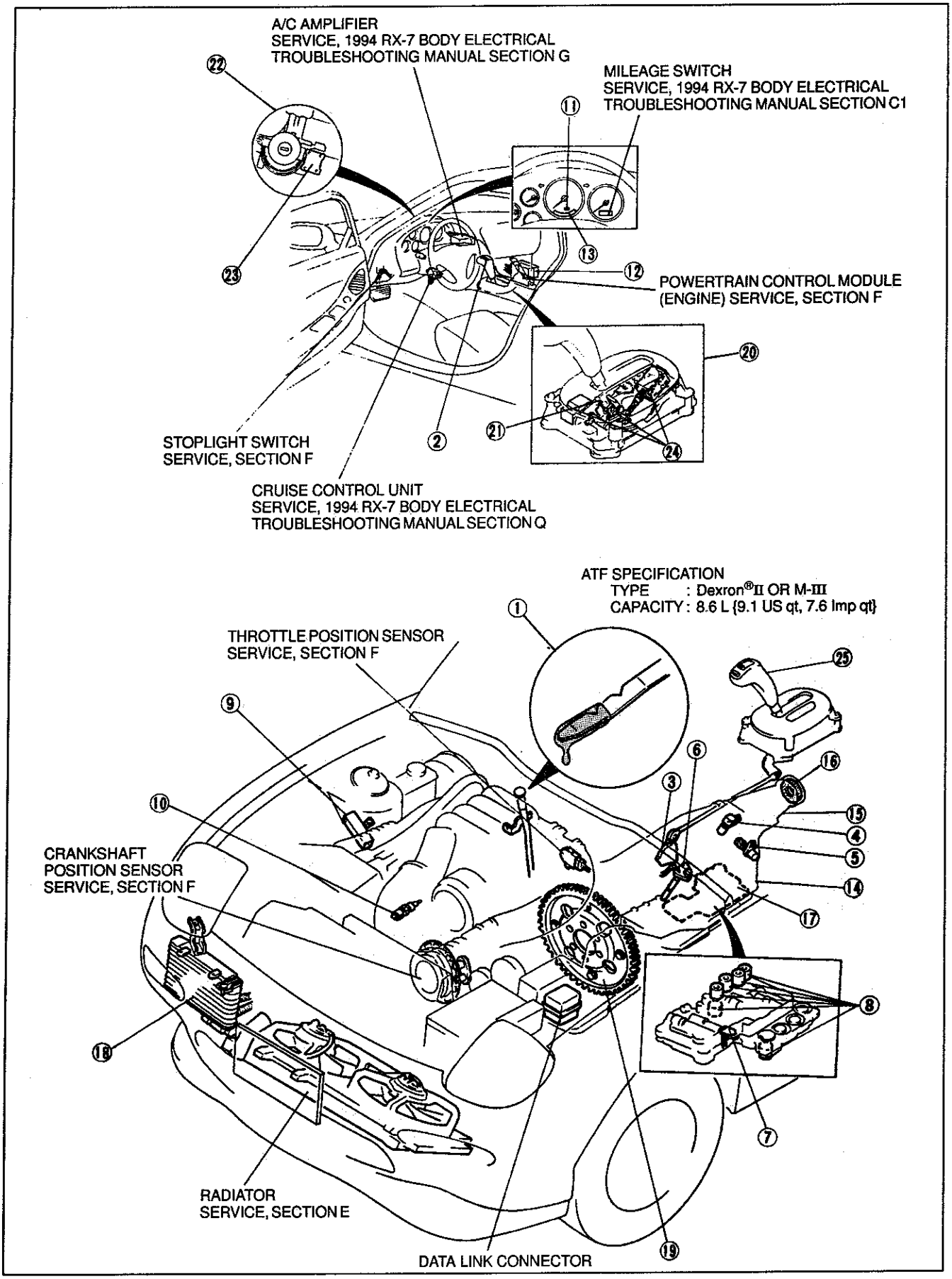
Many thanks to Lenny Terris for scanning this.

Before beginning any service procedure, refer to the 1994 RX-7 Body Electrical Troubleshooting Manual; see section S for air bag system service warnings and section J1 for audio antitheft system alarm conditions.

AUTOMATIC TRANSMISSION (Electronically Controlled)

INDEX

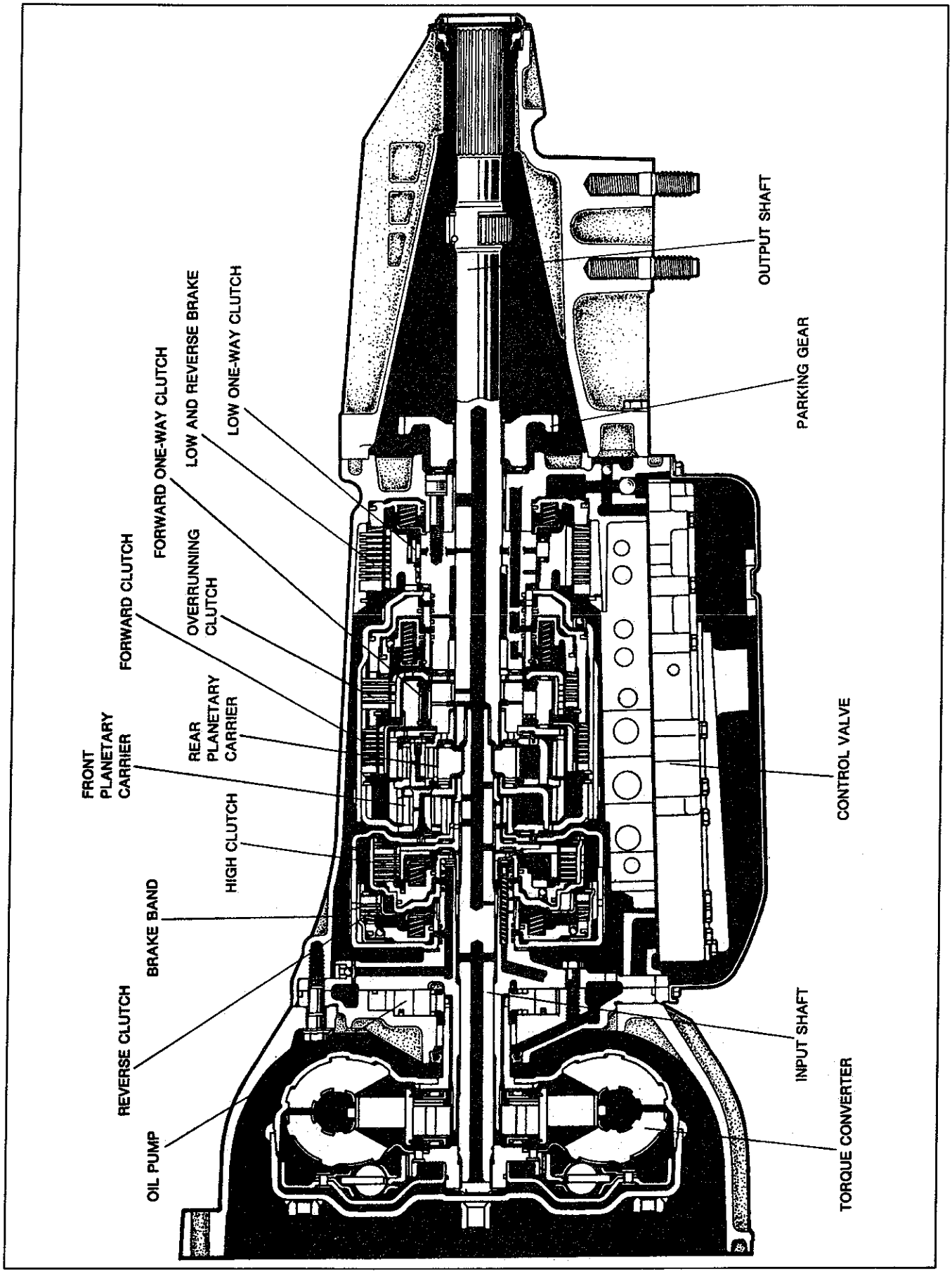

A/C AMPLIFIER
SERVICE, 1994 RX-7 BODY ELECTRICAL
TROUBLESHOOTING MANUAL SECTION G
MILEAGE SWITCH
SERVICE, 1994 RX-7 BODY ELECTRICAL
TROUBLESHOOTING MANUAL SECTION C1
POWERTRAIN CONTROL MODULE
(ENGINE) SERVICE, SECTION F
STOPLIGHT SWITCH
SERVICE, SECTION F
CRUISE CONTROL UNIT
SERVICE, 1994 RX-7 BODY ELECTRICAL
TROUBLESHOOTING MANUAL SECTION Q
ATF SPECIFICATION
TYPE : Dexron®II OR M-III
CAPACITY : 8.6 L {9.1 US qt, 7.6 Imp qt}
THROTTLE POSITION SENSOR
SERVICE, SECTION F
CRANKSHAFT
POSITION SENSOR
SERVICE, SECTION F
RADIATOR
SERVICE, SECTION E
DATA LINK CONNECTOR

OUTLINE

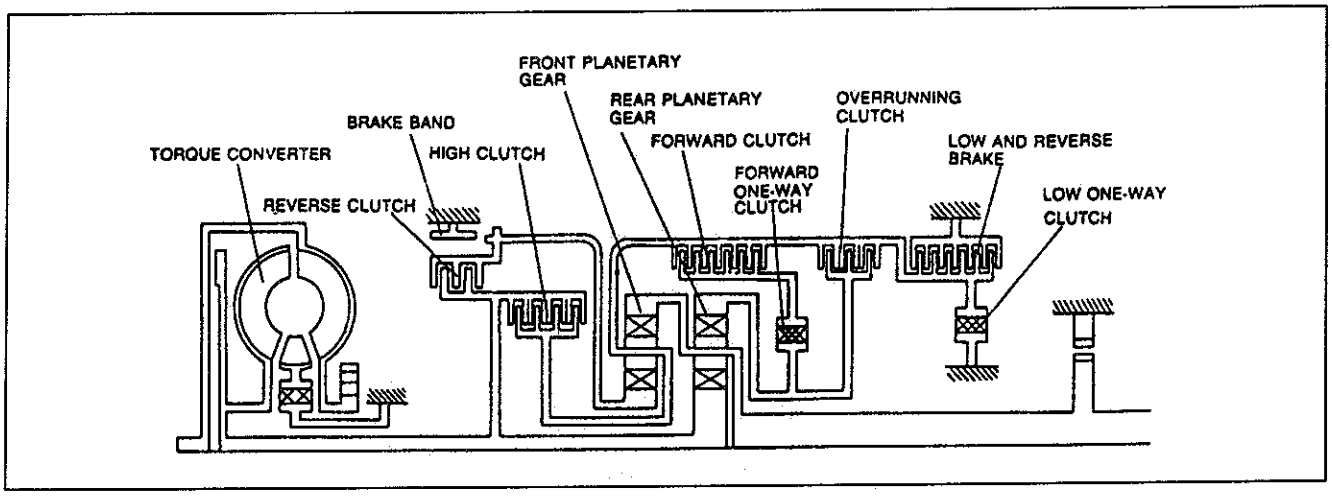
SPECIFICATIONS

Item \ Model			RB4A-EL
Gear ratio	1st gear		3.027
	2nd gear		1.619
	Third gear		1.000
	Fourth gear		0.694
	Reverse		2.272
Final gear ratio			3.909
Automatic transmission fluid (ATF)	Type		Dexron®II or M-III
	Capacity L {US qt, Imp qt}	Total	8.6 {9.1, 7.6}
		Oil pan	4.0 {4.2, 3.5}
Torque converter stall torque ratio			2.200
Number of drive / driven plates	Reverse clutch		2/2
	High clutch		4/7
	Forward clutch		6/6
	Overrunning clutch		3/5
	Low and reverse brake		7/7
Band servo mm {in}	Servo piston outer / inner diameter		80.0/50.0 {3.15/1.97}
	4GR servo piston outer diameter		72.0 {2.83}
Number of teeth on front planetary gear unit	Sun gear		33
	Pinion gear		21
	Internal gear		75
Number of teeth on front planetary gear unit	Sun gear		37
	Pinion gear		19
	Internal gear		75

CROSS-SECTIONAL VIEW



POWERFLOW DIAGRAM

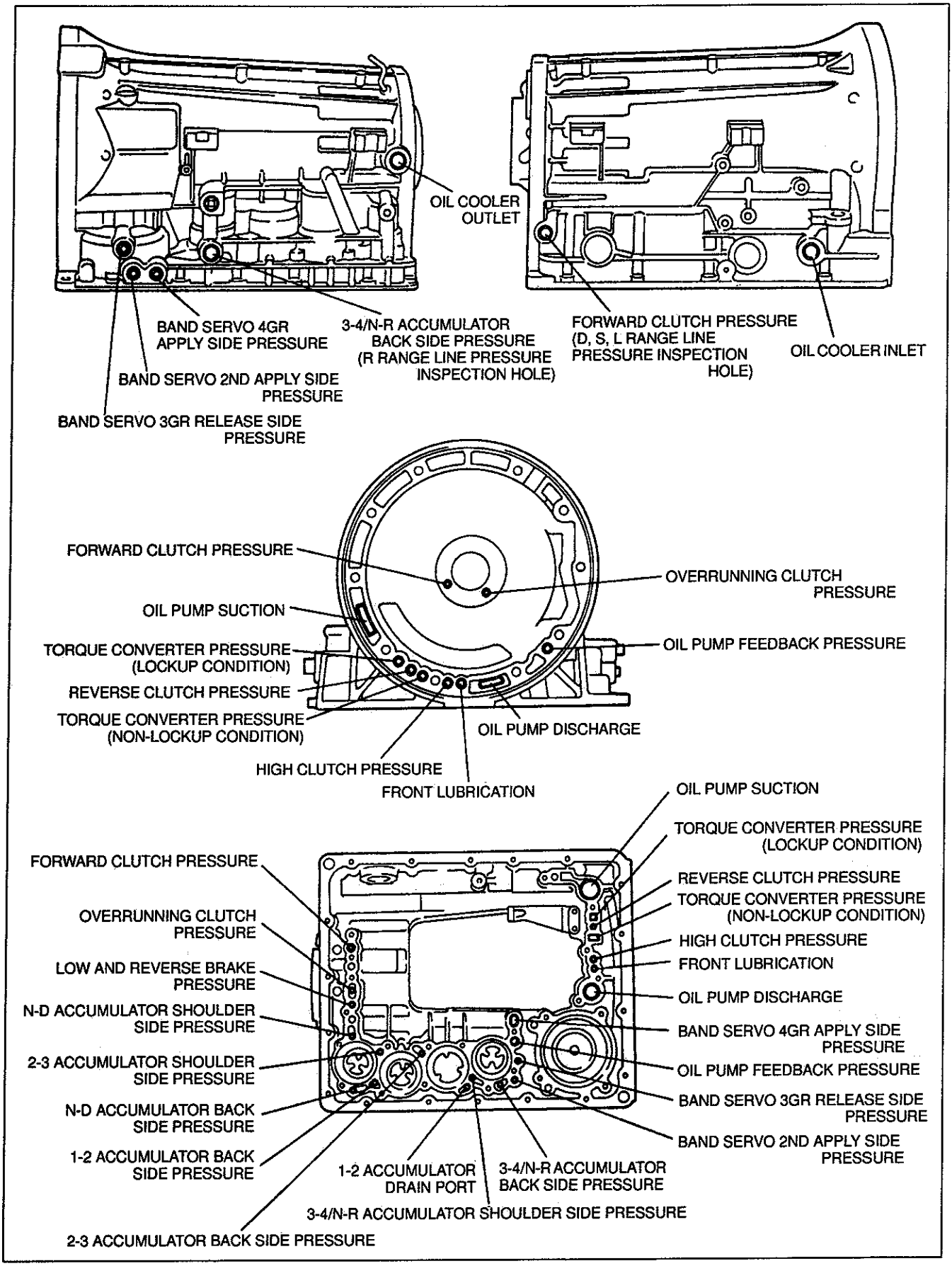


OPERATION OF COMPONENTS

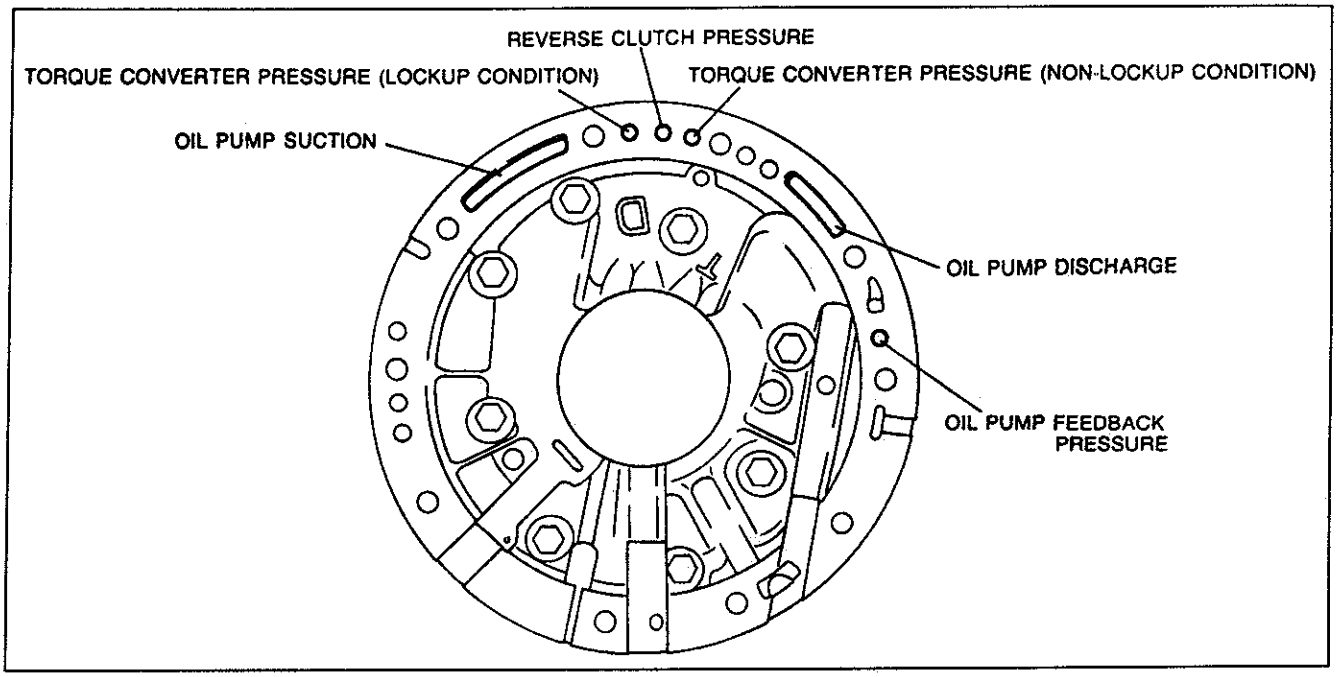
Range	Mode	Gear	Shift	Reverse clutch	High clutch	Forward clutch	Overrunning clutch	Band servo piston			Forward OWC	Low OWC	Low and reverse brake
								2nd applied	3GR released	4GR applied			
P	—	—	—										
R	—	Reverse	—	○									○
N	—	—	—										
D	Except hold	1	↕			○	■				●	●	
		2	↕			○	*3 ■	○			●		
		3	↕		○	○	*3 ■	*1 ⊗	⊗		●		
		4	↓		○	⊗		*2 ⊗	⊗	○			
	hold	2	↕			○	*3 ◎	○			●		
		3	↕		○	○	*3 ◎	*1 ⊗	⊗		●		
		*4 4			○	⊗		*2 ⊗	⊗	○			
S	Except hold	1	↕			○	△				●	●	
		2	↕			○	*3 △	○			●		
		3	↓		○	○	*3 △	*1 ⊗	⊗		●		
	hold	2	↑			○	*3 △	○			●		
		*4 3			○	○	*3 △	*1 ⊗	⊗		●		
L	Except hold	1	↕			○	*3 ○				●	●	○
		2	↓			○	*3 ○	○			●		
	hold	1	↑			○	*3 ○				●	●	○
		*4 2				○	*3 ○	○			●		

OWC: one-way clutch
*1 : Hydraulic pressure is applied to both 2nd gear applied side and Third gear released side of band servo piston However, because area of Third gear released side is larger than 2nd gear applied side, the brake band does not engage.
*2 : Hydraulic pressure is applied to Fourth gear applied side in the above conditions (*1) and brake band engages.
*3 : Indicates that engine braking is available as a result of operation of overrunning clutch.
*4 : Prevents engine overspeed.
○ : Constantly engaged.
● : Operates when accelerated.
△ : Engaged when throttle opening is below approximately 1.3/8.
◎ : Engaged when vehicle speed is above approximately 10 km/h {6.2 MPH} and throttle opening is below approximately 1.3/8.
■ : Engaged when vehicle speed is above approximately 10 km/h {6.2 MPH} and throttle opening is below approximately 1.3/8 (NORMAL A/C OFF mode)
⊗ : Engaged, but does not transmit power.

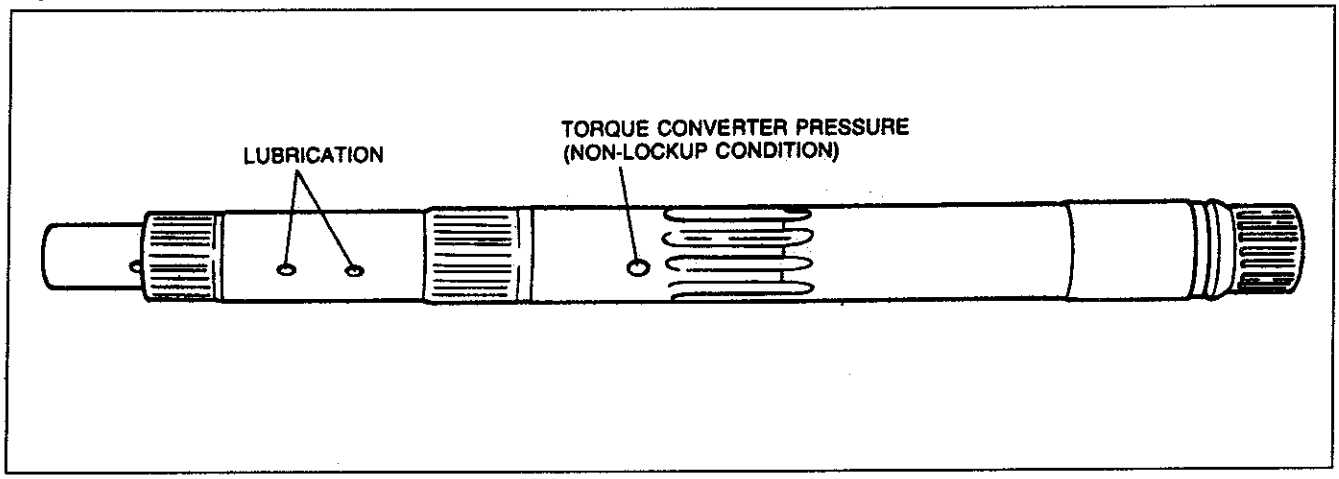
FLUID PASSAGE LOCATION
Transmission Case



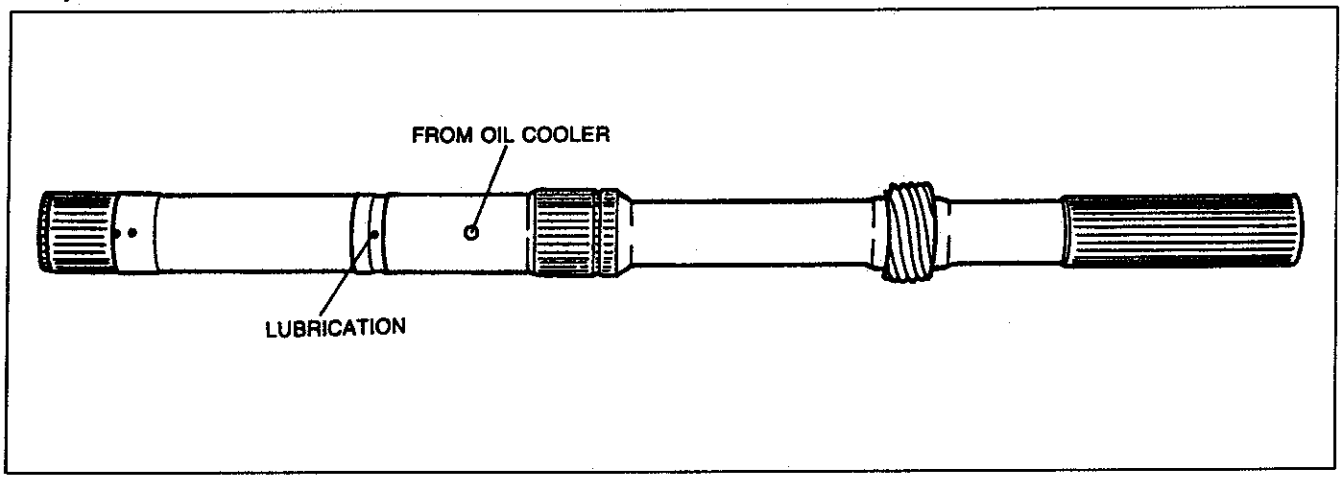
Oil Pump



Input Shaft

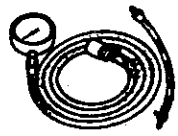
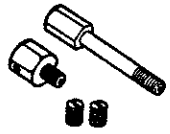
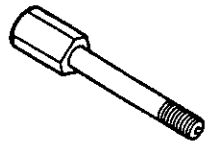


Output Shaft



MECHANICAL SYSTEM TEST

PREPARATION
SST

49 0378 400A Gauge set, oil pressure 	For oil pressure test	49 B019 901 Gauge, oil pressure 	For oil pressure test
49 F019 0A0 Adapter set 	For oil pressure test	49 F019 002 Adapter A (Part of 49 F019 0A0) 	For oil pressure test
49 F019 003 Adapter B (Part of 49 F019 0A0) 	For oil pressure test	49 F019 004 Screw (Part of 49 F019 0A0) 	For oil pressure test

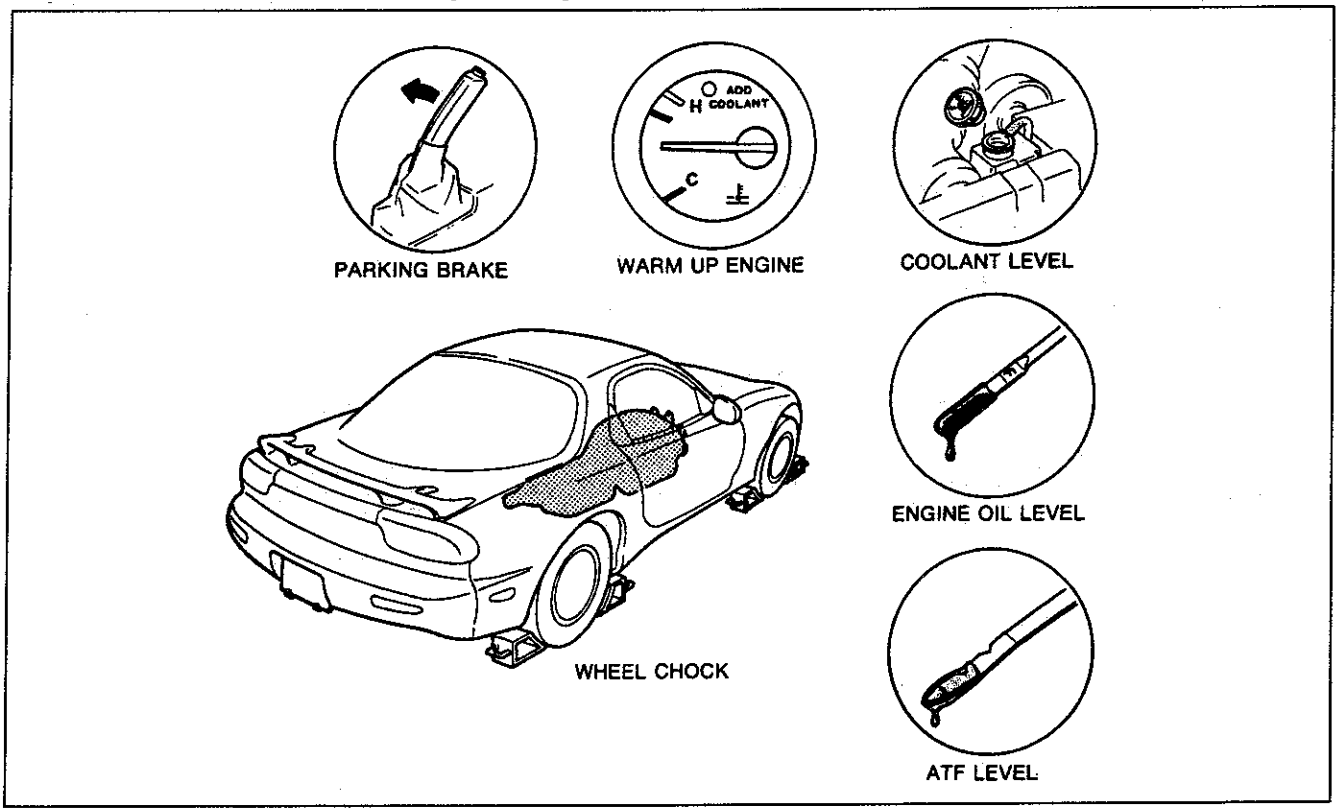
K

STALL TEST

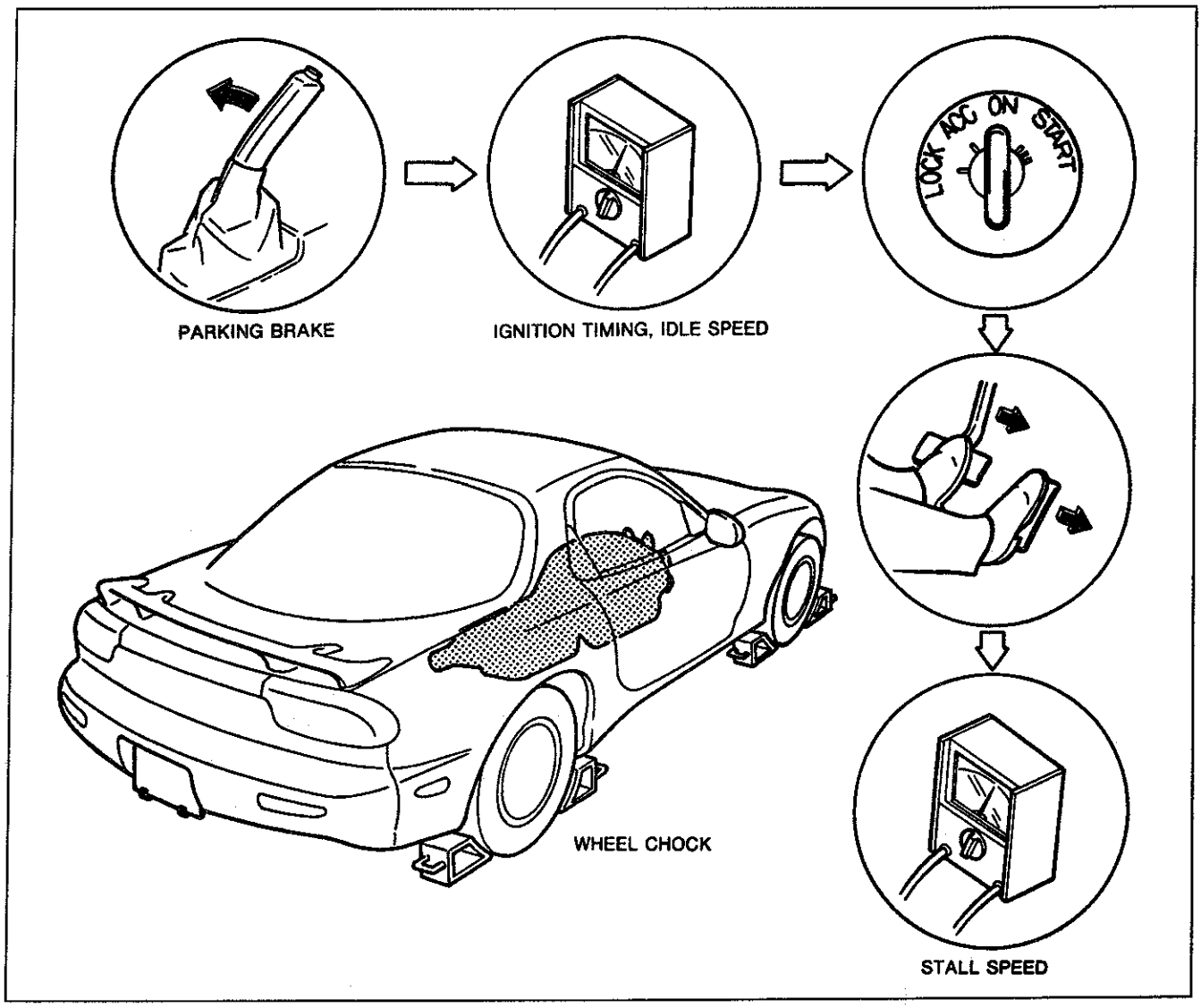
This test is performed to determine if there is slippage of the friction elements or malfunction of the hydraulic components.

Preparation

1. Engage the parking brake and use wheel chocks at the front and rear of the wheels.
2. Warm the engine thoroughly to raise the ATF temperature to operating level **60–70°C {140–158°F}**.
3. Check, and correct as necessary, the engine coolant, engine oil, and ATF levels before testing.



Procedure



1. Check the idle speed and ignition timing in P range. (Refer to section F.)

Caution
- **If the accelerator pedal is pressed for longer than 5 seconds while the brake pedal is pressed, the transmission could be damaged. Therefore, do steps 2 and 3 within 5 seconds of other.**

2. Firmly depress the brake pedal with the left foot, shift the selector lever to D range (except hold mode), and gradually depress the accelerator pedal with the right foot until the throttle valve is at wide opened throttle.
3. When the engine speed no longer increases, quickly read the speed and release the accelerator.
4. Shift the selector to N and let the engine idle for 1 minute or more to cool the ATF.

5. Perform a stall test for the following ranges in the same manner. Check the high clutch and brake band for slipping even if the engine speed is within specification.
   (1) D range (hold mode)
   (2) S range (except hold mode)
   (3) S range (hold mode)
   (4) L range (except hold mode)
   (5) L range (hold mode)
   (6) R range

Engine stall speed: 3,000–3,300 rpm

Evaluation of Stall Test

<table>
<tr><th colspan="2">Condition</th><th colspan="2">Possible Cause</th></tr>
<tr><td rowspan="5">Above specification</td><td rowspan="3">In all ranges</td><td rowspan="3">Insufficient line pressure</td><td>Worn oil pump</td></tr>
<tr><td>Oil leakage from oil pump, control valve, and/ or transmission case</td></tr>
<tr><td>Stuck pressure regulator valve</td></tr>
<tr><td>In D and S ranges (except hold mode)</td><td colspan="2">Forward clutch slipping
Forward one-way clutch slipping
Low one-way clutch slipping</td></tr>
<tr><td>In R range</td><td colspan="2">Low and reverse brake slipping
Reverse clutch slipping
Perform road test to determine whether problem is low and reverse brake or reverse clutch
a) Engine braking applied in L range 1st
...Reverse clutch slipping
b) Engine braking not applied in L range 1st
...Low and reverse brake slipping</td></tr>
<tr><td colspan="2" rowspan="2">Below specification</td><td colspan="2">Engine out of tune</td></tr>
<tr><td colspan="2">One-way clutch slipping within torque converter</td></tr>
</table>

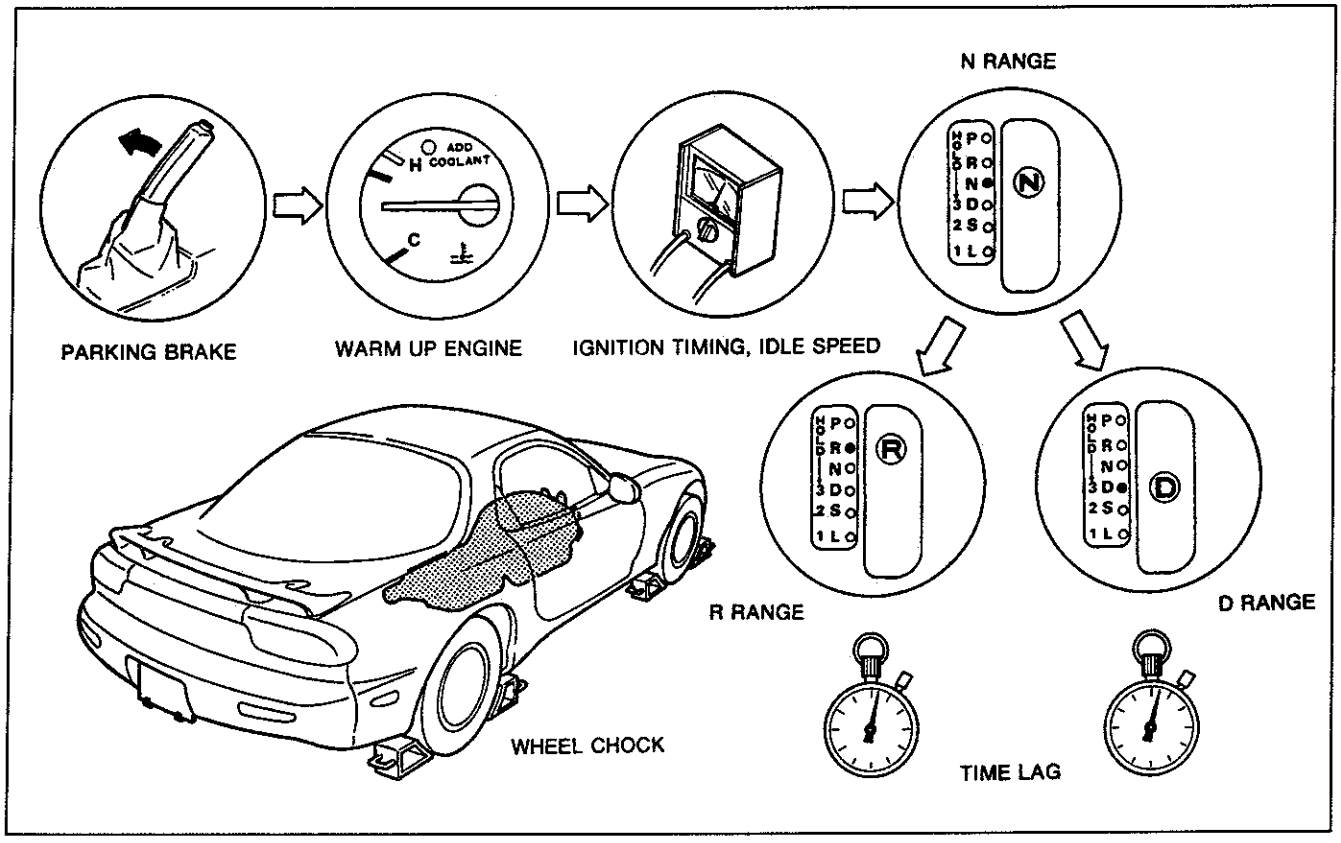
TIME LAG TEST

If the selector lever is shifted while the engine is idling, there will be a certain time lapse, or time lag, before shift shock is felt. This step measures this time lag in order to check conditions of the N-D, 1-2, and 3-4/N-R accumulators; forward, reverse, and one-way clutches; brake band; and low and reverse brake.

Preparation

Perform the preparation procedure outlined in STALL TEST. (Refer to page K-9.)

Procedure



1. Check the idle speed and ignition timing in P range. (Refer to section F.)
2. Shift from N range to D range (except hold mode).
3. Use a stopwatch to measure the time taken from shifting until shock is felt.
4. Do the time lag test for the following shifts in the same manner.
   Make three measurements for each test and average the results.
   (1) N → D range (hold mode)
   (2) N → R range

Time lag: N → D range ..... Below 1.0 sec.
N → R range ..... Below 1.2 sec.

If the time lag test result is above specification, check for the following possible causes.

Evaluation of Time Lag Test

Condition		Possible Cause
Above specification	N → D shift (except hold mode)	Insufficient line pressure Forward clutch slipping Low one-way clutch slipping N-D accumulator not operating properly
	N → D shift (hold mode)	Insufficient line pressure Brake band slipping 1-2 accumulator not operating properly
	N → R shift	Insufficient line pressure Reverse clutch slipping Low and reverse brake slipping 3-4/N-R accumulator not operating properly

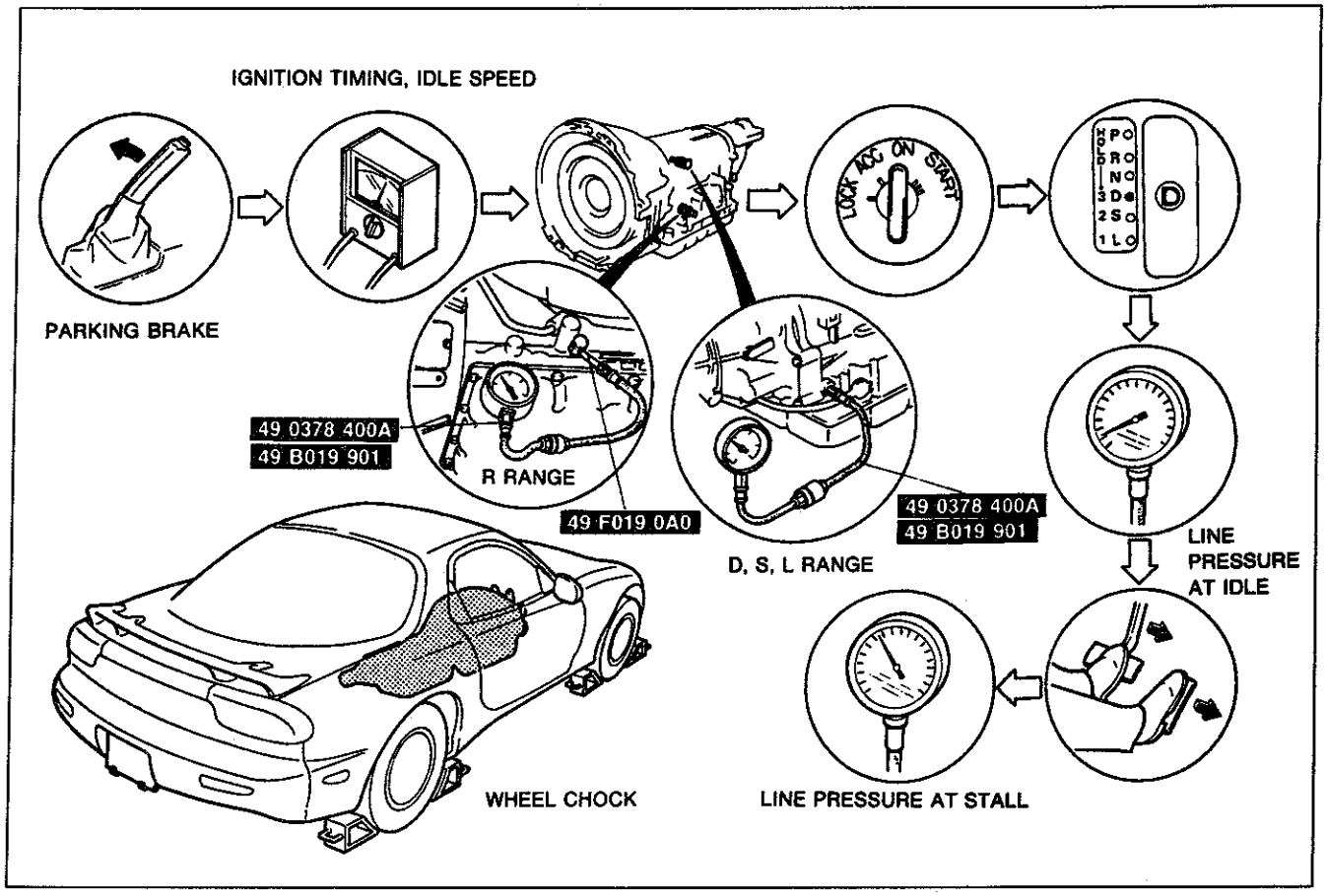
LINE PRESSURE TEST

This test measures line pressures as a means of checking the hydraulic components and inspecting for oil leakage.

Preparation

Perform the preparation procedure outlined in STALL TEST. (Refer to page K-9.)

Procedure



1. Check the idle speed and ignition timing in P range. (Refer to section F.)
2. Remove the front tunnel member and the exhaust pipe bracket.
3. Remove the line pressure inspection bolt, and connect the **SST** (49 F019 0A0).
4. Replace the gauge of **SST** (49 0378 400A) with the other **SST** (49 B019 901).
5. Shift the selector lever to D range and read the line pressure at idle.
   Warning
   - **Removing the square-head plug when the ATF is hot can be dangerous. Hot ATF can come out of the opening and badly burn. Before removing the square-head plug, allow the ATF to cool.**
6. Remove the **SST** (49 B019 901) and replace the gauge of it with the other **SST** (49 0378 400A).
7. Connect the **SST** (49 0378 400A) to the line pressure inspection port.
   Caution
   - **If the accelerator pedal is pressed for longer than 5 seconds while the brake pedal is pressed, the transmission could be damaged. Therefore, do steps 8 and 9 within 5 seconds of other.**
8. Depress the brake pedal firmly with the left foot and gradually depress the accelerator pedal with the right foot until the throttle valve is at wide opened throttle.
9. Read the line pressure as soon as the engine speed becomes constant, then release the accelerator pedal.
10. Shift the selector to N and let the engine idle for 1 minute or more to cool the ATF.
11. Read the line pressure at idle and at the engine stall speed for each range in the same manner.

Specified line pressure:

Range	Line pressure kPa {kgf/cm², psi}	
	Idle	Stall
D, S, L	500–520 {5.0–54, 72–76}	1,200–1,270 {12.2–13.0, 174–184}
R	620–650 {6.3–6.7, 90–95}	1,510–1,570 {15.3–16.1, 218–228}

Warning
- **Removing the square-head plug when the ATF is hot can be dangerous. Hot ATF can come out of the opening and badly burn. Before removing the square-head plug, allow the ATF to cool.**

12. Remove the SST and install a new square head plug in the inspection port.

Tightening torque: 5.0–9.8 N·m {50–100 kgf·cm, 44–86 in·lbf}

13. Install the exhaust pipe bracket.

Tightening torque: 19–25 N·m {1.9–2.6 kgf·m, 14–18 ft·lbf}

14. Install the front tunnel member.

Tightening torque: 18–26 N·m {1.8–2.7 kgf·m, 14–19 ft·lbf}

If the line pressure test result is out of the specification, check for the following possible causes.

Evaluation of Line Pressure Test

Condition		Possible Cause
At idle	Low pressure in every range	Worn oil pump Damaged control piston (in oil pump) Pressure regulator valve or plug sticking Damaged pressure regulator valve spring Fluid leaking between oil strainer, oil pump, and pressure regulator valve
	Low pressure in forward ranges	Fluid leaking from hydraulic circuit of forward clutch
	Low pressure in D and S ranges (hold mode)	Fluid leaking from hydraulic circuit of band servo 2nd apply side
	Low pressure in R range	Fluid leaking from hydraulic circuit of reverse clutch
	Low pressure in R and L ranges	Fluid leaking from hydraulic circuit of low and reverse brake
	Higher than specification	Throttle position sensor out of adjustment Damaged ATF thermosensor Line pressure solenoid valve sticking Short circuit of line pressure solenoid valve circuit Pressure modifier valve sticking Pressure regulator valve or plug sticking
At stall speed	Low pressure	Throttle position sensor out of adjustment Line pressure solenoid valve sticking Short circuit of line pressure solenoid valve circuit Pressure regulator valve or plug sticking Pressure modifier valve sticking Pilot valve sticking Damaged control piston (in oil pump)

ROAD TEST

A road test is necessary to inspect for problems in the different gear ranges. If a range or function targeted by the road test is found to have any problem, refer to the ELECTRONIC SYSTEM COMPONENT segment or the TRANSMISSION, OIL COOLER, DRIVE PLATE, and SHIFT MECHANISM segments of this section.
Do the road test only when the ATF is 60–70°C (140–158°F).
Verify the shift points by using only vehicle speeds shown by the speedometer.

D RANGE TEST
Shift Point, Shift Pattern, and Shift Shock

The power mode and the normal mode are automatically selected by the Powertrain Control Module (Transmission). Once the power mode is selected, the Powertrain Control Module (Transmission) does not switch to normal mode until the ignition switch is turned OFF.
When the ATF temperature is less than 40°C {104°F} in the period shortly after the engine is started, the Powertrain Control Module (Transmission) selects the low ATF temperature mode.
The shift points during the low ATF temperature mode are higher than in the power mode, and lockup is inhibited.

1. Shift the selector lever to D range.

Note
- There is no shift to fourth gear in any of the following conditions.
  1. The ATF temperature is below 10°C {50°F}.
  2. The ATF temperature is below 38°C {100°F} and vehicle speed is less than 63 Km/h {39 MPH}.
  3. The cruise control is operating and there is an 8 km/h {5 MPH} difference between the preset cruise speed and the vehicle speed, or the RESUME/ACCEL switch is ON.

2. Accelerate the vehicle with half- and full-throttle opening.
3. Verify that 1-2, 2-3, and 3-4 upshifts are obtained. The shift points must be as shown in the D range shift diagram.
4. Drive the vehicle in Fourth, Third, and 2nd gears and verify that kickdown occurs for 4 → 3, 4 → 2, 4 → 1, 3 → 2, 3 → 1, 2 → 1, and that the shift points are as shown in the D range shift diagram.
5. Decelerate the vehicle and verify that engine braking effect is felt in Third and 2nd gears when normal A/C OFF mode is selected, vehicle speed is more than 10 km/h {6.2 MPH}, and the throttle opening is less than 1.3/8.

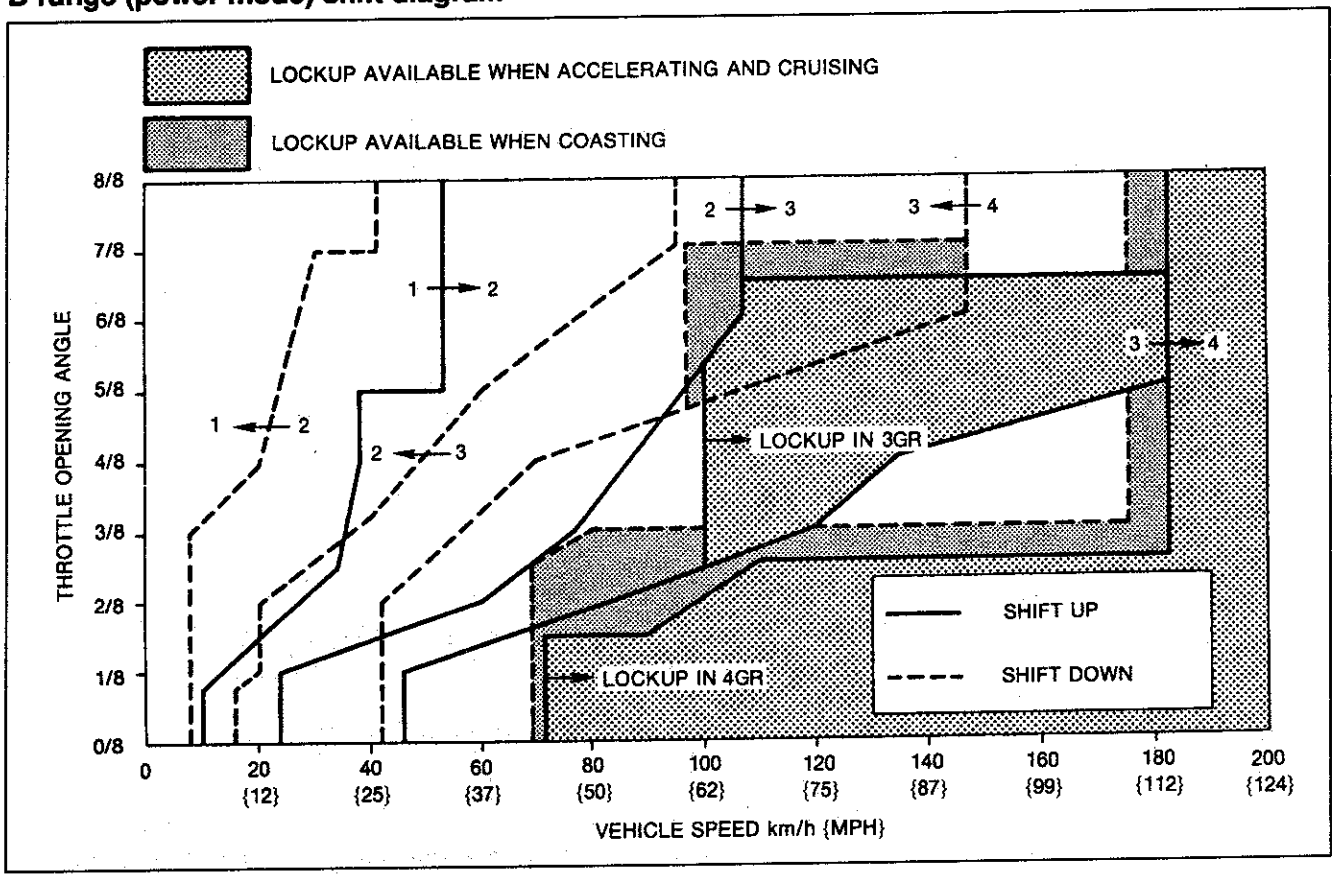
Note
- When the engine coolant temperature is above 115°C {239°F}, the lockup points are lowered.
- There is no lockup in the following conditions.
  1. The transmission is in Fourth gear position and the ATF temperature is below 20°C {68°F}.
  2. The transmission is in Third gear position and ATF temperature is below 38°C {100°F}.
- There is no slip lockup in the following conditions.
  1. There is no slip lockup when the ATF temperature is below 50°C {122°F}.
  2. There is no slip lockup when the ATF temperature is above 100°C {212°F}.
  3. There is no slip lockup when the slip lockup OFF signal is ON.
  4. There is no slip lockup when the transmission is in Fourth gear position and the idle signal is ON.
  5. There is no slip lockup when the transmission is in Third gear position, the idle signal is ON, and vehicle speed is less than 140 km/h {87 MPH}.
  6. There is no slip lockup when the accelerator pedal is depressed rapidly.

7. Drive the vehicle and verify that lockup is obtained.
8. Select hold mode.
9. Accelerate the vehicle with half-and full-throttle opening, and verify that Third gear is held after 2-3 upshift is obtained. The shift points must be as shown in the D range (hold mode) shift diagram.
10. Drive the vehicle in Third and 2nd gears and verify that kickdown does not occur.
11. Decelerate the vehicle and verify that engine braking effect is felt in Third and 2nd gears when vehicle speed is more than 10 km/h {6.2 MPH} and the throttle opening is less than 1.3/8.

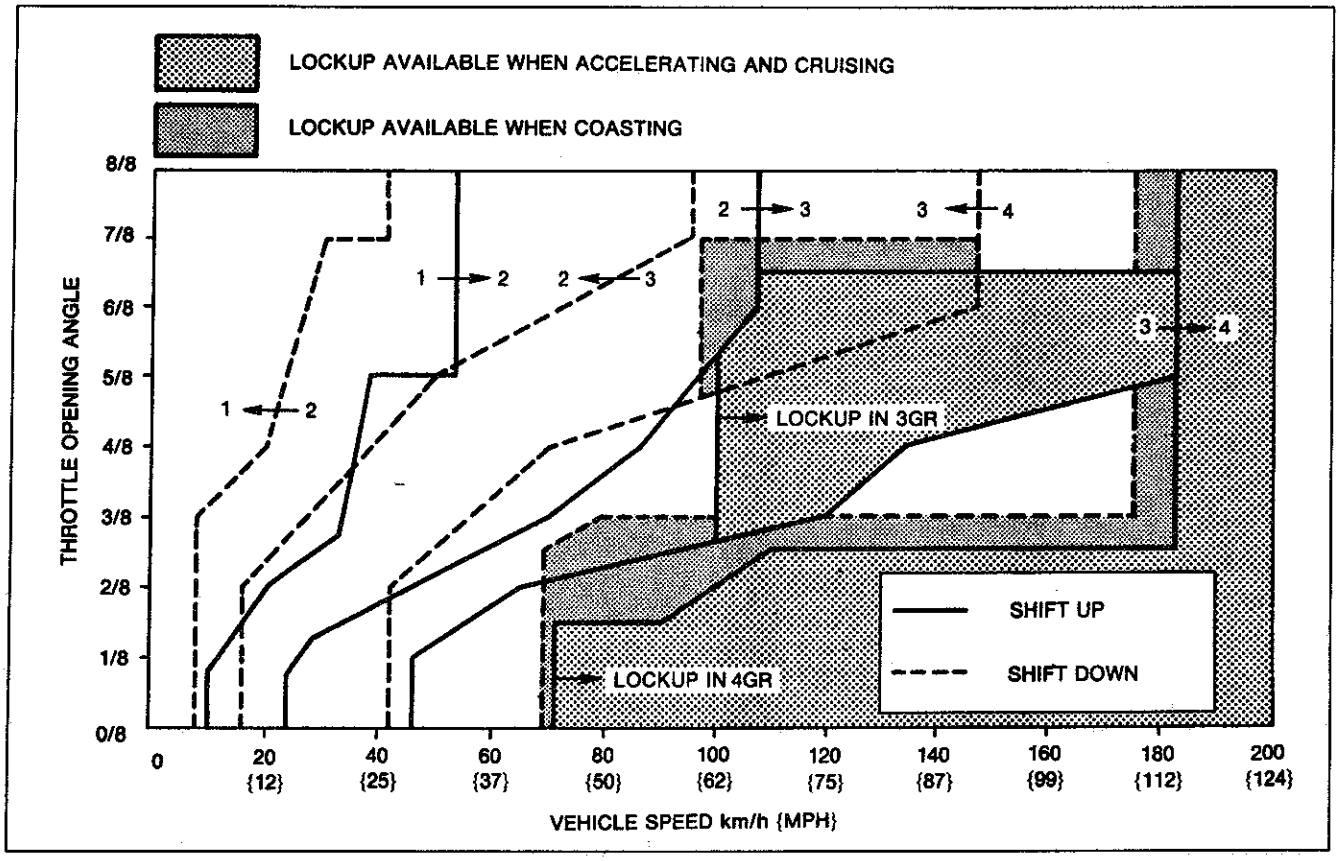
Note
- When the engine coolant temperature is above 115°C {239°F}, the lockup points are lowered.
- There is no lockup when the transmission is in Third gear position and the ATF temperature is below 38°C {100°F}.

12. Drive the vehicle and verify that lockup is obtained.

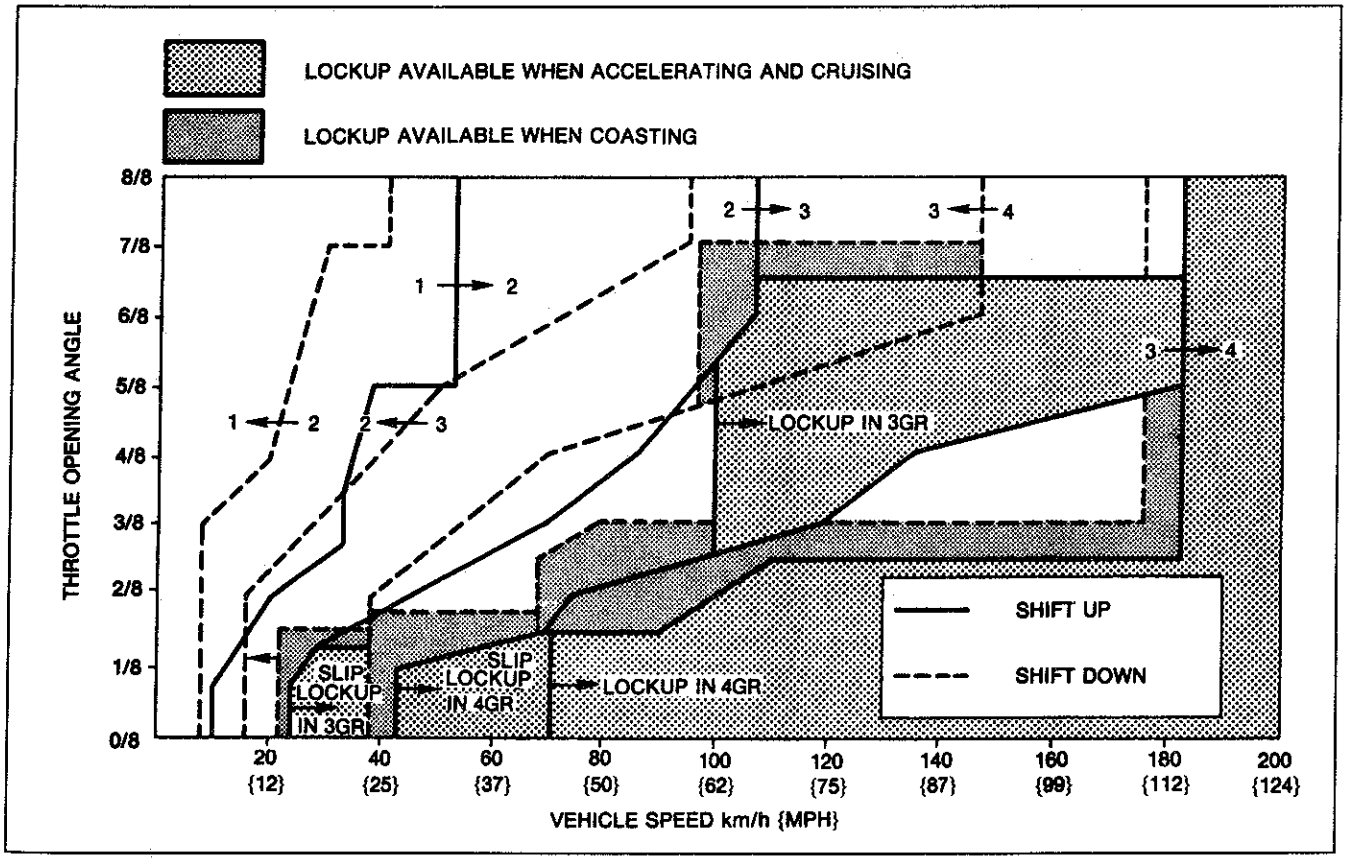
D range (power mode) shift diagram



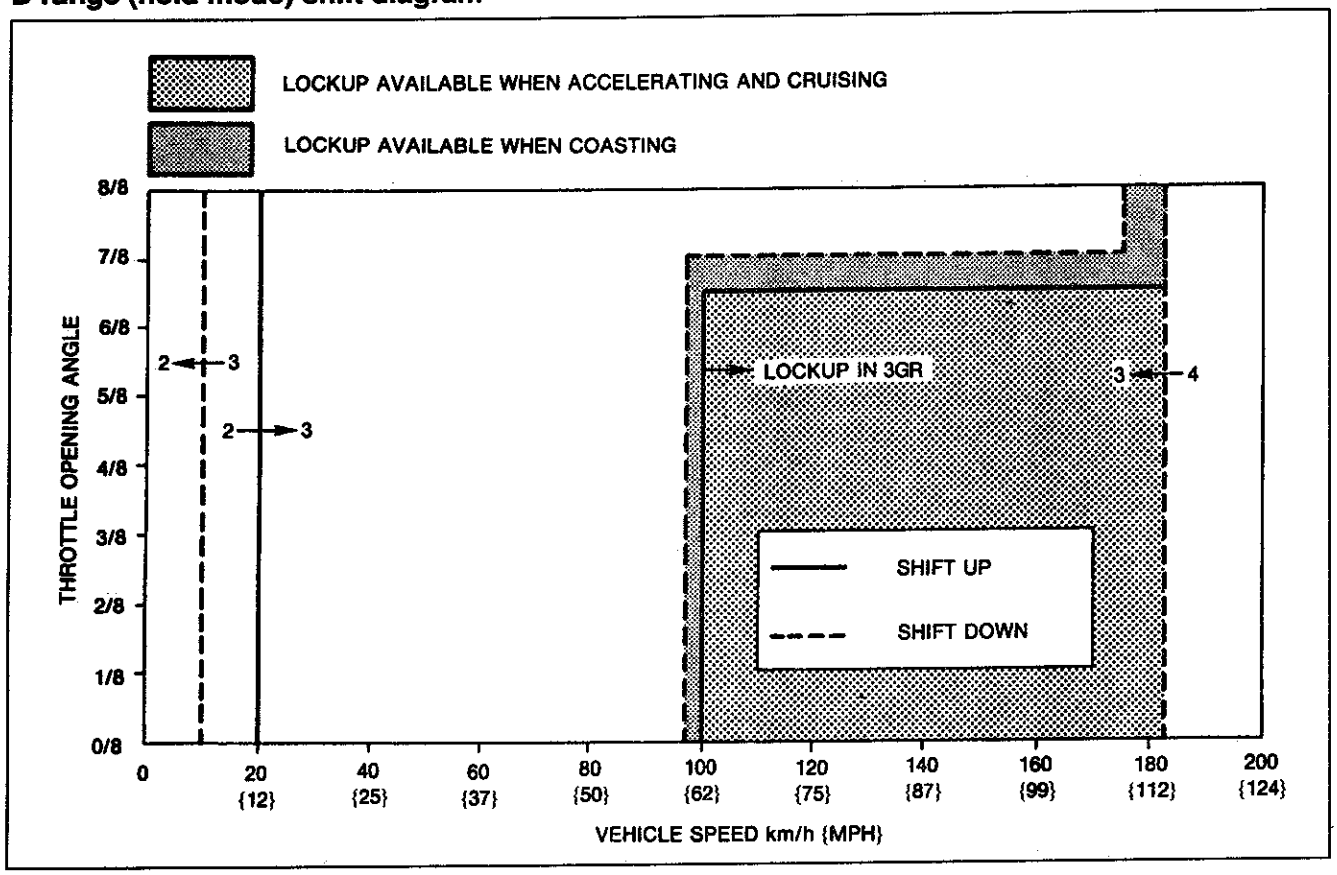
D range (normal A/C ON mode) shift diagram



D range (normal A/C OFF mode) shift diagram



D range (hold mode) shift diagram



Noise and Vibration

Drive the vehicle in Fourth gear (lockup), Fourth gear (no lockup), and Third gear (Hold) and listen closely for any out of the ordinary noise or vibration. The torque converter, propeller shaft, and differential can be sources of abnormal noise and vibration if they are not functioning properly. Check these when searching for sources of noise and vibration.

S RANGE TEST

Shift Point, Shift Pattern, and Shift Shock

1. Shift the selector lever to S range.
2. Accelerate the vehicle with half- and full-throttle opening.
3. Verify that 1-2 and 2-3 upshifts are obtained. The shift points must be as shown in the S range shift diagram.
4. Drive the vehicle in Third and 2rd gears and verify that kickdown occurs for 3 → 2, 3 → 1, 2 → 1, and that the shift points are as shown in the S range shift diagram.
5. Decelerate the vehicle and verify that engine braking effect is felt in Third and 2nd gears when the throttle opening is less than 1.3/8.

Note

- When the engine coolant temperature is above 115°C {239°F}, the lockup points are lowered.
- There is no lockup when the transmission is in Third gear position and the ATF temperature is below 38°C {100°F}.

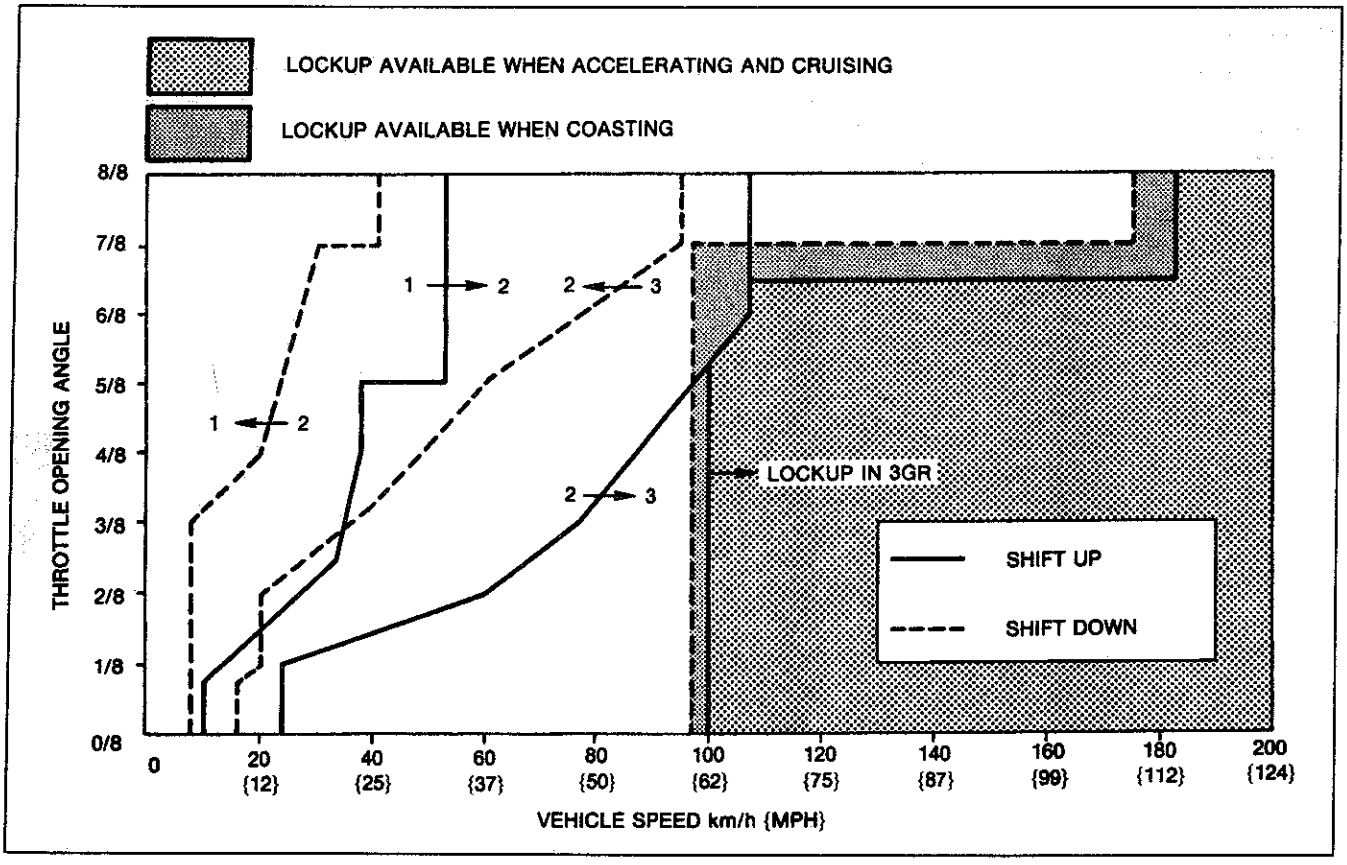
6. Drive the vehicle and verify that lockup is obtained.
7. Select hold mode.
8. Accelerate the vehicle with half- and full-throttle opening, and verify that 2nd gear is held.
9. Decelerate the vehicle and verify that engine braking effect is felt when the throttle opening is less than 1.3/8.

Note

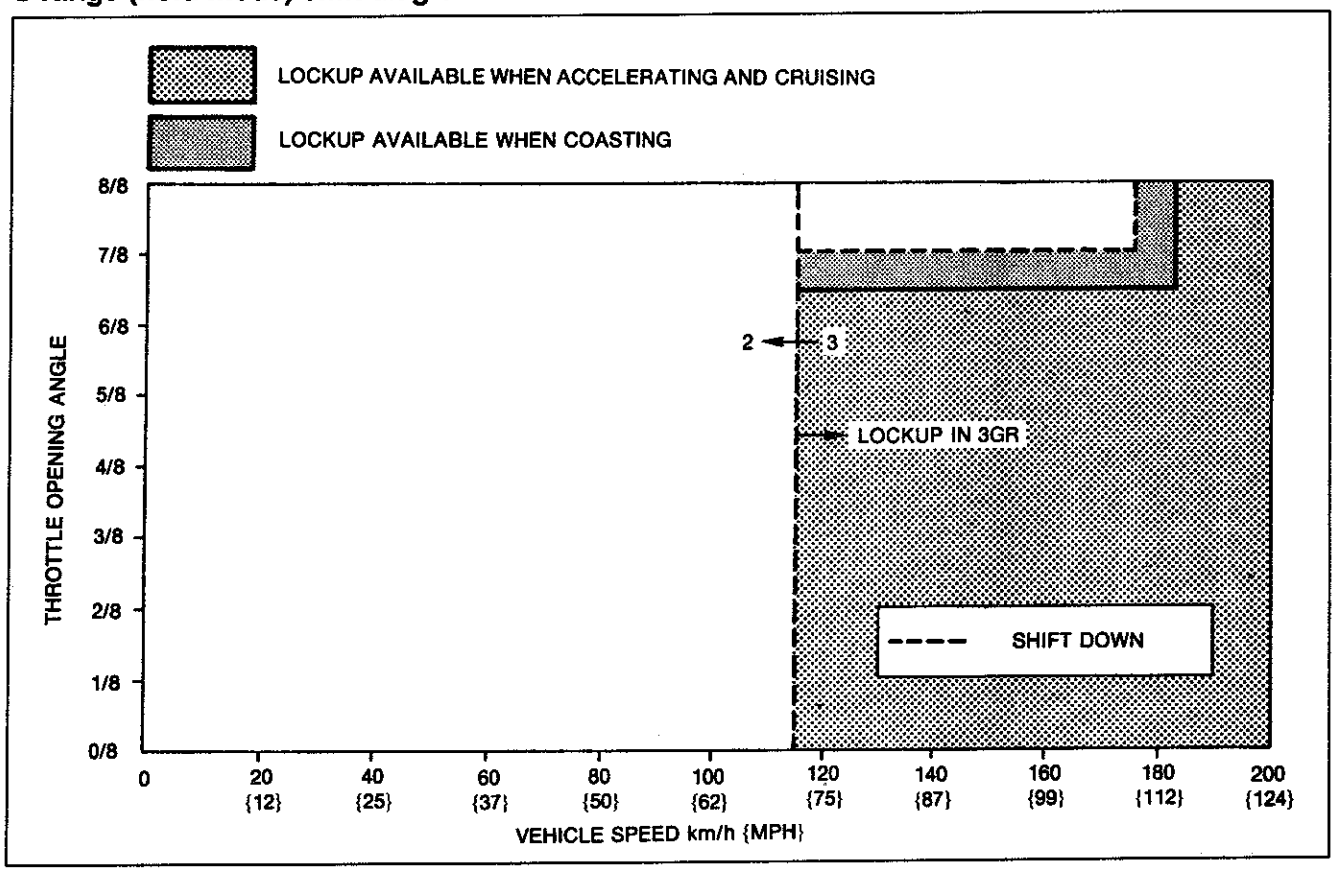
- When the engine coolant temperature is above 115°C {239°F}, the lockup points are lowered.

10. Drive the vehicle and verify that lockup is obtained.

S range (normal mode) shift diagram



S range (hold mode) shift diagram



Noise and Vibration

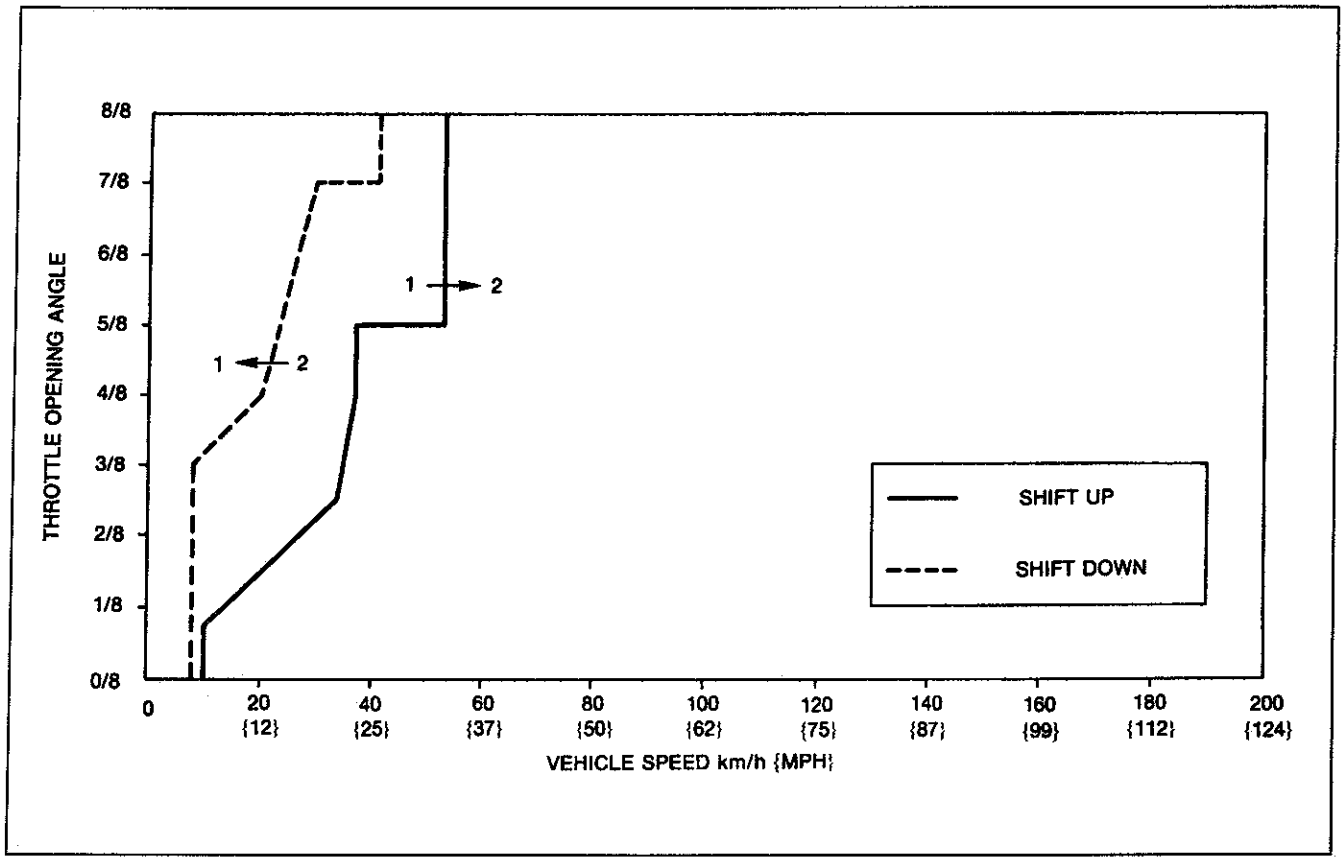
Drive the vehicle in 2nd gear (Hold) and listen closely for any out of the ordinary noise or vibration. The torque converter, propeller shaft, and differential can be sources of abnormal noise and vibration is they are not functioning properly. Check these when searching for sources of noise and vibration.

L RANGE TEST

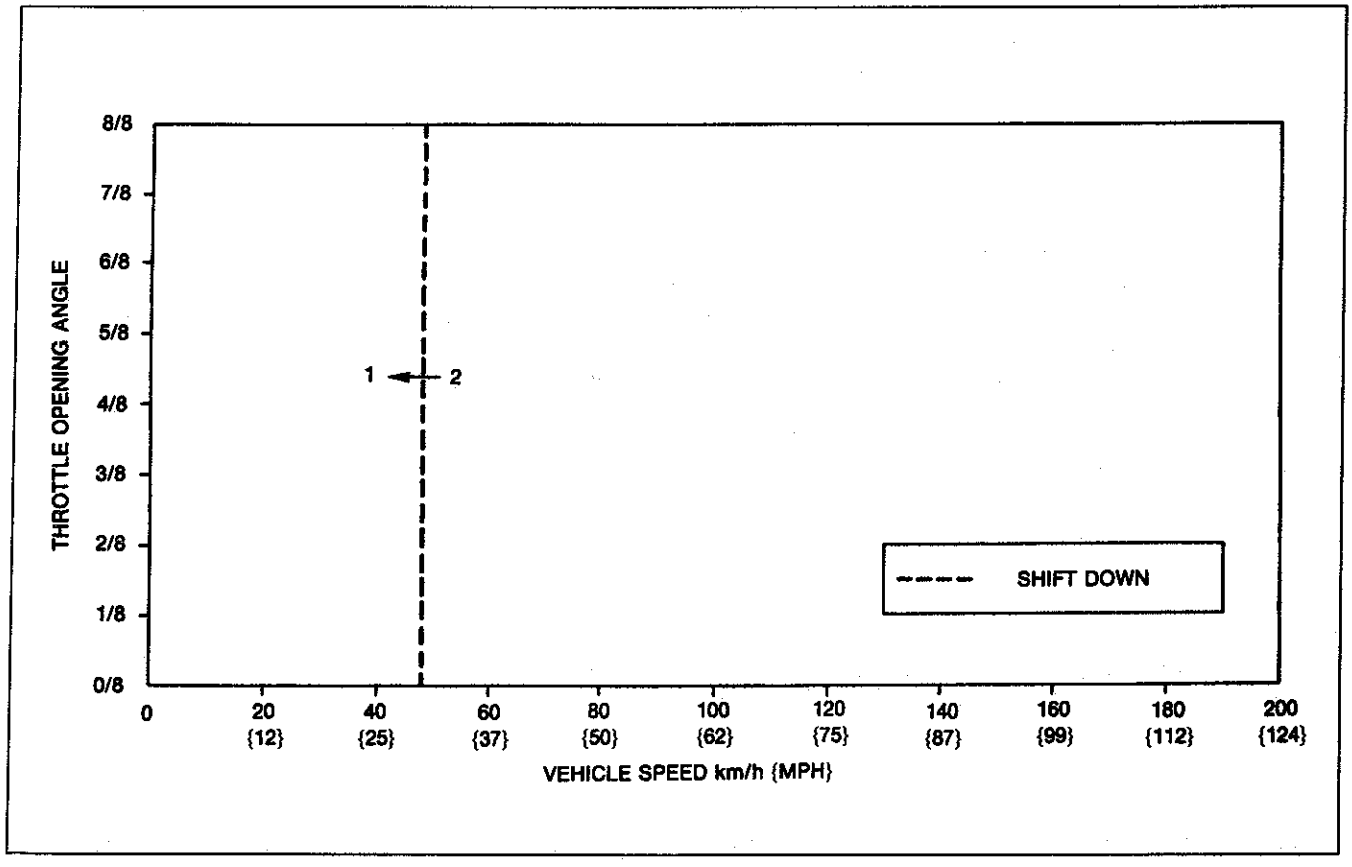
Shift Point, Shift Pattern, and Shift Shock

1. Shift the selector lever to L range.
2. Accelerate the vehicle with half- and full-throttle opening.
3. Verify that 1-2 upshift is obtained. The shift points must be as shown in the L range shift diagram.
4. Drive the vehicle in 2nd gear and verify that kickdown occurs for 2 → 1, and that the shift point is as shown in the L range shift diagram.
5. Decelerate the vehicle and verify that engine braking effect is felt in 2nd and 1st gears.
6. Select hold mode.
7. Accelerate the vehicle with half- and full-throttle opening, and verify that 1st gear is held.
8. Decelerate the vehicle and verify that engine braking effect is felt.

L range (normal mode) shift diagram



L range (hold mode) shift diagram



Noise and Vibration

Drive the vehicle in 1st gear (Hold) and listen closely for any out of the ordinary noise or vibration. The torque converter, propeller shaft, and differential can be sources of abnormal noise and vibration if they are not functioning properly. Check these when searching for sources of noise and vibration.

P RANGE TEST

Shift into P range on a gentle slope. Release the brake and verify that the vehicle does not roll.

Vehicle Speed at Shift Point Table

Range	Mode	Throttle condition (throttle position sensor voltage)	Shift	Vehicle speed km/h {MPH}
D	POWER	Wide open throttle (4.0–4.5V)	$D_1 \rightarrow D_2$	50–56 {31–35}
			$D_2 \rightarrow D_3$	103–111 {64–69}
			$D_3 \rightarrow D_4$	178–188 {111–117}
		Half throttle	$D_1 \rightarrow D_2$	35–41 {22–25}
			$D_2 \rightarrow D_3$	81–93 {50–58}
			$D_3 \rightarrow D_4$	126–144 {78–89}
			*Lockup ON (D_3)	94–106 {58–66} (81–93 {50–58})
			*Lockup ON (D_4)	174–192 {108–119} (126–144 {78–89})
		Closed throttle position (0.1–1.1V)	$D_4 \rightarrow D_3$	39–45 {24–28}
			$D_3 \rightarrow D_2$	13–19 {8–12}
			$D_2 \rightarrow D_1$	5–11 {3–7}
		Kickdown	$D_4 \rightarrow D_3$	142–152 {88–94}
			$D_3 \rightarrow D_2$	91–99 {57–62}
			$D_2 \rightarrow D_1$	38–44 {24–27}
	NORMAL A/C ON	Wide open throttle (4.0–4.5V)	$D_1 \rightarrow D_2$	50–56 {31–35}
			$D_2 \rightarrow D_3$	103–111 {64–69}
			$D_3 \rightarrow D_4$	178–188 {111–117}
		Half throttle	$D_1 \rightarrow D_2$	32–38 {20–24}
			$D_2 \rightarrow D_3$	80–92 {50–57}
			$D_3 \rightarrow D_4$	126–144 {78–89}
			*Lockup ON (D_3)	94–106 {58–66} (80–92 {50–57})
			*Lockup ON (D_4)	174–192 {108–119} (126–144 {78–89})
		Closed throttle position (0.1–1.1V)	$D_4 \rightarrow D_3$	39–45 {24–28}
			$D_3 \rightarrow D_2$	13–19 {8–12}
			$D_2 \rightarrow D_1$	5–11 {3–7}
		Kickdown	$D_4 \rightarrow D_3$	142–152 {88–94}
			$D_3 \rightarrow D_2$	91–99 {57–62}
			$D_2 \rightarrow D_1$	38–44 {24–27}
	NORMAL A/C OFF	Wide open throttle (4.0–4.5V)	$D_1 \rightarrow D_2$	50–56 {31–35}
			$D_2 \rightarrow D_3$	103–111 {64–69}
			$D_3 \rightarrow D_4$	178–188 {111–117}
		Half throttle	$D_1 \rightarrow D_2$	32–38 {20–24}
			$D_2 \rightarrow D_3$	80–92 {50–57}
			$D_3 \rightarrow D_4$	126–144 {78–89}
			*Lockup ON (D_3)	94–106 {58–66} (80–92 {50–57})
			*Lockup ON (D_4)	174–192 {108–119} (126–144 {78–89})
		Closed throttle position (0.1–1.1V)	$D_4 \rightarrow D_3$	32–38 {20–24}
			$D_3 \rightarrow D_2$	13–19 {8–12}
			$D_2 \rightarrow D_1$	5–11 {3–7}
		Kickdown	$D_4 \rightarrow D_3$	142–152 {88–94}
			$D_3 \rightarrow D_2$	91–99 {57–62}
			$D_2 \rightarrow D_1$	38–44 {24–27}

* complete lockup

( ) indicates lockup points when the engine coolant temperature is above 115°C {239°F}.

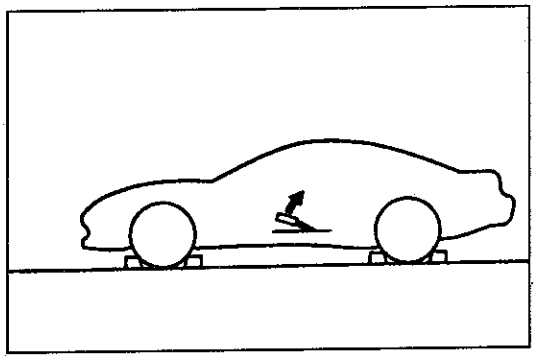
Range	Mode	Throttle condition (throttle position sensor voltage)	Shift	Vehicle speed km/h {MPH}
D	HOLD	—	$D_4 \rightarrow D_3$	180–186 {112–116}
			$D_3 \rightarrow D_2$	7–13 {4–8}
			$D_2 \rightarrow D_3$	15–25 {9–16}
			*Lockup ON (D_3)	94–106 {58–66} (39–51 {24–32})
S	EXCEPT HOLD	Wide open throttle (4.0–4.5V)	$S_1 \rightarrow S_2$	50–56 {31–35}
			$S_2 \rightarrow S_3$	103–111 {64–69}
		Half throttle	$S_1 \rightarrow S_2$	35–41 {22–25}
			$S_2 \rightarrow S_3$	81–93 {50–58}
			*Lockup ON (S_3)	94–106 {58–66} (81–93 {50–58})
		Closed throttle position (0.1–1.1V)	$S_3 \rightarrow S_2$	13–19 {8–12}
			$S_2 \rightarrow S_1$	5–11 {3–7}
		Kickdown	$S_3 \rightarrow S_2$	91–99 {57–62}
			$S_2 \rightarrow S_1$	38–44 {24–27}
	HOLD	—	$S_3 \rightarrow S_2$	112–118 {70–73}
L	EXCEPT HOLD	Wide open throttle (4.0–4.5V)	$L_1 \rightarrow L_2$	50–56 {31–35}
		Half throttle	$L_1 \rightarrow L_2$	35–41 {22–25}
		Closed throttle position (0.1–1.1V)	$L_2 \rightarrow L_1$	5–11 {3–7}
		Kickdown	$L_2 \rightarrow L_1$	38–44 {24–27}
	HOLD	—	$L_2 \rightarrow L_1$	45–51 {28–32}

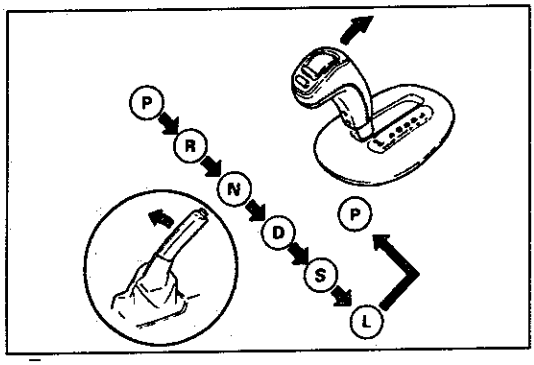
* complete lockup

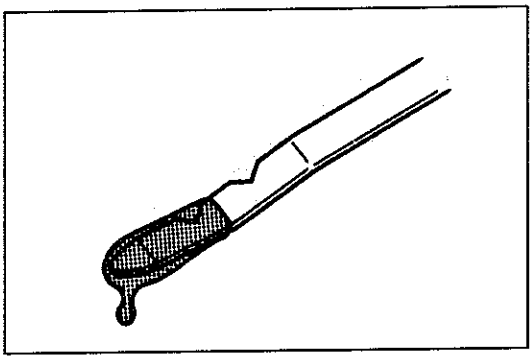
( ) indicates lockup points when the engine coolant temperature is above 115° {239°F}.
Input the voltages displayed on the EC-AT Tester into the following formula to calculate the halfthrottle voltage.

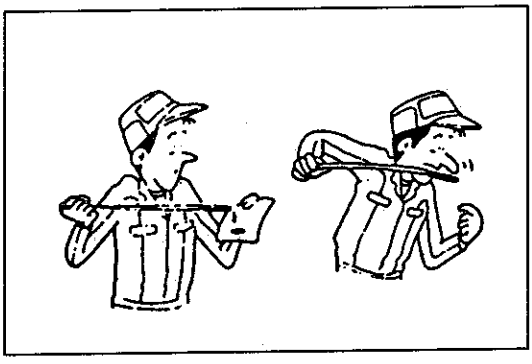
$$\frac{\text{wide open throttle voltage} - \text{closed throttle position voltage}}{2} = \text{Half throttle voltage}$$

Condition		Possible cause
Shifting	Starts in 2nd gear or shifts directly from 1st gear to Fourth gear	Stuck shift A solenoid valve Stuck shift valve A
	Starts in fourth gear	Stuck shift B solenoid valve Stuck shift valve B
	No shift	Stuck shift A and B solenoid valve Stuck shift valve A and/or B
	Incorrect shift points	Throttle position sensor out of adjustment Vehicle speed sensor (revolution sensor) not operating properly
Shift shock felt or slipping exists		Stuck line pressure solenoid valve Accumulators not operating properly Throttle position sensor out of adjustment Vehicle speed sensor (revolution sensor) not operating properly ATF thermosensor not operating properly Worn clutches, one-way clutches, and/or brakes
No engine braking		Stuck overrunning clutch solenoid valve Worn clutches and/or brakes
No lockup shift		Stock lockup solenoid valve Stuck lockup control valve









AUTOMATIC TRANSMISSION FLUID (ATF)

ATF
Inspection
Level

1. Park the vehicle on level ground.
2. Apply the parking brake and securely position wheel chocks to prevent the vehicle from rolling.
3. Warm up the engine until the ATF temperature reaches **60–70°C {140–158°F}**.
4. While depressing the brake pedal, shift the selector lever to each range (P–L). Leave it a few seconds in each range.
5. Shift back to P range.
6. Ensure that the ATF level is between the notches of the ATF dipstick. Add ATF to specification, if necessary.

ATF Type: Dexron®II or M-III
Capacity: 8.6 L {9.1US qt, 7.6 Imp qt}

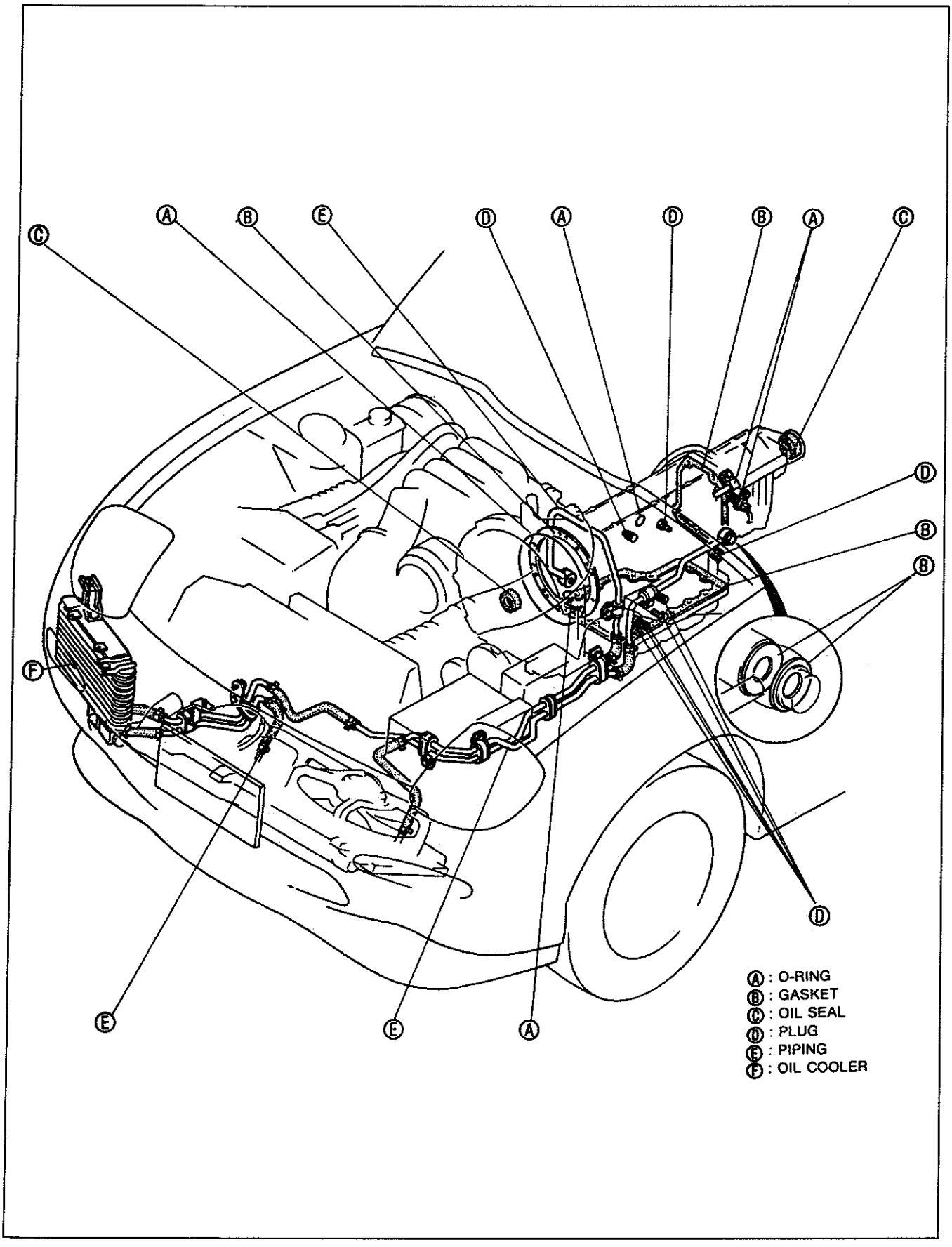
Condition

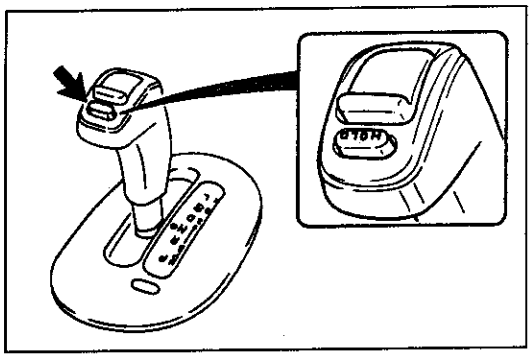
Determine whether the transmission should be disassembled by noting the following.

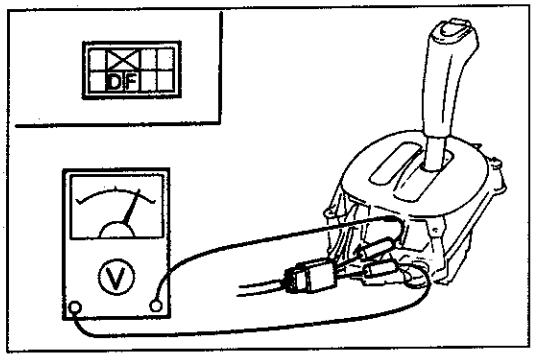
1. Is the ATF muddy or varnished?
2. Does the ATF smell strange or unusual?

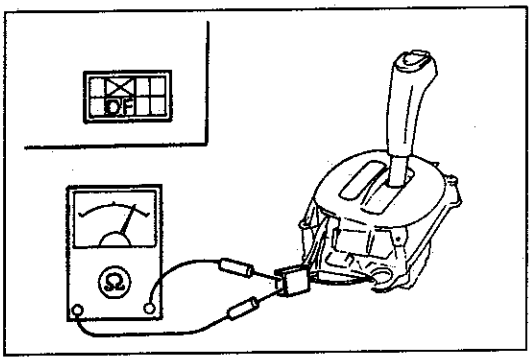
Fluid leakage

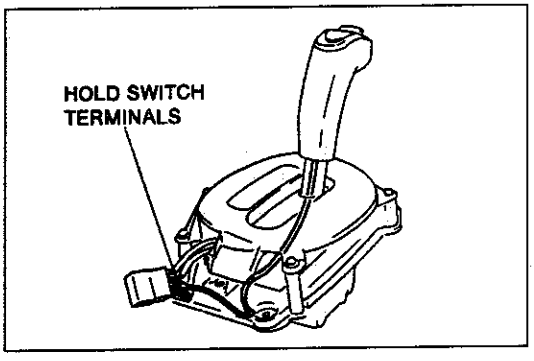
Check for ATF leakage at the points shown below and repair or replace as necessary.

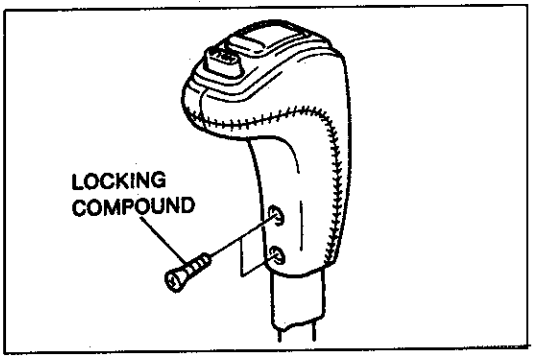












ELECTRONIC SYSTEM COMPONENTS

HOLD SWITCH

Inspection

Operation

1. Turn the ignition switch ON.
2. Press the hold switch ON/OFF and verify that the hold indicator illuminates when the hold mode is selected.
3. If not as specified, measure the hold switch terminal voltage.

Terminal voltage

1. Remove the console panel.
2. Turn the ignition switch ON.
3. Press the hold switch ON/OFF, and measure the voltage between terminals D and F.

B+: Battery positive voltage

Terminal / Switch condition	Terminal voltage (V)	
	D	F
Released	0	0
Depressed	B+	0

4. If not correct, check the hold switch continuity.

Continuity

1. Disconnect the negative battery cable and the shift-lock control unit connector.
2. Press the hold switch ON/OFF, and check continuity between terminals D and F.

