

AUTOMATIC TRANSAXLE SYSTEM

PRECAUTION

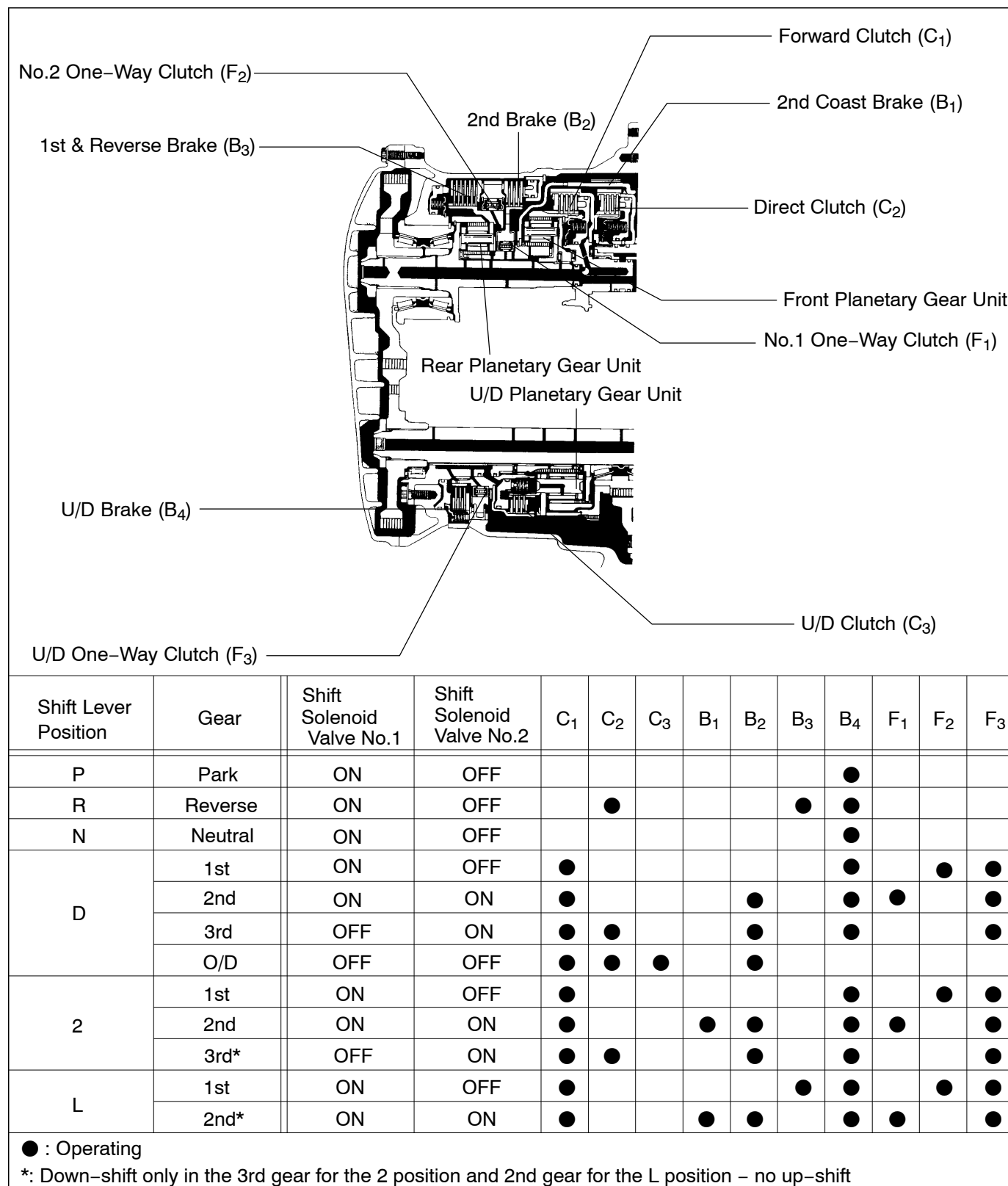
AX050-02

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

- Using a razor blade and a 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.

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

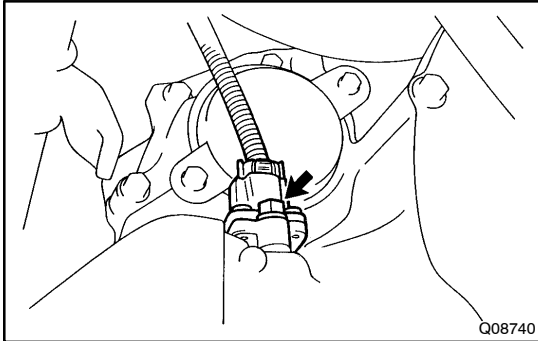
OPERATION



VEHICLE SPEED SENSOR ON-VEHICLE REPAIR

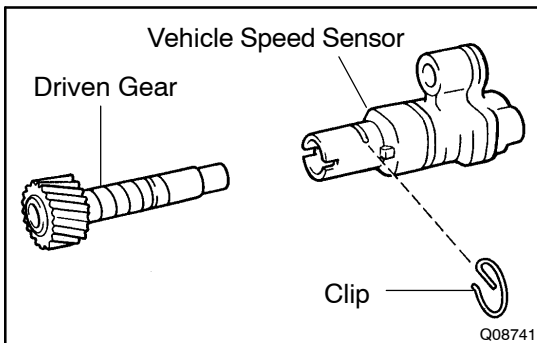
AX0T4-02

1. REMOVE NO.2 ENGINE UNDER COVER



2. DISCONNECT VEHICLE SPEED SENSOR ASSEMBLY

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



- (c) Remove the clip and speedometer driven gear from the vehicle speed sensor.
- (d) Remove the O-ring from the vehicle speed sensor.

3. INSTALL VEHICLE SPEED SENSOR ASSEMBLY

- (a) Coat a new O-ring with ATF and install it to the vehicle speed sensor.
- (b) Install the speedometer driven gear to the vehicle speed sensor and clip.
- (c) Install the vehicle speed sensor assembly and torque the bolts.

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

- (d) Connect the vehicle speed sensor connector.

4. INSTALL NO.2 ENGINE UNDER COVER

PARK/NEUTRAL POSITION (PNP) SWITCH

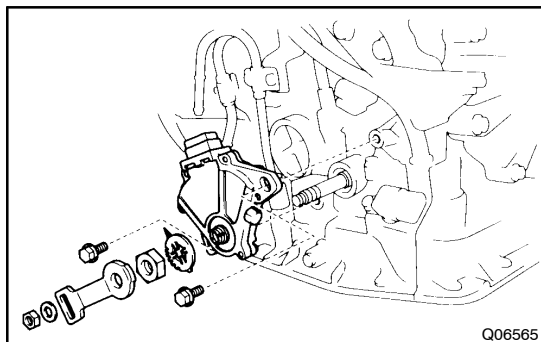
AX0TS-01

ON-VEHICLE REPAIR

1. REMOVE NO.2 ENGINE UNDER COVER
2. DISCONNECT PARK/NEUTRAL POSITION SWITCH CONNECTOR

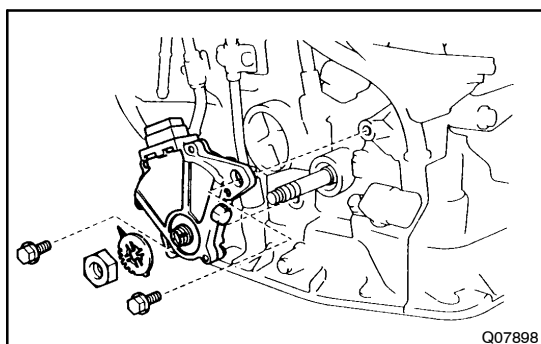
3. REMOVE PARK/NEUTRAL POSITION SWITCH

- (a) Remove the nut and disconnect the shift control cable.
- (b) Remove the nut and shift control lever.
- (c) Using a screwdriver, pry off the lock plate.
- (d) Remove the nut and lock plate.
- (e) Remove the 2 bolts and pull out the park/neutral position switch.



