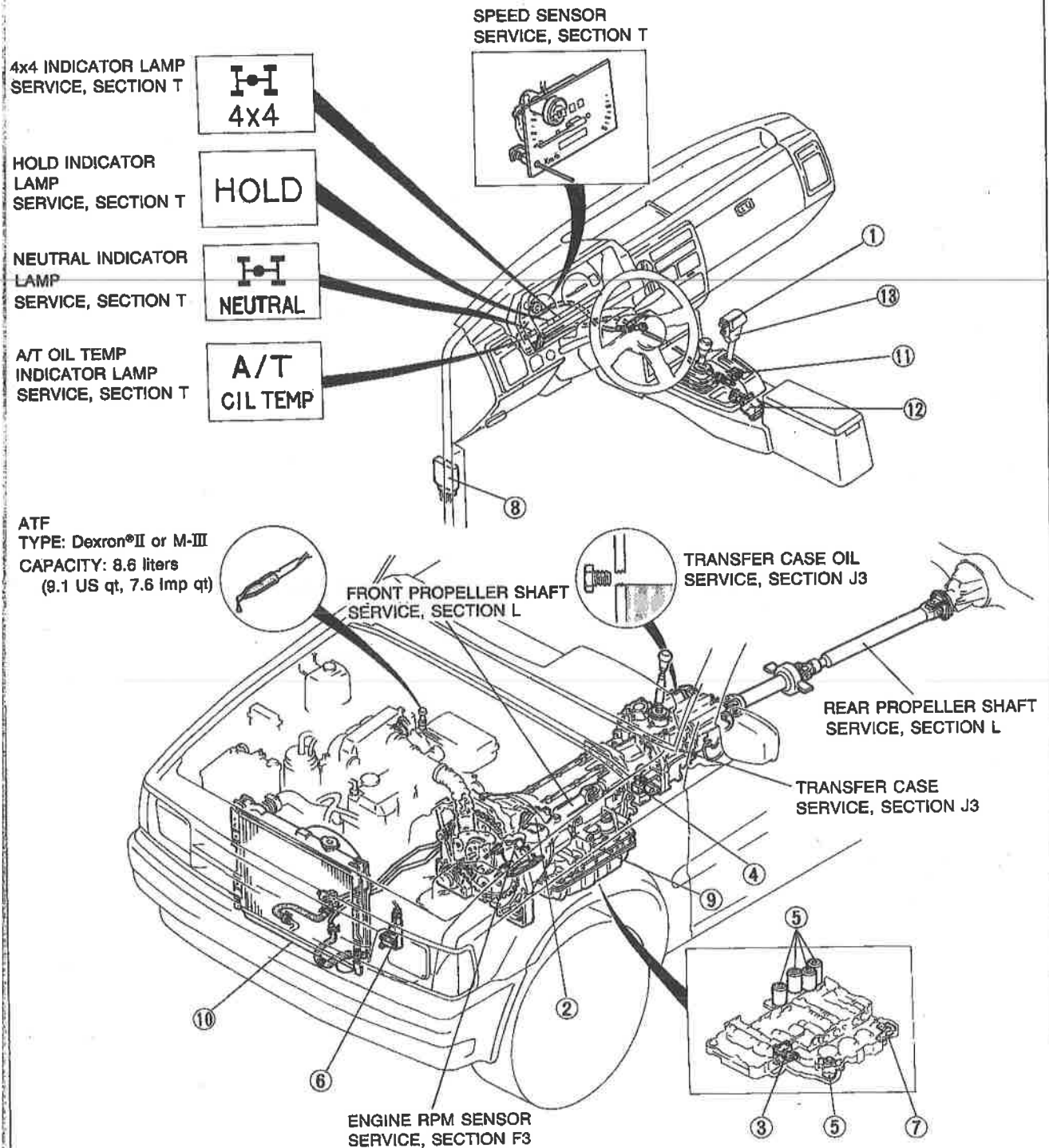
AUTOMATIC TRANSMISSION (Electronically-Controlled)

2BU0K2-001

INDEX



0MU0K1-002

2BU0K2-002

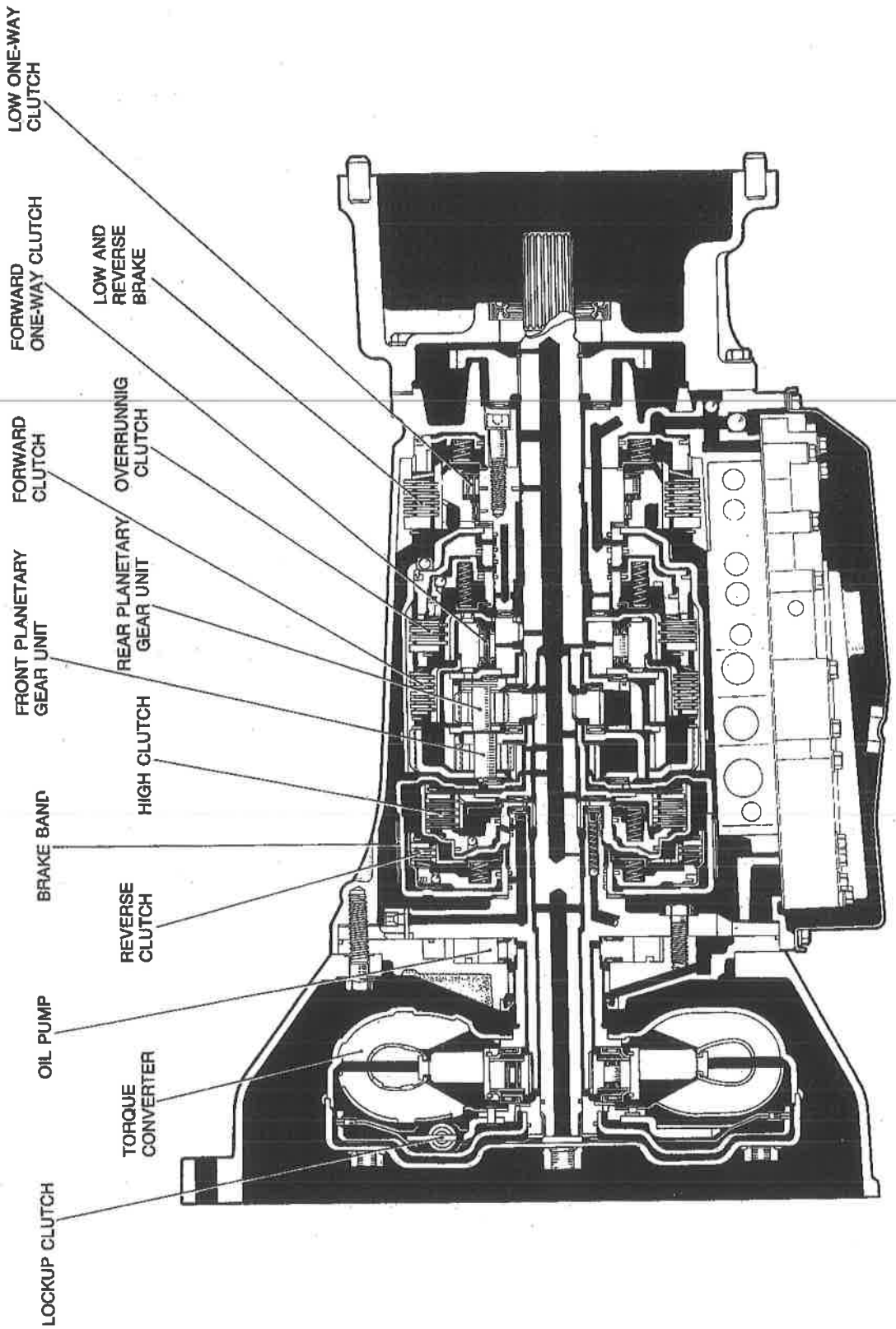
OUTLINE

SPECIFICATIONS

Item \ Transmission			R4AX-EL
Torque converter stall torque ratio			2.000
Gear ratio	1st		2.786
	2nd		1.546
	3rd		1.000
	OD (4th)		0.694
	Reverse		2.273
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		6/6
Automatic transmission fluid (ATF)	Type		Dexron®II or M-III
	Capacity liters (US qt, Imp qt)	Total	8.6 (9.1, 7.6)
		Oil pan	4.0 (4.2, 3.5)

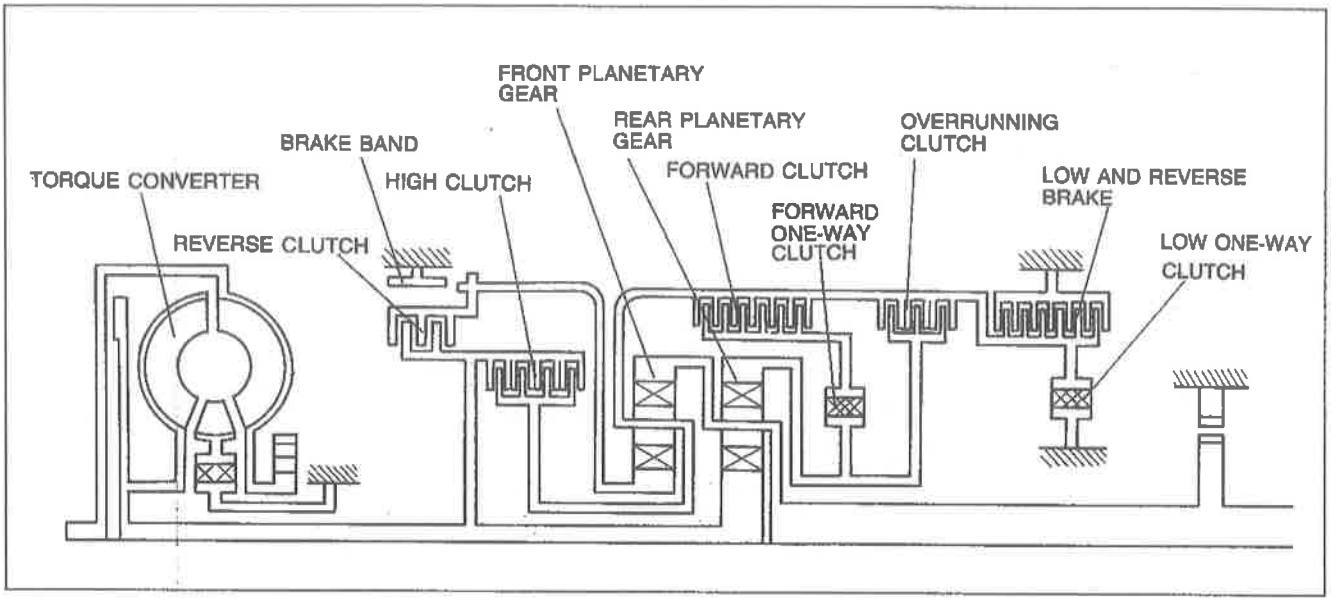
2BU0K2-003

CROSS-SECTIONAL VIEW



9MU0K1-004

POWER FLOW DIAGRAM



9MU0K1-005

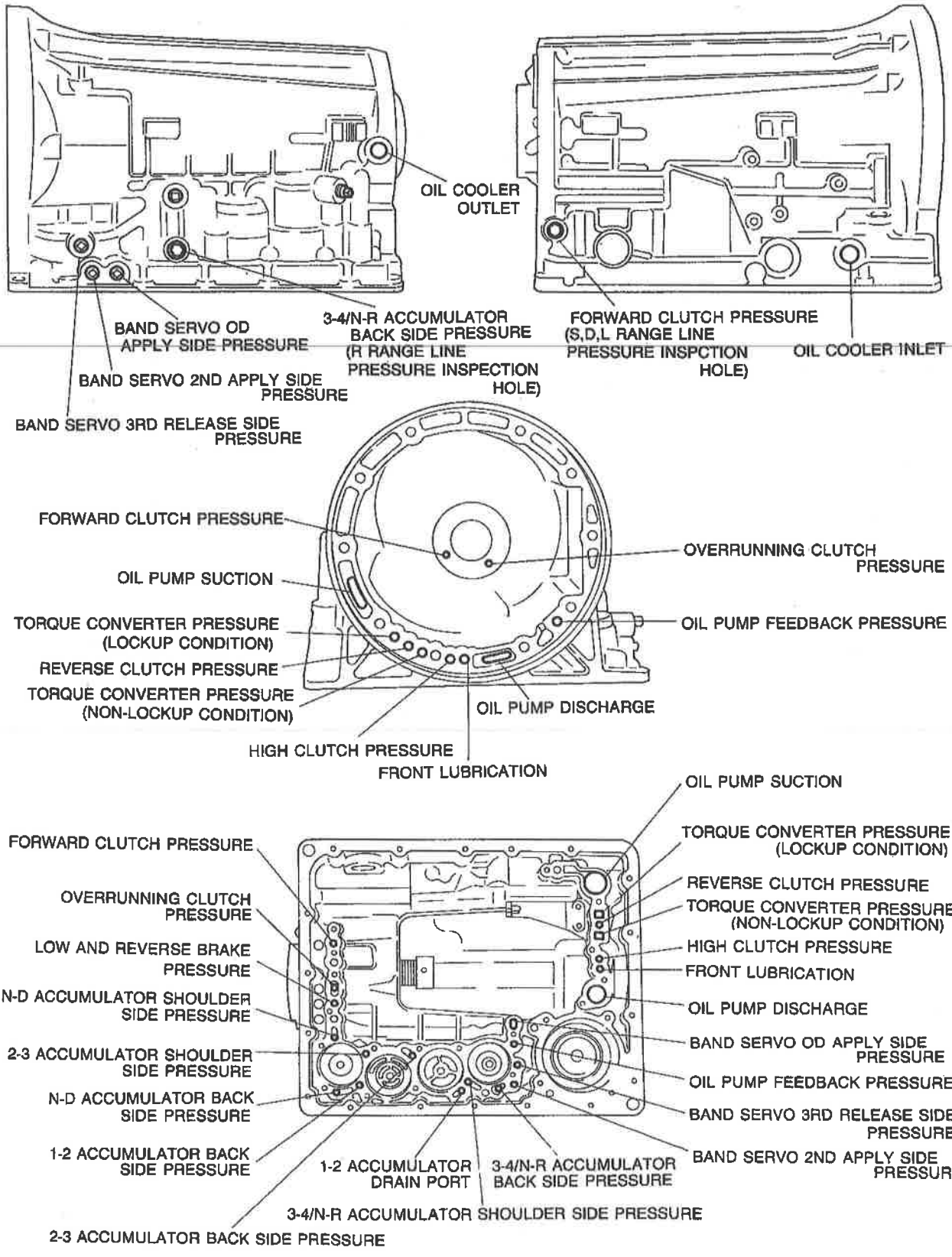
OPERATION OF COMPONENTS

Mode	Range	Gear	Reverse clutch	High clutch	Forward clutch	Overrunning clutch	Brake band			Forward one-way clutch	Low one-way clutch	Low and reverse brake
							2nd applied	3rd released	OD applied			
ECONOMY/POWER	P	—										
	R	Reverse	○									○
	N	—										
	D	1st			○	■				●	●	
		2nd			○	□	○			●		
		3rd		○	○	□	⊗*1	⊗		●		
		OD		○	⊗		⊗*2	⊗	○			
	S	1st			○	★				●	●	
		2nd			○	◎	○			●		
		3rd		○	○	◎	⊗*1	⊗		●		
	L	1st			○	○				●		○
		2nd			○	○	○			●		
HOLD	D	2nd			○	◎	○			●		
		3rd		○	○	◎	⊗*1	⊗		●		
	S	2nd			○	◎	○			●		
	L	1st			○	○				●		○

9MU0K1-006

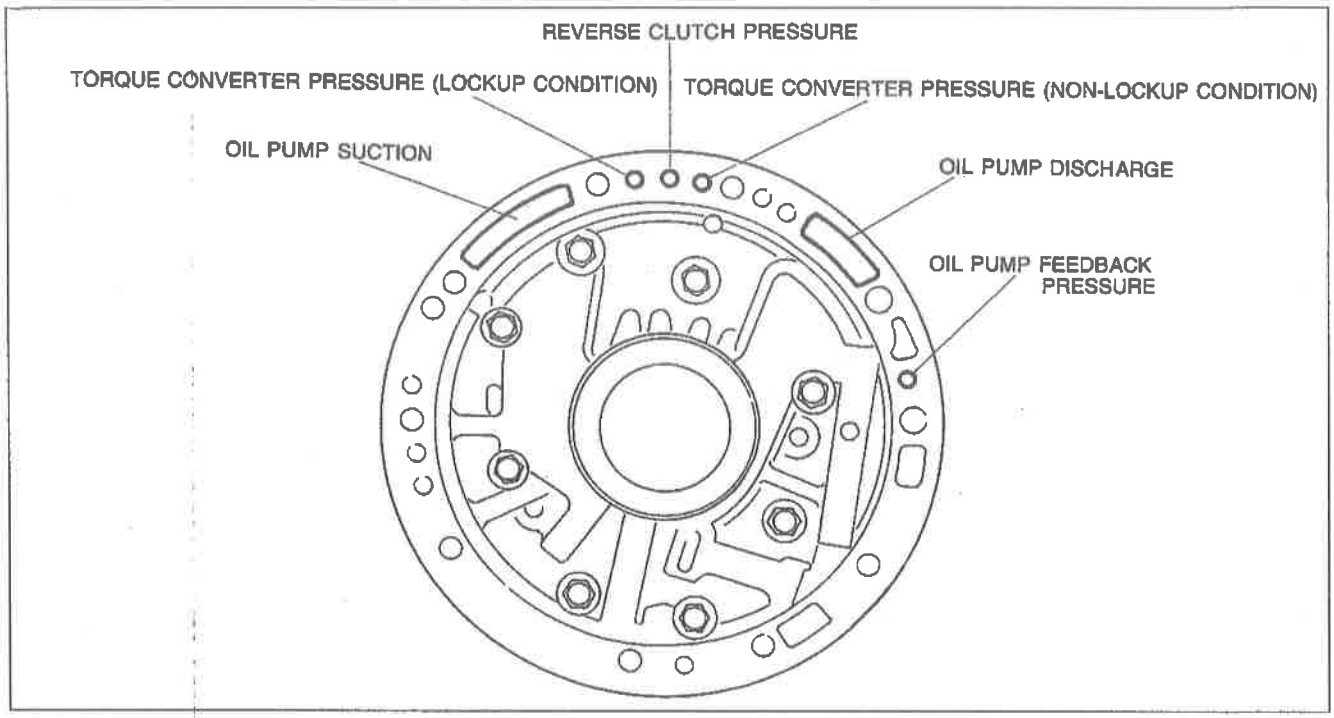
*1 : Hydraulic pressure is applied to both 2nd applied side and 3rd released side of band servo piston. However, because the area of the 3rd released side is larger than the 2nd applied side, the brake band does not operate.
*2 : Hydraulic pressure is applied to OD applied side, plus condition *1 above. Brake band is applied.
○ : Operates.
◎ : Operates when throttle opening is less than 1/8. Engine braking effect available.
★ : Operates when throttle opening is less than 1/8. Engine braking effect not available.
□ : Operates when the EC-AT control unit recive OD inhibit signal from the cruise control unit and throttle opening less than 1/8. Engine braking effect available.
■ : Operates when the EC-AT control unit recive OD inhibit signal from the cruise control unit and throttle opening less than 1/8. Engine braking effect not available.
⊗ : Operates but does not transmit power.
● : Operates during acceleration and cruising.

FLUID PASSAGE LOCATION
Transmission Case



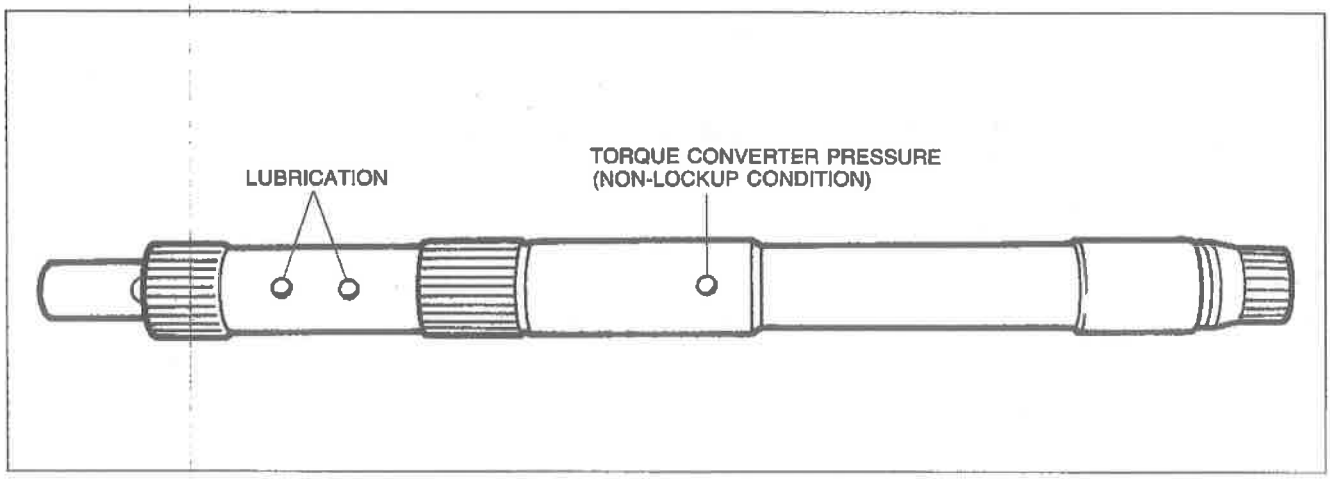
9MU0K1-007

Oil Pump



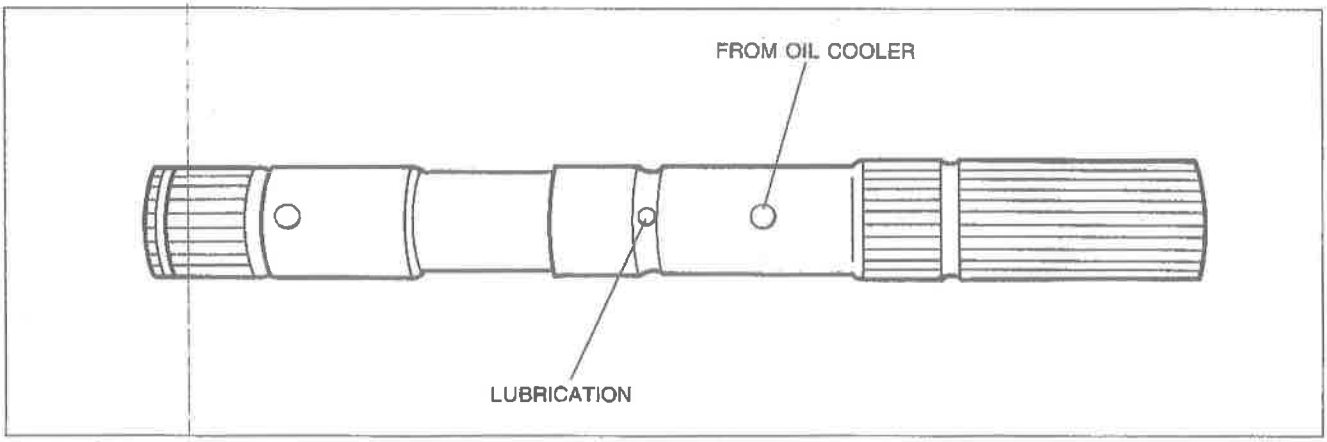
9MU0K1-008

Input Shaft



9MU0K1-009

Output Shaft



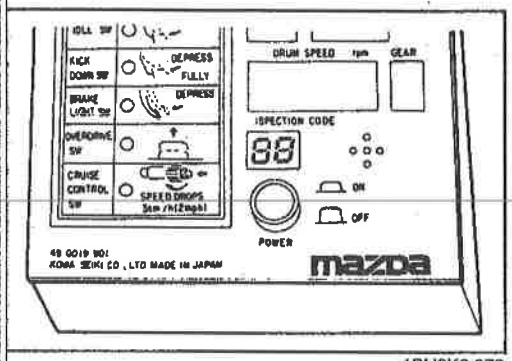
9MU0K1-010

TROUBLESHOOTING

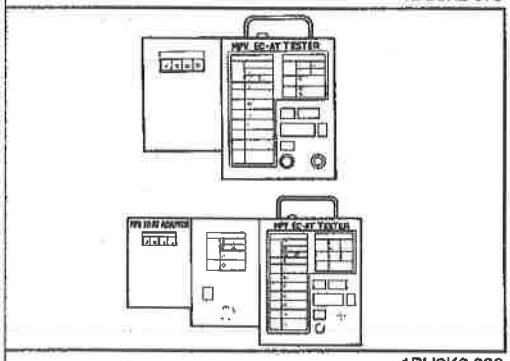
GENERAL NOTES

A problem with the EC-AT may be caused by the engine, the EC-AT powertrain, the hydraulic control system, or the electronic control system.
When troubleshooting, therefore, begin from these points, which can be inspected quickly and easily. The recommended troubleshooting sequence is described below.

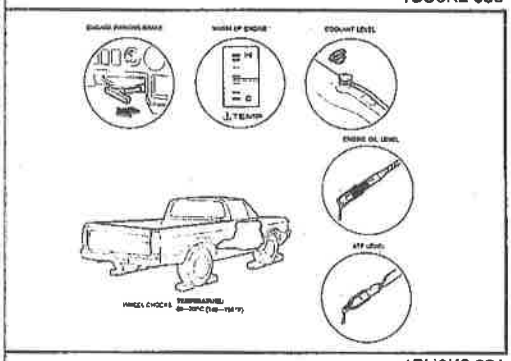
9MU0K1-011



1BU0K2-079



1BU0K2-080



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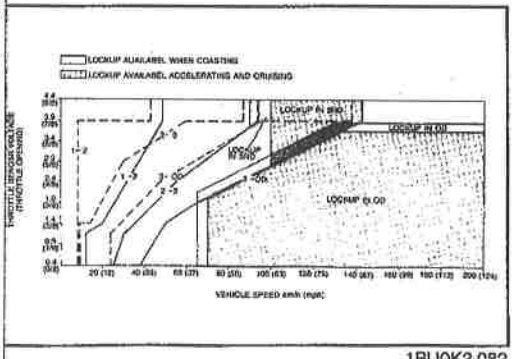


1BU0K2-082

Step 1: Self-diagnostic System Inspection

Check for malfunction code(s) memorized in the EC-AT control unit with the **EC-AT Tester**. (Refer to page K2–13.)

Note
Malfunction code(s) can also be checked for by the flashing sequence of the HOLD indicator lamp. (Refer to page K2–13.)

Step 2: Electric Signal Inspection

Check the signals to/from the EC-AT control unit with the **EC-AT Tester**. (Refer to page K2–21.)

Note
Signals can also be checked by checking the EC-AT control unit terminal voltages with a voltmeter. (Refer to page K2–39.)

Step 3: Mechanical System Test

Check the engine stall speed, time lag, and line pressure. (Refer to page K2–23.)

Step 4: Road Test

Note
For correct testing, vehicle speed, throttle opening (throttle sensor voltage), and gear position should be checked with the EC-AT Tester.

Check the shift point, shift schedule, and shift shock. (Refer to page K2–29.)

If the 4 steps on page K2–8 are followed, the cause of the problem should be located.
Another guide to faster location of the causes of problems, the QUICK DIAGNOSIS CHART, is on pages K2–9 to 12.
In this chart, numbers are used to indicate the components that may be the cause of 51 possible problems.
It is necessary to check only those components indicated by numbers during each step of the troubleshooting process to locate the cause of the problem quickly.

QUICK DIAGNOSIS CHART

The QUICK DIAGNOSIS CHART shows different problems and the relationship of components that might be the cause.

1. Components indicated in the "Adjustment" column indicate the possibility that the problem may result from an incorrect adjustment.
   Check the adjustment of each component, and readjust if necessary.
2. Components indicated in the "Self-diagnosis" column are diagnosed by the EC-AT control unit self-diagnostic function.
   The **EC-AT Tester** can be used for easy retrieval of the these signals.
3. Input and output signals of the EC-AT control unit for components indicated in the "EC-AT Tester" column can be easily checked with the **EC-AT Tester**.
4. Components indicated in the "Mechanical System Test" column can be checked for malfunction by the results of the oil pressure test.
5. Components indicated in the "Road Test" column can be checked for malfunction by the results of the road test.
6. The numbers in the chart indicate the order of inspection for detecting malfunctions.
7. Circled numbers indicate that the transmission must be removed from the vehicle.
8. The checking, adjusting, repair, and replacement procedures for components are described in the page(s) shown in the "Reference page" column.

