

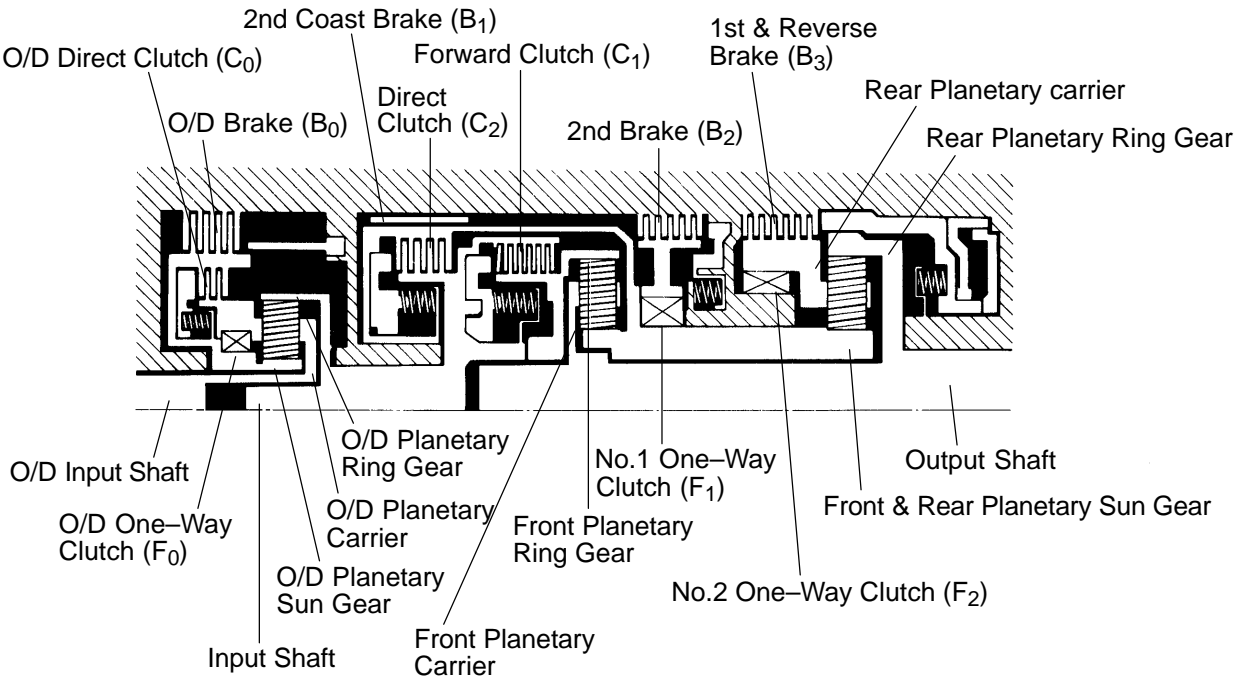
# AUTOMATIC TRANSMISSION SYSTEM

## PRECAUTION

AT03F-01

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

OPERATION



AT2157

◆ ... Operating

Shift lever position	Gear position	C <sub>0</sub>	C <sub>1</sub>	C <sub>2</sub>	B <sub>0</sub>	B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub>	F <sub>0</sub>	F <sub>1</sub>	F <sub>2</sub>
P	Parking	◆									
R	Reverse	◆		◆				◆	◆		
N	Neutral	◆									
D	1st	◆	◆						◆		◆
	2nd	◆	◆				◆		◆	◆	
	3rd	◆	◆	◆			◆		◆		
	O/D		◆	◆	◆		◆				
2	1st	◆	◆						◆		◆
	2nd	◆	◆			◆	◆		◆	◆	
	3rd *1	◆	◆	◆			◆		◆		
L	1st	◆	◆					◆	◆		◆
	2nd *2	◆	◆			◆	◆		◆	◆	

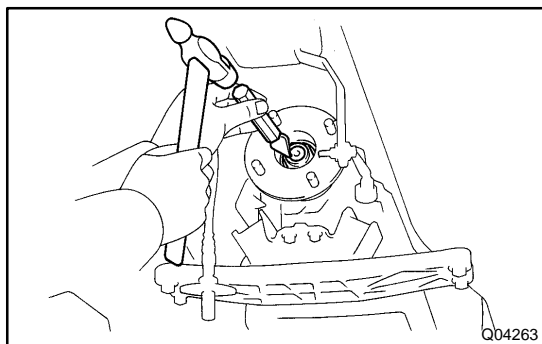
\*1: Down-shift only in the 2 position and 3rd gear — no up-shift.

\*2: Down-shift only in the L position and 2nd gear — no up-shift.

## EXTENSION HOUSING OIL SEAL ON-VEHICLE REPAIR

AT03H-01

1. REMOVE DRAIN PLUG AND DRAIN ATF
2. REMOVE FRONT EXHAUST PIPE AND HEAT INSULATOR (See page [EM-94](#))
3. REMOVE PROPELLER SHAFT (See page [PR-5](#))

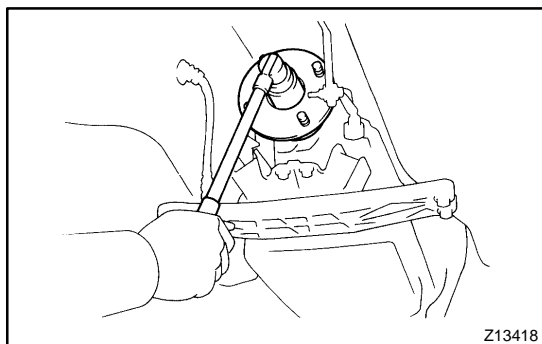


### 4. REMOVE TRANSMISSION OUTPUT FLANGE

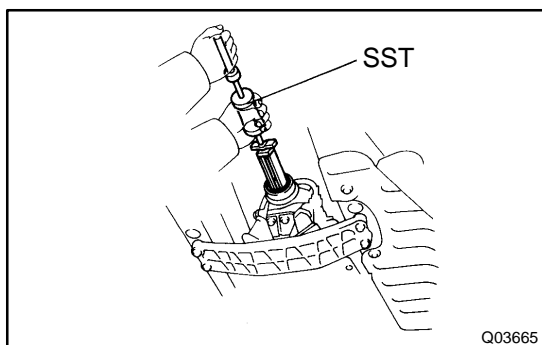
- (a) Using a chisel and hammer, loosen the staked part of the nut.

HINT:

Shift the shift lever to the P position.



- (b) Remove the nut.
- (c) Tap the output flange with a plastic hammer to remove it and 2 washers.
- (d) Using a screwdriver, remove the oil seal from the output flange.



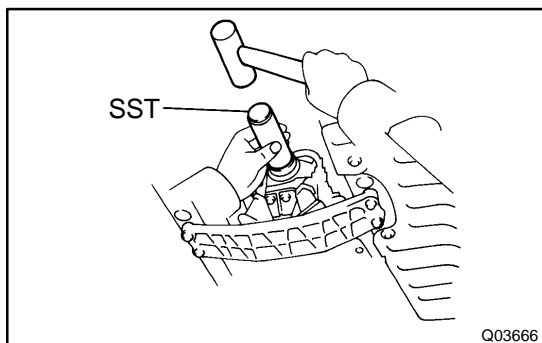
### 5. REMOVE EXTENSION HOUSING REAR OIL SEAL

Using SST, remove the oil seal.

