Applicable Vehicles

- **2002 – 2006** model year vehicles, **all models.**

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
BD1055	Remove Paint Stain Under Rapgard™	0.6	53301–######	67	99

Applicable Warranty*:

This repair is covered under the Lexus Comprehensive Warranty. This warranty is in effect for 48 months or 50,000 miles, whichever occurs first, from the vehicle's in-service date.

* Warranty application is limited to correction of a problem based upon a customer's specific complaint.

Required Tools & Material

TOOLS & MATERIALS	QUANTITY
Infrared Lamp or Heat Gun	1
Aluminum Foil or Damp Cloth	1
Thermometer	1

Repair Procedure

1. Use the aluminum foil or damp cloth to cover plastic/rubber parts that are near the stain.

2. Apply heat to the stain using an infrared lamp or heat gun.

> **NOTE:**
> **Apply heat for 5 – 10 minutes at 158®F – 176®F (70®C – 80®C). Do NOT allow the surface to become hotter than 176®F (80®C). Measure the temperature with a thermometer.**

3. After applying heat for 5 minutes, examine the area to determine if the stain has been removed. If the stain still exists, continue to apply heat and re–examine the stain 5 minutes later.

Technical Service Information Bulletin
January 12, 2005

Title:

IRON PARTICLE RUST CONTAMINATION REPAIR

Models:

'94 – Current

TSIB

Introduction

The purpose of this bulletin is to provide information regarding the proper procedures to clean vehicles that may have been subjected to contamination by airborne iron particles such as rail dust.

Applicable Vehicles

- **1994 – Current** model year **Lexus** vehicles.

Required Tools & Materials

TOOLS & MATERIALS	QUANTITY
Auto Magic® Special Cleaner Concentrate™ #713*	1
Rubber Gloves, Aprons, Boots	As Needed
Eye Protection	
Sponges or Wash Mitts	
Pail or Bucket	

* Contact the main office of Auto Wax Company Inc. (1–800–826–0828 or www.automagic.biz) to find a local source for Auto Magic® Special Cleaner Concentrate.™

Condition

During rail transportation or extended storage near industrial areas, vehicles may occasionally be subjected to contamination by airborne iron particles shed from railroad tracks, train wheels, exposure to heavy machinery facilities, grinding, welding, etc.

Inspection

This type of contamination can be identified by the presence of small red or brown particles on the paint surface. These particles are often difficult to see on dark color paints, but can be easily felt when brushing a hand across horizontal body surfaces such as hood, roof, or deck lid.

CAUTION:

Because of the abrasiveness of these small iron particles, polishing or buffing procedures should not be attempted to repair the paint surface of an affected vehicle. This will result in further paint damage and detract from vehicle appearance.

Repair

Washing the affected paint surfaces with Auto Magic® Special Cleaner Concentrate™ is the recommended method to dislodge embedded iron particles and remove the surrounding rust stains. The correct usage of Auto Magic® Special Cleaner Concentrate™ is described in this bulletin.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

General Precautions

WARNING:

Auto Magic® Special Cleaner Concentrate™ is a corrosive material. Appropriate personal protection equipment must be worn to protect persons performing the contamination removal procedure. Please refer to the precautions on the product prior to use.

CAUTION:

Consult local or state regulations regarding the handling, use, and disposal of Auto Magic® Special Cleaner Concentrate™ prior to use.

Under no circumstances should contamination removal be performed in direct sunlight or contamination removal solution be allowed to dry on vehicle surfaces, as staining of plastic, rubber, or painted parts may result.

Repair Procedure

1. Move vehicle out of direct sunlight. Initially rinse with cool water then wash with liquid car wash detergent. Rinse again thoroughly with fresh water.

2. Dilute the mixture to a 1:8 ratio for painted surfaces. Use the recommended dilution ratio when applying to any other surface. Apply the diluted cleaner concentrate so that it evenly covers the affected area. Use an appropriate mitt or sponge to agitate the surface.

3. Thoroughly rinse vehicle with fresh water.

4. Inspect vehicle carefully both visually and by feel to determine if all iron particles have been removed. Repeat the wash several times if necessary to achieve complete removal.

5. Dry vehicle with a soft terry cloth towel and apply a non–abrasive, non–silicone glaze to obtain a high–gloss finish.

Technical Service Information Bulletin
July 16, 2004

Title:

WHEEL FILM FOR BRAKE ROTOR RUST PREVENTION

Models:

All Models with Wheel Film

TSIB

PD001-04

PRE–DELIVERY SERVICE

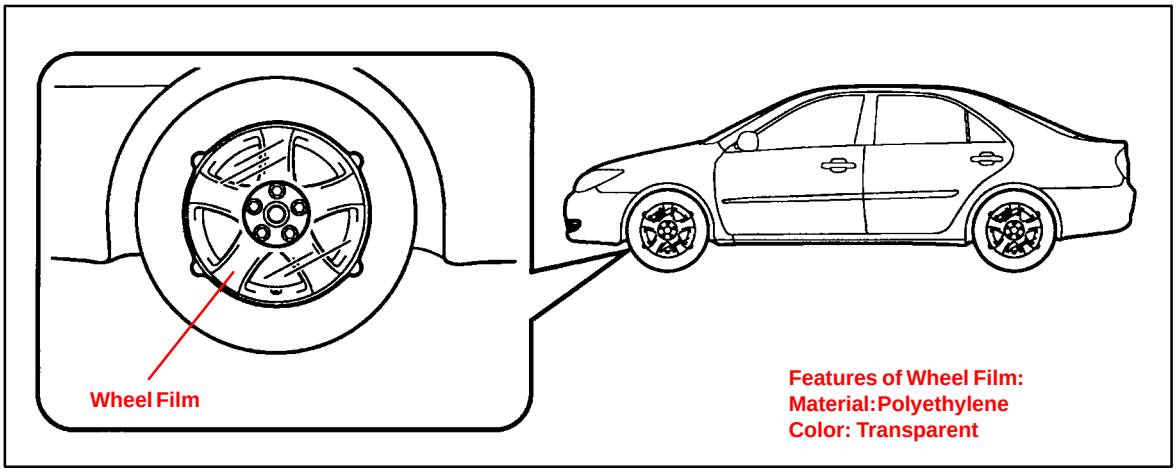
Introduction

To prevent brake rotor rust from forming during transportation and storage, wheel film will be adopted instead of using a cardboard type anti–rust cover.

The purpose of the wheel film is to protect the disc brake rotor from weather elements and initial rust before the vehicle is delivered to the customer. Consequently, the film should remain on the wheel as long as possible.

NOTE:

- **Retain the wheel film on the disc wheel during vehicle display and storage.**
- **Do not remove the wheel film right away at Pre–Delivery Service (PDS) if the vehicle will be stored after PDS.**
- **Remove the wheel film just prior to delivery to customers.**



Applicable Vehicles

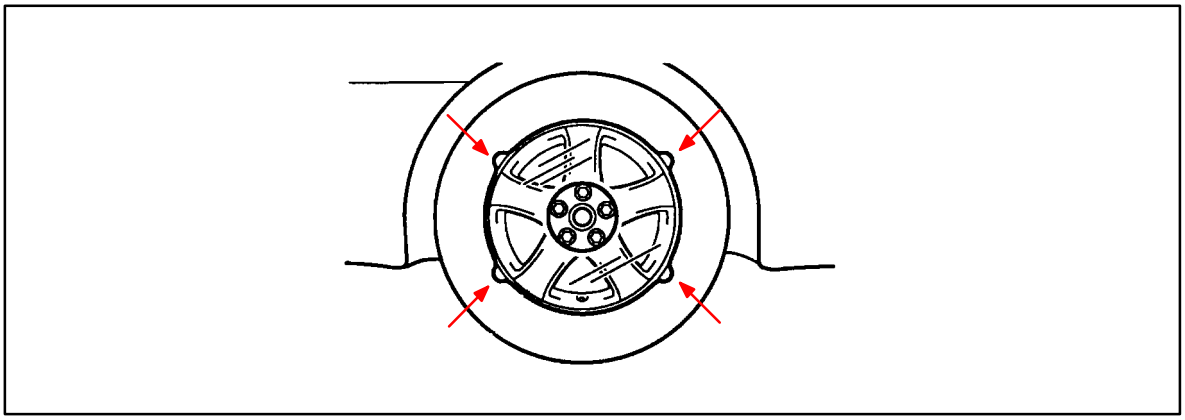
- **All Models** with **wheel film.**

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Removal Procedure

Firmly hold the outer end of the wheel film to pull it off.



NOTE:

- **If film adhesive residue is found on the disc wheel, remove it with a soft cloth dipped in ethyl alcohol (ethanol). Do not use thinner to remove the adhesive residue.**
- **When the wheel film is removed below an ambient temperature of 0®C (32®F), it is possible that the film may tear. For ease of film removal in cold conditions, please warm the film above 0®C (32®F) using one of the following methods:**
  - **Splash (hot) water on the wheel film.**
  - **Warm wheel film with cotton cloth soaked in hot water.**
  - **Warm wheel film with heat gun. Be sure not to overheat the film and wheel.**
  - **Warm wheel film by infrared heater (lamp) for paint. Be sure not to overheat the film and wheel.**
  - **Warm wheel film by steam car wash.**
  - **Park vehicle indoors (e.g. garage, etc.) for an extended period of time.**

Disposal Procedure

Please follow local laws for disposal. Polyethylene film will not generate harmful gasses when it is burned.

Introduction Schedule

MODEL (FRONT & REAR)	PLANT	2003												2004											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
GS 430/300	JAPAN													Beginning January 2005											
GX 470														Beginning January 2005											
LX 470														Beginning January 2005											
RX 330	TMMC																								
	JAPAN																								
SC 430																									

This is a tentative schedule. There is a possibility that the introduction timing may be delayed on some models.

LEXUS

Technical Service Information Bulletin

August 26, 2003

Title:

PRE-DELIVERY SERVICE (PDS) INFORMATION FOR ES 330

Models:

'04 ES 330

TSIB

Introduction

The following items need to be performed during Pre–Delivery Service (PDS) on 2004 model year ES 330 vehicles.

Applicable Vehicles

- **2004** model year **ES 330** vehicles.

Contents

ITEM NO.	SUBJECT	PAGE
1	D.C.C. Fuse Installation During PDS	2
2	Removal of Front Emergency Towing Eyelet and Installation of Towing Eyelet Hole Cover (Performed at Port)	3
3	Front License Plate Mounting Bracket Installation	4
4	Initialization of Moon Roof	5
5	Initial Calibration of Compass	6
6	Installation of Rubber Body Plugs	9

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

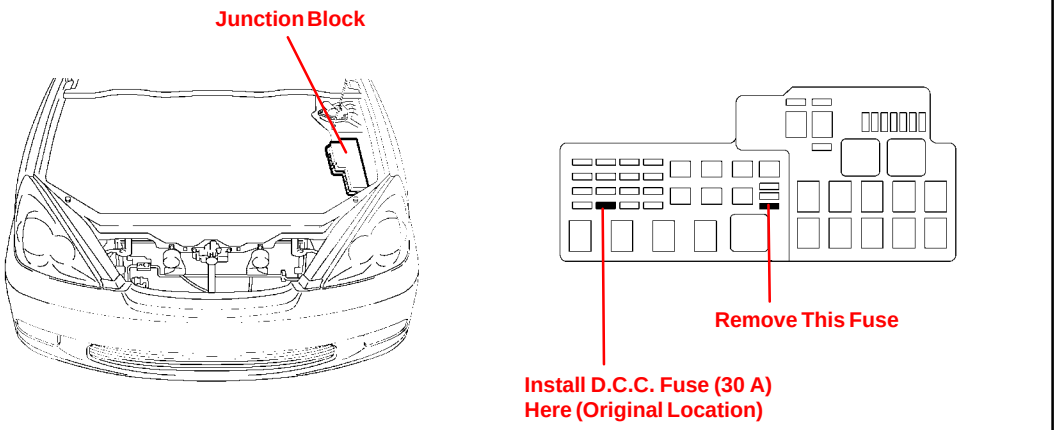
ITEM NO. 1: D.C.C. FUSE INSTALLATION DURING PDS

Introduction

The D.C.C. fuse has been removed at the assembly plant to reduce parasitic current draw in transit and storage.

Installation Procedure

The removed D.C.C. fuse (30 A) is stored in the blank space of the Junction Block in the engine compartment. The D.C.C. fuse must be reinstalled during Pre–Delivery Service (PDS) in the dealership as shown below.



NOTE:

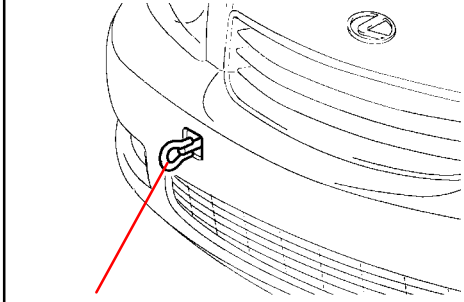
- **Removing the D.C.C. fuse cuts off power sources relating to the Dome, ECU–B and RAD No. 1 fuses.**
- **If the vehicle is stored in the dealership for a long period of time after PDS, disconnect the negative battery terminal to prevent battery discharge. Refer to TSIB PG009–02 for battery maintenance information.**

ITEM NO. 2: REMOVAL OF FRONT EMERGENCY TOWING EYELET AND INSTALLATION OF TOWING EYELET HOLE COVER (PERFORMED AT PORT)

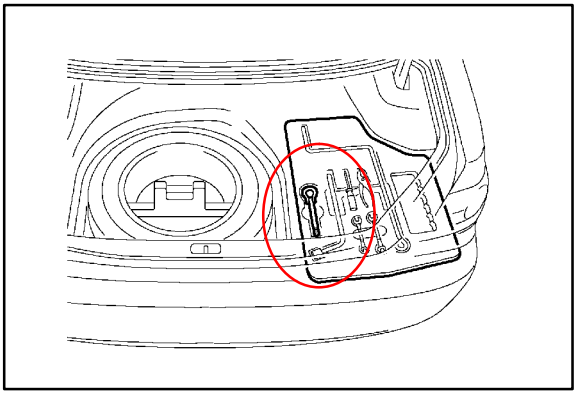
Installation Procedure

1. Remove the emergency towing eyelet from the front bumper by turning counterclockwise.

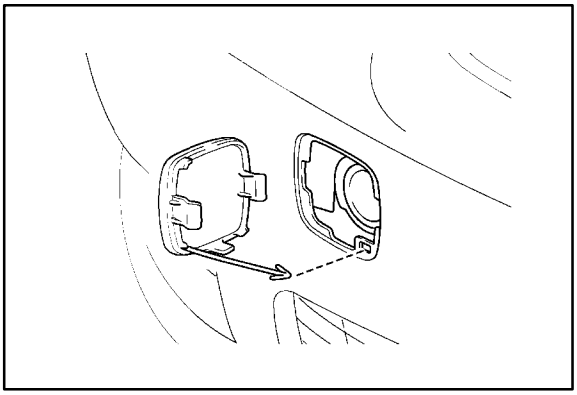
NOTE:
If it is hard to loosen the emergency towing eyelet, use a steel bar.



2. Place the removed emergency towing eyelet in the tool tray in the luggage compartment.



3. Install the front towing eyelet hole cover which is stored in the glove box onto the front bumper as shown in the diagram.



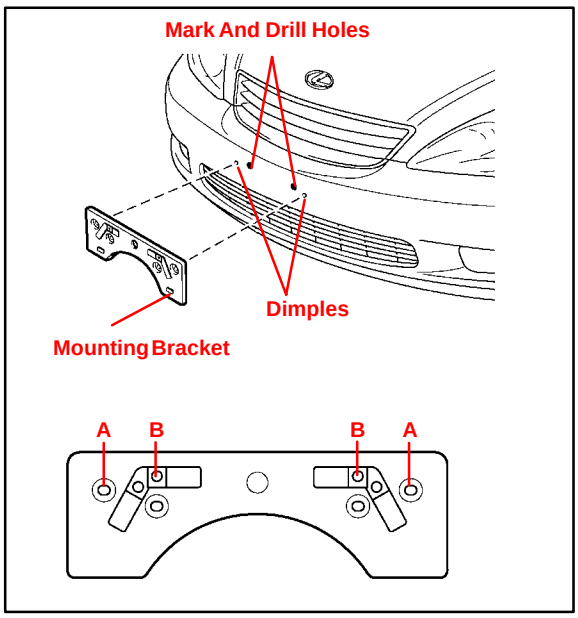
ITEM NO. 3: FRONT LICENSE PLATE MOUNTING BRACKET INSTALLATION

Introduction

The front license plate bracket and two self tapping screws are included in the luggage compartment.

Installation Procedure

1. Aligning the holes “A” of the mounting bracket with the dimples on the front bumper cover, mark the location of the holes “B” on the front bumper cover.



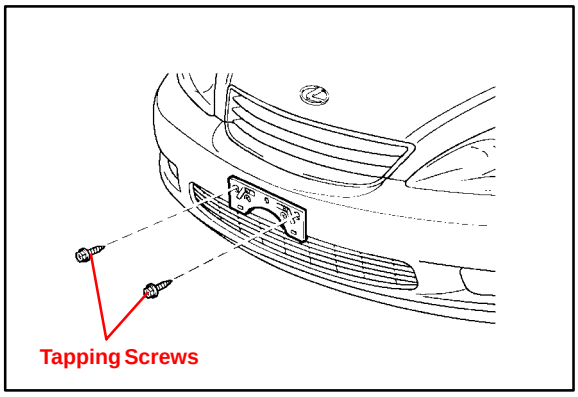
NOTE:
- **Holes “A” are used for installation of the mounting bracket to the bumper cover.**
- **Holes “B” are used for installation of the front license plate to the mounting bracket.**

2. Drill two relief holes with a diameter of 12 mm (0.47 in.) at the marks on the front bumper cover to prevent the license plate retaining bolt end from contacting the cover.

NOTE:
Do not drill the dimples on the front bumper cover.

3. Install the mounting bracket to the front bumper cover using the two self tapping screws.

   Install the front license plate to the mounting bracket using bolts of the following dimensions:



   Length: less than 25 mm (0.98 in.)
   Diameter: 6.0 mm (0.24 in.)
   Pitch: 1.0 mm (0.04 in.)

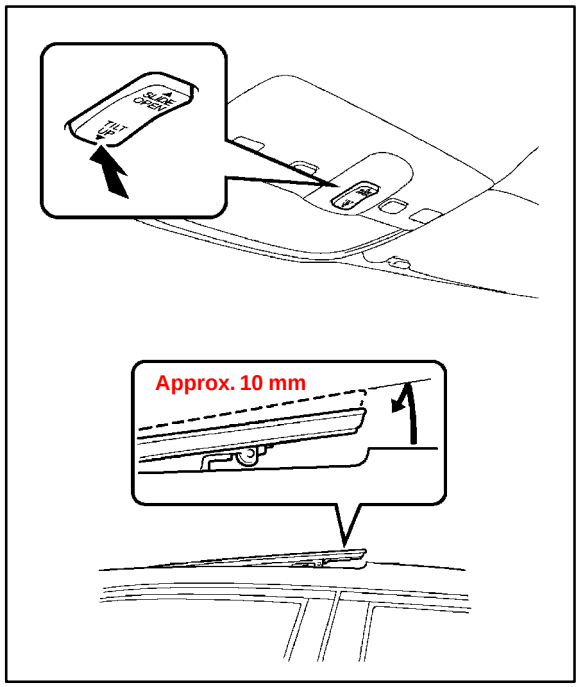
ITEM NO. 4: INITIALIZATION OF MOON ROOF

Introduction

The moon roof is controlled by the sliding roof ECU which detects and memorizes the moon roof position by counting pulses of its motor from the fully tilt–up position as the start position. Once the battery terminal has been disconnected and reconnected, the sliding roof ECU does not detect and memorize the moon roof position, resulting in no functions of the “one–touch tilt up and down,” “one–touch slide open and close” and “jam protection.” Please initialize the moon roof position after reconnecting the battery terminal as outlined below.

Initialization Procedure

1. Turn the ignition switch to the “ON” position.
2. Push and hold the moon roof switch to the “TILT– UP” side until the moon roof tilts all the way up and then tilts down slightly (approximately 10 mm at rear end).
3. Check for proper operation of the “One–touch slide open and close” and “One–touch tilt up and down” functions by pushing the switch briefly to the “SLIDE OPEN” and “TILT UP” positions.



NOTE:

Jam protection function becomes effective through the above initialization procedure.

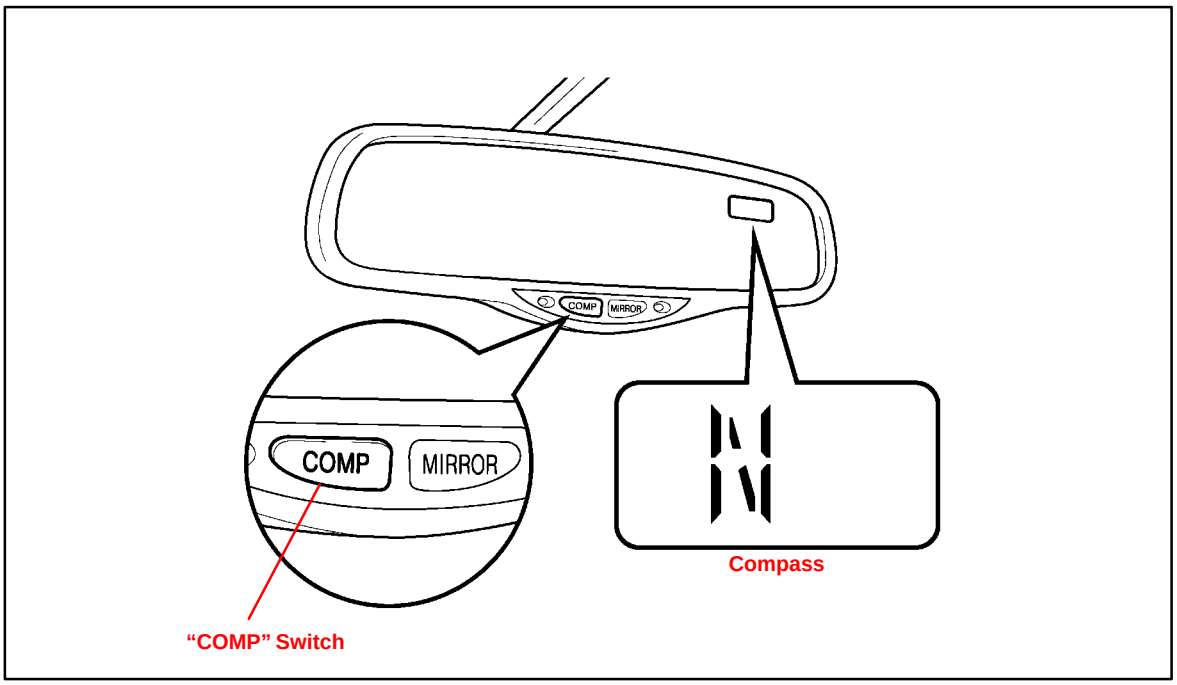
ITEM NO. 5: INITIAL CALIBRATION OF COMPASS

Introduction

The compass indicates the direction that the vehicle is heading by detecting the direction and strength of the earth's magnetic field and processing this data using the compass sensor and microcomputer.

Detection of the direction and strength of the earth's magnetic field varies according to the area in which the vehicle is used and is affected by the residual magnetism of the vehicle. For this reason, the geographic direction displayed may also deviate from the direction determined by the earth's magnetic field according to the area in which the vehicle is used.

Therefore, please perform the initial calibration of the compass in your dealership prior to delivery to customers.

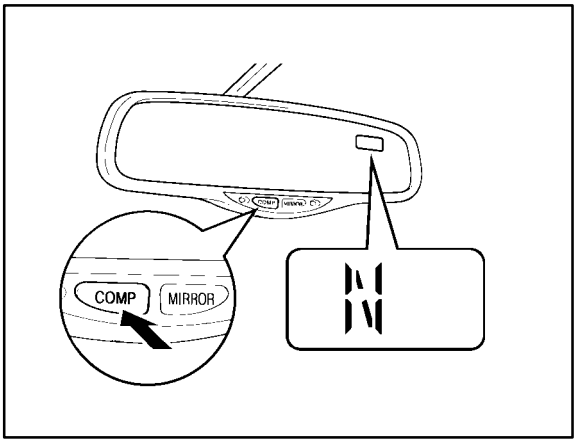


ITEM NO. 5: INITIAL CALIBRATION OF COMPASS (Continued)

Compass Calibration Procedure

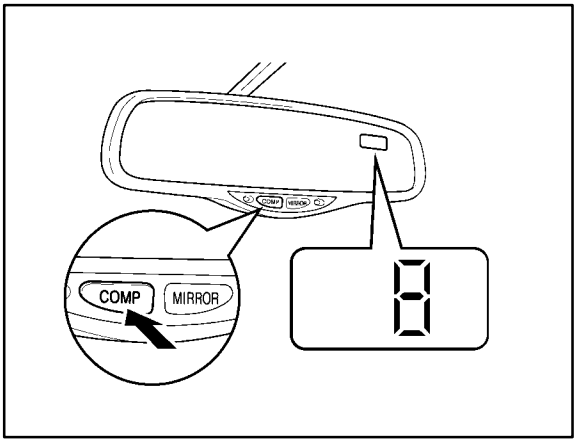
1. Turn the ignition switch to the “ON” position and check that the direction (N, NE, E, SE, S, SW, W, NW) appears on the compass display.

NOTE:
Pushing the “COMP” switch turns on or off the compass display.

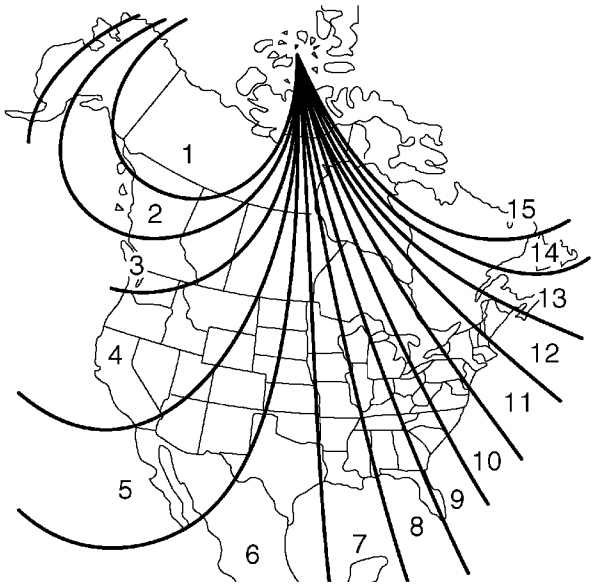


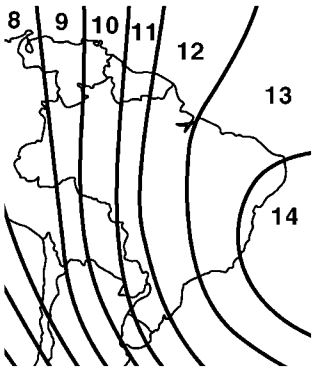
2. Push the “COMP” switch for approximately 3 seconds until the zone number (1 – 15) appears on the display. Then push the switch to select the number of the zone where the vehicle is located.

   See the map below for zone reference.



