

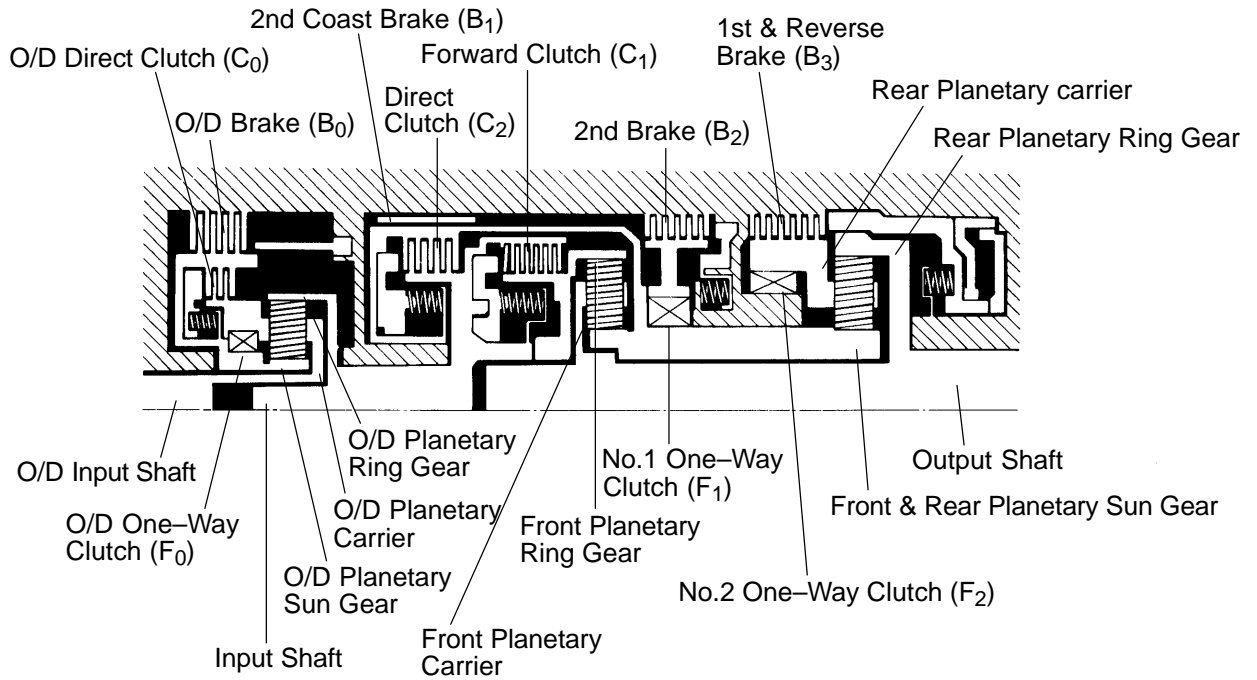
# AUTOMATIC TRANSMISSION SYSTEM

## PRECAUTION

AT03T-01

If the vehicle is equipped with a mobile communication system, refer to the precautions 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	◆	◆			◆	◆		◆	◆	

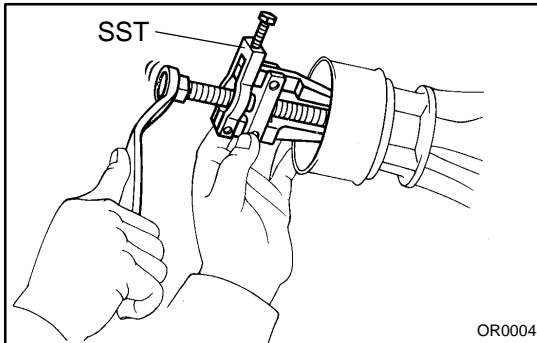
\*1: Down-shift only in the 2 position and 3rd gear — no up-shift.

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

## EXTENSION HOUSING OIL SEAL ON-VEHICLE REPAIR

AT03V-01

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



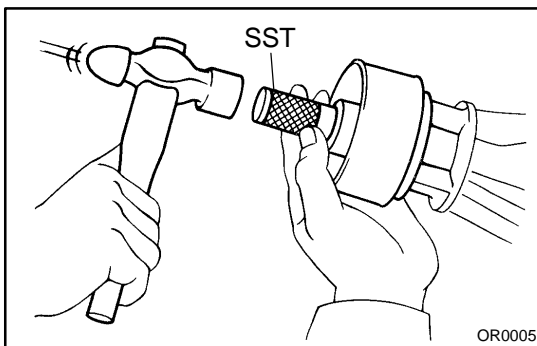
### 2. REMOVE REAR OIL SEAL

#### NOTICE:

Clean the extension housing before removing the oil seal.

Using SST, remove the oil seal.

SST 09308-10010



### 3. INSTALL NEW OIL SEAL

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

SST 09325-40010

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

### 4. INSTALL PROPELLER SHAFT (See page PR-12)

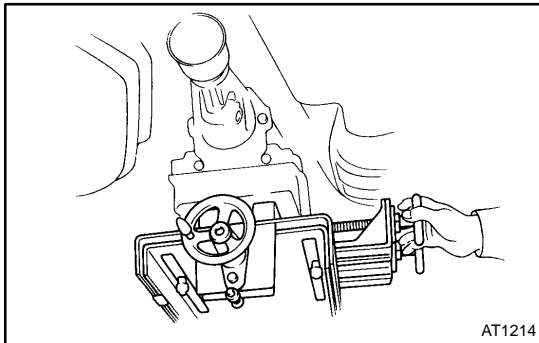
### 5. FILL ATF AND CHECK FLUID LEVEL

(See page DI-330)

## SENSOR ROTOR ON-VEHICLE REPAIR

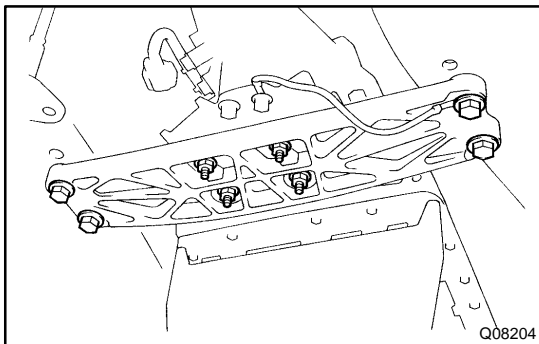
AT03W-01

1. RAISE VEHICLE AND POSITION PAN TO CATCH ANY FLUID THAT MAY DRIP
2. REMOVE PROPELLER SHAFT (See page PR-5)
3. REMOVE VEHICLE SPEED SENSOR (See page AT-6)



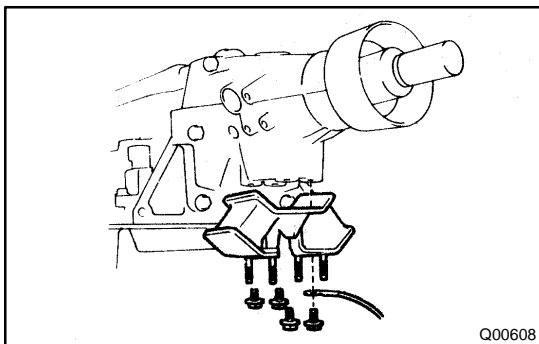
AT1214

4. **JACK UP TRANSMISSION SLIGHTLY**  
Securely support the transmission on a transmission jack. Lift the transmission slightly from the rear support member.