SST 09308-00010

### 6. INSTALL EXTENSION HOUSING REAR OIL SEAL

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

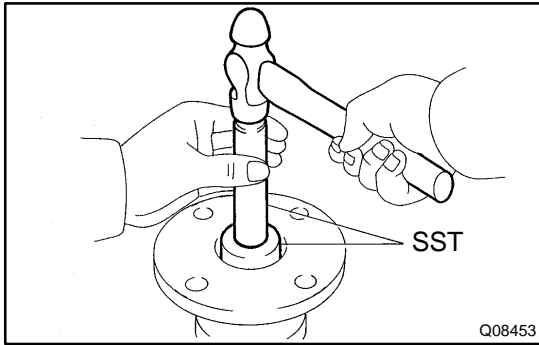


- (b) Using SST and a hammer, drive in the oil seal with the lip facing downward.

SST 09309-37010

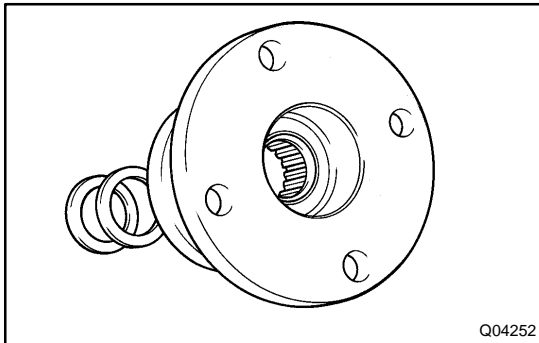
**Oil seal depth from flat end:**

**0 – 0.3 mm (0 – 0.012 in.)**

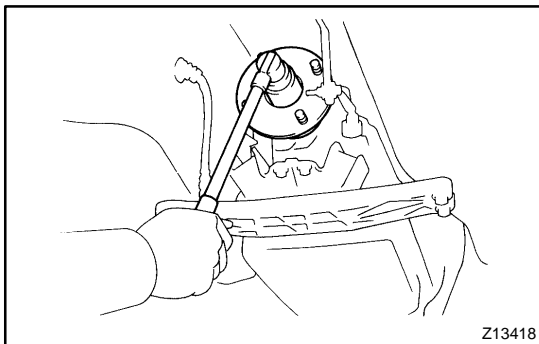


## 7. INSTALL TRANSMISSION OUTPUT FLANGE

- (a) Using SST and a hammer, drive in a new oil seal.  
 SST 09950-60010 (09951-00350),  
 09950-70010 (09951-07100)



- (b) Install the output flange and 2 washers.

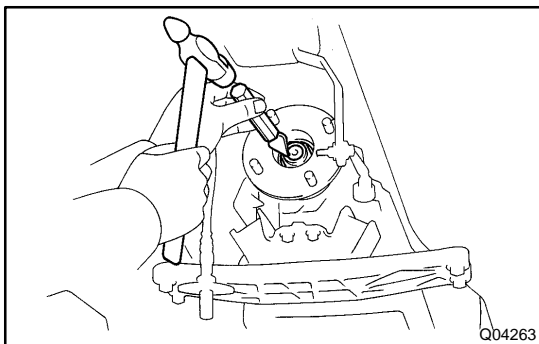


- (c) Install and torque a new nut.

**Torque: 123 N·m (1,250 kgf·cm, 90 ft·lbf)**

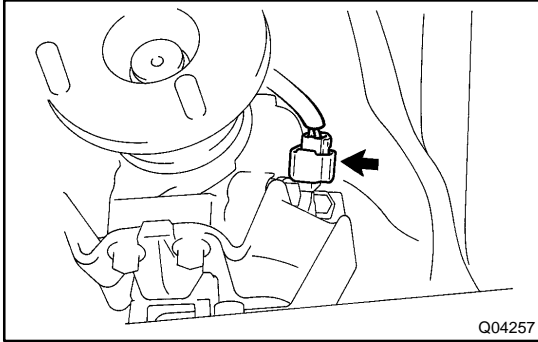
### HINT:

Shift the shift lever to the P position.



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

8. **INSTALL PROPELLER SHAFT (See page [PR-12](#))**
9. **INSTALL FRONT EXHAUST PIPE AND HEAT INSULATOR (See page [EM-94](#))**
10. **INSTALL DRAIN PLUG AND NEW GASKET**  
**Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)**
11. **FILL ATF AND CHECK FLUID LEVEL**  
**(See page [DI-397](#))**



## VEHICLE SPEED SENSOR ON-VEHICLE REPAIR

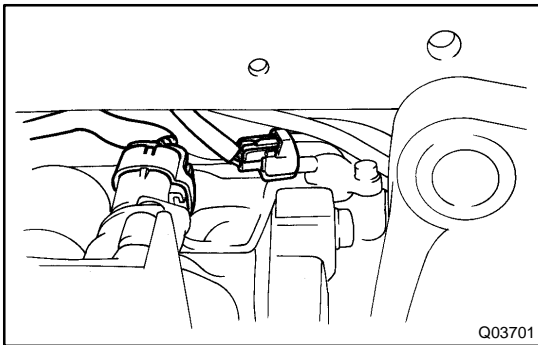
AT03I-01

### 1. REPLACE NO.1 VEHICLE SPEED SENSOR

- (a) Disconnect the No.1 vehicle speed sensor connector.
- (b) Remove the No.1 vehicle speed sensor assembly.
  - (1) Remove the bolt the No.1 vehicle speed sensor assembly.
  - (2) Remove the speedometer driven gear from the No.1 speed sensor.
  - (3) Remove the O-ring from the No.1 vehicle speed sensor.
- (c) Install the No.1 vehicle speed sensor assembly.
  - (1) Coat a new O-ring with ATF and install it to the No.1 vehicle speed sensor.
  - (2) Install the speedometer driven gear to the No.1 vehicle speed sensor.
  - (3) Install the No.1 vehicle speed sensor to the extension housing and torque the bolt.

**Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)**

- (d) Connect the No.1 vehicle speed sensor connector.

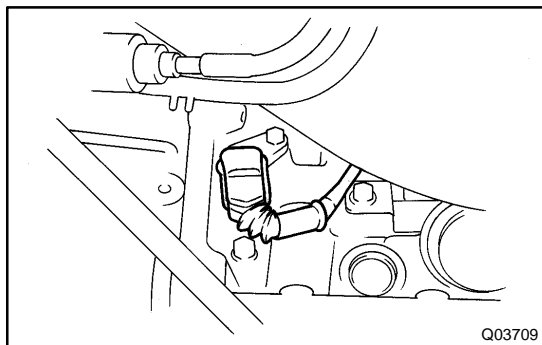


### 2. REPLACE NO.2 VEHICLE SPEED SENSOR

- (a) Disconnect the No.2 vehicle speed sensor connector.
- (b) Remove the No.2 vehicle speed sensor.
  - (1) Remove the bolt and No.2 vehicle speed sensor.
  - (2) Remove the O-ring.
- (c) Install the No.2 vehicle speed sensor.
  - (1) Coat a new O-ring with ATF and install it to the No.2 vehicle speed sensor.
  - (2) Install the No.2 vehicle speed sensor to the extension housing and torque the bolt.

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

- (d) Connect the No.2 vehicle speed sensor connector.

