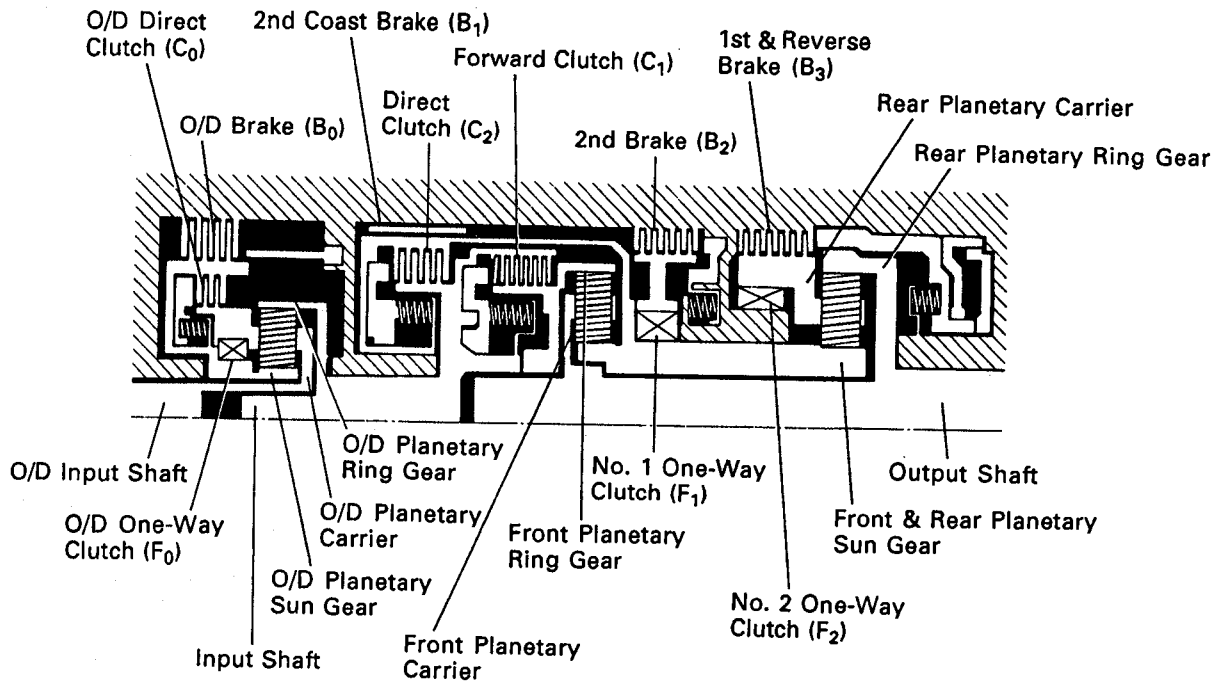


A340E, A340F AUTOMATIC TRANSMISSION

OPERATION	AT- 2
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OPERATION

AT10H-01



AT2157

○ ... Operating

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

*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.

PRECAUTION

AT02F-04

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

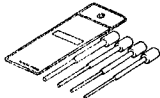
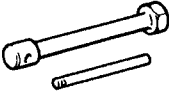
- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces.
- Thoroughly clean all components to remove all the loose material.
- Clean both sealing surfaces with a non-residue solvent.
- Apply the FIPG in an approx. 1 mm (0.04 in.) wide bead along the 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 precaution in the IN section.

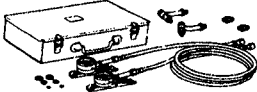
PREPARATION

AT02U-06

SST (SPECIAL SERVICE TOOLS)

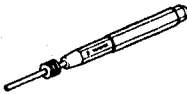
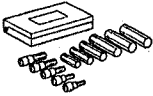
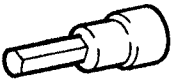
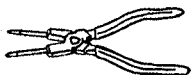
	09032-00100 Oil Pan Seal Cutter	
	09201-10000 Valve Guide Bushing Remover & Replacer Set	Speedometer driven gear oil seal
	(09201-01080) Valve Guide Bushing Remover & Replacer B	
	09308-10010 Oil Seal Puller	
	09325-40010 Transmission Oil Plug	
	09350-30020 TOYOTA Automatic Transmission Tool Set	
	(09351-32010) One-way Clutch Test Tool	
	(09351-32020) Stator Stopper	
	09843-18020 Diagnosis Check Wire	

AT

	09921-00010 Spring Tension Tool	Speedometer driven gear oil seal
	09992-00094 Automatic Transmission Oil Pressure Gauge Set	

RECOMMENDED TOOLS

AT04C-07

	09031-00030 Pin Punch .	
	09040-00010 Hexagon Wrench Set .	
	(09043-20120) Socket Hexagon Wrench 12.	
	09082-00050 TOYOTA Electrical Tester Set.	
	09905-00012 Snap Ring No.1 Expander .	
	09905-00013 Snap Ring Pliers .	

EQUIPMENT

AT02V-00

OBD II scan tool	
Ohmmeter	
Voltmeter	
Torque wrench	
Dial indicator with magnetic base	Check drive plate runout
Vernier calipers	Check torque converter clutch installation
Straight edge	Check torque converter clutch installation

LUBRICANT

Item	Capacity	Classification
Automatic transmission fluid		
A340E:		
Dry fill	7.2 liters (7.6 US qts, 6.3 Imp.qts)	
Drain and refill	1.6 liters (1.7 US qts, 1.4 Imp.qts)	ATF DEXRON® II
A340F:		
Dry fill	9.8 liters (10.5 US qts, 8.6 Imp.qts)	
Drain and refill	2.0 liters (2.1 US qts, 1.8 Imp.qts)	

SSM (SPECIAL SERVICE MATERIALS)

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

ON—VEHICLE REPAIR
VALVE BODY REMOVAL

AT

1. DRAIN ATF

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

2. REMOVE OIL PAN

REMOVAL NOTICE: Some fluid will remain in the oil pan.

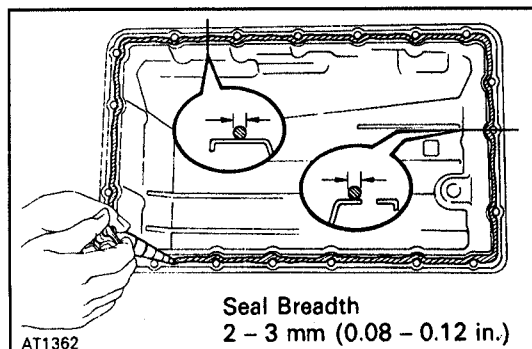
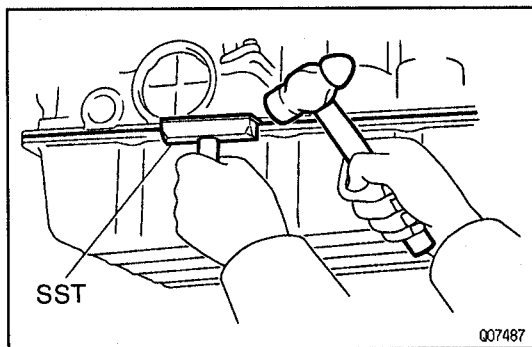
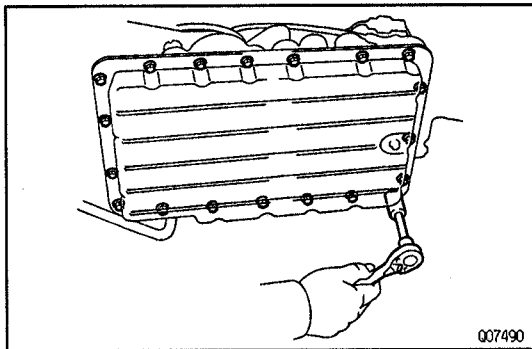
(a) Remove the 19 bolts.

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

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

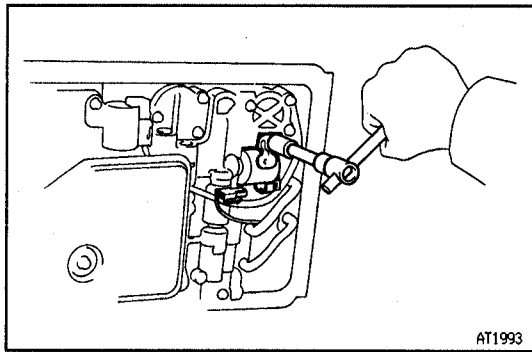
SST 09032-00100

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



INSTALLATION HINT: Apply FIPG to the oil pan, as shown in the illustration.

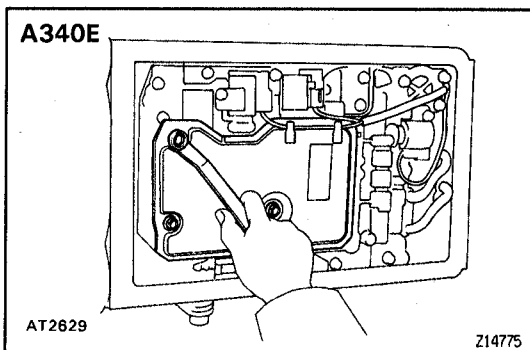
FIPG: Part No. 08826-00090, THREE BOND 1281 or equivalent



3. WHEN REPLACING 3 SHIFT SOLENOID VALVES

- Disconnect the connectors from the solenoid valves.
- Remove the 3 solenoid valve mounting bolts.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)
- Remove the 3 solenoid valves.

INSTALLATION HINT: Replace the O—rings with new ones.



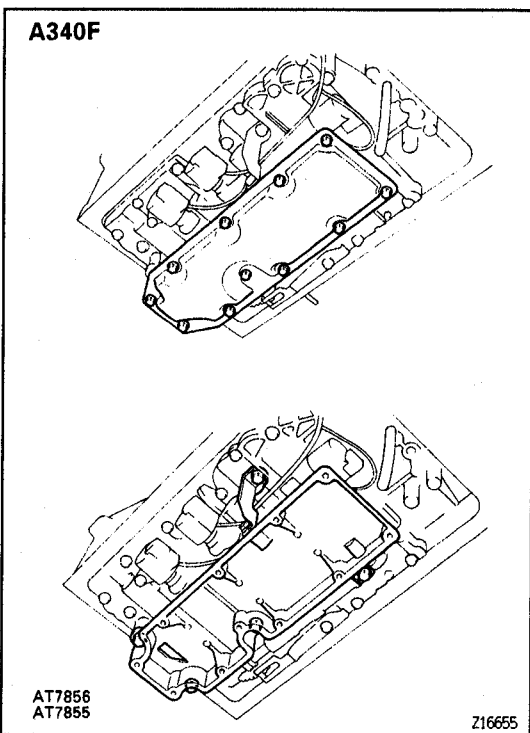
4. REMOVE OIL STRAINER

A340E:

Remove the 3 bolts, and the oil strainer and gaskets.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

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

INSTALLATION HINT: Replace the gaskets with new ones.



A340F:

- Remove the 11 bolts and oil strainer from the oil strainer case.

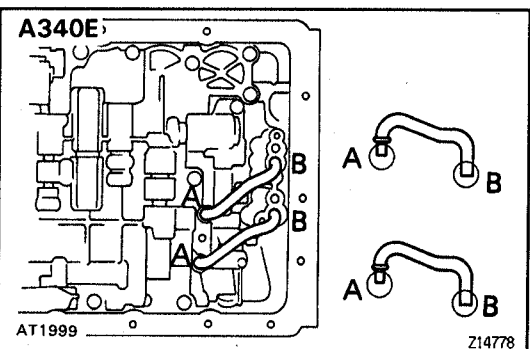
Torque: 6.9 N·m (70 kgf·cm, 61 in·lbf)

- Remove the 2 gaskets from the oil strainer.

INSTALLATION HINT: Replace the gaskets with new ones.

- Remove the 5 bolts and oil strainer case.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)



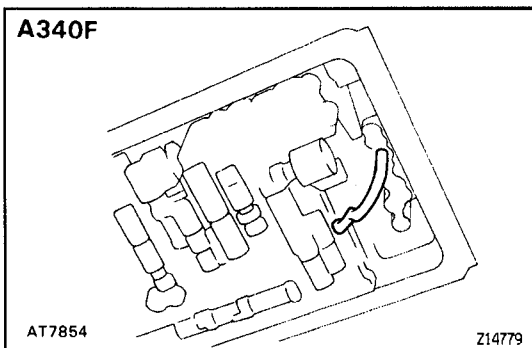
5. REMOVE OIL PIPE

A340E:

Pry up both pipe ends with a large screwdriver and remove the 2 pipes.

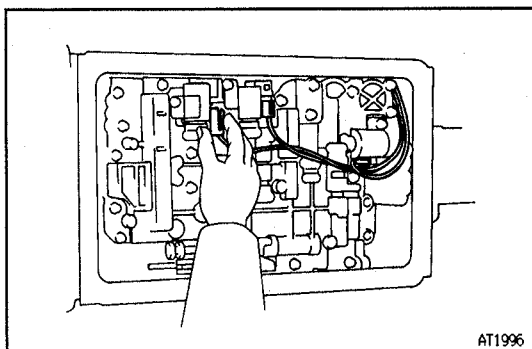
INSTALLATION NOTICE: Make sure that the oil pipes or the magnet do not interfere with the oil pan.

A340F

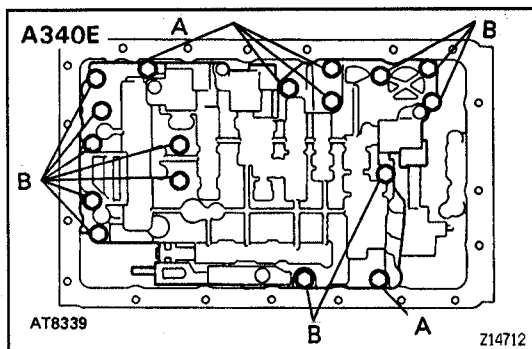
**A340F:**

Pry up both pipe ends with a large screwdriver and remove the pipe.

INSTALLATION NOTICE: Make sure that the oil pipe or the magnet do not interfere with the oil pan.



6. DISCONNECT CONNECTOR FROM EACH SOLENOID VALVE



7. REMOVE VALVE BODY

A340E:

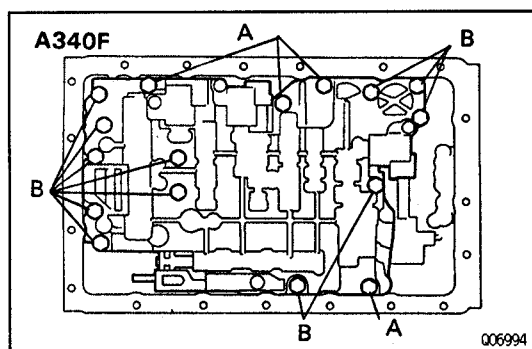
- (a) Remove the 17 bolts.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

Bolt length:

Bolt A: 23 mm (0.91 in.)

Bolt B: 32 mm (1.26 in.)

**A340F:**

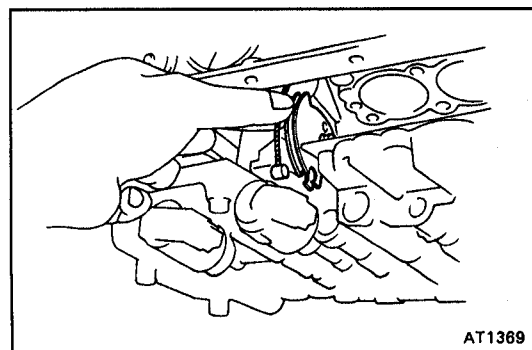
Remove the 16 bolts.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

Bolt length:

Bolt A: 23 mm (0.91 in.)

Bolt B: 32 mm (1.26 in.)



- (b) Disconnect the throttle cable from the cam.

- (c) Remove the valve body.

REMOVAL NOTICE: Be careful not to drop the check ball body and spring.

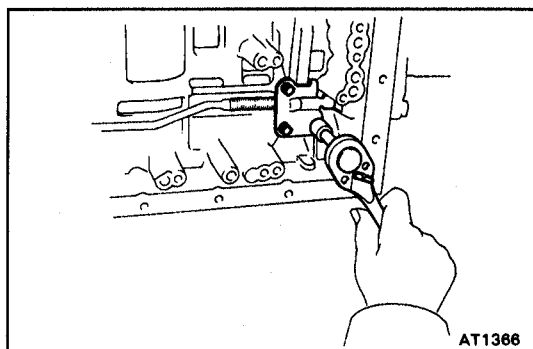
INSTALLATION HINT:

- Install the body together the check ball body and spring.
- Align the groove of the manual valve to the pin of the lever.

VALVE BODY INSTALLATION

Installation is in the reverse order of removal.

HINT: After installation, fill ATF and check fluid level.
(See page AT-42)



AT1366

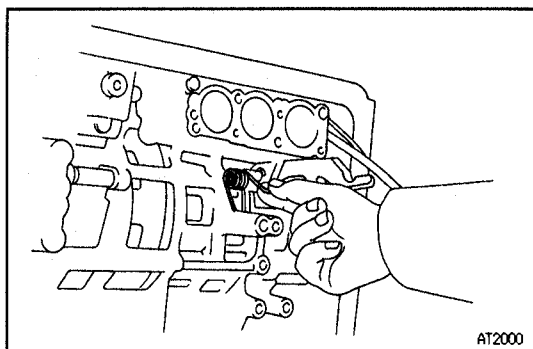
PARKING LOCK PAWL REMOVAL

1. REMOVE VALVE BODY (See page AT-5)
 2. REMOVE PARKING LOCK PAWL BRACKET
- INSTALLATION HINT:

- Push the lock rod fully forward.
- Check that the parking lock pawl operates smoothly.
- Torque the 3 bolts.

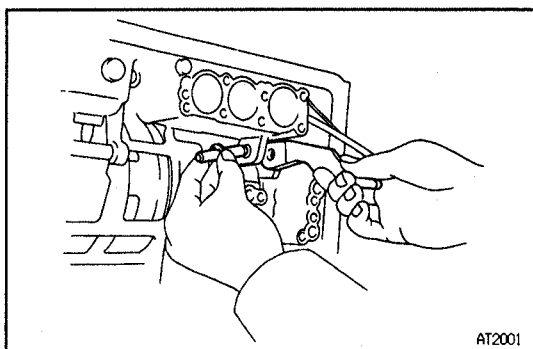
Torque: 7.4 N·m (75 kgf·cm, 65 in.-lbf)

3. REMOVE SPRING FROM PARKING LOCK PAWL SHAFT



AT2000

4. REMOVE PARKING LOCK PAWL AND SHAFT

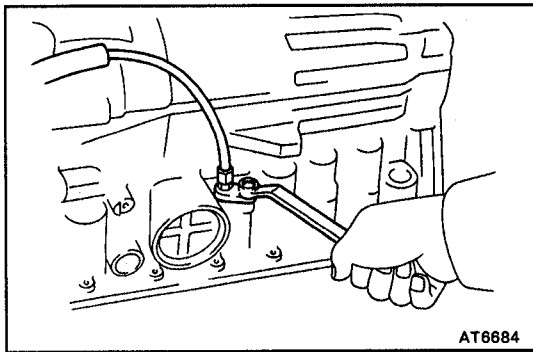


AT2001

PARKING LOCK PAWL INSTALLATION

Installation is in the reverse order of removal.

HINT: After installation, fill ATF and check fluid level.
(See page AT-42)



THROTTLE CABLE REMOVAL

1. DISCONNECT THROTTLE CABLE

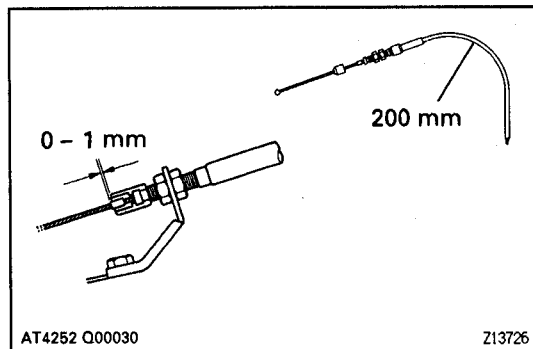
- Disconnect the cable housing from the bracket.
- Disconnect the cable from the throttle linkage.
- Remove the bolt and disconnect the cable clamp from the torque converter clutch housing.

2. DISCONNECT THROTTLE CABLE CLAMP FROM TORQUE CONVERTER CLUTCH HOUSING

3. REMOVE VALVE BODY (See page AT-5)

4. REMOVE THROTTLE CABLE

Remove the retaining bolt and pull out the throttle cable.



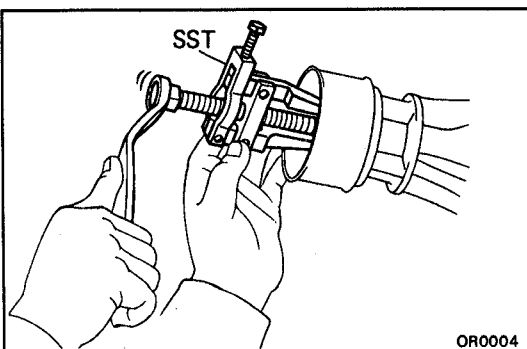
THROTTLE CABLE INSTALLATION

Installation is in the reverse order of removal.

HINT:

- After installation, fill and check the fluid level. (See page AT-42)
 - Adjust the throttle cable. (See page AT-43)
- If throttle cable is new, stake stopper on inner cable.

- Bend the cable so there is a radius of about 200 mm (7.87 in.).
- Pull in the slack of the inner cable.
- Stake the stopper with 0 - 1 mm (0 - 0.04 in.) protruding from the end of the outer cable.



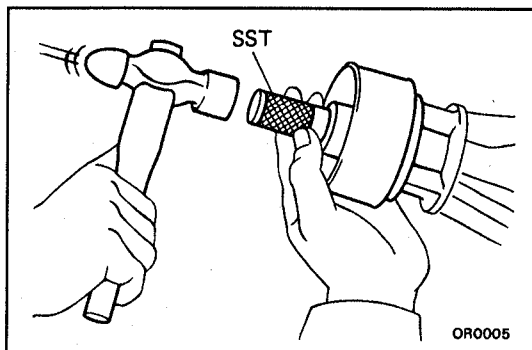
EXTENSION HOUSING (A340E) OIL SEAL REPLACEMENT

- REMOVE PROPELLER SHAFT (See page PR-6)
- REMOVE REAR OIL SEAL

NOTICE: Clean the extension housing before removing the oil seal.

Using SST, remove the oil seal.

SST 09308-10010



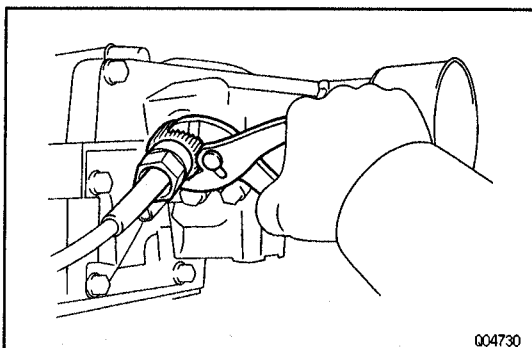
3. INSTALL NEW OIL SEAL

Coat the lip of a new oil seal with MP grease and, using SST and a hammer, carefully drive the oil seal in as far as it will go.

SST 09325-40010

4. INSTALL PROPELLER SHAFT (See page PR-14)

5. CHECK FLUID LEVEL (See page AT-42)



EXTENSION HOUSING (A340E) REMOVAL^{AT10P-01}

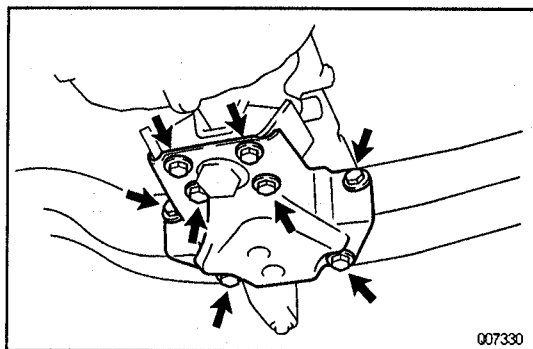
1. REMOVE PROPELLER SHAFT (See page PR-5)

2. DISCONNECT SPEEDOMETER CABLE AND REMOVE THE SPEEDOMETER DRIVEN GEAR

- Loosen the serrated collar with pliers. Do not lose the felt dust protector and washer.
- Disconnect the speedometer cable.
- Remove the bolt and locking plate. Pry out the speedometer driven gear.

3. REMOVE NO.2 VEHICLE SPEED SENSOR

AT



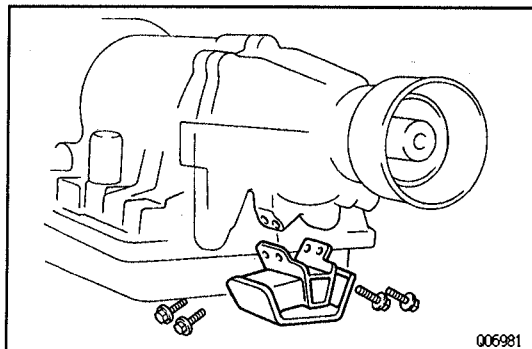
4. REMOVE REAR MOUNTING BRACKET FROM REAR SUPPORT MEMBER

Remove the 8 bolts from the rear mounting bracket.

Torque:

Rear mounting side: 18 N·m (185 kgf·cm, 13 ft·lbf)

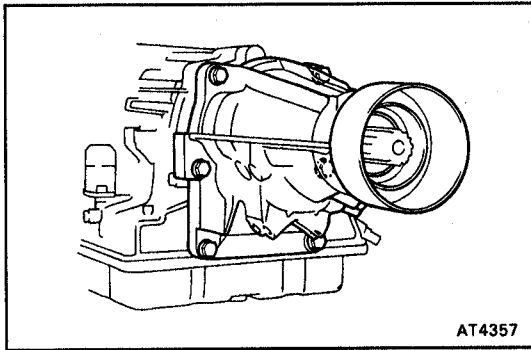
Frame side: 58 N·m (590 kgf·cm, 42 ft·lbf)



5. REMOVE REAR MOUNTING INSULATOR FROM EXTENSION HOUSING

Remove the 4 bolts and the engine rear mounting insulator from the extension housing.

Torque: 65 N·m (660 kgf·cm, 48 ft·lbf)



6. REMOVE EXTENSION HOUSING AND GASKET

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

Torque: 36 N·m (370 kgf·cm, 27 ft·lbf)

INSTALLATION HINT:

- Replace the gasket with a new one.
 - Coat the threads of the all bolts with sealant.
- Sealant: Part No. 08833—00080, THREE BOND 1344, LOCTITE 242 or equivalent**

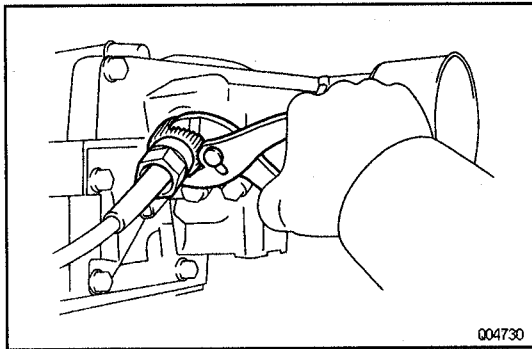
AT100—01

EXTENSION HOUSING (A340E)

INSTALLATION

Installation is in the reverse order of removal.

HINT: After installation, add and check the fluid level.
(See page AT—42)

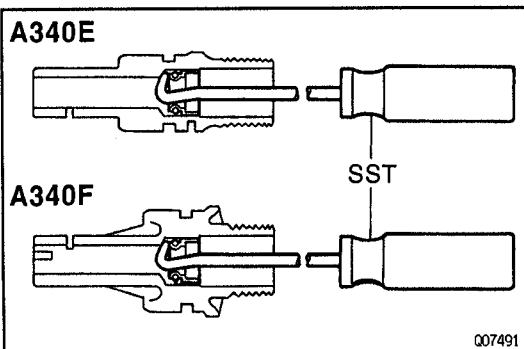
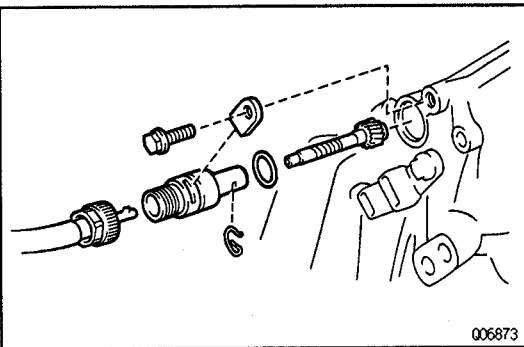


SPEEDOMETER DRIVEN GEAR REPLACEMENT

AT0XD—02

1. DISCONNECT SPEEDOMETER CABLE AND REMOVE THE SPEEDOMETER DRIVEN GEAR

- Loosen the serrated collar with pliers. Do not lose the felt dust protector and washer.
- Disconnect the speedometer cable.
- Remove the bolt and locking plate. Pry out the speedometer driven gear assembly.
- Remove the O—ring from the speedometer drive gear assembly.
- Remove the clip and speedometer driven gear from the speedometer driven gear sleeve.

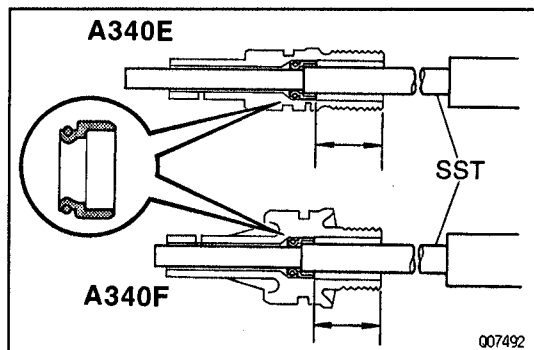


2. REMOVE SPEEDOMETER DRIVEN GEAR OIL SEAL

Using SST, remove the oil seal.