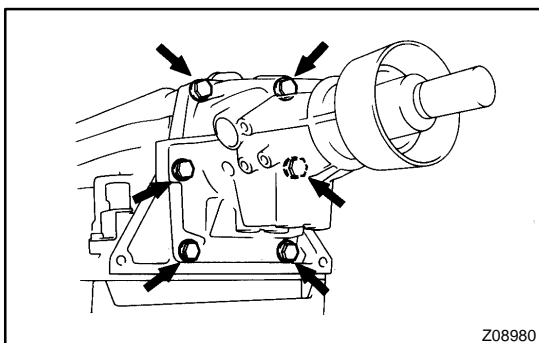
Q08204

5. **REMOVE REAR SUPPORT MEMBER**
  - (a) Remove the 4 nuts.
  - (b) Remove the 4 bolts and support member.



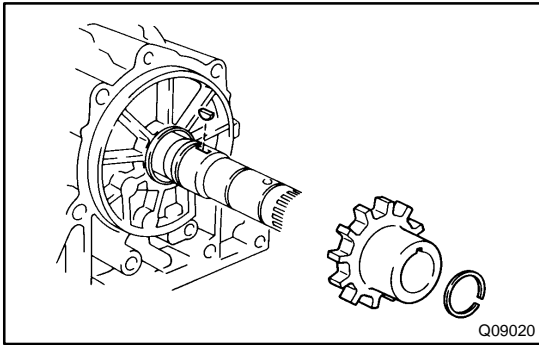
Q00608

6. **REMOVE TRANSMISSION MOUNTING BRACKET**  
Remove the 4 bolts and bracket from the transmission.



Z08980

7. **REMOVE EXTENSION HOUSING**  
Remove the 6 bolts. If necessary, tap the extension housing with a plastic hammer or block of wood to loosen it.

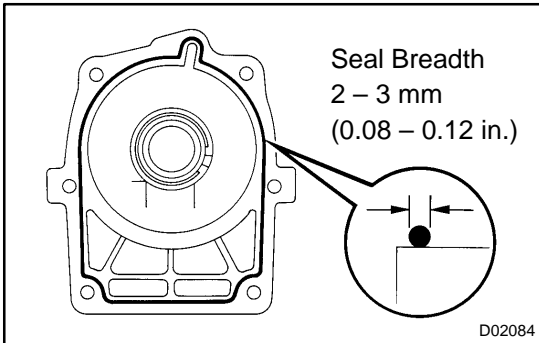


**8. REMOVE SENSOR ROTOR**

- (a) Using a snap ring expander, remove the snap ring.
- (b) Remove the sensor rotor and key.

**9. INSTALL SENSOR ROTOR AND KEY**

- (a) Install the key and sensor rotor.
- (b) Using a snap ring expander, install a new snap ring.



**10. INSTALL EXTENSION HOUSING**

- (a) Apply seal packing to the extension housing.

**Seal packing:**

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

- (b) Install the 6 bolts.

**HINT:**

- ◆ Coat the thread of the all bolts with sealant.

**Sealant:**

**Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent**

- ◆ The 2 lower bolts are shorter.

**Torque: 34 N·m (345 kgf-cm, 25 ft-lbf)**

**11. INSTALL TRANSMISSION MOUNTING BRACKET**

Install the bracket and 4 bolts to the transmission.

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

**12. INSTALL REAR SUPPORT MEMBER**

- (a) Install the support member and 4 bolts.

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

- (b) Install the 4 nuts.

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

**13. REMOVE JACK**

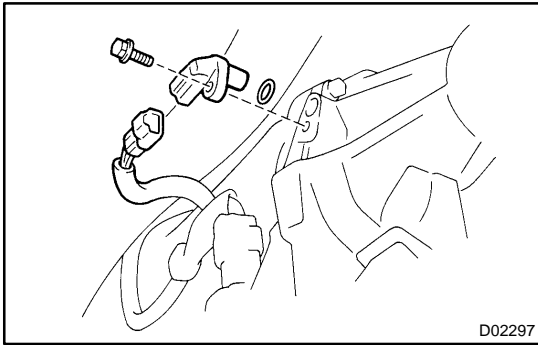
**14. INSTALL VEHICLE SPEED SENSOR**

(See page AT-6)

**15. INSTALL PROPELLER SHAFT (See page PR-12)**

**16. FILL ATF AND CHECK FLUID LEVEL**

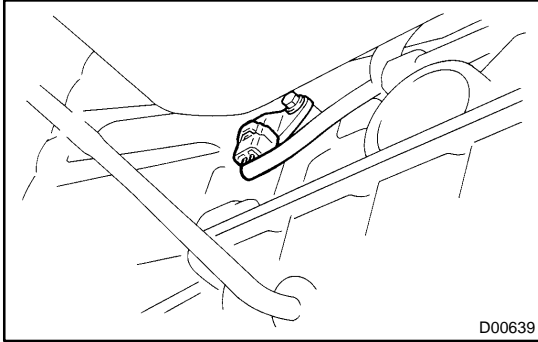
(See page DI-330)



## VEHICLE SPEED SENSOR ON-VEHICLE REPAIR

AT03X-01

1. **DISCONNECT VEHICLE SPEED SENSOR CONNECTOR**
2. **REMOVE VEHICLE SPEED SENSOR**
  - (a) Remove the bolt and vehicle speed sensor.
  - (b) Remove the O-ring from the vehicle speed sensor.
3. **INSTALL VEHICLE SPEED SENSOR**
  - (a) Coat a new O-ring with ATF and install it to the vehicle speed sensor.
  - (b) Install the vehicle speed sensor to the extension housing and torque the bolt.  
**Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)**
4. **CONNECT VEHICLE SPEED SENSOR CONNECTOR**



## O/D DIRECT CLUTCH SPEED SENSOR

AT03Y-01

### ON-VEHICLE REPAIR

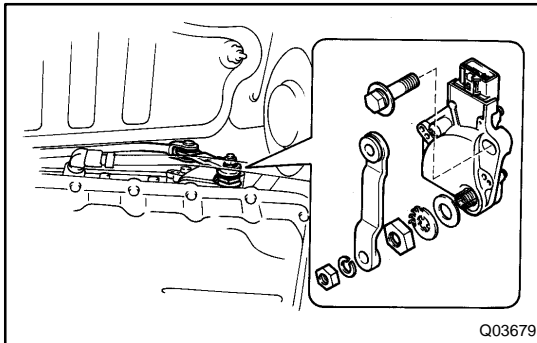
1. **DISCONNECT O/D DIRECT CLUTCH SPEED SENSOR CONNECTOR**
2. **REMOVE O/D DIRECT CLUTCH SPEED SENSOR**
  - (a) Remove the bolt and O/D direct clutch speed sensor.
  - (b) Remove the O-ring.
3. **INSTALL O/D DIRECT CLUTCH SPEED SENSOR**
  - (a) Coat a new O-ring with ATF and install it to the O/D direct 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**

# PARK/NEUTRAL POSITION (PNP) SWITCH

AT03Z-01

## ON-VEHICLE REPAIR

1. REMOVE EXHAUST PIPE (See page EM-89)
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-330).

7. INSTALL EXHAUST PIPE (See page EM-89)
8. TEST DRIVE VEHICLE

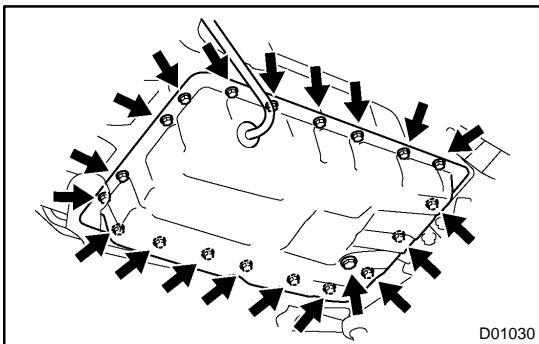
# VALVE BODY ASSEMBLY ON-VEHICLE REPAIR

AT040-01

**CAUTION:**

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

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

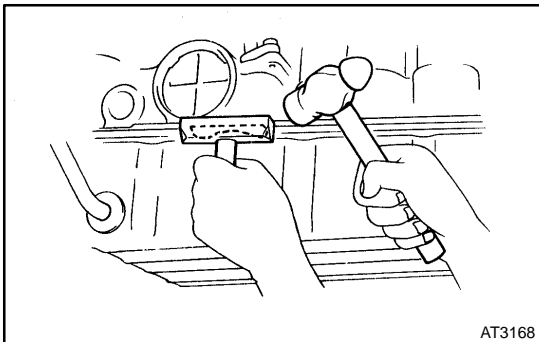


1. REMOVE DRAIN PLUG AND DRAIN ATF
2. REMOVE OIL PAN

**NOTICE:**

Some fluid will remain in the oil pan.