1BU0K2-083

Inspection point and reference page / Item	ATF level and condition (K2–42)	Selector lever and control linkage (K2–146)	Idle speed and engine condition (Section F2)	Ignition switch and starter (Section G)	Inhibitor switch (K2–35)	Hold switch (K2–35)	Cruise control switch (Section T)	Atmospheric pressure sensor (Section F2)	Idle switch (Section F2)	Throttle sensor (Section F2)	Speed sensor 1 (K2–37)	ATF thermosensor (K2–36)	Engine rpm sensor (Section G)	Shift solenoid A (K2–38)	Shift solenoid B (K2–38)	Line pressure solenoid (K2–38)	Dropping resistor (K2–38)	Lockup solenoid (K2–38)	Overrunning clutch solenoid (K2–38)	Line pressure (K2–27)	Control valve body (K2–103)	N-D accumulator (K2–59)	1-2 accumulator (K2–59)	2-3 accumulator (K2–59)	3-4/N-R accumulator (K2–59)	Oil pump (K2–61)	Torque converter (K2–58)	Reverse clutch (K2–65)	High clutch (K2–71)	Forward clutch (K2–85)	Forward one-way clutch (K2–82)	Overrunning clutch (K2–85)	Low one-way clutch (K2–85)	Low and reverse brake (K2–93)	Brake band and band servo (K2–78)	Parking mechanism (K2–99)
	ON VEHICLE																										OFF VEHICLE									
	Preliminary				Electronic system															Hydraulic control system							Powertrain									
Adjustment		X	X		X				X	X																									X	
Self-diagnosis										X	X	X	X	X	X	X	X	X	X																	
EC-AT Tester					X	X	X		X	X	X	X	X	X	X	X	X	X	X																	
Mechanical System Test																					X	X			X	X	X			X	X		X	X		
Road Test														X	X	X		X	X		X	X	X	X	X				X	X	X	X	X	X	X	X

		ON VEHICLE																								OFF VEHICLE								
Item \ Inspection point and reference page		Preliminary				Electronic system															Hydraulic control system						Powertrain								
		K2–42	K2–146	Section F2	Section G	K2–35	K2–35	Section T	Section F2	Section F2	Section F2	Section F2	K2–37	K2–36	Section G	K2–38	K2–38	K2–38	K2–38	K2–38	K2–27	K2–103	K2–59	K2–59	K2–59	K2–59	K2–61	K2–58	K2–65	K2–71	K2–85	K2–82	K2–85	K2–85	K2–93	K2–78	K2–99
		ATF level and condition	Selector lever and control linkage	Idle speed and engine condition	Ignition switch and starter	Inhibitor switch	Hold switch	Cruise control switch	Atmospheric pressure sensor	Idle switch	Throttle sensor	Speed sensor 1	ATF thermosensor	Engine rpm sensor	Shift solenoid A	Shift solenoid B	Line pressure solenoid	Dropping resistor	Lockup solenoid	Overrunning clutch solenoid	Line pressure	Control valve body	N-D accumulator	1-2 accumulator	2-3 accumulator	3-4/N-R accumulator	Oil pump	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 band servo	Parking mechanism
Engine starting	Engine does not start in N and/or P range		2		1	3																														
	Engine starts in ranges other than N and P range		1			2																														
Accelerating	Vehicle does not move in D range (moves in L, S, and R ranges)		1																														②			
	Vehicle does not move in forward ranges (moves in R range) Extremely poor acceleration	1															3				2	4	5					⑥	⑦	⑧	⑨		⑩			
	Vehicle does not move in R range (moves in forward ranges) Extremely poor acceleration		1														3				2	4						⑤	⑥	⑦		⑧		⑨		
	Vehicle does not move in any range	1	2														4				3						⑤	⑨		⑥				⑧	⑦	⑩
	Slippage felt when accelerating	1	2								3						5				4	6	7			8	⑫	⑬	⑩		⑨			⑪		
	Vehicle moves in N range		1																							4			③		②		⑤			
	Excessive creep			1																																
	No creep	1																			2	3					⑤	⑥			④					
	Low maximum speed and poor acceleration	1				2									3	4						5					⑩	⑪	⑥	⑦				⑨	⑧	
No shift	Does not shift from 1st to 2nd		3			2	1					6			4							5													⑦	
	Does not shift from 2nd to 3rd		3			2	1					6				4						5								⑦					⑧	
	Does not shift from 3rd to OD		4			3	1	2				6	7		5																				⑧	
	Lockup does not occur					4				1	2	3	6	5					8		7	9					⑩									
	Does not shift from OD to 3rd	1									2				4		5			3		6										⑧		⑦	
	Does not shift from 3rd to 2nd, or from OD to 2nd	1									2				3	4						5							⑥						⑦	
	Does not shift from 2nd to 1st or from 3rd to 1st	1					3				2				4	5						6							⑧				⑦		⑨	
	Does not kickdown when accelerator is depressed in OD within kickdown range										1	2			3	4																				

Item	Inspection point and reference page	Preliminary				Electronic system															Hydraulic control system						Powertrain									
		K2–42	K2–146	Section F2	Section G	K2–35	K2–35	Section T	Section F2	Section F2	Section F2	K2–37	K2–36	Section G	K2–38	K2–38	K2–38	K2–38	K2–38	K2–38	K2–27	K2–103	K2–59	K2–59	K2–59	K2–59	K2–61	K2–58	K2–65	K2–71	K2–85	K2–82	K2–85	K2–85	K2–93	K2–78	K2–99
		ATF level and condition	Selector lever and control linkage	Idle speed and engine condition	Ignition switch and starter	Inhibitor switch	Hold switch	Cruise control switch	Atmospheric pressure sensor	Idle switch	Throttle sensor	Speed sensor 1	ATF thermosensor	Engine rpm sensor	Shift solenoid A	Shift solenoid B	Line pressure solenoid	Dropping resistor	Lockup solenoid	Overrunning clutch solenoid	Line pressure	Control valve body	N-D accumulator	1-2 accumulator	2-3 accumulator	3-4/N-R accumulator	Oil pump	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 band servo	Parking mechanism
No shift	Excessive engine speed when accelerated in OD due to delayed kickdown										2	1			3	4																				
	Does not shift from 2nd to 1st in L range					1						2			3					5		4											⑥		⑦		
Shift shock	Excessive N to D range shift shock			1					5		2		4	7			8	6			3	9	10							⑪						
	Excessive 1st to 2nd shift shock								6		1		5					7			2	4		3											⑧	
	Excessive 2nd to 3rd shift shock								6		1		5					7			2	4			3					⑧					⑨	
	Excessive 3rd to OD shift shock								5		1							6			2	4				3							⑧		⑦	
	Vehicle brakes when shifted from 1st to 2nd	1																										②	④				⑤	③		
	Vehicle brakes when shifted from 2nd to 3rd	1																																	②	
	Vehicle brakes when shifted from 3rd to OD	1																										④			③	②				
	Shift shock felt when accelerator released and deceleration occurs								3		1							4		5	2	6														
	Excessively large 2nd to 1st shift shock in L range																					1												②		
	Vehicle brakes when shifted to R range	1	2														4				3	5								⑥	⑧		⑨		⑦	
Shift point	Excessively high 1st to 2nd, 2nd to 3rd, and 3rd to OD shift points						3				1	2			4	5																			
	Excessively high OD to 3rd, 3rd to 2nd, and 2nd to 1st shift points										1	2																							
	Excessively high or low lockup point										1	2							3			4													
	Shifts directly from 1st to 3rd	1																						2											③	
Slipping	Almost no shift shock or excessive slippage at 1st to 2nd shift	1									2										3	5		4											⑥	
	Almost no shift shock or excessive slippage at 2nd to 3rd shift	1									2										3	5			4					⑥					⑦	
	Almost no shift shock or excessive slippage at 3rd to OD shift	1									2										3	5				4				⑥					⑦	

Item	Inspection point and reference page	ON VEHICLE: Preliminary: ATF level and condition K2–42	Preliminary: Selector lever and control linkage K2–146	Preliminary: Idle speed and engine condition Section F2	Preliminary: Ignition switch and starter Section G	Electronic system: Inhibitor switch K2–35	Electronic system: Hold switch K2–35	Electronic system: Cruise control switch Section T	Electronic system: Atmospheric pressure sensor Section F2	Electronic system: Idle switch Section F2	Electronic system: Throttle sensor Section F2	Electronic system: Speed sensor 1 K2–37	Electronic system: ATF thermosensor K2–36	Electronic system: Engine rpm sensor Section G	Electronic system: Shift solenoid A K2–38	Electronic system: Shift solenoid B K2–38	Electronic system: Line pressure solenoid K2–38	Electronic system: Dropping resistor K2–38	Electronic system: Lockup solenoid K2–38	Electronic system: Overrunning clutch solenoid K2–38	Hydraulic control system: Line pressure K2–27	Hydraulic control system: Control valve body K2–103	Hydraulic control system: N-D accumulator K2–59	Hydraulic control system: 1-2 accumulator K2–59	Hydraulic control system: 2-3 accumulator K2–59	Hydraulic control system: 3-4/N-R accumulator K2–59	OFF VEHICLE: Powertrain: Oil pump K2–61	Powertrain: Torque converter K2–58	Powertrain: Reverse clutch K2–65	Powertrain: High clutch K2–71	Powertrain: Forward clutch K2–85	Powertrain: Forward one-way clutch K2–82	Powertrain: Overrunning clutch K2–85	Powertrain: Low one-way clutch K2–85	Powertrain: Low and reverse brake K2–93	Powertrain: Brake band and band servo K2–78	Powertrain: Parking mechanism K2–99
Slipping	Engine overruns or slips when shifting OD to 3rd	1									2						4				3	5								⑥	⑦						
	Engine overruns or slips when shifting OD to 2nd	1									2				5		4				3	6									⑧					⑦	
	Engine overruns or slips when shifting 3rd to 2nd	1									2						4			8	3	5			10					⑨	⑦					⑥	
	Engine overruns or slips when shifting OD to 3rd, or OD to 2nd	1									2						4				3	5									⑥	⑦		⑧			
	Lockup clutch (in torque converter) slips when locking	1									2						5		4		3	6						⑦									
Noise	Transmission noisy in P, and N ranges	1									3	4		5							2						⑥	⑦									
	Transmission noisy in D, S, L, and R ranges	1																									②									
Others	No engine braking in L range		2			1					3	4			5					7		6										⑧		⑨		
	Vehicle moves in P or parking gear not disengaged when P is disengaged		1																																	②
	Transmission overheats	1		2							3						5				4	6					⑦	⑭	⑧	⑨	⑪		⑫		⑬	⑩	
	White smoke discharged from exhaust while running	1																											②	③	⑤		⑥		⑦	④	
	Abnormal odor from oil level gauge pipe	1																									③	②	④	⑤	⑦		⑧		⑨	⑥	
	Engine stalls when shifting to D, S, L, or R ranges			1															2			3						④									

2BU0K2-004

SELF-DIAGNOSTIC SYSTEM INSPECTION

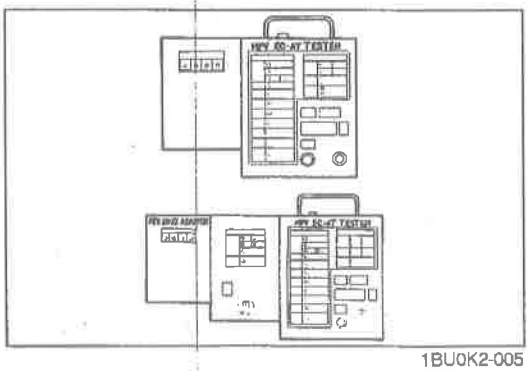
SELF-DIAGNOSTIC FUNCTION

The self-diagnostic system, which is integrated in the EC-AT control unit, diagnoses malfunction of the main sensors (input) and solenoid valves (output) and the EC-AT control unit.
Malfunctions or intermittent malfunctions are stored in the EC-AT control unit to later be output as malfunction codes.
The **EC-AT Tester and Adapter** are used to retrieve these malfunction codes. Each malfunction is indicated by a code number and the buzzer as shown in the table below.

Malfunction Code Number

CODE NO.	LOCATION OF MALFUNCTION	BUZZER	BUZZER (HOLD INDICATOR LAMP FLASH CYCLE)
		49 G019 901 TESTER BODY	49 G019 901A TESTER BODY
01	ENGINE RPM SENSOR	ON / OFF	ON / OFF
06	SPEED SENSOR 1		
07	SPEED SENSOR 2 (IN SPEEDOMETER)		
12	THROTTLE SENSOR		
56	ATF THERMOSENSOR		
60	SHIFT SOLENOID A		
61	SHIFT SOLENOID B		
62	OVERRUNNING CLUTCH SOLENOID		
63	LOCKUP SOLENOID	0.4sec. 2.0sec.	4.0sec. 1.6sec. 1.2sec. 0.4sec. 0.4sec.
64	LINE PRESSURE SOLENOID		

9MU0K1-018



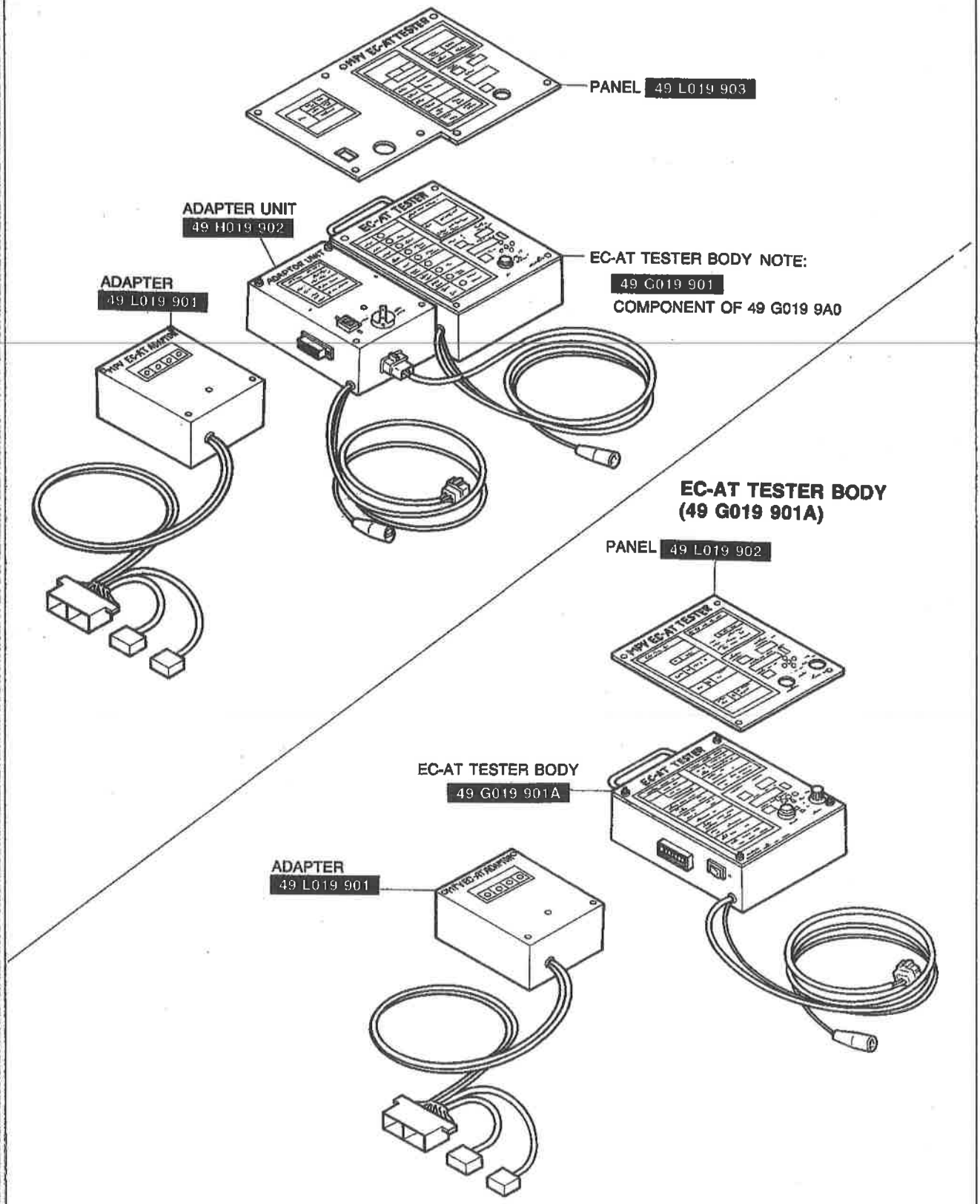
1BU0K2-005

EC-AT TESTER

The previous **EC-AT Tester** can be used along with the **Adapter** (49 L019 901).

Components

EC-AT TESTER BODY (49 G019 901) AND ADAPTER UNIT (49 H019 902)



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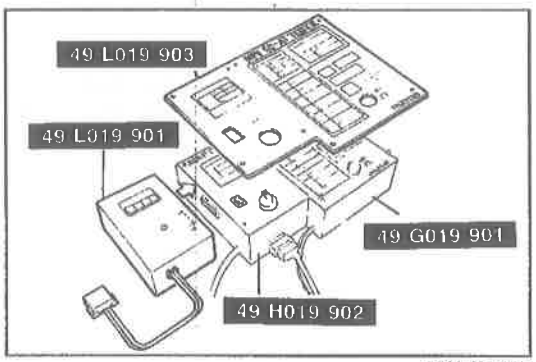
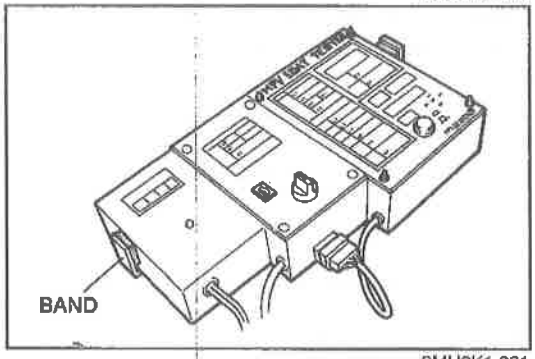


0BU0K2-015

Assembly of EC-AT Tester

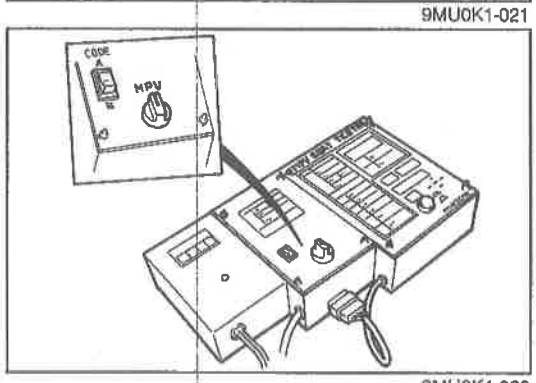
For EC-AT tester body (49 G019 901) and adapter unit (49 H019 902)

1. Install the **adapter** (49 L019 901) to the assembled **EC-AT tester body** (49 G019 901) and **adapter unit** (49 H019 902).
2. Set the **panel** (49 L019 903) onto the EC-AT tester.



9MU0K1-021

3. Affix the EC-AT tester assembly with the band.

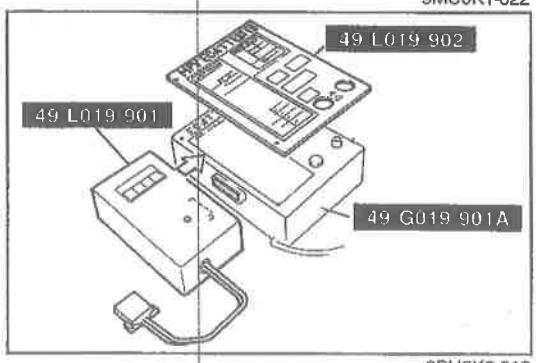


9MU0K1-022

4. Set the code selector switch to position A.

Note
Position B is used only for the 1987 626.

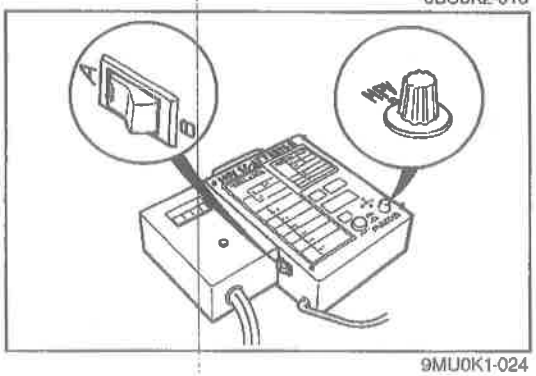
5. Select the select switch to the MPV position.



0BU0K2-016

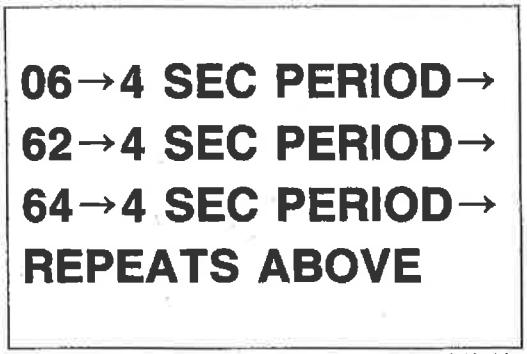
For EC-AT tester body (49 G019 901A)

1. Install the **adapter** (49 L019 901) to the **EC-AT tester body** (49 G019 901A).
2. Set the **panel** (49 L019 902) onto the EC-AT tester body.

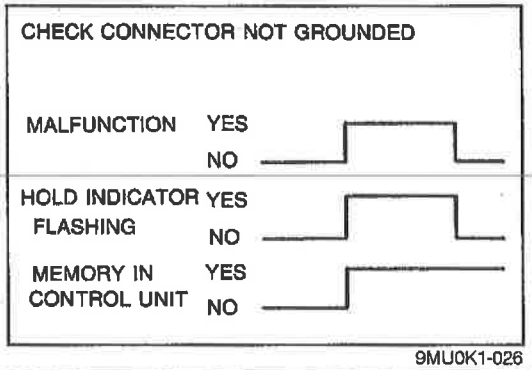


9MU0K1-024

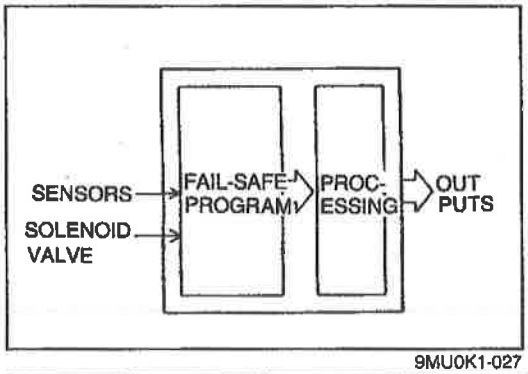
3. Perform steps 3 to 5 above.



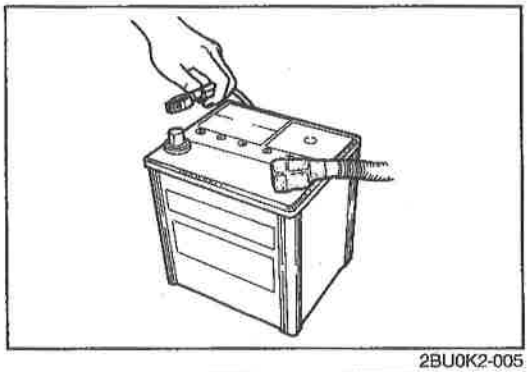
9MU0K1-025



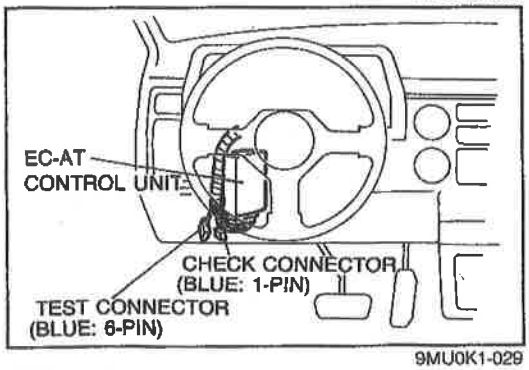
9MU0K1-026



9MU0K1-027



2BU0K2-005



9MU0K1-029

GENERAL NOTES

1. If there is more than one malfunction, the code numbers will be displayed on the tester one by one in numerical order. In the case of malfunctions 62, 06, and 64, the code numbers are displayed in order of 06, 62, then 64. The display is shown.

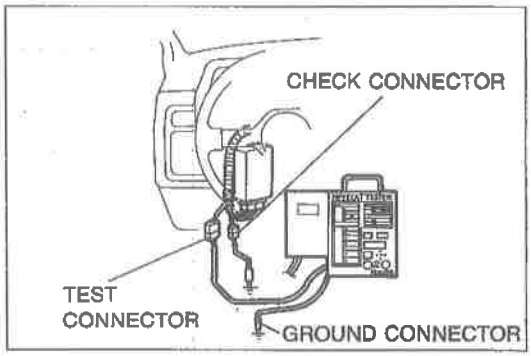
2. The HOLD indicator flashes to indicate the same pattern as the buzzer of the **EC-AT Tester** (49 G019 901A) when the check connector (blue, 1-pin) is grounded.
   When the check connector is not grounded, the indicator flashes at a constant frequency malfunction recovers. However, the malfunction code is memorized in the EC-AT control unit.

3. The EC-AT control unit has a built-in fail-safe function for the throttle sensor, the speed sensors, and all the solenoids. If a malfunction occurs, the EC-AT control unit will control operation of the remaining components according to a preset fail-safe program.
   The vehicle may still be driven, although driving performance will be slightly affected.

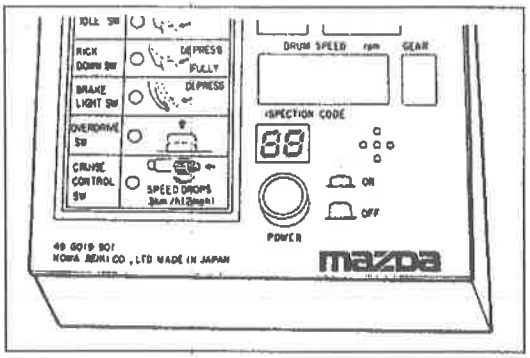
4. The memory of malfunction codes is canceled when the negative battery terminal is disconnected for approximately 20 seconds.

RETRIEVAL PROCEDURES

1. Locate the check connector, and test connector.



0BU0K2-166



1BU0K2-006

2. Connect the 6-pin connector of the **EC-AT Tester** to the test connector (Blue: 6-pin).
3. Ground the ground connector of the **EC-AT Tester**.
4. Ground the check connector (Blue: 1-pin).
5. Turn the ignition switch ON.
6. Check that **"88"** flashes on the digital display and that the buzzer sounds for three seconds.
7. If **"88"** does not flash, check the test connector wiring.
8. If **"88"** flashes and the buzzer sounds continuously for more than **20 seconds**, check the wiring to 2N terminal of the EC-AT control unit for a short-circuit. If necessary, replace the EC-AT control unit and repeat steps 2 to 5.
9. Note the code numbers and check for the causes by referring to the INSPECTION PROCEDURES shown on pages K2–17 to 20. Repair as necessary.

Note
After repairs are made, recheck for code numbers by performing the "AFTER-REPAIR PROCEDURES". (Refer to page K2–20.)

INSPECTION PROCEDURES

No.01 Code Display (Engine RPM Sensor)

Is there poor connection at connector?
- YES → Repair or replace connector
- NO ↓

Connect tachometer to 1G terminal of EC-AT control unit
Does it display correct engine rpm?
- YES → Engine rpm sensor OK
  Cancel memory of code number
- NO ↓

Is resistance of ignition coil OK?
(Refer to Section G)
- NO → Replace ignition coil
- YES ↓

Is there continuity between (–) terminal of ignition coil connector and 1G (W) terminal of EC-AT control unit connector?
- NO → Check for open or short circuit in wiring
- YES → Replace EC-AT control unit

0BU0K2-018

No.06 Code Display (Speed Sensor 1)

Is there poor connection at connector?
- YES → Repair or replace connector
- NO ↓

Does **EC-AT Tester** display vehicle speed?
(Refer to page K2–22)
- YES → Speed sensor 1 OK
  Cancel memory of code number
- NO ↓

Next step

Is resistance of speed sensor 1 OK? (Refer to page K2–37)
NO → Replace speed sensor 1
YES ↓

Is there continuity between Y/L terminal of speed sensor 1 connector and 2L (Y/L) terminal of EC-AT control unit connector, between Y/G terminal of speed sensor 1 connector and 2 J (Y/G) terminal of EC-AT control unit connector?
NO → Check for open or short circuit in wiring
YES → Replace EC-AT control unit

1BU0K2-007

No.07 Code Display (Speed Sensor 2)

Is there poor connection at connector?
YES → Repair or replace connector
NO ↓

Does speed sensor 2 operate correctly? (Refer to Section T)
NO → Replace speed sensor 2
YES ↓

Is there continuity between 1J (G/R) terminal of speedometer connector, and 1I (G/R) terminal of EC-AT control unit connector?
NO → Check for open or short circuit in wiring
YES → Replace EC-AT control unit

9MU0K1-034

No.12 Code Display (Throttle Sensor)

Is there poor connection at connector?
YES → Repair or replace connector
NO ↓

Does **EC-AT Tester** display throttle sensor voltage? (Refer to page K2–22)
YES → Throttle sensor OK. Cancel memory of code number
NO ↓

Is variable resistor of the throttle sensor OK? (Refer to Section F2)
NO → Replace throttle sensor
YES → Check for open or short circuit in wiring

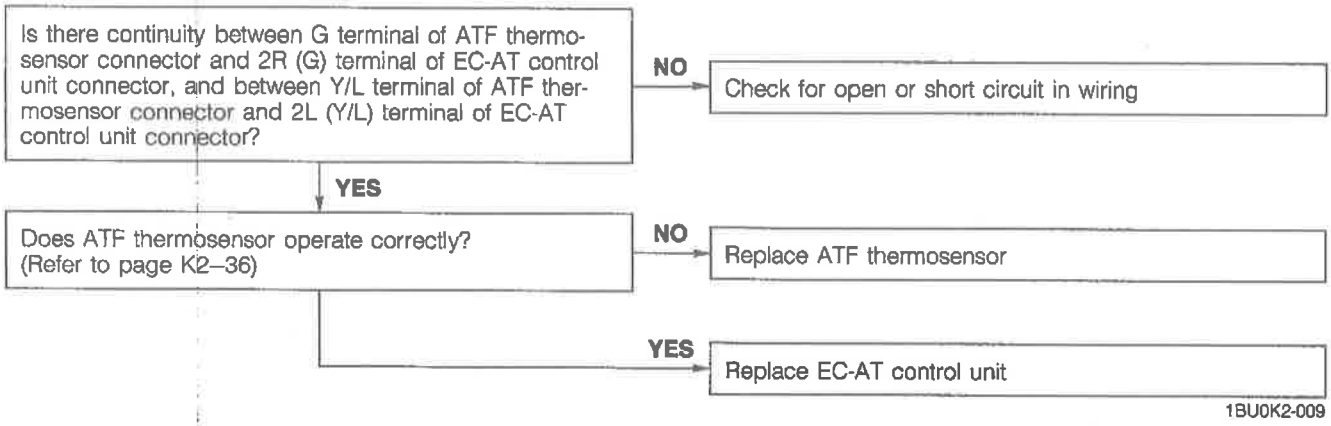
1BU0K2-008

No.56 Code Display (ATF Thermosensor)

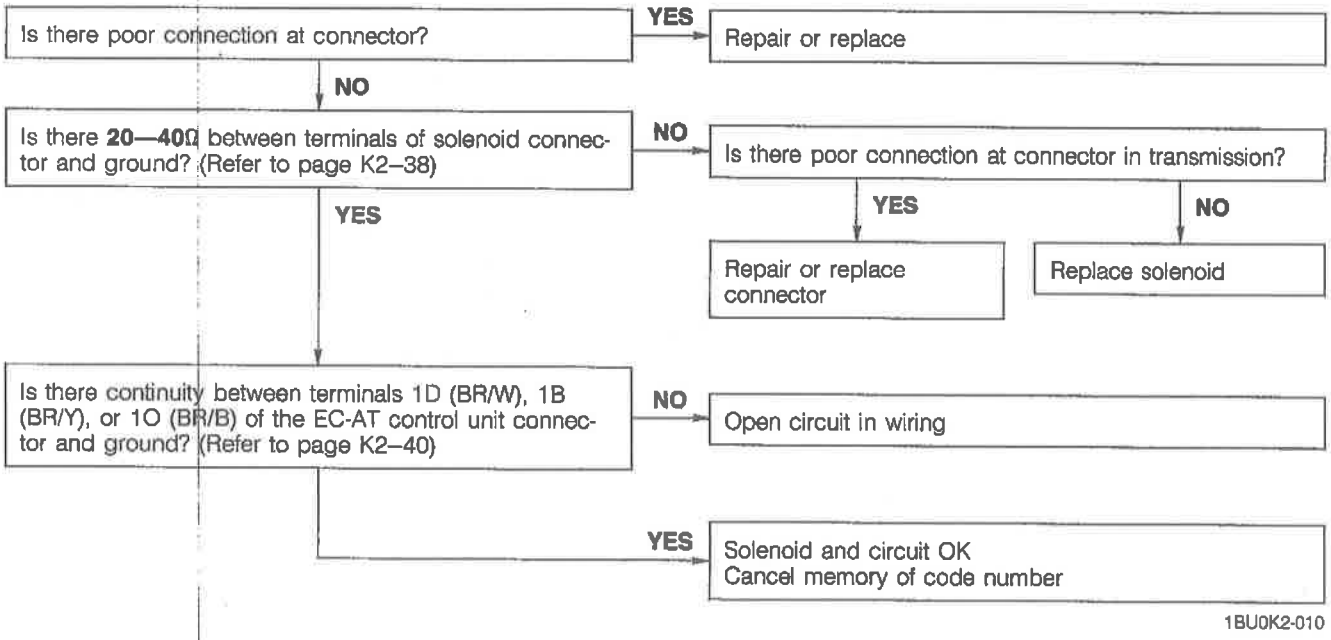
Is there poor connection at connector?
YES → Repair or replace connector
NO ↓

Is there varied voltage at 2R (G) terminal of EC-AT control unit while warming up ATF? (Refer to page K2–41)
YES → ATF thermosensor OK
Cancel memory of code number
NO ↓

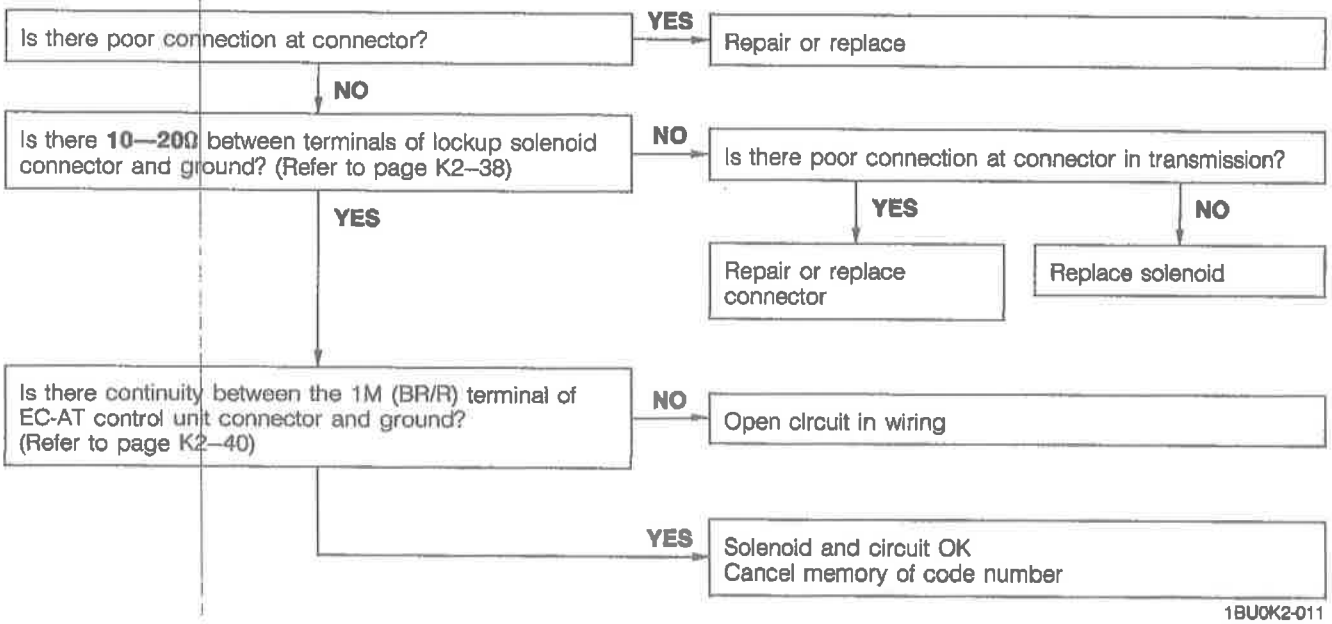
Next step



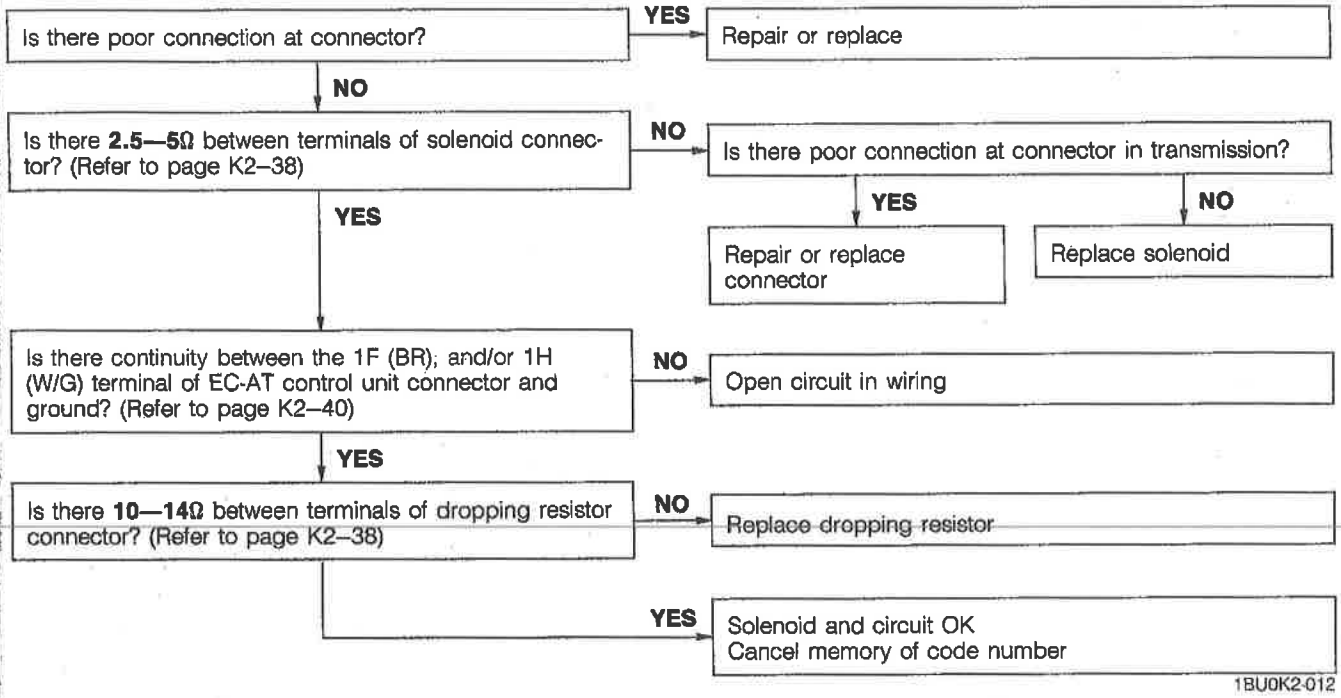
No.60, 61, or 62 Code Display (Shift Solenoid A, Shift Solenoid B, or Overrunning Clutch Solenoid)