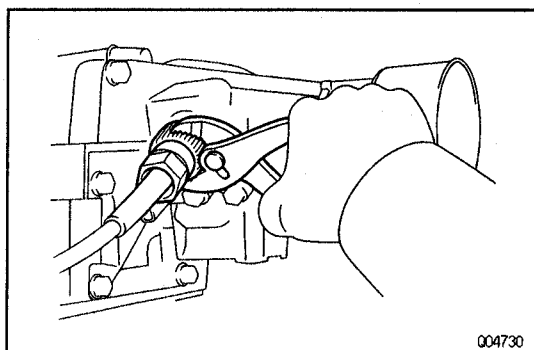
SST 09921—00010

AT



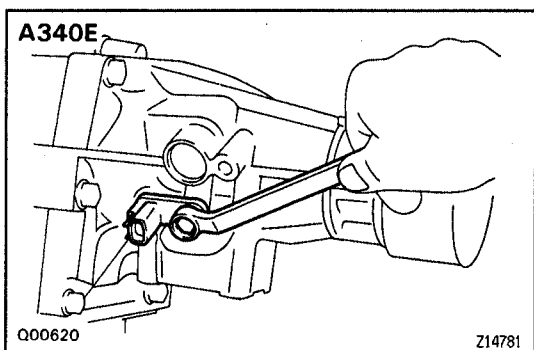
3. INSTALL SPEEDOMETER DRIVEN GEAR OIL SEAL

Using SST, install a new oil seal.
SST 09201-10000 (09201-01080)
Drive in depth: 20 mm (0.79 in.)



4. INSTALL SPEEDOMETER DRIVEN GEAR AND CONNECT SPEEDOMETER CABLE

- Install the clip and speedometer driven gear to the speedometer driven gear sleeve.
- Install a new O-ring to the speedometer driven gear assembly.
- Install the speedometer driven gear.
- Install the locking plate with the bolt.
Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)
- Connect the speedometer cable.
- Tighten the serrated collar with pliers.



NO.2 VEHICLE SPEED SENSOR REPLACEMENT

ATOUM-06

1. DISCONNECT NO.2 VEHICLE SPEED SENSOR CONNECTOR

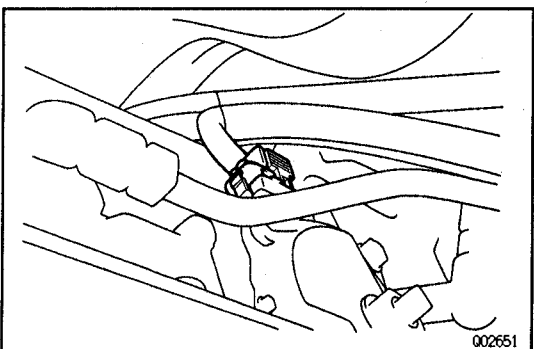
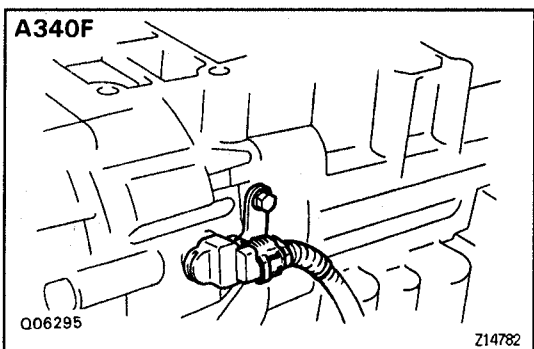
2. REMOVE NO.2 VEHICLE SPEED SENSOR

- Remove the bolt and No.2 vehicle speed sensor.
- Remove the O-ring from it.

3. INSTALL NO.2 VEHICLE SPEED SENSOR

- Cost a new O-ring with ATF and install it to the vehicle speed sensor.
- Install the speed sensor and torque the bolt.
Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)

4. CONNECT NO.2 VEHICLE SPEED SENSOR CONNECTOR



PARK/NEUTRAL POSITION SWITCH REPLACEMENT

ATOVN-06

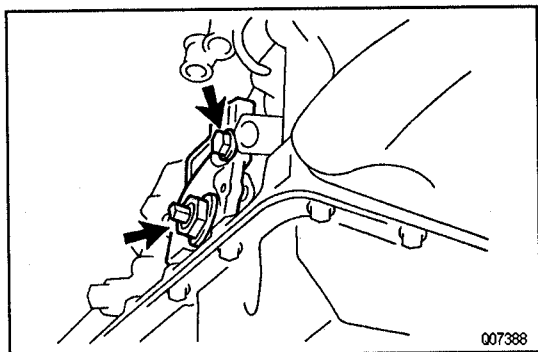
1. DISCONNECT 2 OIL COOLER PIPES

(See page AT-23)

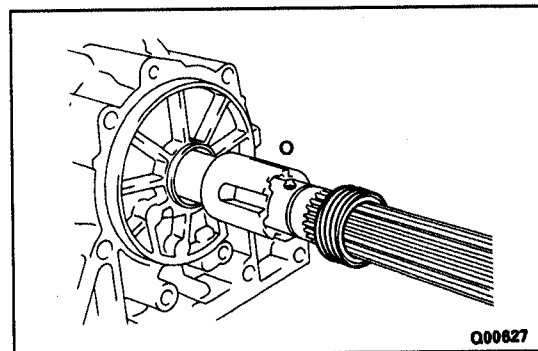
2. DISCONNECT PARK/NEUTRAL POSITION SWITCH CONNECTOR

- Pry off the lock washer and remove the nut.

- (b) Remove the bolt and pull out the park/neutral position switch.



4. INSTALL AND ADJUST PARK/NEUTRAL POSITION SWITCH (See page AT—43)
5. CONNECT PARK / NEUTRAL POSITION SWITCH CONNECTOR
6. CONNECT 2 OIL COOLER PIPES (See page AT—23)

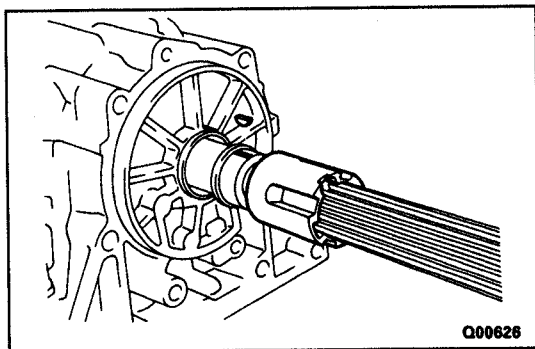


SENSOR ROTOR (A340E) REMOVAL

ATOXE-02

1. REMOVE EXTENSION HOUSING (See page AT—10)
2. REMOVE SPEEDOMETER DRIVE GEAR AND BALL
 - (a) Using snap ring pliers, remove the snap ring.
 - (b) Remove the speedometer drive gear and ball.

AT



3. REMOVE SENSOR ROTOR AND KEY
 - (a) Remove the sensor rotor and key.
 - (b) Using snap ring pliers, remove the snap ring.

SENSOR ROTOR (A340E) INSTALLATION

AT10R-01

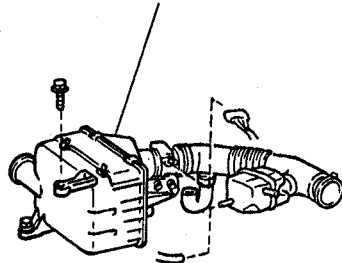
Installation is in the reverse order of removal.

INSTALLATION HINT: After installation, add and check the fluid level. (See page AT—42)

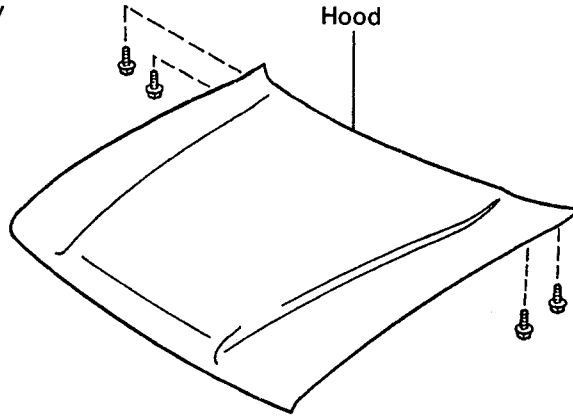
ASSEMBLY REMOVAL AND INSTALLATION (A340E) COMPONENTS

AT0XF-02

MAF Meter, Resonator and Air Cleaner Assembly



Hood



Cruise Control Actuator Cable

Heater Hose

EVAP Hose

Radiator Assembly

Radiator Cap

AT Oil Cooler Hose

Brake Booster Hose

Accelerator Cable

No. 1 Fan Pulley

No. 2 Fan Pulley

◆ O-Ring

Drain Plug

RH Clearance Light

No. 2 Fan Shroud

Fan with Fluid Coupling

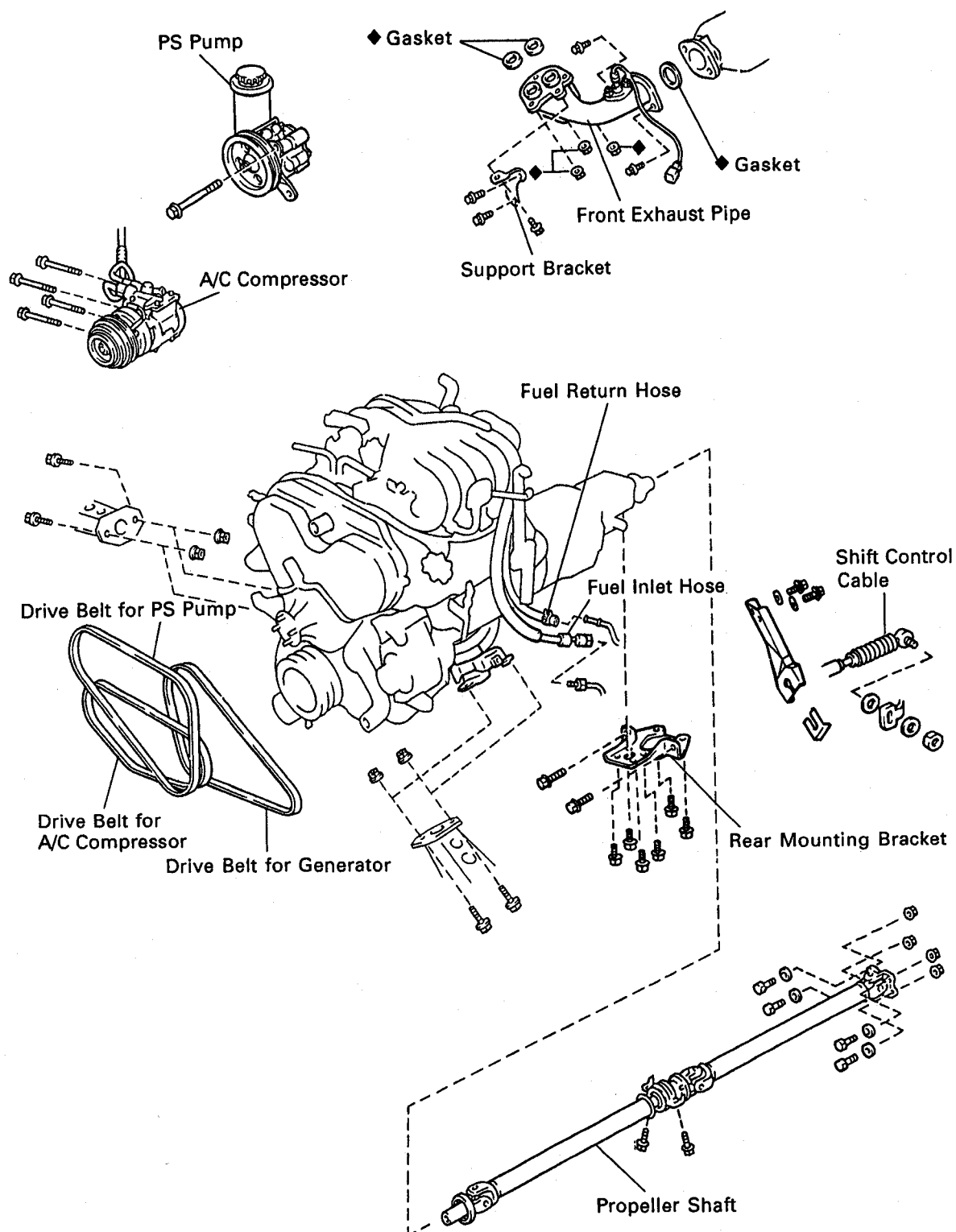
Radiator Grill

Front Bumper Filler

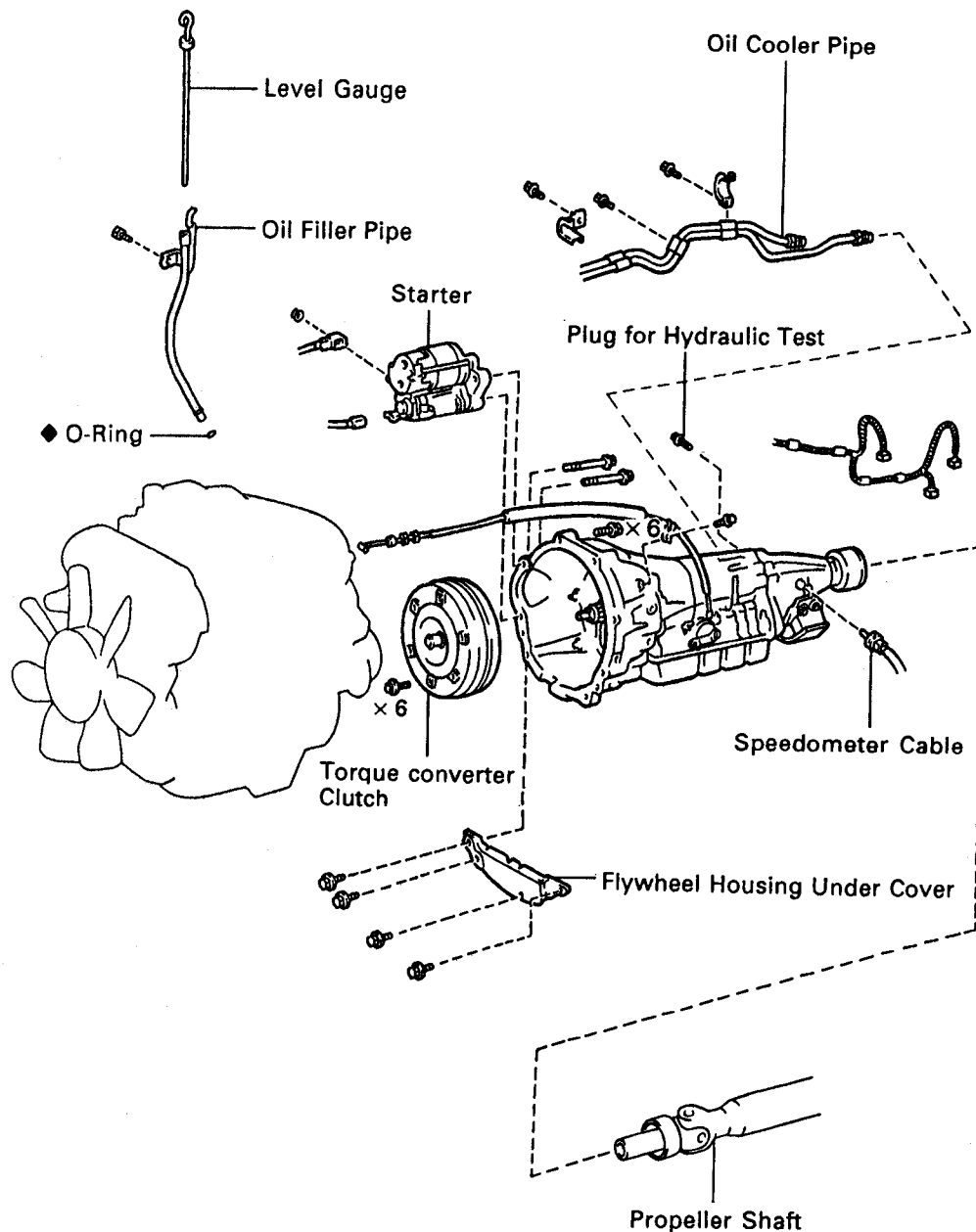
LH Clearance Light

Engine Under Cover

◆ Non-reusable part



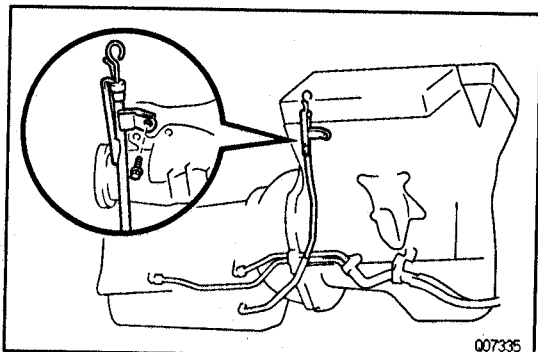
P23214



◆ Non-reusable part

006276

AT0XG-02

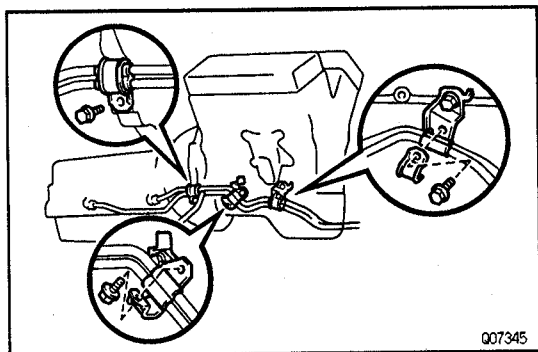


007335

TRANSMISSION REMOVAL

1. REMOVE TRANSMISSION WITH ENGINE
(See page EG-60)
2. REMOVE ATF LEVEL GAUGE
3. REMOVE OIL FILLER PIPE

Remove the bolt and oil filler pipe with the O-ring.
INSTALLATION HINT: Replace the O-ring with a new one.

**4. DISCONNECT 2 OIL COOLER PIPES**

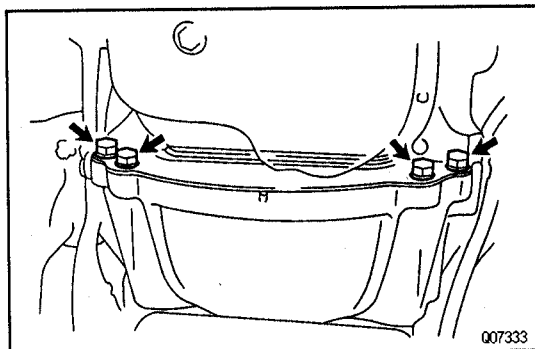
- (a) Loosen the 2 oil cooler pipe union nuts.
- (b) Remove the 3 clamp bolts, 2 clamps, and disconnect the 2 oil cooler pipes.

5. DISCONNECT FOLLOWING CONNECTOR FROM TRANSMISSION

- Park/neutral position switch
- Solenoid connector
- No.2 vehicle speed sensor

6. SEPARATE WIRE HARNESS FROM TRANSMISSION**7. REMOVE FLYWHEEL HOUSING UNDER COVER**

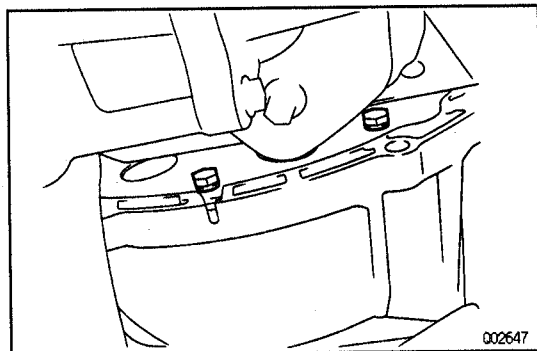
Remove the 4 bolts and flywheel housing under cover.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

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

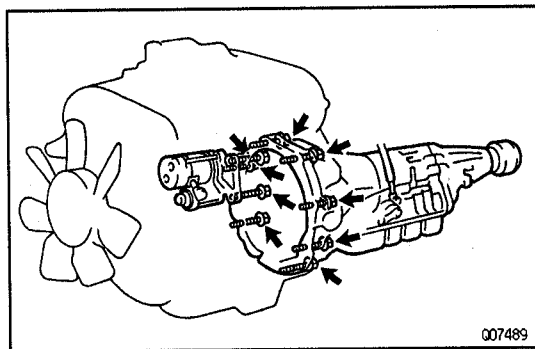
While turning the crankshaft to gain access, remove the 6 bolts.

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

INSTALLATION HINT: First install green colored bolt and then 5 other bolts.

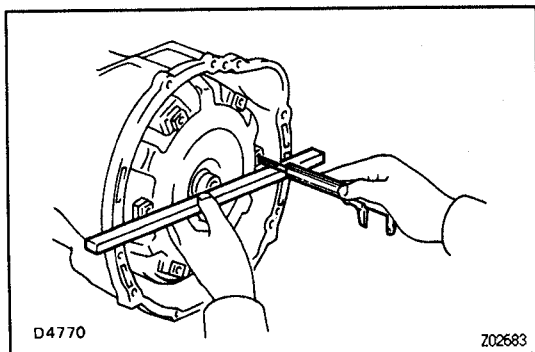
**9. REMOVE STARTER AND TRANSMISSION FROM ENGINE**

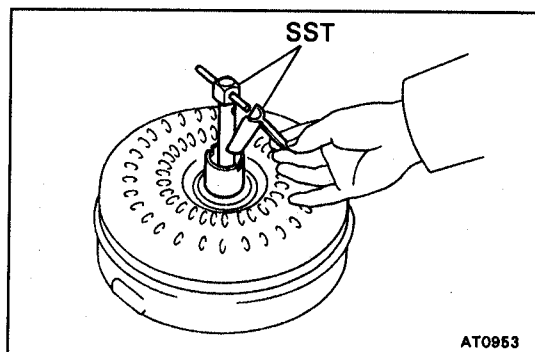
- (a) Remove the 2 starter mounting bolts and starter.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)
- (b) Remove the 6 transmission mounting bolts from the engine.
Torque: 71 N·m (730 kgf·cm, 53 ft·lbf)
- (c) Pull out the transmission to rearward.

**TORQUE CONVERTER CLUTCH
TRANSMISSION INSTALLATION****CHECK TORQUE CONVERTER CLUTCH INSTALLATION**

Using calipers and a straight edge, measure from the installed surface of the transmission housing.

Correct distance: More than 17.95 mm (0.7067 in.)

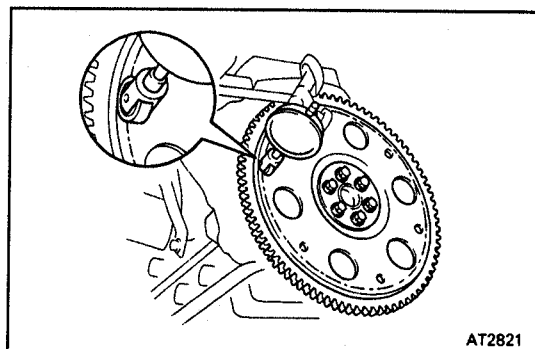
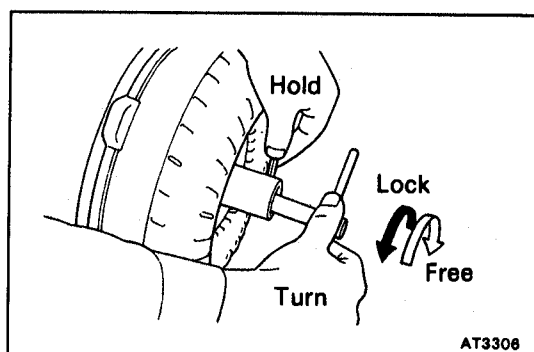




TORQUE CONVERTER CLUTCH AND DRIVE PLATE INSPECTION

1. INSPECT ONE-WAY CLUTCH

- (a) Install SST in the inner race of one-way clutch.
SST 09350-30020 (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 09350-30020 (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 and retest the clutch. Replace the converter if the clutch still fails the test.



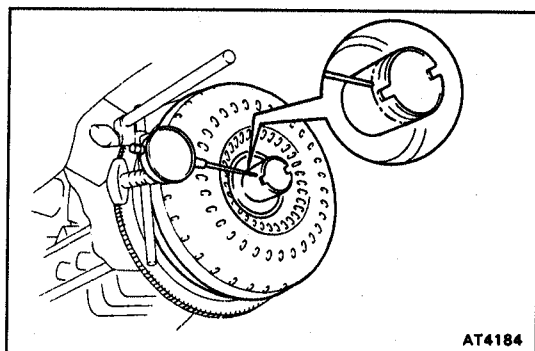
2. MEASURE DRIVE PLATE RUNOUT AND INSPECT RING GEAR

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

Maximum runout: 0.20 mm (0.0079 in.)

If runout is not within specification, 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 to the drive plate. Set up a dial indicator.

Maximum runout: 0.30 mm (0.0118 in.)

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

HINT: Mark the position of the converter clutch to ensure correct installation.

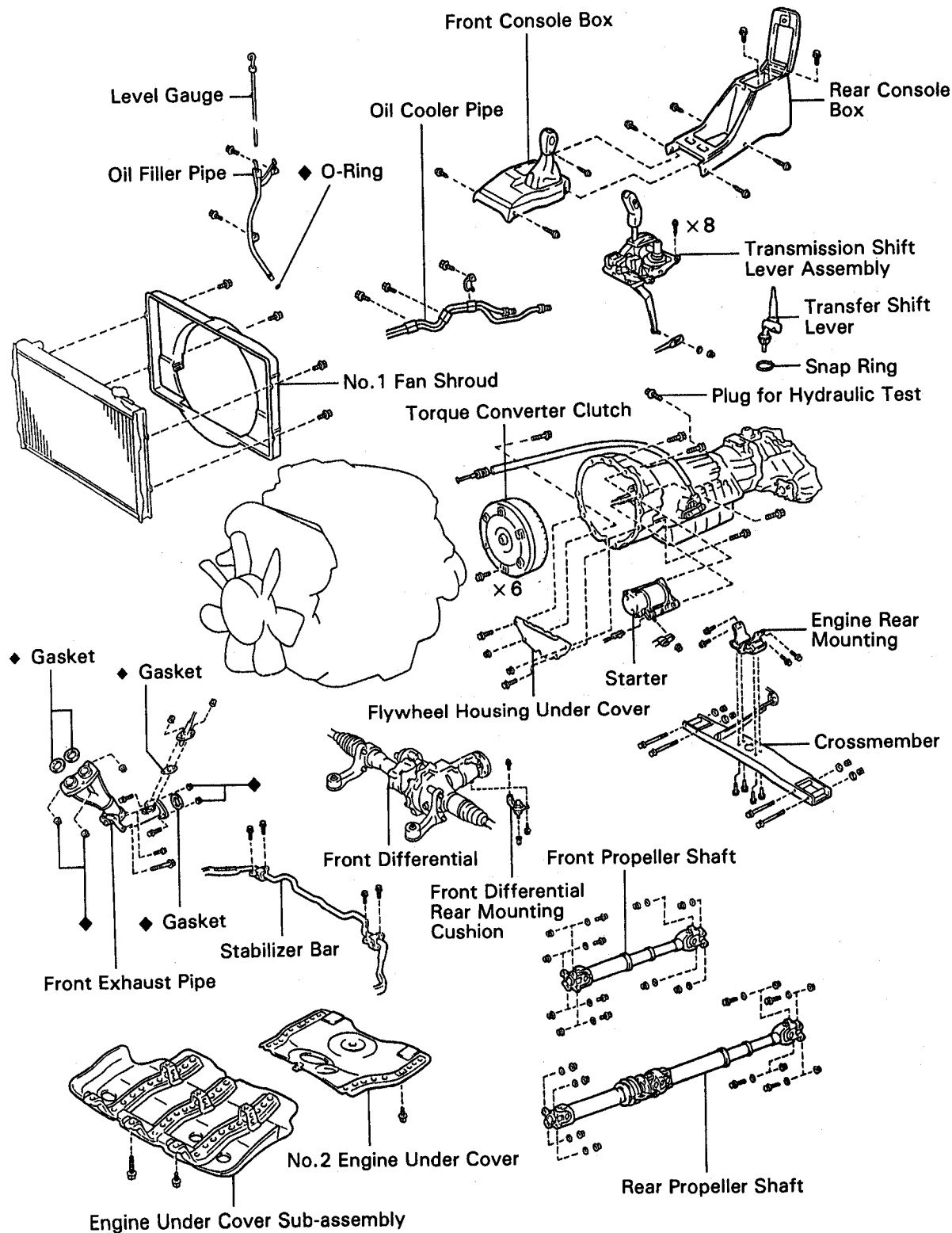
TRANSMISSION INSTALLATION

Installation is in the reverse order of removal.