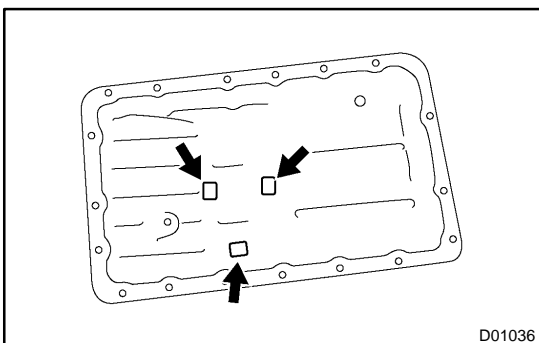
- (a) Remove the 19 bolts.



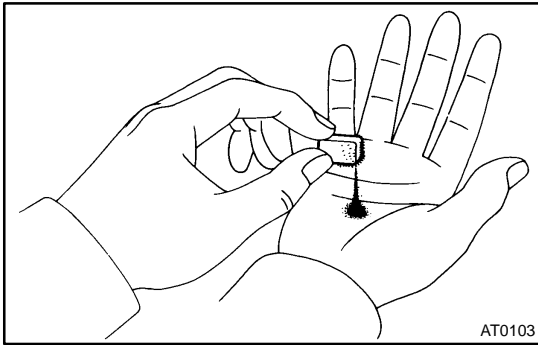
- (b) Install the blade of SST between the transmission case and oil pan, cut off applied sealer, and remove the oil pan.  
SST 09032-00100

**NOTICE:**

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



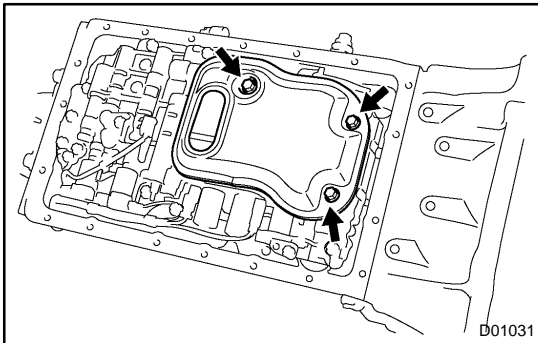
3. REMOVE 3 MAGNETS FROM OIL PAN



#### 4. EXAMINE PARTICLES IN PAN

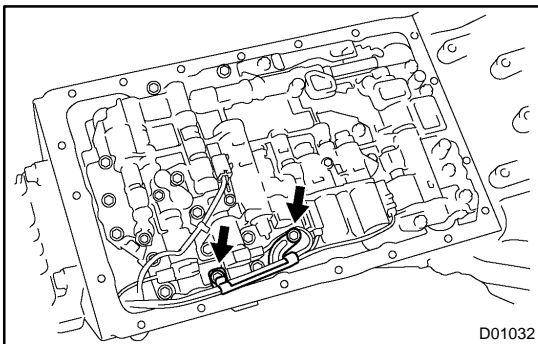
Remove the magnets and use them to collect any steel chips. Look carefully at the chips and particles in the pan and the magnet to anticipate what type of wear you will find in the transmission.

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



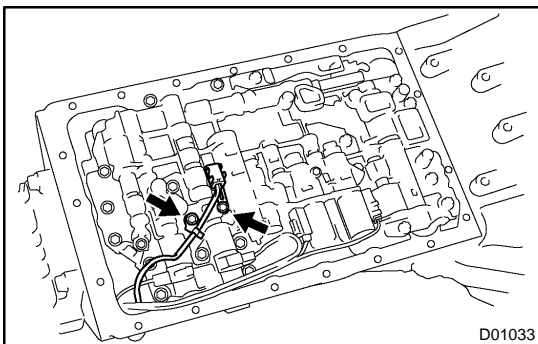
#### 5. REMOVE OIL STRAINER

Remove the 3 bolts and oil strainer from the valve body.

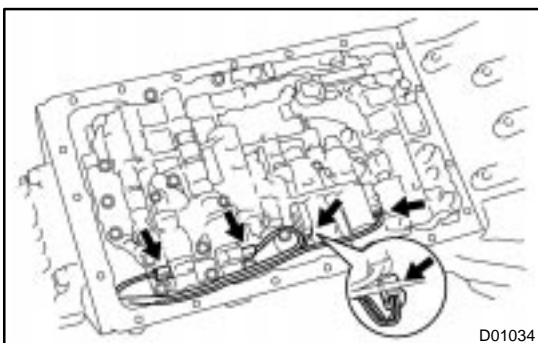


#### 6. REMOVE SOLENOID WIRING

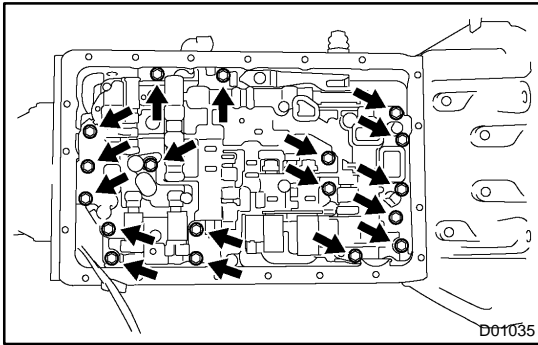
(a) Remove the 2 bolts and clamp.



(b) Remove the 2 set bolts of the clamp and disconnect the ATF Temp. sensor.

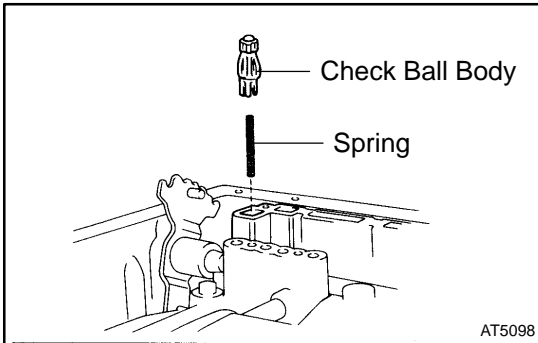


(c) Disconnect the 5 connectors from the solenoid.



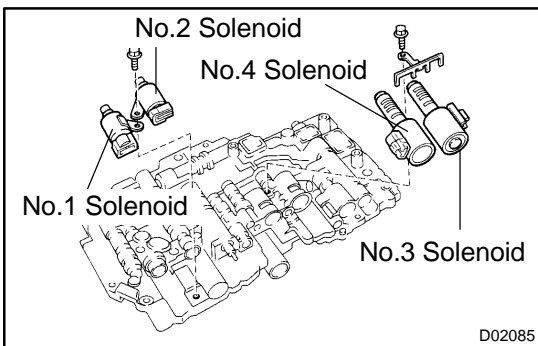
**7. REMOVE VALVE BODY**

- (a) Remove the 18 bolts.
- (b) Remove the valve body.