North America



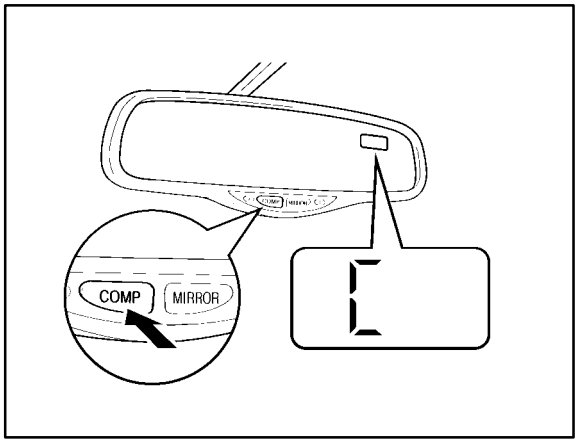


Hawaii:	**5**
Puerto Rico:	**10**
A. Samoa:	**5**
Guam:	**8**
Saipan:	**8**
Taiwan:	**9**
Korea:	**10**

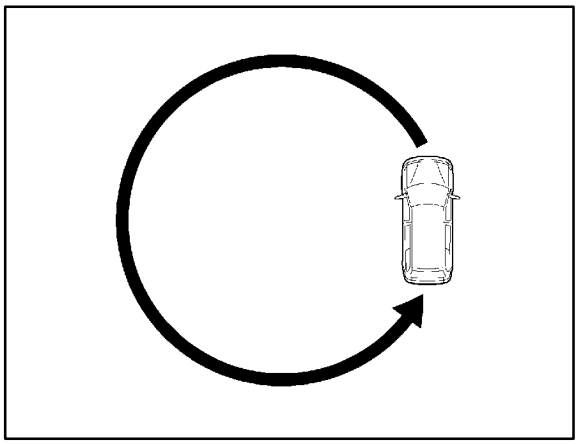
ITEM NO. 5: INITIAL CALIBRATION OF COMPASS (Continued)

Compass Calibration Procedure (Continued)

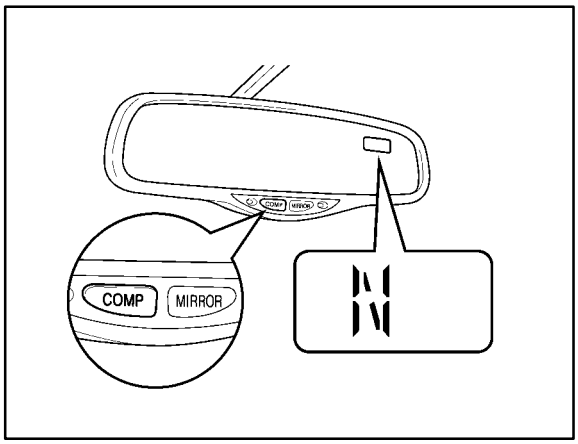
3. Check that the direction appears several seconds after adjustment.
4. Start the engine and push the switch for about 6 seconds until “C” appears on the display.



5. Drive the vehicle slowly at 5 mph, or less, in a circle until the direction is displayed. If there is not enough space to drive in a circle, drive around the block until the direction is displayed.



After driving in circles 1 to 3 times, calibration is complete with the direction shown on the display.



NOTE:

- **Do not perform calibration of the compass in a place where the earth’s magnetic field is subject to interference by artificial magnetic fields (underground parking, under a steel tower, between buildings, roof parking, near a railroad crossing, near a large vehicle, etc.)**
- **During calibration, do not operate electric systems (moon roof, power windows, etc.) as they may interfere with the calibration.**

ITEM NO. 6: INSTALLATION OF RUBBER BODY PLUGS

Introduction

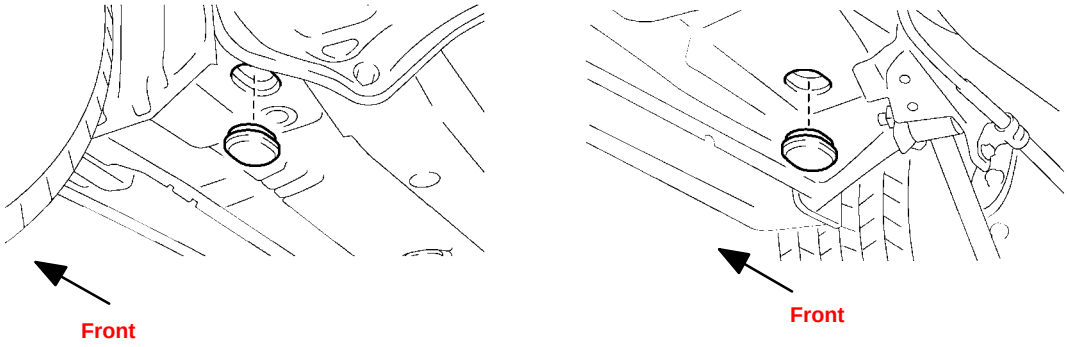
The ES 330 is provided with front and rear torque box holes to tie down the vehicle by wire or carrier truck transportation.

Installation Procedure

Four (4) rubber body plugs are included in the glove compartment at the assembly plant. Install them into the two (2) front and two (2) rear torque box holes during Pre–Delivery Service (PDS).

NOTE:

If the rubber body plugs are not securely installed, road (tire) noise will transfer to the vehicle interior through the torque box holes and rust could occur inside the torque boxes by water entry.



LEXUS

Technical Service Information Bulletin

February 11, 2005

Title:

POWER SYSTEM INITIALIZATION DURING PDS

Models:

'05 All Lexus Models

TSIB

PD010-05

PRE-DELIVERY SERVICE

Introduction

The following is a list of the vehicle systems (Power Window, Sliding Roof, Tire Pressure Warning System, etc.) that need initialization during Pre–Delivery Service (PDS) and the TSIB numbers containing details on initializing each specific system.

NOTE:

Items in RED also need to be initialized any time the battery has been disconnected.

Applicable Vehicles

- All **2005** model year **Lexus** vehicles.

'05 MY Power System Initialization Table

MODEL NAME	INTIALIZATION SYSTEM ITEMS							
	COMPASS	POWER WINDOW	POWER BACK DOOR	SLIDING ROOF	TIRE PRESSURE WARNING SYSTEM		VGRS	SEAT
					DIRECT	INDIRECT		
ES 330	PD002-03	–	–	PD002-03	–	–	–	–
GS 430/300	PG007-00	–	–	–	–	–	–	–
GX 470	PG017-02		–	PG016-02	PD005-03	–	–	–
IS 300	PG022-01	–	–	–	–	–	–	–
LS 430	PG009-01	–	–	–	–	PD003-03	–	PG010-00
LX 470	PG007-00	–	–	–	–	–	PG011-02	–
RX 330	PD005-04	PD003-04	PD002-04	PD004-04	–	PD006-04	–	–
SC 430	PG010-01	–	–	–	PG006-01	–	–	PG005-03

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Technical Service Information Bulletin
August 22, 2005

Title:

DCC FUSE INSTALLATION DURING PDS

Models:

'05 – '06 ES 330

TSIB

PD032-05

PRE-DELIVERY SERVICE

Introduction

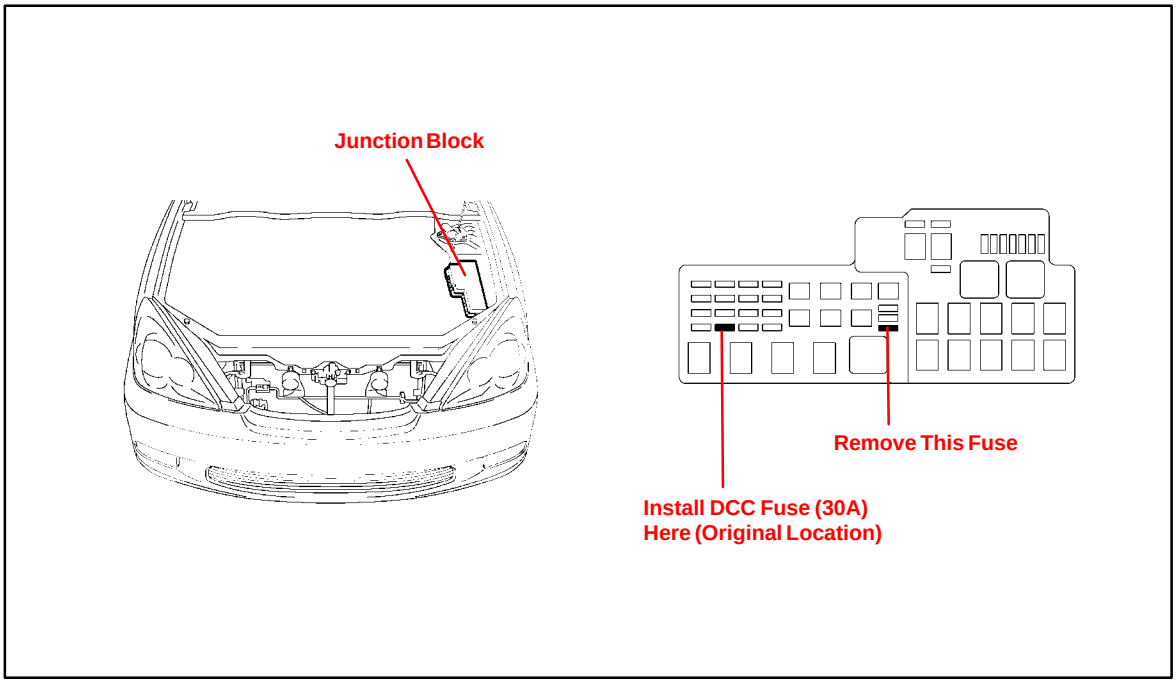
The DCC fuse has been removed at the assembly plant to reduce parasitic current draw in transit and storage.

Applicable Vehicles

- **2005 – 2006** model year **ES 330** vehicles.

Installation Procedure

The removed DCC fuse (30A) is stored in the blank space of the Junction Block in the engine compartment. The DCC fuse must be reinstalled during Pre-Delivery Service (PDS) in the dealership as shown below.



NOTE:

- **Removing the DCC fuse cuts off power sources relating to the DOME, ECU–B, and RAD No. 1 fuses.**
- **If the vehicle is stored in the dealership for a long period of time after PDS, disconnect the negative (–) battery terminal to prevent battery discharge. Refer to TSIB No. PG009–02, "*Battery Maintenance for In-Stock Vehicles & Pre-Delivery,*" for battery maintenance information.**

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Technical Service Information Bulletin
August 22, 2005

Title:

INITIALIZATION OF MOON ROOF DURING PDS

Models:

'05 – '06 ES 330

TSIB

PD033-05

PRE-DELIVERY SERVICE

Introduction

The moon roof is controlled by the sliding roof ECU, which detects and memorizes the moon roof position by counting pulses of its motor from the fully "TILT-UP" position as the start position. Once the battery terminal has been disconnected and reconnected, the sliding roof ECU does not detect and memorize the moon roof position, resulting in no functions of the "one-touch tilt up and down," "one-touch slide open and close," and "jam protection." Initialize the moon roof position after reconnecting the battery terminal as outlined below.

NOTE:

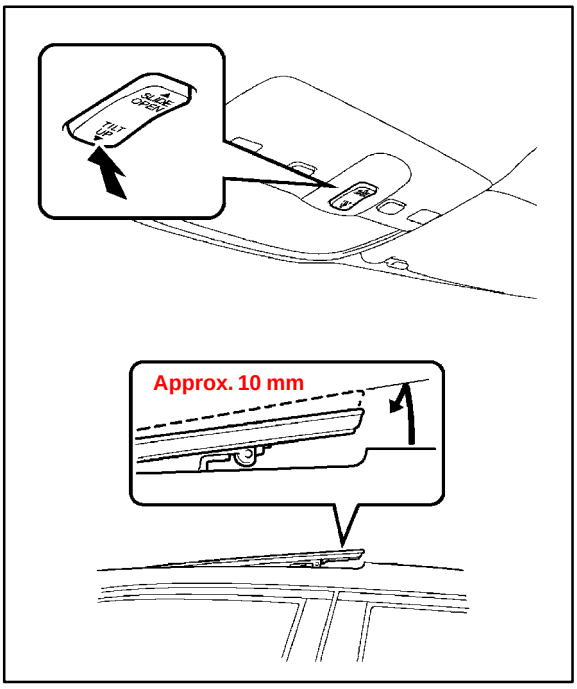
Any time the battery terminal has been disconnected, initialize the moon roof after reconnecting the battery terminal.

Applicable Vehicles

- **2005 – 2006** model year **ES 330** vehicles.

Initialization Procedure

1. Turn the ignition switch to the "ON" position.
2. Push and hold the moon roof switch to the "TILT-UP" side until the moon roof tilts all the way up and then tilts down slightly (approximately 10 mm [0.39 in.] at rear end).
3. Check for proper operation of the "one-touch slide open and close" and "one-touch tilt up and down" functions by pushing the switch briefly to the "SLIDE OPEN" and "TILT-UP" positions.



NOTE:

Jam protection function becomes effective through the above initialization procedure.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

LEXUS

Technical Service Information Bulletin

August 22, 2005

Title:

INITIAL CALIBRATION OF COMPASS DURING PDS

Models:

'05 – '06 ES 330

TSIB

PD034-05

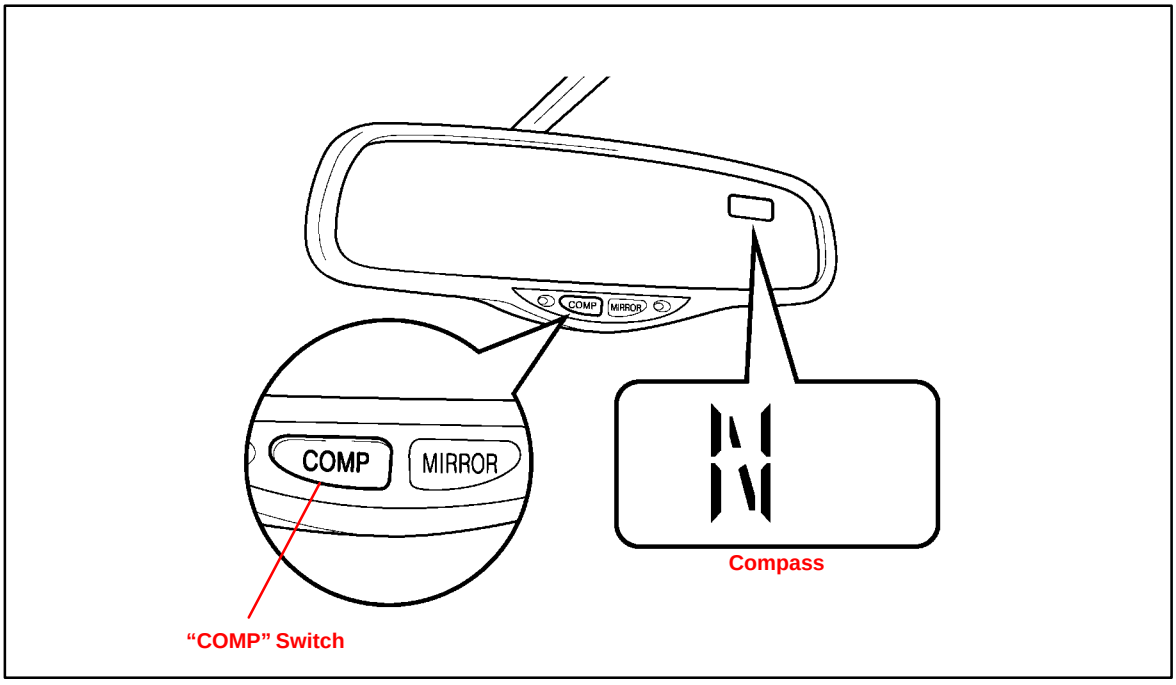
PRE-DELIVERY SERVICE

Introduction

The compass indicates the direction that the vehicle is heading by detecting the direction and strength of the Earth's magnetic field and processing this data using the compass sensor and microcomputer.

Detection of the direction and strength of the Earth's magnetic field varies according to the area in which the vehicle is used and is affected by the residual magnetism of the vehicle. For this reason, the geographic direction displayed may also deviate from the direction determined by the Earth's magnetic field according to the area in which the vehicle is used.

Perform the initial calibration of the compass in your dealership prior to delivery to customers.



Applicable Vehicles

- **2005 – 2006** model year **ES 330** vehicles.

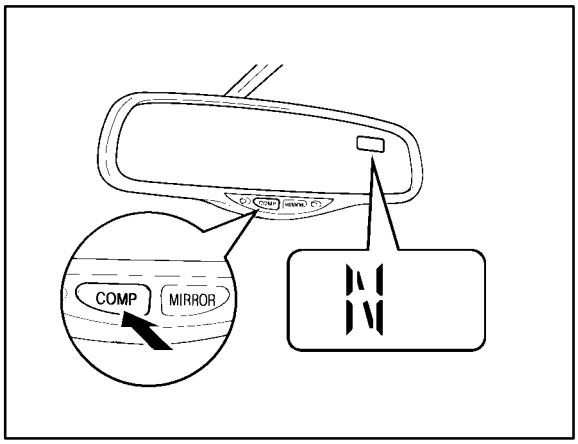
Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Compass Calibration Procedure

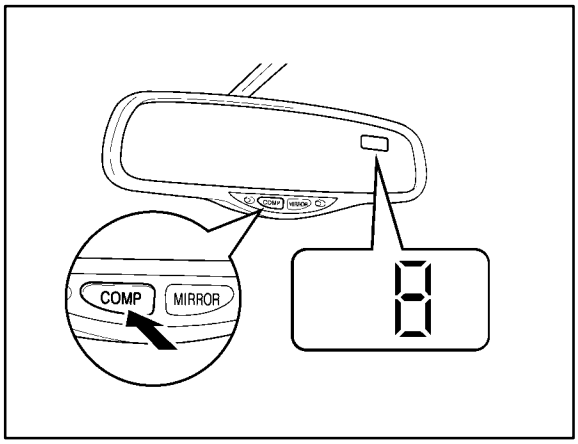
1. Turn the ignition switch to the “ON” position and check that the direction (N, NE, E, SE, S, SW, W, NW) appears on the compass display.

NOTE:
Pushing the “COMP” switch turns the compass display ON or OFF.

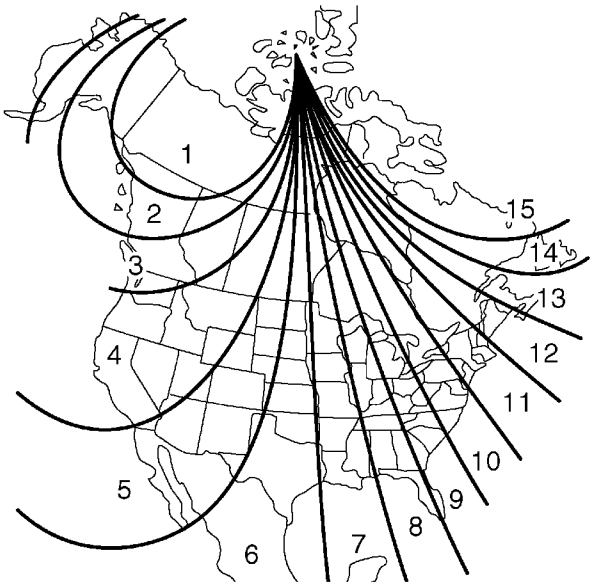


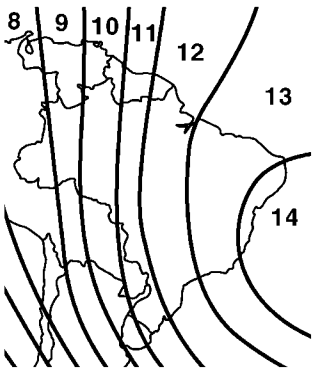
2. Push the “COMP” switch for approximately 3 seconds until the zone number (1 – 15) appears on the display. Then push the switch to select the number of the zone where the vehicle is located.

   See the map below for zone reference.



North America

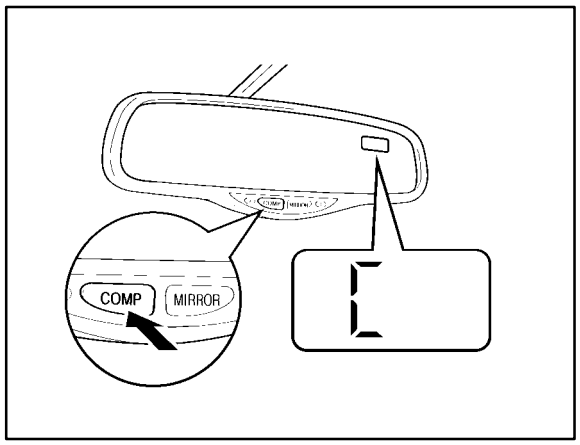




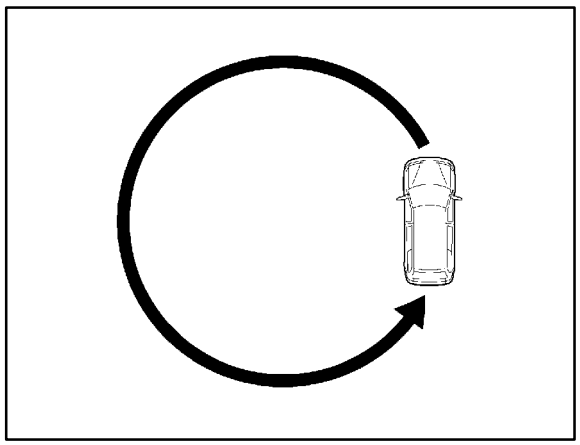
Hawaii:	**5**
Puerto Rico:	**10**
A. Samoa:	**5**
Guam:	**8**
Saipan:	**8**
Taiwan:	**9**
Korea:	**10**

Compass Calibration Procedure (Continued)

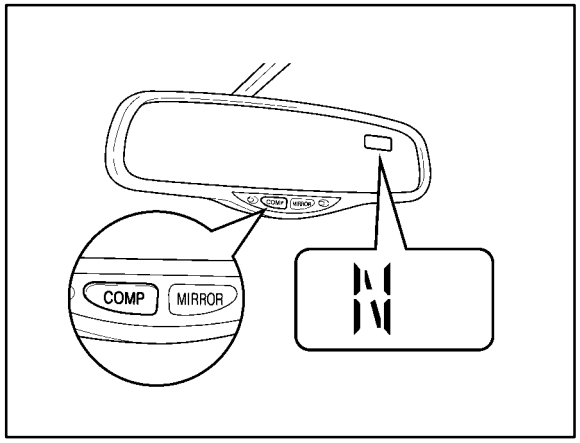
3. Check that the direction appears several seconds after adjustment.
4. Start the engine and push the switch for about 6 seconds until “C” appears on the display.



5. Drive the vehicle slowly at 5 mph (8 km/h), or less, in a circle until the direction is displayed. If there is not enough space to drive in a circle, drive around the block until the direction is displayed.



After driving in 1 to 3 circles, calibration is complete with the direction shown on the display.



NOTE:

- **Do NOT perform calibration of the compass in a place where the Earth’s magnetic field is subject to interference by artificial magnetic fields (underground parking, under a steel tower, between buildings, roof parking, near a railroad crossing, near a large vehicle, etc.)**
- **During calibration, do NOT operate electric systems (moon roof, power windows, etc.) as they may interfere with the calibration.**

Technical Service Information Bulletin
August 25, 2005

Title:

INSTALLATION OF RUBBER BODY PLUGS DURING PDS

Models:

'05 – '06 ES 330

TSIB

Introduction

The ES 330 is equipped with front and rear torque box holes to tie down the vehicle during transportation. Rubber body plugs need to be installed during Pre-Delivery Service (PDS).

Applicable Vehicles

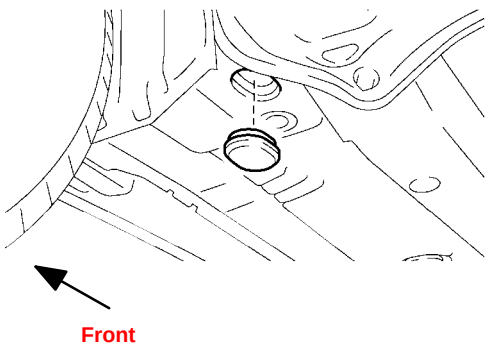
- **2005 – 2006** model year **ES 330** vehicles.

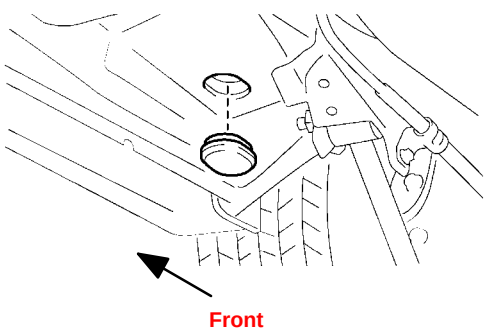
Installation Procedure

Four (4) rubber body plugs are included in the glove compartment at the assembly plant. Install them into the two (2) front and two (2) rear torque box holes located under the vehicle on both sides.

NOTE:

If the rubber body plugs are NOT securely installed, road (tire) noise will transfer to the vehicle interior through the torque box holes and rust could occur inside the torque boxes by water entry.





Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Technical Service Information Bulletin
August 25, 2005

Title:

FRONT LICENSE PLATE MOUNTING BRACKET INSTALLATION

Models:

'05 – '06 ES 330

TSIB

PD036-05

PRE-DELIVERY SERVICE

Introduction

The ES 330 front license plate mounting bracket and two self-tapping screws are placed in the luggage compartment of the vehicle at the assembly plant. For states that require a front license plate, install the bracket and bolts on the bumper cover during Pre-Delivery Service (PDS) according to the following procedure.

Applicable Vehicles

- **2005 – 2006** model year **ES 330** vehicles.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Installation Procedure

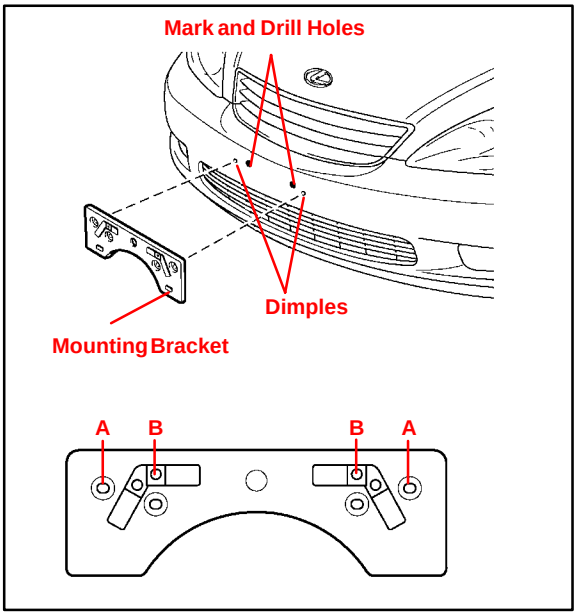
1. Aligning the holes "A" of the mounting bracket with the dimples on the front bumper cover, mark the location of the holes "B" on the front bumper cover.

NOTE:
- **Holes "A" are used for installation of the mounting bracket to the bumper cover.**
- **Holes "B" are used for installation of the front license plate to the mounting bracket.**

2. Drill two relief holes with a diameter of 12 mm (0.47 in.) at the marks on the front bumper cover to prevent the license plate retaining bolt end from contacting the cover.

NOTE:

Do not drill the dimples on the front bumper cover.



Installation Procedure (Continued)

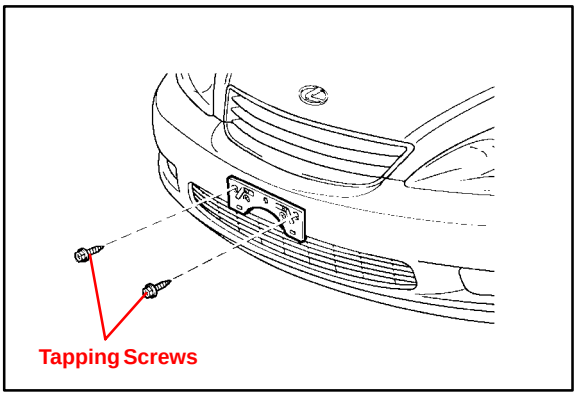
3. Install the mounting bracket to the front bumper cover using the two self-tapping screws.