ASSEMBLY REMOVAL AND INSTALLATION (A340F) COMPONENTS

AT0XH-02

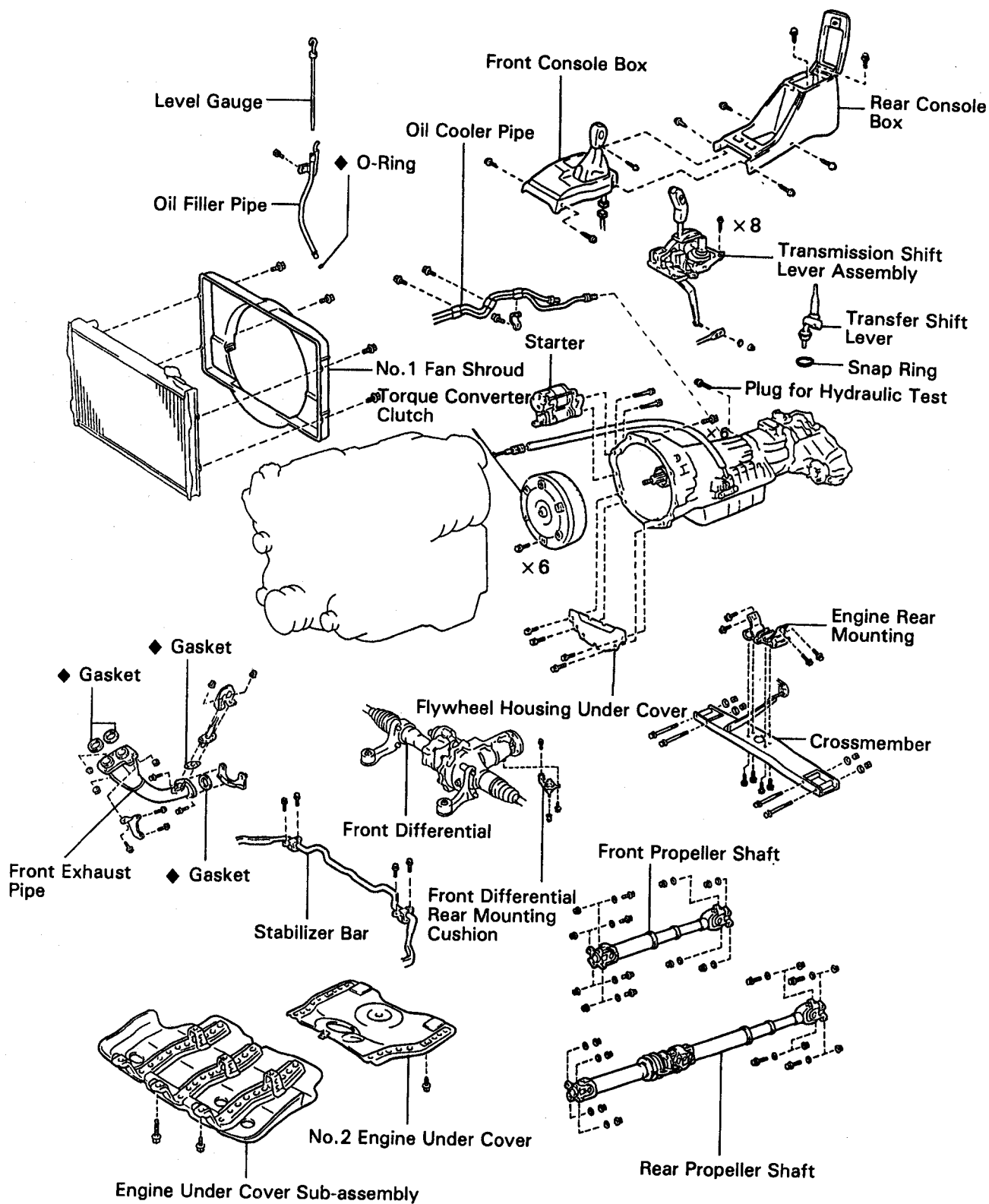
3RZ-FE



◆ Non-reusable part

008277

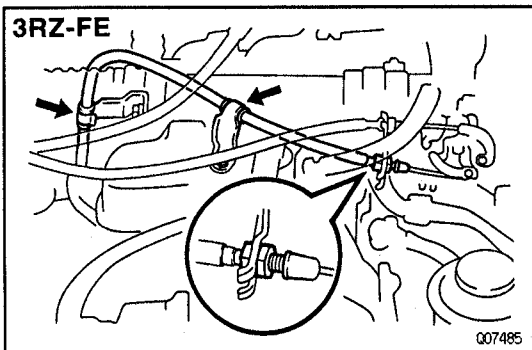
5VZ-FE



◆ Non-reusable part

TRANSMISSION REMOVAL

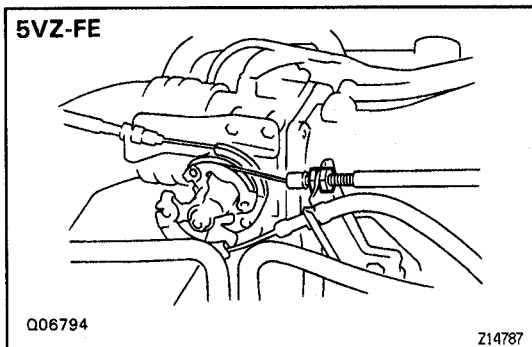
3RZ-FE



Q07485

1. REMOVE ATF LEVEL GAUGE
2. REMOVE ENGINE UNDER COVER

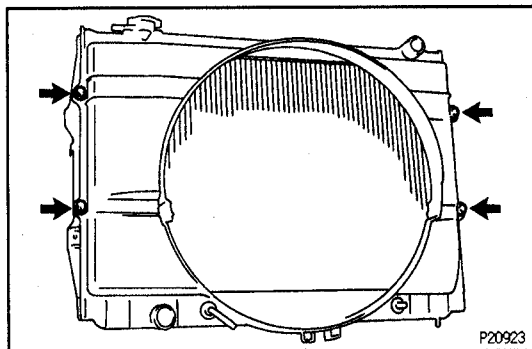
5VZ-FE



Q06794

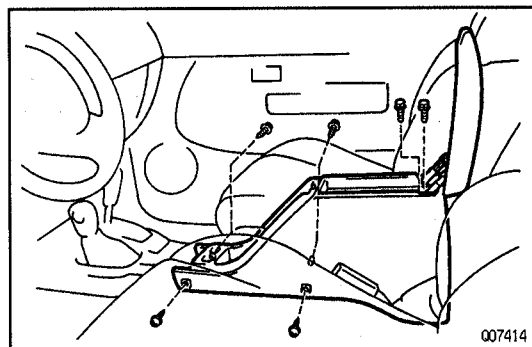
Z14787

3. DISCONNECT THROTTLE CABLE
 - (a) Loosen the nut and disconnect the cable.
 - (b) Separate the throttle cable from the clamp.



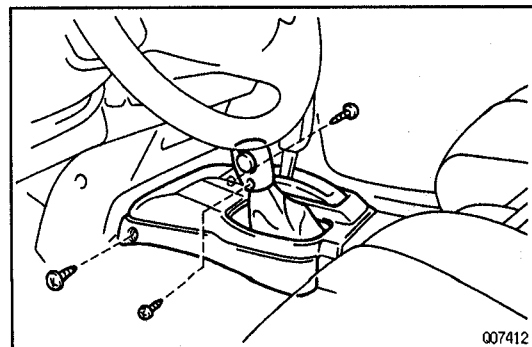
P20923

4. REMOVE NO.1 FAN SHROUD
Remove the 4 bolts and No.1 fan shroud.



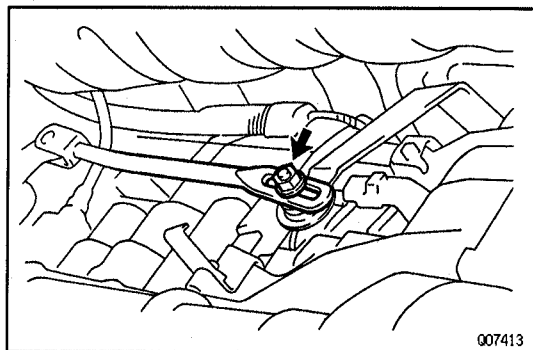
Q07414

5. REMOVE TRANSMISSION SHIFT LEVER ASSEMBLY AND TRANSFER SHIFT LEVER
 - (a) Remove the 2 bolts, 4 screws and rear console box.

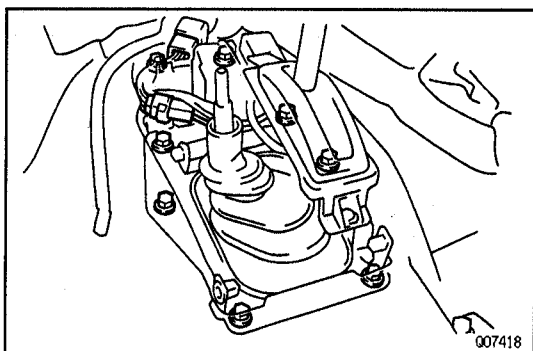


Q07412

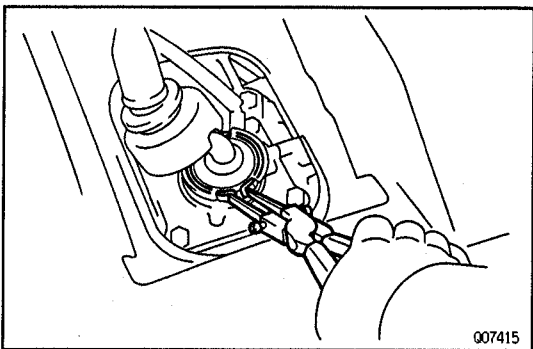
- (b) Remove the 3 screws and front console box with the transfer shift lever knob.
 - (c) Disconnect the connectors.



- (d) Remove the nut and washer, and disconnect the shift control rod.



- (e) Disconnect the 1 connector and remove the 8 screws and transmission shift lever assembly.



- (f) Using snap ring pliers, remove the snap ring and pull out the shift lever from the transfer.
INSTALLATION HINT: Apply MP grease to the transfer shift lever.

6. REMOVE OIL FILLER PIPE

3RZ—FE:

Remove the 2 bolts and oil filler pipe with the O—ring.
INSTALLATION HINT: Replace the O—ring with a new one.

5VZ—FE:

Remove the bolt and oil filler pipe with the O—ring.
INSTALLATION HINT: Replace the O—ring with a new one.

7. REMOVE FRONT AND REAR PROPELLER SHAFT (See page PR—14)

8. REMOVE EXHAUST PIPE

(3RZ—FE: See page EG—102)

(5VZ—FE: See page EG—98)

INSTALLATION HINT: Replace the gasket and nut with new gaskets and nuts.

9. DISCONNECT SPEEDOMETER CABLE

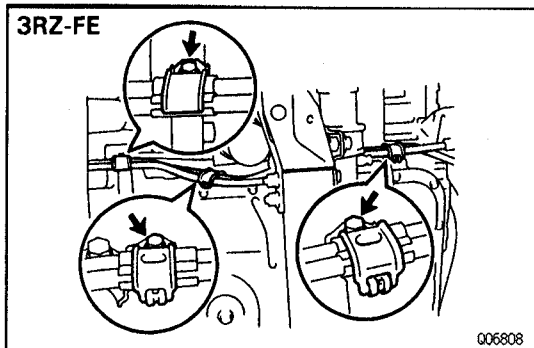
10. DISCONNECT NO.2 VEHICLE SPEED SENSOR CONNECTOR

11. DISCONNECT SOLENOID CONNECTOR

12. DISCONNECT TRANSFER NEUTRAL POSITION SWITCH CONNECTOR

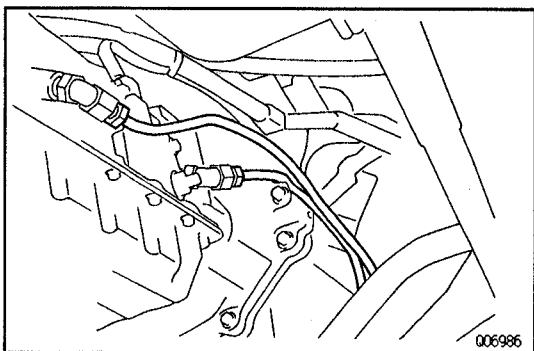
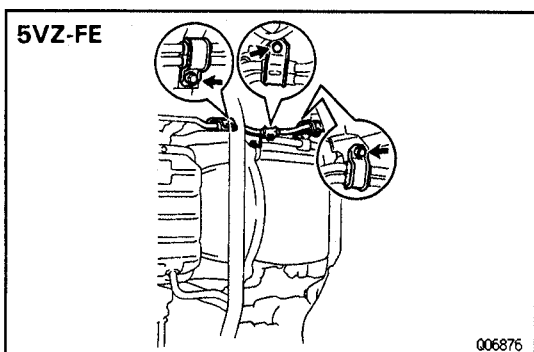
13. DISCONNECT TRANSFER L 4 POSITION SWITCH CONNECTOR

14. DISCONNECT TRANSFER INDICATOR SWITCH



15. DISCONNECT OIL COOLER PIPE

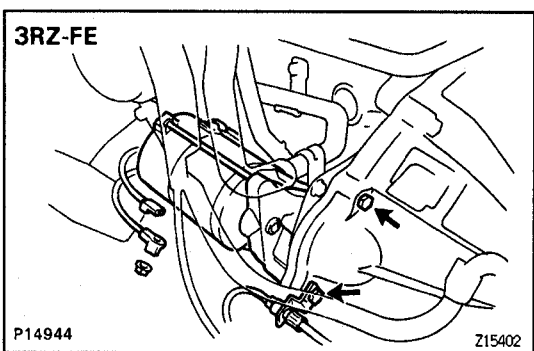
- (a) Remove the 3 bolts and clamps.



- (b) Loosen the 2 union nuts and disconnect the 2 oil cooler pipes.

16. DISCONNECT ATF TEMPERATURE SENSOR CONNECTOR

17. DISCONNECT PARK/NEUTRAL POSITION SWITCH CONNECTOR



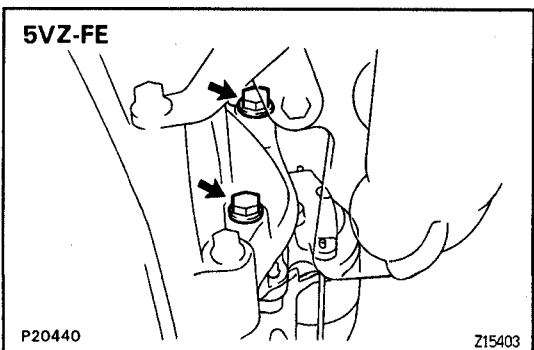
18. REMOVE STARTER

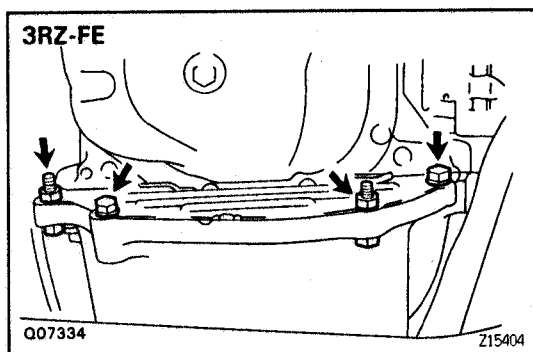
- (a) Remove the nut and disconnect the connector and terminal.

- (b) Remove the 2 bolts and starter.

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

19. REMOVE 4 STABILIZER BAR BRACKET MOUNTING BOLTS (See page SA-87)





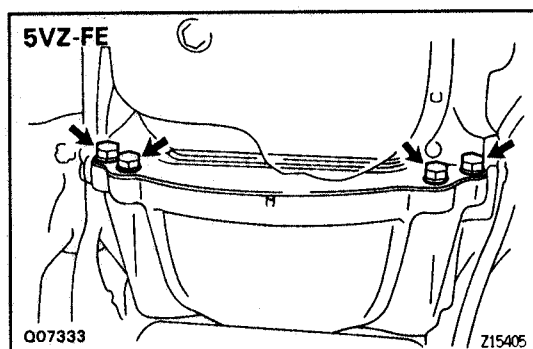
20. REMOVE TORQUE CONVERTER CLUTCH MOUNTING BOLT

(a) 3RZ—FE:

Remove the 2 nuts and bolts.

Remove the 2 bolts and flywheel housing under cover.

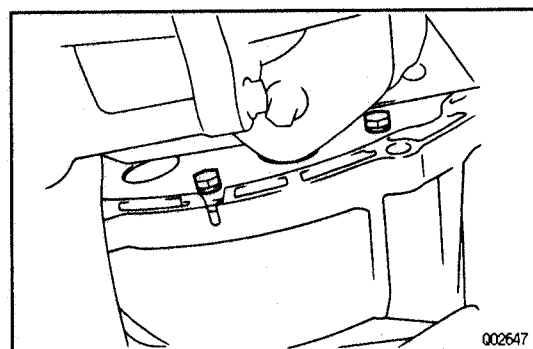
Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)



5VZ—FE:

Remove the 4 bolts and flywheel housing under cover.

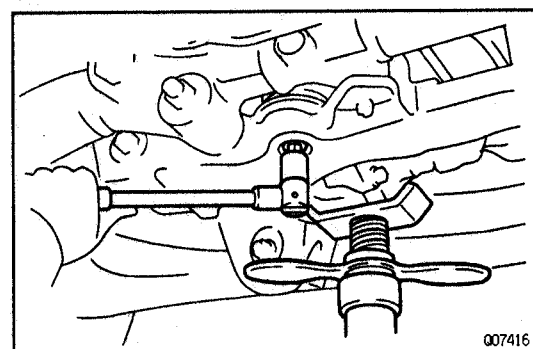
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)



(b) While turning the crankshaft to gain access, remove the 6 bolts.

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

INSTALLATION HINT: First install green colored bolt and then 5 other bolts.



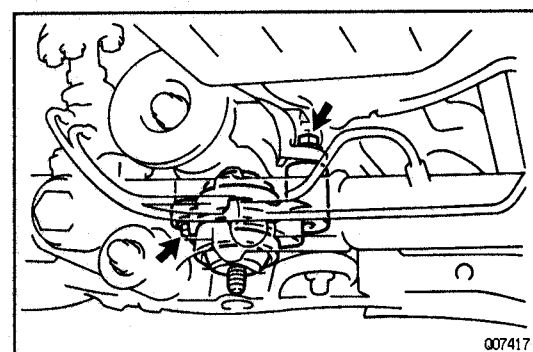
21. REMOVE FRONT DIFFERENTIAL REAR MOUNTING CUSHION

(a) Using a hexagon wrench (12 mm), remove the nut.

Torque: 87 N·m (890 kgf·cm, 64 ft·lbf)

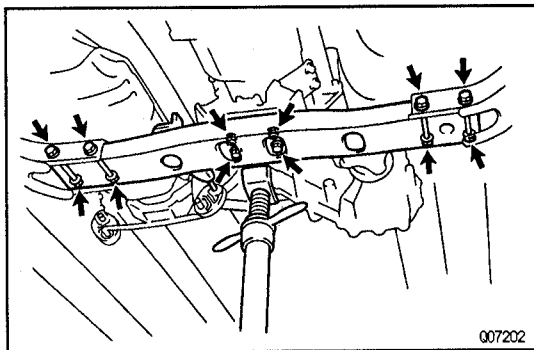
(b) Lift up the front differential.

NOTICE: Be careful not to touch the torque converter clutch housing and front differential companion flange.



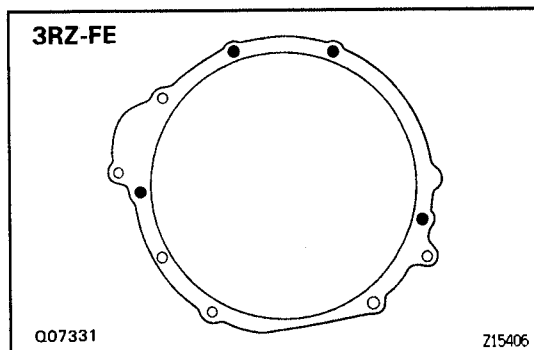
(c) Remove the 2 rear mounting cushion mounting bolts.

Torque: 108 N·m (1,100 kgf·cm, 80 ft·lbf)



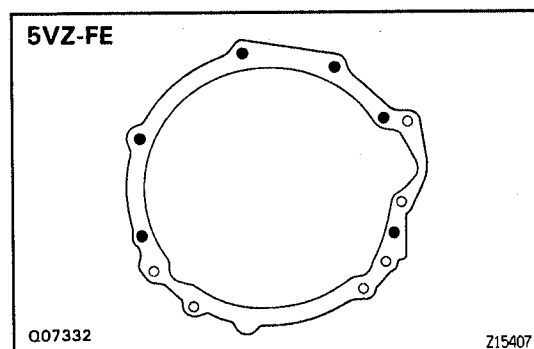
22. REMOVE CROSSMEMBER

- (a) Support the transmission rear side.
- (b) Remove the 4 engine rear mounting bolts.
Torque: 19 N·m (190 kgf·cm, 14 ft·lbf)
- (c) Remove the 4 nuts, bolts and crossmember.
Torque: 65 N·m (660 kgf·cm, 48 ft·lbf)
- (d) Support the transmission with a jack.



23. REMOVE TRANSMISSION

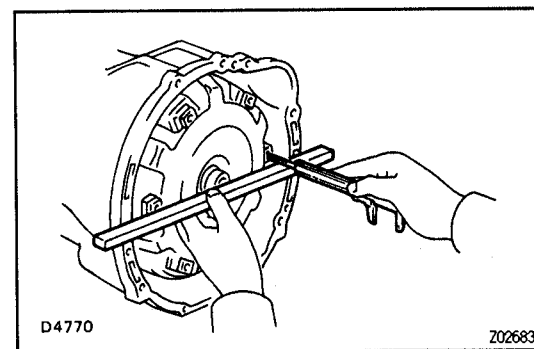
- (a) Lower the transmission rear side.
- (b) Separate the wire harness from the transmission.
- (c) 3RZ—FE:
Remove the 4 bolts and transmission.
Torque: 71 N·m (730 kgf·cm, 53 ft·lbf)



5VZ—FE:

Remove the 6 bolts and transmission.

Torque: 71 N·m (730 kgf·cm, 53 ft·lbf)



TOQUE CONVERTER CLUTCH TRANSMISSION INSTALLATION

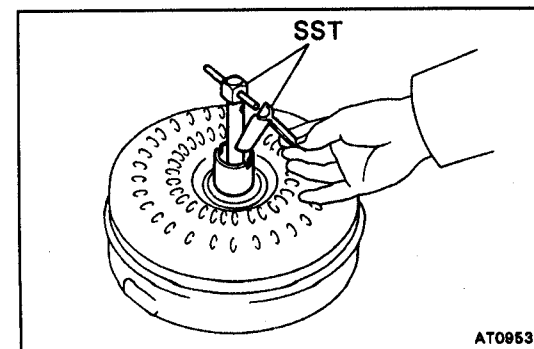
AT0VQ-06

Using calipers and a straight edge, measure from the installed surface of the transmission housing.

Correct distance:

3RZ—FE: More than 31.75 mm (1.2500 in.)

5VZ—FE: More than 17.95 mm (0.7067 in.)

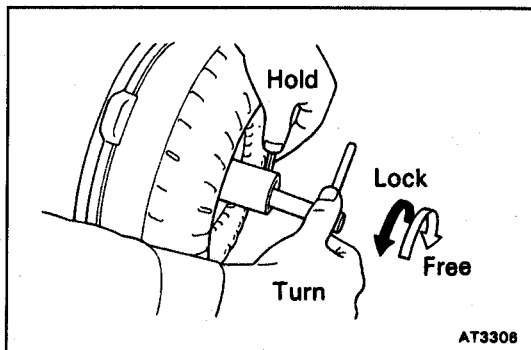


TORQUE CONVERTER CLUTCH AND DRIVE PLATE INSPECTION

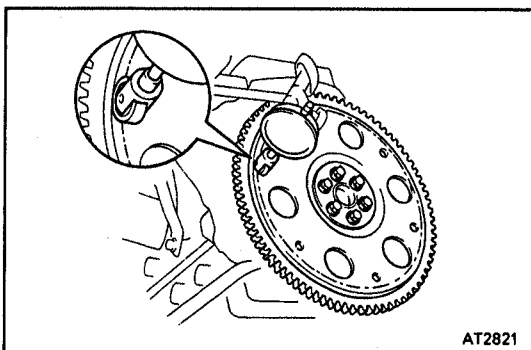
AT0VR-06

1. INSPECT ONE—WAY CLUTCH

- (a) Install SST in the inner race of one—way clutch.
SST 09350—30020 (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—30020 (09351—32010)



- (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 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.

Maximum runout: 0.20 mm (0.0079 in.)

If runout is not within specification, replace the drive plate.

Torque:

3RZ—FE: 74 N·m (750 kgf·cm, 54 ft·lbf)

5VZ—FE: 83 N·m (850 kgf·cm, 61 ft·lbf)

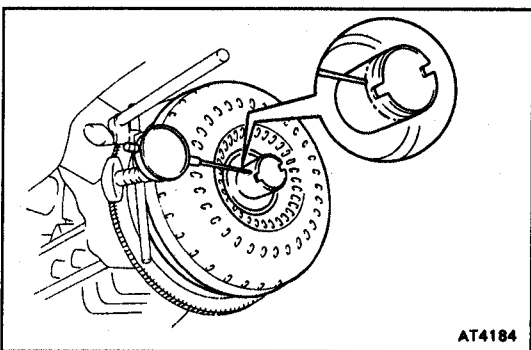
3. MEASURE TORQUE CONVERTER CLUTCH SLEEVE RUNOUT

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

Maximum runout: 0.30 mm (0.0118 in.)

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

HINT: Mark the position of the converter clutch to ensure correct installation.



TRANSMISSION INSTALLATION

AT10U-01

Installation is in the reverse order of removal.

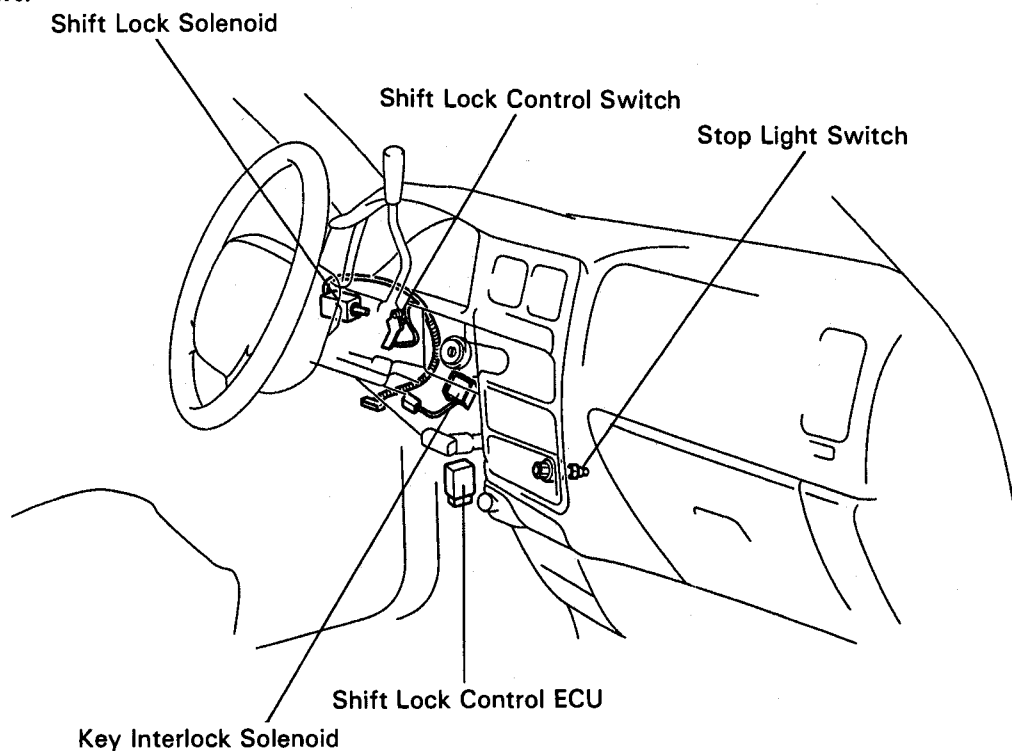
HINT:

- After installation, adjust the shift lever position and throttle cable. (See page AT-43)
- Fill and check fluid level. (See page AT-42)

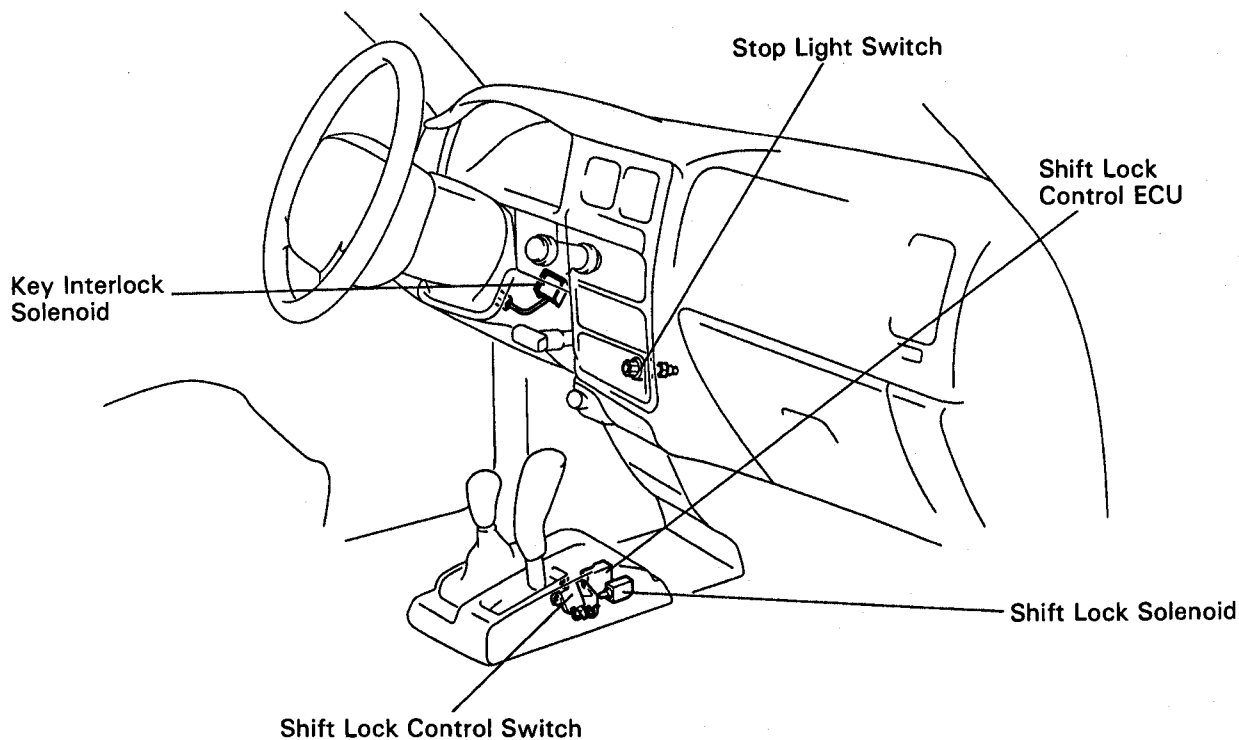
SHIFT LOCK SYSTEM COMPONENT PARTS LOCATION

ATOPO-06

Column Shift:

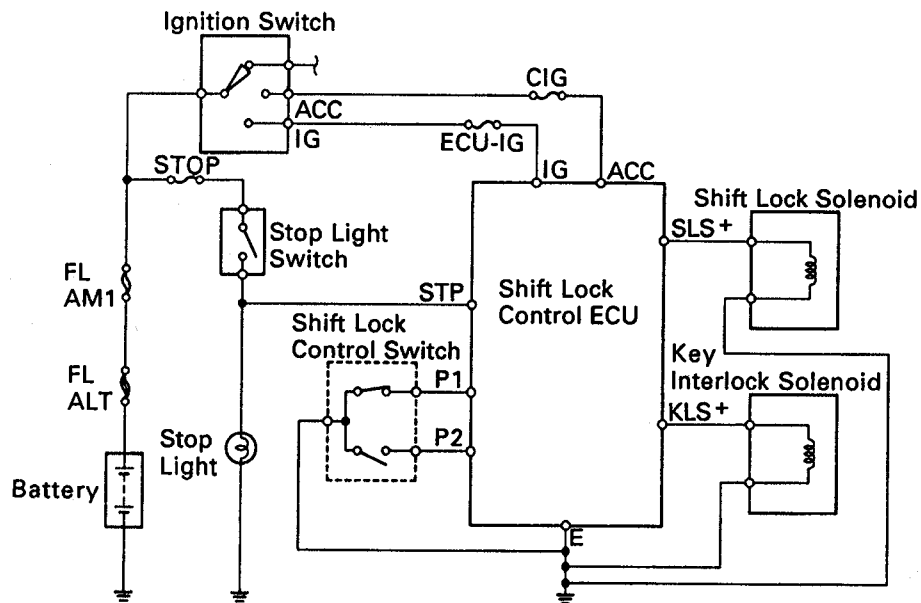


Floor Shift:

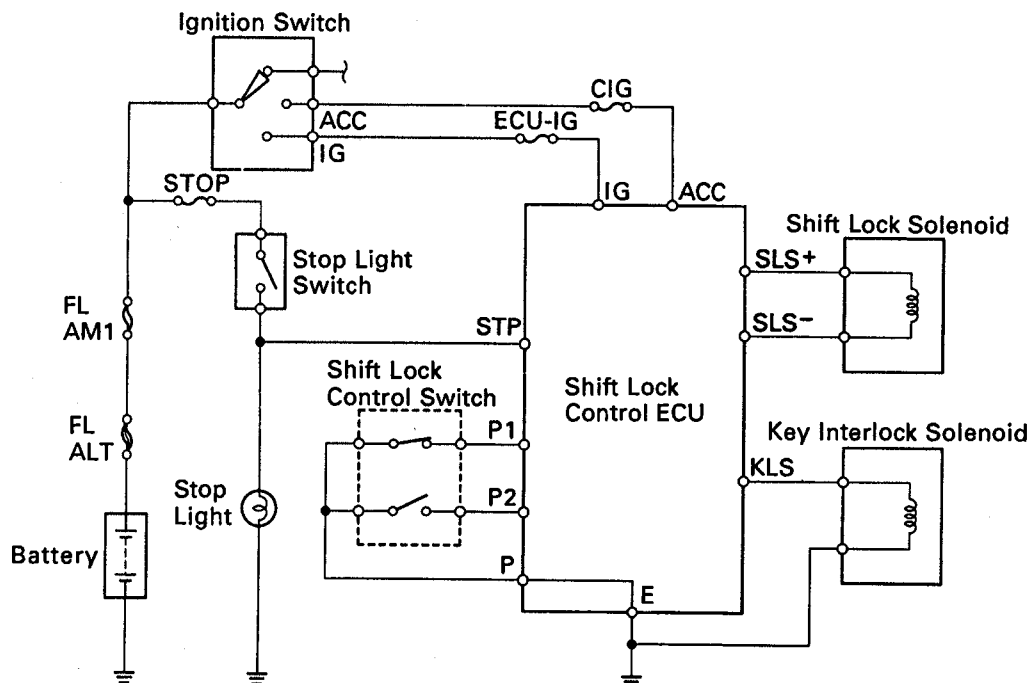


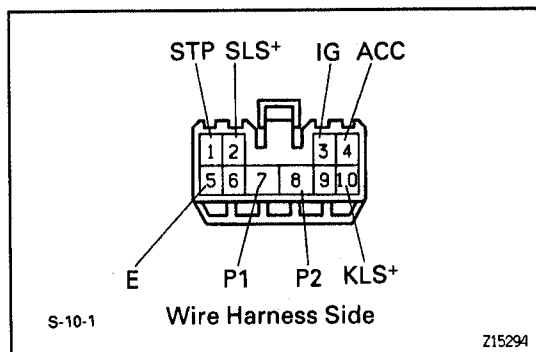
WIRING DIAGRAM

Column Shift:



Floor Shift:





ELECTRONIC CONTROL COMPONENTS INSPECTION

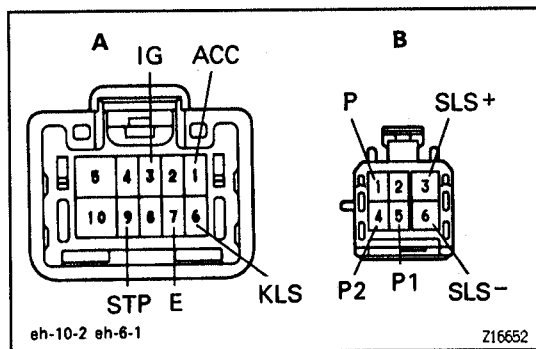
1. Column shift:

INSPECT SHIFT LOCK CONTROL ECU

Using a voltmeter, measure the voltage at each terminal.

Terminal	Measuring Condition	Voltage (V)
ACC — E	IG SW ACC	10 — 14
IG — E	IG SW ON	10 — 14
STP — E	Depressing brake pedal	10 — 14
KLS+ — E	① IG SW ACC and P position	0
	② IG SW ACC and except P position	10 — 14
	③ (After—approx. 1 second)	6 — 9
SLS+ — E	① IG SW ON and P position	0
	② Depress brake pedal	8.5 — 13.5
	③ Except P position	0
P1 — E	① IG SW ON, P position and depress brake pedal	0
	② Shift except P position under conditions above	9 — 13.5
P2 — E	① IG SW ACC and P position	9 — 13.5
	② Shift except P position under conditions above	0

AT



2. Floor shift:

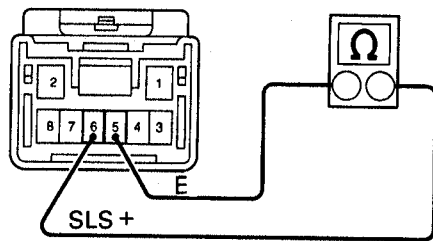
INSPECT SHIFT LOCK CONTROL ECU

Using a voltmeter, measure the voltage at each terminal.

Connector	Terminal	Measuring condition	Voltage (V)
A	ACC - E	IG SW ACC	10 - 14
	IG - E	IG SW ON	10 - 14
	STP - E	Brake pedal depressed	10 - 14
	KLS - E	① IG SW ACC and P position	0
		② R, N, D, 2, L position	7.5 - 11
		③ R, N, D, 2, L position (After - approx. 1 second)	6 - 9.5
B	SLS+ - SLS-	① IG SW ON and P position	0
		② Brake pedal depressed	8 - 13.5
		③ Brake pedal depressed (After - approx. 20 seconds)	6 - 8.5
		④ R, N, D, 2, L position	0
	P1 - P	① IG SW ON, P position and depress brake pedal	0
		② R, N, D, 2, L position	9 - 13.5
	P2 - P	① IG SW ACC and P position	9 - 13.5
		② R, N, D, 2, L position	0

V07133

Column Shift



Q07188

Z15409

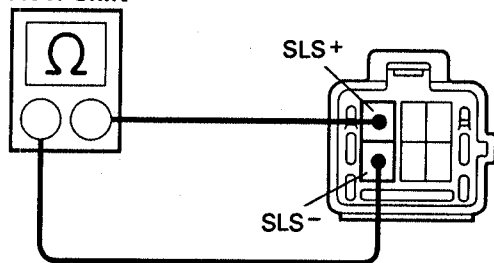
3. INSPECT SHIFT LOCK SOLENOID

- Disconnect the solenoid connector.
- Using an ohmmeter, measure the resistance at each terminal.

Standard resistance: 20 - 28 Ω

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

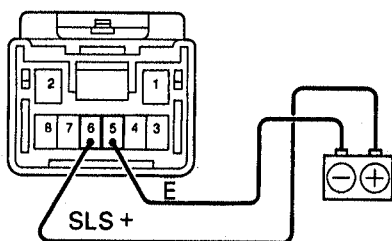
Floor Shift



Q07384

Z16653

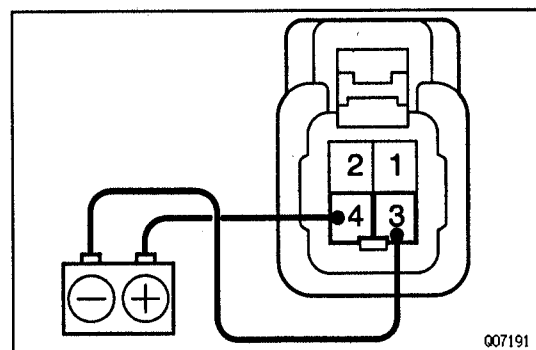
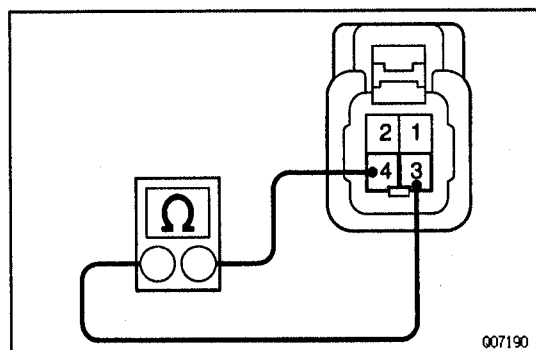
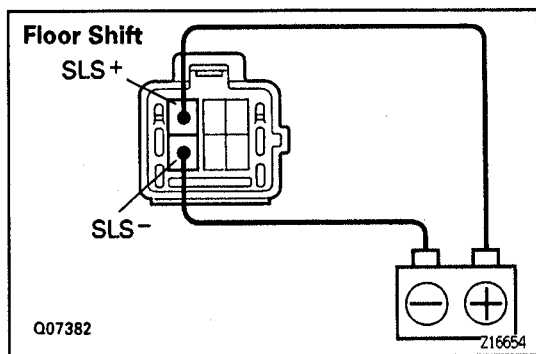
Column Shift



Q07189

Z15411

- Apply battery positive voltage at each terminal. At this time, confirm that the solenoid operates. If the solenoid does not operate, replace the solenoid.



4. INSPECT KEY INTERLOCK SOLENOID

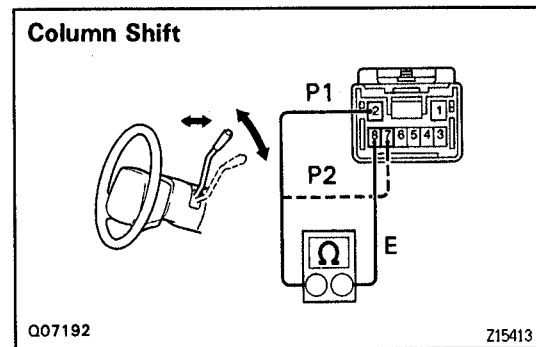
- (a) Disconnect the solenoid connector.
- (b) Using an ohmmeter, measure the resistance between terminals 3 and 4.

Standard resistance: 12 – 17 Ω

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.



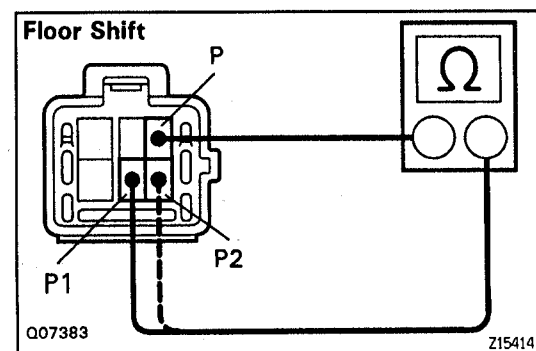
5. INSPECT SHIFT LOCK CONTROL SWITCH

Inspect that there is continuity between each terminal.

Shift position	Tester condition to terminal number	Specified value
*1 P position	P1 – P or E	Continuity
*2 P position	P1 – P or E P2 – P or E	Continuity
R, N, D, 2, L position	P2 – P or E	Continuity

*1: Floor shift release button is not pushed or column shift lever is not pulled.

*2: Floor shift release button is pushed or column shift lever is not pulled toward you.



TROUBLESHOOTING

HOW TO PROCEED WITH

TROUBLESHOOTING AT-33

CUSTOMER PROBLEM ANALYSIS CHECK

SHEET AT-34

DIAGNOSIS SYSTEM AT-35

DIAGNOSIS INSPECTION

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DIAGNOSIS INSPECTION

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CIRCUIT INSPECTION AT-62

DTC P0500 Vehicle Speed Sensor

Malfunction

(No.1 Vehicle Speed Sensor) AT-62

DTC P0710 Transmission Fluid

Temperature Sensor Malfunction

(ATF Temperature Sensor) AT-62

DTC P0750, P0755 Shift Solenoid "A/B"

Malfunction

(Shift Solenoid Valve No.1/No.2) AT-63

DTC P0753, P0758 Shift Solenoid "A/B"

Electrical Malfunction

(Shift Solenoid Valve No.1/No.2) AT-64

DTC P0770 Shift Solenoid "E"

Malfunction

(Shift Solenoid Valve SL) AT-67

DTC P0773 Shift Solenoid "E"

Electrical Malfunction

(Shift Solenoid Valve SL) AT-68

DTC P1700 Speed Sensor No.2 Circuit

Malfunction

(No.2 Vehicle Speed Sensor) AT-71

DTC P1780 Park/Neutral Position

Switch Malfunction AT-73

O/D Cancel Signal Circuit AT-76

O/D Main Switch & O/D OFF Indicator

Light Circuit AT-78

Pattern Select Switch Circuit AT-78

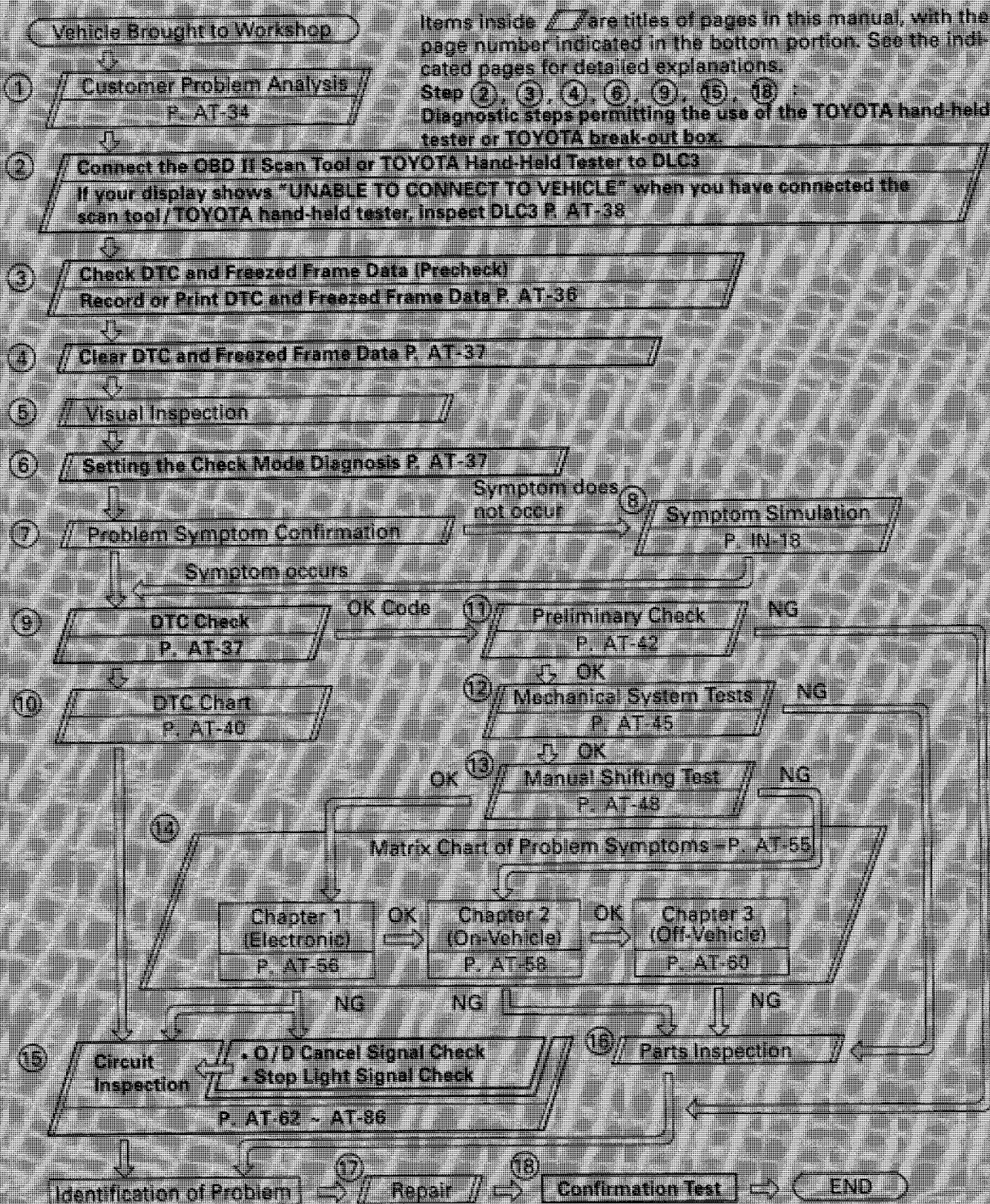
Stop Light Switch Circuit AT-83

A/T. P. (Automatic Transmission Parking)

Indicator Circuit AT-85

HOW TO PROCEED WITH TROUBLESHOOTING

Troubleshoot in accordance with the procedure on the following pages.



AT

AX000-1A

Inspector's Name: _____

Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	km mile

Date Problem Occurred				
How Often Does Problem Occur?	☐ Continuous	☐ Intermittent	(times a day)	

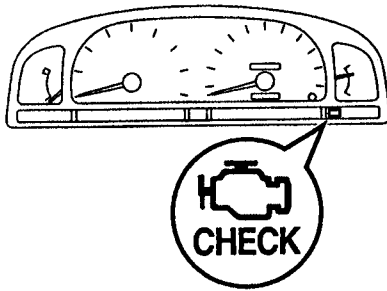
[illegible]

Check Item	Condition of MIL	☐ Normal	☐ Remains ON
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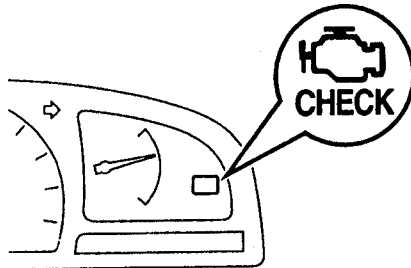
DTC Check	1st Time	☐ Normal code ☐ Malfunction code (Code)
	2nd Time	☐ Normal code ☐ Malfunction code (Code)

DIAGNOSIS SYSTEM

w/ Tachometer

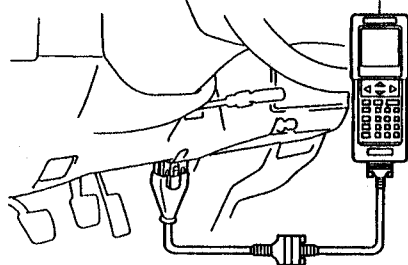


w/o Tachometer

Q08249
Q08248

Z16619

TOYOTA Hand-Held Tester



Q08640

DESCRIPTION

When troubleshooting OBD II vehicles, the only difference from the usual troubleshooting procedure is that you connect to the vehicle the OBD II scan tool complying with SAE J1978 or TOYOTA hand-held tester, and read off various data output from the vehicle's ECM.

OBD II regulations require that the vehicle's on-board computer lights up the Malfunction Indicator Lamp (MIL) on the instrument panel when the computer detects a malfunction in the computer itself or in drive system components which affect vehicle emissions. In addition to the MIL lighting up when a malfunction is detected, the applicable DTCs prescribed by SAE J2012 are recorded in the ECM memory.

(3RZ—FE: See page EG—192)

(5VZ—FE: See page EG—200)

If the malfunction does not reoccur in 3 trips, the MIL goes off but the DTCs remain recorded in the ECM memory.

To check the DTCs, connect the OBD II scan tool or TOYOTA hand-held tester to DLC3 on the vehicle. The OBD II scan tool or TOYOTA hand-held tester also enables you to erase the DTCs and check frozen frame data and various forms of engine data. (For operating instructions, see the OBD II scan tool's instruction book.)

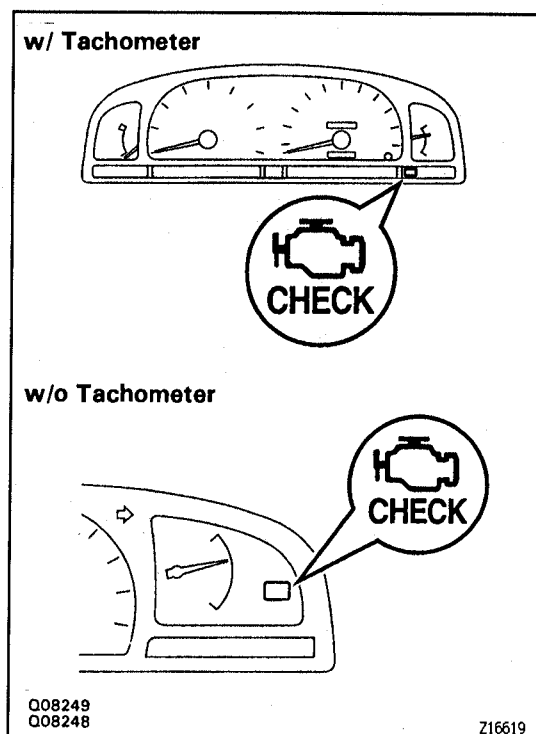
DTCs include SAE controlled codes and Manufacturer controlled codes.

SAE controlled codes must be set as prescribed by the SAE, while Manufacturer controlled codes can be set freely by the manufacturer within the prescribed limits. (See DTC chart on page AT—40)

The diagnosis system operates in normal mode during normal vehicle use, and also has a check mode for technicians to simulate malfunction symptoms and perform troubleshooting. Most DTCs use 2 trip detection logic(*) to prevent erroneous detection. By switching the ECM to check mode when troubleshooting, the technician can cause the MIL to light up and for a malfunction that is only detected once or momentarily. (TOYOTA hand-held tester) (See page AT—36)

* 2 trip detection logic:

When a logic malfunction is first detected, the malfunction is temporarily stored in the ECM memory. If the same malfunction is detected again during the second test drive, this second detection causes the MIL to light up.



DIAGNOSIS INSPECTION (NORMAL MODE) ^{AT10V-01}

MIL CHECK

1. The MIL comes on when the ignition switch is turned ON and the engine is not running.
HINT: If the MIL does not light up, troubleshoot the combination meter (See page BE-34)
2. When the engine is started, the MIL should go off. If the lamp remains on, the diagnosis system has detected a malfunction or abnormality in the system.

DTC CHECK

NOTICE (TOYOTA hand-held tester only): When the diagnostic system is switched from normal mode to check mode, it erases all DTCs and freeze frame data recorded in normal mode. So before switching modes, always check the DTCs and freeze frame data, and note them down.

1. Prepare the OBD II scan tool (complying with SAE J 1978) or TOYOTA hand-held tester.
2. Connect the OBD II scan tool or TOYOTA hand-held tester to DLC3 in the fuse box at the lower right of the instrument panel.
3. Turn the ignition switch ON and turn the OBD II scan tool or TOYOTA hand-held tester switch ON.
4. Use the OBD II scan tool or TOYOTA hand-held tester to check the DTCs and freeze frame data. Note them down. (For operating instructions, see the OBD II scan tool's instruction book.)
5. See page AT-40 to confirm the details of the DTCs.
NOTICE: When simulating symptoms with an OBD II scan tool (excluding TOYOTA hand-held tester) to check the DTCs, use normal mode. For codes on the DTC chart subject to "2 trip detection logic", turn the ignition switch off after the symptoms have been simulated for the first time. Then repeat the simulation process again. When the program has been simulated twice, the MIL lights up and the DTCs are recorded in the ECM.

DIAGNOSIS INSPECTION (CHECK MODE) ATTOW-01**TOYOTA hand—held tester only**

Compared to the normal mode, the check mode has high sensing ability to detect malfunctions.

Furthermore, the same diagnostic items which are detected in the normal mode can also be detected in the check mode.

DTC CHECK

1. Initial conditions.
 - (a) Battery positive voltage 11 V or more.
 - (b) Throttle valve fully closed.
 - (c) Transmission in PARK position.
 - (d) Air conditioning switched off.
2. Turn ignition switch OFF.
3. Prepare the TOYOTA hand—held tester.
4. Connect the TOYOTA hand—held tester to DLC3 in the fuse box at the lower right of the instrument panel.
5. Turn the ignition switch ON and switch the TOYOTA hand—held tester ON.
6. Switch the TOYOTA hand—held tester from normal mode to check mode. (Check that the MIL flashes.)
7. Start the engine. (The MIL goes off after the engine starts.)
8. Simulate the conditions of the malfunction described by the customer.

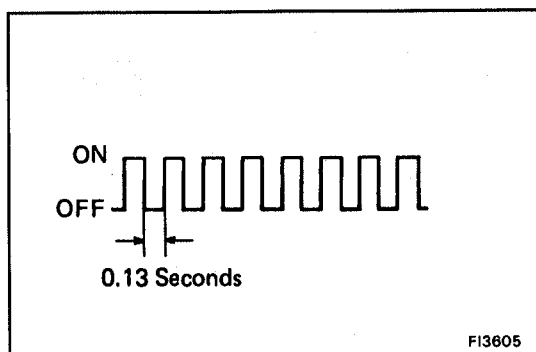
NOTICE: Leave the ignition switch ON until you have checked the DTCs etc.
9. After simulating the malfunction conditions, use the TOYOTA hand — held tester diagnosis selector to check the DTCs and freeze frame data, etc.

HINT: Take care not to turn the ignition switch OFF. Turning the ignition switch off switches the diagnosis system from check mode to normal mode, so all DTCs, etc. are erased.
10. After checking the DTC, inspect the applicable circuit.

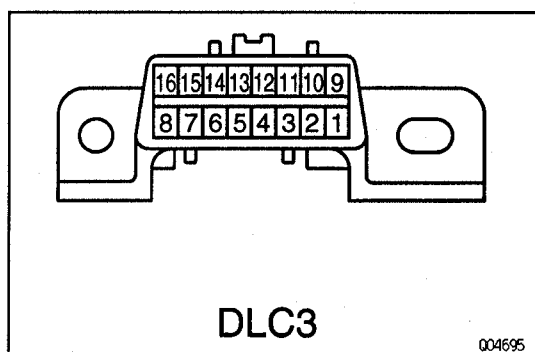
DTC CLEARANCE

The following actions will erase the DTCs and freeze frame data.

Operating the OBD II scan tool (complying with SAE J 1978) or TOYOTA hand—held tester to erase the codes. (See the OBD II scan tool's instruction book for operating instructions.)



NOTICE: If the TOYOTA hand—held tester switches the ECM from normal mode to check mode or vice—versa, or if the ignition switch is turned from ON to ACC or OFF during check mode, the DTCs and freeze frame data will be erased.



DLC3 INSPECTION

The vehicle's ECM uses V.P.W. (Variable Pulse Width) for communication to comply with SAE J1850. The terminal arrangement of DLC3 complies with SAE J1962 and matches the V.P.W. format.

Terminal No.	Connection/Voltage or Resistance	Condition
2	Bus $\oplus$ Line	During communication
4	Chassis Ground/ $\leftrightarrow$ Body 1 Ω or less	Always
5	Signal Ground/ $\leftrightarrow$ Body 1 Ω or less	Always
16	Battery Positive/ $\leftrightarrow$ Body 1 Ω or less Battery Positive/ $\leftrightarrow$ Body 9 ~ 14 V	Always

HINT: If your display shows "UNABLE TO CONNECT TO VEHICLE" when you have connected the cable of the OBD II scan tool or TOYOTA hand—held tester to DLC 3, turned the ignition switch ON and operated the scan tool, there is a problem on the vehicle side or tool side.

- (1) If communication is normal when the tool is connected to another vehicle, inspect DLC3 on the original vehicle.
- (2) If communication is still impossible when the tool is connected to another vehicle, the problem is probably in the tool itself, so consult the Service Department listed in the tool's instruction manual.

CHECK FOR INTERMITTENT PROBLEMS

AT10X-01

TOYOTA hand—held tester only

By putting the vehicle's ECM in check mode, 1 trip detection logic is possible instead of 2 trip detection logic and sensitivity to detect open circuits is increased. This makes it easier to detect intermittent problems.