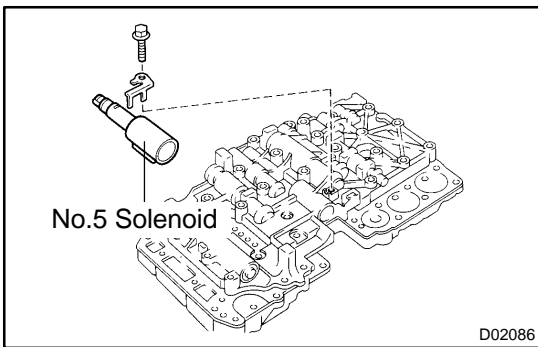
**NOTICE:**

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

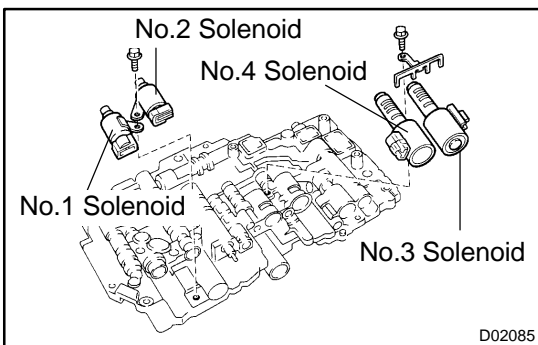


**8. REMOVE SOLENOID VALVES**

- (a) Remove the No.1 and No.2 solenoid valves.
- (b) Remove the O-ring from the No.1 and No.2 solenoid valves.
- (c) Remove the lock plate, No.3 and No.4 solenoid valves.

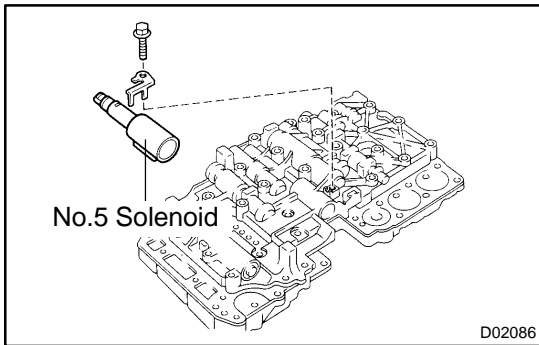


- (d) Remove the No.5 solenoid valve.

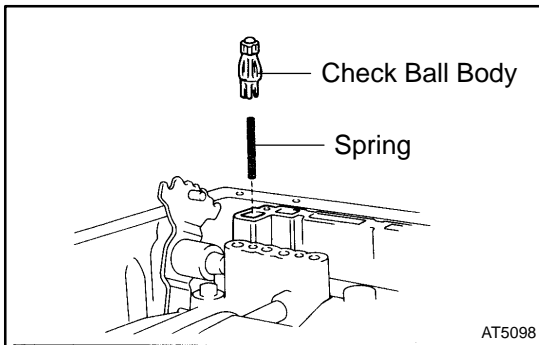


**9. INSTALL SOLENOID VALVES**

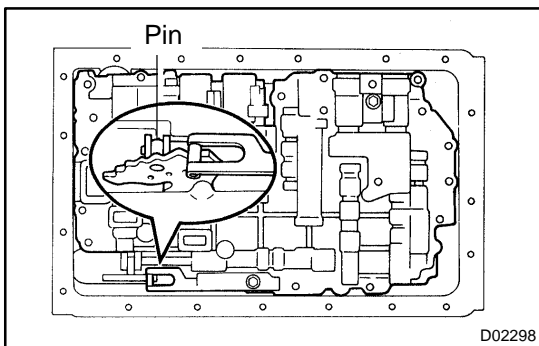
- (a) Install the No.1, No.2, No.3 and No.4 solenoid valves to the lower valve body.



- (b) Install the No.5 solenoid valve to the upper valve body.

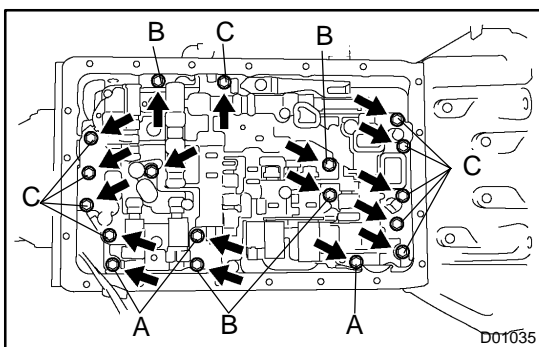


**10. INSTALL CHECK BALL BODY AND SPRING AND HOLD IT**



**11. INSTALL VALVE BODY**

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



- (b) Install the valve body.  
 (c) Install and torque the 18 bolts.

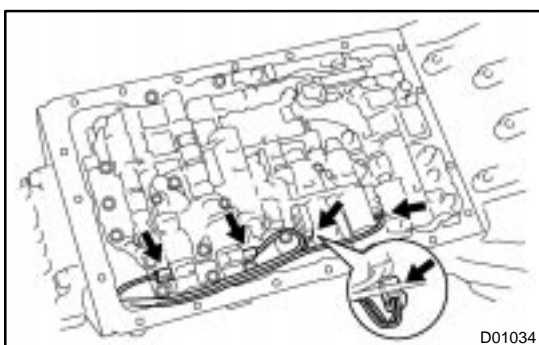
**Bolt length:**

**A bolt: 28.6 mm (1.13 in.)**

**B bolt: 33.6 mm (1.32 in.)**

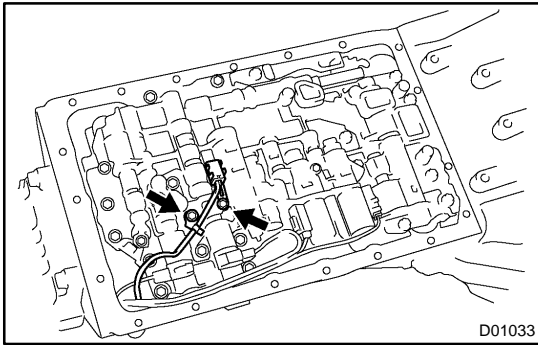
**C bolt: 41.6 mm (1.64 in.)**

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

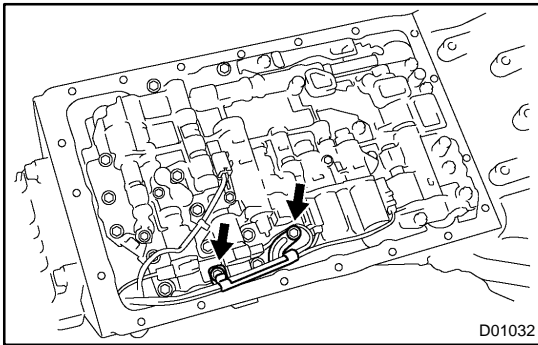


**12. INSTALL SOLENOID WIRING**

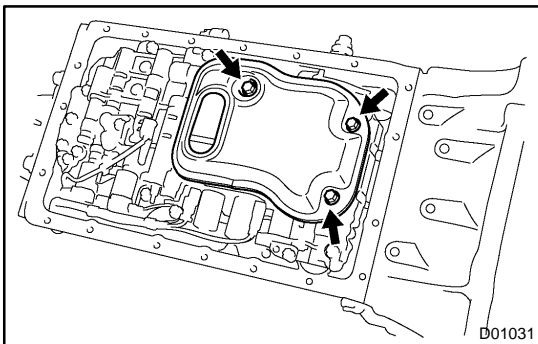
- (a) Connect the 5 connectors to the solenoid.