4. Install the front license plate to the mounting bracket using bolts of the following dimensions:

   Length: Less than 25 mm (0.98 in.)

   Diameter: 6.0 mm (0.24 in.)

   Pitch: 1.0 mm (0.04 in.)



LEXUS

Technical Service Information Bulletin

August 26, 2005

Title:

FRONT EMERGENCY TOWING EYELET & EYELET HOLE COVER

Models:

'05 – '06 ES 330

TSIB

PD037-05

PRE-DELIVERY SERVICE

Introduction

The 2005 – 2006 model year ES 330 is shipped with a front emergency towing eyelet. Follow the procedure below to remove the eyelet and save for customer use.

Applicable Vehicles

- **2005 – 2006** model year **ES 330** vehicles.

Warranty Information

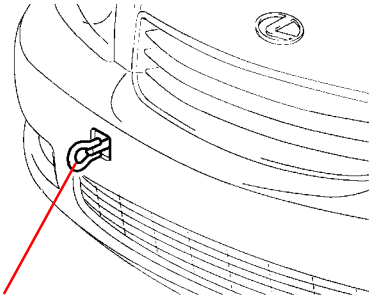
OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Installation Procedure

1. Remove the emergency towing eyelet from the front bumper by turning counterclockwise.

NOTE:

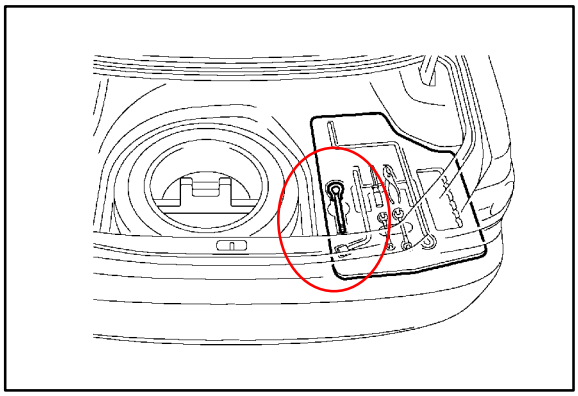
If it is hard to loosen the emergency towing eyelet, use a steel bar.



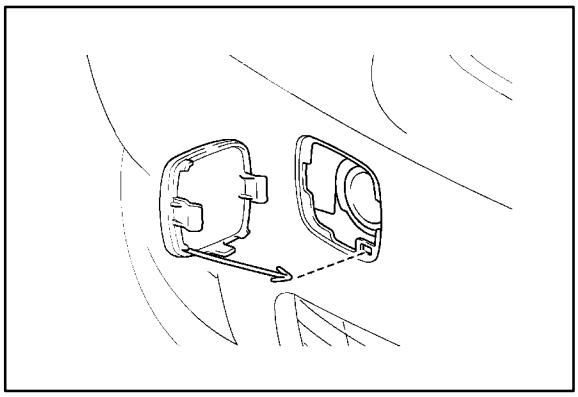
Emergency Towing Eyelet

Installation Procedure (Continued)

2. Place the emergency towing eyelet in the tool tray in the luggage compartment.



3. Install the front towing eyelet hole cover, which is stored in the glove box, onto the front bumper as shown in the illustration.



LEXUS

Technical Service Information Bulletin

January 1, 1999

Title:

VOLUME 4 INFORMATION

Models:

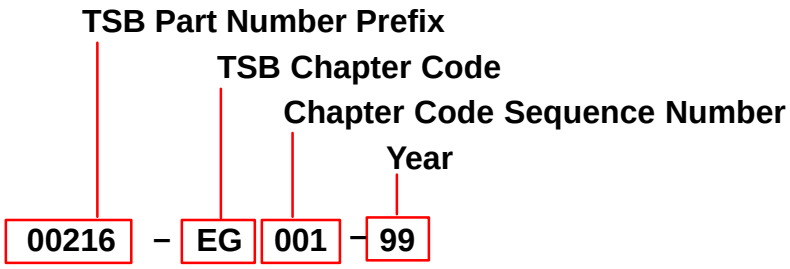
All Models

TSIB

Introduction

Lexus Technical Service Information Bulletins (TSIBs) continue to be one of the most current sources of technical information available. To ensure complete access to this reference source, use the following steps:

- Volume Four will begin with 1999 Technical Service Information Bulletins.
- Place this bulletin along with all 1999 TSIBs into the new binders received with this bulletin.
- Label this new binder “Volume Four“ using the labels provided with the binder.
- Additional copies of 1994 through 1999 TSIBs are available to all Lexus Dealerships through the Non–Parts System (MDC NPM System) by using the following Part Number designation:



Related TSIB Part Numbers

MATERIAL DESCRIPTION	PART NUMBER
1999 TSIB Binder complete with all bulletins issued to date	VOL4
New TSIB Binder and tabs only	00216–00001

LEXUS

Technical Service Information Bulletin

January 18, 2002

Title:

REPLACEMENT CERTIFICATION LABELS

Models:

All Models

TSIB

PG002-02

PRODUCT GENERAL INFORMATION

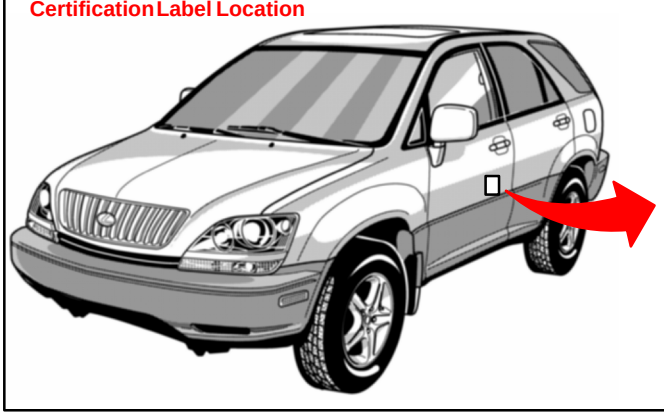
TSB UPDATE NOTICE:

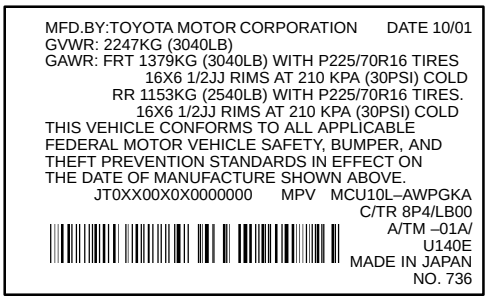
The information contained in this TSIB updates PG015–01 dated May 4, 2001. Revised text is red and underlined. The changes will take place February 1, 2002.

Introduction

Replacement Certification Labels (vinyl label affixed to driver's door or door post) **may be** available from Lexus providing the request meets one of the criteria listed below.

Certification Label Location





Applicable Vehicles

- All Lexus vehicles.

Certification Label Criteria

1. The vehicle is in an accident and the label is damaged or is attached to a part that will be replaced during the repair.

NOTE:

- **Processing a new label *will be delayed significantly if the original certification label is not available.***
- **A replacement label MAY NOT be available if the vehicle is more than 5 years old and the old label does not accompany this request.**

2. The label is stolen.

Procurement Procedure

To request a replacement label, complete a copy of the form on the back of this bulletin. Your dealer parts account will be billed $25.00 for each replacement of a damaged or stolen label.

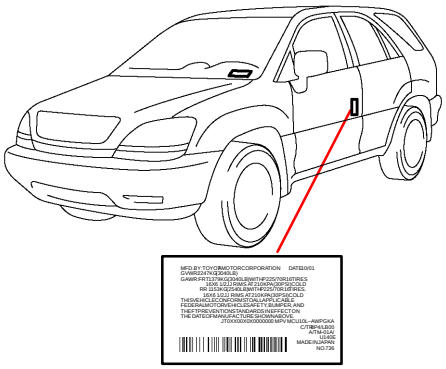
NOTE:

All replacement labels for damaged and/or stolen vehicles are subject to approval by the Technical Compliance Department. If you have any specific questions, contact (310) 468–3390.

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

APPLICATION FOR REPLACEMENT CERTIFICATION LABEL



REASON FOR REPLACEMENT

- ☐ ACCIDENT DAMAGE
- ☐ STOLEN
- ☐ OTHER _____

REASON/EXPLANATION

PLEASE PROVIDE CORRECT VIN _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

ATTACH ORIGINAL LABEL HERE

NOTE:
Original label MUST accompany this application or order will be significantly delayed.

DEALER INFORMATION

DEALER CODE: ☐☐☐☐☐

DEALER NAME: _____

ADDRESS: _____
STREET ADDRESS

_____
CITY, STATE, ZIP CODE

TELEPHONE: ( ) _____
AREA CODE, TELEPHONE NUMBER

CONTACT: _____
FIRST NAME, LAST NAME

MAIL (*DO NOT FAX*) THE COMPLETED REQUEST FORM WITH THE OLD LABEL TO:

TOYOTA MOTOR SALES, U.S.A. INC.
TECHNICAL COMPLIANCE DEPARTMENT, S207
19001 S. WESTERN AVENUE
TORRANCE, CA 90509–2991

Technical Service Information Bulletin
March 2, 2005

Title:

TIRE POSITIONING BEFORE NEW VEHICLE DELIVERY

Models:

'05 – '06 All Lexus

TSIB

Introduction

During the manufacturing process, tire characteristics are measured. Tires are then mounted on the vehicle as matched sets to help reduce conditions such as pulling or drifting. If the wheels are replaced or refinished before vehicle delivery, it is important that the tires remain on the vehicle in the same location and in the same direction of rotation.

Please refer to the following procedure to ensure that the original tires stay in the same location on the vehicle.

Applicable Vehicles

- **All 2005 – 2006** model year **Lexus** vehicles.

Installation Procedure

1. Mark the tire installation position on the inward facing tire sidewall.
   Example: Front Right = FR, Front Left = FL, Rear Right = RR, Rear Left = RL
2. Install the original tires on the new or refinished wheels with the marked side facing inwards.
3. Place the tire/wheel assemblies on the vehicle in the marked positions.

NOTE:
Torque the wheel nuts to the proper torque value in sequence.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

LEXUS

Technical Service Information Bulletin

January 18, 2002

Title:

REPLACEMENT VIN PLATES

Models:

All Models

TSIB

PG003-02

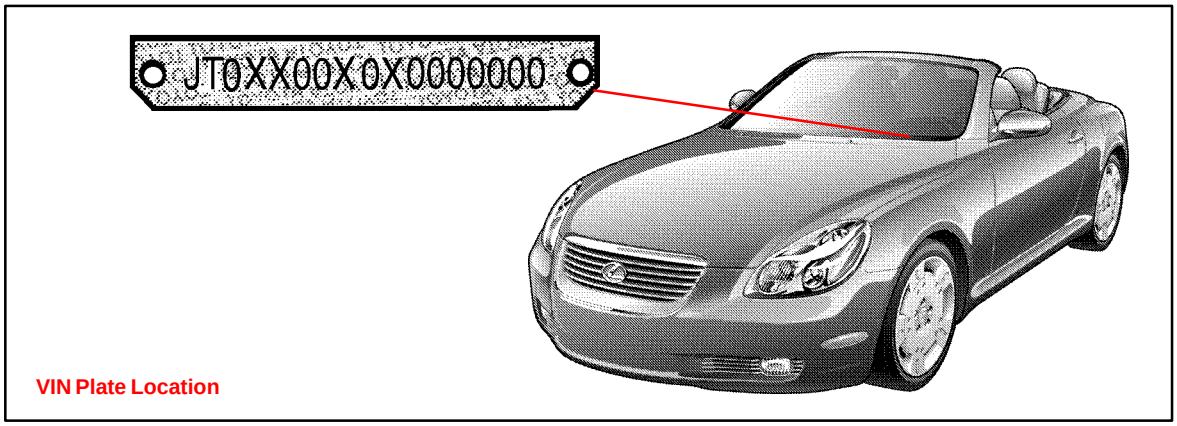
PRODUCT GENERAL INFORMATION

TSB UPDATE NOTICE:

The information contained in this TSIB updates PG016–01 dated May 4, 2001. Revised text is red and underlined. The changes will take place February 1, 2002.

Introduction

Replacement **VIN** plates (metal plates riveted to dashboard) **may be** available from Lexus providing the request meets the criteria listed below.



VIN Plate Location

Applicable Vehicles

- All Lexus vehicles.

Replacement VIN Plate Criteria

- The vehicle is in an accident and the plate is damaged.

NOTE:

The original plate to be replaced MUST accompany the request.

NOTE:

If a plate is stolen, be sure to contact the State Police or your State's Department of Motor Vehicles (DMV). In most cases the State DMV will issue a unique number so that the original number can be included on stolen vehicle listings. If this is the case, a replacement plate is NOT available from Lexus. However, the original VIN, NOT the state issued VIN, must be used on all warranty claims.

Procurement Procedure

To request a replacement plate, complete a copy of the form on the back of this page. Note that the damaged VIN plate **MUST** accompany the request form. Your dealer parts account will be billed $25.00 for each replacement of a damaged plate.

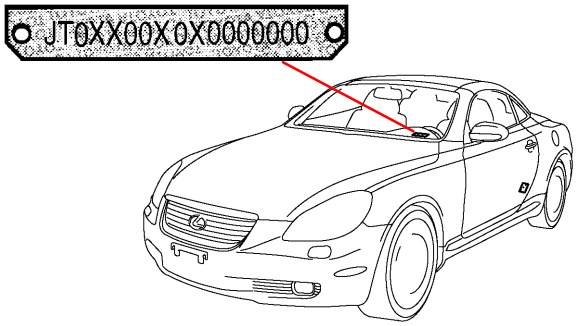
NOTE:

All replacement plates for damaged and/or stolen vehicles are subject to approval by the Technical Compliance Department. If you have any specific questions, contact (310) 468–3390.

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

APPLICATION FOR REPLACEMENT VIN PLATE



REASON FOR REPLACEMENT

☐ ACCIDENT DAMAGE

☐ OTHER _____

REASON/EXPLANATION

PLEASE PROVIDE CORRECT VIN _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

DEALER INFORMATION

DEALER CODE: ☐☐☐☐☐

DEALER NAME: _____

ADDRESS: _____

STREET ADDRESS

_____

CITY, STATE, ZIP CODE

TELEPHONE: ( ) _____

AREA CODE, TELEPHONE NUMBER

CONTACT: _____

FIRST NAME, LAST NAME

MAIL (*DO NOT FAX*) THE COMPLETED REQUEST FORM WITH THE OLD PLATE TO:

TOYOTA MOTOR SALES, U.S.A. INC.
TECHNICAL COMPLIANCE DEPARTMENT, S207
19001 S. WESTERN AVENUE
TORRANCE, CA. 90509–2991

LEXUS

Technical Service Information Bulletin

September 12, 2002

Title:

BATTERY MAINTENANCE FOR IN-STOCK VEHICLES & PRE-DELIVERY

Models:

All Models & Model Years Through Current

TSIB

PG009-02

PRODUCT GENERAL INFORMATION

Introduction

A battery in a stored vehicle is subject to conditions that can reduce its performance and life. These conditions include storage period, temperature, parasitic drain, and battery load. Because of these factors, battery inspection and maintenance are required in order to ensure proper operation and optimal battery life.

As a matter of policy, Lexus does not provide battery warranty coverage for discharged and/or failed batteries due to lack of maintenance; it is the dealer's responsibility to maintain the specified state of charge of the vehicle's battery while in stock and assure proper state of charge at delivery.

To eliminate customer service concerns due to an undercharged battery during the first few weeks of ownership, **all dealers should check battery state of charge and recharge, if necessary, just prior to delivery** (i.e., within 48 hours of delivery).

This new procedure will improve the new vehicle ownership experience by greatly reducing the risk of having a low performance battery concern due to extended storage periods and/or short engine run times prior to the vehicle sale.

Applicable Vehicles

- **All models and model years through current.**

Required Tools & Material

SPECIAL SERVICE TOOLS (SSTs)	MANUFACTURER	PART NUMBER
MICROPRO 815 Digital Battery Analyzer (Essential SST)*	Midtronics	00002–MP815–T

* This SST can be ordered through SPX/OTC by calling 1–800–933–8335.

NOTE:
MICROPRO 815 Digital Battery Analyzer should be periodically updated through the Technical Information System (TIS) for new vehicle models. For detailed information, please see TSIB SS002–02, "Midtronics Battery Tester Software Update."

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Recommended Equipment

TOOLS & EQUIPMENT	MANUFACTURER	PART NUMBER
Fast Battery Charger**	Associated	ASE6003
Fast Battery Charger**	Christie	CAPPDQ

** These tools can be ordered through the Lexus Approved Dealer Equipment program by calling 1–800–368–6787.

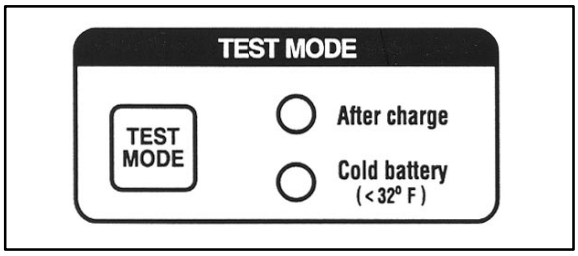
NOTE:
The "Fast Battery Chargers" listed above have been tested and approved by Lexus. These state–of–the–art "smart" chargers were designed to charge batteries at an accelerated rate, without the possibility of damage. Using non–microprocessor controlled battery chargers for fast charging purposes can damage the battery.

Inspection Procedure

All vehicles are to be inspected according to the procedures listed below using the MICROPRO 815 battery tester no more than 48 hours prior to customer vehicle delivery.

PRIOR TO TESTING:
If necessary, remove battery surface charge by turning on high beam headlights for 60 seconds, then let battery voltage recover for one minute.

1. Connect test clamps to battery. (Display will show four zeros indicating a good connection).
2. For cold battery (<32®F) or after charge test, press TEST MODE key until appropriate test is selected.



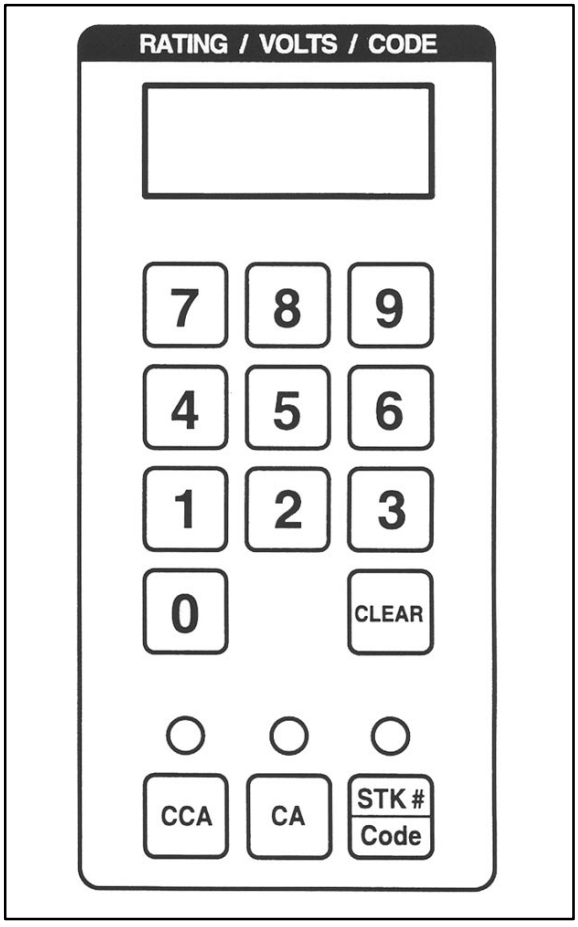
3. Input battery stock number.

NOTE:
Stock number must be used for warranty cases because you cannot read the warranty code if CCA/CA rating is input.

4. Press STK#/Code key to start test.

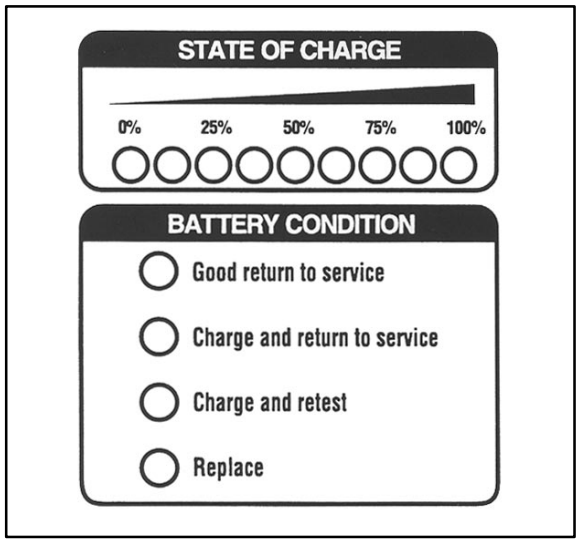
NOTE:
Stock numbers are listed on the reference card located in the tester's cover. Stock numbers can also be referenced on TIS. The TIS listings will always have up–to–date information.

Stock number location in TIS:
1. Go to TIS Home Page.
2. Click on "Diagnostics."
3. Click on "Midtronics Battery Tester Software."
4. Click on "Stock Number Chart."



Inspection Procedure (Continued)

5. Read STATE OF CHARGE and BATTERY CONDITION.
   a. If battery is at 75% STATE OF CHARGE or greater, release vehicle to new owner.
   b. If battery is less than 75% STATE OF CHARGE proceed to Battery Service Procedure.



Battery Service Procedure

Follow the procedures below according to the BATTERY CONDITION results.

BATTERY CONDITION: "Good return to service" (less than 75% State of Charge)
Charge battery using one of the recommended chargers indicated above (or equivalent) following the Quick Charge instructions accompanying that machine.

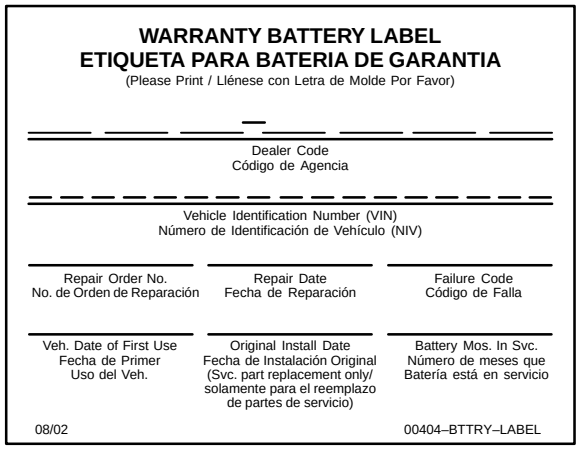
BATTERY CONDITION: "Charge and return to service"
Charge battery using one of the recommended chargers indicated above (or equivalent) following the Quick Charge instructions accompanying that machine.

BATTERY CONDITION: "Charge and retest"
The battery must be Quick Charged and retested using the **After charge** test mode. Carry out the service according to the result of the retest.

BATTERY CONDITION: "Replace"
The battery must be replaced. Press the STK#/CODE key to show the warranty code for the repair order and for the Warranty Battery Label.

Battery Replacement

If a vehicle battery needs to be replaced for a warrantable condition, make sure to complete a Warranty Battery Label and affix it to the failed battery for proper warranty parts and claim processing. **Please include the Vehicle Identification Number and warranty code on the Warranty Battery Label.**



Recommended Battery Maintenance

In addition to this new pre–delivery battery test, a **monthly battery inspection** is still required for stored vehicles. If your dealership is located in an area subject to extreme temperatures (hot or cold), periodic maintenance may need to be performed more frequently.

To reduce parasitic battery drain for vehicles in storage for one week or more, the negative battery cable should always be disconnected to reduce battery discharge. When the negative battery cable is reconnected, please check and reset electrical components such as the clock, radio, etc.

NOTE:

For your reference, the electrical system is made inoperative by removing the appropriate fuse indicated in the Electrical Wiring Diagram.

LEXUS

Technical Service Information Bulletin

March 11, 2005

Title:

FAILURE TO INITIALIZE CAN INTERFACE MODULE

Models:

'04 – '05 Applicable Models

TSIB

REVISED

SS001-05

SPECIAL SERVICE TOOLS

TSIB REVISION NOTICE:

- **June 23, 2005: The "Required SSTs" section has been updated.**

The previous TSIB should be discarded.

Introduction

If the Diagnostic Tester fails to initialize CAN–based communication with on–board vehicle controllers, a damaged cable or inoperative CAN Interface Module may be at fault. This bulletin provides test procedures to check the integrity of the Diagnostic Tester cables and the CAN Interface Module.

Applicable Vehicles

- **2004 – 2005** model year **CAN–equipped** vehicles including 2004 model year LS 430 and 2005 model year GX 470 and LS 430.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Required SSTs

ITEM NO.	SPECIAL SERVICE TOOLS (SSTs)	PART NUMBER	QTY	DRW**
1	**Diagnostic Tool Set***	LEX220036	1	8
COMPONENT(S) OF KIT/SET	**Four (4) components from this kit/set are required:** • Tester (P/N 02002019) • 12 Megabyte Program Card Kit (P/N 01002593–005) with version 12.2a Software (or later) • 14/26 Pin DLC Cable (P/N 02001637) • 14 Pin DLC Self Test Adapter (P/N 02001607)			
2	**CAN Module Kit***	01002744	1	8
COMPONENT(S) OF KIT/SET	NOTE: • All components from this kit/set are required • Module box cannot be ordered separately • J1962 OBD2–II (CAN DLC) (P/N 02003180)			

* Essential SSTs.

** Refers to drawer number in SST Storage System.

NOTE:

Additional Diagnostic Tool Sets, CAN Module Kits, Program Cards, or other SSTs may be ordered by calling SPX/OTC at 1-800-933-8335.

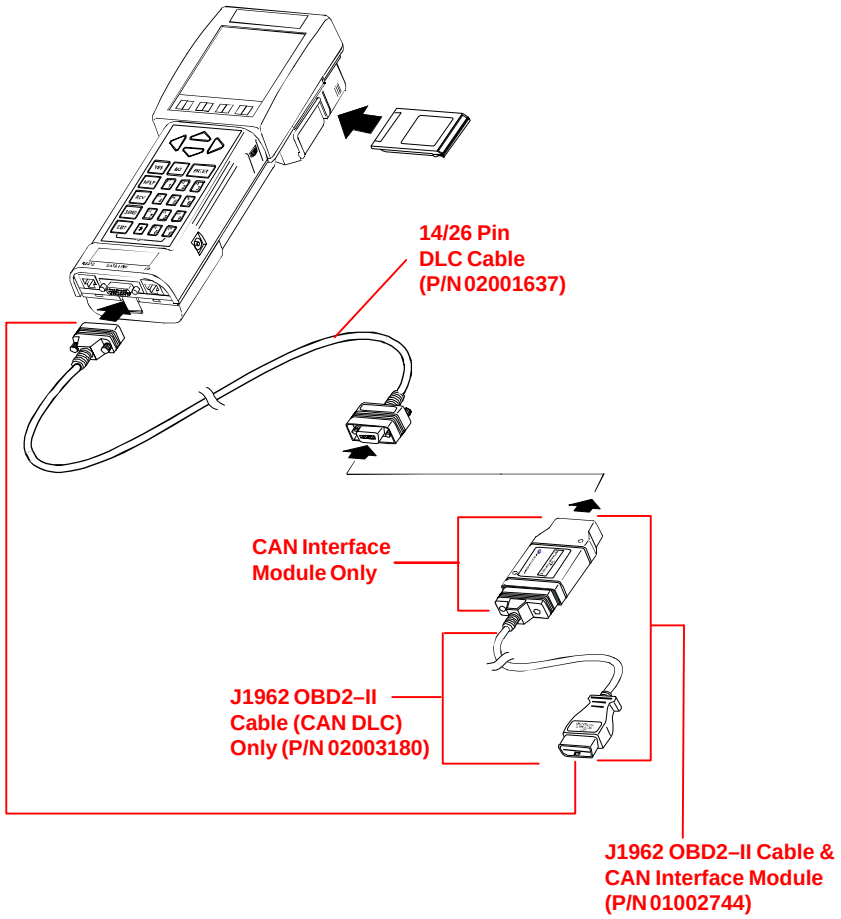
Diagnostic Procedure

Failure to initialize CAN–based communications between the Diagnostic Tester and on–board vehicle controllers can be caused by the following issues:

- The 14/26 Pin DLC cable is damaged, causing an open communication circuit.
- The DLC cable is damaged, causing an open communication circuit.
- The CAN Interface Module is damaged.
- The vehicle's CAN Communication System has a fault, requiring further vehicle diagnostics.