CLEAR DTCs

See page AT-37

SET CHECK MODE

See page AT-37

DO A SIMULATION TEST

See page IN-18

CONNECTOR CONNECTION AND TERMINAL INSPECTION

See page IN-24

VISUAL CHECK AND CONTACT PRESSURE CHECK

See page IN-25

CONNECTOR HANDLING

See page IN-26

DTC CHART

DTC NO. (See page)	Detection Item	Trouble Area	MIL*	Memory
P0500 3RZ-FE : EG-276 5VZ-FE : EG-287	Vehicle Speed Sensor Malfunction (No. 1 Vehicle Speed Sensor)	• Open or short in No. 1 vehicle speed sensor circuit • No. 1 vehicle speed sensor • ECM	●	○
P0710 (AT-62)	Transmission Fluid Temperature Sensor Malfunction (ATF Temperature Sensor)	• Open or short in ATF temperature sensor circuit • ATF temperature sensor • ECM	—	○
P0750 (AT-63)	Shift Solenoid "A" Malfunction (Shift Solenoid Valve No. 1)	• Shift solenoid valve No. 1 is stuck or closed • Valve body is blocked up or stuck	●	○
P0753 (AT-64)	Shift Solenoid "A" Electrical Malfunction (Shift Solenoid Valve No. 1)	• Open or short in shift solenoid valve No. 1 circuit • Shift solenoid valve No. 1 • ECM	●	○
P0755 (AT-63)	Shift Solenoid "B" Malfunction (Shift Solenoid Valve No. 2)	• Shift solenoid valve No. 2 is stuck or closed • Valve body is blocked up or stuck	●	○
P0758 (AT-64)	Shift Solenoid "B" Electrical Malfunction (Shift Solenoid Valve No. 2)	• Open or short in shift solenoid valve No. 2 circuit • Shift solenoid valve No. 2 • ECM	●	○
P0770 (AT-67)	Shift Solenoid "E" Malfunction (Shift Solenoid Valve SL)	• Shift solenoid valve SL is stuck or closed • Valve body is blocked up or stuck • Lock up clutch	●	○
P0773 (AT-68)	Shift Solenoid "E" Electrical Malfunction (Shift Solenoid Valve SL)	• Open or short in shift solenoid valve SL circuit • Shift solenoid valve SL • ECM	●	○
P1700 (AT-71)	Speed Sensor No. 2 Circuit Malfunction (No. 2 Vehicle Speed Sensor)	• Open or short in No. 2 vehicle speed sensor circuit • No. 2 vehicle speed sensor • ECM	●	○
P1780 (AT-73)	Park/Neutral Position Switch Malfunction	• Short in park/neutral position switch circuit • Park/neutral position switch • ECM	●	○

*: — MIL does not light up

● MIL light up

ROAD TEST

NOTICE: Perform the test at normal ATF operating temperature 50 — 80 °C (122 — 176 °F).

1. D POSITION TEST (NORM AND PWR PATTERN)

Shift into the D position and fully depress the accelerator pedal and check the following points:

- (a) Check to see that the 1→2, 2→3 and 3→O/D up—shift take place at the shift point shown in the automatic shift schedule. (See page AT—87)

HINT:

- (1) O/D Gear Up—shift Prohibition Control
- Coolant temp. is 60°C (140°F) or less
 - If there is a 10 km/h (6 mph) difference between the set cruise control speed and vehicle speed.
 - O/D main switch is pushed ON (During O/D OFF indicator light lights up.)
- (2) O/D Gear Lock—up Prohibition Control
- Brake pedal is depressed.
 - Coolant temp. is 60 °C (140 °F) or less.
- (b) Check for shift shock and slip.
Check for shock and slip at the 1→2, 2→3 and 3→O/D up—shifts.
- (c) Check for abnormal noises and vibration.
Run at the D position lock—up or O/D gear and check for abnormal noises and vibration.
HINT: The check for the cause of abnormal noises and vibration must be done very thoroughly as it could also be due to loss of balance in the differential and torque converter clutch, etc..
- (d) Check kick—down operation.
While running in the D position, 2nd, 3rd and O/D gears, check to see that the possible kick—down vehicle speed limits for 2→1, 3→2 and O/D→3 kick—downs conform to those indicated on the automatic shift schedule. (See page AT—87)
- (e) Check abnormal shock and slip at kick—down.
- (f) Check the lock—up mechanism.
- (1) Drive in O/D gear of D position, at a steady speed (lock—up ON) of about 70 km/h (43 mph).
- (2) Lightly depress the accelerator pedal and check that the engine RPM does not change abruptly.

If there is a big jump in engine RPM, there is no lock—up.

2. 2 POSITION TEST

Shift into the 2 position and fully depress the accelerator pedal and check the following points:

- (a) Check up—shift operation.
Check to see that the 1→2 up—shift takes place and that the shift point conforms to the automatic shift schedule. (See page AT—87)
HINT: There is no O/D up—shift and lock—up in the 2 position.
- (b) Check engine braking.
While running in the 2 position and 2nd gear, release the accelerator pedal and check the engine braking effect.
- (c) Check for abnormal noises during acceleration and deceleration, and for shock at up—shift and down—shift.

3. L POSITION TEST

Shift into the 2 position and fully depress the accelerator pedal and check the following points:

- (a) Check no up—shift.
While running in the L position, check that there is no up—shift to 2nd gear.
- (b) Check engine braking.
While running in the L position, release the accelerator pedal and check the engine braking effect.

- (c) Check for abnormal noises during acceleration and deceleration.

4. R POSITION TEST

Shift into the R position and fully depress the accelerator pedal and check for slipping.

CAUTION: Before conducting this test, ensure that the test area is free from personnel and obstruction.

5. P POSITION TEST

Stop the vehicle on a gradient (more than 5°) and after shifting into the P position, release the parking brake.

Then, check to see that the parking lock pawl holds the vehicle in place.

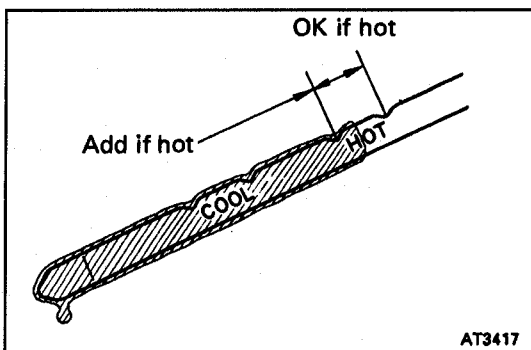
PRELIMINARY CHECK

AT0VV-08

1. CHECK FLUID LEVEL

HINT:

- Drive the vehicle so that the engine and transmission are at normal operating temperature.
Fluid temp. : 70 — 80 °C (158 — 176 °F)
- Only use the COOL range on the dipstick as a rough reference when the fluid is replaced or the engine does not run.



- Park the vehicle on a level surface and set the parking brake.
- 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.
- Pull out the dipstick and wipe it clean.
- Push it back fully into the pipe.
- Pull it out and check that the fluid level is in the HOT range.

If the level is at the low side, add fluid.

Fluid type: ATF DEXRON® II

NOTICE: Do not overfill.

2. CHECK FLUID CONDITION

If the fluid smells burnt or is black, replace it.

3. REPLACE TRANSMISSION FLUID

- Remove the drain plug and drain the fluid.
- Reinstall the drain plug securely.
- With the engine OFF, add new fluid through the oil filler pipe.

Fluid type: ATF DEXRON® II

Capacity:

A340E:

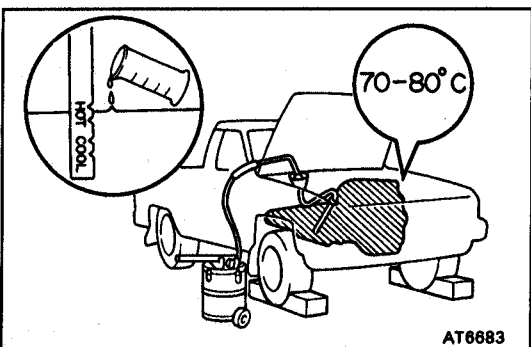
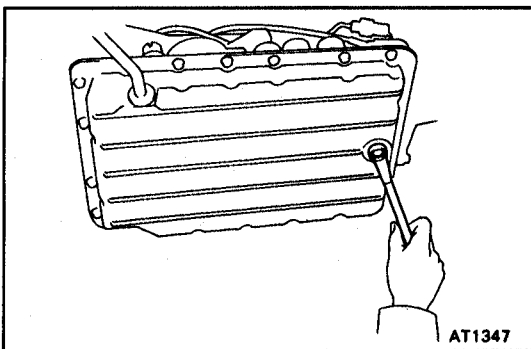
Dry fill: 7.2 liters (7.6 US qts, 6.3 Imp.qts)

Drain and refill: 1.6 liters (1.7 US qts, 1.4 Imp.qts)

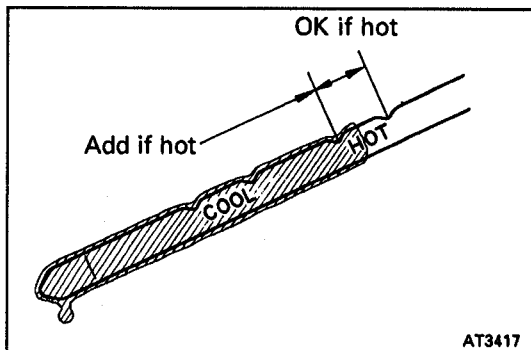
A340F:

Dry fill: 9.8 liters (10.5 US qts, 8.6 Imp.qts)

Drain and refill: 2.0 liters (2.1 US qts, 1.8 Imp.qts)



- (d) Start the engine and shift the shift lever into all positions from P to L position and then shift into P position.
- (e) With the engine idling, check the fluid level. Add fluid up to the COOL level on the dipstick.



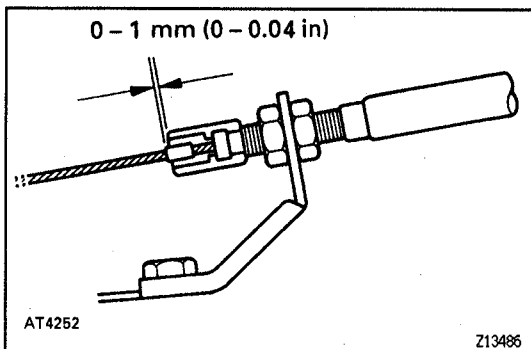
- (f) Check the fluid level at the normal operating temperature, 70 – 80 °C (158 – 176 °F), and add as necessary.

NOTICE: Do not overfill.

4. CHECK FLUID LEAKS

Check for leaks in the transmission.

If there are leaks, it is necessary to repair or replace O-rings, seal packings, oil seals, plugs or other parts.



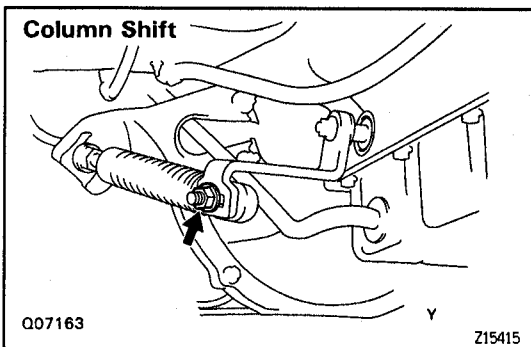
5. INSPECT AND ADJUST THROTTLE CABLE

- (a) Check that the throttle valve is fully closed.
- (b) Check that the inner cable is not slack.
- (c) Measure the distance between the outer cable end and stopper on the cable.

Standard distance:

0 – 1 mm (0 – 0.04 in.)

If the distance is not standard, adjust the cable by the adjusting nuts.



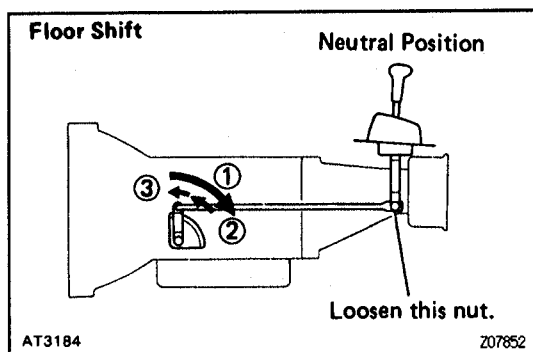
6. INSPECT AND ADJUST SHIFT LEVER POSITION

When shifting the shift lever from the N position to other positions, check that the lever can be shifted smoothly and accurately to each position and that the position indicator correctly indicates the position.

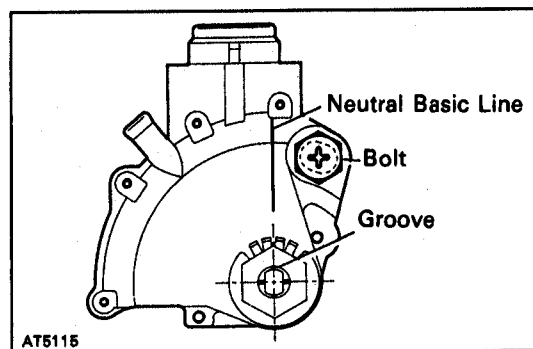
If the indicator is not aligned with the correct position, carry out the following adjustment procedures.

Column shift:

- (a) Loosen the nut on the control shaft lever.
 - (b) Push the control shaft lever fully forward.
 - (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, adjust the control shaft lever nut.
 - (f) Tighten the control shaft lever nut.
- Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)**
- (g) Start the engine and make sure that the vehicle moves forward when shifting the lever from the N to D position and reverse when shifting it to the R position.

**Floor shift:**

- Remove the nut on the shift lever.
- Push the control shaft lever fully downward.
- Return the control shaft lever 2 notches to N position.
- Set the shift lever to N position.
- While holding the shift lever lightly toward the R position side, adjust the control shaft lever nut.
- Tighten the control shaft lever nut.
- Start the engine and make sure that the vehicle moves forward when shifting the lever from the N to D position and reverse when shifting it to the R position.

**7. INSPECT AND ADJUST PARK/NEUTRAL POSITION SWITCH**

Check that the engine can be started with the shift lever only in the N or P position, but not in other positions.

If not as stated above, carry out the following adjustment procedure.

- Loosen the park/neutral position switch bolt and set the shift lever to the N position.
- Align the groove and neutral basic line.
- Hold in position and tighten the bolt.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

For continuity inspect of the park/neutral position switch, see page AT-73.

8. INSPECT IDLE SPEED

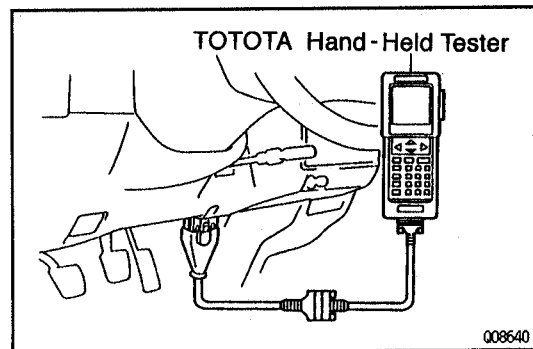
Connect OBD II scan tool or TOYOTA hand-held tester to the DLC3 and inspect the idle speed.

Idle speed:

3RZ-FE: 700 ± 50 rpm

5VZ-FE: 700 ± 50 rpm

(In N position and air conditioner OFF)



MECHANICAL SYSTEM TESTS

STALL TEST

The object of this test is to check the overall performance of the transmission and engine by measuring the stall speeds in the D and R positions.

NOTICE:

- Do the test at normal operating fluid temperature 50 — 80 °C (122 — 176 °F).
- Do not continuously run this test longer than 5 seconds.
- To ensure safety, conduct this test in a wide, clear, level area which provides good traction.
- The stall test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is doing the test.

MEASURE STALL SPEED

- Chock the 4 wheels.
- Connect OBD II scan tool or TOYOTA hand-held tester to DLC3.
- Fully apply the parking brake.
- Keep your left foot pressed firmly on the brake pedal.
- Start the engine.
- Shift into the D position. Press all the way down on the accelerator pedal with your right foot. Quickly read the stall speed at this time.

Stall speed:

3RZ-FE: 1,950 ± 150 rpm

5VZ-FE: 2,150 ± 150 rpm

- Do the same test in R position.

Stall speed:

3RZ-FE: 1,950 ± 150 rpm

5VZ-FE: 2,150 ± 150 rpm

EVALUATION

Problem	Possible cause
(a) Stall speed low in D and R positions.	• Engine output may be insufficient • Stator one-way clutch is not operating properly HINT: If more than 600 rpm below the specified value, the torque converter clutch could be faulty.
(b) Stall speed high in D position.	• Line pressure too low • Forward clutch slipping • No.2 one-way clutch not operating properly • O/D one-way clutch not operating properly
(c) Stall speed high in R position.	• Line pressure too low • Direct clutch slipping • 1st and reverse brake slipping • O/D one-way clutch not operating properly
(d) Stall speed high in D and R positions.	• Line pressure too low • Improper fluid level • O/D one-way clutch not operating properly

TIME LAG TEST

When the shift lever is shifted while the engine is idling, there will be a certain time lapse or lag before the shock can be felt. This is used for checking the condition of the O/D direct clutch, forward clutch, direct clutch, and first and reverse brake.

NOTICE:

- Do the test at normal operating fluid temperature 50 — 80 °C (122 — 176 °F).
- Be sure to allow 1 minute interval between tests.
- Take three measurements and take the average value.

MEASURE TIME LAG

- (a) Fully apply the parking brake.
- (b) Start the engine and check idle speed.

Idle speed:

3RZ—FE and 5VZ—FE: 700 ± 50 rpm (In N position and air conditioner OFF)

- (c) Shift the shift lever from N to D position. Using a stop watch, measure the time it takes from shifting the lever until the shock is felt.

Time lag: N→D Less than 1.2 seconds

In same manner, measure the time lag for N → R.

Time lag: N→R Less than 1.5 seconds

EVALUATION

If N→D or N→R time lag are longer than specified:

Problem	Possible cause
N→D time lag is longer	• Line pressure too low • Forward clutch worn • O/D one—way clutch not operating properly
N→R time lag is longer	• Line pressure too low • Direct clutch worn • 1st and reverse brake worn • O/D one—way clutch not operating properly

HYDRAULIC TEST**MEASURE LINE PRESSURE****NOTICE:**

- Do the test at normal operating fluid temperature 50 — 80 °C (122 — 176 °F).
 - The line pressure test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is doing the test.
 - Be careful to prevent the oil pressure gauge hose from interfering with the exhaust pipe.
- (a) Warm up the transmission fluid.
 - (b) Remove the test plug on the transmission case right side and connect SST.
SST 09992—00094 (09992—00150, 09992—00270)
(See page AT—16,19,20 for the location to connect SST)
 - (c) Fully apply the parking brake and chock the 4 wheels.
 - (d) Start the engine and check idling speed.
 - (e) Keep your left foot pressed firmly on the brake pedal and shift into D position.
 - (f) Measure the line pressure when the engine is idling.
 - (g) Press the accelerator pedal all the way down. Quickly read the highest line pressure when engine speed reaches stall speed.

NOTICE: Release the accelerator pedal and stop test if the rear wheels begin to rotate before the engine speed reaches specified stall speed.

(h) In the same manner, do the test in R position.

SPECIFIED LINE PRESSURE

3RZ — FE:

Condition	D position kPa (kgf/cm ² , psi)	R position kPa (kgf/cm ² , psi)
Idling	363–422 (3.7–4.3, 53–61)	490–588 (5.0–6.0, 71–85)
Stall	932–1,177 (9.5–12.0, 135–171)	1,294–1,638 (13.2–16.7, 188–238)

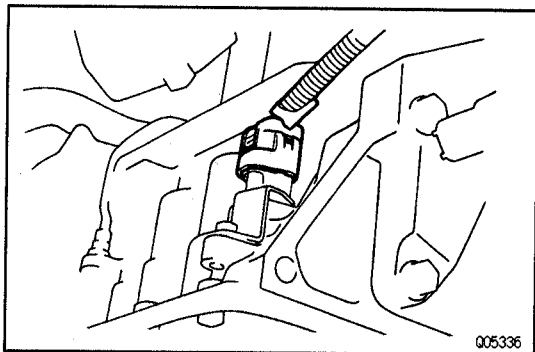
5VZ — FE:

Condition	D position kPa (kgf/cm ² , psi)	R position kPa (kgf/cm ² , psi)
Idling	363–422 (3.7–4.3, 53–61)	608–696 (6.2–7.1, 88–101)
Stall	902–1,147 (9.2–11.7, 131–166)	1,432–1,942 (14.6–19.8, 208–282)

If the measured pressures are not up to specified values, recheck the throttle cable adjustment and retest.

EVALUATION

Problem	Possible cause
If the measured values at all positions are higher.	• Throttle cable out of adjustment • Throttle valve defective • Regulator valve defective
If the measured values at all positions are lower.	• Throttle cable out of adjustment • Throttle valve defective • Regulator valve defective • Oil pump defective • O/D direct clutch defective
If pressure is low in the D position only.	• D position circuit fluid leakage • Forward clutch defective
If pressure is low in the R position only.	• R position circuit fluid leakage • Direct clutch defective • 1st and reverse brake defective



MANUAL SHIFTING TEST

HINT: With this test, it can be determined whether the trouble is within the electrical circuit or is a mechanical problem in the transmission.

1. **DISCONNECT SOLENOID WIRE**
2. **INSPECT MANUAL DRIVING OPERATION**

Check that the shift and gear positions correspond with the table below.

Shift Position	Gear Position
D	O/D
2	3rd
L	1st
R	Reverse
P	Pawl Lock

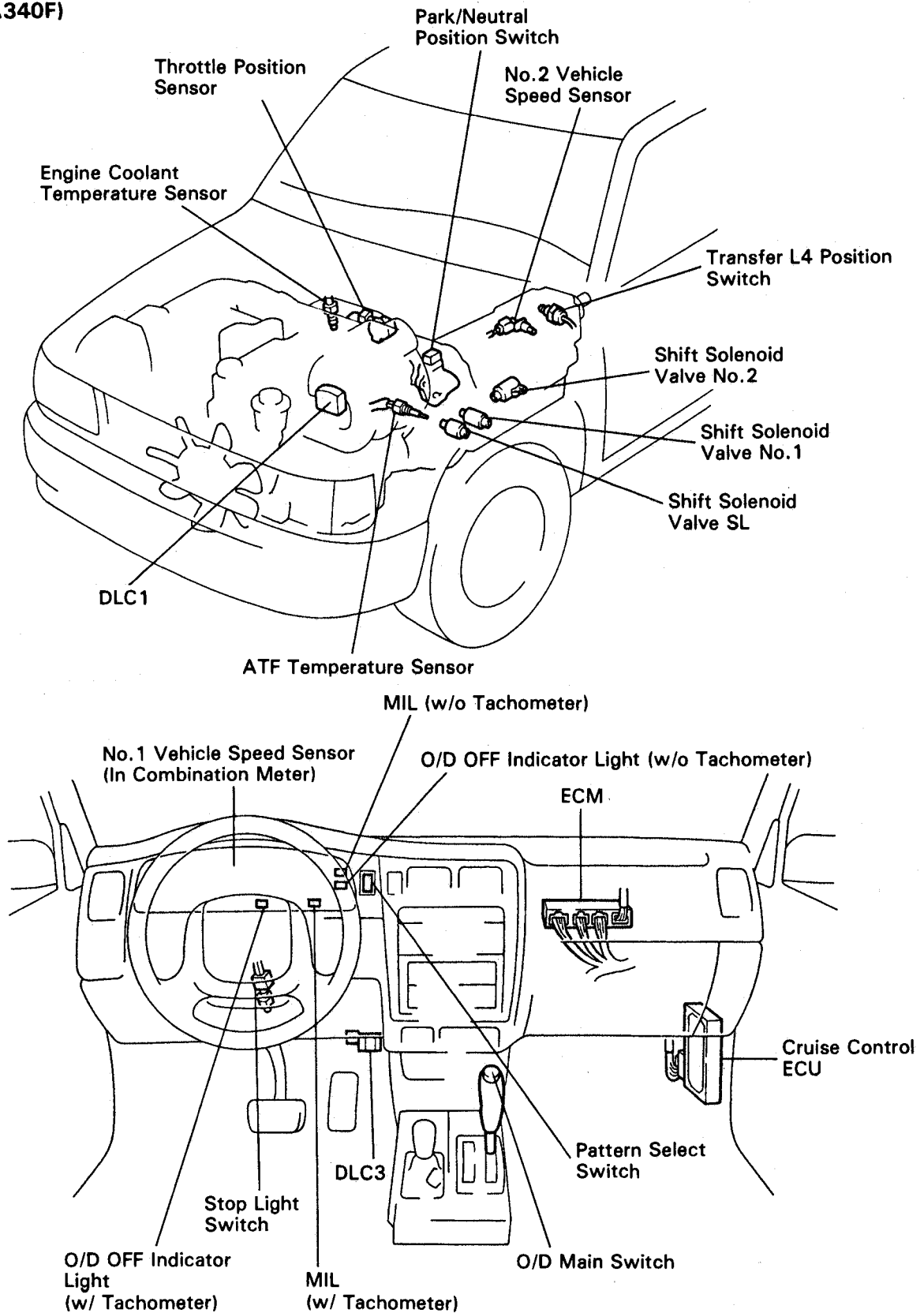
HINT: If the L, 2 and D position gear positions are difficult to distinguish, do the following road test.

- While driving, shift through the L, 2 and D positions. Check that the gear change corresponds to the shift position.
- If any abnormality is found in the above test, the problem is in the transmission itself.

3. **CONNECT SOLENOID WIRE**
4. **CANCEL OUT DTC (See page AT-37)**

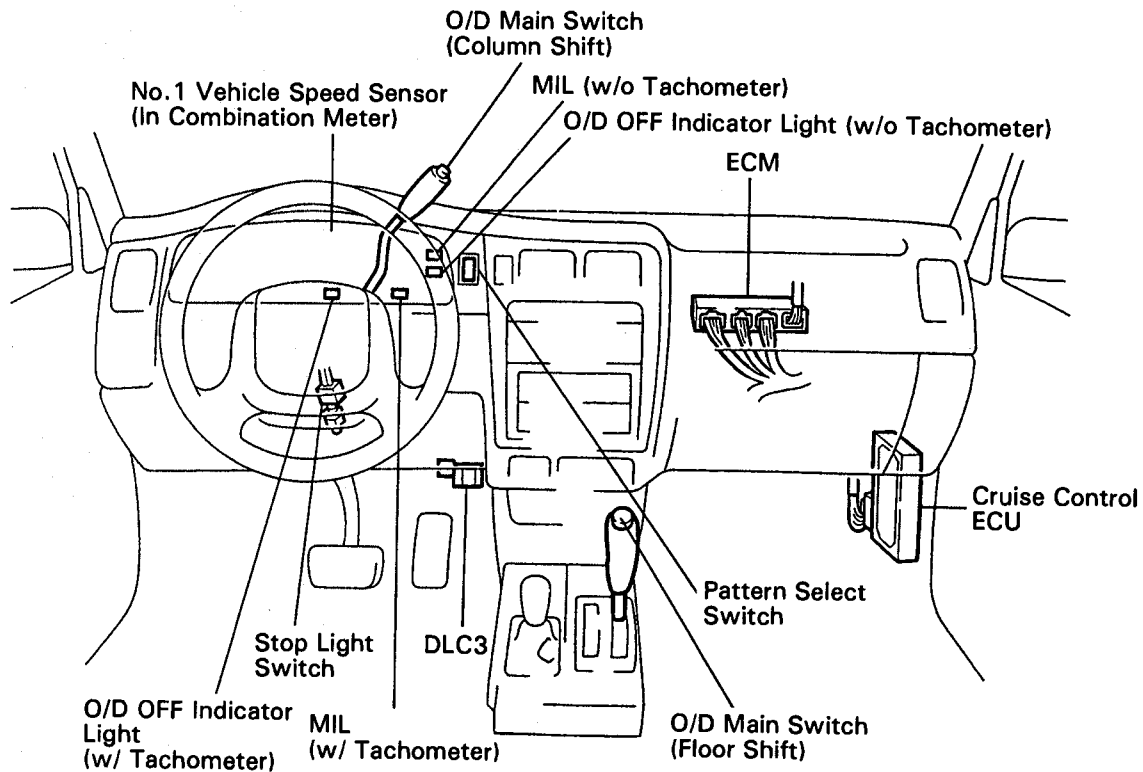
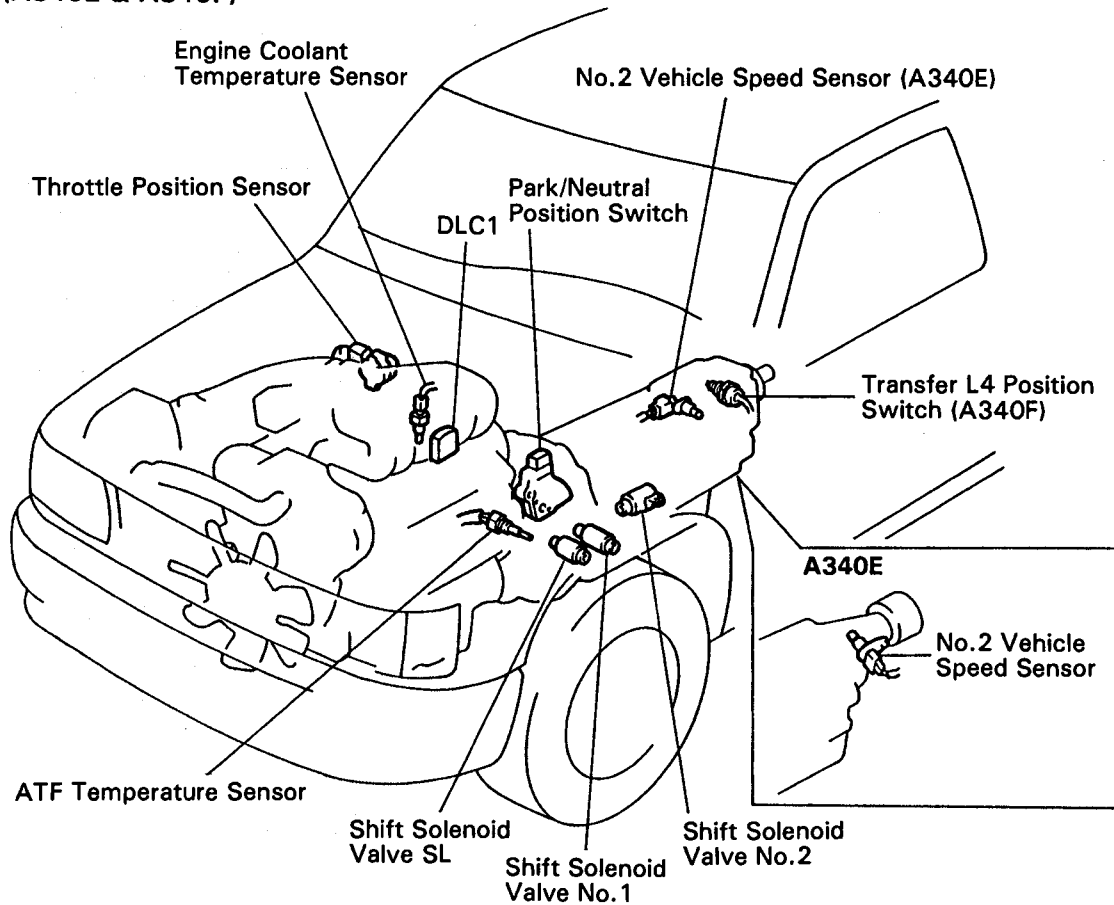
PARTS LOCATION