4. INSTALL PARK/NEUTRAL POSITION SWITCH

- (a) Temporarily install the park/neutral position switch with the 2 bolts.
- (b) Install a new lock plate and tighten the nut.
Torque: 6.9 N·m (70 kgf·cm, 61 in·lbf)
- (c) Stake the nut with the lock plate.

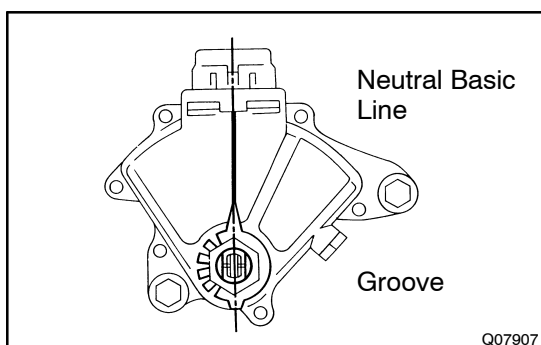


- (d) Adjust the park/neutral position switch (See page [DI-127](#)).

HINT:

Align the groove and park/neutral basic line.

- (e) Tighten the 2 bolts.
Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)

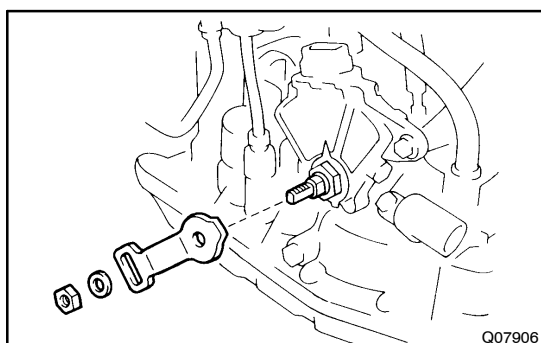


- (f) Install the shift control lever with the nut.
- (g) Connect the control cable with the nut.

Torque: 13 N·m (135 kgf·cm, 10 ft·lbf)

5. CONNECT PARK/NEUTRAL POSITION SWITCH CONNECTOR

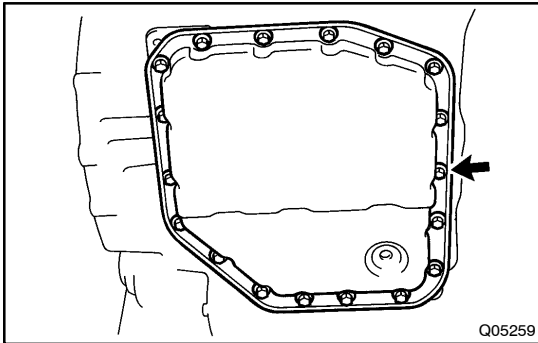
6. INSTALL NO.2 ENGINE UNDER COVER



VALVE BODY ASSEMBLY ON-VEHICLE REPAIR

AX076-02

1. REMOVE DRAIN PLUG AND DRAIN ATF

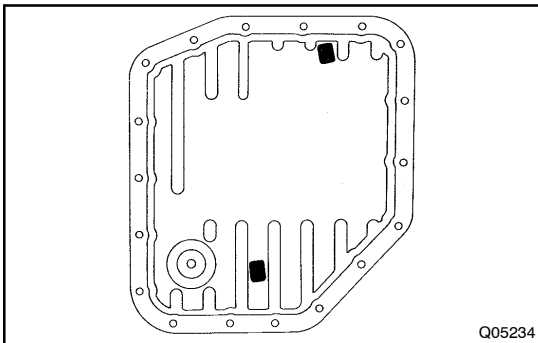


2. REMOVE OIL PAN AND GASKET

Remove the 18 bolts.

NOTICE:

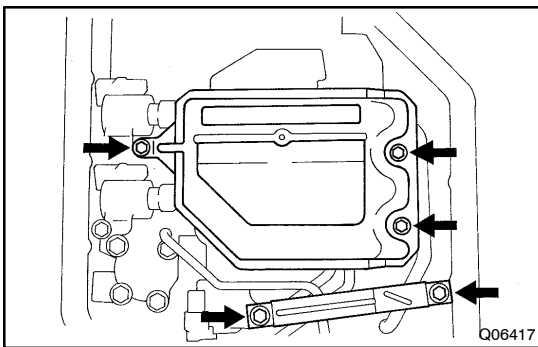
Some fluid will remain in the oil pan. Remove all pan bolts, and carefully remove the oil pan assembly. Discard the gasket.



3. 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 transaxle.

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

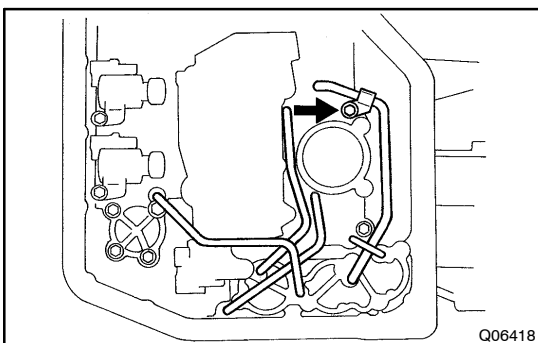


4. REMOVE OIL STRAINER AND APPLY PIPE BRACKET

NOTICE:

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

- Remove the 3 bolts, oil strainer and gasket.
- Remove the 2 bolts and apply pipe bracket.

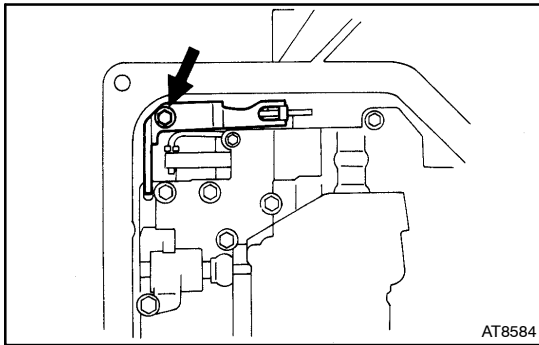


5. REMOVE OIL PIPE CLAMP AND OIL PIPES

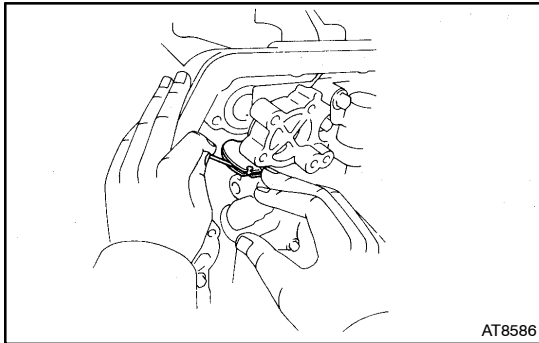
- Remove the bolt and oil pipe clamp.
- Pry up the both pipe ends with a large screwdriver and remove the 5 pipes.

NOTICE:

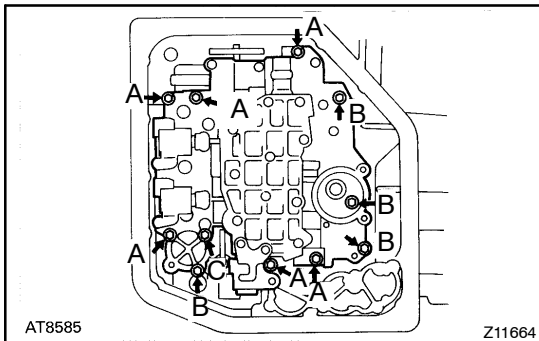
Be careful not to bend or damage the pipe.

**6. REMOVE MANUAL DETENT SPRING**

Remove the bolt and manual detent spring.

7. REMOVE 3 SOLENOID CONNECTORS**8. REMOVE VALVE BODY**

(a) Disconnect the throttle cable.