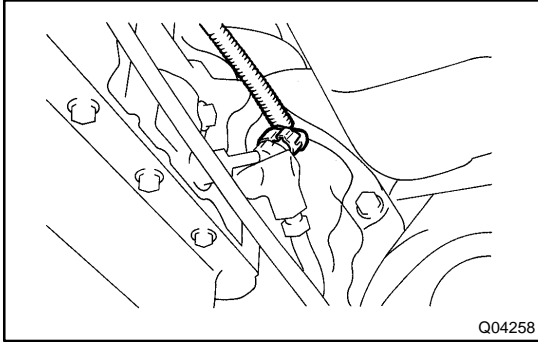


## O/D DIRECT CLUTCH SPEED SENSOR

AT03J-01

### ON-VEHICLE REPAIR

- 1. DISCONNECT O/D DIRECT CLUTCH SPEED SENSOR CONNECTOR**
- 2. REMOVE O/D DIRECT CLUTCH SPEED SENSOR**
  - (a) Remove the bolt and O/D direct clutch speed sensor.
  - (b) Remove the O-ring.
- 3. INSTALL O/D DIRECT CLUTCH SPEED SENSOR**
  - (a) Coat a new O-ring with ATF and install it to the O/D direct clutch speed sensor.
  - (b) Install the O/D direct clutch speed sensor to the transmission case and torque the bolt.  
**Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)**
- 4. CONNECT O/D DIRECT CLUTCH SPEED SENSOR CONNECTOR**



## ATF TEMPERATURE SENSOR ON-VEHICLE REPAIR

AT03K-01

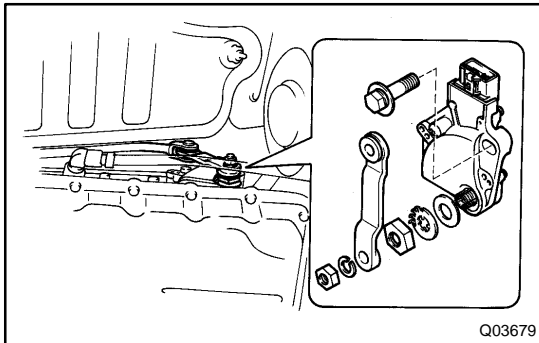
1. **DISCONNECT ATF TEMPERATURE SENSOR CONNECTOR**
2. **REMOVE ATF TEMPERATURE SENSOR**
  - (a) Remove the ATF temperature sensor.
  - (b) Remove the O-ring from it.
3. **INSTALL ATF TEMPERATURE SENSOR**
  - (a) Coat a new O-ring with ATF and install it to the ATF temperature sensor.
  - (b) Install the ATF temperature sensor.  
**Torque: 15 N·m (150 kgf-cm, 11 ft-lbf)**
4. **CONNECT ATF TEMPERATURE SENSOR CONNECTOR**

## PARK/NEUTRAL POSITION (PNP) SWITCH

AT03L-01

### ON-VEHICLE REPAIR

1. REMOVE EXHAUST PIPE (See page [EM-94](#))
2. DISCONNECT PARK/NEUTRAL POSITION SWITCH CONNECTOR



3. REMOVE PARK/NEUTRAL POSITION SWITCH
  - (a) Remove the control shaft lever.
  - (b) Pry off the lock washer and remove the nut.
  - (c) Remove the bolt and park/neutral position switch.
4. INSTALL PARK/NEUTRAL POSITION SWITCH
  - (a) Install the park/neutral position switch and bolt.  
**Torque: 13 N·m (130 kgf-cm, 9 ft-lbf)**
  - (b) Install a new lock plate and the nut.  
**Torque: 3.9 N·m (40 kgf-cm, 35 in.-lbf)**
  - (c) Stake the nut with the lock plate.
  - (d) Install the control shaft lever and nut.  
**Torque: 16 N·m (160 kgf-cm, 12 ft-lbf)**
5. CONNECT PARK/NEUTRAL POSITION SWITCH CONNECTOR
6. CHECK PARK/NEUTRAL POSITION SWITCH OPERATION

Check that the engine can be started with the shift lever only in the in the N or P position, but not in the other positions. If not as started above, carry out the adjustment procedure (See page [DI-397](#)).

7. INSTALL EXHAUST PIPE (See page [EM-94](#))
8. TEST DRIVE VEHICLE



## VALVE BODY ASSEMBLY ON-VEHICLE REPAIR

AT03M-01

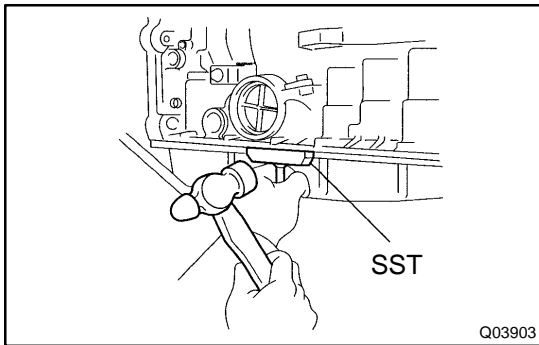
### NOTICE:

When working with FIPG material, you must observe the followings.

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

Otherwise, the FIPG material must be removed and reapplied.

1. REMOVE DRAIN PLUG AND DRAIN ATF
2. REMOVE EXHAUST PIPE (See page [EM-94](#))
3. REMOVE OIL PAN
  - (a) Remove the 19 bolts.



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

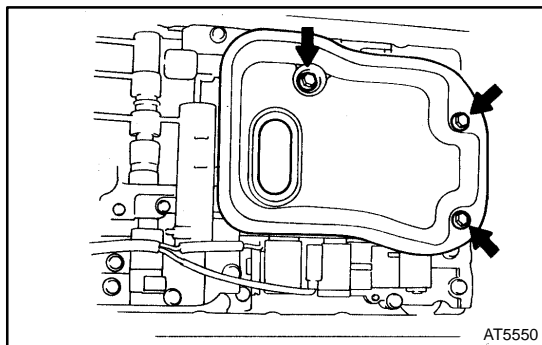
### NOTICE:

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

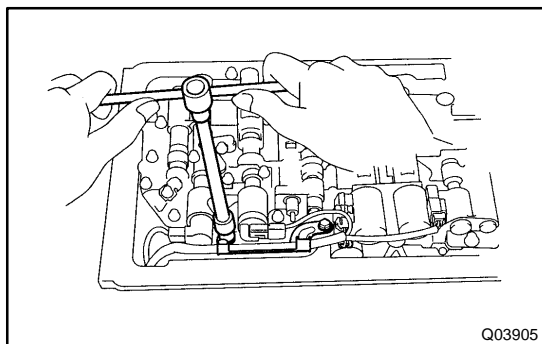
4. REMOVE 3 MAGNETS FROM OIL PAN
5. EXAMINE PARTICLES IN PAN

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

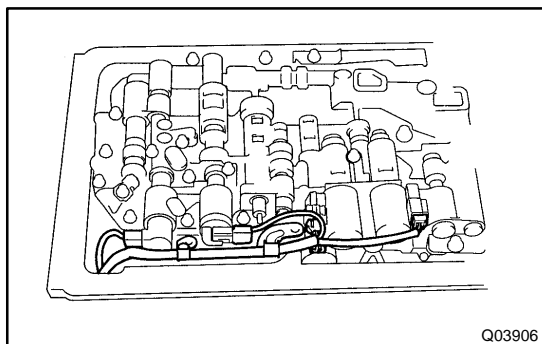
- ◆ Steel (magnetic): bearing, gear and plate wear
- ◆ Brass (non-magnetic): bushing wear

**6. REMOVE OIL STRAINER**

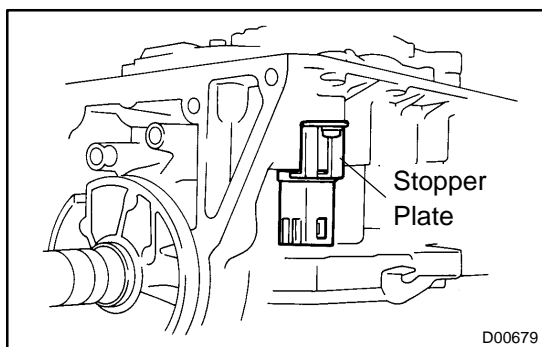
Remove the 3 bolts holding the oil strainer to the valve body.