Switch condition	Continuity
Released	Yes
Depressed	No

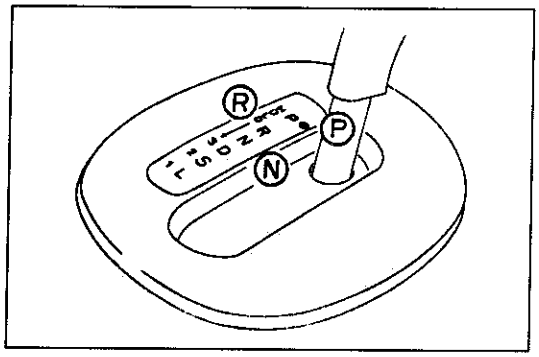
3. If not correct, replace the selector lever knob.
4. Connect the shift-lock control unit connector.
5. Install the console panel.
6. Connect the negative battery cable.

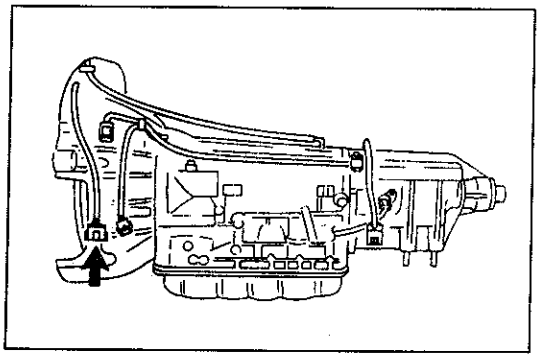
Replacement

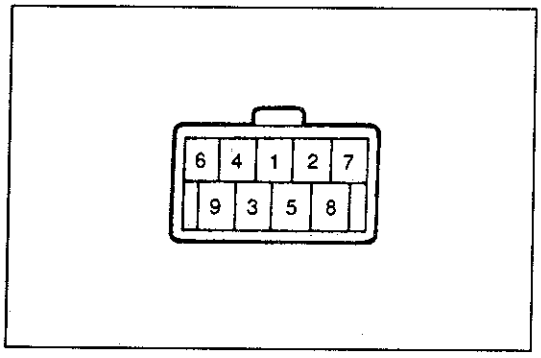
1. Remove the console panel.
2. Remove the indicator panel screws.
3. Disconnect the shift-lock control unit connector and pull the hold switch terminals out of the connector.
4. Remove the selector lever knob.
5. Install the new selector lever knob.
6. Insert the hold switch terminals into the connector and connect the shift-lock control unit connector.
7. Apply a small amount of locking compound to the screws, and tighten.

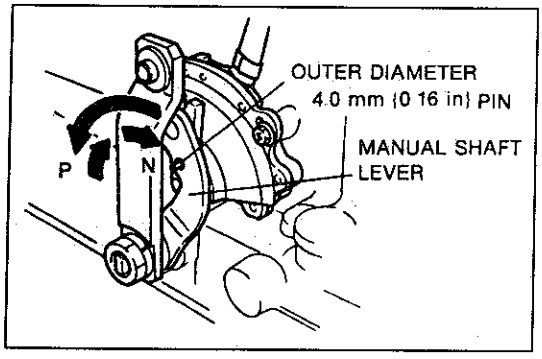
Tightening torque:
1.5–2.9 N·m {15–30 kgf·cm, 14–26 in·lbf}

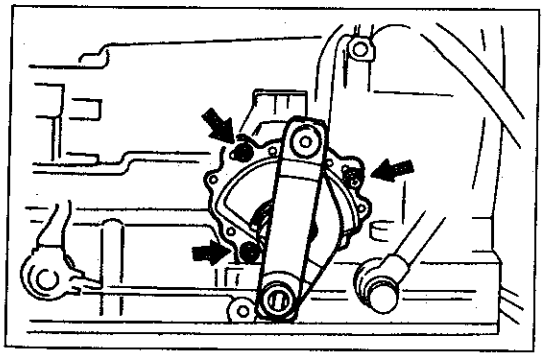
8. Install and adjust the indicator panel. (Refer to page K–165.)
9. Install the console panel.











PARK/NEUTRAL SWITCH

Inspection

Operation

1. Turn the ignition switch to ON.
2. Shift the selector lever and verify that the selected range and selector indicator light (built into combination meter) positions are aligned.
3. Apply the parking brake and securely position wheel chocks to prevent the vehicle from rolling.
4. Verify that the starter operates with the ignition switch at START position and with the selector lever in P and N ranges only.
5. Verify that the back-up lights illuminate when the selector lever is shifted to R range with the ignition switch at the ON position.
6. If not as specified, check the park/neutral switch continuity.

Continuity

1. Disconnect the negative battery cable and the park/neutral switch connector.
2. Remove the park/neutral switch connector from the bracket.
3. Check continuity of the park/neutral switch terminals.

Position	1	2	3	4	5	6	7	8	9
P	○						○	○	○
R		○					○		
N			○				○	○	○
D				○			○		
S					○		○		
L						○	○		

○—○ : Indicates continuity

4. If not correct, adjust or replace the park/neutral switch.
5. Install the park/neutral switch connector to the bracket.
6. Connect the park/neutral switch connector and the negative battery cable.

Adjustment

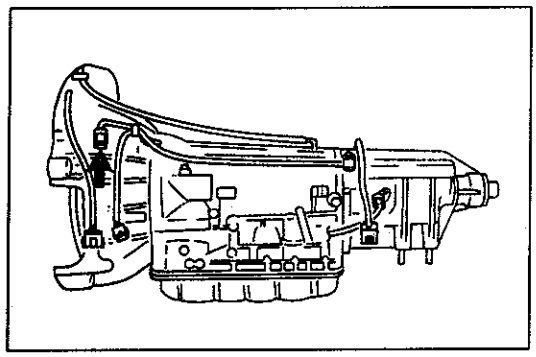
1. Remove the selector rod the from the manual shaft lever.
2. Move the manual shaft to N range position.
3. Loosen the park/neutral switch mounting bolts.
4. Align the holes of the park/neutral switch and the manual shaft by inserting a **4.0 mm {0.16 in}** outer diameter pin.
5. Tighten the park/neutral switch mounting bolts and remove the pin.

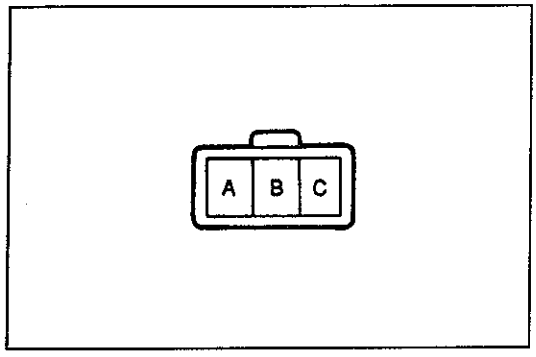
Tightening torque:
2.5–3.9 N·m {25–40 kgf·cm, 22–34 in·lbf}

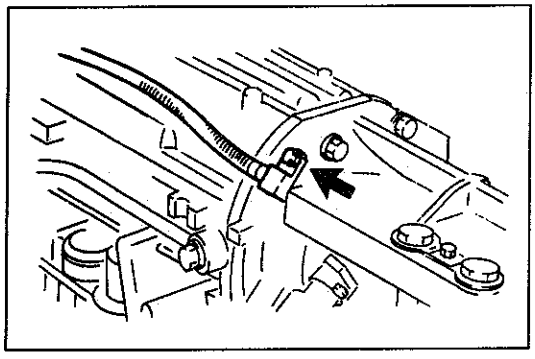
6. Recheck the continuity of the park/neutral switch.
7. If not correct, readjust or replace the park/neutral switch.
8. Install the selector rod to the manual shaft lever.

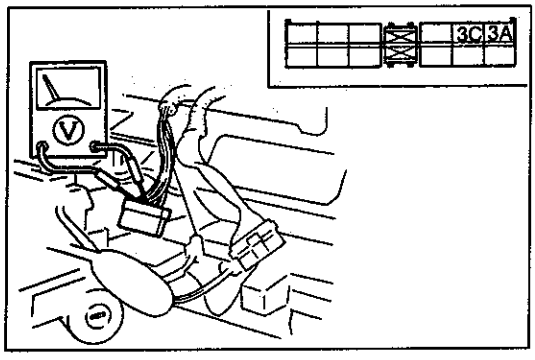
Replacement

Refer to "Adjustment" above for replacement of the park/neutral switch.









VEHICLE SPEED SENSOR (REVOLUTION SENSOR)

Inspection

1. Disconnect the negative battery cable.
2. Disconnect vehicle speed sensor connector.
3. Measure the resistance between the terminals of the vehicle speed sensor.

ATF temperature: 20–80°C {68–176°F}

Terminal	Resistance (Ω)
A and B	500–1,000
B and C	∞
A and C	∞

4. If not correct, replace the vehicle speed sensor.
5. Connect the vehicle speed sensor connector.
6. Connect the negative battery cable.

Replacement

1. Disconnect the negative battery cable.
2. Disconnect the vehicle speed sensor connector.
3. Remove the vehicle speed sensor from the extension housing.
4. Apply ATF to a new O-ring and install it on the speed sensor 1.
5. Install the new vehicle speed sensor.

Tightening torque:
5.0–6.8 N·m {50–70 kgf·cm, 44–60 in·lbf}

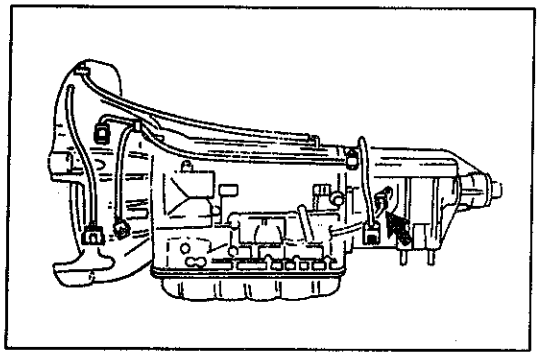
6. Connect the vehicle speed sensor connector.
7. Connect the negative battery cable.

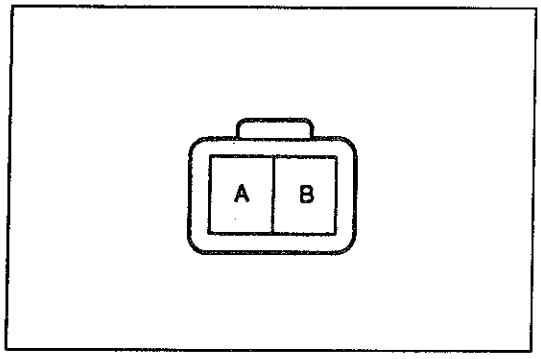
VEHICLE SPEEDOMETER SENSOR

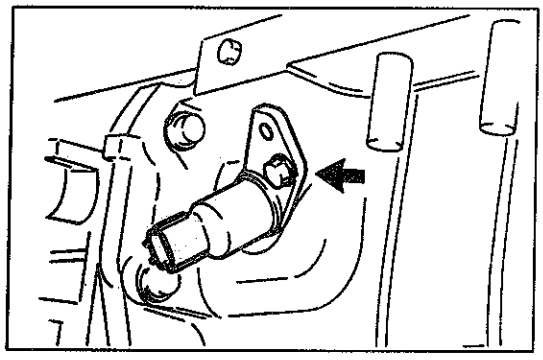
Speedmeter

Inspection

1. Remove the combination meter. (Refer to 1994 RX-7 Body Electrical Troubleshooting Manual, section C1.)
2. Disconnect the speedometer connector.
3. Set the voltmeter to the 5V range.
4. Turn the ignition switch to the LOCK position.
5. Measure the voltage between terminals 3A and 3C of the speedometer connector (harness side) while the rear wheels are turning slowly.
6. When the voltmeter pointer moves slightly, replace the speedometer. If the pointer does not move, check the vehicle speedometer sensor and/or wiring.
7. Connect the speedometer connector.
8. Install the combination meter. (Refer to 1994 RX-7 Body Electrical Troubleshooting Manual, section C1.)







Vehicle Speedometer Sensor
Inspection
1. Disconnect the negative battery cable.
2. Remove the vehicle speedometer sensor.
3. Verify that magnetic resistance is felt when turning the vehicle speedometer sensor driven gear by hand.
4. Disconnect the vehicle speedometer sensor connector.
5. Set the voltmeter to the 5V range.
6. Measure the voltage between terminals A and B while the rear wheels are turning slowly.
7. If the pointer does not move, check the vehicle speedometer sensor continuity.
8. Measure the resistance between terminals A and B.

Resistance:
Approx. 290 Ω (at 20–80°C {68–176°F})

9. If not correct, replace the vehicle speedometer sensor.
10. Apply ATF to a new O-ring and install it on the vehicle speedometer sensor.
11. Install the vehicle speedometer sensor.

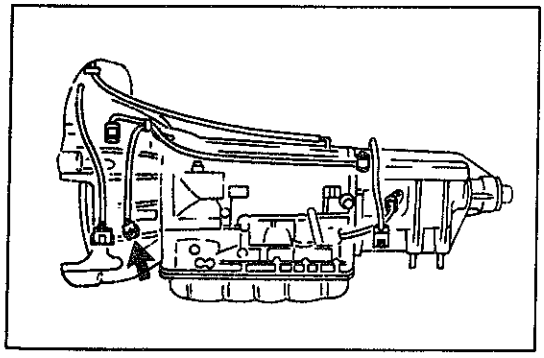
Tightening torque:
7.9–10.7 N·m {80–110 kgf·cm, 70–95 in·lbf}

12. Connect the vehicle speedometer sensor connector.
13. Connect the negative battery cable.

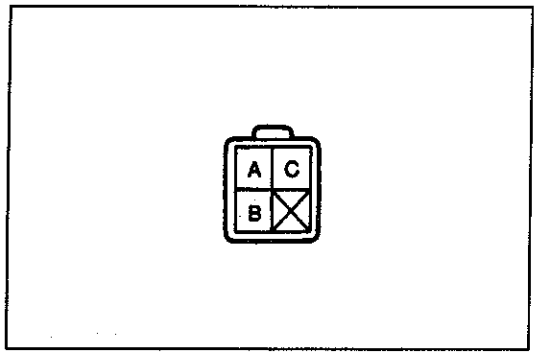
Replacement
1. Disconnect the negative battery cable.
2. Disconnect the vehicle speedometer sensor connector.
3. Remove the vehicle speedometer sensor from the extension housing.
4. Apply ATF to a new O-ring and install it on the vehicle speedometer sensor.
5. Install the new vehicle speedometer sensor.

Tightening torque:
7.9–10.7 N·m {80–110 kgf·cm, 70–95 in·lbf}

6. Connect the vehicle speedometer sensor connector.
7. Connect the negative battery cable.



VEHICLE SPEED PULSE GENERATOR
Inspection
1. Disconnect the negative battery cable.
2. Disconnect the vehicle speed pulse generator connector.

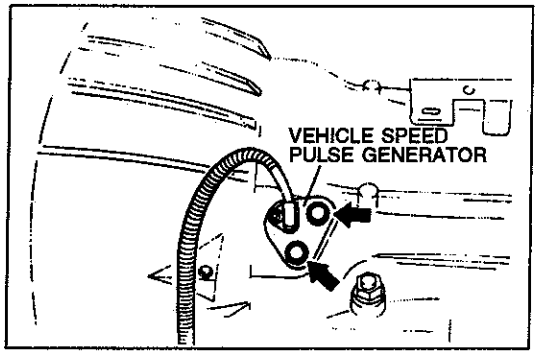


3. Measure the resistance between the terminals of the vehicle speed pulse generator.

ATF temperature: 20–80°C {68–176°F}

Terminal	Resistance (kΩ)
A and B	2.2–3.5
B and C	∞
A and C	∞

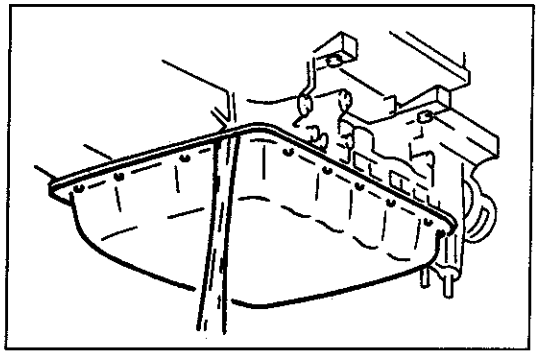
4. If not correct, replace the vehicle speed pulse generator.
5. Connect the vehicle speed pulse generator connector.
6. Connect the negative battery cable.



Replacement

1. Remove the transmission assembly. (Refer to page K–42.)
2. Remove the vehicle speed pulse generator from the transmission case.
3. Apply ATF to a new O-ring and install it on the new vehicle speed pulse generator.
4. Install the new gasket and new vehicle speed pulse generator.
5. Install new bolts and tighten.

Tightening torque:
5.0–6.8 N·m {50–70 kgf·cm, 44–60 in·lbf}

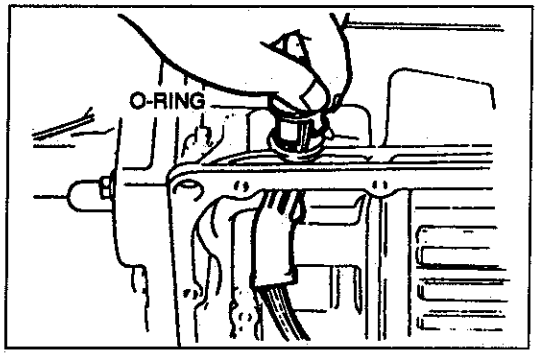


6. Install the transmission assembly. (Refer to page K–149.)

ATF THERMOSENSOR

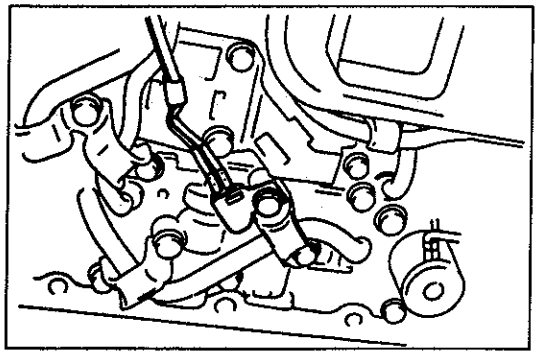
Replacement

Warning
- **Be careful when draining; the AFT is hot.**



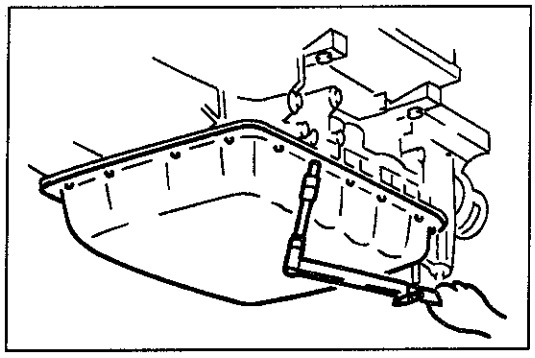
1. Disconnect the negative battery cable.
2. Disconnect the solenoid valve connector.
3. Loosen the oil pan mounting bolts and drain the ATF into a suitable container.
4. Remove the oil pan.
5. Remove the ATF thermosensor from the control valve body.
6. Remove the control valve body. (Refer to page K–128.)

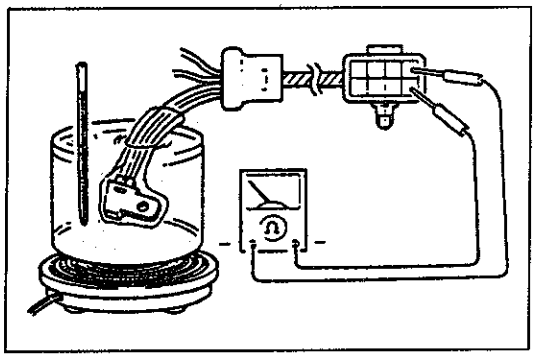
Note
- The ATF thermosensor is part of the solenoid valve harness.



7. Remove the solenoid valve harness from the transmission case.
8. Apply ATF to a new O-ring and install it on the solenoid valve harness.
9. Install the new solenoid valve harness into the transmission case.
10. Install the control valve body. (Refer to page K–130.)
11. Install the ATF thermosensor onto the control valve body.

Tightening torque:
6.9–6.8 N·m {70–90 kgf·cm, 61–78 in·lbf}





12. Clean the oil pan and the magnet, and set the magnet into the oil pan.
13. Remove any old locking compound from the bolt holes.
14. Install a new gasket and the oil pan.

Tightening torque:
6.9–8.8 N·m {70–90 kgf·cm, 61–78 in·lbf}

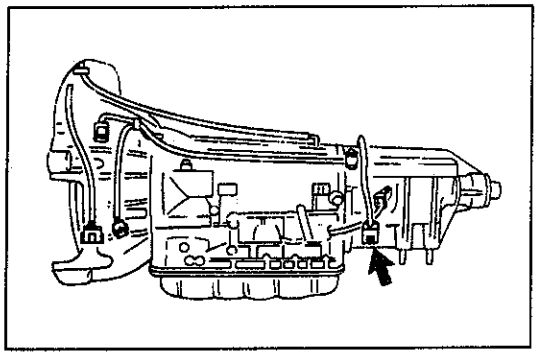
15. Tighten the new bolts evenly and quickly.
16. Connect the solenoid valve connector.
17. Fill the transmission with the specified amount and type of ATF. (Refer to page K-25.)
18. Connect the negative battery cable.

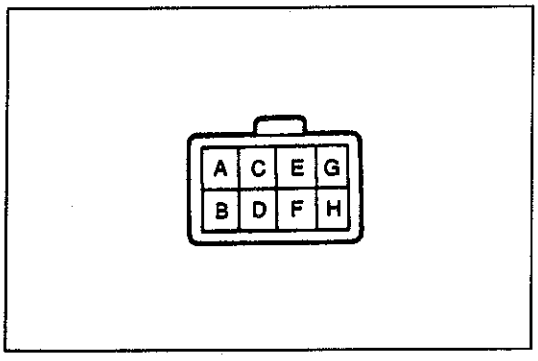
Inspection

1. Refer to "Replacement" on the previous page for removal of the ATF thermosensor.
2. Wrap the ATF thermosensor, place it in water with a thermometer as shown, and heat the water gradually.
3. Measure the resistance between the terminals of the thermosensor.

Water temperature	Resistance (kΩ)
10°C {50°F}	2.5
40°C {104°F}	0.6
80°C {176°F}	0.3

4. If not correct, replace the ATF thermosensor.
5. Refer to "Replacement" for installation of the ATF thermosensor.





SOLENOID VALVES

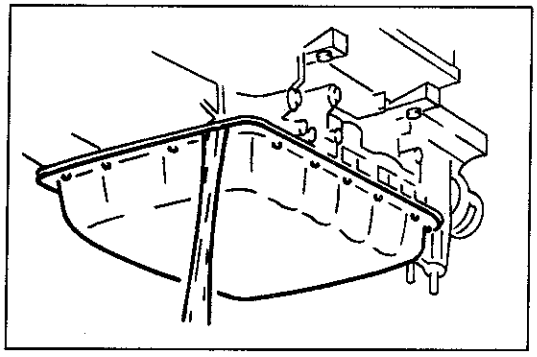
Inspection

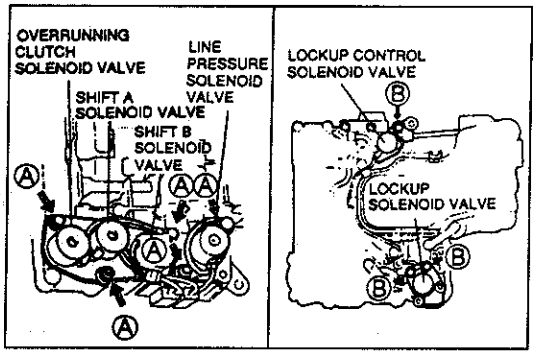
1. Disconnect the negative battery cable.
2. Disconnect the solenoid valve connector.
3. Measure the resistance between terminals A through F and a ground.

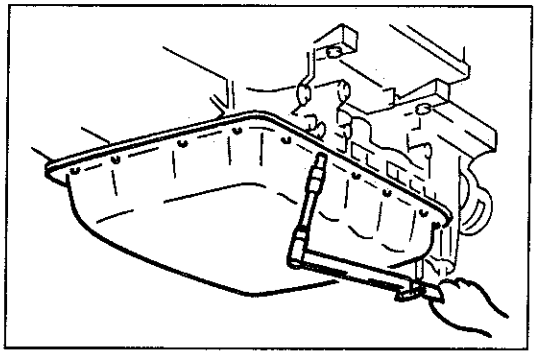
ATF temperature: 20–80°C {68–176°F}

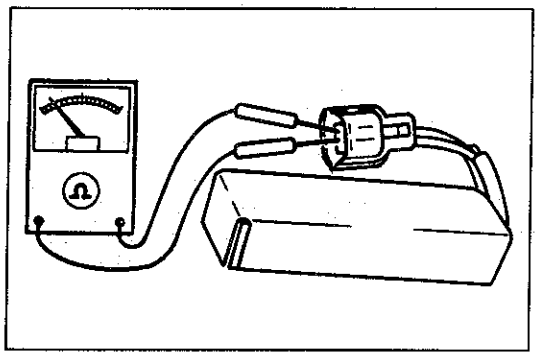
Terminal	Solenoid valve	Resistance (Ω)
A	Lockup control	20–40
B	Shift A	20–40
C	Shift B	20–40
D	Overrunning clutch	20–40
E	Line pressure	2.5–5.0
F	Lockup	10–20

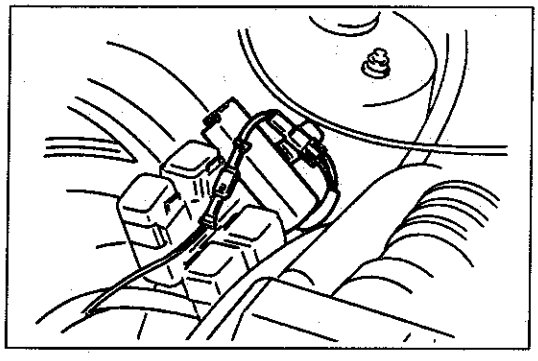
4. If not correct, replace the solenoid valves.
5. Connect the solenoid valve connector.
6. Connect the negative battery cable.











Replacement

If the shift A, shift B, overrunning clutch, and line pressure solenoid valves are not correct, replace the solenoids as an assembly.

1. Disconnect the negative battery cable.
2. Loosen the oil pan mounting bolts and drain the ATF into a suitable container.
3. Remove the oil pan.
4. Remove the control valve body. (Refer to page K-128.)
5. Remove the solenoid valve(s).
6. Apply ATF to a new O-ring(s) and install it on the new solenoid valve(s).
7. Install the new solenoid valve(s) to the control valve body.

Tightening torque
A: 6.9–9.8 N·m {70–100 kgf·cm, 61–86 in·lbf}
B: 9.9–12.7 N·m {100–130 kgf·cm, 86.9–112 in·lbf}

8. Install the control valve body. (Refer to page K-130.)
9. Clean the oil pan and the magnet, and set the magnet into the oil pan.
10. Remove any old locking compound from the bolt holes.
11. Install a new gasket and the oil pan.
12. Tighten the new bolts evenly and quickly.

Tightening torque:
6.9–8.8 N·m {70–90 kgf·cm, 61–78 in·lbf}

13. Fill the transmission with the specified amount and type of ATF. (Refer to page K-25.)
14. Connect the negative battery cable.

DROPPING RESISTOR

Inspection

1. Disconnect the negative battery cable.
2. Disconnect the dropping resistor connector.
3. Measure the resistance between the terminals of the resistor.

Resistance: 10–14 Ω

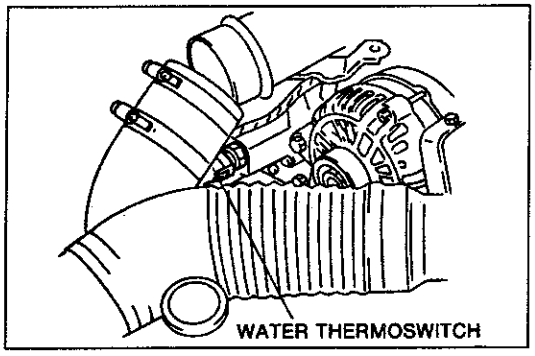
4. If not correct, replace the dropping resistor.
5. Connect the dropping resistor connector.
6. Connect the negative battery cable.

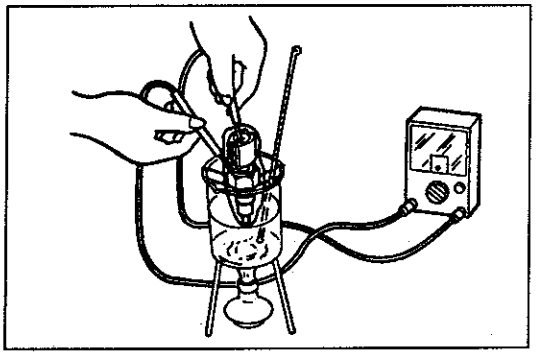
Replacement

1. Disconnect the negative battery cable.
2. Disconnect the dropping resistor connector.
3. Remove the dropping resistor.
4. Install the new dropping resistor.

Tightening torque:
7.9–11.7 N·m {80–120 kgf·cm, 70–104 in·lbf}

5. Connect the dropping resistor connector.
6. Connect the negative battery cable.





WATER THERMOSWITCH

Replacement

1. Disconnect the negative battery cable.
2. Disconnect the water thermoswitch connector.
3. Drain the engine coolant.
4. Remove the water thermoswitch.
5. Install the new water thermoswitch.

Tightening torque:
5.9–6.8 N·m {60–90 kgf·cm, 53–78 in·lbf}

6. Connect the water thermoswitch connector.
7. Fill the engine with the specified amount and type of engine coolant.
8. Connect the negative battery cable.

Inspection

1. Refer to "Replacement" above for removal of water thermoswitch.
2. Wrap the water thermoswitch in wrapping vinyl, place it in the ATF with a thermometer as shown, and heat the ATF gradually.
3. Measure the resistance between the terminals of the water thermoswitch.

ATF temperature	Continuity
Above 115°C {239°F}	Yes
Below 110°C {230°F}	No

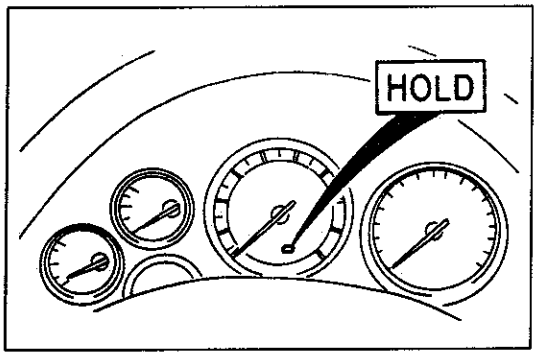
4. If not correct, replace the water thermoswitch.
5. Refer to "Replacement" above for installation of the water thermoswitch.

HOLD INDICATOR

Inspection

Operation

1. Turn the ignition switch ON.

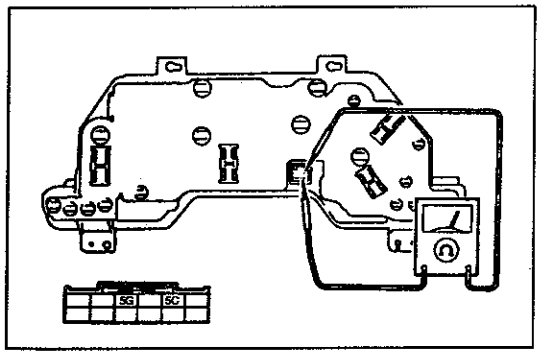


Note
- The hold indicator will flash if a malfunction exists in any of the PCMT system components.

2. Press the hold switch ON/OFF and verify that the hold indicator illuminates when the hold mode is selected.
3. If not as specified, inspect the combination meter and/or hold switch.

Continuity

1. Disconnect the negative battery cable.
2. Remove the combination meter. (Refer to 1994 RX-7 Body Electrical Troubleshooting Manual, section C1.)
3. Check for continuity between terminals 5C and 5G of the combination meter.



Terminal	5C	5G
Continuity	○	○

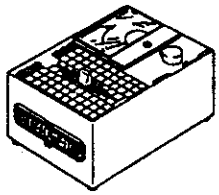
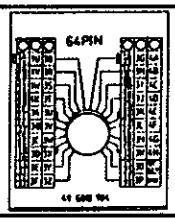
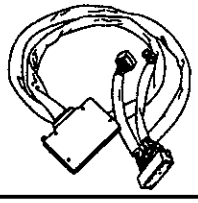
○ ○ : Indicates continuity

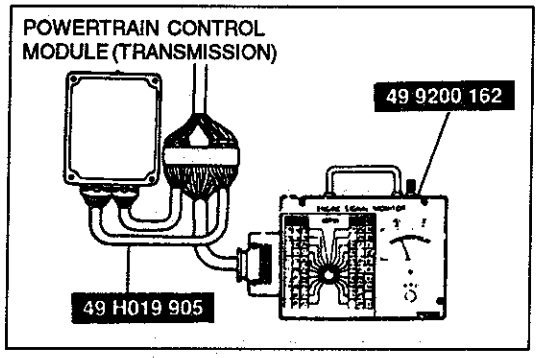
4. If not correct, replace the bulb or the combination meter.
5. Install the combination meter. (Refer to 1994 RX-7 Body Electrical Troubleshooting Manual, section C1.)
6. Connect the negative battery cable.

POWERTRAIN CONTROL MODULE (TRANSMISSION)

Preparation

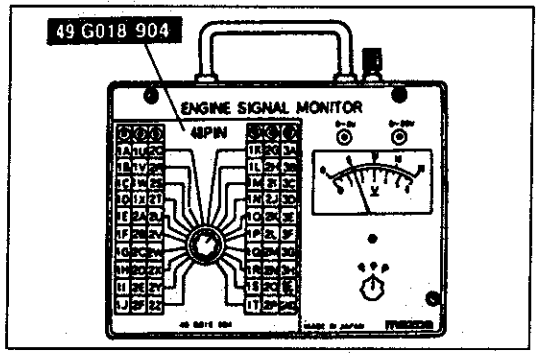
SST

49 9200 162 Monitor, Engine Signal		For inspection of Powertrain Control Module (Transmission) terminal voltage	49 G018 904 Sheet		For inspection of Powertrain Control Module (Transmission) terminal voltage
49 H019 905 Adapter Harness		For inspection of Powertrain Control Module (Transmission) terminal voltage			

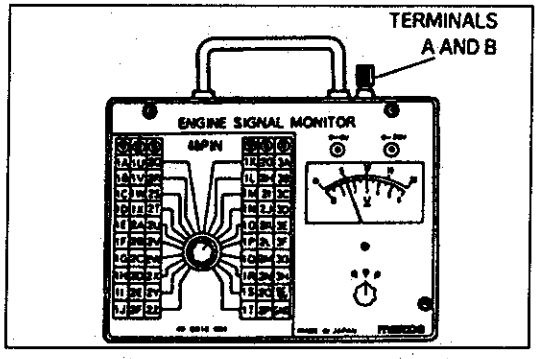


Inspection

1. Lift out the Powertrain Control Module (Transmission) by referring to the Powertrain Control Module (Transmission) replacement procedure. (Refer to page K–41.)
2. Disconnect the Powertrain Control Module (Transmission) connectors.
3. Connect the **SSTs (Engine Signal Monitor** and **Adapter Harness)** to the Powertrain Control Module (Transmission) as shown.



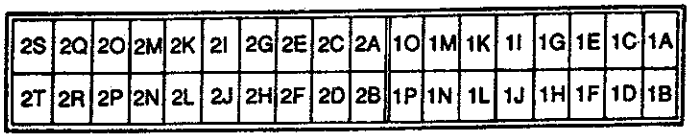
4. Place the **SST (Sheet)** on the **Engine Signal Monitor.**
5. Turn the ignition switch to ON.
6. Measure the terminal voltage at each terminal.
7. If any Powertrain Control Module (Transmission) terminal voltage is incorrect, check the related input or output devices and wiring. If no problem is found, replace the Powertrain Control Module (Transmission).



Caution

- **Applying voltage to terminals A and B of this SST will damage the SST.**

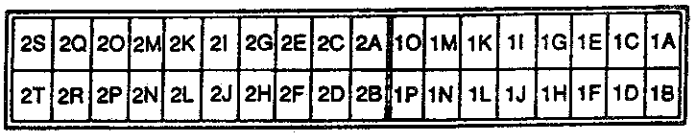
Terminal Voltage Chart (Reference Data)



B+: Battery positive voltage

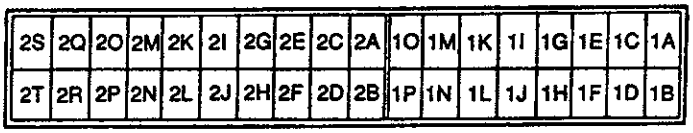
Terminal	Color	Component	Connected to	Voltmeter (+) terminal	Voltmeter (−) terminal	Correct voltage	Condition	Check area
1A	L/R	Battery (backup)	Battery	1A	Ground	B+	Constant	• Wiring and/or connector from terminal 1A to battery
1B (Output)	W/G	Shift B solenoid valve	Solenoid valve	1B		B+	P, R, and N ranges or 1st and 2nd gear positions	• Shift B solenoid valve • Wiring and/or connector from 1B terminal to shift B solenoid valve
						Below 1.0V	Third and Fourth gear positions	
1C (Output)	Y	Inhibitor signal	Engine control unit	1C		Below 1.0V	P and N ranges	• Park/Neutral switch, vehicle speed pulse generator, and/or powertrain control module (engine) • Wiring and/or connector from terminal 1C to powertrain control module (engine) terminal 1R
						B+	Except P and N ranges	
1D (Output)	W/R	Shift A solenoid valve	Solenoid valve	1D		B+	P, R, and N ranges or 1st and Fourth gear positions	• Shift A solenoid valve • Wiring and/or connector from terminal 1D to shift A solenoid valve
						Below 1.0V	2nd and Third gear positions	
1E (Input)	R	Park/Neutral switch (R range)	Park/Neutral switch	1E		B+	R range	• Park/Neutral switch • Wiring and/or connector from terminal 1E to park/neutral switch
						0V	Excect R range	
1F (Output)	W/L	Line pressure solenoid valve	Solenoid valve	1F		Above 1.5V	Throttle valve closed throttle position	• Line pressure solenoid valve • Wiring and/or connector from terminal 1F to line pressure solenoid valve
						Below 1.0V	Throttle valve wide opened throttle	
1G (Input)	Y/L	Engine rpm signal	Engine control unit	1G		0.3–0.8V	Engine running at idle	• Wiring and/or connector from terminal 1G to powertrain control module (engine) terminal 2B • Powertrain control module (engine)
						0V	Engine stopped	
						1.8–2.2V	Engine running at 3,000 rpm (no load)	
1H (Output)	B/LG	Dropping resistor	Dropping resistor	1H		B+	Throttle valve closed throttle position	• Dropping resistor and/or solenoid valve (line pressure) • Wiring and/or connector between terminal 1H, dropping resistor, and solenoid valve.
						Below 1.0V	Throttle valve wide opened throttle	

Terminal 1D voltage [shift A solenoid valve] is below 1.0V when in HOLD mode in P, R, and N ranges.



B+: Battery positive voltage

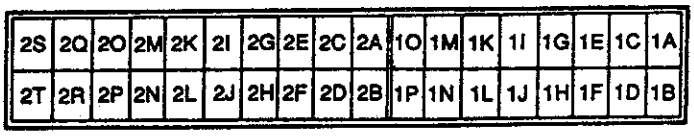
Terminal	Color	Component	Connected to	Voltmeter (+) terminal	Voltmeter (−) terminal	Correct voltage	Condition	Check area
1I (Input)	G/R	Vehicle speedometer sensor	Speedometer	1I	Ground	2–3V	Vehicle moving	• Vehicle speedometer sensor and/or speedometer • Wiring and/or connector between terminal 1I speedometer, and vehicle speedometer sensor.
						0V or 4.5–5.5V	Vehicle stopped	
1J (Ground)	B/L	Ground (Powertrain control module (Transmission))	—	1J		0V	Constant	• Wiring condition.
1K (Output)	Y	Hold indicator / FAT terminal (data link connector)	Combination meter (hold indicator light) and FAT terminal (data link connector)	1K		Below 1.0V	Hold mode	• Wiring and/or connector from terminal 1K to hold indicator light (combination meter) • Hold indicator light
						B+	Except hold mode	
1L (Input)	V/P	A/C signal	A/C relay	1L		Below 3.0V	A/C ON	• Powertrain control module (engine) and/or Air conditioning sensor • Wiring and/or connector from terminal 1L to Air conditioning sensor
						B+	A/C OFF	
1M (Output)	W	Lockup solenoid valve	Solenoid valve	1M		B+	Lockup	• Lockup solenoid valve • Wiring and/or connector from terminal 1M to lockup solenoid valve
						Below 1.0V	No lockup	
1N	B/Y	Battery (main)	Ignition switch	1N		B+	Ignition switch ON	• Meter fuse and/or ignition switch • Wiring and/or connector from terminal 1N to ignition switch (IG1)
						0V	Ignition switch OFF	
1O (Output)	W/Y	Overrunning clutch solenoid valve	Solenoid valve	1O		Below 1.0V	Throttle valve wide opened throttle (D range)	• Overrunning clutch solenoid valve • Wiring and/or connector from terminal 1O to overrunning clutch solenoid valve
						B+	Throttle valve closed (D range)	
1P	B/Y	Battery (main)	Ignition switch	1P		B+	Ignition switch ON	• Meter fuse and/or ignition switch • Wiring and/or connector from terminal 1P to ignition switch (IG1)
						0V	Ignition switch OFF	
2A (Input)	BR/W	Throttle sensor (V_{REF})	Throttle position sensor	2A		4.5–5.5V	Ignition switch ON	• Wiring and/or connector from terminal 2A to powertrain control module (engine) terminal 3I • Throttle position sensor
						0V	Ignition switch OFF	



B+: Battery positive voltage

Terminal	Color	Component	Connected to	Voltmeter (+) terminal	Voltmeter (−) terminal	Correct voltage	Condition	Check area
2B (Input)	Y/G	Park/Neutral switch (D range)	Park/Neutral switch	2B	Ground	B+	D range	• Park/Neutral switch • Wiring and/or connector from terminal 2B to park/neutral switch
						0V	Excect D range	
2C (Input)	G/Y	Barometric absolute pressure sensor	Powertrain control module (engine)	2C		2.0–4.5V	Ignition switch ON	• Wiring and/or connector from terminal 2C to powertrain control module (engine) erminal 2D
						0V	Ignition switch OFF	
2D (Input)	L/Y	Park/Neutral switch (P and N ranges)	Park/Neutral switch	2D	Ground	0V	P and N ranges	• Park/Neutral switch and/or ignition switch • Wiring and/or connector between terminal 2D park/neutral switch, and ignition switch (STA)
						B+	Except P and N ranges	
2E (Input)	O	Vehicle speed pulse generator	Vehicle speed vehicle speed pulse generator	2E*1	2L	Approx. above 0.5V AC	Vehicle speed above 25 km/h {16 MPH}	• Vehicle speed pulse generator • Wiring and/or connector from terminal 2E to vehicle speed pulse generator
						Approx. 0V (AC)	Vehicle stopped (Ignition switch ON)	
2P (Output)	G/W	Lockup control solenoid valve	Solenoid valve	2F	Ground	B+	lockup	• Lockup control solenoid valve • Wiring and/or connector from terminal 2F to lockup control solenoid valve
						Below 1.0V	No lockup	
2G (Input)	G/R	Slip lockup OFF signal	Powertrain control module (engine)	2G		Below 1.0V	Engine running at 3.000 rpm	• Wiring and/or connector from terminal 2G to powertrain control module (engine) terminal 2C • Powertrain control module (engine)
						B+	Engine running at idle	
2H (Input)	L/G	Torque reduced signal	Powertrain control module (engine)	2H*2		B+	Engine running at idle	• Wiring and/or connector from terminal 2H to powertrain control module (engine) terminal 2G • Throttle position sensor, vehicle speed sensor vehicle speed pulse generator, and/or powertrain control module (engine)
						Below 1.0V	Throttle opening above 1/8 (Engine coolant temp below 40°C {104°F})	
2I (Input)	W/Y	Hold switch	Hold switch	2I		B+	Switch depressed	• Hold switch • Wiring and/or connector from terminal 2I to hold switch
						0V	Switch released	

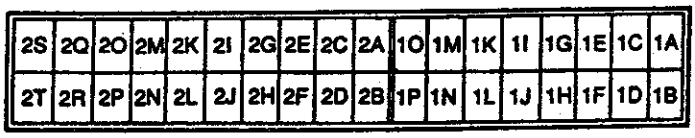
*1 Check terminal 2E (vehicle speed pulse generator) voltage by using the AC range.
*2 2H (Torque reduced signal) : Some kinds of testers may give incorrect values. This is because the voltage output period is very short.



B+: Battery positive voltage

Terminal	Color	Component	Connected to	Voltmeter (+) terminal	Voltmeter (−) terminal	Correct voltage	Condition	Check area
2J (Input)	Y/G	Vehicle speed sensor (revolution sensor)	Vehicle speed sensor (revolution sensor)	2J*	2L	Approx. above 1.0V (AC)	Vehicle speed above 25 km/h {16 MPH}	• Vehicle speed sensor (revolution sensor) • Wiring and/or connector from terminal 2J to vehicle speed sensor
						Approx. 0V (AC)	Vehicle stopped	
2K	L/W	TAT terminal(data link connector) / 4GR inhibit signal (auto speed control signal)	TAT terminal (data link connector) and cruise control unit	2K	Ground	4.5–5.5	Ignition switch ON	• Terminal 1N and 1P voltage • Wiring and/or connector from terminal 2K to data link connector TAT terminal • Wiring and/or connector from terminal 2K to cruise control unit terminal G
						0V	TAT terminal grounded	
2L (Ground)	W	Ground (input signals)	—	2L		0V	Constant	• Wiring condition
2M (Input)	R/W	Idle signal	Powertrain control module (engine)	2M	Ground	4.5–5.5V	Throttle valve opened	• Throttle position sensor and/or powertrain control module (engine) • Wiring and/or connector from terminal 2M to powertrain control module (engine) terminal 2E
						Below 1.0V	Throttle valve closed throttle position	
2N (Input)	B	Water thermo-switch / mileage switch	Water thermo-switch and mileage switch	2N		0V	Engine coolant temp. above 115°C {239°F} or vehicle total mileage above 625 km {388 miles} and vehicle stopped	• Water thermo-switch and/or mileage switch • Wiring and/or connector from terminal 2N to water thermo-switch
						B+	Engine coolant temp. below 110°C {230°F} or vehicle total mileage below 625 km {388 miles} and vehicle stopped	
2O (Input)	LG/R	Stoplight switch	Stoplight switch	2O		B+	Brake pedal depressed	• Stoplight switch • Wiring and/or connector from terminal 2O to stoplight switch
						0V	Brake pedal released	

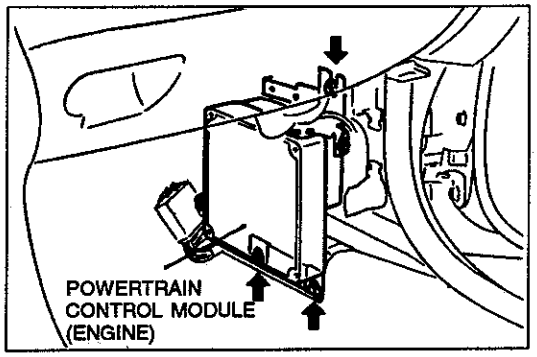
* Check terminal 2J (speed sensor 1) voltage by using the AC range.

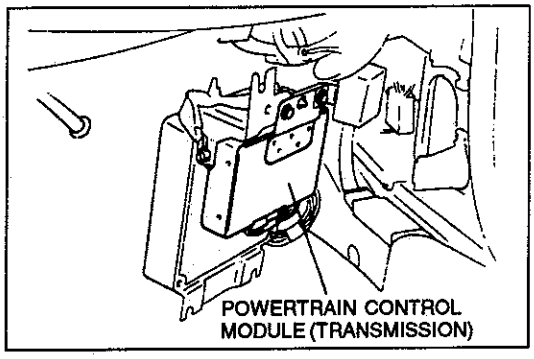


B+: Battery positive voltage

Terminal	Color	Component	Connected to	Voltmeter (+) terminal	Voltmeter (−) terminal	Correct voltage	Condition	Check area
2P (Output)	G/W	Reduce torque signal / slip lockup signal	Powertrain control module (engine)	2P*	Ground	Below 1.0V	When shifting from 1st to 2nd or from 2nd to Third with the throttle opening above 1.5/8. When slip lockup with the throttle opening below 0.5/8.	• Wiring and/or connector from terminal 2P to powertrain control module (engine) terminal 1Q • Throttle position sensor, vehicle speed sensor, vehicle speed pulse generator, lockup, lockup control solenoid valve, and/or powertrain control module (engine)
						B+	Engine running at idle	
2Q (Input)	BR/W	Park/Neutral switch (L range)	Park/Neutral switch	2Q		B+	L range	• Park/Neutral switch • Wiring and/or connector from terminal 2Q to park/neutral switch
						0V	Except L range	
2R (Input)	R	ATF thermosensor	ATF thermosensor	2R	2L	Approx. 2.4–0.4V	While warming up ATF Note • Approx. 1.8V: ATF temperature 10°C {50°F} • Approx. 1.1V: ATF temperature 40°C {104°F}	• ATF thermosensor • Wiring and/or connector from terminal 2R to ATF thermosensor
2S (Input)	L/R	Park/Neutral switch (S range)	Park/Neutral switch	2S	Ground	B+	S range	• Park/Neutral switch • Wiring and/or connector from terminal 2S to park/neutral switch
						0V	Except S range	
2T (Input)	B/G	Throttle position sensor (TVO)	Throttle position sensor	2T		0.1–1 1V	Throttle valve closed throttle position	• Throttle position sensor • Wiring and/or connector from terminal 2T to throttle position sensor
						4.0–4.5V	Throttle valve wide opened throttle	

* 2P (Reduce torque signal/ lockup signal): Some kinds of testers may give incorrect values. This is because the voltage output period is very short.





Replacement

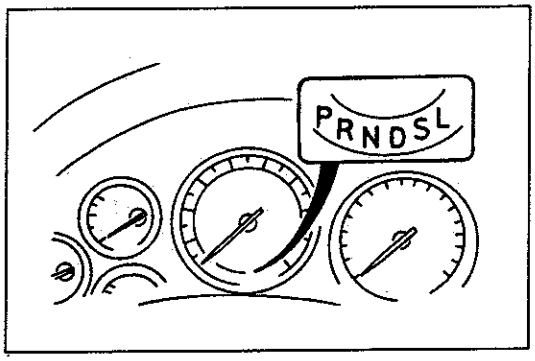
1. Disconnect the negative battery cable.
2. Remove the front side trim (passenger side).
3. Remove the Powertrain Control Module (Engine). (Refer to section F.)
4. Remove the nuts shown in the figure and disconnect the Powertrain Control Module (Transmission) connectors.
5. Install the new Powertrain Control Module (Transmission).

Tightening torque:
7.9–10.7 N·m {80–110 kgf·cm, 70–95 in·lbf}

6. Connect the Powertrain Control Module (Transmission) connectors.
7. Install the Powertrain Control Module (Engine). (Refer to section F.)

Tightening torque:
7.9–10.7 N·m {80–110 kgf·cm, 70–95 in·lbf}

8. Install the front side trim (passenger side).
9. Connect the negative battery cable.

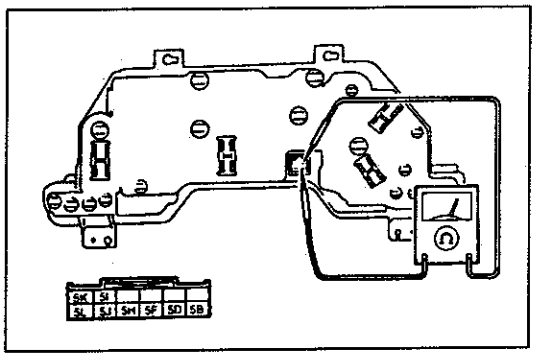


SELECTOR INDICATOR LIGHT

Inspection

Operation

1. Verify that the selected range and selector indicator light (built into combination meter) positions are aligned.
2. If not as specified, check the park/neutral switch and/or selector indicator light.



Continuity

1. Disconnect the negative battery cable.
2. Remove the combination meter. (Refer to 1994 RX-7 Body Electrical Troubleshooting Manual, section C1.)
3. Check for continuity between the terminals.

Terminal / Position	5K	5I	5L	5J	5H	5F	5D	5B
P	○	—	○					
R	○	—	—	○				
N		○	—	—	○			
D		○	—	—	—	○		
S		○	—	—	—	—	○	
L		○	—	—	—	—	—	○

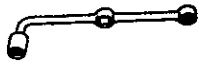
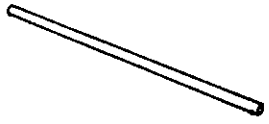
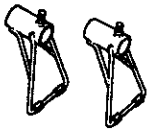
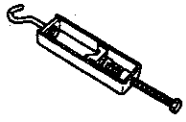
○—○ : Indicates Continuity

4. If not correct, replace the bulb or combination meter.
5. Install the combination meter. (Refer to 1994 RX-7 Body Electrical Troubleshooting Manual, section C1.)
6. Connect the negative battery cable.

TRANSMISSION

TRANSMISSION UNIT (REMOVAL)

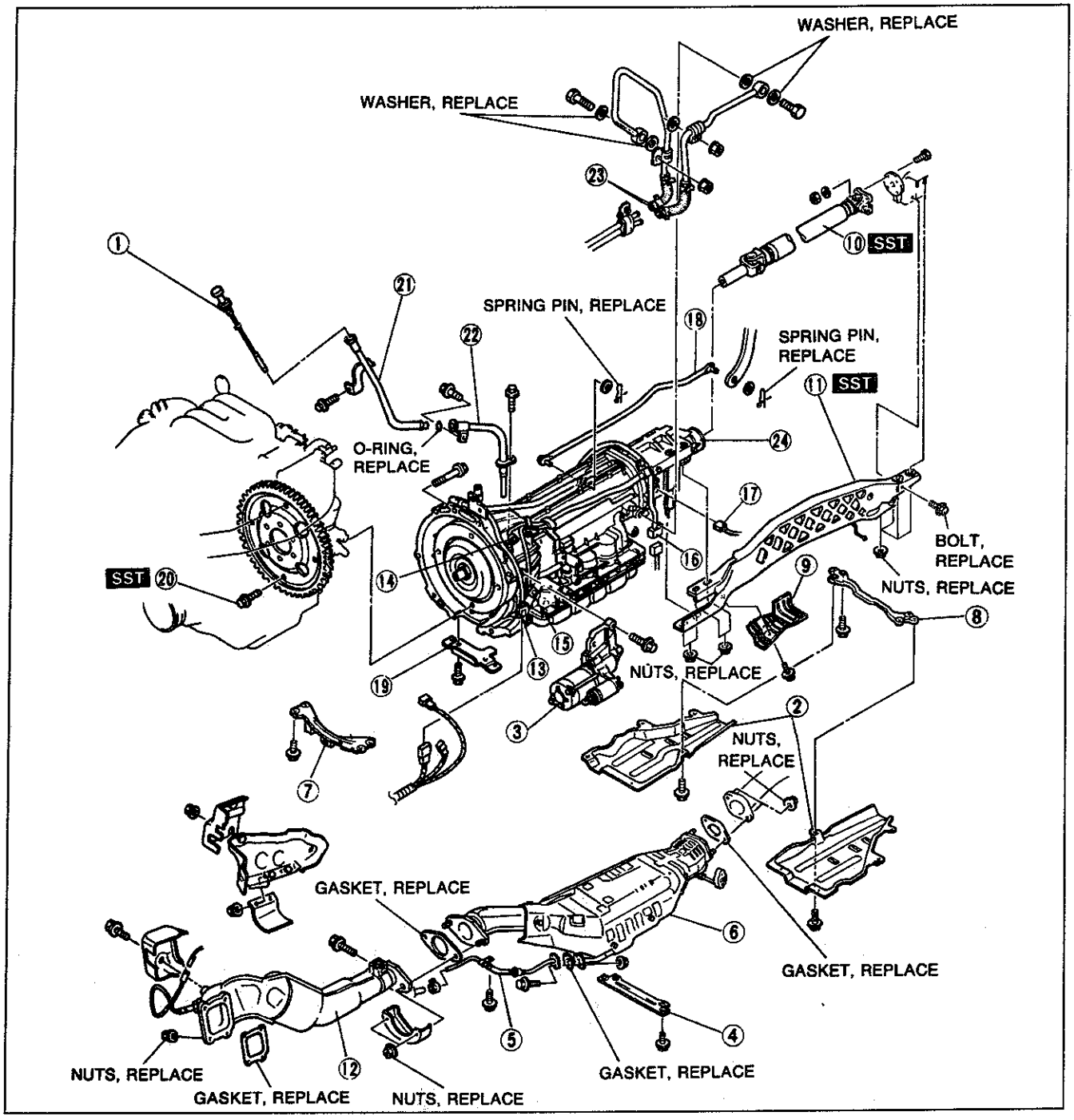
Preparation
SST

49 J019 002 Cap 	For prevention of ATF leakage	49 0877 435 Special wrench 	For loosening of torque converter installation bolts
49 G017 5A0 Support, engine 	For support of engine	49 G017 50 1 Bar (Part of 49 G017 5A0) 	For support of engine
49 G017 502 Support (Part of 49 G017 5A0) 	For support of engine	49 G017 503 Hook (Part of 49 G017 5A0) 	For support of engine

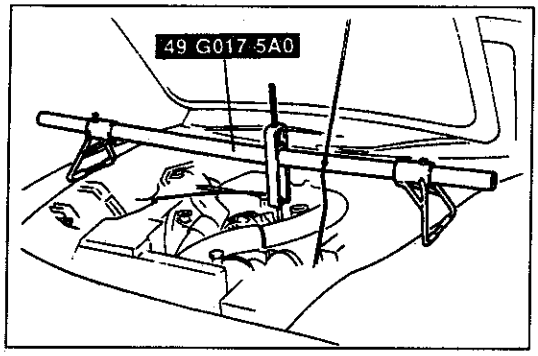
Removal

The oil pan could contain small chips, shavings, and other particles helpful in checking the condition of the transmission and diagnosing certain problems. To ensure that all foreign particles stay in the oil pan, make sure that the transmission is never tipped completely over while the oil pan is still installed.

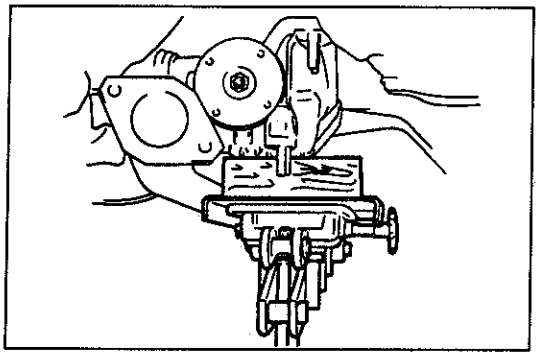
1. Disconnect the negative battery cable.
2. On level ground, jack up the vehicle and support it evenly on safety stands.
3. Remove in the order shown in the figure, referring to **Removal Note**.



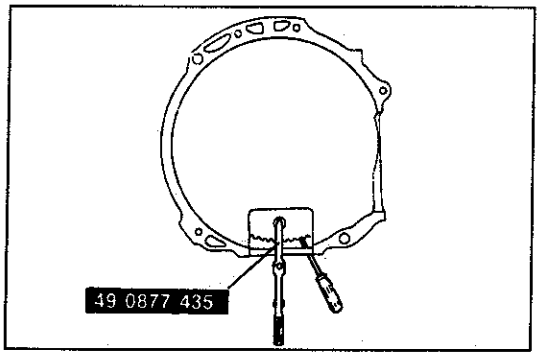
1. ATF dipstick
2. Undercover (right and left)
3. Starter
4. Tunnel member (center)
5. Secondary air injection pipe
6. Three-way catalyst assembly
7. Front tunnel member
8. Rear tunnel member
9. Cover
10. Propeller shaft
    Removal ..... section L
11. Power plant frame (PPF)
    Removal Note ..... page K–44
12. Front exhaust pipe
13. Park/neutral switch connector
14. Vehicle speed sensor connector
15. Vehicle speed pulse generator connector
16. Solenoid valve connector
17. Vehicle speedometer sensor connector
18. Selector rod (selector lever side)
19. Service hole cover
20. Torque converter bolts
    Removal Note ..... page K–44
21. Oil filler tube (upper)
22. Oil filler tube (lower)
23. Oil cooler hose
24. Transmission
    Removal Note ..... page K–45



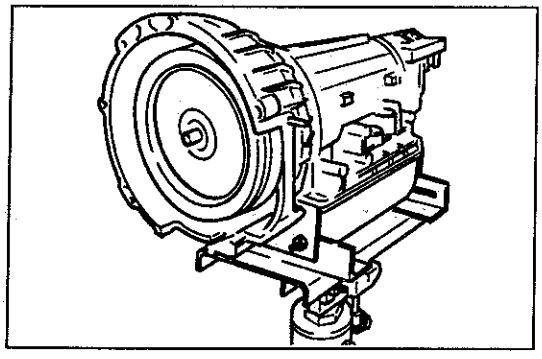
Removal note
Power plant frame (PPF)
1. Hold the engine by using the **SST**.



2. Hold the differential with a transmission jack.
3. Remove the PPF.



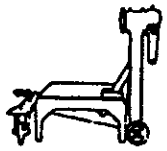
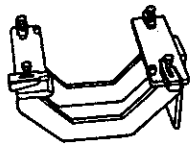
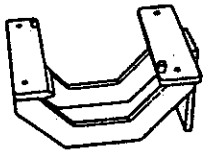
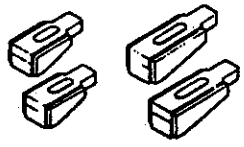
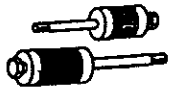
Torque converter bolts
1. Lock the drive plate by using a screwdriver.
2. Remove the torque converter bolts by using the **SST**.



Transmission
Set the transmission onto the transmission jack, paying special attention not to damage the oil pipes. Make sure that the torque converter side of the transmission is tilted slightly upward during removal. Carefully lower the transmission from the vehicle.

TRANSMISSION UNIT (DISASSEMBLY)

Preparation
SST

49 0107 680A Engine stand		For disassembly of transmission	49 U019 0A0A Hanger set, transmission		For disassembly of transmission
49 H075 495B Body (Part of 49 U019 0A0A)		For disassembly of transmission	49 U019 003 Holder (Part of 49 U019 0A0A)		For disassembly of transmission
49 0378 390 Puller, oil pump		For disassembly of transmission			

Precaution
General Notes:

1. Disassemble the transmission in a clean area (clean work space) to prevent contaminants from entering into the mechanisms.
2. Inspect the individual transmission components in accordance with the QUICK DIAGNOSIS CHART during disassembly.
3. Use only plastic hammers when applying force to separate the light alloy case joints.
4. Never use rags during disassembly; they may leave particles that can clog fluid passages.
5. Several parts resemble one another; organize them so that they do not get mixed up.
6. Disassemble the control valve assembly and thoroughly clean it when the clutch or brake band has burned out or when the ATF has degenerated.

Cleaning Notes:

1. Clean the transmission exterior thoroughly with a steam cleaner or cleaning solvents, or both, before disassembly.

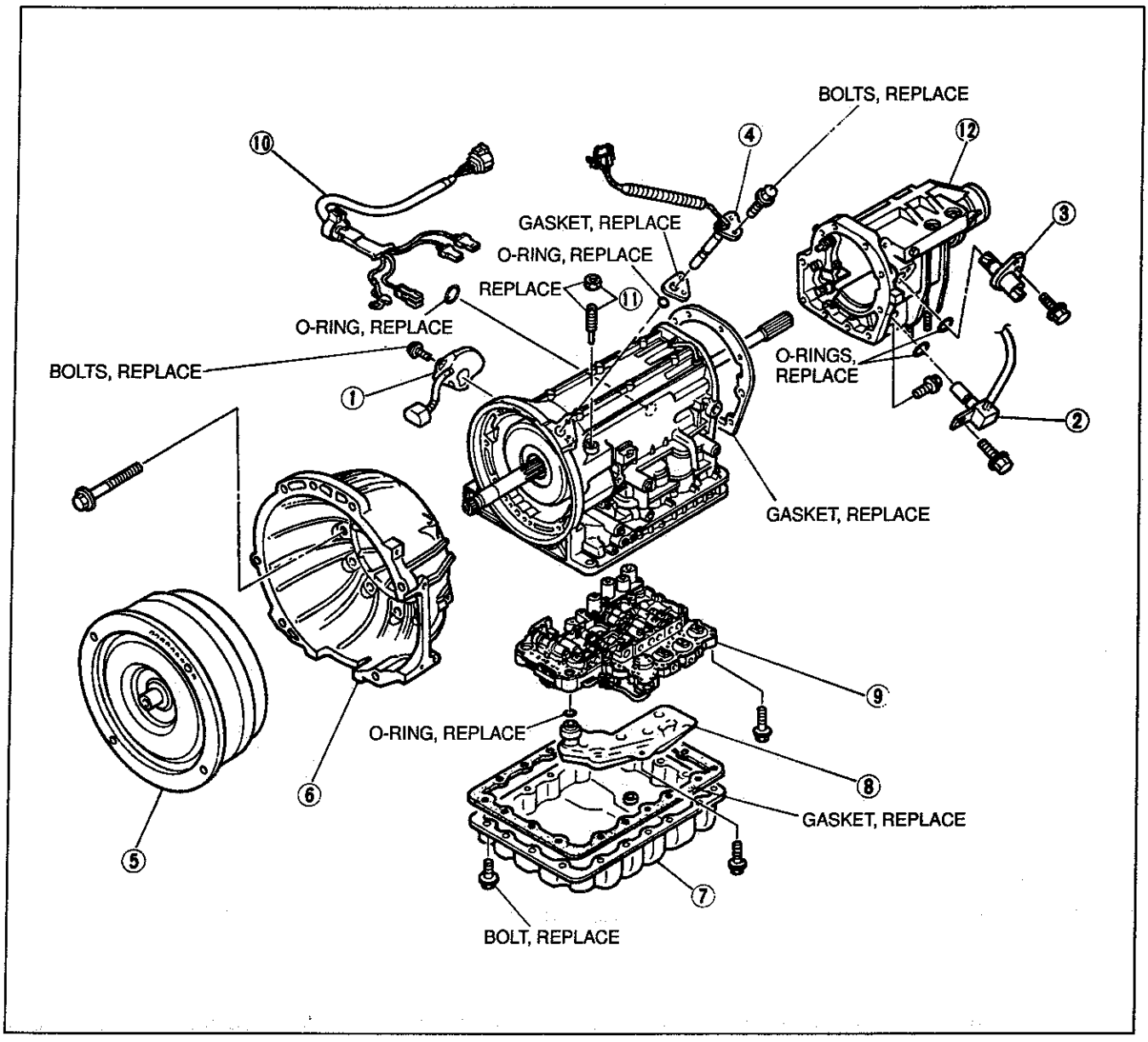
Warning

- **Using compressed air can cause dirt and other partieles to fly out, causing injury to the eyes. Wear protective eye wear whenever using compressed air.**

2. Clean the removed parts with cleaning solvent, and dry with compressed air. Clean out all holes and passages with compressed air, and verify that there are no obstructions.

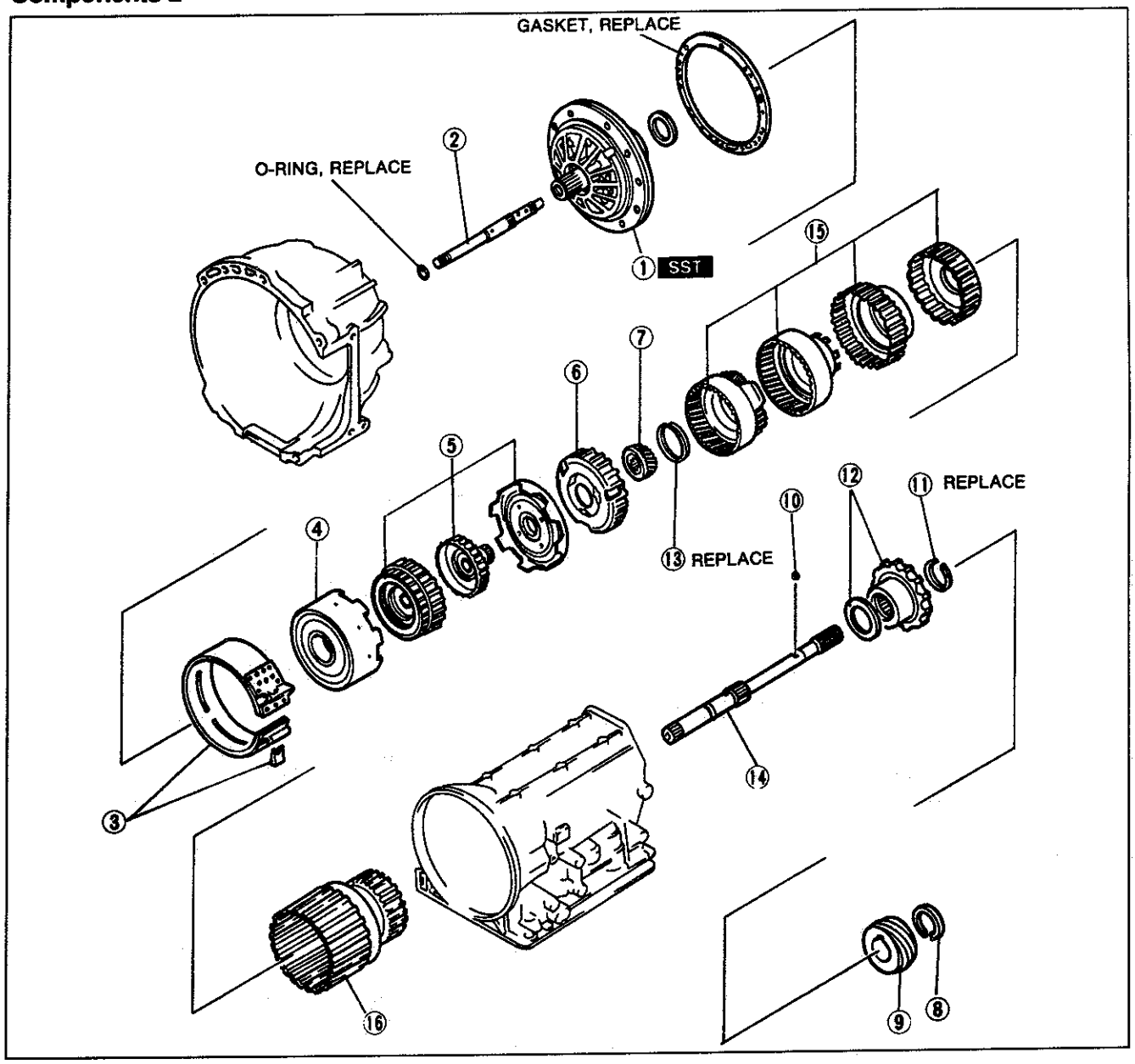
Disassembly
Disassemble in the order shown in the figure, referring to **Disassembly Procedure.**

Components 1



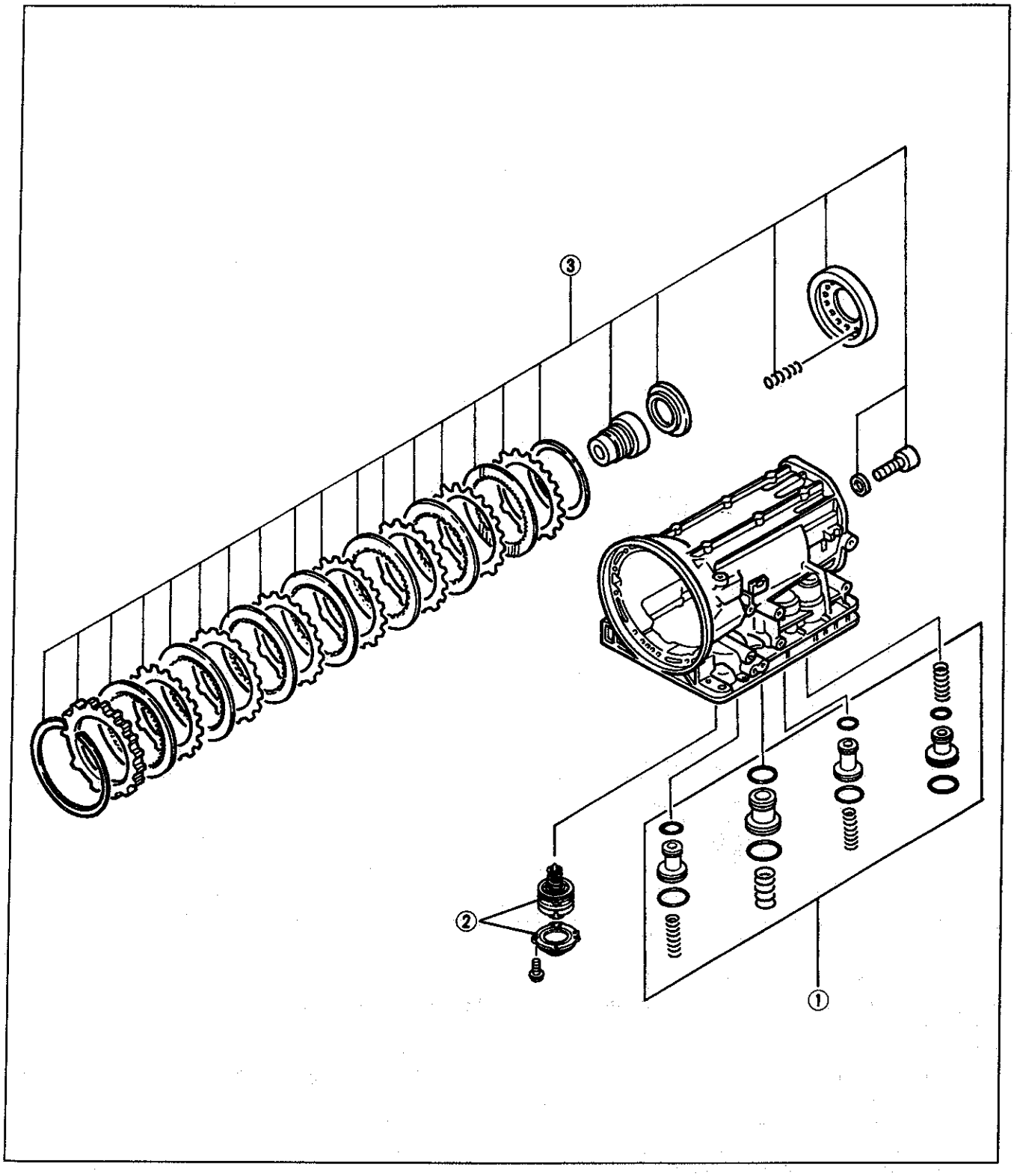
1. Park/neutral switch
   - Inspection ..... page K- 28
   - Adjustment ..... page K- 28
   - Replacement ..... page K- 28
2. Vehicle speed sensor
   - Inspection ..... page K- 29
   - Replacement ..... page K- 29
3. Vehicle speedometer sensor
   - Inspection ..... page K- 30
   - Replacement ..... page K- 30
4. Vehicle speed pulse generator
   - Inspection ..... page K- 30
   - Replacement ..... page K- 31
5. Torque converter
   - Inspection ..... page K- 57
6. Converter housing
7. Oil pan
8. Oil strainer
9. Control valve body
   - Disassembly / Inspection ..... page K-108
   - Assembly ..... page K-125
   - On-Vehicle Removal ..... page K-128
   - On-Vehicle Installation ..... page K-130
10. Solenoid valve harness
11. Anchorend bolt and nut
12. Extension housing / Parking mechanism
    - Disassembly / Inspection / Assembly ..... page K- 97
    - On-Vehicle Removal / Installation ..... page K-101

Components 2

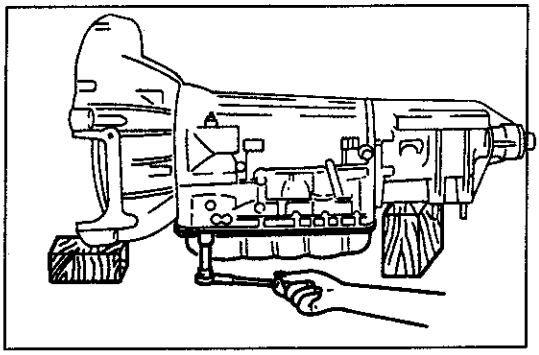


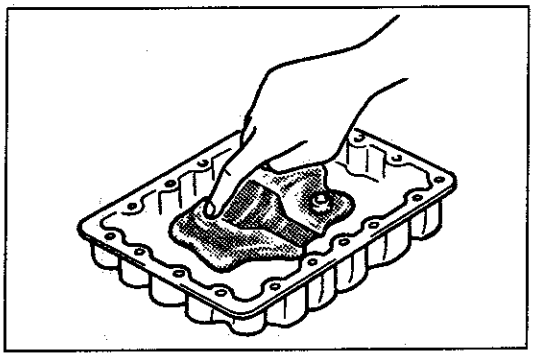
1. Oil pump
   Disassembly / Inspection / Assembly ..... page K-60
2. Input shaft
3. Brake band and strut
4. Reverse clutch
   Preinspection ..... page K-64
   Disassembly / Inspection / Assembly ..... page K-65
5. High clutch and front sun gear
   Preinspection ..... page K-70
   Disassembly / Inspection / Assembly ..... page K-71
6. Front planetary carrier
7. Rear sun gear
8. Snap ring
9. Speedometer drive gear
10. Steel ball
11. Snap ring
12. Parking gear and bearing
13. Snap ring
14. Output shaft
15. Front internal gear, rear internal gear, forward clutch hub, overrunning clutch hub
    Preinspection ..... page K-80
    Disassembly / Inspection / Assembly ..... page K-80
16. Forward clutch drum (forward clutch, overrunning clutch, low one-way clutch)
    Preinspection ..... page K-83
    Disassembly / Inspection / Assembly ..... page K-84

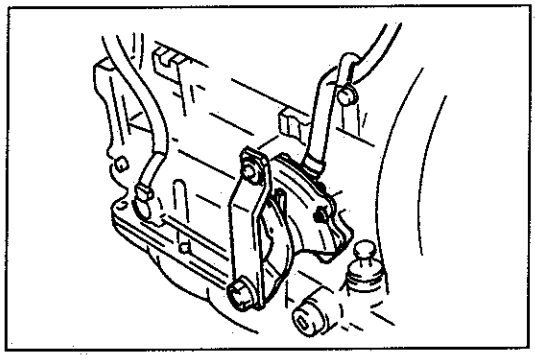
Components 3



1. Accumulators
   Disassembly / Inspection / Assembly ..... page K-58
2. Band servo
   Preinspection ..... page K-76
   Disassembly / Inspection / Assembl ..... page K-76
3. Low and reverse brake
   Preinspection ..... page K-91
   Disassembly / Inspection / Assembly ..... page K-92

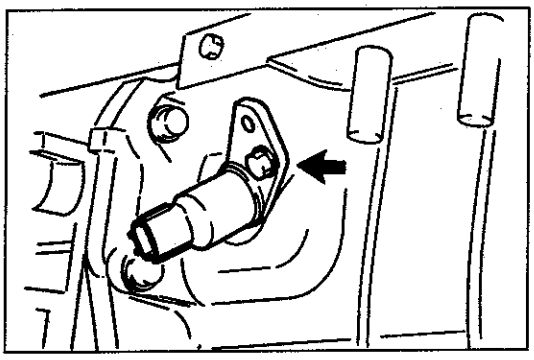




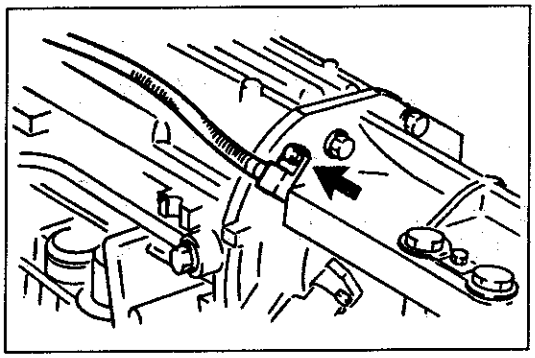


Disassembly procedure

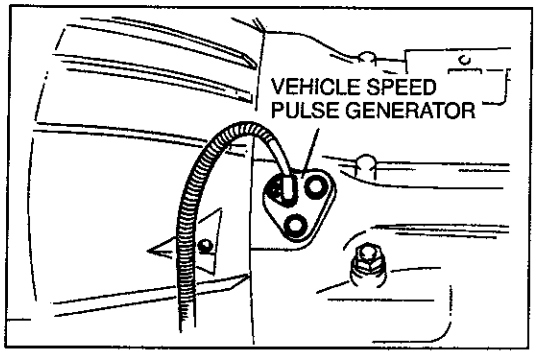
1. Support the transmission by placing wooden blocks under the converter housing and the extension housing.
2. Remove the oil pan and gasket.
   If large amounts of material are found in the oil pan, replace the torque converter and inspect the transmission for the cause.
3. Examine any material found in the pan or on the magnet to determine the condition of the transmission.
   Clutch facing material ..... Drive plate and brake band wear
   Steel (magnetic) ..... Bearing gear, and driven plate wear
   Aluminum (non-magnetic) ... Bushings or cast aluminum parts wear
4. Install the oil pan with a few bolts to protect the control valve body.
5. Remove the harness from the connector bracket.
6. Remove the park/neutral switch.



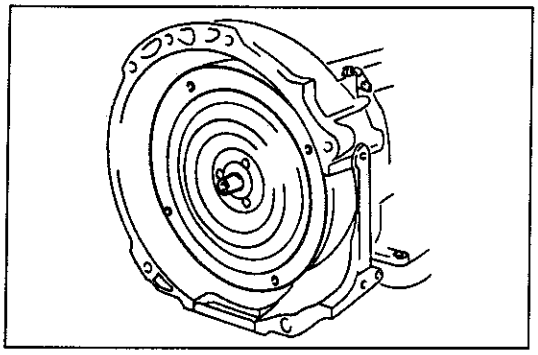
7. Remove the harness from the connector bracket.
8. Remove the connector bracket from the converter housing.
9. Remove the vehicle speedometer sensor.
10. Remove the O-ring from the vehicle speedometer sensor.



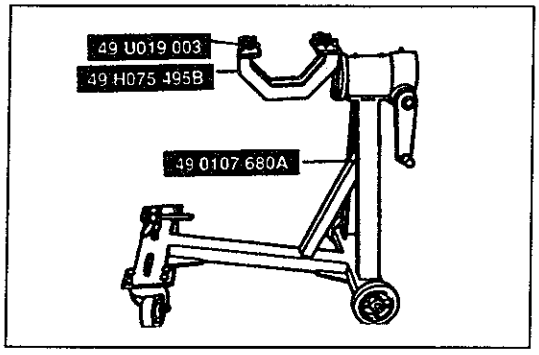
11. Remove the vehicle speed sensor.
12. Remove the O-ring from the vehicle speed sensor.



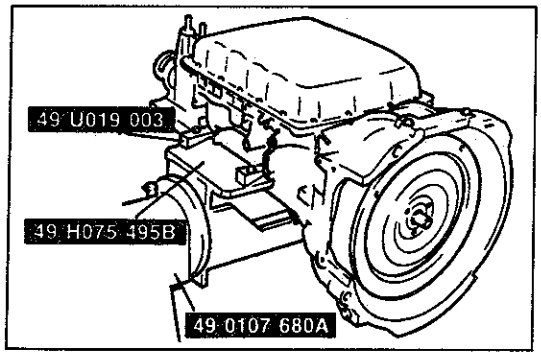
13. Remove the vehicle speed pulse generator and gasket from the transmission case.
14. Remove the O-ring from the vehicle speed pulse generator.



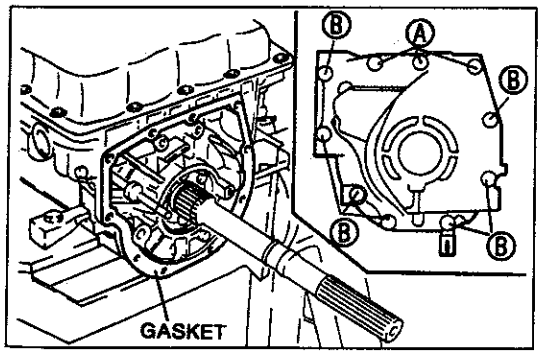
15. Remove the torque converter, and immediately turn it so that the hole faces upward. This will help to keep any remaining fluid from spilling.



16. Assemble the **SSTs** as shown.

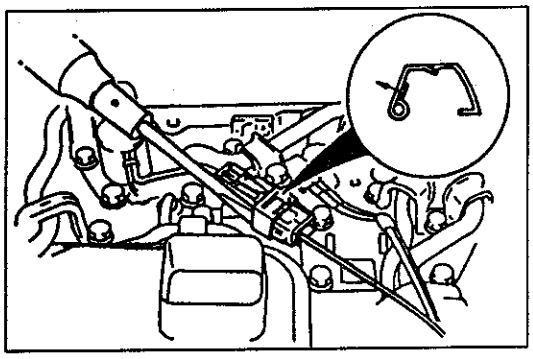


17. Mount the transmission to the **SSTs**.
18. Remove the oil pan, gasket, and magnet.

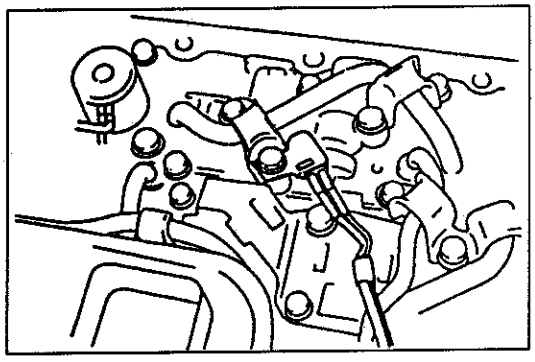


19. Remove the extension housing and gasket.

Bolt length (measured from below bolt head)
A: 30 mm {1.181 in}
B: 45 mm {1.772 in}

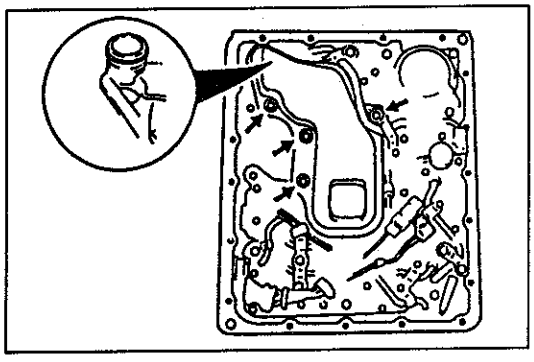


20. Remove the clip by carefully prying with a small flathead screwdriver.
21. Remove the lockup solenoid valve connector.



22. Remove the ATF thermosensor.

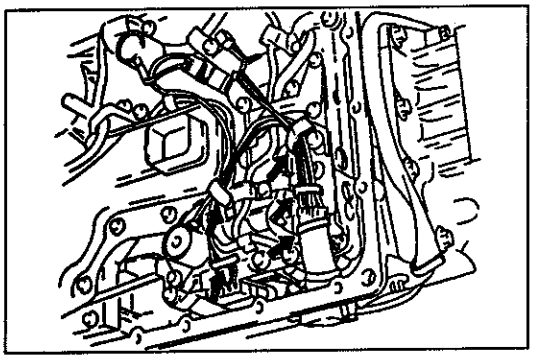
    Bolt length (measured from below bolt head):
    45 mm {1.772 in}



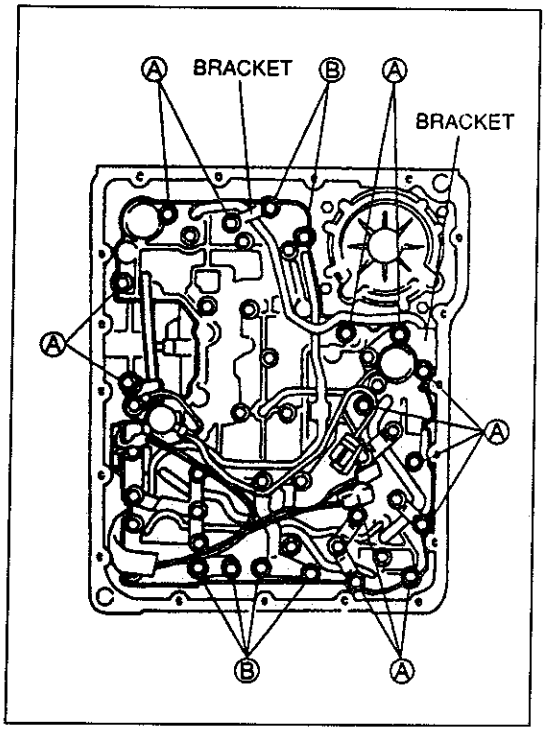
23. Remove the oil strainer.

    Bolt length (measured from below bolt head):
    50 mm {1.969 in}

24. Remove the O-ring from the oil strainer.

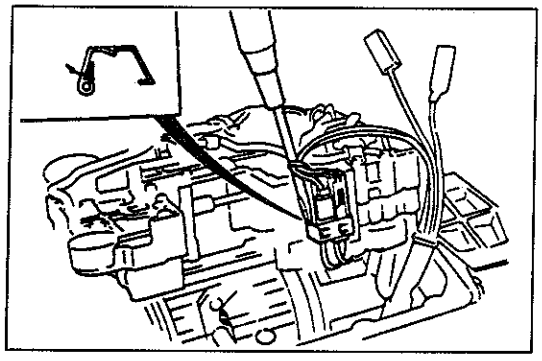


25. Separate the solenoid valve harness from the harness clip.

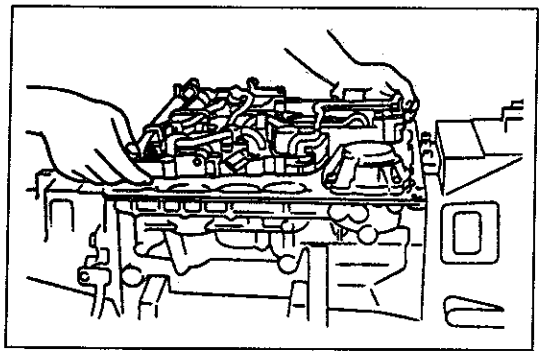


26. Remove bolts A, B, and the brackets shown in the figure.

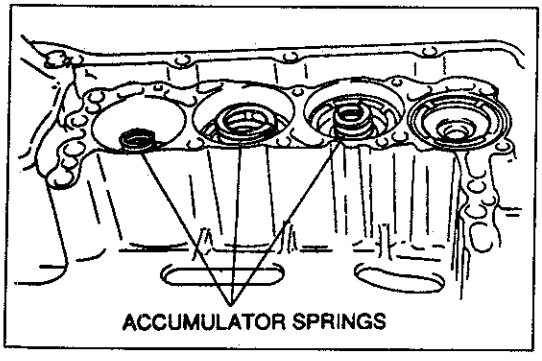
Bolt length (measured from below bolt head)
A: 33 mm {1.299 in}
B: 45 mm {1.772 in}



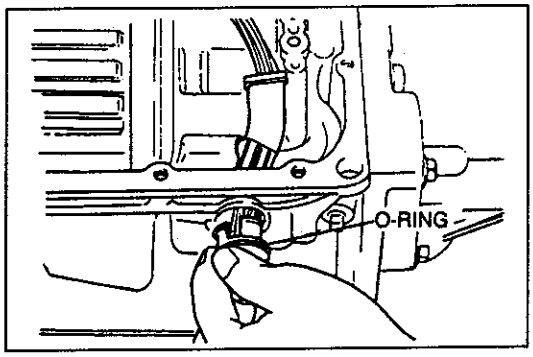
27. Remove the clip by carefully prying with a small flathead screwdriver.
28. Disconnect the solenoid valve connectors.



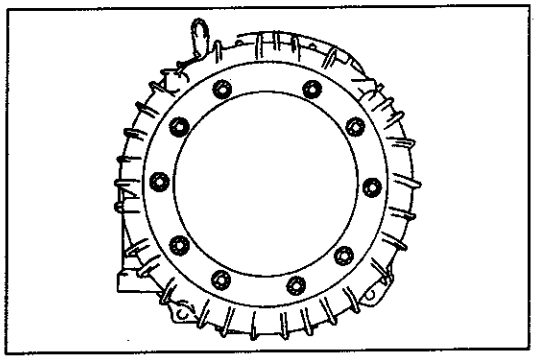
29. Remove the control valve body.



30. Remove the accumulator springs.



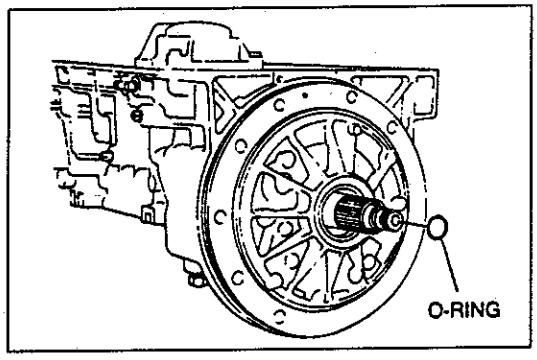
31. Remove the solenoid connector from the transmission case.
32. Remove the O-ring from the solenoid valve harness.



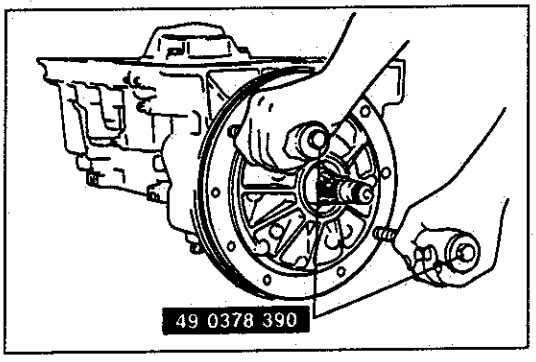
33. Remove the converter housing from the transmission case.

Caution
- **The converter housing is made of aluminum, and is therefore easily dented and scratched by metal tools. When removing old sealant, do not gouge or strike the sealing surface of the converter housing.**

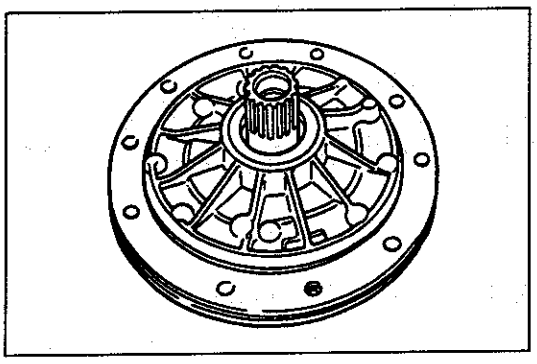
34. Clean the sealant from the converter housing.



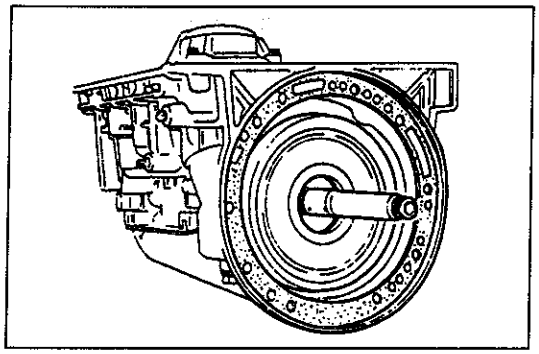
35. Remove the O-ring from the input shaft.



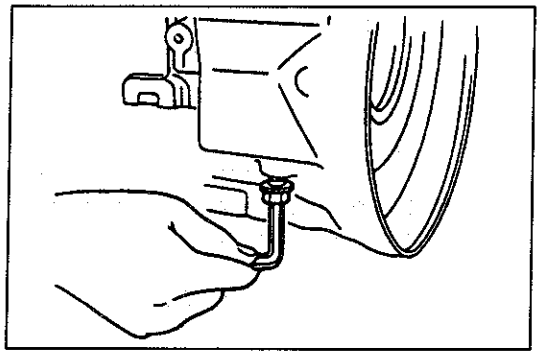
36. Install the **SST** to the oil pump.
37. Slowly remove the oil pump from the transmission case by evenly sliding the weights of the **SST**.
38. Remove the **SST** from the oil pump.



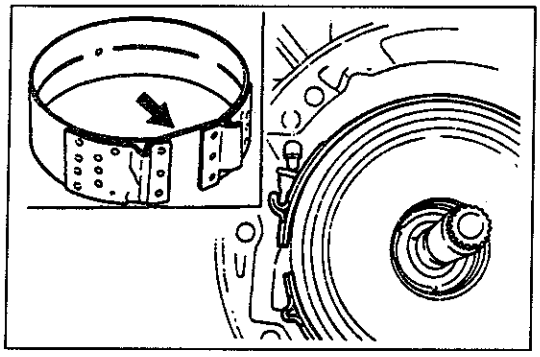
39. Clean the sealant from the oil pump housing, being careful not scratch or dent the machined surfaces.



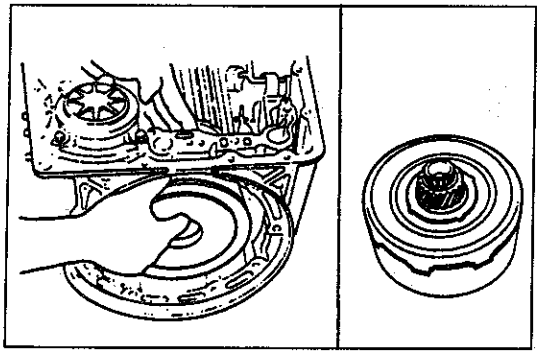
40. Remove the oil pump gasket.
41. Pull out the input shaft while holding the reverse clutch drum.



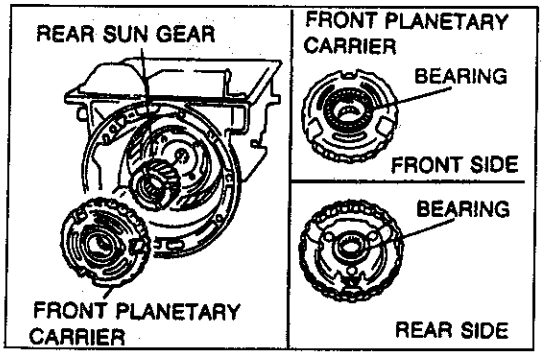
42. While holding the anchor end bolt, loosen the locknut.
43. Remove the anchor end bolt.
44. Clean the sealant from the case threads.



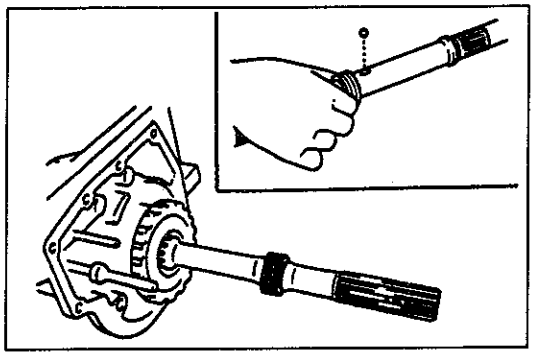
45. Remove the brake band and hold it together with a piece of wire as shown in the figure.
46. Remove the band strut.



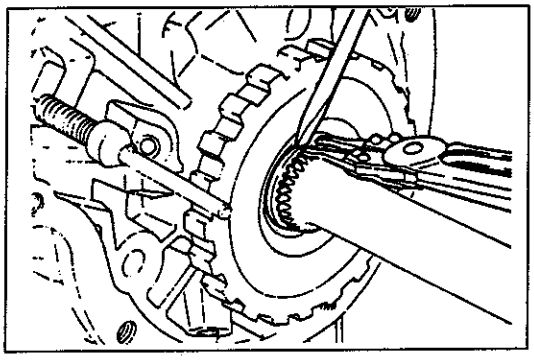
47. Remove the reverse clutch, high clutch, and front sun gear assembly from the transmission case.



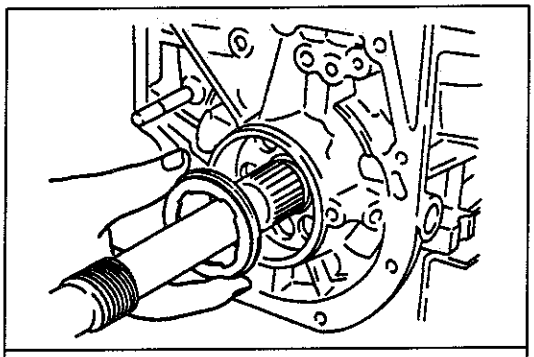
48. Remove the front planetary carrier, bearings, and rear sun gear.
    Inspect the following and replace as necessary.
    1) Front planetary carrier
       Inspect gear teeth for damage, wear, and cracks.
       Check for rough rotation of pinion gears.
    2) Rear sun gear
       Inspect gear teeth for damage, wear, and cracks.
    3) Bearing
       Inspect for damage and rough rotation.