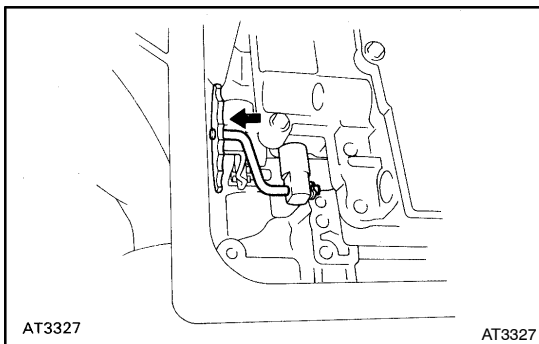
(b) Remove the 11 bolts and wire retainer.

Bolt length:

Bolt A: 20 mm (0.79 in.)

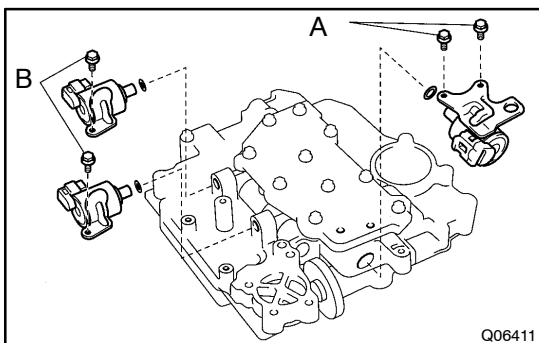
Bolt B: 30 mm (1.18 in.)

Bolt C: 55 mm (2.17 in.)



(c) Disconnect the manual valve connecting rod.

(d) Remove the valve body.

**9. REMOVE 3 SOLENOID VALVES**

(a) Remove the 3 solenoid valves.

(b) Remove the O-rings from each of the solenoid valves.

10. INSTALL SHIFT SOLENOID VALVE

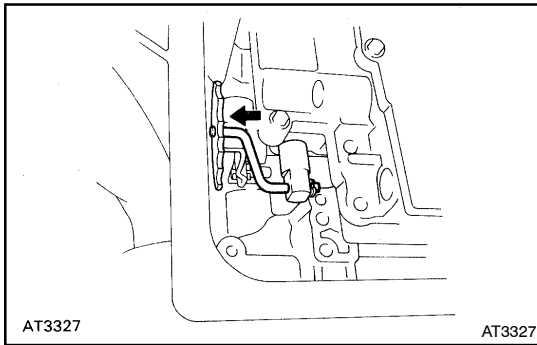
(a) Coat new O-rings with ATF and install them to the each of the solenoid valve.

(b) Install the 3 shift solenoid valves with the 2 bolts.

Torque:

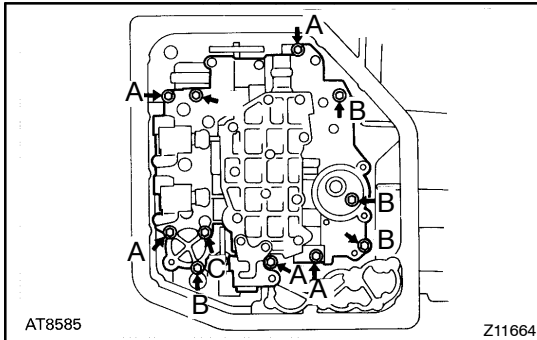
Bolt A: 6.4 N·m (65 kgf·cm, 56 in·lbf)

Bolt B: 10 N·m (100 kgf·cm, 7 ft·lbf)



11. INSTALL VALVE BODY

- (a) Install the valve body.
- (b) Connect the manual valve connecting rod.



- (c) Install the 17 bolts and wire retainer.

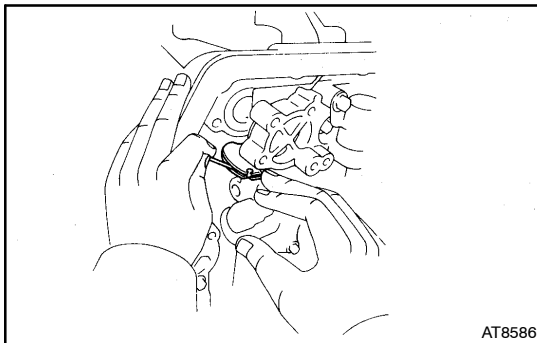
Bolt length:

Bolt A: 20 mm (0.79 in.)

Bolt B: 30 mm (1.18 in.)

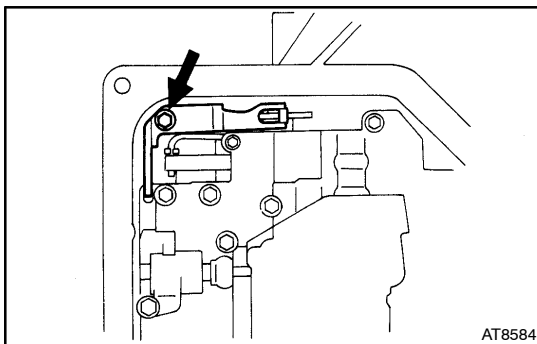
Bolt C: 55 mm (2.17 in.)

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)



- (d) Connect the throttle cable.

12. CONNECT 3 SOLENOID CONNECTORS



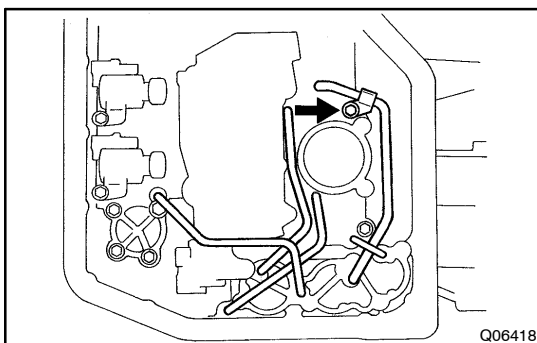
13. INSTALL MANUAL DETENT SPRING

Install the manual detent spring with the bolt.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

HINT:

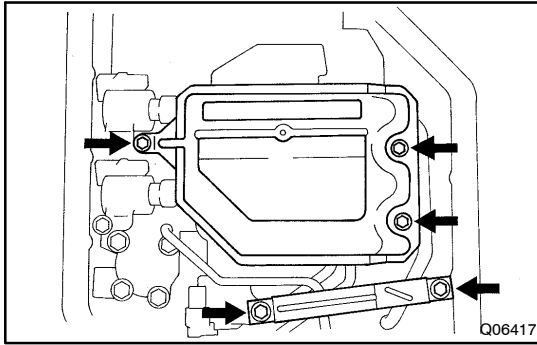
Check that the manual valve lever is in contact with the center of the roller at the tip of the detent spring.



14. INSTALL OIL PIPE CLAMP AND OIL PIPES

- (a) Install the 5 pipes with a large screwdriver.
- (b) Install the oil pump clamp with the bolt.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

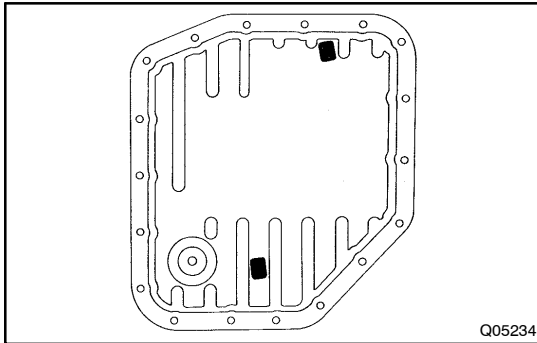
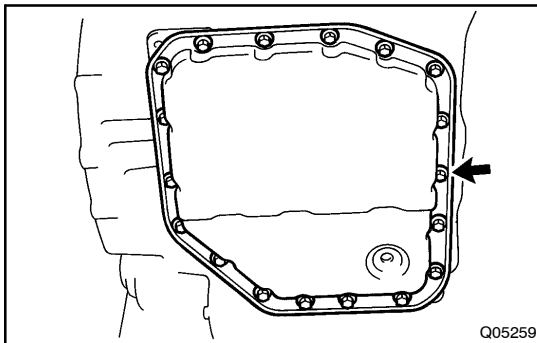
**15. INSTALL OIL STRAINER AND APPLY PIPE BRACKET**

Install the oil strainer, gasket with the 3 bolts.

Torque: 10 N·m (102 kgf·cm, 7 ft·lbf)

HINT:

Replace used the gasket with a new one.