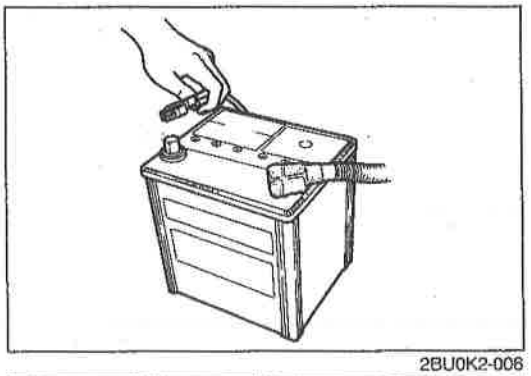
No.63 Code Display (Lockup Solenoid)



No.64 Code Display (Line Pressure Solenoid)



1BU0K2-012



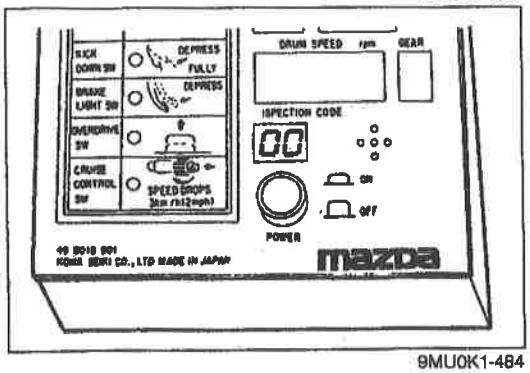
2BU0K2-006

DRIVE AT 50 km/h (31 mph)

KICKDOWN

STOP THE VEHICLE

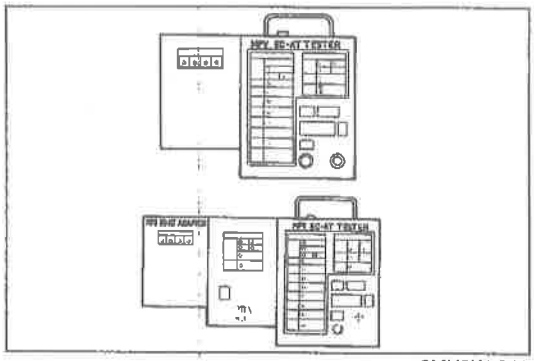
79G07C-069



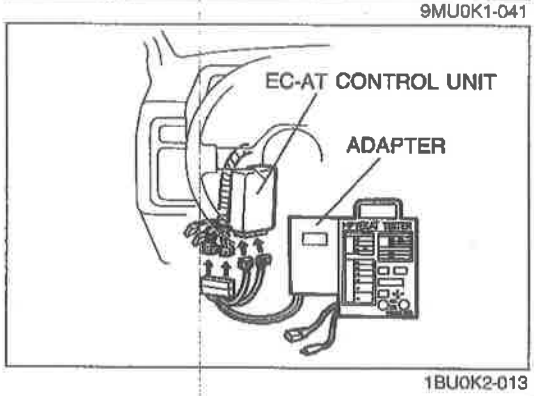
9MU0K1-484

AFTER-REPAIR PROCEDURES

1. Cancel the memory of malfunctions by disconnecting the negative battery terminal for approximately 20 seconds and reconnect it.
2. Remove the **EC-AT tester** if it is connected.
3. Drive the vehicle at 50 km/h (31 mph), then depress the accelerator pedal fully to activate kickdown. Stop the vehicle gradually.
4. Reconnect the **EC-AT Tester** to the test connector (Blue: 6-pin).
5. Ground the ground connector of the **EC-AT Tester**.
6. Ground the check connector (Blue: 1-pin).
7. Turn the ignition switch ON.
8. Check that no code numbers are displayed.



9MU0K1-041



1BU0K2-013

ELECTRIC SIGNAL INSPECTION

In this step, the input and output signals are checked with the **EC-AT Tester**.
The tester checks for proper operation of the various switches and sensors in the EC-AT system. It also checks the control unit for output of the various control signals.

INSPECTION PROCEDURES

1. Assemble the **EC-AT Tester**. (Refer to page K2–15.)
2. Disconnect the connectors from the EC-AT control unit.
3. Connect the **Adapter** between the control unit and the connectors.
4. Turn the ignition switch and main switch of the **EC-AT Tester** ON.
5. Check indication of the respective light or digital display in each condition, referring to the indication table below.

Indication Table of Light and Digital Display

Item		Indication	Condition	Possible cause
Input (Light)				
INHIBITOR SW	P, N	ON	Other ranges	Inhibitor switch or wiring
		OFF	P or N range	
	D	ON	D range	
		OFF	Other ranges	
	S	ON	S range	
		OFF	Other ranges	
	L	ON	L range	
		OFF	Other ranges	
	R	ON	R range	
		OFF	Other ranges	
MODE SW		Not used		—
HOLD SW		ON	Hold switch depressed	Hold switch or wiring
		OFF	Hold switch released	
*ATF THERMOSENSOR		ON	ATF temperature above 40°C (104°F)	ATF thermosensor or wiring
		OFF	ATF temperature below 40°C (104°F)	
IDLE SW		ON	Throttle valve fully closed	Idle switch (in throttle sensor) or wiring
		OFF	Throttle valve open	
ATMOSPHERIC PRESSURE SENSOR		ON	Atmospheric pressure below 679 mmHg (26.73 inHg) which is approximately at 1,500 m (4,921 ft)	Atmospheric pressure sensor (in engine control unit) or wiring
		OFF	Atmospheric pressure above 679 mmHg (26.73 inHg)	

Note
***: Items should be checked with engine running or while driving.**

Item		Indication	Condition	Possible cause
*CRUISE CONTROL SW		ON	SET or RESUME switch ON or vehicle speed 8 km/h (5 mph) lower than preset speed (Driving vehicle, cruise control operation)	Cruise control unit, switch, or wiring
		OFF	SET or RESUME switch OFF and vehicle speed kept at preset speed (driving vehicle, cruise control operation and not cruise control operation)	
Input (Digital display)				
THROTTLE SENSOR		EC-AT control unit terminal voltage	Constant	Throttle sensor or wiring
*VEHICLE SPEED		Vehicle speed calculated from speed sensor 1 signal	Constant	Speed sensor 1 or wiring
*ENGINE RPM		Not used		—
Output (Light)				
*SOLENOID	SHIFT A	ON	1st and OD gear positions	Control unit, shift solenoid A, or wiring
		OFF	2nd and 3rd gear positions	
	SHIFT B	ON	1st and 2nd gear positions	Control unit, shift solenoid B, or wiring
		OFF	3rd and OD gear positions	
	OVER-RUNNING	ON	Other conditions	Control unit, overrunning clutch solenoid, or wiring
		OFF	When engine braking and 3-2 timing control	
	LOCKUP	Bright	Lockup	Control unit, lockup solenoid, or wiring
		Dim	Non-lockup	
	LINE PRESSURE	ON (Bright↔Dim)	While driving	Control unit, line pressure solenoid, or wiring
		OFF	Vehicle stopped	
HOLD INDICATOR		ON	Hold mode	Control unit, hold switch, or wiring
		OFF	Other modes	
MODE INDICATOR		ON	Power mode	Control unit, mode switch, or wiring
		OFF	Other modes	
*GEAR POSITION	1st	ON	1st gear position	—
		OFF	Other gear positions	
	2nd	ON	2nd gear position	
		OFF	Other gear positions	
	3rd	ON	3rd gear position	
		OFF	Other gear positions	
	OD	ON	OD gear position	
		OFF	Other gear positions	

1BU0K2-014

Note
*** : Items should be checked with engine running or while driving.**

MECHANICAL SYSTEM TEST

PREPARATION
SST

49 0378 400A Gauge set, oil pressure 	49 H019 002 Adapter 	49 B019 901 Gauge, oil pressure 

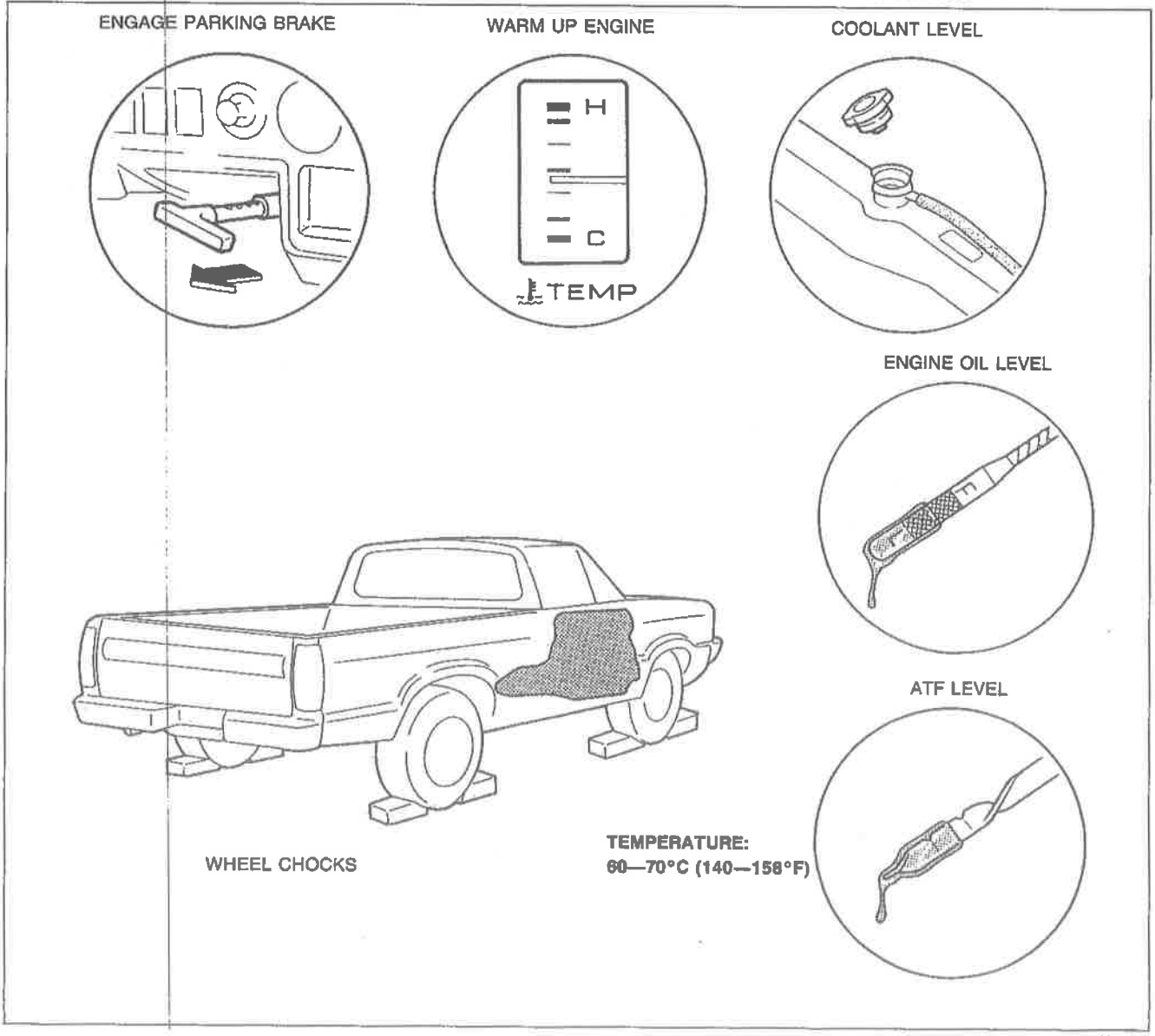
1BU0K2-015

STALL TEST

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

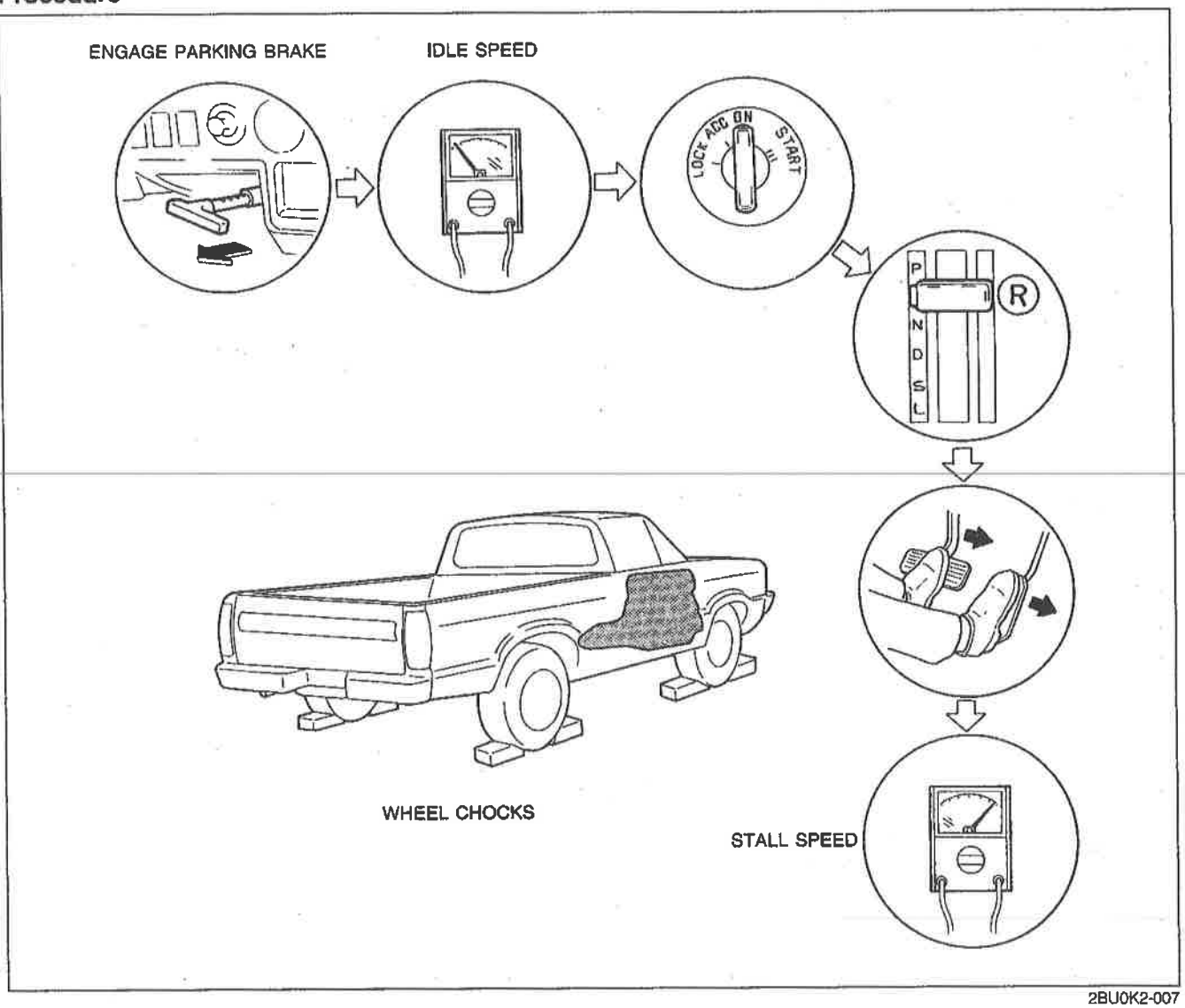
Preparation

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



0MU0K1-013

Procedure



2BU0K2-007

1. Connect a tachometer to the engine.
2. Start the engine and check the idle speed in P range. (Refer to Section F2.)

   Idle speed: 750—790 rpm

3. Shift the selector lever to R range.

   Caution
   Step 4 must be performed within 5 seconds to prevent possible transmission damage.

4. Firmly depress the foot brake with the left foot, and gently depress the accelerator pedal with the right foot.

   Caution
   Step 5 must be performed within 5 seconds to prevent possible transmission damage.

5. When the engine speed no longer increases, quickly read the engine speed and release the accelerator.

   Caution
   Idling for at least one minute is to cool the ATF and to prevent deterioration of the fluid.

6. Move the selector lever to N range and let the engine idle for at least one minute.

Caution
Be sure to allow sufficient cooling time between each stall test.

7. Perform the stall test for the following ranges in the same manner.
   (1) D range
   (2) S range
   (3) L range

Engine stall speed: 2,300—2,500 rpm

9MU0K1-047

Evaluation of Stall Test

Condition		Possible cause	
Above specification	In all ranges	Insufficient line pressure	Worn oil pump
			Oil leakage from oil pump, control valve, and/or transmission case
			Stuck pressure regulator valve
	In D and S ranges	Forward clutch slipping Forward one-way clutch slipping Low one-way clutch slipping	
	In R range	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 brake applied in L range 1st ...Reverse clutch b) Engine brake not applied in L range 1st ...Low and reverse brake	
Within specification		All shift control elements within transmission are functioning normally	
Below specification		Engine out of tune	
		One-way clutch slipping within torque converter	

9MU0K1-048

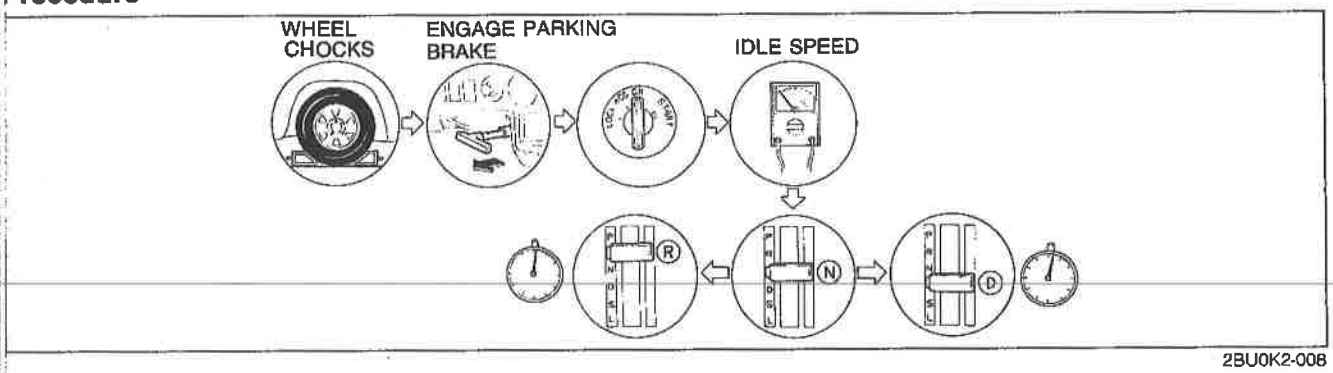
TIME LAG TEST

If the selector lever is shifted while the engine is idling, there will be a certain time lapse, or time lag, before shock is felt. This step measures this time lag for checking 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 shown in the STALL TEST. (Refer to page K2–23.)

Procedure



2BU0K2-008

1. Start the engine and check the idle speed on P range. (Refer to Section F2.)

   Idle speed: 750—790 rpm

2. Shift from N range to D range.
3. Use a stop watch to measure the time it takes from shifting until shock is felt.

   Caution
   Idling for at least one minute is to cool the ATF and prevent deterioration of the fluid.

4. Shift the selector to N range and run the engine at idle speed for at least one minute.

   Note
   Make three measurements for each test and take the average value.

5. Perform the test for the following shifts in the same manner.
   (1) N→D range
   (2) N→D range (Hold mode)
   (3) N→R range

Specified time lag: N→D range ..... Less than 1.0 second
N→R range ..... Less than 1.2 second

Evaluation of Time Lag Test

Condition		Possible Cause
Above specification	N→D and N→D (Hold) shift	Insufficient line pressure Forward clutch slipping Forward one-way clutch slipping
	N→D shift	Insufficient line pressure Low one-way clutch slipping N-D accumulator not operating properly
	N→D (Hold) shift	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

9MU0K1-050

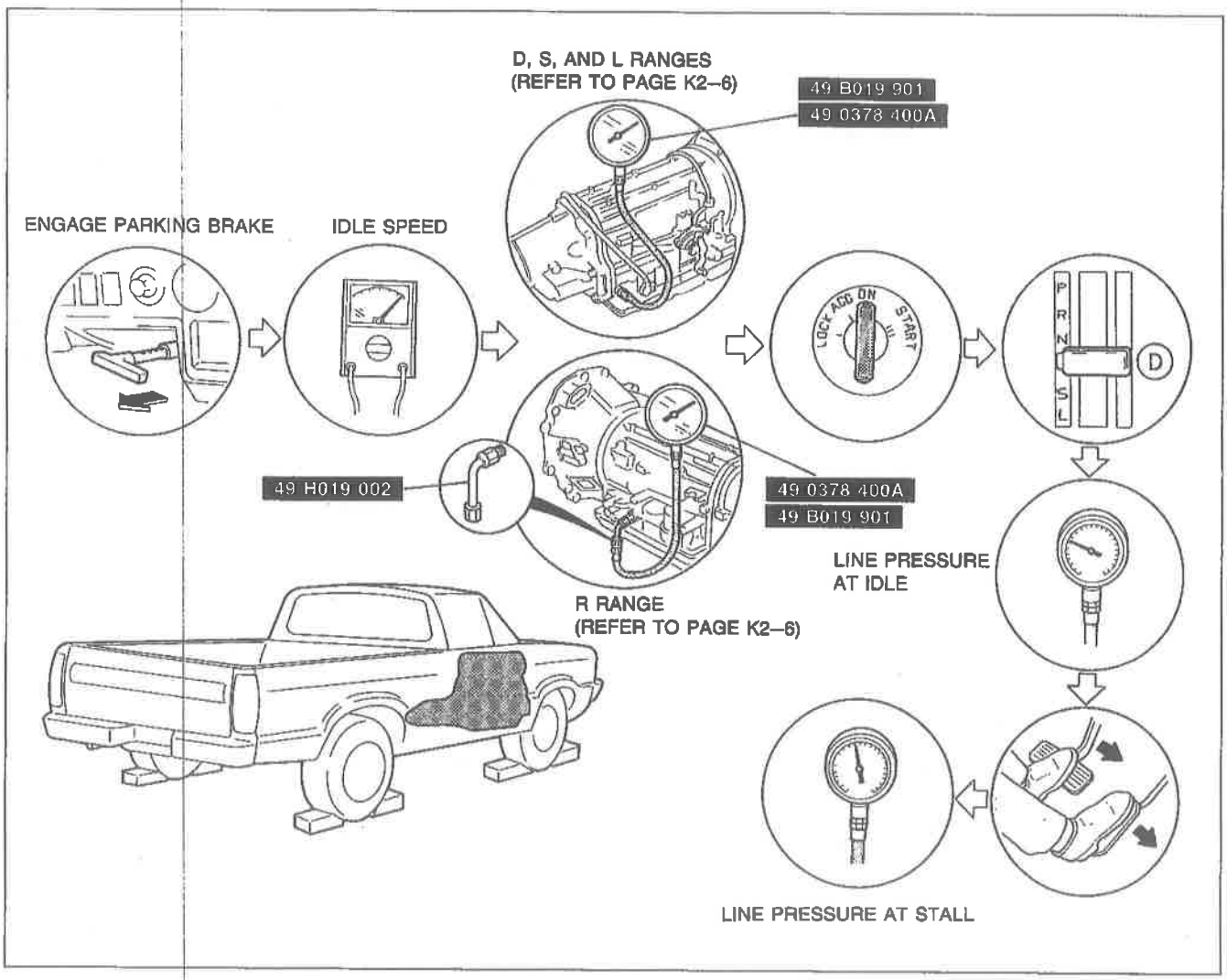
LINE PRESSURE TEST

This test measures line pressures for checking the hydraulic components and inspecting for oil leakage.

Preparation

1. Perform the preparation procedure shown in the STALL TEST. (Refer to page K2–23.)
2. Connect a tachometer to the engine.
3. Connect the **SST** to the line pressure inspection hole(s).

Procedure



2BU0K2-009

1. Start the engine and check the idle speed in P range. (Refer to Section F2.)

   Idle speed: 750—790 rpm

2. Shift the selector lever to D range and read the line pressure at idle.

   Caution
   Step 3 must be performed within 5 seconds to prevent possible transmission damage.

3. Depress the brake pedal firmly with the left foot and gradually depress the accelerator pedal with the right foot.

   Caution
   Step 4 must be performed within 5 seconds to prevent possible transmission damage.

4. Read the line pressure as soon as the engine speed becomes constant, then release the accelerator pedal.

Caution
Idling for at least one minute is to cool the ATF and to prevent deterioration of the fluid.

5. Shift the selector lever to N range and run the engine at idle for at least one minute.
6. 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 (kg/cm², psi)	
	Idle	Stall
D, S, L	432—471 (4.4—4.8, 63—68)	1,040—1,118 (10.6—11.4, 151—162)
R	598—638 (6.1—6.5, 87—92)	1,452—1,530 (14.8—15.6, 210—222)

0BU0K2-030

7. Install new plugs in the inspection ports.

Tightening torque: 4.9—9.8 N·m (50—100 cm-kg, 43—87 in-lb)

Evaluation of Line Pressure Test

Condition		Possible cause
When idling	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 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 only)	Fluid leaking from hydraulic circuit of band servo 2nd apply side
	Low pressure in R range only	Fluid leaking from hydraulic circuit of reverse clutch
	Low pressure in R and L ranges only	Fluid leaking from hydraulic circuit of low and reverse brake
	Higher than specification	Throttle sensor out of adjustment Damaged fluid thermosensor Line pressure solenoid sticking Short circuit of line pressure solenoid circuit Pressure modifier valve sticking Pressure regulator valve or plug sticking
At stall speed	Low pressure	Throttle sensor out of adjustment Damaged control piston (in oil pump) Line pressure solenoid sticking Short circuit of line pressure solenoid circuit Pressure regulator valve or plug sticking Pressure modifier valve sticking Pilot valve sticking

9MU0K1-053

ROAD TEST

Caution
Perform the test at normal ATF operating temperature (60—70°C, 140—158°F).

This step is performed to inspect for problems in the various ranges. If these tests show any problems, refer to the electronic system component or mechanical sections to adjust or replace.

D RANGE TEST

Shift Point, Shift Pattern, and Shift Shock

1. Shift the selector lever to D range.

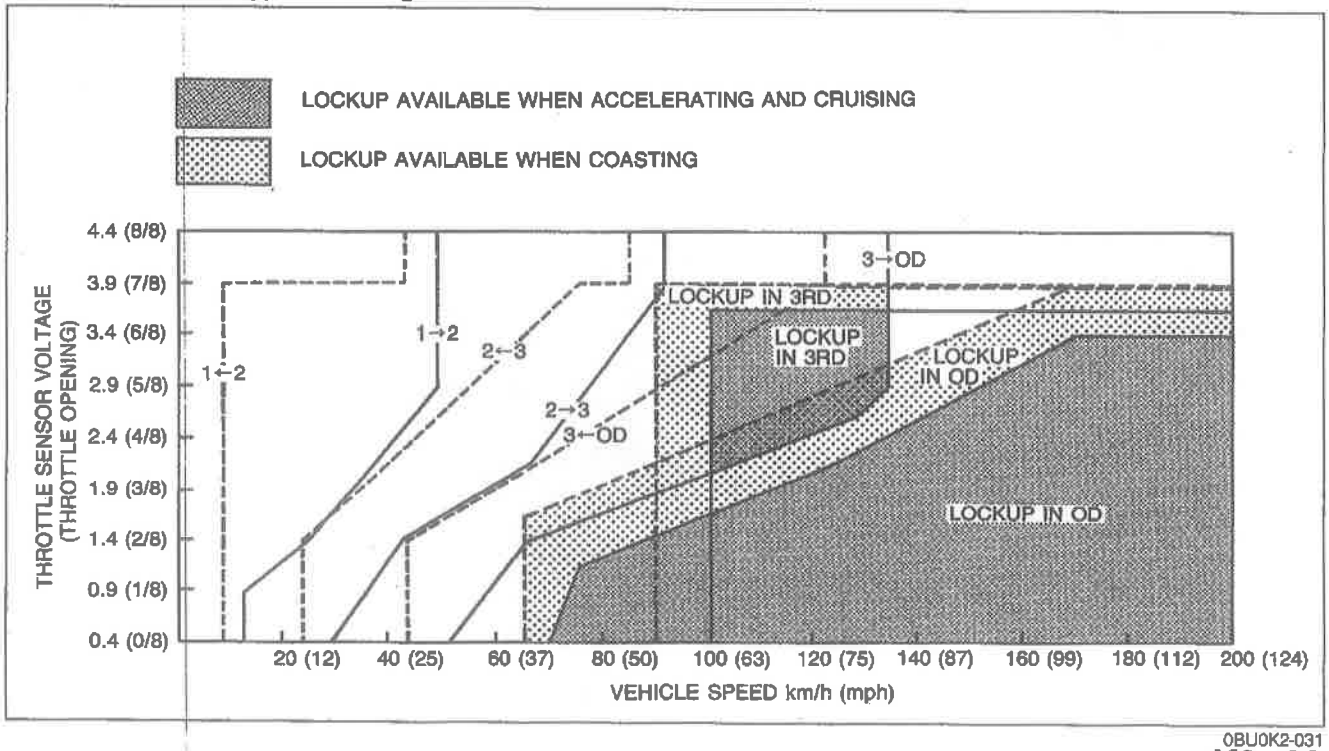
Note
Throttle sensor voltage of the EC-AT Tester represents the throttle valve opening.
Driving mode (Economy or Power) is automatically changed corresponding to accelerator pedal depressing speed.

2. Accelerate the vehicle with half- and full-throttle opening.
3. Check that 1-2, 2-3, and 3-OD upshifts, downshifts, and lockup are obtained. The shift points must be as shown in the D range (Economy or Power) shift diagram.

Note
a) Vehicle speed of the EC-AT Tester and the speedometer and vehicle speed on a chassis roller may not meet the specified shift pattern because of incorrect tire size. Therefore, check the shift points with the VEHICLE SPEED of the EC-AT Tester.
b) There is no overdrive when the ATF temperature is below 10°C (50°F).
c) There is no overdrive when the cruise control is operating and there is an 8 km/h (13 mph) difference between the preset cruise speed and vehicle speed, or SET or RESUME switch is ON.
d) There is no overdrive when ATF temperature is below 40°C (104°F).
e) There is no lockup when the accelerator pedal is fully closed (idle switch ON) while driving the vehicle below 120 km/h (74 mph).