3RZ-FE (A340F)

Q07338
Q08466

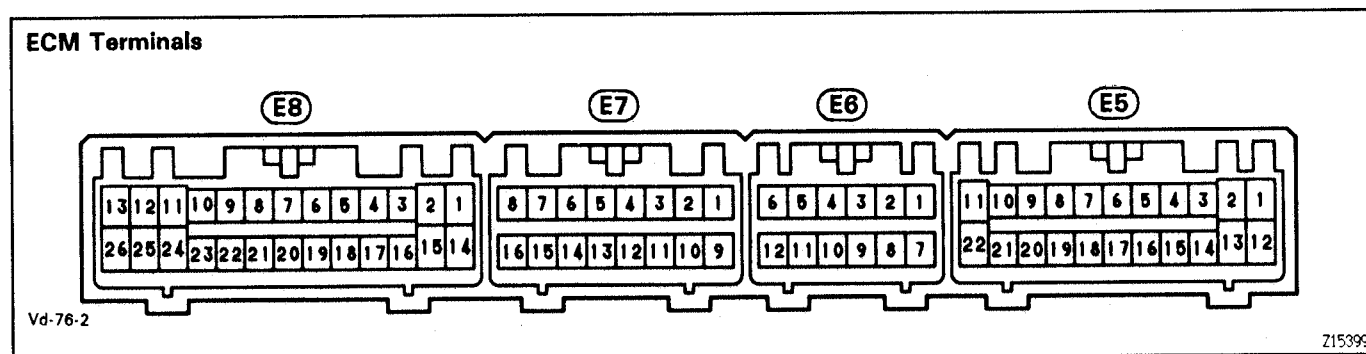
Z16801

5VZ-FE (A340E & A340F)



STANDARD VALUE OF ECM TERMINAL

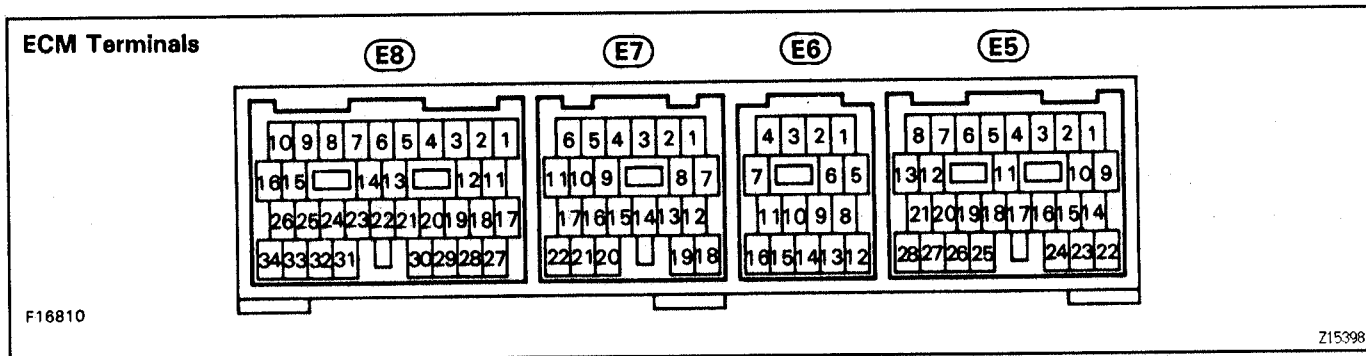
3RZ—FE:



Connector, Terminal No. Symbols Wiring Color	Condition	Standard Value
E5, 8 — E8, 24 SP1 — E1 G-O — BR	1. Disconnect cruise control connector. 2. IG ON Stationary Turn one rear wheel slowly	Below 1.5 V Pulse signal is output Below 1.5 V ↔ 4–6 V
E8, 10 — E8, 24 S1 — E1 V-Y — BR	IG OFF and disconnect ECM connector IG ON 1st or 2nd gear 3rd or O/D gear	11 — 15 Ω 9 — 14 V 9 — 14 V Below 1.5 V
E8, 9 — E8, 24 S2 — E1 LG — BR	IG OFF and disconnect ECM connector IG ON 2nd or 3rd gear 1st or O/D gear	11 — 15 Ω Below 1.5 V 9 — 14 V Below 1.5 V
E8, 8 — E8, 24 SL — E1 R-G — BR	IG OFF and disconnect ECM connector IG ON Vehicle driving under lock-up position	11 — 15 Ω Below 1.5 V 9 — 14 V
E6, 10 — E6, 4 SP2 ⁺ — SP2 ⁻ Y-R — W-R	IG OFF and disconnect ECM connector Engine is running	560 — 680 Ω Pulse signal is output Below 1.5 V ↔ 4–6 V
E5, 18 — E8, 24 OD1 — E1 L — BR	IG ON	9 — 14 V
E5, 17 — E8, 24 OD2 — E1 L-O — BR	O/D main switch ON O/D main switch OFF	9 — 14 V Below 1.5 V
E8, 21 — E7, 9 OIL — E2 Y-R — BR-B	ATF temperature: 115°C (239°F) or more	Below 1.5 V
E5, 16 — E8, 24 L — E1 V-W — BR	IG ON Shift lever L position Shift lever other than L position	9 — 14 V Below 1.5 V

E5, 15 — E8, 24 2 — E1 P — BR	IG ON Shift lever 2 position Shift lever other than 2 position	9 — 14 V Below 1.5 V
E5, 17 — E8, 24 R — E1 R-B — BR	IG ON Shift lever R position Shift lever other than R position	9 — 14 V Below 1.5 V
E5, 22 — E8, 24 NSW — E1 B — BR	IG ON Shift lever P or N position Shift lever other than P and N position	9 — 14 V Below 1.5 V
E5, 21 — E8, 24 B/K — E1 G-W — BR	IG ON Brake pedal is depressed Brake pedal is released	7.5 — 14 V Below 1.5 V
E7, 4 — E7, 9 THW — E2 G-R — BR-B	IG ON Engine coolant temperature 80 °C (176 °F)	Below 1.5 V
E7, 11 — E7, 9 IDL — E2 Y-L — BR-B	IG ON Accel. pedal is released Accel. pedal is depressed	Below 1.5 V 9 — 14 V
E7, 10 — E7, 9 VTA — E2 Y — BR-B	IG ON Accel. pedal is released Accel. pedal is depressed	Below 0.3 — 0.8 V 3.2 — 4.9 V
E8, 21 — E8, 24 L4 — E1 G — BR	IG ON Transfer shift position H2 or H4 Transfer shift position L4	9 — 14 V Below 1.5 V
E5, 14 — E8, 24 PWR — E1 G-O — BR	IG ON NORM Pattern PWR Pattern	Below 1.5 V 9 — 14 V

5VZ — FE:



Connector, Terminal No. Symbols Wiring Color	Condition	Standard Value
E5, 12 — E6, 16 SP1 — E1 G.O — BR	1. Disconnect cruise control connector. 2. IG ON Stationary Turn one rear wheel slowly	Below 1.5 V Pulse signal is output Below 1.5 V ↔ 4—6 V
E8, 11 — E6, 16 S1 — E1 V.Y — BR	IG OFF and disconnect ECM connector IG ON 1st or 2nd gear 3rd or O/D gear	11 — 15 Ω 9 — 14 V 9 — 14 V Below 1.5 V
E8, 17 — E6, 16 S2 — E1 LG — BR	IG OFF and disconnect ECM connector IG ON 2nd or 3rd gear 1st or O/D gear	11 — 15 Ω Below 1.5 V 9 — 14 V Below 1.5 V
E8, 27 — E6, 16 SL — E1 R.G — BR	IG OFF and disconnect ECM connector IG ON Vehicle driving under lock—up position	11 — 15 Ω Below 1.5 V 9 — 14 V
E7, 9 — E7, 4 SP2+ — SP2- Y.R — W.R	IG OFF and disconnect ECM connector IG ON Turn one rear wheel slowly	560 — 680 Ω Pulse signal is output Below 1.5 V ↔ 4 — 6 V
E5, 7 — E6, 16 OD1 — E1 L — BR	IG ON	9 — 14 V
E5, 6 — E6, 16 OD2 — E1 L.O — BR	O/D main switch ON O/D main switch OFF	9 — 14 V Below 1.5 V
E7, 12 — E7, 22 OIL — E2 Y.R — BR.B	ATF temperature: 115°C (239°F) or more	Below 1.5 V
E5, 3 — E6, 16 L — E1 V.W — BR	IG ON Shift lever L position Shift lever other than L position	9 — 14 V Below 1.5 V

E5, 1 — E6, 16 R — E1 R-B — BR	IG ON	Shift lever R position Shift lever other than R position	9 — 14 V Below 1.5 V
E5, 2 — E6, 16 2 — E1E1 P — BR	IG ON	Shift lever 2 position Shift lever other than 2 position	9 — 14 V Below 1.5 V
E8, 14 — E7, 22 NSW — E1 B — BR	IG ON	Shift lever P or N position Shift lever other than P and N position	9 — 14 V Below 1.5 V
E5, 25 — E5, 16 B/K — E1 G-W — BR	IG ON	Brake pedal is depressed Brake pedal is released	7.5 — 14 V Below 1.5 V
E7, 20 — E7, 22 THW — E2 G-R — BR-Y	IG ON	Engine coolant temperature 80 °C (176 °F)	Below 1.5 V
E8, 32 — E7, 22 IDL — E2 Y-L — BR-Y	IG ON	Accel. pedal is released Accel. pedal is depressed	Below 1.5 V 9 — 14 V
E7, 7 — E7, 22 VTA — E2 G-O — BR-Y	IG ON	Accel. pedal is released Accel. pedal is depressed	Below 0.3 — 0.8 V 3.2 — 4.9 V
* E8, 29 — E6, 16 L4 — E1 G — BR	IG ON	Transfer shift position H2 or H4 Transfer shift position L4	4 — 6 V Below 1.5 V
E5, 10 — E6, 16 PWR — E1 G-O — BR	IG ON	NORM Pattern PWR Pattern	Below 1.5 V 9 — 14 V

*: 4WD only

MATRIX CHART OF PROBLEM SYMPTOMS

If a normal code is displayed during the DTC check, but the trouble still occurs, check the circuits for each symptom in the order given in the charts on the following pages and proceed to the page given for troubleshooting.

The Matrix Chart is divided into 3 chapters.

Chapter 1: Electronic Circuit Matrix Chart

Chapter 2: On—Vehicle Repair Matrix Chart

Chapter 3: Off—Vehicle Repair Matrix Chart

When troubleshooting, check Chapter 1 first. If instructions are given in Chapter 1 to proceed to Chapter 2 or 3, proceed as instructed.

1. If the instruction "Proceed to next circuit inspection shown on matrix chart" is given in the flow chart for each circuit, proceed to the circuit with the next highest number in the table to continue the check.
2. If the trouble still occurs even though there are no abnormalities in any of the other circuits, then check or replace the ECM.

Chapter 1. Electronic Circuit

See Page		3RZ-FE : EG-276 5VZ-FE : EG-287	AT-71	AT-64	AT-68	3RZ-FE : EG-219 5VZ-FE : EG-232	AT-73	AT-83
Suspect Area		No. 1 vehicle speed sensor circuit	No. 2 vehicle speed sensor circuit	Shift solenoid valve No. 1, No. 2 circuit	Shift solenoid valve SL circuit	Throttle position sensor circuit	Park/neutral position switch circuit	Stop light switch circuit
Symptom								
Vehicle does not move in any forward position and reverse position								
Vehicle does not move in a particular position or positions								
No up-shift	1st → 2nd	3	4	1		2	6	
	2nd → 3rd	3	4	1		2	6	
	3rd → O/D	3	4	2		5	6	
No down-shift	O/D → 3rd	3	4	1		2		
	3rd → 2nd	3	4	1		2		
	2nd → 1st	3	4	1		2		
Lock-up does not engage		3	4		1	2	6	5
Lock-up does not disengage		3	4		1	2		5
Shift point too high or too low		3	4			1		
Up-shifts to 2nd while in L position							1	
Up-shifts to 3rd while in 2 position								
Up-shifts to O/D from 3rd while O/D main switch is OFF								
Up-shifts to O/D from 3rd while engine is cold								
Harsh engagement	N → D				1	3	4	
	Lock-up	3	4		1	2		
	Any driving position	4	5		1	3		
Slip or Shudder	Forward and reverse							
	A particular position							
No engine braking								
Poor acceleration		2	3	4	5	1		
No kick-down		2		3		1		
No pattern select								
Large shift shock or engine stalls when starting off or stopping					1			2

AT-62	AT-78	AT-78	AT-76	3RZ-FE : EG-215 5VZ-FE : EG-225	IN-29	AX-58	AT-60
ATF temperature sensor circuit	Pattern select switch circuit	O/D main switch & O/D OFF indicator light circuit	O/D cancel signal circuit	Engine coolant temperature sensor circuit	ECM	On-vehicle repair matrix chart	OFF-vehicle repair matrix chart
						1	2
						1	2
					8	5	7
					8	5	7
		1	7	8	11	9	10
					6	5	
					6	5	
					7	5	6
				7	10	8	9
					8	6	7
	2				5		
					2		
					1		
				1	4	2	3
2					7	5	6
					7	5	6
2					8	6	7
						1	2
						1	2
						1	2
						6	7
					5		4
	1				2		
					4		3

AT

Chapter 2. On—Vehicle Repair

★ : A340E, A340F, A340H AUTOMATIC TRANSMISSION Repair Manual (Pub.No.RM391U)
or A340F, A343F AUTOMATIC TRANSMISSION Repair Manual (Pub.No.RM479U)

See Page		AT-43	AT-43	★	★	★	★	★	★
Suspect Area		Throttle cable	Transmission control rod	Oil strainer	Parking lock pawl	Manual valve	Throttle valve	1-2 shift valve	2-3 shift valve
Symptom									
Vehicle does not move in any forward position and reverse position		1	2		5	3			
Vehicle does not move in R position									
Vehicle does not move in a particular positions or positions (except R position)									
No up-shift	1st → 2nd							1	
	2nd → 3rd								1
	3rd → O/D								
No down-shift	O/D → 3rd								
	3rd → 2nd								1
	2nd → 1st							1	
Lock-up does not engage or Lock-up does not disengage									
Harsh engagement	N → D								
	Lock-up								
	N → R								
	N → L								
	1st → 2nd (D position)								
	1st → 2nd (2 position)								
	2nd → 3rd → O/D								
	1st → 2nd → 3rd → O/D								
	3rd → O/D						1		
	2nd → 3rd								
	3rd → O/D								
	O/D → 3rd								
Slip or Shudder	Forward and Reverse	1	2	3					
	Particular position	1	2						
No engine braking	1st								
	2nd								
No kick-down								1	2

★	★	★	★	★	★	★	★	★	★	★	★	★	AT-60
3-4 shift valve	Primary regulator valve	Lock-up relay valve	Accumulator control valve	Cut-back valve	C ₂ accumulator	Low coast modulator valve	B ₂ accumulator	2nd coast modulator valve	B ₀ accumulator	C ₀ accumulator	Pressure relief valve	Off-vehicle repair matrix chart	
	4											6	
												1	
												1	
												2	
												2	
1												2	
1													
												2	
		1										2	
			1									2	
		1										2	
			1		2							3	
						1							
			1				2						
			1				2						
				1									
			2										
			1		2							3	
			1						2			3	
			1							2		3	
											4	5	
												3	
						1						2	
								1				2	

AT

Chapter 3. Off—Vehicle Repair

★ : A340E, A340F, A340H AUTOMATIC TRANSMISSION Repair Manual (Pub.No.RM391U)
or A340F, A343F AUTOMATIC TRANSMISSION Repair Manual (Pub.No.RM479U)

See Page		★	★	★	★	AT-17, 25	★
Suspect Area		O/D one-way clutch (Fo)	O/D brake (Bo)	O/D direct clutch (Co)	O/D planetary gear unit	Torque converter clutch	1st and reverse brake (B3)
Symptom							
Vehicle does not move in any forward position and reverse position		1	2	3	4	5	
Vehicle does not move in R position				5			4
Vehicle does not move in	D, 2 and L positions						
	D and 2 positions						
	2 position						1
	L position						
No up-shift	1st → 2nd						
	2nd → 3rd						
	3rd → O/D		1				
No down-shift	2nd → 1st						
Lock-up does not engage or Lock-up does not disengage						1	
Harsh engage- ment	N → D						
	N → R						2
	2nd → 3rd						
	3rd → O/D		2	1	3		
	O/D → 3rd		1				
	Lock-up					1	
Slip or Shudder	Forward and Reverse (After warm-up)	2		3		1	
	Forward and Reverse (Just after engine starts)					1	
	R position						2
	1st						
	2nd						
	3rd						
	O/D		1				
No engine braking	1st ~ 3rd			1			
	1st						1
	2nd						
Poor acceleration	All positions					1	
	O/D			1	2		
	Other than O/D		1				
	Other than 2nd						
	1st and 2nd						
	L and R positions						1
	R position						
Engine stalls when starting off or stopping						1	

★	★	★	★	★	★	★
2nd coast brake (B1)	Direct clutch (C2)	Front and rear planetary gear unit	Forward clutch (C1)	No. 2 one-way clutch (F2)	2nd brake (B2)	No. 1 one-way clutch (F1)
1	3	2				
			1			
				1		
2	3				1	
					1	2
	1					
1					2	
			1			
1	1					
	1					
			1	2		
2					1	3
	1					
1						
1					2	
	1					
			1			

AT

CIRCUIT INSPECTION

DTC	P0500	Vehicle Speed Sensor Malfunction (No. 1 Vehicle Speed Sensor)
-----	-------	--

See page 3RZ-FE EG-276, 5VZ-FE EG-286.

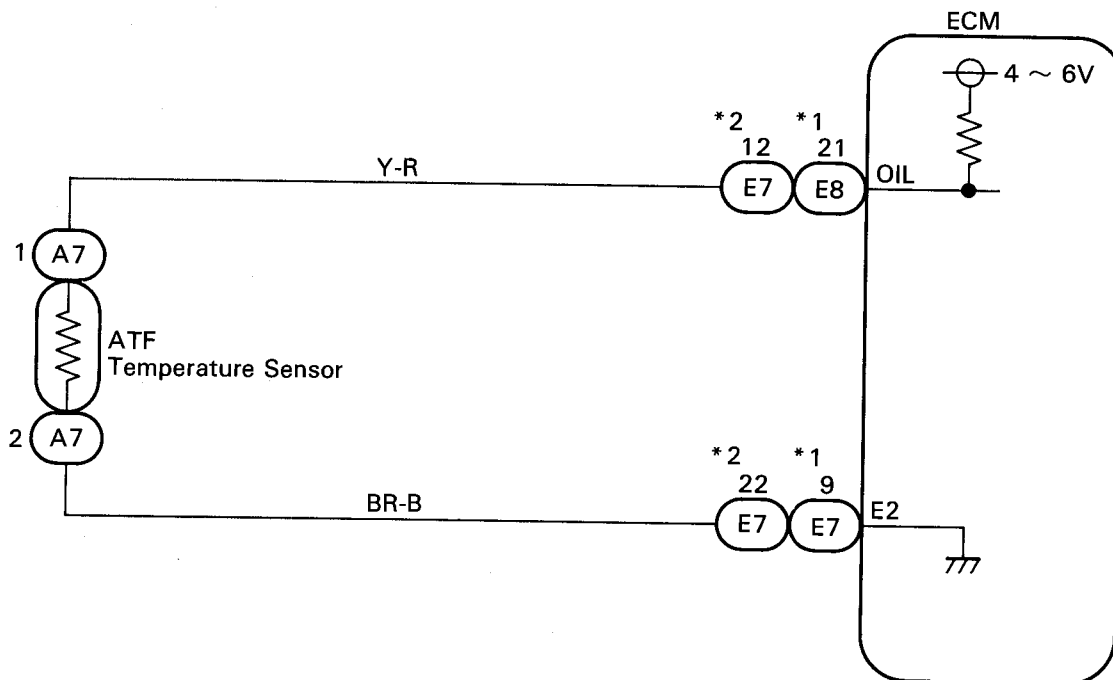
DTC	P0710	Transmission Fluid Temperature Sensor Circuit Malfunction (ATF Temperature Sensor)
-----	-------	--

CIRCUIT DESCRIPTION

The ATF temperature sensor converts fluid temperature into a resistance value which is input into the ECM.

DTC No.	DTC Detecting Condition	Trouble Area
P0710	Either a) or b) is detected for 0.5 sec. or more: a) Temperature sensor resistance less than 79 k Ω b) After the engine has been operating for 15 minutes or more, the resistance at the temperature sensor is more than 156 k Ω	• Open or short in ATF temperature sensor circuit • ATF temperature sensor • ECM

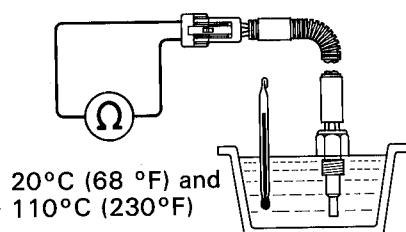
WIRING DIAGRAM



*1: 3RZ-FE

*2: 5VZ-FE

INSPECTION PROCEDURE

1 Check ATF Temperature Sensor.**P** Remove ATF temperature sensor.**C** Measure resistance between terminals of ATF temperature sensor at 20°C (68°F) and 110°C (230°F).

OK Resistance:

20°C (68°F):	Approx. 4,290 Ω
110°C (230°F):	Approx. 690 Ω

Q07637

OK**NG**

Replace ATF temperature sensor.

2 Check harness and connector between ATF temperature sensor and ECM.
(See page IN-24).**OK****NG**

Repair or replace harness or connector.

Check and replace ECM.

DTC**P0750**
P0755**Shift Solenoid A/B Malfunction**
(Shift Solenoid Valve No.1/No.2)

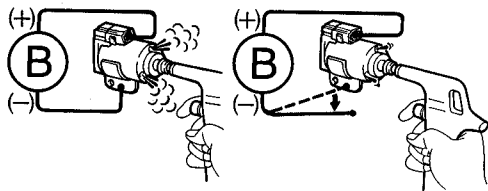
SYSTEM DESCRIPTION

The ECM uses signals from the vehicle speed sensor to detect the actual gear position (1st, 2nd, 3rd or O/D gear). The ECM then compares the actual gear with the shift schedule in the ECM memory to detect mechanical trouble of the shift solenoid valves and valve body.

DTC No.	DTC Detecting Condition	Trouble Area
P0750 P0755	During normal driving, the gear required by the ECM does not match the actual gear. (2 trip detection logic)	- Shift solenoid valve No.1/No.2 is stuck open or closed. - Valve body is blocked up or stuck.

Check the shift solenoid valve No.1 when DTC P0750 is output and check shift solenoid valve No.2 when DTC P0755 is output.

INSPECTION PROCEDURE

1 Check shift solenoid valve No.1 or No.2 operation.

- P**
1. Remove the oil pan.
 2. Remove the shift solenoid valve No.1 or No.2.

- C**
1. Applying 490 kPa (5 kgf/cm², 71 psi) of compressed air, check that the shift solenoid valves do not leak air.
 2. When battery positive voltage is supplied to the shift solenoid valves, check they open.

Q07640

OK

NG

Replace shift solenoid valve No.1 or No.2.

2 Check valve body (See page AT-58).

OK

NG

Repair or replace valve body.

AT

Repair the transmission (See page AT-14, 19).

DTC

P0753
P0758Shift Solenoid A/B Electrical Malfunction
(Shift Solenoid Valve No. 1/No. 2)

CIRCUIT DESCRIPTION

Shifting from 1st to O/D is done in combination with ON and OFF of the shift solenoid valves No.1 and No.2 controlled by ECM. If an open or short circuit occurs in either of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valve to allow the vehicle to be operated safely (Fail safe function).

Fail Safe Function

If either of the shift solenoid valve circuits develops an open or a short, the ECM turns the other shift solenoid ON and OFF to shift to the gear positions shown in the table below. The ECM also turns the shift solenoid valve SL OFF at the same time. If both solenoids are malfunction, hydraulic control cannot be done electronically so it must be done manually.

Manual shifting as shown in the following table must be done. (In the case of a short circuit, the ECM stops sending current to the short circuited solenoid).

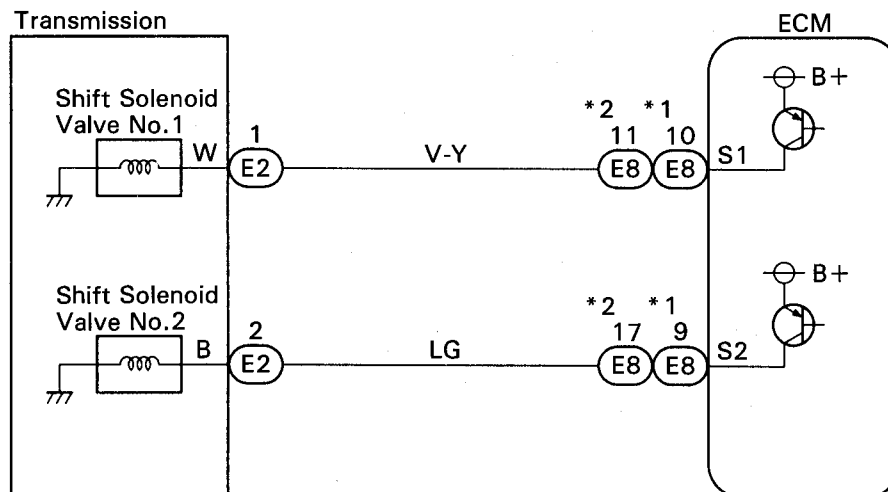
Position	NORMAL			SHIFT SOLENOID VALVE NO.1 MALFUNCTIONING			SHIFT SOLENOID VALVE NO.2 MALFUNCTIONING			BOTH SOLENOIDS MALFUNCTIONING	
	Solenoid valve		Gear	Solenoid valve		Gear	Solenoid valve		Gear	Gear when shift selector is manually operated	
	No.1	No.2		No.1	No.2		No.1	No.2			
D	ON	OFF	1st	X	ON	3rd	ON	X	1st	O/D	
	ON	ON	2nd	X	ON	3rd	OFF	X	O/D	O/D	
	OFF	ON	3rd	X	ON	3rd	OFF	X	O/D	O/D	
	OFF	OFF	O/D	X	OFF	O/D	OFF	X	O/D	O/D	
2	ON	OFF	1st	X	ON	3rd	ON	X	1st	3rd	
	ON	ON	2nd	X	ON	3rd	OFF	X	3rd	3rd	
	OFF	ON	3rd	X	ON	3rd	OFF	X	3rd	3rd	
L	ON	OFF	1st	X	OFF	1st	ON	X	1st	1st	
	ON	ON	2nd	X	ON	2nd	ON	X	1st	1st	

X: Malfunctions

Check the shift solenoid valve No. 1 when DTC P0753 is output and check the shift solenoid valve No. 2 when DTC P0758 is output.

DTC No.	DTC Detecting Condition	Trouble Area
P0753 P0758	The ECM checks for an open or short circuit in the shift solenoid valves No.1 and No.2 circuit when it changes. The ECM records DTC P0753 or P0758 if condition a) or b) is detected once, but it does not light up MIL. After ECM detects condition a) or b) continuously 8 times or more in one-trip, it causes the MIL light up until condition a) or b) disappears. After that, if the ECM detects condition a) or b) once, it starts lighting up MIL again. a) When the solenoid is energized, the solenoid resistance is 8 Ω or less and is counted b) When the solenoid is not energized, the solenoid resistance is 100 kΩ or more and is counted	- Solenoid valve - Open or short in shift solenoid valve No.1 or No.2 circuit - ECM

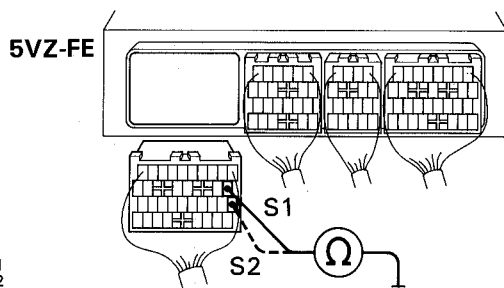
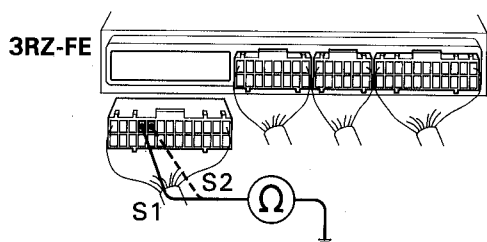
WIRING DIAGRAM



* 1: 3RZ-FE

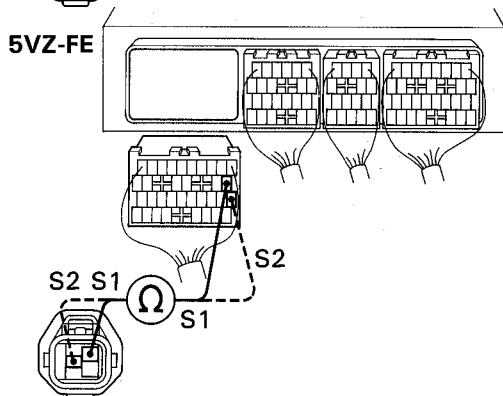
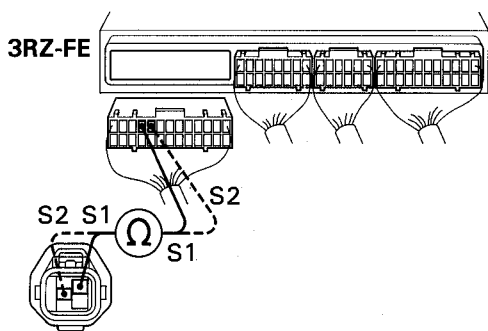
* 2: 5VZ-FE

INSPECTION PROCEDURE

1 Measure resistance between terminal S1 or S2 of ECM and body ground.Q07641
Q07642**NG****P** Disconnect the connector from the ECM.**C** Measure resistance between terminal S1 or S2 of ECM and body ground.**OK** Resistance: 11 ~ 15 Ω**OK**

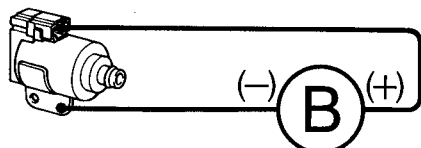
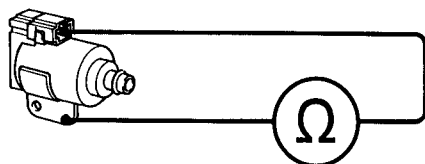
Check and replace ECM.