NOTE:
The Diagnostic Tester may operate properly in other modes such as OBD/MOBD and CARB OBDII with a damaged cable or CAN module.

Figure 1



NOTE:
To lengthen the Diagnostic Tester cable life, do not wrap the cable around the tester, or hold the tester only by the cable.

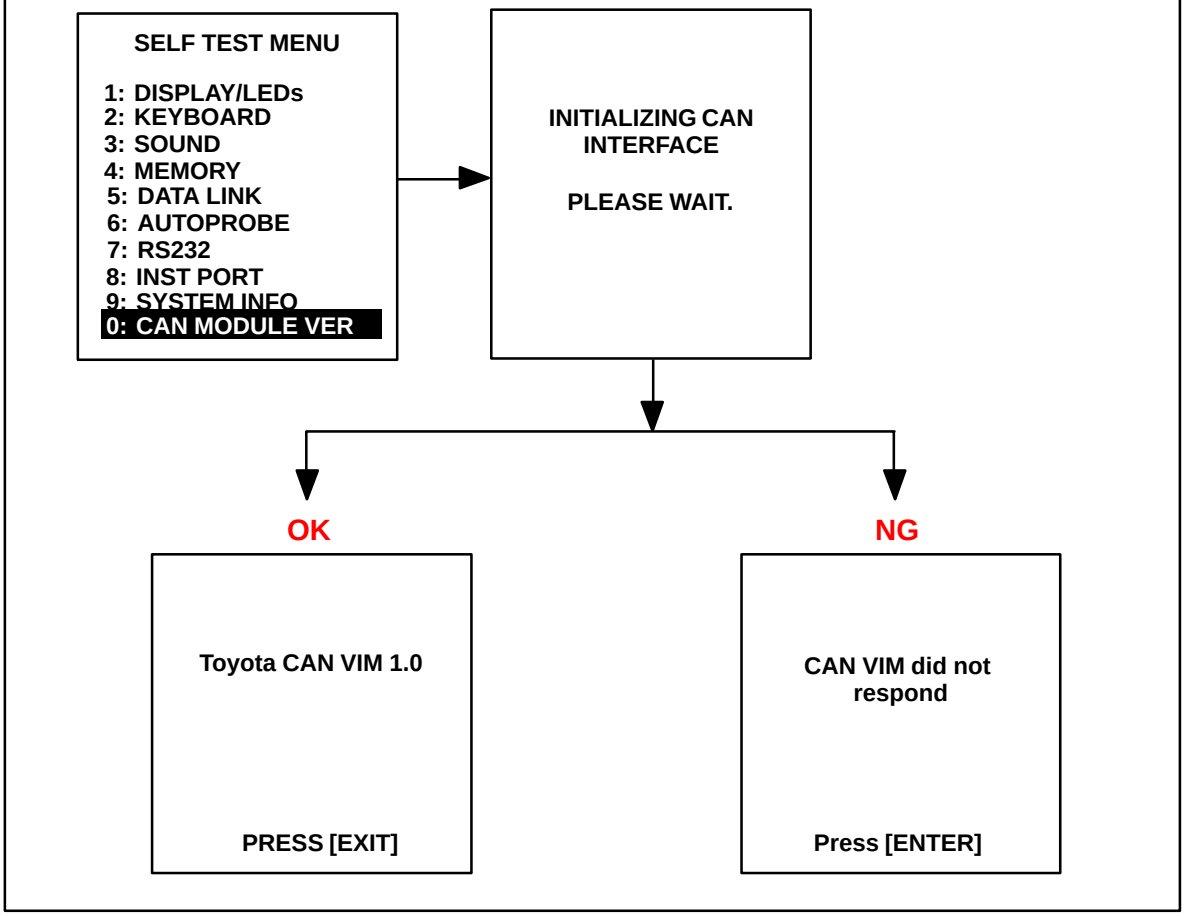
Diagnostic Procedure (Continued)

To determine the cause of communication error, perform the following steps:

1. Using the Diagnostic Tester, perform the CAN MODULE VERSION self test.
   Select DIAGNOSIS/SETUP/SELF TEST and perform the following screen flow.

NOTE:
Before performing test, confirm that the Diagnostic Tester, 14/26 Pin DLC cable, and CAN Interface Module are all securely connected.

Figure 2



SELF TEST Result:

OK

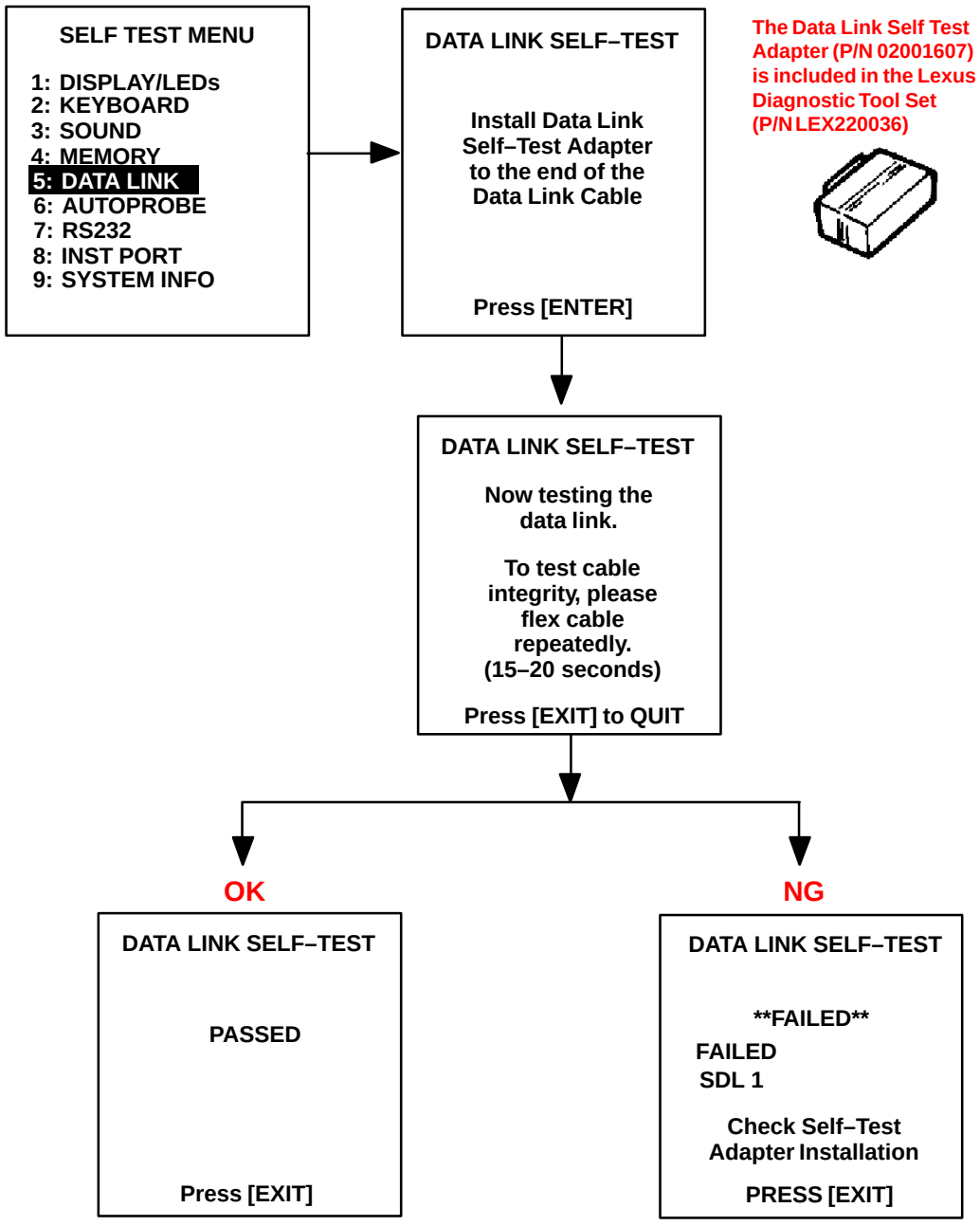
NG → **SELF TEST FAILED: CAN VIM did not respond. Go to step 2.**

SELF TEST PASSED: Go to step 3.
This response verifies the CAN module and the 14/26 Pin DLC cable are OK.

Diagnostic Procedure (Continued)

2. Perform the Data Link Self Test (Figure 3).

Figure 3



DATA LINK SELF TEST Result:

OK

NG → **DATA LINK TEST FAILED: Replace 14/26 Pin DLC cable (P/N 02001637).**

DATA LINK TEST PASSED: Replace CAN Interface Module (P/N 01002744).

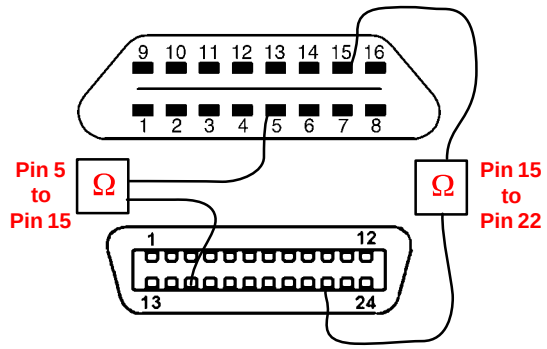
Diagnostic Procedure (Continued)

3. Inspect the J1962 OBD2–II cable (CAN DLC).
   A. Disconnect the CAN Interface Module from the J1962 OBD2–II cable (CAN DLC).

      A small Phillips screwdriver is required to separate the CAN Interface Module from the J1962 OBD2–II cable.

   B. Test the J1962 OBD2–II cable (CAN DLC) for continuity.

Figure 4



J1962 OBD2–II Cable (CAN DLC) Test Result:

OK

NG → **(More than 6 Ω) Replace the J1962 OBD2–II cable (CAN DLC, P/N 02003180).**

Suspect vehicle side problem.
Refer to the Technical Information System (TIS): applicable model year Repair Manual: *Diagnostics: CAN Communication System: Problem Symptoms Table: Check CAN Bus Line.*

NOTE:
If the Diagnostic Tester successfully communicates with another CAN–equipped vehicle, suspect vehicle side problem.

LEXUS

Technical Service Information Bulletin

August 26, 2002

Title:

IMMOBILIZER KEY CODE RESET

Models:

Applicable ES 300, GS 430, GS 300, IS 300, & LX 470

TSIB

REVISED

SS002-01

SPECIAL SERVICE TOOLS

TSIB REVISION NOTICE:

- **August 26, 2005: The model years for each model have been specifically defined in the "Applicable Vehicles" section. The "Required SSTs" section has been updated.**
- **February 11, 2003: Model years for LX 470 revised to apply to 2001 and 2002 only.**
- **August 26, 2002: ES 300, GS 300, and IS 300 models added. Model years for GS 430 and LX 470 vehicles expanded to include 2002 and later. Diagnostic Tester software in Required Tools & Material updated to version 9.01a (or later).**

Previous versions of this TSIB should be discarded.

Introduction

Immobilizer Reset is a new feature that allows the registration of a new Master Key even if all original Master Keys are lost. Once the Immobilizer system is reset, all previously registered keys will be erased.

Applicable Vehicles

MODEL YEAR	MODEL	ENGINE MODEL
2001 – 2005*	GS 430	3UZ–FE
2001 – 2002*	LX 470	2UZ–FE
2002 – 2003*	ES 300	1MZ–FE
2002 – 2005*	GS 300	2JZ–GE
2002 & Later*	IS 300	2JZ–GE

* Immobilizer Key Code Reset procedure is not available for prior model years.

NOTE:

Refer to TIS (Technical Information System) for the most current applicable vehicle information.

Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME
N/A	Model Specific	Replacement Key (Master or Sub)

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Required SSTs

ITEM NO.	SPECIAL SERVICE TOOLS (SSTs)	PART NUMBER	QTY	DRW**
1	**Lexus Diagnostic Tester Kit*** NOTE: • All components from this kit/set are required • 12 Megabyte Diagnostic Tester Program Card (P/N 01002593–005) with version 13.0a Software (or later) is required	LEX220036	1	8
2	**CAN Interface Module Kit*** NOTE: • All components from this kit/set are required	01002744	1	8

* Essential SSTs.

** Refers to drawer number in SST Storage System.

NOTE:

Additional Diagnostic Tester Kits, CAN Interface Modules, Program Cards, or other SSTs may be ordered by calling SPX/OTC at 1-800-933-8335.

Function Description

The Immobilizer Reset function is a 5-step process:

1. Using the Diagnostic Tester, retrieve a “Seed Number” through the **OBD/MOBD Immobilizer** function.
   - A “Seed Number” is a unique number provided by the Diagnostic Tester and validated by TIS (Technical Information System) in order to return a Passcode.
2. Using TIS, select **Immobilizer Reset**, and complete the request form to retrieve a “Passcode Number.”
   - A “Passcode Number” is a unique number required by the Diagnostic Tester to reset the ECU allowing it to accept a new Master Key.
3. Enter the “Passcode Number” received from TIS into the Diagnostic Tester.
4. Confirm successful Immobilizer reset and new Master Key registration.
5. Register any additional customer keys.

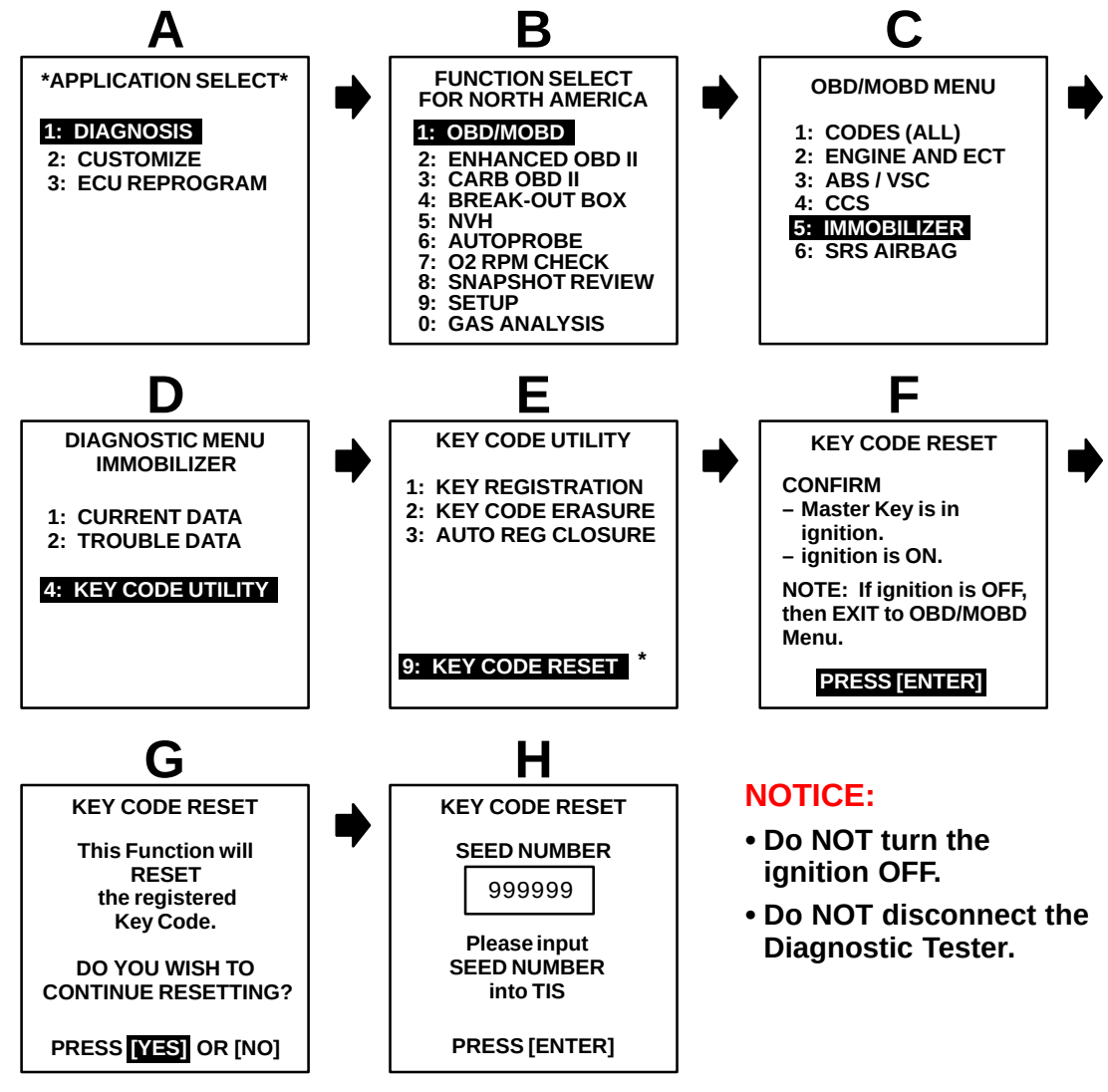
Key Code Reset Procedure

NOTE:
Ensure that the Diagnostic Tester is equipped with the latest version of software (13.0a or later).

Connect the Diagnostic Tester to DLC3 and turn ignition ON.

1. Using the Diagnostic Tester, follow the screen flows below to retrieve the "Seed Number." (**DO NOT DISCONNECT** the Diagnostic Tester from the vehicle during this process.)

FIGURE 2. DIAGNOSTIC TESTER SCREEN FLOW

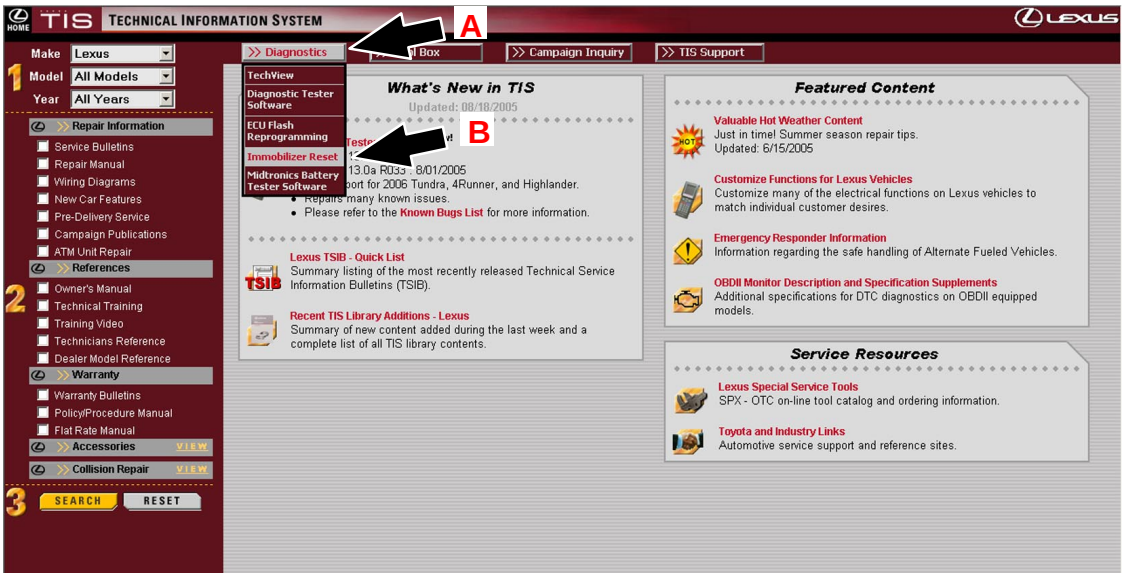


* Option "9: KEY CODE RESET" will not appear if your present vehicle does not support the key code reset functions.

Key Code Reset Procedure (Continued)

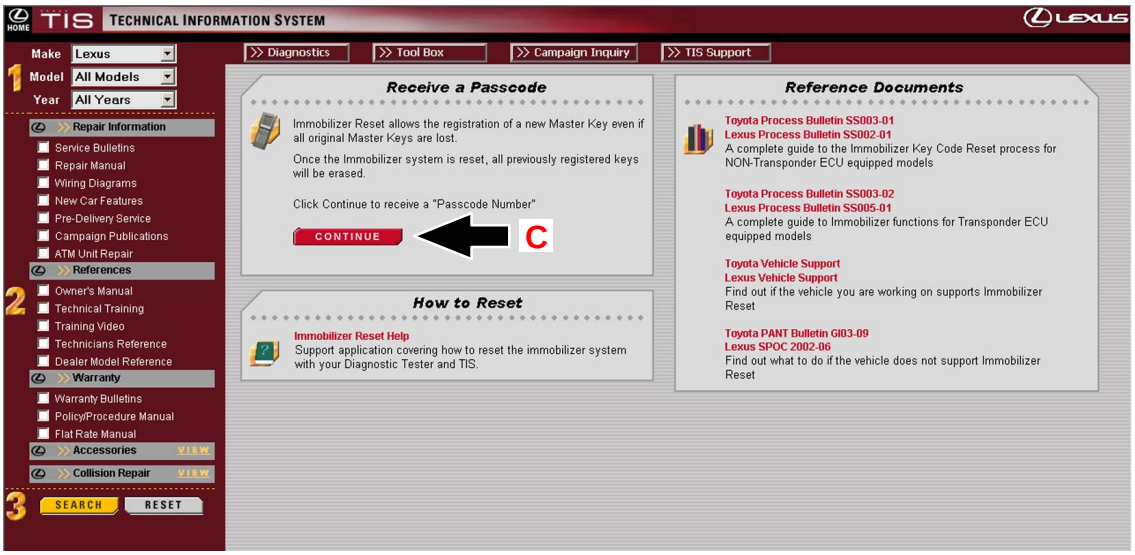
2. Using TIS, select **Immobilizer Reset**, and complete the request form to retrieve a "Passcode Number."
   A. Click on **Diagnostics**.
   B. Click on **Immobilizer Reset**.

FIGURE 3. SELECTING IMMOBILIZER RESET ON TIS



C. Read the instructions on the screen and click on **Continue**. (See Figure 4 below.)

FIGURE 4. IMMOBILIZER RESET INSTRUCTIONS ON TIS

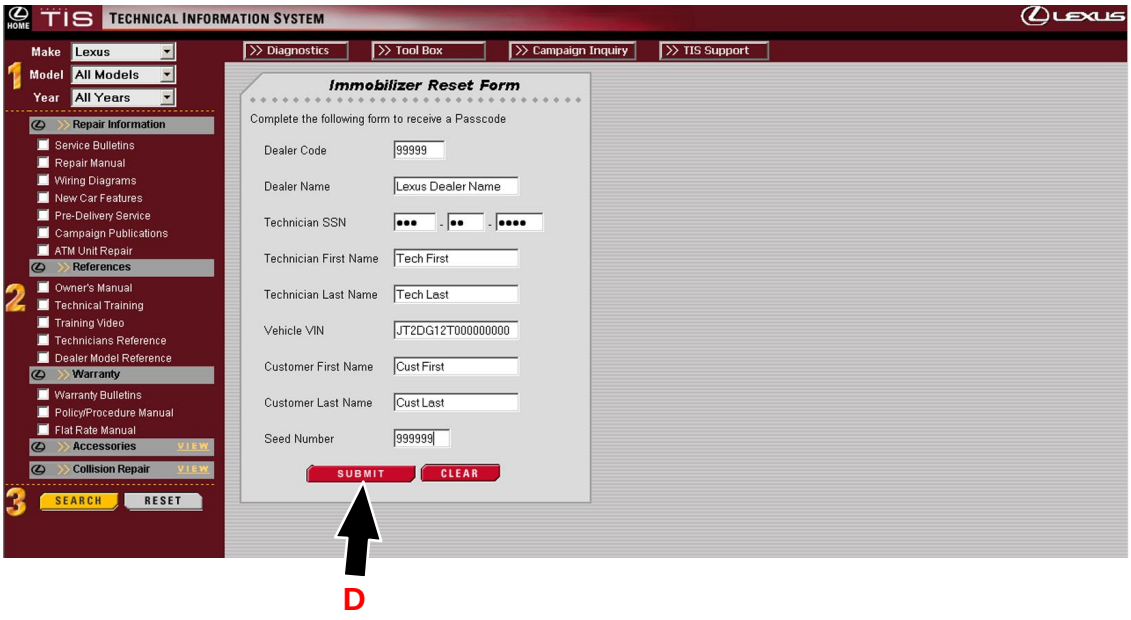


Key Code Reset Procedure (Continued)

D. Complete the request form and enter the "Seed Number" from the Diagnostic Tester. Click on **Submit** (Figure 5).

NOTE:
All fields must be completed.

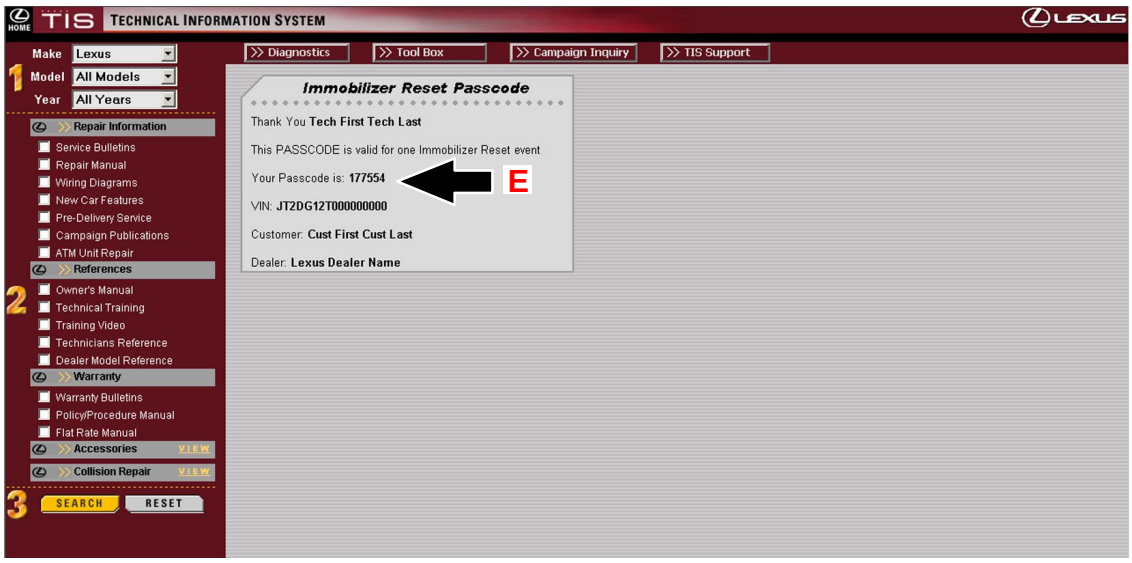
FIGURE 5. REQUEST FORM ON TIS



E. TIS will now return the Passcode that needs to be entered into the Diagnostic Tester.

NOTE:
The Passcode given by TIS is only valid for one Immobilizer Reset Event.