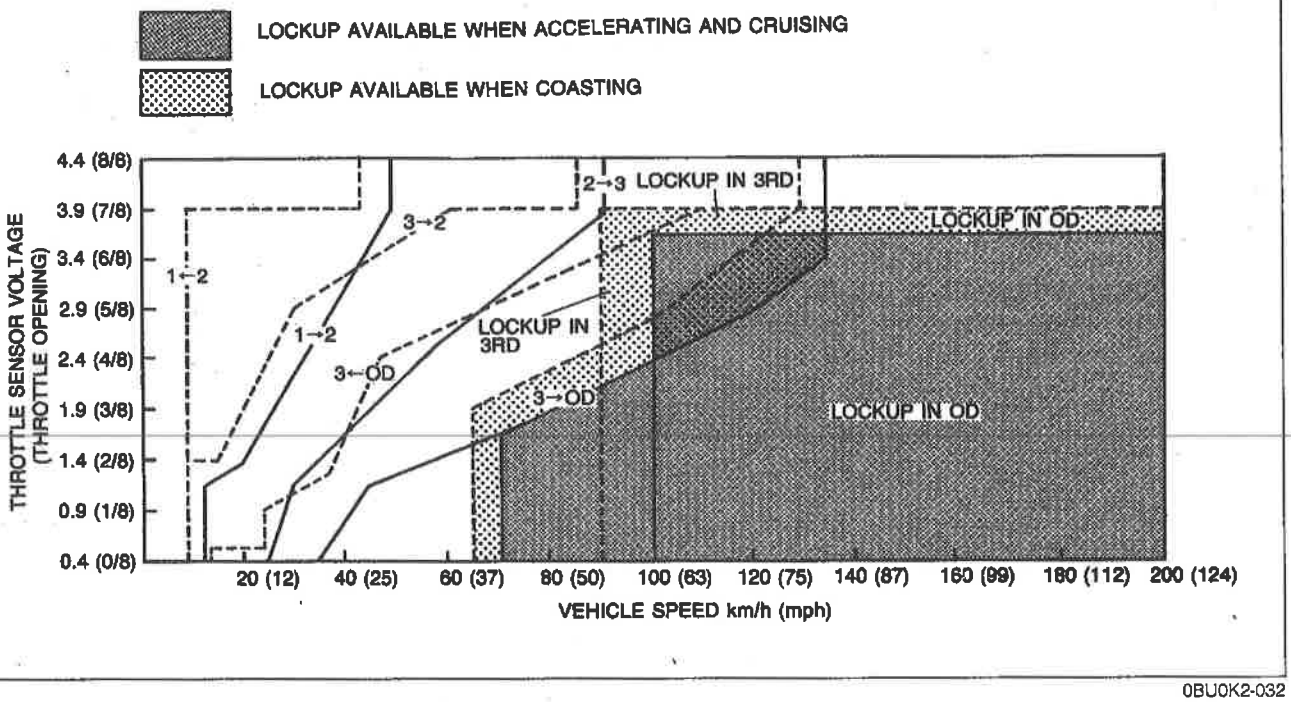
4. Check the upshifts for shift shock or slippage in the same manner.
5. While driving in OD, shift the selector lever to S range and check that OD-3 downshift immediately occurs.

D range (Economy) shift diagram



0BU0K2-031

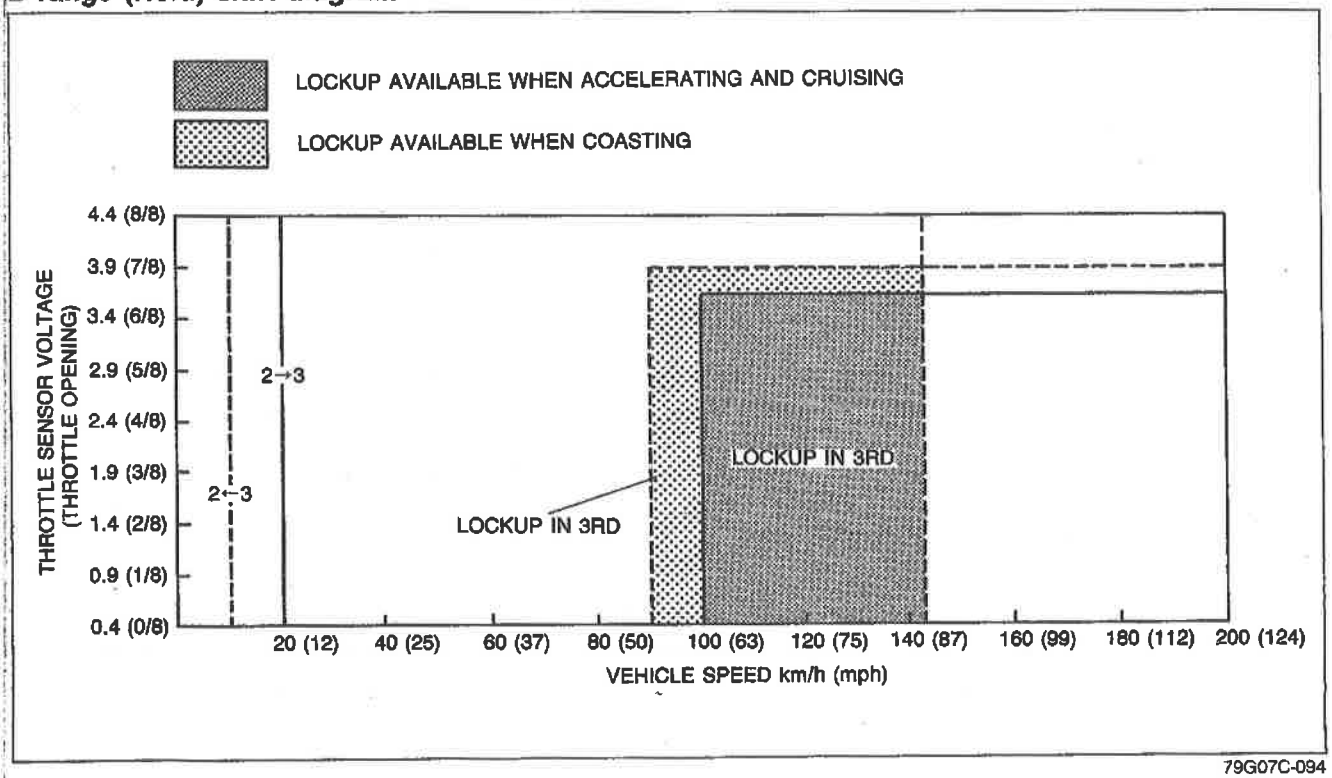
D range (Power) shift diagram



0BU0K2-032

6. Select the Hold mode.
7. Accelerate the vehicle; check 2-3 up- and downshifts and lockup and that no 1st or OD is obtained. The 2-3 shift points are as shown in the D range (Hold) shift diagram.
8. Decelerate the vehicle and check that engine braking effect is felt in 3rd and 2nd gears when throttle opening less than 1/8.

D range (Hold) shift diagram



79G07C-094

Evaluation

Condition		Possible Cause
Shifting	Starts in 2nd or shifts directly from 1st to OD	Stuck shift solenoid A Stuck shift valve A
	Starts in OD	Stuck shift solenoid B Stuck shift valve B
	No shift	Stuck shift solenoid A and/or B Stuck shift valve A and/or B
	Incorrect shift points	Throttle sensor out of adjustment Speed sensor 1 not operating properly
Shift shock felt or slipping		Stuck line pressure solenoid Accumulators not operating properly Throttle sensor out of adjustment Speed sensor 1 not operating properly ATF thermosensor not operating properly Worn clutches, one-way clutches, and/or brakes
No engine braking		Stuck overrunning clutch solenoid Worn clutches, and/or brakes
No lockup shift		Stuck lockup solenoid Stuck lockup control valve

9MU0K1-056

Noise and Vibration

Drive the vehicle in OD (lockup), OD (no lockup), and 3rd (Hold) and check for abnormal noise or vibration.

Note
Abnormal noise and vibration can also be caused by the torque converter, propeller shaft, or differential. Therefore, check for the cause with extreme care.

Kickdown

Drive the vehicle in OD, 3rd, and 2nd gears and check that kickdown occurs for OD→3, OD→2, OD→1, 3→2, 3→1, 2→1, and that the shift points are as shown in the shift diagram. (Refer to pages K2–29, 30.)

1BU0K2-018

S RANGE TEST

Shift Pattern

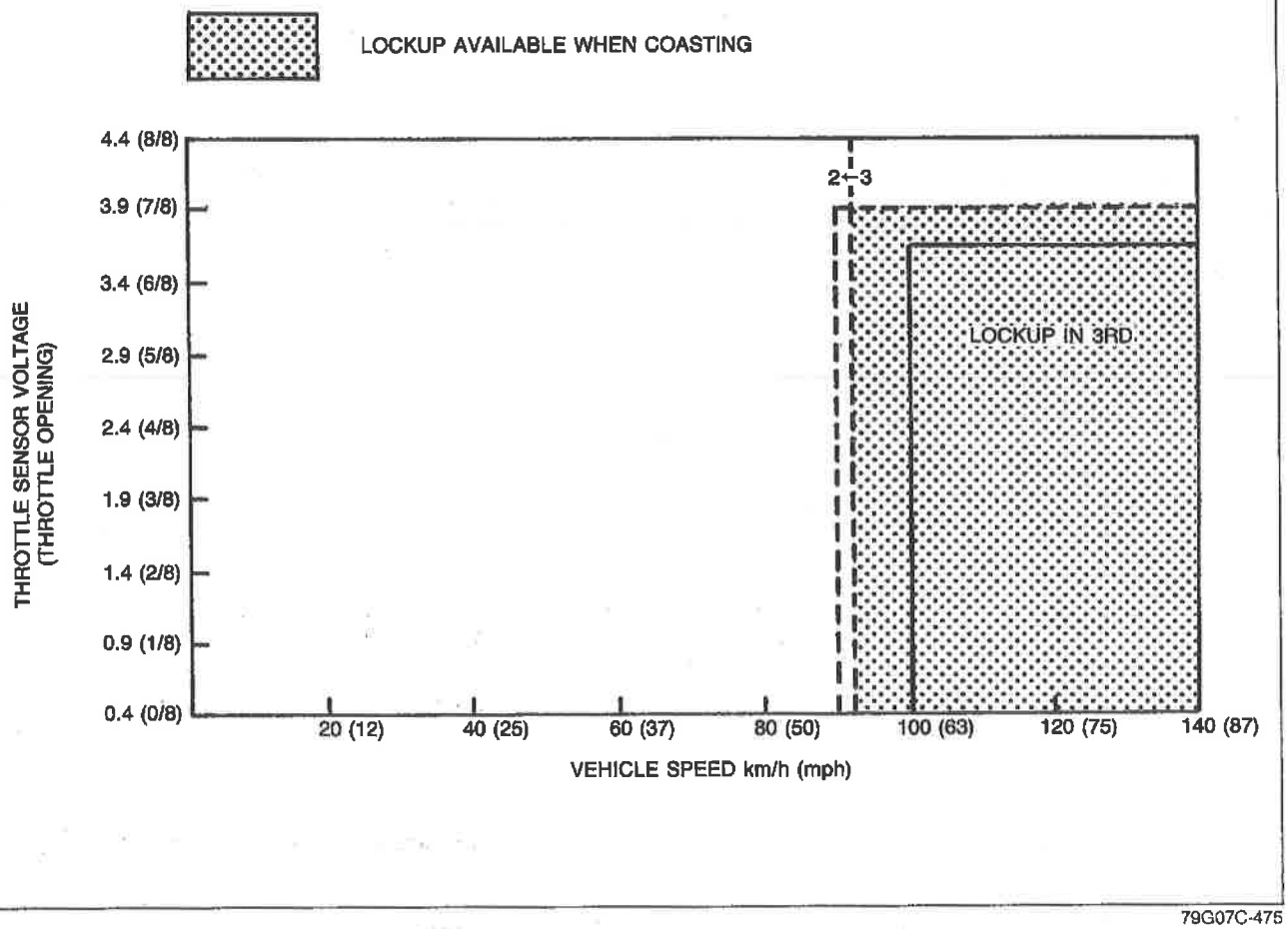
1. Shift the selector lever to S range.
2. Accelerate the vehicle; check that 1-2 and 2-3 up- and downshifts, and lockup are obtained and that no OD is obtained.
3. Decelerate the vehicle and check that engine braking effect is felt in only 3rd and 2nd gear when throttle opening less than 1/8.

Note
a) Inspections of shift shock and shift points are not necessary because these are the same as those of the D-range test.
b) Shift points are the same as those of the D-range (Economy) shift diagram except 3↔OD.

4. While driving in S range (Economy mode) and 3rd gear, select the Hold mode and check that 3rd gear is held until the 3-2 downshift point is achieved as shown in the S range (Hold) shift diagram.
5. Accelerate the vehicle in S range (Hold mode) and check that 2nd gear is held.
6. Decelerate the vehicle and check that engine braking effect is felt when throttle opening less than 1/8.

S range (Hold) shift diagram

0BU0K2-034



79G07C-475

Noise and Vibration

Drive the vehicle in 2nd gear (Hold mode) and check for abnormal noise or vibration.

Note
Abnormal noise and vibration can also be caused by the torque converter, propeller shaft, or differential. Therefore, check for the cause with extreme care.

L RANGE TEST

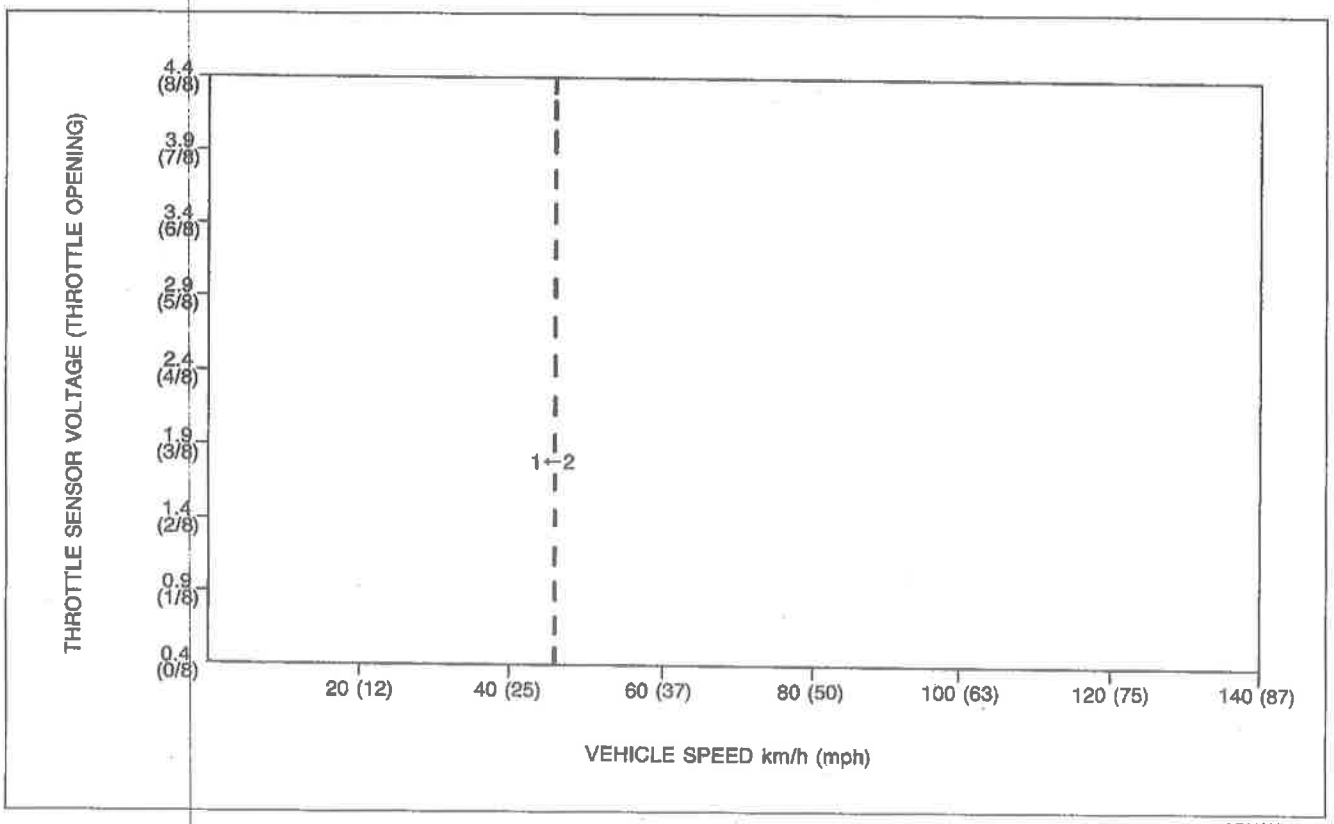
Shift Pattern

1. Shift the selector lever to L range.
2. Accelerate the vehicle and check that the 1-2 up- and downshifts are obtained and that no 3rd gear, overdrive, or lockup is obtained.

Note
a) Inspection of shift shock and shift points are not necessary because these are the same as those of the D-range test.
b) Shift points are the same as those of the D-range (Economy) shift diagram except 2↔3 and 3↔OD.

3. Decelerate the vehicle and check that engine braking effect is felt in 1st and 2nd gears.
4. While driving in D range (Hold mode) and 3rd gear, shift the selector lever to L range and check that 3rd gear is held until the 3-2 downshift point as shown in the L range (Hold) shift diagram is achieved, then that 2nd gear is held until 2-1 downshift point is achieved.
5. Accelerate the vehicle in L range (Hold mode) and check that 1st gear is held.
6. Decelerate the vehicle and check that engine braking effect is felt.

L range (Hold) shift diagram



0BU0K2-035

Noise and Vibration

Drive the vehicle in 1st gear (Hold mode) and check for abnormal noise or vibration.

Note
Abnormal noise and vibration can also be caused by the torque converter, propeller shaft or differential. Therefore, check for the cause with extreme care.

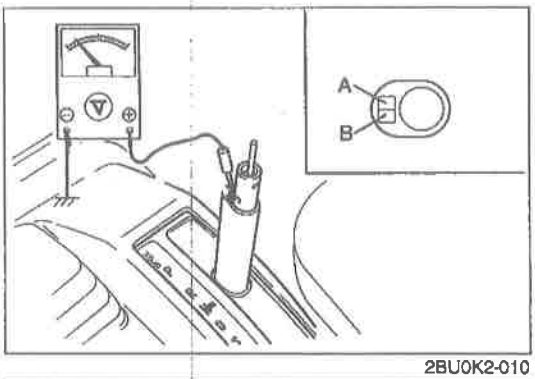
P RANGE TEST

1. Shift into P range on a gentle slope, release the brake, and check that the vehicle does not roll.
2. Shift into P range while driving the vehicle at **maximum** of **4 km/h (2.5 mph)** on a level surface, and check that the vehicle stop.

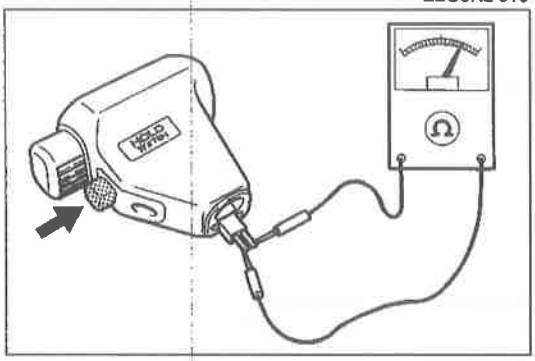
Vehicle Speed at Shiftpoint Table

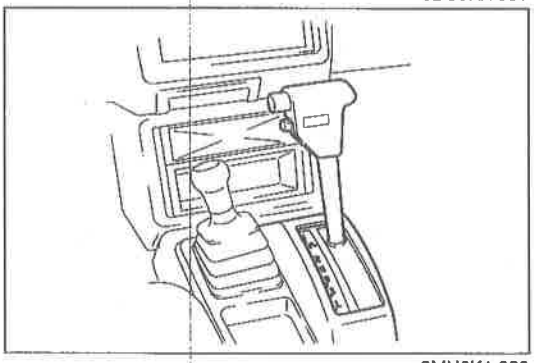
Mode	Range	Throttle condition (Throttle sensor voltage)	Shift	Vehicle speed km/h (mph)
Normal (Power)	D	Fully opened (4.4 volt)	$D_1 \rightarrow D_2$	47—51 (29—32)
			$D_2 \rightarrow D_3$	87—95 (54—59)
			$D_3 \rightarrow OD$	129—139 (80—86)
		Half throttle (1.6—2.2 volt)	$D_1 \rightarrow D_2$	39—43 (24—27)
			$D_2 \rightarrow D_3$	66—72 (41—45)
			Lockup ON (D_3)	96—104 (60—64)
			$D_3 \rightarrow OD$	111—119 (69—74)
			Lockup ON (OD)	128—136 (79—84)
			Lockup OFF (OD)	96—104 (60—64)
			$OD \rightarrow D_3$	71—79 (44—49)
			Lockup OFF (D_3)	86—94 (53—58)
			$D_3 \rightarrow D_2$	42—48 (26—30)
		Kickdown	$OD \rightarrow D_3$	124—134 (77—83)
			$OD \rightarrow D_2$	81—89 (50—55)
			$OD \rightarrow D_1$	41—45 (25—28)
			$D_3 \rightarrow D_2$	81—89 (50—55)
			$D_3 \rightarrow D_1$	41—45 (25—28)
			$D_2 \rightarrow D_1$	41—45 (25—28)
Normal (Economy)		Fully opened (4.4 volt)	$D_1 \rightarrow D_2$	47—51 (29—32)
			$D_2 \rightarrow D_3$	87—95 (54—59)
			$D_3 \rightarrow OD$	129—139 (80—86)
		Half throttle (1.6—2.2 volt)	$D_1 \rightarrow D_2$	30—34 (19—21)
			$D_2 \rightarrow D_3$	52—58 (32—36)
			$D_3 \rightarrow OD$	96—104 (60—64)
			Lockup ON (OD)	96—104 (60—64)
			Lockup OFF (OD)	81—89 (50—55)
			$OD \rightarrow D_3$	43—51 (27—32)
			$D_3 \rightarrow D_2$	22—28 (14—17)
		Kickdown	$OD \rightarrow D_3$	124—134 (77—83)
			$OD \rightarrow D_2$	81—89 (50—55)
			$OD \rightarrow D_1$	41—45 (25—28)
			$D_3 \rightarrow D_2$	81—89 (50—55)
			$D_3 \rightarrow D_1$	41—45 (25—28)
			$D_2 \rightarrow D_1$	41—45 (25—28)
Normal	S	Fully opened (4.4 volt)	$S_1 \rightarrow S_2$	47—51 (29—32)
			$S_2 \rightarrow S_3$	87—95 (54—59)
			$S_3 \rightarrow S_2$	82—88 (51—55)
			$S_2 \rightarrow S_1$	41—45 (25—28)
		Half throttle (1.6—2.2 volt)	$S_1 \rightarrow S_2$	39—43 (24—27)
			$S_2 \rightarrow S_3$	66—72 (41—45)
			$S_3 \rightarrow S_2$	41—47 (25—29)
Normal	L	Fully opened (4.4 volt)	$L_1 \rightarrow L_2$	47—51 (29—32)
			$L_2 \rightarrow L_1$	41—45 (25—28)
		Half throttle (1.6—2.2 volt)	$L_1 \rightarrow L_2$	39—43 (24—27)
HOLD	D	—	$D_2 \rightarrow D_3$	18—22 (11—14)
			$D_3 \rightarrow D_2$	7—13 (4—8)
	S	Fully closed (0.4 volt)	$OD \rightarrow D_3$	138—148 (86—92)
			$S_3 \rightarrow S_2$	88—96 (55—60)
	L		$L_2 \rightarrow L_1$	44—48 (27—30)

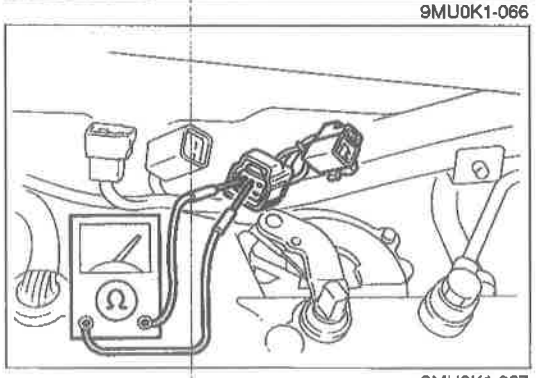
1BU0K2-019



2BU0K2-010


9BU0KX-031


9MU0K1-066


9MU0K1-067

ELECTRONIC SYSTEM COMPONENTS

HOLD OFF SWITCH

Inspection

Terminal voltage

1. Remove the selector lever knob.
2. Turn the ignition switch ON.
3. Check the voltage between terminal A and ground, and between terminal B and ground.

VB: Battery voltage

Terminal	Terminal voltage
A and ground	0V
B and ground	VB

4. If correct, check continuity between the terminals.
5. If not correct, check the wiring harness.

Continuity

1. Check continuity of the terminals.

Continuity	Switch
Yes	Released
No	Depressed

2. If not correct, replace the selector lever knob.

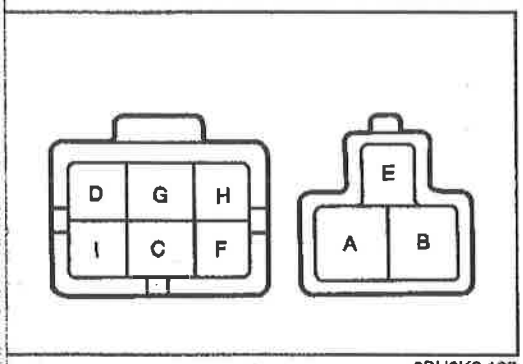
3. If not correct, replace the change knob as an assembly.

INHIBITOR SWITCH

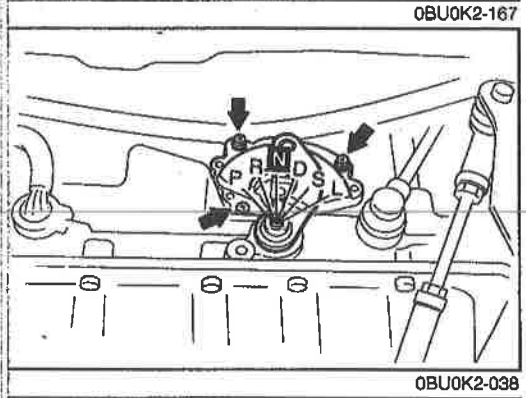
Inspection

Operation

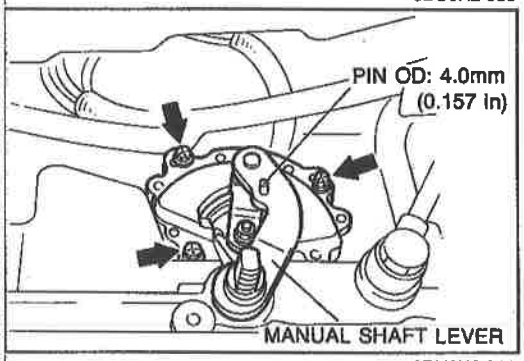
1. Check that the starter operates with the ignition switch at START position and the selector lever in P and N range only and that it does not operate in any other position.
2. Check that the back-up lights illuminate when shifted to the R range with the ignition switch in the ON position.
3. Check the inhibitor switch if it is not as specified.



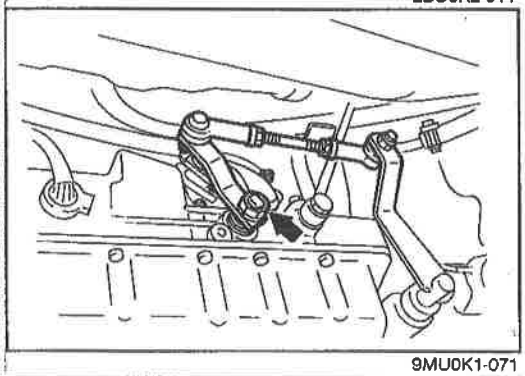
0BU0K2-167

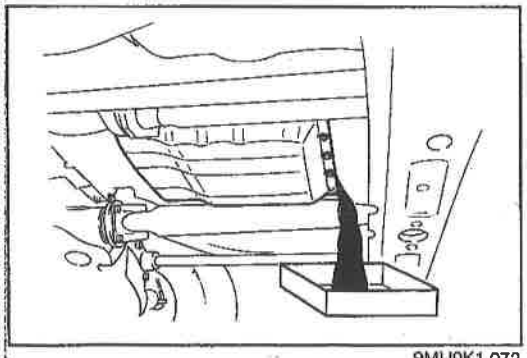


0BU0K2-038



2BU0K2-011


9MU0K1-071


9MU0K1-072

Continuity

1. Jack up the vehicle and support it with safety stands.
2. Disconnect the control linkage from the manual shaft.
3. Disconnect the inhibitor switch connector.
4. Check continuity of the terminals.

Position	Connector terminal								
	A	B	C	D	E	F	G	H	I
P	○—○		○—○						
R			○—		—○				
N	○—○		○—			—○			
D			○—				—○		
S			○—					—○	
L			○—						—○

○—○: Indicates continuity

5. If not correct, adjust the inhibitor switch.
6. If correct, check or adjust the selector lever. (Refer to page K2–149.)

Adjustment

1. Move the manual shaft to N position.
2. Loosen the inhibitor switch mounting bolts.
3. Align the holes of the inhibitor switch and the manual shaft lever by inserting a an **approx. 4.0mm (0.157 in)** O.D. pin.
4. Tighten the mounting bolts.

Tightening torque:
2.5—3.9 N·m (25—40 cm-kg, 22—35 in-lb)

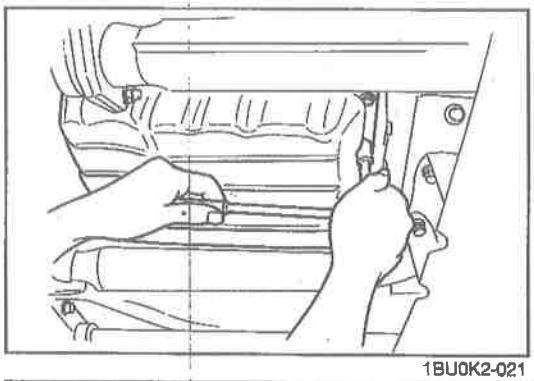
5. Recheck the continuity of the inhibitor switch.
6. If not correct, replace the inhibitor switch.
7. Connect the control linkage.

Tightening torque:
29—39 N·m (3.0—4.0 m-kg, 22—29 ft-lb)

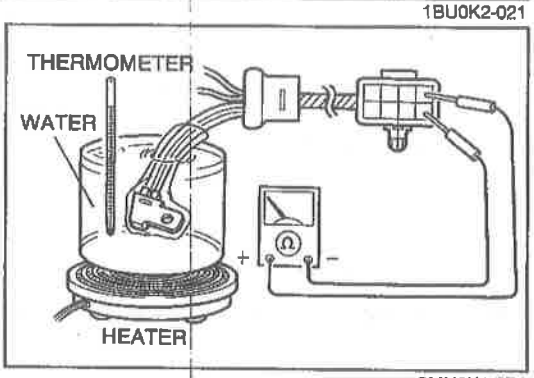
ATF THERMOSENSOR

Inspection

1. Jack up the vehicle and support it with safety stands.
2. Loosen the oil pan mounting bolts, and drain the ATF into a suitable container.


1BU0K2-021

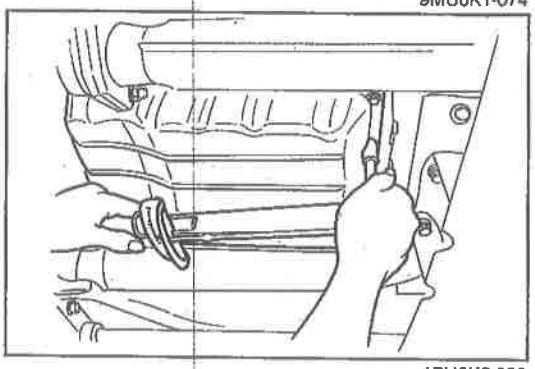
3. Remove the oil pan.
4. Remove the control valve body and solenoid connector. (Refer to page K2–124.)



9MU0K1-074

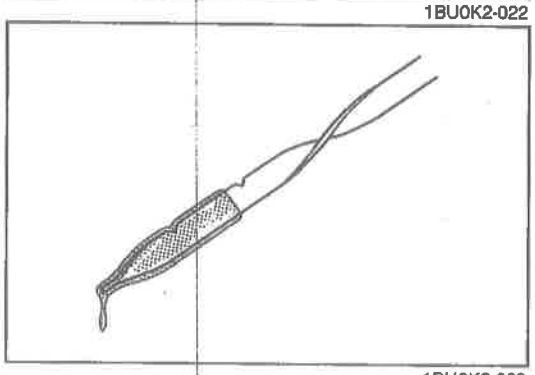
5. Place the ATF thermosensor in water with a thermometer as shown and heat the water gradually.
6. Measure the resistance between the terminals. If necessary, replace the ATF thermosensor.