AT

2 Check harness and connector between ECM and automatic transmission solenoid connector.**P** Disconnect the solenoid connector on the automatic transmission.**C** Check harness and connector between terminals S1 or S2 of ECM and S1 or S2 terminals of solenoid connector.**OK** There is no open and no short circuit.Q07643
Q07644
Q05336**OK****NG**

Repair or replace harness or connector.

3 Check shift solenoid valve No.1 or No.2.

Q07645
Q07646

OK

- P**
1. Jack up the vehicle.
 2. Remove oil pan.
 3. Disconnect solenoid connector.
 4. Remove shift solenoid valve No.1 or No.2.

C Measure resistance between solenoid connector and solenoid body.

OK Resistance: 11 ~ 15 Ω

C Connect positive (+) lead to terminal of solenoid connector, negative (−) lead to solenoid body.

OK The solenoid makes an operating noise.

NG

Replace shift solenoid valve.

Repair or replace solenoid wire.

DTC

P0770

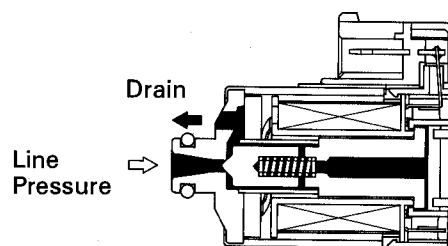
Shift Solenoid E Malfunction
(Shift Solenoid Valve SL)

AT

SYSTEM DESCRIPTION

The ECM uses the signals from the throttle position sensor, air-flow meter and crankshaft position sensor to monitor the engagement condition of the lock-up clutch.

Then the ECM compares the engagement condition of the lock-up clutch with the lock-up schedule in the ECM memory to detect mechanical trouble of the shift solenoid valve SL, valve body and torque converter clutch.



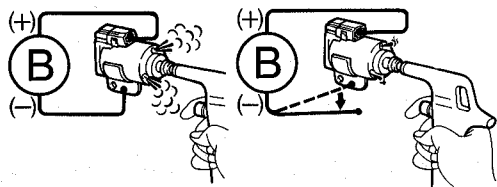
Q06995

DTC No.	DTC Detecting Condition	Trouble Area
P0770	Lock-up does not occur when driving in the lock-up range (normal driving at 80 km/h [50 mph], or lock-up remains ON in the lock-up OFF range. (2 trip detection logic)	• Shift solenoid valve SL is stuck open or closed. • Valve body blocked up or stuck. • Lock-up clutch

INSPECTION PROCEDURE

1

Check shift solenoid valve SL operation.



Q07640

P Remove shift solenoid valve SL from valve body.

- C**
1. Applying 490 kPa (5 kgf/cm², 71 psi) of compressed air, check that the solenoid valve does not leak air.
 2. When battery positive voltage is supplied to the shift solenoid valve, check it opens.

OK

NG

Replace shift solenoid valve SL.

2

Check valve body (See page AT-76).

OK

NG

Repair or replace valve body.

Replace torque converter clutch (See pages AT-18, 25).

AT

DTC

P0773

Shift Solenoid E Electrical Malfunction
(Shift Solenoid Valve SL)

CIRCUIT DESCRIPTION

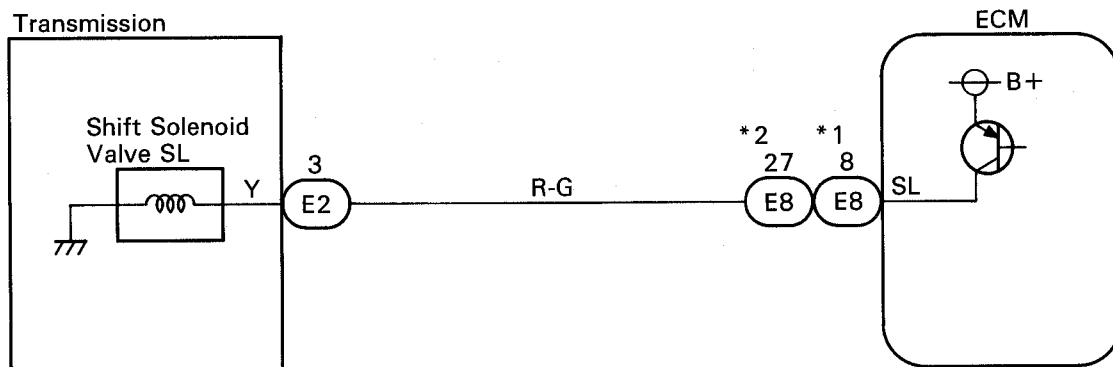
The shift solenoid valve SL is turned ON and OFF by signals from the ECM to control the hydraulic pressure acting on the lock-up relay valve, which then controls operation of the lock-up clutch.

Fail safe Function

If the ECM detects a malfunction, it turns the shift solenoid valve SL OFF.

DTC No.	DTC Detecting Condition	Trouble Area
P0773	Either a) or b) are detected for 1 time. (2 trip detection logic) a) Solenoid resistance is 8 Ω or less short circuit when solenoid is energized. b) Solenoid resistance is 100 kΩ or more open circuit when solenoid is not energized.	• Open or short in shift solenoid valve SL circuit. • Shift solenoid valve SL • ECM

WIRING DIAGRAM



*1: 3RZ-FE

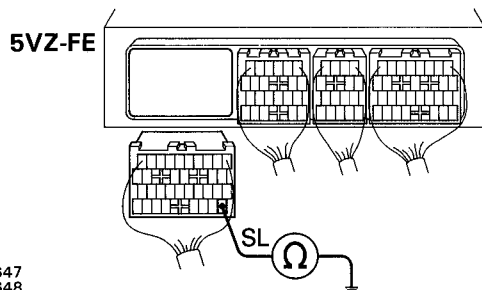
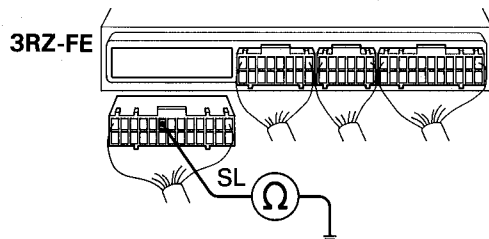
*2: 5VZ-FE

Q07379

INSPECTION PROCEDURE

1

Measure resistance between terminal SL of ECM and body ground.

Q07647
Q07648

NG

P

Disconnect the connector from ECM.

C

Measure resistance between terminal SL of ECM and body ground.

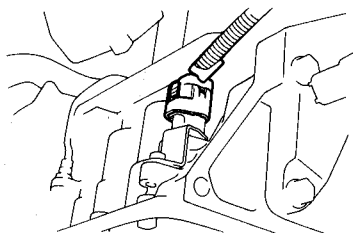
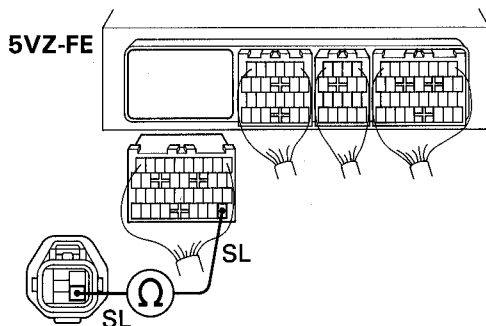
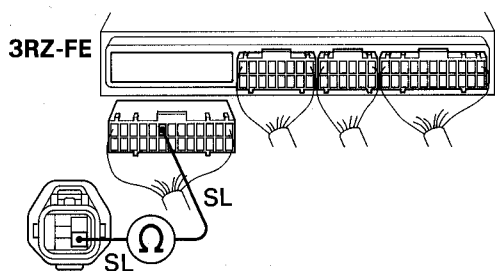
OK

Resistance: 11 ~ 15 Ω

OK

Check and replace ECM.

AT

2**Check harness and connector between ECM and automatic transmission solenoid connector.****P**

Disconnect the solenoid connector from transmission.

C

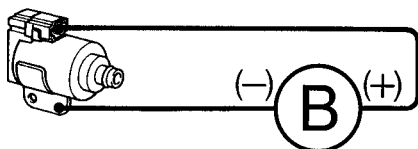
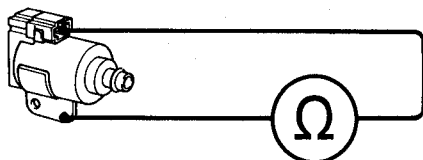
Check harness between terminal SL of ECM and terminal SL of automatic transmission solenoid connector.

OK

There is no open or short circuit.

OK**NG**

Repair or replace harness or connector between ECM and automatic transmission solenoid connector.

3**Check shift solenoid valve SL.****P**

1. Jack-up the vehicle.
2. Remove oil pan.
3. Disconnect shift solenoid valve SL connector.
4. Remove shift solenoid valve SL.

C

Measure resistance between shift solenoid valve SL connector terminal and solenoid body.

OK

Resistance: 11 ~ 15 Ω

C

Connect positive ⊕ lead to terminal of solenoid connector, negative ⊖ lead to solenoid body.

OK

The shift solenoid valve SL makes operation noise.

OK**NG**

Replace shift solenoid valve SL.

Check and replace or repair the solenoid wire.

Q07649
Q07650
Q05336Q07645
Q07646

CIRCUIT INSPECTION

DTC

P1700

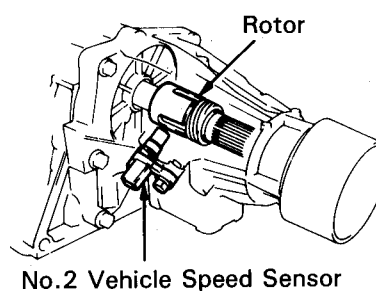
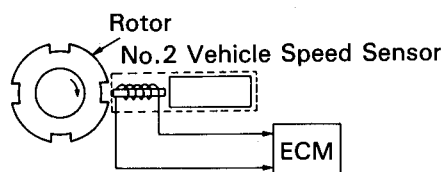
Speed Sensor No.2 (No.2 Vehicle Speed Sensor) Circuit Malfunction

CIRCUIT DESCRIPTION

The No.2 vehicle speed sensor detects the rotation speed of the transmission output shaft and sends signals to the ECM. The ECM determines the vehicle speed based on these signals. An AC voltage is generated in the No.2 vehicle speed sensor coil as the rotor mounted on the output shaft rotates, and this voltage is sent to the ECM.

The gear shift point and lock-up timing are controlled by the ECM based on the signals from this vehicle speed sensor and the throttle position sensor signal.

If the No.2 vehicle speed sensor malfunctions, the ECM uses input signals from the No.1 vehicle speed sensor as a back-up signal.



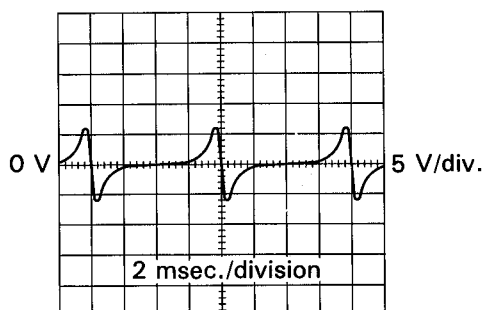
Q04812 Q04813

AT

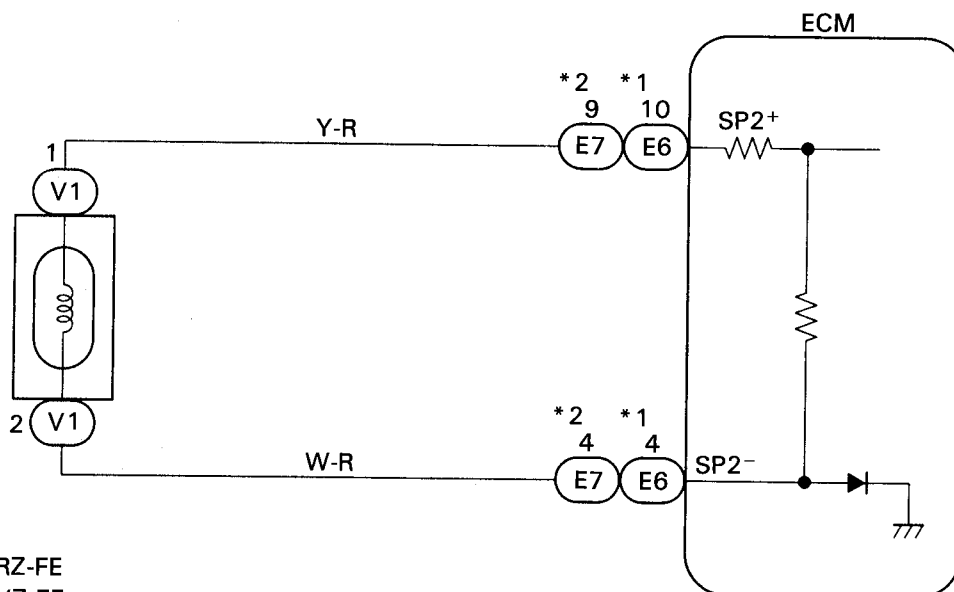
DTC No.	DTC Detecting Condition	Trouble Area
P1700	All conditions below are detected 500 times or more continuously. (2 trip detection logic) a) No signal from No.1 vehicle speed sensor is input to ECM while 4 pulses of No.2 vehicle speed sensor signal is sent. b) Vehicle speed: 9 km/h (5.6 mph) or more for at least 4 secs. c) Park/neutral position switch: OFF (Other than P or N position) d) T/R: Other than N position (A340F only).	- No.2 vehicle speed sensor - Open or short in No.2 vehicle speed sensor circuit - ECM

Reference

- Wave form between terminals SP2⁺ and SP2⁻ when vehicle speed is approx. 60 km/h (37 mph).



WIRING DIAGRAM



* 1: 3RZ-FE

* 2: 5VZ-FE

Q07396

INSPECTION PROCEDURE

1

Check vehicle speed value or continuity between terminals SP2⁺ and SP2⁻ of ECM.

AT

When using OBD II scan tool or TOYOTA hand-held tester:

- P** (1) Remove the DLC3 cover.
- (2) Connect the OBD II scan tool or TOYOTA hand-held tester to the DLC3.
- (3) Start the engine and OBD II scan tool or TOYOTA hand-held tester main switch ON.

C Drive the vehicle and read vehicle speed value.

OK Vehicle speed matches tester speed value.

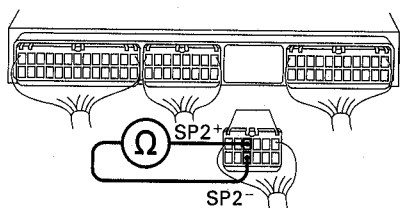
When not using OBD II scan tool or TOYOTA hand-held tester:

P Disconnect connector from ECM.

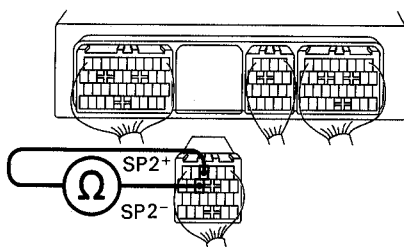
C Check resistance between terminals SP2⁺ and SP2⁻ of ECM.

OK Resistance: 560 ~ 680 Ω

3RZ-FE



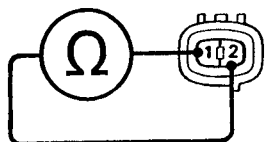
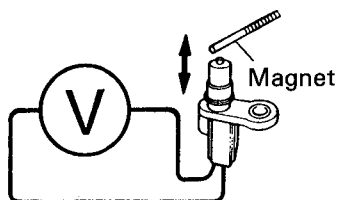
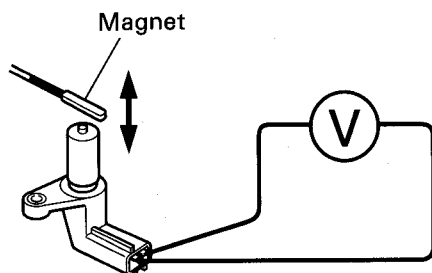
5VZ-FE

Q08458
Q08457

NG

OK

Check and replace ECM.

2**Check No.2 vehicle speed sensor.****A340E****A340F**Q08218
Q08292**OK****P** Remove No.2 vehicle speed sensor from transmission.**C** Measure resistance between terminals 1 and 2 of vehicle speed sensor.**OK** Resistance: 560 ~ 680 Ω

Reference

Check the vehicle speed sensor's function**C** Check voltage between terminals 1 and 2 the vehicle speed sensor when a magnet is put close to the front end of the vehicle speed sensor then taken away quickly.**OK** Voltage is generated intermittently.

Hint: The voltage generated is extremely low.

NG**Replace No.2 vehicle speed sensor.**

Check and repair harness and connector between ECM and No.2 vehicle speed sensor.
(See page IN-24).

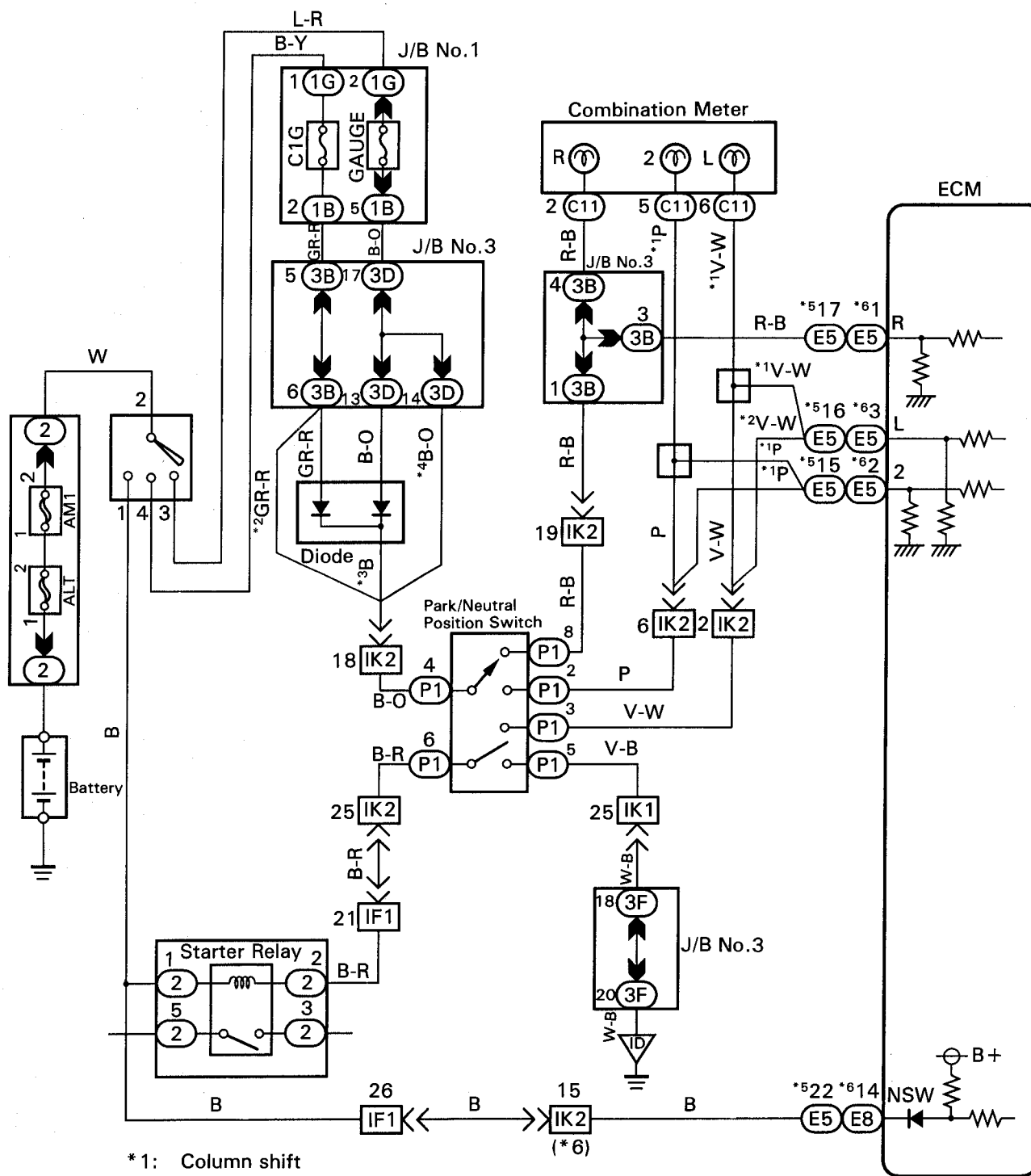
DTC**P1780****Park/Neutral Position Switch Malfunction****CIRCUIT DESCRIPTION**

The park/neutral position switch detects the shift lever position and sends signals to the ECM.

The ECM receives signals (NSW, R, 2 and L) from the park/neutral position switch. When the signal is not sent to the ECM from the park/neutral position switch, the ECM judges that the shift lever is in D position.

DTC No.	DTC Detecting Condition	Trouble Area
P1780	2 or more switches are ON simultaneously for "R", "N", "2" and "L" positions. (2 trip detection logic)	• Short in park/neutral position switch circuit • Park/neutral position switch • ECM
	When driving under conditions a) and b) for 30 seconds or more, the park/neutral position switch is ON (N position). (2 trip detection logic) a) Vehicle speed: 70 km/h (44 mph) or more b) Engine speed: 1,500 ~ 2,500 rpm	

WIRING DIAGRAM



- * 1: Column shift
- * 2: Floor shift
- * 3: Column shift (Canada)
- * 4: Column shift (USA)
- * 5: 3RZ-FE
- * 6: 5VZ-FE

INSPECTION PROCEDURE

1

Read PNP, REVERSE, 2ND, LOW signals.

When using TOYOTA hand-held tester:

- P** 1. Remove the DLC3 cover.
2. Connect the TOYOTA hand-held tester to the DLC3.
3. Turn ignition switch ON and TOYOTA hand-held tester main switch ON.
- C** Shift the shift lever to the R, 2 and L positions, and read the PNP, REVERSE, 2ND and LOW signal on the TOYOTA hand-held tester.

OK

Shift position	Signal
2	2ND OFF → ON
L	LOW OFF → ON
R	REVERSE OFF → ON
P, N	NSW OFF → ON

When not using TOYOTA hand-held tester:

- P** Turn ignition switch ON.
- C** Measure voltage between terminals NSW, 2, L of ECM and body ground when the shift lever is shifted to the following positions.

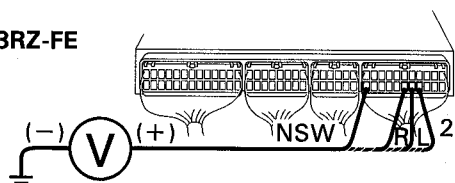
OK

Position	NSW-body ground	R-body ground	2-body ground	L-body ground
P,N	0 V	0 V	0 V	0 V
R	9 ~ 14V*	9 ~ 14 V	0 V	0 V
D	9 ~ 14V	0 V	0 V	0 V
2	9 ~ 14V	0 V	9 ~ 14 V	0 V
L	9 ~ 14V	0 V	0 V	9 ~ 14 V

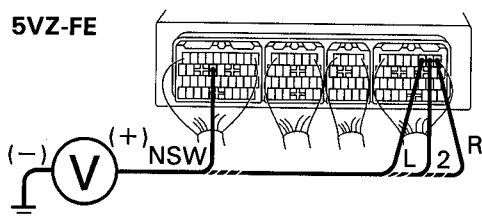
*: The voltage will drop slightly due to lighting up of the back up light.

ON

3RZ-FE



5VZ-FE

BE3840
Q08479
Q08480

NG

OK

Proceed to next circuit inspection shown on matrix chart (See page AT-58).

AT

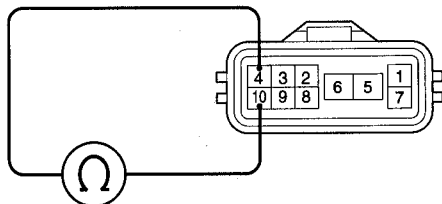
2**Check park/neutral position switch.****P**

1. Jack up the vehicle.
2. Remove the park/neutral position switch.

C

Check continuity between each terminal shown below when the shift lever is moved to each position.

○—○ Continuity



Terminal Position	6	5	4	7	8	10	9	2	3
P	○—○		○—○						
R			○—○		○—○				
N	○—○		○—○			○—○			
D			○—○				○—○		
2			○—○					○—○	
L			○—○						○—○

Q07657

OK**NG**

Replace park/neutral position switch.

3**Check harness and connector between battery and park/neutral position switch, ECM and park/neutral position switch (See page IN-24).****OK****NG**

Repair or replace harness and connector.

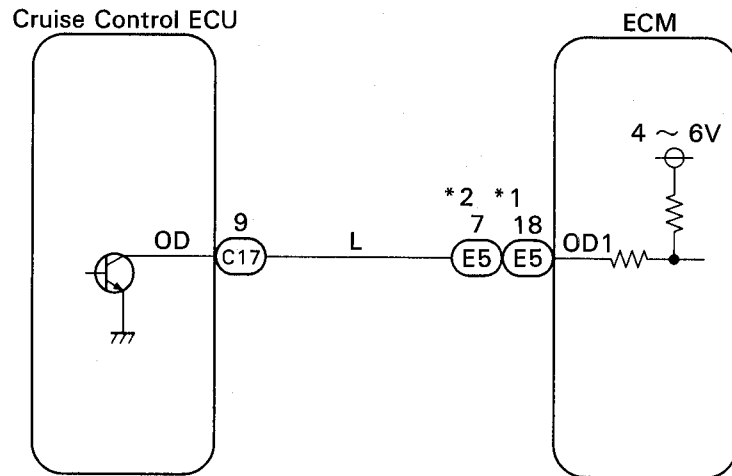
Check and replace ECM.

O/D Cancel Signal Circuit**CIRCUIT DESCRIPTION**

While driving uphill with cruise control activated, in order to minimize gear shifting and provide smooth cruising, overdrive may be prohibited temporarily under some conditions.

The cruise control ECU sends O/D cut signals to the ECM as necessary and the ECM cancels overdrive shifting until these signals are discontinued.

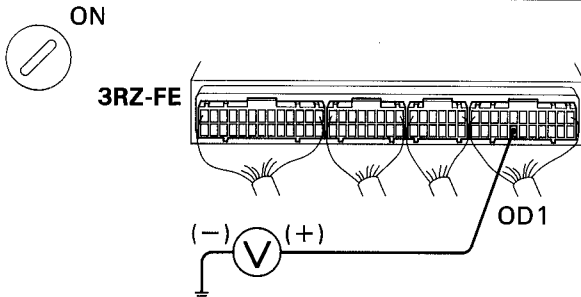
WIRING DIAGRAM



Q07397

INSPECTION PROCEDURE

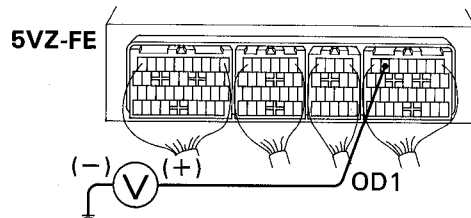
- 1** Check voltage between terminal OD1 of ECM and body ground.



P Turn ignition switch ON.

C Measure voltage between terminal OD1 of ECM and body ground.

OK Voltage: 4 ~ 6 V

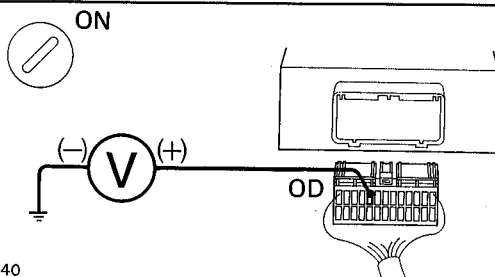
BE3840
Q07658
Q07659

NG

OK

Proceed to next circuit inspection shown on matrix chart (See page AT-58).

- 2** Check voltage between terminal OD of cruise control ECU harness side connector and body ground.



P 1. Disconnect cruise control ECU connector.
2. Turn ignition switch ON.

C Measure voltage between terminal OD of cruise control ECU harness side connector and body ground.

OK Voltage: 4 ~ 6 V

BE3840
Q07660

NG

OK

Check and replace cruise control ECU.

3

Check harness and connector between cruise control ECU and ECM.

OK

NG

Repair or replace harness or connector.