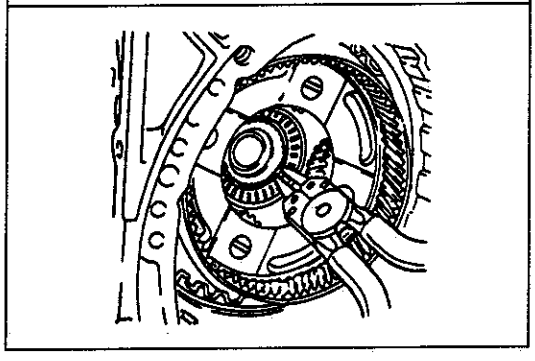
49. Remove the snap ring and the speedometer drive gear.
50. Remove the steel ball.



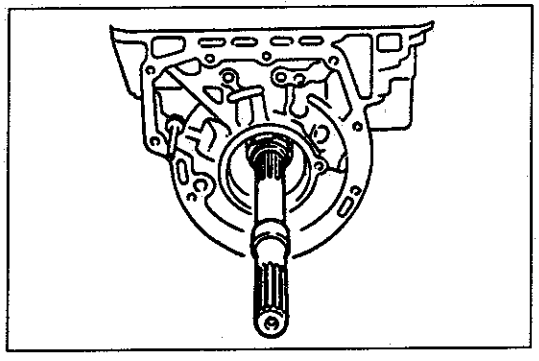
51. Remove the snap ring from the output shaft.
52. Remove the parking gear.



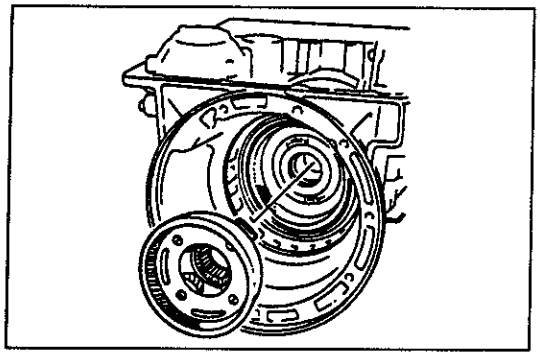
53. Remove the bearing from the rear of the transmission case. Inspect for damage and rough rotation. Replace as necessary.



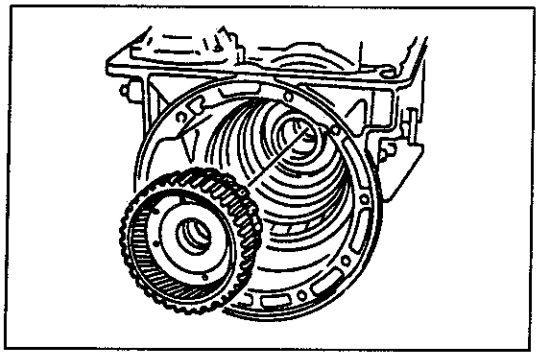
54. Push the output shaft slightly forward and remove the snap ring from the output shaft.



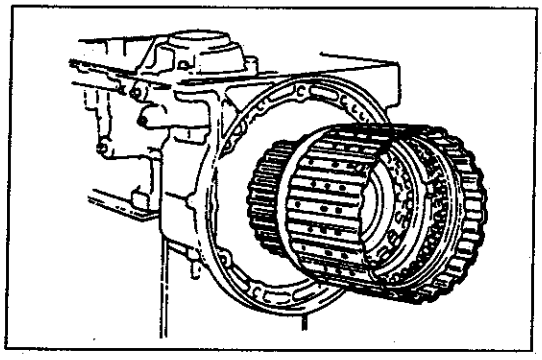
55. Slide the output shaft from the rear of the transmission case.



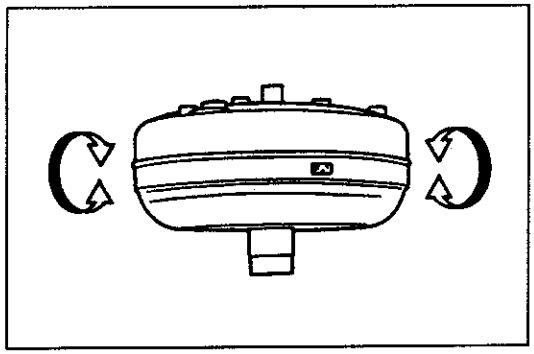
56. Remove the front internal gear (integrated with rear planetary carrier).



57. Remove the rear internal gear, forward clutch hub, and overrunning clutch hub assembly.



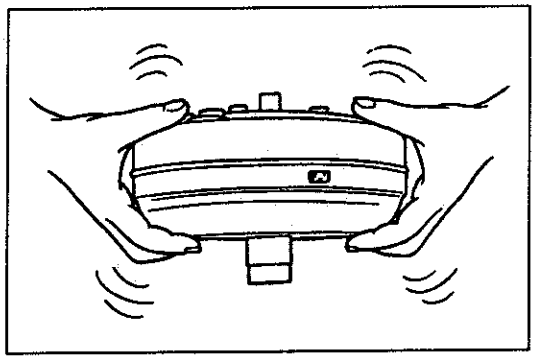
58. Remove the forward clutch drum (forward clutch, overrunning clutch, and low one-way clutch) assembly.



TORQUE CONVERTER

Inspection

1. Check the outside of the converter for damage and cracks. Replace the torque converter if there are any problems.
2. Check for rust on the pilot hub or the boss. Remove any rust completely.



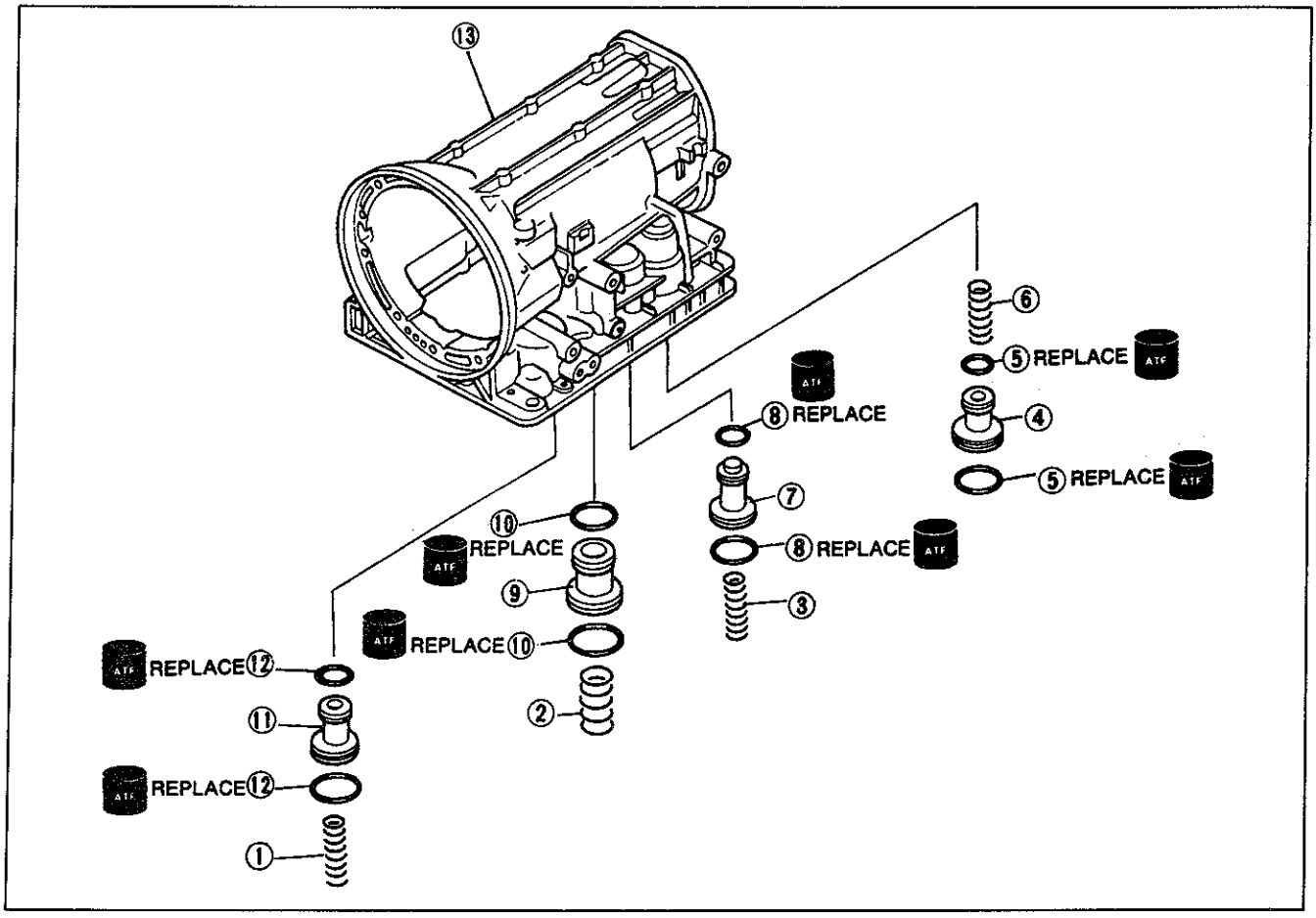
Cleaning the inside of the converter

1. Drain all ATF remaining in the converter.
2. Pour in new ATF **(2.0 L {2.1 US qt, 1.8 Imp qt})**.
3. Shake the converter to clean the inside. Drain the ATF.
4. Repeat steps 2 and 3 until you are sure that the inside of the torque converter is clean.

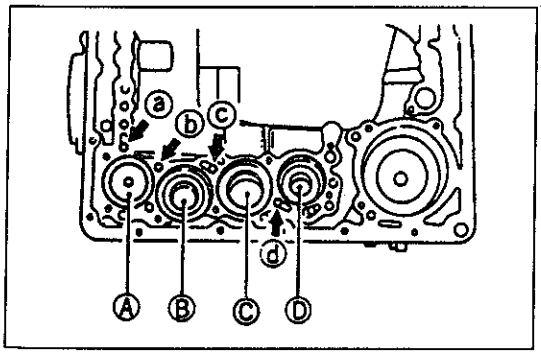
ACCUMULATORS

Disassembly / Inspection / Assembly

1. Disassemble in the order in the figure, referring to **Disassembly Note**.
2. Inspect all parts and replace if necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Procedure**.



1. 3-4/N-R accumulator spring
   Inspection ..... page K-59
2. 1-2 accumulator spring
   Inspection ..... page K-59
3. 2-3 accumulator spring
   Inspection ..... page K-59
4. N-D accumulator piston
   Disassembly Note ..... below
5. O-rings
6. N-D accumulator spring
   Inspection ..... page K-59
7. 2-3 accumulator piston
   Disassembly Note ..... below
8. O-rings
9. 1-2 accumulator piston
   Disassembly Note ..... below
10. O-rings
11. 3-4/N-R accumulator piston
    Disassembly Note ..... below
12. O-rings
13. Transmission case

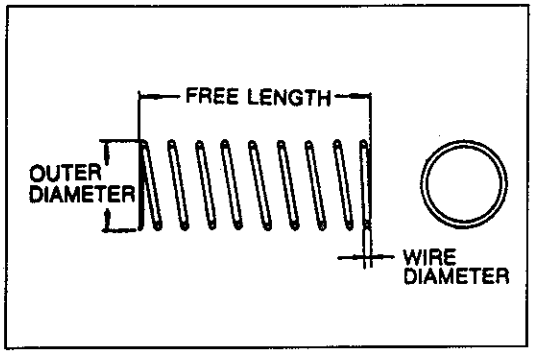


Disassembly note

Accumulator piston

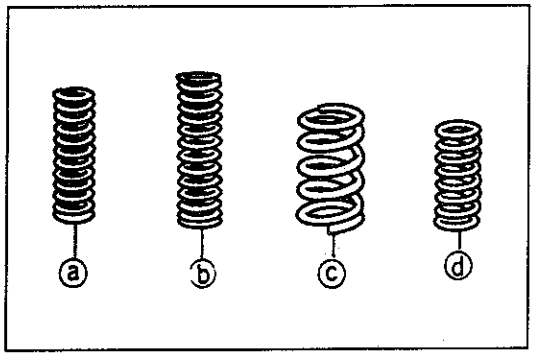
Remove the accumulator pistons from transmission case by applying compressed air through the oil passage as shown in the figure.

Item / Accumulator	Location	Oil passage
N-D accumulator	A	a
2-3 accumulator	B	b
1-2 accumulator	C	c
3-4/N-R accumulator	D	d



Inspection
Accumulator spring
1. Measure the spring free length

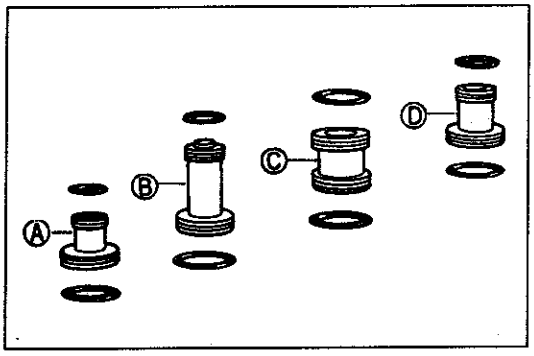
Item / Spring	Outer dia. mm {in}	Free length mm {in}	No. of coils	Wiredia. mm {in}
N-D accumulator spring	18.0 {0.71}	43.0 {1.69}	7.9	2.3 {0.091}
1-2 accumulator spring	29.3 {1.15}	45.0 {1.77}	3.8	3.7 {0.15}
2-3 accumulator spring	19.5 {0.77}	66.0 {2.60}	8.6	3.0 {0.12}
3-4/N-R accumulator spring	18.0 {0.71}	43.0 {1.69}	7.9	2.3 {0.091}

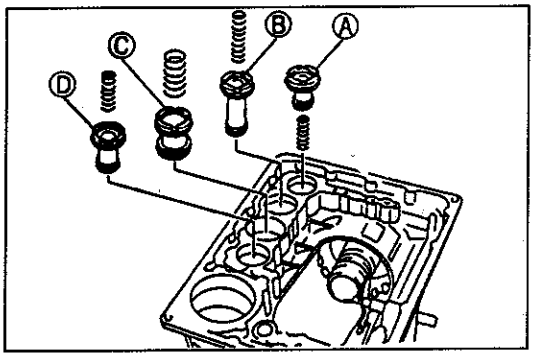


2. If not within specification, replace the spring.

Assembly procedure
Outer diameter and installation order of spring

Spring		Installation order	Outer dia. mm {in}
a	N-D accumulator	Spring – Piston	18.0 {0.709}
b	2-3 accumulator	Piston – Spring	20.0 {0.787}
c	1-2 accumulator	Piston – Spring	29.3 {1.154}
d	3-4/N-R accumulator	Piston – Spring	17.3 {0.681}

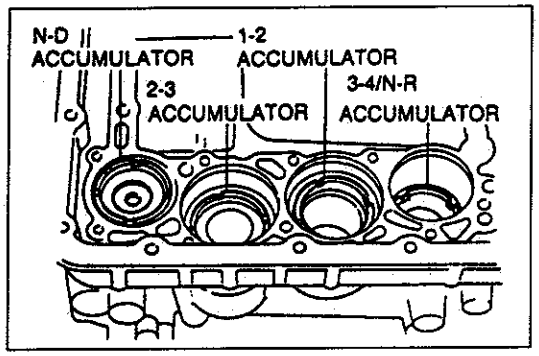




1. Apply ATF to the new O-rings and install them onto the accumulator pistons.

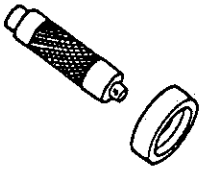
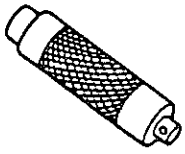
Piston / O-ring		Large mm {in}	Small mm {in}
A	N-D accumulator	45.0 {1.77}	29.0 {1.14}
B	2-3 accumulator	50.0 {1.97}	32.0 {1.26}
C	1-2 accumulator	50.0 {1.97}	45.0 {1.77}
D	3-4/N-R accumulator	45.0 {1.77}	29.0 {1.14}

2. Apply even pressure to the perimeter of the accumulator pistons and install them into the transmission case.
3. Install each spring into its own accumulator piston.

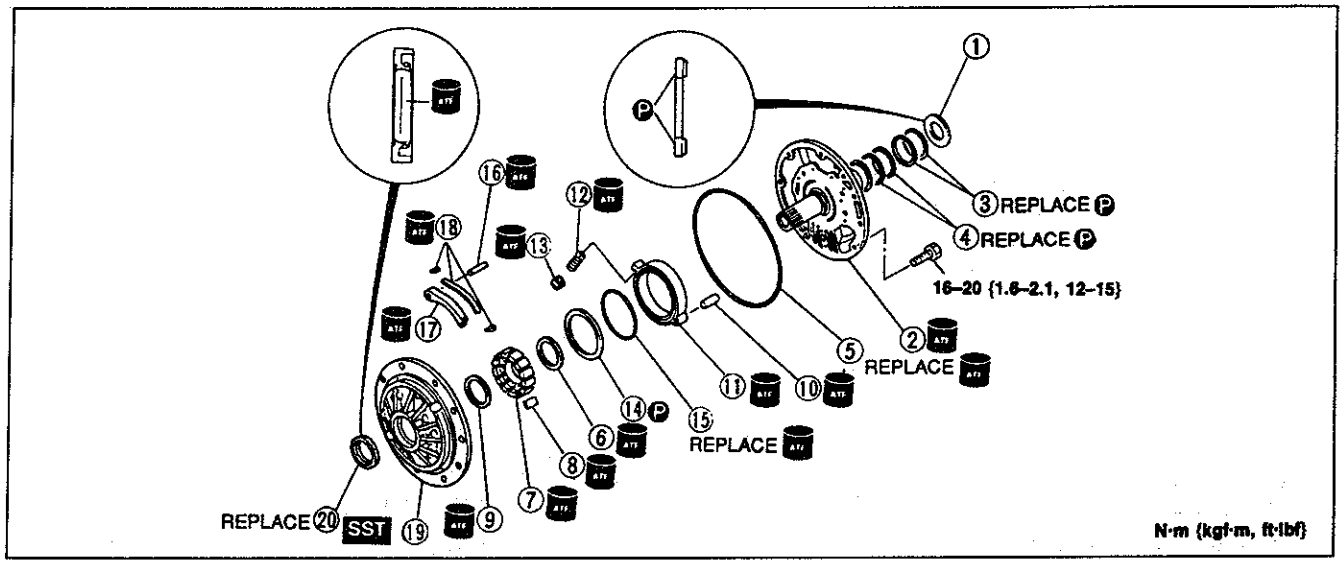


OIL PUMP

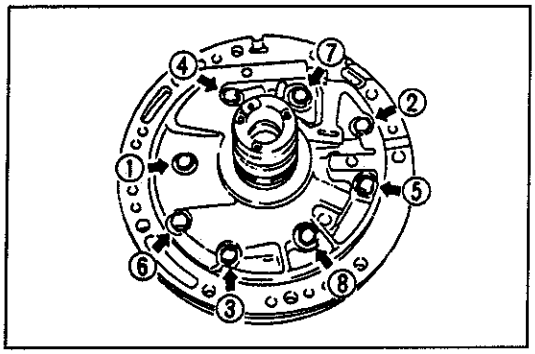
Preparation
SST

49 G030 795 Installer, oil seal 	For installation of oil seal	49 G030 796 Body (Part of 49 G030 795) 	For installation of oil seal
49 G030 797 Handle (Part of 49 G030 795) 	For installation of oil seal		

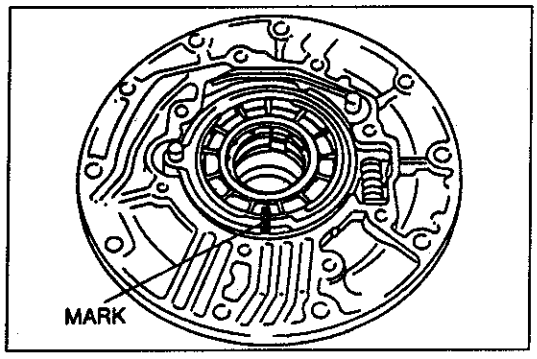
Disassembly / Inspection / Assembly
1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Procedure**.



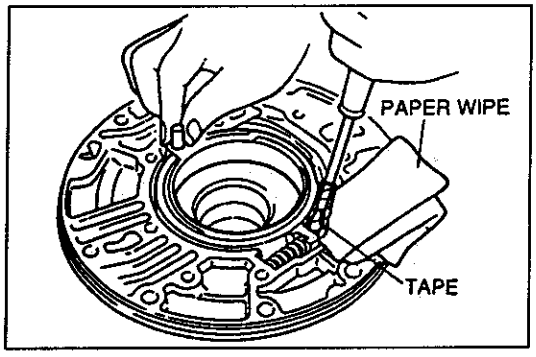
1. Bearing
   Inspect for damage and rough rotation
2. Oil pump cover
   Disassembly Note ..... page K–61
   Inspection ..... page K–61
3. Seal ring (small diameter)
4. Seal ring (large diameter)
5. O-ring
6. Vane ring
7. Rotor
   Disassembly Note ..... page K–61
   Inspection ..... page K–62
8. Vane
   Inspection ..... page K–62
9. Vane ring
10. Pivot pin
    Disassembly Note ..... page K–61
11. Cam ring
    Disassembly Note ..... page K–61
    Inspection ..... page K–62
12. Cam ring spring
    Inspection ..... page K–62
13. Spring seat
14. Friction ring
15. O-ring
16. Pivot pin
17. Control piston
    Inspection ..... page K–62
18. Side seal
19. Oil pump housing
    Inspection ..... page K–62
20. Oil seal



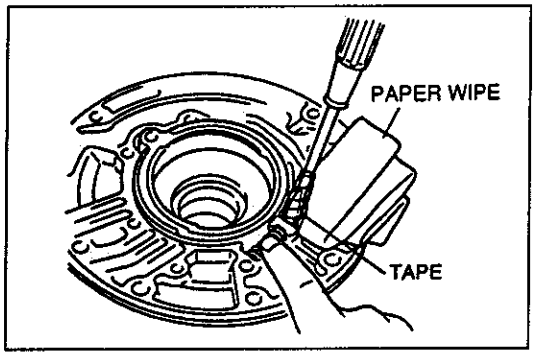
Disassembly note
Oil pump cover
1. Gradually loosen the mounting bolts in the order shown.
2. Remove the oil pump cover from the oil pump housing.



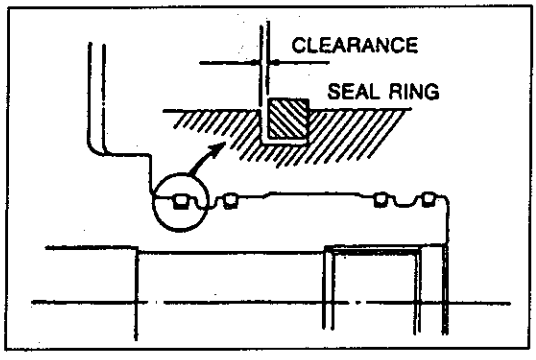
Rotor
1. Mark the rotor and cam ring without scratching or denting them.
2. Remove the rotor and vanes from the cam ring.



Pivot pin
Hold the cam ring back with a tape-wrapped screwdriver and remove the pivot pin.



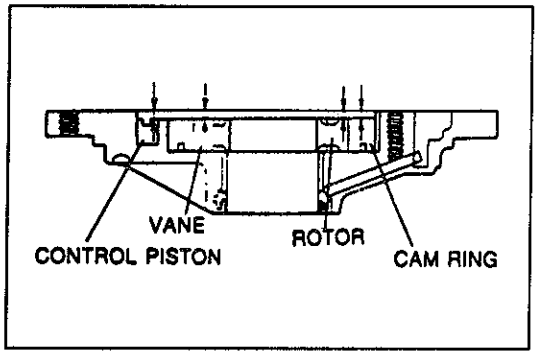
Cam ring
1. Hold the cam ring spring back and remove the cam ring.
2. Remove the cam ring spring.



Inspection
Oil pump cover
1. Fit new seal rings into the oil pump cover.
2. Measure the clearance between the seal ring and the ring groove.

Standard clearance:
0.10–0.25 mm {0.004–0.010 in}
Maximum clearance: 0.25 mm {0.010 in}

3. If not within specification, replace the oil pump assembly.



Oil pump housing, cam ring, rotor, vane, and control piston

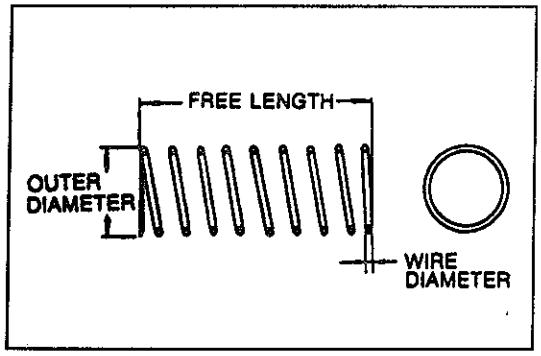
1. Install the cam ring, vanes, rotor, and control piston. Do not install the friction ring, O-ring, control piston, side seals, and cam ring spring yet.
2. Measure the distance from the edge of the oil pump housing to the cam ring, rotor, vanes, and control piston at least four points along their circumferences.

Clearance

mm {in}

Part \ Distance	Standard	Maximum
Cam ring	0.010–0.024 {0.0004–0.0009}	0.030 {0.0012}
Rotor, vane, control piston	0.030–0.044 {0.0012–0.0017}	0.050 {0.0020}

3. If not within specification, replace the oil pump assembly.



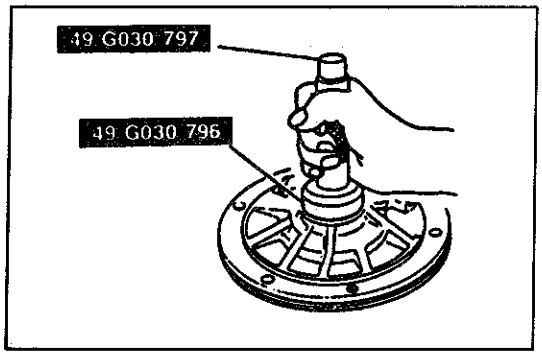
Cam ring spring

1. Measure the spring free length.

Specification

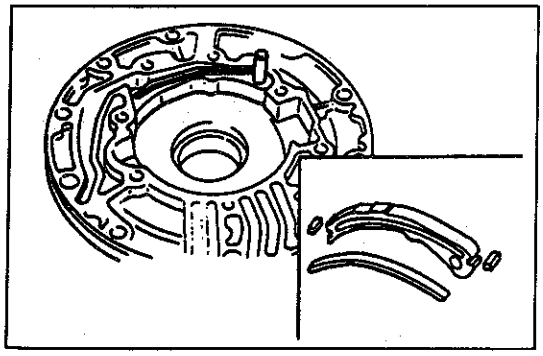
Outerdia. mm {in}	Free length mm {in}	No. of coils	Wiredia. mm {in}
13.7 {0.539}	39.8 {1.567}	7.8	2.3 {0.091}

2. If not correct, replace the cam ring spring.

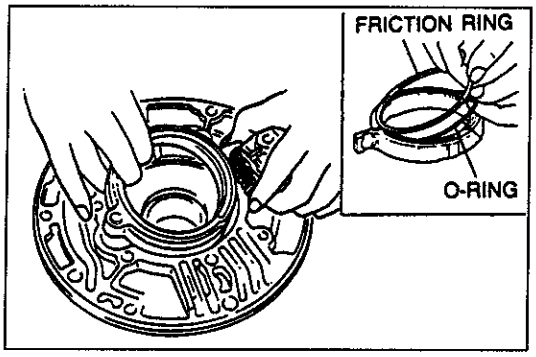


Assembly procedure

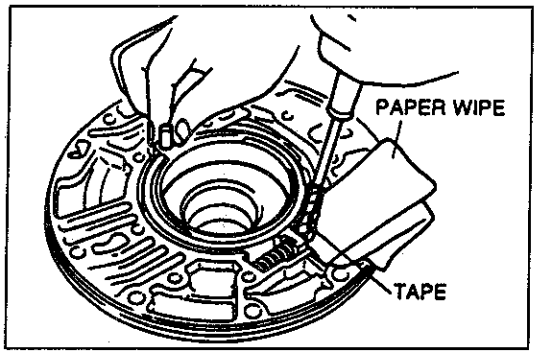
1. Apply ATF to the lip of a new oil seal, and install it by using the **SST**s.



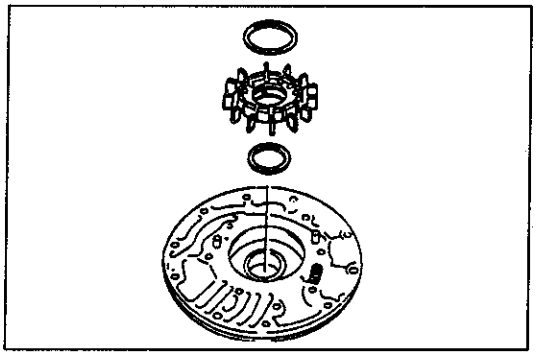
2. Apply ATF to side seals, and install them on the control piston with the black surface facing the control piston.
3. Install the control piston and pivot pin.



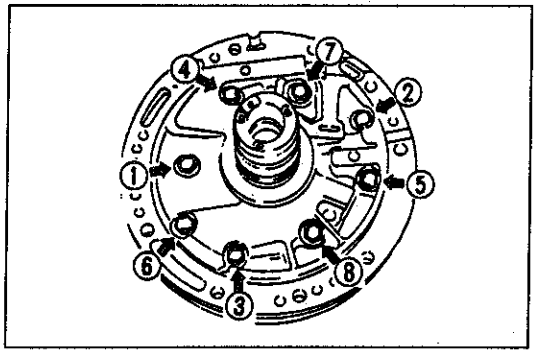
4. Apply petroleum jelly to the cam ring groove and install a new O-ring and friction ring into the cam ring.
5. Install the cam ring and spring while compressing the spring against the oil pump housing.



6. Hold the cam ring with a tape-wrapped screwdriver, and install the pivot pin.

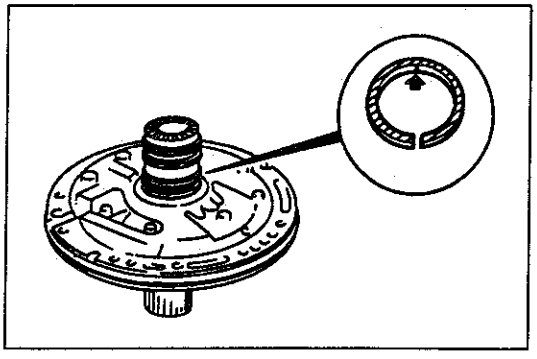


7. Confirm that the mark on the rotor is facing upward, and install the rotor, vanes, and vane rings.
8. Carefully install the oil pump cover onto the oil pump housing.

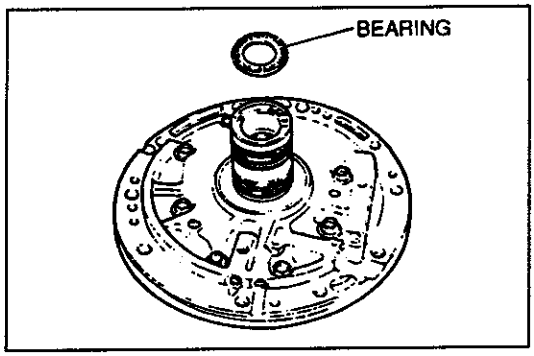


9. Tighten the bolts evenly and gradually in the order shown.

Tightening torque:
16–20 N·m {1.6–2.1 kgf·m, 12–15 ft·lbf}



10. Apply petroleum jelly to the seal rings. Fit the large seal ring (yellow mark) into the bottom ring groove and small ring (no mark) into the top ring groove.
11. Apply ATF to a new O-ring and install it onto the oil pump.

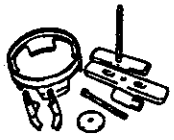
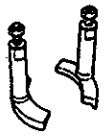
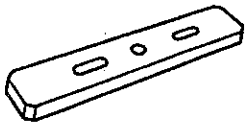
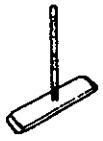
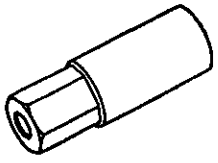


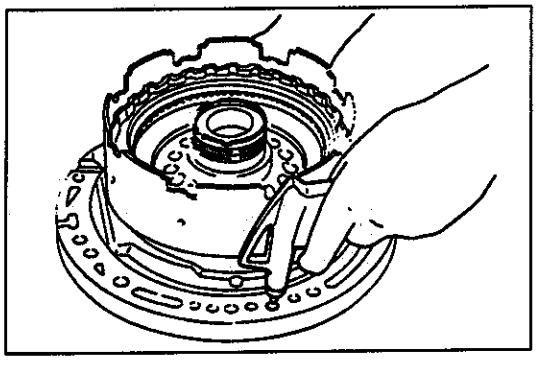
12. Apply petroleum jelly to the bearing and set it on the oil pump.

Bearing outer diameter: 47.0 mm {1.85 in}

REVERSE CLUTCH

Preparation
SST

49 G019 0A7A Compressor set, return spring 	For disassembly / assembly of snap ring	49 G019 025 Body B (Part of 49 G019 0A7A) 	For disassembly / assembly of snap ring
49 G019 026 Plate (Part of 49 G01 9 0A7A) 	For disassembly / assembly of snap ring	49 G019 027 Attachment A (Part of 49 G019 0A7A) 	For disassembly / assembly of snap ring
49 G019 029 Nut (Part of 49 G019 0A7A) 	For disassembly / assembly of snap ring		

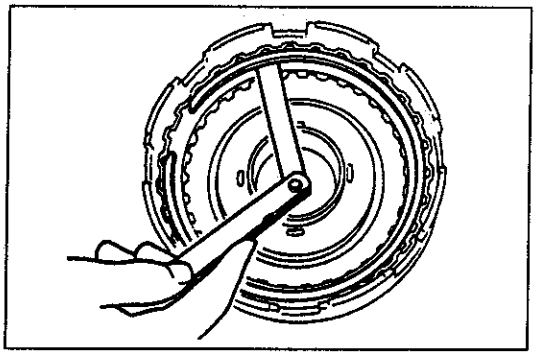


Preinspection
Reverse clutch operation

1. Install the reverse clutch onto the oil pump along with the seal rings. Apply compressed air to the oil passage as shown.
2. Verify that the retaining plate moves toward the snap ring.

Air pressure: 390 kPa {4.0 kgf/cm^2, 57 psi} max.

3. If not, the D-ring or the seal ring may be damaged or fluid may be leaking at the piston check ball. Inspect and replace as necessary when assembling



Clearance between retaining plate and snap ring

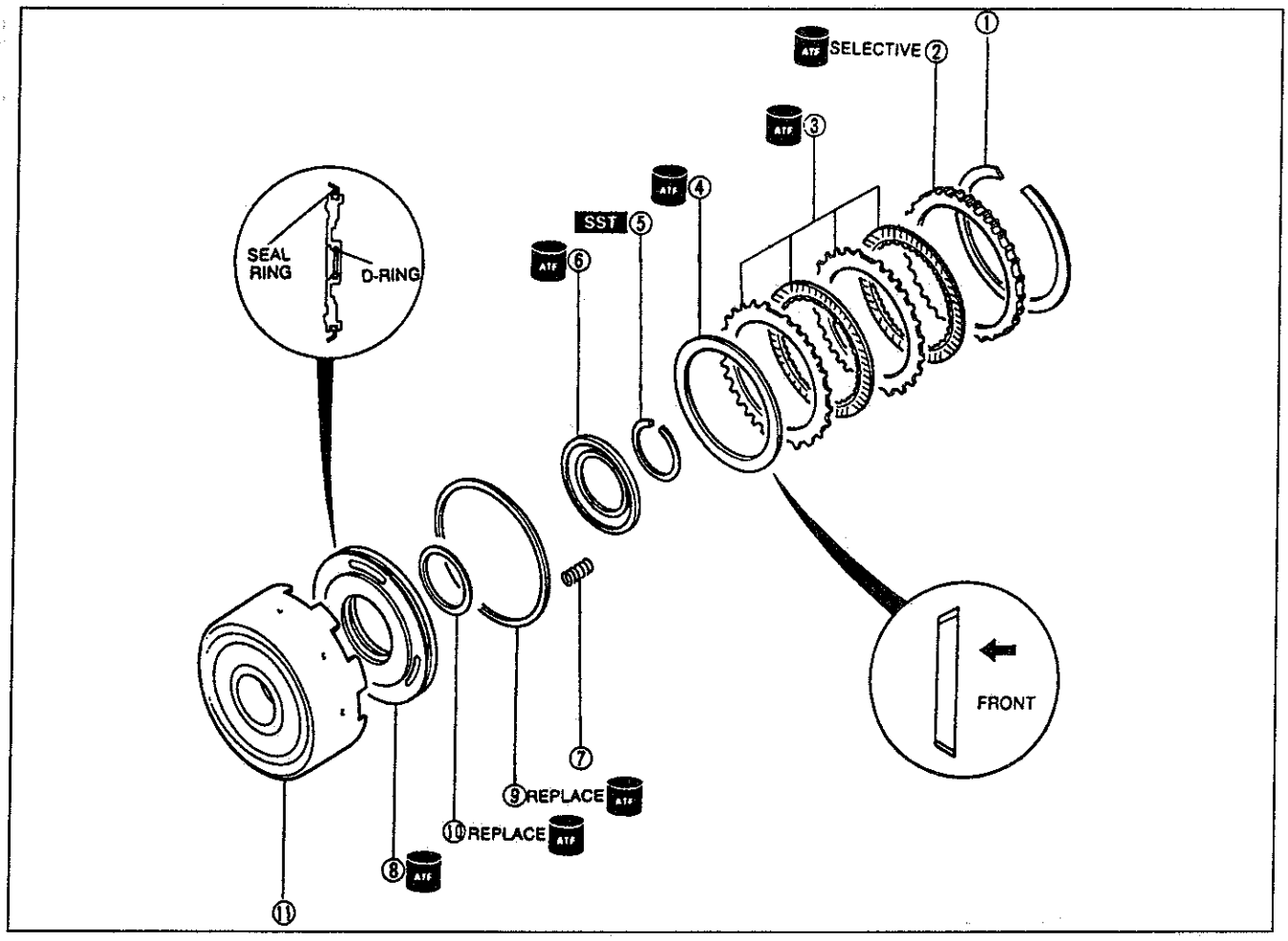
1. Measure the clearance between the retaining plate and the snap ring.

   Clearance: 0.50–1.20 mm {0.020–0.047 in}

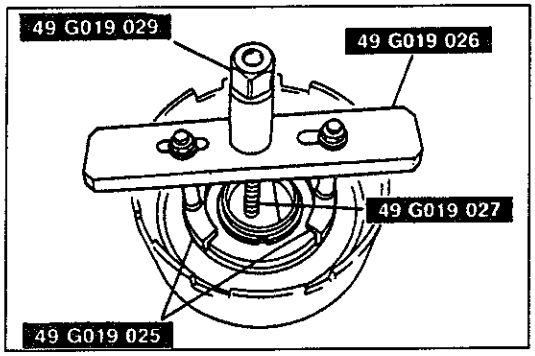
2. Select the correct retaining plate when assembling. (Refer to page K–68)

Disassembly / Inspection / Assembly

1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Procedure**.



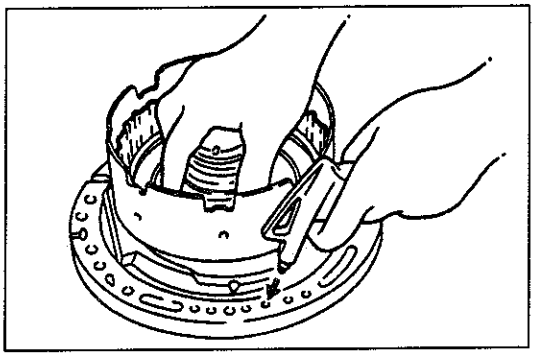
1. Snap ring
2. Retaining plate
3. Drive plates and driven plates
   Inspect for wear and burning
   Inspection ..... page K–66
4. Dished plate
5. Snap ring
   Disassembly Note ..... page K–66
6. Spring retainer
7. Return springs
   Inspection ..... page K–66
8. Clutch piston
   Shake the clutch piston and verify that the check ball is free
   Disassembly Note ..... page K–66
   Inspection ..... page K–66
9. Seal ring
10. D-ring
11. Reverse clutch drum



Disassembly Note
Snap ring

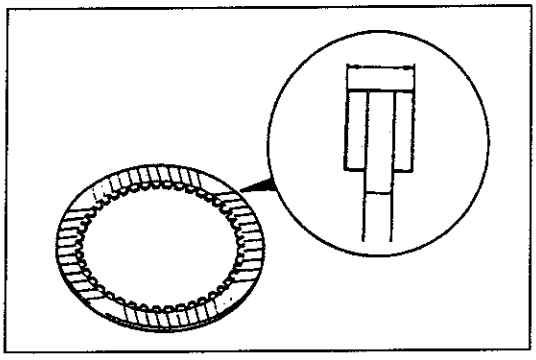
Caution
- **Depress the spring retainer only enough to remove the snap ring. Overpressing will damage the retainer assembly edges.**

1. While holding the spring retainer down with the **SSTs**, remove the snap ring by using snap ring pliers.
2. Remove the spring retainer and return springs.



Clutch piston
1. Install the reverse clutch with seal rings onto the oil pump.
2. Remove the piston by applying compressed air through the oil passage.

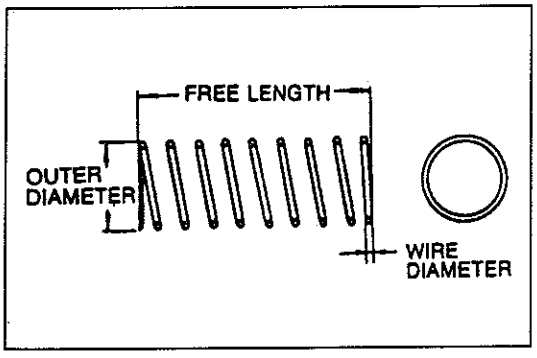
Air pressure: 390 kPa {4.0 kgf/cm^2, 57 psi} max.



Inspection
Drive plates
1. Measure the facing thickness in three places, and calculate the average.

Thickness
Standard: 2.0 mm {0.079 in}
Minimum: 1.8 mm {0.071 in}

2. If not within specification, replace the drive plate.

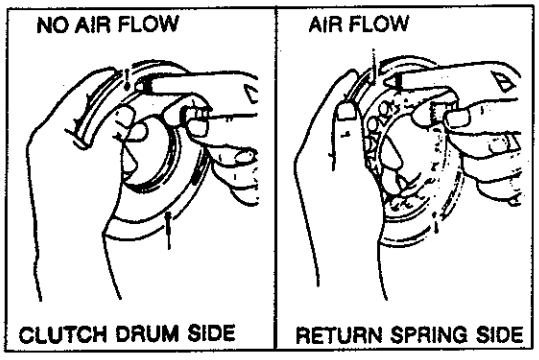


Return springs
1. Measure the spring free length.

Specification

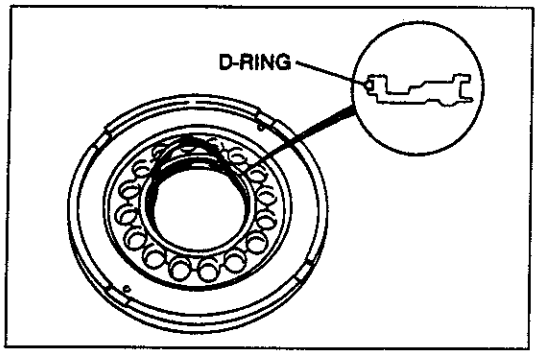
Outerdia. mm {in}	Free length mm {in}	No. of coils	Wiredia. mm {in}
11.6 {0.457}	19.69 {0.775}	4.0	1.3 {0.051}

2. If not within specification, replace the return spring.



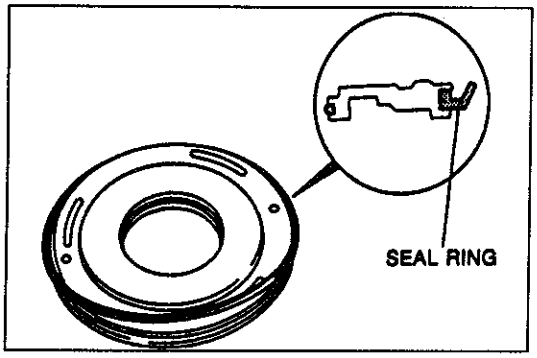
Clutch piston
1. Shake the clutch piston and verify that the check ball is free.
2. Verify that there is no air flow when applying compressed air through the oil hole on the clutch drum side.
3. Verify that there is air flow when applying compressed air through the oil hole on the return spring side.

Air pressure: 390 kPa {4.0 kgf/cm^2, 57 psi} max.

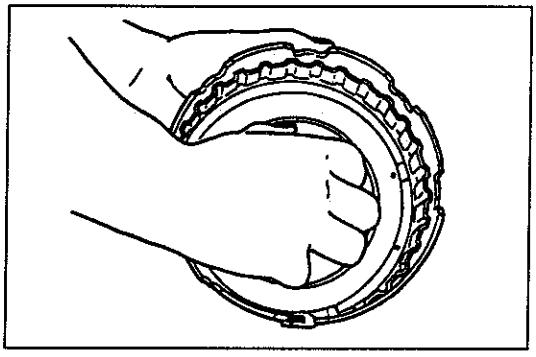


Assembly procedure

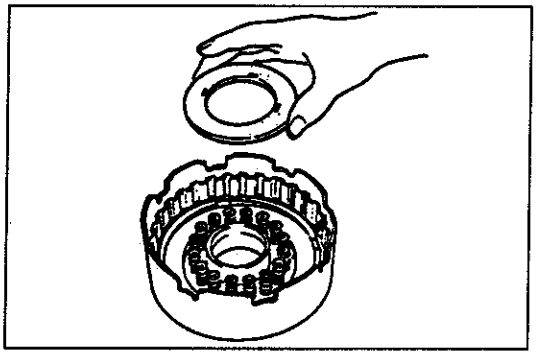
1. Apply ATF to a new D-ring and install it into the clutch piston.



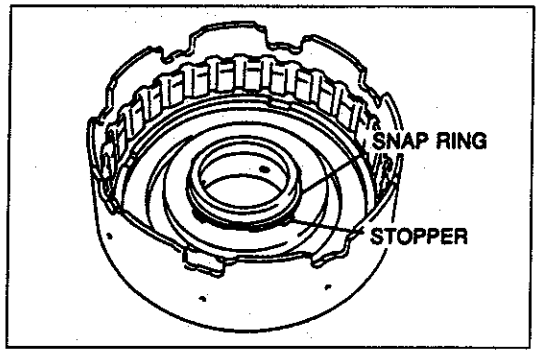
2. Apply ATF to a new seal ring and install it into the clutch piston.



3. Apply ATF to the inner face of the reverse clutch drum.
4. Apply even pressure to the perimeter of the clutch piston, and install it into the reverse clutch drum by turning it evenly and gradually.
5. Verify that the piston can be turned by hand.
   If it cannot, then remove it and check for damage to the seal ring.

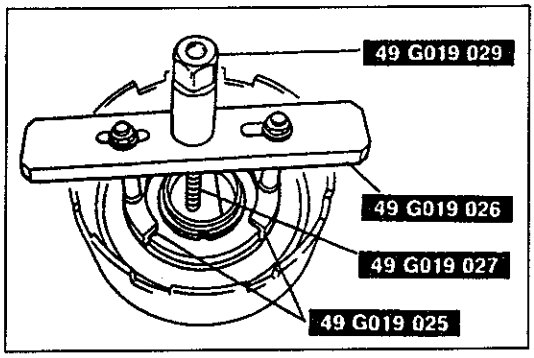


6. Install the return springs and spring retainer.

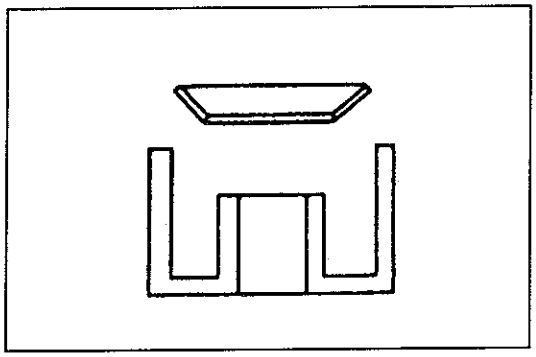


Caution

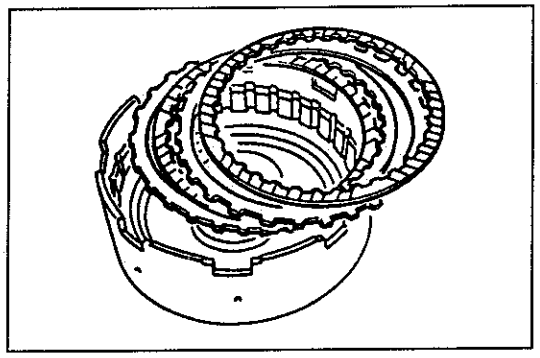
- **Depress the spring retainer only enough to install the snap ring. Overpressing will damage the retainer assembly edges.**



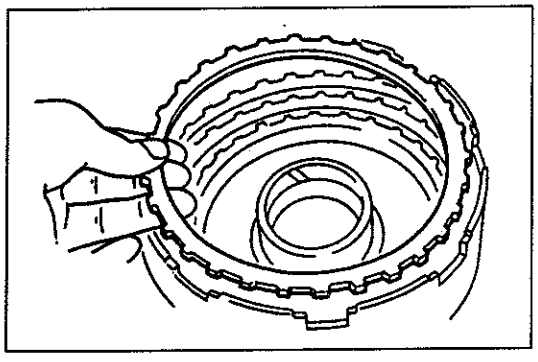
7. While holding the snap ring retainer down with the **SSTs**, install the snap ring into the spring retainer stopper.



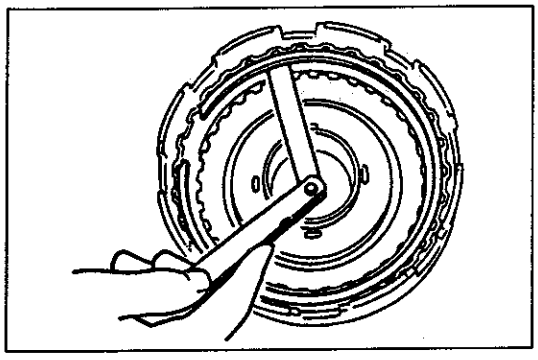
8. Install the dished plate as shown in the figure.



9. Soak new drive plates in ATF for at least two hours.
10. Apply ATF to the driven plates immediately before assembly.
11. Install the drive and driven plates into the reverse clutch drum in the following order.
    Driven-Drive-Driven-Drive



12. Install the retaining plate.
13. Install the snap ring.



14. Measure the clearance between the retaining plate and the snap ring by using a feeler gauge.

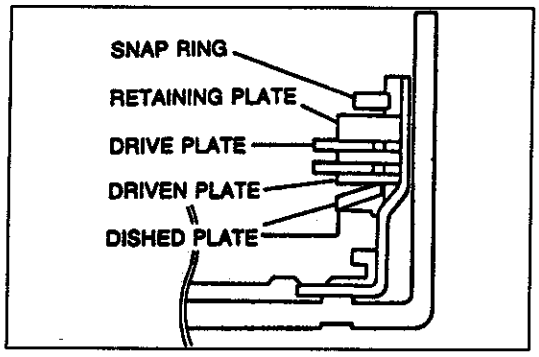
    Clearance: 0.50–1.20 mm {0.020–0.047 in}

15. If not within specification, adjust the clearance by selecting the correct retaining plate.

Retaining plate size

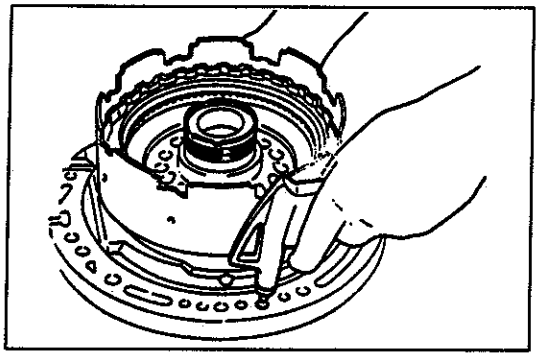
mm {in}

4.6 {0.181}	4.8 {0.189}	5.0 {0.197}	5.2 {0.205}
5.4 {0.213}	5.6 {0.220}	5.8 {0.228}	—



16. If the clearance cannot be brought to within specification after installation of the thickest retaining plate, replace the dished plate, driven plates, and drive plates. Adjust the clearance by selecting the correct retaining plate.

Clearance: 0.50–0.80 mm {0.020–0.031 in}



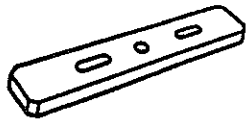
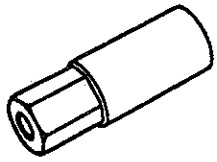
Caution
- **Applying compressed air to the assembled clutch pack for longer than 3 seconds at a time will damage the seal.**

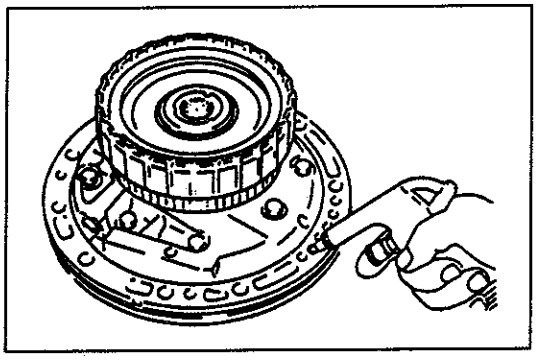
17. Install the reverse clutch with seal rings onto the oil pump. Apply compressed air through the oil passage and verify clutch operation.

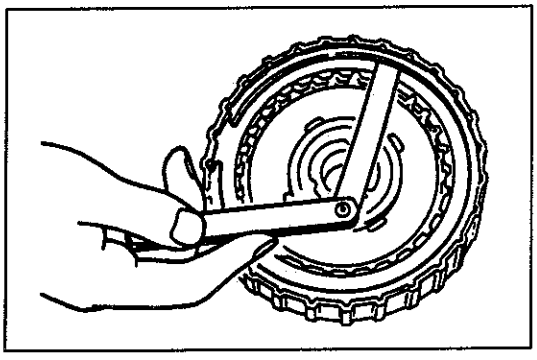
Air pressure: 390 kPa {4.0 kgf/cm^2, 57 psi} max.

HIGH CLUTCH AND FRONT SUN GEAR

Preparation
SST

49 G019 0A7A Compressor set, return spring 	For removal / installation of snap ring	49 G019 025 Body B (Part of 49 G019 0A7A) 	For removal / installation of snap ring
49 G019 026 Plate (Part of 49G0190A7A) 	For removal / installation of snap ring	49 G019 027 Attachment A (Part of 49 G019 0A7A) 	For removal / installation of snap ring
49 G019 029 Nut (Part of 49 G019 0A7A) 	For removal / installation of snap ring		





Preinspection
High clutch operation

1. Install the high clutch with seal rings onto the oil pump. Apply compressed air through the oil passage as shown.
2. Verify that the retaining plate moves toward the snap ring.

   Air pressure: 390 kPa {4.0 kgf/cm^2, 57 psi} max.

3. If not, the D-rings may be damaged or fluid may be leaking at the piston check ball. Inspect and replace as necessary when assembling.

Clearance between retaining plate and snap ring

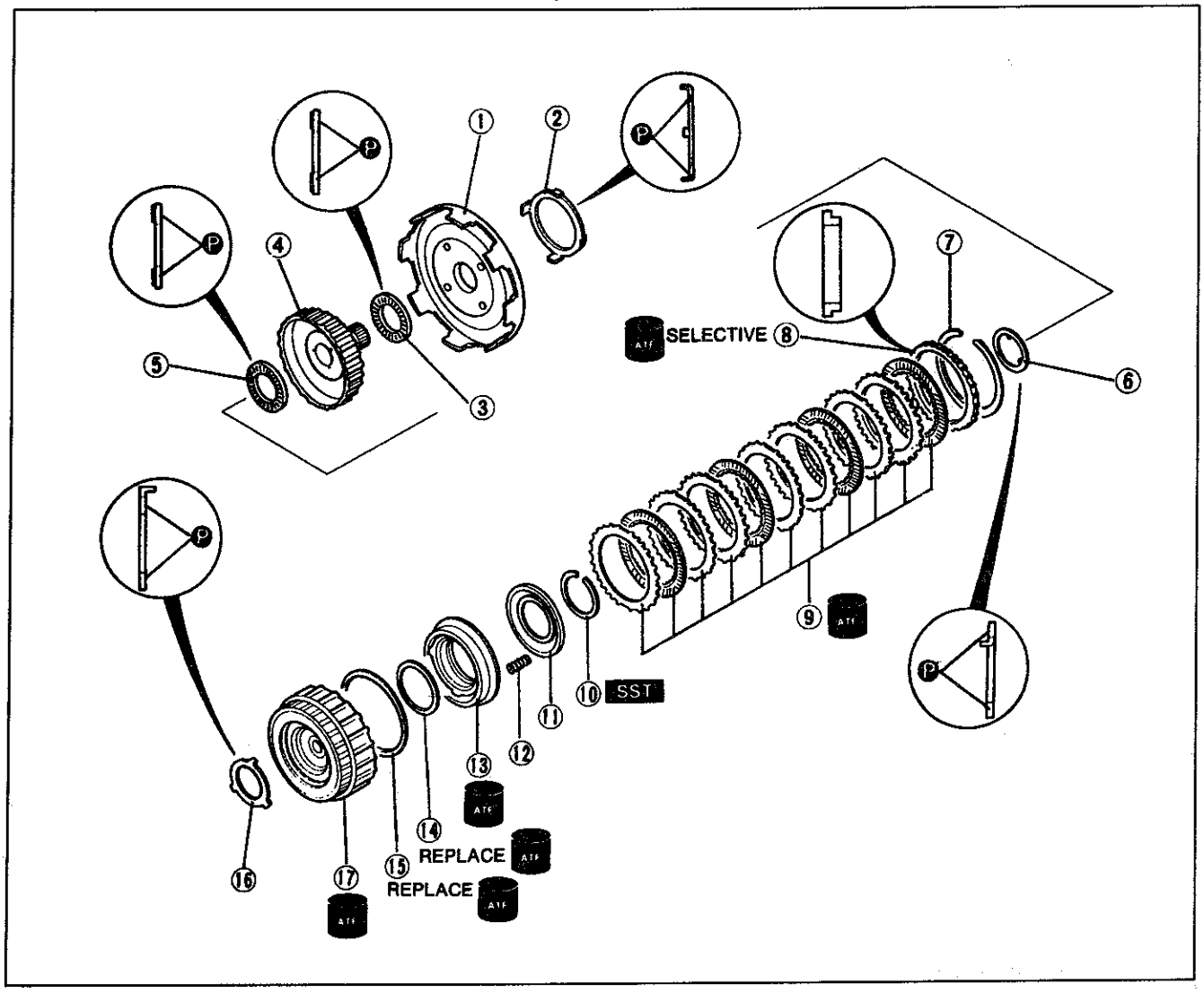
1. Measure the clearance between the retaining plate and the snap ring.

   Clearance: 1.8–3.0 mm {0.071–0.118 in}

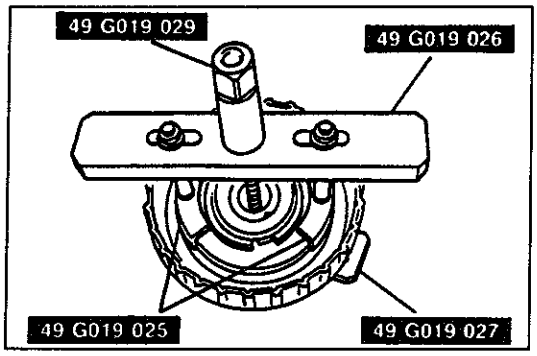
2. Select the correct retaining plate when assembling. (Refer to page K–74.)

Disassembly / Inspection / Assembly

1. Disassemble in the order shown in the figure, referring to **Disassembly Note.**
2. Inspect all parts and replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly procedure.**



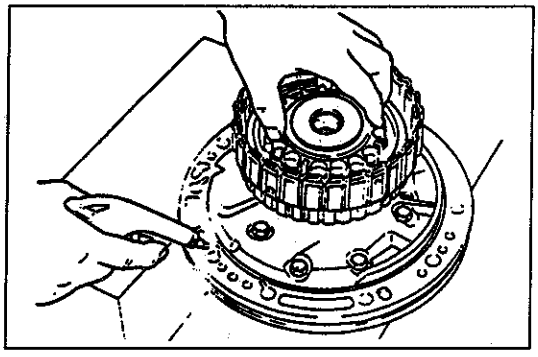
1. Front sun gear
   Inspect gear teeth for damage, wear, and cracks
2. Bearing race
   Inspect bearing surface for scoring and scratches
3. Bearing
   Inspect for damage and rough rotation
4. High clutch hub
5. Bearing
   Inspect for damage and rough rotation
6. Bearing race
   Inspect bearing surface for scoring and scratches
7. Snap ring
8. Retaining plate
9. Drive plates and driven plates
   Inspect for wear and burning
   Inspection ..... page K-72
10. Snap ring
    Disassembly Note ..... page K-72
11. Spring retainer
12. Return springs
    Inspection ..... page K-72
13. Clutch piston
    Shake the clutch piston and verify that the check ball is free
    Disassembly Note ..... page K-72
    Inspection ..... page K-72
14. D-ring
15. D-ring
16. Bearing race
    Inspect bearing surface for scoring and scratches
17. High clutch drum



Disassembly note
Snap ring

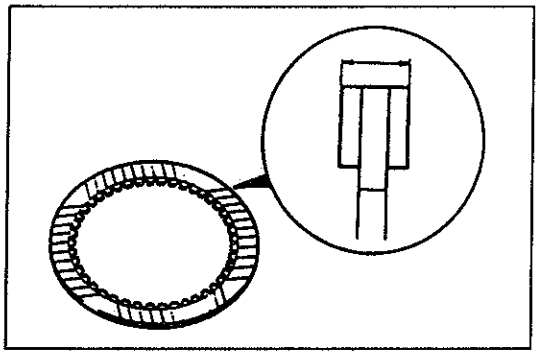
Caution
- **Depress the spring retainer only enough to remove the snap ring. Overpressing will damage the retainer assembly edges.**

1. While holding the spring retainer down by using the **SSTs**, remove the snap ring by using snap ring pliers.
2. Remove the piston retainer and return springs.



Clutch piston
1. Install the high clutch with seal rings onto the oil pump.
2. Remove the piston by applying compressed air through the oil passage.

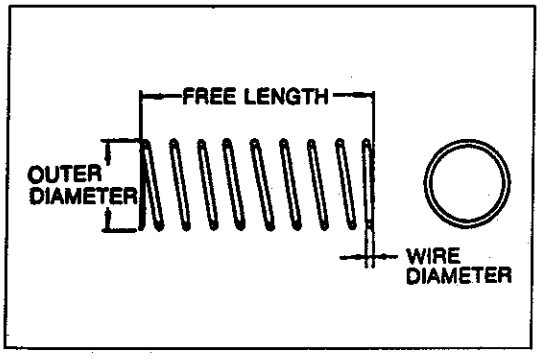
Air pressure: 390 kPa {4.0 kgf/cm^2, 57 psi} max.



Inspection
Drive plates
1. Measure the facing thickness in three places, and calculate the average.

Thickness
Standard: 1.6 mm {0.063 in}
Minimum: 1.4 mm {0.055 in}

2. If not within specification, replace the drive plate.

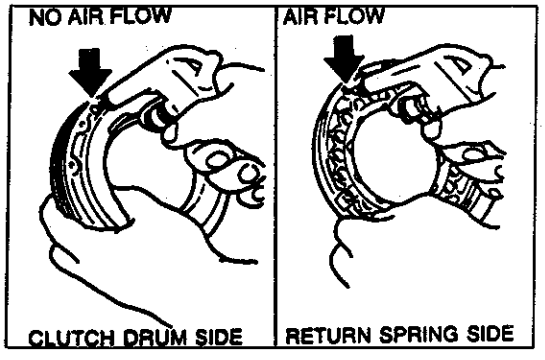


Return springs
1. Measure the spring free length.

Specification

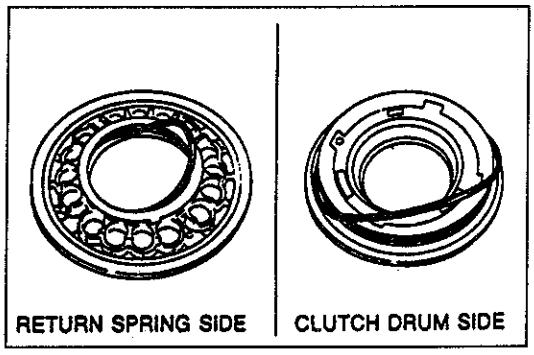
Outer dia. mm {in}	Free length mm {in}	No. of coils	Wiredia. mm {in}
11.6 {0.457}	22.3 {0.878}	5.2	1.2 {0.047}

2. If not within specification, replace the return spring.



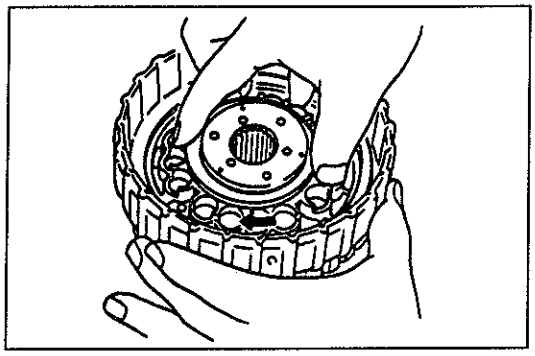
Clutch piston
1. Shake the clutch piston and verify that the check ball is free.
2. Verify that there is no air flow when applying compressed air through the oil hole on the clutch drum side.
3. Verify that there is air flow when applying compressed air through the oil hole on the return spring side.

Air pressure: 390 kPa {4.0 kgf/cm^2, 57 psi} max.

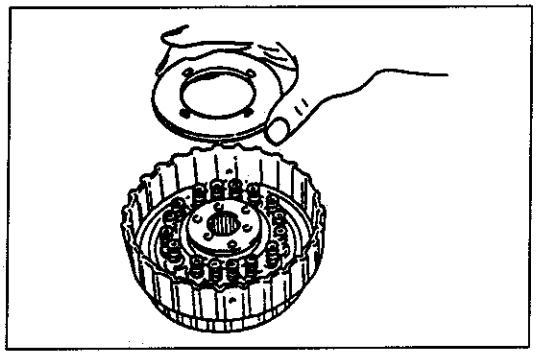


Assembly procedure

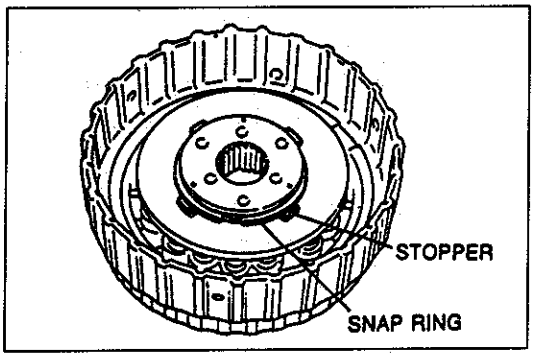
1. Apply ATF to new D-rings and install them into the clutch piston.



2. Apply ATF to the inner face of the high clutch drum.
3. Apply even pressure to the perimeter of the clutch piston, and install it into the reverse clutch drum by turning it evenly and gradually.
4. Verify that the piston can be turned by hand. If it cannot, then remove it and check for damage to the seal ring.

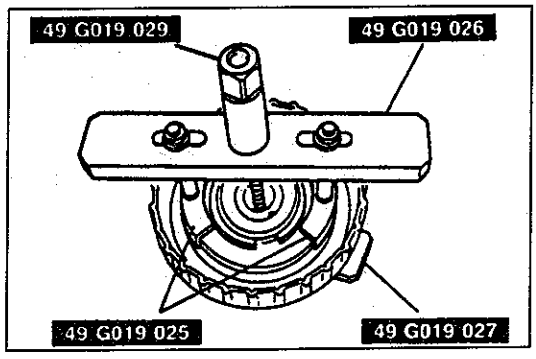


5. Install the return springs and spring retainer.

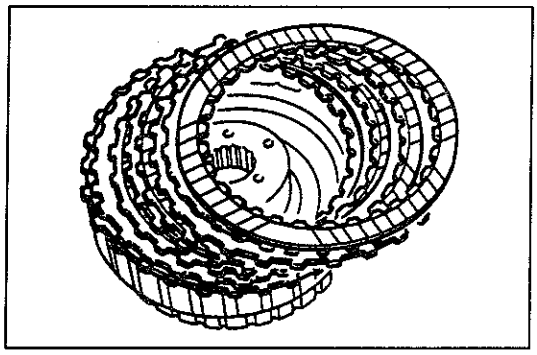


Caution

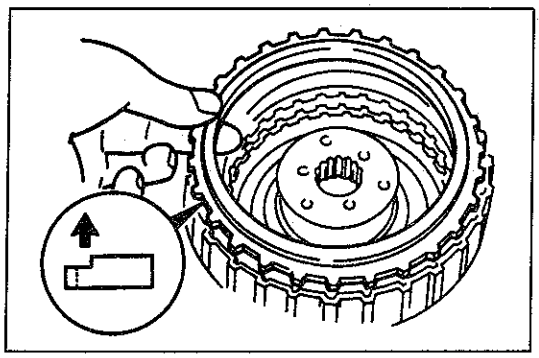
- **Depress the spring retainer only enough to install the snap ring. Overpressing will damage the retainer assembly edges.**



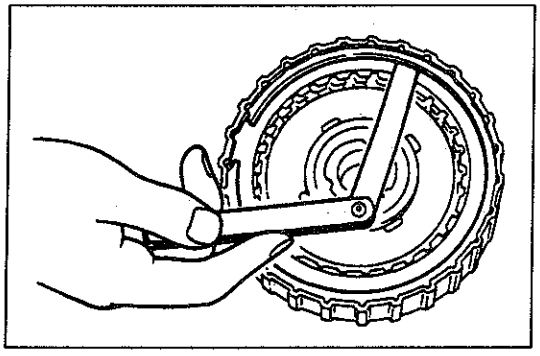
6. While holding the spring retainer down by using the **SSTs**, install the snap ring into the spring retainer stopper.



7. Soak new drive plates in ATF for at least two hours.
8. Apply ATF to the driven plates immediately before assembly.
9. Install the drive and driven plates into the high clutch drum in the following order.
   Driven-Drive-Driven-Driven-Drive-Driven-Driven-Drive-Driven-Driven-Drive



10. Install the retaining plate.
11. Install the snap ring.



12. Measure the clearance between the retaining plate and the snap ring by using a feeler gauge.

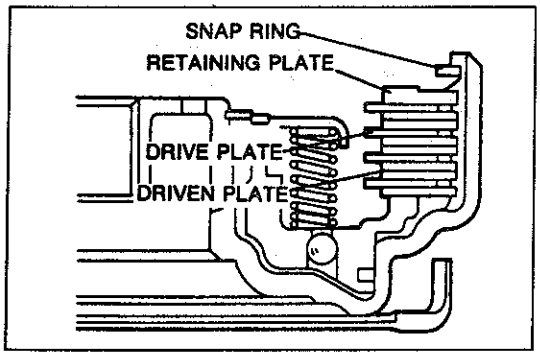
    Clearance: 1.8–3.0 mm {0.071–0.118 in}

13. If not within specification, adjust the clearance by selecting the correct retaining plate.

Retaining plate size

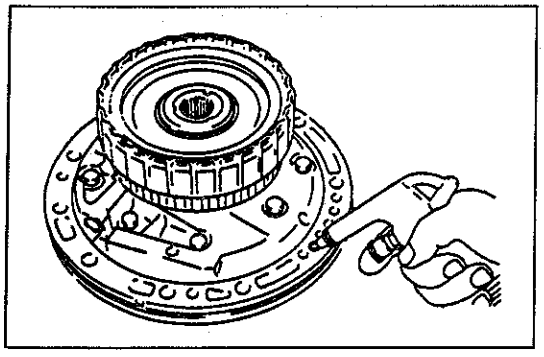
mm {in}

3.4 {0.134}	3.6 {0.142}	3.8 {0.150}
4.0 {0.157}	4.2 {0.165}	—



14. If the clearance cannot be brought to within specification after installation of the thickest retaining plate, replace the driven plates and drive plates. Adjust the clearance by selecting the correct retaining plate.

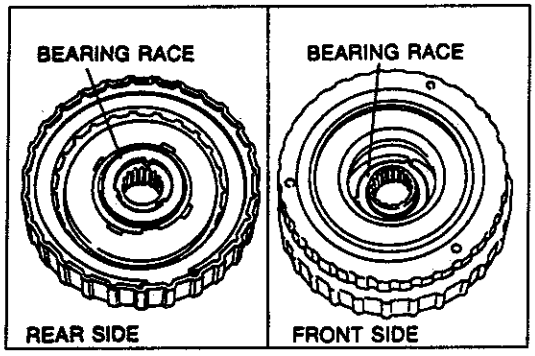
    Clearance: 1.8–2.2 mm {0.071–0.087 in}



Caution
- **Applying compressed air to the assembled clutch pack for longer than 3 seconds at a time will damage the seal.**

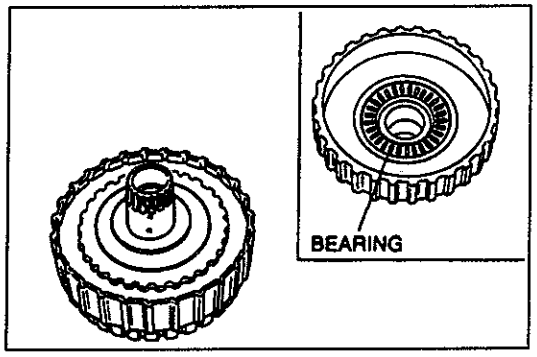
15. Install the high clutch with the seal rings onto the oil pump. Apply compressed air through the oil passage and verify clutch operation.

    Air pressure: 390 kPa {4.0 kgf/cm^2, 57 psi} max.



16. Apply petroleum jelly to the bearing races and install them in the high clutch drum as shown.

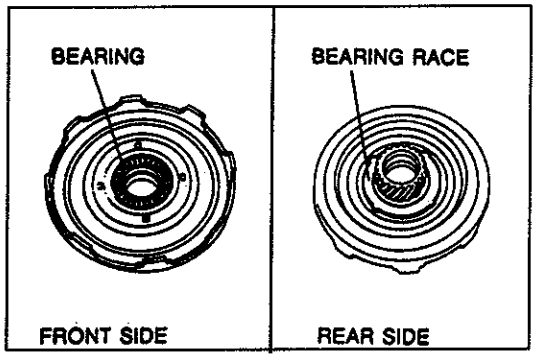
Bearing race outer diameter
Front: 43.5 mm {1.71 in}
Rear: 51.5 mm {2.03 in}



17. Apply petroleum jelly to the bearing and install it in the high clutch hub as shown.

Bearing outer diameter: 53.0 mm {2.09 in}

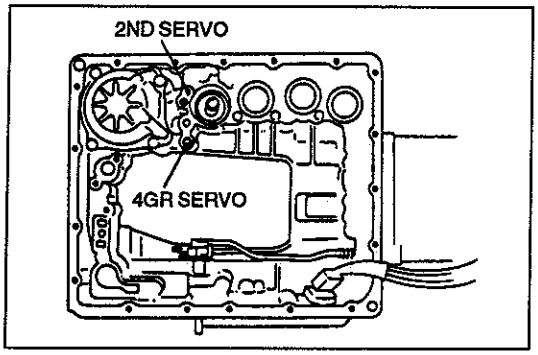
18. Apply ATF to the high clutch hub, and install it in the high clutch drum by turning it evenly and gradually.



19. Apply petroleum jelly to the bearing and bearing race, and install them to the front sun gear.

Bearing outer diameter: 53.0 mm {2.09 in}
Bearing race outer diameter: 75.0 mm {2.95 in}

20. Assemble the front sun gear, reverse clutch, high clutch, and high clutch hub.

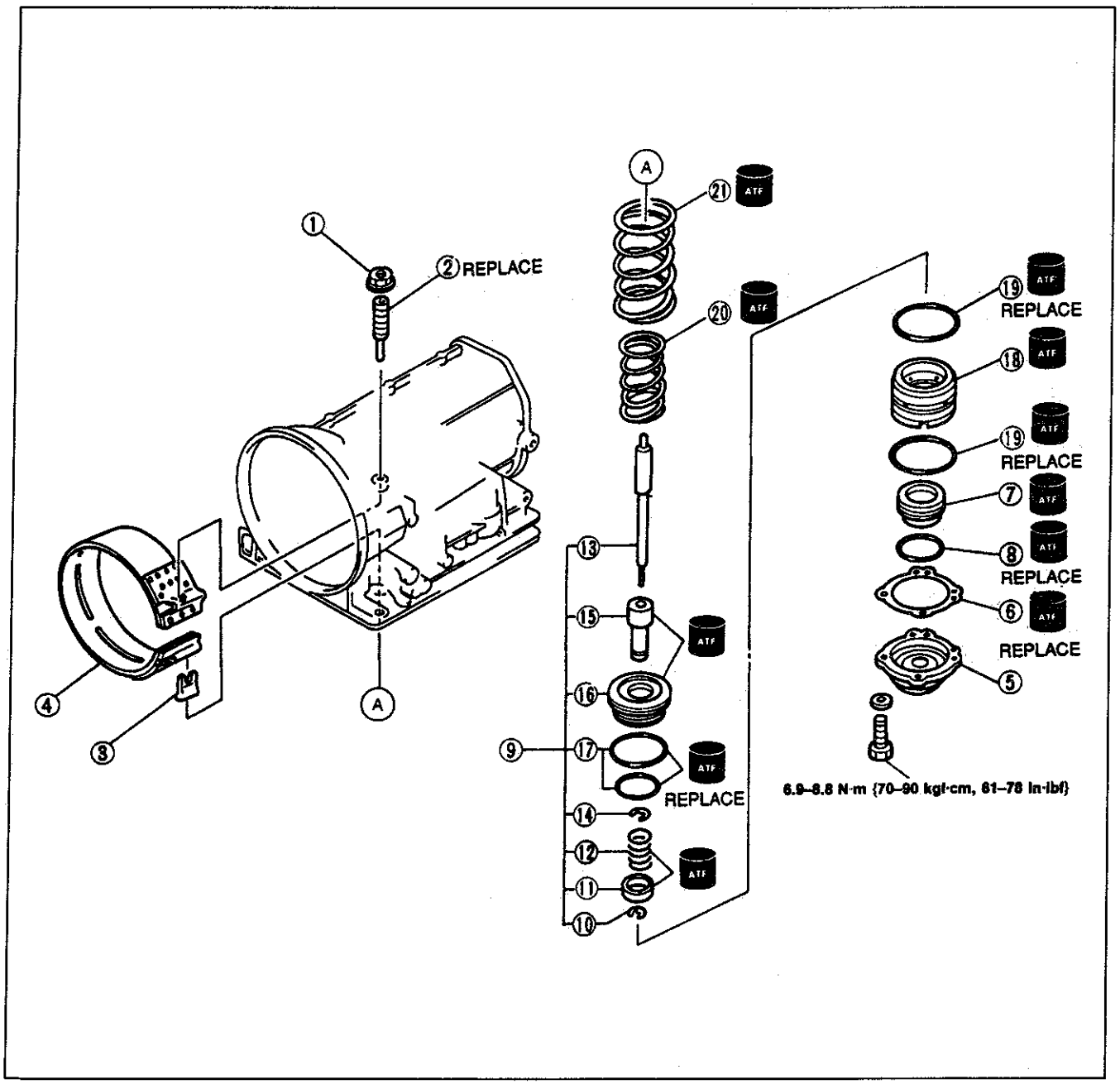


BAND SERVO
Preinspection
Band servo operation
1. Apply compressed air through the oil passage as shown.
2. Verify that the piston stem moves toward the brake band.

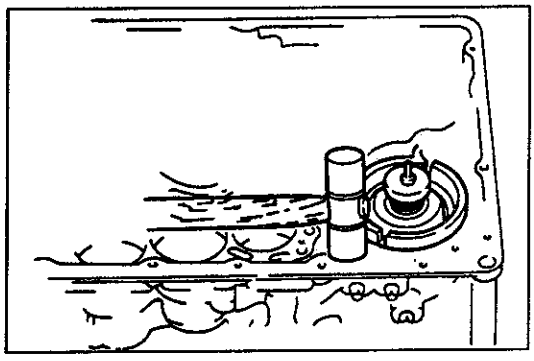
Air pressure: 390 kPa {4.0 kgf/cm^2, 57 psi} max.

3. If not, the D-rings or the O-rings may be damaged or the piston assembly may be sticking. Inspect and replace as necessary when assembling.

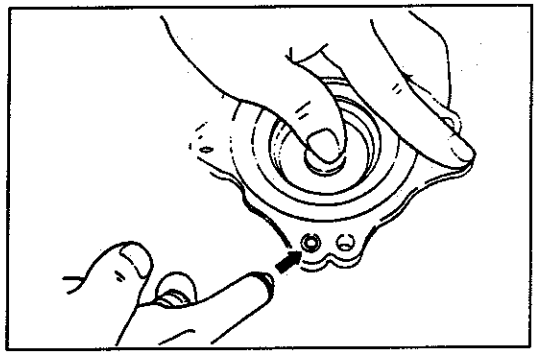
Disassembly / Inspection / Assembly
1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Procedure**.



1. Locknut
2. Anchor end bolt
3. Band strut
4. Brake band
5. Band servo retainer
6. Gasket
7. Fourth gear band servo piston
   Disassembly Note
   ..... below
8. D-ring
9. Piston and servo piston retainer
   Disassembly Note
   ..... below
10. Retaining ring (small)
11. Spring retainer
12. Return spring C
    Inspection ..... below
13. Piston stem
14. Retaining ring (large)
15. Servo spring retainer
16. Band servo piston
17. D-rings
18. Servo piston retainer
19. O-rings
20. Return spring B
    Inspection ..... below
21. Return spring A
    Inspection ..... below



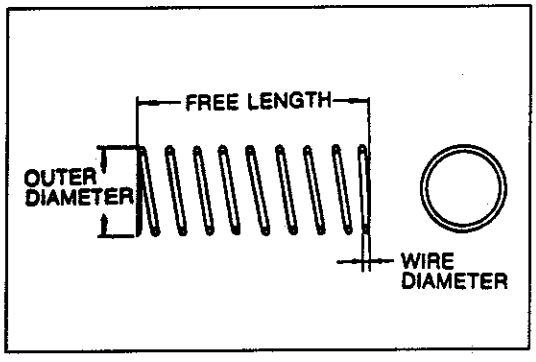
Disassembly note
Piston and servo piston retainer
Remove the piston and servo piston retainer from the transmission case by using a plastic hammer.



4GR band servo piston
1. Block one oil hole of the Fourth gear servo piston retainer and the center hole in the Fourth gear band servo piston.
2. Apply compressed air through the other oil hole in the Fourth gear servo piston retainer to remove the Fourth gear band servo piston.

   Air pressure: 390 kPa {4.0 kgf/cm^2, 57 psi} max.

3. Remove the D-ring from the Fourth gear band servo piston.

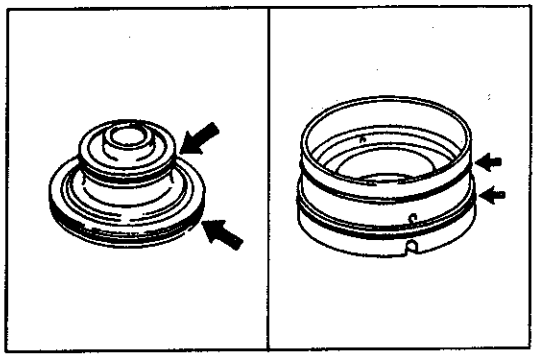


Inspection
Return spring
1. Measure the spring free length.

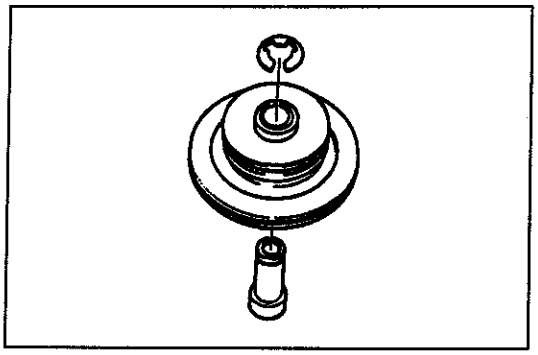
Specification

Item / Spring	Outer dia. mm {in}	Free length mm {in}	No. of coils	Wire dia. mm {in}
Spring A	40.3 {1.59}	53.8 {2.12}	3.0	2.3 {0.091}
Spring B	34.3 {1.35}	45.6 {1.80}	3.0	2.3 {0.091}
Spring C	27.6 {1.09}	2.97 {1.17}	3.2	2.6 {0.102}

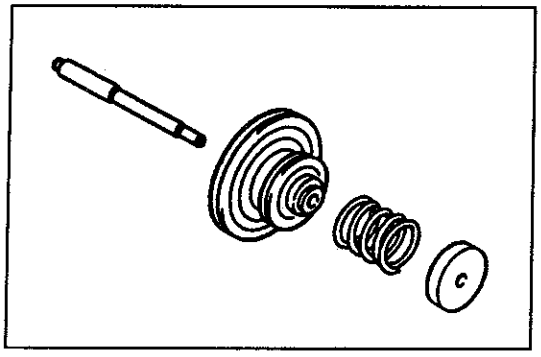
2. If not within specification, replace the return spring.



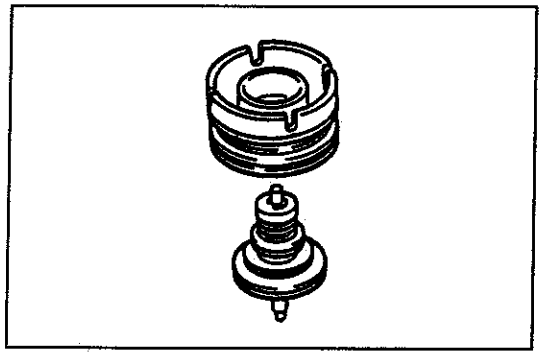
Assembly procedure
1. Apply ATF to new O-rings and install them onto the servo piston retainer.
2. Apply ATF to new D-rings and install them onto the band servo piston.



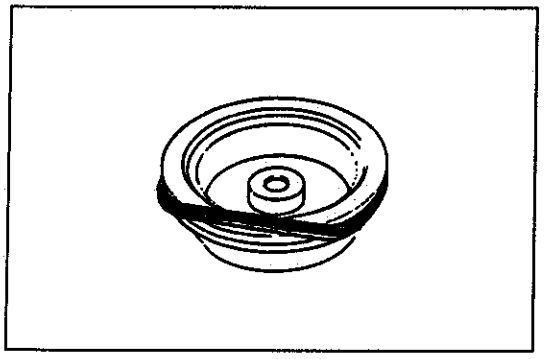
3. Apply ATF to the servo spring retainer and retaining ring (large). Assemble them in the band servo piston.



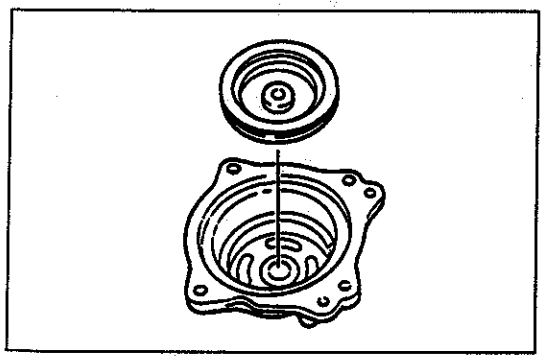
4. Assemble the band servo piston, piston stem, return spring, and spring retainer.
5. Install the retaining ring (small).



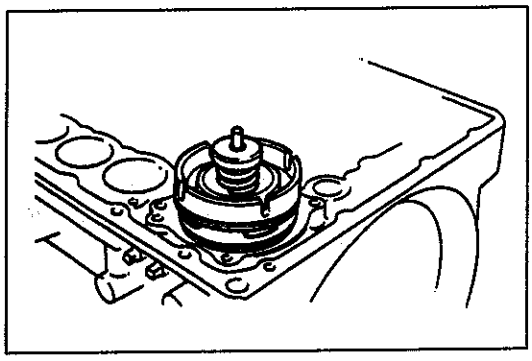
6. Apply ATF to the band servo piston assembly.
7. Apply even pressure to the perimeter of the piston, and install it onto the servo piston retainer.



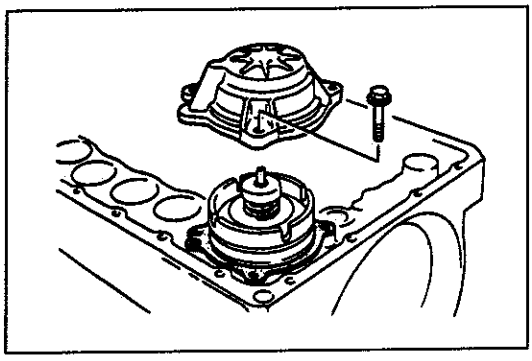
8. Apply ATF to a new D-ring and install it onto the Fourth gear band servo piston.



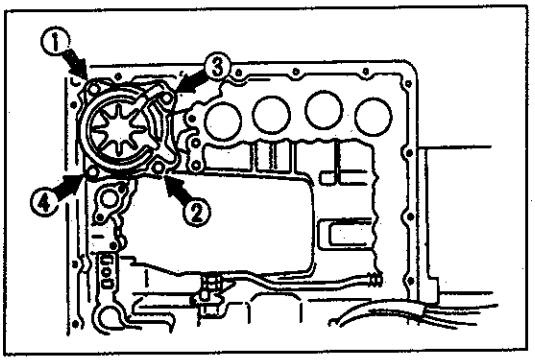
9. Apply ATF to the Fourth gear band servo piston.
10. Apply even pressure to the perimeter of the piston, and install it into the band servo retainer.



11. Install return springs A and B.
12. Apply ATF to the piston assembly.
13. Apply even pressure to the perimeter of the piston assembly, and install it into the transmission case.

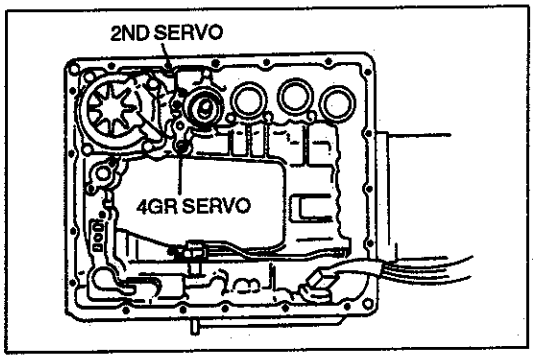


14. Apply ATF to the band servo retainer and a new gasket, and install them on the transmission case.



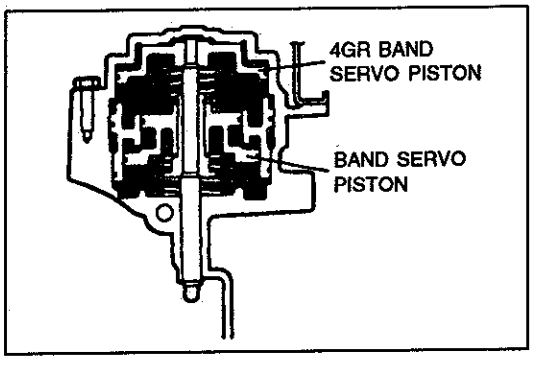
15. Tighten the bolts evenly and gradually in the order shown.

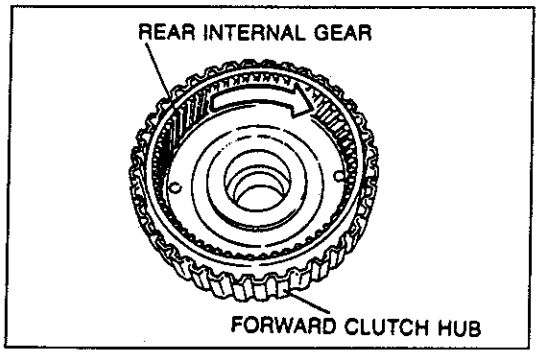
Tightening torque:
6.9–8.8 N·m {70–90 kgf·cm, 61–78 in·lbf}



16. Verify servo piston operation by applying compressed air through the oil holes as shown.

Air pressure: 390 kPa {4.0 kgf/cm^2, 57 psi} max.





FRONT INTERNAL GEAR, REAR INTERNAL GEAR, FORWARD CLUTCH HUB, OVERRUNNING CLUTCH HUB

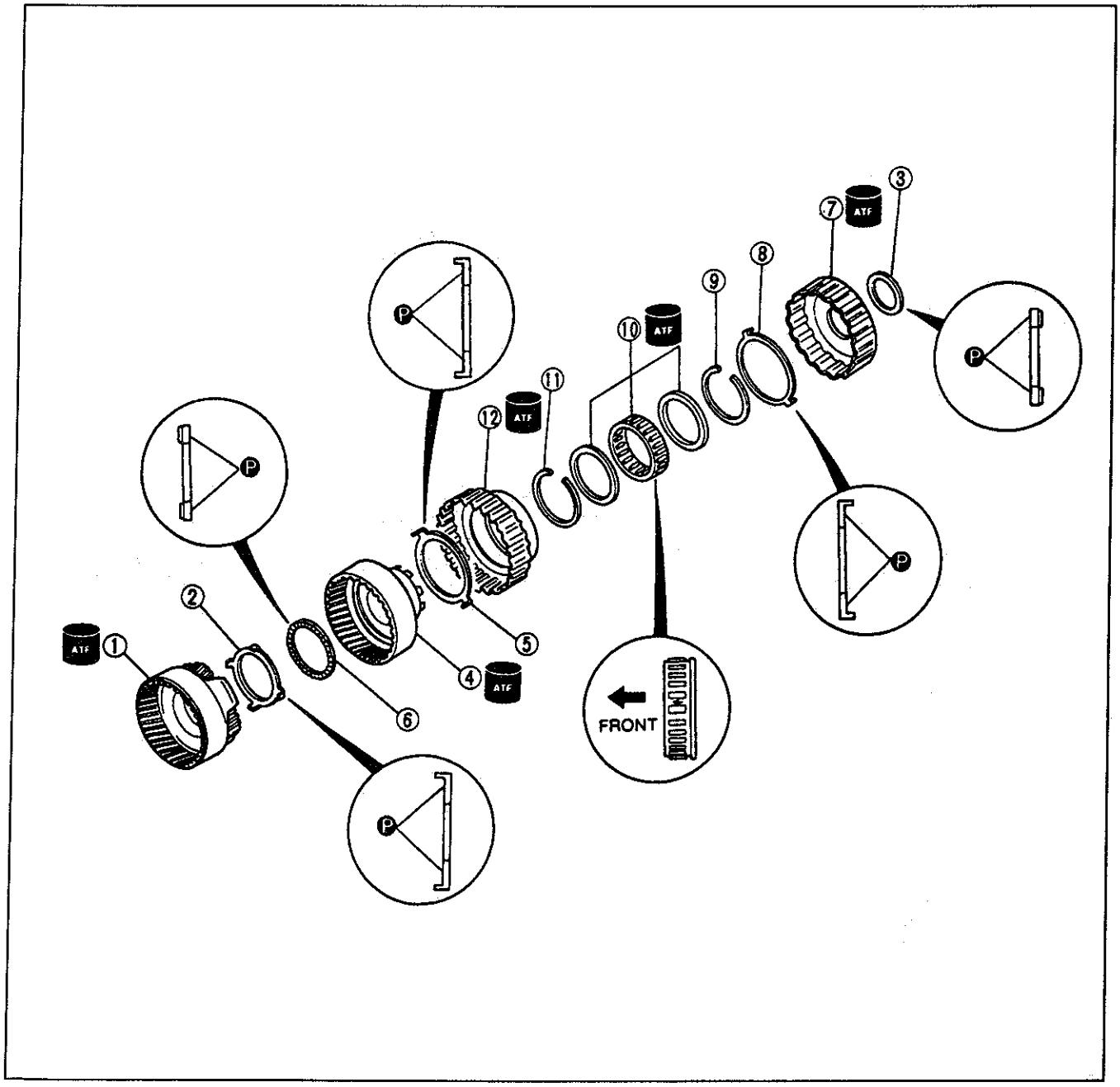
Preinspection

Forward one-way clutch operation

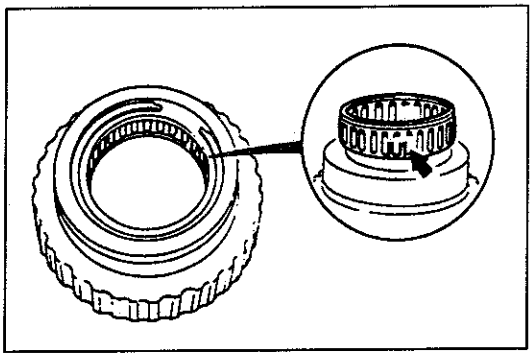
1. While holding the forward clutch hub, verify that the rear internal gear rotates smoothly when turned clockwise and locks when turned counterclockwise.
2. If not as specified, replace the one-way clutch.

Disassembly / Inspection / Assembly

1. Disassemble in the order shown in the figure.
2. Inspect all parts and replace if necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Procedure**.

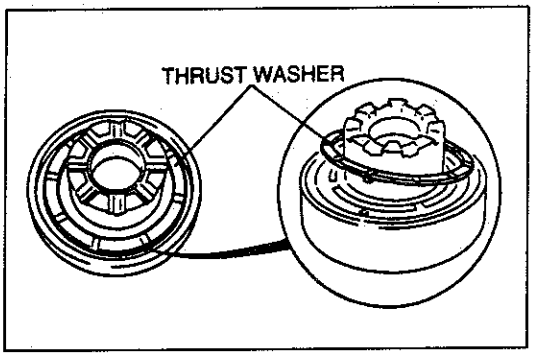


1. Front internal gear (with rear planetary carrier)
   Inspect gear teeth for damage, wear, and cracks
   Check rotation of pinion gears
2. Bearing race
   Inspect bearing surface for scoring and scratches
3. Bearing
   Inspect for damage and rough rotation
4. Rear internal gear
   Inspect gear teeth for damage, wear, and cracks
5. Thrust washer
6. Bearing
   Inspect for damage and rough rotation
7. Overrunning clutch hub
8. Thrust washer
9. Snap ring
10. Forward one-way clutch
    Inspection ..... page K-80
11. Snap ring
12. Forward clutch hub

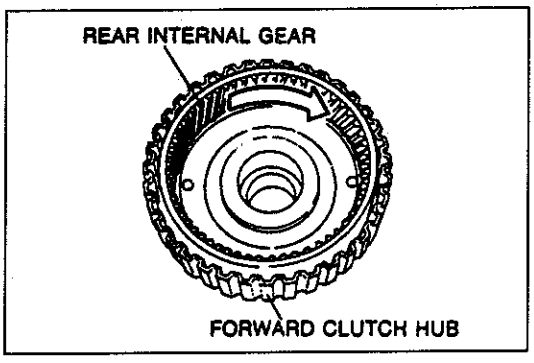


Assembly procedure

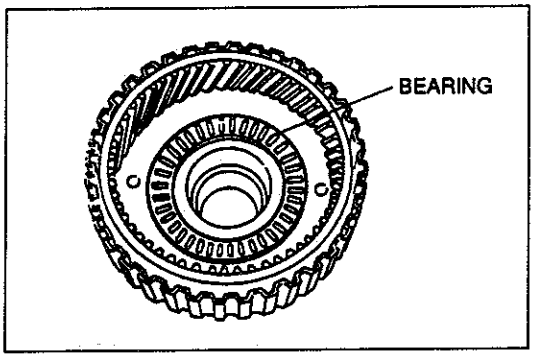
1. Install the snap ring into the forward clutch hub.
2. Apply ATF to the forward one-way clutch. Install it into the forward clutch hub, with the flange facing upward.



3. Apply petroleum jelly to the thrust washer, and set it so that the tabs fit in the holes of the rear internal gear.

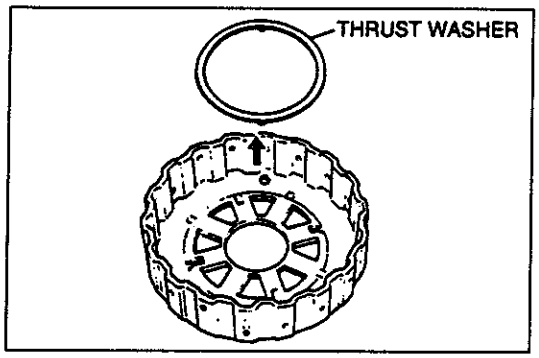


4. Apply ATF to the rear internal gear, and install it in the forward clutch hub by turning it evenly and gradually.
5. Hold the forward clutch hub and verify that the rear internal gear turns counterclockwise. If it does not, then the one-way clutch is installed upside down.