Water temperature	Resistance
20°C (68°F)	Approx. 2.5 kΩ
80°C (176°F)	Approx. 0.3 kΩ

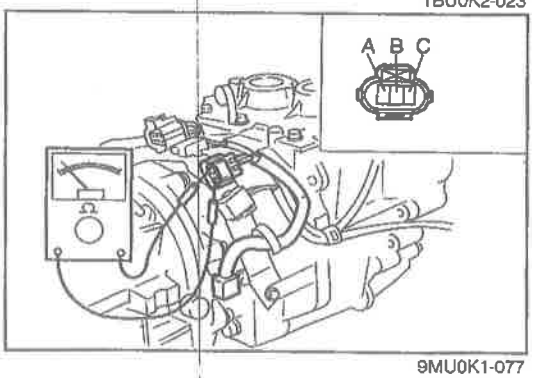

1BU0K2-022

7. Install the solenoid connector and control valve body. (Refer to page K2–126.)
8. Install the oil pan.

Tightening torque:
4.9—7.8 N·m (50—80 cm-kg, 43—69 in-lb)


1BU0K2-023

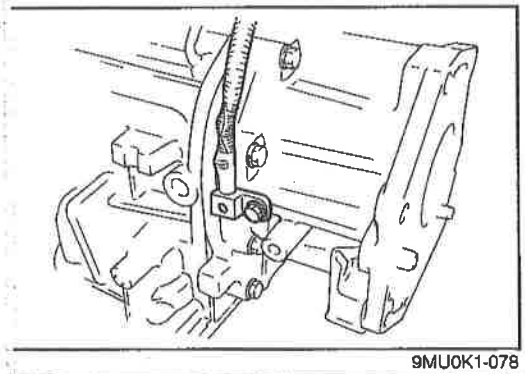
9. Pour in ATF, and with the engine idling, check the ATF level and check for leaks. (Refer to page K2–42.)



9MU0K1-077

SPEED SENSOR 1
Inspection
1. Jack up the vehicle and support it with safety stands.
2. Disconnect the connector.
3. Measure the resistance between the terminals.

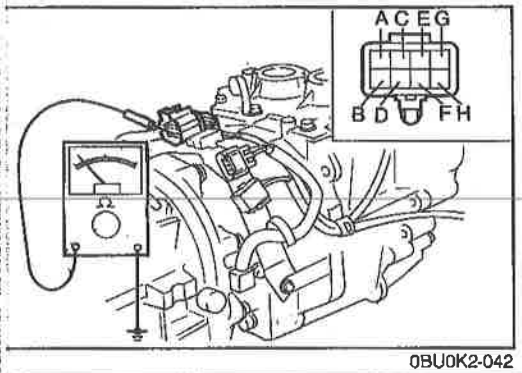
Terminal	Resistance
A and B	504—616Ω
B and C	∞
A and C	∞



9MU0K1-078

4. If not correct, replace the speed sensor 1.

Tightening torque:
4.9—6.9 N·m (50—70 cm-kg, 43—61 in-lb)



0BU0K2-042

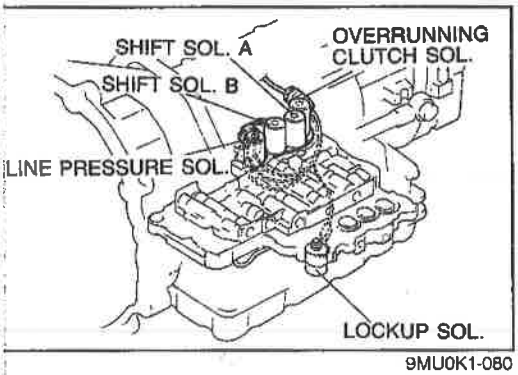
SOLENOID VALVES

Inspection

1. Jack up the vehicle and support it with safety stands.
2. Disconnect the connector.
3. Measure the resistance between the terminals.

Note
a) Terminal A: ATF thermoswitch
b) Terminal G, H: ATF thermosensor

Terminal	Connected to	Resistance
B	Shift solenoid A	20—40Ω
C	Shift solenoid B	20—40Ω
D	Overrunning clutch solenoid	20—40Ω
E	Line pressure solenoid	2.5—5Ω
F	Lockup solenoid	10—20Ω



9MU0K1-080

4. If not correct, replace the solenoid or assembly.

Note
If shift solenoid A, shift solenoid B, overrunning clutch solenoid, or line pressure solenoid is not correct, replace as an assembly.

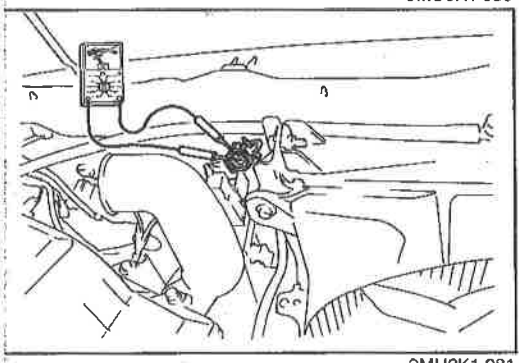
DROPPING RESISTOR

Inspection

1. Disconnect the dropping resistor connector.
2. Measure the resistance of the terminals.

Resistance: 10—14Ω

3. If not correct, replace the dropping resistor.



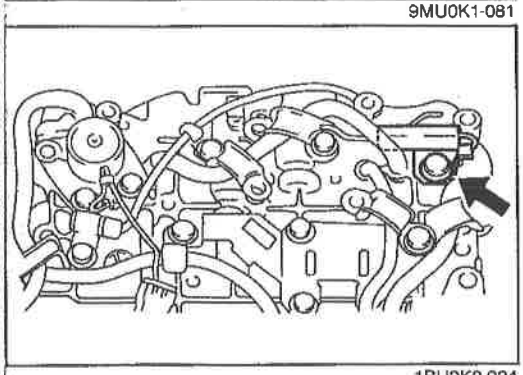
9MU0K1-081

ATF THERMOSWITCH

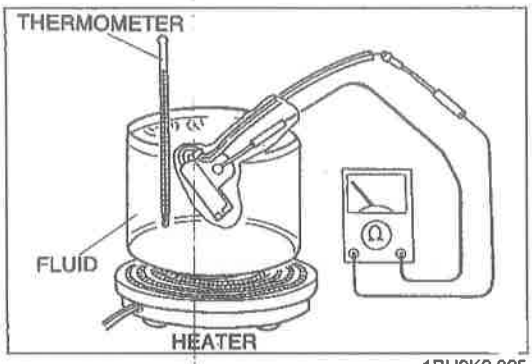
Inspection

1. Drain the ATF. (Refer to ATF thermosensor inspection; page K2–36, Steps 1—3.)
2. Disconnect the connector and remove the ATF thermoswitch.
3. Place the ATF thermoswitch in fluid with a thermometer as shown and heat the fluid gradually.
4. Measure the continuity between terminal and bracket.

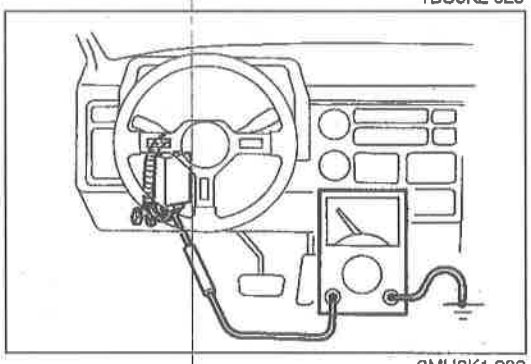
Fluid temperature	Continuity
Above 150°C (302°F)	Yes
Below 145°C (293°F)	No



1BU0K2-024



1BU0K2-025


9MU0K1-082

5. If not correct, replace the ATF thermoswitch.
6. Install the ATF thermoswitch and connect the connector.

Tightening torque:
6.9—8.8 N·m (70—90 cm-kg, 61—78 In-lb)

7. Add ATF to the correct level. (Refer to ATF thermosensor inspection; page K2–36, Steps 8, 9.)

EC-AT CONTROL UNIT

Inspection

1. Turn the ignition switch ON, and check the EC-AT control unit terminal voltage, referring to the Terminal Voltage Chart.
2. If not correct, check or replace the component(s), wiring, and/or EC-AT control unit.

Terminal Voltage Chart

2S	2Q	2O	2M	2K	2I	2G	2E	2C	2A	1O	1M	1K	1I	1G	1E	1C	1A
2T	2R	2P	2N	2L	2J	2H	2F	2D	2B	1P	1N	1L	1J	1H	1F	1D	1B

9MU0K1-083

VB: Battery voltage

Terminal	Connected to	Voltmeter + terminal	Voltmeter – terminal	Voltage	Condition
1A (Memory power)	Battery	1A	Ground	VB	Constant
1B (Output)	Shift solenoid B	1B	Ground	VB	Solenoid ON in following condition: • 1st and 2nd gear positions
				0V	Solenoid OFF in following condition: • 3rd and OD gear positions
1C	—	—	—	—	—
1D (Output)	Shift solenoid A	1D		VB	Solenoid ON in following condition: • 1st and OD gear positions
				0V	Solenoid OFF in following condition: • 2nd and 3rd gear positions
1E (Input)	Inhibitor switch (R range)	1E		VB	R range
				0V	Other ranges
1F (Output)	Line pressure solenoid	1F		1.7—4.5V	Accelerator pedal depressed (After ATF warm, engine stopped)
				Below 1.5V	Accelerator pedal fully released (After ATF warm, engine stopped)
1G (Input)	Engine rpm sensor*	1G		Above 1V **(AC)**	Engine running
				Below 0.5V **(AC)**	Engine stopped
1H (Output)	Dropping resistor	1H		VB	Accelerator pedal fully released (After ATF warm, engine stopped)
				Below 1.5V	Accelerator pedal depressed (After ATF warm, engine stopped)
1I (Input)	Speed sensor 2	1I		Approx. 2—3V	While driving
				0V or 4.5—5.5V	Vehicle stopped
1J (Ground)	—	1J		0V	Constant
1K (Output)	Hold indicator	1K		VB	Power or Economy mode
				0V	Hold mode
1L (Ground)	—	1L		0V	Constant
1M (Output)	Lockup solenoid	1M		VB	Solenoid ON, Lockup
				Below 1.5V	Solenoid OFF, Non-lockup
1N (Battery power)	Battery	1N		VB	Ignition switch ON
				0V	Ignition switch OFF
1O (Output)	Overrunning clutch solenoid	1O		VB	Solenoid ON in following condition: • D range (Engine stopped)
				0V	Solenoid OFF in following condition: • Except D range (Engine stopped)
1P (Battery power)	Battery	1P		VB	Ignition switch ON
				0V	Ignition switch OFF
2A (Input)	Throttle sensor	2A	2L	4.5—5.5V	Ignition switch ON
				0V	Ignition switch OFF
2B (Input)	Inhibitor switch (D range)	2B	Ground	VB	D range
				0V	Other ranges
2C	—	—	—	—	—
2D (Input)	Inhibitor switch (N and P ranges)	2D	Ground	VB	Except P or N ranges
				0V	P or N range
				Below 7V	P or N range and engine crank

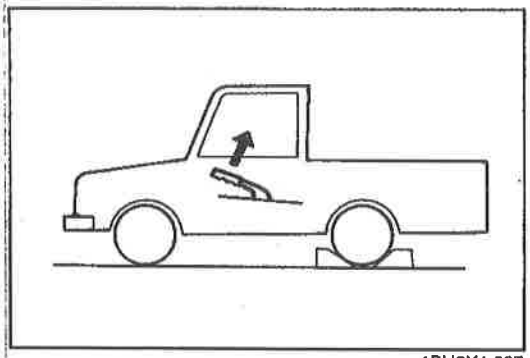
* Checked with AC range

VB: Battery voltage

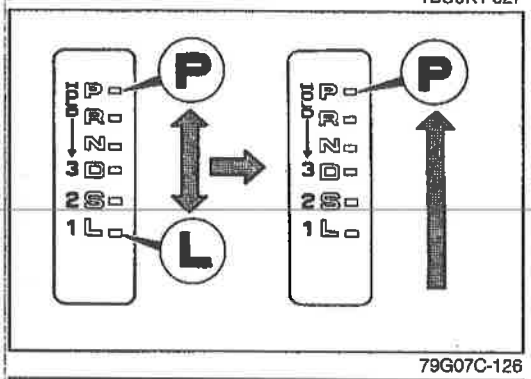
Terminal	Connected to	Voltmeter + terminal	Voltmeter – terminal	Voltage	Condition
2E (Input)	Cruise control unit	2E	Ground	Above 6V	Normal conditions
				Below 1.5V	Set or Resume switch ON or vehicle speed 8 km/h (5 mph) lower than preset speed (Driving vehicle cruise control operation)
2F	—	—	—	—	—
2G	Engine control unit	2G	Ground	Above 6V	Normal condition
				Below 1.5V	Atomospheric pressure below 679 mmHg (26.73 inHg) which is approximately at 1,500 m (4,921 ft)
2H	—	—	—	—	—
2I (Input)	Hold switch	2I	Ground	Above 6V	Switch released
				0V	Switch depressed
2J (Input)	Speed sensor 1*	2J		Above 1V **(AC)**	Vehicle speed above 25 km/h (16 mph)
				Approx. 0V **(AC)**	Vehicle stopped
2K (Input)	EC-AT check connector	2K		Above 6V	Normal
				0V	Check connector grounded
2L (Ground)	Ground (For sensors)	2L		0V	Constant
2M (Input)	Idle switch	2M		VB	Idle switch OFF (Throttle valve open)
				0V	Idle switch ON (Throttle valve fully closed)
2N (Output)	EC-AT Tester (Malfunction code)	2N		VB	Normal (With EC-AT tester)
				0V	If malfunction present (With EC-AT tester)
				Code signal	EC-AT check connector grounded (With EC-AT tester)
2O	—	—	—	—	—
2P	—	—	—	—	—
2Q (Input)	Inhibitor switch (L range)	2Q	Ground	VB	L range
				0V	Other ranges
2R (Input)	ATF thermosensor	2R	2L	Approx. 2.4—0.4V	While warming up ATF Note Approx. 1.8V: ATF temp. 10°C (50°F) Approx. 1.1V: ATF temp. 40°C (104°F)
2S (Input)	Inhibitor switch (S range)	2S	Ground	VB	S range
				0V	Other ranges
2T (Input)	Throttle sensor	2T	2L	Approx. 0.5—4.3V	Throttle valve fully closed to fully open

* Checked with AC range

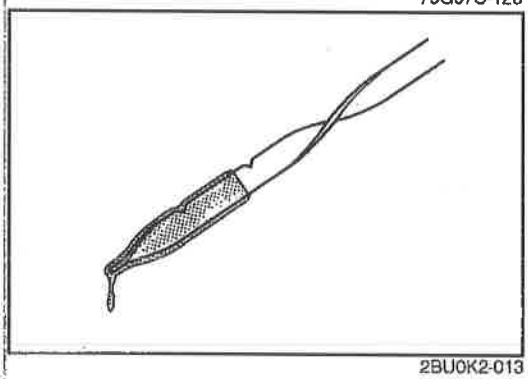
2BU0K2-012



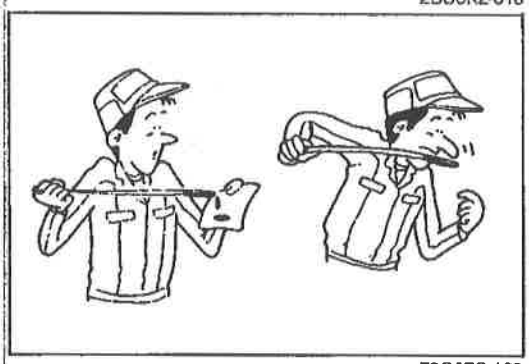
1BU0K1-027



79G07C-126



2BU0K2-013



79G07C-128

AUTOMATIC TRANSMISSION FLUID (ATF)

INSPECTION

Level

Caution
Place the vehicle on a flat, level surface.

1. Apply the parking brake and position wheel chocks securely to prevent the vehicle from rolling.
2. Warm-up the engine until the ATF reaches **60—70°C (140—158°F)**.
3. While the engine is idling, shift the selector lever from P to L and back again.
4. Let the engine idle.
5. Shift the selector lever to P.
6. Ensure that the ATF level is between the notches on the transmission level gauge. Add ATF to specification if necessary.

ATF type: Dexron®II or M-III

Condition

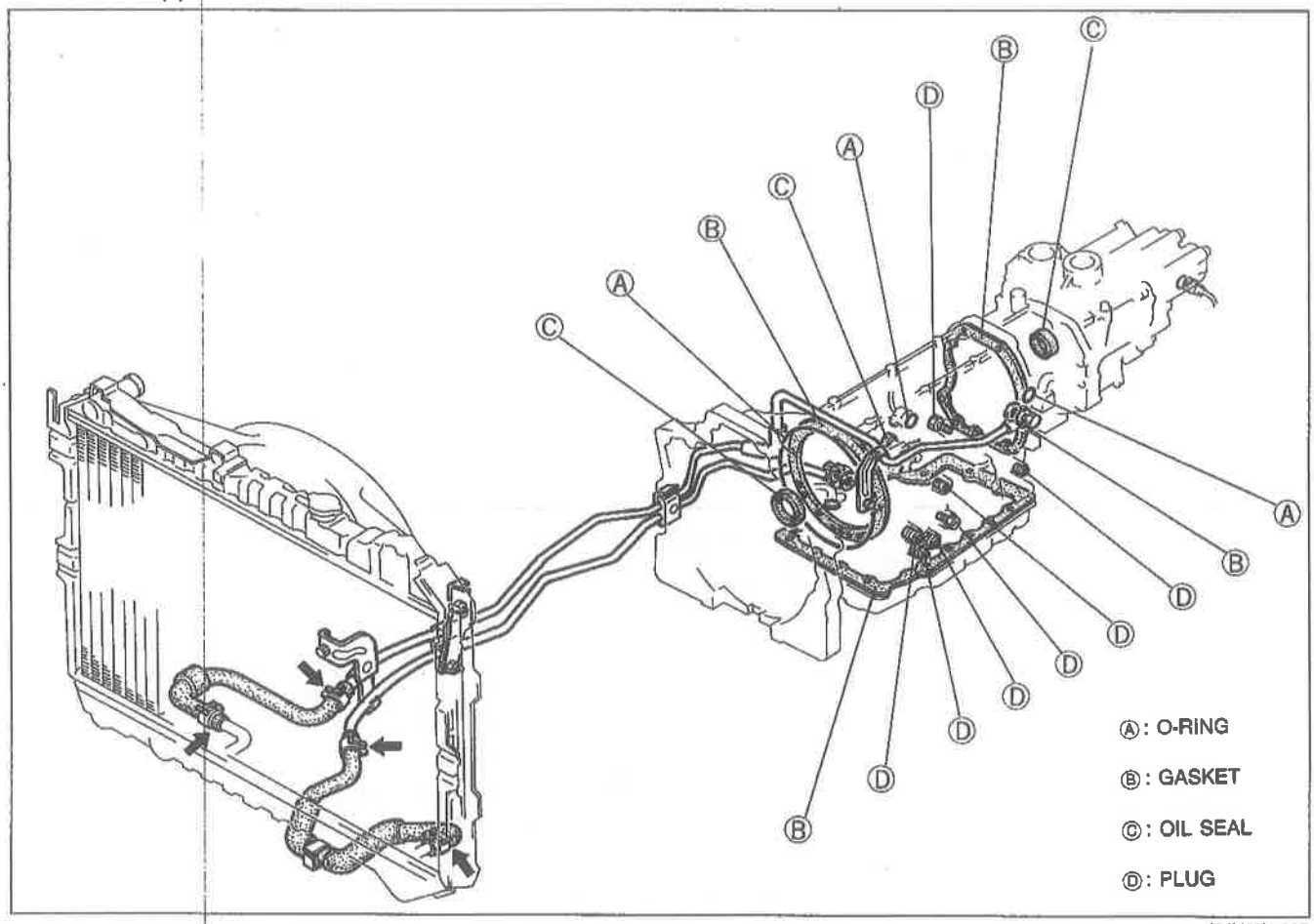
1. Check the ATF for discoloration.
2. Check the ATF for any unusual smell.

Note
a) Determine whether or not the automatic transmission should be disassembled by observing the condition of the ATF carefully.
b) If the ATF is muddy and varnished, it indicates burned drive plates.

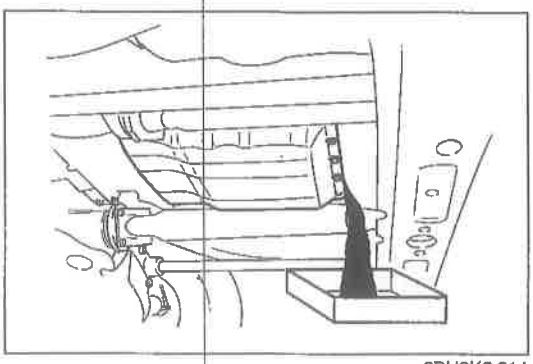
Fluid leaks

Check for fluid leaks of the transmission as shown below, repair or replace if necessary.

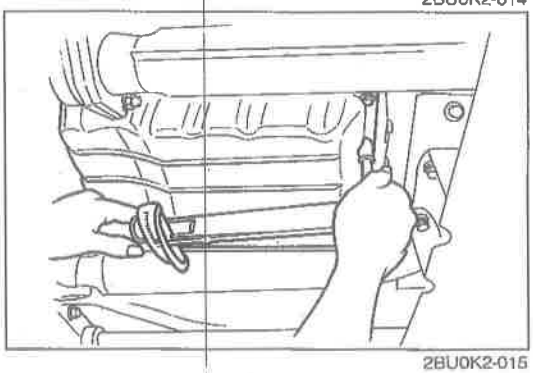
1. Gaskets, O-rings, and plugs
2. Oil hoses and oil pipes, and connections
3. Oil cooler(s)



9MU0K1-087



2BU0K2-014



2BU0K2-015

REPLACEMENT

1. Jack up the vehicle and support it with safety stands.

Warning
Be careful when draining; the ATF is hot.

2. Loosen the oil pan mounting bolts, and drain the ATF into a container.
3. Remove the oil pan and gasket.
4. Clean the oil pan and the magnet.
5. Install the oil pan along with a new gasket.

Tightening torque:
4.9—7.8 N·m (50—80 cm-kg, 43—69 in-lb)

6. Jack down the vehicle and add **approx. 4.0 liters (4.2 US qt, 3.5 Imp qt)** ATF.

Specified ATF: Dexron®II or M-III

7. Check the ATF level. (Refer to page K2–42.)

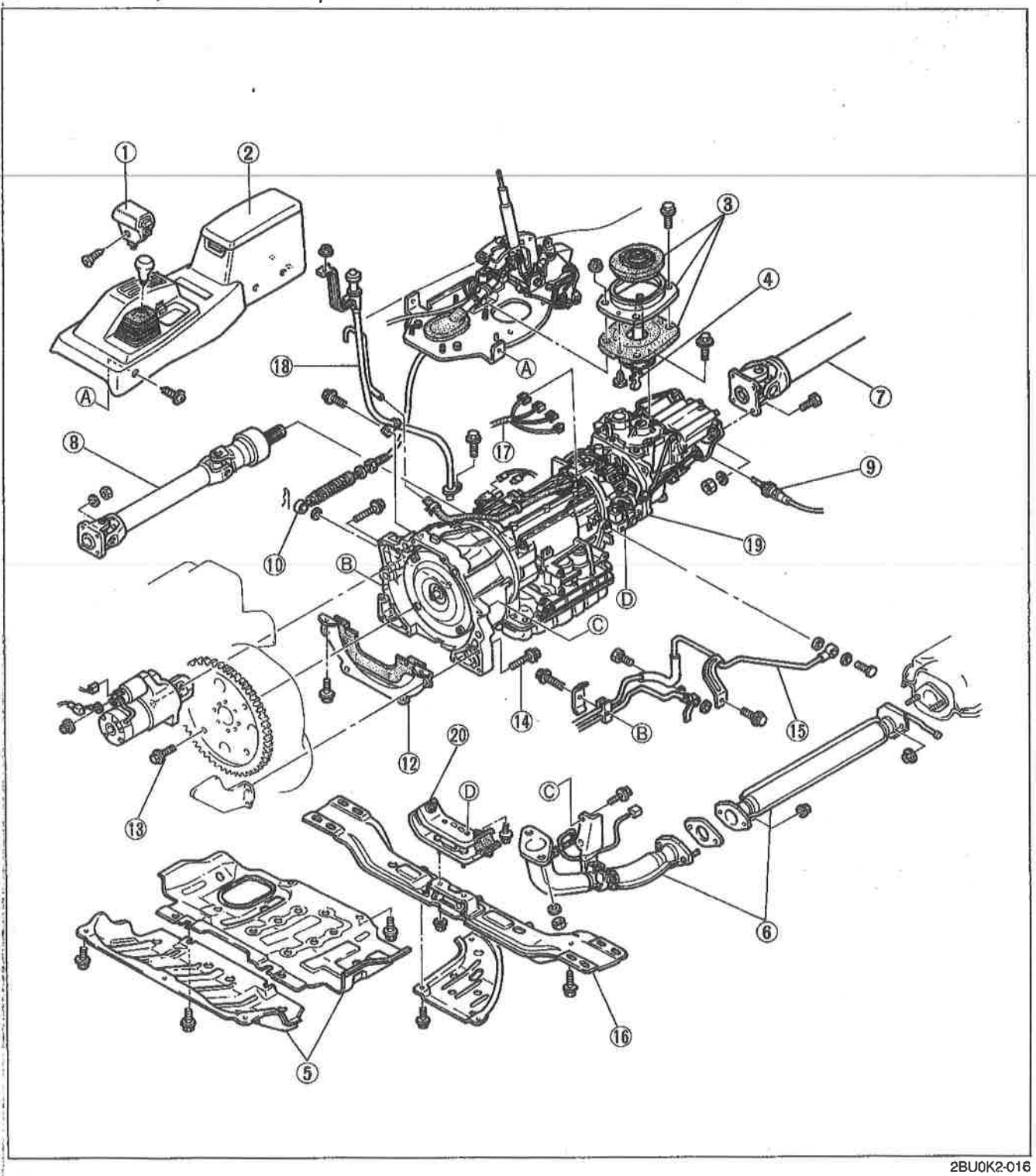
TRANSMISSION

TRANSMISSION UNIT (REMOVAL)

1. Disconnect the negative battery cable.
2. Jack up the vehicle and support it with safety stands.
3. Remove in the order shown in the figure, referring to **Removal Note**.

Caution
Do not turn the transmission over before removing the oil pan.

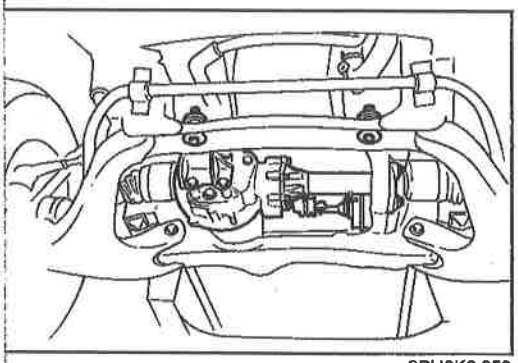
4. After removal, remove the oil pan to check condition of the transmission.



2BU0K2-016

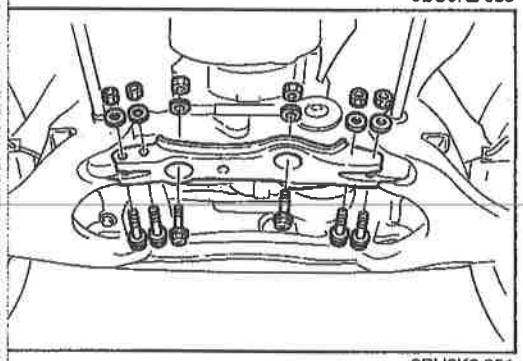
1. Selector knob
2. Console box
3. Insulator plate and boot
4. 4x4 shift lever
5. Under cover
6. Exhaust pipe
7. Rear propeller shaft
   Service..... Section L
8. Front propeller shaft
   Service..... Section L
9. Speedometer cable
10. Selector cable
11. No.2 cross member
    Removal Note..... page K2–46
12. Under cover
13. Torque converter installation bolt
    Removal Note..... page K2–46
14. Transmission installation bolt
15. Oil pipe connector and bracket
16. Cross member
    Removal Note..... page K2–46
17. Connectors
18. Oil level gauge and pipe
19. Automatic transmission
20. Transmission mount

2BU0K2-017



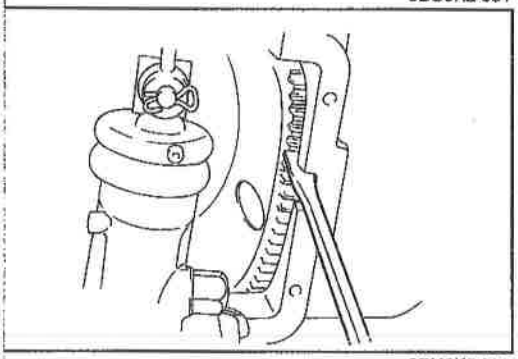
0BU0K2-050

Removal note
No.2 cross member
1. Loosen the differential mounting bolts.



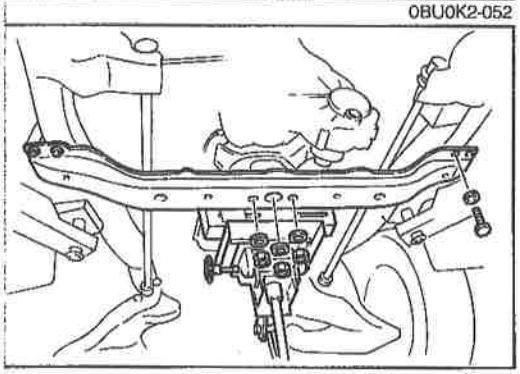
0BU0K2-051

2. Remove the cross member.



0BU0K2-052

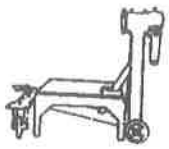
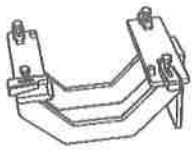
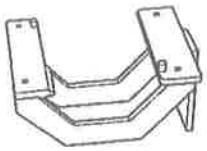
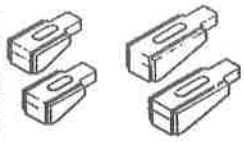
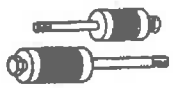
Torque converter installation bolts
1. Hold the drive plate with the screwdriver.
2. Remove the torque converter installation bolts.



0BU0K2-054

Cross member
1. Support the transmission with the transmission jack.
2. Remove the cross member.

TRANSMISSION UNIT (DISASSEMBLY)
Preparation
SST

49 0107 680A Engine stand		49 U019 0A0A Transmission hanger		49 H075 495B Body (Part of 49 U019 0A0A)	
49 U019 003 Holder (Part of 49 U019 0A0A)		49 0378 390 Puller, oil pump			

2BU0K2-018

Precaution

General Notes:

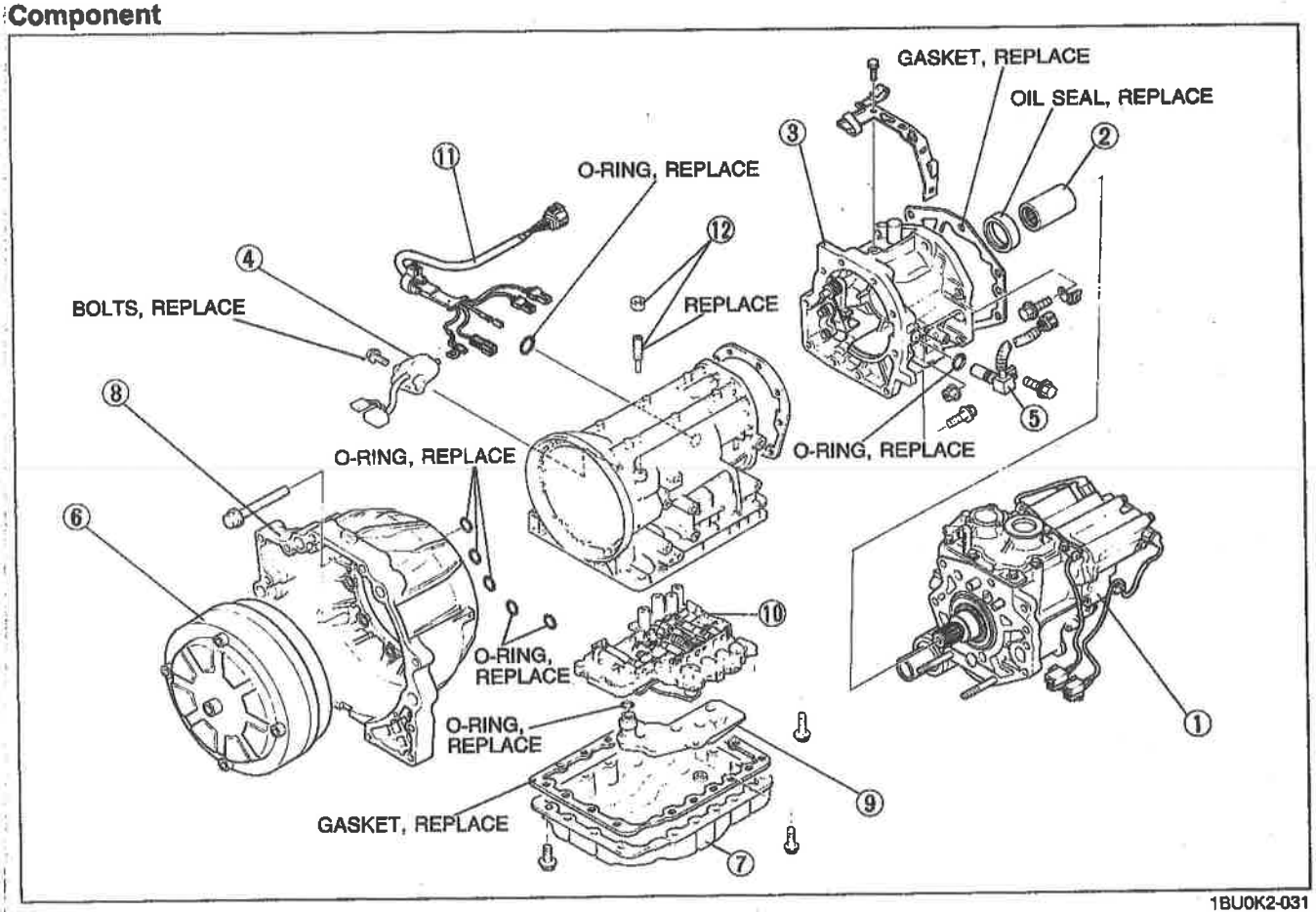
1. Disassemble the transmission in a clean area (dustproof work space) to prevent entry of dust into the mechanisms.
2. Inspect the individual transmission components in accordance with the QUICK DIAGNOSIS CHART during disassembly.
3. Use only plastic hammers when applying force to separate the light 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 throughly clean it when the clutch or brake band has burned or when the ATF has degenerated.