**16. INSTALL 2 MAGNETS IN OIL PAN****17. INSTALL OIL PAN AND GASKET**

(a) Install a new gasket to the oil pan.

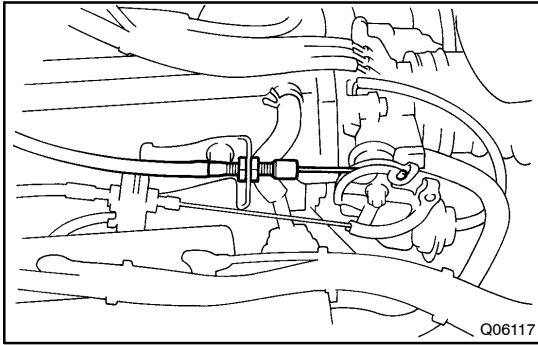
(b) Install the oil pan with the 18 bolts.

Torque: 4.9 N·m (50 kgf·cm, 43 in·lbf)

18. INSTALL DRAIN PLUG

Torque: 17 N·m (175 kgf·cm, 13 ft·lbf)

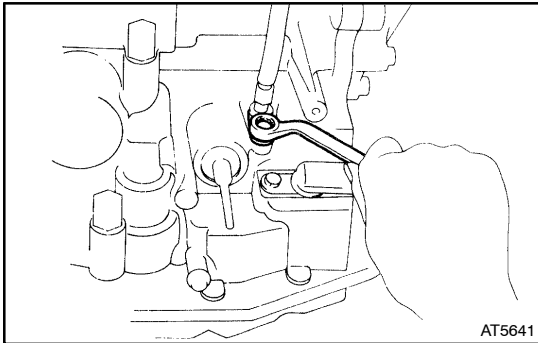
19. FILL ATF AND CHECK ATF (See page [DI-127](#))



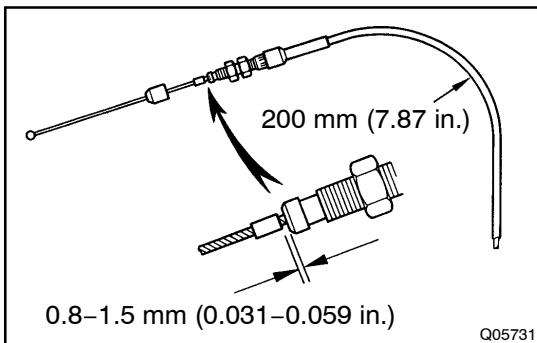
THROTTLE CABLE ON-VEHICLE REPAIR

AX055-02

1. DISCONNECT THROTTLE CABLE FROM ENGINE
2. REMOVE NO.2 ENGINE UNDER COVER
3. REMOVE PARK/NEUTRAL POSITION SWITCH (See page [AX-4](#))
4. REMOVE VALVE BODY (See page [AX-5](#))



5. REMOVE THROTTLE CABLE
 - (a) Remove the retaining bolt and plate.
 - (b) Pull out the cable from the transaxle case.



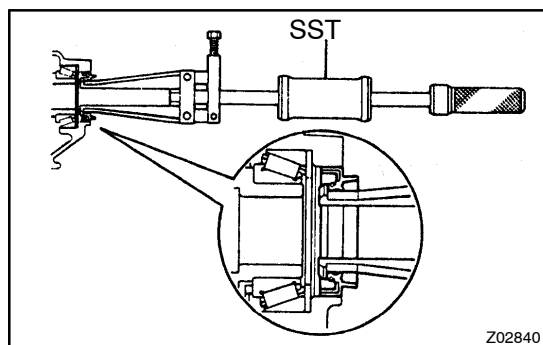
6. INSTALL THROTTLE CABLE

If throttle cable is new, do the following operations (a) – (c).

- (a) Bend the cable so there is a radius of about 200 mm (7.87 in.).
- (b) Pull the inner cable lightly until a slight resistance is felt, and hold it.
- (c) Stake the stopper 0.8 – 1.5 mm (0.031 – 0.059 in.) from the end of outer cable.
- (d) Be sure to push it in all the way.
- (e) Install the bolt.
7. INSTALL VALVE BODY (See page [AX-5](#))
8. INSTALL PARK/NEUTRAL POSITION SWITCH (See page [AX-4](#))
9. INSTALL NO.2 ENGINE UNDER COVER
10. CONNECT THROTTLE CABLE
11. ADJUST THROTTLE CABLE (See page [DI-127](#))
12. FILL ATF AND CHECK ATF (See page [DI-127](#))

DIFFERENTIAL OIL SEAL ON-VEHICLE REPAIR

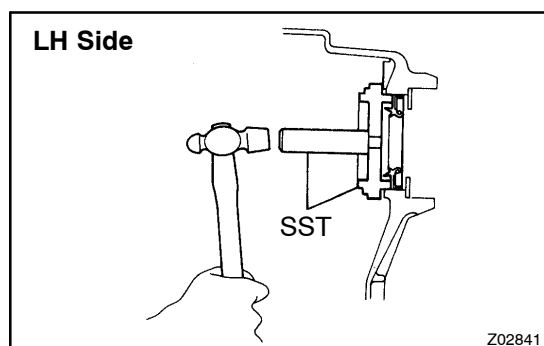
1. DRAIN ATF
2. REMOVE ENGINE UNDER COVER
3. REMOVE LH AND RH DRIVE SHAFTS
(See page [SA-20](#))



4. REMOVE LH AND RH SIDE OIL SEALS

Using SST, drive out the both side oil seals.

SST 09308-00010



5. INSTALL LH AND RH SIDE OIL SEALS

- (a) Using SST and a hammer, drive in a new oil seal until its surface is flush until the case surface.

SST LH side

09350-32014 (09351-32111, 09351-32130)

RH side

09350-32014 (09351-32130, 09351-32150)

Oil seal drive in depth:

LH side: 5.2 ± 0.5 mm (0.205 ± 0.020 in.)

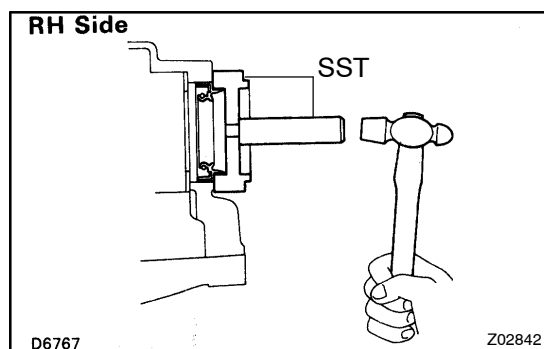
RH side: 0 ± 0.5 mm (0 ± 0.020 in.)