FIGURE 8. RECEIVING PASSCODE FOR DIAGNOSTIC TESTER

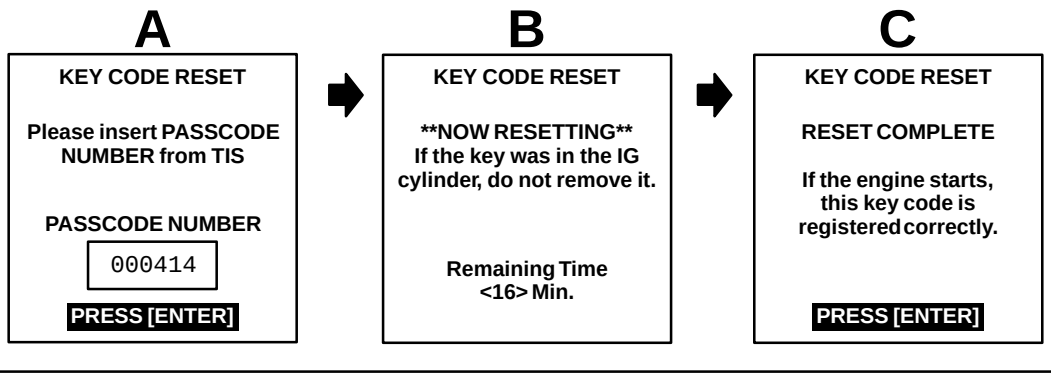


Key Code Reset Procedure (Continued)

3. Using the numbered keys (0–9) on the Diagnostic Tester, enter the "Passcode Number" received from TIS. (See Figure 7 below.) Press **ENTER** to clear all registered key codes.

NOTE:
Key Code Reset takes approximately 16 minutes.

FIGURE 7. PASSCODE ENTRY SCREEN FLOW



4. Confirm successful Immobilizer reset and new Master Key registration by starting the vehicle.

NOTE:
If the vehicle starts, the new Master Key code is registered correctly.
If the vehicle does not start, perform the Immobilizer Reset function again.

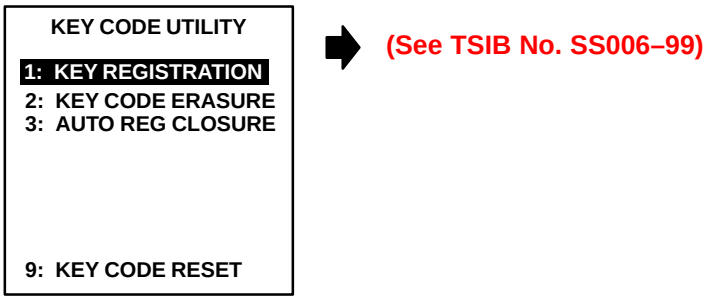
5. All previously registered key codes have been erased except the Master Key used during "Key Code Reset."

   Register any additional customer keys by using "Key Registration."

   Each key will start the engine if registered correctly.

   - Please refer to TSIB No. SS006–99, *"Scantool Immobilizer Key Code Utility,"* for additional detail on this procedure.

FIGURE 8. KEY REGISTRATION



Technical Service Information Bulletin
November 28, 2005

Title:

CD SKIP VERIFICATION USING LEXUS MASTER CD

Models:

'01 – '06 All Models

TSIB

SPECIAL SERVICE TOOLS

SS003-05

Introduction

Lexus has developed a master CD to be used for customer complaints of the CD player skipping or CD player cannot read disc. This disc has been specially manufactured to test the performance of the Lexus CD players. Using this master CD will confirm that the radio exceeds Lexus' specification for CD player performance.

Applicable Vehicles

- **2001 – 2006** model year **Lexus** vehicles.

Test Disc Specifications

TRACKS	DEFECT	MUSIC	TRACK TIME
1	None	Minuetto	3:15
2	0.8 mm Black Dot	2ème Gymnopédie	2:32
3	0.6 mm Black Dot	Overture Minature	3:02
4	None	Marche	2:36
5	None	Claire de Lune	3:09
6	None	Nocturne	3:12
7	0.4 mm Scratch	Danse de la Fée Dragée	2:28
8	0.6 mm Scratch	Danse Arabe	2:29
9	0.8 mm Scratch	Fantanisie-Improptu	2:51
10	1.0 mm Scratch	Hungarian Dance No. 5	2:02
11	None	Prelude <Raindrop>	3:38
12	None	Maiden's Prayer	3:15
13	Fingerprint 65 um	Valse des Fleurs	3:08
14	None	1ère Gymnopedie	2:54
15	Fingerprint 75 um	Danse Des Mirlitons	2:06

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Required SSTs

ITEM NO.	SPECIAL SERVICE TOOLS (SSTs)	PART NUMBER	QTY	DRW**
1	**Lexus Master CD*** NOTE: • All components from this kit/set are required	00002–07130–SCD	1	22

* Essential SSTs.

** Refers to drawer number in SST Storage System.

NOTE:

Additional SSTs may be ordered by calling SPX/OTC at 1-800-933-8335.

Repair Procedure

1. Make sure the vehicle is stationary during the test.
2. Insert a compact disc (NOT the Lexus Master CD) to make sure the radio can accept and eject the disc without damaging it.
3. Check the Lexus Master CD for any unintended scratches or dirt. Wipe away dirt using a glass cleaning cloth. If the disc is damaged, order a replacement master CD.
4. Insert the Lexus Master CD and change to track number 9.
5. Play the track for one minute.
   A. If skips are heard, replace the CD player.
   B. If NO skips are heard, the CD player is working normally. Check the customer's CDs for scratches or other damage to the discs. Confirm that the customer is using a pre-recorded CD, NOT CD-Rs or CD-RWs as they may NOT have been burned properly.

NOTE:

- **Tracks 1 – 8 and 11 – 14 are reference tracks. They can be used, but the conditions are less severe than track 9. Do NOT use tracks 10 and 15.**
- **Track 9 (0.8 mm scratch) is much more severe than the Lexus engineering specification in order to ensure customer satisfaction. If the customer's radio passes this test, a replacement radio will NOT improve the performance.**
- **This disc has been specially manufactured with a physical defect for the purposes of testing the CD player's performance. It is NOT possible to make copies of this disc that can be used to test the CD player's performance.**

LEXUS

Technical Service Information Bulletin

July 6, 2001

Title:

DIAGNOSTIC TESTER IMMOBILIZER FUNCTIONS

Models:

Applicable ES 330, GS 300, GS 430, GX 470, LS 430, LX 470, RX 330, & SC 430

REVISED

SS005-01

SPECIAL SERVICE TOOLS

TSIB REVISION NOTICE:

- **August 26, 2005: The model years for each model have been specifically defined in the "Applicable Vehicles" section. The following vehicles have been added to the "Applicable Vehicles" section: ES 330, GS 300, GS 430, and RX 330. The "Required SSTs" section has been updated.**
- **January 9, 2003: GX 470 and LX 470 have been added to Applicable Vehicles. The "Required SSTs" section has been updated to the current version software. Screen flows revised (screen C and D) in Figures 1 (screen C and D), 2 (screen C), 3 (screen C), 4 (screen C and G), and 9 (screen A).**
- **The information contained in this TSIB supercedes the original SS005–01.**

Previous versions of this TSIB should be discarded.

Introduction

The Diagnostic Tester incorporates support for Immobilizer system service. This bulletin covers the following Immobilizer functions available using the Diagnostic Tester:

- Transponder Key Type
- Transponder Code Registration
- Transponder Code Erasure
- Transponder ECU Reset
- Transponder ECU Replacement
- Engine ECU Replacement

NOTE:

The available functions and procedures for the models listed in this TSIB differ slightly from previous models and other Immobilizer systems currently in use on Lexus vehicles.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Applicable Vehicles

MODEL YEAR	MODEL	ENGINE MODEL
2001 & Later	LS 430	3UZ–FE
2002 & Later	SC 430	3UZ–FE
2003 & Later	GX 470	2UZ–FE
	LX 470	
2004 & Later	ES 330	3MZ–FE
	RX 330	
2006	GS 300 (w/o Smart Key)	3GR–FSE
	GS 430 (w/o Smart Key)	3UZ–FE

NOTE:
Refer to TIS (Technical Information System) for the most current applicable vehicle information.

Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME
N/A	Model Specific	Replacement Transponder Key (Master or Sub)

Required SSTs

ITEM NO.	SPECIAL SERVICE TOOLS (SSTs)	PART NUMBER	QTY	DRW**
1	**Lexus Diagnostic Tester Kit*** NOTE: • All components from this kit/set are required • 12 Megabyte Diagnostic Tester Program Card (P/N 01002593–005) with version 13.0a Software (or later) is required	LEX220036	1	8
2	**CAN Interface Module Kit*** NOTE: • All components from this kit/set are required	01002744	1	8

* Essential SSTs.

** Refers to drawer number in SST Storage System.

NOTE:
Additional Diagnostic Tester Kits, CAN Interface Modules, Program Cards, or other SSTs may be ordered by calling SPX/OTC at 1-800-933-8335.

Function Description

1. Transponder Key Type

Before any Immobilizer functions are performed, verify the type of transponder key that you are attempting to use for the service operation. Some functions may only be performed with a registered Master Key.

2. Transponder Code Registration

This function allows the registration of additional transponder keys (Master or Sub) using a registered Master Key.

3. Transponder Code Erasure

This function allows the user to erase all the transponder keys except the registered Master Key used during this function.

4. Transponder ECU Reset

This function allows the registration of a new Master Key even if all original Master Keys are lost. Once the Immobilizer system is reset, all previous registered keys will be erased.

5. Transponder ECU Replacement

When the Transponder ECU is replaced, the transponder keys must be registered to the new ECU, auto registration closed, and ECU communication completed.

6. Engine ECU Replacement

When the Engine ECU is replaced, ECU communication must be completed to synchronize an encrypted security code between the engine and Transponder ECUs.

Operation Procedure

TRANSPONDER KEY TYPE

1. Transponder Key Type

Before any Immobilizer functions are performed, verify the type of transponder key that you are attempting to use for the service operation. Some functions may only be performed with a registered Master Key.

A. Insert the current key into the ignition cylinder and turn to the **ON** position.

HINT:

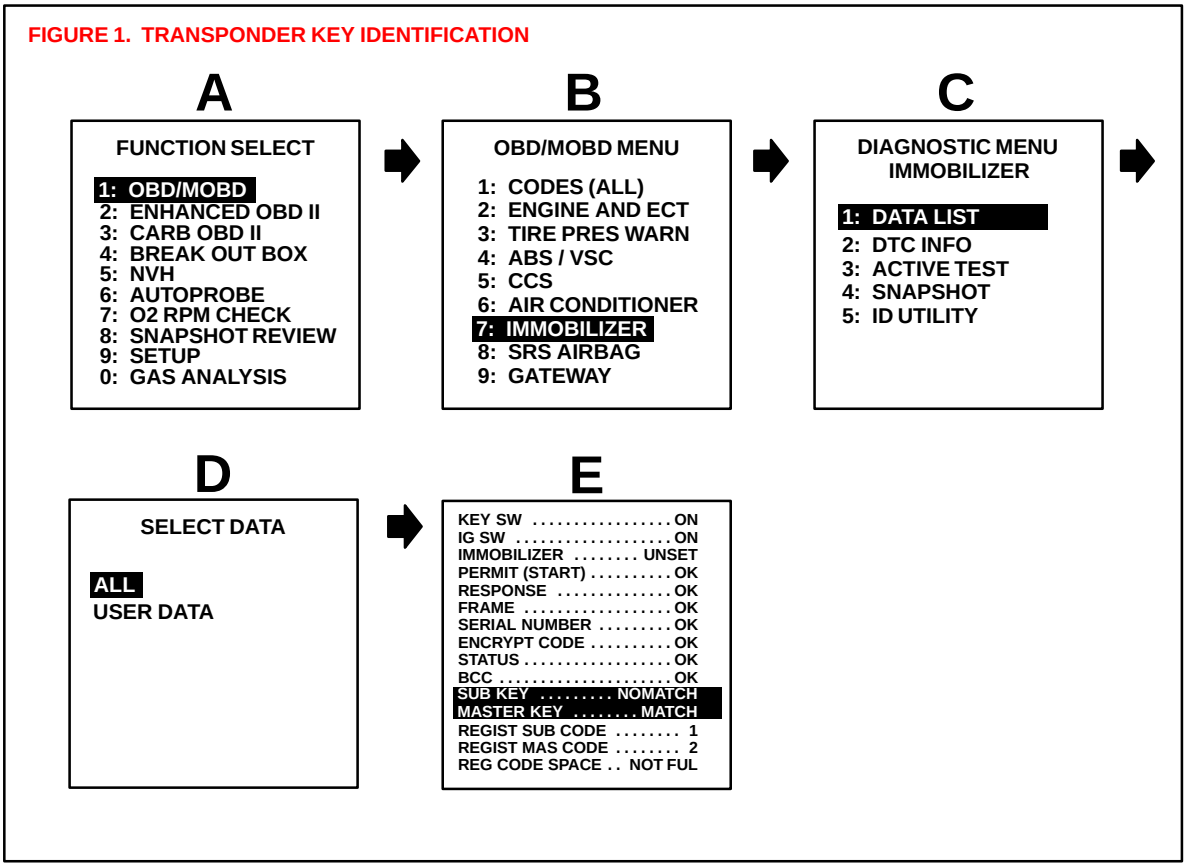
The Immobilizer key blanks are preconfigured as Master or Sub Keys. Master Key blanks cannot be registered as Sub Keys nor can Sub Key blanks be registered as Master Keys. Also, the flat key is now enabled as a full function Master Key that must be registered.

B. Follow the screen flow in Figure 1 to determine the key type.

C. Key type and registration status will be indicated on the Immobilizer data list (Figure 1, screen E).

- "MATCH" = The key in the ignition cylinder matches this key type.
- "NOMATCH" = The key in the ignition cylinder does NOT match this key type.

FIGURE 1. TRANSPONDER KEY IDENTIFICATION



Operation Procedure (Continued)

TRANSPONDER CODE REGISTRATION

2. Transponder Code Registration

This function allows the normal registration of additional transponder keys (Master or Sub) using a registered Master Key.

NOTE:

This function requires the use of one registered Master Key. The use of a Sub Key will NOT complete Transponder Code Registration. Attempting registration of additional keys with only a Sub Key will result in errors and incomplete registration.

HINT:

The Immobilizer key blanks are preconfigured as Master or Sub Keys. Master Key blanks cannot be registered as Sub Keys nor can Sub Key blanks be registered as Master Keys. Also, the flat key is now enabled as a full function Master Key that must be registered.

A. Insert a registered Master Key into the ignition cylinder and turn to the **ON** position.

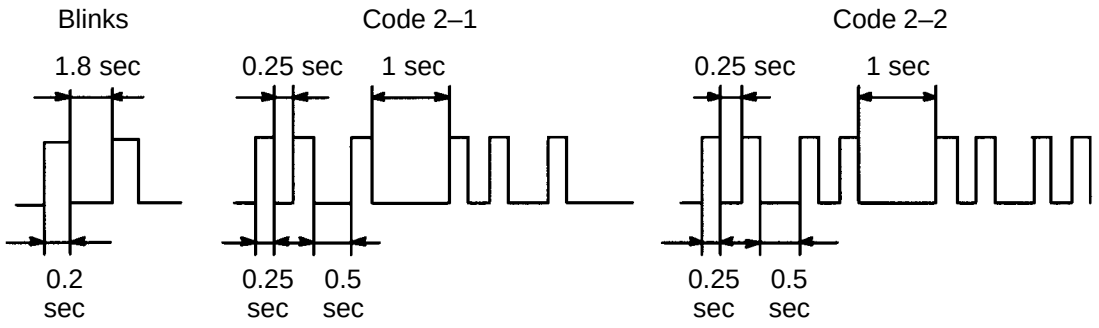
B. Follow the screen flow in Figure 2 to register new Master or Sub keys. It is possible to register up to 5 Master Keys and 3 Sub Keys.

C. Be sure to follow the instructions on key insertion, ignition ON/OFF and key removal exactly as described on the Diagnostic Tester.

HINT:

The security indicator light reveals the following information:

- **Always ON and NO key in IG* = Transponder ECU in Auto Registration mode**
- **Blinking and NO key in IG = Normal operation**
- **Blinking Code 21 = Transponder Code Registration failed**
- **Blinking Code 22 = Attempt was made to register an already registered Transponder Code**

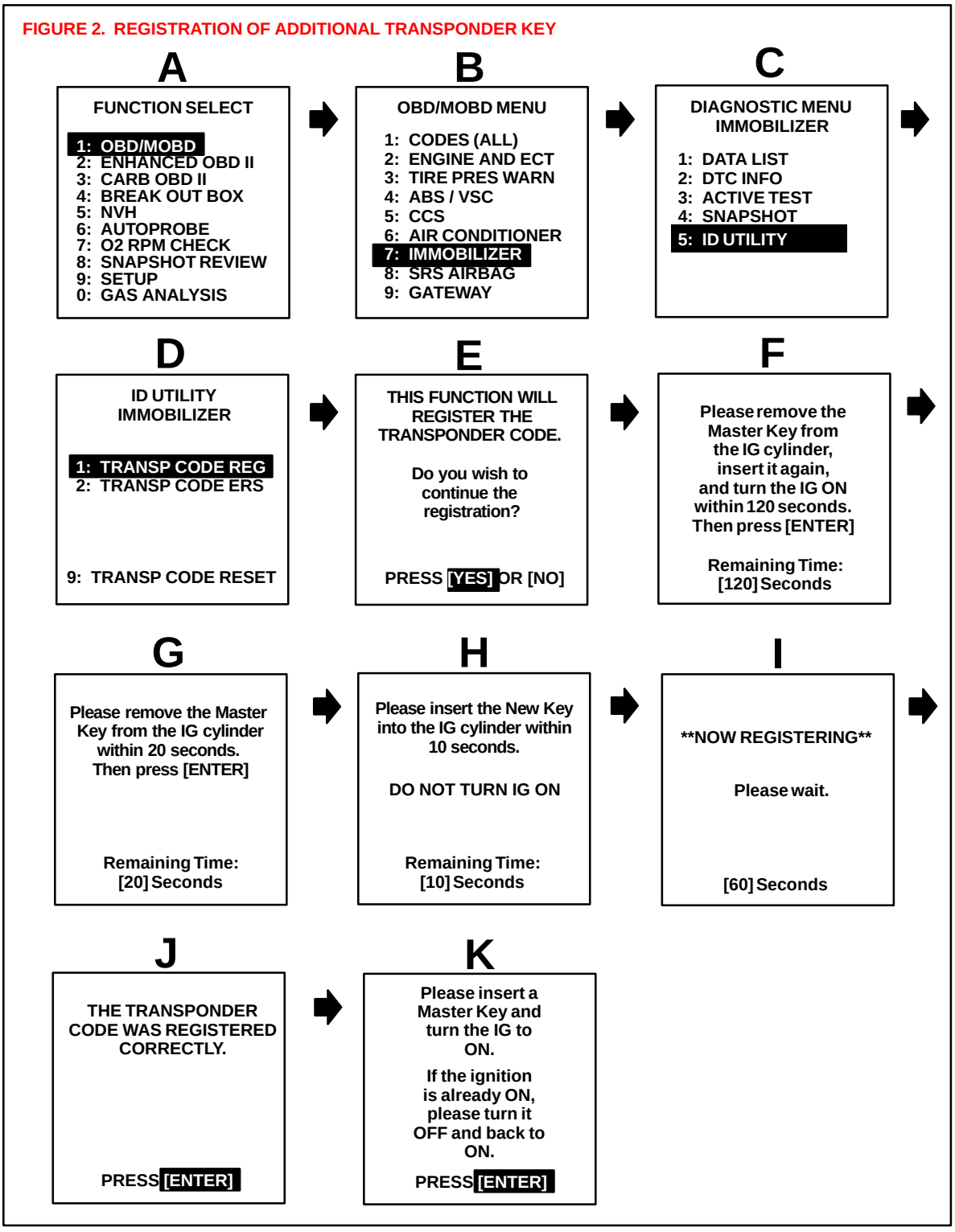


* Immediately after the transponder ECU is installed, the security indicator will blink.

Operation Procedure (Continued)

TRANSPONDER CODE REGISTRATION

FIGURE 2. REGISTRATION OF ADDITIONAL TRANSPONDER KEY



Operation Procedure (Continued)

TRANSPONDER CODE ERASURE

3. Transponder Code Erasure

This function allows the user to erase all the transponder keys except the registered Master Key used during this function.

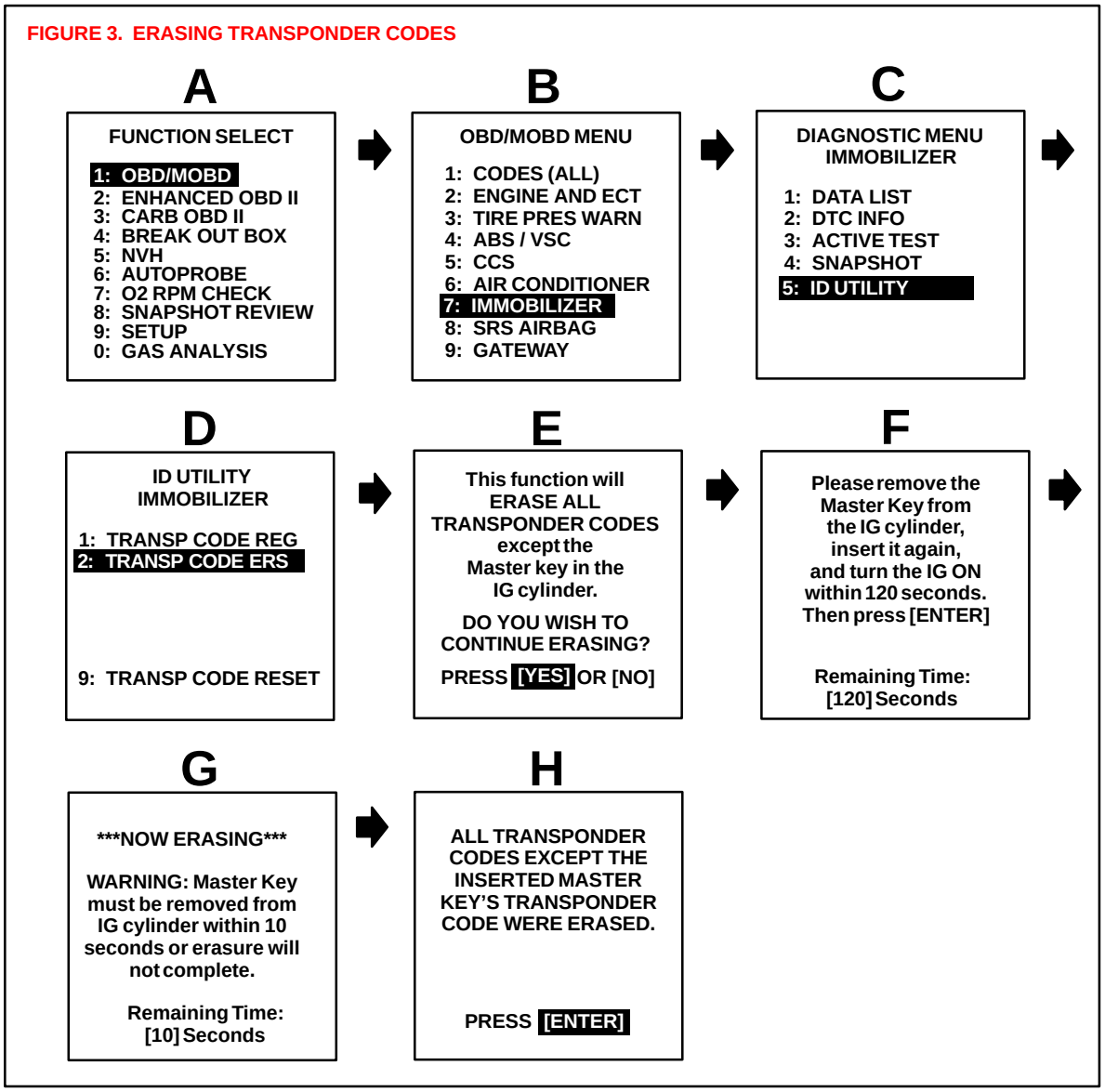
NOTE:

This function requires the use of one registered Master Key. The use of a Sub Key will NOT complete Transponder Code Erasure.

A. Insert a registered Master Key into the ignition cylinder and turn to the **ON** position.

B. Follow the screen flow in Figure 3 below to erase all Master or Sub keys, except the registered Master Key used for this procedure.

FIGURE 3. ERASING TRANSPONDER CODES



Operation Procedure (Continued)

TRANSPONDER ECU RESET

4. Transponder ECU Reset

This function allows the registration of a new Master Key even if all original Master Keys are lost. Once the Immobilizer system is reset, all previous registered keys will be erased. Use a new transponder Master Key to complete Transponder ECU Reset.

Immobilizer Reset

The Immobilizer Reset function is a 4-step process:

A. Using the Diagnostic Tester, retrieve a “Seed Number” through the **OBD/MOBD Immobilizer** function.
   - A “Seed Number” is a unique number provided by the Diagnostic Tester and validated at TMS in order to return a Passcode.

B. Using the TIS (Technical Information System) workstation, select **Immobilizer Reset**, and complete the request form to retrieve a “Passcode Number.”
   - A “Passcode Number” is a unique number required by the Diagnostic Tester to reset the ECU allowing it to accept a new Master Key.

C. Enter the “Passcode Number” received from TIS into the Diagnostic Tester, register any additional customer keys, and close auto registration mode.

D. Confirm successful Immobilizer reset and new Master Key registration.

Operation Procedure (Continued)

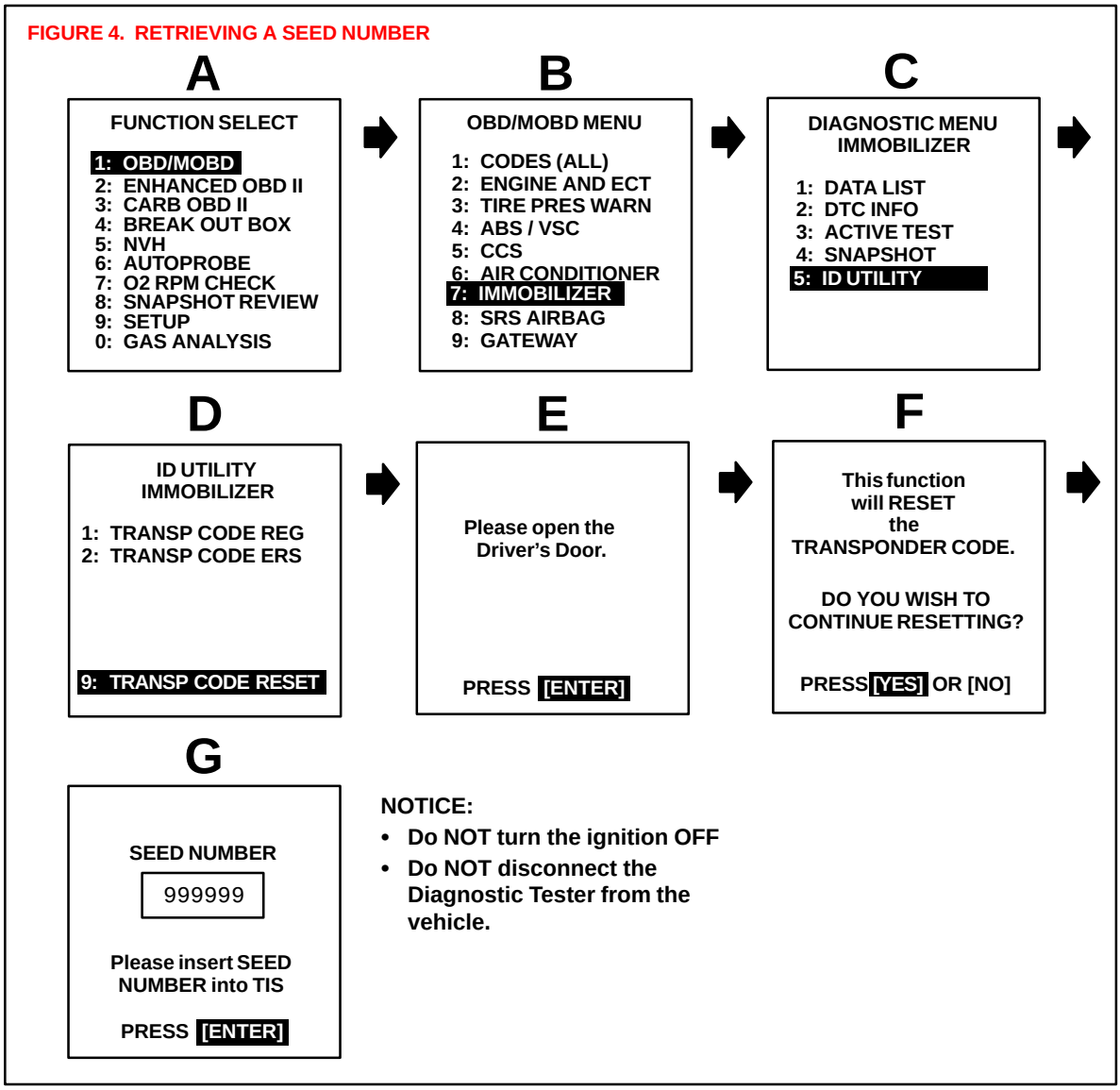
TRANSPONDER ECU RESET

A. Connect the Diagnostic Tester to DLC3 and turn ignition **ON**.

a. Using the Diagnostic Tester, retrieve a “Seed Number” through the **OBD/MOBD Immobilizer** function.

b. Follow each step outlined in Figure 4.