**7. REMOVE SOLENOID WIRING**

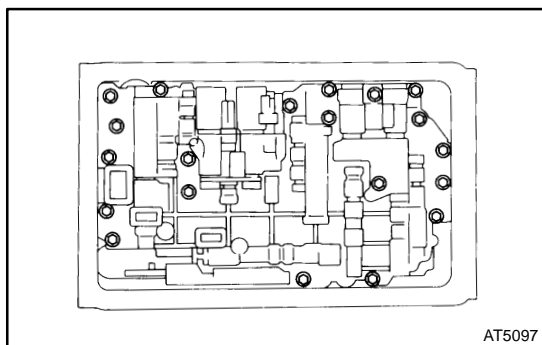
(a) Remove the 2 bolts and clamp.



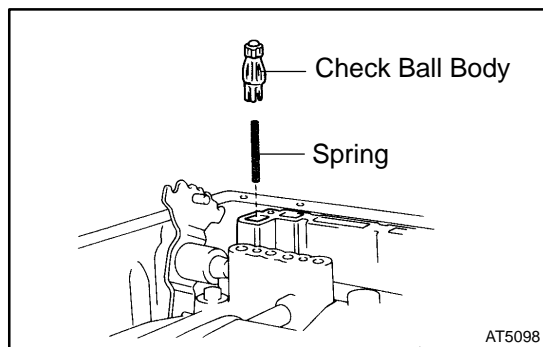
(b) Disconnect the 5 connectors from the solenoid valves.



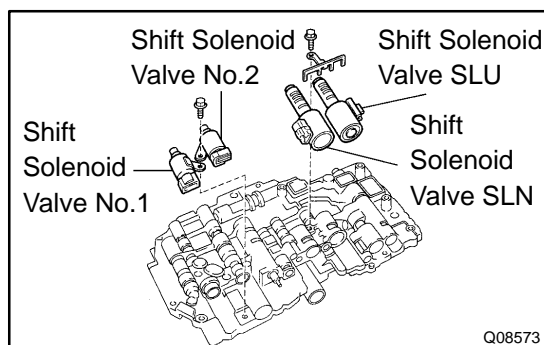
- (c) Remove the stopper plate from the case.
- (d) Pull the wiring out of the transmission case.
- (e) Remove the O-ring from the grommet.

**8. REMOVE VALVE BODY**

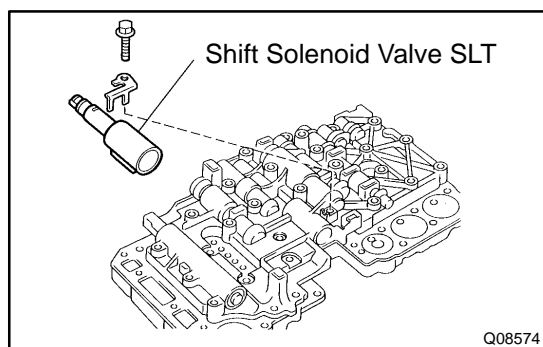
- (a) Remove the 20 bolts.
- (b) Remove the valve body.

**NOTICE:**

**Do not drop the check ball body and spring.**

**9. REMOVE 5 SHIFT SOLENOID VALVES**

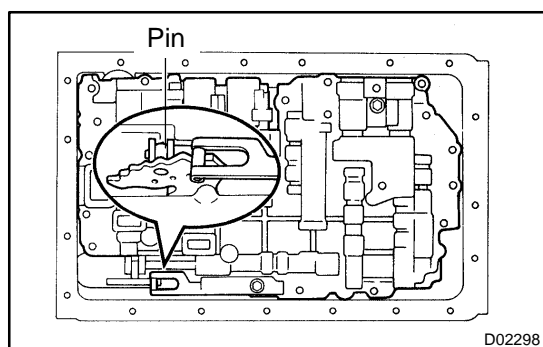
- Remove the shift solenoid valves No.1 and No.2.
- Remove the O-ring from the shift solenoid valves No.1 and No.2.
- Remove the lock plate, shift solenoid valves SLU and SLN.



- Remove the shift solenoid valve SLT.

**10. INSTALL 5 SHIFT SOLENOID VALVES**

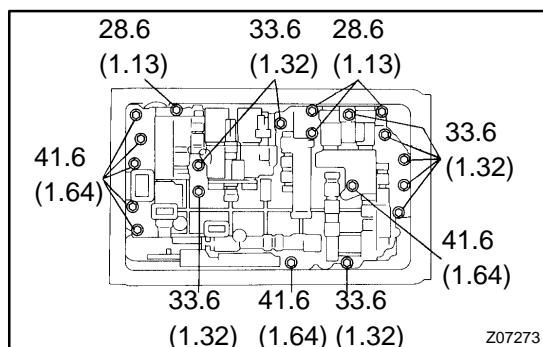
- Install the shift solenoid valve SLT.
- Install the shift solenoid valves SLN, SLU and lock plate.
- Install a new O-ring to the shift solenoid valves No.1 and No.2.
- Install the shift solenoid valves No.1 and No.2.

**11. INSTALL VALVE BODY**

- Install the valve body.

**HINT:**

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



- Install the 20 bolts.

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

**HINT:**

Each bolt length (mm, in.) is indicated in the illustration.

**12. INSTALL SOLENOID WIRING**

- (a) Coat a new O-ring with ATF and install it to the solenoid wire.
- (b) Install the solenoid wiring to the case and install the stopper plate.

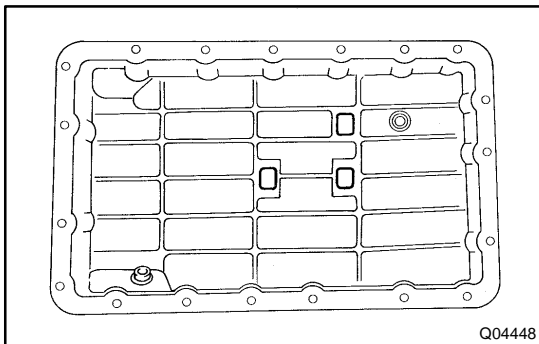
**Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)**

- (c) Connect the 5 solenoid connectors.
- (d) Install the clamp with 2 bolts.

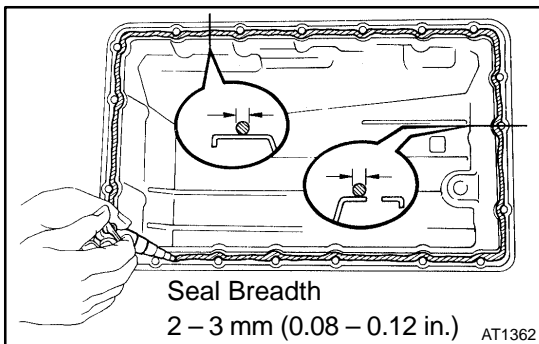
**13. INSTALL OIL STRAINER AND GASKETS**

Install the oil strainer and 3 bolts.

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

**14. INSTALL 3 MAGNET TO OIL PAN****15. INSTALL OIL PAN**

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



- (b) Apply FIPG to the oil pan, as shown in the illustration.

**FIPG:**

**Part No. 08826-00090, THREE BOND 1281 or equivalent**

- (c) Install the 19 bolts.