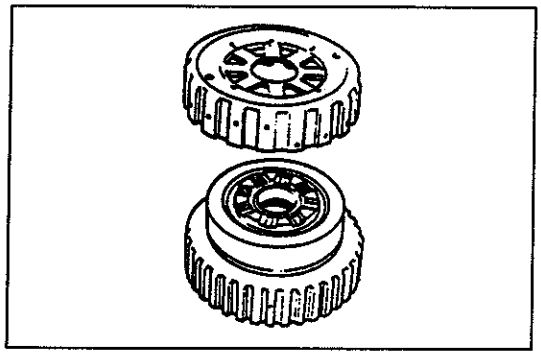


6. Apply petroleum jelly to the bearing, and install it on the rear internal gear.

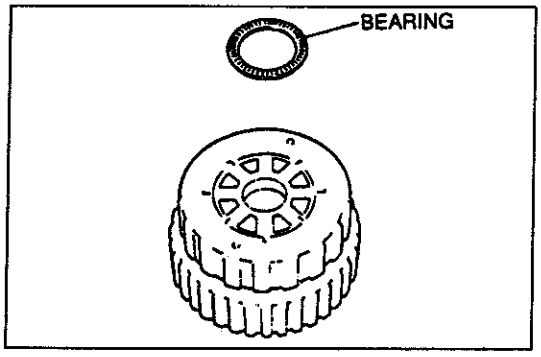
   Bearing outer diameter: 78.0 mm {3.07 in}



7. Apply petroleum jelly to the thrust washer, and set it so that the tabs fit in the holes of the overrunning clutch hub.

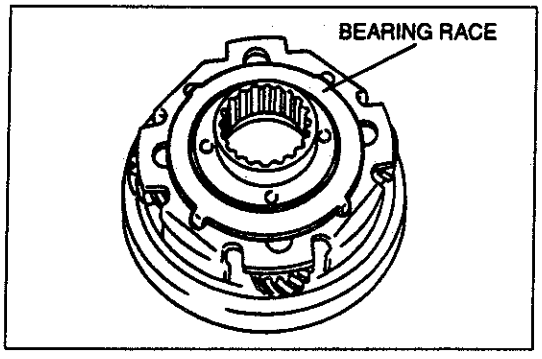


8. Set the overrunning clutch hub on the rear internal gear.



9. Apply petroleum jelly to the bearing, and set it on the overrunning clutch hub.

Bearing outer diameter: 59.0 mm {2.32 in}

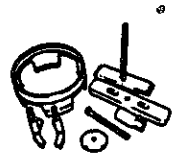
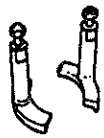
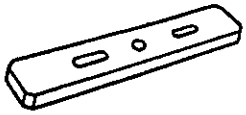
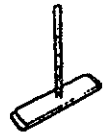
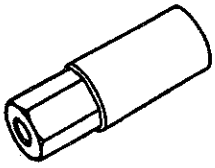
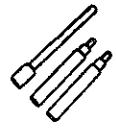


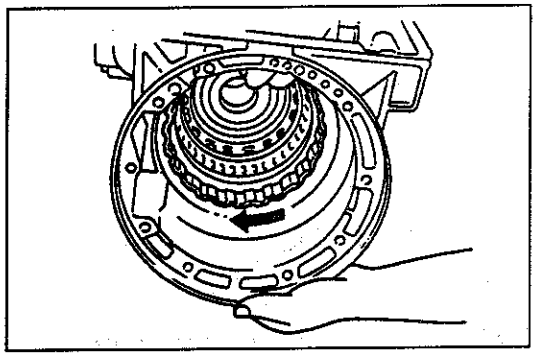
10. Apply petroleum jelly to the bearing race, and set it on the front internal gear.

Bearing race outer diameter: 75.0 mm {2.95 in}

FORWARD CLUTCH DRUM (FORWARD CLUTCH, OVERRUNNING CLUTCH, LOW ONE-WAY CLUTCH)

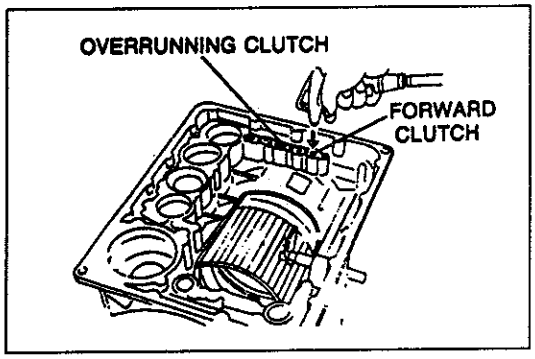
Preparation
SST

49 G019 0A7A Compressor set, return spring 	For removal / installation of snap ring	49 G019 025 Body B (Part of 49 G019 0A7A) 	For removal / installation of snap ring
49 G019 026 Plate (Part of 49 G019 0A7A) 	For removal / installation of snap ring	49 G019 027 Attachment A (Part of 49 G019 0A7A) 	For removal / installation of snap ring
49 G019 029 Nut (Part of 49 G019 0A7A) 	For removal / installation of snap ring	49 L019 001 Bolt 	For removal / installation of snap ring



Preinspection
Low one-way clutch operation

1. Install the forward clutch drum into the transmission case.
2. Verify that the forward clutch drum rotates smoothly when turned clockwise, and locks when turned counterclockwise.
3. If not, replace the one-way clutch.

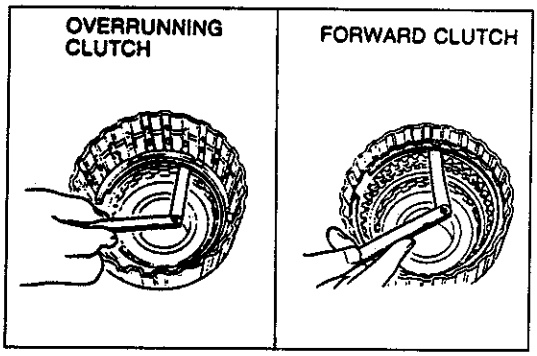


Forward clutch and overrunning clutch operation

1. Install the forward clutch drum and low one-way clutch inner race into the transmission case. Apply compressed air through the oil passage as shown.
2. Verify that the retaining plates move toward the snap rings.

   Air pressure: 390 kPa {4.0 kgf/cm^2, 57 psi} max.

3. If not, the D-rings or the seal ring may be damaged or fluid may be leaking at the piston check ball. Inspect and replace as necessary when assembling.



Clearance between retaining plate and snap ring

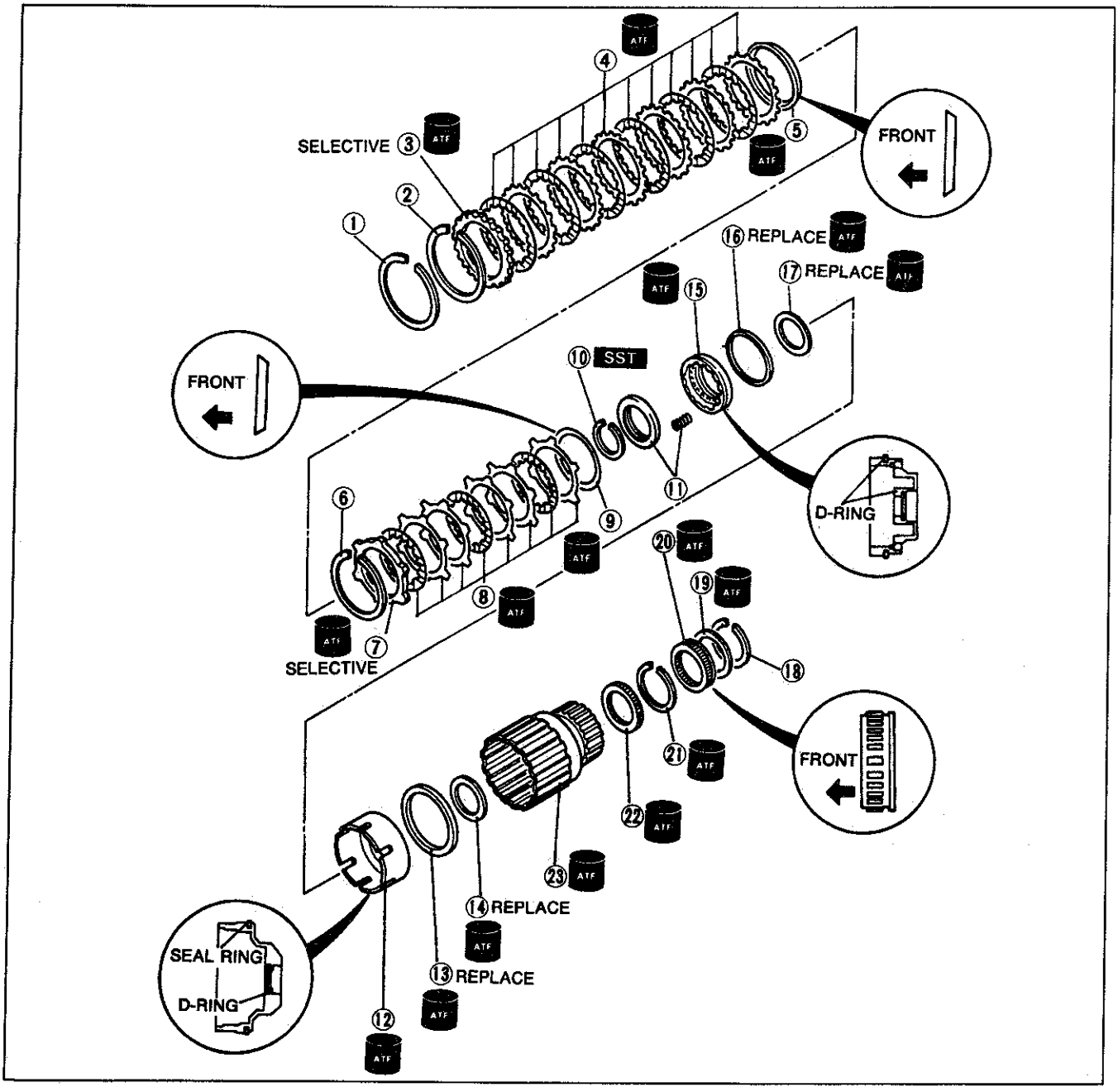
1. Measure the clearance between the retaining plate and the snap ring of the forward clutch and the overrunning clutch.

   Clearance
   Forward clutch: 0.45–1.85 mm {0.018–0.073 in}
   Overrunning clutch: 1.0–2.0 mm {0.039–0.079 in}

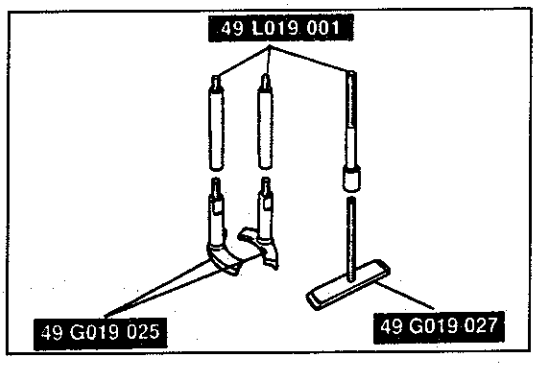
2. Select the correct retaining plate when assembling. (Refer to pages K–89, 90.)

Disassembly / Inspection / Assembly

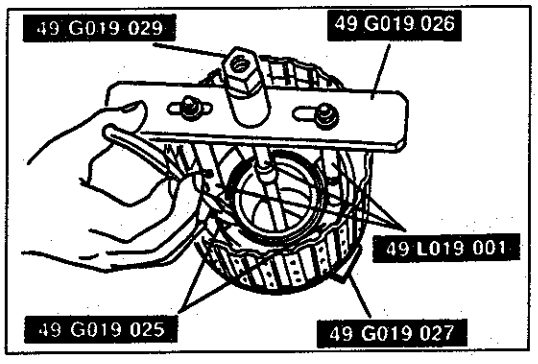
1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Procedure**.



1. Snap ring
2. Snap ring
3. Retaining plate
4. Drive plates and driven plates
   Inspect for wear and burning
   Inspection ..... page K-86
5. Dished plate
6. Snap ring
7. Retaining plate
8. Drive plates and driven plates
   Inspect for wear and burning
   Inspection ..... page K-86
9. Dished plate
10. Snap ring
    Disassembly Note ..... below
11. Spring retainer and return springs
    Inspection ..... page K-86
12. Forward clutch piston
    Disassembly Note ..... below
13. Seal ring
14. D-ring
15. Overrunning clutch piston
    Shake the clutch piston and verify that the check ball is free
    Disassembly Note ..... below
    Inspection ..... page K-86
16. D-ring
17. D-ring
18. Snap ring
19. Side plate
20. Low one-way clutch
    Inspection ..... page K-83
21. Snap ring
22. Bearing (radial bearing)
    Inspect for damage and rough rotation
23. Forward clutch drum
    Inspection ..... page K-86

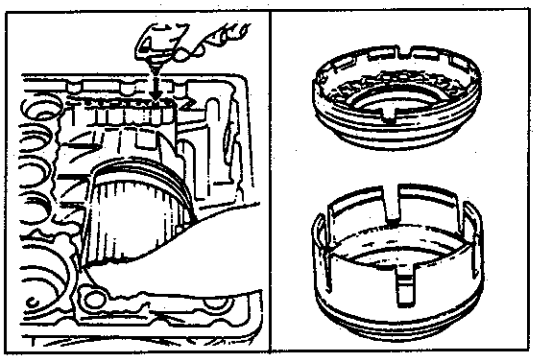


Disassembly note
Snap ring
1. Assemble the **SST.**



Caution
- **Depress the spring retainer only enough to install the snap ring. Overpressing will damage the retainer assembly edges.**

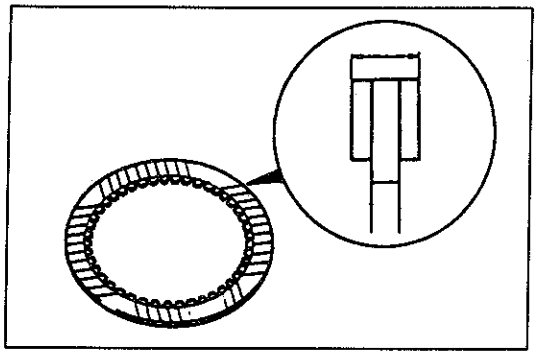
2. While holding the spring retainer down with the **SSTs**, and remove the snap ring by using snap ring pliers.
3. Remove the spring retainer and return springs.



Forward clutch piston, Overrunning clutch piston
1. Set the forward clutch drum in the transmission case.
2. Remove the piston by applying compressed air through the oil passage.

   Air pressure: 390 kPa {4.0 kgf/cm^2, 57 psi} max.

3. Remove the overrunning clutch piston from the forward clutch piston.

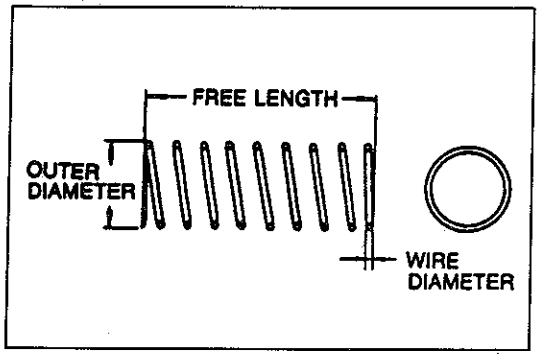


Inspection
Drive plates
1. Measure the facing thickness in three places, and calculate the average.

Forward clutch
Standard: 2.0 mm {0.079 in}
Minimum: 1.8 mm {0.071in}

Overrunning clutch
Standard: 2.0 mm {0.079 in}
Minimum: 1.8 mm {0.071in}

2. If not within specification, replace the drive plate.

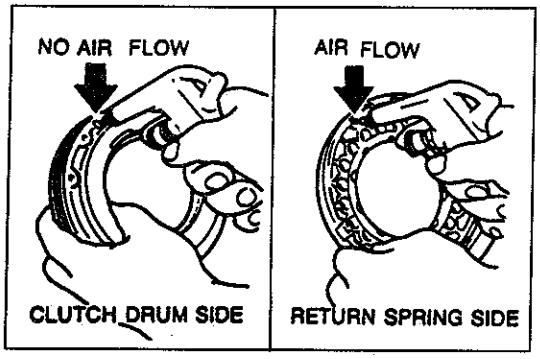


Return springs
1. Measure the spring free length.

Specification

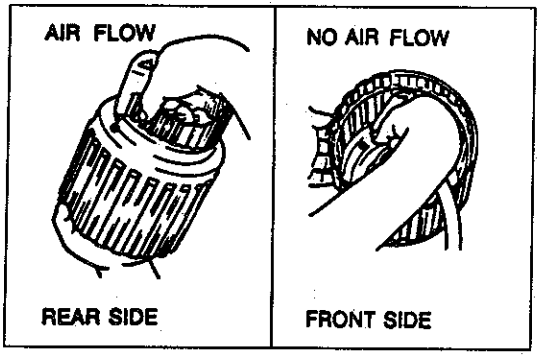
Outer dia. mm {in}	Free length mm {in}	No. of coils	Wire dia. mm {in}
9.7 {0.38}	35.8 {1.41}	10.3	1.3 {0.051}

2. If not within specification, replace the return spring.



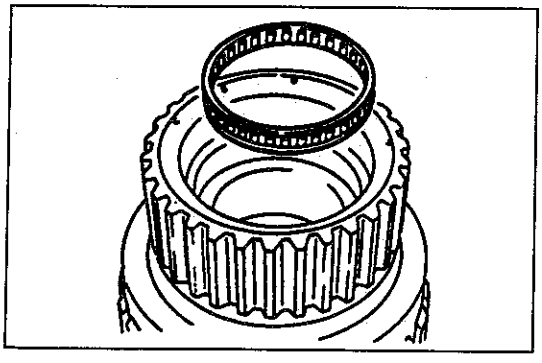
Overrunning clutch piston
1. Shake the clutch piston and verify that the check ball is free.
2. Verify that there is no air flow when applying compressed air through the oil hole on the clutch drum side.
3. Verify that there is air flow when applying compressed air through the oil hole on return spring side.

Air pressure: 390 kPa {4.0 kgf/cm^2, 57 psi} max.

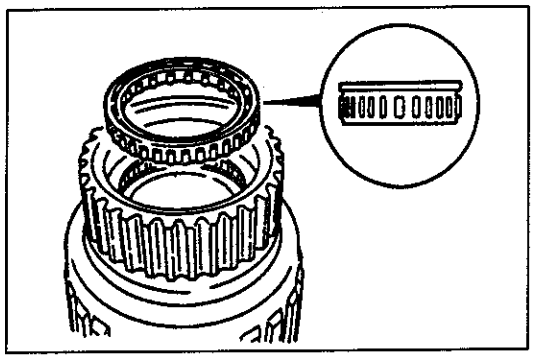


Forward clutch drum
1. Verify that there is no air flow when applying compressed air through the oil hole on the front side.
2. Verify that there is airflow when applying compressed air through the oil hole on the rear side.

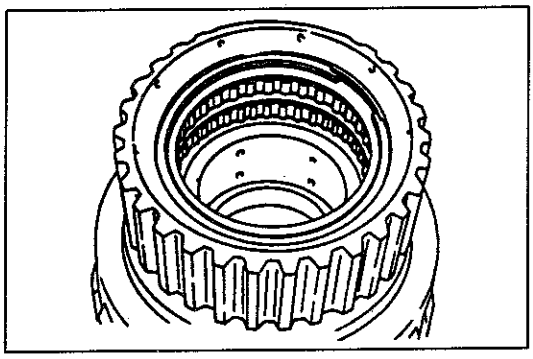
Air pressure: 390 kPa {4.0 kgf/cm^2, 57 psi} max.



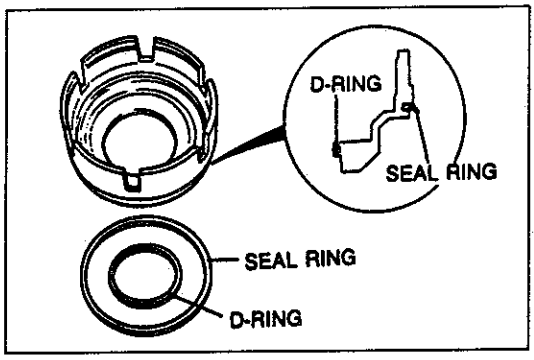
Assembly procedure
1. Apply ATF to the bearing and install it into the forward clutch drum.
2. Install the snap ring.



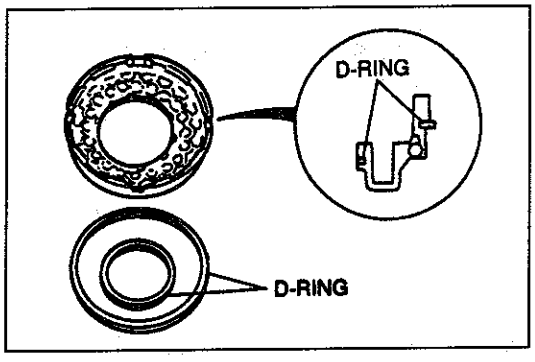
3. Apply ATF to the low one-way clutch.
   Install it carefully into the forward clutch drum, with the flange facing upward.



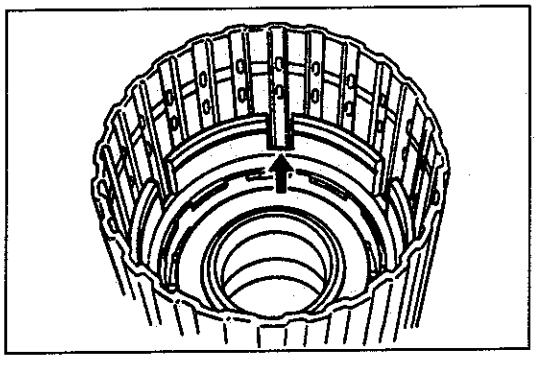
4. Apply ATF to the side plate and snap ring, and install them into the forward clutch drum.



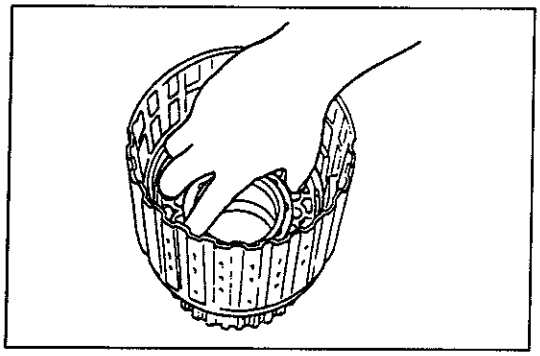
5. Apply ATF to a new D-ring and seal ring, and install them into the forward clutch piston as shown.



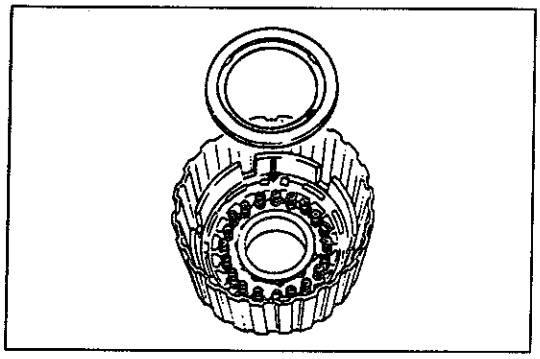
6. Apply ATF to the new D-rings, and install them to the over-running clutch piston as shown.



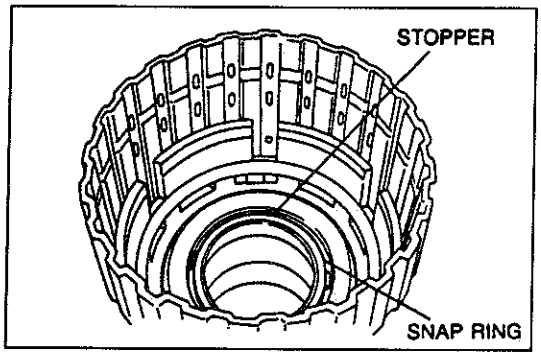
7. Apply ATF to the inner face of the forward clutch drum and to the forward clutch piston.
8. Apply even pressure to the perimeter of the forward clutch piston, and install it into the forward clutch drum by turning it evenly and gradually. Align the notches in the forward clutch piston with the grooves in the forward clutch drum.
9. Verify that the piston can be turned by hand. If it cannot, then remove it and check for damage to the seal ring.



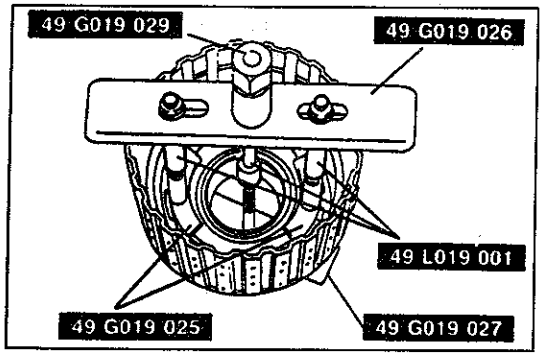
10. Apply ATF to the inner face of the forward clutch piston and to the overrunning clutch piston.
11. Apply even pressure to the perimeter of the overrunning clutch piston, and install it into the forward clutch piston by turning it evenly and gradually.



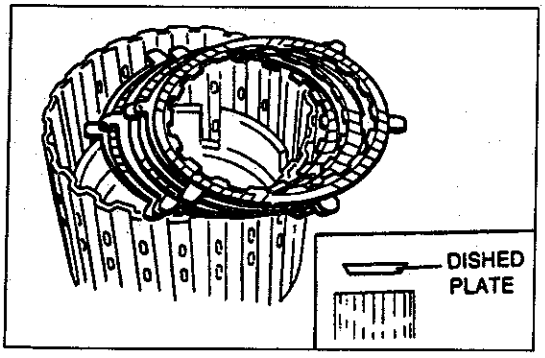
12. Install the return springs and spring retainer.



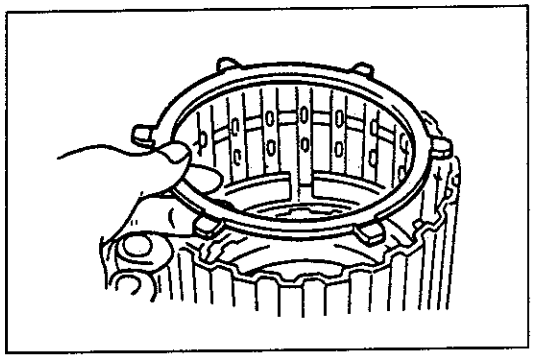
Caution
- **Depress the spring retainer only enough to install the snap ring. Overpressing will damage the retainer assembly edges.**



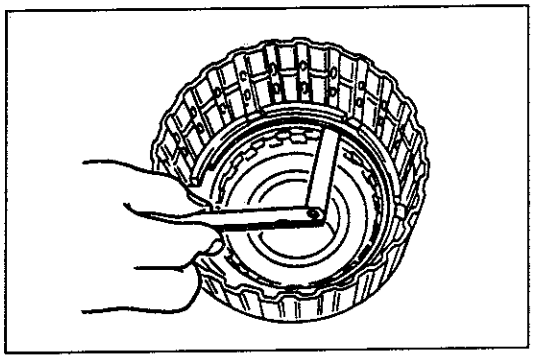
13. While holding the spring retainer down with the **SSTs**, install the snap ring into the spring retainer stopper.



14. Install the dished plate as shown.
15. Soak new drive plates in ATF for at least two hours.
16. Apply ATF to the driven plates immediately before assembly.
17. Install the drive and driven plates into the forward clutch piston in the following order.
Driven-Drive-Driven-Driven-Drive-Driven-Driven-Drive



18. Install the retaining plate.
19. Install the snap ring.



20. Measure the clearance between the retaining plate and the snap ring by using a feeler gauge

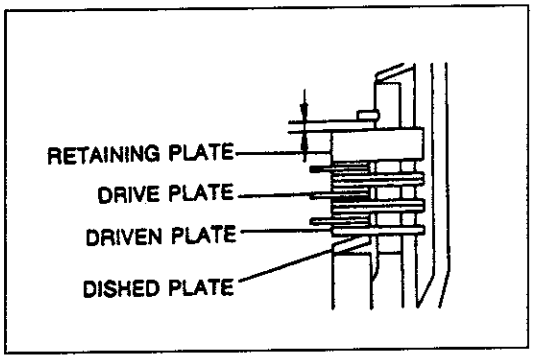
    Clearance: 1.0–2.0 mm {0.039–0.079 in}

21. If not within specification, adjust the clearance by selecting the correct retaining plate.

Retaining plate size

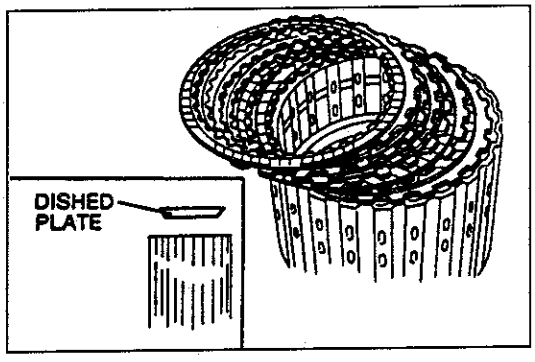
mm {in}

4.0 {0.157}	4.2 {0165}	4.4 {0.173}	4.6 {0.181}
4.8 {0.189}	5.0 {0.197}	5.2 {0.205}	—

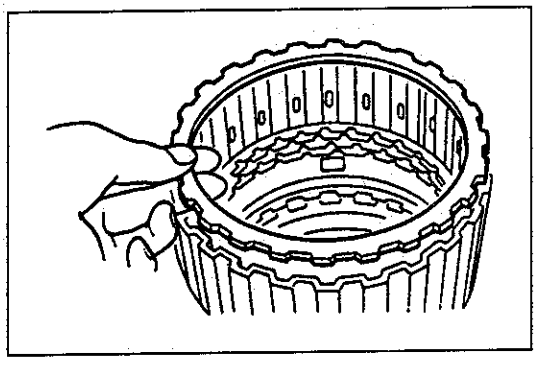


22. If the clearance cannot be brought to within specification after installation of the thickest retaining plate, replace the dished plate, driven plates, and drive plates.
    Adjust the clearance by selecting the correct retaining plate.

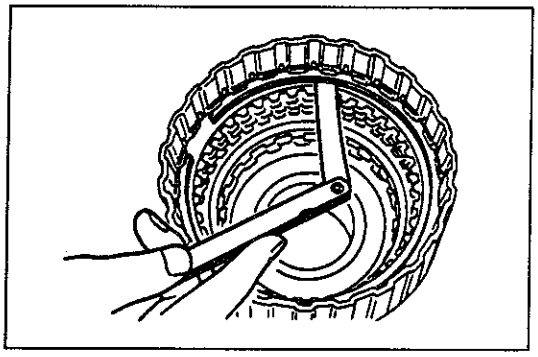
    Clearance: 1.0–1.4 mm {0.039–0.055 in}



23. Install the dished plate as shown.
24. Soak new drive plates in ATF for at least two hours.
25. Apply ATF to the driven plates immediately before assembly.
26. Install the drive and driven plates into the forward clutch drum in the following order.
    Driven-Drive-Driven-Drive-Driven-Drive-Driven-Drive-Driven-Drive-Driven-Drive



27. Install the retaining plate.
28. Install the snap ring.



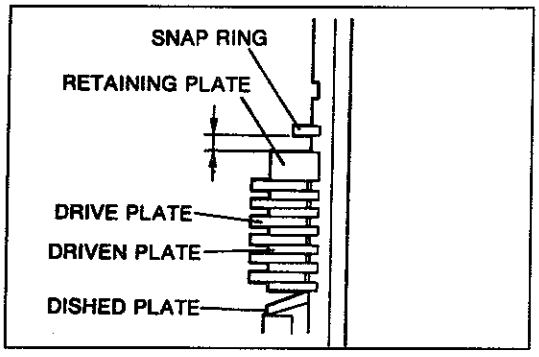
29. Measure the clearance between the retaining plate and the snap ring by using a feeler gauge. If not within specification, adjust the clearance by selecting the correct retaining plate.

Clearance: 0.45–1.85 mm {0.018–0.073 in}

Retaining plate size

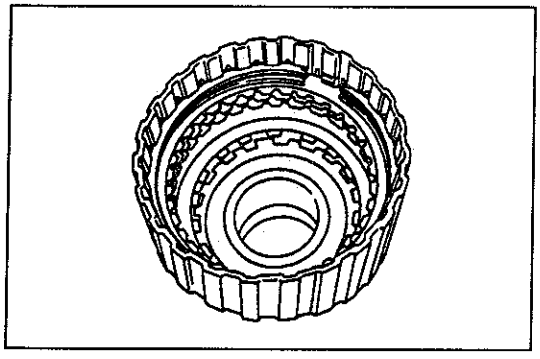
mm {in}

8.0 {0.315}	8.2 {0.323}	8.4 {0.331}	8.6 {0.339}
8.8 {0.346}	9.0 {0.354}	9.2 {0.362}	—



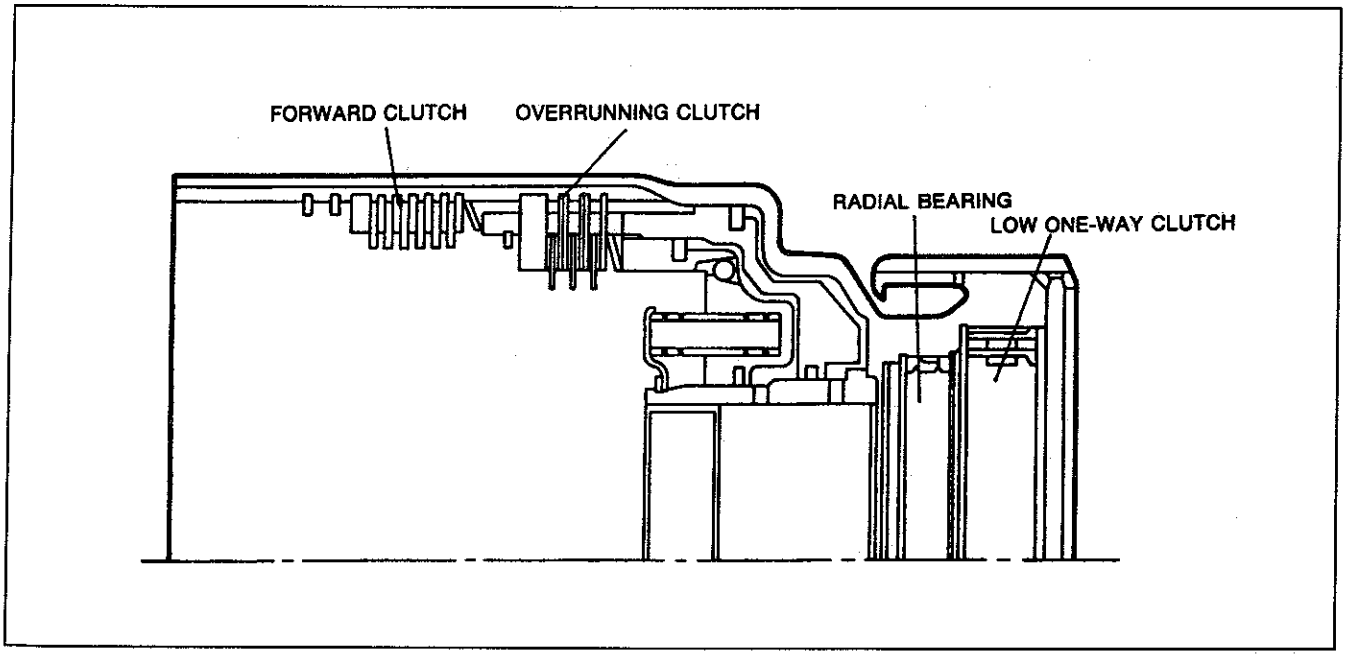
30. If the clearance cannot be brought to within specification after installation of the thickest retaining plate, replace the dished plate, driven plates, and drive plates.
Adjust the clearance by selecting the correct retaining plate.

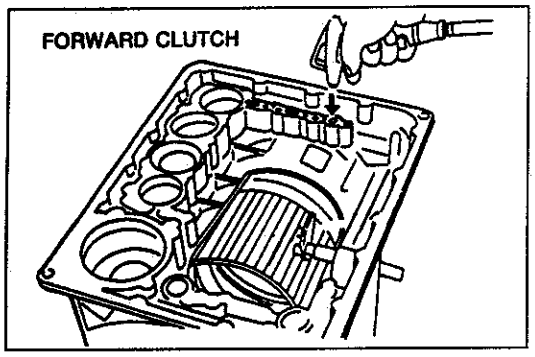
Clearance: 0.45–0.85 mm {0.018–0.033 in}



31. Install the snap ring.

Illustration of proper assembly

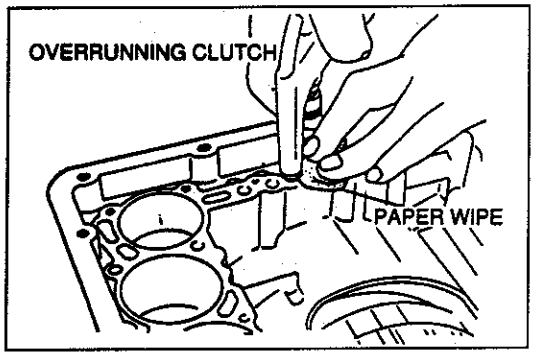




Caution
- **Applying compressed air to the assembled clutch pack for longer than 3 seconds at a time will damage the seal.**

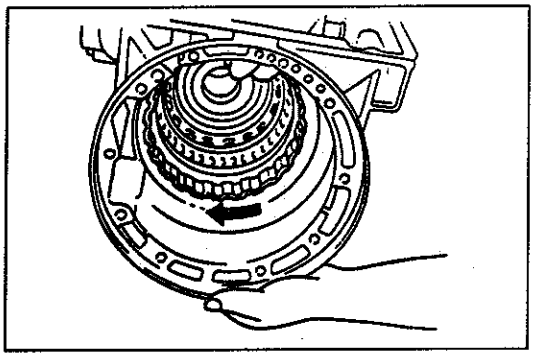
32. Set the forward clutch drum in the transmission.
33. Apply compressed air through the oil passage as shown, and verify the forward clutch operation.

Air pressure: 390 kPa {4.0 kgf/cm^2, 57 psi} max.

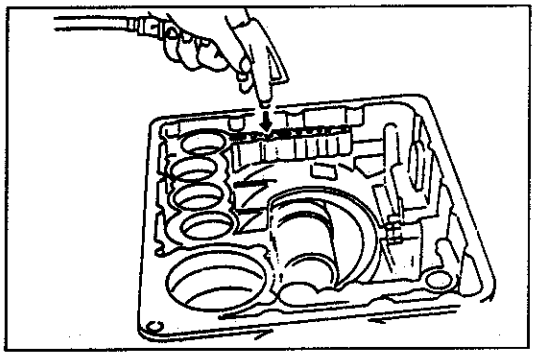


34. Apply compressed air through the oil passage, and check the overrunning clutch operation.
Hold a paper towel around the nozzle of the air gun to keep air from escaping around the edges.

Air pressure: 390 kPa {4.0 kgf/cm^2, 57 psi} max.



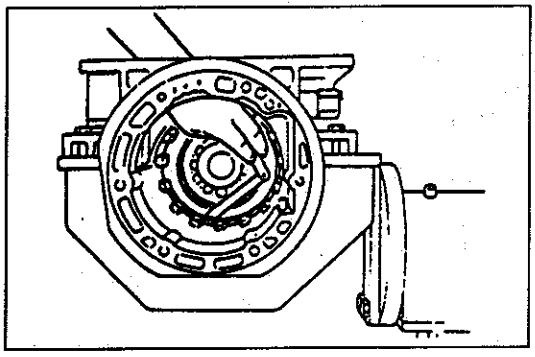
35. Verify that the forward clutch drum turns clockwise only. If it turns counterclockwise, the one-way clutch is installed upside down.



LOW AND REVERSE BRAKE
Preinspection
Low and reverse brake operation
1. Apply compressed air through the oil passage as shown.
2. Verify that the retaining plate moves toward the snap ring.

Air pressure: 390 kPa {4.0 kgf/cm^2, 57 psi} max.

3. If not, the D-ring or the seal ring may be damaged or fluid may be leaking at the piston check ball. Inspect and replace as necessary when assembling.



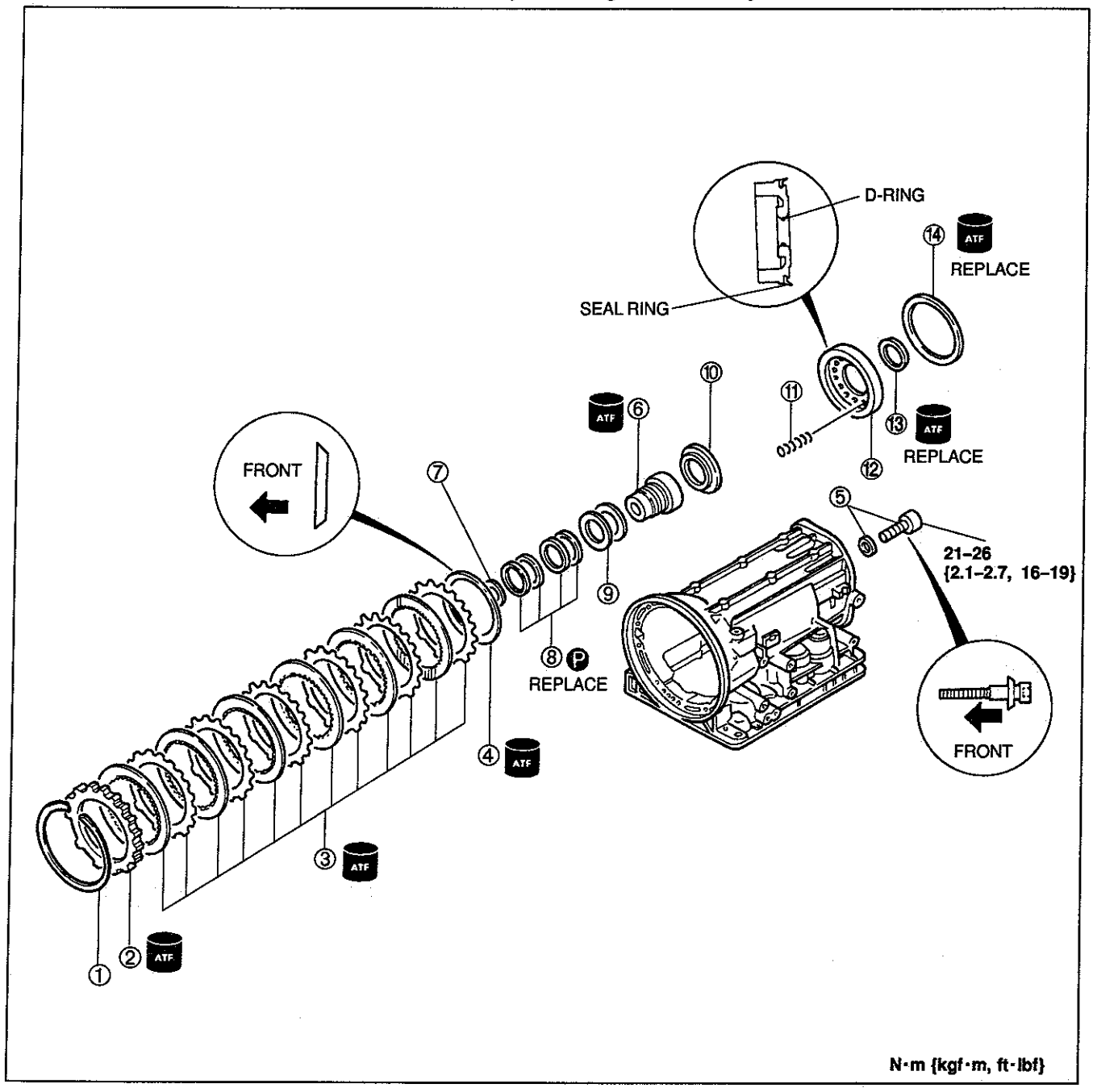
Clearance between retaining plate and snap ring
1. Measure the clearance between the retaining plate and the snap ring.

Clearance: 0.8–2.6 mm {0.031–0.102 in}

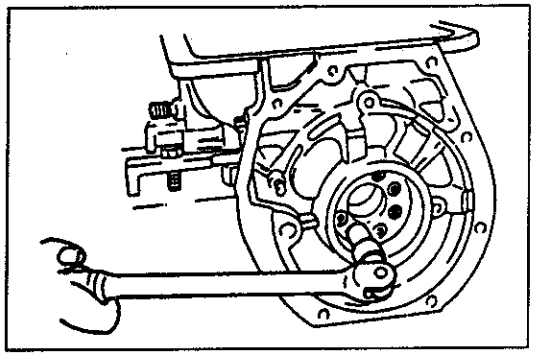
2. Select the correct retaining plate when assembling. (Refer to page K–95.)

Disassembly / Inspection / Assembly

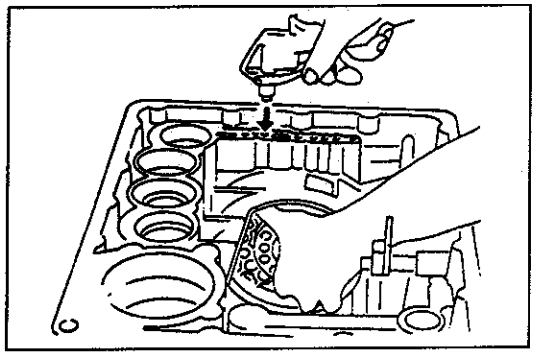
1. Disassemble in the order shown in the figure, referring to **Disassembly note.**
2. Inspect all parts and replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Procedure.**



1. Snap ring
2. Retaining plate
3. Drive plates and driven plates
   Inspect for damage and burning
   Inspection ..... page K–93
4. Dished plate
5. Allen-head bolts and washers
6. Low one-way clutch inner race
   Disassembly Note ..... page K–93
   Inspection ..... page K–93
7. Bearing
   Inspect for damage and rough rotation
8. Seal rings
9. Thrust washeres
10. Spring retainer
11. Return springs
    Inspection ..... page K–93
12. Low and reverse brake piston
    Shake the clutch piston and verify that the check ball is free
    Disassembly Note ..... page K–93
13. D-ring
14. Seal ring

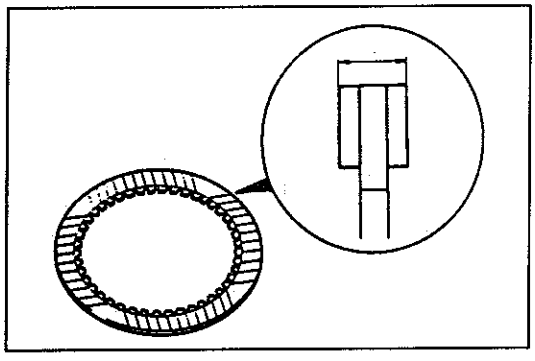


Disassembly note
Low one-way clutch inner race
1. Loosen the bolts gradually in a crisscross pattern. Hold the inner race with your free hand so that it doesn't spring out as the last bolt is removed.
2. Remove the Allen-head bolts, washers, and low one-way clutch inner race.



Low and reverse brake piston
Remove the low and reverse brake piston by applying compressed air through the oil passage as shown.

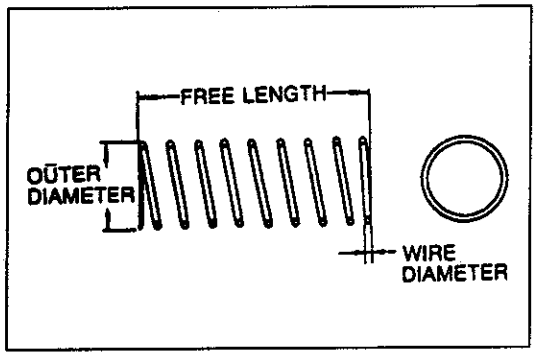
Air pressure: 390 kPa {4.0 kgf/cm^2, 57 psi} max.



Inspection
Drive plates
1. Measure the facing thickness in three places, and calculate the average.

Thickness
Standard: 2.0 mm {0.079 in}
Minimum: 1.8 mm {0.071 in}

2. If not within specification, replace the drive plate.

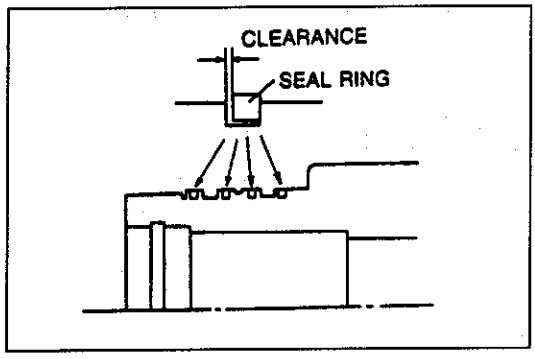


Return springs
1. Measure the spring free length.

Specification

Outer dia. mm {in}	Free length mm {in}	No. of coils	Wire dia. mm {in}
11.6 {0.457}	22.3 {0.878}	5.2	1.2 {0.047}

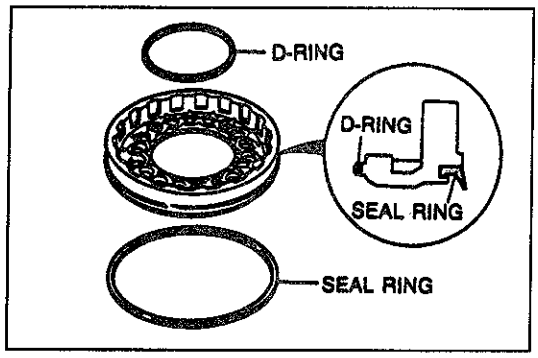
2. If not within specification, replace the return spring.



Low one-way clutch inner race
1. Apply petroleum jelly to new seal rings and install them to the one-way clutch inner race.
2. Measure the clearance between each seal ring and ring groove.

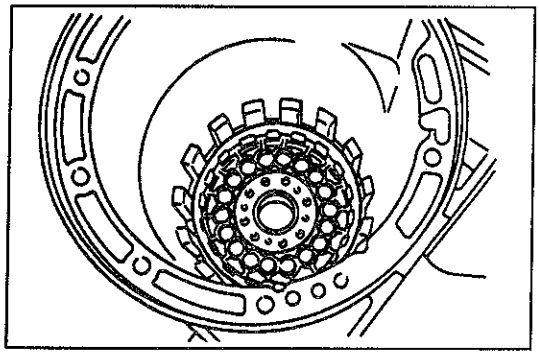
Standard clearance:
0.10–0.25 mm {0.004–0.010 in}
Maximum clearance: 0.25 mm {0.010 in}

3. If not within specification, replace the low one-way clutch inner race.

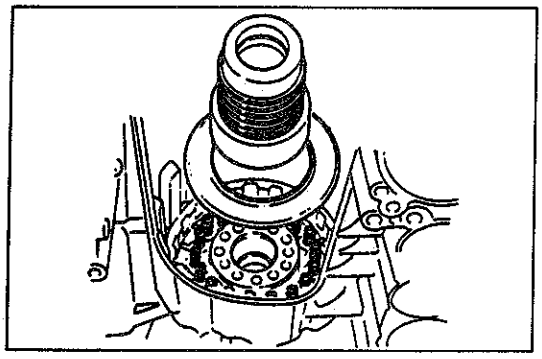


Assembly procedure

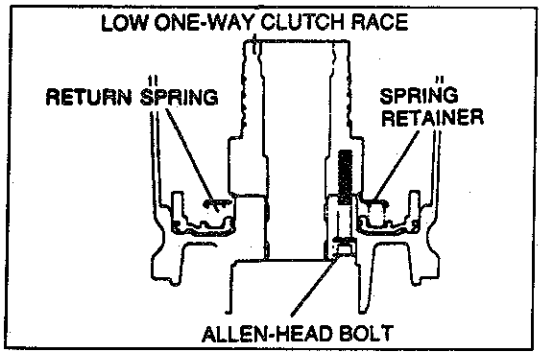
1. Apply ATF to a new D-ring and seal ring and install them to the low and reverse brake piston.



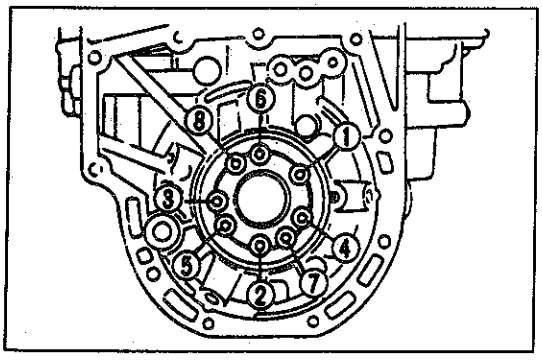
2. Apply ATF to the inner face of the transmission case.
3. Apply even pressure to the perimeter of the low and reverse brake piston, and install it into the transmission case by turning it evenly and gradually.
4. Verify that the piston can be turned by hand. If it cannot, then remove it and check for damage to the seal ring.



5. Set the return springs, spring retainer, and low one-way clutch inner race into the transmission case.

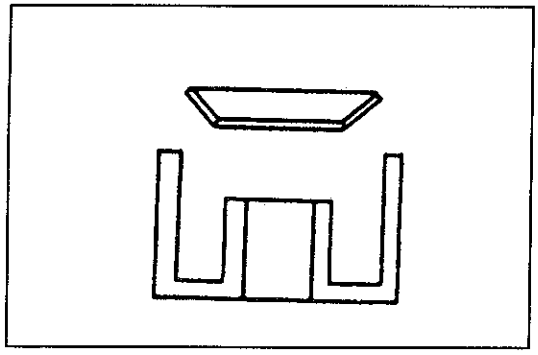


6. Verify that the return springs, spring retainer, and low one-way clutch inner race are properly positioned.

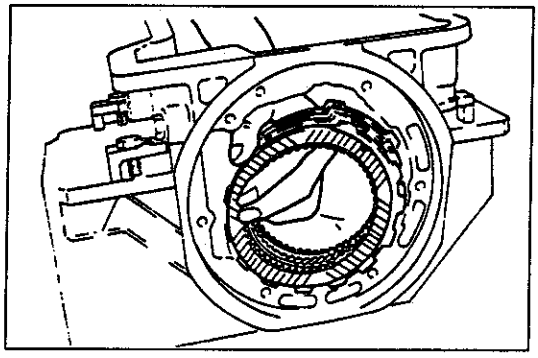


7. Tighten the Allen-head bolts evenly and gradually in the order shown.

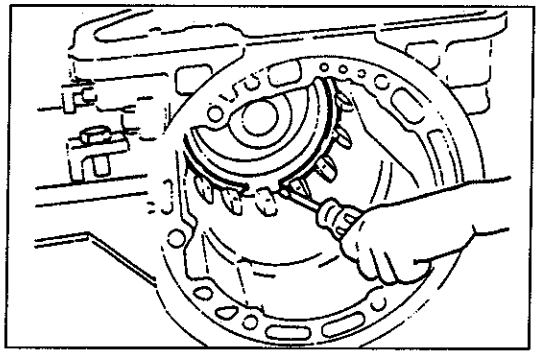
Tightening torque:
21–26 N·m {2.1–2.7 kgf·m, 16–19 ft·lbf}



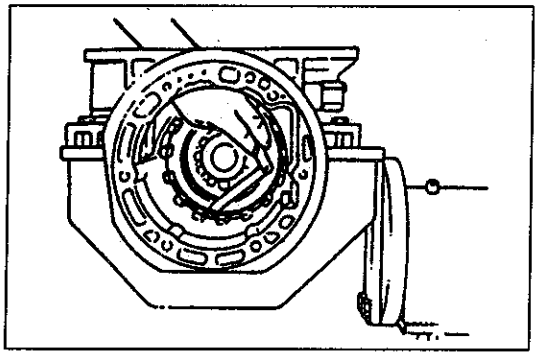
8. Install the dished plate as shown.



9. Soak new drive plates in ATF for at least two hours before installation.
10. Apply ATF to the driven plates immediately before assembly.
11. Install the drive and driven plates into the transmission case in the following order.
    Driven-Drive-Driven-Drive-Driven-Drive-Driven-Drive-Driven-Drive-Driven-Drive-Driven-Drive



12. Install the retaining plate.
13. Install the snap ring.



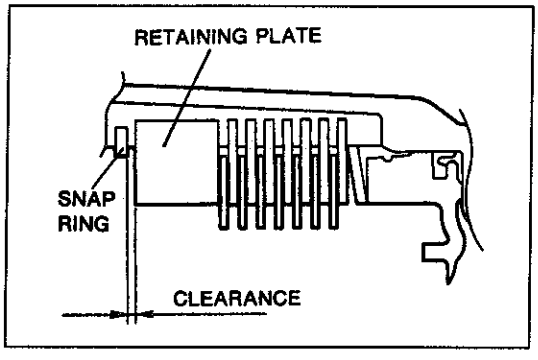
14. Measure the clearance between the retaining plate and the snap ring by using a feeler gauge. If not within specification, adjust the clearance by selecting the correct retaining plate.

    Clearance: 0.8–2.6 mm {0.031–0.102 in}

Retaining plate size

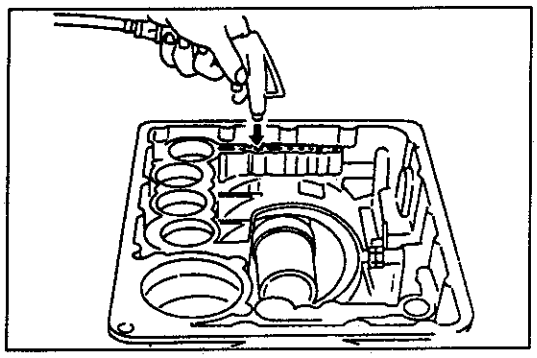
mm {in}

6.2 {0.244}	6.4 {0.252}	6.6 {0.260}	6.8 {0.268}
7.0 {0.276}	7.2 {0.283}	7.4 {0.291}	7.6 {0.299}
7.8 {0.307}	8.0 {0.315}	—	—



15. If the clearance cannot be brought to within specification after installation of the thickest retaining plate, replace the dished plate, driven plates and drive plates.
    Adjust the clearance by selecting the correct retaining plate.

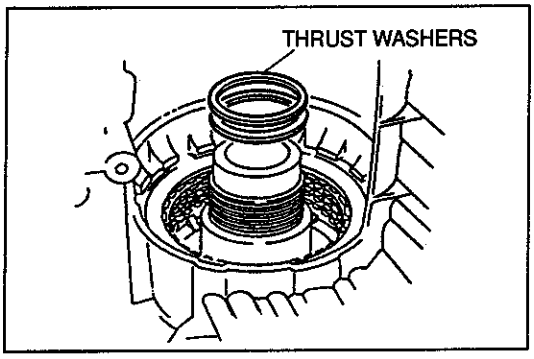
    Clearance: 0.8–1.2 mm {0.031–0.047 in}



Caution
- **Applying compressed air to the assembled clutch pack for longer than 3 seconds at a time will damage the seal.**

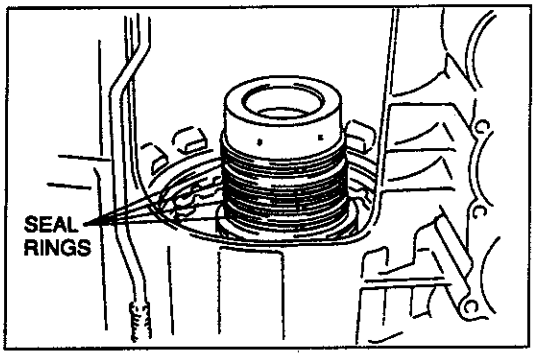
16. Verify operation of the piston by applying compressed air through the oil passage of the low and reverse brake as shown.

Air pressure: 390 kPa {4.0 kgf/cm^2, 57 psi} max.

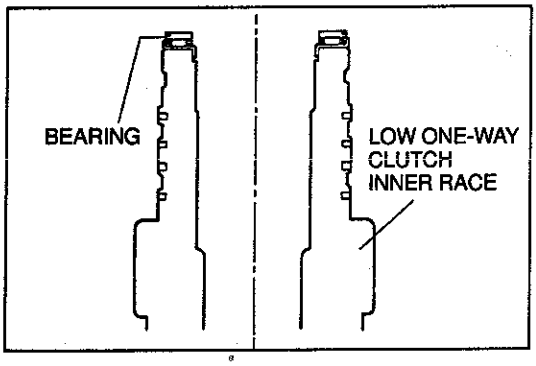


17. Apply petroleum jelly to the bearing, and install it on the low one-way clutch inner race with the black surface facing downward.

Bearing outer diameter: 78.1 mm {3.07 in}



18. Apply petroleum jelly to the seal rings, and fit them into the ring grooves of the low one-way clutch inner race.

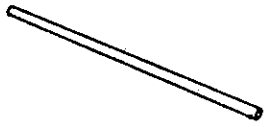
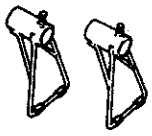
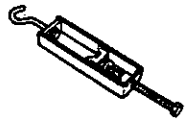
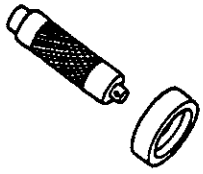
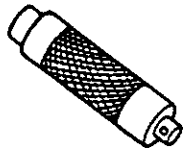


19. Apply petroleum jelly to the bearing, and install it onto the low one-way clutch inner race.

Bearing outer diameter: 59.0 mm {2.32 in}

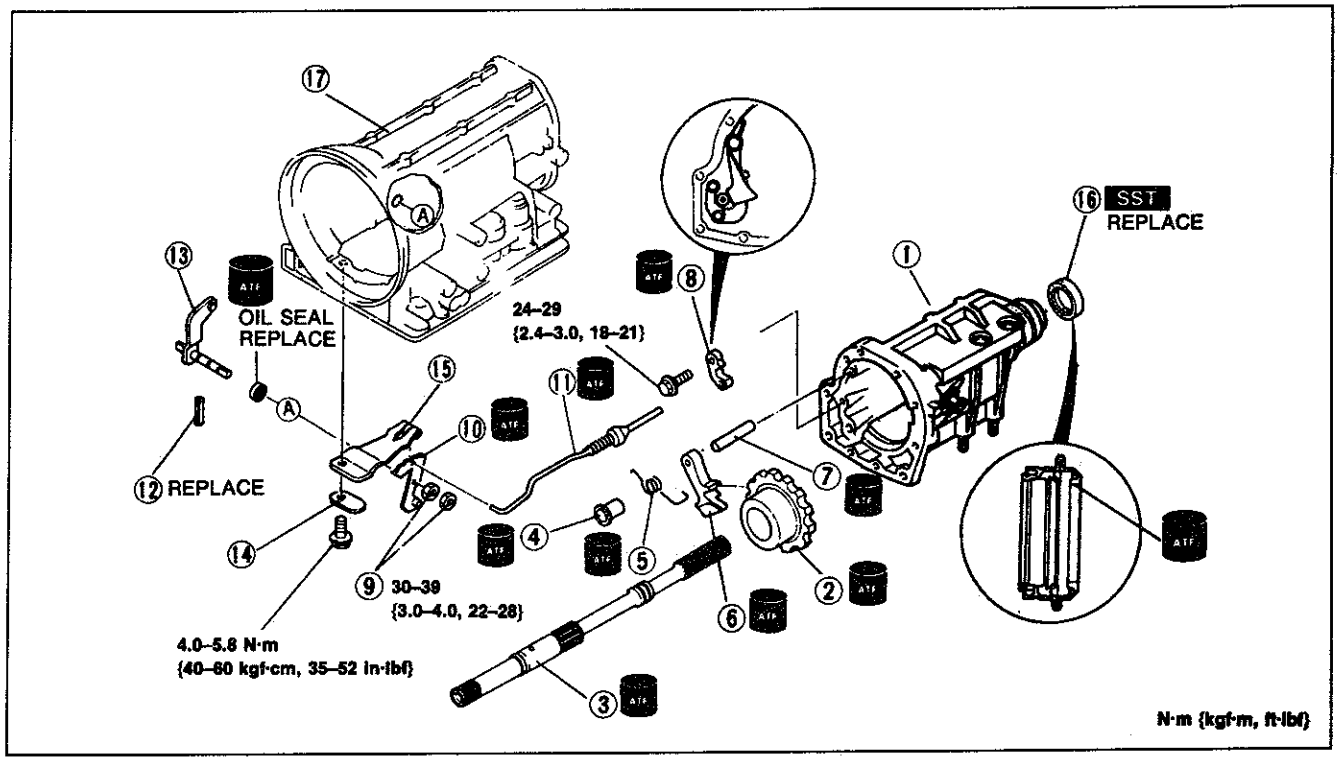
EXTENSION HOUSING / PARKING MECHANISM

Preparation
SST

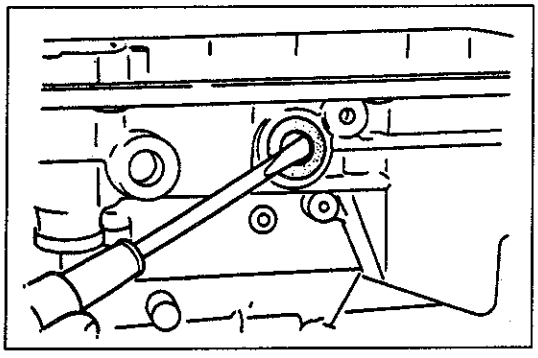
49 G017 5A0 Support, engine 	For support of engine	49 G017 501 Bar (Part of 49 G017 5A0) 	For support of engine
49 G017 502 Support (Part of 49 G017 5A0) 	For support of engine	49 G017 503 Hook (Part of 49 G017 5A0) 	For support of engine
49 G030 795 Installer, oil seal 	For installation of oil seal	49 G030 797 Handle (Part of 49 G030 795) 	For installation of oil seal
49 F019 001 Installer, oil seal 	For installation of oil seal		

Disassembly / Inspection / Assembly

1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Procedure**.



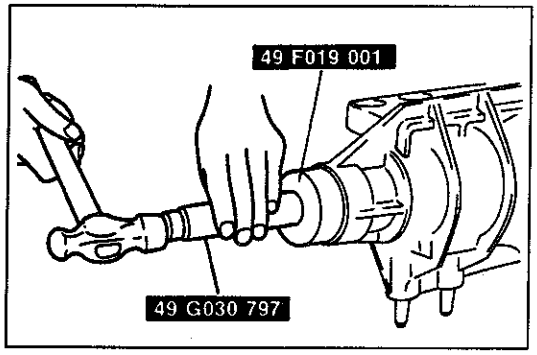
1. Extension housing
2. Parking gear
   Inspect gear teeth for damage and wear
   Inspect bearing for rough rotation
3. Output shaft
   Inspect splines for damage and wear
4. Parking pawl spacer
5. Return spring
6. Parking pawl
7. Parking pawl shaft
8. Parking actuator
9. Locknuts
10. Manual plate
11. Parking rod
12. Roll pin
13. Manual shaft
14. Spacer
15. Detent spring
    Inspect for fracture and wear
16. Oil seal (extension housing)
17. Transmission case
    Inspection
    a) Damage and wear of oil seal
       Disassembly Note ..... below
    b) Damage and rough rotation of inner bearing



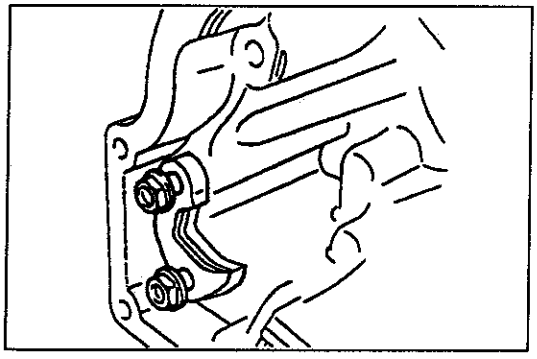
Disassembly note

Oil seal (transmission side)

Remove the oil seal, being careful to not allow any metal tools to scratch the inside of the transmission case.

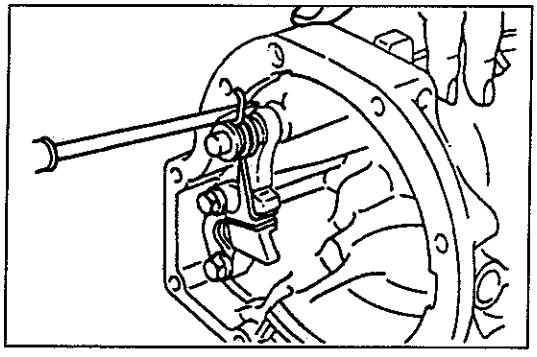


Assembly procedure
1. Apply ATF to the lip of the new oil seal.
2. Install the oil seal by using the **SSTs**.

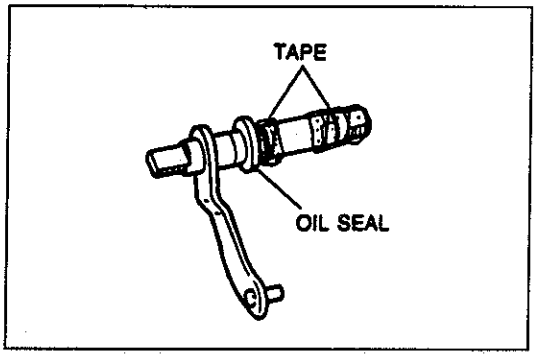


3. Apply ATF to the parking rod guide and parking actuator and install them in the extension housing.

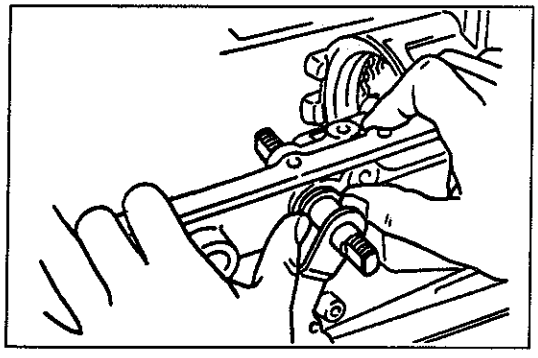
Tightening torque:
24–29 N·m {2.4–3.0 kgf·m, 18–21 ft·lbf}



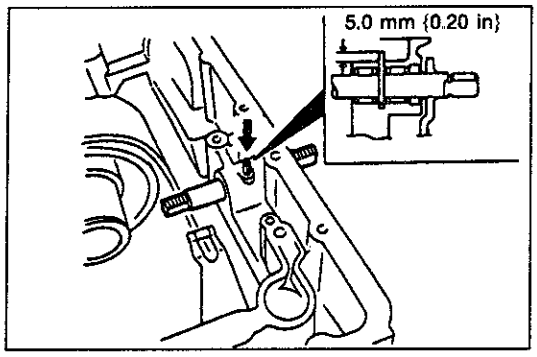
4. Apply ATF to the parking pawl shaft and install it in the extension housing.
5. Apply ATF to the parking pawl, return spring, and spacer. Install them in the extension housing.



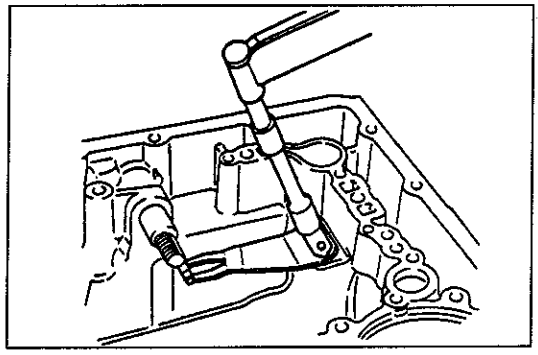
6. Wrap the threads of the manual shaft with tape.
7. Apply ATF to the lip of a new oil seal and install it onto the manual shaft.



8. Apply ATF to the bearing in the transmission case.
9. Install the manual shaft into the transmission case.
10. Push the oil seal squarely into the transmission case.
11. Remove the tape.

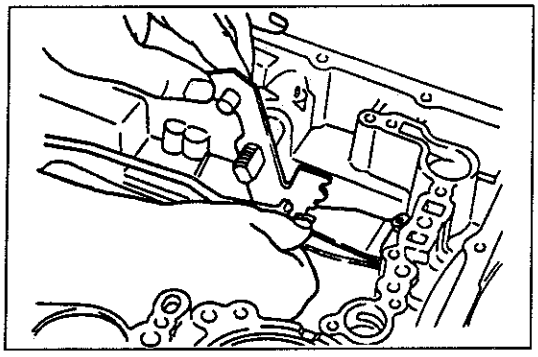


12. Align the groove in manual shaft with the roll pin hole. Tap the roll pin into the case as shown in the figure.

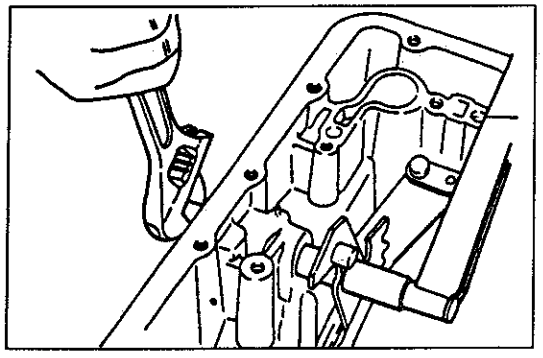


13. Install the detent spring and spacer.

Tightening torque:
4.0–5.8 N·m {40–60 kgf·cm, 36–52 in·lbf}

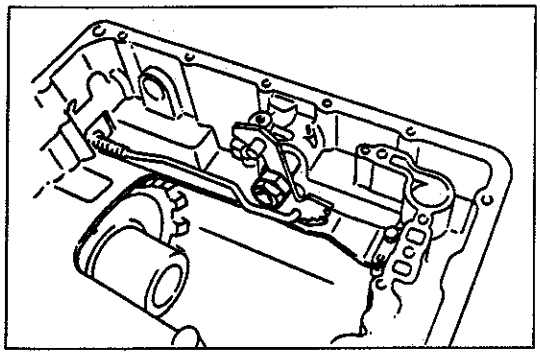


14. Install the manual plate and parking rod.



15. While holding the manual shaft as shown in the figure, tighten the locknuts.

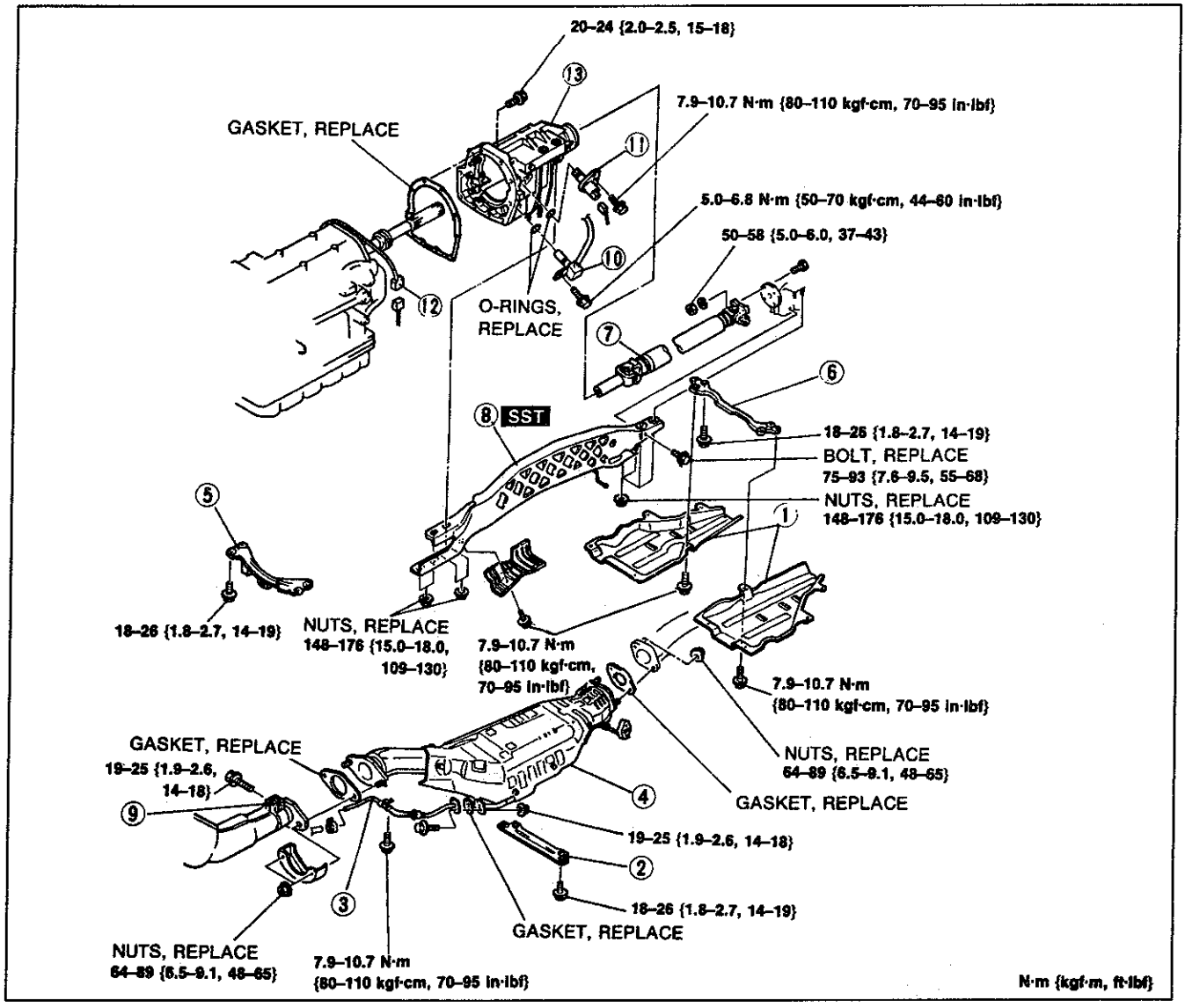
Tightening torque:
30–39 N·m {3.0–4.0 kgf·m, 22–28 ft·lbf}



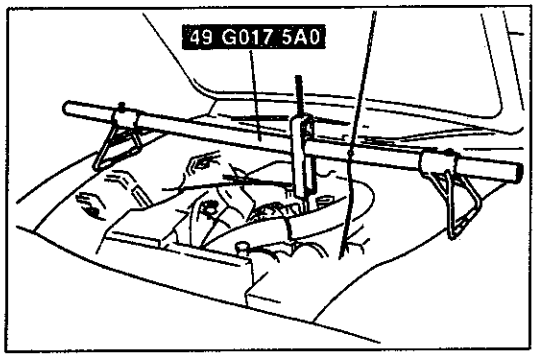
16. Verify operation of the parking mechanism.

On-Vehicle Removal / Installation

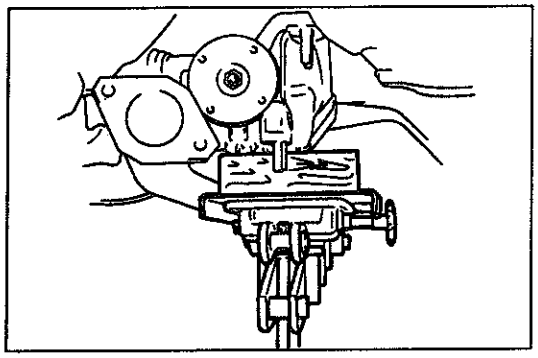
1. Disconnect the negative battery cable.
2. Clean the transmission exterior thoroughly.
3. Remove in the order shown in the figure, referring to **Removal Note**.
4. Install the reverse order of removal, referring to **Installation Note**.
5. Perform the following after installation of the extension housing.
   (1) Connect the negative battery cable.
   (2) Check the ATF level and add ATF to specification, if necessary.



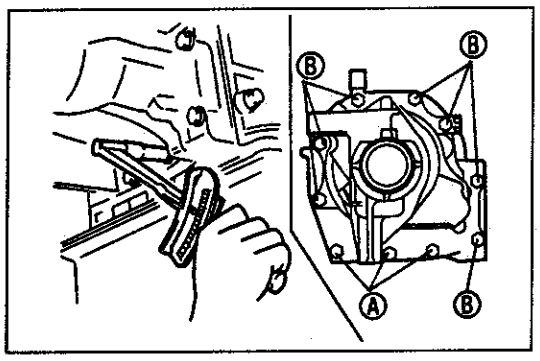
1. Undercover (right and left)
2. Center tunnel member
3. Secondary air injection pipe
4. Three-way catalyst assembly
5. Front tunnel member
6. Rear tunnel member
7. Propeller shaft
   Removal / Installation ..... section L
8. Power plant frame (PPF)
   Removal Note ..... page K–102
   Installation Note ..... page K–102
9. Front exhaust pipe bracket
10. Vehicle speed sensor
11. Vehicle speedometer sensor
12. Solenoid valve connector
13. Extension housing
    Installation Note ..... page K–102



Removal note
Power plant frame (PPF)
1. Hold the engine by using the **SST**.



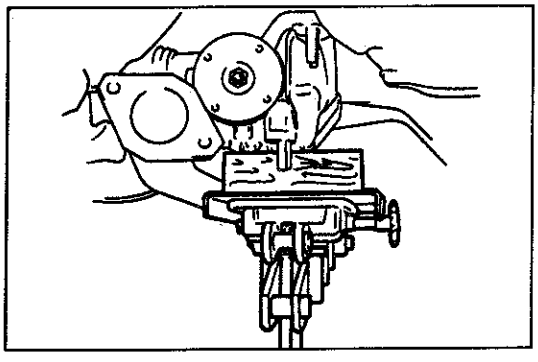
2. Hold the differential with the transmission jack.
3. Remove the PPF.



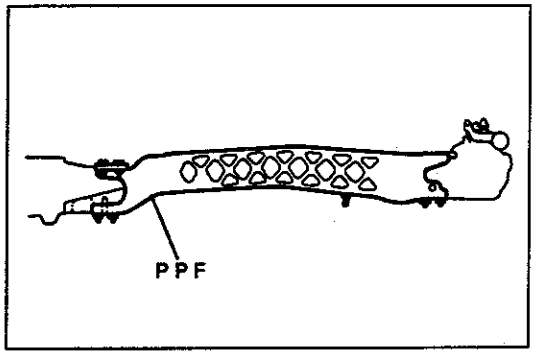
Installation note
Extension housing
1. Install a new gasket on the transmission case.
2. Install the extension housing.

Bolt length (measured from below the head):
A: 30 mm {1.18 in}
B: 45 mm {1.77 in}

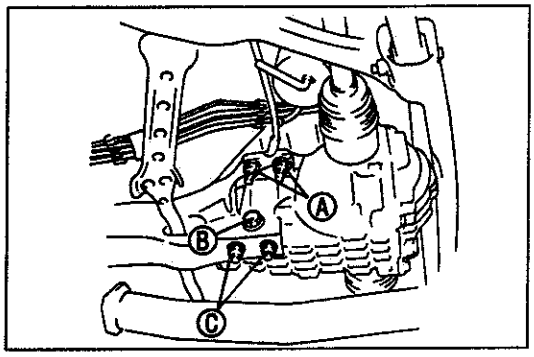
Tightening torque:
20–24 N·m {2.0–2.5 kgf·m, 15–18 ft·lbf}



Power plant frame (PPF)
1. Hold the differential at a 0° angle by using the transmission jack.

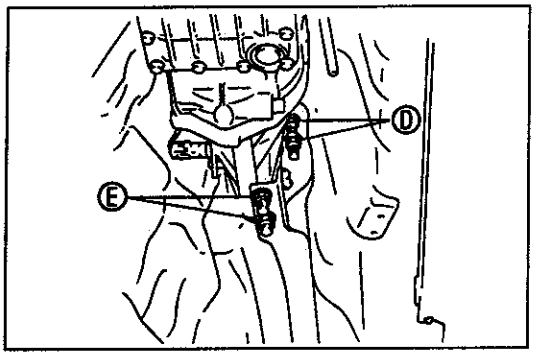


2. Hold the PPF in place with a new bolt and nuts.



3. Tighten the differential-side PPF installation bolt and nuts in the order A, B, C.

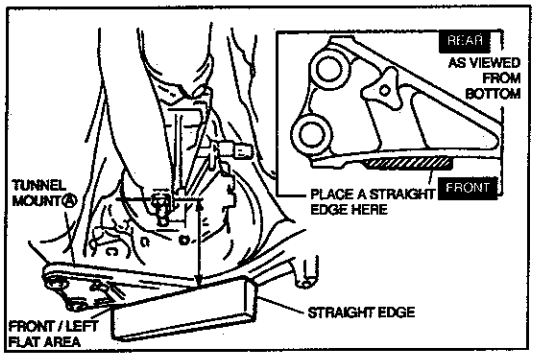
Tightening torque:
A, C: 148–176 N·m {15.0–18.0 kgf·m, 109–130 ft·lbf}
B: 75–93 N·m {7.6–9.5 kgf·m, 55–68 ft·lbf}



4. Tighten the transmission-side PPF installation nuts in the order D, E.

Tightening torque:
148–176 N·m {15.0–18.0 kgf·m, 109–130 ft·lbf}

5. Remove the transmission jack.



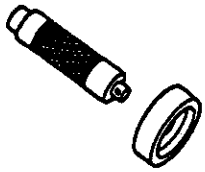
6. Measure A as shown in the figure.

Specification
Right side: 73.0 mm {2.87 in} min.
Left side : 75.0 mm {2.95 in} min.

Note
- When measuring with a straight edge placed on both the right and left sides, the clearance should be 74.0 mm {2.91 in} minimum.

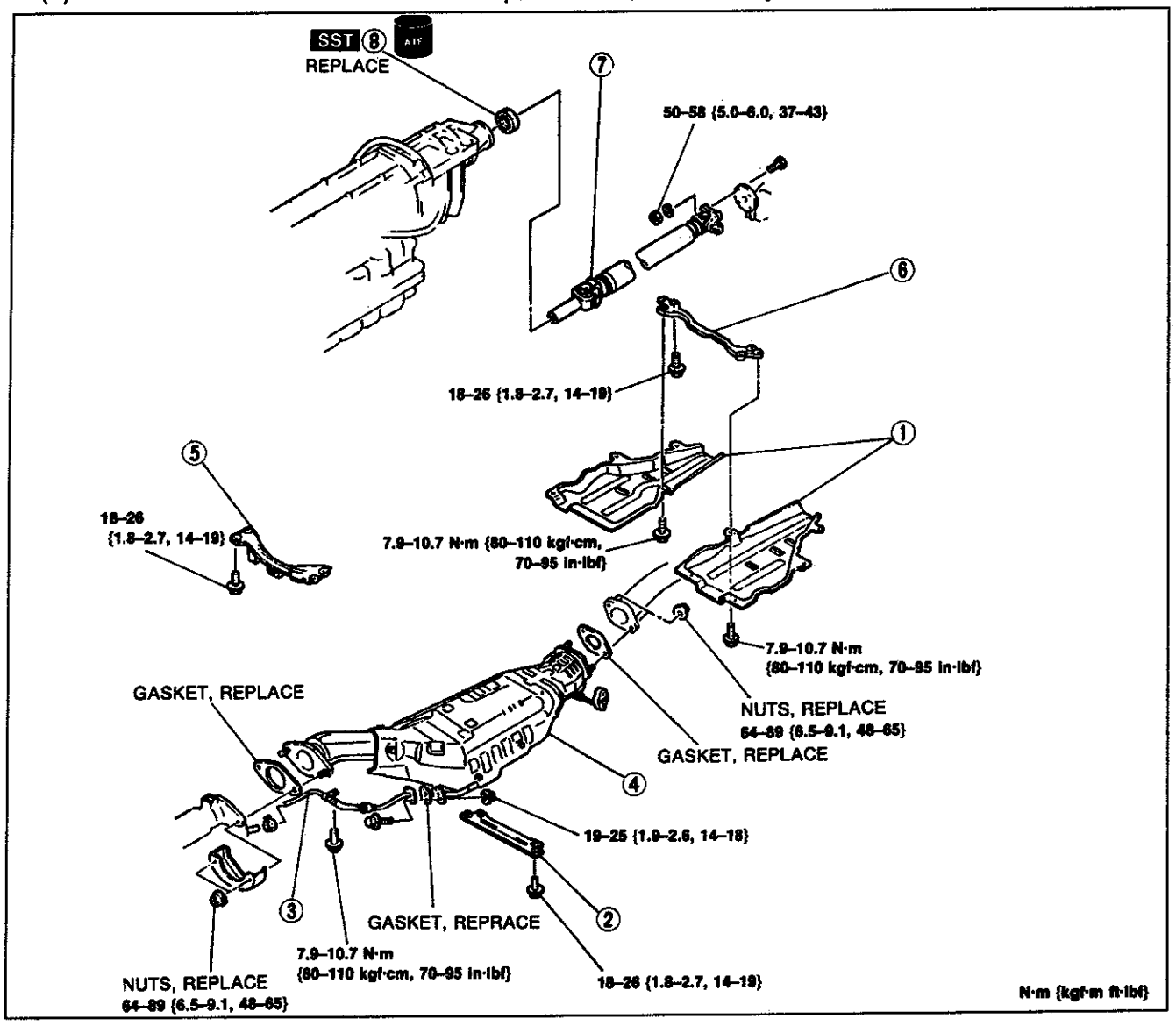
7. If not within specification, readjust the PPF.

OIL SEAL (EXTENSION HOUSING)
Preparation
SST

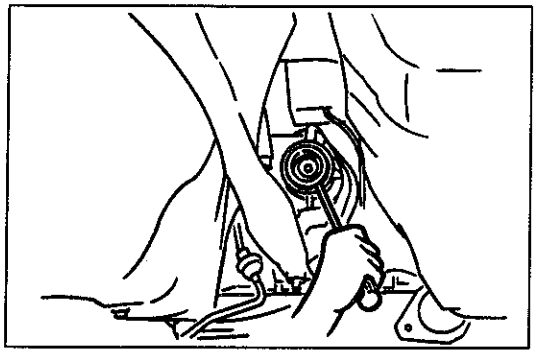
40 G030 795 Installer, oil seal 	For installation of oil seal	40 G030 797 Handle (Part of 49 G030 795) 	For installation of oil seal
40 F019 001 Installer, oil seal 	For installation of oil seal		

On-Vehicle Removal / Installation

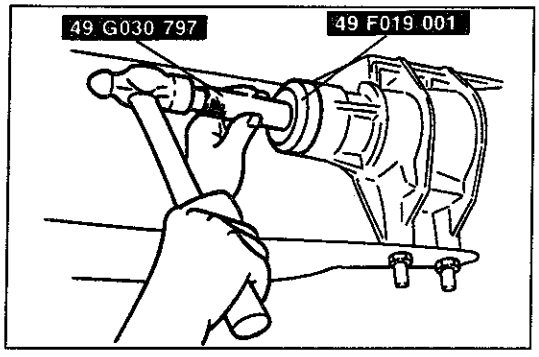
1. Disconnect the negative battery cable.
2. Clean the transmission exterior thoroughly with a steam cleaner or cleaning solvents.
3. Remove in the order shown in the figure, referring to **Removal Note**.
4. Install in the reverse order of removal, referring to **Installation Note**.
5. Perform the following after installation of the oil seal.
   (1) Connect the negative battery cable.
   (2) Check the ATF level and add ATF to specification, if necessary.



1. Undercover (right and left)
2. Center tunnel member
3. Secondary air injection pipe
4. Three-way catalyst assembly
5. Front tunnel member
6. Rear tunnel member
7. Propeller shaft
   Removal / Installation ..... section L
8. Oil seal
   Removal Note ..... page K–106
   Installation Note ..... page K–106



Removal note
Oil seal
Remove the oil seal, being careful to not allow any metal tools to scratch the extension housing or output shaft.



Installation note
Oil seal
1. Using the **SST** and a hammer, tap the new oil seal in evenly until the **SST** contacts the extension housing.
2. Coat the lip of the oil seal with ATF.

MEMO

CONTROL VALVE BODY (DISASSEMBLY / INSPECTION)

Disassembly / Inspection

Caution

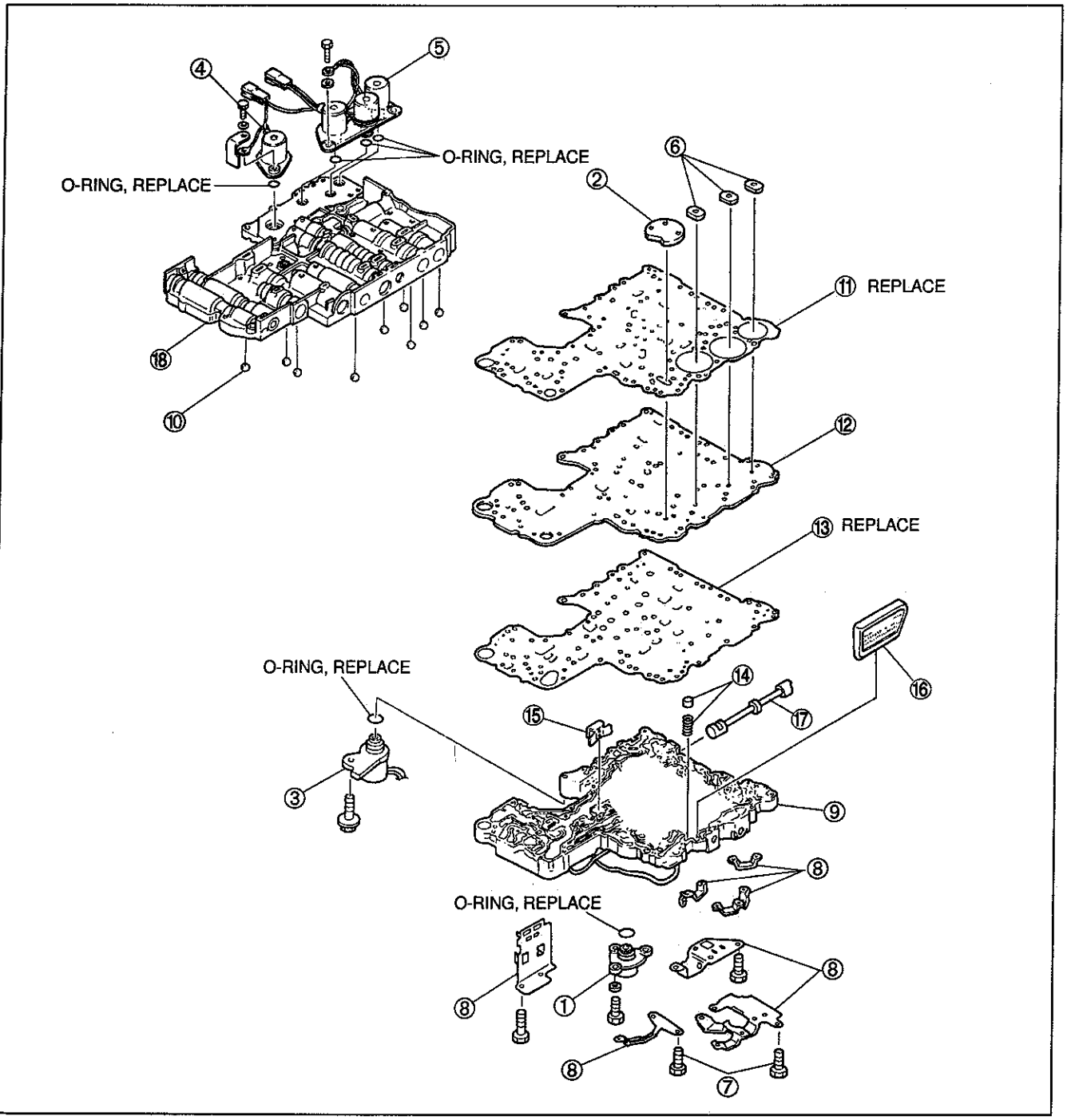
- **Denting or scratching these components will reduce the ability of the transmission to shift properly. When handling these components or the valve body that contains them, be careful not to drop on hit them.**

1. Disassemble in the order shown in the figure, referring to **Disassembly Procedure**.
2. Neatly arrange the removed parts to avoid confusing similar parts.
3. Inspect all parts and repair or replace as necessary.

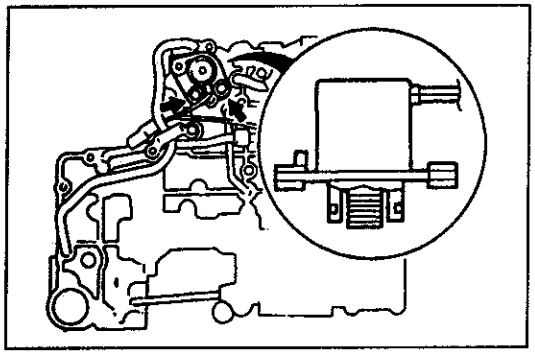
Warning

- **Using compressed air can cause dirt and other particles to fly out, causing injury to the eyes. Wear protective eye wear whenever using compressed air.**

4. Clean the removed parts with cleaning solvent, and dry them with compressed air. Clean out all holes and passages with compressed air.

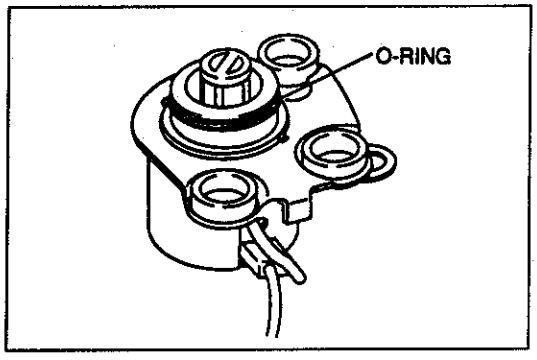


1. Lockup solenoid valve
   Inspect filter for clogging and damage
   Inspection ..... page K- 32
2. Side plate
3. Lockup control solenoid valve
   Inspect filter for clogging and damage
   Inspection ..... page K- 32
4. Line pressure solenoid valve
   Inspect filter for clogging and damage
   Inspection ..... page K- 32
5. Overrunning clutch, shift A, and shift B solenoid valves
   Inspect filter for clogging and damage
   Inspection ..... page K- 32
6. Support plate
7. Retaining bolts and nuts
   Installation position ..... page K-124
8. Brackets
   Installation position ..... page K-123
9. Lower control valve body
   Disassembly / Inspection / Assembly ..... page K-120
10. Steel balls
    Installation position ..... page K-123
11. Upper gasket
12. Separator plate
    Inspect fluid passages for clogging and damage
13. Lower gasket
14. Orifice check valve and spring
15. Pilot filter
    Inspect for clogging and damage
16. Accumulator filter
    Inspect for clogging and damage
17. Manual valve
    Inspect for sticking, scoring, and scratches
18. Upper control valve body
    Disassembly / Inspection / Assembly ..... page K-112

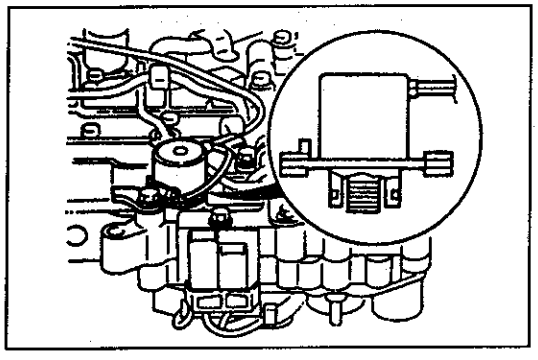


Disassembly procedure

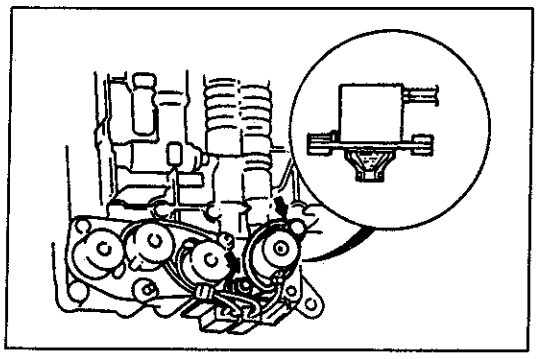
1. Remove the lockup solenoid valve and side plate from the lower control valve body.



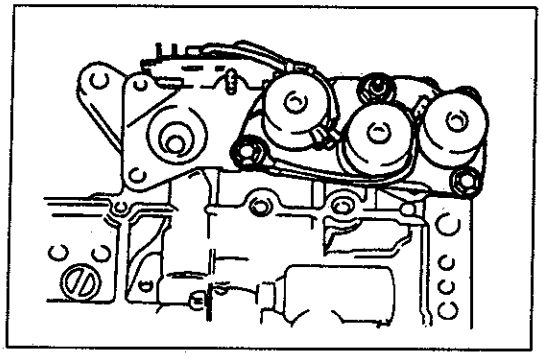
2. Remove the O-ring from the lockup solenoid valve.



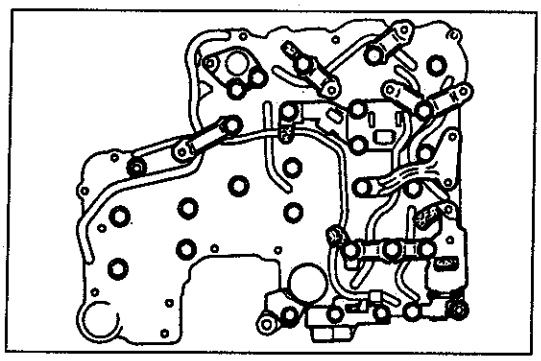
3. Remove the lockup control solenoid valve from the lower control valve body.
4. Remove the O-ring from the lockup control solenoid valve.