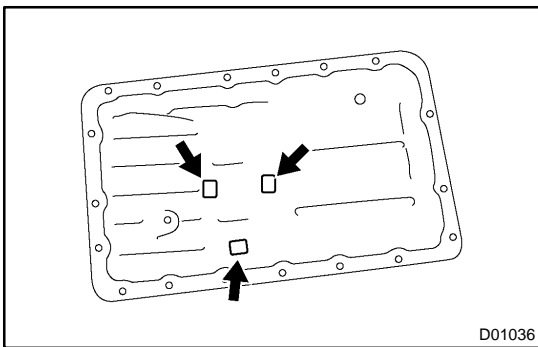
- (b) Set the ATF Temp. sensor.
- (c) Install and torque the 2 set bolts of the clamp.  
**Torque: 6.6 N·m (68 kgf·cm, 58 in.-lbf)**



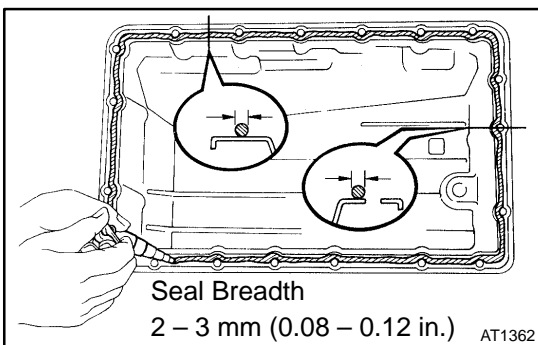
- (d) Install the clamp.
- (e) Install and torque the 2 bolts.  
**Torque: 10 N·m (100 kgf·cm, 7 ft-lbf)**



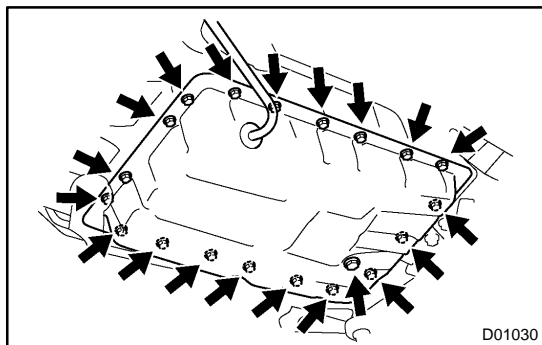
- 13. INSTALL OIL STRAINER**
- (a) Install the oil strainer to the valve body.
  - (b) Install and torque the 3 bolts.  
**Torque: 10 N·m (100 kgf·cm, 7 ft-lbf)**



- 14. INSTALL OIL PAN**
- (a) Install the 3 magnets in the indentations of the oil pan, as shown in the illustration.



- (b) Remove any FIPG, and be careful not to drop oil on the contacting surfaces of the transmission case and oil pan.
- (c) Apply FIPG to the oil pan, as shown in the illustration.  
**FIPG:**  
**Part No. 08826-00090, THREE BOND 1281 or equivalent**

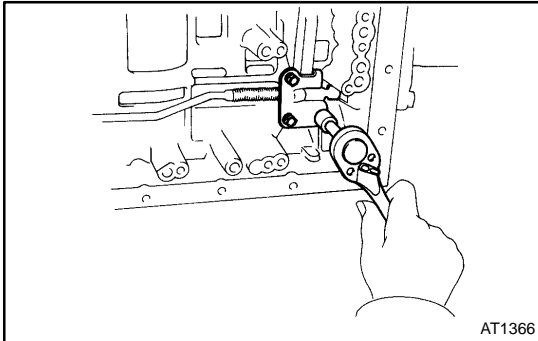


- (d) Install the oil pan to the transmission case.
  - (e) Install and torque the 19 bolts.  
Torque: 7.3 N·m (75 kgf·cm, 65 in.-lbf)
15. **INSTALL AND TORQUE DRAIN PLUG**  
Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)
16. **FILL ATF AND CHECK FLUID LEVEL**  
(See page [DI-330](#))

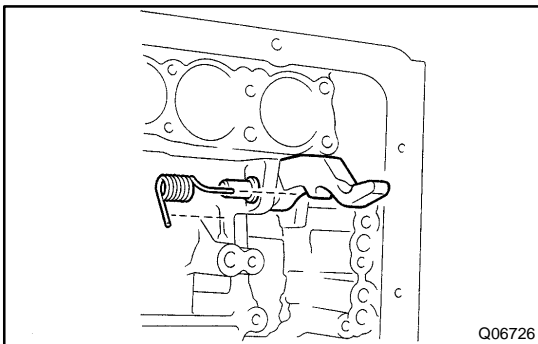
# PARKING LOCK PAWL ON-VEHICLE REPAIR

AT041-01

1. REMOVE VALVE BODY (See page [AT-9](#))



2. REMOVE PARKING LOCK PAWL BRACKET  
Remove the 3 bolts and parking lock pawl bracket.



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

Install the parking lock pawl bracket and 3 bolts.

HINT:

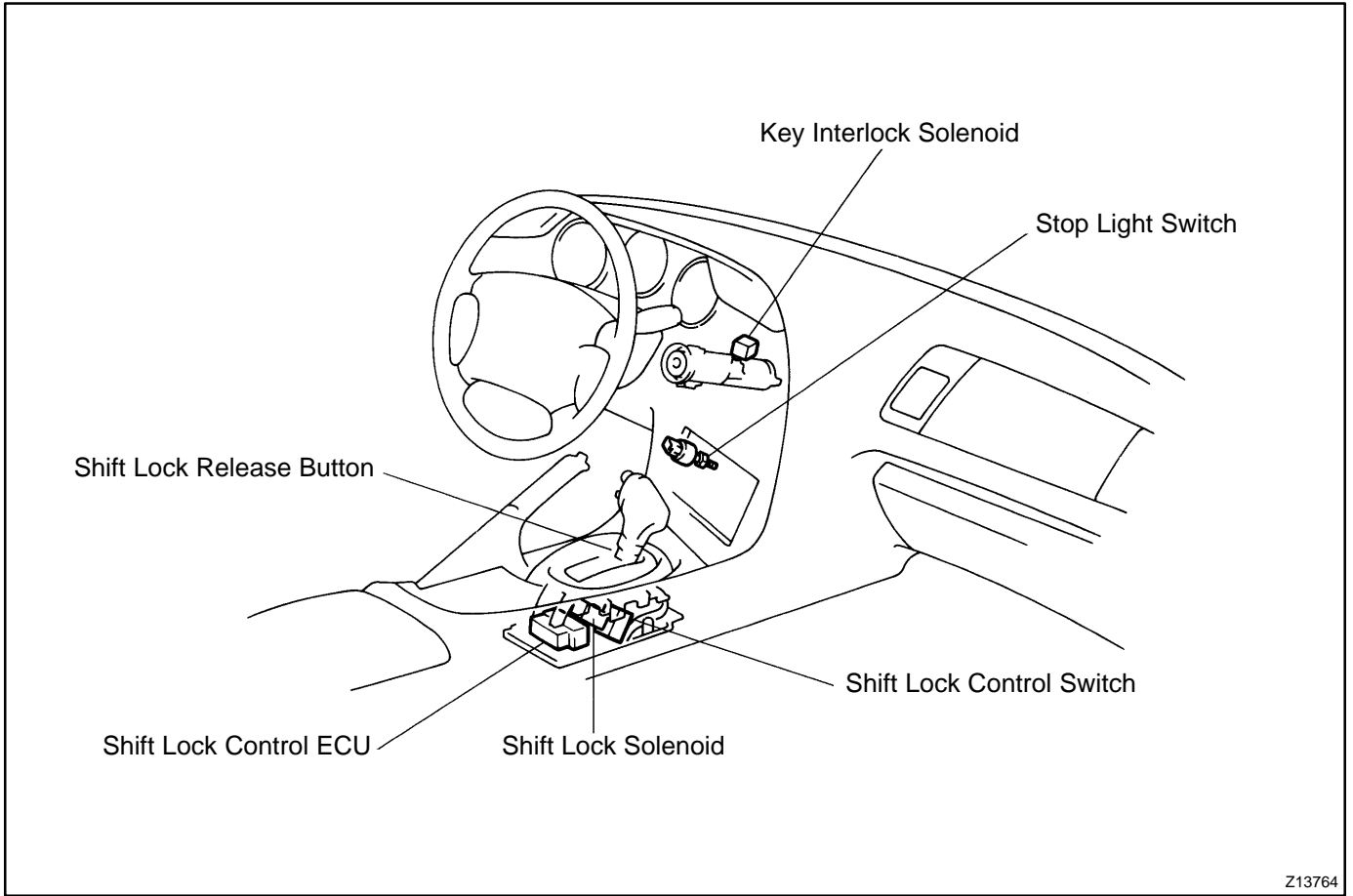
- ◆ Push the lock rod fully forward.
- ◆ Check that the parking lock pawl operates smoothly.