**Torque: 7.4 N·m (75 kgf·cm, 85 in.-lbf)**

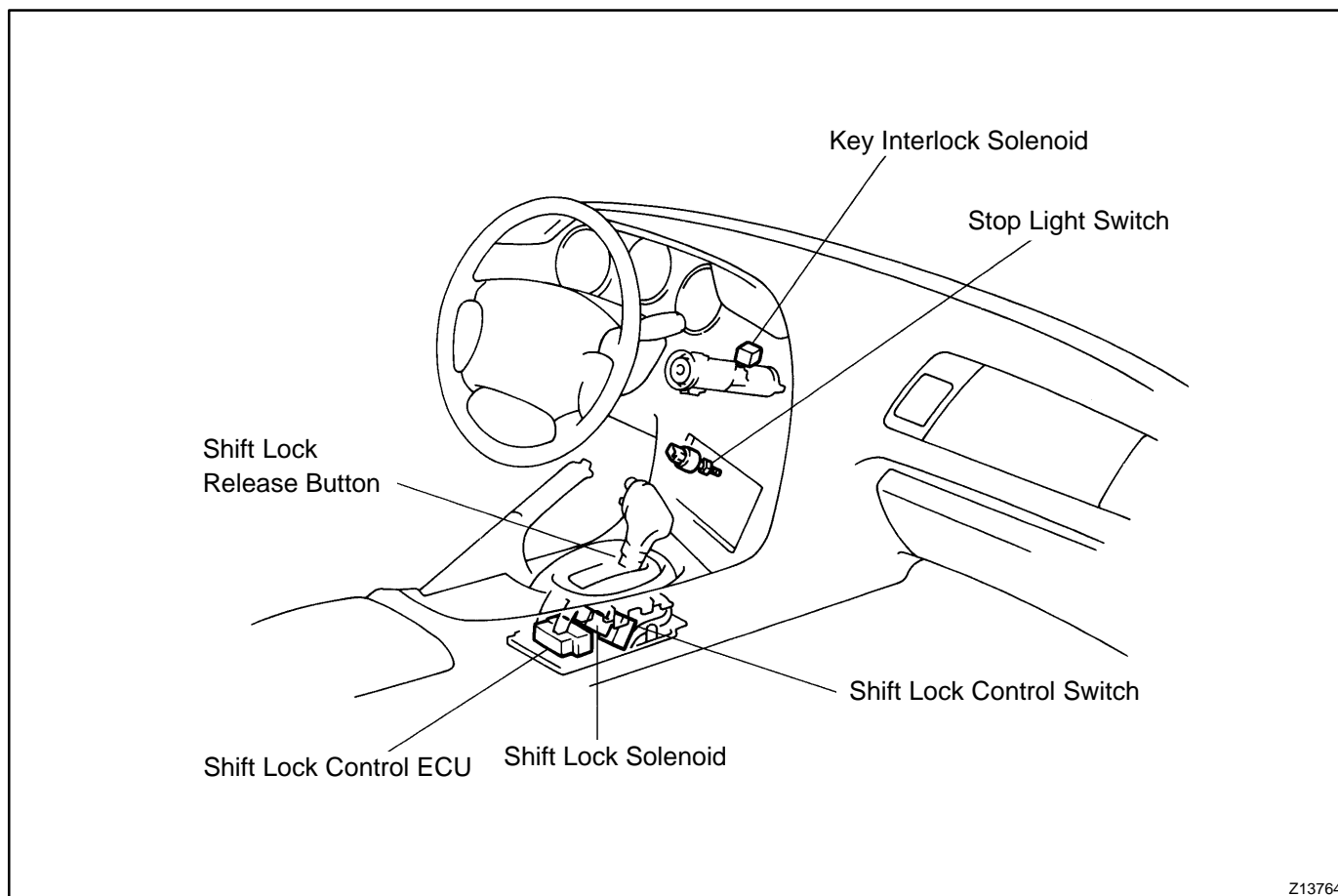
**16. INSTALL DRAIN PLUG**

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

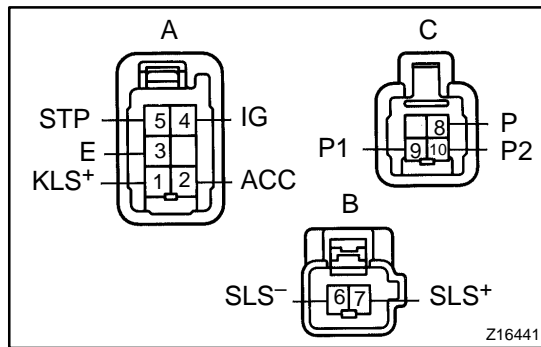
**17. INSTALL EXHAUST PIPE (See page [EM-94](#))****18. FILL ATF AND CHECK FLUID LEVEL (See page [DI-397](#))**

# SHIFT LOCK SYSTEM LOCATION

AT03N-01



Z13764



## INSPECTION

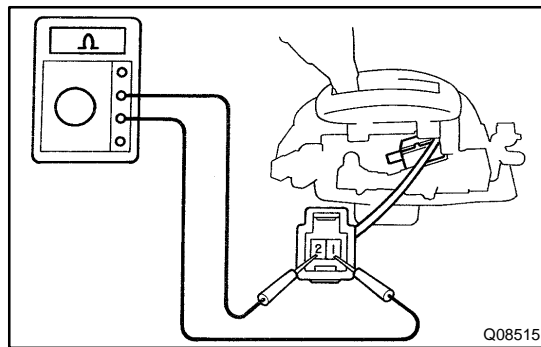
### 1. INSPECT SHIFT LOCK CONTROL ECU

Using a voltmeter, measure the voltage at each terminal.

HINT:

Do not disconnect the ECU connector.

Connector	Terminal	Measuring condition	Voltage (V)
A	2 – 3	IG SW ACC	10 – 14
	4 – 3	IG SW ON	10 – 14
	5 – 3	Depress brake pedal	10 – 14
	1 – 3	IG SW ON and P position	0
		R, N, D, 2, L position	7.5 – 11
		R, N, D, 2, L position (after 1 second)	6 – 9.5
B	6 – 7	IG SW ON and P position	0
		Depress brake pedal	8 – 13.5
		R, N, D, 2, L position	0
C	9 – 8	IG SW ON, P position and depress brake pedal	0
		R, N, D, 2, L position	9 – 13.5
	10 – 8	IG SW ACC and P position	9 – 13.5
		R, N, D, 2, L position	0

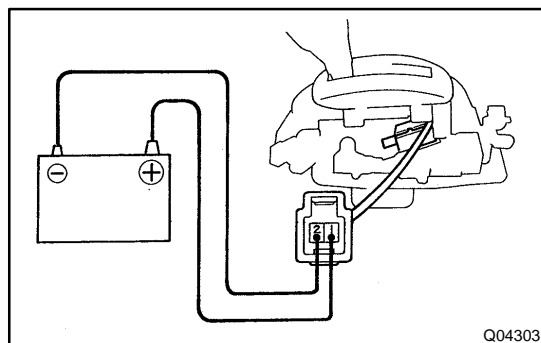


### 2. INSPECT SHIFT LOCK SOLENOID

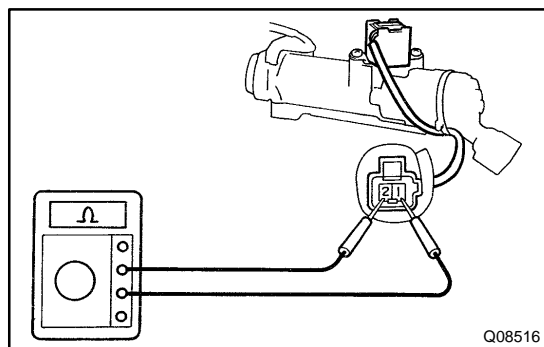
- Disconnect the solenoid connector.
- Using an ohmmeter, measure the resistance between terminals 1 and 2.