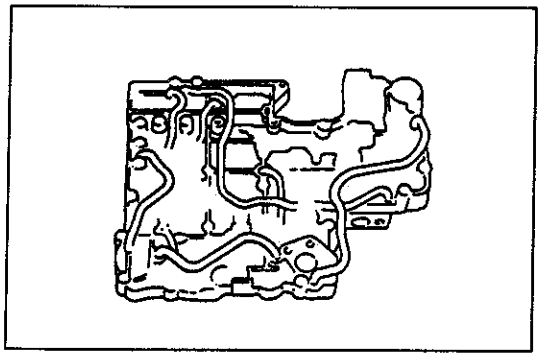
5. Remove the line pressure solenoid valve from the upper control valve body.
6. Remove the O-ring from the line pressure solenoid valve.



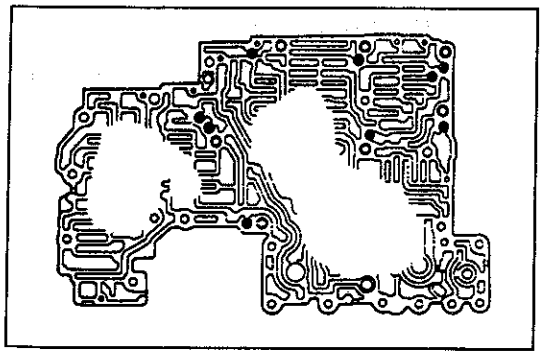
7. Remove the solenoids from the upper control valve body.
8. Remove the O-rings from the solenoids.



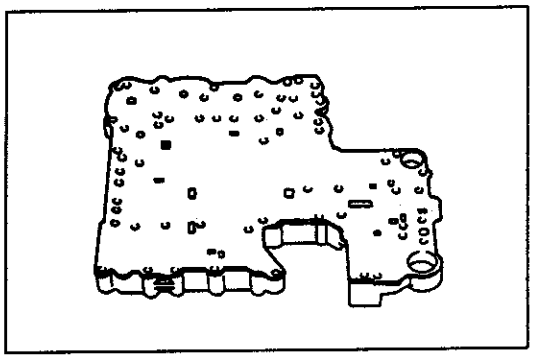
9. Remove the support plates.
10. Remove the bolts, nuts, and brackets.



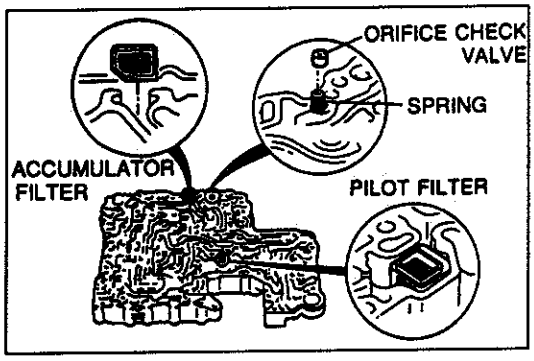
11. Separate the lower control valve body, lower and upper gaskets, and separator plate assembly from the upper control valve body.



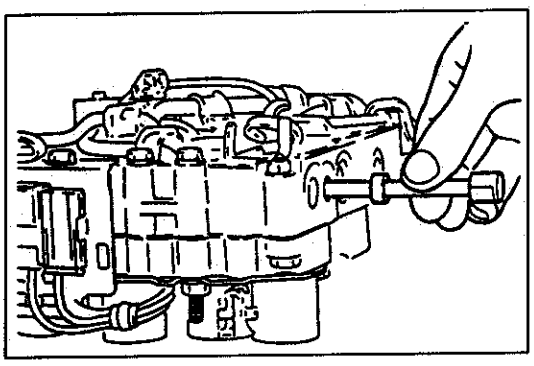
12. Remove the steel balls from the upper control valve body.



13. Face the lower control valve body downward.
14. Remove the separator plate and gaskets.



15. Remove the orifice check valve, spring, pilot filter, and accumulator filter.



16. Remove the manual valve from the lower control valve body.

UPPER CONTROL VALVE BODY

Disassembly / Inspection / Assembly

Caution

- **Denting or scratching these precisely machined components will reduce the ability of the transmission to shift properly. When handling these components or the valve body that contains them, be careful not to drop or hit them.**
- **Using a magnet in this procedure could magnetize the valve body inner components, reducing the ability of the transmission to shift properly.**

Note

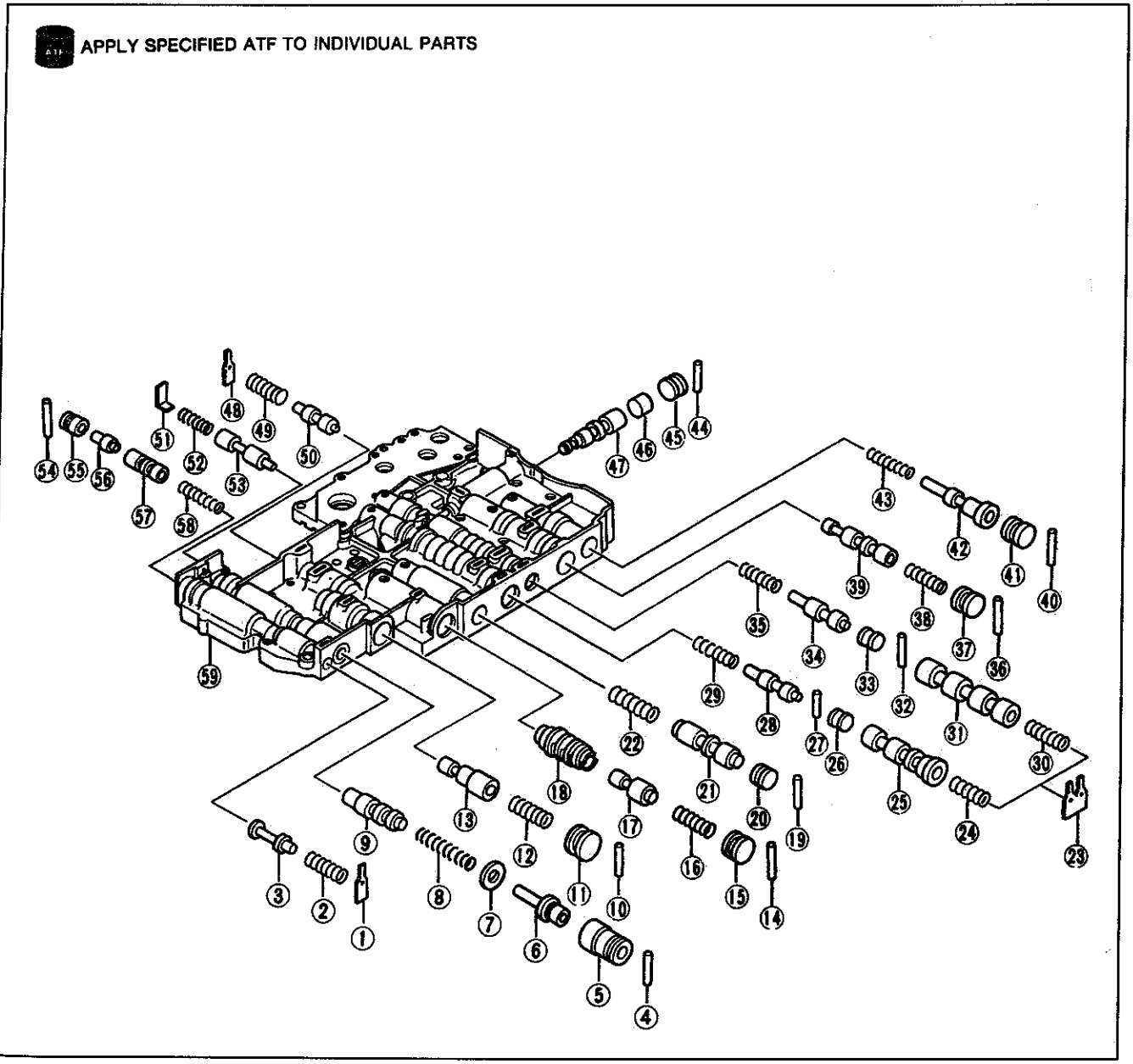
- If a valve does not slide out under its own weight, place the valve body open-side down and tap on the valve body lightly with a plastic hammer.

1. Disassemble in the order shown in the figure, nothing the proper reassembly direction of the valves and internal parts.
2. Inspect all parts and repair or replace as necessary.

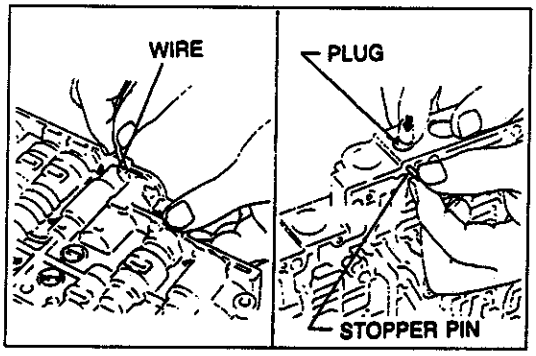
Warning

- **Using compressed air can cause dirt and other particles to fly out, causing injury to the eyes. Wear protective eye wear whenever using compressed air.**

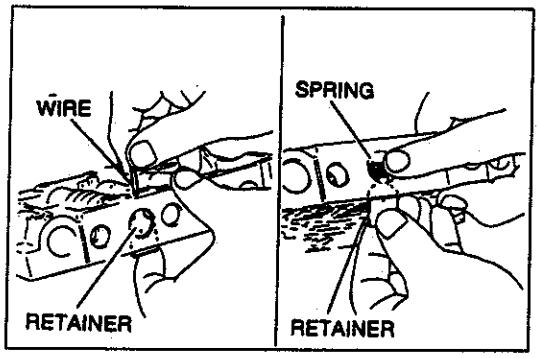
3. Clean all parts and bores with compressed air and apply ATF to them immediately before assembly.
4. Assemble in the reverse order of disassembly, referring to **Assembly Procedure**.



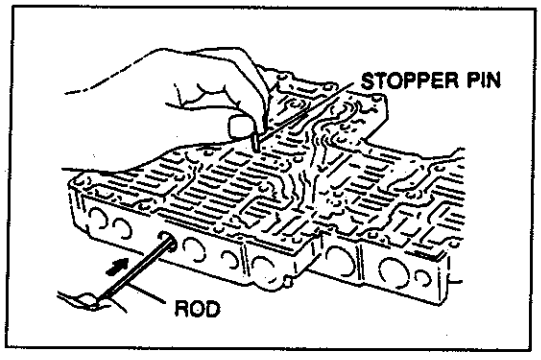
1. Retainer
   Disassembly Note ..... page K-114
2. Torque converter relief spring
   Inspection ..... page K-115
3. Torque converter relief valve
   Inspect for sticking, scoring, and scratches
4. Stopper pin
   Disassembly Note ..... page K-114
5. Pressure regulator sleeve
6. Pressure regulator plug
   Inspect for sticking, scoring, and scratches
7. Spring seat
8. Pressure regulator spring
   Inspection ..... page K-115
9. Pressure regulator valve
   Inspect for sticking, scoring, and scratches
10. Stopper pin
    Disassembly Note ..... page K-114
11. Pressure modifier plug
12. Pressure modifier spring
    Inspection ..... page K-115
13. Pressure modifier valve
    Inspect for sticking, scoring, and scratches
14. Stopper pin
    Disassembly Note ..... page K-114
15. Accumulator control plug
16. Accumulator control valve spring
    Inspection ..... page K-115
17. Accumulator control valve
    Inspect for sticking, scoring, and scratches
18. Accumulator control sleeve
    Inspect for sticking, scoring, and scratches
19. Stopper pin
    Disassembly Note ..... page K-114
20. Shuttle shift valve D plug
21. Shuttle shift valve D
    Inspect for sticking, scoring, and scratches
22. Shuttle shift valve D spring
    Inspection ..... page K-115
23. Retainer
    Disassembly Note ..... page K-114
24. Shift valve B spring
    Inspection ..... page K-115
25. Shift valve B
    Inspect for sticking, scoring, and scratches
26. Stopper pin
    Disassembly Note ..... page K-114
27. 4-2 sequence plug
28. 4-2 sequence valve
    Inspect for sticking, scoring, and scratches
29. 4-2 sequence spring
    Inspection ..... page K-115
30. Shift valve A spring
    Inspection ..... page K-115
31. Shift valve A
    Inspect for sticking, scoring, and scratches
32. Stopper pin
    Disassembly Note ..... page K-114
33. 4-2 relay plug
34. 4-2 relay valve
    Inspect for sticking, scoring and scratches
35. 4-2 relay spring
    Inspection ..... page K-115
36. Stopper pin
    Disassembly Note ..... page K-114
37. Overrunning clutch control plug
38. Overrunning clutch control spring
    Inspection ..... page K-115
39. Overrunning clutch control valve
    Inspect for sticking, scoring and scratches
40. Stopper pin
    Disassembly Note ..... page K-114
41. Overrunning clutch reducing plug
42. Overrunning clutch reducing valve
    Inspect for sticking, scoring and scratches
43. Overrunning clutch reducing spring
    Inspection ..... page K-115
44. Stopper pin
    Disassembly Note ..... page K-114
45. Shuttle shift valve S plug 1
46. Shuttle shift valve S plug 2
47. Shuttle shift valve S
    Inspect for sticking, scoring and scratches
48. Retainer
    Disassembly Note ..... page K-114
49. Pilot spring
    Inspection ..... page K-115
50. Pilot valve
    Inspect for sticking, scoring and scratches
51. Retainer
    Disassembly Note ..... page K-114
52. Lockup modifier spring
    Inspection ..... page K-115
53. Lockup modifier valve
    Inspect for sticking, scoring and scratches
54. Stopper pin
    Disassembly Note ..... page K-114
55. Lockup control sleeve
56. Lockup control plug
    Inspect for sticking, scoring and scratches
57. Lockup control valve
    Inspect for sticking, scoring and scratches
58. Lockup control spring
    Inspection ..... page K-115
59. Upper control valve body
    Inspect for damage and scoring



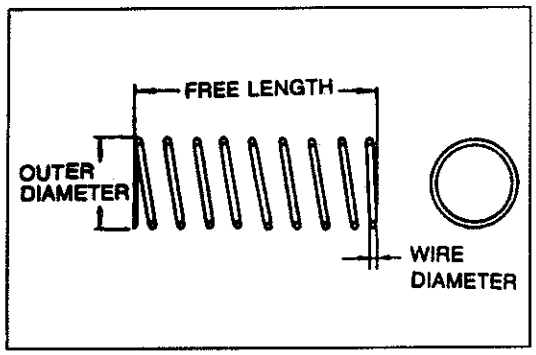
Disassembly note
Stopper pin
1. Push the stopper pin out with a wire.
2. Depress and hold the plug or sleeve with a finger to prevent the valve from popping out.
3. Remove the stopper pin, and remove the valve and internal parts.



Retainer
1. Push the retainer out with a wire.
2. Hold the inside parts with a finger to prevent the valve from popping out.
3. Remove the retainer, the valve, and the internal parts.



Stopper pin
(4-2 sequence valve and 4-2 relay valve)
1. Push the stopper pin out with a wire.
2. Depress the plug with a vinyl-tape-wrapped **1.5 mm {0.059 in}** diameter rod.
3. Remove the stopper pin, the valve, and the internal parts.

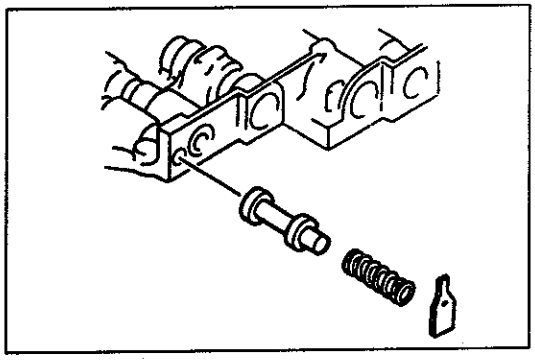


Inspection
Springs
1. Measure the spring free length.
2. If not within specification, replace the spring.

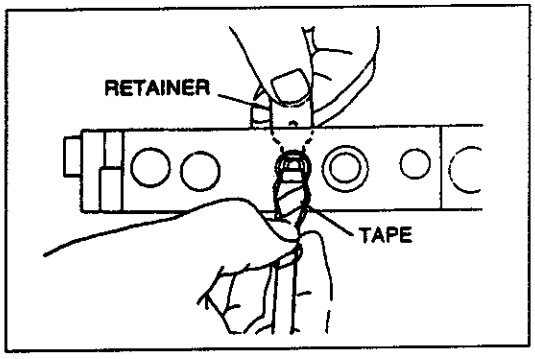
Specification

Spring \ Item		Outer dia. mm {in}	Free length mm {in}	No. of coils	Wire dia. mm {in}
Torque converter relief valve		9.2 {0.362}	38.3 {1.508}	14.2	1.5 {0.059}
Pressure regulator valve		14.0 {0.551}	29.0 {1.142}	5.6	1.6 {0.063}
Pressure modifier valve*	A	6.8 {0.268}	31.95 {1.258}	15.5	0.8 {0.031}
	B	6.9 {0.272}	32.6 {1.283}	13.2	0.8 {0.031}
	C	6.9 {0.272}	32.8 {1.291}	15.6	0.9 {0.035}
Accumulator control valve spring		10.5 {0.413}	17.0 {0.669}	4.3	0.5 {0.012}
Shuttle shift valve D		6.0 {0.236}	26.5 {1.043}	12.0	0.7 {0.028}
4-2 sequence valve		6.95 {0.274}	29.1 {1.146}	11.0	0.55 {0.022}
Shift valve B		7.0 {0.276}	25.0 {0.984}	9.5	0.65 {0.026}
4-2 relay valve		6.95 {0.274}	29.1 {1.146}	11.0	0.55 {0.022}
Shift valve A		7.0 {0.276}	25.0 {0.984}	9.5	0.65 {0.026}
Overrunning clutch control valve		7.0 {0.276}	23.6 {0.929}	7.9	0.6 {0.024}
Overrunning clutch reducing valve		7.0 {0.276}	32.5 {1.280}	12.6	0.85 {0.033}
Pilot valve		9.1 {0.358}	25.7 {1.012}	8.3	1.1 {0.043}
Lockup modifier valve		4.2 {0.165}	21.5 {0.846}	13.6	0.4 {0.016}
Lockup control valve		4.7 {0.185}	23.4 {0.921}	15.6	0.45 {0.018}

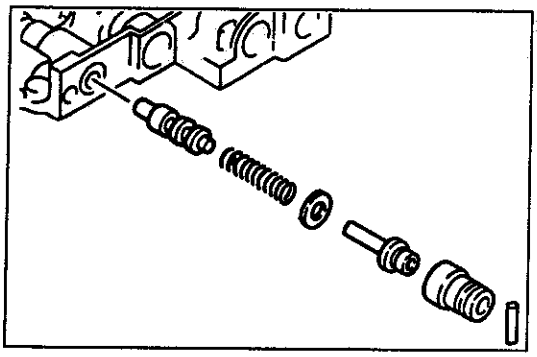
* Either A, B, or C type spring is installed at shipment. Only A type spring is available for replacement.



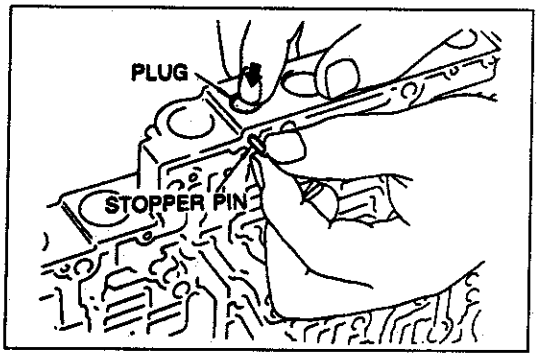
Assemble procedure
1. Insert the torque converter relief valve and spring.



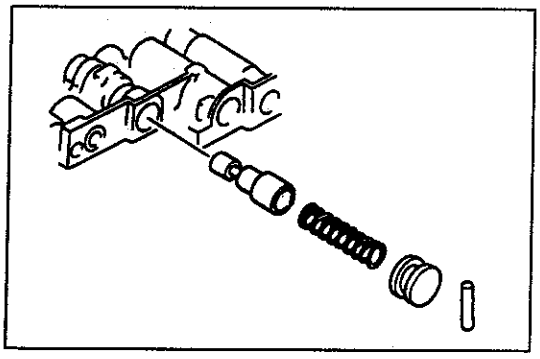
2. Install the retainer while compressing the spring.



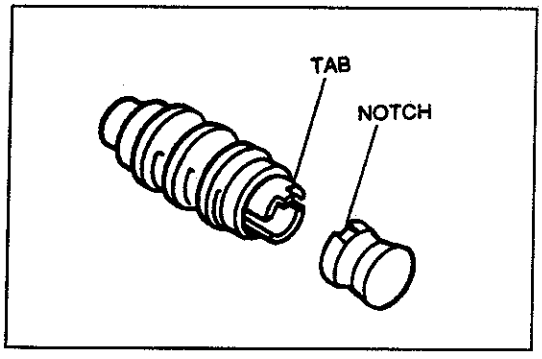
3. Insert the pressure regulator valve, spring, spring seat, plug, and sleeve.



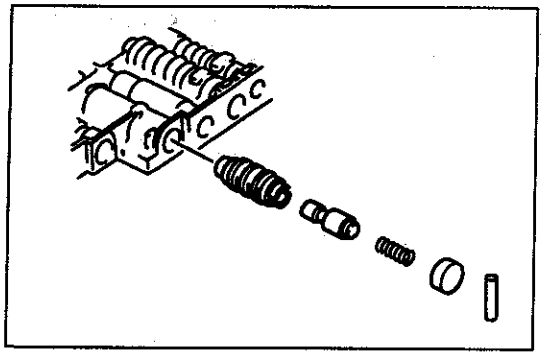
4. Insert the stopper pin while pushing the sleeve.



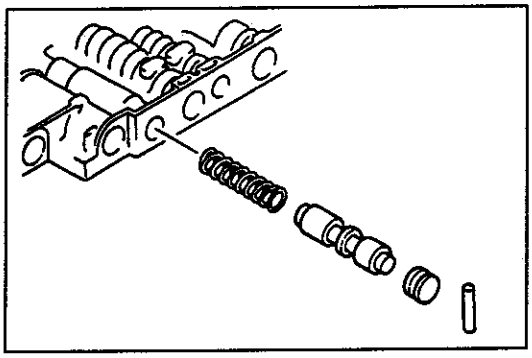
5. Insert the pressure modifier valve, spring, and plug.
6. Insert the stopper pin while pushing the plug.



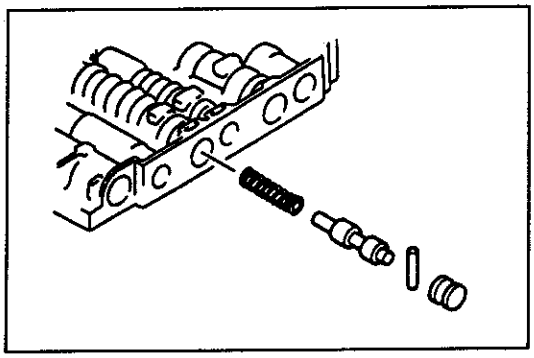
7. Align the tab of the sleeve with the plug notch.



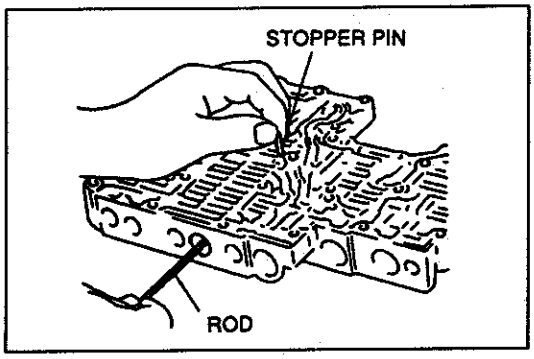
8. Insert the accumulator control sleeve, valve, and spring.
9. Insert the plug.
10. Insert the stopper pin.



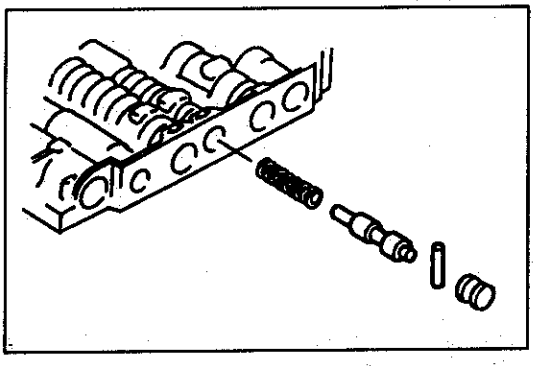
11. Insert the shuttle shift valve D spring, valve, and plug.
12. Insert the stopper pin while pushing the plug.



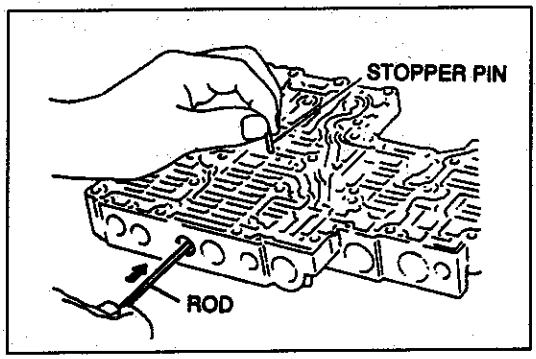
13. Insert the 4-2 sequence spring, valve, and plug.



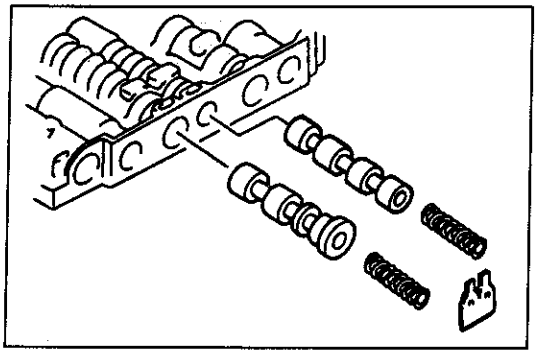
14. Push in the plug with a vinyl-tape-wrapped **1.5 mm {0.059 in}** diameter rod.
15. Insert the stopper pin.



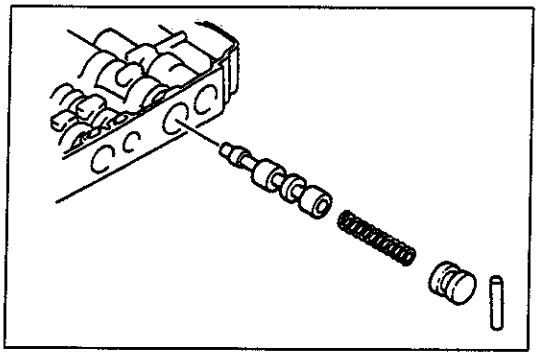
16. Insert the 4-2 relay spring, valve, and plug.



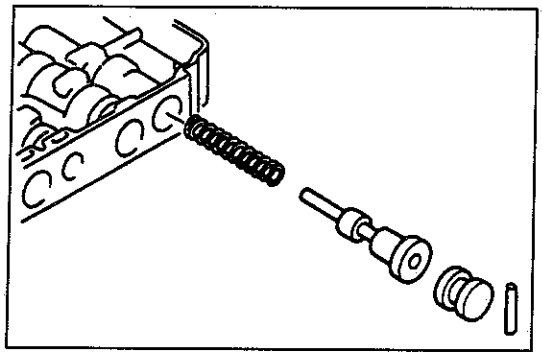
17. Push in the plug with a vinyl-tape-wrapped **1.5 mm {0.059 in}** diameter rod and insert the stopper pin.



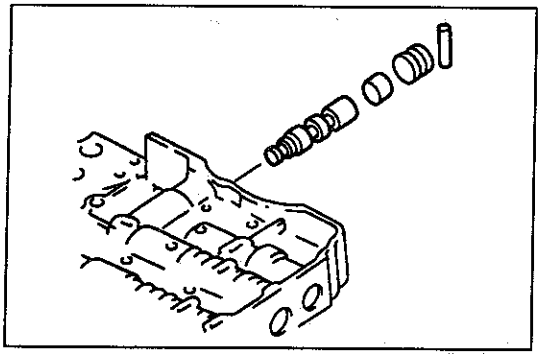
18. Insert shift valve A and spring.
19. Insert shift valve B and spring.
20. Install the retainer while compressing the springs.



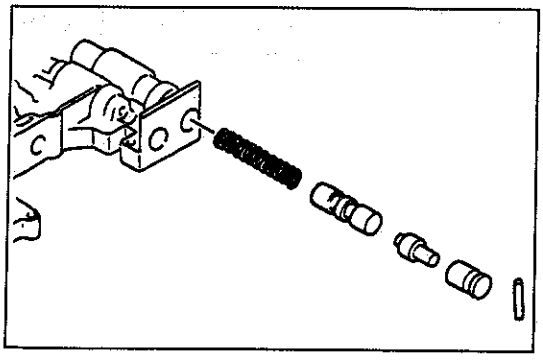
21. Insert the overrunning clutch control valve, spring, and plug.
22. Insert the stopper pin while pushing the plug.



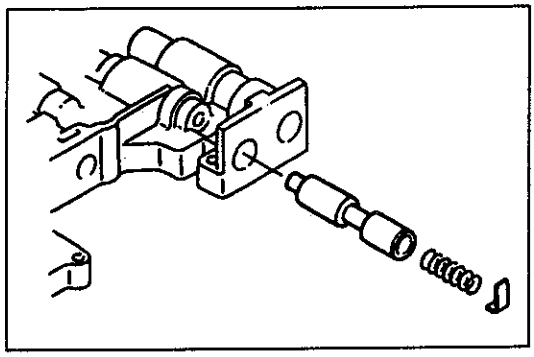
23. Insert the overrunning clutch reducing spring, valve, and plug.
24. Insert the stopper pin while pushing the plug.



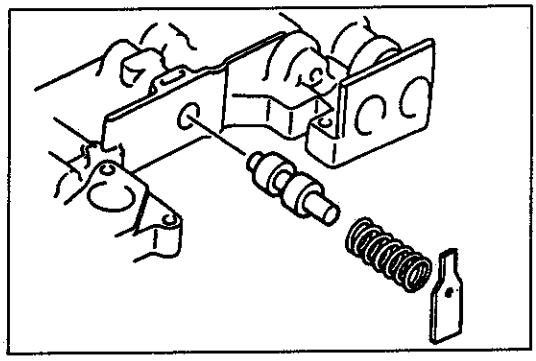
25. Insert the shuttle shift valve S, plug 2, and plug 1.
26. Insert the stopper pin.



27. Insert the lockup control spring, valve, plug, and sleeve.
28. Insert the stopper pin while pushing the sleeve.



29. Insert the lockup modifier valve and spring.
30. Insert the retainer while pushing the spring.



31. Insert the pilot valve and spring.
32. Insert the retainer while pushing the spring.

LOWER CONTROL VALVE BODY

Disassembly / Inspection / Assembly

Caution

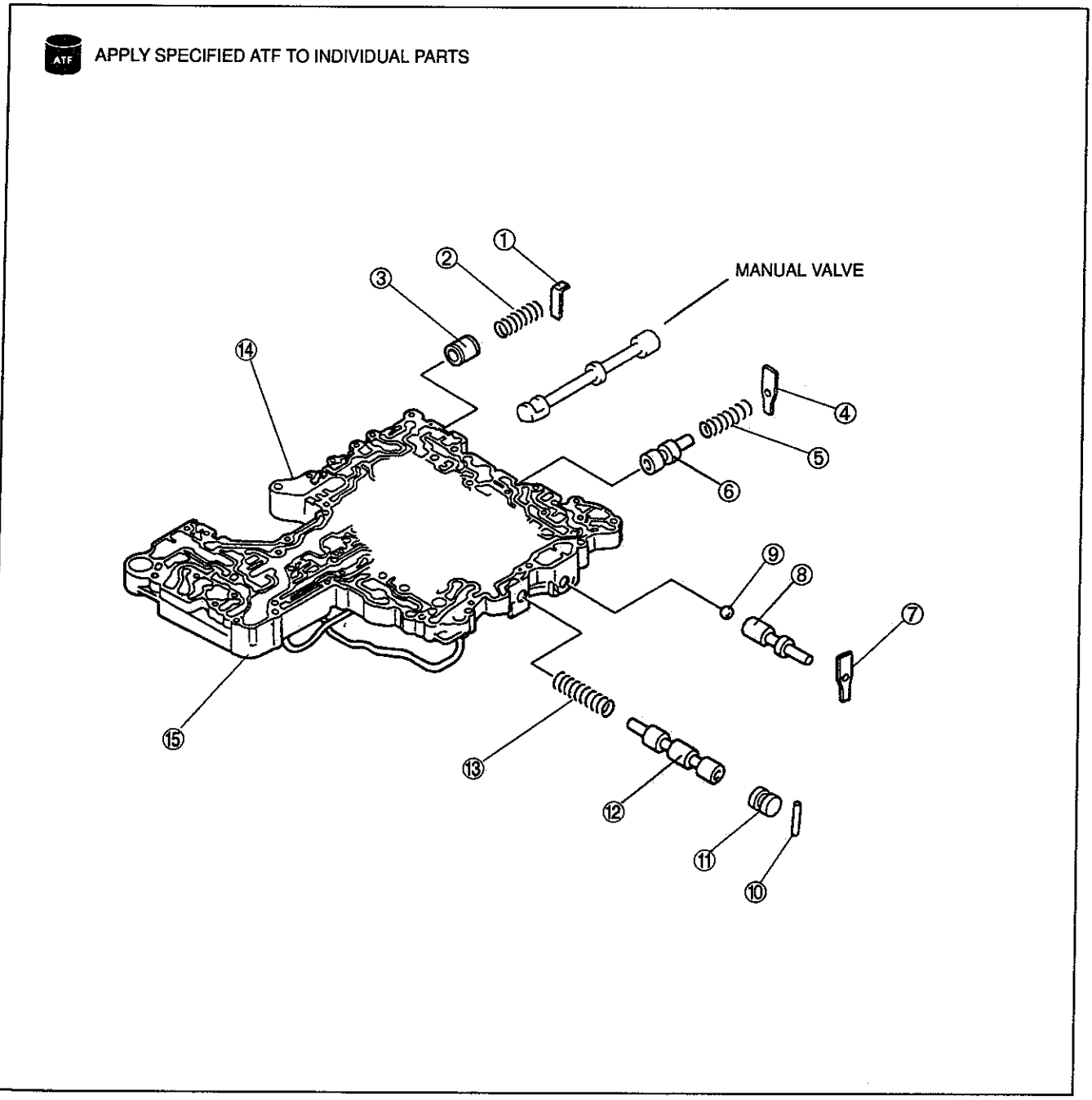
- **Denting or scratching these precisely machined components will reduce the ability of the transmission to shift properly. When handling these components or the valve body that contains them, be careful not to drop or hit them.**
- **Using a magnet in this procedure could magnetize the valve body inner components, reducing the ability of the transmission to shift properly.**

1. Disassemble in the order shown in the figure, nothing the proper reassembly direction of the valves and internal parts.
2. Inspect all parts and repair or replace as necessary.

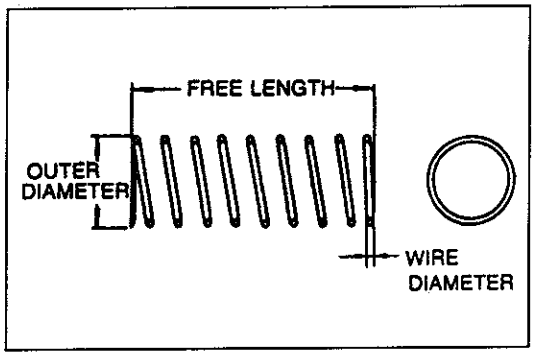
Warning

- **Using compressed air can cause dirt and other particles to fly out, causing injury to the eyes. Wear protective eye wear whenever using compressed air.**

3. Clean all parts and bores with compressed air and apply ATF to them immediately before assembly.
4. Assemble in the reverse order of disassembly, referring to **Assembly Procedure**.



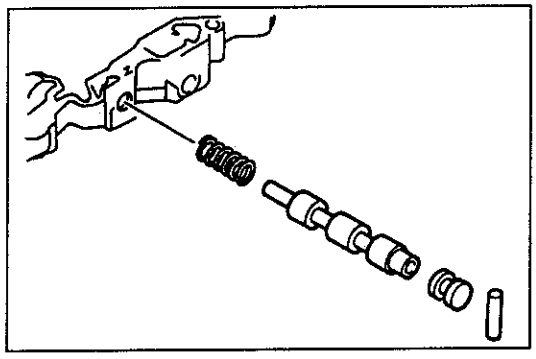
1. Stopper pin
   Disassembly Note ..... page K–114
2. Modifier accumulator plug
3. Modifier accumulator spring
   Inspection ..... below
4. Modifier accumulator valve
   Inspect for sticking, scoring and scratches
5. Retainer
   Disassembly Note ..... page K–114
6. 1st reducing spring
   Inspection ..... below
7. 1st reducing valve
   Inspect for sticking, scoring and scratches
8. Retainer
   Disassembly Note ..... page K–114
9. 3-2 timing valve
   Inspect for sticking, scoring and scratches
10. Steel ball
11. Stopper pin
    Disassembly Note ..... page K–114
12. Servo charger plug
13. Servo charger valve
    Inspect for sticking, scoring and scratches
14. Servo charger spring
    Inspection ..... below
15. Lower control valve body
    Inspect for damage and scoring



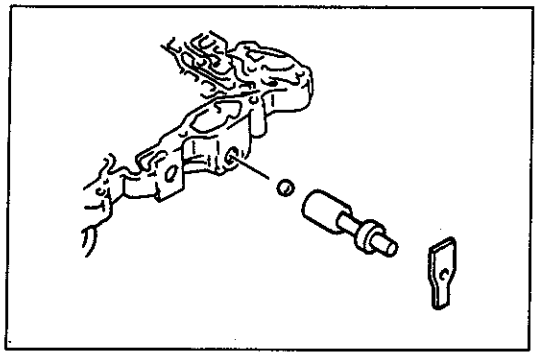
Inspection
Springs
1. Measure the spring free length.
2. If not within specification, replace the spring.

Specification

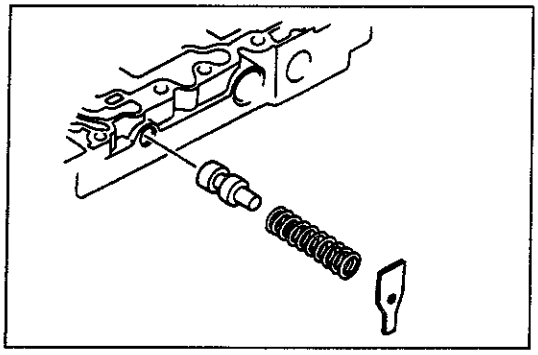
Item / Spring	Outerdia. mm {in}	Free length mm {in}	No. of coils	Wiredia. mm {in}
Modifier accumulator valve	9.8 {0.39}	30.5 {1.20}	8.75	1.3 {0.05}
1st reducing valve	6.8 {0.27}	25.4 {1.00}	12.5	0.8 {0.03}
Servo charger valve	6.5 {026}	33.2 {1.31}	12.0	0.5 {0.02}



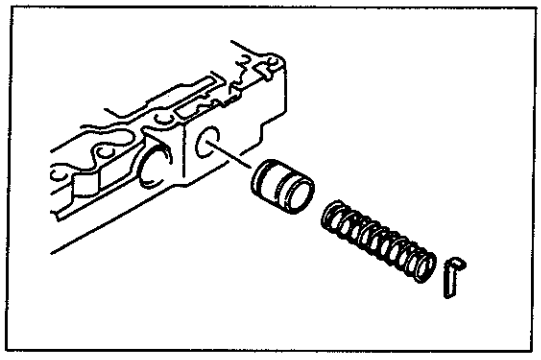
Assembly procedure
1. Insert the servo charger spring, valve, and plug.
2. Insert the stopper pin while pushing the plug.



3. Insert the steel ball and 3-2 timing valve.
4. Insert the retainer.

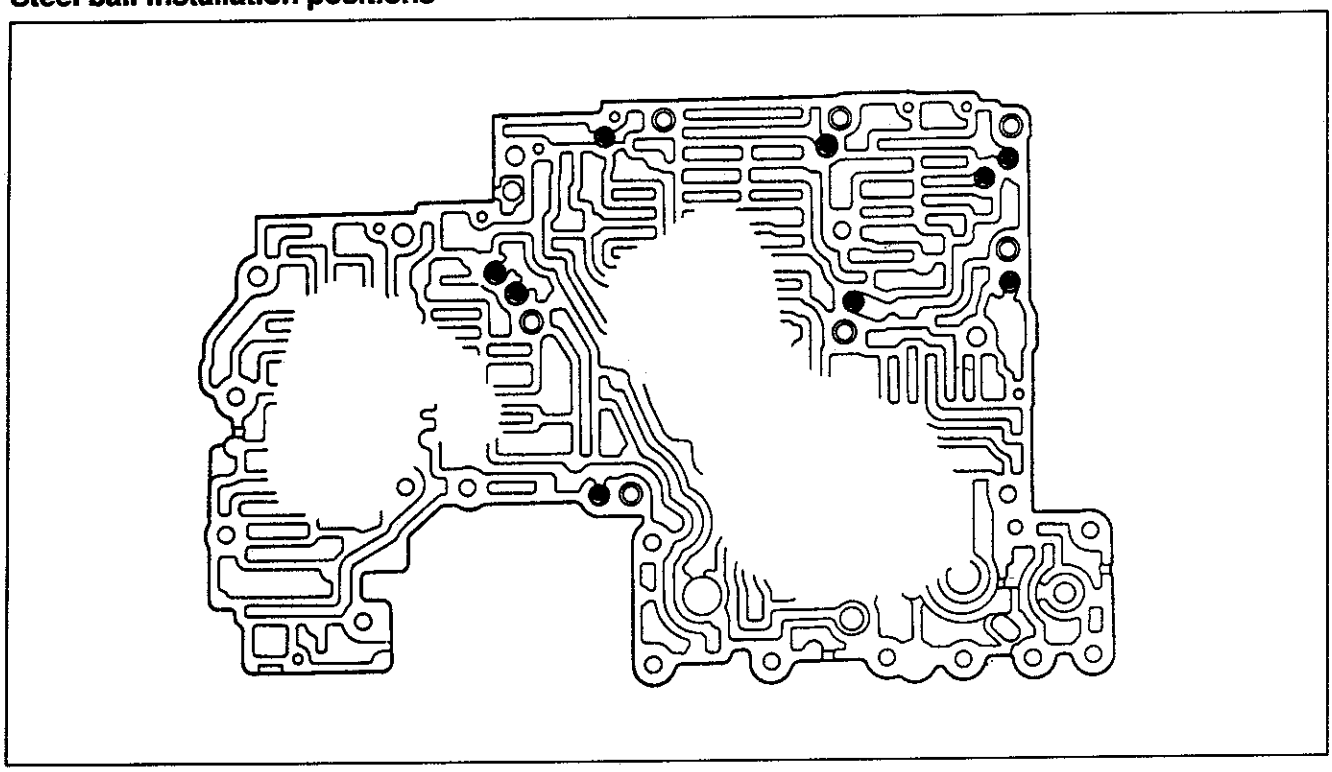


5. Insert the 1st reducing valve and spring.
6. Insert the retainer while compressing the spring.

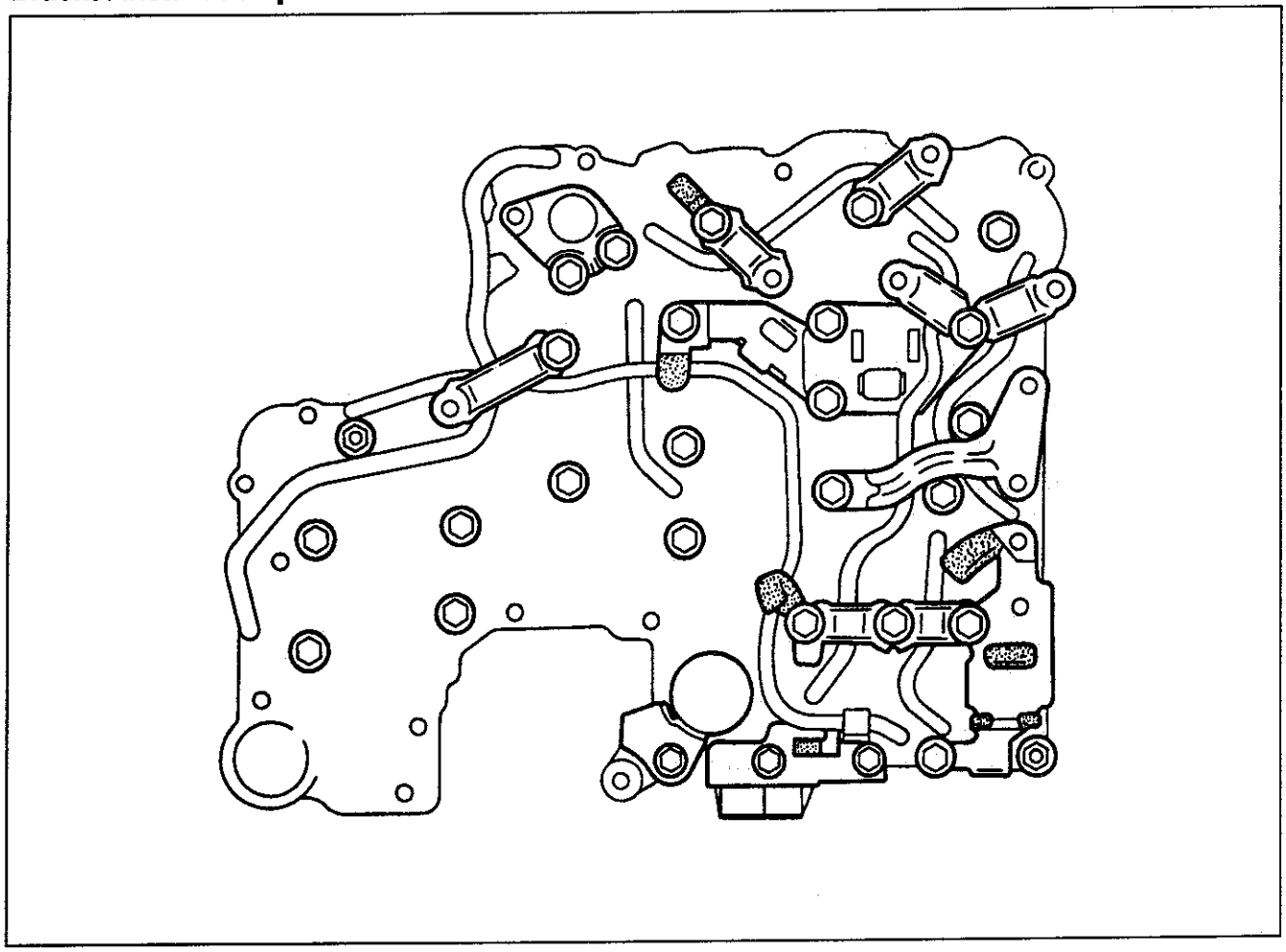


7. Insert the modifier accumulator valve, spring, and plug.
8. Insert the stopper key while pushing the plug.

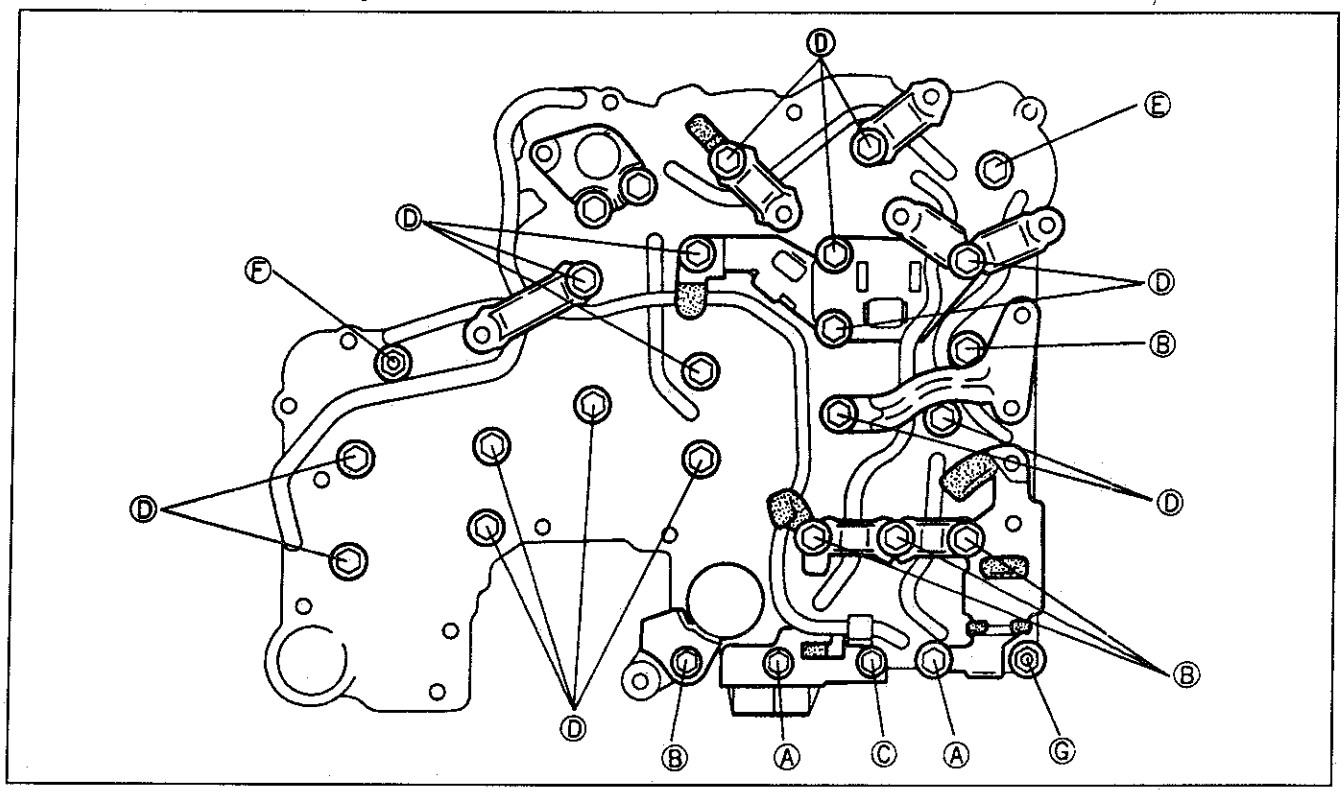
Steel ball installation positions

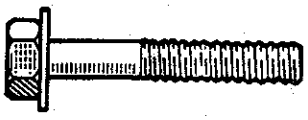
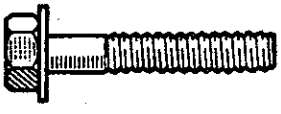
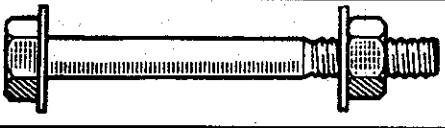
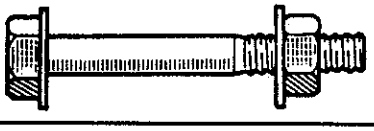


Bracket installation positions



Bolt and nut installation positions

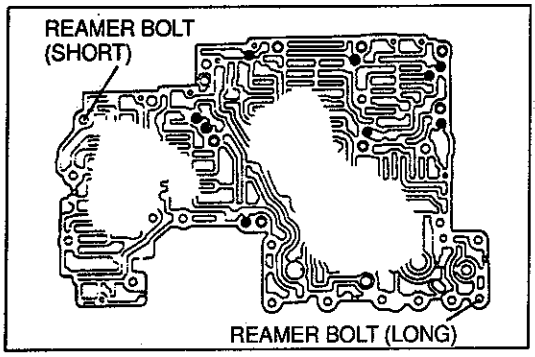


Identification letter	Bolt and nut	Length mm {in}	Torque specification N·m {kgf·cm, in·lbf}
A		65 {2.6}	6.9–8.8 {70–90, 61–78}
B		50 {2.0}	
C		40 {1.6}	
D		33 {1.3}	
E		27 {1 1}	
F		55 {2.2}	
G		45 {1.8}	

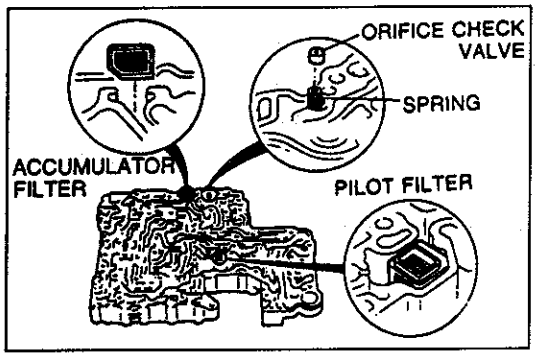
CONTROL VALVE BODY (ASSEMBLY)

Assembly

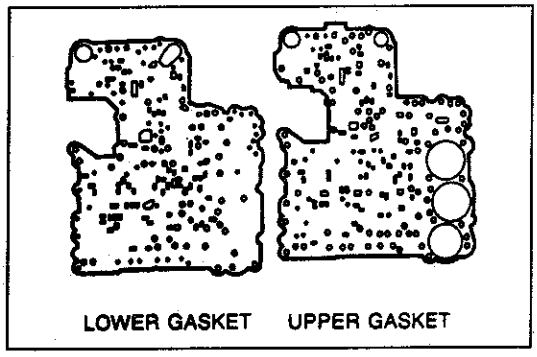
1. Verify that all parts are clean and free of dust and other small particles.
2. Apply ATF to all O-rings and gaskets.
3. Assemble as shown in the figure, referring to **Assembly Procedure**.



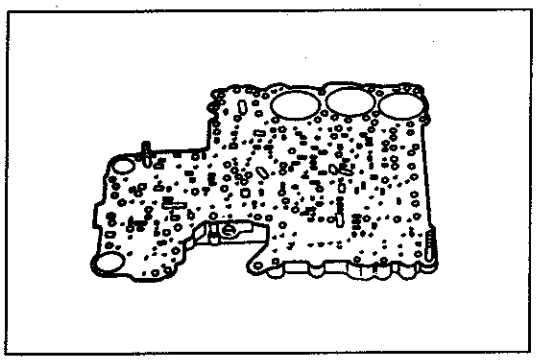
4. Install the steel balls and reamer bolts into their proper positions in the upper control valve body. (Refer to page K-123 for installation positions.)

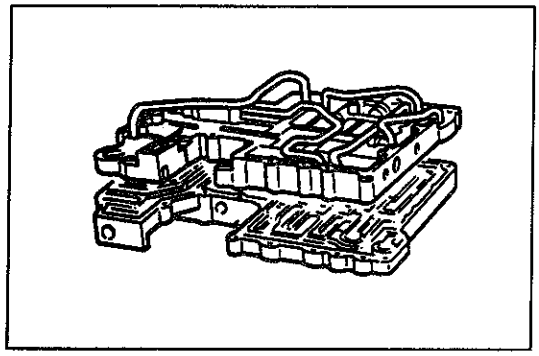


5. Install the pilot filter, accumulator filter, orifice check valve, and spring into their proper positions in the lower control valve body.

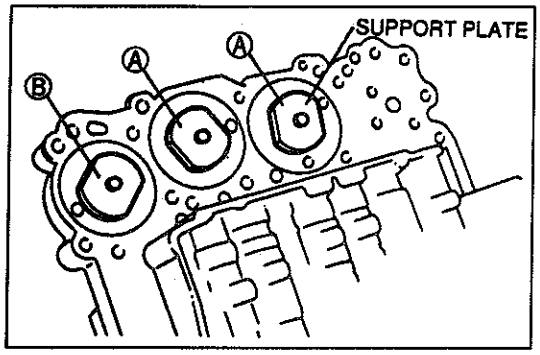


6. Set the new upper and lower gaskets onto the lower valve body. Refer to the figure to distinguish the two gaskets.



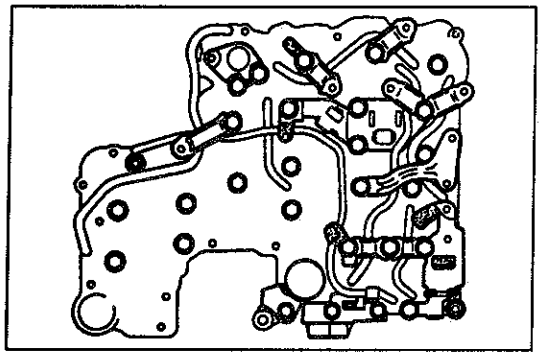


7. Set the lower control valve body onto the upper control valve body.



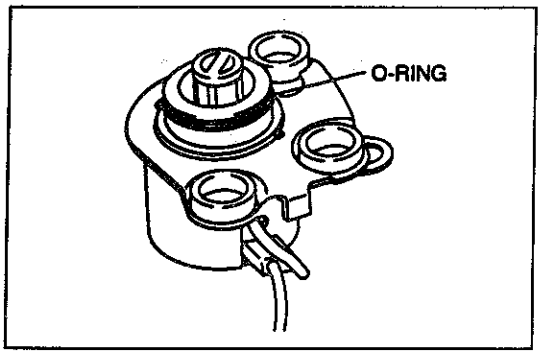
8. Install the support plates as shown.

Bolt length (measured from below bolt head):
A: 33 mm {1.3 in}
B: 27 mm {1.1in}

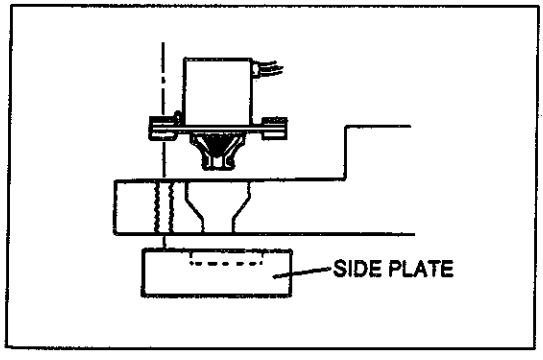


9. Install the brackets in their proper positions. (Refer to page K-123 for installation positions.)
10. Install the bolts and nuts in their proper positions, and tighten the fasteners evenly and gradually. (Refer to page K-124 for installation positions.)

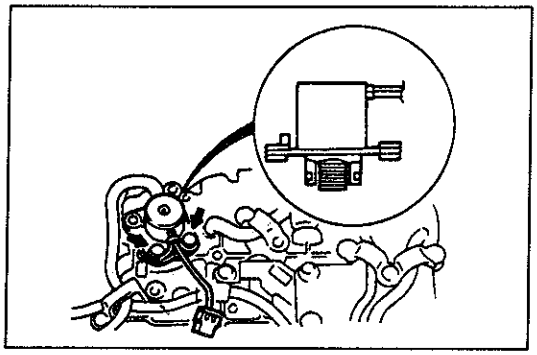
Tightening torque:
6.9–8.8 N·m {70–90 kgf·cm, 61–78 in·lbf}



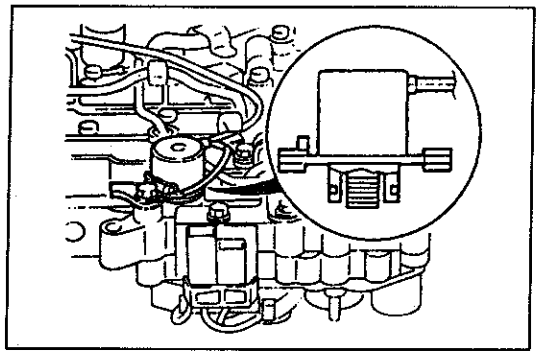
11. Install a new O-ring onto the lockup solenoid valve.



12. Install the lockup solenoid valve and side plate to the lower valve body, as shown in the figure.

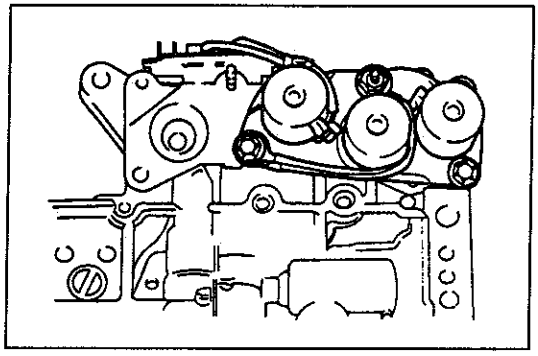


Tightening torque:
9.9–12.7 N·m {100–130 kgf·cm, 87–112 in·lbf}



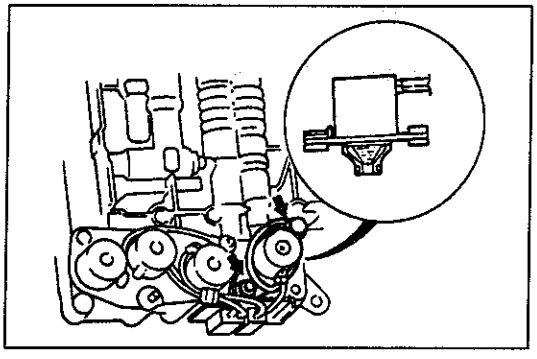
13. Install a new O-ring onto the lockup control solenoid valve.
14. Install the lockup control solenoid valve into the lower control valve body.

Tightening torque:
9.9–12.7 N·m {100–130 kgf·cm, 87–112 in·lbf}



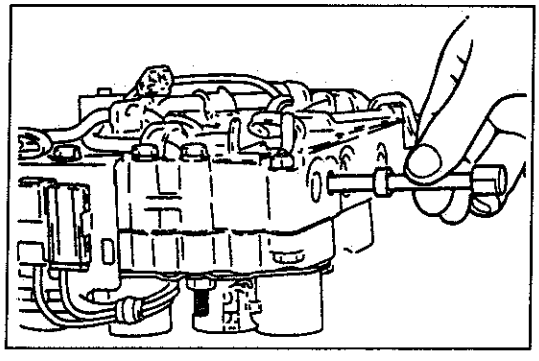
15. Install the new O-rings onto the solenoids.
16. Install the solenoids into the upper control valve body.

Tightening torque:
6.9–9.8 N·m {70–100 kgf·cm, 61–86 in·lbf}

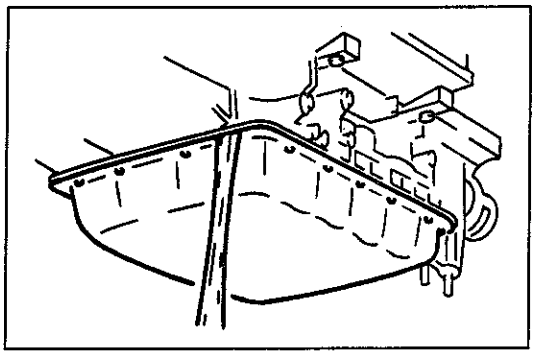


17. Install a new O-ring onto the line pressure solenoid valve.
18. Install the line pressure solenoid valve into the upper control valve body.

Tightening torque:
6.9–9.8 N·m {70–100 kgf·cm, 61–86 in·lbf}



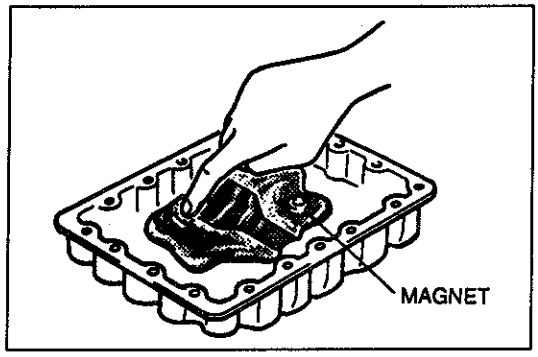
19. Insert the manual valve.

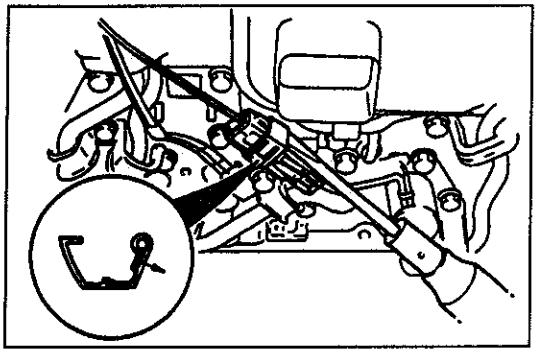


CONTROL VALVE BODY
(ON-VEHICLE REMOVAL / INSTALLATION)
On-vehicle Removal

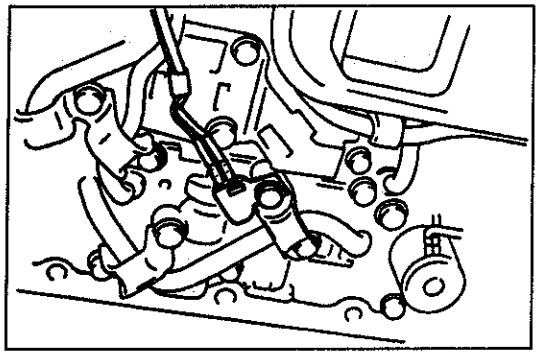
Warning
- **Be careful when draining; the ATF is hot.**

1. Disconnect the negative battery cable.
2. Clean the transmission exterior thoroughly with a steam cleaner or cleaning solvents.
3. On level ground, jack up the vehicle and support it evenly on safety stands.
4. Loosen the oil pan bolts and drain the ATF into a suitable container.
5. Remove the oil pan and gasket.
6. Remove the magnet from the oil pan and examine any material found in the pan or on the magnet to determine the condition of the transmission.



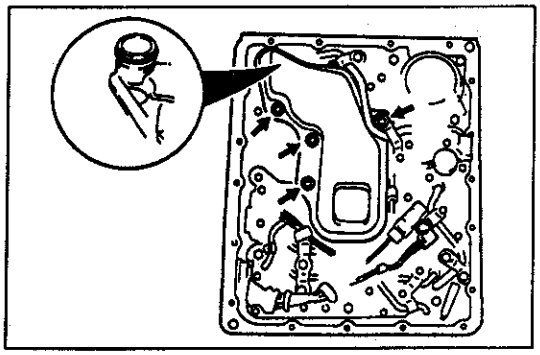


7. Remove the clip.
8. Disconnect the lockup solenoid valve connector.



9. Remove the ATF thermosensor.

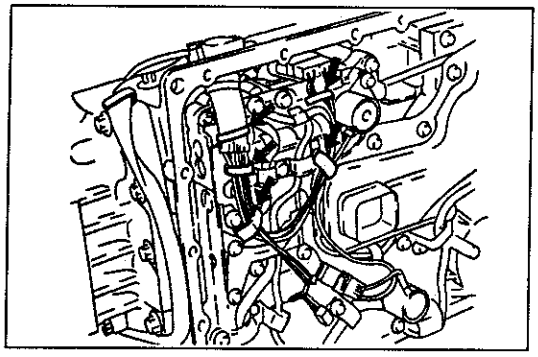
Bolt length (measured from below bolt head):
45 mm {1.8 in}



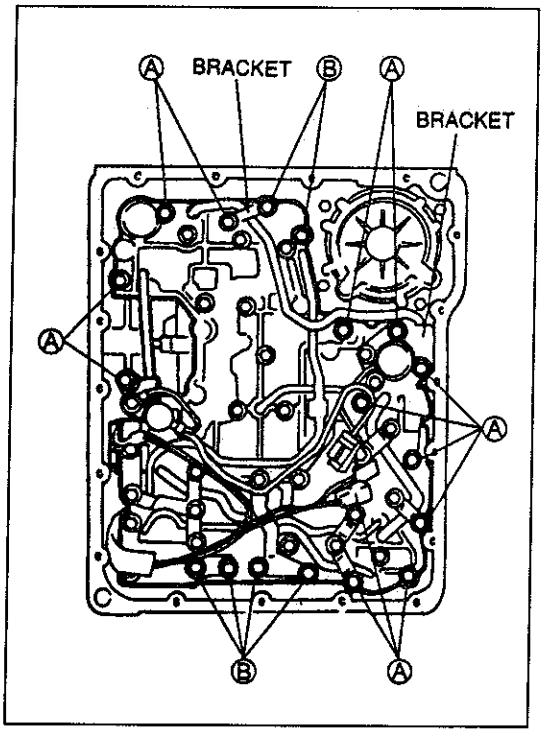
10. Remove the oil strainer.

Bolt length (measured from below bolt head):
50 mm {2.0 in}

11. Remove the O-ring from the oil strainer.

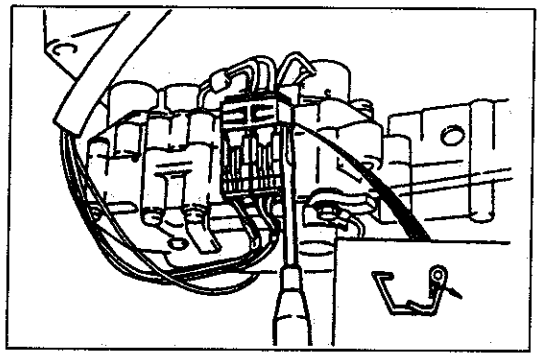


12. Separate the solenoid valve harness from the harness clip.

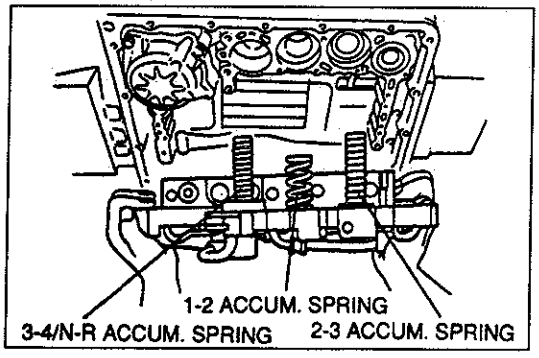


13. Remove bolts A and B and the brackets shown in the figure.

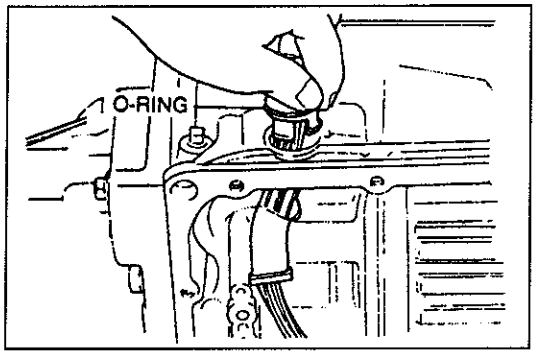
Bolt length (measured from below bolt head):
A: 33 mm {1.3 in}
B: 45 mm {1.8 in}



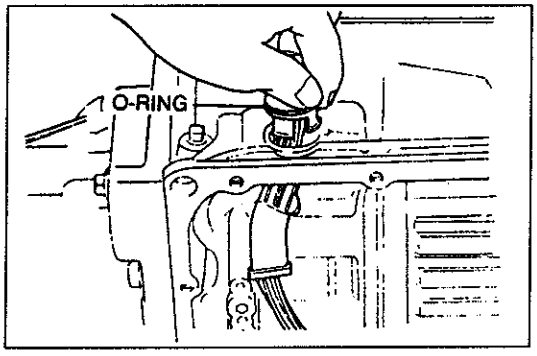
14. Remove the clip.
15. Disconnect the solenoid valve connectors.



16. Carefully remove the control valve body assembly and accumulator springs.

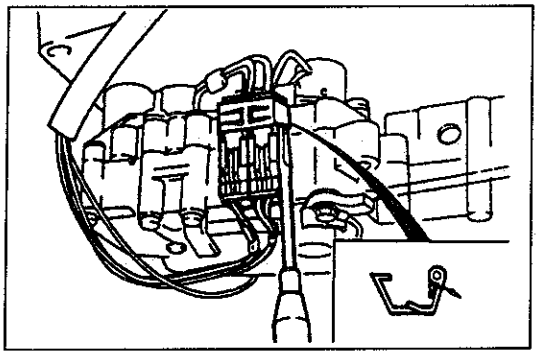


17. If necessary, remove the solenoid valve harness from the transmission case.
18. Remove the O-ring from the solenoid valve harness.

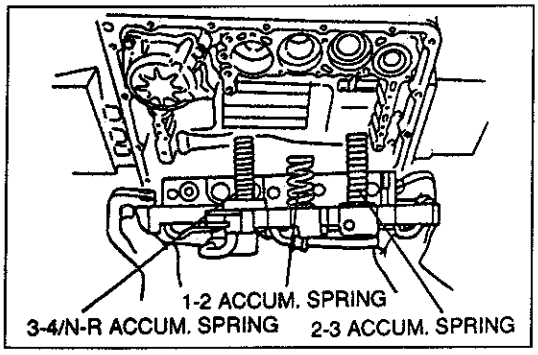


On-Vehicle Installation

1. Apply ATF to the new O-ring and install it onto the solenoid valve harness.
2. Install the solenoid valve harness into the transmission case.



3. Connect the solenoid valve connectors.
4. Install the clip.

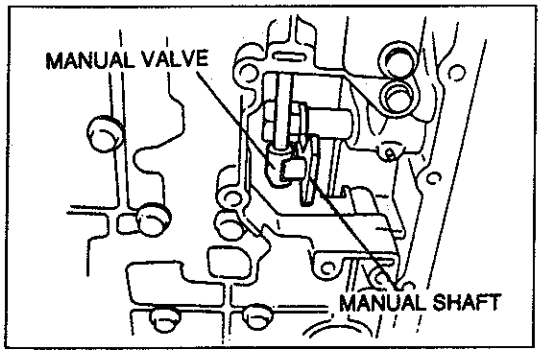


5. Set the accumulator springs into the control valve body as shown.

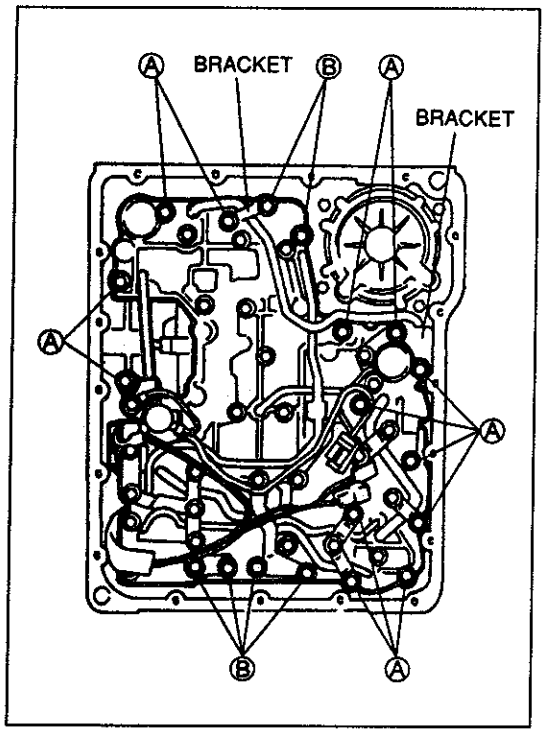
Spring specifications

mm {in}

Item / Spring	Outer dia.	Free length	No. of coils	wire dia.
3-4 / N-R accumulator piston	18.0 {0.71}	43.0 {1.69}	7.9	2.3 {0.091}
1-2 accumulator piston	29.3 {1.15}	45.0 {1.77}	3.8	3.7 {0.15}
2-3 accumulator piston	19.5 {0.77}	66.0 {2.60}	8.6	3.0 {0.12}



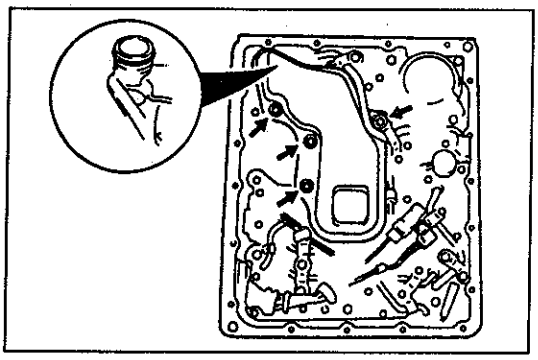
6. Verify that the manual valve and manual shaft are assembled correctly.
7. Set the control valve into the transmission case and secure it.



8. Install the A and B bolts and bracket as shown in the figure.

Bolt length (measured from below bolt head):
A: 33 mm {1.3 in}
B: 45 mm {1.8 in}

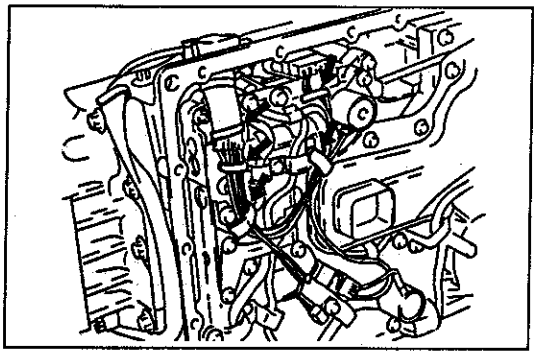
Tightening torque:
6.9–8.8 N·m {70–90 kgf·cm, 61–78 in·lbf}



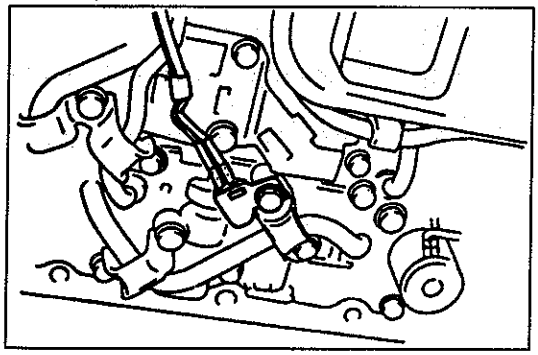
9. Apply ATF to a new O-ring and install it onto the oil strainer.
10. Install the oil strainer.

Bolt length (measured from below bolt head):
50 mm {2.0 in}

Tightening torque:
6.9–8.8 N·m {70–90 kgf·cm, 61–78 in·lbf}



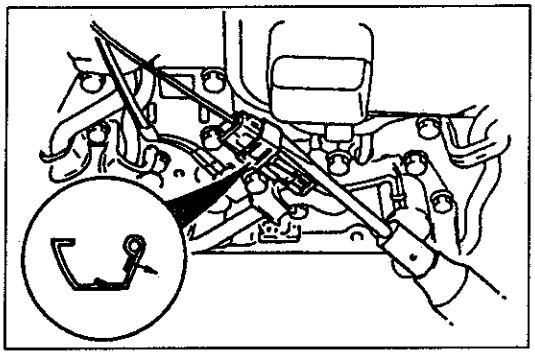
11. Secure the solenoid valve harness with the harness clip.



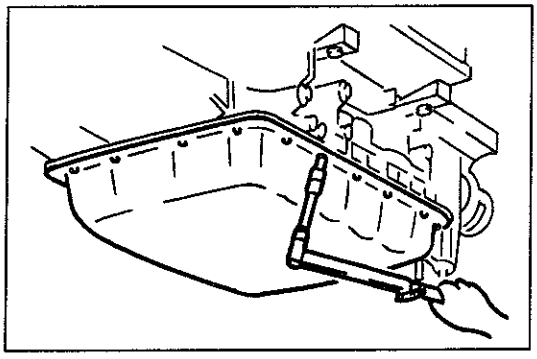
12. Install the ATF thermosensor.

Bolt length (measured from below bolt head):
45 mm {1.8 in}

Tightening torque:
6.9–8.8 N·m {70–90 kgf·cm, 61–78 in·lbf}

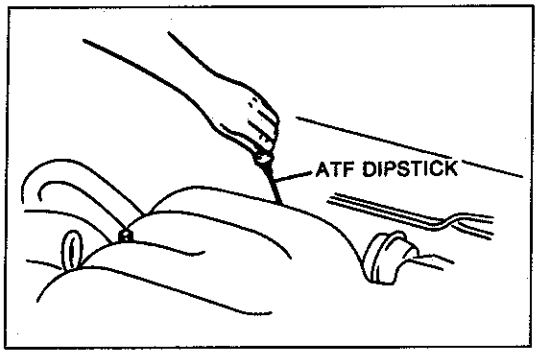


13. Connect the lockup solenoid valve connector.
14. Install the clip.



15. Clean the oil pan and the magnet, and set the magnet into the oil pan.
16. Remove any old locking compound from the bolt holes.
17. Install a new gasket and the oil pan.
18. Tighten the new bolts evenly and quickly.

Tightening torque:
6.9–8.8 N·m {70–90 kgf·cm, 61–78 in·lbf}

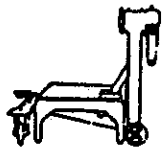
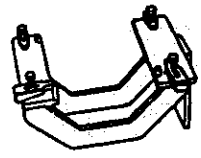
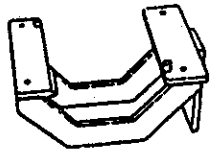
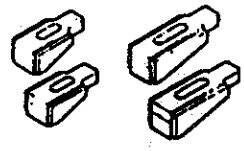


19. Connect the negative battery cable.
20. Pour in ATF and verify that the ATF level is as specified. (Refer to page K–25.)

TRANSMISSION UNIT (ASSEMBLY)

Preparation

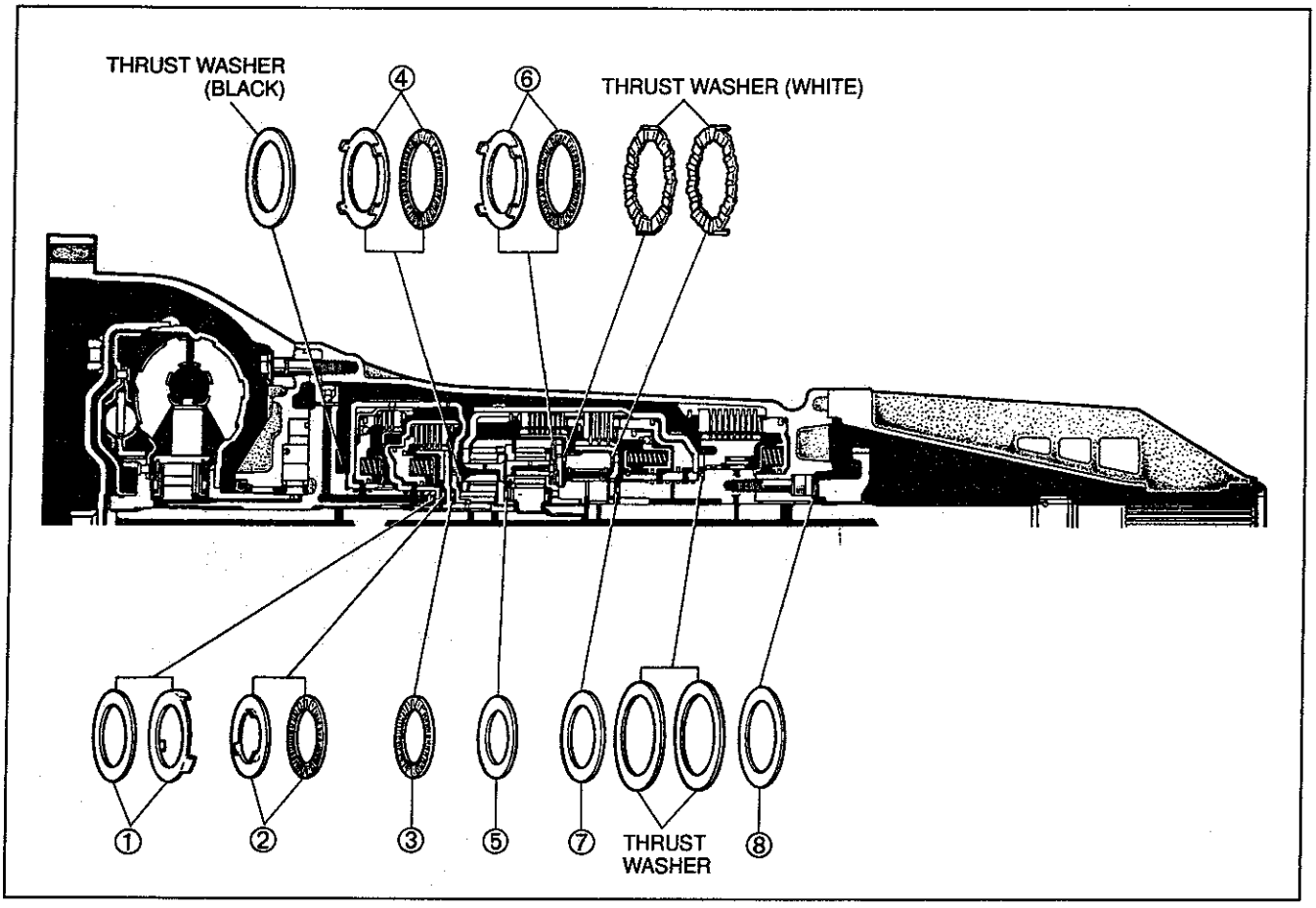
SST

49 0107 680A Engine stand 	For assembly of transmission	49 U019 0A0A Hanger set, transmission 	For assembly of transmission
49 H075 495B Body (Part of 49 U019 0A0A) 	For assembly of transmission	49 U019003 Holder (Part of 49U019 0A0A) 	For assembly of transmission

Precaution

1. If the drive plates or brake band is replaced with new one(s), soak them in ATF for at least 2 hours before installation.
2. Before assembly, apply ATF to all seal rings, rotating parts, O-rings, D-rings and sliding parts.
3. All O-rings, D-rings, seals, and gaskets must be replaced with new ones included in the overhaul kit.
4. Use petroleum jelly, not grease, during reassembly.
5. When it is necessary to replace a bushing, replace the subassembly that includes that bushing.
6. Assemble the housing within 10 minutes after applying sealant, and allow it to cure at least 30 minutes after assembly before filling the transmission with ATF.

Thrust washer, bearing, and bearing race locations

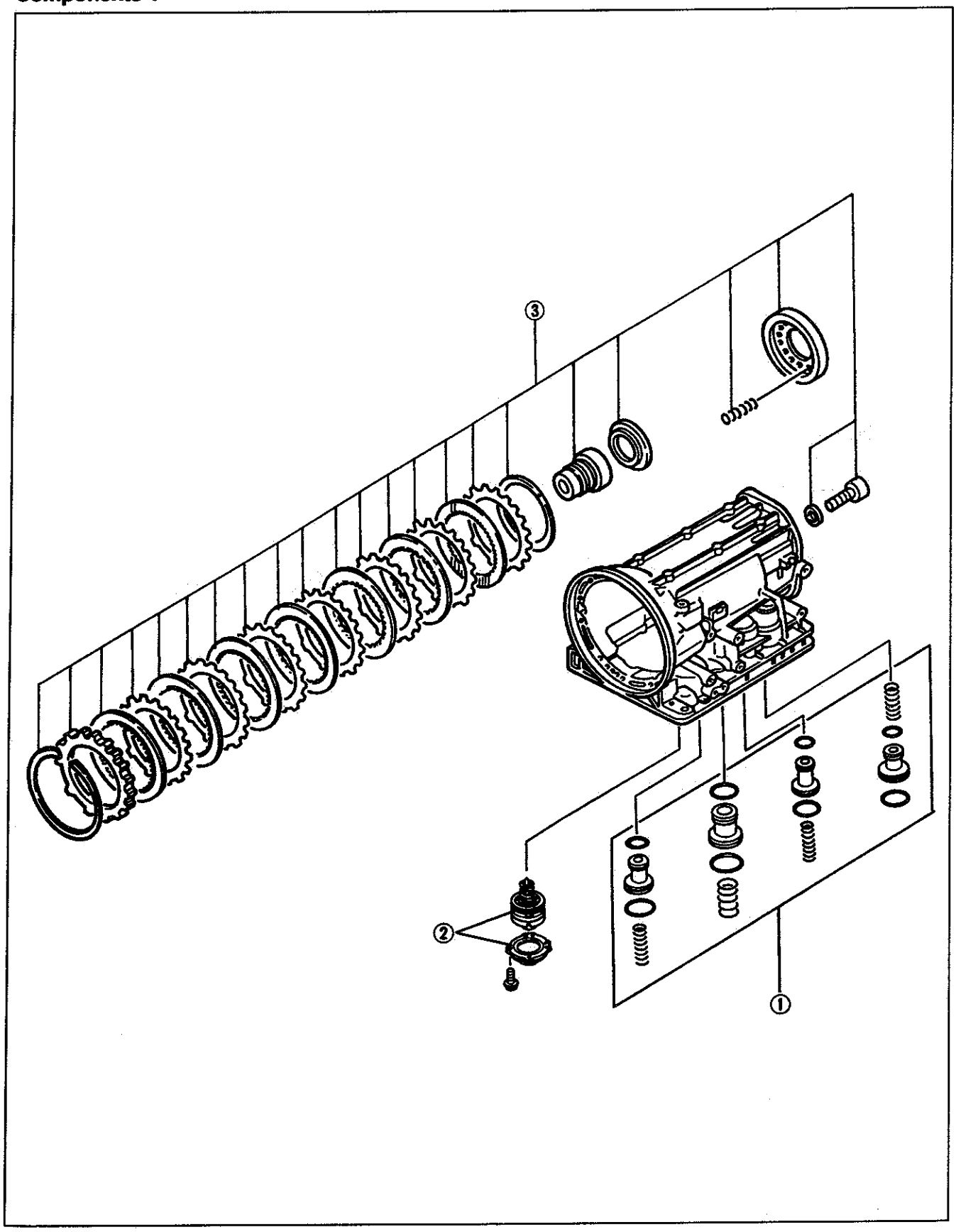


Outer diameter of bearing and race

		1	2	3	4	5	6
Bearing	mm {in}	47.0 {1.85}	53.0 {2.09}	53.0 {2.09}	78.0 {3.07}	53.0 {2.09}	78.0 {3.07}
Race	mm {in}	43.5 {1.71}	51.5 {2.03}	—	75.0 {2.95}	—	75.0 {2.95}

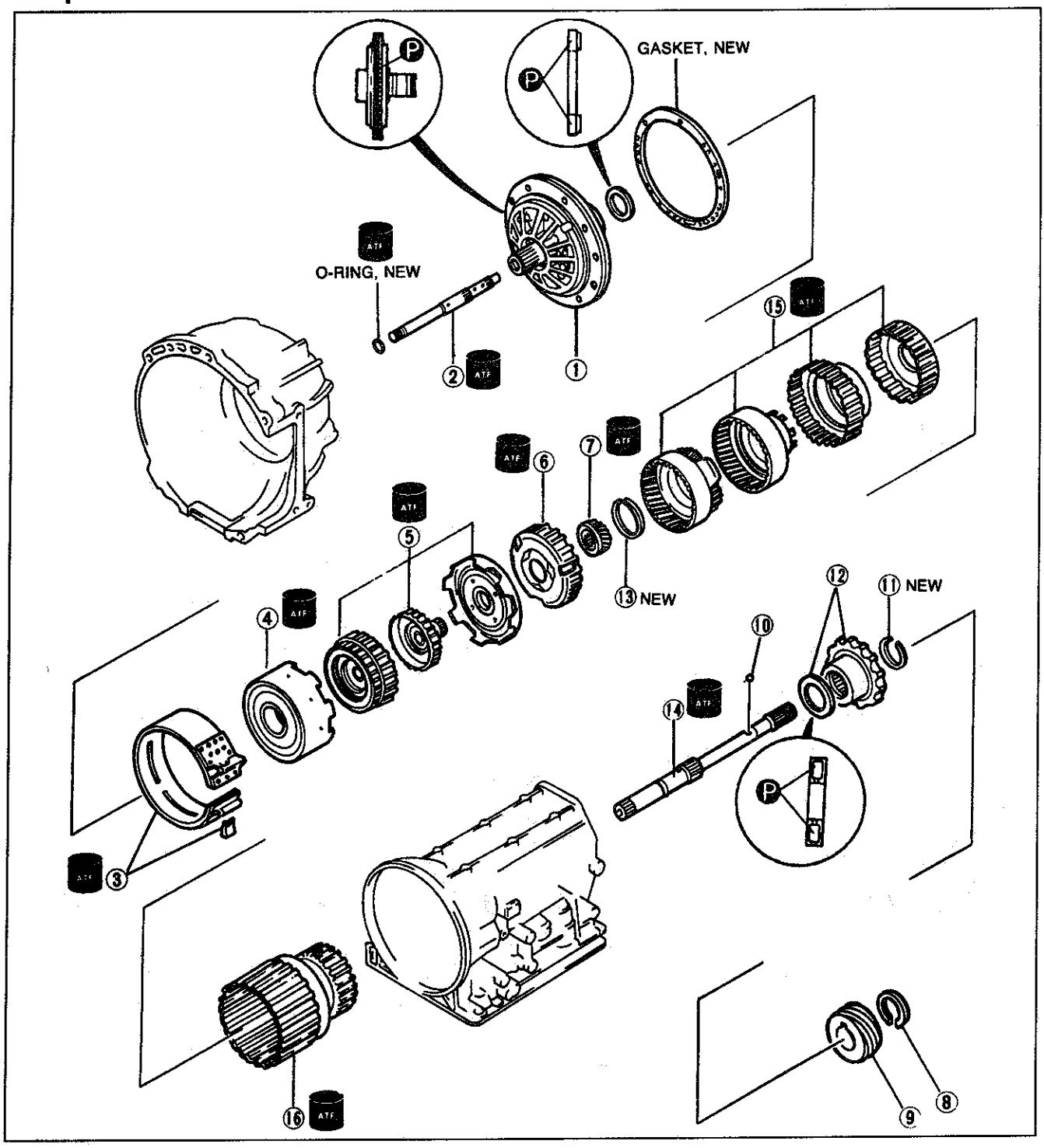
		7	8
Bearing	mm {in}	59.0 {2.32}	64.0 {2.52}
Race	mm {in}	—	—

Components 1



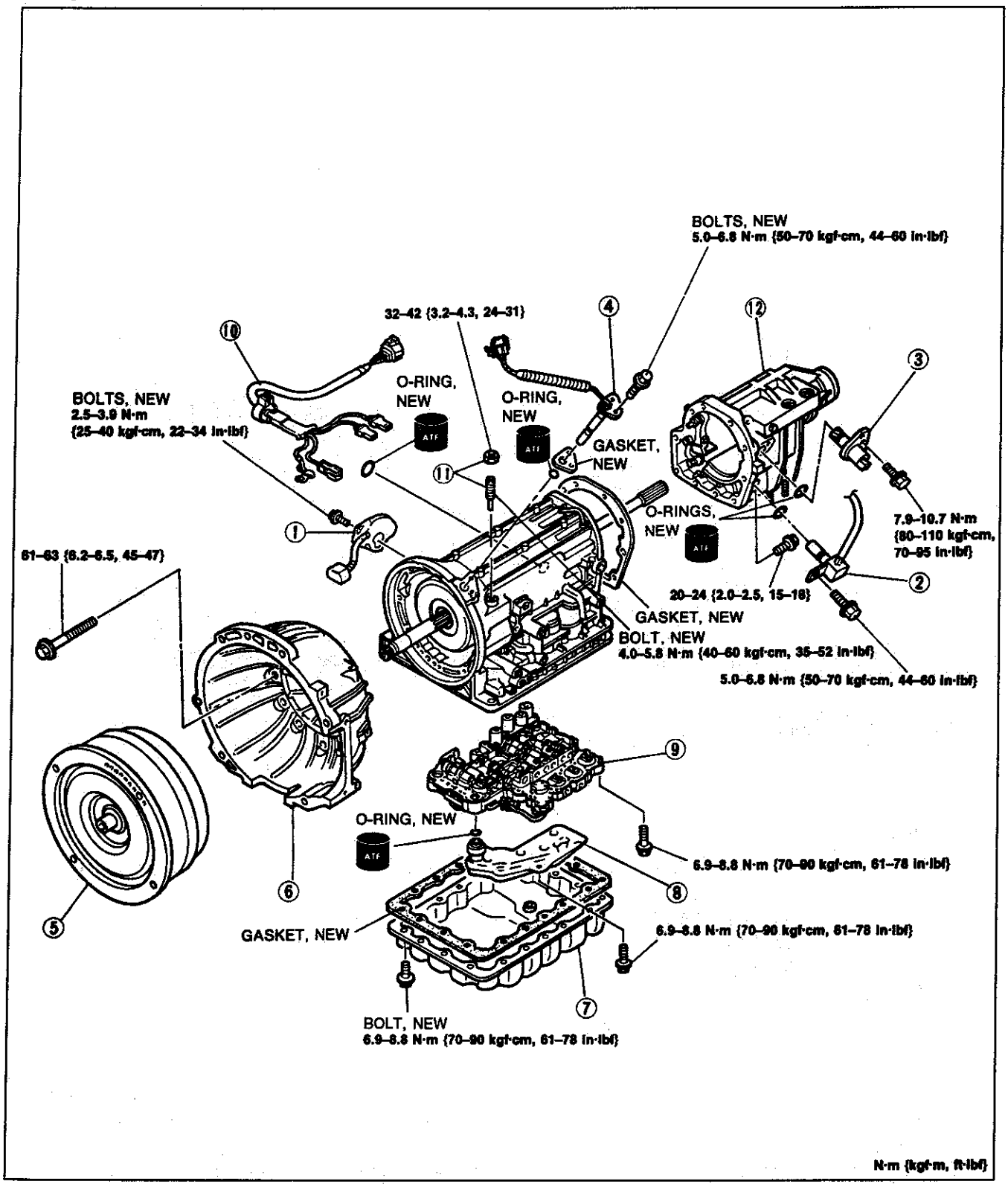
1. Accumulator
2. Band servo
3. Low and reverse brake

Components 2

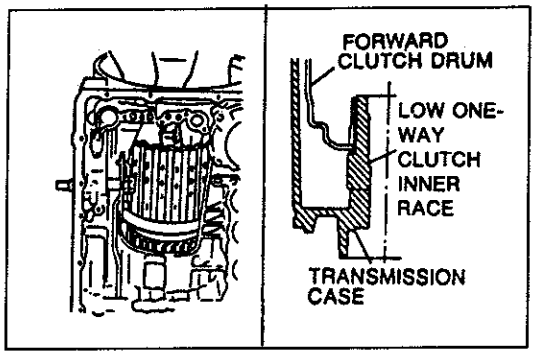


1. Oil pump
2. Input shaft
3. Brake band and strut
4. Reverse clutch
5. High clutch and front sun gear
6. Front planetary carrier
7. Rear sun gear
8. Snap ring
9. Speedometer drive gear
10. Steel ball
11. Snap ring
12. Parking gear and bearing
13. Snap ring
14. Output shaft
15. Front internal gear, rear internal gear, forward clutch hub, overrunning clutch hub
16. Forward clutch drum (forward clutch, overrunning clutch, low one-way clutch)

Components 3

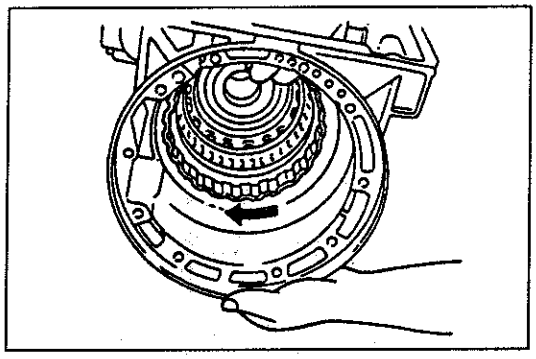


1. Park/neutral switch
2. Vehicle speed sensor
3. Vehicle speedometer sensor
4. Vehicle speed pulse generator
5. Torque converter
6. Converter housing
7. Oil pan
8. Oil strainer
9. Control valve body
10. Solenoid valve harness
11. Anchor end bolt and nut
12. Extension housing / Parking mechanism

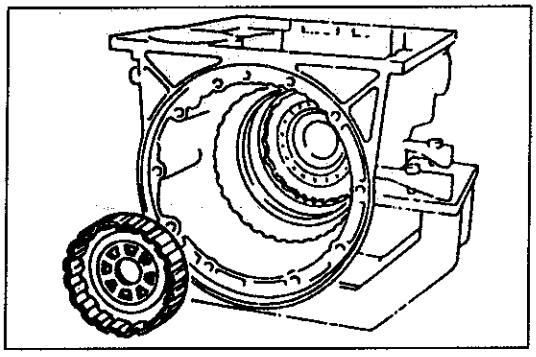


Assembly procedure

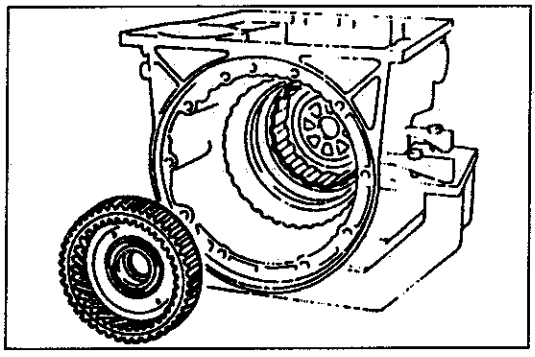
1. Install the forward clutch drum while slowly turning it clockwise until its hub passes fully over the low one-way clutch inner race.



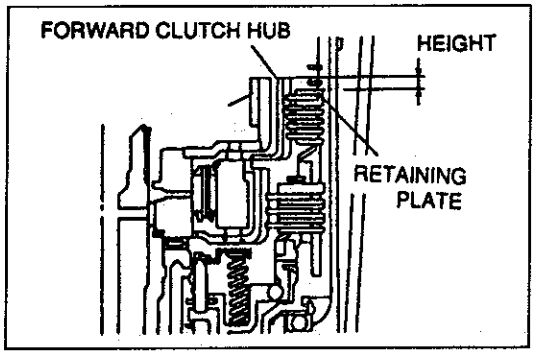
2. Verify that the forward clutch drum will turn only clockwise.