Cleaning Notes:

1. Clean the transmission exterior thoroughly with steam or cleaning solvents, or both, before disassembly.
2. Clean the removed parts with cleaning solvent, and dry with compressed air. Clean out all holes and passages with compressed air, and check that there are no obstructions.
3. Wear eye protection when using compressed air to clean components.

2BU0K2-019

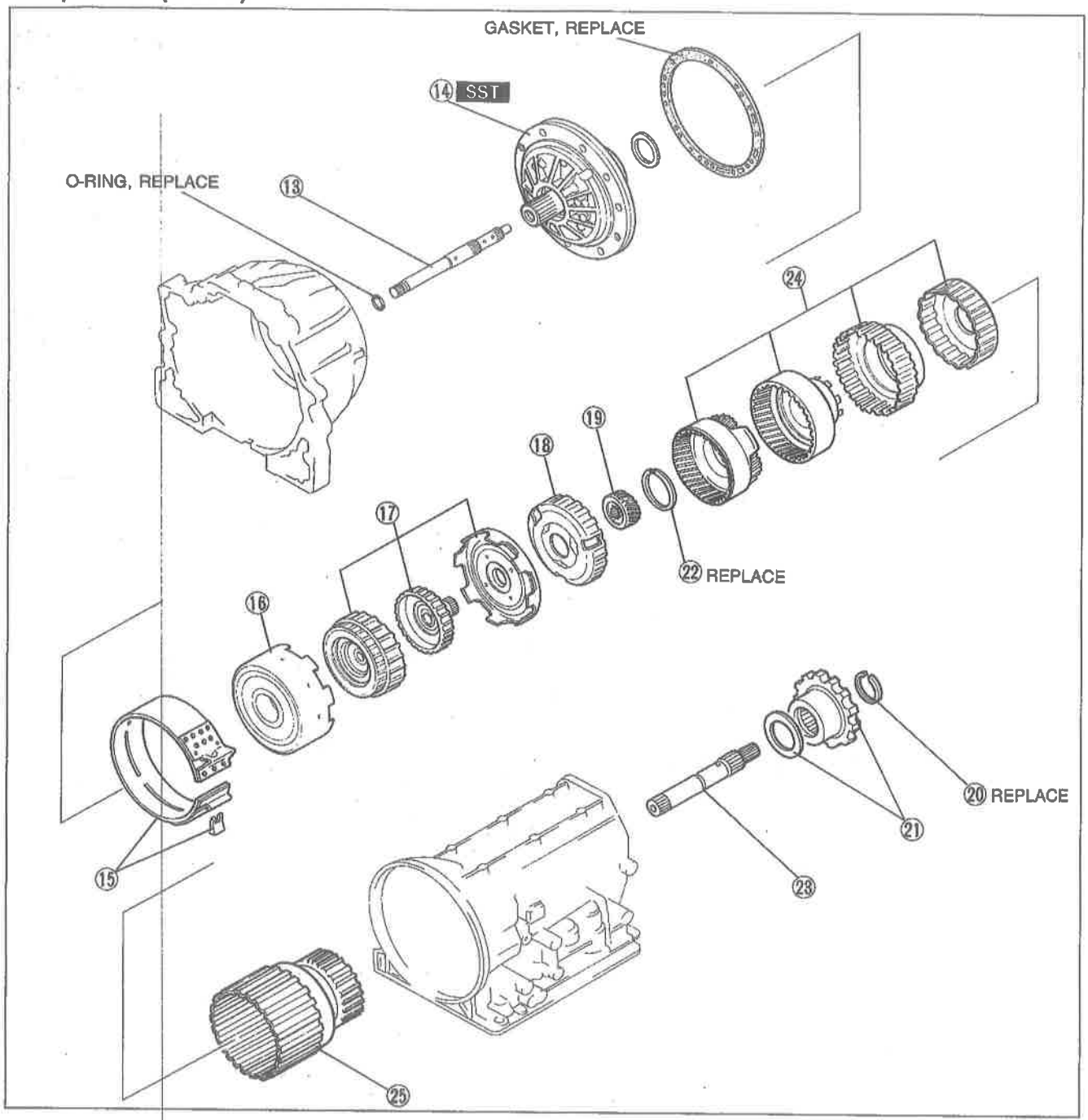
Component



1BU0K2-031

1. Transfer case
2. Input sleeve
3. Adapter case
   Disassembly and Inspection ..... page K2– 99
   Assembly ..... page K2–100
4. Inhibitor switch
   Inspection .... page K2– 36
   Adjustment... page K2– 36
5. Speed sensor 1
   Inspection ..... page K2–38
6. Torque converter
   Inspection ..... page K2–58
7. Oil pan
8. Converter housing
9. Oil strainer
10. Control valve body
    Disassembly and Inspection ..... page K2–105
    Assembly ..... page K2–123
11. Solenoid valve connectors
12. Anchor end bolt and nut

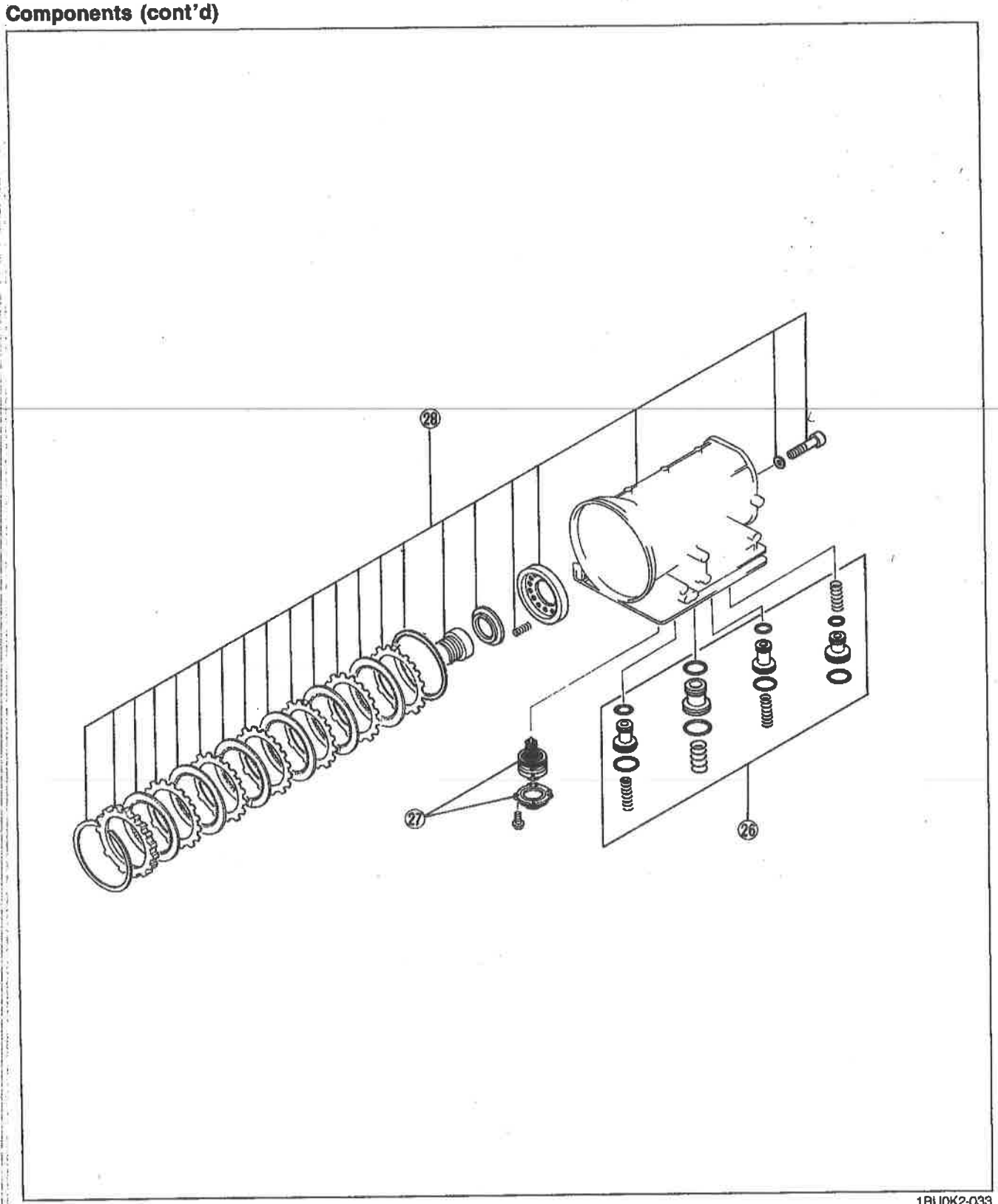
Components (cont'd)



1BU0K2-032

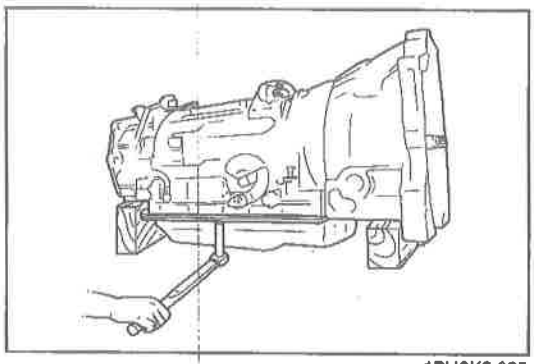
13. Input shaft
14. Oil pump
    Disassembly and Inspection .... page K2–61
    Assembly ..... page K2–63
15. Brake band and strut
16. Reverse clutch
    Disassembly and Inspection .... page K2–66
    Assembly ..... page K2–68
17. High clutch and front sun gear
    Disassembly and Inspection .... page K2–72
    Assembly ..... page K2–74
18. Front planetary carrier
19. Rear sun gear
20. Snap ring
21. Parking gear and bearing
22. Snap ring
23. Output shaft
24. Front internal gear, rear internal gear, forward clutch hub, overrunning clutch hub
    Disassembly and Inspection .... page K2–82
    Assembly ..... page K2–83
25. Forward clutch drum (forward clutch, overrunning clutch, low one-way clutch)
    Disassembly and Inspection .... page K2–86
    Assembly ..... page K2–88

Components (cont'd)



1BU0K2-033

26. Accumulator spring and piston
    Disassembly and Inspection ..... page K2–59
    Assembly ..... page K2–60
27. Band servo
    Disassembly and Inspection ..... page K2–78
    Assembly ..... page K2–79
28. Low and reverse brake piston and spring
    Disassembly and Inspection ..... page K2–95
    Assembly ..... page K2–96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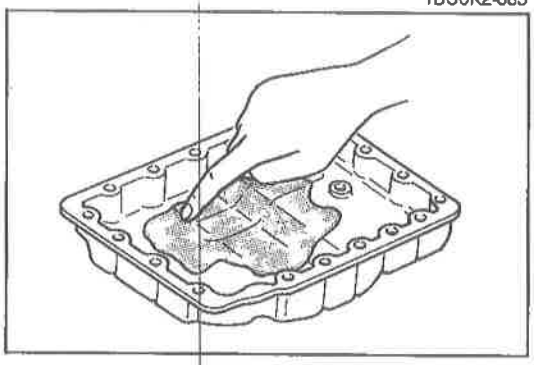

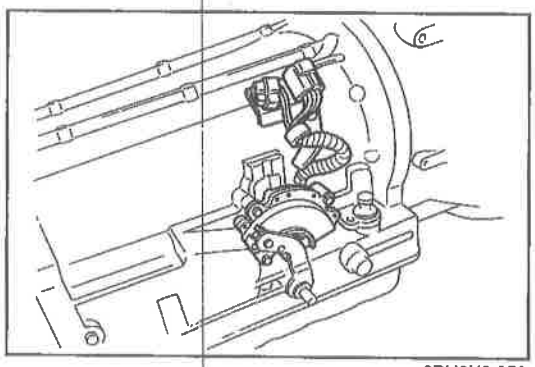
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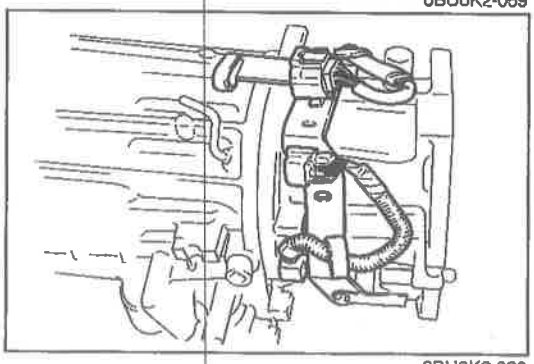
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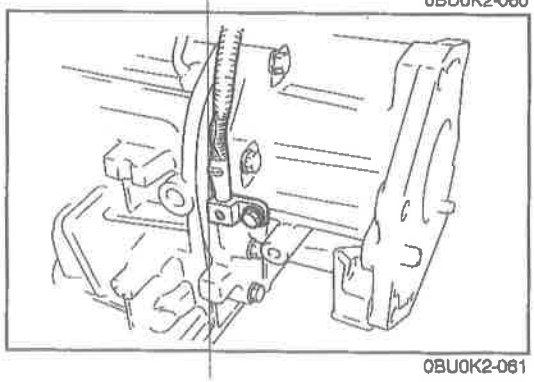

0BU0K2-061

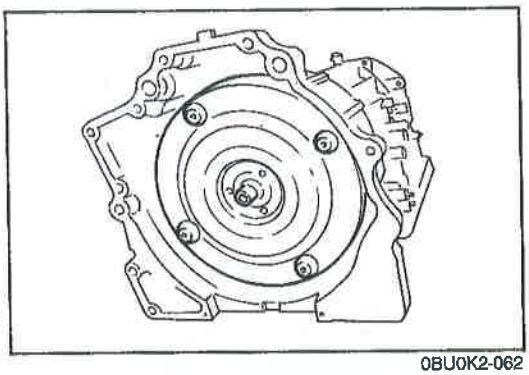
Procedure

Caution
Keep the transmission oil-pan down so that any foreign material will remain in the pan.

1. Remove the transfer case. (Refer to Section J3.)
2. Place the transmission on wooden blocks under the converter housing and the extension housing.
3. Remove the oil pan and gasket.
   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 (magnet) ..... Bearing, gear, and driven plate wear
   Aluminum (nonmagnetic) .... Bushings or cast aluminum parts wear
   If large amounts of material are found, replace the torque converter and carefully check the transmission for the cause.
4. Install the oil pan with a few bolts to protect the valve body.
5. Remove the connector bracket from the transmission case.
6. Remove the inhibitor switch.
7. Remove the connector bracket from the extension housing.
8. Disconnect the harness from the harness bracket.

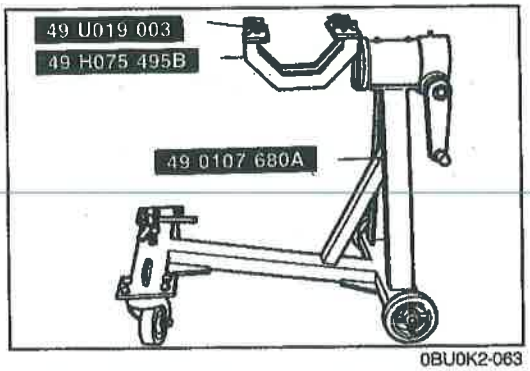
Caution
Do not damage the speed sensor.

9. Remove the speed sensor 1.
10. Remove the O-ring from the speed sensor 1.


0BU0K2-062

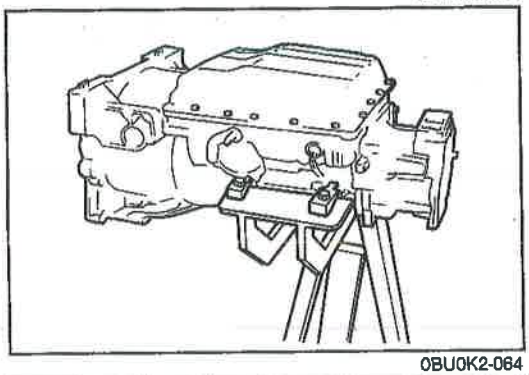
Note
Be careful not to spill the ATF when removing the torque converter.

11. Remove the torque converter.

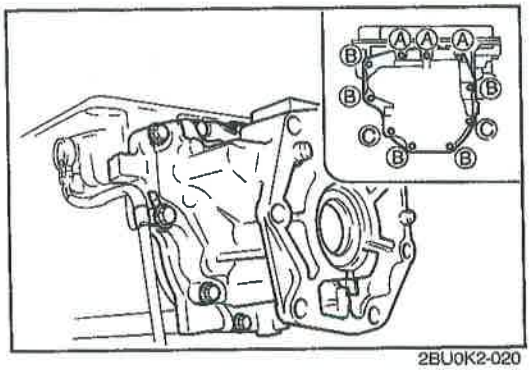


0BU0K2-063

12. Assemble the **SST** as shown.


0BU0K2-064

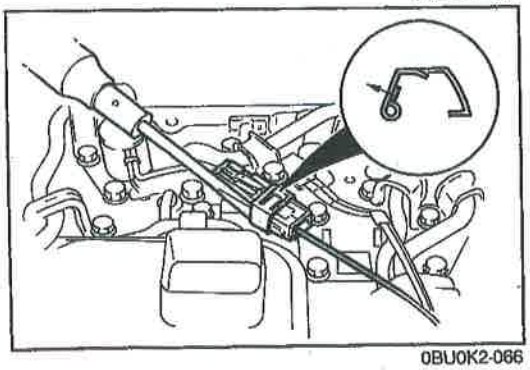
13. Mount the transmission to the **SST**.
14. Remove the oil pan.



2BU0K2-020

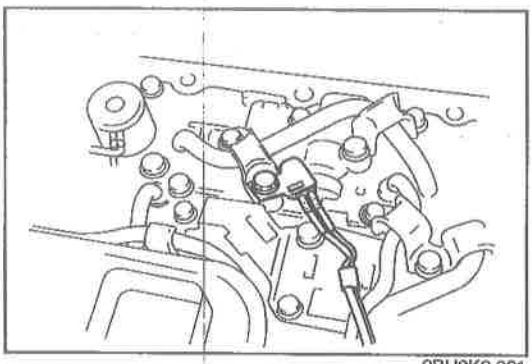
15. Remove the adapter case and gasket.

Bolt length (Measured from below the head)
Ⓐ: 30mm (1.181 in)
Ⓑ: 45mm (1.772 in)
Ⓒ: 50mm (1.969 in)


0BU0K2-066

Caution
Do not damage the harness or connector.

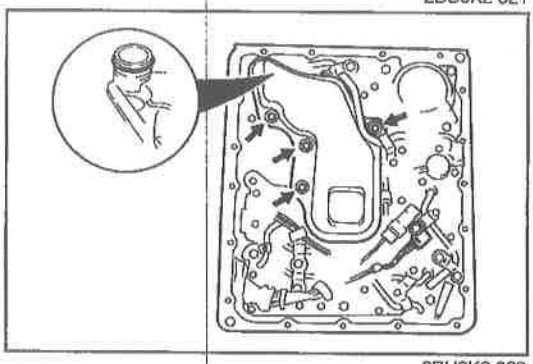
16. Remove the clip.
17. Disconnect the lockup solenoid connector.



2BU0K2-021

18. Disconnect the ATF thermosensor.

Bolt length (Measured from below the head):
45mm (1.772 in)

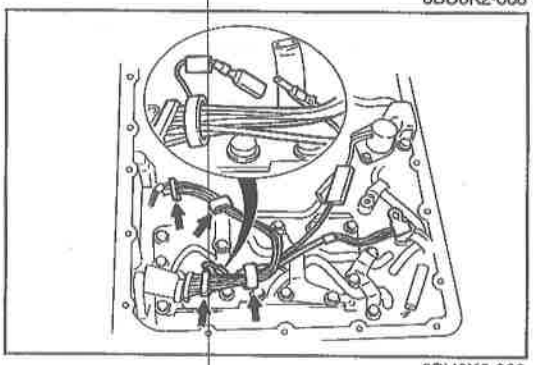


0BU0K2-068

19. Remove the oil strainer.

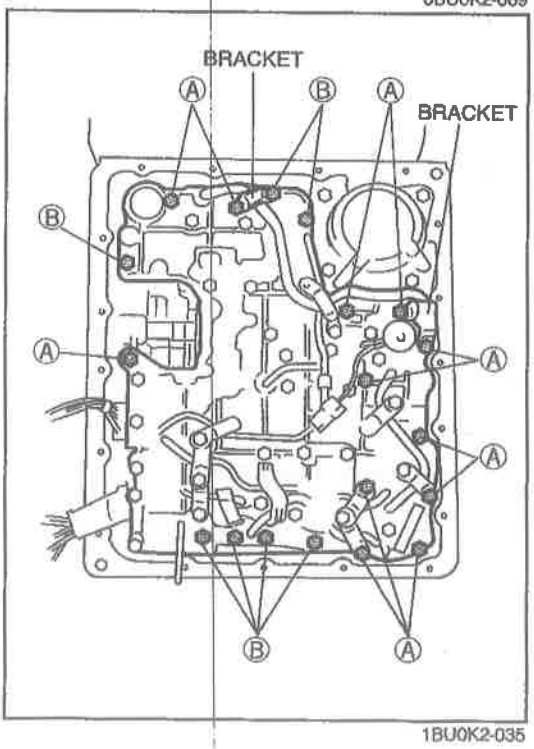
Bolt length (Measured from below the head):
50mm (1.969 in)

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



0BU0K2-069

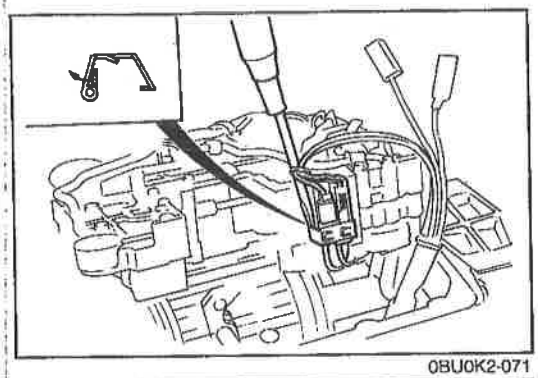
21. Separate the solenoid harness from the harness clip.



1BU0K2-035

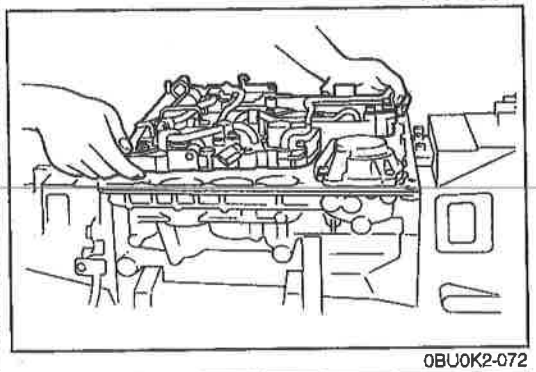
22. Remove the bolts Ⓐ and Ⓑ, and brackets shown in the figure.

Bolt length (Measured from below the head)
Ⓐ: 33mm (1.299 in)
Ⓑ: 45mm (1.772 in)


0BU0K2-071

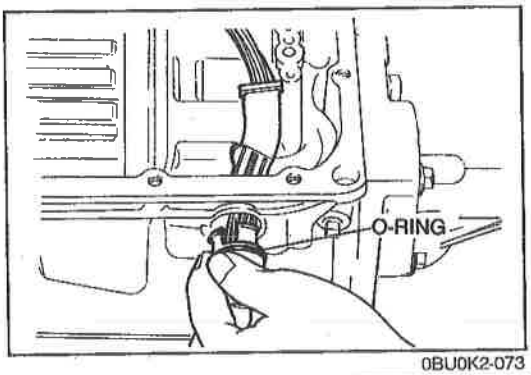
Caution
Do not damage the harness or connector.

23. Remove the clip.
24. Disconnect the solenoid connectors.


0BU0K2-072

Caution
Do not remove the control valve body unless you also remove the oil pipes.

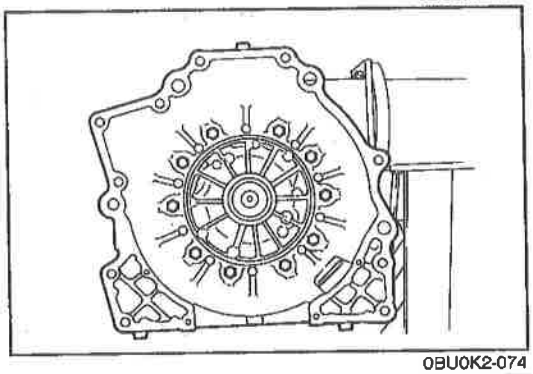
25. Remove the control valve body.



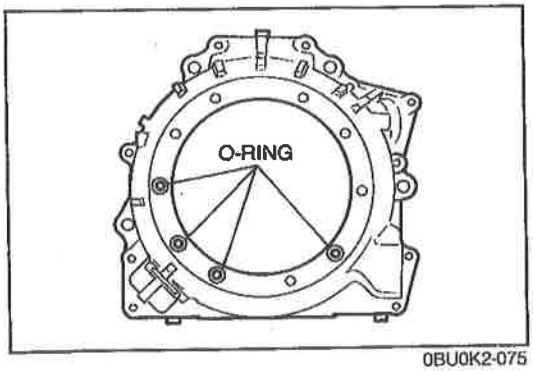
0BU0K2-073

Caution
Do not damage the solenoid connector.

26. Remove the solenoid connector from the transmission case.
27. Remove the O-ring from the solenoid connector.


0BU0K2-074

28. Remove the converter housing from the transmission case.

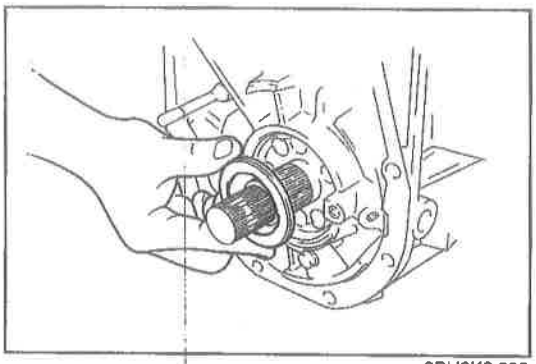


0BU0K2-075

29. Remove the O-rings from the converter housing.

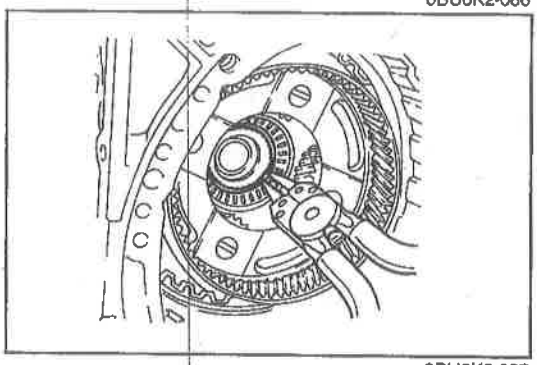
Caution
Do not damage the converter housing.

30. Clean the sealing compound from the converter housing.



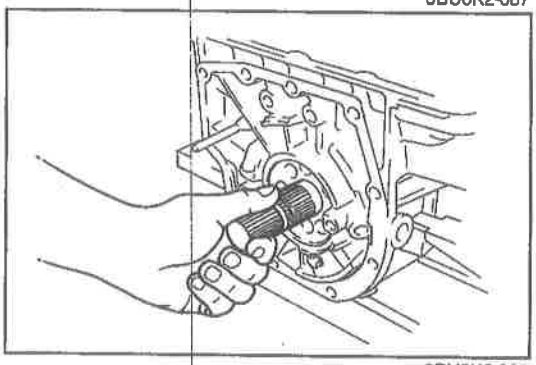
0BU0K2-086

45. Remove the bearing behind the transmission case.



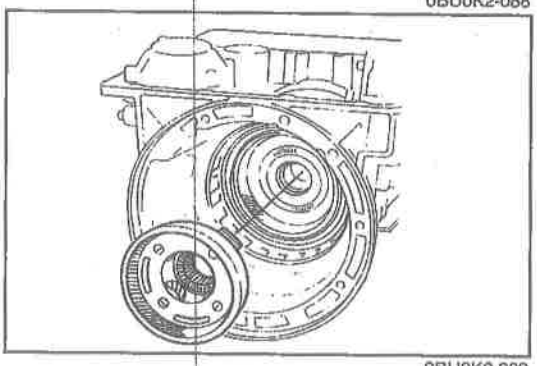
0BU0K2-087

46. While pushing the output shaft forward in slightly, and remove the snap ring (front) from the output shaft.



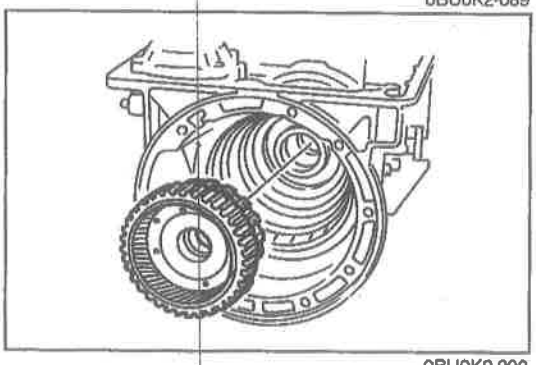
0BU0K2-088

47. Pull out the output shaft.



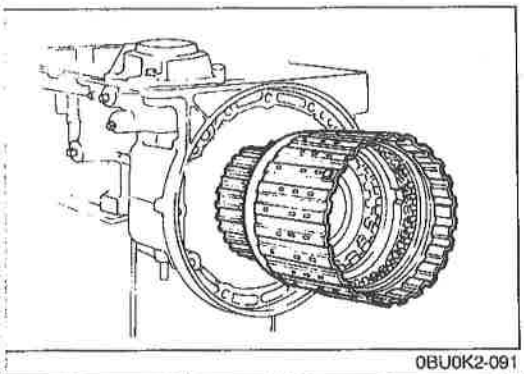
0BU0K2-089

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



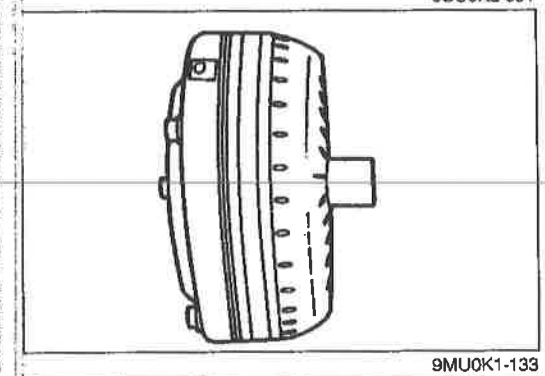
0BU0K2-090

49. Remove the rear internal gear, forward clutch hub, and overrunning clutch hub as an assembly.



0BU0K2-091

50. Remove the forward clutch drum (forward clutch, overrunning clutch, low one-way clutch) from the transmission case.

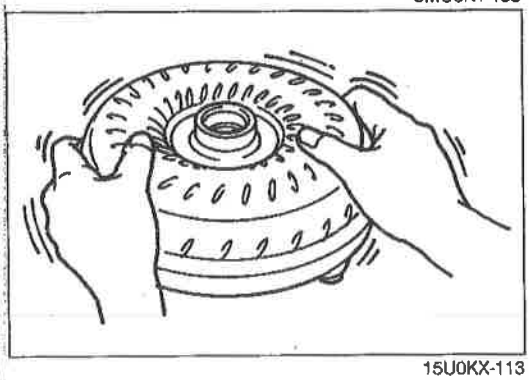


9MU0K1-133

TORQUE CONVERTER

Inspection

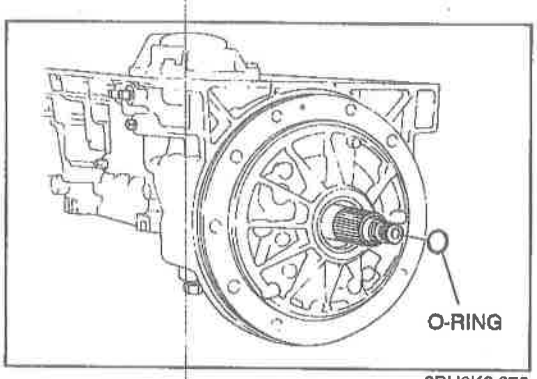
1. Check the outside of the converter for damage and cracks, and replace the torque converter if there is any problem.
2. Check for rust on the pilot hub on the boss, and remove it completely if there is any.