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

6. INSTALL LH AND RH DRIVE SHAFTS

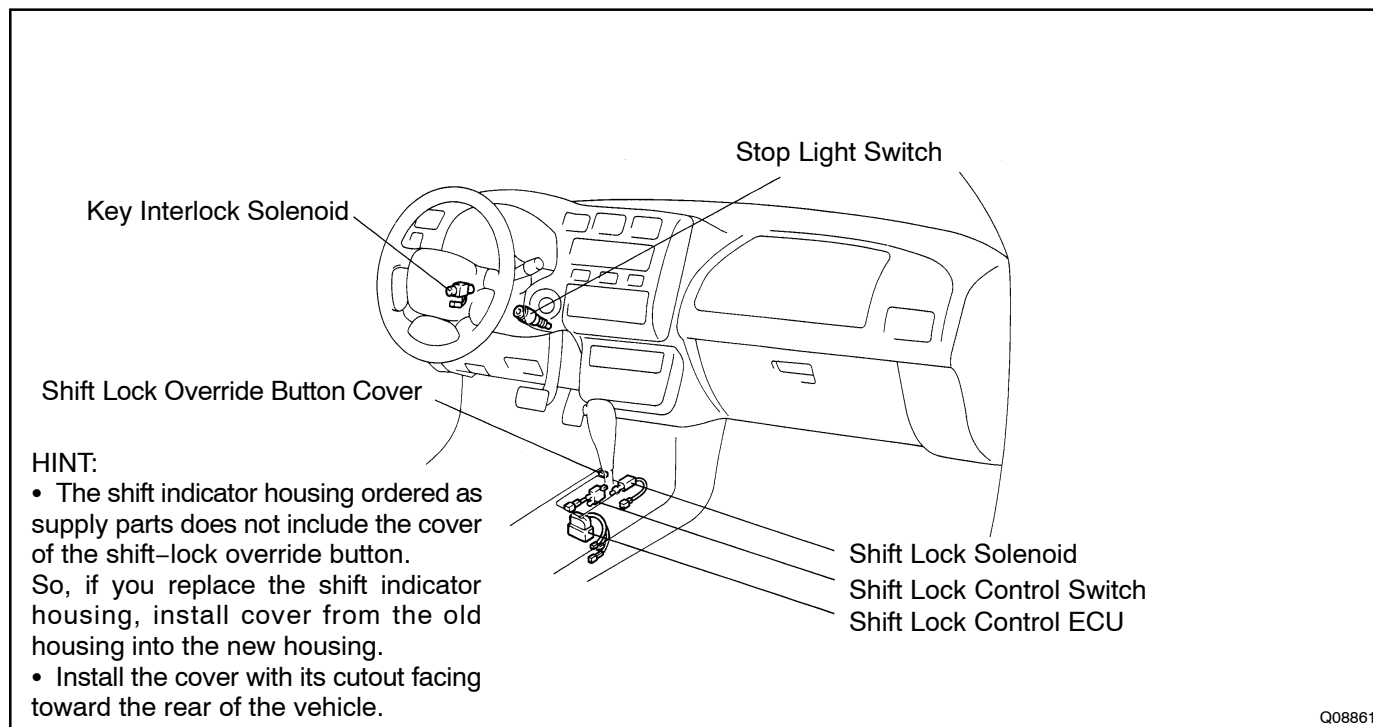
(See page [SA-31](#))

7. FILL ATF AND CHECK ATF LEVEL (See page [DI-127](#))
8. INSTALL ENGINE UNDER COVER

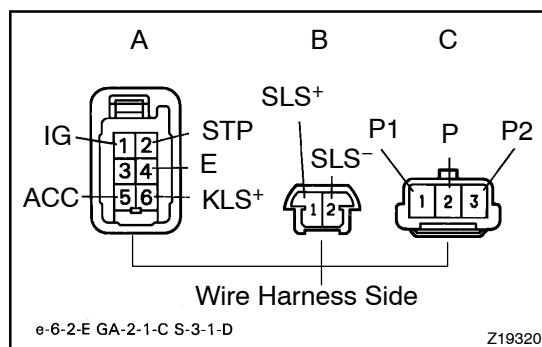


SHIFT LOCK SYSTEM LOCATION

AX04X-02



Q08861



INSPECTION

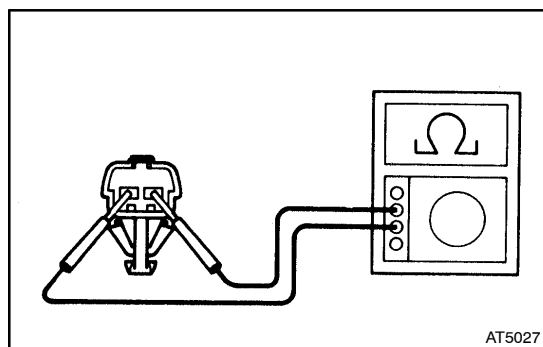
1. INSPECT SHIFT LOCK CONTROL ECU

Using a voltmeter, measure the voltage at each terminal.

HINT:

Do not disconnect the ECU connector.

Connector	Terminal	Measuring condition	Voltage (V)
A	5 – 4 (ACC – E)	Ignition switch ACC	10 – 14
	1 – 4 (IG – E)	Ignition switch ON	10 – 14
	2 – 4 (STP – E)	Depress brake pedal	10 – 14
	6 – 4 (KLS+ – E)	2. Ignition switch ACC and P position	0
		3. Ignition switch ACC and except P position	7.5 – 11
		4. (After–approx. 1 second)	5.5 – 10
B	1 – 2 (SLS+ – SLS-)	1. Ignition switch ON and P position	0
		2. Depress brake pedal	8.5 – 14
		3. Except P position	0
C	1 – 2 (P1 – P)	1. Ignition switch ON, P position and depress brake pedal	0
		2. Shift except P position under condition above	10 – 14
	3 – 2 (P2 – P)	1. Ignition switch ACC and P position	10 – 14
		2. Shift except P position under condition above	0



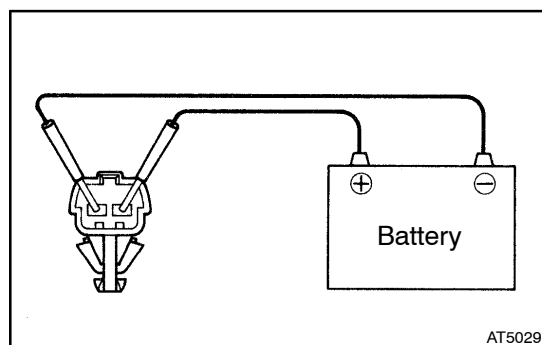
AT5027

2. INSPECT SHIFT LOCK SOLENOID

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

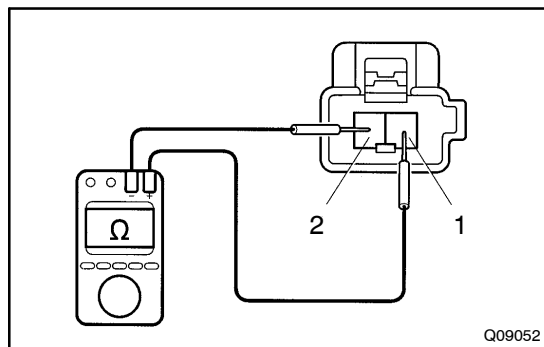
Standard resistance: 26 – 33 Ω

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



AT5029

- Apply battery positive voltage between the terminals. Check that the solenoid can be heard operating. If solenoid operation is not as specified, replace the solenoid.

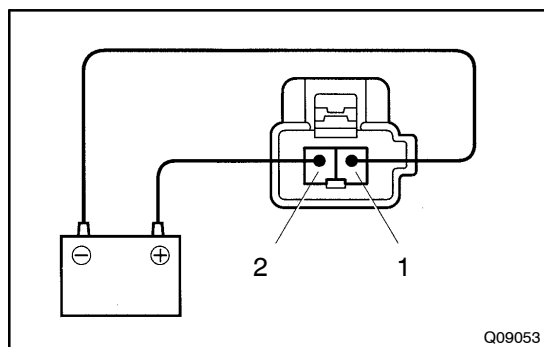


3. INSPECT KEY INTERLOCK SOLENOID

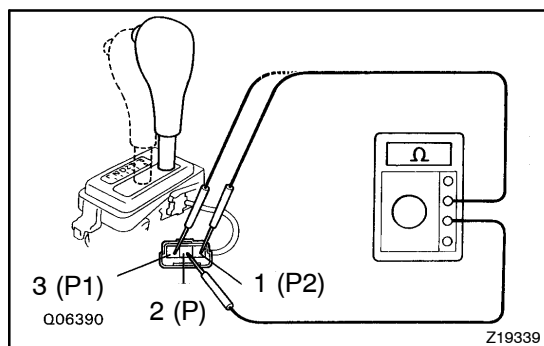
- (a) Disconnect the solenoid connector.
- (b) Using an ohmmeter, measure the resistance between the terminals.

Standard resistance: 12.5 – 16.5 Ω

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



- (c) Apply battery positive voltage between the terminals.
Check that the solenoid can be heard operating.
- If solenoid operation is not as specified, replace the solenoid.