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

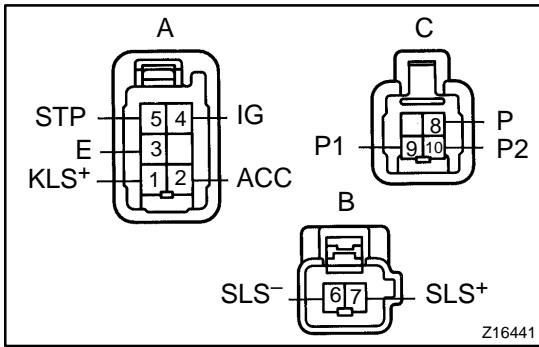
8. INSTALL VALVE BODY (See page [AT-9](#))

# SHIFT LOCK SYSTEM LOCATION

AT042-01



Z13764



## INSPECTION

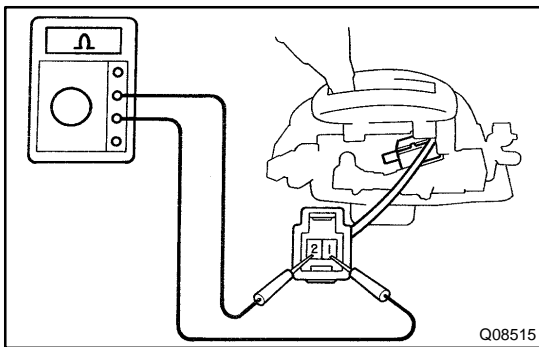
### 1. INSPECT SHIFT LOCK CONTROL ECU

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
		IG SW ON	10 - 14
	1 - 3	Depress brake pedal	10 - 14
		IG SW ON and P position	0
		R, N, D, 2, L position	7.5 - 11
B	6 - 7	R, N, D, 2, L position (after 1 second)	6 - 9.5
		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

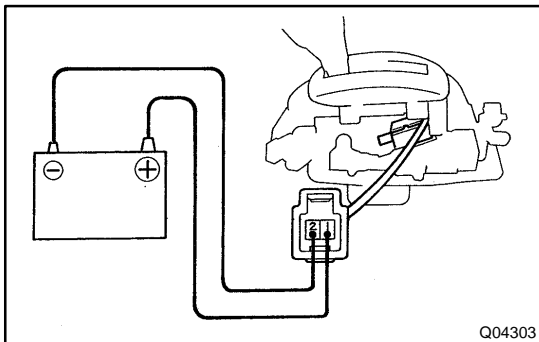


### 2. INSPECT SHIFT LOCK SOLENOID

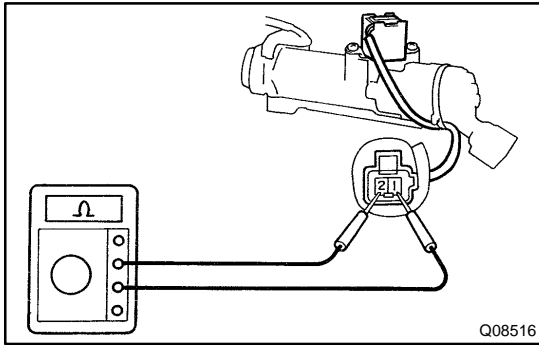
- (a) Disconnect the solenoid connector.
- (b) Using an ohmmeter, measure the resistance between terminals 1 and 2.

**Standard resistance: 29 - 36 Ω**

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



- (c) 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.

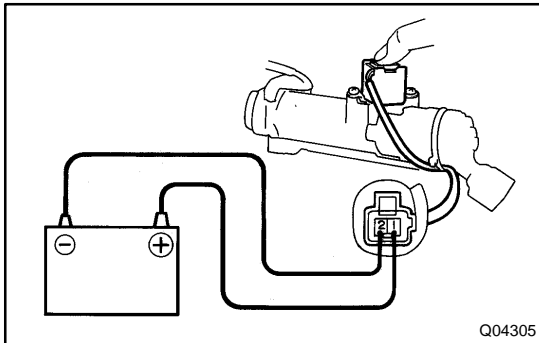


### 3. INSPECT KEY INTERLOCK SOLENOID

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

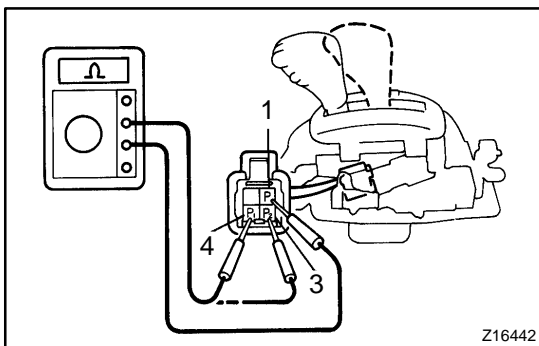
**Standard resistance: 12 – 17  $\Omega$**