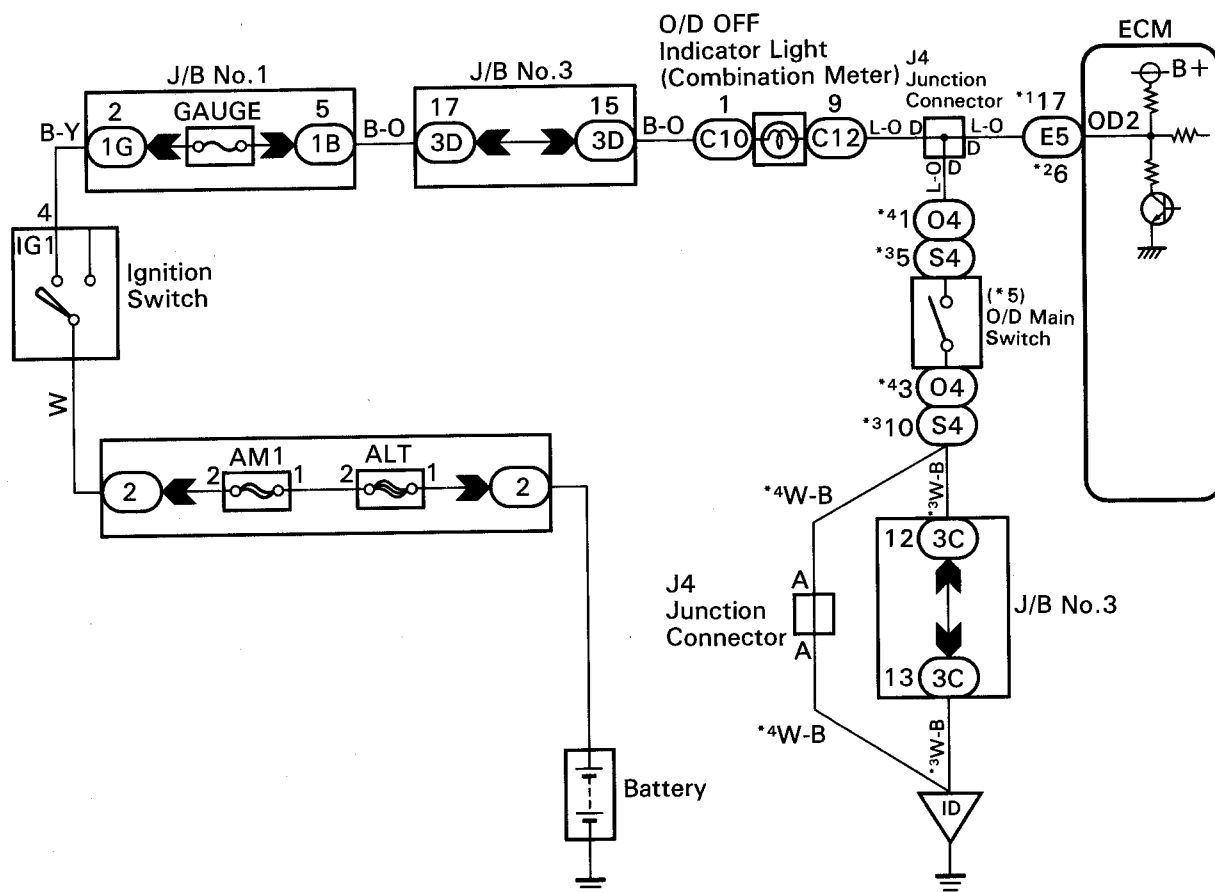
Check and replace ECM.

O/D Main Switch & O/D OFF Indicator Light Circuit

CIRCUIT DESCRIPTION

The O/D main switch contacts go open when the switch is pushed in and go closed when it is pushed out. In O/D main switch at OFF position, the O/D OFF indicator light lights up, and the ECM prohibits shifting to overdrive.

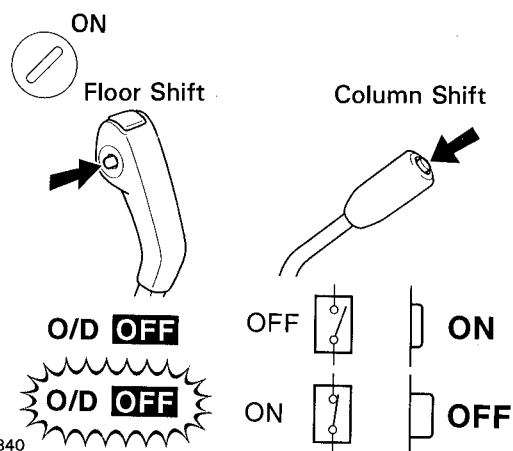
WIRING DIAGRAM



INSPECTION PROCEDURE

O/D OFF indicator light does not light up.

1 Check operation of O/D Main Switch.



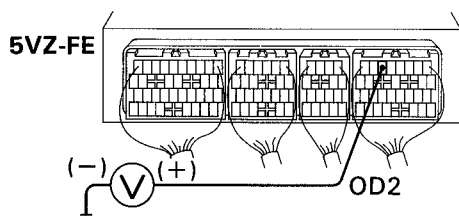
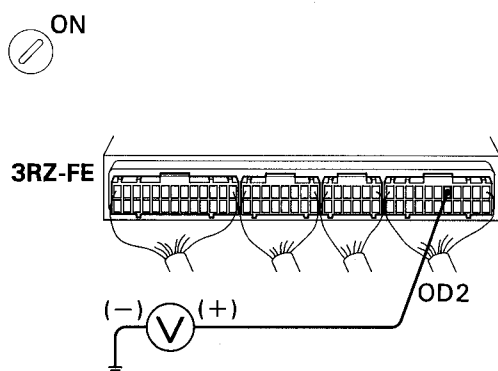
OK

- C** 1. Turn ignition switch ON.
2. Check "O/D OFF" indicator light when O/D main switch is pushed in to ON.
- OK** "O/D OFF" indicator light goes off.
- C** 3. Check "O/D OFF" indicator light when O/D main switch is pushed again, to OFF.
- OK** "O/D OFF" indicator light lights up.

NG

Go to step 4 .

2 Check OVRDRIVE CUT SW2 signal.



BE3840
Q07661
Q07662

NG

When using TOYOTA hand-held tester:

- P** 1. Remove the DLC3 cover.
2. Connect the TOYOTA hand-held tester to the DLC3.
3. Turn ignition switch ON and TOYOTA hand-held tester main switch ON.
- C** Read the OD2 signal on the TOYOTA hand-held tester.
- OK** O/D main switch pushed in:
OVRDRIVE CUT SW2 OFF
O/D main switch pushed out:
OVRDRIVE CUT SW2 ON

When not using TOYOTA hand-held tester:

- P** Turn ignition switch ON.
- C** Check voltage between terminal OD2 of ECM and body ground.

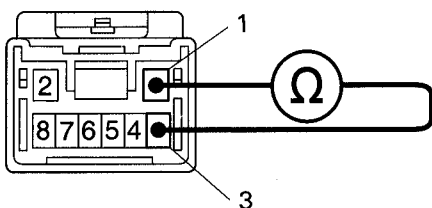
OK

O/D Main Switch	Voltage
OFF	Below 1.5 V
ON	9 ~ 14 V

OK

Proceed to next circuit inspection shown on matrix chart (See page AT-58).

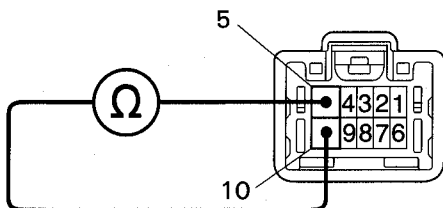
AT

3**Check harness and connector between O/D OFF indicator light and ECM**
(See page IN-24).**OK****NG****Repair or replace harness or connector.****Check and replace ECM.****4****Check O/D Main Switch.****Column Shift****C**

1. Disconnect O/D main switch connector.
2. Measure resistance at each terminal of O/D main switch connector.

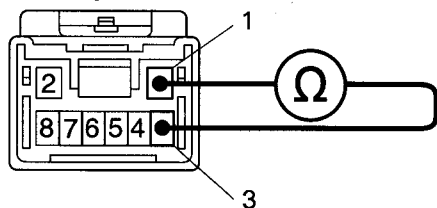
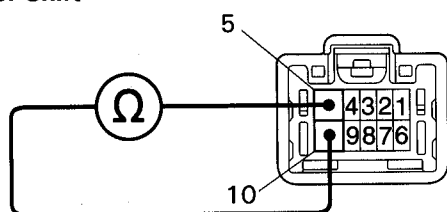
OK

O/D Main Switch	Resistance
ON	$\infty \Omega$ (open)
OFF	0 Ω (continuity)

Floor Shift

AT

Q08283
Q08284**OK****NG****Replace O/D main switch.****Check and replace combination meter.**
(See page BE-34).

O/D OFF indicator light remains ON**1 Check O/D Main Switch.****Column Shift****Floor Shift**Q08283
Q08284

- C** 1. Disconnect O/D main switch connector.
2. Measure resistance at each terminal of O/D main switch connector.

OK

O/D Main Switch	Resistance
ON	$\infty \Omega$ (open)
OFF	0 Ω (continuity)

OK**NG**

Replace O/D main switch.

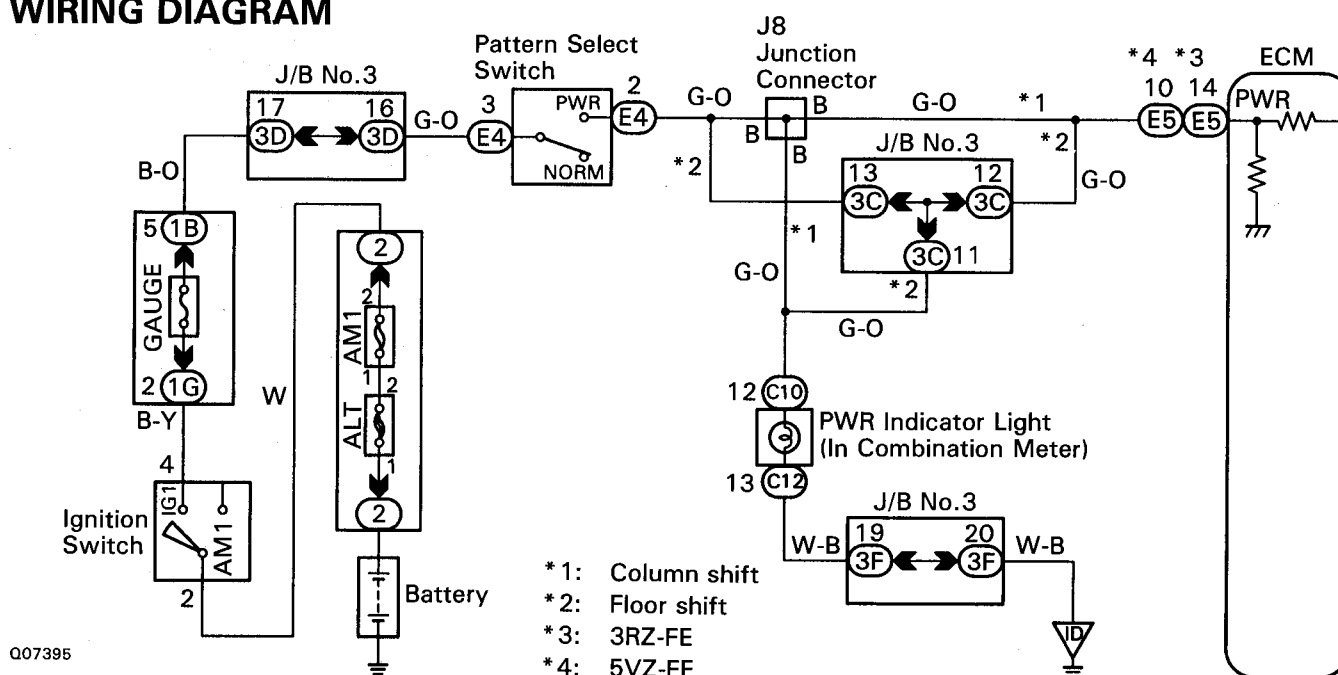
2 Check harness and connector between O/D OFF indicator light and O/D main switch, O/D OFF indicator light and ECM (See page IN-24).**OK****NG**

Repair or replace harness or connector.

Check and replace ECM.

Pattern Select Switch Circuit**CIRCUIT DESCRIPTION**

The ECM memory contains the shift programs for the NORMAL and POWER patterns, 2 position, L position and the lock-up patterns. Following the programs corresponding to the signals from the pattern select switch, the park/neutral position and other various sensors, the ECM switches the solenoid valves ON and OFF, and controls the transmission gear change and the lock-up clutch operation.



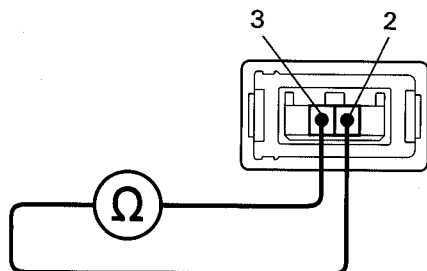
Proceed to next circuit inspection shown on matrix chart (See page AT-58).

2**Check pattern select switch.****P**

Disconnect pattern select switch connector.

C

Measure resistance between 2 and 3 terminals pattern select switch connector when the select switch is set to PWR and NORM positions.



Pattern	Resistance
PWR	0 Ω (continuity)
NORM	∞ Ω (open)

Q08286

OK**NG**

Replace pattern select switch.

3**Check harness and connector between battery and pattern select switch, pattern select switch and ECM (See page IN-24).****OK****NG**

Repair or replace harness or connector.

Check and replace ECM.

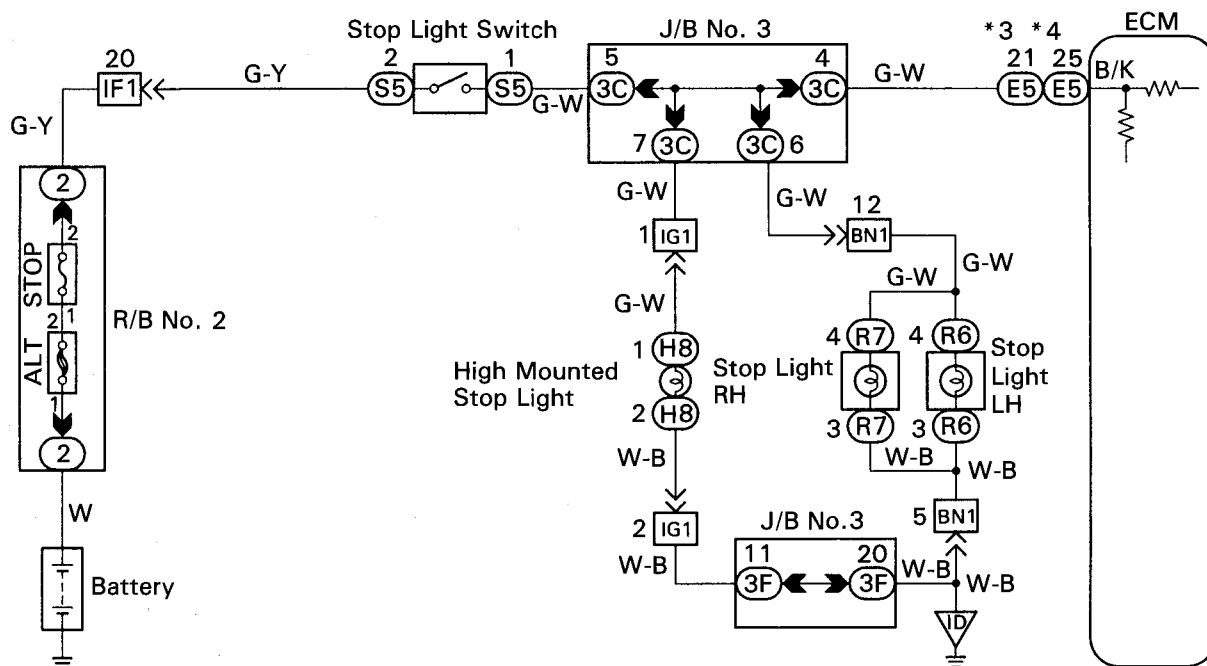
Stop Light Switch Circuit

CIRCUIT DESCRIPTION

The purpose of this circuit is to prevent the engine from stalling, while driving in lock-up condition, when brakes are suddenly applied.

When the brake pedal is operated, this switch sends a signal to ECM. Then the ECM cancels operation of the lock-up clutch while braking is in progress.

WIRING DIAGRAM



- *1: w/ Cruise Control System
- *2: w/o Cruise Control System
- *3: 3RZ-FE
- *4: 5VZ-FE

Q08623

AT

INSPECTION PROCEDURE

1

Check operation of stop light.

C

Check if the stop lights go on and off normally when the brake pedal is operated and released.

OK

NG

Check and repair stop light circuit.

2**Check STP signal.**

When using OBD II scan tool or TOYOTA hand-held tester:

- P** 1. Connect the OBD II scan tool or TOYOTA hand-held tester to the DLC3.
2. Turn ignition switch ON and OBD II scan tool or TOYOTA hand-held tester main switch ON.

C Read the STP signal on the TOYOTA hand-held tester.

OK Brake pedal is depressed: **STP ON**
Brake pedal is released: **STP OFF**

When not using OBD II scan tool or TOYOTA hand-held tester:

P Turn ignition switch ON.

C Check voltage between terminal B/K of ECM and body ground.

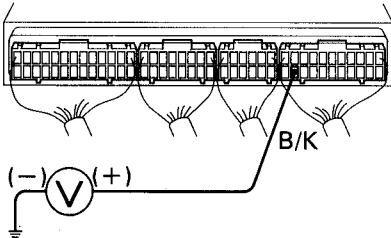
OK

Brake pedal	Voltage
Depressed	7.5 ~ 14 V
Released	Below 1.5 V

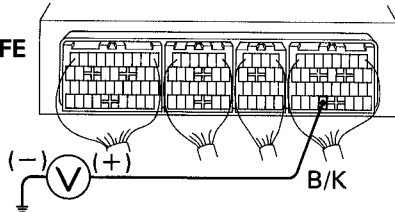
AT

ON

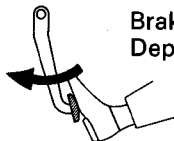
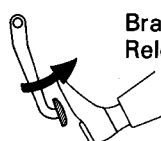
3RZ-FE



5VZ-FE



BE3840
P22300
BE3840
Q06991
Q06992
Q06993

Brake Pedal
DepressedBrake Pedal
Released**NG****OK**

Proceed to next circuit inspection shown on matrix chart (See page AT-58).

3**Check harness and connector between ECM and stop light switch.****OK****NG**

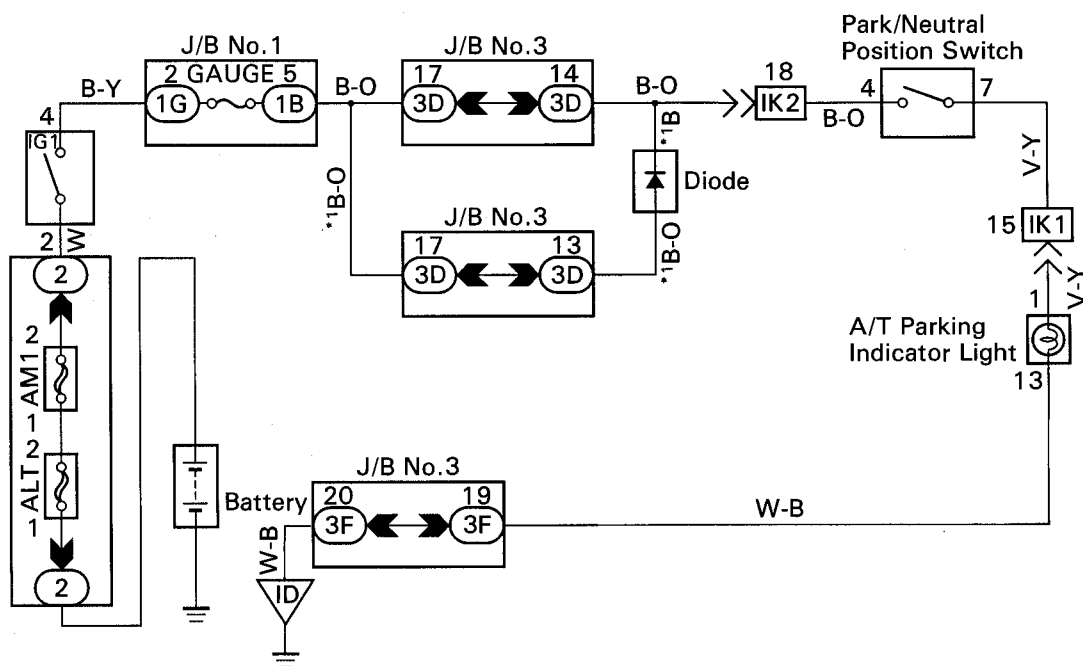
Repair or replace harness or connector.

Check and replace ECM.

A/T.P. (Automatic Transmission Parking) Indicator Circuit**CIRCUIT DESCRIPTION**

The propeller shaft and wheels are free even when the transmission shift lever is set to "P" as long as the transfer shift lever is in "neutral" position. The A/T.P. indicator light lights up to warn the driver that the propeller shaft and wheels are not locked. If the A/T.P. indicator light goes on, the transfer shift lever should be shifted out of "N" position.

WIRING DIAGRAM



*1: Canada Column only

Q08621

AT

INSPECTION PROCEDURE

1

Check park/neutral position switch (See page AT-73).

OK

NG

Replace park/neutral position switch.

2

Check transfer neutral position switch (See page TR-20).

NG

OK

Replace transfer neutral position switch.

3

Check combination meter (See page BE-34).

OK

NG

Repair or replace combination meter.

Check and replace harness and connector.
(See page IN-24)

SERVICE SPECIFICATIONS**SERVICE DATA**

ATOVX-08

3RZ—FE (A340E):

Line pressure (wheel locked)				
Engine idling				
	D position	363—422 kPa	3.7—4.2 kgf/cm ²	53—61 psi
	R position	490—588 kPa	5.0—6.0 kgf/cm ²	71—85 psi
AT stall (Throttle valve fully opened)				
	D position	932—1,177 kPa	9.5—12.0 kgf/cm ²	135—171 psi
	R position	1,294—1,638 kPa	13.2—16.7 kgf/cm ²	188—238 psi
Engine stall revolution	D and R positions	1,950 ± 150 rpm		
Time lag	N → D position	Less than 1.2 seconds		
	N → R position	Less than 1.5 seconds		
Engine idle speed (A/C OFF)				
	N position	700 ± 50 rpm		
Throttle cable adjustment (Throttle valve fully closed)		Between boot and face and inner cable stopper		
		0—1 mm	0—0.04 in.	
Torque converter clutch installation distance		More than 31.75 mm	More than 1.2500 in.	
Drive plate runout	Max.	0.20 mm	0.0079 in.	
Torque converter clutch runout	Max.	0.30 mm	0.0118 in.	

TIRE SIZE: 31 X 10.5R15**SHIFT POINT (NORM and PWR Pattern)**

Shift position	Shifting point		Vehicle speed km/h (mph)
D	Throttle valve fully opened	1→2	52—56 (32—35)
		2→3	93—101 (58—63)
		3→O/D	132—140 (82—87)
		O/D→3	126—134 (78—83)
		3→2	87—92 (54—57)
		2→1	41—45 (25—28)
	Throttle valve fully closed	3→O/D	32—36 (20—22)
		O/D→3	24—28 (15—17)
2	Throttle valve fully opened	1→2	52—56 (32—35)
		3→2	104—112 (65—70)
		2→1	41—45 (25—28)
L	Throttle valve fully opened	3→2	89—97 (55—60)
		2→1	50—55 (31—34)

LOCK—UP POINT (NORM and PWR Pattern)

D position	Lock—up ON km/h (mph)	Lock—up OFF km/h (mph)
Throttle valve opening 5%		
O/D Gear	76—81 (47—50)	70—75 (44—47)

TIRE SIZE: P255/75R15

SHIFT POINT (NORM and PWR Pattern)

Shift position	Shifting point	Vehicle speed km/h (mph)
D	Throttle valve fully opened 1→2	53–58 (33–36)
	2→3	96–104 (60–65)
	3→O/D	135–144 (84–89)
	O/D→3	129–138 (80–86)
	3→2	89–95 (55–59)
	2→1	42–47 (26–29)
	Throttle valve fully closed 3→O/D	33–37 (21–23)
	O/D→3	24–29 (15–18)
2	Throttle valve fully opened 1→2	53–58 (33–36)
	3→2	107–116 (66–72)
	2→1	42–47 (26–29)
L	Throttle valve fully opened 3→2	91–100 (57–62)
	2→1	52–56 (32–35)

LOCK-UP POINT (NORM and PWR Pattern)

D position Throttle valve opening 5%	Lock-up ON km/h (mph)	Lock-up OFF km/h (mph)
O/D Gear	78–83 (48–52)	72–77 (45–48)

AT

5VZ-FE (A340E and A340F):

Line pressure (wheel locked)				
Engine idling				
	D position	363–422 kPa	3.7–4.3 kgf/cm ²	53–61 psi
	R position	608–696 kPa	6.2–7.1 kgf/cm ²	88–101 psi
AT stall(Throttle valve fully opened)				
	D position	902–1,147 kPa	9.2–11.7 kgf/cm ²	131–166 psi
	R position	1,432–1,942 kPa	14.6–19.8 kgf/cm ²	208–282 psi
Engine stall revolution	D and R positions	2,150 ± 150 rpm		
Time lag	N → D position	Less than 1.2 seconds		
	N → R position	Less than 1.5 seconds		
Engine idle speed (A/C OFF)	N position	700 ± 50 rpm		
Throttle cable adjustment (Throttle valve fully closed)		Between boot and face and inner cable stopper		
		0–1 mm	0–0.04 in.	
Torque converter clutch installation distance		3RZ-FE	More than 31.75 mm	More than 1.2500 in.
		5VZ-FE	More than 17.95 mm	More than 0.7067 in.
Drive plate runout	Max.	0.20 mm	0.0079 in.	
Torque converter clutch runout	Max.	0.30 mm	0.0118 in.	

A340E:**SHIFT POINT (NORM and PWR Pattern)**

Shift position	Shifting point		Vehicle speed km/h (mph)
D	Throttle valve fully opened	1→2	64–69 (40–43)
		2→3	120–130 (75–81)
		3→O/D	162–172 (101–107)
		O/D→3	154–164 (96–102)
		3→2	111–120 (69–75)
		2→1	51–56 (32–35)
	Throttle valve fully closed	3→O/D	47–52 (29–32)
		O/D→3	25–30 (16–19)
2	Throttle valve fully opened	1→2	64–69 (40–43)
		3→2	128–137 (80–85)
		2→1	51–56 (32–35)
L	Throttle valve fully opened	3→2	109–118 (68–73)
		2→1	62–67 (38–42)

LOCK-UP POINT (NORM and PWR Pattern)

D position Throttle valve opening 5%	Lock-up ON km/h (mph)	Lock-up OFF km/h (mph)
O/D Gear	81–86 (50–53)	73–79 (45–49)

A340F:**TIRE SIZE: 31 X 10.5R15****SHIFT POINT (NORM and PWR Pattern)**

Shift position	Shifting point		Vehicle speed km/h (mph)
D	Throttle valve fully opened	1→2	58–63 (36–39)
		2→3	109–117 (68–73)
		3→O/D	147–156 (91–97)
		O/D→3	140–149 (87–93)
		3→2	100–109 (62–68)
		2→1	46–50 (29–31)
	Throttle valve fully closed	3→O/D	42–47 (26–29)
		O/D→3	22–27 (14–18)
2	Throttle valve fully opened	1→2	58–63 (36–39)
		3→2	116–125 (72–78)
		2→1	46–50 (29–31)
L	Throttle valve fully opened	3→2	99–107 (62–68)
		2→1	56–61 (35–38)

LOCK-UP POINT (NORM and PWR Pattern)

D position Throttle valve opening 5%	Lock-up ON km/h (mph)	Lock-up OFF km/h (mph)
O/D Gear	73–78 (45–48)	66–71 (41–44)

A340F:**TIRE SIZE: P225/75R15****SHIFT POINT (NORM and PWR Pattern)**

Shift position	Shifting point		Vehicle speed	km/h (mph)
D	Throttle valve fully opened	1→2	56–61	(35–38)
		2→3	105–114	(65–71)
		3→O/D	142–152	(88–94)
		O/D→3	135–145	(84–90)
	Throttle valve fully closed	3→2	97–106	(60–66)
		2→1	44–49	(27–30)
		3→O/D	41–46	(25–29)
		O/D→3	22–26	(14–16)
2	Throttle valve fully opened	1→2	56–61	(35–38)
		3→2	112–121	(70–75)
		2→1	44–49	(27–30)
L	Throttle valve fully opened	3→2	95–105	(59–65)
		2→1	54–59	(34–37)

LOCK—UP POINT (NORM and PWR Pattern)

D position	Lock—up ON	km/h (mph)	Lock—up OFF	km/h (mph)
Throttle valve opening 5%				
O/D Gear		71–76 (44–47)		64–69 (40–43)

TORQUE SPECIFICATIONS

Part tightened	N·m	kgf·cm	ft·lbf
Valve body x Transmission case	10	100	7
Oil strainer x Valve body (A340E)	10	100	7
Oil strainer case x Valve body (A340F)	10	100	7
Oil strainer x Oil strainer case (A340F)	6.9	70	61 in·lbf
Oil pan	7.4	75	65 in·lbf
Drain plug	20	205	15
Parking lock pawl bracket x Transmission case	7.4	75	65 in·lbf
Extension housing x Transmission case (A340E)	36	370	27
Extension housing x Rear mounting insulator	25	260	19
Rear support member x Rear mounting insulator (A340F)	18	185	13
Rear support member x Body (A340F)	95	970	70
Rear mounting insulator x Rear mounting bracket (A340E)	18	185	13
Rear mounting bracket x Frame (A340E)	58	590	42
Center support bearing x Body	36	370	27
Drive plate x Crankshaft (3RZ—FE)	74	750	54
Drive plate x Crankshaft (5VZ—FE)	83	850	61
Torque converter clutch x Drive plate	41	420	30
Front exhaust pipe x Exhaust manifold	62	630	46
Front exhaust pipe x TWC	48	490	35
Rear support member x Dynamic damper	61	620	44
Oil cooler pipe union nut	34	350	25
Transmission x Engine	71	730	53
Rear end plate x Transmission (3RZ—FE)	37	380	27
Rear end plate x Transmission (5VZ—FE)	18	185	13
Exhaust pipe clamp (3RZ—FE)	19	195	14
Exhaust pipe support bracket x Transmission (3RZ—FE)	71	730	53
Exhaust pipe support bracket x Transmission (5VZ—FE)	44	450	33
Exhaust pipe support bracket x Exhaust pipe (5VZ—FE)	44	450	33
Park/Neutral position switch	Nut	6.9	70
	Bolt	13	130
No.2 vehicle speed sensor		5.4	55
Speedometer driven gear sleeve x Locking plate		16	160
ATF Temperature sensor x Transmission		15	150
Solenoid valve x Valve body		10	100

AT

AT