3. Verify that the bearing is installed on the rear of the overrunning clutch hub.
4. Install the overrunning clutch hub into the forward clutch drum.
5. Verify that the thrust washer is installed on the front of the overrunning clutch hub.

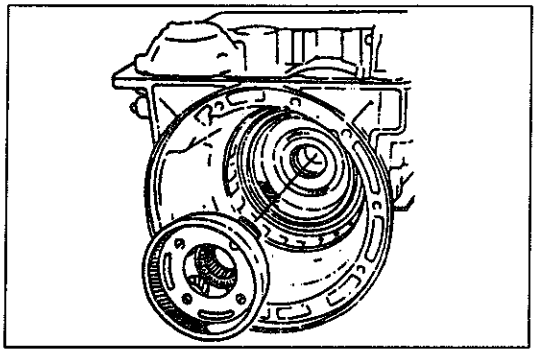


6. Install the rear internal gear and forward clutch hub assembly into the forward clutch drum.
7. Verify that the bearing is installed on the rear internal gear.

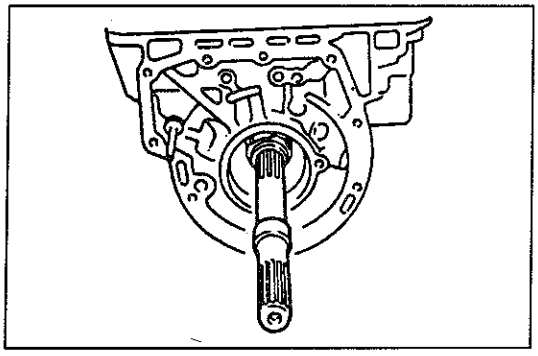


8. Measure the height difference between the forward clutch retaining plate and the top of the forward clutch hub.

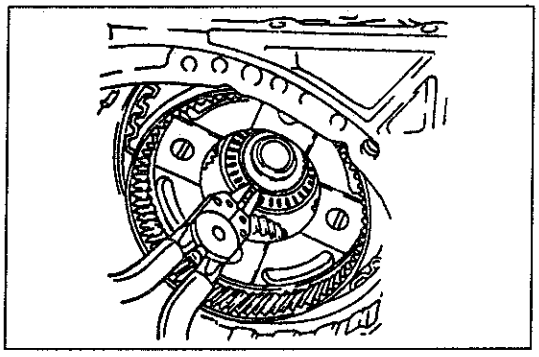
Height: 2.0–3.0 mm {0.079–0.118 In} approx.



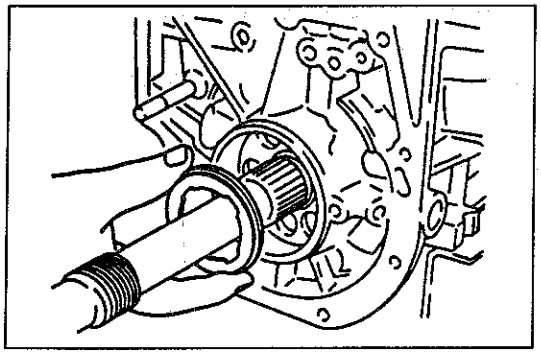
9. Verify that the bearing race is installed on the front internal gear (rear planetary carrier).
10. Install the front internal gear (rear planetary carrier) into the forward clutch assembly.



11. Insert the output shaft from the rear of the transmission case.

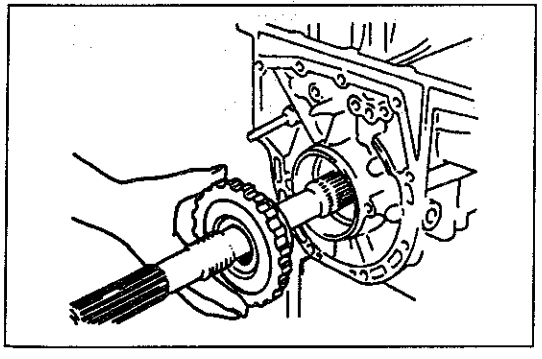


12. Push the output shaft slightly forward, and install a new snap ring on the shaft. Verify that the output shaft cannot be pulled from the rear of the transmission case.

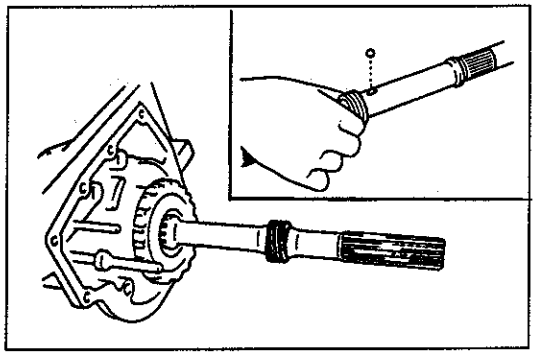


13. Apply petroleum jelly to the bearing and install it to the transmission case with the black surface facing outward.

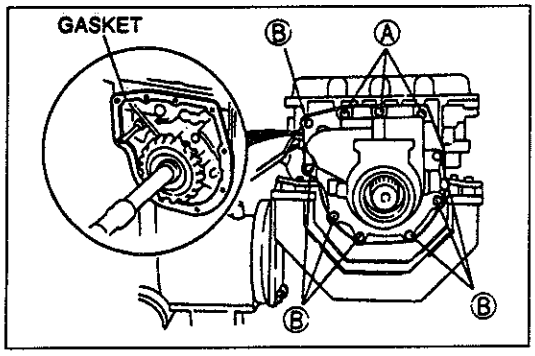
    Bearing outer diameter: 64.0 mm {2.52 in}



14. Install the parking gear.
15. Pull the output shaft slightly back, and install a new snap ring on the shaft. Verify that the output shaft cannot be pulled from the front of the transmission case.



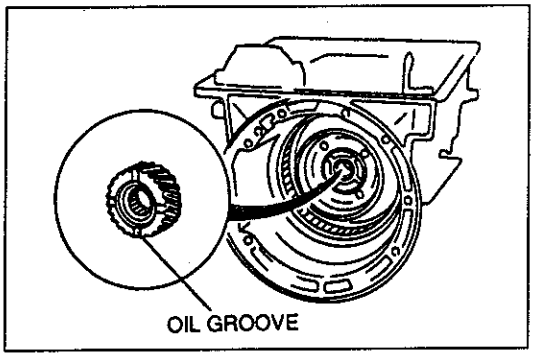
16. Install the steel ball and speedometer drive gear onto the output shaft.
17. Secure the speedometer drive gear with the snap ring.



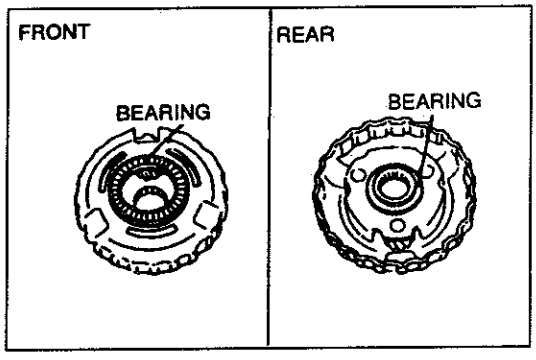
18. Install a new gasket and the extension housing.

Bolt length (measured from below bolt head):
A: 30 mm {1.2 in}
B: 45 mm {1.8 in}

Tightening torque:
20–24 N·m {2.0–2.5 kgf·m, 15–18 ft·lbf}

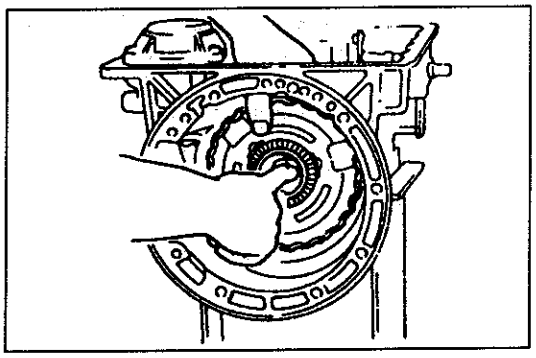


19. Install the rear sun gear into the rear planetary carrier with the oil grooves of the gear facing outward.

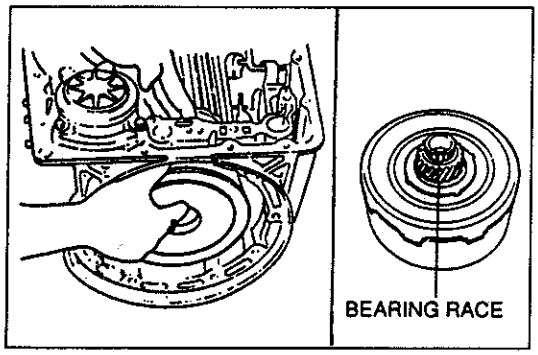


20. Apply petroleum jelly to the bearings and install them to the front planetary carrier. Install the rear bearing with the black surface facing outward.

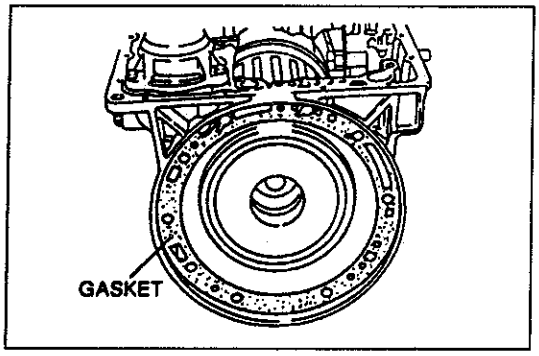
Bearing outer diameter
Front: 78.0 mm {3.07 in}
Rear: 53.0 mm {2.09 in}



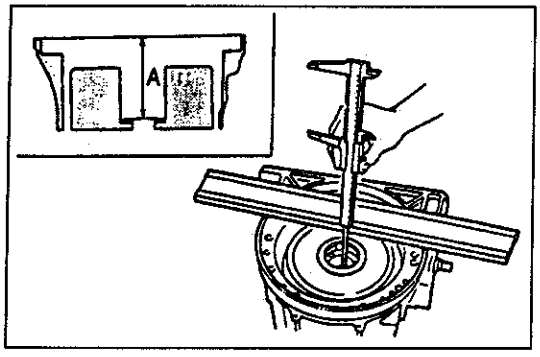
21. While rotating the forward clutch drum clockwise, install the front planetary carrier into the forward clutch drum.



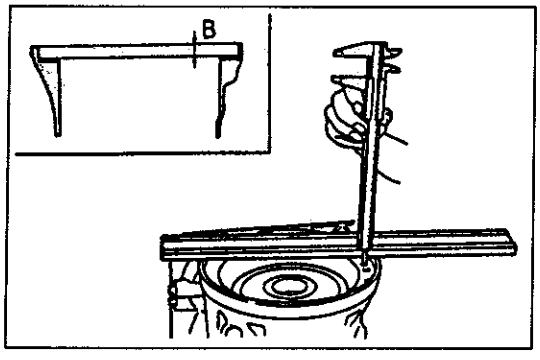
22. Verify that the bearing race is installed on the front sun gear.
23. Install the reverse clutch, high clutch, and front sun gear assembly into the transmission case.
24. Verify that the bearing race is installed on the high clutch drum.



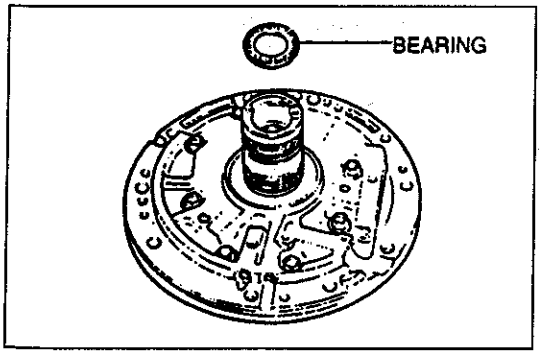
25. Adjust the total end play.
    (1) Install a new oil pump gasket.



(2) Measure height A by using vernier calipers and a straightedge.

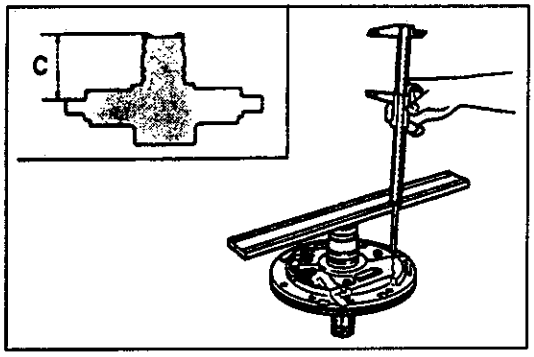


(3) Measure height B.

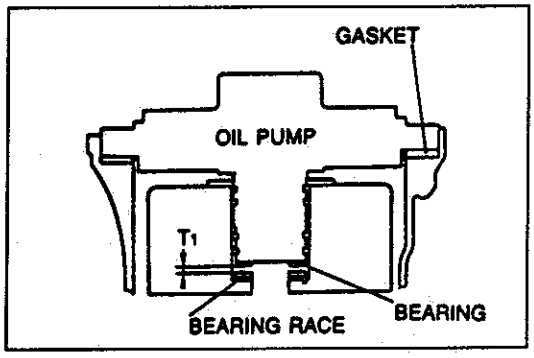


(4) Apply petroleum jelly to the bearing and install it on the oil pump.

Bearing outer diameter: 47.0 mm {1.85 in}



(5) Measure height C.



(6) Calculate the total end play by using the formula below.

Formula: T1 = A – B – C – 0.1 mm {0.004 in}

T1: Total end play
A: Distance between front of transmission case and bearing race on the high clutch drum
B: Distance between front of transmission case and oil pump gasket
C: Distance between upper surface of oil pump bearing and oil pump gasket contact surface.
0.1 mm {0.0039 in}: Amount of compression of new oil pump gasket

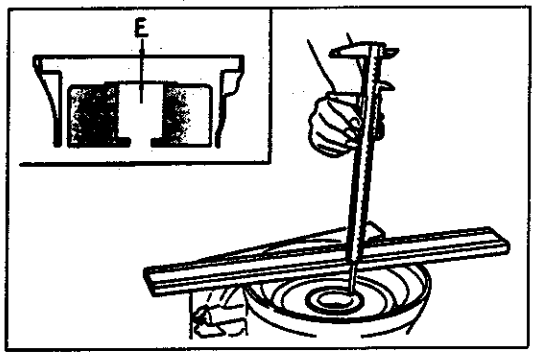
Total end play:
0.25–0.55 mm {0.010–0.022 in}

(7) If the total end play is not within specification, adjust it by selecting and installing the proper bearing race.

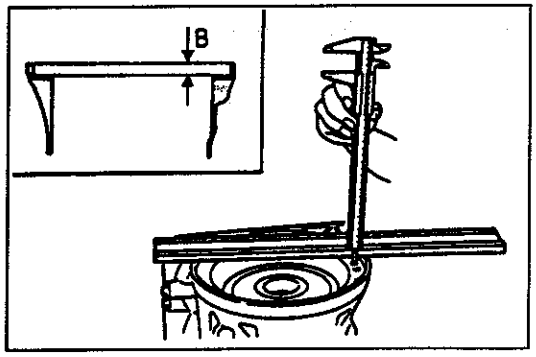
Bearing race size

mm {in}

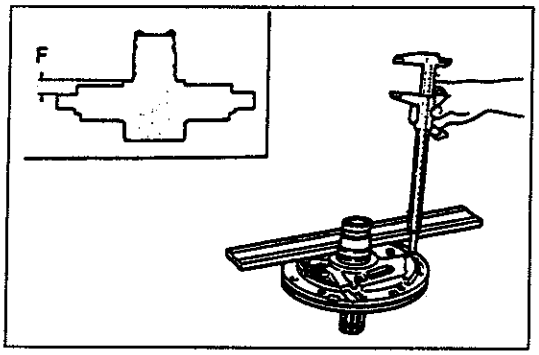
0.8 {0.031}	1.0 {0.039}	1.2 {0.047}	1.4 {0.055}
1.6 {0.063}	1.8 {0.071}	2.0 {0.079}	—



26. Adjust the reverse clutch end play.
(1) Install the thrust washer on the reverse clutch.
(2) Measure height E by using vernier calipers and a straightedge.



(3) Measure height B.

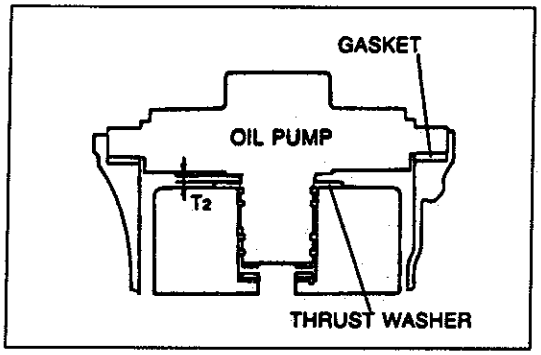


(4) Measure height F.

(5) Calculate the reverse clutch end play by using the formula below.

Formula: T2 = E – B – F – 0.1 mm {0.004 in}

T2: Reverse clutch end play
B: Distance between front of transmission case and oil pump gasket.
E: Distance between front of transmission case and thrust washer on the reverse clutch drum
F: Distance between reverse clutch thrust washer contact surface of oil pump and oil pump gasket contact surface
0.1 mm {0.0039 in}: Amount of compression of new oil pump gasket



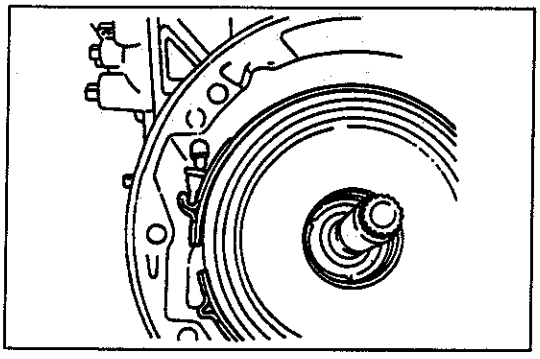
Reverse clutch end play:
0.55–0.90 mm {0.022–0.035 in}

(6) If the reverse clutch end play is not within specification, adjust it by selecting and installing the proper thrust washer.

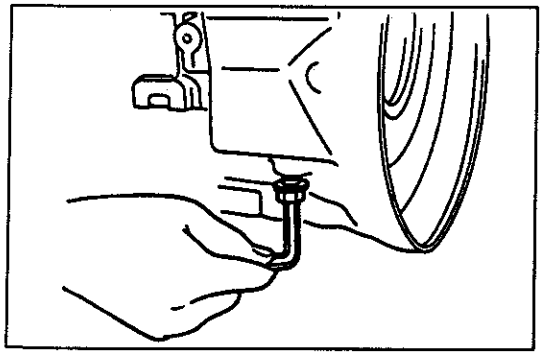
Thrust washer size

mm {in}

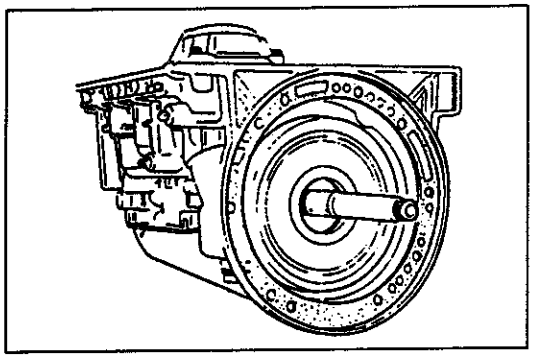
0.7 {0.028}	0.9 {0.035}	1.1 {0.043}	1.3 {0.051}
1.5 {0.059}	1.7 {0.067}	1.9 {0.075}	—



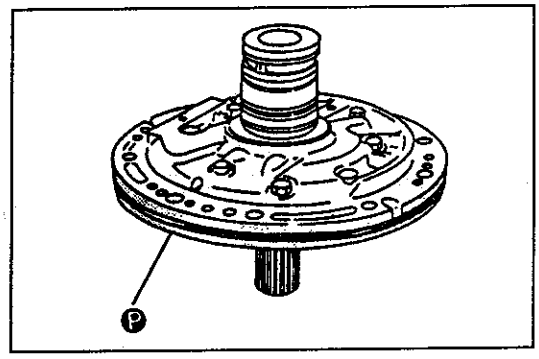
27. Apply ATF to the brake band and band strut, and install them into the transmission. Refer to page K–76 to adjust the brake band during transmission assembly.



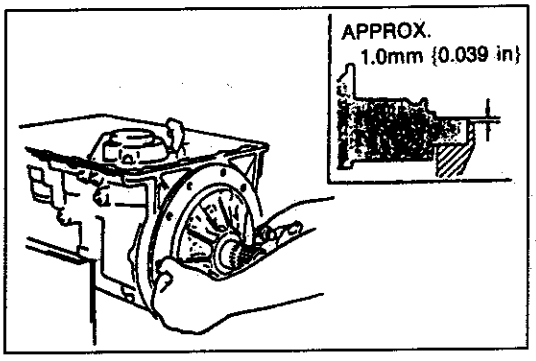
28. Temporarily install a new anchor end bolt.



29. Apply ATF to the input shaft and install it into the transmission case.

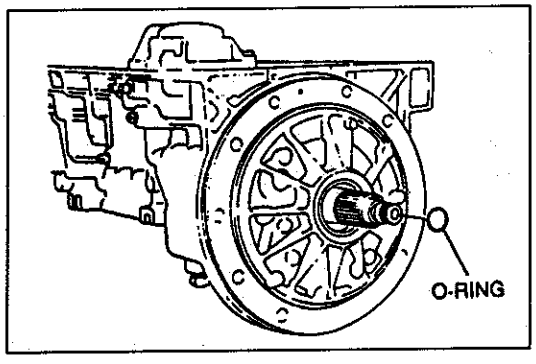


30. Apply petroleum jelly to the oil pump assembly as shown.

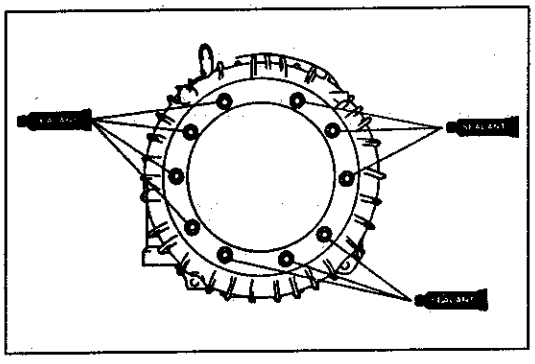


31. Install the oil pump assembly into the transmission case by hand only, using two converter housing bolts as guides.

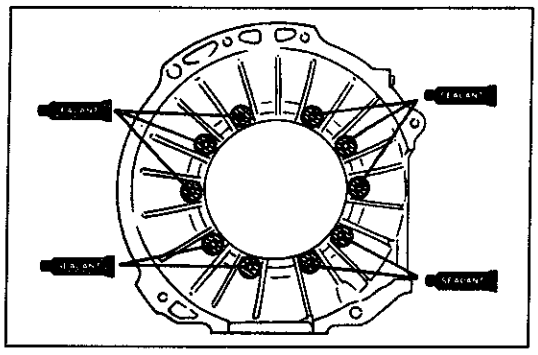
Height: 1.0 mm {0.039 in} approx.

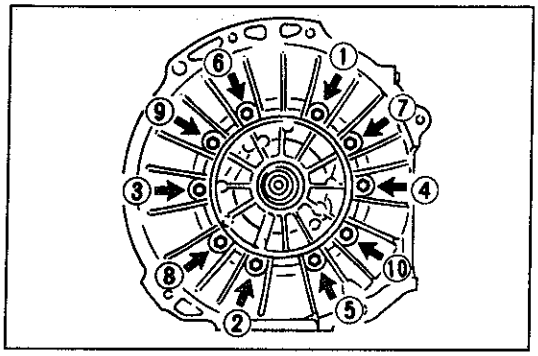


32. Apply ATF to a new O-ring, and install it onto the input shaft.



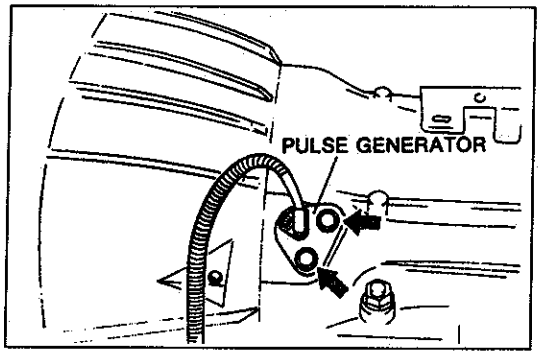
33. Apply sealant lightly around the bolt holes as shown.





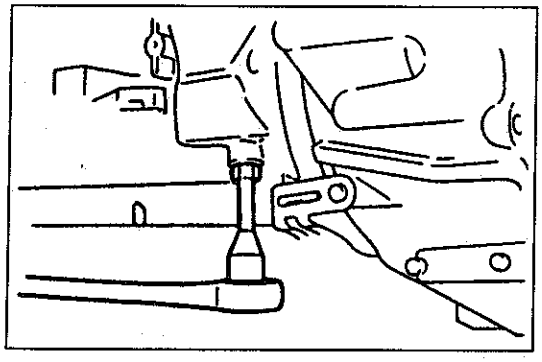
34. Remove the converter housing guide bolts.
35. Install the converter housing onto the transmission case, and tighten the bolts evenly in the order shown.

Tightening torque:
61–63 N·m {6.2–6.5 kgf·m, 45–47 ft·lbf}



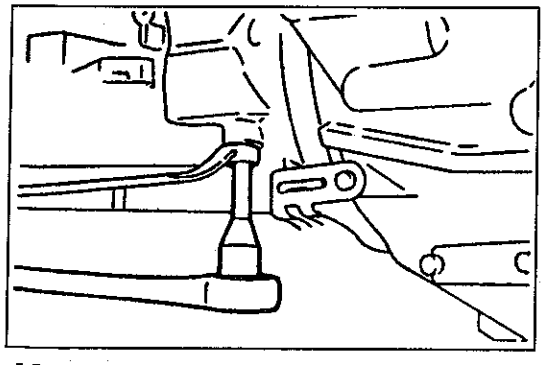
36. Apply ATF to a new O-ring and install it onto the vehicle speed pulse generator.
37. Install a new gasket and the vehicle speed pulse generator.
38. Install new bolts and tighten them.

Tightening torque:
5.0–6.8 N·m {50–70 kgf·cm, 44–60 in·lbf}



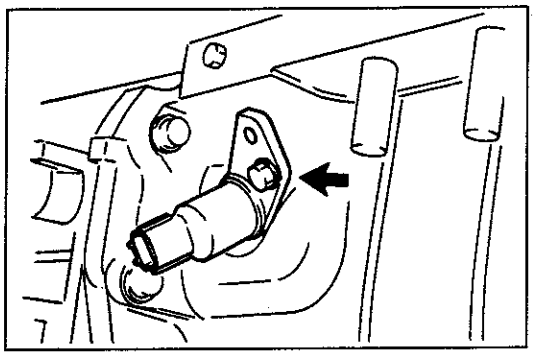
39. Adjust the brake band.
(1) Tighten the anchor end bolt.

Tightening torque:
4.0–5.8 N·m {40–60 kgf·cm, 35–52 in·lbf}



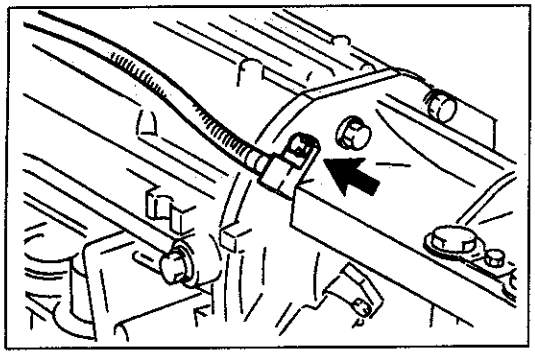
(2) Loosen the anchor end bolt 2.5 turns.
(3) Install the locknut.
(4) Hold the anchor end bolt and tighten the locknut.

Tightening torque:
32–42 N·m {3.2–4.3 kgf·m, 24–31 ft·lbf}



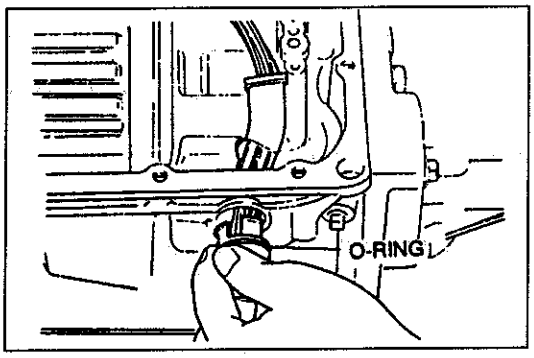
40. Apply ATF to a new O-ring and install it onto the vehicle speedometer sensor.
41. Install the vehicle speedometer sensor into the extension housing.

Tightening torque:
7.9–10.7 N·m {80–110 kgf·cm, 70–95 in·lbf}

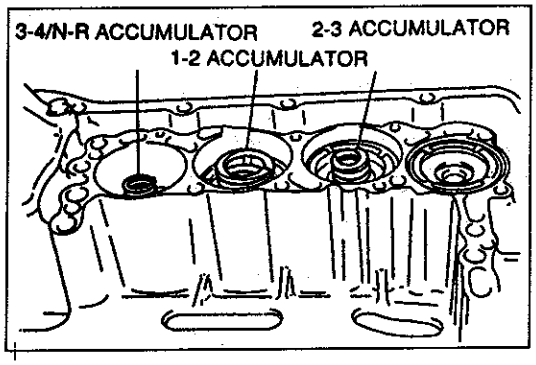


42. Apply ATF to a new O-ring and install it onto the vehicle speed sensor.
43. Install the vehicle speed sensor into the extension housing.

Tightening torque:
5.0–6.8 N·m {50–70 kgf·cm, 44–60 in·lbf}



44. Apply ATF to a new O-ring and install it onto the solenoid valve harness.
45. Install the solenoid valve harness into the transmission case.

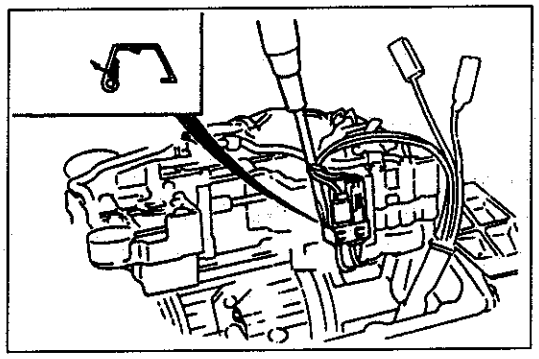


46. Install the accumulator spring into the accumulator piston.

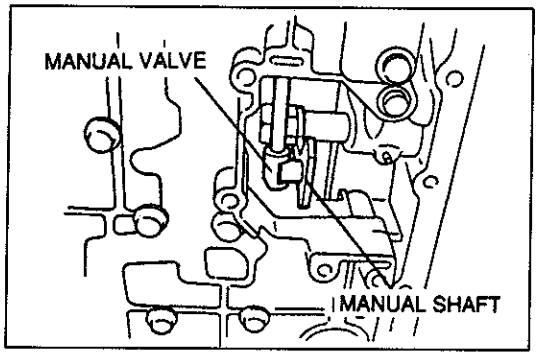
Spring specifications

mm {in}

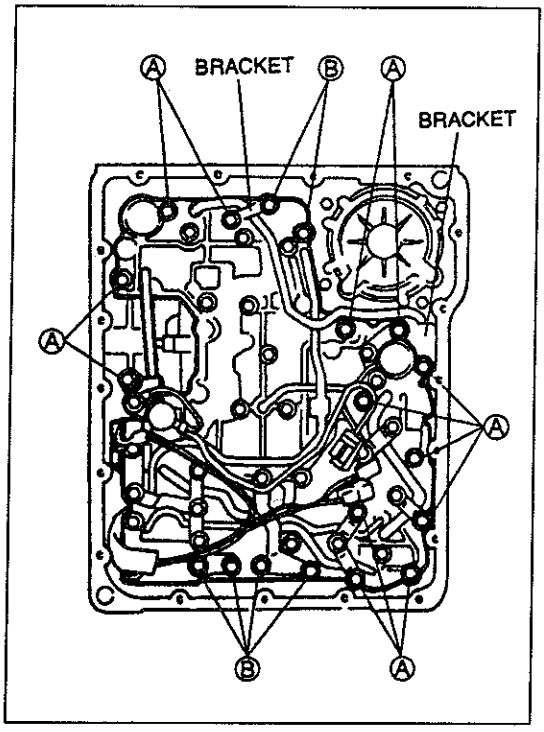
Item / Spring	Outer dia.	Free length	No. of coils	Wire dia.
3-4/N-R accumulator piston	18.0 {0.71}	43.0 {1.69}	7.9	2.3 {0.091}
1–2 accumulator piston	29.3 {1.15}	45.0 {1.77}	3.8	3.7 {0.15}
2–3 accumulator piston	19.5 {0.77}	66.0 {2.60}	8.6	3.0 {0.12}



47. Connect the solenoid valve connectors.
48. Install the clip.



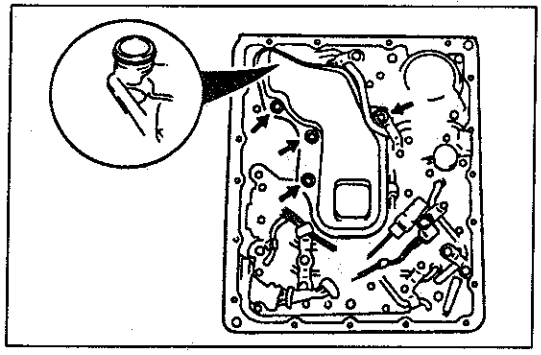
49. Verify that the manual valve and manual shaft are assembled correctly.



50. Install the valve body assembly, and tighten the bolts evenly.

Bolt length (measured from below bolt head):
A: 33 mm {1.3 in}
B: 45 mm {1.8 in}

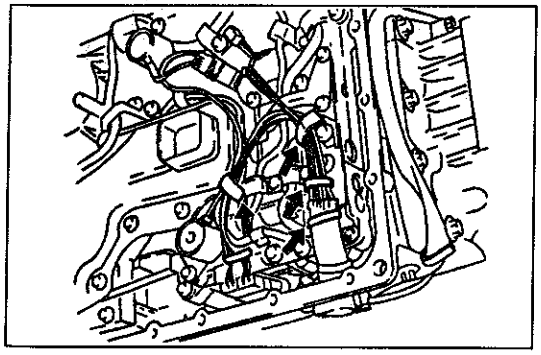
Tightening torque:
6.9–8.8 N·m {70–90 kgf·cm, 61–78 in·lbf}



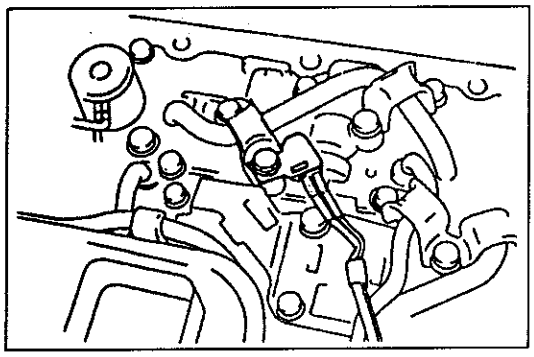
51. Apply ATF to a new O-ring and install it onto the oil strainer.
52. Install the oil strainer into the control valve body.

Bolt length (measured from below bolt head):
50 mm {2.0 in}

Tightening torque:
6.9–8.8 N·m {70–90 kgf·cm, 61–78 in·lbf}



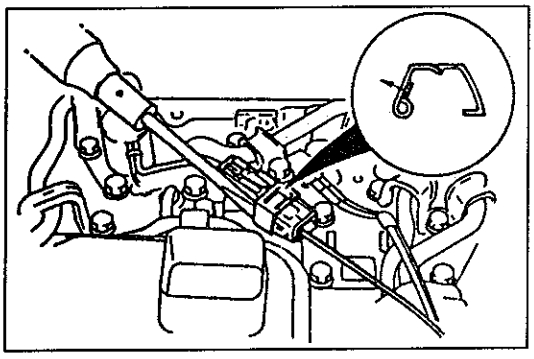
53. Secure the solenoid valve harness with the clips.



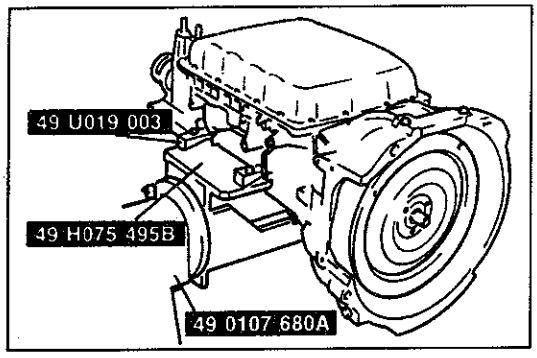
54. Install the ATF thermosensor as shown in the figure.

Bolt length (measured from below bolt head):
45 mm {1.8 in}

Tightening torque:
6.9–8.8 N·m {70–90 kgf·cm, 61–78 in·lbf}



55. Connect the lockup solenoid valve connector.
56. Install the clip.

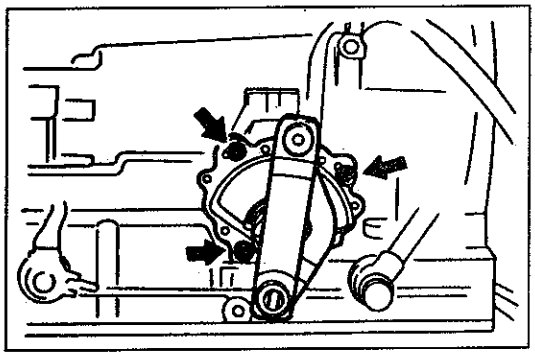


57. Set the magnet into the oil pan.
58. Remove any old locking compound from the bolt holes.
59. Install a new gasket and the oil pan.
60. Tighten the new bolts evenly and quickly.

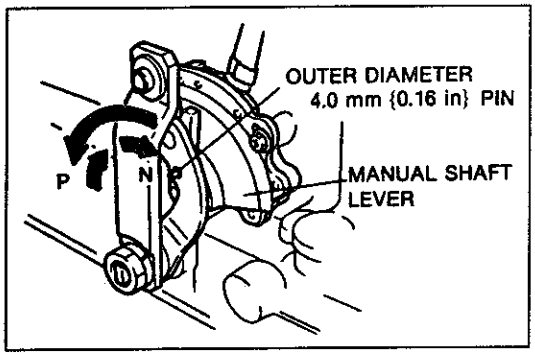
Tightening torque:
6.9–8.8 N·m {70–90 kgf·cm, 61–78 in·lbf}

61. Remove the transmission from the **SSTs (transmission hanger)**.
62. Install the connector brackets onto the extension housing.

Tightening torque:
7.9–11.7 N·m {80–120 kgf·cm, 70–104 in·lbf}



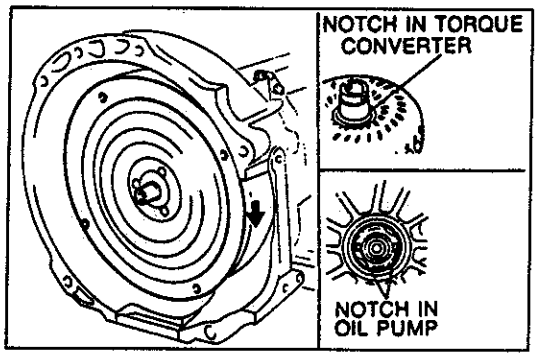
63. Install the harness onto the connector bracket.
64. Install and adjust the park/neutral switch.
    (1) Verify that the manual shaft is set at the L position (fully forward).
    (2) Install the park/neutral switch over the manual shaft and install new bolts.



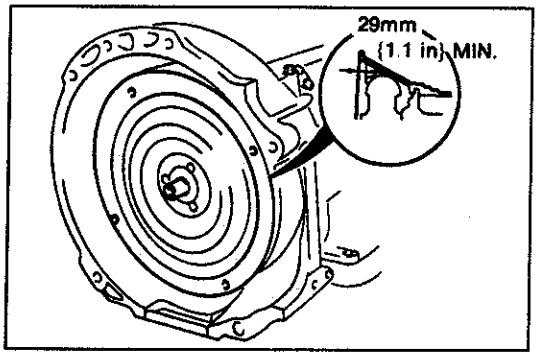
    (3) Turn the manual shaft fully rearward, then return it **2 notches** (N range position).
    (4) Insert a **4.0 mm {0.16 in}** outer diameter pin through the holes of the park/neutral switch and the manual shaft lever.
    (5) Tighten the park/neutral switch retaining bolts.

Tightening torque:
2.5–3.9 N·m {25–40 kgf·cm, 22–34 in·lbf}

    (6) Remove the pin.



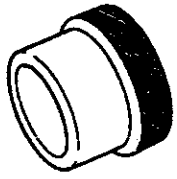
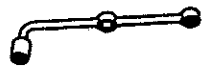
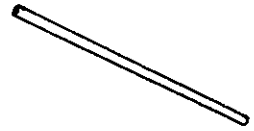
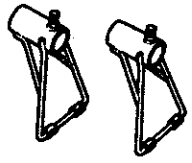
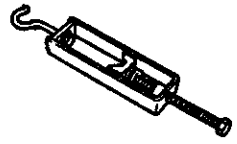
65. Remove the transmission from the **SST**. If the torque converter is completely empty, hold it upright, and fill it with 2.0 L {2.1 US qt, 1.8 Imp qt} of ATF.
66. Install the torque converter to the transmission. Rotate the torque converter to align the splines.



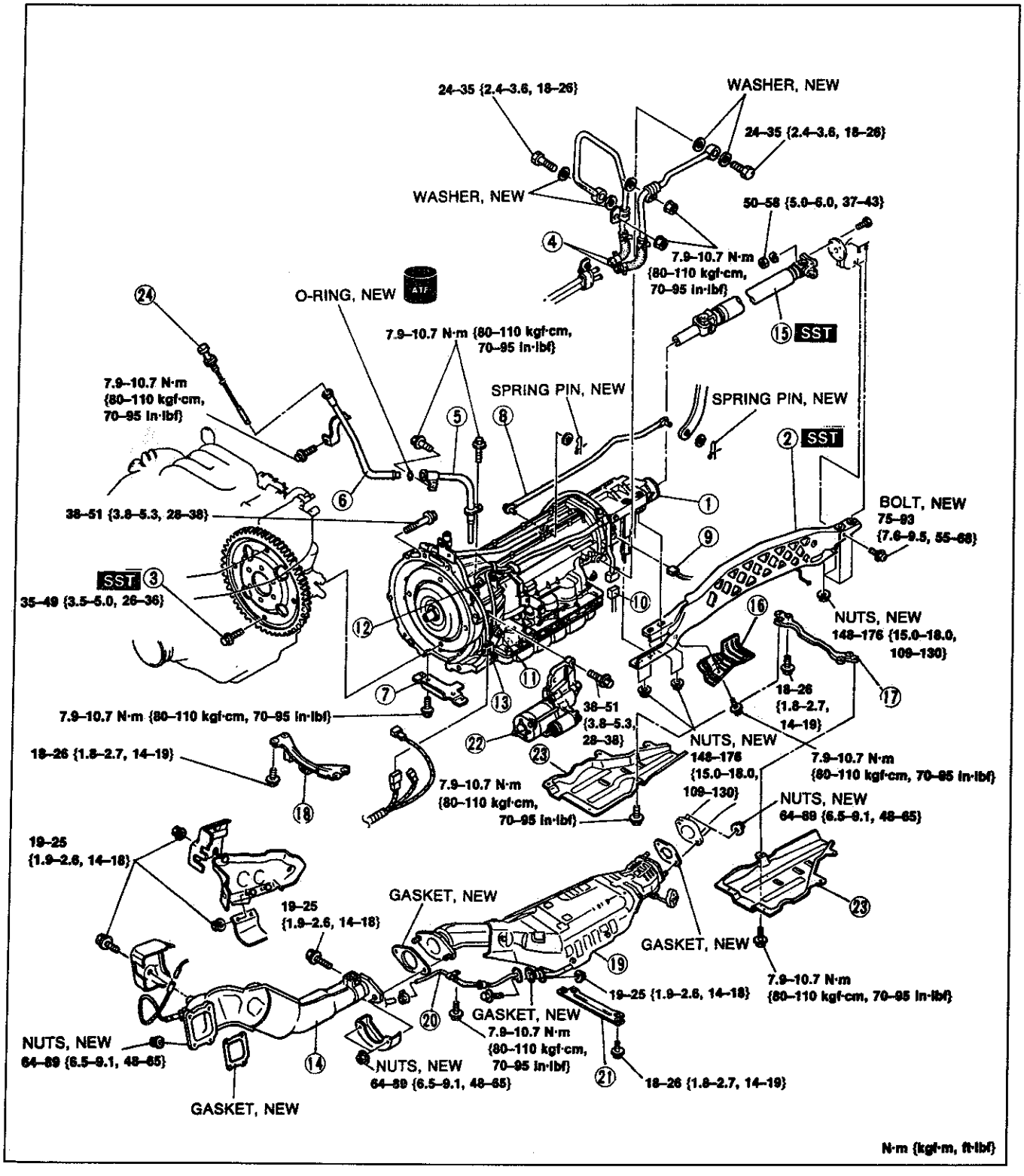
67. Measure the installation depth of the torque converter by using vernier calipers and a straightedge.

    Specification: 29 mm {1.1in} min.

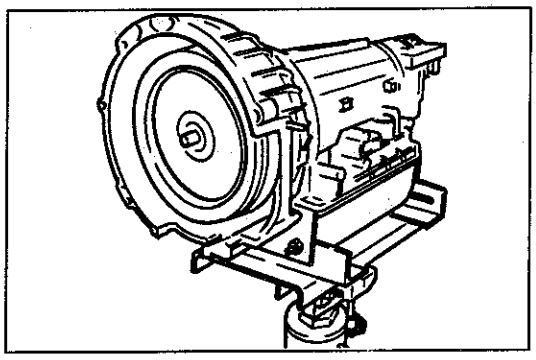
TRANSMISSION UNIT (INSTALLATION)
Preparation
SST

49 J019 002 Cap 	For prevention of ATF leakage	49 0877 435 Special wrench 	For loosening of torque converter installation bolts
49 G017 5A0 Support, engine 	For support of engine	49 G017 501 Bar (Part of 49 G017 5A0) 	For support of engine
49 G017 502 Support (Part of 49 G017 5A0) 	For support of engine	49 G017 503 Hook (Part of 49 G017 5A0) 	For support of engine

1. Install in the order shown in the figure, referring to **Installation Note.**
2. Fill the transmission with the specified ATF after installation.
3. Connect the negative battery cable.
4. Inspect the park/neutral switch operation. (Refer to page K–28).
5. Inspect the selector lever operation. (Refer to page K–164).
6. Inspect for oil leakage from the transmission.
7. Perform a road test. (Refer to page K–16).
8. Inspect the ATF level and condition. (Refer to page K–25).

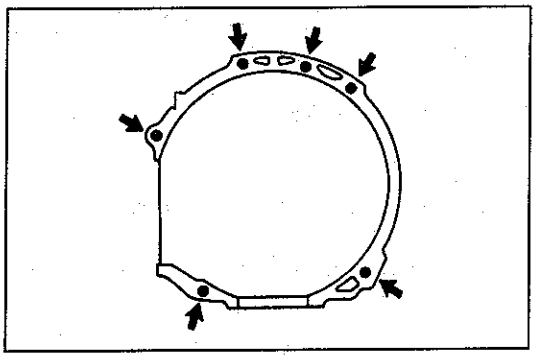


1. Transmission
   Installation Note ..... below
2. Power plant frame (PPF)
   Installation Note ..... below
3. Torque converter bolts
   Installation Note ..... page K-153
4. Oil cooler hose
5. Oil filler tube (lower)
6. Oil filler tube (upper)
7. Service hole cover
8. Selector rod (selector lever side)
   Installation Note ..... page K-153
9. Vehicle speedometer sensor connector
10. Solenoid valve connector
11. Vehicle speed pulse generator connector
12. Vehicle speed sensor connector
13. Park/neutral switch connector
14. Front exhaust pipe
15. Propeller shaft
    Installation ..... section L
16. Cover
17. Rear tunnel member
18. Front tunnel member
19. Three-way catalyst assembly
20. Secondary air injection pipe
21. Center tunnel member
22. Starter
23. Undercover (right and left)
24. ATF dipstick



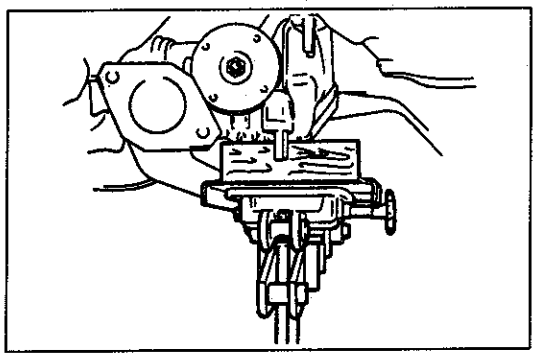
Installation note
Transmission

1. Set the transmission onto the transmission jack, paying special attention not to damage the oil pipes.
   Make sure that the torque converter side of the transmission is tilted slightly upward.
2. Mount the transmission to the engine.



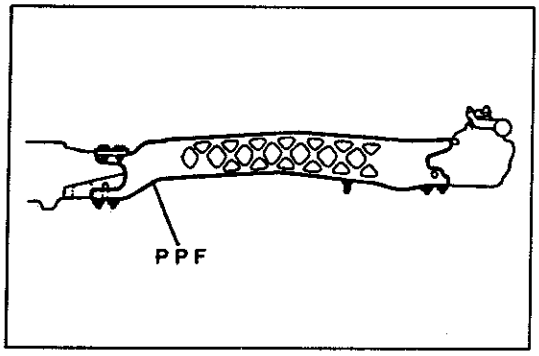
3. Gradually tighten the mounting bolts.

   Tightening torque:
   38–51 N·m {3.8–5.3 kgf·m, 28–38 ft·lbf}

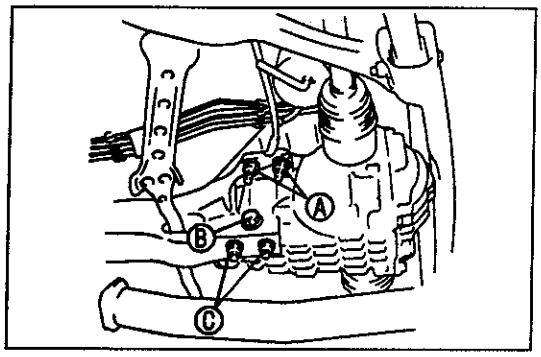


Power plant frame (PPF)

1. Hold the differential at a 0° angle by using the transmission jack.

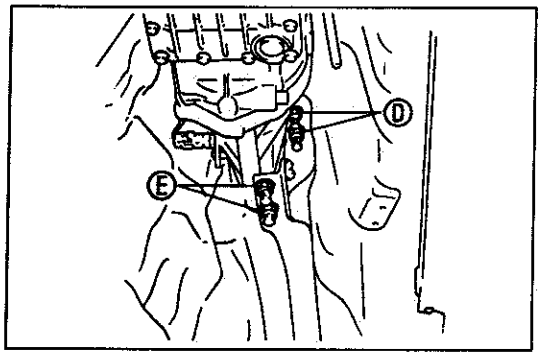


2. Hold the PPF in place with a new bolt and nuts.



3. Tighten the differential-side PPF installation bolt and nuts in the order A, B, C.

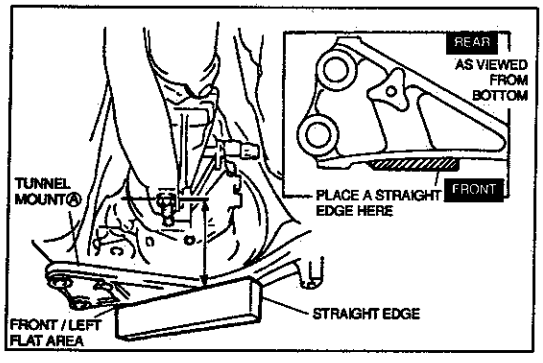
Tightening torque:
A, C: 148–176 N·m {15.0–18.0 kgf·m, 109–130 ft·lbf}
B: 75–93 N·m {7.6–9.5 kgf·m, 55–68 ft·lbf}



4. Tighten the transmission-side PPF installation nuts in the order D, E.

Tightening torque:
148–176 N·m {15.0–18.0 kgf·m, 109–130 ft·lbf}

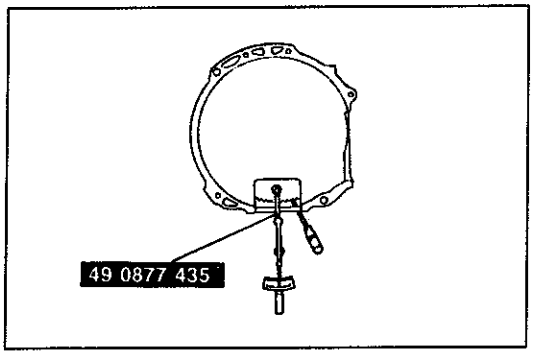
5. Remove the transmission jack.



6. Place a straightedge on the flat area on the front/left edge of the tunnel mount (A) so that it passes under the PPF installation bolts.
Measure from the top of the straightedge to the PPF.

Standard: 75.1 mm {2.96 in}
Acceptable: range : 70–77 mm {2.76–3.03 in}

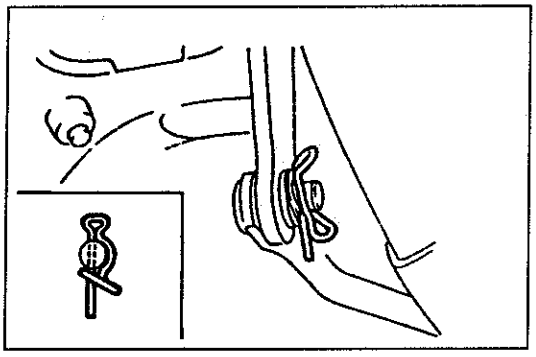
7. If the clearance is not within specification, readjust the PPF.



Torque converter bolts

1. Align the holes by turning the torque converter.
2. Lock the drive plate by using a screwdriver.
3. Hand-tighten the torque converter mounting bolts in a crisscross pattern, and then tighten them to the specified torque by using the **SST**.
4. Modify the torque converter tightening torque to allow for use of a torque wrench-**SST** combination. (Refer to section GI, "Torque Formulas".)
5. Tighten the torque converter installation bolts to the specified torque by using the **SST**.

Tightening torque:
35–49 N·m {3.5–5.0 kgf·m, 26–36 ft·lbf}



Selector rod

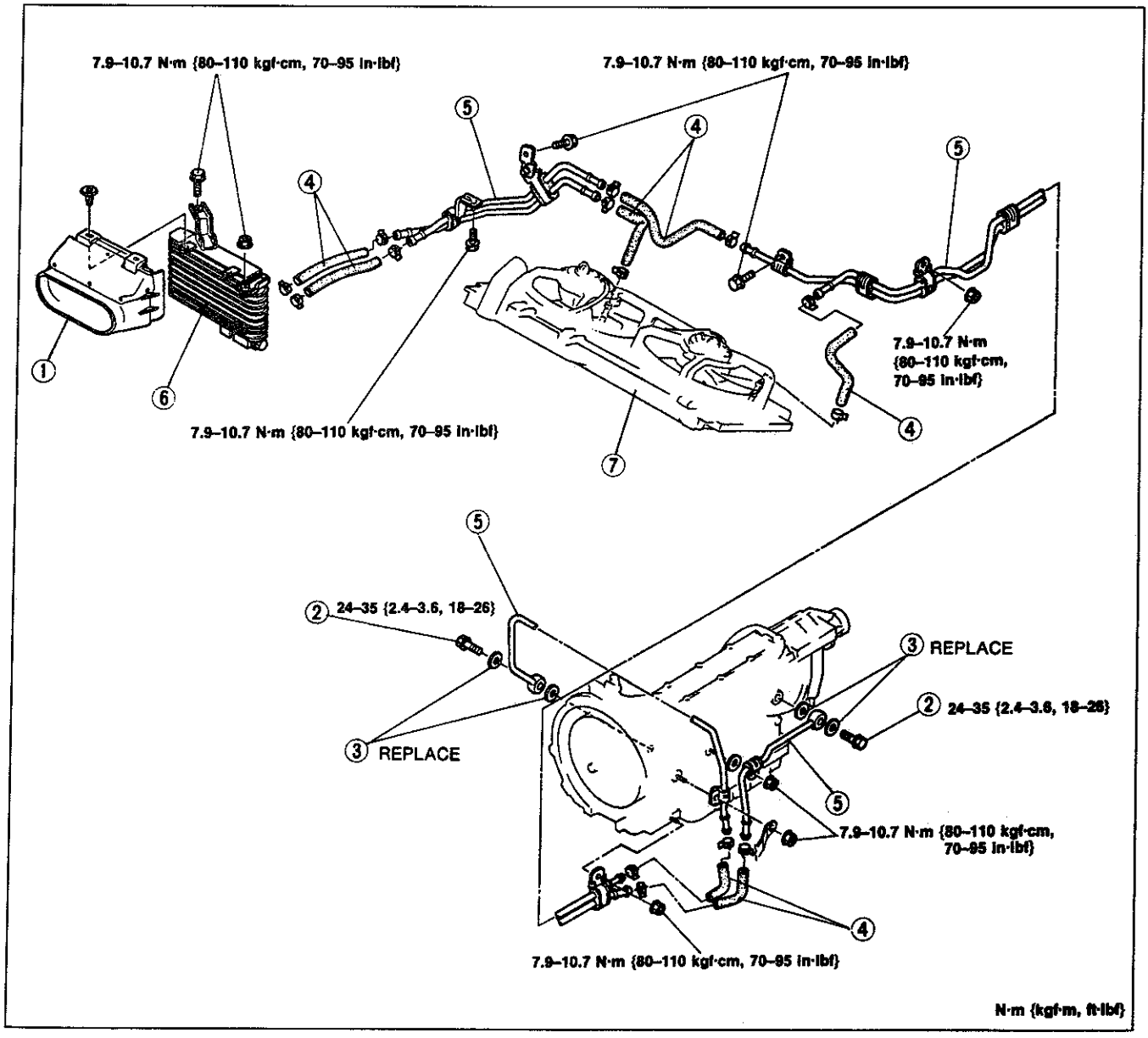
1. Install the selector rod.
2. Install the washer and a new spring pin as shown.

OIL COOLER

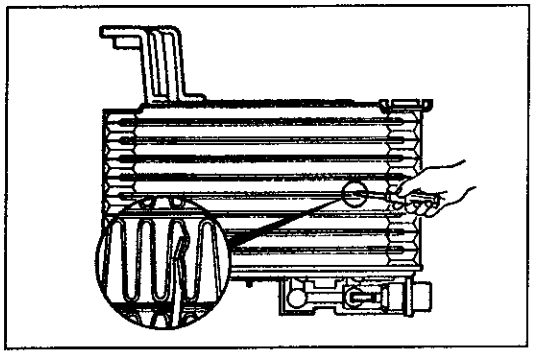
OIL COOLER

Removal / Inspection / Installation

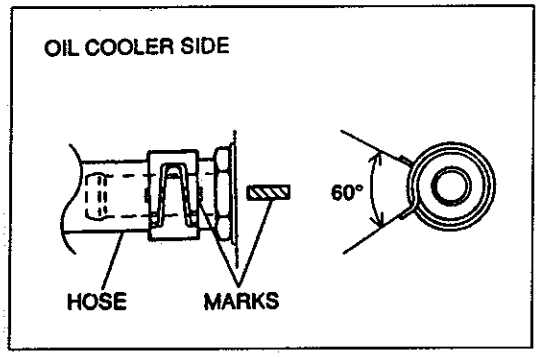
1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure.
3. Inspect all parts and repair or replace as necessary.
4. Install in the reverse order of removal, referring to **Installation Note**.
5. Add ATF to the specified level.
6. Connect the negative battery cable.
7. Inspect the oil leakage from the oil pipes and oil hoses.
8. Inspect the ATF level and condition. (Refer to page K-25.)



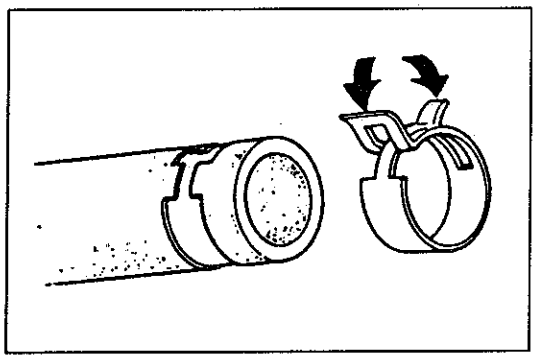
1. Air duct
2. Connector bolts
   Inspect for or clogging
3. Washers
4. Oil hoses
   Inspect for damage and cracks
   Installation Note ..... page K-155
5. Oil pipes
   Inspect for damage and cracks
6. Oil cooler
   Inspection ..... page K-155
7. Radiator
   Service ..... section E



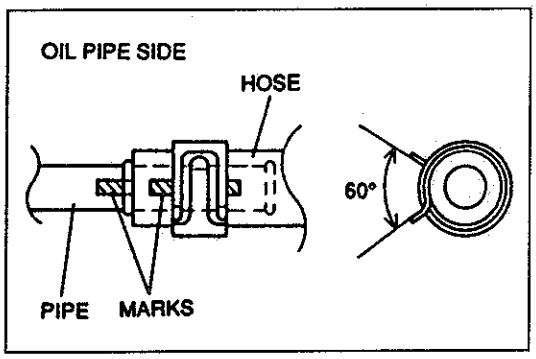
Inspection
Oil cooler
1. Inspect for cracks, damage, and water leakage, and replace as necessary.
2. Inspect for bent fins and repair with a screwdriver as necessary.



Installation note
Oil hoses
1. Align the marks, and slide the oil cooler hose onto the oil cooler pipe until it is fully seated as shown.



2. Install the hose clamp onto the hose at the center of the mark and at the angle shown. If reusing the oil hose, position the new hose clamp exactly into the mark left by the previous hose clamp.
3. Verify that the hose clamp does not interfere with any other parts.



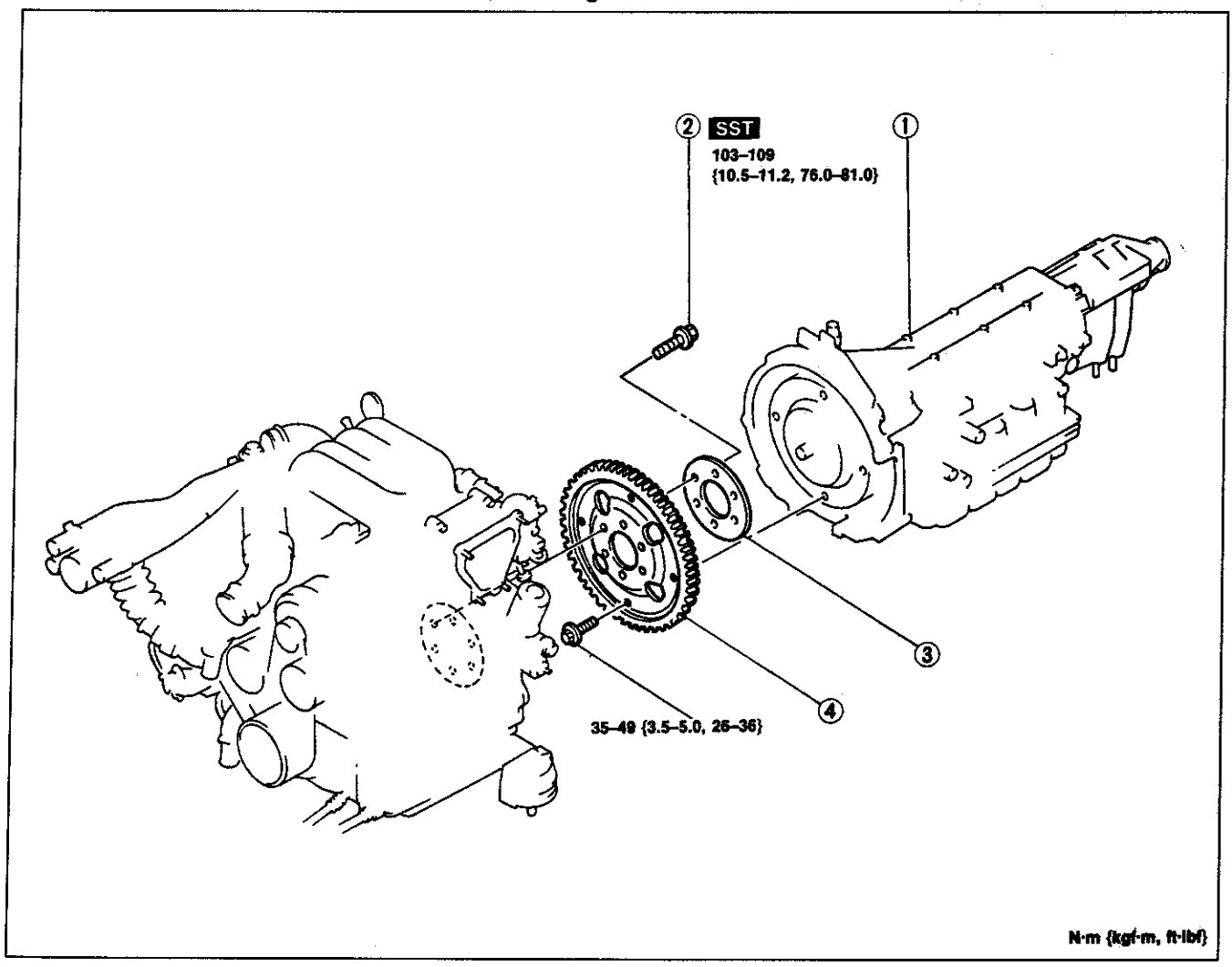
DRIVE PLATE

PREPARATION
SST

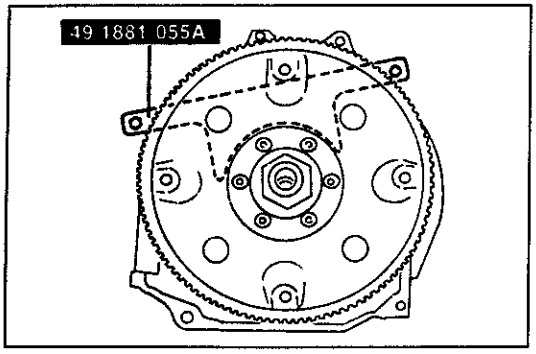
49 1881 055A Stopper, counter weight		For prevention of engine rotation

DRIVE PLATE
Removal / Inspection / Installation

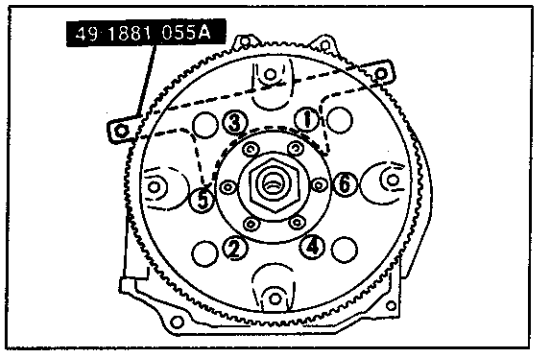
1. Remove in the order shown in the figure, referring to **Removal Note**.
2. Inspect all parts and replace as necessary.
3. Install in the reverse order of removal, referring to **Installation Note**.



1. Transmission
   - Removal ..... page K- 42
   - Installation ..... page K–149
2. Drive plate mounting bolts
   - Removal Note ..... page K–157
   - Installation Note ..... page K–157
3. Adapter
4. Drive plate
   - Inspect for cracks and for ring gear wear and damage



Removal note
Drive plate mounting bolts
1. Set the **SST** or equivalent against the drive plate.
2. Remove the drive plate.

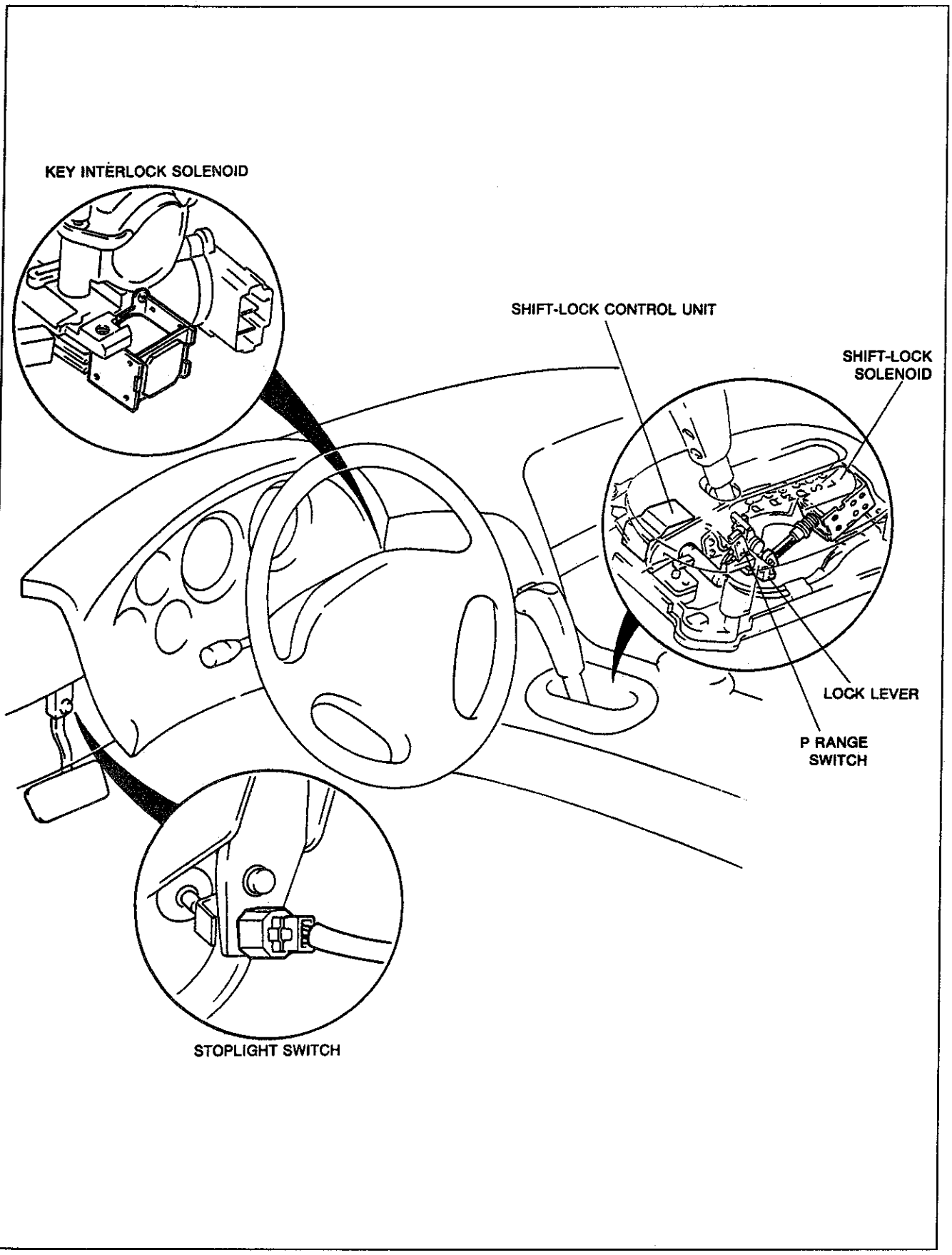


Installation note
Drive plate mounting bolts
1. Set the **SST** or equivalent against the drive plate.
2. Tighten the drive plate installation bolts in two or three steps as shown.

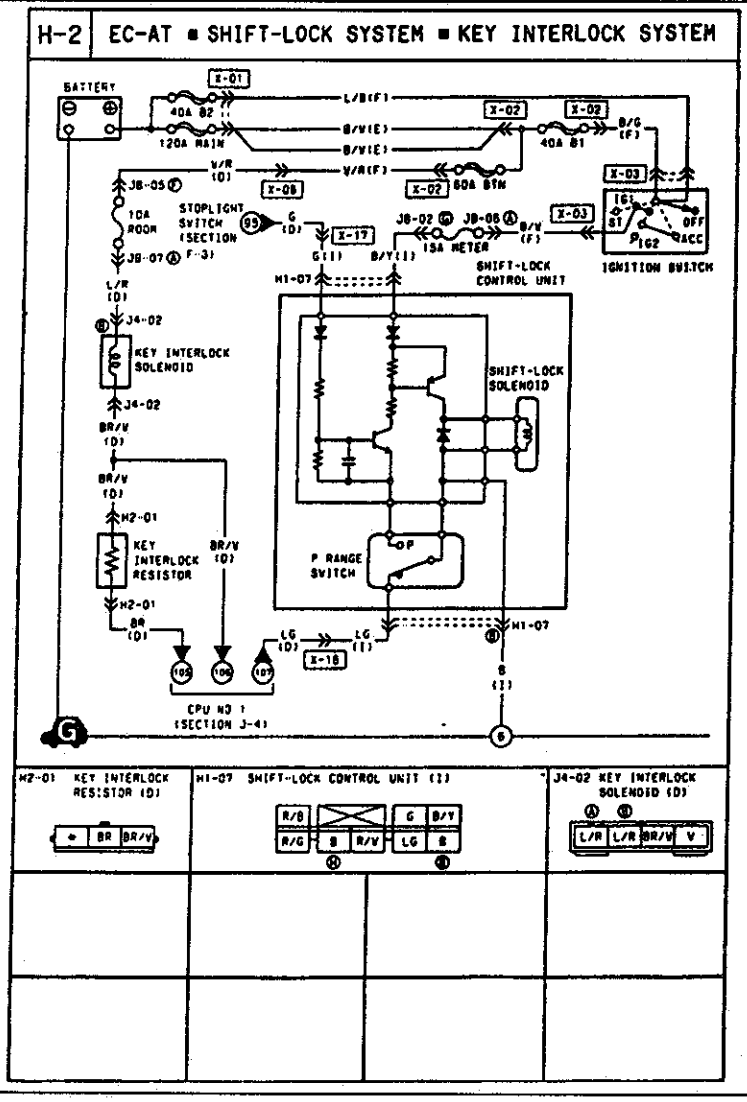
Tightening torque:
103–109 N·m {10.5–11.2 kgf·m, 76.0–81.0 ft·lbf}

SHIFT MECHANISM

SHIFT-LOCK SYSTEM COMPONENTS



TROUBLESHOOTING
Circuit Diagram



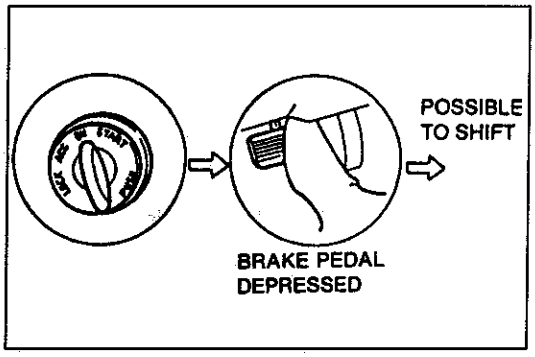
Diagnosis chart

Problem	Possible cause	Action	Page
Selector lever cannot be moved from P range with brake pedal depressed and ignition switch ON	MAIN 120A fuse burned	Replace	K-159
	BTN 60A fuse burned	Replace	K-159
	STOP 20A fuse burned	Replace	K-159
	METER 15A fuse burned	Replace	K-159
	Ignition switch system malfunction • Wire harness broken • Poor connection	 Repair or replace Connect firmly	 K-159 K-159
	Ignition switch malfunction	Inspect and replace	section T*
	Stoplight switch system malfunction • Wire harness broken • Poor connection	 Repair or replace Connect firmly	 K-159 K-159
	Stoplight switch remains OFF	Adjust or replace	section T*
	Shift-lock control system malfunction • Wire harness broken • Poor connection • P range switch remains OFF • Shift-lock control unit malfunction • Shift-lock solenoid malfunction	 Repair or replace Connect firmly Inspect and replace Inspect and replace Inspect and replace	 K-159 K-159 K-162 K-162 K-162
	Misadjustment of selector lever or improper assembly of shift-look solenoid	Adjust or repair	K-164

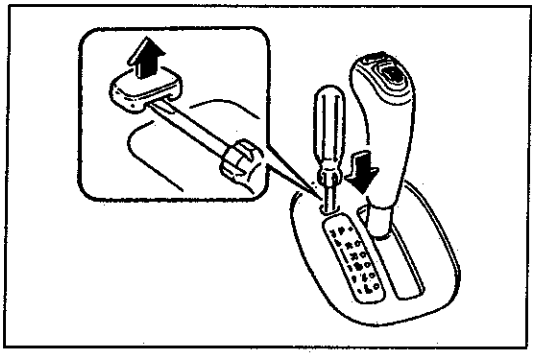
* Refer to 1994 RX-7 Body Electrical Troubleshooting Manual.

Problem	Possible cause	Action	Page
Selector lever can be moved from P range with ignition switch ON, but without brake pedal depressed	Stoplight switch remains ON	Adjust or replace	section T*
	Shift-lock control system malfunction • Shift-lock control unit malfunction	Inspect and replace	K-162
	Misadjustment of selector lever or improper assembly of Shift-lock solenoid	Adjust or repair	K-164
Selector lever can be moved from P range with ignition switch OFF and brake pedal depressed	Ignition switch malfunction	Inspect and replace	section T*
	Shift-lock control system malfunction • Shift-lock control unit malfunction	Inspect and replace	K-162
	Misadjustment of selector lever or improper assembly of Shift-lock solenoid	Adjust or repair	K-164
Shift-lock solenoid operation heard when brake pedal depressed with ignition switch ON in other than P range	P range switch remains ON	Inspect and replace	K-162
	Misadjustment of selector lever or improper assembly of Shift-lock solenoid	Adjust or repair	K-164
Selector lever remains locked when emergency override button operated	Emergency override button not pushed fully down	Push down fully and hold emergency override button, and move selector lever	—
	Broken emergency override button	Replace	K-168
	Misadjustment of indicator panel	Adjust	K-165
Ignition key can be turned to lock position with selector lever in other than P range	MAIN 120A fuse burned	Replace	K-159
	BTN 60A fuse burned	Replace	K-159
	ROOM 10A fuse burned or not installed	Replace or install	K-159
	P range switch system malfunction • Wire harness broken • Poor connection	Repair or replace Connect firmly	K-159 K-159
	P range switch remains ON	Inspect and replace	K-162
	Key interlock solenoid malfunction • Wire harness broken • Poor connection • Key interlock solenoid malfunction	Repair or replace Connect firmly Inspect and replace	K-159 K-159 K-162
	Key interlock resistor malfunction • Wire harness broken • Poor connection	Repair or replace Connect firmly	— —
	Key cylinder (push switch) malfunction • Wire harness broken • Poor connection	Inspect and replace Repair or replace Connect firmly	section T* K-159 K-159
	Central processing unit (CPU) malfunction	Inspect and replace	section T*
Ignition key cannot be turned to lock position with selector lever in P range	P range switch remains OFF	Inspect and replace	K-162
	Key interlock solenoid malfunction	Inspect and replace	K-162
	Key cylinder (push switch) malfunction	Inspect and replace	section T*
	Misadjustment of selector lever	Adjust	K-164

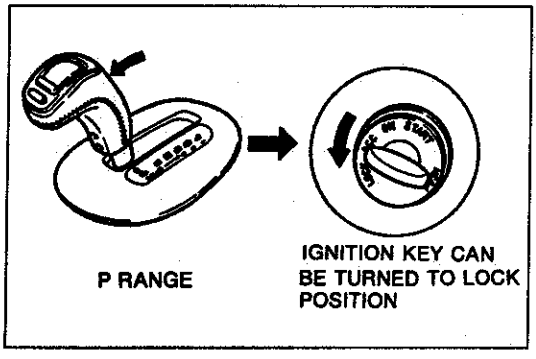
* Refer to 1994 RX-7 Body Electrical Troubleshooting Manual



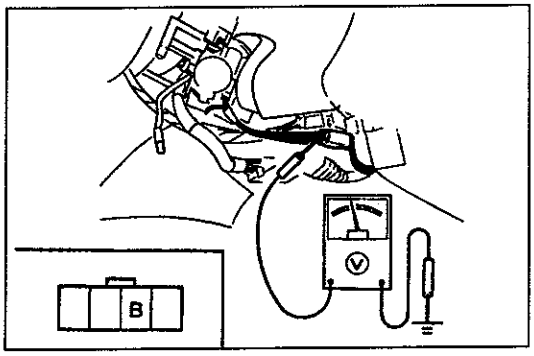
SHIFT-LOCK
Inspection
1. Turn the ignition switch to ON (engine off).
2. Verify that the selector lever is in P range.
3. Without the brake pedal depressed, verify that the selector lever cannot be shifted from P range.
4. Depress the brake pedal and verify that the selector lever can be shifted from P range.
5. If not as specified, check the Shift-lock control system connector terminal voltage and continuity. (Refer to page K-162)

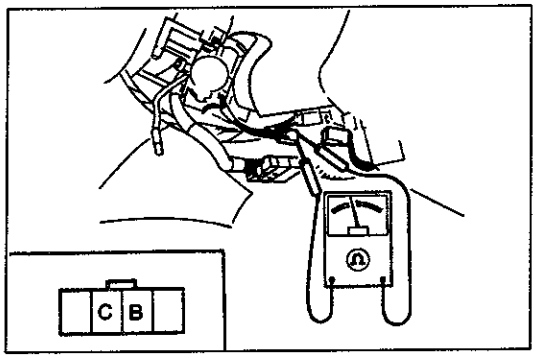


EMERGENCY OVERRIDE BUTTON
Inspection
1. Turn the ignition switch to OFF.
2. Verify that the selector lever is in P range.
3. Without the brake pedal depressed, verify that the selector lever cannot be shifted from P range.
4. Insert the screwdriver provided in the tool kit into the emergency override hole and push down. Verify that the selector lever can be shifted from P range.
5. If not as specified, inspect and repair as necessary, referring to Troubleshooting. (Refer to page K-159.)



KEY INTERLOCK
Inspection
1. Turn the ignition switch ON (engine off).
2. Shift the selector lever to R range.
3. Verify that the ignition key cannot be turned to LOCK position.
4. Shift the selector lever to P range.
5. Verify that the ignition key can be turned to LOCK position.
6. If not as specified, inspect and repair as necessary, referring to Troubleshooting. (Refer to page K-159.)





KEY INTERLOCK SOLENOID

Inspection

Terminal voltage

1. Remove the column cover.
2. Turn the ignition switch ON.
3. Measure the voltage between terminals B and a ground.

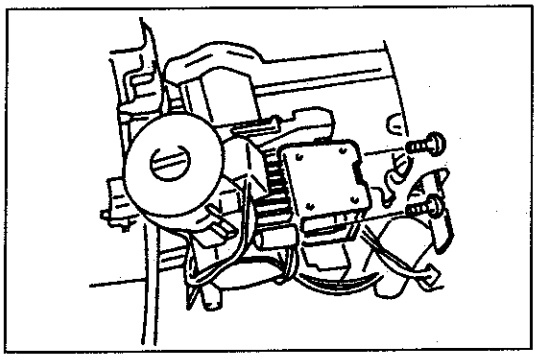
B+: Battery positive voltage

Selector lever position	Voltage
P range	B+
Except P range	0V

4. If not correct, check the key interlock solenoid continuity.

Continuity

1. Disconnect the negative battery cable and the key interlock solenoid connector.
2. Check continuity between terminals B and C.
3. If not correct, replace the key interlock solenoid.
4. Connect the key interlock solenoid connector.
5. Connect the negative battery cable.

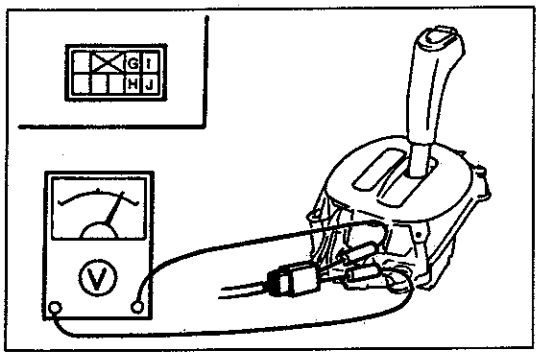


Replacement

1. Disconnect the negative battery cable.
2. Remove the column cover.
3. Disconnect the key interlock solenoid connector.
4. Remove the screws and the key interlock solenoid.
5. Install the new key interlock solenoid and tighten the screws.

Tightening torque:
6.9–12.7 N·m {70–130 kgf·cm, 61–112 in·lbf}

6. Connect the key interlock solenoid connector.
7. Install the column cover.
8. Connect the negative battery cable.



SHIFT-LOCK CONTROL SYSTEM

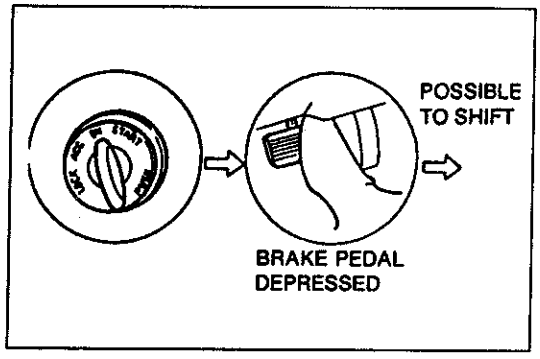
Inspection

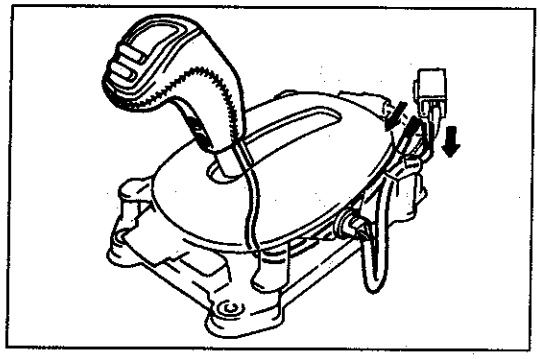
1. Remove the console panel.
2. Shift the selector lever to P range.
3. Turn the ignition switch to ON (engine off), and check terminal voltages and continuity, referring to the chart below. When checking continuity between terminal J (harness side) and ground, disconnect the connector.

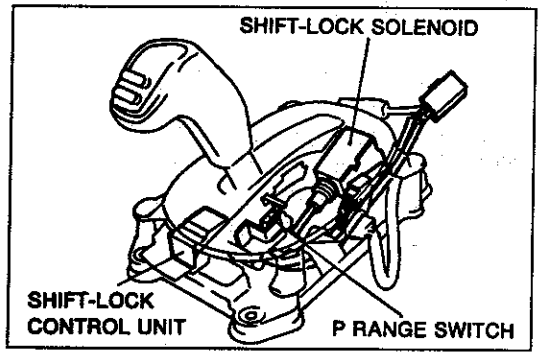
4. Turn the ignition switch OFF, and check continuity between terminal J and a ground, referring to the chart below.
5. If not as specified, repair the wire harness and/or replace the P range switch, shift-lock solenoid, and shift-lock control unit as an assembly.

B+: Battery positive voltage

Terminal	(–) terminal connected to	Measured value	Condition		Specification
G	Ground	Voltage	Brake pedal released → depressed		0V → B+
H	J	Continuity	P range	Selector lever push button released	No
				Selector lever push button depressed	Yes
			Except P range		Yes
I	Ground	Voltage	Ignition switch OFF → ON		0V → B+
J	Ground	Continuitiy	Constant		Yes





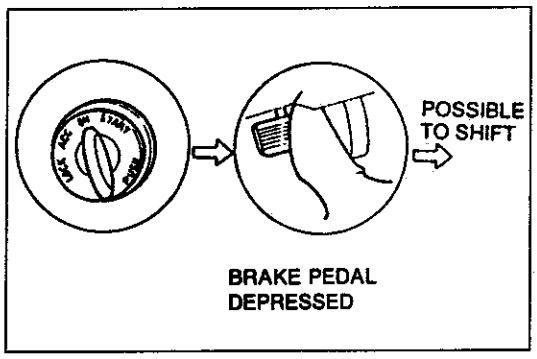


5. Install the console panel.
6. Verify correct operation of the shift-lock system. (Refer to page K–161.)

Replacement

Replace the P range switch, shift-lock solenoid, and shift-lock control unit as an assembly if even one of them is not correct.

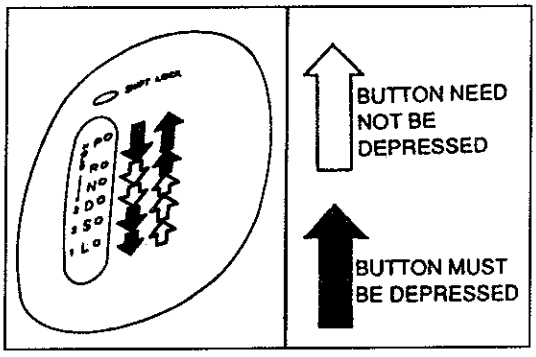
1. Disconnect the negative battery cable.
2. Remove the console panel and rear console.
3. Remove the indicator screws and lift up the indicator panel.
4. Disconnect the shift-lock control unit connector.
5. Pull the hold switch terminals and the position indicator light terminals out of the connector.
6. Remove the P range switch, shift-lock solenoid, and shift-lock control unit as an assembly.
7. Install the new P range switch, shift-lock solenoid, and shift-lock control unit as an assembly.
8. Insert the hold switch terminals and the position indicator light terminals into the connector.
9. Connect the shift-lock control unit connector.
10. Install and adjust the indicator panel. (Refer to page K–165.)
11. Install the console panel and rear console.
12. Connect the negative battery cable.
13. Verify correct operation of the shift-lock system. (Refer to page K–161.)



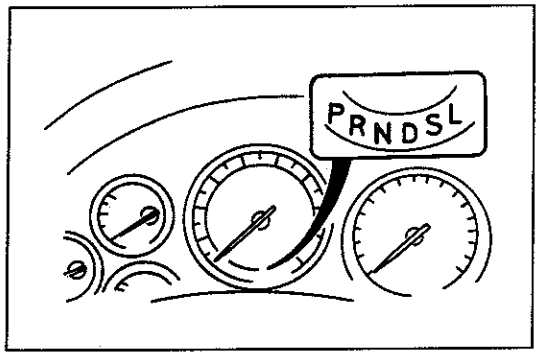
SELECTOR LEVER

Inspection

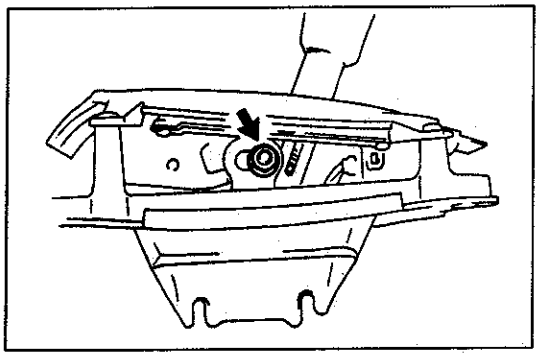
1. Turn the ignition switch to ON (engine off).
2. With the brake pedal depressed, verify that there is a "click" at each range when shifted in the pattern shown.



3. Verify that the selector lever can only be shifted as shown.
4. Verify that there is a "click" at each range when shifted from P → L range.
5. Verify that the positions of the selector lever and the indicator are aligned.
6. If not as specified, adjust the indicator panel. (Refer to page K-165.)



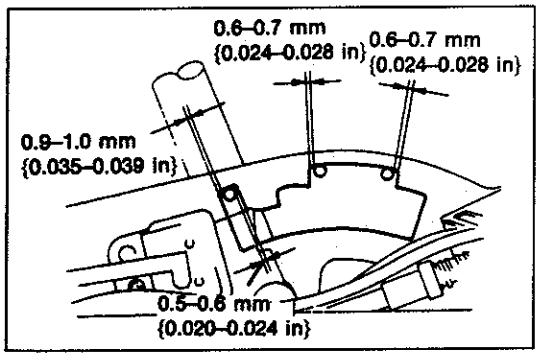
7. Verify that the positions of the selector lever and the selector indicator light in the instrument cluster are aligned.
8. If not as specified, adjust the park/neutral switch. (Refer to page K-28.)
9. Verify that the vehicle operates correctly in the selected ranges.



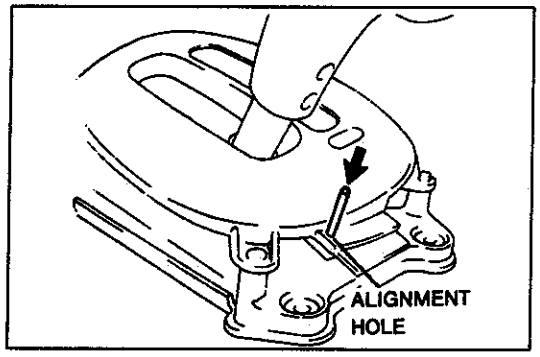
Adjustment

1. Remove the console panel.
2. Remove the indicator screws and lift up the indicator panel.
3. Shift the selector lever to P range.
4. Loosen the locknut as shown.
5. Adjust the lever so that the clearance between the guide plate and the guide pin in P range is as shown.
6. Tighten the locknut.

Tightening torque:
20–28 N·m {2.0–2.9 kgf·m, 15–20 ft·lbf}



7. Move the selector lever to N and D ranges and verify that the clearance between the guide plate and the guide pin is the same at both positions.
8. If not as specified, readjust the lever.
9. Install and adjust the indicator panel. (Refer to page K-165.)
10. Install the console panel.
11. Connect the negative battery cable.



Indicator panel adjustment

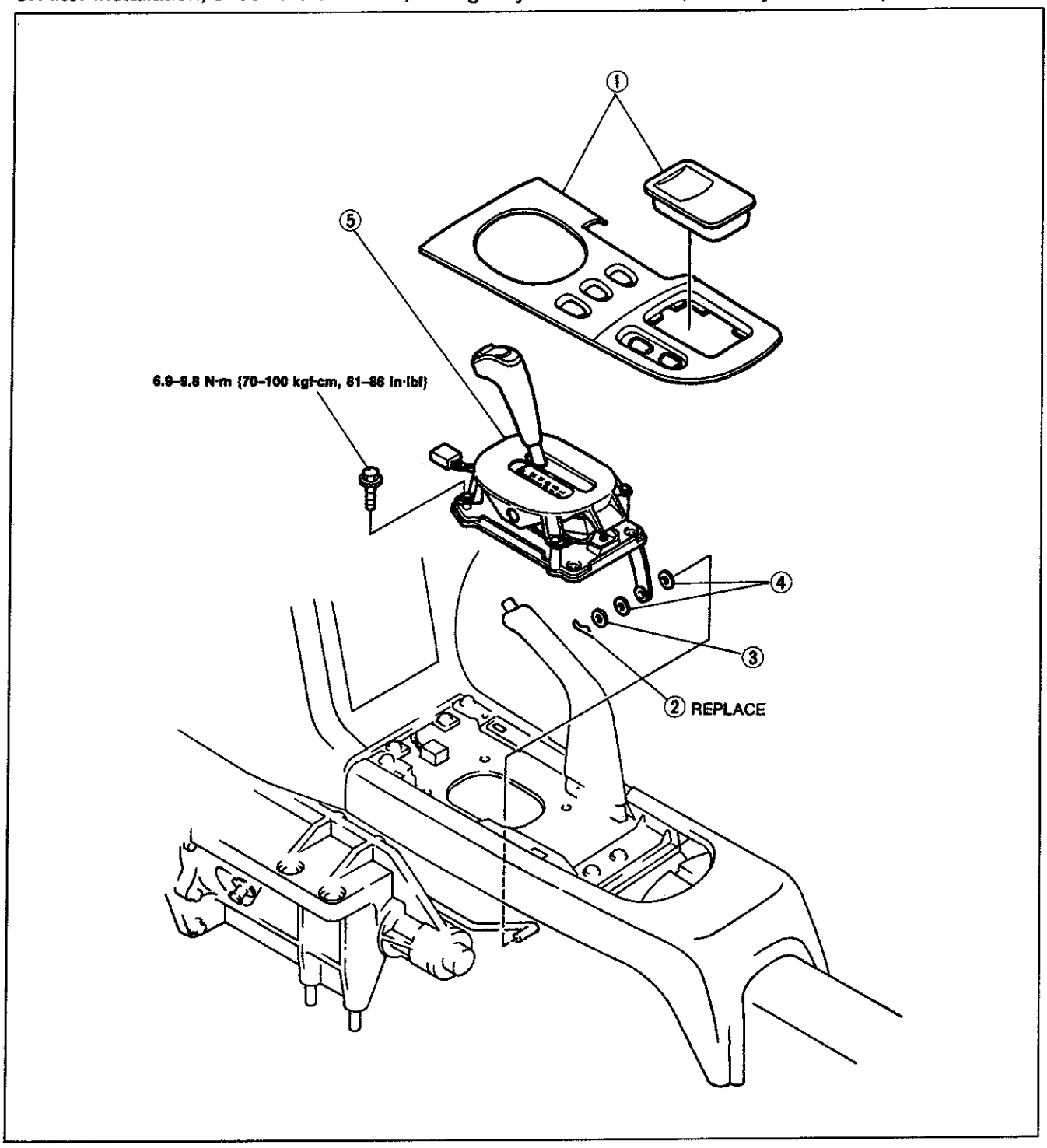
1. Shift the selector lever to P range.
2. Align the alignment holes in the slider with the holes in the indicator panel.
3. Install a suitable heavy-gauge wire to hold the slider.
4. Tighten the indicator screws.

   Tightening torque:
   2.0–2.9 N·m {20–30 kgf·cm, 18–26 in·lbf}

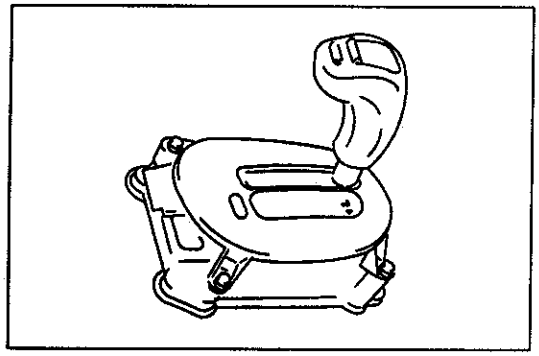
5. Remove the wire.
6. Verify that the selector lever properly aligns with the indicator in each range.

Removal / Installation

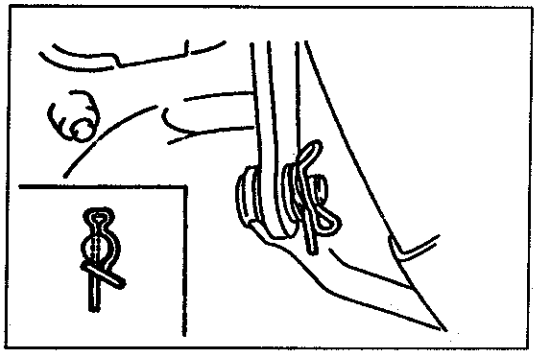
1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure, referring to **Removal Note.**
3. Install in the reverse order of removal, referring to **Installation Note.**
4. Connect the negative battery cable.
5. After installation, check the shift-lock, emergency override button, and key interlock operations.



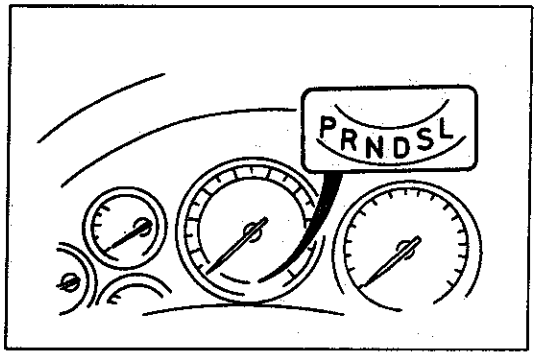
1. Console panel
2. Spring pin
   - Removal Note ..... page K-167
   - Installation Note ..... page K-167
3. Wave washer
4. Washer
5. Selector lever
   - Inspection ..... page K-164
   - Adjustment ..... page K-164
   - Disassembly / Inspection / Assembly ..... page K-168



Removal Note
Spring pin
1. Shift the selector lever to L range.
2. Remove the spring pin and washer.
3. Remove the selector rod from the adjustment lever.



Installation Note
Spring pin
1. Shift the selector lever to L range.
2. Install the selector rod to the adjustment lever.
3. Install the washer and new spring pin as shown.