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

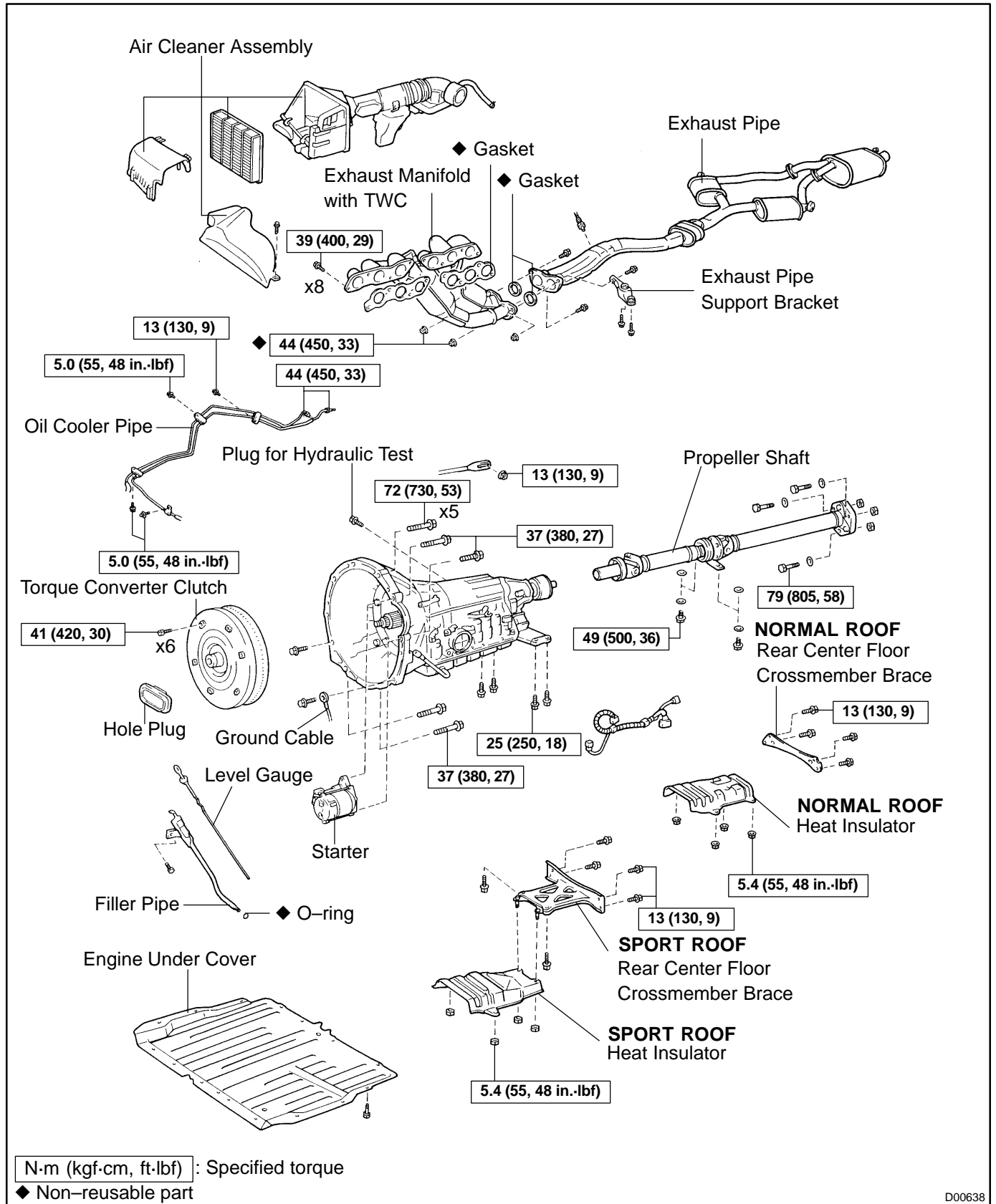
Inspect that there is continuity between each terminal.

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

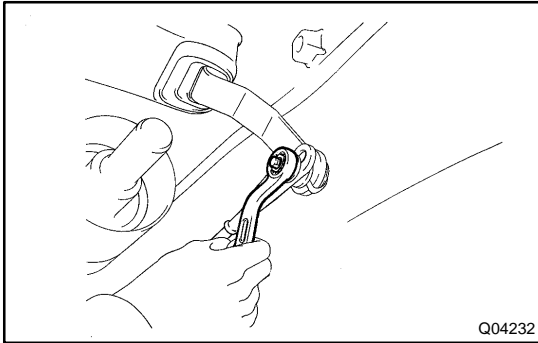
AT044-01



D00638

## REMOVAL

1. REMOVE AIR CLEANER ASSEMBLY
2. REMOVE ENGINE UNDER COVER
3. REMOVE EXHAUST PIPE (See page [EM-89](#))
4. REMOVE EXHAUST MANIFOLD WITH TWC (See page [EC-7](#))
5. REMOVE PROPELLER SHAFT (See page [PR-5](#))
6. REMOVE FILLER PIPE



Q04232

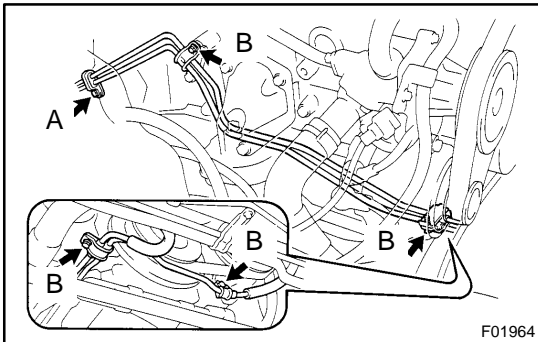
### 7. REMOVE TRANSMISSION CONTROL ROD

Remove the nut from the 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-330](#)).



F01964

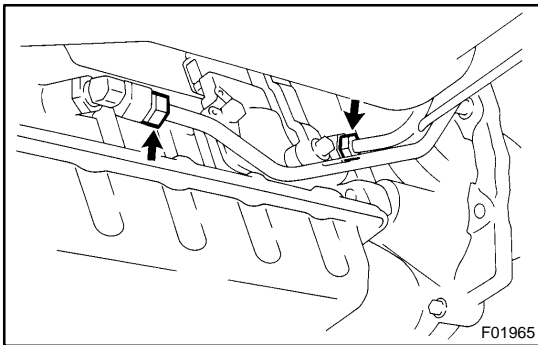
### 8. DISCONNECT 2 OIL COOLER PIPES

- (a) Remove the 4 bolts and oil cooler pipe clamps.

**Torque:**

**A bolt: 13 N·m (130 kgf-cm, 9 ft-lbf)**

**B bolt: 5.0 N·m (55 kgf-cm, 48 in.-lbf)**



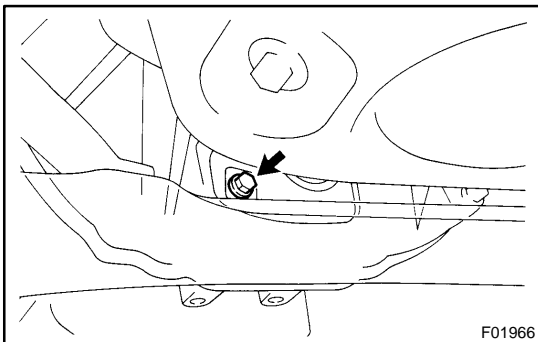
F01965

- (b) Disconnect the 2 oil cooler pipes.

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

### 9. REMOVE TORQUE CONVERTER CLUTCH MOUNTING BOLTS

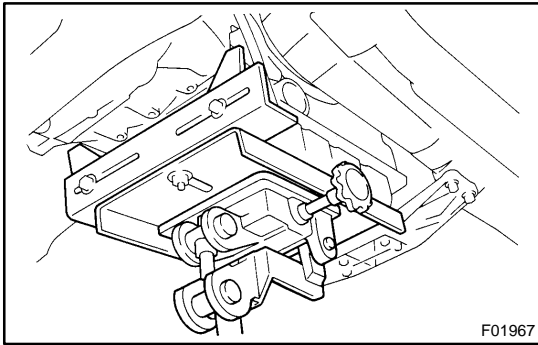
- (a) Remove the hole plug.



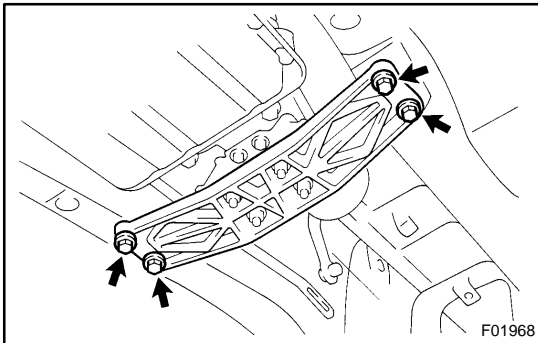
F01966

- (b) Turn the crankshaft to gain access and remove the 6 bolts with holding the crankshaft puller set bolt by a wrench.

**Torque: 41 N·m (420 kgf-cm, 30 ft-lbf)**



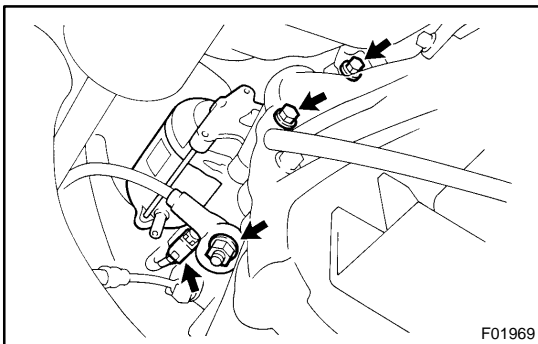
**10. JACK UP TRANSMISSION**



**11. REMOVE REAR MOUNTING**

Remove the 4 bolts and rear mounting.