**Standard resistance: 29 – 36  $\Omega$**

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



- Apply battery positive voltage between terminals 1 and 2. At this time, confirm that the solenoid operates. If the solenoid does not operate, replace the solenoid.

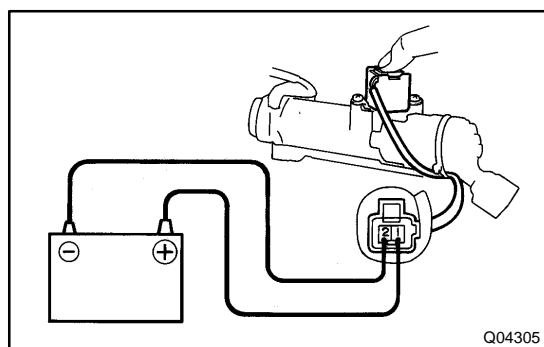


### 3. INSPECT KEY INTERLOCK SOLENOID

- (a) Disconnect the solenoid connector.
- (b) Using an ohmmeter, measure the resistance between terminals 1 and 2.

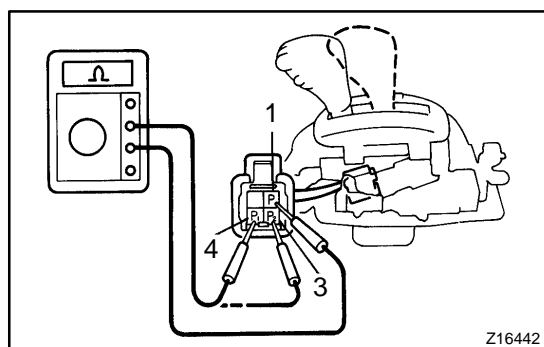
**Standard resistance: 12 – 17  $\Omega$**

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



- (c) Touch the solenoid with your finger and check that solenoid operation can be felt when battery positive voltage is applied intermittently to the terminals 1 and 2.

If the solenoid does not operate, replace the solenoid.



### 4. INSPECT SHIFT LOCK CONTROL SWITCH

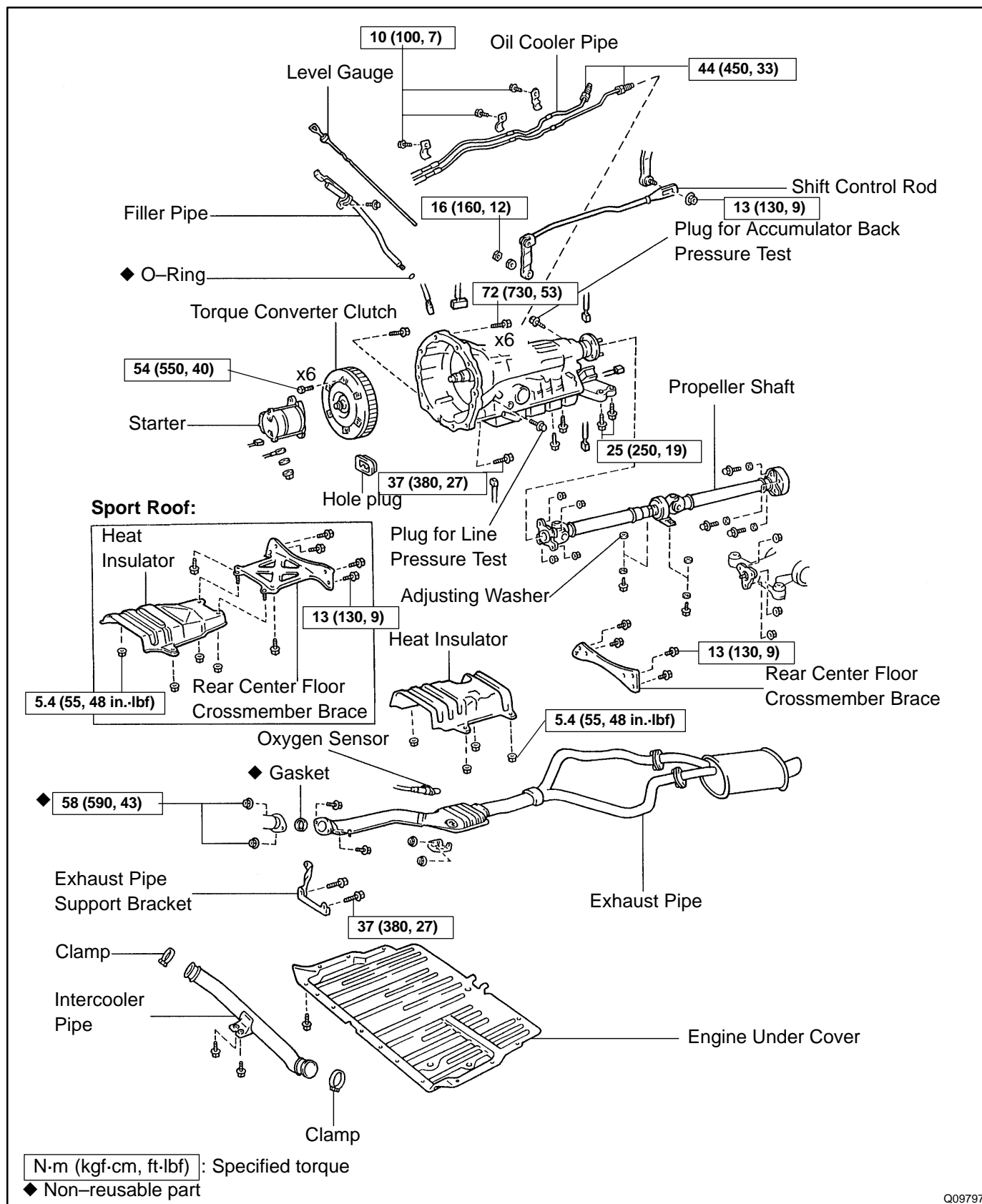
Inspect that there is continuity between each terminal.

Shift position	Tester condition	Specified value
P position (Release button is not pushed)	1 – 4	Continuity
P position (Release button is pushed)	1 – 4 1 – 3	Continuity
R, N, D, 2, L position	1 – 3	Continuity

If continuity is not as specified, replace the switch.

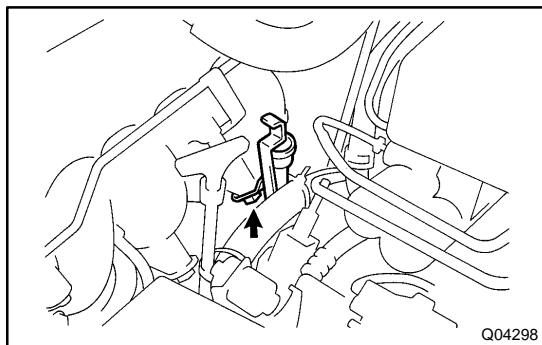
## AUTOMATIC TRANSMISSION UNIT COMPONENTS

AT03P-01



Q09797





## REMOVAL

### 1. REMOVE LEVEL GAUGE

### 2. REMOVE FILLER PIPE

Remove the bolt and filler pipe.