4. INSPECT SHIFT LOCK CONTROL SWITCH

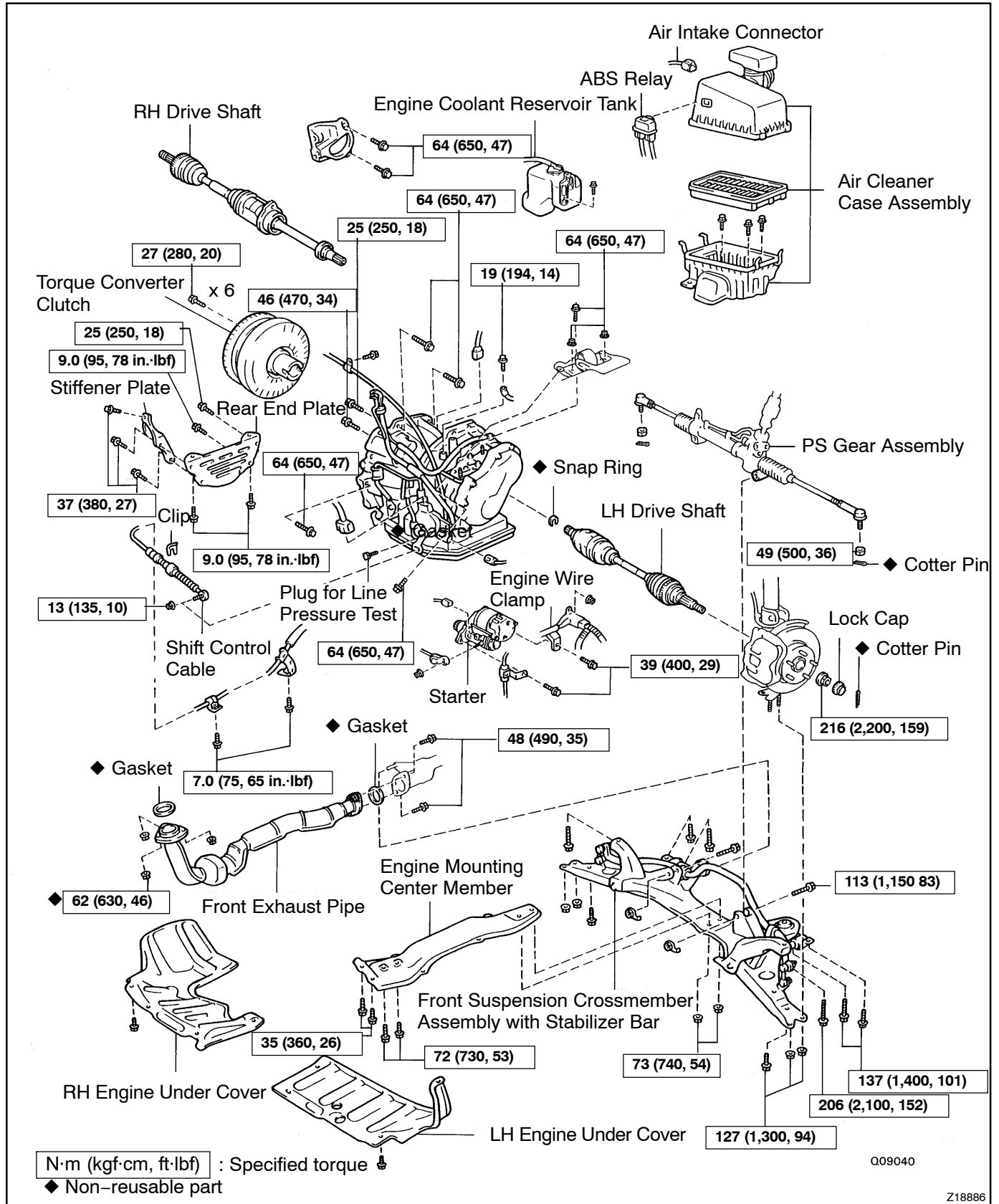
Inspect that there is continuity between each terminal.

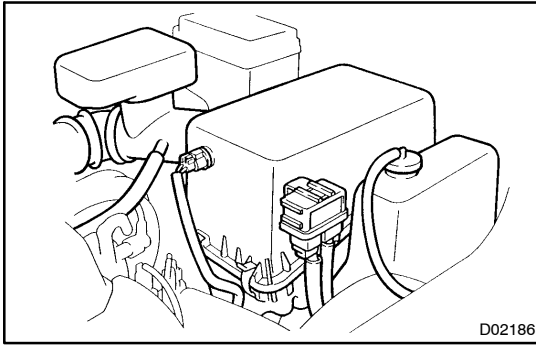
Shift position	Tester connection	Specified value
P position (Release button is not pushed)	2 – 3 (P – P1)	Continuity
P position (Release button is pushed)	2 – 3 (P – P1) 2 – 1 (P – P2)	Continuity
R, N, D, 2, L position	2 – 1 (P – P2)	Continuity

If continuity is not as specified, replace the switch.

AUTOMATIC TRANSAXLE UNIT COMPONENTS

AX07B-01



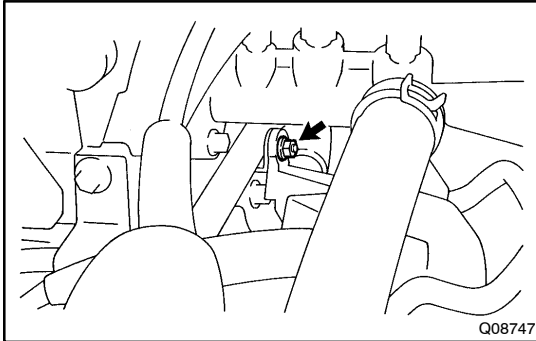


REMOVAL

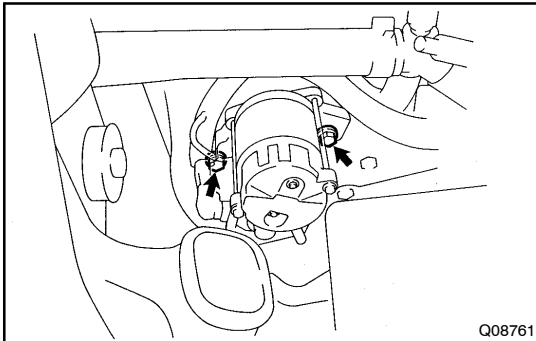
1. **DISCONNECT THROTTLE CABLE**
2. **REMOVE ENGINE COOLANT RESERVOIR TANK**
3. **REMOVE AIR CLEANER ASSEMBLY**
 - (a) Disconnect the connector and ABS relay.
 - (b) Remove the 3 bolts and air cleaner assembly.

4. **REMOVE GROUND CABLE**
Remove the bolt from the transaxle.

Torque: 19 N·m (194 kgf·cm, 14 ft·lbf)

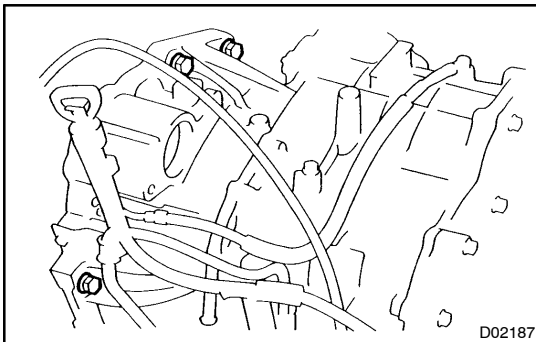


5. **REMOVE SET NUT OF ENGINE WIRE CLAMP**



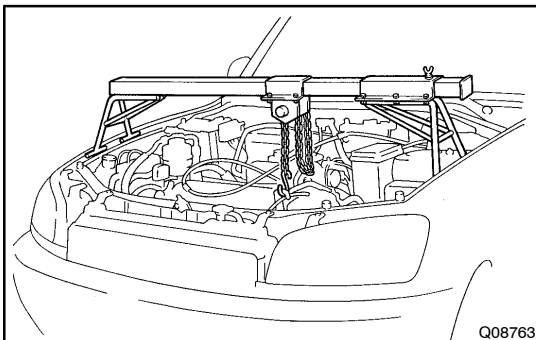
6. **REMOVE STARTER**

- (a) Disconnect the connector and nut from the starter.
- (b) Remove the 2 bolts and disconnect the engine wire.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)
- (c) Remove the starter.