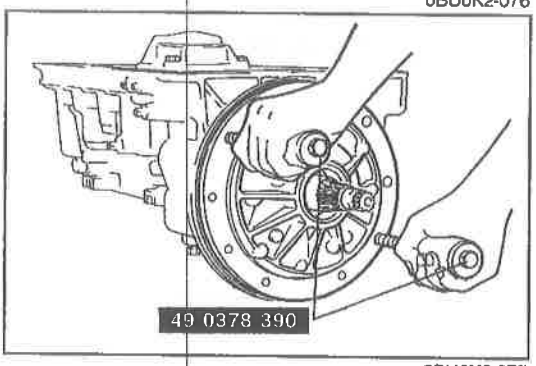
15U0KX-113

Washing inside the converter

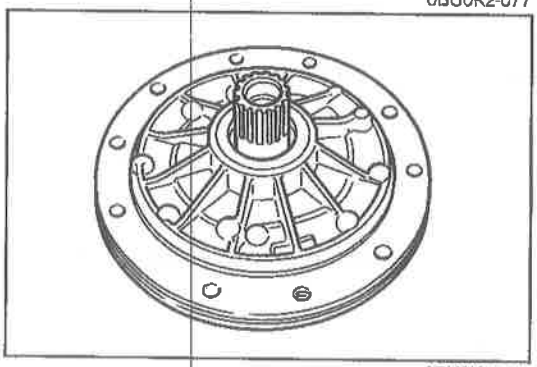
1. Drain any ATF remaining in the converter.
2. Pour in solvent **(0.5 liter, 0.5 US qt, 0.4 Imp qt)**.
3. Shake the converter to clean the inside. Pour out the solvent.
4. Pour in ATF.
5. Shake the converter to clean the inside. Pour out the ATF.



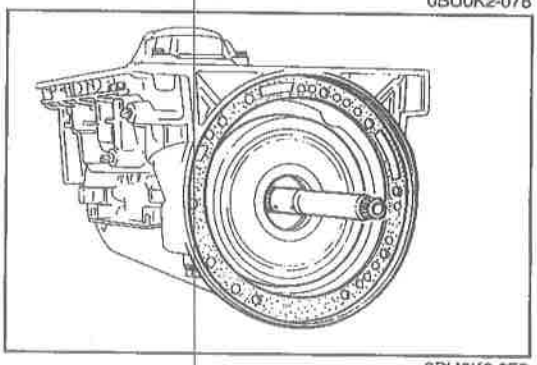
0BU0K2-076



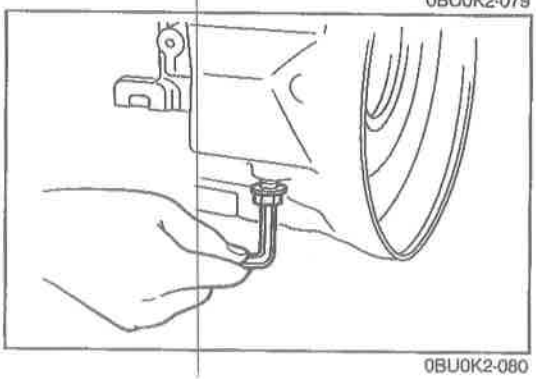
0BU0K2-077



0BU0K2-078



0BU0K2-079



0BU0K2-080

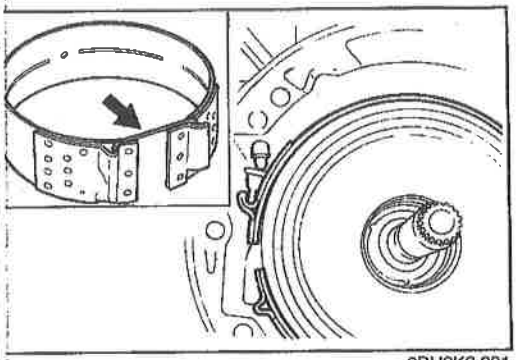
Procedure

Caution
Keep the transmission oil-pan down so that any foreign material will remain in the pan.

1. Remove the transfer case. (Refer to Section J2.)
2. Place the transmission on wooden blocks under the converter housing and the extension housing.
3. Remove the oil pan and gasket.
   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 (magnet)..... Bearing, gear, and driven plate wear
   Aluminum (nonmagnetic).... Bushings or cast aluminum parts wear
   If large amounts of material are found, replace the torque converter and carefully check the transmission for the cause.
4. Install the oil pan with a few bolts to protect the valve body.
5. Remove the connector bracket from the transmission case.
6. Remove the inhibitor switch.
7. Remove the connector bracket from the extension housing.
8. Disconnect the harness from the harness bracket.

Caution
Do not damage the speed sensor.

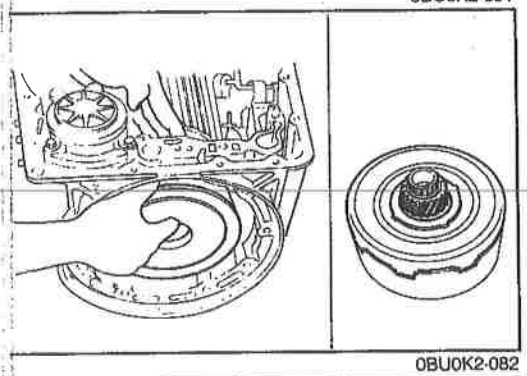
9. Remove the speed sensor 1.
10. Remove the O-ring from the speed sensor 1.



0BU0K2-081

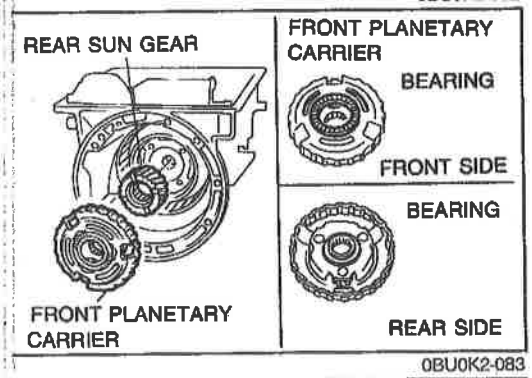
Caution
To prevent the brake facing from cracking or peeling, do not stretch the brake band. Secure it with a wire clip.

40. Remove the brake band and the band strut.



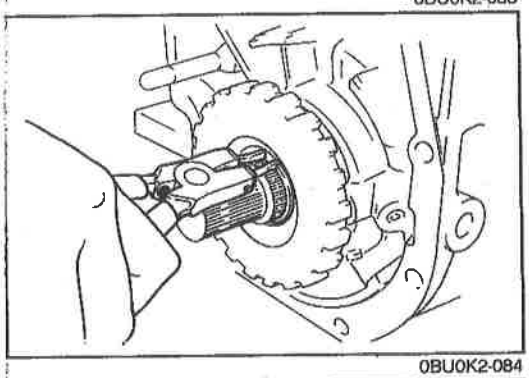
0BU0K2-082

41. Remove the reverse clutch, high clutch, and the front sun gear from the transmission case as an assembly.



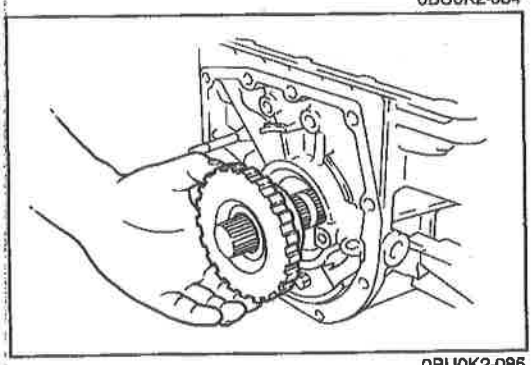
0BU0K2-083

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



0BU0K2-084

43. Remove the snap ring (rear) from the output shaft.



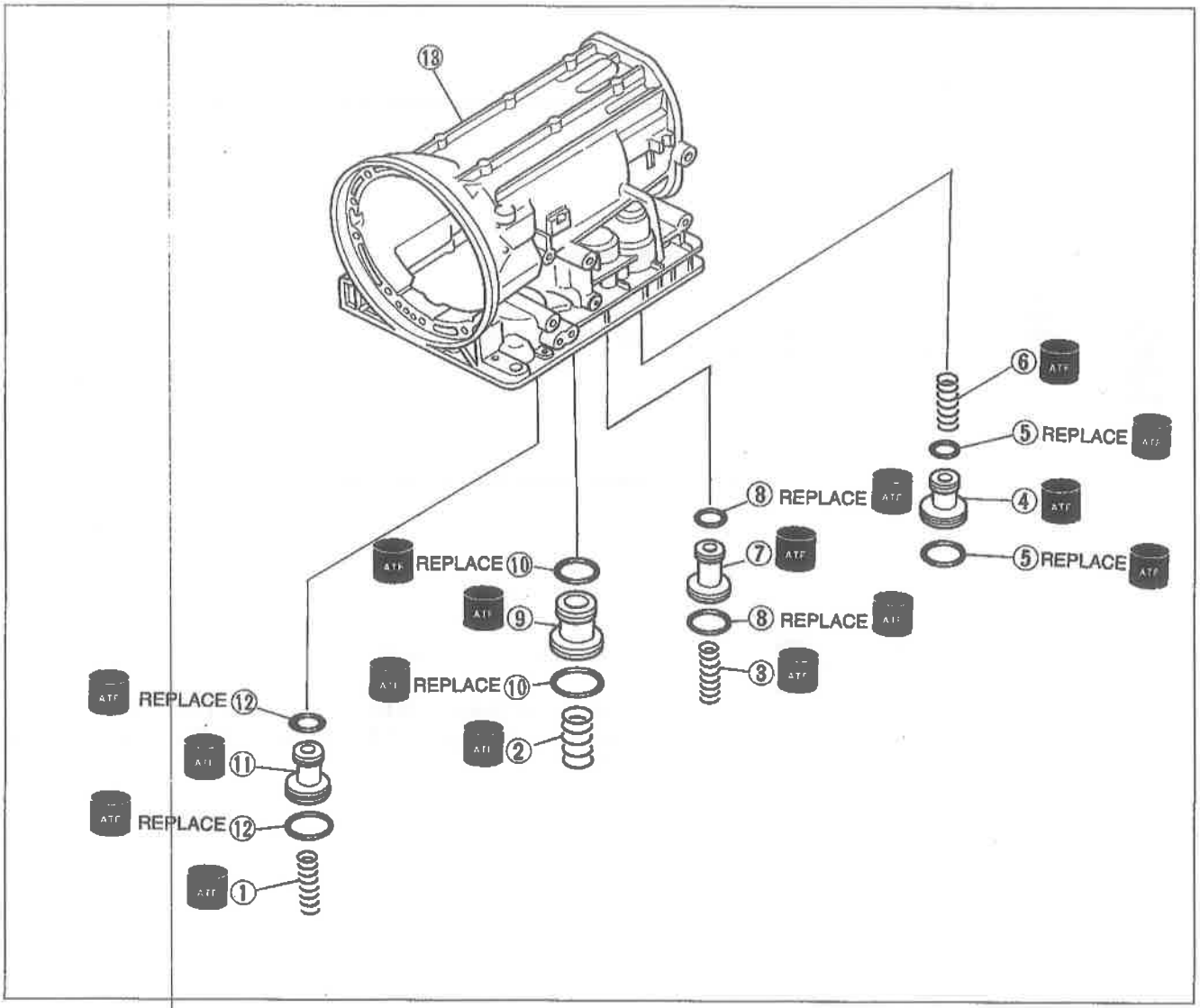
0BU0K2-085

44. Remove the parking gear.

ACCUMULATORS

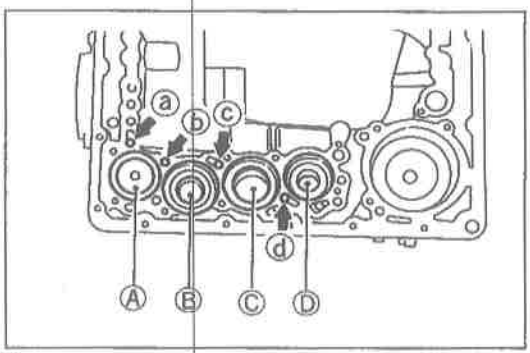
Disassembly and Inspection

Disassemble in the order shown in the figure, referring to **Disassembly Note**.
Inspect all parts, and repair or replace if necessary.



1BU0K2-036

1. 3-4/N-R accumulator spring
   Inspection ..... page K2–60
2. 1-2 accumulator spring
   Inspection ..... page K2–60
3. 2-3 accumulator spring
   Inspection ..... page K2–60
4. N-D accumulator piston
5. O-rings
6. N-D accumulator spring
   Inspection ..... page K2–60
7. 2-3 accumulator piston
8. O-rings
9. 1-2 accumulator piston
10. O-rings
11. 3-4/N-R accumulator piston
12. O-rings
13. Transmission case



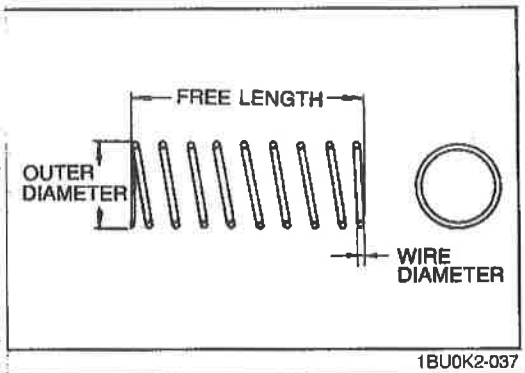
9MU0K1-136

Disassembly note

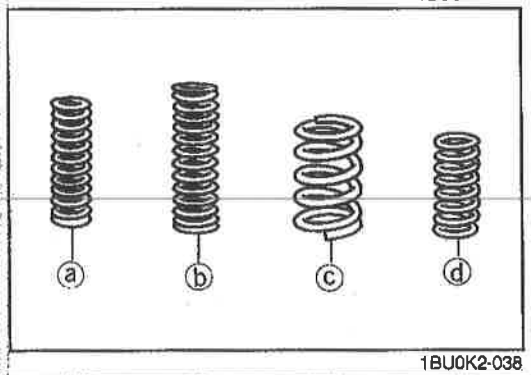
Accumulator piston

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

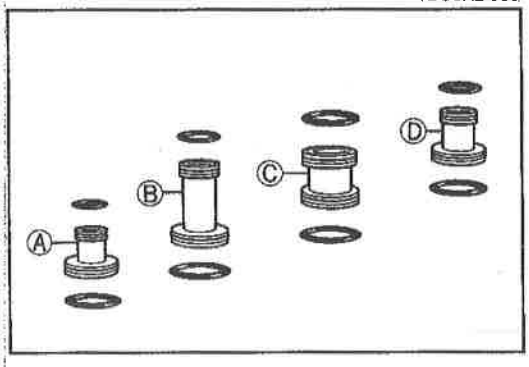
Item / Accumulator	Location	Oil passage
N-D accumulator	A	a
2-3 accumulator	B	b
1-2 accumulator	C	c
3-4/N-R accumulators	D	d

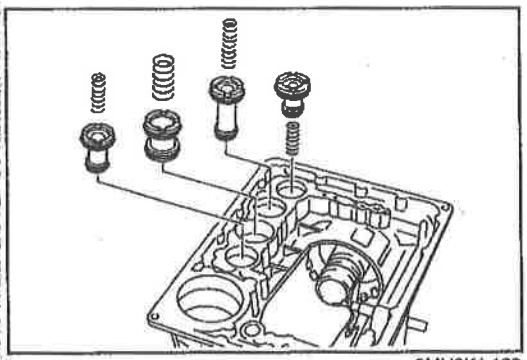


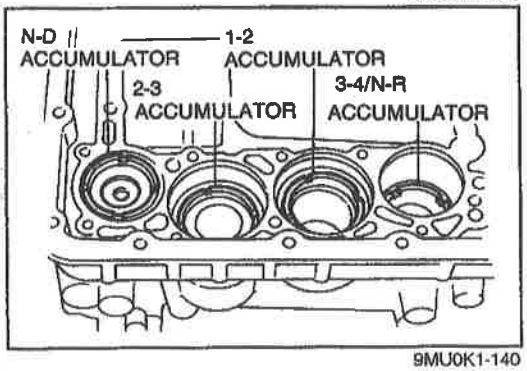
1BU0K2-037



1BU0K2-038




9MU0K1-139



9MU0K1-140

Inspection

Accumulator, spring

Measure the spring free length.

	Outer dia. mm (in)	Free length mm (in)	No. of coil	Wire dia. mm (in)
N-D accumulator piston	18.0 (0.709)	43.0 (1.693)	12.3	2.3 (0.091)
1-2 accumulator piston	29.3 (1.154)	45.0 (1.772)	3.6	4.0 (0.157)
2-3 accumulator piston	20.0 (0.787)	66.0 (2.598)	11.4	3.5 (0.138)
3-4/N-R accumulators piston	17.3 (0.681)	58.4 (2.299)	12.3	2.3 (0.091)

If not within specification, replace the spring.

Assembly

Note
Installation order
N-D accumulator: Spring — Piston
2-3 accumulator: Piston — Spring
1-2 accumulator: Piston — Spring
3-4/N-R accumulators: Piston — Spring
Outer diameter of spring

Spring		Outer dia. mm (in)
a	N-D accumulator	18.0 (0.709)
b	2-3 accumulator	20.0 (0.787)
c	1-2 accumulator	29.3 (1.154)
d	3-4/N-R accumulators	17.3 (0.681)

Apply even pressure to the perimeter of the accumulator pistons to avoid damaging the O-rings when installing.

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

Piston \ O-ring		Large mm (in)	Small mm (in)
A	N-D accumulator	45.0 (1.772)	29.0 (1.142)
B	2-3 accumulator	50.0 (1.969)	32.0 (1.260)
C	1-2 accumulator	50.0 (1.969)	45.0 (1.772)
D	3-4/N-R accumulators	45.0 (1.772)	29.0 (1.142)

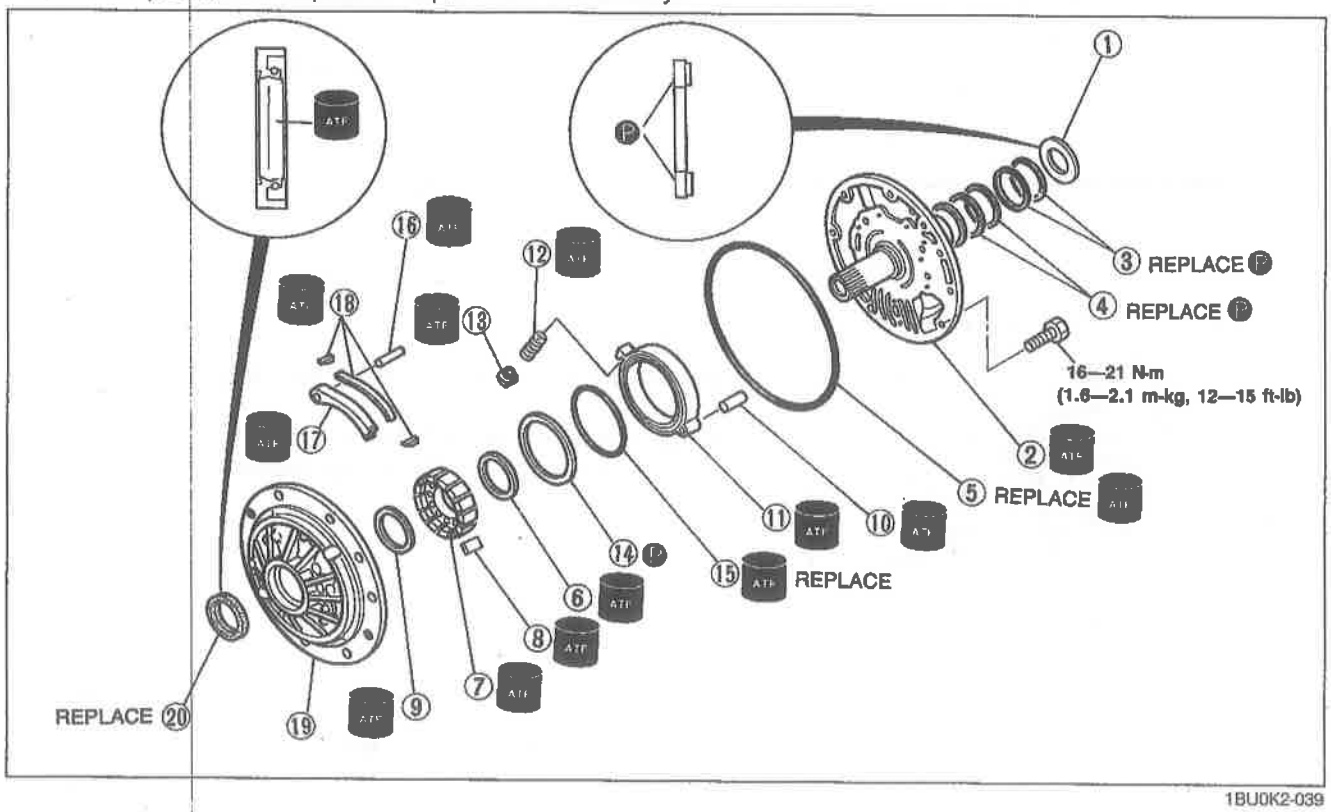
2. Install the accumulator pistons and springs.

OIL PUMP
Preparation
SST

49 G030 795 Installer, oil seal	49 G030 796 Body (Parts of 49 G030 795)	49 G030 797 Handle (Parts of 49 G030 795)

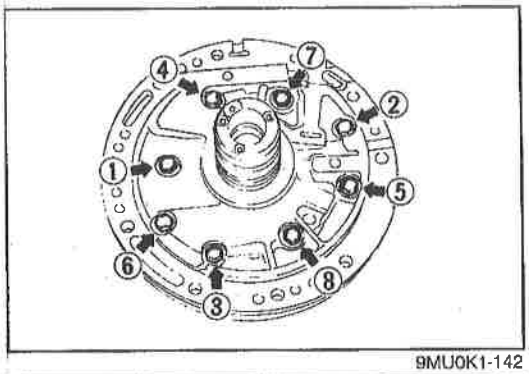
9MU0K1-486

Disassembly and Inspection
Disassemble in the order shown in the figure, referring to **Disassembly Note**.
Inspect all parts, and repair or replace as necessary.



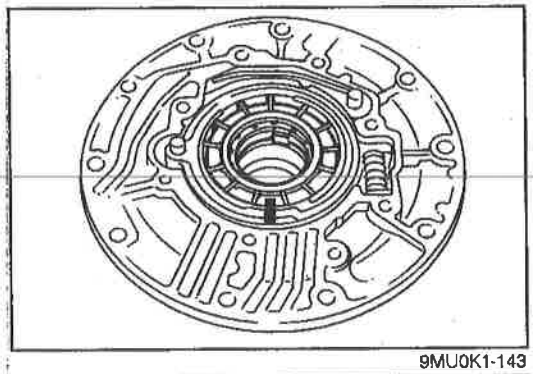
1BU0K2-039

1. Bearing
   Inspect for damage or rough rotation
2. Oil pump cover
   Disassembly Note ..... page K2–62
   Inspection ..... page K2–62
3. Seal ring (small diameter)
4. Seal ring (large diameter)
5. Seal ring
6. Vane ring
7. Rotor
   Disassembly Note ..... page K2–62
   Inspection ..... page K2–63
8. Vane
   Inspection ..... page K2–63
9. Vane ring
10. Pivot pin
    Disassembly Note ..... page K2–62
11. Cam ring
    Disassembly Note ..... page K2–62
    Inspection ..... page K2–63
12. Spring
    Inspection ..... page K2–63
13. Spring seat
14. Friction ring
15. O-Ring
16. Pivot pin
17. Control piston
    Inspection ..... page K2–63
18. Side seal
19. Oil pump housing
    Inspection ..... page K2–63
20. Oil seal



9MU0K1-142

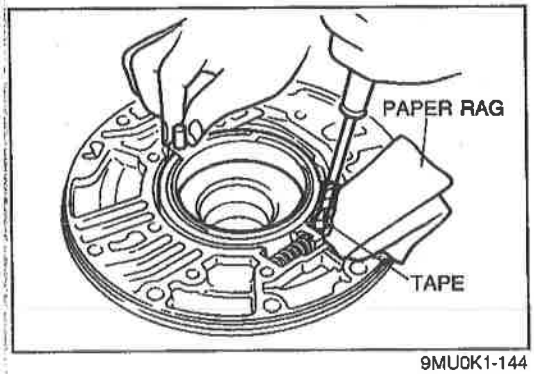
Disassembly note
Oil pump cover
Loosen the mounting bolts evenly in the pattern shown and remove the oil pump cover from the oil pump housing.


9MU0K1-143

Rotor

Caution
Do not use a punch to mark the rotor.

Mark the rotor and cam ring; then separate the rotor and vanes from the cam ring.

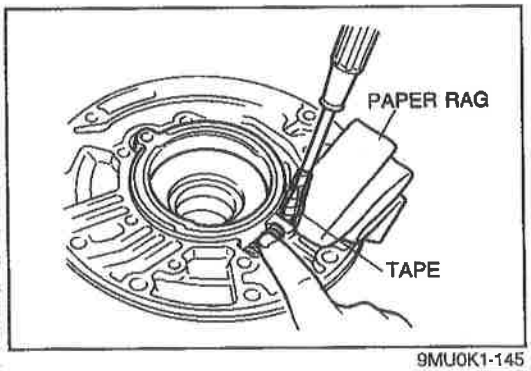


9MU0K1-144

Pivot pin

Caution
Do not scratch the oil pump housing.

1. Wrap a screwdriver with tape.
2. While pushing on the cam ring, remove the pivot pin.

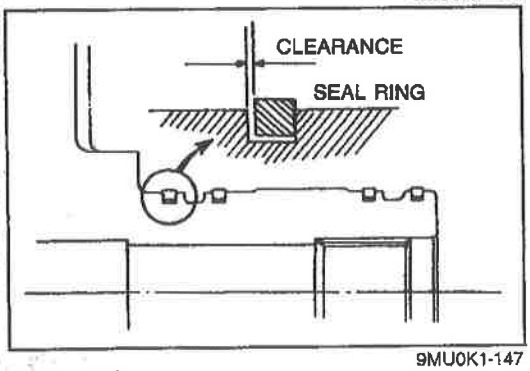


9MU0K1-145

Cam ring

Caution
a) Do not to scratch the oil pump housing.
b) Hold the cam ring spring to prevent it from popping out.

Remove the cam ring and cam ring spring.

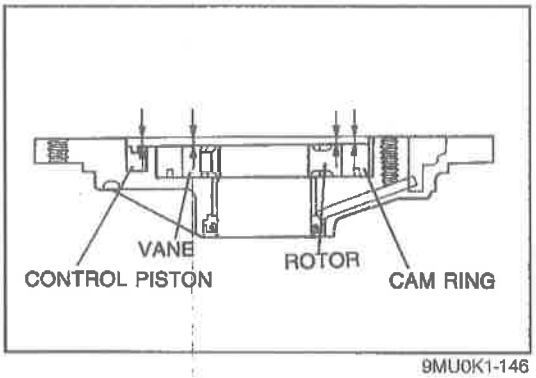


9MU0K1-147

Inspection
Oil pump cover
1. Apply petroleum jelly to new seal ring.
2. Measure the clearance between the seal ring and the ring groove.

Standard clearance:
0.10—0.25mm (0.0039—0.0098 In)
Maximum clearance: 0.25mm (0.0098 In)

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



9MU0K1-146

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

Note
Do not install the friction ring, O-ring, control piston side seals, or cam ring spring.

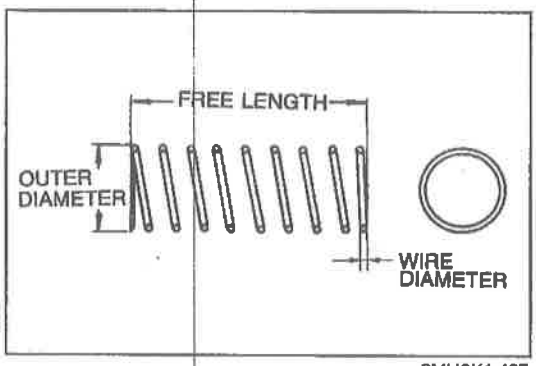
1. Install the cam ring vanes, rotor and control piston.
2. Measure the clearance between the end of the oil pump housing and cam ring, rotor, vanes and control piston in at least four places along their circumferences.

Clearance

mm (in)

Clearance / Port	Standard	Maximum
Cam ring	0.010—0.024 (0.0004—0.009)	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 as an assembly.



9MU0K1-487

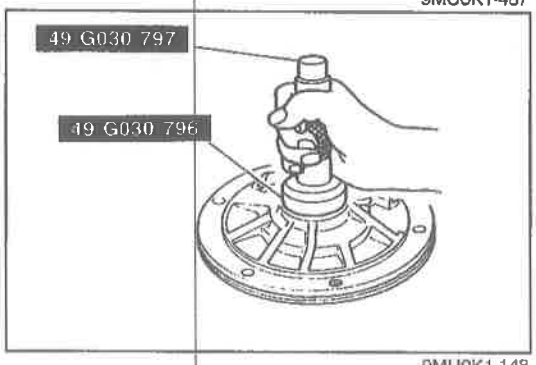
Cam ring spring

1. Measure the spring specification.

Specification

Outer dia. mm (in)	Free length mm (in)	No. of coil	Wire dia. mm (in)
13.7 (0.539)	39.8 (1.567)	7.8	2.3 (0.091)

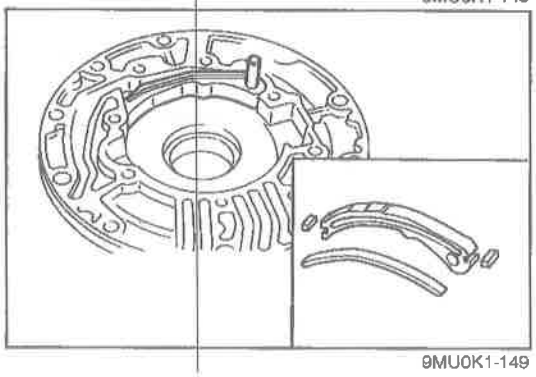
2. If not correct, replace the cam ring spring.



9MU0K1-148

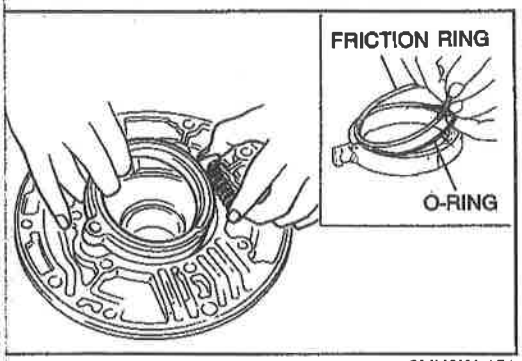
Assembly

1. Apply ATF to the new oil seal. Install the oil seal with the **SST**.



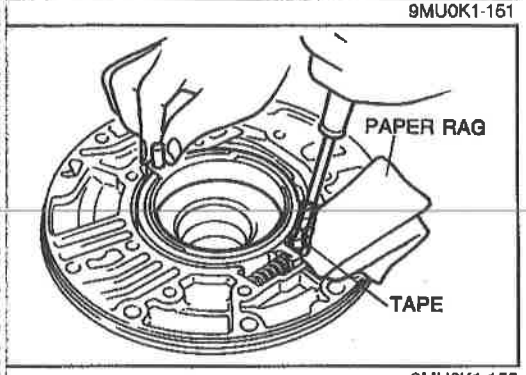
9MU0K1-149

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



9MU0K1-151

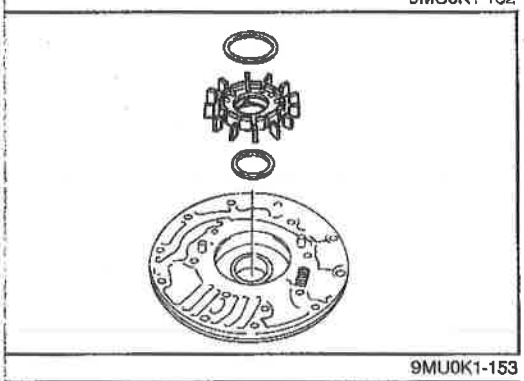
4. Apply petroleum jelly to the cam ring groove and install a new O-ring and friction ring into the cam ring.
5. Install the cam ring and spring while compressing the spring against the oil pump housing.