FIGURE 4. RETRIEVING A SEED NUMBER



Operation Procedure (Continued)

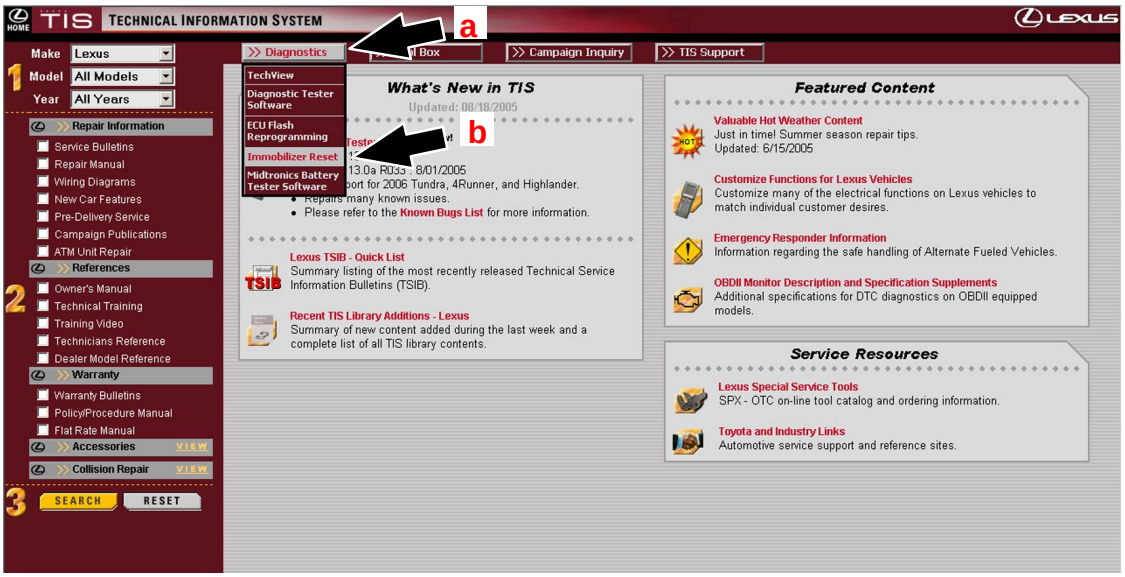
TRANSPONDER ECU RESET

B. Using the TIS workstation, select **Immobilizer Reset**, and complete the request form to retrieve a "Passcode Number."

a. Click on **Diagnostics**.

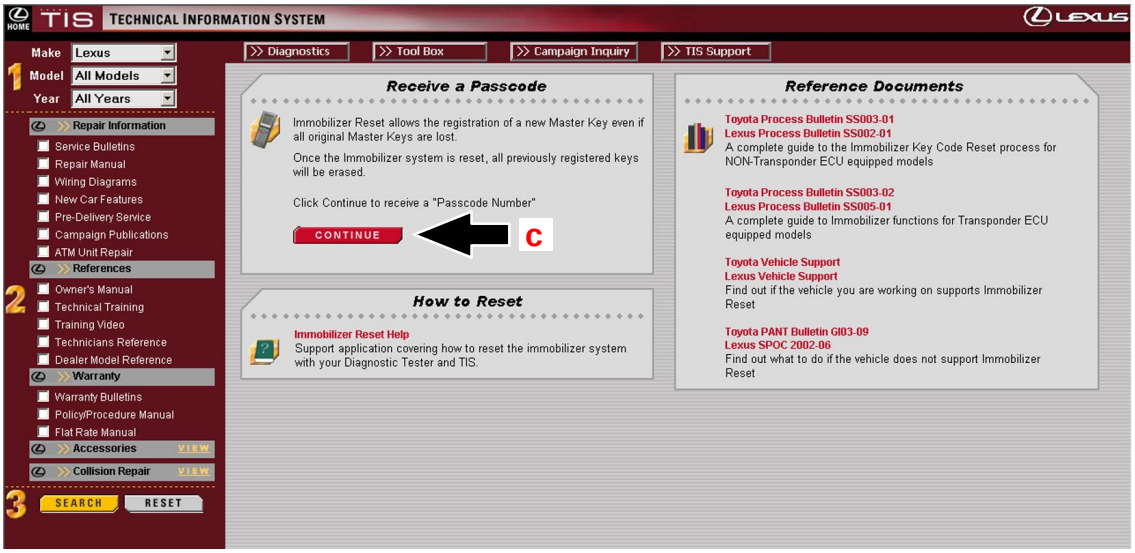
b. Click on **Immobilizer Reset**.

FIGURE 5. SELECTING IMMOBILIZER RESET ON TIS



c. Read the instructions on the screen and click on **Continue**. (See Figure 6 below.)

FIGURE 6. IMMOBILIZER RESET INSTRUCTIONS ON TIS



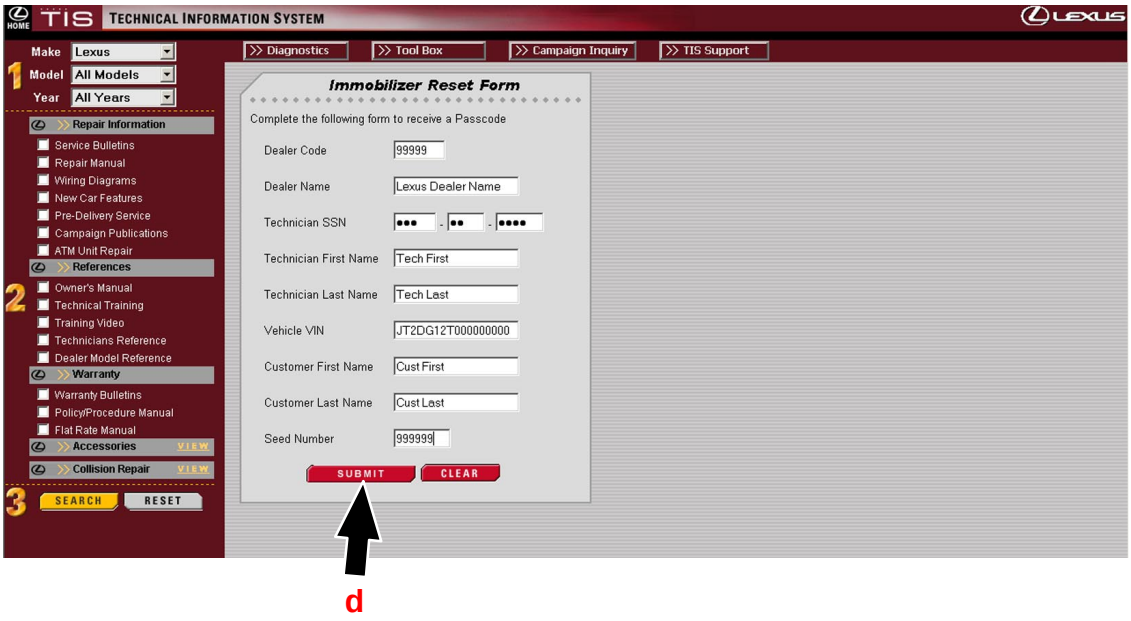
Operation Procedure (Continued)

TRANSPONDER ECU RESET

d. Complete the request form and enter the "Seed Number" from the Diagnostic Tester. Click on **Submit** (Figure 7).

NOTE:
All fields must be completed.

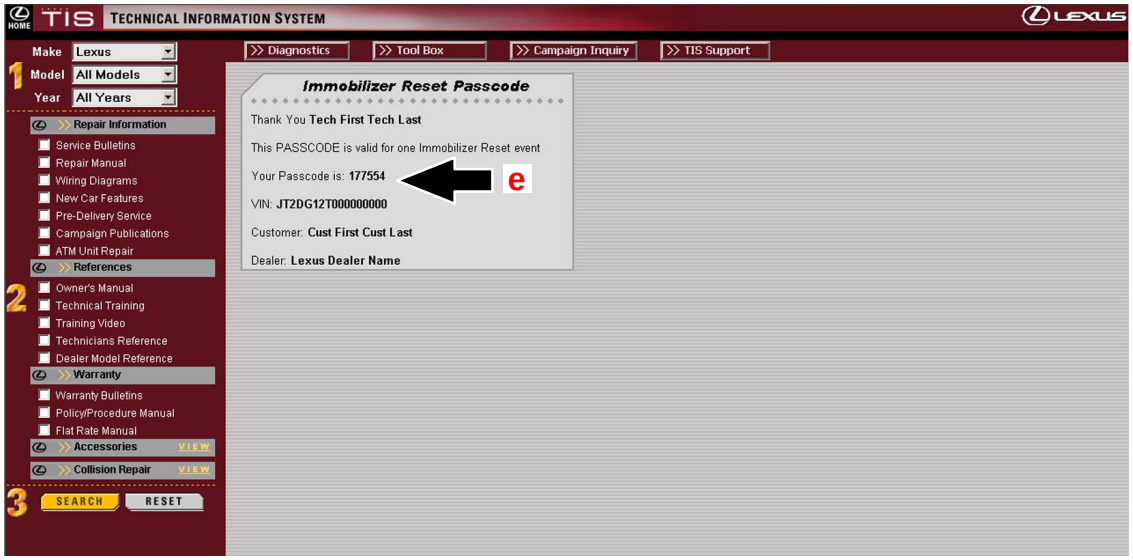
FIGURE 7. REQUEST FORM ON TIS



e. TIS will now return the Passcode that needs to be entered into the Diagnostic Tester.

NOTE:
The Passcode given by TIS is only valid for one Immobilizer Reset Event.

FIGURE 8. RECEIVING PASSCODE FOR DIAGNOSTIC TESTER



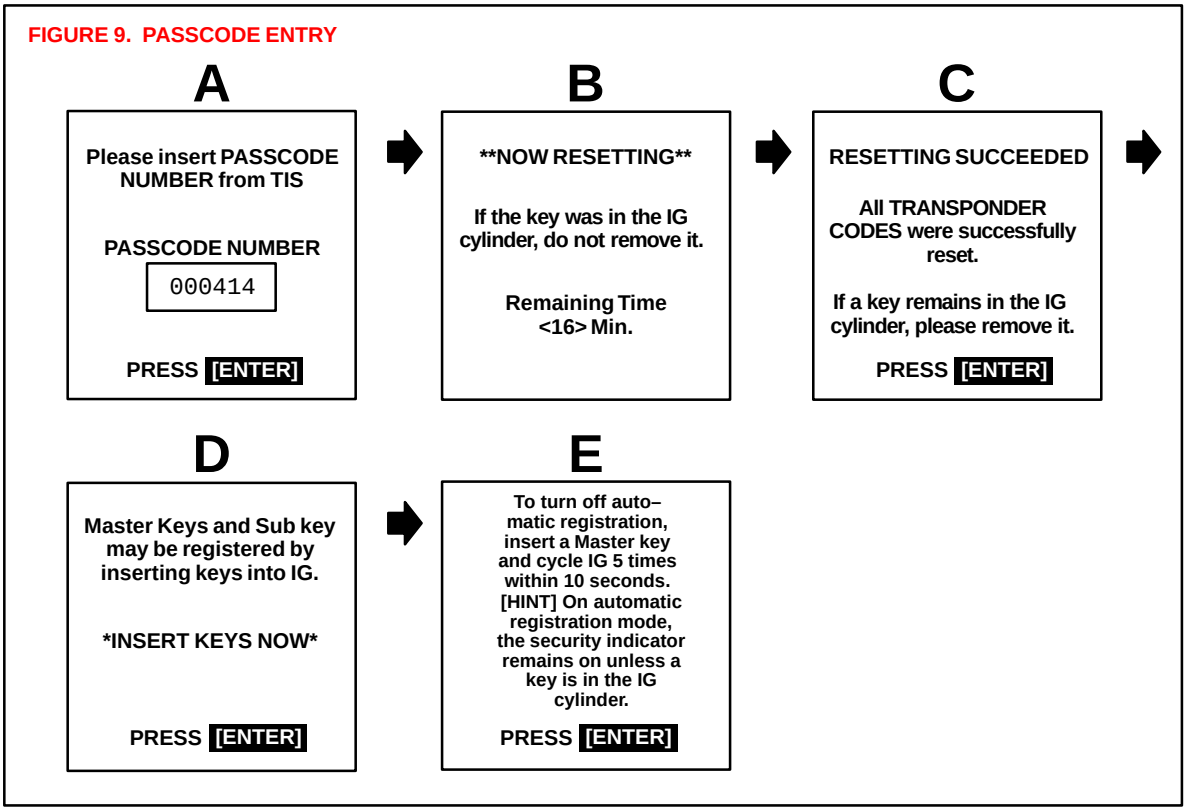
Operation Procedure (Continued)

TRANSPONDER ECU RESET

C. Using the numbered keys (0–9) on the Diagnostic Tester, enter the "Passcode Number" received from TIS into the Diagnostic Tester (see Figure 9 below). Press **ENTER** to clear all registered transponder codes except the Master key in the ignition cylinder.

NOTE:
- **During the reset process do not remove the key from the ignition.**
- **This step takes approximately 16 minutes.**

FIGURE 9. PASSCODE ENTRY



- Following a reset, the Transponder ECU is in auto registration mode.
- Auto registration mode allows 3 Master Keys and one Sub Key to register automatically.
- To register additional keys, remove the Master Key currently in the ignition. Insert keys (Master or Sub) into the ignition cylinder without turning the ignition on or off – simply insert and remove. (See Figure 9, screen D.)

NOTE:
- **If 4 keys are registered at this time, auto registration mode is automatically closed.**
- **If less than 4 keys are registered at this time, auto registration mode must be closed manually by cycling the ignition ON/OFF more than 5 times in 10 seconds. (See Figure 9, screen E.)**
- **If more than 4 keys need to be registered, use Transponder Code Registration.**

Operation Procedure (Continued)

TRANSPONDER ECU RESET

D. Verify that keys are registered correctly by starting the engine with each newly registered key.

NOTE:
- **If the vehicle starts, the new key code was registered correctly.**
- **If the vehicle does not start with any key, perform the Immobilizer Reset function again.**
- **If only one of the registered keys will not start the vehicle, attempt to register the key again following the Transponder Code Registration procedure (page 5 of this bulletin).**

TRANSPONDER ECU REPLACEMENT

5. Transponder ECU Replacement

When the Transponder ECU is replaced, the transponder keys must be registered, auto registration closed, and ECU communication completed.

A. Replacement transponder ECUs are in auto registration mode. This allows transponder keys to automatically register as they are inserted into the ignition cylinder. It is possible to automatically register 3 Master Keys, and 1 Sub Key.

NOTE:
- **If 4 keys are registered at this time, auto registration mode is closed.**
- **If less than 4 keys are registered at this time, auto registration mode must be closed manually by cycling the ignition ON/OFF more than 5 times in 10 seconds.**
- **If more than 4 keys need to be registered, use Transponder Code Registration procedure (page 5 of this bulletin).**

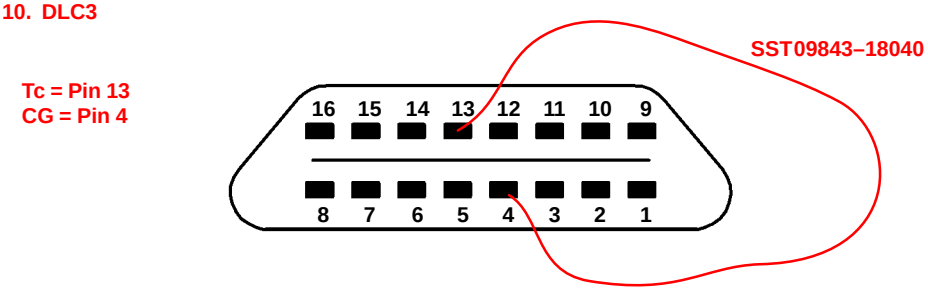
B. Once auto registration mode is closed, ECU Communication must be performed between the transponder ECU and the Engine ECU. Complete ECU communication using the following steps:

a. Insert registered Master Key into the ignition cylinder.

b. Turn ignition ON (engine OFF).

c. Short Tc and CG terminals of DLC3 using Diagnosis Check Wire (SST 09843–18040 or equivalent) and leave for 30 minutes. (See Figure 10.)

FIGURE 10. DLC3



d. After 30 minutes, turn ignition OFF and remove check wire from DLC3

e. Start the vehicle to confirm successful ECU communication.

NOTE:

If ECU communication is not completed correctly, the engine will not start and DTC B2799 will be set. DTC B2799 will be cleared after engine starts correctly.

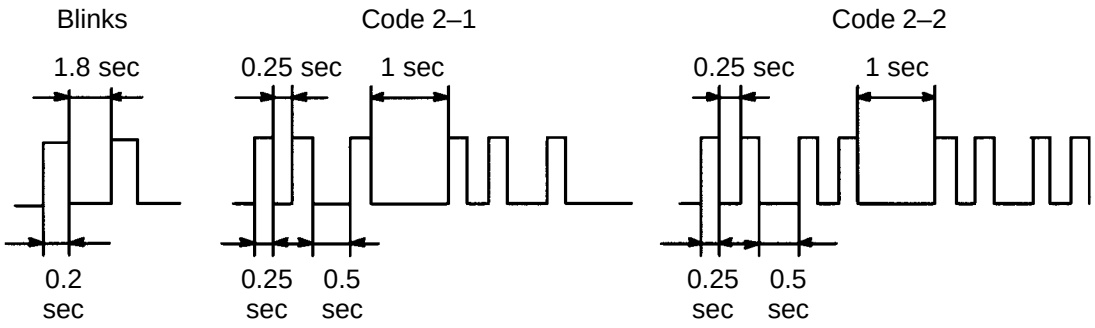
Operation Procedure (Continued)

TRANSPONDER ECU REPLACEMENT

HINT:

The security indicator light reveals the following information:

- **Always ON and NO key in IG* = Transponder ECU in Auto Registration mode**
- **Blinking and NO key in IG = Normal operation**
- **Blinking Code 21 = Transponder Code Registration failed**
- **Blinking Code 22 = Attempt was made to register an already registered Transponder Code**



* Immediately after the transponder ECU is installed, the security indicator will blink.

ENGINE ECU REPLACEMENT

6. Engine ECU Replacement

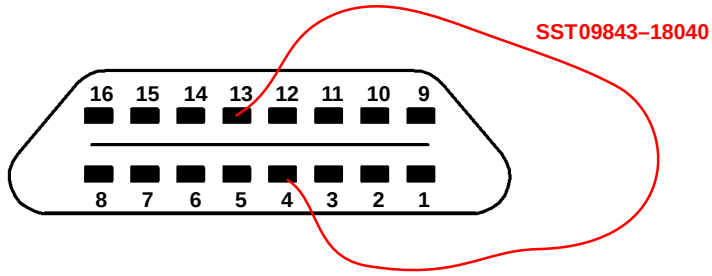
When the Engine ECU is replaced, ECU communication must be completed. ECU Communication must be performed between the transponder ECU and the Engine ECU. Complete ECU communication using the following steps:

A. Insert registered Master Key into the ignition cylinder.

B. Turn ignition ON (engine OFF).

C. Short Tc and CG terminals of DLC3 using Diagnosis Check Wire (SST 09843–18040 or equivalent) and leave for 30 minutes. (See Figure 11.)

FIGURE 11. DLC3



D. After 30 minutes, turn ignition OFF and remove check wire from DLC3

E. Start the vehicle to confirm successful ECU communication.

NOTE:

If ECU communication is not completed correctly, the engine will not start and DTC B2799 will be set. DTC B2799 will be cleared after engine starts correctly.

Technical Service Information Bulletin
April 29, 2005

Title:

STEERING INTERMEDIATE SHAFT NOISE

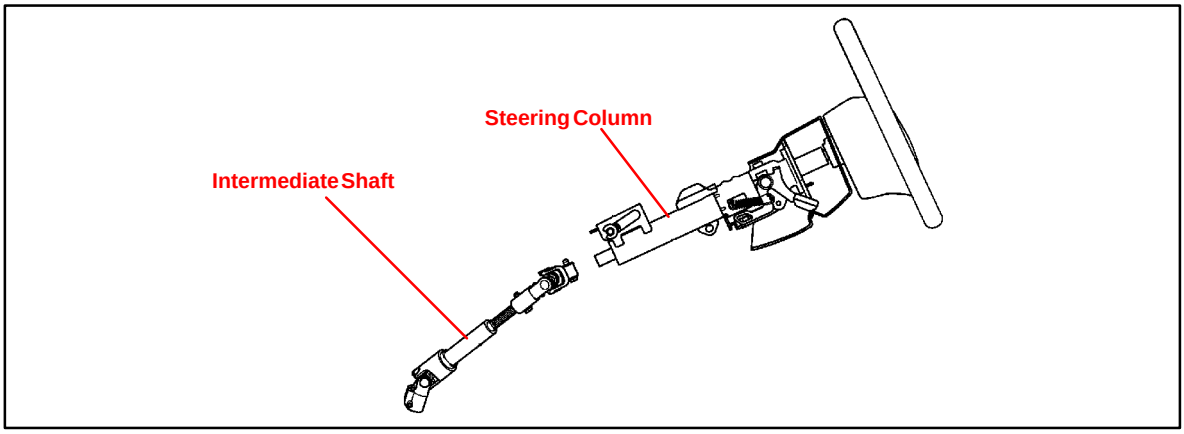
Models:

'03 ES 300, '04 – '05 ES 330

TSIB

Introduction

Some customers may hear and feel a clunk, pop, or knock type noise when turning the steering wheel left or right. A new intermediate shaft has been developed to address this concern.



Applicable Vehicles

- **2003** model year **ES 300** vehicles.
- **2004** model year **ES 330** vehicles.
- **2005** model year **ES 330** vehicles produced **BEFORE** the Production Change Effective VINs shown below.

Production Change Information

MODEL	PRODUCTION CHANGE EFFECTIVE VIN
ES 330	JTHBA30G#55098506

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
ST4008	R & R Steering Intermediate Shaft	0.9	45220–33200	91	19

Applicable Warranty*:

This repair is covered under the Lexus Comprehensive Warranty. This warranty is in effect for 48 months or 50,000 miles, whichever occurs first, from the vehicle's in-service date.

* Warranty application is limited to correction of a problem based upon a customer's specific complaint.

Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME	QTY
45220–33200	45220–33240	Intermediate Shaft Assembly	1

Repair Procedure

Prior to removing the steering intermediate shaft, make sure the steering wheel and front wheels remain stationary. Once the intermediate shaft is removed, do NOT allow the steering wheel to spin freely.

For information on replacing the steering intermediate shaft assembly, refer to the Technical Information System (TIS): 2003 – 2004 model year ES 330 Repair Manual: *Steering Column: Steering Column Assy: Overhaul.*

LEXUS

Technical Service Information Bulletin

December 21, 2001

Title:

REPAIR MANUAL SUPPLEMENT: VEHICLE PULLING TO ONE SIDE

Models:

All '02 – '06 Model

TSIB

REVISED

STEERING

ST004-01

TSIB REVISION NOTICE:

- **October 5, 2005: 2003 – 2006 model years have been added to Applicable Vehicles. A note has been added to the illustration in step 3.**
- **March 1, 2002: OP Codes updated in Warranty Information.**

All previous versions of this TSIB should be discarded.

Introduction

This bulletin contains general vehicle pulling diagnosis and repair procedures along with specific information to help correct pulling complaints.

This information supplements Repair Manual procedures when the symptoms are:

- The driver holds the steering wheel without exerting steering effort while driving straight ahead, and the vehicle drifts to the right or the left.
- While driving straight ahead, the driver has to steer either to the right or the left to maintain straight driving.

Applicable Vehicles

- **2002 – 2006** model year **Lexus** vehicles.

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
ST1004	Preliminary Check & Road Test	0.6	45046–09020	31	99
Combo A	Switch Front Tire/Wheel & Road Test	0.5			
Combo B	Reverse the Front One Side Tire	0.7			
Combo C	Check Front Wheel Alignment	1.2			
Combo D	Adjust Front Wheel Alignment	0.7			
Combo E	Adjust Camber Setting	0.7			
420091	Dismount and Mount Tire and Balance Wheel and Tire Assembly	0.5	42611–48030		
Combo A	Each additional Wheel	0.3			

NOTE:
Above combination codes A, B, D and E include road test time.

Applicable Warranty*:
This repair is covered under the Lexus Comprehensive Warranty. This warranty is in effect for 12 months or 20,000 miles, whichever occurs first, from the vehicle's in-service date.

* Warranty application is limited to correction of a problem based upon a customer's specific complaint.