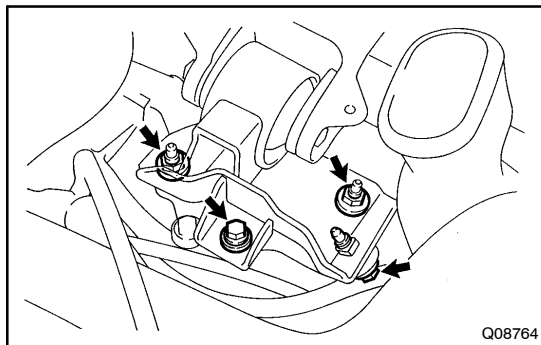


7. **REMOVE 3 UPPER SIDE TRANSAXLE MOUNTING BOLTS**

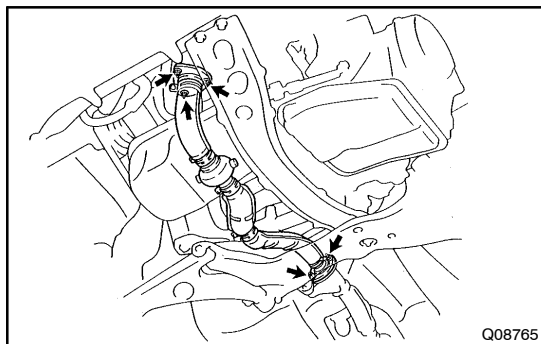
Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)



8. **INSTALL ENGINE SUPPORT FIXTURE**



9. **REMOVE ENGINE LEFT MOUNTING BOLT AND NUTS**
Torque:
Bolt: 64 N·m (650 kgf·cm, 47 ft·lbf)
Nut: 64 N·m (650 kgf·cm, 47 ft·lbf)
10. **REMOVE LEFT AND RIGHT ENGINE UNDER COVERS**
11. **DRAIN ATF**
12. **REMOVE LEFT AND RIGHT DRIVE SHAFTS**
(See page [SA-20](#))



13. **REMOVE FRONT EXHAUST PIPE**
(a) Remove the 2 bolts and gasket from the exhaust pipe.
Torque: 48 N·m (490 kgf·cm, 35 ft·lbf)

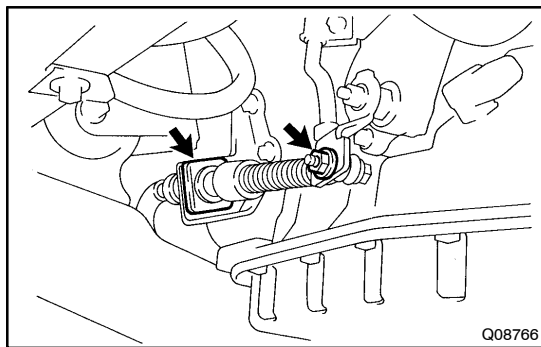
HINT:

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

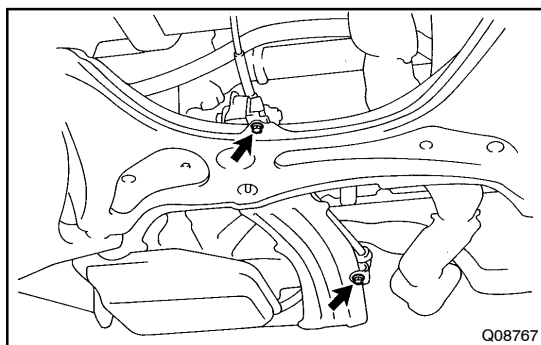
- (b) Remove the 3 nuts, front exhaust pipe and gasket.
Torque: 62 N·m (630 kgf·cm, 46 ft·lbf)

HINT:

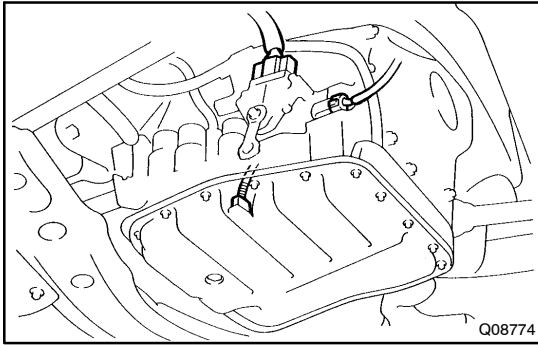
At the time of installation, please refer to the following item.
Replace used nuts and gasket with new nuts and gasket.



14. **DISCONNECT SHIFT CONTROL CABLE**
(a) Remove the nut from the control shaft lever.
Torque: 13 N·m (135 kgf·cm, 10 ft·lbf)
(b) Remove the clip and disconnect the control cable.

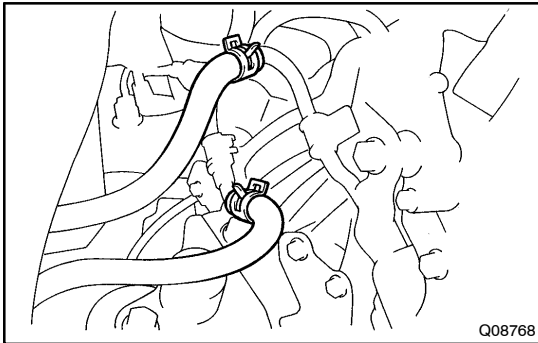


- (c) Remove the 2 shift cable mounting bolts.
Torque: 7.0 N·m (75 kgf·cm, 65 in·lbf)



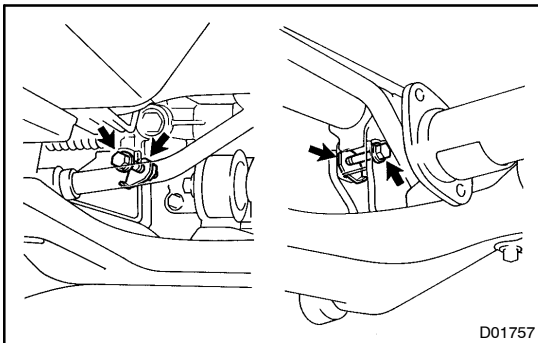
15. DISCONNECT FOLLOWING CONNECTORS

- Shift solenoid valve SL connector
- Park/neutral position switch connector
- Vehicle speed sensor connector



16. DISCONNECT 2 OIL COOLER HOSES

Loosen the 2 clips and disconnect the 2 oil cooler hoses.

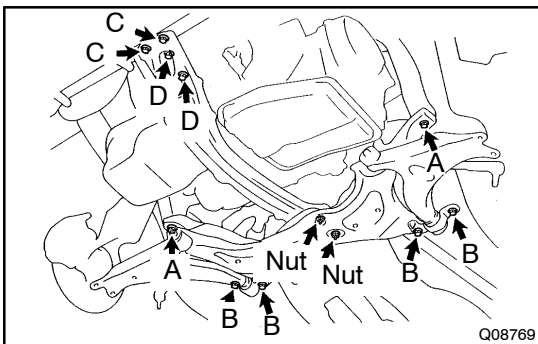


17. REMOVE 2 POWER STEERING GEAR MOUNTING BOLTS AND NUTS

Torque: 113 N·m (1,150 kgf·cm, 83 ft·lbf)

NOTICE:

Support the power steering gear housing securely.



18. REMOVE FRONT SUSPENSION CROSSMEMBER ASSEMBLY WITH STABILIZER BAR

Remove the 10 bolts, 2 nuts and front suspension crossmember assembly with stabilizer bar.