4. Tighten the selector lever bolt.

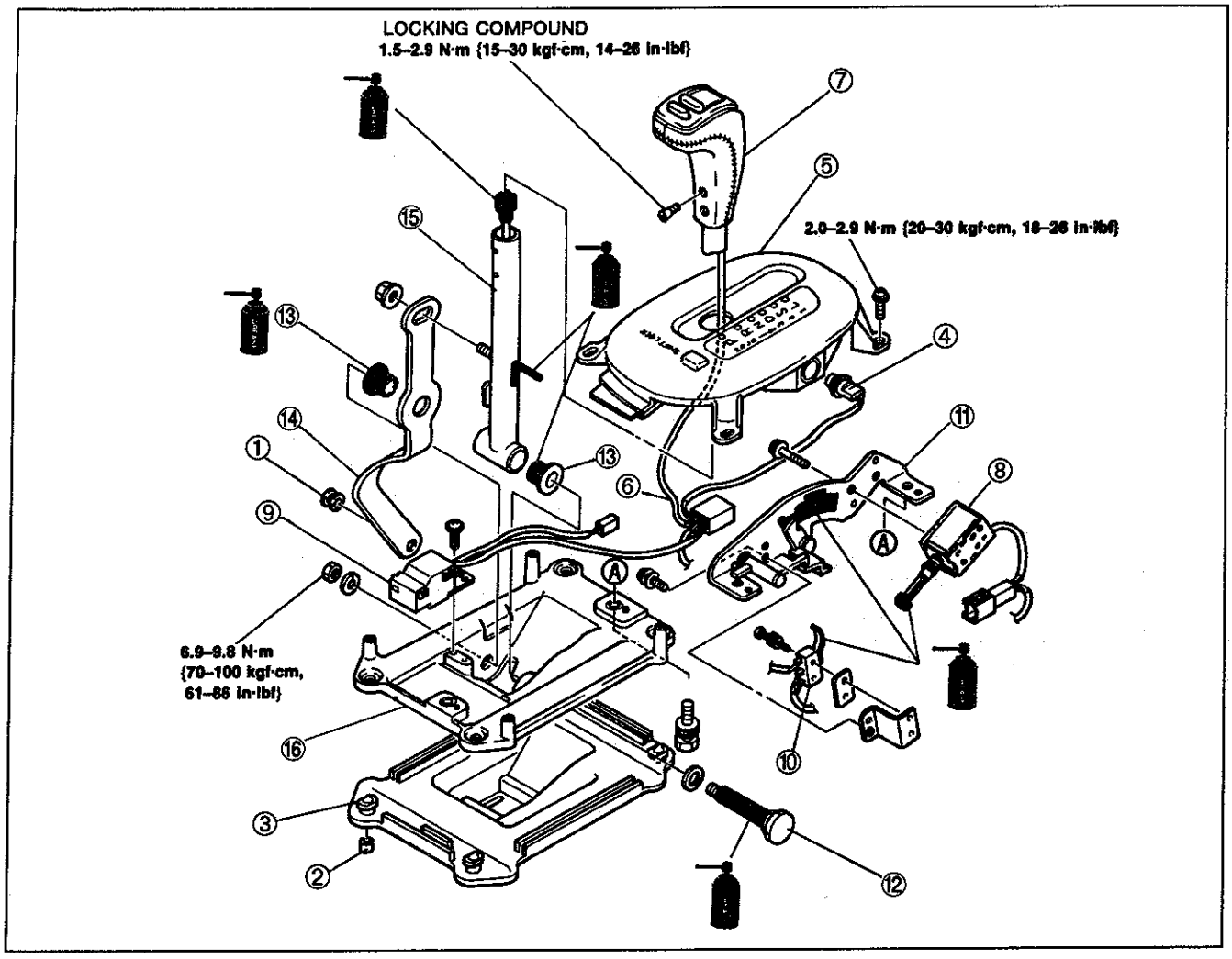
   Tightening torque:
   6.9–9.8 N·m {70–100 kgf·cm, 61–86 in·lbf}

5. Verify that the positions of the selector lever and the selector indicator light are aligned.

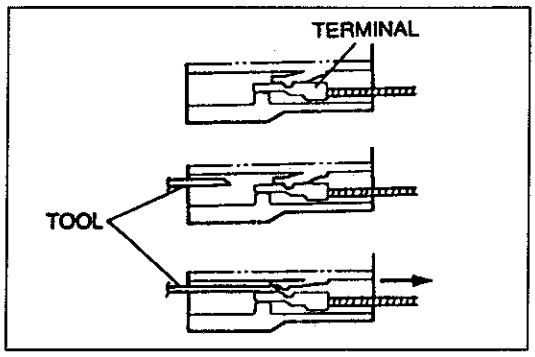
Disassembly / Inspection / Assembly

Note
- The P range switch does not need to be removed unless necessary.

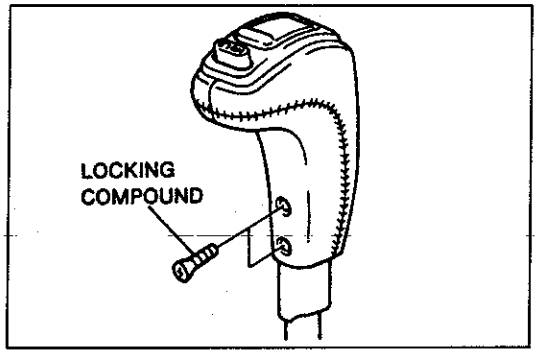
1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Note**.
4. If the adjustment lever locknut is loosened, adjust the selector lever after installation. (Refer to page K-164.)



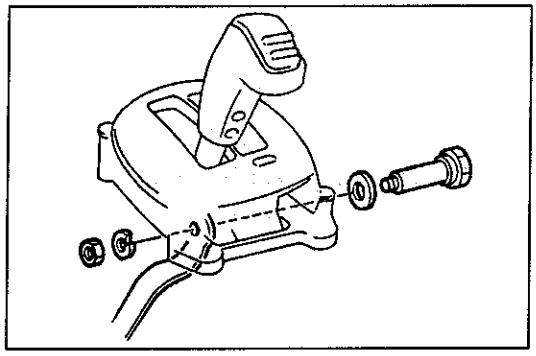
1. Bushing
2. Spacer
3. Boot
4. Position indicator light
5. Indicator panel
   Assembly Note ..... page K-170
6. Connector pin
   Disassembly Note ..... page K-169
7. Selector lever knob
   Disassembly Note ..... page K-169
   Assembly Note ..... page K-170
8. Shift-lock solenoid
   Inspection ..... page K-162
9. Shift-lock control unit
   Inspection ..... page K-162
10. P range switch
    Inspection ..... page K-162
11. Guide plate
12. Spindle
    Disassembly Note ..... page K-169
    Assembly Note ..... page K-169
13. Bushing
14. Adjustment lever
15. Selector lever
    Inspection for smooth operation
    Inspection guide pin for damage and wear
16. Selector lever bracket.



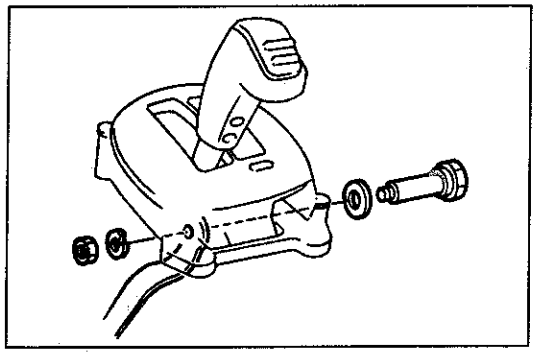
Disassembly Note
Connector pin
1. Insert a thin piece of metal from the terminal side of the connector, and press down the terminal locking top.
2. Pull the terminal out of the connector.



Selector lever knob
1. Remove the screws from selector lever knob.
2. Remove the selector lever knob and sleeve.

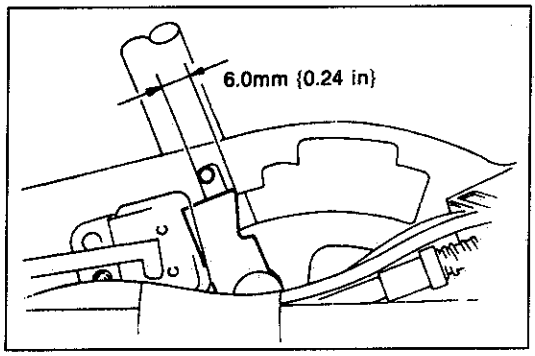


Spindle
1. Shift the selector lever to P range.
2. Secure the adjustment lever in a vise.
3. Remove the spindle nut.

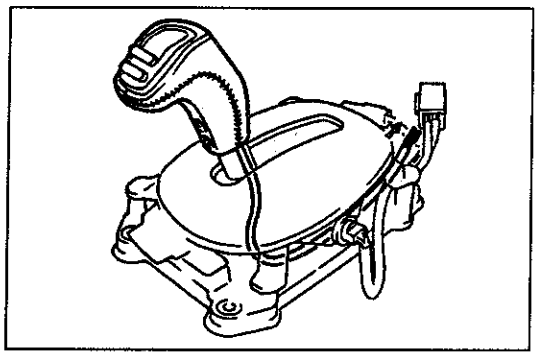


Assembly Note
Spindle
1. Install the selector lever and spindle to the selector lever bracket.
2. Shift the selector lever to P range.
3. Place the adjustment lever in a vise and tighten the spindle nut.

Tightening torque:
6.9–9.8 N·m {70–100 kgf·cm, 61–86 in·lbf}

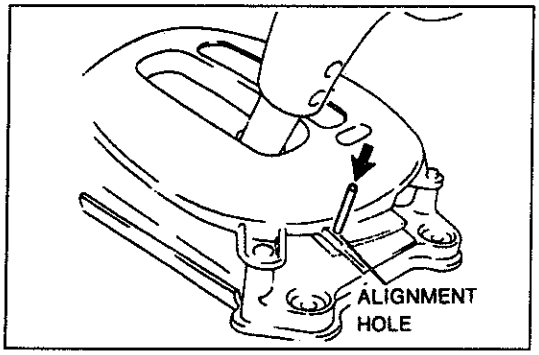


4. Verify that the overlap of the guide pin and the lock lever is within specification with the selector lever pushed forward.



Indicator panel

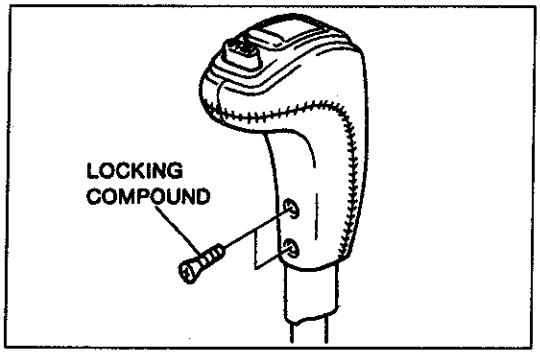
1. Install the selector sleeve and the selector lever knob to the selector lever.
2. Position the hold switch harness as shown.
3. Insert the connector pin to the connector.
4. Shift the selector lever to P range.



5. Align the align ment holes in the slider with the holes in the indicator panel.
6. Install a suitable heavy-gauge wire to hold the slider.
7. Tighten the indicator screws.

Tightening torque:
2.0–2.9 N·m {20–30 kgf·cm, 18–26 in·lbf}

8. Remove the wire.
9. Verify that the selector lever properly aligns with the indicator in each range.



Selector lever knob

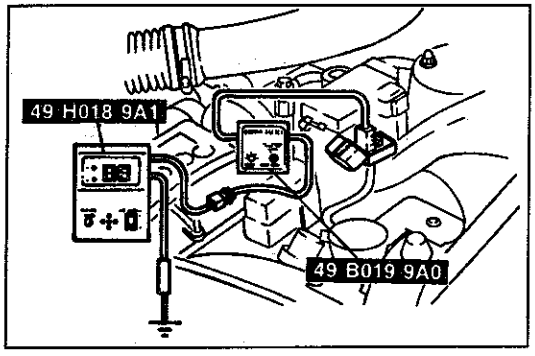
1. Apply locking compound to the screws.
2. Tighten the screws.

Tightening torque:
1.5–2.9 N·m {15–30 kgf·cm, 14–26 in·lbf}

TROUBLESHOOTING GUIDE

GENERAL NOTES

A problem with the Powertrain Control Module (Transmission) may be caused by the engine, the Powertrain Control Module (Transmission), the hydraulic control system, or the electronic control system. When troubleshooting, begin with those points which can be inspected quickly and easily. The recommended troubleshooting sequence is described below.

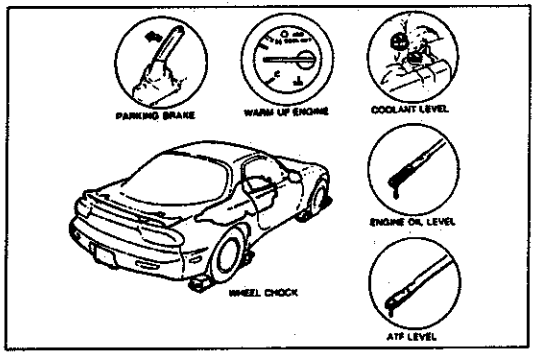


Step 1: Self-diagnostic System Inspection

Check for diagnostic trouble code(s) memorized in the Powertrain Control Module (Transmission) by using the **Self-Diagnosis Checker**. (Refer to page K-214.)

Note

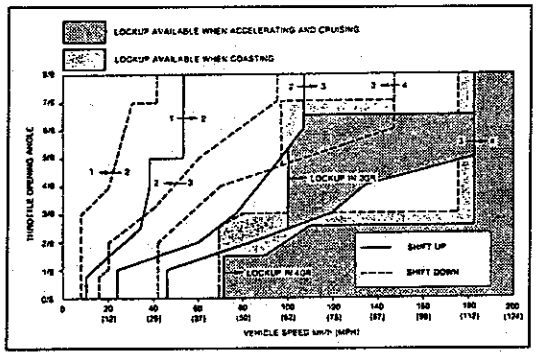
- You can also check the flashing sequence of the HOLD indicator light for diagnostic trouble codes (Refer to page K-214)



Step 2: Mechanical System Test

1. Check the engine stall speed, time lag, and line pressure. (Refer to page K-9.)

2. Check the shift point, shift schedule, and shift shock (Refer to page K-16). Use the Powertrain Control Module (Transmission) when checking vehicle speed, engine speed, throttle opening (throttle position sensor voltage), and gear position



Step 3: Road Test

Check the shift point, shift schedule, and shift shock. (Refer to page K-16) For correct testing, the vehicle speed, engine speed, throttle opening (throttle sensor voltage), and gear position should be checked with the Engine Signal Monitor.

QUICK DIAGNOSIS CHART

OUTLINE

The Quick Diagnosis Chart shows various problems and the various components that might be the cause of the problem.

1. Components indicated in the "Self-diagnosis" row of the QUICK DIAGNOSIS CHART (I) are diagnosed by the powertrain control module (Transmission) self-diagnosis function. **Self-Diagnosis Checker** can be used for easy retrieval of the service code numbers.
2. Components indicated in the "Adjustment" row of the QUICK DIAGNOSIS CHART (I) indicate that there is a possibility that the problem may be the result of an incorrect adjustment.
   Check the adjustment of each component, and readjust if necessary.
3. Input and output signals of the powertrain control module (Transmission) for the components indicated in the Engine Signal Monitor row of the QUICK DIAGNOSIS CHART (I) can be easily checked by using the **Engine Signal Monitor**.
4. Components indicated in the "Stall Test" row of the QUICK DIAGNOSIS CHART (I) can be checked for malfunction by observing the results of the stall test.
5. Components indicated in the "Time Lag Test" row of the QUICK DIAGNOSIS CHART (I) can be checked for malfunction by observing the results of the time lag test.
6. Components indicated in the "Line Pressure Test" row of the QUICK DIAGNOSIS CHART (I) can be checked for malfunction by observing the results of the row pressure test.
7. Components indicated in the "Road Test" row of the QUICK DIAGNOSIS CHART (I) can be checked for malfunction by observing the results of the road test.
8. QUICK DIAGNOSIS CHART (II) shows the relationship between the troubleshooting item and inspection point.

QUICK DIAGNOSIS CHART (I)

Item \ Possible parts and reference page		Preliminary									Electronic system																				
		ATF level and condition K-25	Selector lever K-164	Idle speed and ignition timing section F	Ignition system and starter section G	Stall test K-9	Time lag test K-12	Line pressure test K-14	Road test K-16	Park/neutral switch K-28	Throttle position sensor section F	Vehicle speed sensor (revolution sensor) K-29	Vehicle speedometer sensor K-29	Engine rpm signal section G	ATF thermosensor K-31	Shift A solenoid valve K-32	Shift B solenoid valve K-32	Line pressure solenoid valve K-32	Dropping resistor K-33	Lockup solenoid valve K-32	Lockup control solenoid valve K-32	Overrunning clutch solenoid valve K-32	Vehicle speed pulse generator K-30	Inhibitor signal K-35	Idle signal section F	4GR inhibit signal (ASC signal) K-35	Hold switch K-27	A/C signal K-35
Self-diagnosis											○	○	○	○	○	○	○	○		○	○	○	○								
Adjustment		○	○	○						○	○																				
Testers	Self-diagnosis Checker										○	○	○	○	○	○	○	○		○	○	○	○								
	Engine Signal Monitor									○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Stall test																															
Time lag test																															
Line pressure test																															
Road test																															

QUICK DIAGNOSIS CHART (I)

Electronic system									Hydraulic control system								Powertrain									Possible parts and reference page / Item	
Slip lockup signal	Torque reduced signal	Reduce torque signal	Stoplight switch	Slip lockup OFF signal	Water thermoswitch	Barometric absolute pressure sensor	Mileage switch	Control valve body	N-D accumulator	1-2 accumulator	2-3 accumulator	3-4/N-R accumulator	Band servo	Oil pump	Hydraulic circuit	Torque converter	Reverse clutch	High clutch	Forward clutch	Forward one-way clutch	Overrunning clutch	Low one-way clutch	Low and reverse brake	Brake band (and servo)	Parking mechanism		
K-35	K-35	K-35	K-35	K-35	K-34	K-35	K-35	K-108	K-58	K-58	K-58	K-58	K-76	K-60	K-253	K-57	K-64	K-70	K-83	K-80	K-83	K-83	K-91	K-76	K-97		
	○	○				○																				Self-diagnosis	
			○																							Adjustment	
	○	○				○																				Self-Diagnosis Checker	Testers
○	○	○	○	○	○	○	○																			Engine Signal Monitor	
								○						○		○	○	○	○	○		○	○	○		Stall test	
									○	○		○					○		○			○	○	○		Time lag test	
								○						○	○		○		○				○			Line pressure test	
								○	○	○	○	○							○	○	○	○	○	○	○	Road test	

QUICK DIAGNOSIS CHART (II-1)

Troubleshooting item \ Possible parts and reference page			Preliminary						Electronic system																				
			K-25	K-164	section F	section G	K-9	K-12	K-14	K-16	K-28	section F	K-29	K-29	section G	K-31	K-32	K-32	K-32	K-33	K-32	K-32	K-32	K-30	K-35	section F	K-35	K-27	K-35
			ATF level and condition	Selector lever	Idle speed and ignition timing	Ignition system and starter	Stall test	Time lag test	Line pressure test	Road test	Park/neutral switch	Throttle position sensor	Vehicle speed sensor (revolution sensor)	Vehicle speedometer sensor	Engine rpm signal	ATF thermosensor	Shift A solenoid valve	Shift B solenoid valve	Line pressure solenoid valve	Dropping resistor	Lockup solenoid valve	Lockup control solenoid valve	Overrunning clutch solenoid valve	Vehicle speed pulse generator	Inhibitor signal	Idle signal	4GR inhibit signal (ASC signal)	Hold switch	A/C signal
6	Engine starts in other than P and N ranges			3		2					1																		
14	Engine stalls	Idle when shifted from N or P to other ranges			1						3		5											4	2				
18		On deceleration	1		2						4		6											5	3				
24	Engine rough	On deceleration	1	3					2			6							4	5									
25	Poor acceleration	Drive away	1				3		2	7	10	6	12				8	9	4	5								11	
26		On acceleration																											
30	Surges while cruising											1	3								4					2			
31	Lack of power		1				3		2	7	10	6	12				8	9	4	5								11	
32	Poor fuel economy										10	7	11		9	6	3	4			1	2	5			8	13	14	
40	Vehicle does not move in D, S, L, and/or R range		1	4					2	3		7							5	6									
	①	Vehicle does not move in D, S, and/or L range		1																									
	②	Vehicle does not move in D, and/or S range		1					2										3	4									
	③	Vehicle does not move in R range	1						2										3	4									
41	Vehicle moves in N range		1	3					2			6							4	5									
42	Vehicle moves in P range			1						2																			
43	Excessive creep				1		3		2		9	6							4	5				8	7				
44	No shift									1			5				2	3										4	
	①	Does not shift from 1st to 2nd											4				2	3										1	
	②	Does not shift from 2nd to 3GR											2					1											
	③	Does not shift from to 4GR															1												
	④	Does not shift from 4GR to 3GR									5		6			1	2	3					4				7	8	
	⑤	Does not shift from 4GR to 2nd, or 3GR to 2nd	1						6			2					3	4										5	
	⑥	Does not shift from 3GR to 1st, or 2nd to 1st	1						6			2					3	4										5	
45	Abnormal shift		1									2	3																
	①	Shifts directly from 1st to 3GR	1																										
	②	Does not kickdown when accelerator is depressed in 4GR within kickdown range										1	2				3	4											
	③	Excessive engine speed when accelerated in 4GR due to delayed kickdown										2	1				3	4											
46	Frequent shifting											1																	
47	Shift point high or low											1	3		2														4
48	No lockup										7	4	8		6	3					1	2				5			
49	No kickdown											1	5				2	3										4	

* Numbers in ○ indicate the inspection sequence.

QUICK DIAGNOSIS CHART (II-1)

Electronic system									Hydraulic control system								Powertrain										Possible parts and reference page / Troubleshooting item		
K-35	K-35	K-35	K-35	K-35	K-34	K-35	K-35	K-108	K-58	K-58	K-58	K-58	K-76	K-60	K-253	K-57	K-64	K-70	K-83	K-80	K-83	K-83	K-91	K-76	K-97			
Slip lockup signal	Torque reduced signal	Reduce torque signal	Stoplight switch	Slip lockup OFF signal	Water thermoswitch	Barometric absolute pressure sensor	Mileage switch	Control valve body	N-D accumulator	1-2 accumulator	2-3 accumulator	3-4/N-R accumulator	Band servo	Oil pump	Hydraulic circuit	Torque converter	Reverse clutch	High clutch	Forward clutch	Forward one-way clutch	Overrunning clutch	Low one-way clutch	Low and reverse brake	Brake band (and servo)	Parking mechanism			
																										Engine starts in other than P and N ranges		6
									6						8	7									Idle when shifted from N or P to other ranges	Engine stalls	14
									7						9	8									On deceleration		18
								7										10	9		8		12	11		On deceleration	Engine rough	24
5								13					14	19	21	20	15	16					18	17		Drive away	Poor acceleration	25
																										On acceleration		26
								6							7	8										Surges while cruising		30
								13					14	19	21	20	15	16					18	17		Lack of power		31
					12			15					18		17	16								19		Poor fuel economy		32
								8					9	10	18	14	17	11	16				13	12	15	Vehicle does not move in D, S, L, and/or R range		
															3							2				Vehicle does not move in D, S, and/or L range	①	40
								5							11		6	7	8		9		10			Vehicle does not move in D, and/or S range	②	
								5	6						12		7	8	9	10		11				Vehicle does not move in R range	③	
								7							11		10		8		9					Vehicle moves in N range		41
																									3	Vehicle moves in P range		42
								10																		Excessive creep		43
								6					7		10			9						8		No shift		
								5					6		9			8						7		Does not shift from 1st to 2nd	①	
								3					4		7			6						5		Does not shift from 2nd to 3GR	②	
								2					3		7						5		6	4		Does not shift from to 4GR	③	44
								9					10		12									11		Does not shift from 4GR to 3GR	④	
								7					9		11			8						10		Does not shift from 4GR to 2nd, or 3GR to 2nd	⑤	
								7					10		12			8				9		11		Does not shift from 3GR to 1st, or 2nd to 1st	⑥	
								4					5		7									6		Abnormal shift		
										2			3		5									4		Shifts directly from 1st to 3GR	①	
																										Does not kickdown when accelerator is depressed in 4GR with in kickdown range	②	45
																										Excessive engine speed when accelerated in 4GR due to delayed kickdown	③	
								2							3											Frequent shifting		46
								5																		Shift point high or low		47
								9							11	10										No lockup		48
								6																		No kickdown		49

QUICK DIAGNOSIS CHART (II-2)

Troubleshooting item \ Possible parts and reference page				Preliminary						Electronic system																				
				K-25	K-164	section F	section G	K-9	K-12	K-14	K-16	K-28	section F	K-29	K-29	section G	K-31	K-32	K-32	K-32	K-33	K-32	K-32	K-32	K-30	K-35	section F	K-35	K-27	K-35
			ATF level and condition																											
			Selector lever																											
			Idle speed and ignition timing																											
			Ignition system and starter																											
			Stall test																											
			Time lag test																											
			Line pressure test																											
			Road test																											
			Park/neutral switch																											
			Throttle position sensor																											
			Vehicle speed sensor (revolution sensor)																											
			Vehicle speedometer sensor																											
			Engine rpm signal																											
			ATF thermosensor																											
			Shift A solenoid valve																											
			Shift B solenoid valve																											
			Line pressure solenoid valve																											
			Dropping resistor																											
			Lockup solenoid valve																											
			Lockup control solenoid valve																											
			Overrunning clutch solenoid valve																											
			Vehicle speed pulse generator																											
			Inhibitor signal																											
			Idle signal																											
			4GR inhibit signal (ASC signal)																											
			Hold switch																											
			A/C signal																											
50		Engine speed flares up	When accelerating	1	3					2			6								4	5								
51			When upshifting and/or downshifting	1	3			9		2			6	8							4	5			7					
	①		During 1st to 2nd shifting	1	2			9		3			6	8							4	5				7				
	②		During 2nd to 3GR shifting	1	2			9		3			6	8							4	5			7					
	③		During 3GR to 4GR shifting	1	2			9		3			6	8							4	5				7				
	④		During 4GR, or 3GR to 2nd shifting	1	2			8		3			6								4	5			7					
	⑤		During 3GR, or 2nd to 1st shifting	1	2			9		3			6					8			4	5			7					
52		Excessive shift shock	P, N to R and/or N to D	1		2		4		3		10	7								5	6			9	8				
53			When upshifting and/or downshifting	1				3		2			6	10			8				4	5			9		7			
	①		During 1st to 2nd shifting					12		1			4	7			5				2	3			6					
	②		During 2nd to 3GR shifting					12		1			4	7			5				2	3			6					
	③		During 3GR to 4GR shifting					8		1			4	7			5				2	3			6					
	④		During 2nd to 1st shifting in L range					10		1			4	7			5				2	3			6					
	⑤		When coasting							2			5	8			6				3	4		1	7		9			
	⑥		During lockup	1									3	7		6							2		5		4			
54	No engine braking			1								5	3											2				4		
55	No mode changes																												1	
56	Transmission noise		N and/or P ranges	1									4	5		6					2	3								
57			All ranges	1																										
58	Transmission overheats			1				3		2			6								4	5	7	8						
				2		1				4			7	10		9					5	6	3				8			
					3		2				1																			
											3														2	1				

* Numbers in ○ indicate the inspection sequence.

QUICK DIAGNOSIS CHART (II-2)

Electronic system									Hydraulic control system								Powertrain										Possible parts and reference page / Troubleshooting item			
K-35	K-35	K-35	K-35	K-35	K-34	K-35	K-35	K-108	K-58	K-58	K-58	K-58	K-76	K-60	K-253	K-57	K-64	K-70	K-83	K-80	K-83	K-83	K-91	K-76	K-97				
Slip lockup signal	Torque reduced signal	Reduce torque signal	Stoplight switch	Slip lockup OFF signal	Water thermoswitch	Barometric absolute pressure sensor	Mileage switch	Control valve body	N-D accumulator	1-2 accumulator	2-3 accumulator	3-4/N-R accumulator	Band servo	Oil pump	Hydraulic circuit	Torque converter	Reverse clutch	High clutch	Forward clutch	Forward one-way clutch	Overrunning clutch	Low one-way clutch	Low and reverse brake	Brake band (and servo)	Parking mechanism				
								7						13	15	14	11		8	9		10	12			When accelerating			50
						10		11		12	13	14			20			16	17	18		19		15		When upshifting and/or downshifting			51
							10	11		12					14									13		During 1st to 2nd shifting	Engine speed flares up	①	
							10	11			12				15			14						13		During 2nd to 3GR shifting		②	
								10				11			14			13						12		During 3GR to 4GR shifting		③	
								9							12			11						10		During 4GR, or 3GR to 2nd shifting			
								10							12									11		During 3GR, or 2nd to 1st shifting		④	
								11	12			13			17		15		14				16			P, N to R and/or N to D			52
	11	12				13		14		15	16	17			21			20			19			18		When upshifting and/or downshifting			53
	8	9				11	10	12		13					15									14		During 1st to 2nd shifting	Excessive shift shock	①	
	8	9				11	10	12			13				16			15						14		During 2nd to 3GR shifting		②	
						9		10				11			14						13			12		During 3GR to 4GR shifting		③	
	8	9				11		12							14								13			During 2nd to 1st shifting in L range		④	
								10																		When coasting		⑤	
								8							10	9										During lockup		⑥	
								6							9						7		8			No engine braking			54
																										No mode changes			55
														7		8										N and/or P ranges	Transmission noise		56
																2										All ranges			57
								9						10	18	17	11	12	14		15		16	13		Transmission overheats			58
								11							13	12													

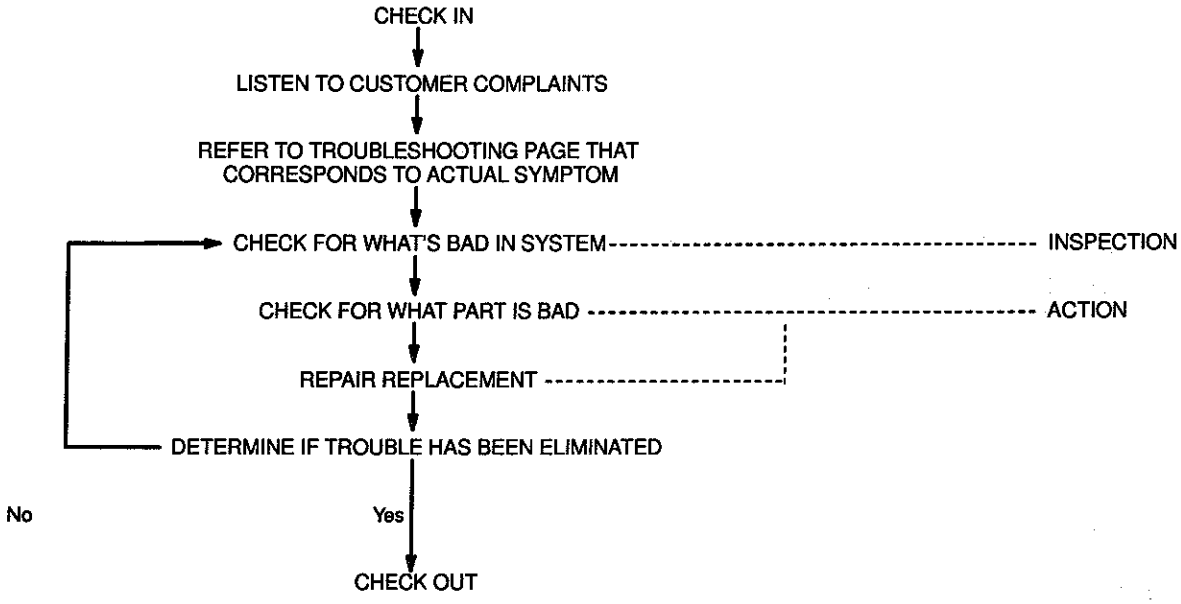
SYMPTOM TROUBLESHOOTING

USING THIS SECTION

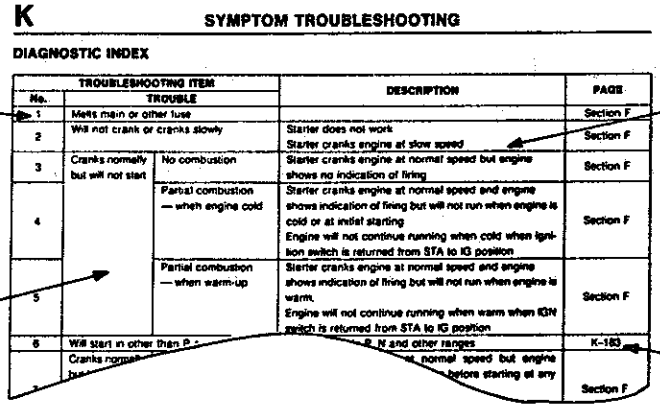
Introduction

Most of the automatic transmission control system is electronically controlled, often making it difficult to diagnose problems in the system, especially intermittent problems. Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a drivability complaint. The customer is often a good source of information on such problems, especially intermittent ones. Through talks with the customer, one can find out what the symptoms are and under what conditions they occur.

Work Flow



Diagnostic Index



K SYMPTOM TROUBLESHOOTING

DIAGNOSTIC INDEX

No.	TROUBLESHOOTING ITEM TROUBLE		DESCRIPTION	PAGE
1	Melts main or other fuse			Section F
2	Will not crank or cranks slowly		Starter does not work Starter cranks engine at slow speed	Section F
3	Cranks normally but will not start	No combustion	Starter cranks engine at normal speed but engine shows no indication of firing	Section F
4		Partial combustion — when engine cold	Starter cranks engine at normal speed and engine shows indication of firing but will not run when engine is cold or at initial starting Engine will not continue running when cold when ignition switch is returned from STA to IG position	Section F
5		Partial combustion — when warm-up	Starter cranks engine at normal speed and engine shows indication of firing but will not run when engine is warm. Engine will not continue running when warm when IGN switch is returned from STA to IG position	Section F
6	Will start in other than P ...		... R, N and other ranges	K-183
7	Cranks normal...		... at normal speed but engine ... before starting at any	Section F

No.:
Each troubleshooting item is assigned a number

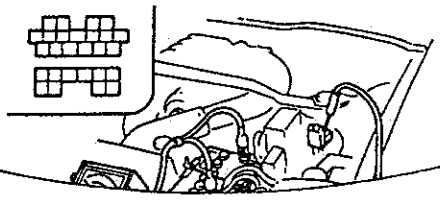
Troubleshooting Item:
There are 58 troubleshooting items. Choose the item that most closely corresponds to the actual symptom.

Description:
Describes each troubleshootiong item

Page:
Shows the reference page.

Troubleshooting Chart

K SYMPTOM TROUBLESHOOTING

14	ENGINE STALLS IDLE WHEN SHIFTED FROM N OR P TO OTHER RANGES		
DESCRIPTION	• Engine stops unexpectedly when shifted from N or P to other ranges at idle		
[TROUBLESHOOTING HINTS] ① Engine idle speed low ② Control valve stuck (lockup control valve, shuttle shift valve D, lockup modifier valve, or pilot valve) ③ Inhibitor signal malfunction ④ Park/Neutral switch worn or misadjusted ⑤ Vehicle speed pulse generator malfunction ⑥ Vehicle speed sensor (revolution sensor) malfunction			
STEP	INSPECTION		ACTION
1	Are ignition timing and idle speed OK? ☞Section F **Ignition timing: Leading 5° ATDC, Trailing 20° ATDC** **Idle speed: 700–750 rpm (P range)** 	Yes	Go to next step
		No	Adjust ignition timing and/or idle speed ☞Section F

DESCRIPTION:
Further describes the symptom. Confirm that the chart addresses the actual symptom before beginning troubleshooting.

TROUBLESHOOTING HINTS:
Describes the possible point of malfunction.

STEP:
Shows the order of troubleshooting. Proceed with troubleshooting as indicated.

INSPECTION:
Describes an inspection method to quickly determine the malfunction of parts. If a detailed procedure is necessary to perform the INSPECTION, refer to the page shown by the "☞" mark.

ACTION:
Recommends the appropriate action to take as a result (Yes/No) of the INSPECTION. How to perform the action is described on the reference page shown by the "☞" mark.

DIAGNOSTIC INDEX

TROUBLESHOOTING ITEM			DESCRIPTION	PAGE
No.	TROUBLE			
1	Melts main or other fuse			section F
2	Will not crank or cranks slowly		Starter does not work Starter cranks engine at slow speed	section F
3	Cranks normally but will not start	No combustion	Starter cranks engine at normal speed but engine shows no indication of firing	section F
4		Partial combustion – when engine cold	Starter cranks engine at normal speed and engine shows indication of firing but will not run when engine is cold or at initial starting Engine will not continue running when cold when ignition switch is returned from STA to IG position	section F
5		Partial combustion – when warm-up	Starter cranks engine at normal speed and engine shows indication of firing but will not run when engine is warm Engine will not continue running when warm when IGN switch is returned from STA to IG position	section F
6	Will start in other than P and N ranges		Engine starts in P, N and other ranges	K–183
7	Cranks normally but hard to start	Any engine temp.	Starter cranks engine at normal speed but engine requires excessive cranking time before starting at any engine temperature Engine starts after stalling a few times at any engine temperature	section F
8		When engine cold	Starter cranks engine at normal speed but engine requires excessive cranking time before starting when engine is cold Engine starts after stalling a few times when engine is cold	section F
9		After warm-up	Starter cranks engine at normal speed but engine requires excessive cranking time before starting after warm-up	section F
10	Engine stalls	Idle at any engine temp.	Engine stops unexpectedly at any engine temp.	section F
11		During fast idle	Engine stops unexpectedly during fast-idle operation	section F
12		Idle after warm-up	Engine stops unexpectedly at idle after warm-up	section F
13		Idle with A/C, P/S, and/or E/L ON	Engine stops unexpectedly when A/C, P/S, and/or E/L turned ON at idle	section F
* 14		Idle when shifted from N or P to other ranges	Engine stops unexpectedly when shifted from N or P to other ranges at idle	section F K–184
15		Driveway	Engine stops unexpectedly upon driveaway	section F
16		On acceleration	Engine stops unexpectedly at beginning of acceleration or during acceleration	section F
17		While cruising	Engine stops unexpectedly while cruising	section F
*18		On deceleration	Engine stops unexpectedly at beginning of deceleration or recovery from deceleration exhaust afterburn	section F K–186
19	Engine rough	Idle at any engine temp.	Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at any engine temp. Idle speed too slow and excessive engine shake at any engine temp.	section F
20		During fast idle	Fast idle speed too slow and excessive engine shake during fast idle, but returns to normal after warm-up	section F
21		Idle after warm-up	Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at idle after warm-up	section F

* Refer to section F before referring to K sections.

TROUBLESHOOTING ITEM			DESCRIPTION	PAGE
No.	TROUBLE			
22	Engine rough	Idle with A/C, P/S, and/or E/L ON	Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at idle when A/C, P/S, and/or E/L ON	section F
23		Idle when shifted from N or P to other range	Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake at idle when shifted from P or N to other range	section F
* 24		On deceleration	Engine shakes at beginning of deceleration, during deceleration, or recovery from deceleration Exhaust afterburn	section F K-187
* 25	Poor acceleration	Driveaway	Engine speed increases normally but vehicle speed slowly increases during driveaway	section F K-189
* 26		On acceleration	Engine speed increases normally but vehicle speed slowly increases during acceleration	
27	High idle speed after warm-up		Idle speed continues at fast idle after warm-up Engine returns slowly to idle after acceleration is released	section F
28	Idle fluctuates / Idle hants		Engine speed changes back and forth between specified idle speed and higher speed	section F
29	Hesitates / Stumbles on acceleration		Momentary pause at beginning of acceleration or during acceleration	section F
* 30	Surges while cruising		Momentary minor irregularity in engine output at steady vehicle speed	section F K-192
* 31	Lack of power		Performance poor under load (i.e., power down when climbing hills)	section F K-194
* 32	Poor fuel economy		Fuel economy unsatisfactory	section F K-194
33	A/C does not work		A/C compressor magnetic clutch does not engage when Air conditioning sensor ON	section F
34	Knocking / Pinging		Sound produced when air/fuel mixture is ignited by something other than spark plug (i.e., hot spot in combustion chamber)	section F
35	Fuel odor		Gasoline fuel smell or visible leaks	section F
36	Exhaust sulfur smell		Rotten egg smell from exhaust	section F
37	High oil consumption		Oil consumption excessive	section F
38	Self-Diagnosis Checker flashes 88		MIL always ON/Self-Diagnosis Checker flashes 88 with test connector ground	section F
39	MIL never ON		Self-Diagnosis Checker indicates diagnostic trouble code No. of input device but MIL never ON	section F
40	Vehicle does not move in D, S, L and/or R ranges		No creep at all Vehicle does not move when accelerator pedal depressed after shifted to D, S, L and/or R range	K-194
41	Vehicle moves in N range		Vehicle creeps in N range Vehicle moves when accelerator pedal not depressed	F-195
42	Vehicle moves in P range		Vehicle rolls in P range, and drivetrain not lockup	F-195
43	Excessive creep		Vehicle moves quickly in D, S, L and R ranges (accelerator pedal not depressed) Excessive N to R range and N to D range shift shock felt	F-195

* Refer to section F before referring to K section.

TROUBLESHOOTING ITEM No.	TROUBLE		DESCRIPTION	PAGE
44	No shift		With gear position in hold mode: Single range shift (1st → 2nd, 2nd → 3GR, or 3GR → 4GR) only Sometimes shifts correctly	K-196
45	Abnormal shift		Shifts incorrectly (incorrect shift pattern) (ex) Vehicle shifts 1st → 4GR directly when accelerating with accelerator pedal depressed slightly	K-198
46	Frequent shifting		Downshift occurs when accelerator depressed slightly in D, S and L ranges (except hold mode)	K-200
47	Shift point high or low		Shift points do not match shift diagram Shift delayed when accelerating Shifts occur too fast when accelerating and engine speed does not increase	K-201
48	No lockup		No lockup when vehicle speed reaches lockup range	K-202
49	No kickdown		Does not downshift when accelerator pedal depressed more than 7/8 within kickdown range	K-202
50	Engine speed flares up	When accelerating	Engine speed flares up on acceleration	K-202
51		When upshifting and/or downshifting	Engine flares up when accelerator pedal depressed for upshifting Engine flares up suddenly when accelerator pedal depressed for downshifting	K-203
52	Excessive shift shock	P, N to R and/or N to D	Strong shift shock felt at idle when shifting from N to D or R range	K-205
53		When upshifting and/or downshifting	Excessive shift shock felt when accelerating at upshifting During cruising, excessive shift shock felt when accelerator pedal depressed at downshifting	K-208
54	No engine braking		Engine speed drops to idle but vehicle does not slow when accelerator pedal released during cruising at medium to high speed Engine speed drops to idle but vehicle does not slow when accelerator pedal released when in L range at low vehicle speed	K-211
55	No mode change		Mode does not change to/from normal mode in D range Hole mode not selected or not cancelled	K-213
56	Transmission noise	All ranges	Transmission noisy in all ranges when vehicle is idling	K-213
57		D, S, L, R ranges	Abnormal noise from transmission in D, S, L, R	K-213
58	Transmission overheats		ATF smells burnt and/or is discolored	K-213

SYMPTOM TROUBLESHOOTING CHART

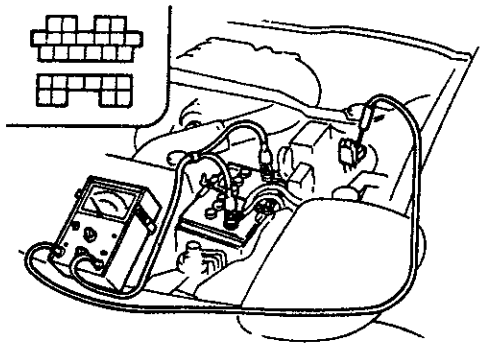
6	WILL START IN OTHER THAN P AND N RANGES
DESCRIPTION	• Engine starts in P, N and other ranges

[TROUBLESHOOTING HINTS]
Inspect parts and wiring; repair, adjust, or replace malfunctioning parts as necessary

① Park/Neutral switch worn or misadjusted ☞page K–28
② Ignition system malfunction ☞section G
③ Selector lever installation or adjustment incorrect ☞page K–164

14	ENGINE STALLS IDLE WHEN SHIFTED FROM N OR P TO OTHER RANGES
DESCRIPTION	• Engine stops unexpectedly when shifted from N or P to other ranges at idle

[TROUBLESHOOTING HINTS]
① Engine idle speed low
② Control valve stuck (lockup control valve, shuttle shift valve D, lockup modifier valve, or pilot valve)
③ Inhibitor signal malfunction
④ Park/Neutral switch worn or misadjusted
⑤ Vehicle speed pulse generator malfunction
⑥ Vehicle speed sensor (revolution sensor) malfunction

STEP	INSPECTION		ACTION
1	Are ignition timing and idle speed OK? ☞section F 	Yes	Go to next step
		No	Adjust ignition timing and/or idle speed ☞section F
2	Is problem corrected when 20-pin and 16-pin connectors of powertrain control module (Transmission) are disconnected?	Yes	Go to next step
		No	Overhaul control valve body and repair or replace parts as necessary If large amounts of material are found, overhaul transmission and repair or replace parts as necessary
3	Is output voltage of inhibitor signal at powertrain control module (Transmission) terminal OK? B+: Battery positive voltage	Yes	Check wiring and connector from terminal 1C of powertrain control module (Transmission) to terminal 1R of powertrain control module (Engine)
		No	Go to next step

Term.	Unit	Spec.	Condition	Page
1C	V	B+	D range	K-35
		Below 1.0	P and N ranges	

Unit: V → Voltage

STEP	INSPECTION		ACTION
4	Are measurements at powertrain control module (Transmission) terminals OK?	Yes	Replace powertrain control module (Transmission) ☞page K-41
		No	Check for malfunctioning parts and wiring ● Park/Neutral switch ☞page K-28 ● Vehicle speed pulse generator ☞page K-30 ● Vehicle speed sensor (revolution sensor) ☞page K-29

B+: Battery positive voltage

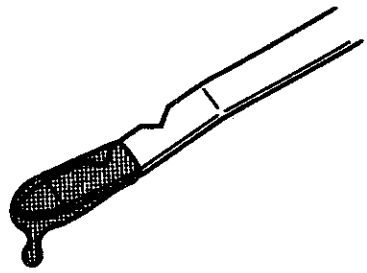
Term.	Unit	Spec.	Condition	Page
2D	V	0	P and N ranges	K-35
		B+	Except P and N ranges	
1E	V	B+	R range	
		0	Except R range	
2B	V	B+	D range	
		0	Except D range	
2S	V	B+	S range	
		0	Except S range	
2Q	V	B+	L range	
		0	Except L range	
2E↔2L	kΩ	2.2-3.5	Constant (Ign: OFF)	
2J↔2L	Ω	500-1,000	Constant (Ign: OFF)	

Unit: V → Voltage
Ω → Resistance

TERMINAL	FUNCTION
2D, 1E, 2B, 2S, 2Q	Park/Neutral switch
2E	Vehicle speed pulse generator
2J	Vehicle speed sensor
2L	Ground (input)

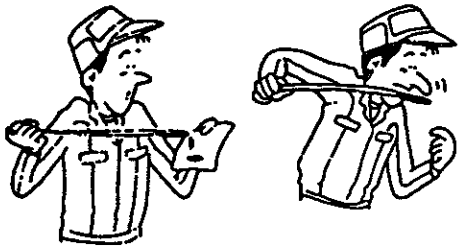
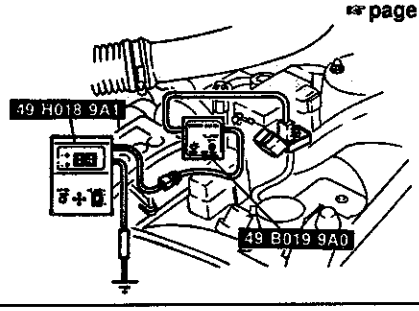
18	ENGINE STALLS ON DECELERATION
DESCRIP-TION	• Engine stops unexpectedly at beginning of deceleration or recovery from deceleration • Exhaust afterburn

[TROUBLESHOOTING HINTS]
① ATF level low

STEP	INSPECTION		ACTION
1	Is ATF level OK? ☞page K–25 **Level: Between notches on dipstick** 	Yes	Go to No.14 "ENGINE STALLS WHEN SHIFTED FROM N TO D AND/OR FROM N TO R RANGE" in section K of this manual ☞page K–184
		No	Adjust ATF level ☞page K–25

24	ENGINE ROUGH ON DECELERATION
DESCRIPTION	• Engine shakes at beginning of deceleration, during deceleration, or recovery from deceleration • Exhaust afterburn

[TROUBLESHOOTING HINTS]
① ATF level low
② Selector lever installation or adjustment incorrect
③ Throttle position sensor malfunction or misadjusted
④ Line pressure low
⑤ Powertrain slippage (forward clutch, forward one-way clutch, low one-way clutch, reverse clutch, or low and reverse brake)
⑥ Control valve stuck (pressure regulator valve, pressure modifier valve, or pilot valve)
⑦ Line pressure solenoid valve worn
⑧ Dropping resistor malfunction

STEP	INSPECTION		ACTION
1	Are ATF level and condition OK? ☞page K-25 	Yes	Go to next step
		No	Problem within transmission Go to next step, and check for the main cause When the problem is found, overhaul the transmission and repair or replace parts as necessary
2	Are there any diagnostic trouble code(s) displayed on the Self-Diagnosis Checker when the ignition switch is ON? ☞page K-214 	Yes	Check for cause of code(s) ☞page K-214 If problem remains, overhaul transmission and repair or replace parts as necessary
		No	Go to next step
3	Is line pressure OK? ☞page K-14 **Specified line pressure** **kPa (kgf/cm², psi)**	Yes	Overhaul transmission and repair or replace parts as necessary
		No	Check selector lever operation ☞page K-164 If OK, go to next step If not OK, adjust, repair or replace selector lever ☞page K-164, 166

Engine	Range	Idle	Stall
13B	D, S, L	500–520 {5.0–5.4, 72–76}	1,200–1,270 {12.2–13.0, 174–184}
	R	620–650 {6.3–6.7, 90–95}	1,510–1,570 {15.3–16.1, 218–228}

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td>4</td><td>Are measurements at powertrain control module (Transmission) terminals OK?
<table>
<tr><th>Term.</th><th>Unit</th><th>Spec.</th><th>Condition</th><th>Page</th></tr>
<tr><td rowspan="2">1F</td><td>Ω</td><td>2.5–5.0</td><td>Constant (Ign OFF)</td><td>K–35</td></tr>
<tr><td rowspan="2">%</td><td>Approx. 100</td><td>Throttle valve fully closed (Ign: ON)</td><td rowspan="2">K–246</td></tr>
<tr><td>Approx. 5</td><td>Throttle valve fully opened (Ign: ON)</td></tr>
<tr><td rowspan="2">1H</td><td>Ω</td><td>12.5–19.0</td><td>Constant (Ign OFF)</td><td>K–35</td></tr>
<tr><td rowspan="2">%</td><td>Approx. 100</td><td>Throttle valve fully closed v(Ign: ON)</td><td rowspan="2">K–246</td></tr>
<tr><td>Approx. 5</td><td>Throttle valve opened (Ign: ON)</td></tr>
</table>
Unit: Ω → Resistance
% → ON duty
<table>
<tr><th>TERMINAL</th><th>FUNCTION</th></tr>
<tr><td>1F</td><td>Line pressure solenoid valve</td></tr>
<tr><td>1H</td><td>Dropping resistor</td></tr>
</table></td><td>Yes</td><td>Replace control valve body assembly
☞ page K–128

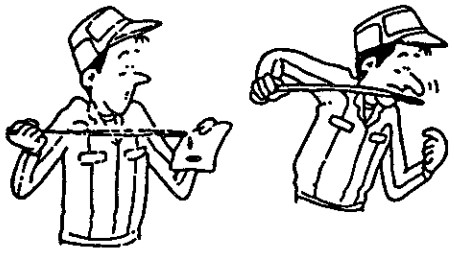
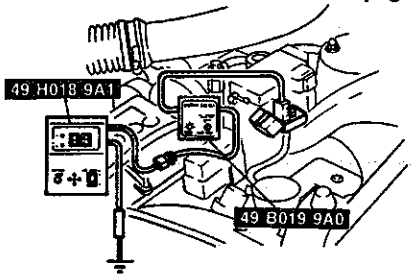
If problem remains, overhaul transmission and repair or replace parts as necessary</td></tr>
<tr><td></td><td></td><td>No</td><td>If resistance not OK, check for malfunctioning parts and wiring
● Lline pressure solenoid valve ☞ page K–32
● Dropping resistor ☞ page K–33

If resistance OK but voltage not, go to next step</td></tr>
<tr><td>5</td><td>Is input voltage of throttle position sensor at powertrain control module (Transmission) OK?
<table>
<tr><th>Term.</th><th>Unit</th><th>Spec.</th><th>Condition</th><th>Page</th></tr>
<tr><td rowspan="2">2T</td><td rowspan="2">V</td><td>0.1–1.1</td><td>Throttle valve closed throttle position</td><td rowspan="2">K–35</td></tr>
<tr><td>4.0–4.5</td><td>Throttle valve wide open throttle</td></tr>
</table>
Unit: V → Voltage</td><td>Yes</td><td>Replace powertrain control module (Transmission)
☞ page K–41</td></tr>
<tr><td></td><td></td><td>No</td><td>Check throttle position sensor and wiring
☞ section F</td></tr>
</table>

25, 26	POOR ACCELERATION WHEN DRIVE AWAY OR ON ACCELERATION
DESCRIPTION	• Engine speed increases normally but vehicle speed slowly increases during driveaway. • Engine speed increases normally but vehicle speed slowly increases during acceleration.

[TROUBLESHOOTING HINTS]

① ATF level low
② Selector lever installation or adjustment incorrect
③ Throttle position sensor malfunction or misadjusted
④ Line pressure low
⑤ Powertrain slippage
⑥ Control valve stuck (pressure regulator valve, pressure modifier valve, pilot valve, shift valve A, or shift valve B)
⑦ Line pressure solenoid valve worn
⑧ Dropping resistor malfunction
⑨ Shift A, B solenoid valve worn
⑩ Park/Neutral switch worn
⑪ Hold switch worn
⑫ Vehicle speed sensor (revolution sensor) malfunction
⑬ Torque converter worn
⑭ Engine power low

STEP	INSPECTION		ACTION
1	Are ATF level and condition OK? ☞page K-25 	Yes	Go to next step
		No	Problem within transmission Go to next step, and check for the main cause when the problem is found, overhaul the transmission and repair or replace parts as necessary
2	Are there any diagnostic trouble code(s) displayed on the Self-Diagnosis Checker when the ignition switch is ON? ☞page K-214 	Yes	Check for cause of code(s) ☞ page K-214
		No	Go to next step
3	Is line pressure OK? ☞page K-14 **Specified line pressure** **kPa {kgf/cm², psi}** Engine 13B: Range D, S, L: Idle 500–520 {5.0–5.4,72–76}; Stall 1,200–1,270 {12.2–13.0, 174–184} Engine 13B: Range R: Idle 620–650 {6.3–67,90–95}; Stall 1,510–1,570 {15.3–16.1, 218–228}	Yes	Go to next step
		No	Check selector lever operation ☞page K-164 If OK, go to next step If not OK, adjust, repair or replace selector lever ☞ page K-164, 166

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td>4</td><td>Is engine stall speed OK?
☞page K-9
rpm
<table><tr><th>Engine</th><th>Engine stall speed</th></tr><tr><td>13B</td><td>3,000–3,300</td></tr></table></td><td>Yes</td><td>Go to Step 7</td></tr>
<tr><td></td><td></td><td>No</td><td>Overhaul transmission and repair or replace parts as necessary</td></tr>
<tr><td>5</td><td>Are measurements at powertrain control module (Transmission) terminals OK?
<table><tr><th>Term.</th><th>Unit</th><th>Spec.</th><th>Condition</th><th>Page</th></tr><tr><td rowspan="3">1F</td><td>Ω</td><td>2.5–5.0</td><td>Constant (Ign: OFF)</td><td>K-35</td></tr><tr><td rowspan="2">%</td><td>Approx. 100</td><td>Throttle valve closed throttle position (Ign: ON)</td><td rowspan="2">K-246</td></tr><tr><td>Approx. 5</td><td>Throttle valve wide open throttle (Ign: ON)</td></tr><tr><td rowspan="3">1H</td><td>Ω</td><td>12.5–190</td><td>Constant (Ign: OFF)</td><td>K-35</td></tr><tr><td rowspan="2">%</td><td>Approx. 100</td><td>Throttle valve closed throttle position (Ign: ON)</td><td rowspan="2">K-246</td></tr><tr><td>Approx. 5</td><td>Throttle valve wide open throttle (Ign: ON)</td></tr></table>Unit: Ω → Resistance
% → ON duty
<table><tr><th>TERMINAL</th><th>FUNCTION</th></tr><tr><td>1F</td><td>Line pressure solenoid valve</td></tr><tr><td>1H</td><td>Dropping resistor</td></tr></table></td><td>Yes</td><td>Overhaul transmission and repair or replace parts as necessary</td></tr>
<tr><td></td><td></td><td>No</td><td>If resistance not OK, check for malfunctioning parts and wiring
• Line pressure solenoid valve ☞page K-32
• Dropping resistor ☞page K-33

If resistance OK but duty not, go to next step</td></tr>
<tr><td>6</td><td>Is input voltage of throttle position sensor at powertrain control module (Transmission) OK?
<table><tr><th>Term.</th><th>Unit</th><th>Spec.</th><th>Condition</th><th>Page</th></tr><tr><td rowspan="2">2T</td><td rowspan="2">V</td><td>0.1–1.1</td><td>Throttle valve closed throttle position</td><td rowspan="2">K-35</td></tr><tr><td>4.0–4.5</td><td>Throttle valve wide open throttle</td></tr></table>Unit: V → Voltage</td><td>Yes</td><td>Replace powertrain control module (Transmission)
☞page K-41

If problem remains, overhaul transmission and repair or replace parts as necessary</td></tr>
<tr><td></td><td></td><td>No</td><td>Check throttle position sensor and wiring
☞section F

If problem remains, overhaul transmission and repair or replace parts as necessary</td></tr>
<tr><td>7</td><td>Disconnect solenoid 8-pin connector; is vehicle driven as follows?
☞page K-247
<table><tr><th>Range</th><th>Gear position</th></tr><tr><td>D range</td><td>3GR (fixed)</td></tr><tr><td>S range</td><td>3GR (fixed)</td></tr><tr><td>L range</td><td>2nd (fixed)</td></tr><tr><td>R range</td><td>Reverse (fixed)</td></tr></table></td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Replace control valve body assembly
☞page K-128

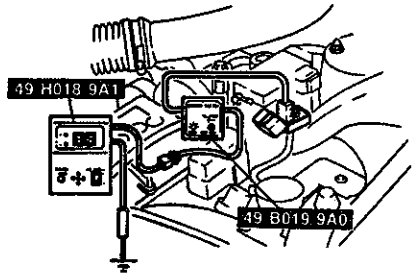
If problem remains, overhaul transmission and repair or replace parts as necessary</td></tr>
<tr><td>8</td><td>Drive vehicle in D, S, and L ranges (except hold mode); does vehicle start from stop in 1st gear?

Are engine rpm at 20km/h {12 mph} and throttle opening OK?
RPM: Approx. 2,100
Throttle opening: 4/8</td><td>Yes</td><td>Overhaul transmission and repair or replace parts as necessary</td></tr>
<tr><td></td><td></td><td>No</td><td>Go to next step</td></tr>
</table>

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td>9</td><td>Are measurements at powertrain control module (Transmission) terminals OK?
B+: Battery positive voltage
<table>
<tr><th>Term.</th><th>Unit</th><th>Spec.</th><th>Condition</th><th>Page</th></tr>
<tr><td rowspan="3">1D</td><td>Ω</td><td>20–40</td><td>Constant (Ign: OFF)</td><td rowspan="6">K–35</td></tr>
<tr><td rowspan="2">V</td><td>Below 1.0</td><td>2nd and 3GR gear</td></tr>
<tr><td>B+</td><td>1st and 4GR gear</td></tr>
<tr><td rowspan="3">1B</td><td>Ω</td><td>20–40</td><td>Constant (Ign: OFF)</td></tr>
<tr><td rowspan="2">V</td><td>Below 1.0</td><td>3GR and 4GR gear</td></tr>
<tr><td>B+</td><td>1st and 2nd gear</td></tr>
</table>
Unit: Ω → Resistance
V → Voltage
<table>
<tr><th>TERMINAL</th><th>FUNCTION</th></tr>
<tr><td>1D</td><td>Shift A solenoid valve</td></tr>
<tr><td>1B</td><td>Shift B solenoid valve</td></tr>
</table></td><td>Yes</td><td>Replace control valve body assembly
☞page K–128
If problem remains, overhaul transmission and repair or replace parts as necessary</td></tr>
<tr><td></td><td></td><td>No</td><td>If resistance not OK, check for malfunctioning parts and wiring
• Shift A solenoid valve ☞page K–32
• Shift B solenoid valve ☞page K–32
If resistance OK but voltage not, go to next step</td></tr>
<tr><td>10</td><td>Are measurements at powertrain control module (Transmission) terminals OK?
B+: Battery positive voltage
<table>
<tr><th>Term.</th><th>Unit</th><th>Spec.</th><th>Condition</th><th>Page</th></tr>
<tr><td rowspan="2">2D</td><td rowspan="2">V</td><td>0</td><td>P and N ranges</td><td rowspan="12">K–35</td></tr>
<tr><td>B+</td><td>Except P and N ranges</td></tr>
<tr><td rowspan="2">1E</td><td rowspan="2">V</td><td>0</td><td>R range</td></tr>
<tr><td>B+</td><td>Except R range</td></tr>
<tr><td rowspan="2">2B</td><td rowspan="2">V</td><td>0</td><td>D range</td></tr>
<tr><td>B+</td><td>Except D range</td></tr>
<tr><td rowspan="2">2S</td><td rowspan="2">V</td><td>0</td><td>S range</td></tr>
<tr><td>B+</td><td>Except S range</td></tr>
<tr><td rowspan="2">2Q</td><td rowspan="2">V</td><td>0</td><td>L range</td></tr>
<tr><td>B+</td><td>Except L range</td></tr>
<tr><td rowspan="2">2I</td><td rowspan="2">V</td><td>0</td><td>Switch depressed</td></tr>
<tr><td>B+</td><td>Switch released</td></tr>
<tr><td>2J ↔ 2L</td><td>Ω</td><td>500–1,000</td><td>Constant (Ign: OFF)</td></tr>
</table>
Unit: V → Resistance
Ω → Voltage
<table>
<tr><th>TERMINAL</th><th>FUNCTION</th></tr>
<tr><td>2D, 1E, 2B, 2S, 2Q</td><td>Park/Neutral switch</td></tr>
<tr><td>2I</td><td>Hold switch</td></tr>
<tr><td>2J</td><td>Vehicle speed sensor</td></tr>
<tr><td>2L</td><td>Ground (Input)</td></tr>
</table></td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Check for malfunctioning parts and wiring
• Park/Neutral switch ☞ page K–28
• Hold switch ☞ page K–27
• Vehicle speed sensor (revolution sensor) ☞ page K–29
If problem remains, return to step 7</td></tr>
<tr><td>11</td><td>Replace with known good powertrain control module (Transmission); is problem corrected?
☞page K–41</td><td>Yes</td><td>Replace powertrain control module (Transmission)
☞page K–41</td></tr>
<tr><td></td><td></td><td>No</td><td>Replace torque converter</td></tr>
</table>

30	SURGES WHILE CRUISING
DESCRIPTION	• Momentary minor irregularity in engine output at steady vehicle speed

[TROUBLESHOOTING HINTS]
① ATF level low
② Throttle position sensor malfunction or misadjusted
③ Lockup solenoid valve worn
④ Idle signal malfunction
⑤ Slip lockup OFF signal malfunction

STEP	INSPECTION		ACTION
1	Are there any diagnostic trouble code(s) displayed on the Self-Diagnosis Checker when the ignition switch is ON? ☞page K-214 	Yes	Check for cause of code(s) ☞page K-214
		No	Go to next step
2	Is input voltage of throttle position sensor at powertrain control module (Transmission) OK? Term. / Unit / Spec. / Condition / Page 2T / V / 0.1–1 1 / Throttle valve closed throttle position / K-35 2T / V / 4.0–4.5 / Throttle valve wide open throttle / K-35 Unit: V → Voltage	Yes	Go to next step
		No	Check throttle position sensor and wiring ☞section F
3	Are resistance and output duty of lockup solenoid valve at powertrain control module (Transmission) terminals OK? Term. / Unit / Spec. / Condition / Page 1M / Ω / 10–20 / Constant (Ign: OFF) / K-35 1M / % / Approx. 5 / No lockup (Ign: ON) / K-247 1M / % / Approx. 95 / Lockup (Ign: ON) / K-247 Unit: Ω → Resistance % → ON duty	Yes	Replace control valve body assembly ☞page K-128 If problem remains, overhaul transmission and repair or replace parts as necessary
		No	If resistance not OK, check for lockup solenoid valve and wiring ☞page K-32 If resistance OK but duty not, go to next step

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td>4</td><td>Are measurements at powertrain control module (Transmission) terminals OK?

B+: Battery positive voltage
<table>
<tr><th>Term.</th><th>Unit</th><th>Spec.</th><th>Condition</th><th>Page</th></tr>
<tr><td rowspan="2">2M</td><td rowspan="2">V</td><td>Below 1.0</td><td>Throttle valve closed throttle position</td><td rowspan="4">K-35</td></tr>
<tr><td>4.5–5.5</td><td>Throttle valve opened</td></tr>
<tr><td rowspan="2">2G</td><td rowspan="2">V</td><td>Below 1.0</td><td>Engine running at 3,000 rpm</td></tr>
<tr><td>B+</td><td>Engine running at idle</td></tr>
</table>
Unit: V → Voltage
<table>
<tr><th>TERMINAL</th><th>FUNCTION</th></tr>
<tr><td>2M</td><td>Idle signal</td></tr>
<tr><td>2G</td><td>Slip lockup OFF signal</td></tr>
</table></td><td>Yes</td><td>Replace powertrain control module (Transmission)
☞page K-41

If problem remains, overhaul transmission and repair or replace parts as necessary</td></tr>
<tr><td></td><td></td><td>No</td><td>Check for malfunctioning parts and wiring
• Idle signal ☞page K-35
• Slip lockup OFF signal ☞page K-35</td></tr>
</table>

31	LACK OF POWER
DESCRIPTION	• Performance poor under load (i.e., power down when climbing hills)

[TROUBLESHOOTING HINTS]
Inspect parts and wiring; repair, adjust, or replace malfunctioning parts as necessary

① ATF level low ☞page K-25
② Selector lever installation or adjustment incorrect ☞page K-164
③ Throttle position sensor malfunction or misadjusted ☞section F
④ Line pressure low ☞page K-14
⑤ Powertrain slippage
⑥ Control valve stuck (pressure regulator valve, pressure modifier valve, shift valve A or shift valve B)
⑦ Lline pressure solenoid valve worn ☞page K-32
⑧ Dropping resistor malfunction ☞page K-33
⑨ Shift A and/or B solenoid valve worn ☞page K-32
⑩ Park/Neutral switch worn or misadjusted ☞page K-28
⑪ Hold switch circuit malfunction ☞page K-27
⑫ Vehicle speed sensor (revolution sensor) malfunction ☞page K-29
⑬ Torque converter worn ☞page K-57
⑭ Engine power low

32	POOR FUEL ECONOMY
DESCRIPTION	• Fuel economy unsatisfactory

[TROUBLESHOOTING HINTS]
Inspect parts and wiring; repair, adjust, or replace malfunctioning parts as necessary

① Lockup solenoid valve worn ☞page K-32
② Lockup control solenoid valve worn ☞page K-32
③ Control valve stuck (lockup control valve, lockup modifier valve, pilot valve, or shuttle shift valve D)
④ ATF thermosensor malfunction ☞page K-31
⑤ Throttle position sensor malfunction or misadjusted ☞section F
⑥ Engine rpm signal malfunction ☞page K-35
⑦ Vehicle speed sensor (revolution sensor) malfunction ☞page K-29
⑧ Park/Neutral switch worn or misadjusted ☞page K-28

40	VEHICLE DOES NOT MOVE IN D, S, L AND/OR R RANGES
DESCRIPTION	• No creep at all • Vehicle does not move when accelerator pedal depressed after shifted to D, S, L and/or R range

[TROUBLESHOOTING HINTS]
Inspect parts and wiring; repair, adjust, or replace malfunctioning parts as necessary

① ATF level low ☞page K-25
② Selector lever installation or adjustment incorrect ☞page K-164
③ Throttle position sensor malfunction or misadjusted ☞section F
④ Line pressure low ☞page K-14
⑤ Powertrain slippage (high clutch, brake band, forward clutch, or reverse clutch)
⑥ Control valve stuck (manual valve pressure regulator valve, pressure modifier valve or pilot valve)
⑦ Line pressure solenoid valve worn ☞page K-32
⑧ Dropping resistor malfunction ☞page K-33
⑨ Parking mechanism worn ☞page K-97

41	VEHICLE MOVES IN N RANGE
DESCRIPTION	• Vehicle creeps in N range • Vehicle moves when accelerator pedal not depressed

[TROUBLESHOOTING HINTS]
Inspect parts and wiring; repair, adjust, or replace malfunctioning parts as necessary

① Selector lever installation or adjustment incorrect ☞page K–164
② Powertrain burnt (forward clutch, or overrunning clutch)
③ Throttle position sensor malfunction or misadjusted ☞section F
④ Control valve stuck (manual valve)
⑤ Line pressure solenoid valve worn ☞page K–32
⑥ Dropping resistor malfunction ☞page K–33

42	VEHICLE MOVES IN P RANGE
DESCRIPTION	• Vehicle rolls in P range, and drivetrain not lookup

[TROUBLESHOOTING HINTS]
Inspect parts and wiring; repair, adjust, or replace malfunctioning parts as necessary

① Selector lever installation or adjustment incorrect ☞page K–164
② Parking mechanism worn ☞page K–97

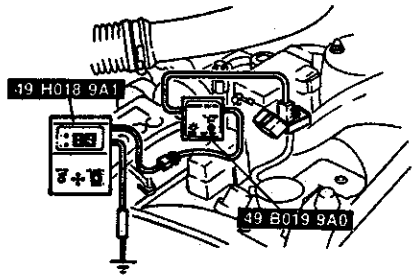
43	EXCESSIVE CREEP
DESCRIPTION	• Vehicle moves quickly in D, S, L, and R ranges (accelerator pedal not depressed) • Excessive N to R range and N to D range shift shock felt

[TROUBLESHOOTING HINTS]
Inspect parts and wiring; repair, adjust, or replace malfunctioning parts as necessary

① Engine idle speed misadjusted ☞section F
② Line pressure at idle high ☞page K–14

44	NO SHIFT
DESCRIP-TION	With gear position usually in hold mode ● Single range shift (1st → 2nd, 2nd → 3GR, or 3GR → 4GR) only ● Sometimes shifts correctly

[TROUBLESHOOTING HINTS]
① Shift A and B solenoid valves worn
② Control valve stuck
③ Hold switch malfunction
④ Vehicle speed sensor (revolution sensor) malfunction
⑤ Poor ground
⑥ Powertrain control module (Transmission) malfunction

STEP	INSPECTION		ACTION
1	Are there any diagnostic trouble code(s) displayed on the Self-Diagnosis Checker when the ignition switch is ON? ☞page K-214 	Yes	Check for cause of code(s) ☞page K-214
		No	Go to next step
2	Disconnect solenoid 8-pin connector; is vehicle driven as follows? ☞page K-247 **Range / Gear position** D range: 3GR (fixed) S range: 3GR (fixed) L range: 2nd (fixed) R range: Reverse (fixed)	Yes	Go to next step
		No	Replace control valve body assembly ☞page K-128 If problem remains, overhaul transmission and repair or replace parts as necessary
3	Drive vehicle in D, S, and L ranges (except hold mode); does vehicle start from stop in 1st gear? Are engine rpm at 20 km/h {12 mph} and throttle opening OK? **RPM: Approx. 2,100** **Throttle opening: 4/8**	Yes	Go to step 5
		No	Go to next step

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td>4</td><td>Are measurements at powertrain control module (Transmission) terminals OK?

B+: Battery positive voltage

<table>
<tr><th>Term.</th><th>Unit</th><th>Spec.</th><th>Condition</th><th>Page</th></tr>
<tr><td rowspan="3">1D</td><td>Ω</td><td>20–40</td><td>Constant (Ign: OFF)</td><td rowspan="6">K–35</td></tr>
<tr><td rowspan="2">V</td><td>Below 1.0</td><td>2nd and 3GR gear</td></tr>
<tr><td>B+</td><td>1st and 4GR gear</td></tr>
<tr><td rowspan="3">1B</td><td>Ω</td><td>20–40</td><td>Constant (Ign: OFF)</td></tr>
<tr><td rowspan="2">V</td><td>Below 1.0</td><td>3GR and 4GR gear</td></tr>
<tr><td>B+</td><td>1st and 2nd gear</td></tr>
</table>
Unit: Ω → Resistance
V → Voltage

<table>
<tr><th>TERMINAL</th><th>FUNCTION</th></tr>
<tr><td>1D</td><td>Shift A solenoid valve</td></tr>
<tr><td>1B</td><td>Shift B solenoid valve</td></tr>
</table></td><td>Yes</td><td>Replace control valve body assembly
☞page K–128

If problem remains, overhaul transmission and repair or replace parts as necessary</td></tr>
<tr><td></td><td></td><td>No</td><td>If resistance not OK, check for malfunctioning parts and wiring
• Shift A solenoid valve ☞page K–32
• Shift B solenoid valve ☞page K–32

If resistance OK, but voltage not, go to next step</td></tr>
<tr><td>5</td><td>Are measurements at powertrain control module (Transmission) terminals OK?

B+: Battery positive voltage

<table>
<tr><th>Term.</th><th>Unit</th><th>Spec.</th><th>Condition</th><th>Page</th></tr>
<tr><td rowspan="2">2I</td><td rowspan="2">V</td><td>0</td><td>Switch depressed</td><td rowspan="3">K–35</td></tr>
<tr><td>B+</td><td>Switch released</td></tr>
<tr><td>2J ↔ 2L</td><td>Ω</td><td>500–1,000</td><td>Constant
(Ign: OFF)</td></tr>
</table>
Unit: V → Voltage
Ω → Resistance

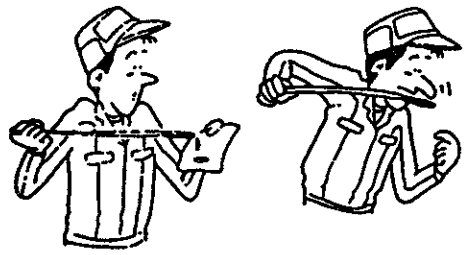
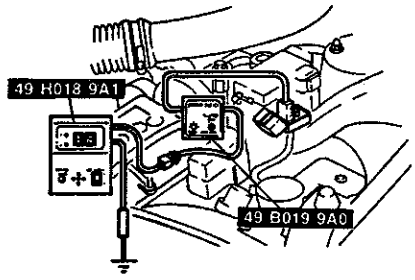
<table>
<tr><th>TERMINAL</th><th>FUNCTION</th></tr>
<tr><td>2I</td><td>Hold switch</td></tr>
<tr><td>2J</td><td>Vehicle speed sensor</td></tr>
<tr><td>2L</td><td>Ground (input)</td></tr>
</table></td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Check for malfunctioning parts and wiring
• Hold switch ☞page K–27
• Vehicle speed sensor (revolution sensor) ☞page K–29

If problem remains, return to step 3</td></tr>
<tr><td>6</td><td>Is voltage between terminal 1L of powertrain control module (Transmission) and transmission case OK?

Specified voltage: 0V (Normal condition)</td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Problem in ground circuit
Repair wiring or replace connector</td></tr>
<tr><td>7</td><td>Replace with known good powertrain control module (Transmission); is problem corrected?
☞page K–41</td><td>Yes</td><td>Replace powertrain control module (Transmission)
☞page K–41</td></tr>
<tr><td></td><td></td><td>No</td><td>Overhaul transmission and repair or replace parts as necessary</td></tr>
</table>

45	ABNORMAL SHIFT
DESCRIPTION	• Shifts incorrectly (incorrect shift pattern) Ex) Vehicle shifts 1st → 4GR directly when accelerating with accelerator pedal depressed slightly

[TROUBLESHOOTING HINTS]
① ATF level low
② Poor ground
③ Throttle position sensor malfunction or misadjusted
④ Vehicle speed sensor (revolution sensor) malfunction
⑤ Powertrain control module (Transmission) malfunction
⑥ Stuck control valve (shift valve A, shift valve B, or pilot valve)

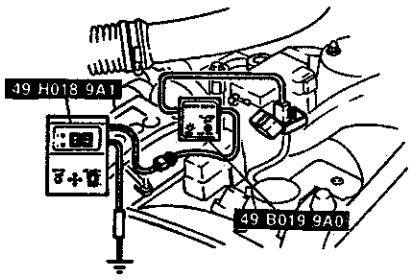
STEP	INSPECTION		ACTION
1	Are ATF level and condition OK? ☞page K–25 	Yes	Go to next step
		No	Problem within transmission Go to next step and check for cause When the problem is found, overhaul the transmission and repair or replace parts as necessary
2	Are there any diagnostic trouble code(s) displayed on the Self-Diagnosis Checker when the ignition switch is ON? ☞page K–214 	Yes	Check for cause of code(s) ☞page K–214
		No	Go to next step
3	Is voltage between terminal 1L of powertrain control module (Transmission) and transmission case OK? **Specified voltage: 0V (Normal condition)**	Yes	Go to next step
		No	Problem in ground circuit Repair wiring or replace connector

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td>4</td><td>Are measurements at powertrain control module (Transmission) terminals OK?
<table>
<tr><th>Term.</th><th>Unit</th><th>Spec.</th><th>Condition</th><th>Page</th></tr>
<tr><td rowspan="2">2T</td><td rowspan="2">V</td><td>0.1–1.1</td><td>Throttle valve closed throttle position</td><td rowspan="3">K–35</td></tr>
<tr><td>4.0–4.5</td><td>Throttle valve wide open throttle</td></tr>
<tr><td>2J ↔ 2L</td><td>Ω</td><td>500–1,000</td><td>Constant</td></tr>
</table>
Unit: V → Voltage
Ω → Resistance
<table>
<tr><th>TERMINAL</th><th>FUNCTION</th></tr>
<tr><td>2T</td><td>Throttle position sensor</td></tr>
<tr><td>2J</td><td>Vehicle speed sensor</td></tr>
<tr><td>2L</td><td>Ground (input)</td></tr>
</table></td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Check for malfunctioning parts and wiring
● Throttle position sensor ☞section F
● Vehicle speed sensor (revolution sensor) ☞page K–29</td></tr>
<tr><td>5</td><td>Replace with known good powertrain control module (Transmission); is problem corrected? ☞page K–41</td><td>Yes</td><td>Replace powertrain control module (Transmission) ☞page K–41</td></tr>
<tr><td></td><td></td><td>No</td><td>Replace control valve body assembly ☞page K–128

If problem remains, overhaul transmission and repair or replace parts as necessary</td></tr>
</table>

46	FREQUENT SHIFTING
DESCRIPTION	• Downshift occurs when accelerator depressed slightly in D, S, and L ranges (except hold mode)

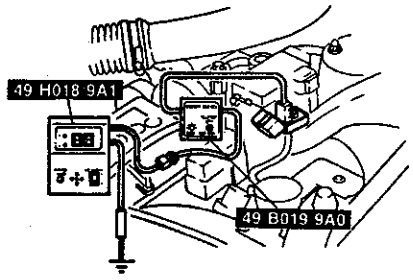
[TROUBLESHOOTING HINTS]
① Poor ground
② Throttle position sensor malfunction or misadjusted
③ Powertrain control module (Transmission) misadjusted

STEP	INSPECTION		ACTION
1	Are there any diagnostic trouble code(s) displayed on the Self-Diagnosis Checker when the ignition switch is ON? ☞**page K–214** 	Yes	Check for cause of code(s) ☞**page K–214** If problem remains, overhaul transmission and repair or replace parts as necessary
		No	Go to next step
2	Is voltage between terminal 1L of powertrain control module (Transmission) and transmission case OK? **Specified voltage: 0V (Normal condition)**	Yes	Go to next step
		No	Problem in ground circuit Repair wiring or replace connector
3	Is input voltage of throttle position sensor at powertrain control module (Transmission) OK? Unit: V → Voltage	Yes	Go to next step
		No	Check for throttle position sensor and wiring ☞**section F**
4	Replace with known good powertrain control module (Transmission); is problem corrected? ☞**page K–41**	Yes	Replace powertrain control module (Transmission) ☞**page K–41**
		No	Replace control valve body assembly ☞**page K–128** If problem remains, overhaul transmission and repair or replace parts as necessary

Term.	Unit	Spec.	Condition	Page
2T	V	0.1–1.1	Throttle valve closed throttle position	K–35
		4.0–4.5	Throttle valve wide open throttle	

47	SHIFT POINT HIGH OR LOW
DESCRIP-TION	● Shift points do not match shift diagram ● Shifts delayed when accelerating ● Shifts occur too fast when accelerating and engine speed does not increase

[TROUBLESHOOTING HINTS]
① Throttle position sensor malfunction or misadjusted
② Engine rpm signal malfunction
③ Vehicle speed sensor (revolution sensor) malfunction
④ A/C signal malfunction

STEP	INSPECTION		ACTION
1	Are there any diagnostic trouble code(s) displayed on the Self-Diagnosis Checker when the ignition switch is ON? ☞page K-214 	Yes	Check for cause of code(s) ☞page K-214
		No	Go to next step
2	Is input voltage of throttle position sensor at powertrain control module (Transmission) OK? Unit: V → Voltage	Yes	Go to next step
		No	Check throttle position sensor and wiring ☞section F
3	Are measurements at powertrain control module (Transmission) terminals OK? B+: Battery positive voltage Unit: V → Voltage Ω → Resistance	Yes	Replace powertrain control module (Transmission) ☞page K-41 If problem remains, overhaul transmission and repair or replace parts as necessary
		No	Check for malfunctioning parts and wiring ● Engine rpm signal ☞section G ● Vehicle speed sensor (revolution sensor) ☞page K-29 ● A/C signal ☞section F

Term.	Unit	Spec.	Condition	Page
2T	V	0.1–1.1	Throttle valve closed throttle position	K-35
		4.0–4.5	Throttle valve wide open throttle	

Term.	Unit	Spec.	Condition	Page
1G	V	0.3–0.8	Engine running at idle	K-35
		0	Engine stopped	
		1.8–2.2	Engine running at 3,000 rpm (no load)	
2J ↔ 2L	Ω	500–1,000	Constant (Ign: OFF)	
1L	V	Below 3.0	A/C ON	
		B+	A/C OFF	

TERMINAL	FUNCTION
1G	Engine rpm signal
2J	Vehicle speed sensor
1L	A/C signal
2L	Ground (Input)

48	NO LOCKUP
DESCRIP-TION	• No lockup when vehicle speed reaches lockup range

[TROUBLESHOOTING HINTS]
Inspect parts and wiring; repair, adjust, or replace malfunctioning parts as necessary

① Lockup solenoid valve worn ☞page K–32
② Lockup control solenoid valve worn ☞page K–32
③ Control valve stuck (lockup control valve, lockup modifier valve, pilot valve, or shuttle shift valve D)
④ ATF thermosensor malfunction ☞page K–31
⑤ Throttle position sensor malfunction or misadjusted ☞section F
⑥ Idle signal malfunction ☞page K–35
⑦ Engine rpm signal malfunction ☞page K–35
⑧ Vehicle speed sensor (revolution sensor) ☞page K–29
⑨ Park/Neutral switch worn or misadjusted ☞page K–28

49	NO KICKDOWN
DESCRIP-TION	• Does not downshift when accelerator pedal depressed more than 7/8 within kickdown range

[TROUBLESHOOTING HINTS]
Inspect parts and wiring; repair, adjust, or replace malfunctioning parts as necessary

① Throttle position sensor malfunction or misadjusted ☞section F
② Shift A and/or B solenoid valve worn ☞page K–32
③ Control valve stuck (shift valve A, shift valve B, or pilot valve)
④ Hold switch malfunction ☞page K–27
⑤ Vehicle speed sensor (revolution sensor) malfunction ☞page K–29

50	ENGINE SPEED FLARES UP WHEN ACCELERATING
DESCRIP-TION	• Engine speed flares up on acceleration

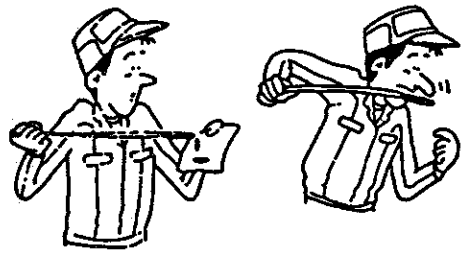
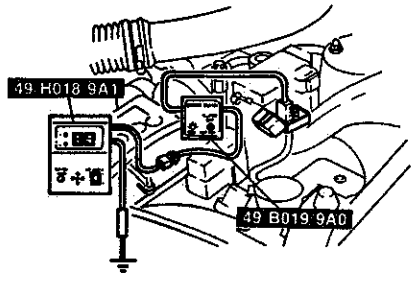
[TROUBLESHOOTING HINTS]
Inspect parts and wiring; repair, adjust, or replace malfunctioning parts as necessary

① ATF level low ☞page K–25
② Selector lever installation or adjustment incorrect ☞page K–164
③ Throttle position sensor malfunction or misadjusted ☞section F
④ Line pressure low ☞page K–14
⑤ Powertrain slippage (forward clutch, forward one-way clutch, low one-way clutch, reverse clutch, or low and reverse brake)
⑥ Control valve stuck (pressure regulator valve, pressure modifier valve or pilot valve)
⑦ Line pressure solenoid valve worn ☞page K–32
⑧ Dropping resister malfunction ☞page K–33

51	ENGINE SPEED FLARES UP WHEN UPSHIFTING AND/OR DOWNSHIFTING
DESCRIPTION	• Engine flares up when accelerator pedal depressed for upshifting • Engine flares up suddenly when accelerator pedal depressed for downshifting

[TROUBLESHOOTING HINTS]

① ATF level low
② Selector lever installation or adjustment incorrect
③ Throttle position sensor malfunction or misadjusted
④ Line pressure low
⑤ Powertrain slippage (brake band, high clutch, forward clutch, forward one-way clutch, or low one-way clutch)
⑥ Control valve stuck (pressure regulator valve, pressure modifier valve, pilot valve, shift valve A, or shift valve B)
⑦ Line pressure solenoid valve worn
⑧ Dropping resistor malfunction
⑨ Vehicle speed pulse generator malfunction
⑩ Vehicle speed sensor (revolution sensor) malfunction
⑪ Barometric absolute pressure sensor malfunction

STEP	INSPECTION		ACTION
1	Are ATF level and condition OK? ☞page K-25 	Yes	Go to next step
		No	Problem within transmission Go to next step, and check for the main cause When the problem is found, overhaul the transmission and repair or replace parts as necessary
2	Are there any diagnostic trouble code(s) displayed on the Self-Diagnosis Checker when the ignition switch is ON? ☞page K-214 	Yes	Check for cause of code(s) ☞page K-214
		No	Go to next step
3	Is line pressure OK? ☞page K-14 **Specified line pressure** **kPa (kgf/cm², psi)**	Yes	Overhaul transmission and repair or replace parts as necessary
		No	Check selector lever operation ☞page K-164 If OK, go to next step If not OK, adjust, repair, or replace selector lever ☞page K-164, 166

Engine	Range	Idle	Stall
13B	D, S, L	500–520 {5.0–5.4, 72–76}	1,200–1,270 {12.2–13.0,174–184}
	R	620–650 {6.3–6.7, 90–95}	1,510–1,570 {15.3–16.1, 218–228}

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td>4</td><td>Are measurements at powertrain control module (Transmission) terminals OK?
<table><tr><th>Term.</th><th>Unit</th><th>Spec.</th><th>Condition</th><th>Page</th></tr><tr><td rowspan="3">1F</td><td>Ω</td><td>2.5–5.0</td><td>Constant (Ign: OFF)</td><td>K–35</td></tr><tr><td rowspan="2">%</td><td>Approx. 100</td><td>Throttle valve closed throttle position (Ign: ON)</td><td rowspan="2">K–246</td></tr><tr><td>Approx. 5</td><td>Throttle valve wide open throttle (Ign: ON)</td></tr><tr><td rowspan="3">1H</td><td>Ω</td><td>12.5–19.0</td><td>Constant (Ign: OFF)</td><td>K–35</td></tr><tr><td rowspan="2">%</td><td>Approx. 100</td><td>Throttle valve closed throttle position (Ign: ON)</td><td rowspan="2">K–246</td></tr><tr><td>Approx. 5</td><td>Throttle valve wide open throttle (Ign: ON)</td></tr></table>Unit: Ω → Resistance
% → ON duty
<table><tr><th>TERMINAL</th><th>FUNCTION</th></tr><tr><td>1F</td><td>Line pressure solenoid valve</td></tr><tr><td>1H</td><td>Dropping resistor</td></tr></table></td><td>Yes</td><td>Replace control valve body assembly
☞page K–128

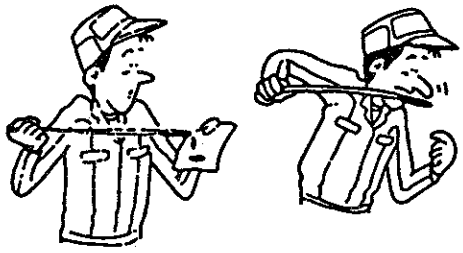
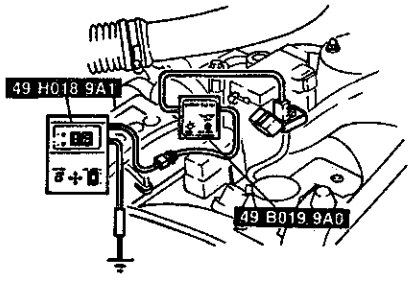
If problem remains, overhaul transmission and repair or replace parts as necessary</td></tr>
<tr><td></td><td></td><td>No</td><td>If resistance not OK, check for malfunctioning parts and wiring
• Line pressure solenoid valve ☞page K–32
• Dropping resistor ☞page K–33

If resistance OK but duty not, go to next step</td></tr>
<tr><td>5</td><td>Is input voltage of throttle position sensor at powertrain control module (Transmission) OK?
<table><tr><th>Term.</th><th>Unit</th><th>Spec.</th><th>Condition</th><th>Page</th></tr><tr><td rowspan="2">2T</td><td rowspan="2">V</td><td>0.1–1.1</td><td>Throttle valve closed throttle position</td><td rowspan="2">K–35</td></tr><tr><td>4.0–4.5</td><td>Throttle valve wide open throttle</td></tr></table>Unit: V → Voltage</td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Check throttle position sensor and wiring
☞section F</td></tr>
<tr><td>6</td><td>Are measurements at powertrain control module (Transmission) terminals OK?
<table><tr><th>Term.</th><th>Unit</th><th>Spec.</th><th>Condition</th><th>Page</th></tr><tr><td>2E ↔ 2L</td><td>kΩ</td><td>2.2–3.5</td><td>Constant (Ign: OFF)</td><td rowspan="4">K–35</td></tr><tr><td>2J ↔ 2L</td><td>Ω</td><td>500–1,000</td><td>Constant (Ign: OFF)</td></tr><tr><td rowspan="2">2C</td><td rowspan="2">V</td><td>2.0–4.5V</td><td>Ignition switch ON</td></tr><tr><td>0V</td><td>Ignition switch OFF</td></tr></table>Unit: Ω → Resistance
V → Voltage
<table><tr><th>TERMINAL</th><th>FUNCTION</th></tr><tr><td>2E</td><td>Vehicle speed pulse generator</td></tr><tr><td>2J</td><td>Vehicle speed sensor</td></tr><tr><td>2C</td><td>Barometric absolute pressure sensor</td></tr><tr><td>2L</td><td>Ground (input)</td></tr></table></td><td>Yes</td><td>Replace powertrain control module (Transmission)
☞page K–41</td></tr>
<tr><td></td><td></td><td>No</td><td>Check for malfunctioning parts and wiring
• Vehicle speed pulse generator ☞page K–30
• Vehicle speed sensor (revolution sensor) ☞page K–29
• Barometric absolute pressure sensor ☞page K–35</td></tr>
</table>

52	EXCESSIVE SHIFT SHOCK P, N TO R AND/OR N TO D
DESCRIPTION	• Strong shift shock felt at idle when shifting from N to D or R range

[TROUBLESHOOTING HINTS]

① ATF level low
② Idle speed high
③ Throttle position sensor malfunction or misadjusted
④ Line pressure high
⑤ Control valve stuck (pressure regulator valve, pressure modifier valve, or pilot valve)
⑥ Powertrain slippage
⑦ Line pressure solenoid valve worn
⑧ Dropping resistor malfunction
⑨ N-D, or 3-4/N-R accumulator worn
⑩ Inhibitor signal malfunction
⑪ Vehicle speed pulse generator malfunction
⑫ Park/Neutral switch worn or misadjusted

STEP	INSPECTION		ACTION
1	Are ATF level and condition OK? ☞page K-25 	Yes	Go to next step
		No	Problem within transmission Go to next step and check for the main cause When the problem is found, overhaul the transmission and repair or replace parts as necessary
2	Are ignition timing and idle speed OK? ☞section F	Yes	Go to next step
		No	Adjust ignition timing and/or idle speed ☞section F
3	Are there any diagnostic trouble code(s) displayed on the Self-Diagnosis Checker when the ignition switch is ON? ☞page K-214 	Yes	Check for cause of code(s) ☞page K-214
		No	Go to next step
4	Is line pressure OK? ☞page K-14 **Specified line pressure** **kPa (kgf/cm², psi)**	Yes	Go to next step
		No	Go to step 6

Engine	Range	Idle	Stall
13B	D, S, L	500–520 {5.0–5.4, 72–76}	1,200–1,270 {12.2–13.0,174–184}
	R	620–650 {6.3–6.7, 90–95}	1,510–1,570 {15.3–16.1, 218–228}

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td>5</td><td>Is engine stall speed OK?
☞page K-9
rpm
<table><tr><th>Engine</th><th>Engine stall speed</th></tr><tr><td>13B</td><td>3,000–3,300</td></tr></table></td><td>Yes</td><td>Go to step 8</td></tr>
<tr><td></td><td></td><td>No</td><td>Overhaul transmission and repair or replace parts as necessary</td></tr>
<tr><td>6</td><td>Are measurements at powertrain control module (Transmission) terminals OK?
<table><tr><th>Term.</th><th>Unit</th><th>Spec.</th><th>Condition</th><th>Page</th></tr><tr><td rowspan="3">1F</td><td>Ω</td><td>2.5–5.0</td><td>Constant (Ign: OFF)</td><td>K-35</td></tr><tr><td rowspan="2">%</td><td>Approx. 100</td><td>Throttle valve closed throttle position (Ign: ON)</td><td rowspan="2">K-246</td></tr><tr><td>Approx. 5</td><td>Throttle valve wide open throttle (Ign: ON)</td></tr><tr><td rowspan="3">1H</td><td>Ω</td><td>12.5–19.0</td><td>Constant (Ign: OFF)</td><td>K-35</td></tr><tr><td rowspan="2">%</td><td>Approx. 100</td><td>Throttle valve closed throttle position (Ign: ON)</td><td rowspan="2">K-246</td></tr><tr><td>Approx. 5</td><td>Throttle valve wide open throttle (Ign: ON)</td></tr></table>Unit: Ω → Resistance
% → ON duty
<table><tr><th>TERMINAL</th><th>FUNCTION</th></tr><tr><td>1F</td><td>Line pressure solenoid valve</td></tr><tr><td>1H</td><td>Dropping resistor</td></tr></table></td><td>Yes</td><td>Overhaul transmission and repair or replace parts as necessary</td></tr>
<tr><td></td><td></td><td>No</td><td>If resistance not OK, check for malfunctioning parts and wiring
• Line pressure solenoid valve ☞page K-32
• Dropping resistor ☞page K-33

If resistance OK but duty not, go to next step</td></tr>
<tr><td>7</td><td>Is input voltage of throttle position sensor at powertrain control module (Transmission) OK?
<table><tr><th>Term.</th><th>Unit</th><th>Spec.</th><th>Condition</th><th>Page</th></tr><tr><td rowspan="2">2T</td><td rowspan="2">V</td><td>0.1–1.1</td><td>Throttle valve closed throttle position</td><td rowspan="2">K-35</td></tr><tr><td>4.0–4.5</td><td>Throttle valve wide open throttle</td></tr></table>Unit: V → Voltage</td><td>Yes</td><td>Replace powertrain control module (Transmission)
☞page K-41</td></tr>
<tr><td></td><td></td><td>No</td><td>Check throttle position sensor and wiring
☞section F</td></tr>
</table>

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td>8</td><td>Are measurements at powertrain control module (Transmission) terminals OK?

B+: Battery positive voltage

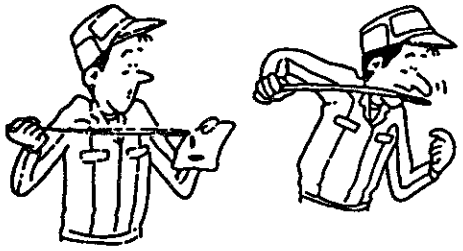
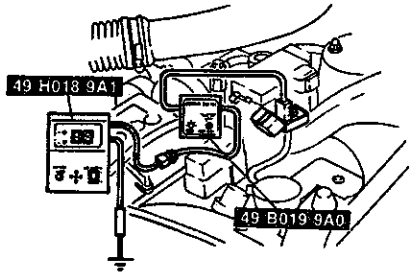
<table>
<tr><th>Term.</th><th>Unit</th><th>Spec.</th><th>Condition</th><th>Page</th></tr>
<tr><td rowspan="2">1C</td><td rowspan="2">V</td><td>B+</td><td>D range</td><td rowspan="14">K–35</td></tr>
<tr><td>Below. 1.0</td><td>P and N ranges</td></tr>
<tr><td>2E ↔ 2L</td><td>kΩ</td><td>2.2–3.5</td><td>Constant (Ign: OFF)</td></tr>
<tr><td rowspan="2">2D</td><td rowspan="2">V</td><td>0</td><td>P and N ranges</td></tr>
<tr><td>B+</td><td>Except P and N ranges</td></tr>
<tr><td rowspan="2">1E</td><td rowspan="2">V</td><td>B+</td><td>R range</td></tr>
<tr><td>0</td><td>Except R range</td></tr>
<tr><td rowspan="2">2B</td><td rowspan="2">V</td><td>B+</td><td>D range</td></tr>
<tr><td>0</td><td>Except D range</td></tr>
<tr><td rowspan="2">2S</td><td rowspan="2">V</td><td>B+</td><td>S range</td></tr>
<tr><td>0</td><td>Except S range</td></tr>
<tr><td rowspan="2">2Q</td><td rowspan="2">V</td><td>B+</td><td>L range</td></tr>
<tr><td>0</td><td>Except L range</td></tr>
</table>
Unit: V → Voltage
Ω → Resistance

<table>
<tr><th>TERMINAL</th><th>FUNCTION</th></tr>
<tr><td>1C</td><td>Inhibitor signal</td></tr>
<tr><td>2E</td><td>Vehicle speed pulse generator</td></tr>
<tr><td>2D, 1E, 2B, 2S, 2Q</td><td>Park/Neutral switch</td></tr>
<tr><td>2L</td><td>Ground (Input)</td></tr>
</table></td><td>Yes</td><td>Overhaul transmission and repair or replace parts as necessary</td></tr>
<tr><td></td><td></td><td>No</td><td>Check for malfunctioning parts and wiring
• Park/Neutral signal ☞page K–35
• Vehicle speed pulse generator ☞page K–30
• Park/Neutral switch ☞page K–28</td></tr>
</table>

53	EXCESSIVE SHIFT SHOCK WHEN UPSHIFTING AND/OR DOWNSHIFTING
DESCRIPTION	• Excessive shift shock felt when accelerating at upshifting • During cruising, excessive shift shock felt when accelerator pedal depressed at downshifting

[TROUBLESHOOTING HINTS]

① ATF level low
② Throttle position sensor malfunction or misadjusted
③ Line pressure high
④ Powertrain slippage
⑤ Control valve stuck (pressure regulator valve, pressure modifier valve, pilot valve, servo charger valve, or accumulator control valve)
⑥ Line pressure solenoid valve worn
⑦ Dropping resistor malfunction
⑧ Idle signal malfunction
⑨ ATF thermosensor malfunction
⑩ Vehicle speed pulse generator malfunction
⑪ Vehicle speed sensor (revolution sensor) malfunction
⑫ Barometric absolute pressure sensor
⑬ Torque reduced signal and/or reduce torque signal malfunction?