Contents This bulletin is divided into the following sections:

Wheel Alignment and Tire Characteristics . . . . . Pages 2–3

Repair Procedure Flow Chart . . . . . Page 4

Repair Procedures

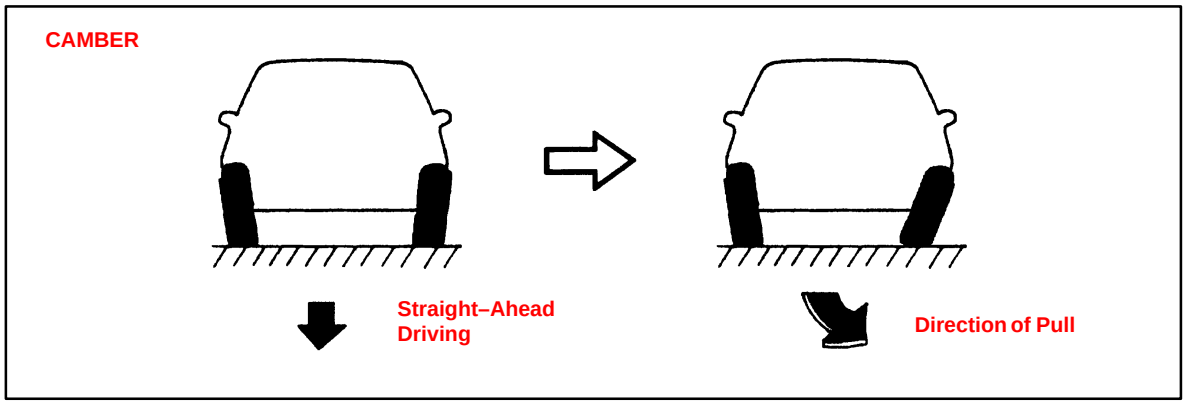
1. **Important Notice . . . . . Page 5**
2. **Troubleshooting . . . . . Pages 5–6**
3. **Vehicle Pulling Caused by Wheel Alignment . . . . . Pages 6–7**
4. **Vehicle Pulling Caused by Tire Conicity . . . . . Pages 7–9**
5. **Camber Adjustment Method . . . . . Pages 9–10**

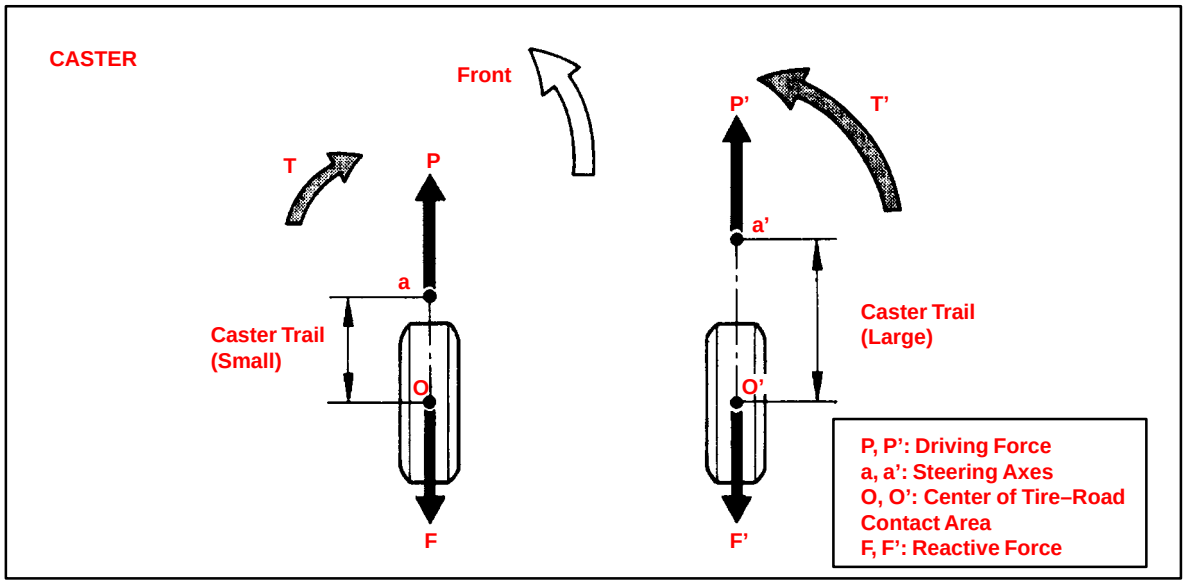
Wheel Alignment & Tire Characteristics

1. Relationship Between Wheel Alignment and Vehicle Pulling to One Side

When the cross camber or caster of the front wheel alignment is large, it can cause vehicle pulling.

WHEEL ALIGNMENT	DIRECTION OF VEHICLE PULLING
Camber	Vehicle pulls in direction of wheel with large camber value
Caster	Vehicle pulls in direction of wheel with small caster value





If the cross camber or caster is within the specified range (30' or less), noticeable vehicle pulling will not occur due to side-to-side differences in camber or caster.

NOTE:

On a flat road, if the cross camber or caster is 30' or less and the steering wheel is held without exerting steering effort for 100 m (109 yards) when driving at 100 km/h (62 mph), the alignment–induced drift distance is approximately 0.5 m (1.64 ft).

Wheel Alignment & Tire Characteristics (Continued)

2. Relationship Between Tire Characteristics and Vehicle Pulling to One Side

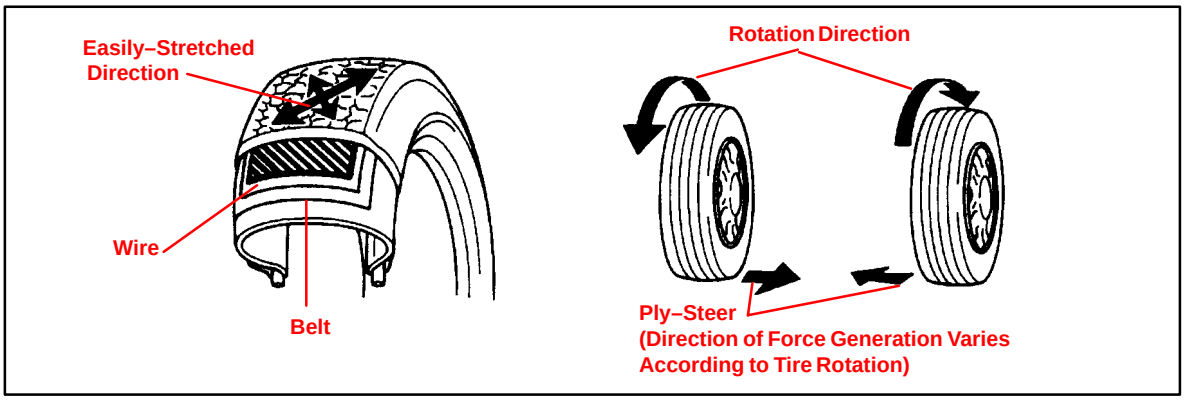
When radial tires are rotating, they have the characteristic of generating force in the lateral direction between the tire and the road surface. This lateral force is comprised of two factors:

- Ply–steer, which changes direction according to the rotation direction of the tires.
- Conicity, which is generated in a fixed direction regardless of the tire rotation direction.

If these lateral forces are too strong, vehicle pulling will occur.

A. Ply–Steer

Lateral force due to ply-steer is produced by the construction of the belts inside the tire tread. With radial tires, the wire of the belt is slanted as shown in the illustration below. Thus, it is in the lateral direction that tire tread easily changes shape (stretches), and lateral force is generated between the tire and the road surface in the lateral direction.

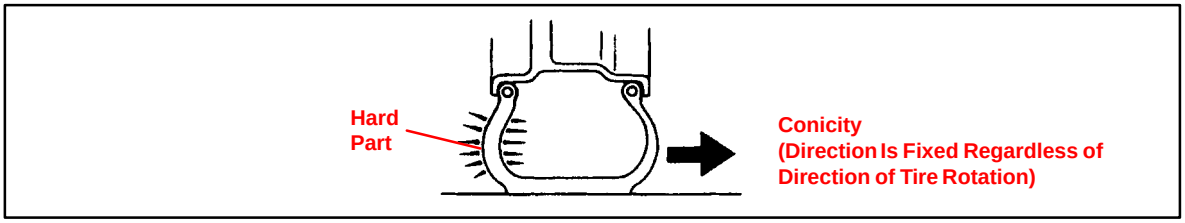


NOTE:

Lateral force from ply-steer prevents vehicle drift caused by road slant, so in many cases lateral force to the right is provided for left-handed steering vehicles.

B. Conicity

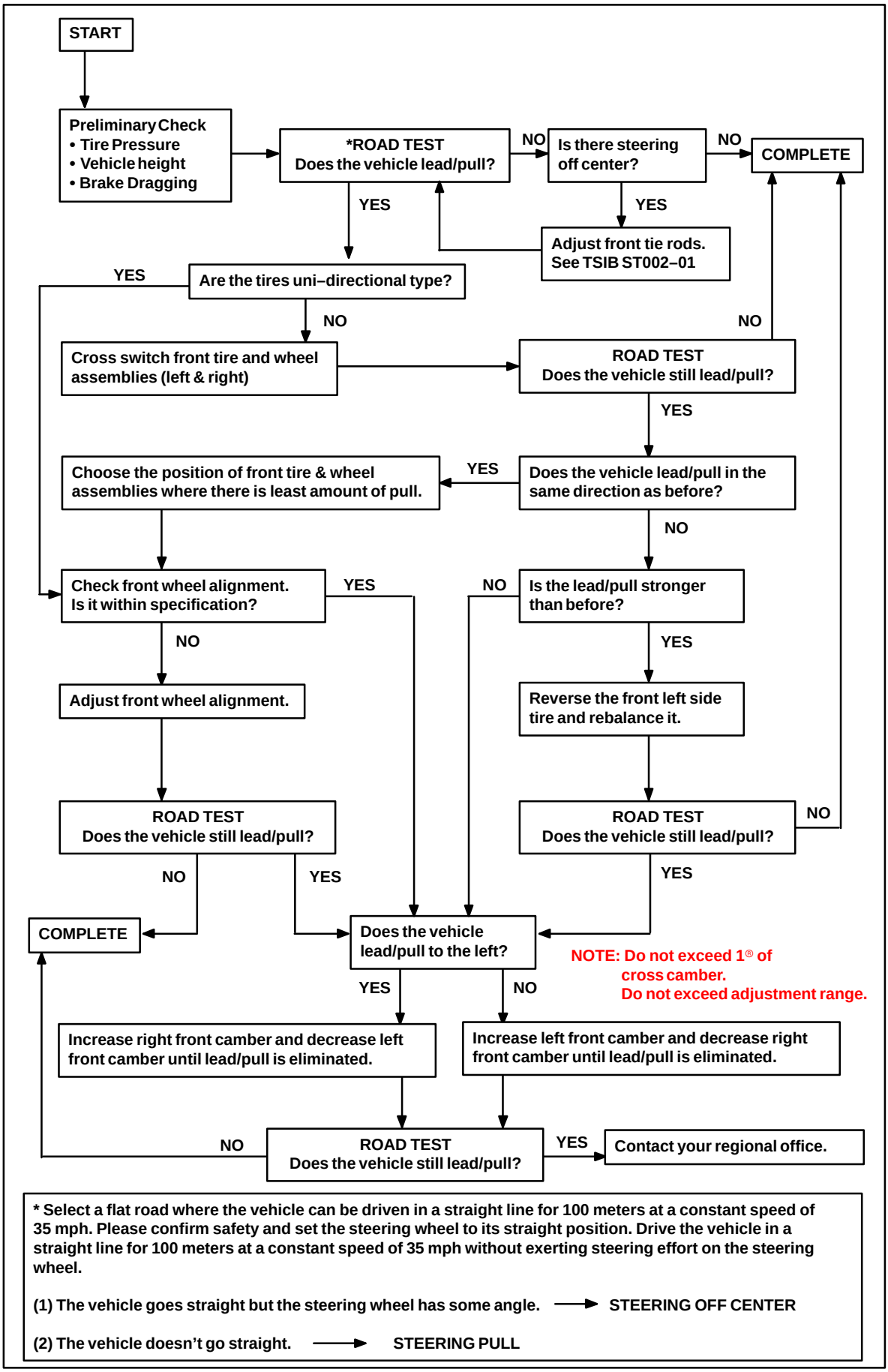
Conicity is lateral force resulting from uneven formation of the left and right sides of the tire. The direction the lateral force is exerted depends on the hardness of the side walls and the difference in height between the left/right sides of the tire.



NOTE:

- **In the case of vehicle pulling caused by tires, the lateral force which is exerted as a result of conicity has the greatest effect. On a flat road, if the steering wheel is held without exerting steering effort for 100 m (109 yards) when travelling at 100 km/h (62 mph), the vehicle may drift as much as 1.5 m (5 ft).**
- **When vehicle pulling is due to conicity, the amount of drift can be reduced and the direction of drift can be changed by changing the location of the tire or reversing the tire when installing it on the wheel.**

Repair Procedure Flow Chart



* Select a flat road where the vehicle can be driven in a straight line for 100 meters at a constant speed of 35 mph. Please confirm safety and set the steering wheel to its straight position. Drive the vehicle in a straight line for 100 meters at a constant speed of 35 mph without exerting steering effort on the steering wheel.

(1) The vehicle goes straight but the steering wheel has some angle. → STEERING OFF CENTER

(2) The vehicle doesn't go straight. → STEERING PULL

Repair Procedures

1. IMPORTANT NOTICE

Before repairing vehicle pulling to one side, it is necessary to clearly identify the cause of the pulling condition. Frequently, the cause of the vehicle pulling to one side is diagnosed as wheel alignment. However, the actual cause may be lateral force generated by the tires. Performing wheel alignment when tire force is the cause could result in the wheel alignment being set at a value outside of specifications. This would then cause other problems such as uneven tire wear, etc.

2. Troubleshooting

First determine whether vehicle pulling to one side is caused by a wheel alignment problem or tire characteristics, then decide which repairs to make.

A. Perform the following checks and correct as necessary.

a. Check tires for size, wear and for proper inflation pressure.

b. Check whether the vehicle is noticeably tilted backward/forward or left/right.

NOTE:

Tilting of the vehicle produces a left–right difference in the camber and caster and can cause vehicle pulling to one side.

c. Check brakes for dragging.

B. Confirm problem symptoms.

With the customer accompanying you, drive the vehicle to confirm if the customer's complaint involves vehicle pulling to one side or steering wheel off center. If the problem is steering wheel off center, adjust the front tie rods on the vehicle. **Refer to Lexus TSIB ST002–01**. Also check the direction of vehicle pulling and the extent of the pulling.

C. Decide if vehicle pulling is due to wheel alignment or tires.

a. Switch the left and right front tires (If the tires are non–unidirectional).

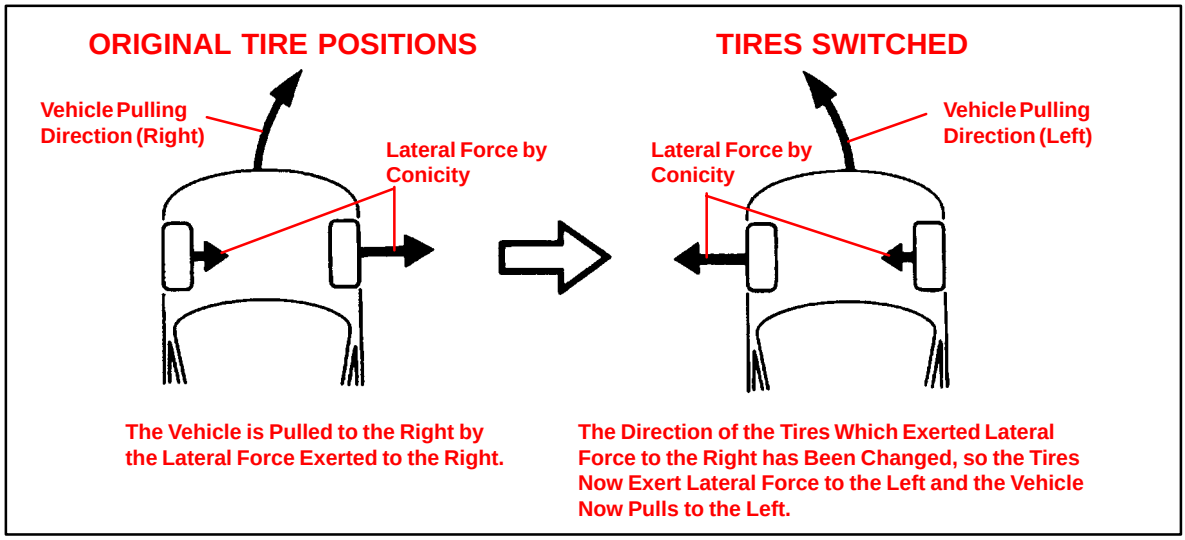
b. Conduct a drive test to check whether the direction that the vehicle pulls has changed.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
No change in vehicle pulling condition	Front wheel alignment	Proceed to Repair Procedure 3. Vehicle pulling caused by Wheel Alignment (Page 6)
Vehicle pulling eliminated	Tire conicity	Repair complete. Vehicle Pulling Caused by Tire Conicity (Page 3 and 6)
Vehicle pulling direction is reversed	Tire conicity	Proceed to Repair Procedure 4. Vehicle Pulling Caused by Tire Conicity (Page 7)

Repair Procedures (Continued)

Helpful hints to determine cause of vehicle pulling:

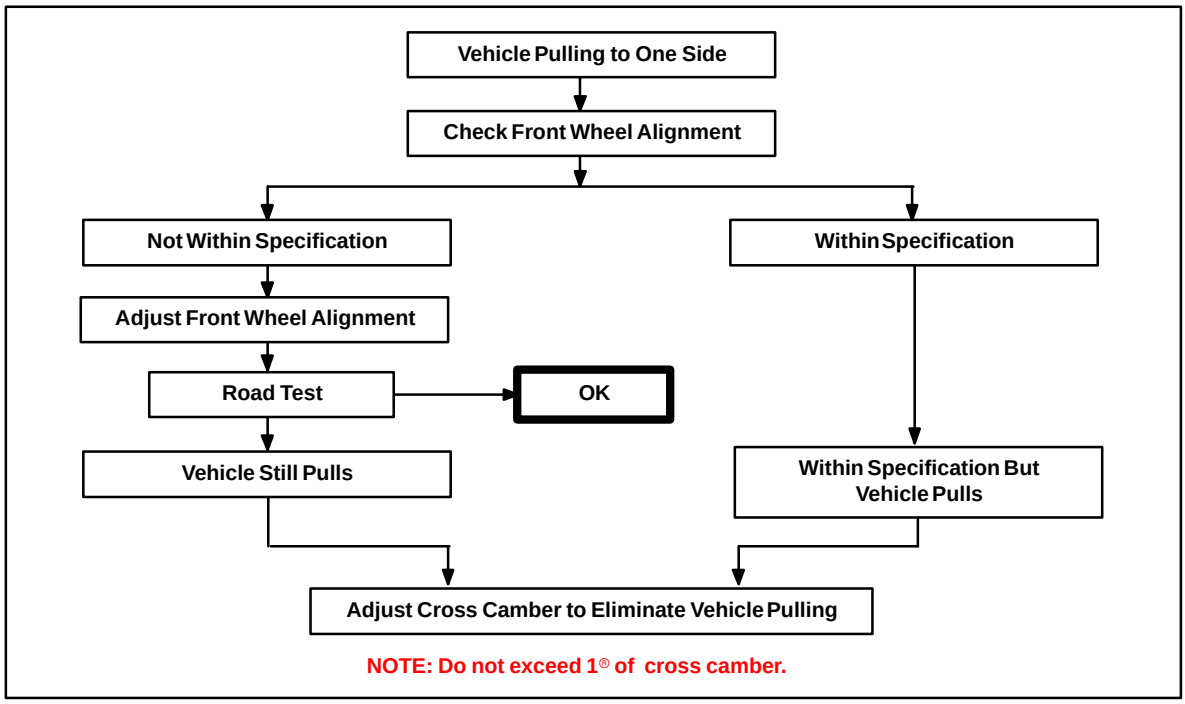
- The direction of lateral force from tire conicity becomes reversed when the left and right tires are switched. Therefore, if the pulling direction changes when the tires are switched, it can be concluded that vehicle pulling is caused by tire conicity.



- If the pulling direction does not change after the front tires are switched, the cause of vehicle pulling is not tire conicity. In this case, the likely cause is a front wheel alignment condition.

3. Vehicle Pulling Caused by Wheel Alignment

When it is determined by troubleshooting that the vehicle pulling to one side is caused by wheel alignment, perform repairs according to the following procedure.



Repair Procedures (Continued)

WHEN VEHICLE PULLS TO LEFT	WHEN VEHICLE PULLS TO RIGHT
Increase right front camber and decrease left front camber until vehicle pulling is eliminated	Increase left front camber and decrease right front camber until vehicle pulling is eliminated

NOTE:
- **Keep the cross camber within 1® or less.**
- **Keep the camber of each wheel within specifications (+/–45' of center value).**
- **If adjustment exceeds the specifications, uneven tire wear will result.**

4. Vehicle Pulling Caused by Tire Conicity

When it is determined by troubleshooting that the vehicle pulling to one side is caused by tire conicity, perform repairs according to the following procedures.

Indication of Tire Conicity as a Cause:
When the front tires are switched, the pulling direction changes. Proceed to STEP 1.

STEP 1:

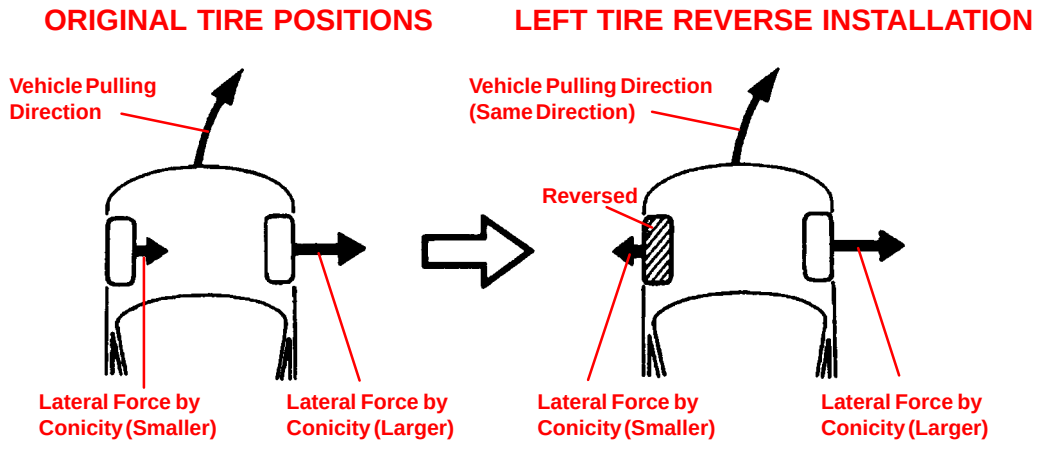
Remove the front left tire from the wheel and reverse the tire. Then perform a road test and check for change in the pulling direction.

HINT:

By performing this operation, it can be checked whether the left or right tire exerts a stronger lateral force. Either tire can be reversed. Shown here is an example of the left tire reversed.

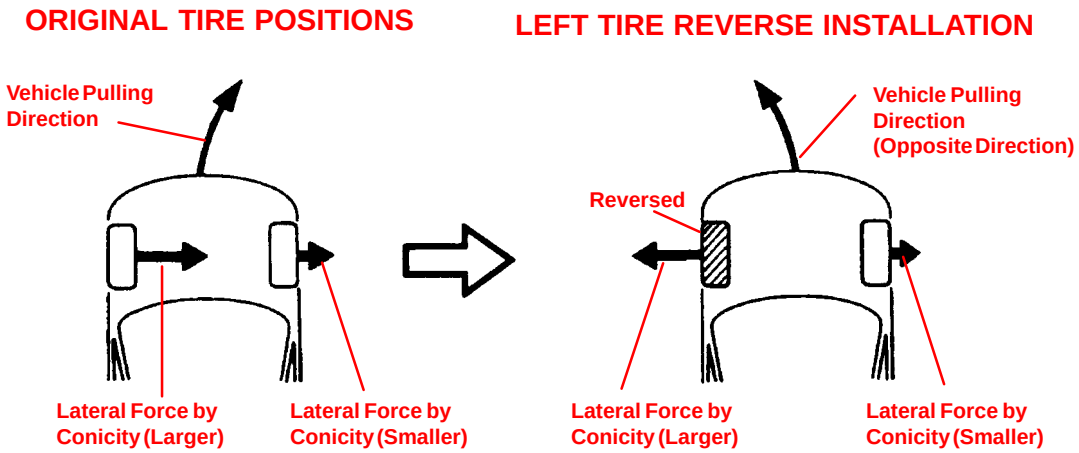
If Vehicle Pulls in the Same Direction: Go to STEP 2.

The lateral force generated by the right front tire is greater than the left tire, so the vehicle is pulling due to the lateral force of the right tire.



Repair Procedures (Continued)

If Vehicle Pulls in the Opposite Direction: Go to STEP 2.
The lateral force generated by the left front tire is greater than the right tire, so the vehicle is pulling due to the lateral force of the left tire.



If Vehicle Pull Is Eliminated: Repair Is Now Complete.

The lateral force generated by the left and right front tires is virtually the same, so the lateral force is neutralized and the vehicle travels straight ahead. The repair operation is now completed.

STEP 2:
Rotate the **larger** lateral force front tire with the rear tire and check the change in the vehicle pulling.

NOTE:
By shifting the front tire with the larger lateral force to the rear, the vehicle pulling level is usually reduced.

If Vehicle Is Still Pulling: Go to STEP 3.

If Vehicle Pull Is Eliminated: Repair Is Now Complete.

Repair Procedures (Continued)

STEP 3:
Adjust cross camber to eliminate vehicle pulling.

HINT:
If the tires are placed in the positions they were in during tire rotation when the least amount of vehicle pulling occurred, wheel alignment can be performed with a minimal amount of adjustment.

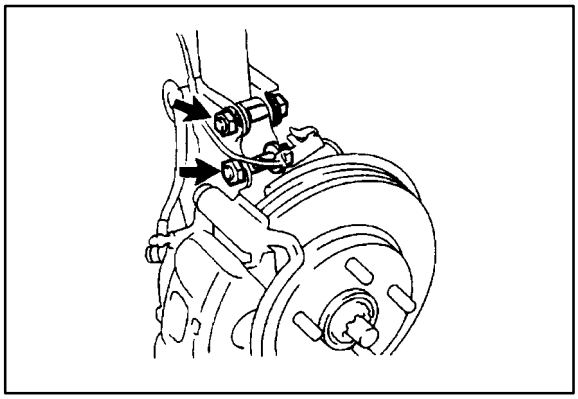
WHEN VEHICLE PULLS TO LEFT	WHEN VEHICLE PULLS TO RIGHT
Increase right front camber and decrease left front camber until vehicle pulling is eliminated	Increase left front camber and decrease right front camber until vehicle pulling is eliminated

NOTE:
- **Keep the cross camber within 1® or less.**
- **Keep the camber of each wheel within specifications (+/–45' of center value).**
- **If adjustment exceeds the specifications, uneven tire wear will result.**

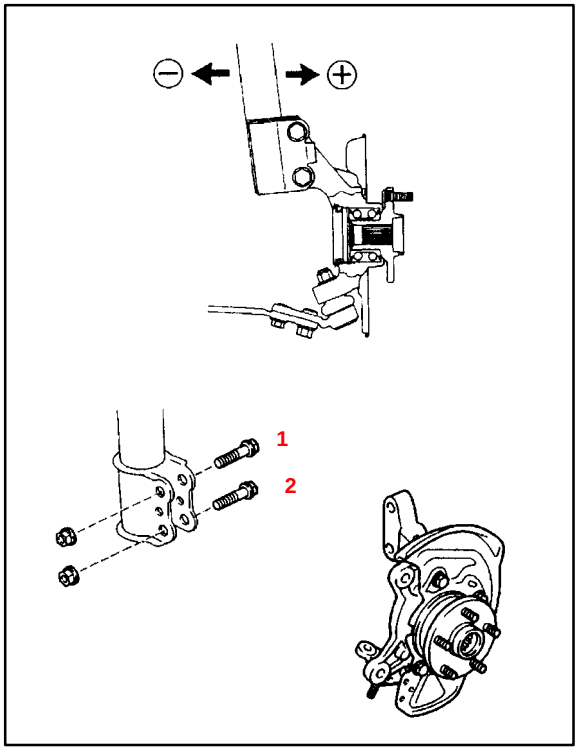
5. Camber Adjustment Method

NOTE:
After the camber has been adjusted, inspect the toe–in.

NOTE:
The method of camber adjustment differs for different models, so please refer to the repair manual of the vehicle involved. (This is a sample from the RX 300 Repair Manual).



A. Remove the front wheels and ABS speed sensor clamp.
B. Remove the two nuts on the lower side of the shock absorber.
C. Coat the threads of the nuts with engine oil.
D. Temporarily install the two nuts.
E. Adjust the camber by pushing or pulling the lower side of the shock absorber in the direction in which the camber adjustment is required.
F. Tighten the nuts.
Torque: 210 N•m
(2,150 kgf•cm, 155 ft•lbf)



Repair Procedures (Continued)

G. Install the front wheels.
Torque: 103 N•m (1,050 kgf•cm, 76 ft•lbf)

H. Check the camber.

NOTE:

Adjusting value for the set bolts is 6' – 30' (0.1° – 0.5°).
When making an adjustment of more than 45', replace the upper and lower steering knuckle set bolts with the adjusting bolts. If the camber is not within the specification, use the table shown to estimate how much additional camber adjustment will be required, and select the appropriate camber adjusting bolt.