HINT:

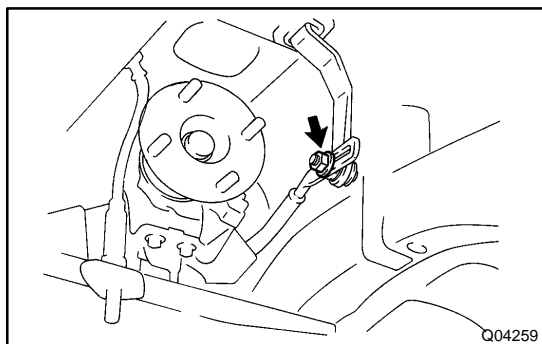
At the time of installation, please refer to the following item.

Replace the used O-ring with a new one.

### 3. REMOVE ENGINE UNDER COVER

### 4. REMOVE EXHAUST PIPE (See page [EM-94](#))

### 5. REMOVE PROPELLER SHAFT (See page [PR-5](#))



### 6. DISCONNECT SHIFT CONTROL ROD FROM SHIFT LEVER

Torque: 13 N·m (130 kgf-cm, 9 ft-lbf)

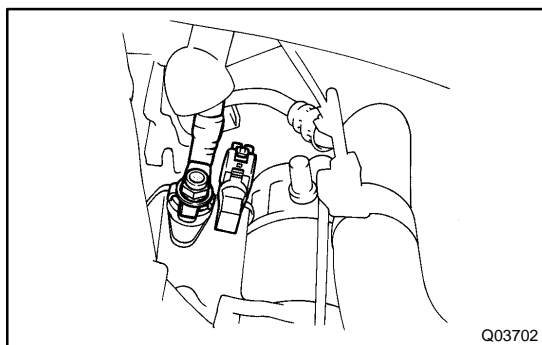
HINT:

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

Inspect and adjust the park/neutral position switch (See page [DI-397](#)).

### 7. DISCONNECT THESE CONNECTORS:

- ◆ O/D direct clutch speed sensor
- ◆ No.1 vehicle speed sensor
- ◆ No.2 vehicle speed sensor
- ◆ Solenoid wire
- ◆ Park/neutral position switch
- ◆ ATF temperature sensor



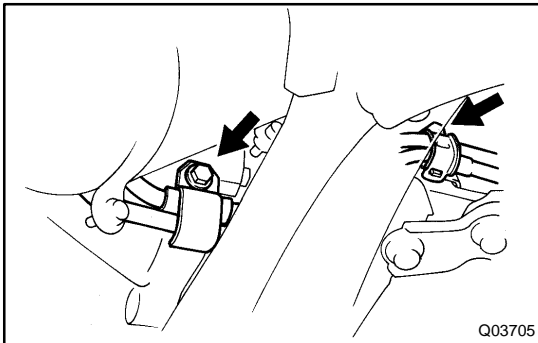
### 8. DISCONNECT CONNECTORS AND CABLE FROM STARTER

- (a) Remove the nut and disconnect the terminal.
- (b) Disconnect the connector.

**9. DISCONNECT OIL COOLER PIPE**

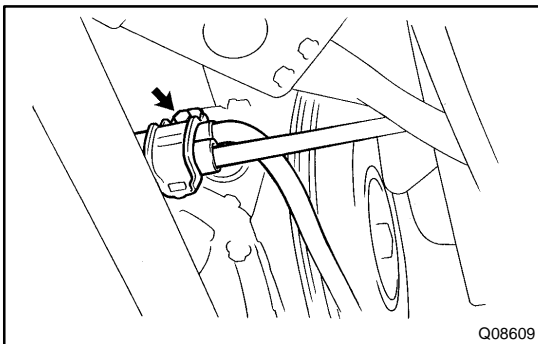
- (a) Loosen the 2 oil cooler union nuts.

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



- (b) Remove the center and rear oil cooler pipe brackets.

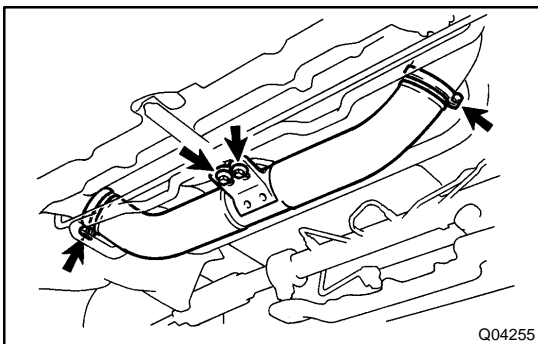
**Torque: 10 N·m (100 kgf-cm, 7 ft-lbf)**



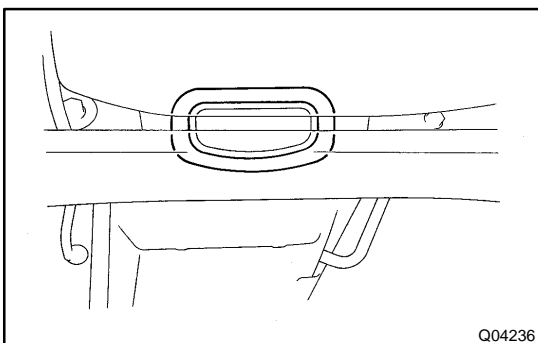
- (c) Remove the front oil cooler pipe bracket.

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

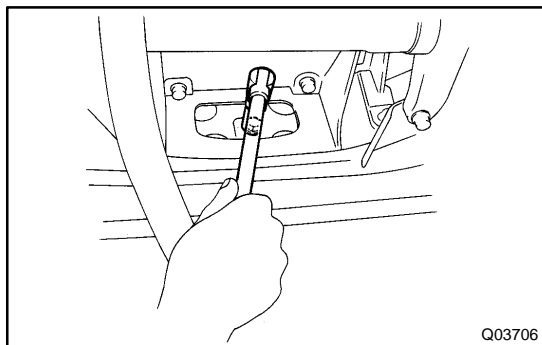
- (d) Disconnect the 2 oil cooler pipes.

**10. REMOVE INTERCOOLER PIPE**

- (a) Remove the 2 bolts.  
(b) Loosen the 2 clamps.  
(c) Remove the pipe.

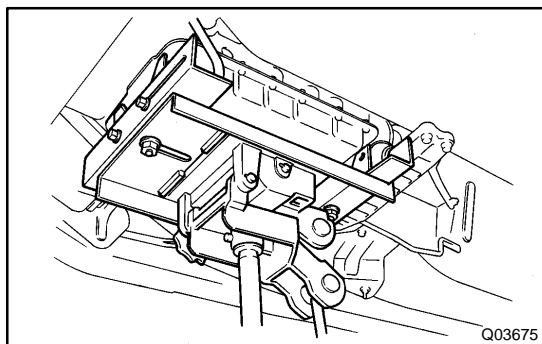
**11. REMOVE HOLE PLUG CLUTCH MOUNTING BOLT**

- (a) Remove the hole plug.

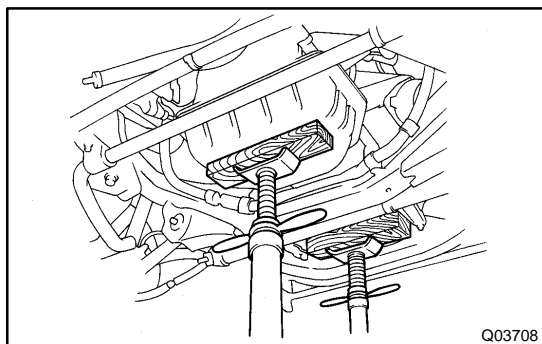


- (b) Turn the crankshaft to gain access to each bolt, remove the 6 bolts with holding the crankshaft pulley nut by a wrench.