STEP	INSPECTION		ACTION
1	Are ATF level and condition OK? ☞page K–25 	Yes	Go to next step
		No	Problem within transmission Go to next step, and check for the main cause When the problem is found, overhaul the transmission and repair or replace parts as necessary
2	Are there any diagnostic trouble code(s) displayed on the Self-Diagnosis Checker when the ignition switch is ON? ☞page K–214 	Yes	Check for cause of code(s) ☞ page K–214
		No	Go to next step
3	Is line pressure OK? ☞page K–14 **Specified line pressure** **kPa (kgf/cm², psi)**	Yes	Go to next step
		No	Go to step 5

Engine	Range	Idle	Stall
13B	D, S, L	500–520 {5.0–5.4, 72–76}	1,200–1,270 {12.2–13.0,174–184}
	R	620–650 {6.3–6.7, 90–95}	1,510–1,570 {15.3–16.1, 218–228}

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td>4</td><td>Is engine stall speed OK?
☞page K-9
rpm
<table><tr><th>Engine</th><th>Engine stall speed</th></tr><tr><td>13B</td><td>3,000–3,300</td></tr></table></td><td>Yes</td><td>Go to step 8</td></tr>
<tr><td></td><td></td><td>No</td><td>Overhaul transmission and repair or replace parts as necessary</td></tr>
<tr><td>5</td><td>Are measurements at powertrain control module (Transmission) terminals OK?
<table><tr><th>Term.</th><th>Unit</th><th>Spec.</th><th>Condition</th><th>Page</th></tr><tr><td rowspan="3">1F</td><td>Ω</td><td>2.5–5.0</td><td>Constant (Ign: OFF)</td><td>K-35</td></tr><tr><td rowspan="2">%</td><td>Approx. 100</td><td>Throttle valve closed throttle position (Ign: ON)</td><td rowspan="2">K-246</td></tr><tr><td>Approx. 5</td><td>Throttle valve wide open throttle (Ign: ON)</td></tr><tr><td rowspan="3">1H</td><td>Ω</td><td>12.5–19.0</td><td>Constant (Ign: OFF)</td><td>K-35</td></tr><tr><td rowspan="2">%</td><td>Approx. 100</td><td>Throttle valve closed throttle position (Ign: ON)</td><td rowspan="2">K-246</td></tr><tr><td>Approx. 5</td><td>Throttle valve wide open throttle (Ign: ON)</td></tr></table>Unit: Ω → Resistance
% → ON duty
<table><tr><th>TERMINAL</th><th>FUNCTION</th></tr><tr><td>1F</td><td>Line pressure solenoid valve</td></tr><tr><td>1H</td><td>Dropping resistor</td></tr></table></td><td>Yes</td><td>Overhaul transmission and repair or replace parts as necessary</td></tr>
<tr><td></td><td></td><td>No</td><td>If resistance not OK, check for malfunctioning parts and wiring
● Line pressure solenoid valve ☞page K-32
● Dropping resistor ☞page K-33

If resistance OK but duty not, go to next step</td></tr>
<tr><td>6</td><td>Is input voltage of throttle position sensor at powertrain control module (Transmission) OK?
<table><tr><th>Term.</th><th>Unit</th><th>Spec.</th><th>Condition</th><th>Page</th></tr><tr><td rowspan="2">2T</td><td rowspan="2">V</td><td>0.1–1.1</td><td>Throttle valve closed throttle position</td><td rowspan="2">K-35</td></tr><tr><td>4.0–4.5</td><td>Throttle valve wide open throttle</td></tr></table>Unit: V → Voltage</td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Check throttle position sensor and wiring
☞section F</td></tr>
<tr><td>7</td><td>Is input voltage of idle signal at powertrain control module (Transmission) OK?
<table><tr><th>Term.</th><th>Unit</th><th>Spec.</th><th>Condition</th><th>Page</th></tr><tr><td rowspan="2">2M</td><td rowspan="2">V</td><td>Below 1.0</td><td>Throttle valve closed throttle position</td><td rowspan="2">K-35</td></tr><tr><td>4.5–5.5</td><td>Throttle valve opened</td></tr></table>Unit: V → Voltage</td><td>Yes</td><td>Replace powertrain control module (Transmission)
☞page K-41</td></tr>
<tr><td></td><td></td><td>No</td><td>Check throttle position sensor and wiring
☞section F</td></tr>
</table>

STEP	INSPECTION		ACTION
8	Are measurement at powertrain control module (Transmission) terminals OK?	Yes	Overhaul transmission and repair or replace parts as necessary
		No	Check for malfunctioning parts and wiring ● ATF thermosensor ☞page K–31 ● Vehicle speed pulse generator ☞page K–30 ● Vehicle speed sensor (revolution sensor) ☞page K–29 ● Barometric absolute pressure sensor ☞page K–35 ● Reduce torque signal ☞page K–35 ● Torque reduced signal ☞page K–35

B+: Battery positive voltage

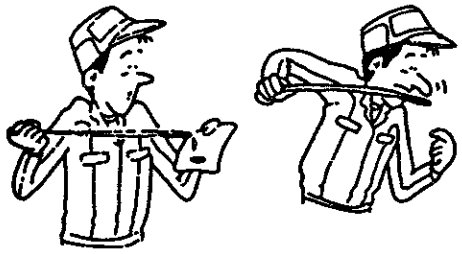
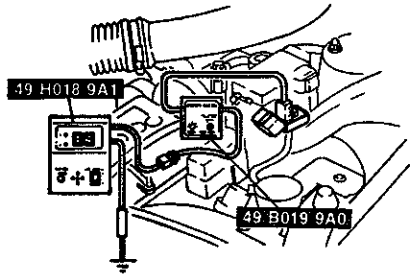
Term.	Unit	Spec.	Condition	Page
2R ↔ 2L	V	Approx. 1.8	ATF temp. 10°C {50°F}	K–35
		Approx. 1.1	ATF temp. 40°C {104°F}	
		Approx. 0.4	ATF temp. 80°C {176°F}	
2E ↔ 2L	kΩ	2.2–3.5	Constant (Ign: OFF)	
2J ↔ 2L	Ω	500–1,000	Constant (Ign: OFF)	
2C	V	2.0–4.5V	Ignition switch ON	
		0V	Ignition switch OFF	
2H	V	B+	Engine running at idle	
		Below 1.0	Throttle opening above 1/8 (Engine coolant temp. below 40°C {104°F})	
2P	V	Below 1.0	Shifting	
		B+	Engine running at idle	

Unit: V → Voltage
Ω → Resistance

TERMINAL	FUNCTION
2R	ATF thermosensor
2E	Vehicle speed pulse generator
2J	Vehicle speed sensor
2C	Barometric absolute pressure sensor
2H	Reduce torque signal
2P	Torque reduced signal
2L	Ground (input)

54	NO ENGINE BRAKING
DESCRIPTION	• Engine speed drops to idle but vehicle does not slow when accelerator pedal released during cruising at medium to high speed • Engine speed drops to idle but vehicle does not slow when accelerator pedal released when in L range at low vehicle speed

[TROUBLESHOOTING HINTS]
① ATF level low
② Powertrain slippage
③ Control valve stuck (overrunning clutch control valve, overrunning clutch reducing valve, 1st reducing valve, or pilot valve)
④ Overrunning clutch solenoid valve worn
⑤ Throttle position sensor malfunction or misadjusted
⑥ 4GR inhibit signal (ASC signal) malfunction
⑦ Park/Neutral switch worn or misadjusted

STEP	INSPECTION		ACTION
1	Are ATF level and condition OK? ☞page K–25 	Yes	Go to next step
		No	Problem within transmission Go to next step and check for the main cause When the problem is found, overhaul the transmission and repair or replace parts as necessary
2	Are there any diagnostic trouble code(s) displayed on the Self-Diagnosis Checker when the ignition switch is ON? ☞page K–214 	Yes	Check for cause of code(s) ☞ page K–214
		No	Go to next step
3	Is there slippage when accelerating or shifting, or flare up when shifting?	Yes	Powertrain slipped Go to No.50 "ENGINE SPEED FLARES UP WHEN ACCELERATING" or No.51 "ENGINE SPEED FLARES UP WHEN UP-SHIFTING AND/OR DOWNSHIFTING" in section K of this manual ☞page K–202, 203
		No	Go to next step

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td>4</td><td>Is engine braking felt in L range?
☞page K-21</td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Replace control valve body assembly
☞page K-128

If problem remains, overhaul transmission and repair or replace parts as necessary</td></tr>
<tr><td>5</td><td>Are resistance and output voltage of overrunning clutch solenoid valve at powertrain control module (Transmission) terminal OK?

B+: Battery positive voltage

<table>
<tr><th>Term.</th><th>Unit</th><th>Spec.</th><th>Condition</th><th>Page</th></tr>
<tr><td rowspan="3">1O</td><td>Ω</td><td>20–40</td><td>Constant (Ign: OFF)</td><td rowspan="3">K-35</td></tr>
<tr><td rowspan="2">V</td><td>Below 1.0</td><td>2nd gear and throttle opening less than 1.3/8 in S range hold mode</td></tr>
<tr><td>B+</td><td>4GR</td></tr>
</table>
Unit: V → Resistance
Ω → Voltage</td><td>Yes</td><td>Go to next or replace step</td></tr>
<tr><td></td><td></td><td>No</td><td>If resistance not OK, check for overrunning clutch solenoid valve and wiring
☞page K-32

If resistance OK and voltage not, go to next step</td></tr>
<tr><td>6</td><td>Are measurements at powertrain control module (Transmission) terminals OK?

B+: Battery positive voltage

<table>
<tr><th>Term.</th><th>Unit</th><th>Spec.</th><th>Condition</th><th>Page</th></tr>
<tr><td rowspan="2">2T</td><td rowspan="2">V</td><td>0.1–1.1</td><td>Throttle valve closed throttle position</td><td rowspan="14">K-35</td></tr>
<tr><td>4.0–4.5</td><td>Throttle valve wide open throttle</td></tr>
<tr><td rowspan="2">2K</td><td rowspan="2">V</td><td>4.5–5.5</td><td>Ignition switch ON</td></tr>
<tr><td>0</td><td>TAT terminal grounded</td></tr>
<tr><td rowspan="2">2D</td><td rowspan="2">V</td><td>0</td><td>P and N ranges</td></tr>
<tr><td>B+</td><td>Except F and N ranges</td></tr>
<tr><td rowspan="2">1E</td><td rowspan="2">V</td><td>B+</td><td>R range</td></tr>
<tr><td>0</td><td>Except R range</td></tr>
<tr><td rowspan="2">2B</td><td rowspan="2">V</td><td>B+</td><td>D range</td></tr>
<tr><td>0</td><td>Except D range</td></tr>
<tr><td rowspan="2">2S</td><td rowspan="2">V</td><td>B+</td><td>S range</td></tr>
<tr><td>0</td><td>Except S range</td></tr>
<tr><td rowspan="2">2Q</td><td rowspan="2">V</td><td>B+</td><td>L range</td></tr>
<tr><td>0</td><td>Except L range</td></tr>
</table>
Unit: V → Voltage

<table>
<tr><th>TERMINAL</th><th>FUNCTION</th></tr>
<tr><td>2T</td><td>Throttle position sensor</td></tr>
<tr><td>2K</td><td>4GR inhibit signal, TAT terminal</td></tr>
<tr><td>2D, 1E, 2B, 2S, 2Q</td><td>Park/Nertral switch</td></tr>
</table></td><td>Yes</td><td>Replace powertrain control module (Transmission)
☞page K-41</td></tr>
<tr><td></td><td></td><td>No</td><td>Check for malfunctioning parts and wiring
• Throttle position sensor ☞section F
• 4GR inhibit signal (ASC signal), TAT terminal ☞page K-35
• Park/Neutral switch ☞page K-28</td></tr>
</table>

55	NO MODE CHANGE
DESCRIPTION	• Mode does not change to/from normal mode in D range • Hold mode not selected or not cancelled

[TROUBLESHOOTING HINTS]
Inspect parts and wiring; repair, adjust, or replace malfunctioning parts as necessary
① Hold switch malfunction ☞**page K–27**
② Throttle position sensor malfunction or misadjusted ☞**section F**
③ Powertrain control module (Transmission) malfunction ☞**page K–35**

56	TRANSMISSION NOISE ALL RANGES
DESCRIPTION	• Transmission noisy in all ranges when vehicle is idling

[TROUBLESHOOTING HINTS]
Inspect parts and wiring; repair, adjust, or replace malfunctioning parts as necessary
① ATF level low ☞**page K–25**
② Throttle position sensor malfunction or misadjusted ☞**section F**
③ Vehicle speed sensor (revolution sensor) malfunction ☞**page K–29**
④ Engine rpm signal malfunction ☞**page K–35**

57	TRANSMISSION NOISE D, S, L, R RANGES
DESCRIPTION	• Abnormal noise from transmission in D, S, L, R

[TROUBLESHOOTING HINTS]
Inspect parts and wiring; repair, adjust, or replace malfunctioning parts as necessary
① ATF level low ☞**page K–25**
② Torque converter malfunction ☞**page K–57**

58	TRANSMISSION OVERHEATS
DESCRIPTION	• ATF smells burnt and/or is discolored

[TROUBLESHOOTING HINTS]
Inspect parts and wiring; repair, adjust, or replace malfunctioning parts as necessary
① ATF level low ☞**page K–25**
② Line pressure low ☞**page K–14**
③ Powertrain burnt
④ Line pressure solenoid valve stuck ☞**page K–246**
⑤ Dropping resistor malfunction ☞**page K–33**
⑥ Throttle position sensor malfunction or misadjusted ☞**section F**
⑦ Lockup solenoid valve worn ☞**page K–32**
⑧ Lockup control solenoid valve worn ☞**page K–32**
⑨ Oil cooler circuit malfunction ☞**page K–154**

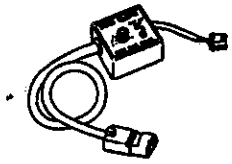
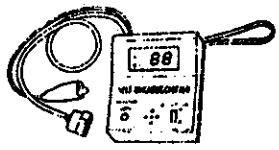
SELF-DIAGNOSIS FUNCTION

DESCRIPTION

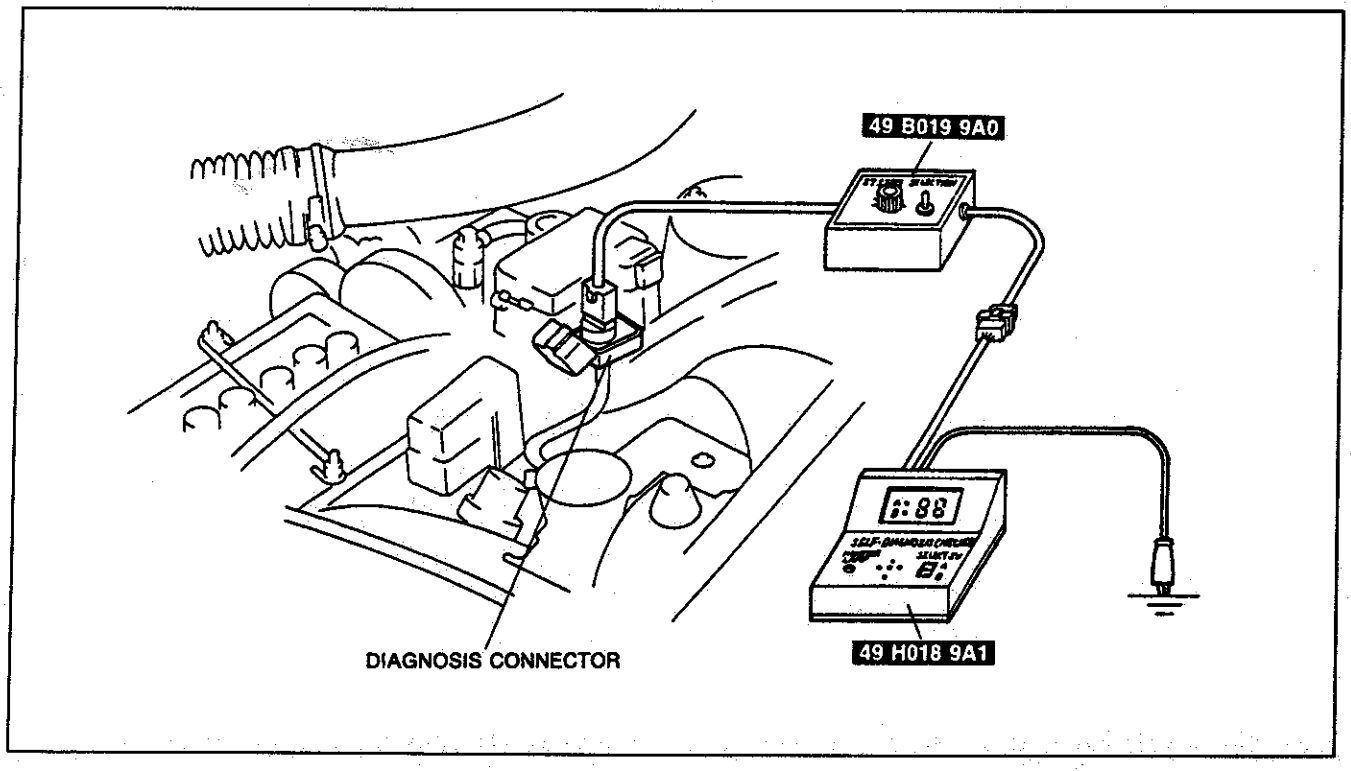
The self-diagnosis system integrated in the powertrain control module (Transmission) diagnoses malfunction of the main sensors (input), solenoid valves (output), and of the powertrain control module (Transmission) itself.
Malfunctions or intermittent malfunctions are memorized in the powertrain control module (Transmission) to later be output as diagnostic trouble codes.
The **Self-Diagnosis Checker** can be used to retrieve these diagnostic trouble codes. The **Self-Diagnosis Checker** indicates a malfunction by displaying a code and sounding a buzzer.
When the TAT and GND terminals of the data link connector are jumped with the ignition switch ON, the powertrain control module (Transmission) outputs any memorized diagnostic trouble codes by flashing the hold indicator.

PREPARATION

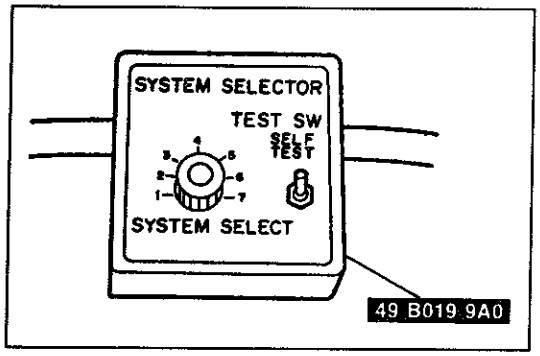
SST

49 B019 9A0 System Selector 	For diagnosis of PCMT	49 H018 9A1 Self-Diagnosis Checker 	For diagnosis of PCMT

Assembly of SST

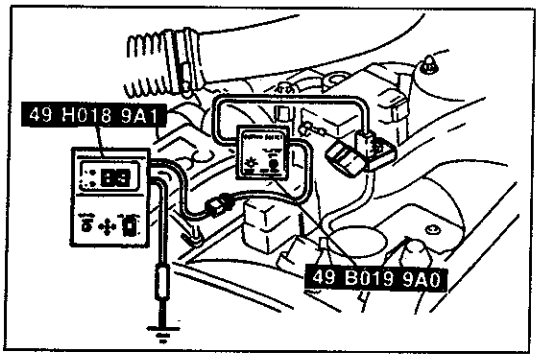


MEMO

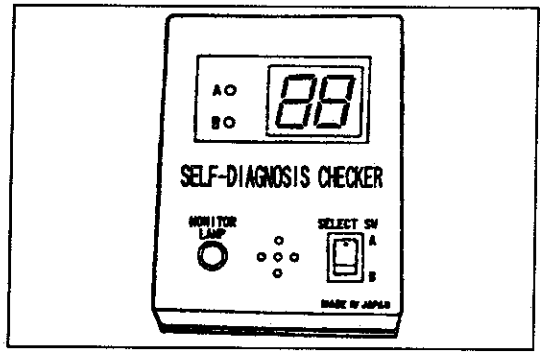


DIAGNOSTIC TROUBLE CODE NUMBER
Inspection Procedure
Self-Diagnosis Checker

1. Connect the **SST (System Selector)** to the data link connector.
2. Set the SYSTEM SELECT switch A to position 2.
3. Set the TEST SW to SELF TEST position.



4. Connect the **SST (Self-Diagnosis Checker)** to the **SST (System Selector)** and a ground.
5. Set the SELECT SW to position A.
6. Turn the ignition switch ON.
7. Verify that **"88"** flashes on the digital display and that the buzzer sounds for 3 seconds.
8. If **"88"** does not flash, check the main relay and terminals 1N and/or 1P of the powertrain control module (Transmission) for an open or short circuit.
9. If **"88"** flashes and the buzzer sounds continuously for more than 20 seconds, check the wiring to terminal 2N of the powertrain control module (Transmission) for an open or short circuit.
   If necessary, replace the powertrain control module (Transmission) and repeat from step 2.
10. Note any code(s) and check for the cause(s). Repair as necessary.
11. After repairs are made, do the After-Repair Procedure (Refer to page K-234) to verify that there are no remaining codes.

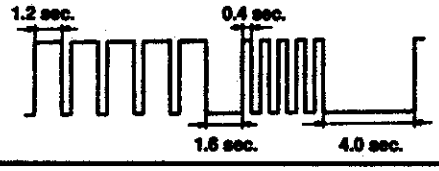


Diagnostic trouble code number

Code No.	Indicator flashing pattern	Diagnosed circuit	Condition	Point	Memorized	Page
01		Engine rpm signal	No input signal from ECU	• Wiring from powertrain control module (Engine) to powertrain control module (Transmission) • Powertrain control module (Engine)	Yes	K-219
06		Vehicle speed sensor (Revolution sensor)	No input signal from vehicle speed sensor (Revolution sensor)	• Vehicle speed sensor connector • Wiring from vehicle speed sensor to powertrain control module (Transmission) • Vehicle speedometer sensor resistance	Yes	K-220
07		Vehicle speedometer sensor	No input signal from vehicle speedometer sensor	• Vehicle speedometer sensor connector • Wiring from vehicle speedometer sensor to combination meter • Wiring from combination meter to powertrain control module (Transmission) • Speedometer resistance	Yes	K-221
12		Throttle position sensor	Open or short circuit of throttle position sensor or wiring	• Throttle position sensor connector • Wiring from throttle position sensor to powertrain control module (Transmission) • Throttle position sensor resistance	Yes	K-222
55		Vehicle speed pulse generator	No input signal from vehicle speed pulse generator	• Vehicle speed pulse generator connector • Wiring from vehicle speed pulse generator to powertrain control module (Transmission) • Vehicle speed pulse generator resistance	Yes	K-223
56		ATF thermosensor	Open or short circuit of ATF thermosensor or wiring	• ATF thermosensor connector • Wiring from ATF thermosensor to powertrain control module (Transmission) • ATF thermosensor resistance	Yes	K-224
57		Reduce torque signal/Slip lock-up signal, torque reduced signal	Open or short circuit of reduce torque signal/ slip lockup signal wiring, and/or torque reduced signal wiring	• Wiring from powertrain control module (Engine) to powertrain control module (Transmission) • Powertrain control module (Transmission) • Powertrain control module (engine)	Yes	K-225
58		Barometric absolute pressure sensor	Open or short circuit of barometic absolute pressure sensor wiring	• Wiring from powertrain control module (Engine) to powertrain control module (Transmission) • Powertrain control module (engine)	Yes	K-226
60		Shift A solenoid valve	Open or short circuit of solenoid valve wiring	• Solenoid valve connector • Wiring from solenoid valve to powertrain control module (Transmission) • Solenoid valve resistance • Wiring from dropping resistor to powertrain control module (Transmission) (Only No.64) • Dropping resistor resistance (Only No.64)	Yes	K-227
61		Shift B solenoid valve			Yes	K-228
62		Overrunning clutch solenoid valve			Yes	K-229
63		Lockup solenoid valve			Yes	K-230
64		Line pressure solenoid valve			Yes	K-231
65		Lockup control solenoid valve			Yes	K-233

Note
- If there is more than one malfunction, the codes will be indicated in numerical order, lowest number first.

Diagnostic trouble code display pattern example

Diagnostic trouble code number	Display pattern
55	

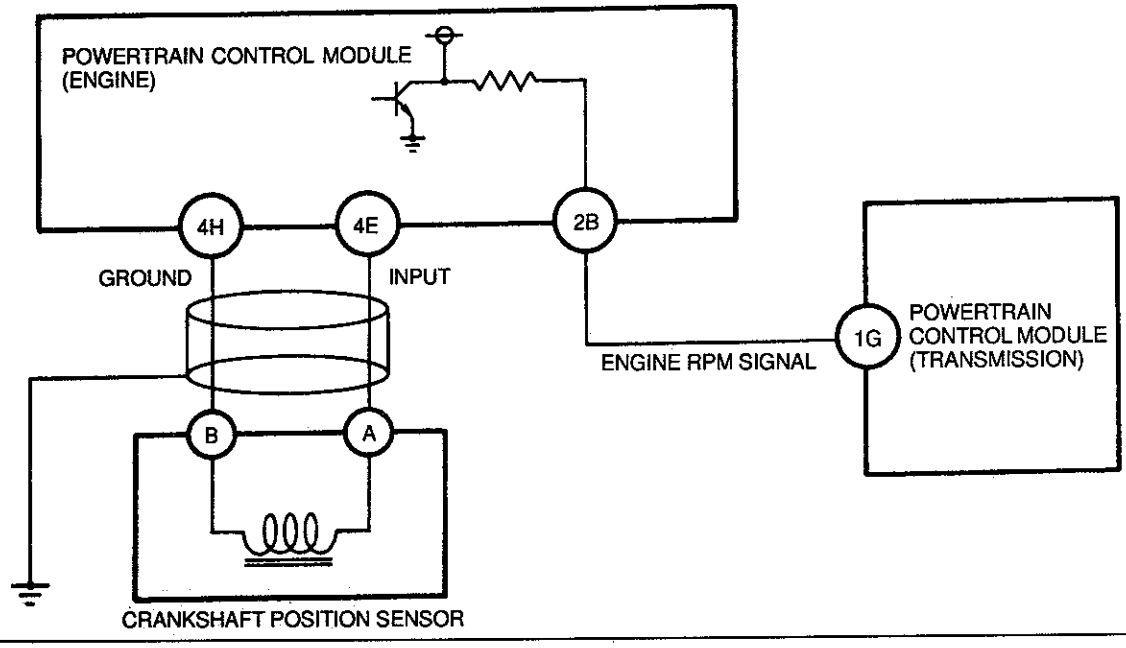
DIAGNOSTIC TROUBLE CODE NO.01 ENGINE RPM SIGNAL

STEP	INSPECTION		ACTION
1	Are there any poor connections at distributor, powertrain control module (Engine) and powertrain control module (Transmission) connectors?	Yes	Repair or replace connector
		No	Go to next step
2	Connect a circuit tester to terminals as shown Is input voltage of engine rpm signal at powertrain control module (Transmission) OK? ☞page K-35	Yes	Go to step 5
		No	Go to next step
3	Disconnect 16-pin powertrain control module (Transmission) connector Is there continuity between terminal 1G of powertrain control module (Transmission) and terminal 2B of powertrain control module (Engine)	Yes	Go to next step
		No	Repair wiring
4	Connect a circuit tester to terminals as shown Is input voltage of engine rpm signal at powertrain control module (Engine) OK? ☞section F	Yes	Go to next step
		No	Check crank angle sensor and/or wiring ☞section F If OK, replace powertrain control module (Engine) If not OK, repair or replace malfunction parts and/or wiring
5	Disconnect negative battery cable for at least 20 seconds, and depress the brake pedal. Connect battery cable and recheck for diagnostic trouble code Is diagnostic trouble code displayed? ☞page K-234	Yes	Replace powertrain control module (Transmission) ☞page K-41
		No	Intermittent poor connection Check for cause

(+) tern.	(–) term.	Voltage (V)	Condition
1G	Ground	0	Engine stopped
		0.3–0.8	Engine idling
		1.8–2.2	Engine running at 3,000 rpm (no load)

(+) tern.	(–) term.	Voltage (V)	Condition
2B	Ground	0	Engine stopped
		0.3–0.8	Engine idling
		1.8–2.2	Engine running at 3,000 rpm (no load)

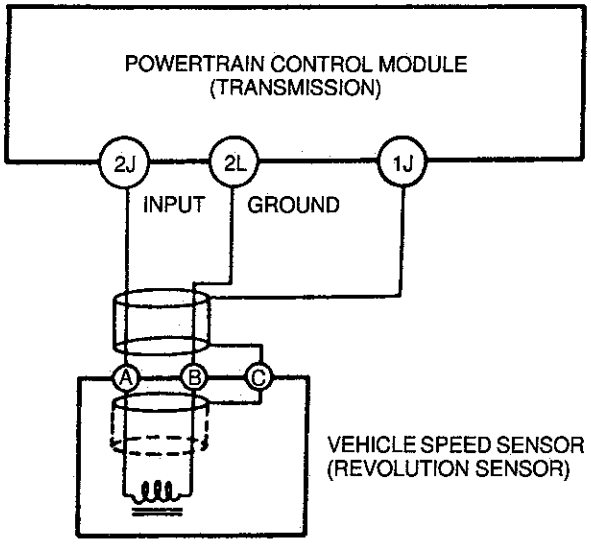
CIRCUIT DIAGRAM



DIAGNOSTIC TROUBLE CODE NO.06 VEHICLE SPEED SENSOR (REVOLUTION SENSOR)

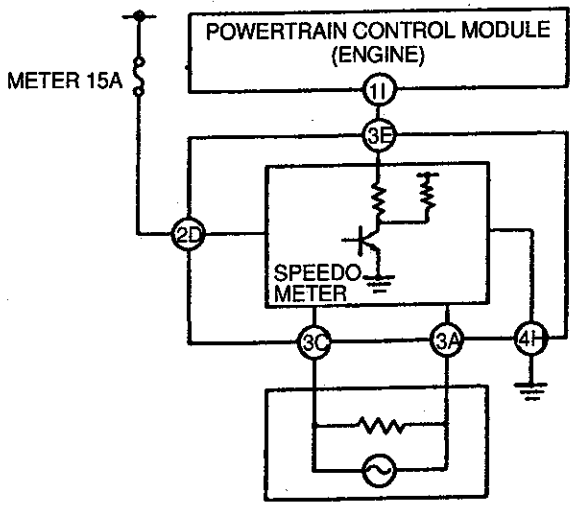
STEP	INSPECTION		ACTION
1	Are there any poor connections at vehicle speed sensor and powertrain control module (Transmission) connectors?	Yes	Repair or replace connector
		No	Go to next step
2	Connect a circuit tester to terminals as shown Is input voltage of vehicle speed sensor at powertrain control module (Transmission) OK? ☞page K–35	Yes	Go to step 5
	(+) tern. / (–) term. / Voltage (V) / Condition 2J / 2L / Approx. above 1.0 (AC range) / While driving (above 25km/h {16MPH}) 2J / 2L / Approx. 0 (AC range) / Vehicle stopped	No	Go to next step
3	Disconnect 20-pin powertrain control module (Transmission) connector Is resistance between terminal 2J and terminal 2L OK? **Resistance: 500–1,000 Ω**	Yes	Go to step 5
		No	Go to next step
4	Disconnect vehicle speed sensor connector Is resistance of sensor OK? ☞page K–29	Yes	Check wiring and connectors from powertrain control module (Transmission) to vehicle speed sensor If OK, go to next step If not OK, repair wiring and/or connector
	Terminal / Resistance (Ω) A ↔ B / 500–1,000 B ↔ C / ∞ A ↔ C / ∞	No	Replace vehicle speed sensor ☞page K–29
5	Disconnect negative battery cable for at least 20 seconds, and depress the brake pedal. Connect battery cable and recheck for diagnostic trouble code Is diagnostic trouble code displayed? ☞page K–234	Yes	Replace powertrain control module (Transmission) ☞page K–41
		No	Intermittent poor connection Check for cause

CIRCUIT DIAGRAM



DIAGNOSTIC TROUBLE CODE NO.07 VEHICLE SPEEDOMETER SENSOR			
STEP	INSPECTION		ACTION
1	Are there any poor connections at vehicle speedometer sensor and powertrain control module (Transmission) connectors?	Yes	Repair or replace connector
		No	Go to next step
2	Connect a circuit tester to terminals as shown Is input voltage of vehicle speedometer sensor at powertrain control module (Transmission) OK? ☞page K-35 (+) tern. 1I; (–) term. Ground; Voltage (V) 2–3, Condition Vehicle moving; Voltage (V) 0 or 4.5–5.5, Condition Vehicle stopped	Yes	Go to step 8
		No	Go to next step
3	Remove combination meter Is there continuity between terminal 3E of meter connector and terminal 1I of powertrain control module (Transmission)?	Yes	Go to next step
		No	Repair or replace wiring and/or connector
4	Connect circuit tester to terminals 3C and 3A of meter connector Does pointer of circuit tester move slightly when rear wheels are slowly turned? ☞page K-29	Yes	Go to next step
		No	Replace speedometer
5	Remove vehicle speedometer sensor Is resistance felt when turning speedometer driven gear by hand? ☞page K-30	Yes	Go to next step
		No	Replace vehicle speedometer sensor ☞page K-30
6	Disconnect vehicle speedometer sensor connector and connect circuit tester Does pointer of circuit tester move slightly when driven gear is slowly turned? ☞page K-30	Yes	Go to next step
		No	Replace vehicle speedometer sensor ☞page K-30
7	Disconnect vehicle speedometer sensor connector Is continuity of sensor OK? ☞page K-30 **Resistance: Approx. 290 Ω (20°C {68°F}); reference**	Yes	Check wiring and connectors from vehicle speedometer sensor to speedmetor If OK, go to next step If not OK, repair wiring and/or connector
		No	Replace vehicle speedometer sensor ☞page K-30
8	Disconnect negative battery cable for at least 20 seconds and the brake pedal is depressed Connect battery cable and recheck for diagnostic trouble code Is diagnostic trouble code displayed? ☞page K-234	Yes	Replace powertrain control module (Transmission) ☞page K-41
		No	Intermittent poor connection Check for cause

CIRCUIT DIAGRAM

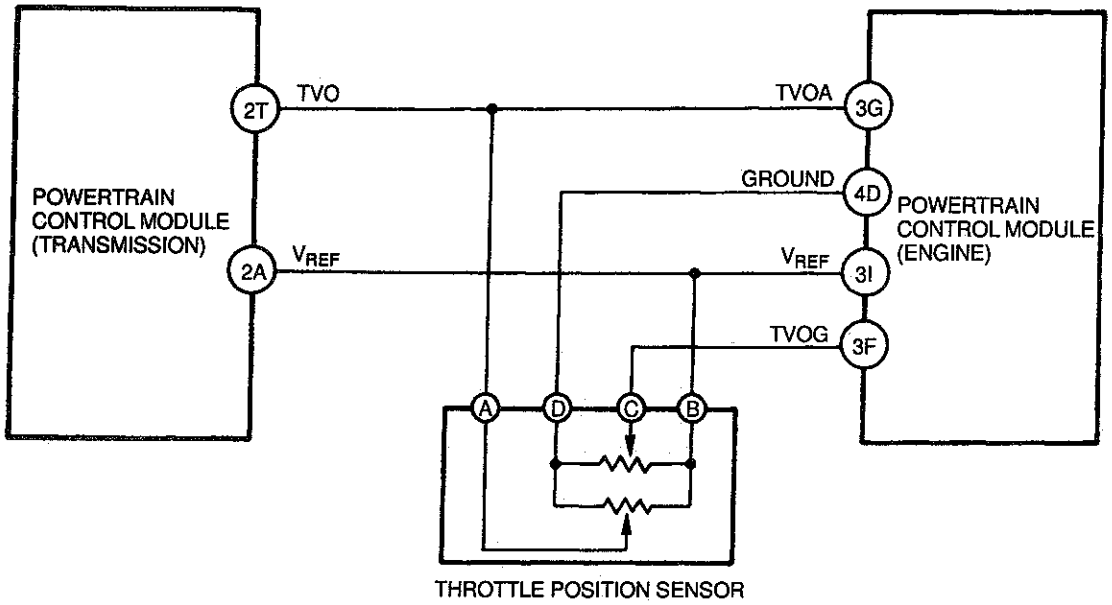


VEHICLE SPEEDOMETER SENSOR

DIAGNOSTIC TROUBLE CODE NO.12 THROTTLE POSITION SENSOR

STEP	INSPECTION		ACTION
1	Are there any poor connections at throttle position sensor and powertrain control module (Transmission) connector or terminal?	Yes	Repair or replace connector
		No	Go to next step
2	Connect a circuit tester to terminals as shown Is input voltage of throttle position sensor (TVO) at powertrain control module (Transmission) OK? ☞page K-35 (+) tern. / (–) term. / Voltage (V) / Condition: 2T / Ground / 0 1–1 1 / Throttle valve closed throttle position 2T / Ground / 4.0–4.5 / Throttle valve wide open throttle	Yes	Go to step 5
		No	Go to next step
3	Connect a circuit tester to terminals as shown Is input voltage of throttle position sensor (VREP) at powertrain control module (Transmission) OK? ☞page K-35 (+) tern. / (–) term. / Voltage (V) / Condition: 2A / Ground / 4.5–5.5 / Ignition switch ON 2A / Ground / 0 / Ignition switch OFF	Yes	Go to next step
		No	Check voltage at terminal 3I of powertrain control module (Engine) **Voltage: 4.5–5.5V (ignition switch ON)** If OK, go to next step If not OK, repair wiring and/or connector, or replace powertrain control module (Transmission)
4	Is throttle position sensor OK? ☞section F	Yes	Check wiring and connectors from powertrain control module (Transmission) to throttle position sensor If OK, go to next step If not OK, repair wiring and/or connector
		No	Adjust or replace throttle position sensor ☞section F
5	Disconnect negative battery cable for at least 20 seconds and the brake pedal is depressed Connect battery cable and recheck for diagnostic trouble code Is diagnostic trouble code displayed? ☞page K-234	Yes	Replace powertrain control module (Transmission) ☞page K-41
		No	Intermittent poor connection Check for cause

CIRCUIT DIAGRAM



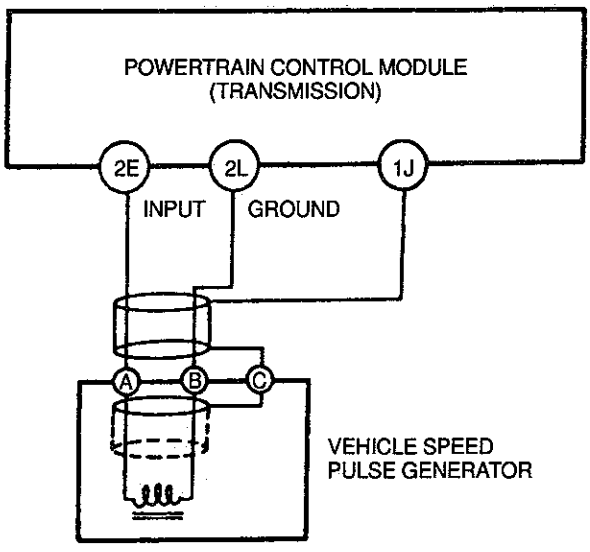
DIAGNOSTIC TROUBLE CODE NO.55 VEHICLE SPEED PULSE GENERATOR

STEP	INSPECTION		ACTION
1	Are there any poor connections at vehicle speed pulse generator and powertrain control module (Transmission) connector or terminal?	Yes	Repair or replace connector
		No	Go to next step
2	Connect a circuit tester to terminals as shown Is input voltage of vehicle speed pulse generator at powertrain control module (Transmission) OK? ☞page K-35	Yes	Go to step 5
		No	Go to next step
3	Disconnect 20-pin powertrain control module (Transmission) connector Is resistance between terminal 2E and terminal 2L OK? **Resistance: 2.2–3.5 kΩ**	Yes	Go to next step
		No	Go to next step
4	Disconnect vehicle speed pulse generator connector Is resistance of vehicle speed pulse generator OK? ☞page K-30	Yes	Check wiring and connectors from powertrain control module (Transmission) to vehicle speed pulse generator If OK, go to next step If not OK, repair wiring and/or connector
		No	Replace vehicle speed pulse generator ☞page K-31
5	Disconnect negative battery cable for at least 20 seconds and the brake pedal is depressed. Connect battery cable and recheck for diagnostic trouble code Is diagnostic trouble code displayed? ☞page K-234	Yes	Replace powertrain control module (Transmission) ☞page K-41
		No	Intermittent poor connection Check for cause

(+) tern.	(–) term.	Voltage (V)	Condition
2E	2L	Approx.0 above 0.5 (AC range)	While driving (above 25km/h {16mph})
		Approx. 0 (AC range)	Vehicle stopped

Terminal	Resistance (KΩ)
A ↔ B	2.2–3.5
B ↔ C	∞
A ↔ C	∞

CIRCUIT DIAGRAM



DIAGNOSTIC TROUBLE CODE NO.56 ATF THERMOSENSOR

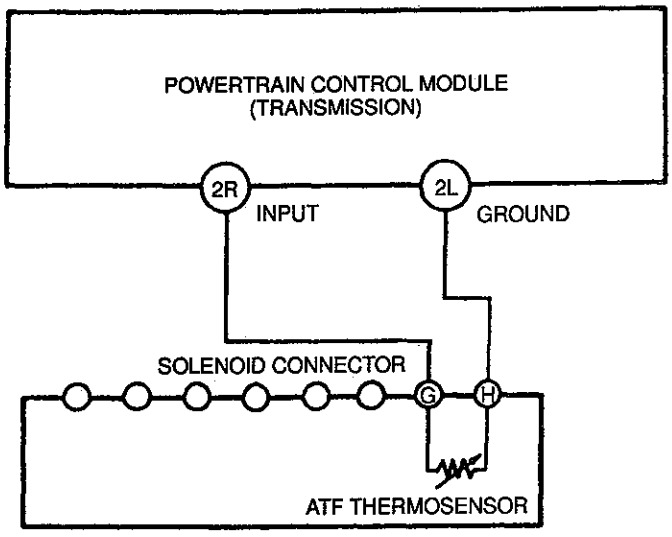
STEP	INSPECTION		ACTION
1	Are there any poor connections at ATP thermosensor and powertrain control module (Transmission) connector or terminal?	Yes	Repair or replace connector
		No	Go to next step
2	Connect a circuit tester to terminals as shown Is input voltage of ATF thermosensor at powertrain control module (Transmission) OK? ☞page K-35	Yes	Go to step 5
		No	Go to next step
3	Disconnect 20-pin powertrain control module (Transmission) connector Is resistance between terminal 2R and terminal 2L OK?	Yes	Go to step 5
		No	Go to next step
4	Disconnect solenoid connector Is resistance between terminal G and terminal H of ATF thermosensor OK? ☞page K-32	Yes	Check wiring and connectors from powertrain control module (Transmission) to ATF thermosensor If OK, go to next step If not OK, repair wiring and/or connector
		No	Replace ATF thermosensor ☞page K-31
5	Disconnect negative battery cable for at least 20 seconds and the brake pedal is depressed Connect battery cable and recheck for diagnostic trouble code Is diagnostic trouble code displayed? ☞page K-234	Yes	Replace powertrain control module (Transmission) ☞page K-41
		No	Intermittent poor connection Check for cause

(+) tern.	(–) term.	Voltage (V)	Condition
2R	2L	Approx. 1.8	ATF temp. 10°C {50°F}
		Approx. 1.1	ATF temp. 40°C {104°F}
		Approx. 0.4	ATF temp. 80°C {176°F}

Terminal	Resistance (KΩ)
2R ↔ 2L	Approx. 3.8 ATF temp. 10°C {50°F}
	Approx. 1.2 ATF temp. 40°C {104°F}
	Approx. 0.3 ATF temp. 80°C {176°F}

Terminal	Resistance (KΩ)
G ↔ H	Approx. 3.8 ATF temp. 10°C {50°F}
	Approx. 1.2 ATF temp. 40°C {104°F}
	Approx. 0.3 ATF temp. 80°C {176°F}

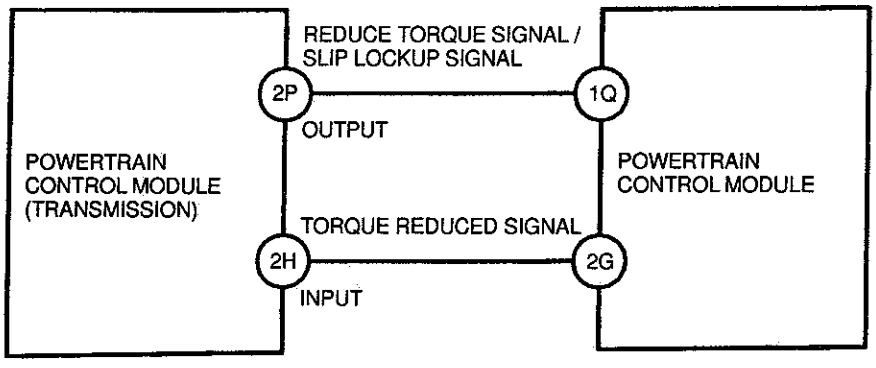
CIRCUIT DIAGRAM



DIAGNOSTIC TROUBLE CODE NO.57 REDUCE TORQUE SIGNAL / SLIP LOCKUP SIGNAL, TORQUE REDUCED SIGNAL

STEP	INSPECTION		ACTION
1	Are there any poor connections at powertrain control module (Engine) and powertrain control module (Transmission) connectors?	Yes	Repair or replace connector
		No	Go to next step
2	Connect a circuit tester to terminals as shown Is input voltage of torque reduced signal at powertrain control module (Transmission) OK? ☞page K-35 B+: Battery positive voltage (+) tern. 2H; (–) term. Ground; Voltage (V): B+; Condition: Engine idling (+) tern. 2H; (–) term. Ground; Voltage (V): Below 1.0; Condition: Throttle opening above 1/8 (Engine coolant temp below 40°C {104°F})	Yes	Go to step 4
		No	Go to next step
3	Disconnect 20-pin powertrain control module (Transmission) connector Is there continuity between terminal 2H of powertrain control module (Transmission) and terminal 2G of powertrain control module (Engine)?	Yes	Go to next step
		No	Repair wiring
4	Connect a circuit tester to terminals as shown Is input voltage of torque reduced signal at powertrain control module (Transmission) OK? ☞page K-35 B+: Battery positive voltage (+) tern. 2P; (–) term. Ground; Voltage (V): Below 1.0; Condition: When shifting from 1st to 2nd or from 2nd to 3GR with the throttle opening above 1.5/8 When slip lockup with the throttle opening below 0.5/8 (+) tern. 2P; (–) term. Ground; Voltage (V): B+; Condition: Engine idling	Yes	Go to step 6
		No	Go to next step
5	Disconnect 20-pin powertrain control module (Transmission) connector Is there continuity between terminal 2P of powertrain control module (Transmission) and terminal 1Q of powertrain control module (Engine)?	Yes	Go to next step
		No	Repair wiring
6	Disconnect negative battery cable for at least 20 seconds and the brake pedal is depressed Connect battery cable and recheck for diagnostic trouble code Is diagnostic trouble code displayed? ☞page K-234	Yes	Replace powertrain control module (Transmission) or powertrain control module (Engine) ☞page K-41
		No	Intermittent poor connection Check for cause

CIRCUIT DIAGRAM



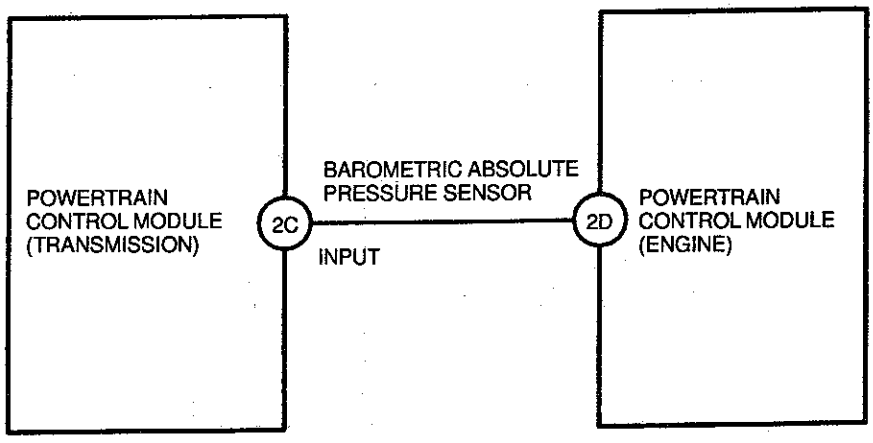
DIAGNOSTIC TROUBLE CODE NO.58 BAROMETRIC ABSOLUTE PRESSURE SENSOR

STEP	INSPECTION		ACTION
1	Are there any poor connections at powertrain control module (Engine) and powertrain control module (Transmission) connectors?	Yes	Repair or replace connector
		No	Go to next step
2	Connect a circuit tester to terminals as shown Is input voltage of barometric absolute pressure sensor at powertrain control module (Transmission) OK? ☞page K-35	Yes	Go to step 5
		No	Go to next step
3	Disconnect 20-pin powertrain control module (Transmission) connector Is there continuity between terminal 2C of powertrain control module (Transmission) and terminal 2D of powertrain control module (Engine)?	Yes	Go to next step
		No	Repair wiring
4	Connect a circuit fester to terminals as shown Is output voltage of barometric absolute pressure sensor at powertrain control module (Engine) OK? ☞section F	Yes	Go to next step
		No	Replace powertrain control module (Engine) ☞section F
5	Disconnect negative battery cable for at least 20 seconds and the brake pedal is depressed Connect battery cable and recheck for diagnostic trouble code Is diagnostic trouble code displayed? ☞page K-234	Yes	Replace powertrain control module (Transmission) ☞page K-41
		No	Intermittent poor connection Check for cause

(+) tern.	(–) term.	Voltage (V)	Condition
2C	Ground	2.0–4.5	Ignition switch ON
		0V	Ignition switch OFF

(+) tern.	(–) term.	Voltage (V)	Condition
2D	Ground	2.0–4.5V	Ignition switch ON
		0V	Ignition switch OFF

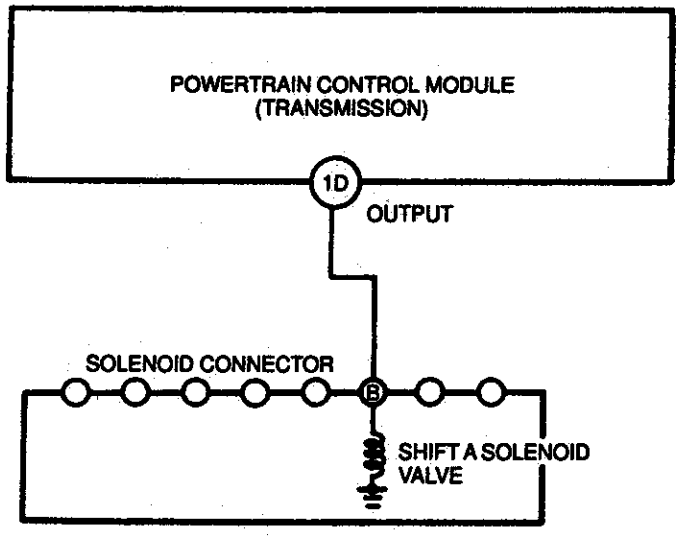
CIRCUIT DIAGRAM



DIAGNOSTIC TROUBLE CODE NO.60 SHIFT A SOLENOID VALVE

STEP	INSPECTION		ACTION
1	Are there any poor connections at solenoid valve and powertrain control module (Transmission) connectors?	Yes	Repair or replace connector
		No	Go to next step
2	Connect a circuit tester to terminals as shown Is output voltage of shift A solenoid valve at powertrain control module (Transmission) OK? ☞page K-35 B+: Battery positive voltage (+) term. 1D; (–) term. Ground; Voltage (V): B+ / Below 1.0; Condition: 1st, 4GR gear / 2nd, 3GR gear	Yes	Check wiring and go to step 5
		No	Go to next step
3	Disconnect 16-pin powertrain control module (Transmission) connector Is resistance between terminal 1D and a ground **Resistance: 20–40Ω**	Yes	Go to step 5
		No	Go to next step
4	Disconnect solenoid connector Is resistance between ground and terminal B of shift A solenoid valve OK? ☞page K-32 **Resistance: 20–40Ω**	Yes	Check wiring and connectors from powertrain control module (Transmission) to shift A solenoid valve If OK, go to next step If not OK, repair wiring and/or connector
		No	Replace shift A solenoid valve ☞page K-33
5	Disconnect negative battery cable for at least 20 seconds and the brake pedal is depressed Connect battery cable and recheck for diagnostic trouble code Is diagnostic trouble code displayed? ☞page K-234	Yes	Replace powertrain control module (Transmission) ☞page K-41
		No	Intermittent poor connection Check for cause

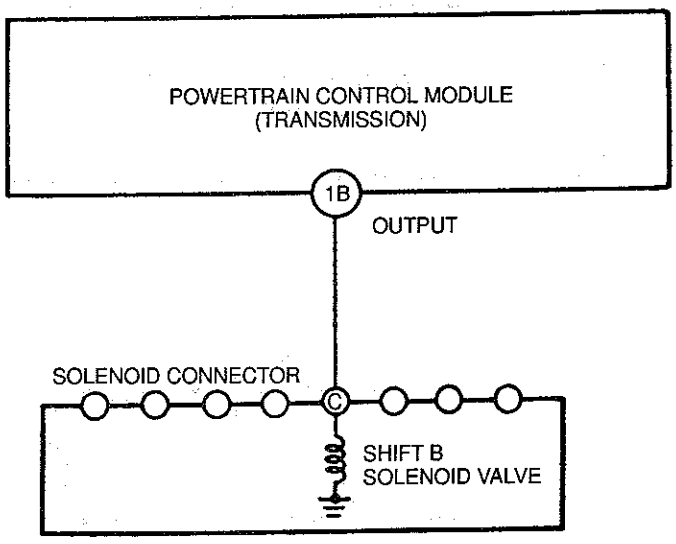
CIRCUIT DIAGRAM



DIAGNOSTIC TROUBLE CODE NO.61 SHIFT B SOLENOID VALVE

STEP	INSPECTION		ACTION
1	Are there any poor connections at solenoid valve and powertrain control module (Transmission) connectors?	Yes	Repair or replace connector
		No	Go to next step
2	Connect a circuit tester to terminals as shown Is output voltage of shift B solenoid valve at powertrain control module (Transmission) OK? ☞page K-35 B+: Battery positive voltage (+) tern. 1B; (–) term. Ground; Voltage (V): B+ / Below 1.0; Condition: 1st, 2nd gear / 3GR, 4GR gear	Yes	Check wiring and go to step 5
		No	Go to next step
3	Disconnect 16-pin powertrain control module (Transmission) connector Is resistance between terminal 1B and a ground OK? **Resistance: 20–40Ω**	Yes	Go to step 5
		No	Go to next step
4	Disconnect solenoid connector Is resistance between ground and terminal C of shift B solenoid valve OK? ☞page K-32 **Resistance: 20–40Ω**	Yes	Check wiring and connectors from powertrain control module (Transmission) to shift B solenoid valve If OK, go to next step If not OK, repair wiring and/or connector
		No	Replace shift B solenoid valve ☞page K-33
5	Disconnect negative battery cable for at least 20 seconds and the brake pedal is depressed Connect battery cable and recheck for diagnostic trouble code Is diagnostic trouble code displayed? ☞page K-234	Yes	Replace powertrain control module (Transmission) ☞page K-41
		No	Intermittent poor connection Check for cause

CIRCUIT DIAGRAM

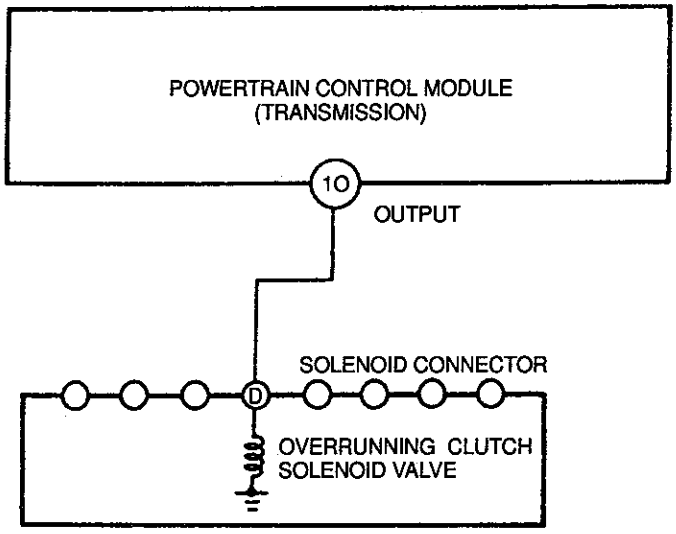


DIAGNOSTIC TROUBLE CODE NO.62 OVERRUNNING CLUTCH SOLENOID VALVE

STEP	INSPECTION		ACTION
1	Are there any poor connections at solenoid valve and powertrain control module (Transmission) connectors?	Yes	Repair or replace connector
		No	Go to next step
2	Connect a circuit fester to terminals as shown Is output voltage of overrunning clutch solenoid valve at powertrain control module (Transmission) OK? ☞page K–35 B+: Battery positive voltage	Yes	Check wiring and go to step 5
		No	Go to next step
3	Disconnect 16-pin powertrain control module (Transmission) connector Is resistance between terminal 1O and a ground OK? **Resistance: 20–40Ω**	Yes	Go to step 5
		No	Go to next step
4	Disconnect solenoid connector Is resistance between ground and terminal D of overrunning clutch solenoid valve OK? ☞page K–32 **Resistance: 20–40Ω**	Yes	Check wiring and connectors from powertrain control module (Transmission) to overrunning clutch solenoid valve If OK, go to next step If not OK, repair wiring and/or connector
		No	Replace overrunning clutch solenoid valve ☞page K–33
5	Disconnect negative battery cable for at least 20 seconds and the brake pedal is depressed Connect battery cable and recheck for diagnostic trouble code Is diagnostic trouble code displayed? ☞page K–234	Yes	Replace powertrain control module (Transmission) ☞page K–41
		No	Intermittent poor connection Check for cause

(+) tern.	(–) term.	Voltage (V)	Condition
1O	Ground	B+	D range (throttle valve closed)
		Below 1 0	D range (throttle valve wide open throttle)

CIRCUIT DIAGRAM

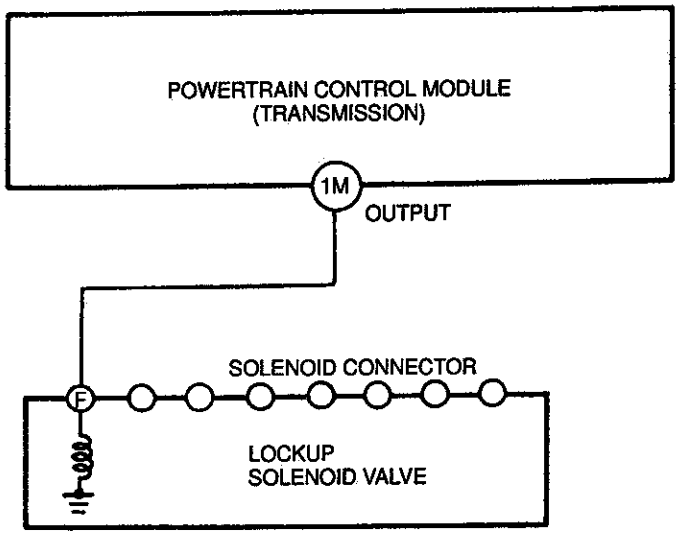


DIAGNOSTIC TROUBLE CODE NO.63 LOCKUP SOLENOID VALVE

STEP	INSPECTION		ACTION
1	Are there any poor connections at solenoid valve and powertrain control module (Transmission) connectors?	Yes	Repair or replace connector
		No	Go to next step
2	Disconnect 16-pin powertrain control module (Transmission) connector Is resistance between terminal 1M and a ground OK? **Resistance: 10–20Ω**	Yes	Go to step 4
		No	Go to next step
3	Disconnect solenoid connector Is resistance between ground and terminal F of lockup solenoid valve OK? ☞**page K–32** **Resistance: 10–20Ω**	Yes	Check wiring and connectors from powertrain control module (Transmission) to lockup solenoid valve If OK, go to next step If not OK, repair wiring and/or connector
		No	Replace lockup solenoid valve ☞**page K–33**
4	Connect a dwell meter to terminals as shown Is output duty of lockup solenoid valve at powertrain control module (Transmission) OK? ☞**page K–247**	Yes	Go to next step
		No	Replace powertrain control module (Transmission) ☞**page K–41**
5	Disconnect negative battery cable for at least 20 seconds and the brake pedal is depressed Connect battery cable and recheck for diagnostic trouble code Is diagnostic trouble code displayed? ☞**page K–234**	Yes	Replace powertrain control module (Transmission) ☞**page K–41**
		No	Intermittent poor connection Check for cause

(+) tern.	(–) term.	Duty (ON %)	Condition
1M	Ground	Approx. 5	No lockup
		Approx. 100	Lockup

CIRCUIT DIAGRAM



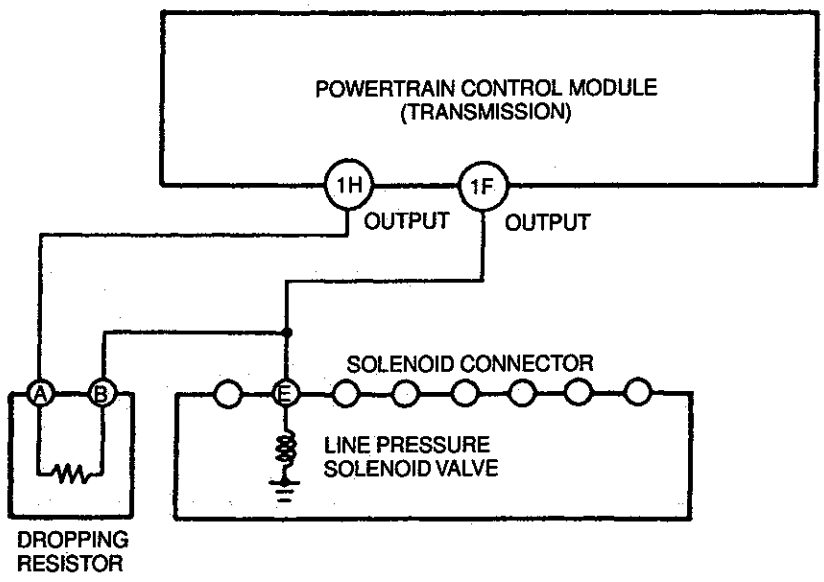
DIAGNOSTIC TROUBLE CODE NO.64 LINE PRESSURE SOLENOID VALVE

STEP	INSPECTION		ACTION
1	Are there any poor connections at solenoid valve and powertrain control module (Transmission) connectors?	Yes	Repair or replace connector
		No	Go to next step
2	Disconnect 16-pin powertrain control module (Transmission) connector Is resistance between terminal 1F (line pressure solenoid valve) and a ground OK? **Resistance: 2.5–5.0Ω**	Yes	Go to next step
		No	Go to step 4
3	Disconnect 16-pin powertrain control module (Transmission) connector Is resistance between terminal 1H (dropping resistor) and a ground OK? **Resistance: 12.5–19.0Ω**	Yes	Go to step 5
		No	Go to step 7
4	Disconnect solenoid connector Is resistance between ground and terminal E of line pressure solenoid valve OK? ☞**page K–32** **Resistance: 2.5–5.0Ω**	Yes	Check wiring and connectors from powertrain control module (Transmission) to line pressure solenoid valve If OK, go to next step If not OK, repair wiring and/or connector
		No	Replace line pressure solenoid valve ☞**page K–33**
5	Connect a dwell meter to terminals as shown Is output duty of dropping resistor at powertrain control module (Transmission) OK? ☞**page K–246**	Yes	Go to next step
		No	Replace powertrain control module (Transmission), perform road test, and go to step 8 ☞**page K–41,16**
6	Connect a dwell meter to terminals as shown Is output duty of line pressure solenoid valve at powertrain control module (Transmission) OK? ☞**page K–246**	Yes	Go to next step
		No	Replace powertrain control module (Transmission), perform road test, and go to step 8 ☞**page K–41,16**
7	Disconnect dropping resistor connector Is resistance of resistor OK? ☞**page K–33** **Resistance: 10–14Ω**	Yes	Check wiring and connectors from powertrain control module (Transmission) to dropping resistor If OK, go to next step If not OK, repair wiring and/or connector
		No	Repair or dropping resistor ☞**page K–33**
8	Disconnect negative battery cable for at least 20 seconds and the brake pedal is depressed Connect battery cable and recheck for diagnostic trouble code Is diagnostic trouble code displayed? ☞**page K–234**	Yes	Replace powertrain control module (Transmission) ☞**page K–41**
		No	Intermittent poor connection Check for cause

(+) tern.	(–) term.	Duty (ON %)	Condition
1H	Ground	Approx. 100	Throttle valve closed throttle
		Approx. 5	Throttle valve wide open throttle

(+) tern.	(–) term.	Duty (ON %)	Condition
1F	Ground	Approx. 100	Throttle valve closed throttle position
		Approx. 5	Throttle valve wide open throttle

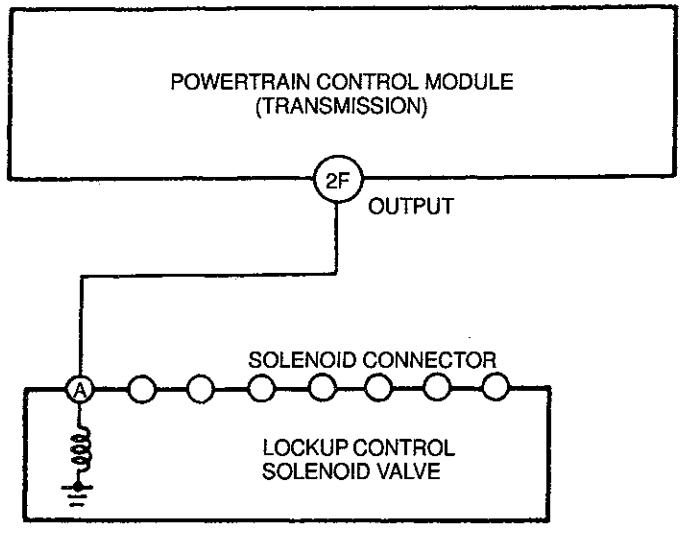
CIRCUIT DIAGRAM

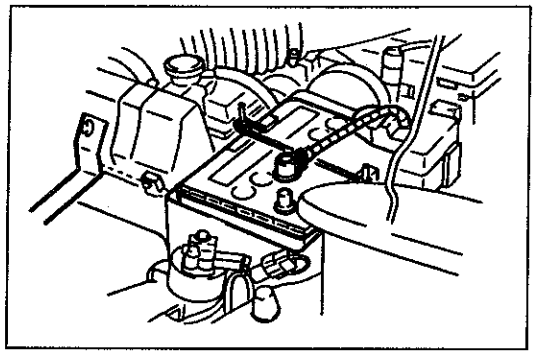


DIAGNOSTIC TROUBLE CODE NO.65 LOCKUP CONTROL SOLENOID VALVE

STEP	INSPECTION		ACTION
1	Are there any poor connections at solenoid valve and powertrain control module (Transmission) connectors?	Yes	Repair or replace connector
		No	Go to next step
2	Connect a circuit fester to terminals as shown Is output voltage of lockup control solenoid valve at powertrain control module (Transmission) OK? ☞page K–35 B+: Battery positive voltage (+) tern. / (–) term. / Voltage (V) / Condition 2F / Ground / B+ / Lockup 2F / Ground / Below 1.0 / No lockup	Yes	Check wiring and go to step 5
		No	Go to next step
3	Disconnect 20-pin powertrain control module (Transmission) connector Is resistance between terminal 2F and a ground OK? **Resistance: 20–40Ω**	Yes	Go to step 5
		No	Go to next step
4	Disconnect solenoid connector Is resistance between ground and terminal A of lockup control solenoid valve OK? ☞page K–32 **Resistance: 20–40Ω**	Yes	Check wiring and connectors from powertrain control module (Transmission) to lockup control solenoid valve If OK, go to next step If not OK, repair wiring and/or connector
		No	Replace lockup control solenoid valve ☞page K–33
5	Disconnect negative battery cable for at least 20 seconds and the brake pedal is depressed Connect battery cable and recheck for diagnostic trouble code Is diagnostic trouble code displayed? ☞page K–234	Yes	Replace powertrain control module (Transmission) ☞page K–41
		No	Intermittent poor connection Check for cause

CIRCUIT DIAGRAM





After-Repair Procedure

1. Cancel the memory of diagnostic trouble codes by disconnecting the negative battery cable for at least **20 seconds** and the brake pedal is depressed.
   Reconnect the battery cable.
2. Remove the **SST (Self-diagnosis Checker)** if connected.

DRIVE AT 50 km/h {31 MPH}
|
KICKDOWN
|
STOP THE VEHICLE

3. Drive the vehicle at 50 km/h {31MPH}, and depress the accelerator pedal fully to activate kickdown. Stop the vehicle gradually.
4. Connect the **SST (Self-diagnosis Checker)** to the data link connector.
5. Turn the ignition switch to ON.
6. Verify that no codes are displayed.

SERVICE POINTS

OUTLINE

Hold Switch

- If the wiring of the hold switch is open or shorted, selection to/from hold mode is not possible.

Park/Neutral Switch

- If a malfunction occurs in the wiring of the park/neutral switch, the powertrain control module (Transmission) cannot determine the range position, and shifting may be abnormal in D, S, and L ranges. There may not be a shift to Fourth gear.

Throttle Position Sensor

- If the wiring of the throttle position sensor is open or shorted, diagnostic trouble code No.12 is displayed by the self-diagnosis function, and hold mode is canceled.
- If a malfunction occurs in the throttle position sensor, the powertrain control module (Transmission) judges the throttle opening signals from the idle signal, and sets the line pressure as follows:

Idle signal	Throttle opening angle	Line pressure
OFF (throttle valve opened)	4/8 stroke	Maximum
ON (throttle valve closed throttle position)	0/8 stroke	Minimum

Idle Signal

- If the wiring is open, the powertrain control module (Transmission) does not correct the throttle characteristics. In this case, lockup is not canceled when cruising (closed throttle position) and vehicle jolts when accelerator pedal is depressed or released.
- If the wiring is shorted, the line pressure will be low (does not match throttle characteristics) and the transmission may slip when shifting.

Vehicle Speed Sensor

- If there is no input signal from vehicle speed sensor, diagnostic trouble code No.06 is displayed by the self-diagnosis function and hold mode is canceled.
- Shifting is made based on signals from vehicle speedometer sensor.
- If a malfunction occurs in vehicle speed sensor and vehicle speedometer sensor at the same time, shift A and B solenoid valve go OFF and D and S ranges become in Third gear position, L range becomes in 2nd gear position, and lockup is inhibited.

Vehicle Speedometer Sensor

- If there is no input signal from vehicle speedometer sensor, diagnostic trouble code No.07 is displayed by the self-diagnosis function, and hold mode is canceled.
- If a malfunction occurs in vehicle speedometer sensor, shifting is made normal based on signals from the vehicle speed sensor (revolution sensor).
- If a malfunction occurs in vehicle speed sensor and vehicle speedometer sensor at the same time, shift A and B solenoid valve go OFF and D and S ranges become in Third gear position, L range becomes in 2nd gear position, and lockup is inhibited.

Vehicle Speed Pulse Generator

- If no input signal from the vehicle speed pulse generator, diagnostic trouble code No.55 is displayed by the self-diagnosis function and hold mode is canceled.
- If a malfunction occurs in the vehicle speed pulse generator, the torque reduction control function is inhibited.
  The gear position at shifting cannot be determined and timing control at shifting is made based on signals from vehicle speed sensor (revolution sensor). Shift shock may be slightly strong.

Stoplight Switch

- If the wiring of the stoplight switch is open or shorted, PCMT control is made normal.
- If the wiring is shorted to the battery power, there may be a shift from Fourth gear to Third gear when the throttle valve is at the closed throttle position.

Torque Reduced Signal
- If the wiring is open or shorted, diagnostic trouble code No.57 is displayed by the self-diagnosis function and hold mode is canceled.
- If a malfunction occurs in the torque reduced signal, the torque reduction control function is inhibited and the line pressure characteristics will be high when shifting. Shift shock may be slightly strong.
- If a malfunction occurs in the reduce torque signal or slip lockup signal, diagnostic trouble code No.57 is displayed by the self-diagnosis function.

Mileage Switch
- If the wiring is open, the line pressure characteristics will be slightly high. Shift shock may be slightly strong when shifting from 1st to 2nd or from 2nd to Third gear.
- If the wiring is shorted, the transmission may slip when shifting from 1st to 2nd or from 2nd to Third gear until the total mileage of the vehicle exceeds approximately 600 km {372 miles}.

Water Thermoswitch
- If the wiring of the water thermoswitch is open or shorted, PCMT control is made normal.
- If the wiring is shorted, the engine coolant temperature may increase.

A/C Signal
- If the wiring is open, normal mode, A/C ON is selected because an ON A/C signal is judged.
- If the wiring is shorted, normal mode, A/C OFF is selected because an OFF A/C signal is judged.

Slip Lockup OFF Signal
- If the wiring of the slip lockup OFF signal is open or shorted, PCMT control is made normal.

Engine RPM Signal
- If there is no input signal from the engine rpm signal, diagnostic trouble code No.01 is displayed by the self-diagnosis function and hold mode is canceled.
- If a malfunction occurs in the engine rpm signal, lockup shock may be slightly strong.

ATF Thermosensor
- If the wiring is open, diagnostic trouble code No.56 is memorized by the self-diagnosis function. Line pressure is set at maximum and Fourth gear and lockup are inhibited.
- If the wiring is shorted, diagnostic trouble code No.56 is memorized by the self-diagnosis function. Shift shock at low ATF temperature may be strong.

Barometric Absolute Pressure Sensor
- If the wiring is open or shorted, diagnostic trouble code No.58 is displayed by the self-diagnosis function. Line pressure is not controlled correctly at high altitude and shift shock will be strong.

4GR Inhibit Signal (ASC Signal)
- If the wiring is open, there is no input signal from the cruise control unit and acceleration feeling (driving performance) will be deteriorated when the vehicle speed drops 8km/h {5mph} below the set speed or RESUME/ACCEL switch is operated during cruise control operation.
- If the wiring is shorted, there is no shift to Fourth gear.

TAT Terminal (Data Link Connector)
- If the wiring is open, diagnostic trouble code(s) are not displayed by the self-diagnosis function.
- If the wiring is shorted, diagnostic trouble code(s) memorized in the powertrain control module (Transmission) are displayed by hold indicator.

Shift A and B Solenoid Valve
- If the wiring is open or shorted, diagnostic trouble code No.60 for shift A solenoid valve or diagnostic trouble code No.61 for shift B solenoid valve is displayed and hold mode is canceled.
- If either solenoid valve malfunctions, both solenoid valves go OFF and D and S ranges become in Third gear position, L range becomes in 2nd gear position, and lockup is inhibited.

Line Pressure Solenoid Valve
- If the wiring is open or shorted, diagnostic trouble code No.64 is displayed by the self-diagnosis function and hold mode is canceled.
- If a malfunction occurs in the line pressure solenoid valve, line pressure is set at maximum to make driving possible.
- If a malfunction occurs in the dropping resistor, diagnostic trouble code No.64 is displayed by the self-diagnosis function.

Lockup Solenoid Valve
- If the wiring is open or shorted, diagnostic trouble code No.63 is displayed by the self-diagnosis function and hold mode is canceled.
- If a malfunction occurs in the lockup solenoid valve, the solenoid valve goes OFF and lockup is canceled.

Lockup Control Solenoid Valve
- If the wiring is open or shorted, diagnostic trouble code No.65 is displayed by the self-diagnosis function and hold mode is canceled.
- If a malfunction occurs in the lockup control solenoid valve, the solenoid valve goes OFF and lockup is canceled.

Overrunning Clutch Solenoid Valve
- If the wiring is open or shorted, diagnostic trouble code No.62 is displayed by the self-diagnosis function and hold mode is canceled.
- If a malfunction occurs in the overrunning clutch solenoid valve, the solenoid valve goes OFF and the overrunning clutch engages. Engine braking is available when coasting. There is no shift to Fourth gear.

Dropping Resistor
- If the wiring is open or shorted, diagnostic trouble code No.64 is displayed by the self-diagnosis function and hold mode is canceled.
- If a malfunction occurs in the dropping resistor, the line pressure is set at maximum to make driving possible.
- If a malfunction occurs in the line pressure solenoid valve, diagnostic trouble code No.64 is displayed by the self-diagnosis function.

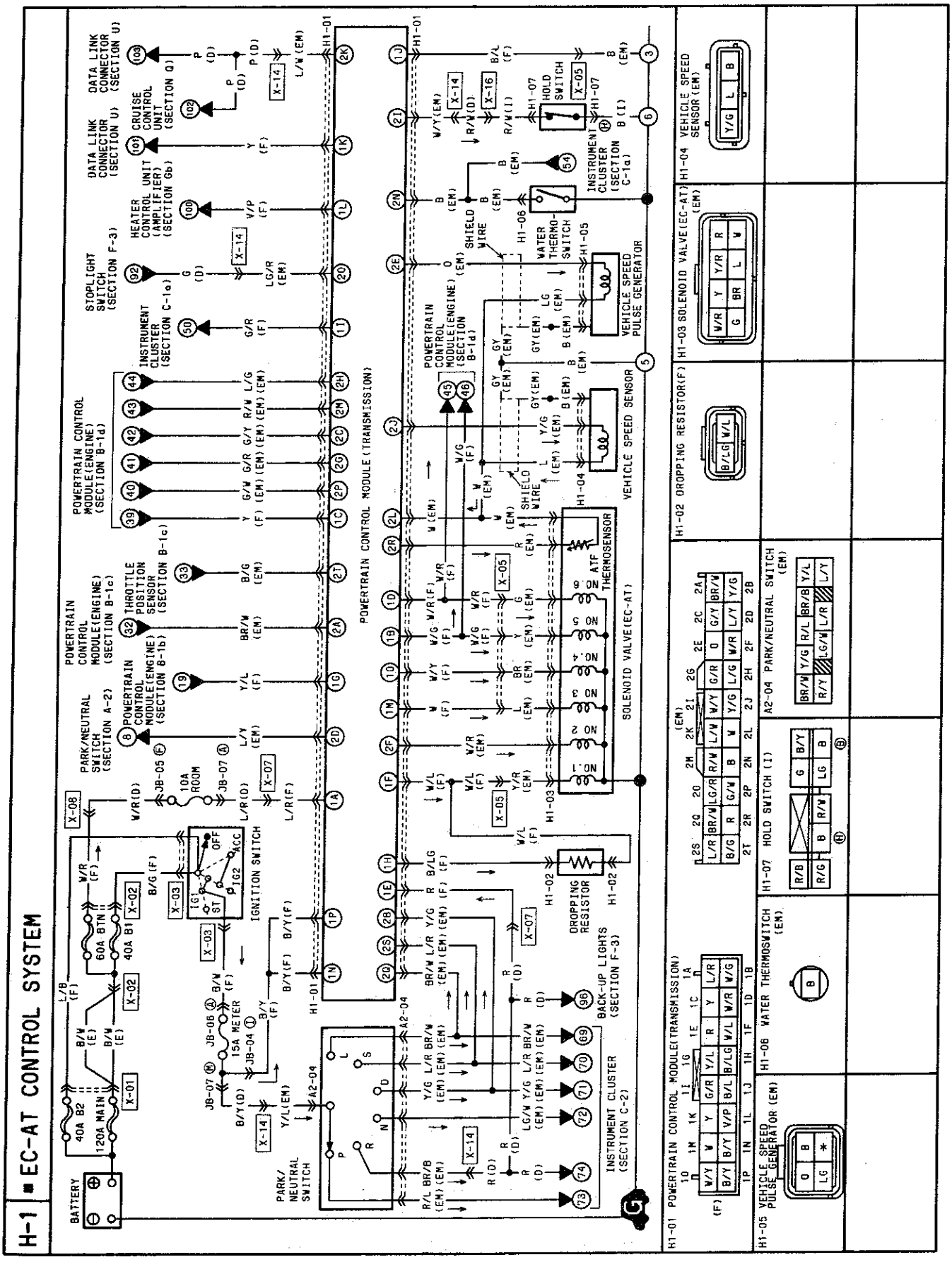
Reduce Torque Signal
- If the wiring is open or shorted, diagnostic trouble code No.57 is displayed by the self-diagnosis function and hold mode is canceled.
- If a malfunction occurs in the reduce torque signal, the torque reduction control function is inhibited and line pressure will be high at shifting. Shift shock may be slightly strong.
- If a malfunction occurs in the torque reduced signal or slip lockup signal, diagnostic trouble code No.57 is displayed by the self-diagnosis function.

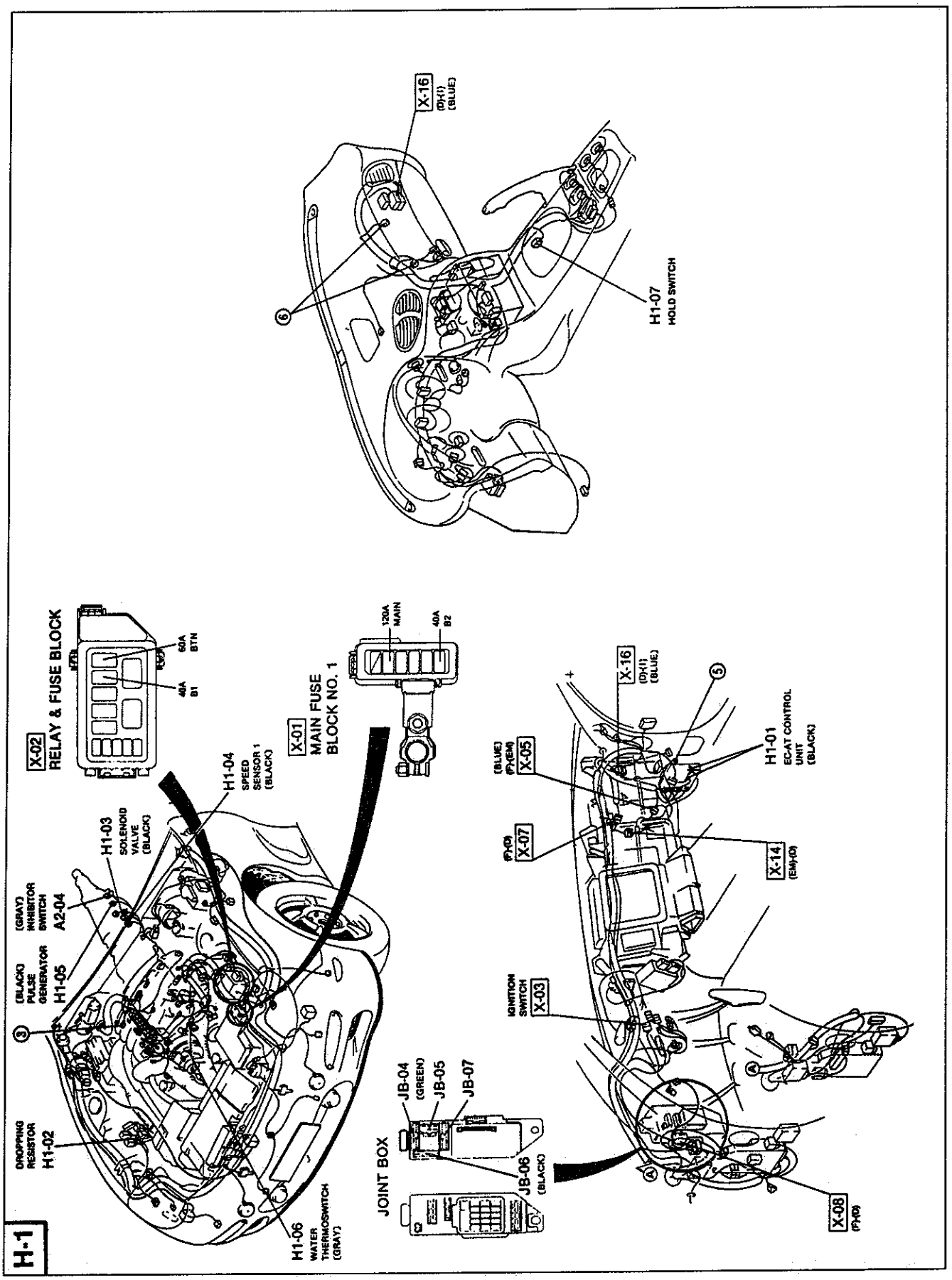
Slip Lockup Signal
- If the wiring is open or shorted, diagnostic trouble code No.57 is displayed by the self-diagnosis function and hold mode is canceled.
- If a malfunction occurs in the slip lockup signal, the torque reduction control function is inhibited and line pressure will be high at shifting. Shift shock may be slightly strong.
- If a malfunction occurs in the torque reduced signal or reduce torque signal, diagnostic trouble code No.57 is displayed by the self-diagnosis function.

Inhibitor Signal
- If the wiring is open, the engine speed will be slightly low in P and N ranges.
- If the wiring is shorted, the engine speed will be slightly high in R, D, S, and L ranges.

Hold Indicator Light
- If the wiring is open, the hold indicator light will not illuminate.
- If the wiring is shorted, the hold indicator light will remain illuminated.
- If the wiring between the FAT terminal and terminal 2N is open or shorted, diagnostic trouble code(s) will not be displayed by the self-diagnosis function.

WIRING DIAGRAM




H-1
X-16 (D)-(1) (BLUE)
H1-07 HOLD SWITCH
X-02 RELAY & FUSE BLOCK
60A BTN
40A B1
X-01 MAIN FUSE BLOCK NO. 1
120A MAIN
40A B2
H1-04 SPEED SENSOR 1 (BLACK)
H1-03 SOLENOID VALVE (BLACK)
(GRAY) INHIBITOR SWITCH A2-04
(BLACK) PULSE GENERATOR H1-05
DROPPING RESISTOR H1-02
H1-06 WATER THERMOSWITCH (GRAY)
JOINT BOX
JB-04 (GREEN)
JB-05
JB-07
JB-06 (BLACK)
IGNITION SWITCH X-03
(BLUE) (F)-(EM) X-05
(F)-(I) X-07
X-16 (D)-(1) (BLUE)
H1-01 EC-AT CONTROL UNIT (BLACK)
X-14 (EM)-(I)
X-08 (F)-(I)

MEMO

ELECTRICAL DIAGNOSIS SUPPORT

Hold Switch

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 2I – hold switch	Mode does not change when hold switch is not operated	Mode does not change when hold switch is operated	Shifting may be abnormal Mode may change when hold switch not operated
Hold switch-ground		No symptom	

Park/Neutral Switch

If the park/neutral switch fuse burns out while the vehicle is being driven, the Powertrain control module (Transmission) will operate as if in the current range only. If the ignition switch is turned from OFF to ON after the fuse burns out, the vehicle can still be driven, but the Powertrain control module (Transmission) will operate as if in N range, and will inhibit lockup.

R Range Switch

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 1E – R range switch	No symptom	METER 15A fuse burns out when R range is selected	May not shift to 4GR in D range S, L range shift pattern may be same as D range
R range switch – battery		Fuse burns out	
R range switch – range indicator light	Range indicator light does not illuminate	METER 15A fuse burns out when R range is selected	

L Range Switch

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 2Q – L range switch	L range shift pattern may be same as D or S range	METER 15A fuse burns out when L range is selected	May not shift to 4GR in D range S, L range shift pattern may be same as D range
L range switch – battery		Fuse burns out	
L range switch – range indicator light	Range indicator light does not illuminate	METER 15A fuse burns out when L range is selected	

S Range Switch

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 2S – S ran e switch	S range shift pattern may be same as D or L range	METER 15A fuse burns out when S range is selected	May not shift to 4GR in D range S, R range shift pattern may be same as D range
S range switch – battery		Fuse burns out	
S range switch – range indicator light	Range indicator light does not illuminate	METER 15A fuse burns out when S range is selected	

D Range Switch

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 2B – D range switch	D range shift pattern may be same as S or L range	METER 15A fuse burns out when D ran e is selected	May not shift to 4GR in D range S, R range shift pattern may be same as D range
D range switch – battery		Fuse burns out	
D range switch – range indicator light	Range indicator light does not illuminate	METER 15A fuse burns out when D range is selected	

P, N Range Switch

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 2D – P, N range switch	No symptom	IG KEY 40A fuse burns out when ignition switch turned START	May not shift to 4GR in D range S, L range shift pattern may be same as D range
P, N range switch – starter circuit	Starter does not operate		

NA: Not applicable

Throttle Position Sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 2A – throttle position sensor	Code No.12 output Shift point incorrect and shift shock strong	Code No.12 output Shift point incorrect and shift shock strong	Line pressure will be abnormal and clutch may slip if Powertrain control module (Transmission) does not judge malfunction Vehicle may jolt
Powertrain control module (Transmission) terminal 2T – throttle position sensor			

Idle Signal

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 2M – Powertrain control module (Engine) terminal 2E	Vehicle jolts when accelerator pedal depressed or released	Clutches may slip when shifting	Line pressure will be abnormal and clutches may slip if Powertrain control module (Transmission) does not judge Vehicle malfunction may jolt

Vehicle Speed Sensor (Revolution Sensor)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 2J – vehicle speed sensor	Code No.06 output	Code No.06 output	NA
Vehicle speed sensor – ground (Powertrain control module (Transmission) terminal 2L)		NA	

Vehicle Speedometer Sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 1I – vehicle speedometer sensor	Code No.07 output	Code No.07 output	NA

Vehicle Speed Pulse Generator

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 2E – vehicle speed pulse generator	Code No.55 output Shift shock may be slightly strong	Code No.55 output Shift shock may be slightly strong	NA
Vehicle speed pulse generator – ground (Powertrain control module (Transmission) terminal 2L)		NA	

Stoplight Switch

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 2Q – stoplight switch	No symptom	Stop 15A fuse burns out when brake pedal is depressed	NA
Stoplight switch – battery		NA	

NA: Not applicable

Torque Reduced Signal

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 2H – Powertrain control module (Engine) terminal 2G	Code No.57 output Shift shock may be slightly strong	Code No.57 output Shift shock may be slightly strong	NA

Mileage Switch

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 2N – speedometer	Shift shock may be strong when shifting from 1st to 2nd or from 2nd to 3GR	Transmission may slip when shifting from 1st to 2nd or from 2nd to 3GR until the total mileage of the vehicle exceeds approximately 600 km {372 mile}	NA

Water Thermoswitch

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 2N – water thermoswitch	Acceleration feeling (driving performance) will be deteriorated	Engine coolant temperature may increase	Acceleration feeling (driving performance) will be deteriorated

A/C Signal

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 1L – Powertrain control module (Engine) terminal 1K	Will always be normal, A/C ON mode	Will always be normal, A/C OFF mode	NA

Slip Lockup OFF Signal

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 2G – Powertrain control module (Engine) terminal 2C	No symptom	No symptom	NA

Engine RPM Signal

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 1G – Powertrain control module (Engine) terminal 2B	Code No.01 output Lockup shock will be strong	Code No.01 output Lockup shock will be strong	NA

ATF Thermosensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 2R – ATF thermosensor	Code No.56 output 4GR and lockup will be inhibited	No code No.56 output Shift shock will be strong at low ATF temperature	NA
ATF thermosensor – ground (Powertrain control module (Transmission) terminal 2L)		NA	

NA: Not applicable

Barometric Absolute Pressure Sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 2C – Powertrain control module (Engine) terminal 2D	Code No.58 output Shift shock will be strong at high altitude	Code No.58 output Shift shock will be strong at high altitude	NA

4GR Inhibit Signal (ASC Signal)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 2K – cruise control unit terminal 1G	4GR not inhibited when 4GR inhibit signal ON	Does not shift to 4GR Always diagnoses Powertrain control module (Transmission) system	NA

TAT Terminal (Data Link Connector)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 2K – TAT terminal	Does not diagnose PCMT system	Always diagnoses Powertrain control module (Transmission) system Does not shift to 4GR	NA

Shift A Solenoid Valve

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 1D – shift A solenoid valve	Code No.60 output D, S range: Third gear fixed L range: 2nd gear fixed	Code No. 60 output D, S range: Third gear fixed L range: 2nd gear fixed	Shifting may be abnormal if Powertrain control module (Transmission) does not judge malfunction
Shift A solenoid valve – ground		No symptom	

Shift B Solenoid Valve

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 1B – shift B solenoid valve	Code No.61 output D, S range: Third gear fixed L range: 2nd gear fixed	Code No.61 output D, S range: Third gear fixed L range: 2nd gear fixed	Shifting may be abnormal if Powertrain control module (Transmission) does not judge malfunction
Shift B solenoid valve – ground		No symptom	

Line Pressure Solenoid Valve

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 1F – line pressure solenoid valve	Code No.64 output Shift shock and select shock will be strong	Code No.64 output Shift shock and select shock will be strong	Shifting may be abnormal if Powertrain control module (Transmission) does not judge malfunction
Line pressure solenoid valve – ground		No symptom	

Lockup Solenoid Valve

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 1M – lockup solenoid valve	Code No.63 output Lockup will not operate	Code No.63 output Lockup will not operate	Lockup may not be operated in lockup zone
Lockup solenoid valve – ground		No symptom	

NA: Not applicable

Lockup Control Solenoid Valve

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 2P – lockup control solenoid valve	Code No.65 output Lockup will not operate	Code No.65 output Lockup will not operate	Lockup may not be operated in lockup zone
Lockup control solenoid valve – ground		No symptom	

Overrunning Clutch Solenoid Valve

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 1O – overrunning clutch solenoid valve	Code No.62 output Engine breaking always operated during coasting Does not shift to 4GR	Code No.62 output Engine breaking always operated during coasting Does not shift to 4GR	May not shift to 4GR
Overrunning clutch solenoid valve – ground		No symptom	

Dropping Resister

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 1H – dropping resister	Code No.64 output Shift shock and select shock will be strong	Code No.64 output Shift shock and select shock will be strong	NA
Dropping resister – solenoid valve (line pressure)			

Reduce Torque Signal

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 2P – Powertrain control module (Engine) terminal 1Q	Code No.57 output Shift shock may be slightly strong	Code No.57 output Shift shock may be slightly strong	NA

Slip Lockup Signal

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 2P – Powertrain control module (Engine) terminal 1Q	Code No.57 output Shift shock may be slightly strong	Code No.57 output Shift shock may be slightly strong	NA

Inhibitor Signal

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 1C – Powertrain control module (Engine) terminal 1R	Engine speed will be slightly low in P and N ranges	Engine speed will be slightly high in R, D, S, and L ranges	NA

Hold Indicator Light

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 1K – Hold indicator light	Hold indicator light not illuminated	Hold indicator light always illuminated	NA

NA: Not applicable

FAT Terminal (Data Link Connector)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 1K – FAT terminal (data link connector)	Diagnostic trouble code(s) not displayed by self-diagnosis function When using Self-Diagnosis Checker, "88" flashes after 20 seconds	Diagnostic trouble code(s) not displayed by self-diagnosis function When using Self-Diagnosis Checker, "88" flashes after 20 seconds	NA

Battery Power (Backup)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 1A – battery	Memory functions that rely on Self-Diagnosis, such as diagnostic trouble code memory, do not operate	ROOM 10A fuse burns out	NA

Battery Power

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Powertrain control module (Transmission) terminal 1N – battery	No symptom	METER 15A fuse burns out when ignition switch is ON	NA
Powertrain control module (Transmission) terminal 1P – battery	No symptom	METER 15A fuse burns out when ignition switch is ON	NA
Powertrain control module (Transmission) terminals 1N and 1P – battery	Powertrain control module (Transmission) does not function D, S range: Third gear fixed L range: 2nd gear fixed	METER 15A fuse burns out when ignition switch is ON	NA

Ground

Circuit	Condition		
	Open circuit	Short circuit	Poor around
Powertrain control module (Transmission) 1J terminal – ground	Powertrain control module (Transmission) does not function D, S range: Third gear fixed L range: 2nd gear fixed	No symptom	Shifting may be abnormal

NA: Not applicable

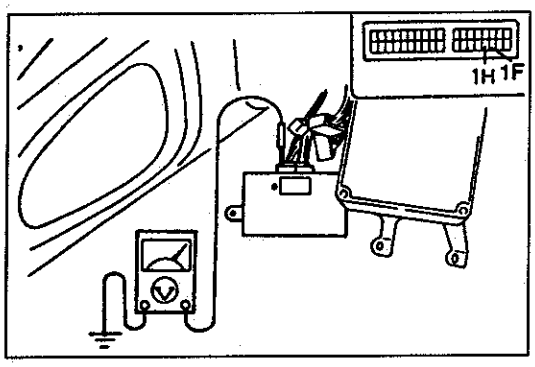
If a solenoid circuit or sensor circuit has poor grounding, the following malfunctions may exist:
1. Abnormal shifting
   - Shift points abnormal
   - Transmission hunts (repeated upshifting/downshifting)
   - Drives away except in 1st gear
   - Does not shift to Fourth gear.
   - Fail-safe function may be operated by on-board diagnosis system according to extent of malfunction
2. Deterioration of shift feeling
   - Oil pressure high and shift shock strong
   - Shift timing incorrect and engine flares up
   - Shift timing incorrect and vehicle brakes on shifting
   - Fail-safe function may be operated by on-board diagnosis system according to extent of malfunction

SYSTEM INSPECTION

LINE PRESSURE SOLENOID VALVE OUTPUT DUTY

Inspection

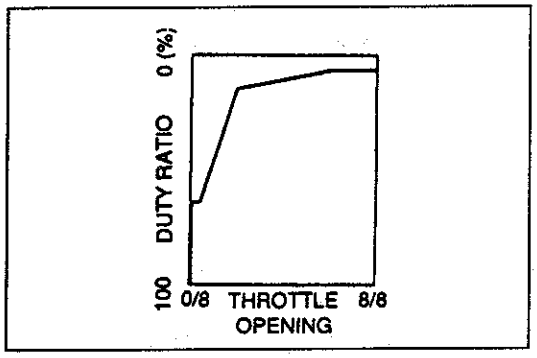
1. Connect the (+) terminal of a dwell meter to terminal 1F (line pressure solenoid valve) and terminal 1H (dropping resistor) of the powertrain control module (Transmission). Set the dwell meter selector to the 4 cylinder position.
2. Turn the ignition switch to ON.
3. Depress and release the accelerator pedal, and verify the OFF duty ratio by using the dwell meter.



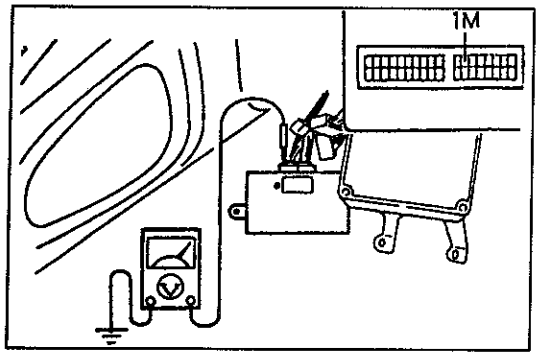
Throttle opening	Duty ratio (ON %)
Closed throttle position (0/8)	Approx. 100
Wide open throttle (8/8)	Approx. 5

Dwell angle/Duty ratio relationship

Dwell angle (°)	0	18	36	54	72	90
Duty ratio (%)	0	20	40	60	80	100



4. Depress the accelerator pedal slowly and verify the duty ratio charges as shown in the graph.
5. If not as specified, check the powertrain control module (Transmission) (refer to page K-35), dropping resistor (refer to page K-33), and line pressure solenoid (refer to page K-32).



LOCKUP SOLENOID VALVE OUTPUT DUTY

Inspection

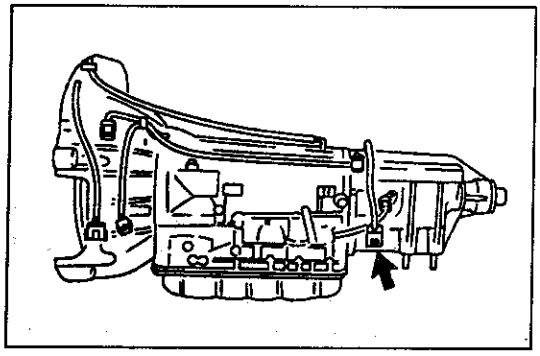
1. Connect the (+) terminal of a dwell meter to terminal 1M of the powertrain control module (Transmission) and the (−) terminal to a ground.
2. Drive the vehicle and verify the OFF duty ratio in the lock-up condition by using the dwell meter.
3. Verify the duty ratio in the lockup condition.

Condition	Duty ratio (ON %)
No lockup	Approx. 5
Lockup	Approx. 95

Dwell angle/Duty ratio relationship

Dwell angle (°)	0	18	36	54	72	90
Duty ratio (%)	0	20	40	60	80	100

4. If not as specified, check the powertrain control module (Transmission) (refer to page K-35), and lockup solenoid valve (refer to page K-32).



MANUAL OPERATION TEST

Inspection

1. Disconnect solenoid connector.
2. Accelerate the vehicle from 0 km/h, and determine the gear position by observing the engine speed.
   When vehicle speed is 40 km/h {25 mph}, engine rpm in 2nd gear should be approximately 2,300 rpm, and in Third gear it should be approximately 1,500 rpm.
3. Verify the gear position of each range.

Range	Gear Position
D range	3rd, fixed
S range	3rd, fixed
L range	2nd, fixed
R range	Reverse

4. If not within specification, check the oil pressure or transmission.

MEMO

HYDRAULIC CIRCUIT