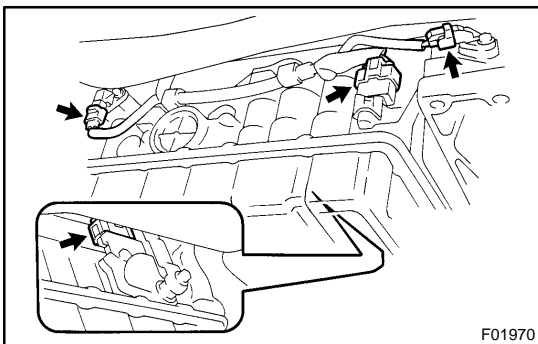
**Torque: 25 N·m (250 kgf-cm, 18 ft-lbf)**



**12. REMOVE STARTER**

- (a) Disconnect the connector.
- (b) Remove the nut and cable.
- (c) Remove the 2 bolts and starter.

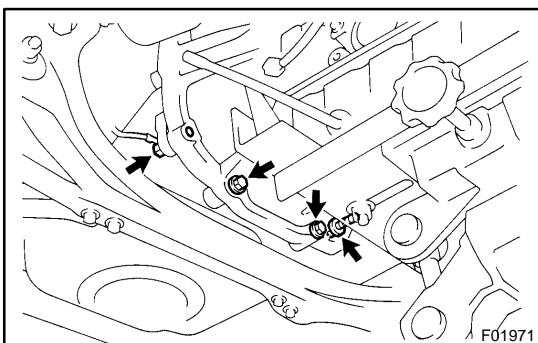
**Torque: 37 N·m (380 kgf-cm, 27 ft-lbf)**



**13. DISCONNECT THESE CONNECTOR**

- ◆ Vehicle speed sensor connector
- ◆ Solenoid wire connector
- ◆ Park/neutral position switch connector
- ◆ Direct clutch speed sensor connector

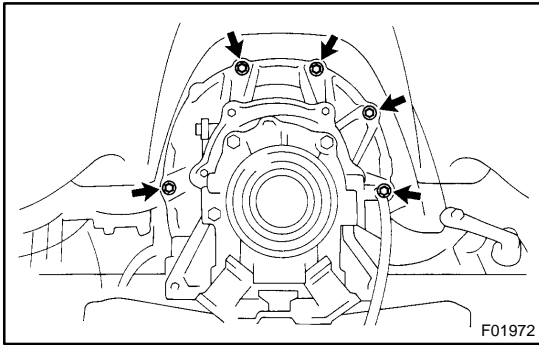
**14. DISCONNECT 3 WIRE CLAMPS FROM TRANSMISSION**



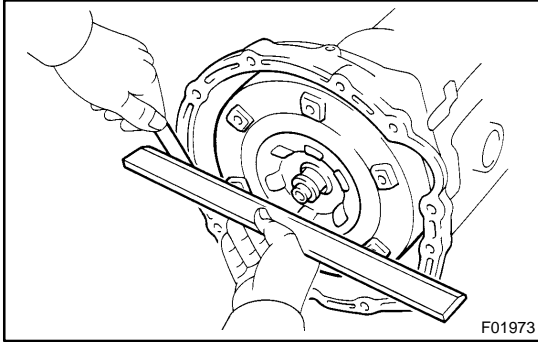
**15. REMOVE TRANSMISSION**

- (a) Remove the 4 bolts and ground cable.

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



- (b) Remove the 5 bolts.  
**Torque: 72 N·m (730 kgf-cm, 53 ft-lbf)**
- (c) Lower the engine rear side and remove the transmission from the engine.



## INSTALLATION

### 1. CHECK TORQUE CONVERTER CLUTCH INSTALLATION

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

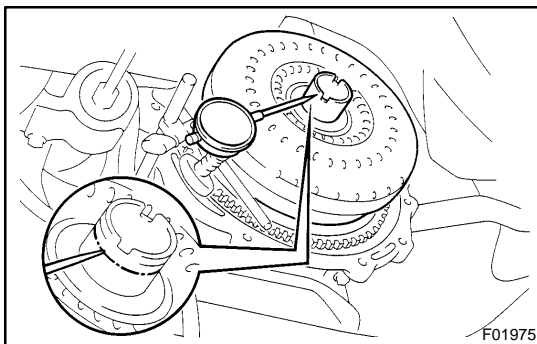
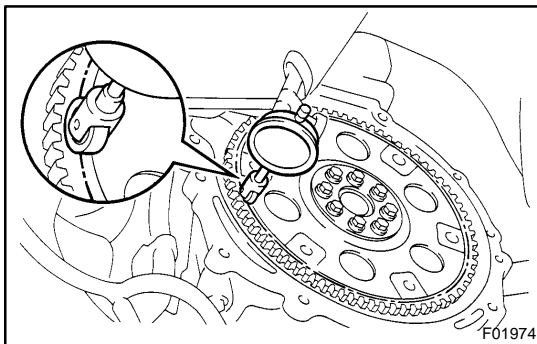
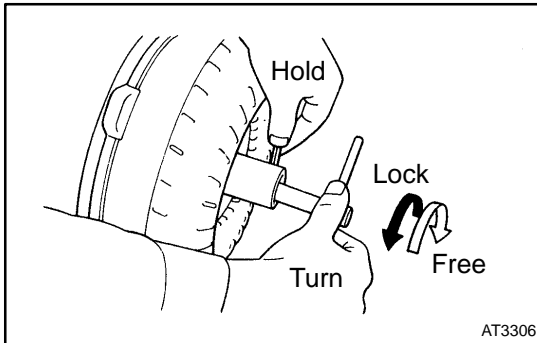
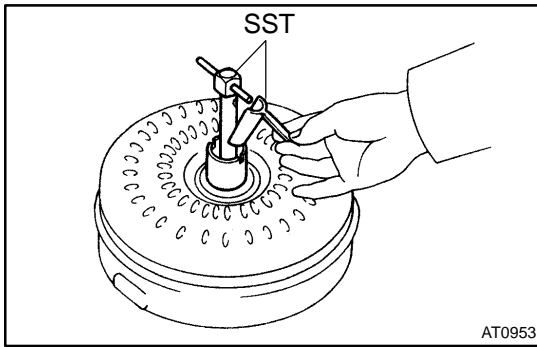
**Clearance: Less than 0.1 mm (0.004 in.)**

### 2. TRANSMISSION INSTALLATION

Installation is in the reverse order of removal (See page [AT-20](#)).

HINT:

- ◆ Fill ATF and check fluid level (See page [DI-330](#)).
- ◆ Check and adjust the park/neutral position switch (See page [DI-330](#)).
- ◆ Perform the test drive of the vehicle.



## TORQUE CONVERTER CLUTCH AND DRIVE PLATE INSPECTION

AT047-01

### 1. INSPECT ONE-WAY CLUTCH

- (a) Install SST into the inner race of the one-way clutch.  
SST 09350-32020 (09351-32010)
- (b) 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)
- (c) With the torque converter clutch setting up on its side, check that the clutch locks when turned counterclockwise, and rotates 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

- (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.

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

### 3. MEASURE TORQUE CONVERTER CLUTCH SLEEVE RUNOUT

Temporarily mount the torque converter clutch on the drive plate. Set a dial indicator and measure the torque converter clutch 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 clutch to ensure the installation is correctly performed.