Torque:

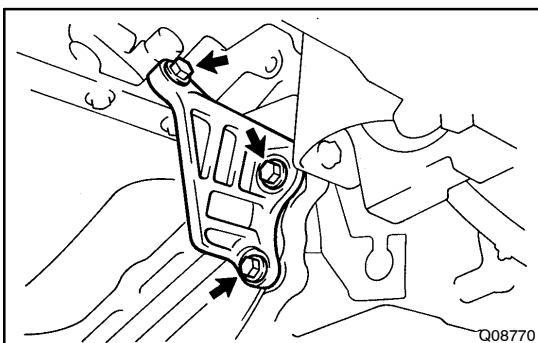
A bolt: 206 N·m (2,100 kgf·cm, 152 ft·lbf)

B bolt: 137 N·m (1,400 kgf·cm, 101 ft·lbf)

C bolt: 35 N·m (360 kgf·cm, 26 ft·lbf)

D bolt: 72 N·m (730 kgf·cm, 53 ft·lbf)

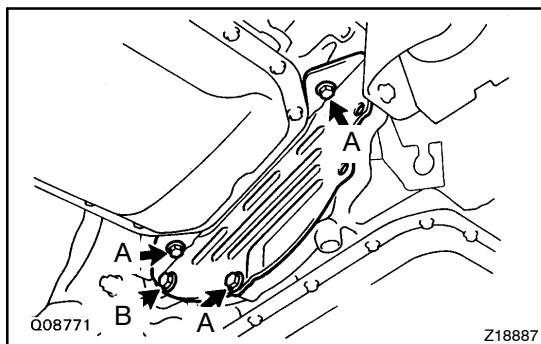
Nut: 73 N·m (740 kgf·cm, 54 ft·lbf)



19. REMOVE STIFFENER PLATE

Remove the 3 bolts and stiffener plate.

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

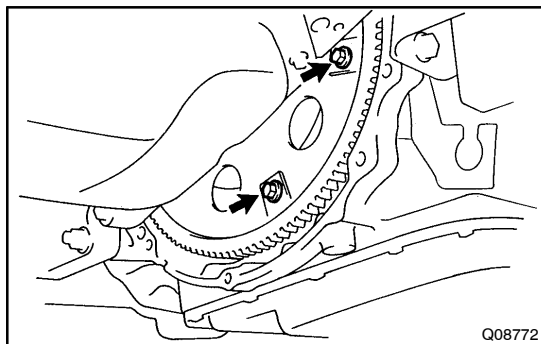
**20. REMOVE REAR END PLATE**

Remove the 4 bolts and rear end plate.

Torque:

A bolt: 9.0 N·m (95 kgf·cm, 78 in·lbf)

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

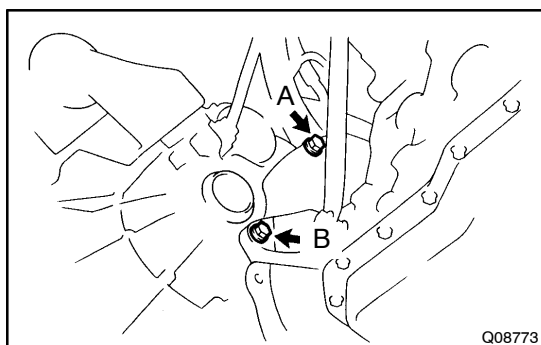
**21. REMOVE TORQUE CONVERTER CLUTCH MOUNTING BOLT**

Turn the crankshaft to gain access and remove the 6 bolts with holding the crankshaft pulley set bolt by a wrench.

Torque: 27 N·m (280 kgf·cm, 20 ft·lbf)

HINT:

At the time of installation, please refer to the following item.
First install the gray bolt. Then install 5 black bolts while turning the crankshaft to gain access.

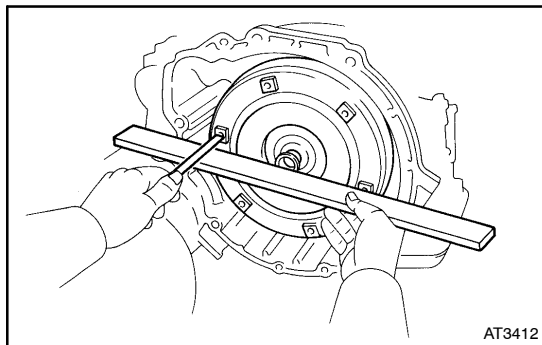
22. SUPPORT TRANSAXLE WITH A TRANSMISSION JACK**23. REMOVE TRANSAXLE**

Remove the rear side transaxle mounting 2 bolts and transaxle.

Torque:

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

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



INSTALLATION

1. INSTALL TORQUE CONVERTER CLUTCH

Using calipers and a straight edge, measure from the installed surface to front surface of the transaxle housing.

Correct distance: More than 12.75 mm (0.502 in.)

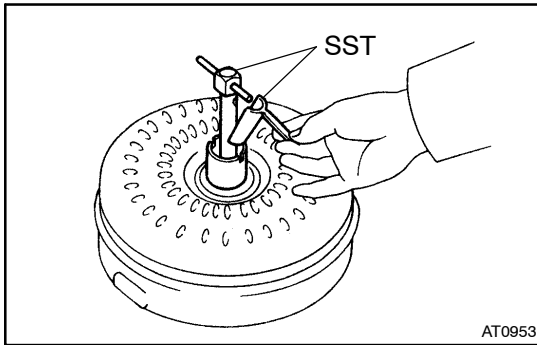
2. INSTALL TRANSAXLE

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

HINT:

After installation, check and inspect items as follows.

- Fluid level (See page [DI-127](#))
- Front wheel alignment (See page [SA-4](#))
- Road test the vehicle

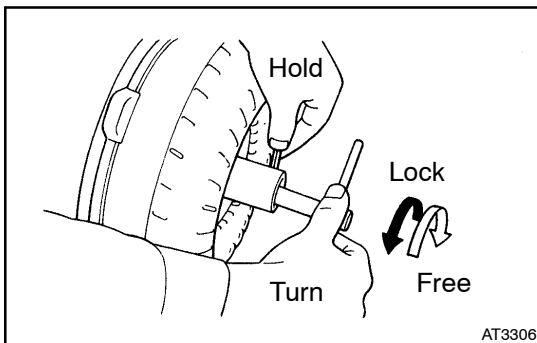


TORQUE CONVERTER CLUTCH AND DRIVE PLATE INSPECTION

AX05A-02

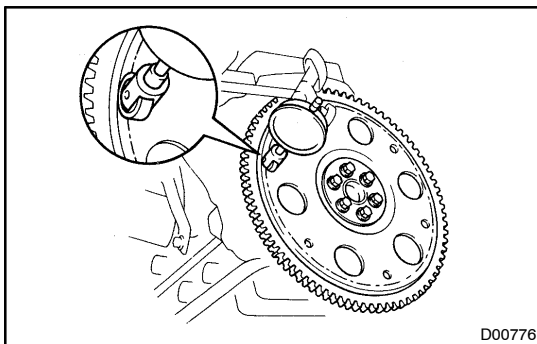
1. INSPECT ONE-WAY CLUTCH

- (a) Install SST into the inner race of the one-way clutch.
SST 09350-32014 (09351-32010)
- (b) Install SST so that it fits in the notch of the converter clutch hub and outer race of the one-way clutch.
SST 09350-32014 (09351-32020)



- (c) With the torque converter clutch standing on its side, the clutch locks when turned counterclockwise, and rotates freely and smoothly clockwise.

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



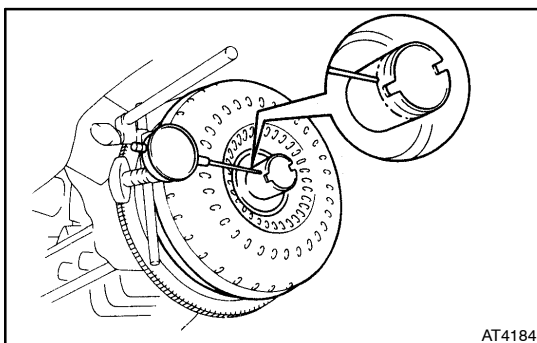
2. MEASURE DRIVE PLATE RUNOUT AND INSPECT RING GEAR

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

Maximum runout: 0.20 mm (0.0079 in.)

If the runout is not within the specification or if the ring gear is damaged, replace the drive plate. If installing a new drive plate, note the orientation of spacers and tighten the bolts.

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



3. MEASURE TORQUE CONVERTER CLUTCH SLEEVE RUNOUT

Temporarily mount the torque converter clutch to the drive plate. Set up a dial indicator, 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 clutch.

HINT:

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