**Torque: 54 N·m (550 kgf-cm, 40 ft-lbf)**



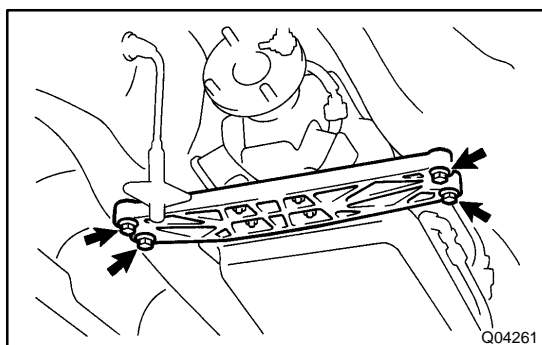
## 12. SET TRANSMISSION JACK



## 13. SUPPORT ENGINE

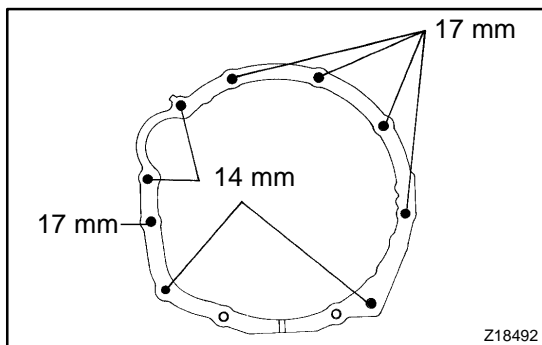
### NOTICE:

Use a wooden block so not to damage the engine oil pan.



## 14. REMOVE TRANSMISSION REAR SUPPORT

**Torque: 25 N·m (250 kgf-cm, 19 ft-lbf)**



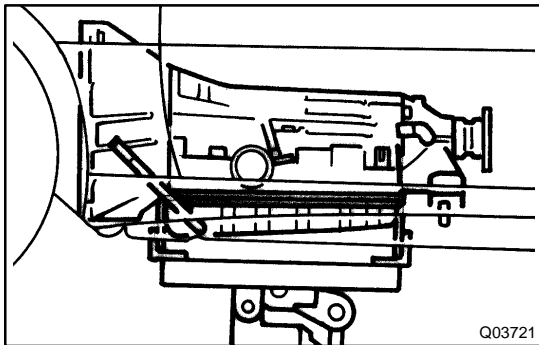
## 15. REMOVE STARTER AND TRANSMISSION SET BOLT

### Torque:

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

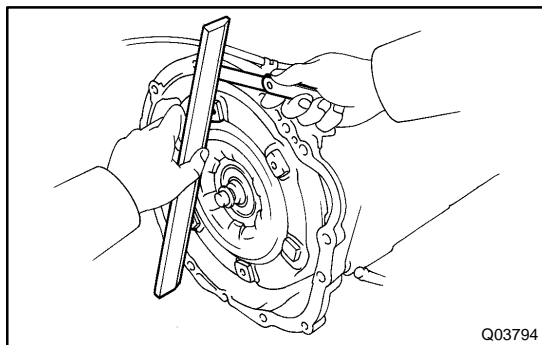
14 mm head bolt: 37 N·m (380 kgf-cm, 27 ft-lbf)

## 16. DISCONNECT WIRE HARNESS FROM EACH WIRE HARNESS CLAMP

**17. REMOVE TRANSMISSION FROM ENGINE****HINT:**

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

- ◆ Jack up and push the transmission fully into position.
- ◆ Make sure the engine and transmission are aligned precisely.
- ◆ Adjust the angle of the engine and transmission so that the engine installation surface and transmission surfaces are parallel.



## INSTALLATION

1. **INSTALL TORQUE CONVERTER CLUTCH IN TRANSMISSION**
2. **CHECK TORQUE CONVERTER CLUTCH INSTALLATION**

Using feeler gauge and a straight edge, measure between the installed surfaced of the transmission and the straight edge.

**Clearance: Less than 0.1 mm (0.004 in.)**

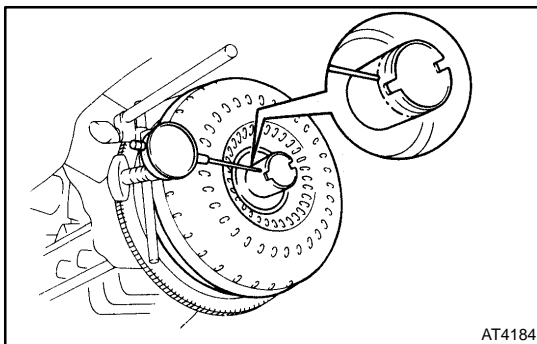
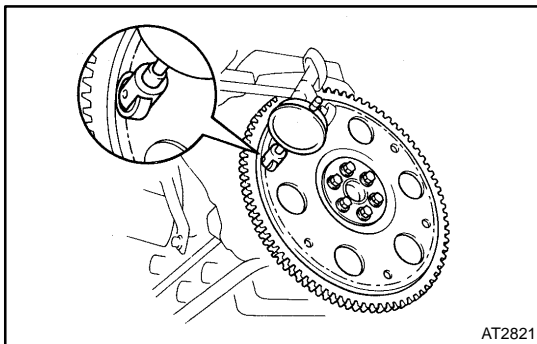
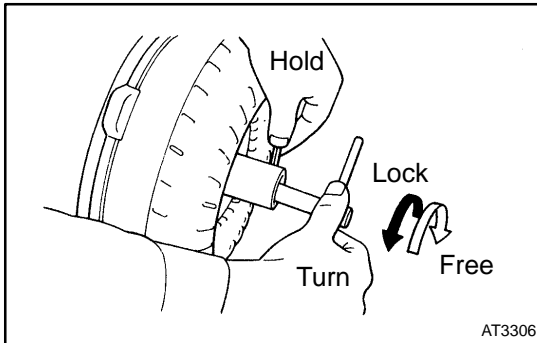
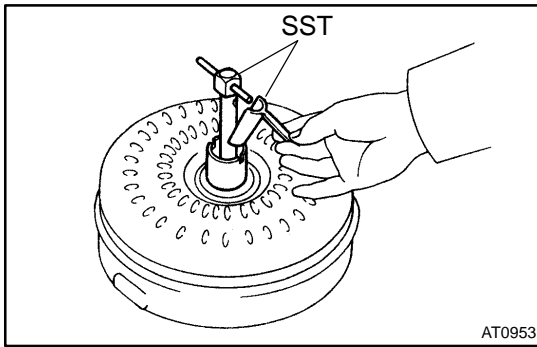
3. **TRANSMISSION INSTALLATION**

Installation is in the reverse order of removal (See page [AT-17](#)).

### HINT:

After installation, check and inspect items as follows.

- ◆ Fluid level (See page [DI-397](#))
- ◆ Shift lever position (See page [DI-397](#))
- ◆ Road test the vehicle



## TORQUE CONVERTER CLUTCH AND DRIVE PLATE INSPECTION

AT03S-01

### 1. INSPECT ONE-WAY CLUTCH

- Install SST into the inner race of the one-way clutch.  
SST 09350-32020 (09351-32010)
- Install SST so that it fits in the notch of the converter hub and outer race of the one-way clutch.  
SST 09350-32020 (09351-32020)
- With the torque converter standing on its side, check that the clutch locks when turned counterclockwise, and rotates freely and smoothly clockwise.

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

### 2. MEASURE DRIVE PLATE RUNOUT AND INSPECT RING GEAR

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

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

### 3. MEASURE TORQUE CONVERTER SLEEVE RUNOUT

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

**Maximum runout: 0.30 mm (0.0118 in.)**

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

**HINT:**

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