Bolt / Adjusting Value	Set Bolt		Adjusting Bolt					
			1 Dot		2 Dots		3 Dots	
	1	2	1	2	1	2	1	2
15'	●			●				
30'	●					●		
45'	●							●
1°00'			●					●
1°15'					●			●
1°30'							●	●

I. Follow steps 5–a through 5–h again. Between steps 5–b and 5–c, exchange one or two selected bolts.

HINT:

When exchanging the two bolts, exchange one bolt each time.

If Vehicle Pull Is Eliminated: Repair Is Now Complete.

If Vehicle Is Still Pulling: Contact Your Regional Office For Further Assistance.

LEXUS

Technical Service Information Bulletin

May 5, 2003

Title:

ECM RESET MEMORY FUNCTION

Models:

'98 – '05 Applicable Models

TSIB

REVISED

TC002-03

TRANSMISSION & CLUTCH

TSIB REVISION NOTICE:

December 20, 2004: Applicable Vehicles section has been updated and modified, 2004 and 2005 model years added; and Reset Procedure 2 has been revised. Previous versions of this TSIB should be discarded.

Introduction

Whenever an automatic transmission is replaced, overhauled or individual components are replaced, use this procedure to erase Engine Control Module (ECM, SAE term: Powertrain Control Module, PCM) "Learned Values" and minimize subsequent performance concerns.

CAUTION:

Failure to follow the following procedure may lengthen the time to readjust the "Learned Values," potentially resulting in performance concerns.

Applicable Vehicles

Refer to **Reset Procedure 1** for the following vehicles with Electronically Controlled Automatic Transmissions:

- **1999 – 2003** model year **ES 300** and **RX 300** vehicles.
- **2003 – 2005** model year **GX 470** vehicles.
- **2004 – 2005** model year **RX 330** vehicles.

Refer to **Reset Procedure 2** for the following vehicles with Electronically Controlled Automatic Transmissions:

- **1998 – 2005** model year **GS 430/400/300, LS 430/400, LX 470,** and **SC 430/400/300** vehicles.
- **2001 – 2005** model year **IS 300** vehicles.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Required SSTs

SPECIAL SERVICE TOOLS (SSTs)	PART NUMBER	QUANTITY
Lexus Diagnostic Tester Kit*	01001270	1
CAN Interface Module Kit*	01002744	1
12 Megabyte Diagnostic Tester Program Card with version 12.01a Software (or later)*	01002593-005	1

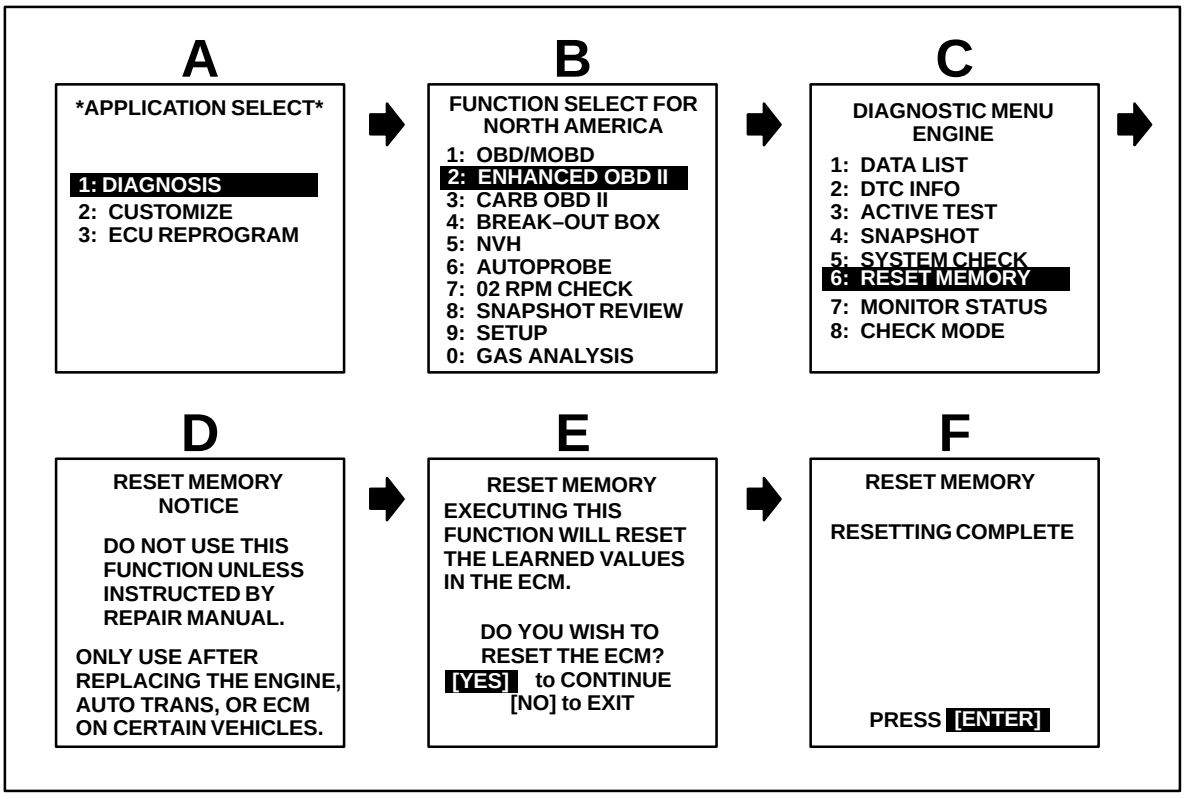
* Essential SSTs.

NOTE:

Additional Diagnostic Tester Kits, CAN Interface Modules, Program Cards or other SSTs may be ordered by calling SPX/OTC at 1-800-933-8335.

Reset Procedure 1

1. Connect the Lexus Diagnostic Tester to the vehicle.
2. Reset the ECM (PCM). Refer to the procedures below.



3. Start the engine and warm it up to normal operating temperatures before test–driving.
4. Perform a thorough test drive with several accelerations from a stop with “light throttle” application until proper transmission shifting is verified.

Reset Procedure 2

1. Disconnect the negative battery cable for 5 minutes.
2. Reconnect battery cable.
3. Start the engine and warm it up to normal operating temperatures before test–driving.
4. Perform a thorough test drive with several accelerations from a stop with “light throttle” application until proper transmission shifting is verified.

LEXUS

Technical Service Information Bulletin

August 4, 2003

Title:

ECM CALIBRATION: SHIFT FEELING ENHANCEMENT

Models:

'02 – '03 ES 300 & '04 – '05 ES 330

TSIB

REVISED

TC004-03

TRANSMISSION & CLUTCH

REVISION NOTICE:

- **April 1, 2005: 2004 – 2005 model year ES 330 vehicles have been added to Applicable Vehicles. Introduction and Note have been updated on page 1. Calibration Identification Chart has been updated to include ES 330 calibration IDs.**
- **August 6, 2003: There has been a change in Warranty Time.**

Previous versions of this TSIB should be discarded.

Introduction

To improve the transmission shift feeling during specific operating modes, the Engine Control Module (SAE term: Powertrain Control Module/PCM) calibration has been revised. These improvements include:

- Reduced downshift lag when accelerating at speeds from 10 to 20 mph.
- Less gear hunting when driving on/off accelerator pedal at 20 to 30 mph (for example: during heavy rush–hour traffic).
- Improved response rate during heavy acceleration from a stop.

NOTE:

- **Version 12.01a or later Diagnostic Tester software is required to perform this procedure.**
- **Before proceeding, verify the ECM (PCM) calibration has NOT been updated by checking for the Authorized Modifications Label (shown in step 1 of the Repair Procedure).**
- **Harsh ATM shifting may result if any Repair Procedure steps are omitted (specifically steps 2 and 4 of "Flash Reprogram ECM" on page 6).**

Applicable Vehicles

- **2002 – 2003** model year **ES 300** vehicles.
- **2004 – 2005** model year **ES 330** vehicles.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
EG5017	Recalibrate ECM Engine & Transmission	0.9	89666–3325# 89666–3344# 89661–33B3# 89661–33A4#	26	99

Applicable Warranty*:

This repair is covered under the Lexus Federal Emissions Warranty. This warranty is in effect for 96 months or 80,000 miles, whichever occurs first, from the vehicle's in-service date.

* Warranty application is limited to correction of a problem based upon a customer's specific complaint.

Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME	QTY
N/A	00451–00001–LBL	Authorized Modifications Label	1

NOTE:

Authorized Modification Labels may be ordered in packages of 25 from the Materials Distribution Center (MDC) through Dealer Daily Dealer Support Materials System or by calling the MDC at 1–800–622–2033.

Required SSTs

SPECIAL SERVICE TOOLS (SSTs)	PART NUMBER	QTY	DRW**
CAN Interface Module Kit*	01002744	1	8
Lexus Diagnostic Tester Kit*	01001270	1	8
12 Megabyte Diagnostic Tester Program Card with version 12.01a Software (or later)*	01002593-005 (Component of 01001270)	1	

* Essential SSTs.

** Refers to drawer number in SST Storage System.

NOTE:

Additional Diagnostic Tester Kits, CAN Interface Modules, Program Cards, or other SSTs may be ordered by calling SPX/OTC at 1-800-933-8335.

Calibration Identification Chart

MODEL	ECM (CPU)	PREVIOUS CALIBRATION ID	NEW CALIBRATION ID
2002 – 2003 ES 300	Main	33323000 33323100 33323200 33341000 33341100 33341200 33341300 33341400	33387000
	Sub	53314000 53314100 53314200 53328000 53328100 53328200 53328300 53328400	53343000
2004 – 2005 ES 330	Main	33350000 33350100 33360000 33360100	33360200
	Sub	53334000 53340000	53340100

NOTE:

- **2004 model year ES 330 vehicles, which have been flash reprogrammed using the procedures in this TSIB, will contain upgraded 2005 model year OBD II logic and <u>will require VIN input.</u> Refer to the 2005 model year ES 330 Repair Manual information on the Technical Information System (TIS) when checking Powertrain Diagnostic Trouble Codes (DTCs) on 2004 model year ES 330 vehicles that have been reprogrammed.**
- **2002 model year ES 300 vehicles, which have been flash reprogrammed using the procedures in this TSIB, will contain upgraded 2003 model year OBD II logic. Refer to the 2003 model year ES 300 Repair Manual information on the Technical Information System (TIS) when checking Powertrain Diagnostic Trouble Codes (DTCs) on 2002 model year ES 300 vehicles that have been reprogrammed.**

Repair Procedure

1. Check for the Authorized Modifications Label affixed to the vehicle in the location shown in Figure 1. Confirm if ECM (PCM) calibration has been updated. If not the latest ECM (PCM) calibration — go to step 2.

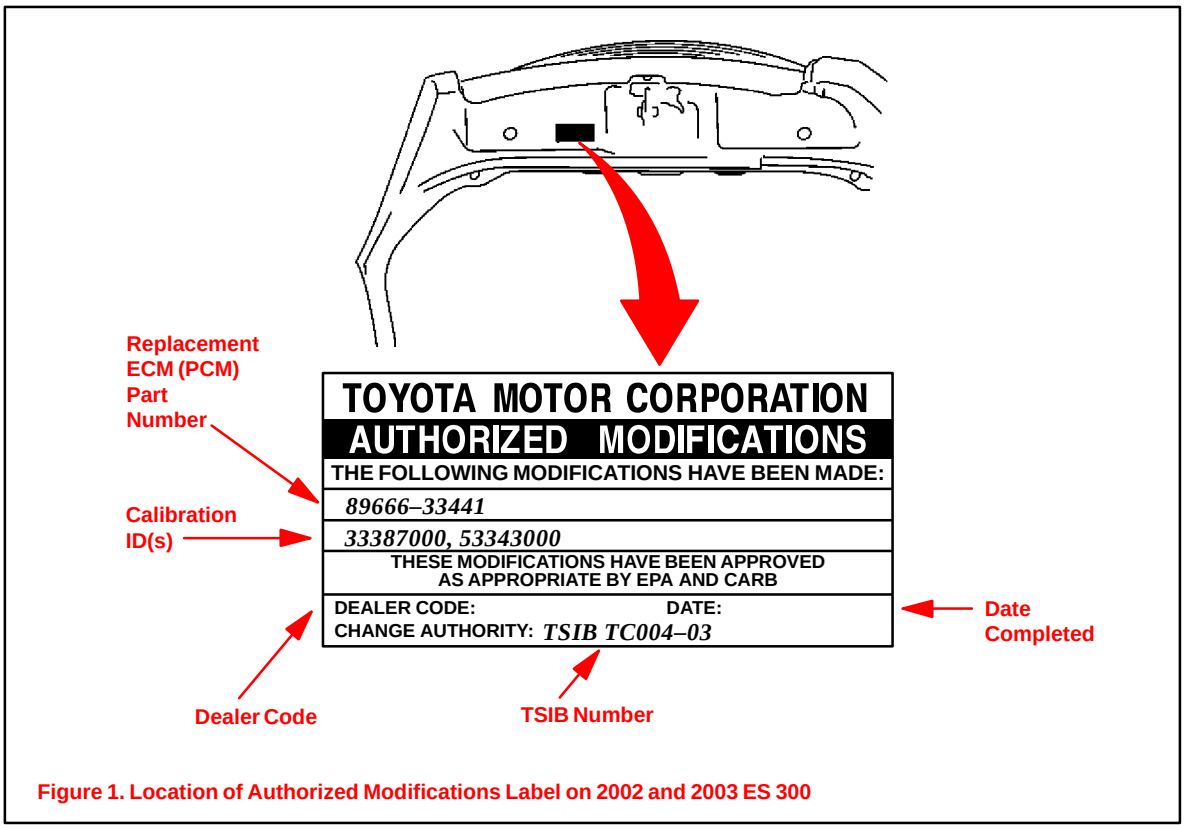


Figure 1. Location of Authorized Modifications Label on 2002 and 2003 ES 300

Repair Procedure (Continued)

2. Connect the Diagnostic Tester to the vehicle and select CURRENT ECU CAL from the ECU REPROGRAM MAIN MENU. Determine the vehicle's current ECU calibration (see Figure 2).
   – The sample screen prints seen below are the 12.01a software version and may differ from subsequent software versions.

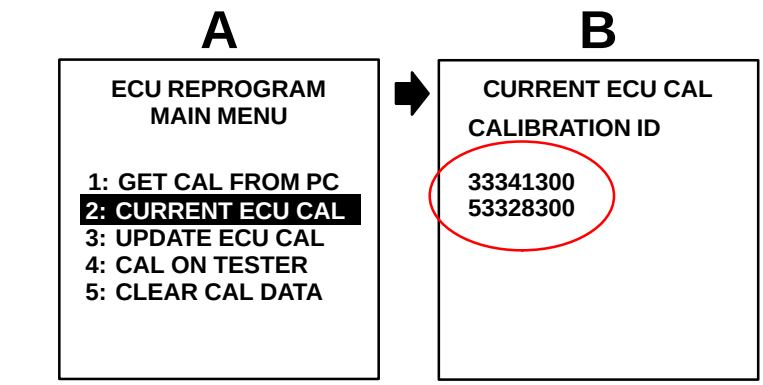


Figure 2. Determining Current ECU Calibration

NOTE:
- **If Calibration ID matches "Previous Calibration ID" as shown in Calibration Identification Chart on page 3, proceed with flash reprogramming.**
- **If Calibration ID matches "New Calibration ID" as shown in Calibration Identification Chart, this vehicle has already been programmed. Refer to TIS for diagnostic procedures applicable to any stored DTCs.**

3. If ECU calibration ID is not the same as the "New Calibration ID" listed previously, proceed to Flash Reprogram ECM (PCM).

4. Flash Reprogram ECM (PCM)

Follow the procedures outlined in Lexus TSIB No. SS001–01, *"ECU Flash Reprogramming Process,"* and flash the ECM (PCM) with the new calibration file update.

NOTE:

If the "Check Engine" light is ON when the ignition is turned back on to begin the reprogramming process, a scan tool cable problem exists. Refer to TSIB No. SS001–01, *"ECU Flash Reprogramming Process."*

Repair Procedure (Continued)

5. **Reset the ECM** (PCM) learned values using the diagnostic tester. Refer to the procedures below.
   – The sample screen prints seen below are the 12.01a software version and may differ from subsequent software versions.

NOTE:
Failure to reset the ECM (PCM) memory will result in continued ATM shifting complaints.

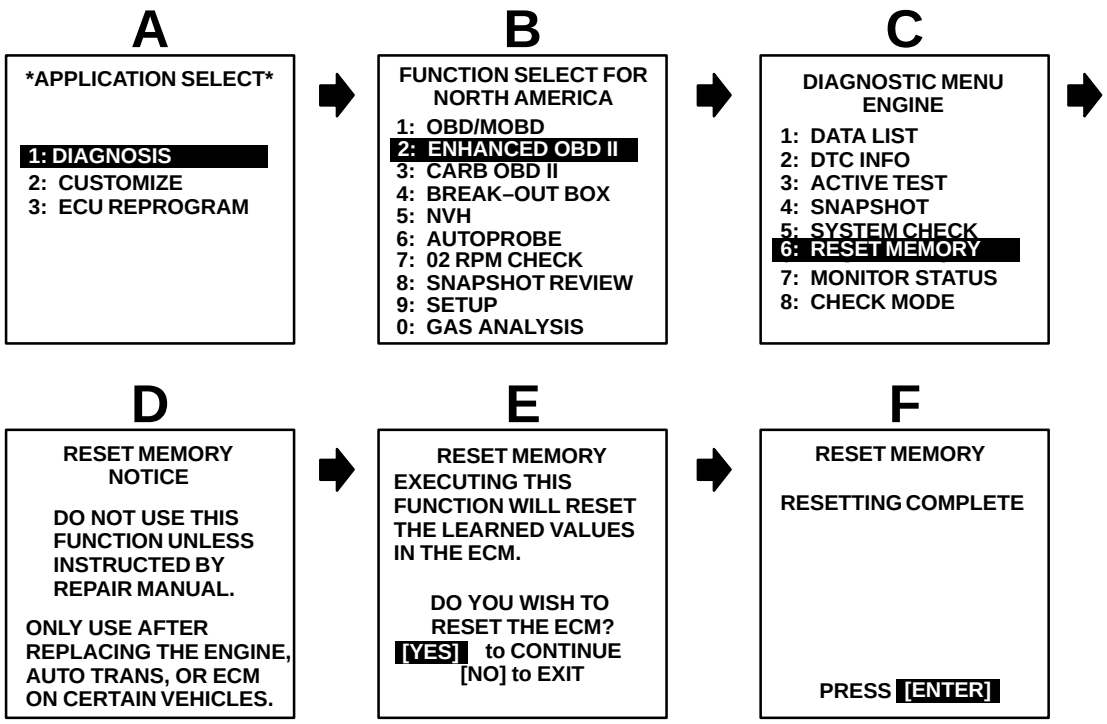


Figure 3. ECM (PCM) Learned Values Reset

6. Follow the procedures outlined in TSIB No. EG012–04, *"Entering VIN During ECM (PCM) Replacement and/or DTC P0630,"* and write the VIN to the ECM (PCM).
7. Start the engine and warm it up to normal operating temperature before test–driving.
8. Test drive vehicle to confirm proper vehicle operation.
9. Enter the required information on the Authorized Modifications Label and affix it to the vehicle at the location shown in Figure 1 (page 4). The Authorized Modifications Label is available through the MDC, P/N 00451–00001–LBL.
10. Calibration update is complete.

NOTE:
- **Select premium unleaded gasoline with an Octane Rating of 91 (Research Octane Number 96) or higher for optimum engine performance.**
- **The effect of the new calibration may become more apparent after several days of driving as the ECM (PCM) "learned values" are re–established from the customer's driving.**

WHEEL AND TIRE SYSTEM

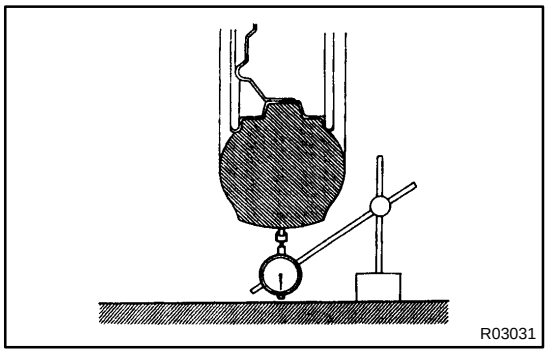
28009-17

INSPECTION

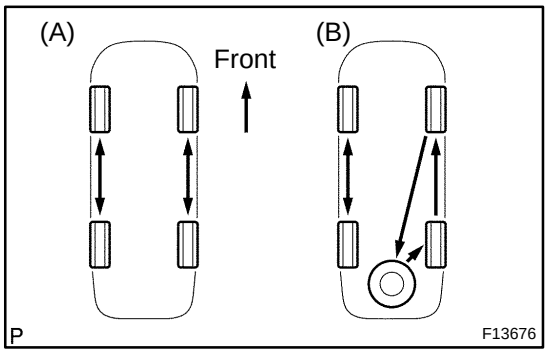
1. INSPECT TIRE

(a) Check the tires for wear and proper inflation pressure.
Cold tire inflation pressure:

Tire size	Front, Rear kPa (kgf/cm^2, psi)
P215/60R16 94V	200 (2.0, 29)
P215/55R17 93V	210 (2.1, 30)



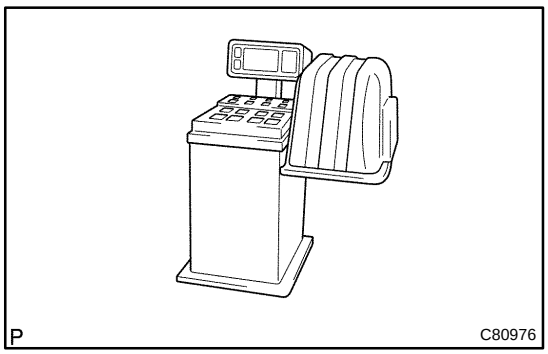
(b) Using a dial indicator, check the tire runout.
Tire runout: 1.0 mm (0.039 in.) or less



2. ROTATE TIRES

HINT:

- Rotate tires as shown in illustration (A) if a spare tire is not included in the rotation.
- Rotate tires as shown in illuatration (B) if a spare tire is included in the rotation.



3. INSPECT WHEEL BALANCE

(a) Check and adjust the Off-the-car balance.
(b) If necessary, check and adjust the On-the-car balance.
Imbalance after adjustment: 8.0 g (0.018 lb) or less

4. INSPECT BEARING LOOSENESS (SEE PAGE 30-2)

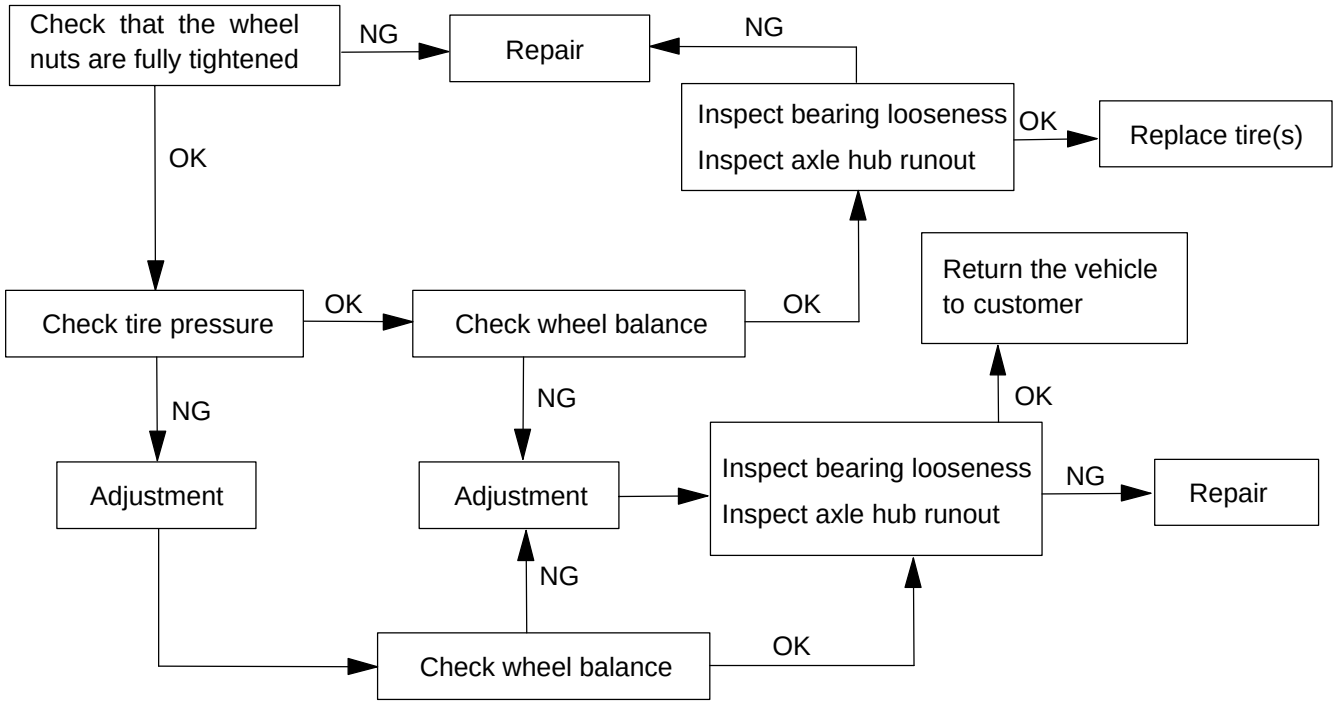
5. INSPECT AXLE HUB RUNOUT (SEE PAGE 30-2)

2805R-01

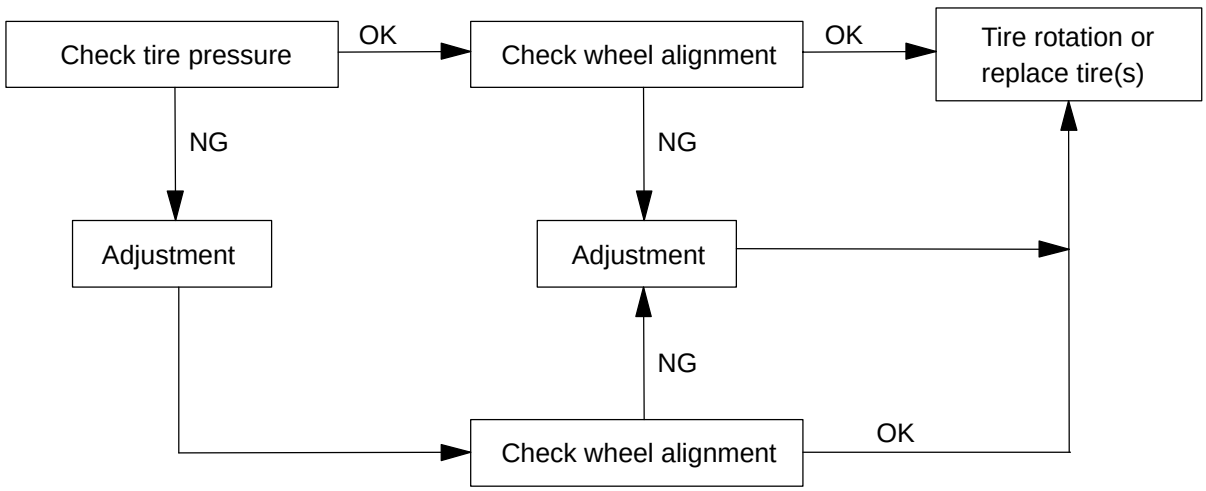
HOW TO PROCEED WITH TROUBLESHOOTING

1. VEHICLE PULLING DIAGNOSIS (SEE PAGE 26-2)

2. DIAGNOSIS OF TIRE VIBRATION



3. DIAGNOSIS OF IRREGULAR TIRE WEAR



Author : Date : 2403