9MU0K1-152

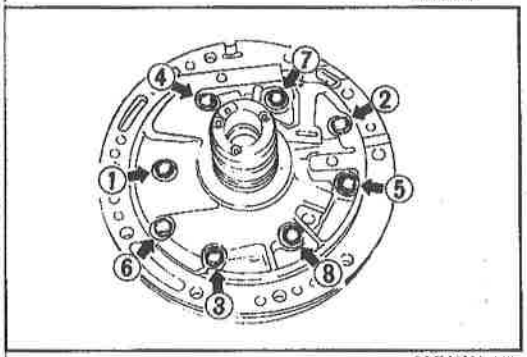
Caution
Do not scratch the oil pump housing.

6. Wrap a screwdriver with tape.
7. While pushing on the cam ring, install the pivot pin.



9MU0K1-153

8. Confirm the marks and install the rotor, vanes, and vane rings.

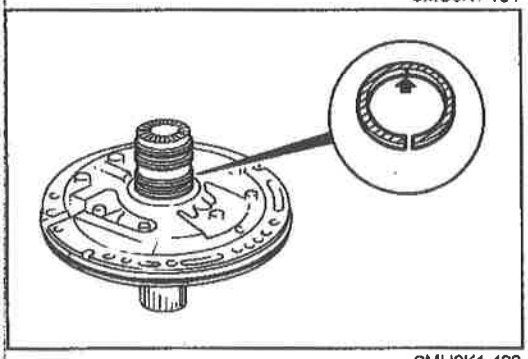


9MU0K1-154

Caution
Do not damage the oil seal with the splines of the oil pump cover.

9. Install the oil pump cover onto the oil pump housing.
10. Tighten the bolts evenly and gradually in the order shown.

Tightening torque:
16—21 N·m (1.6—2.1 m-kg, 12—15 ft-lb)



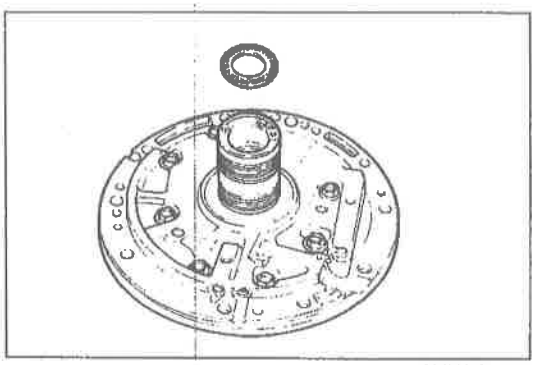
9MU0K1-499

Caution
Do not overexpand the seal rings when installing.

Note
a) Press the seal rings down into the petroleum jelly to hold them.
b) Seal rings come in two different diameters.

Small dia seal ring:	**No mark**
Large dia seal ring:	**Yellow mark in area shown by arrow**

11. Put petroleum jelly into the ring grooves, and install the new seal rings.
12. Apply ATF to a new O-ring , and install it on the oil pump.

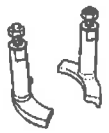
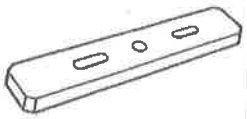
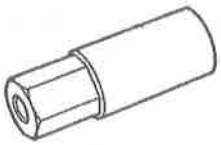


9MU0K1-157

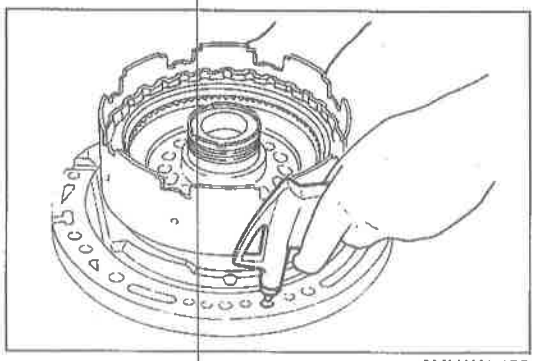
13. Apply petroleum jelly to the bearing, and set it on the oil pump.

Bearing outer diameter: 47.0mm (1.850 in)

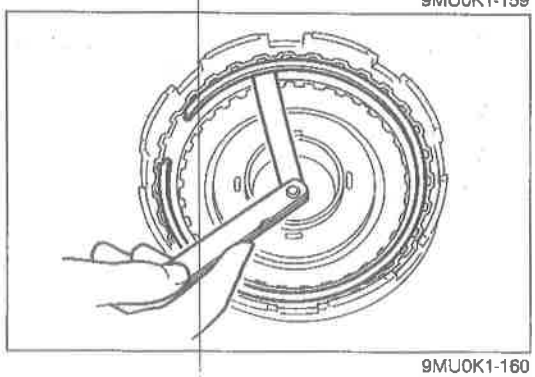
REVERSE CLUTCH
Preparation
SST

49 G019 0A7A Compressor set, return spring 	49 G019 025 Body B (Part of 49 G019 0A7A) 	49 G019 026 Plate (Part of 49 G019 0A7A) 
49 G019 027 Attachment A (Part of 49 G019 0A7A) 	49 G019 029 Nut (Part of 49 G019 0A7A) 	

2BU0K2-022



9MU0K1-159



9MU0K1-160

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.

   Air pressure: 392 kPa (4.0 kg/cm^2, 57 psi) max.

2. Verify that the retaining plate moves to the snap ring. If not, the D-ring or the oil seal may be damaged or fluid may be leaking at the piston check ball. Inspect them and replace when assembling.

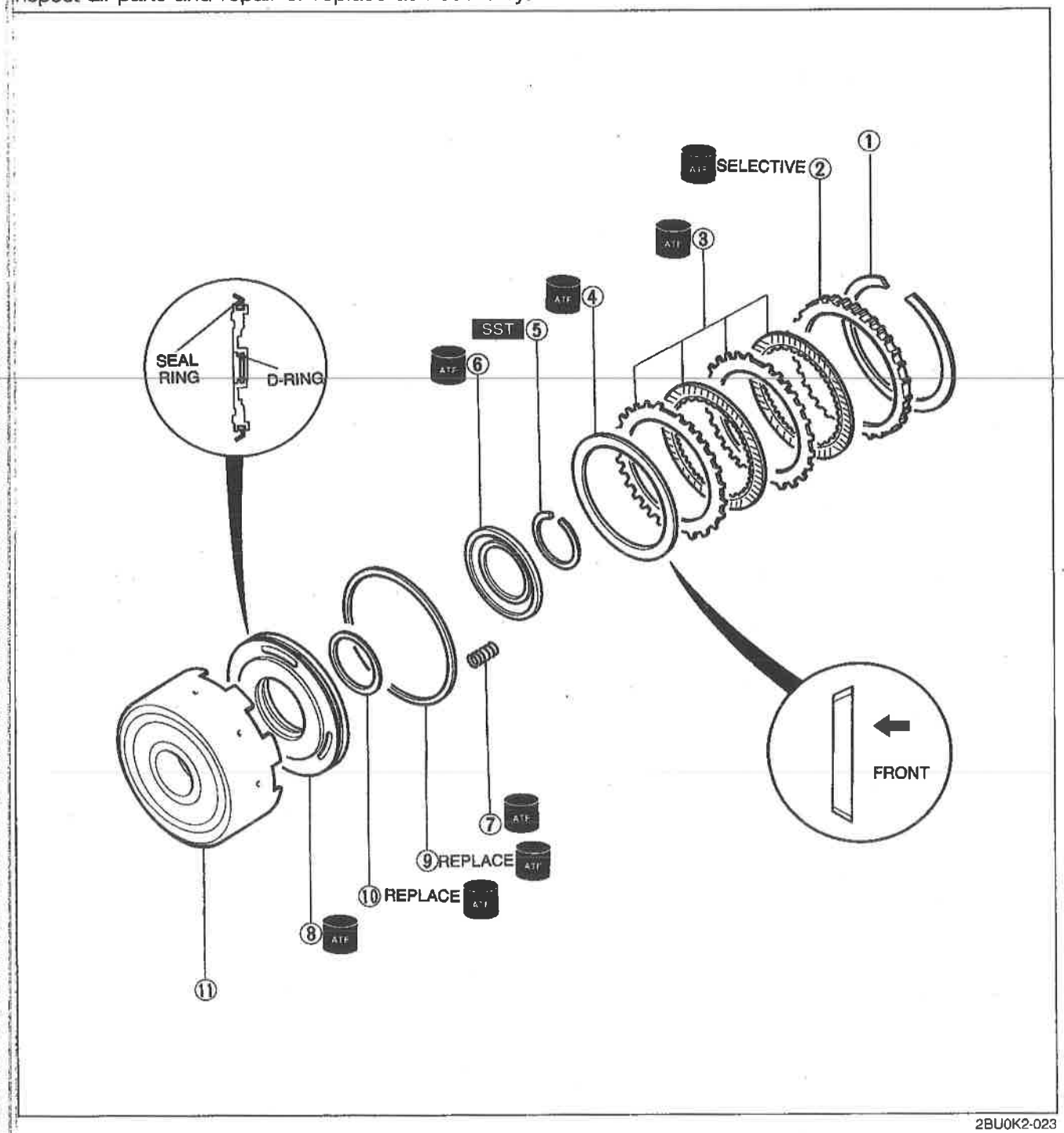
Clearance between retaining plate and snap ring
Measure the clearance between the retaining plate and the snap ring.

Standard clearance: 0.50—1.20mm (0.020—0.047 In)

Select the correct retaining plate when assembling.

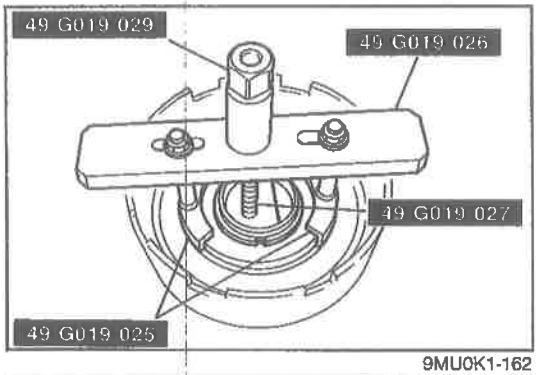
Disassembly and Inspection

Disassemble in the order shown in the figure, referring to **Disassembly Note**.
Inspect all parts and repair or replace as necessary.

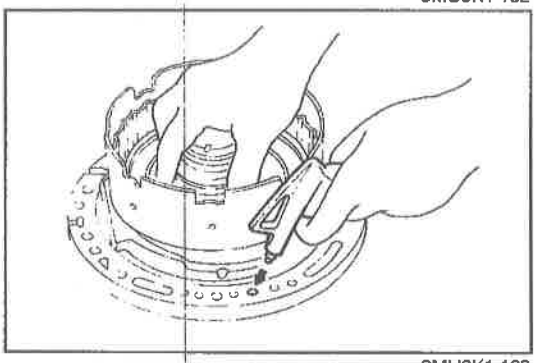


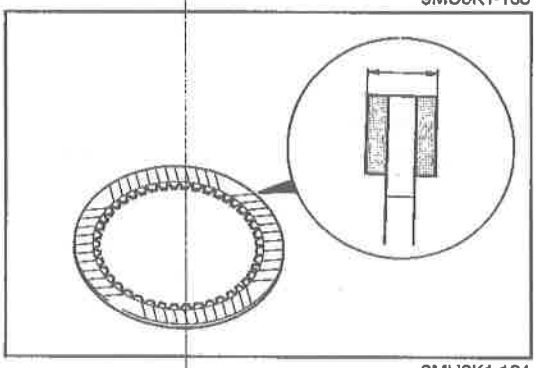
2BU0K2-023

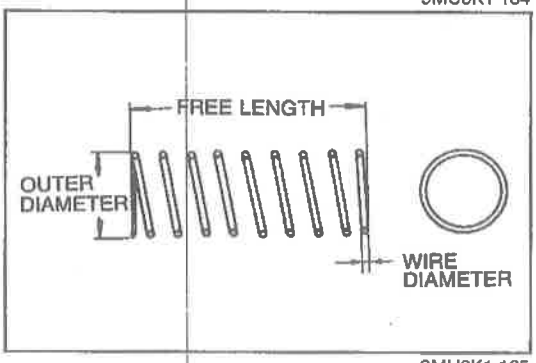
1. Snap ring
2. Retaining plate
3. Drive plates and driven plates
   Inspect for wear or burning
   Inspection ..... page K2–67
4. Dished plate
5. Snap ring
   Disassembly Note ..... page K2–67
6. Spring retainer
7. Return spring
   Inspection ..... page K2–67
8. Clutch piston
   Inspect balls for sticking by shaking piston
   Disassembly Note ..... page K2–67
   Inspection ..... page K2–67
9. Seal ring
10. D-ring
11. Reverse clutch drum



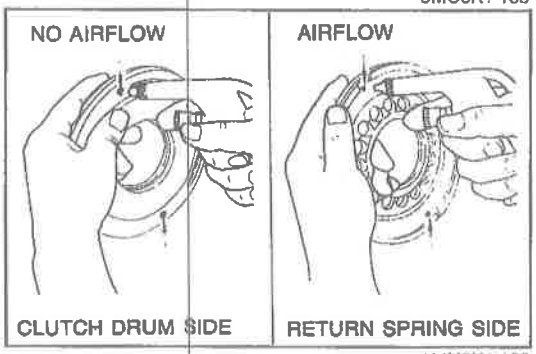
9MU0K1-162


9MU0K1-163


9MU0K1-164



9MU0K1-165



9MU0K1-166

Disassembly note
Snap ring

Caution
a) Depress the spring retainer only enough to remove the snap ring.
b) Do not damage the snap ring.

1. Compress the spring with the **SST**, then remove the snap ring with snap ring pliers.
2. Remove the spring retainer and spring.

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

Air pressure: 392 kPa (4.0 kg/cm^2, 57 psi) max.

Inspection
Drive plates
1. Measure the facing thickness in three places, and determine the average of the three readings.

Standard thickness: 2.0mm (0.079 in)
Minimum thickness: 1.8mm(0.071 in)

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

Return spring
1. Measure the spring specifications.

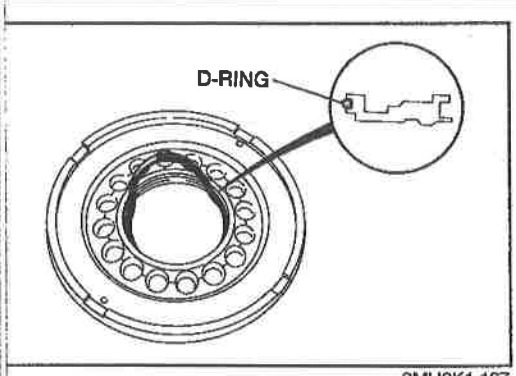
Specification

Outer dia. mm (in)	Free length mm (in)	No. of coil	Wire dia. 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. Verify that there is no air leakage when applying Compressed air through the oil hole opposite the return spring.
2. Verify that there is air flow when applying compressed air through the oil hole on the return spring side.

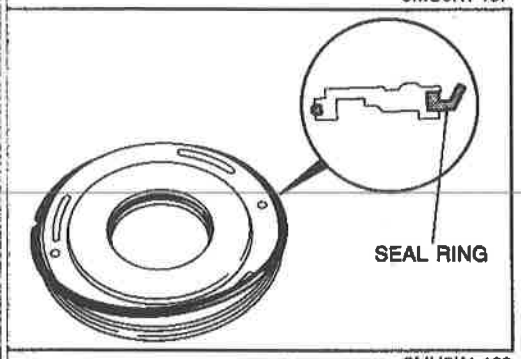
Air pressure: 392 kPa (4.0 kg/cm^2, 57 psi) max.



9MU0K1-167

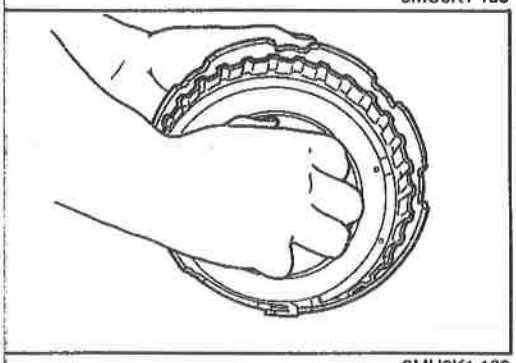
Assembly

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



9MU0K1-168

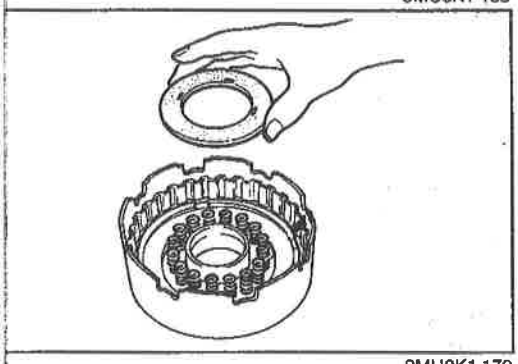
2. Apply ATF to the new seal ring and install it into the clutch piston.


9MU0K1-169

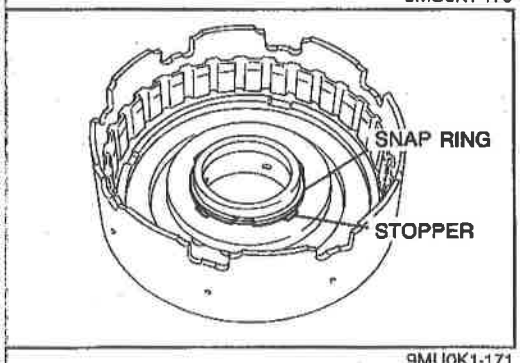
3. Apply ATF to the inner surface of the reverse clutch drum.

Caution
Apply even pressure to the perimeter of the clutch piston to avoid damaging the seal ring and D-ring when installing.

4. Install the clutch piston in the reverse clutch drum by turning it evenly and gradually.

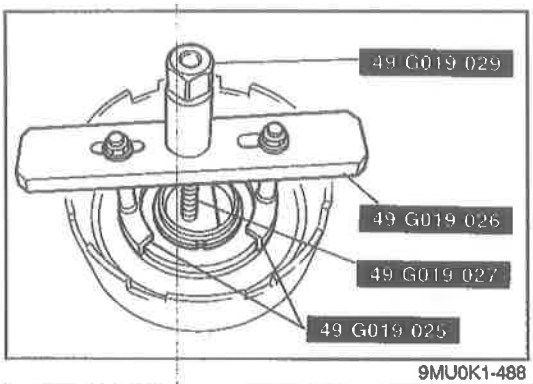

9MU0K1-170

5. Install the return springs and spring retainer.



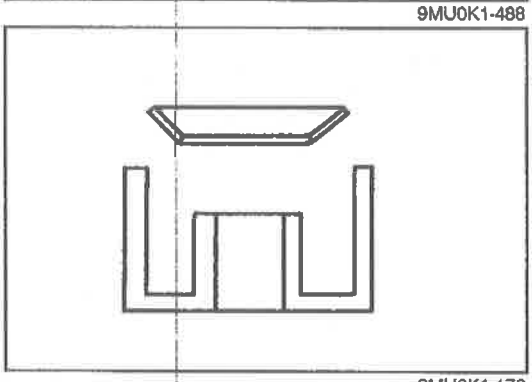
9MU0K1-171

Caution
a) Depress the spring retainer only enough to install the snap ring.
b) Do not overexpand the snap ring when installing.
c) Do not align the snap ring end-gap with the spring retainer.

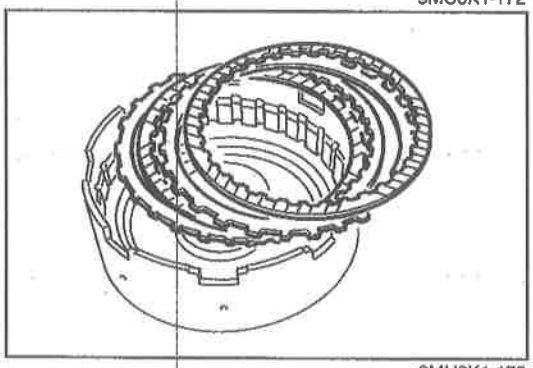


9MU0K1-488

6. Install the snap ring while compressing the springs with the **SST**.

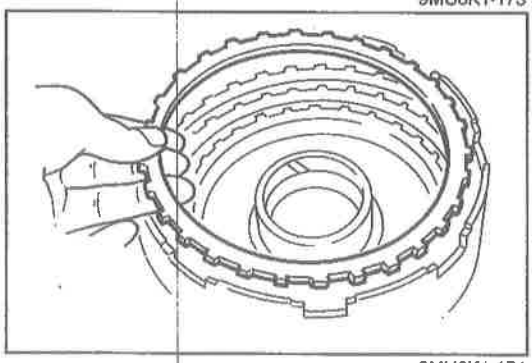

9MU0K1-172

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


9MU0K1-173

Note
Installation order: Driven-Drive-Driven-Drive

8. Apply ATF to the drive plates and driven plates, and install them into the reverse clutch drum.


9MU0K1-174

9. Install the retaining plate.

Caution
Do not deform the snap ring.

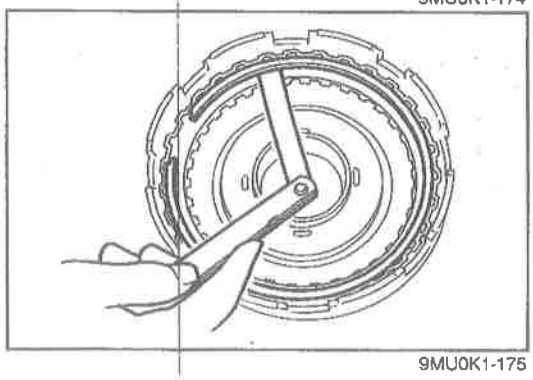
10. Install the snap ring.
11. Measure the clearance between the retaining plate and snap ring with a feeler gauge. If not within specification, adjust the clearance by installing the correct retaining plate.

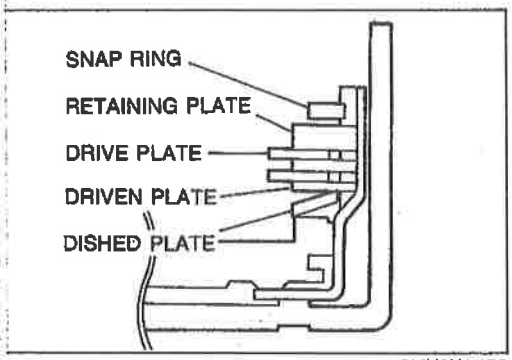
Standard clearance:
0.50—1.20mm (0.020—0.047 in)

Retaining plate sizes

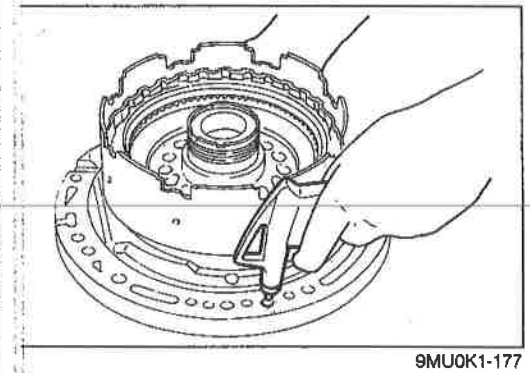
mm (in)

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)	


9MU0K1-175



9MU0K1-176



9MU0K1-177

12. 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 installing the correct retaining plate.

Standard Clearance: 0.50—0.80mm (0.020—0.031 in)

Retaining plate sizes

mm (in)

4.6 (0.185)	4.8 (0.189)	5.0 (0.197)	5.2 (0.205)
5.4 (0.213)	5.6 (0.220)	5.8 (0.228)	

Caution
Apply air for no more than 3 seconds.

13. Install the reverse clutch on to the oil pump along with the seal rings. Apply compressed air to the oil passage and check the clutch operation.

Air pressure: 392 kPa (4.0 kg/cm^2, 57 psi) max.

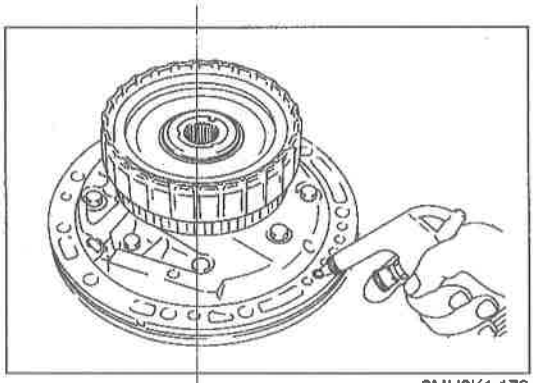
HIGH CLUTCH AND FRONT SUN GEAR

Preparation

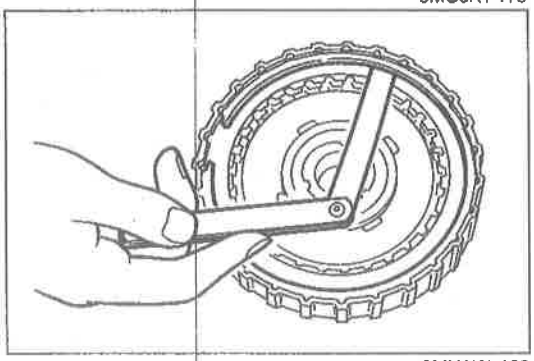
SST

49 G019 0A7A Compressor set, return spring	49 G019 025 Body B (Part of 49 G019 0A7A)	49 G019 026 Plate (Part of 49 G019 0A7A)
49 G019 027 Attachment A (Part of 49 G019 0A7A)	49 G019 029 Nut (Part of 49 G019 0A7A)	

2BU0K2-024



9MU0K1-179



9MU0K1-180

Preinspection

High clutch operation

1. Install the high clutch onto the oil pump along with the seal rings. Apply compressed air to the oil passage as shown.

   Air pressure: 392 kPa (4.0 kg/cm^2, 57 psi) max.

2. Verify that the retaining plate moves toward the snap ring. If not, the D-ring may be damaged or fluid may be leaking at the piston check ball.
   Inspect them and replace when assembling.

Clearance between retaining plate and snap ring

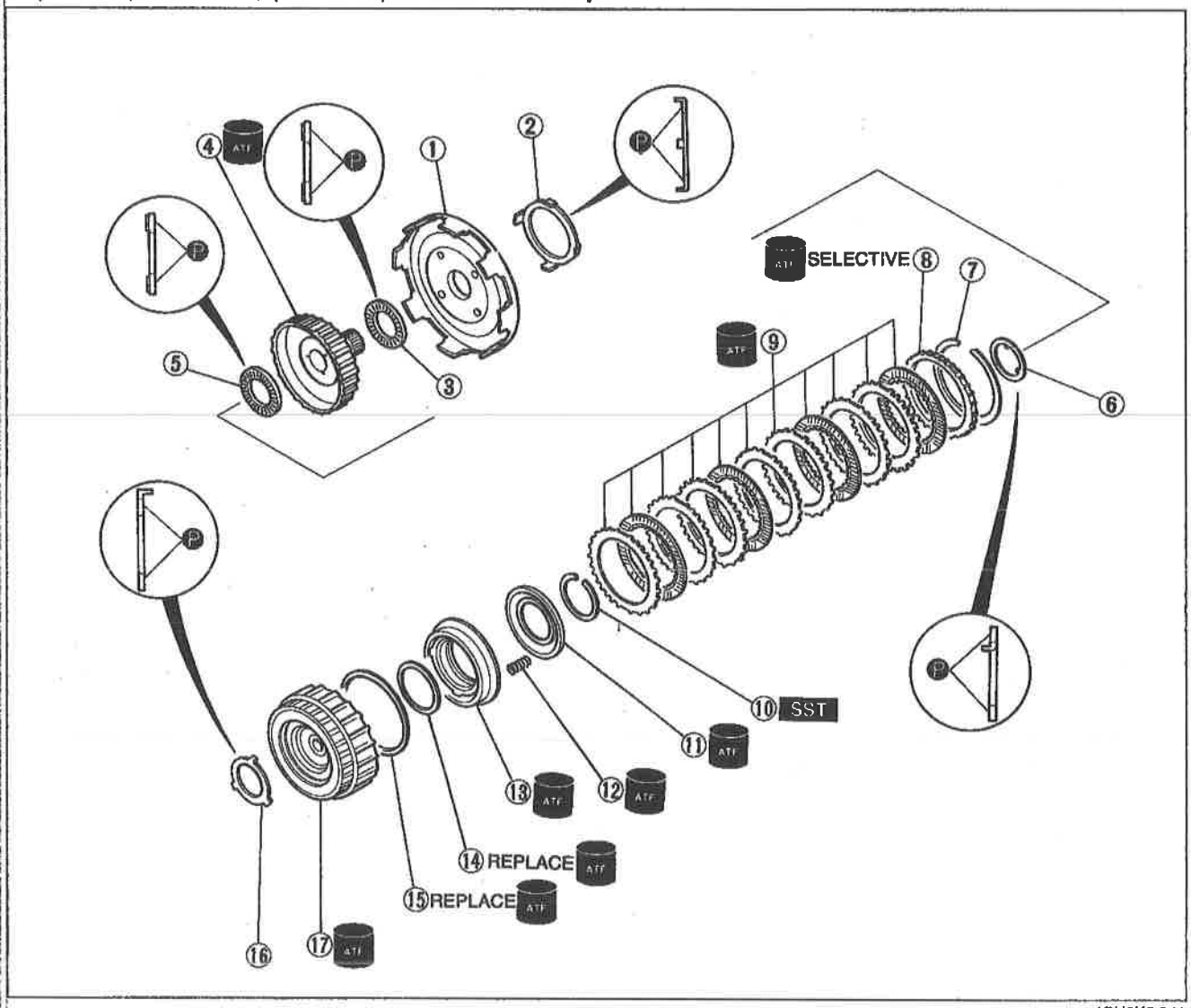
Measure the clearance between the retaining plate and the snap ring.

Standard clearance: 1.8—3.0mm (0.071—0.118 in)

Select and install the correct retaining plate when assembling.

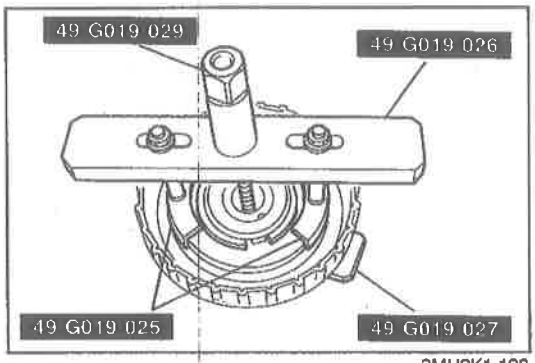
Disassembly and Inspection

Disassemble in the order shown in the figure, referring to **Disassembly Note**.
Inspect all parts, and repair or replace as necessary.

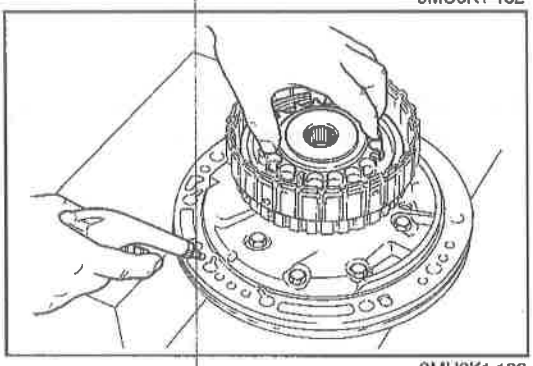


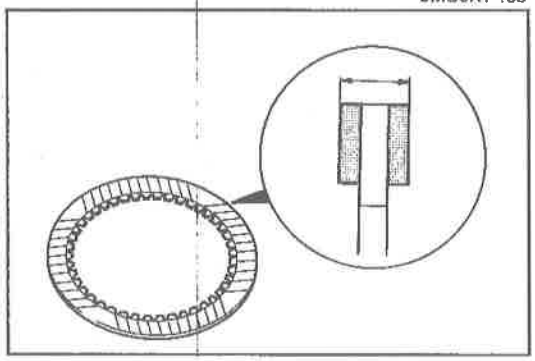
1BU0K2-041

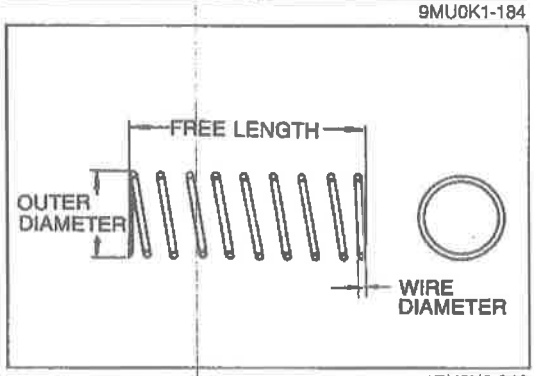
1. Front sun gear
   Inspect individual gear teeth for damage, wear, or cracks
2. Bearing race
   Inspect bearing surface for scoring or scratches
3. Bearing
   Inspect for damage or rough rotation
4. High clutch hub
5. Bearing
   Inspect for damage or rough rotation
6. Bearing race
   Inspect bearing surface for scoring or scratches
7. Snap ring
8. Retaining plate
9. Drive plates and driven plates
   Inspect for wear or burning
   Inspection ..... page K2–73
10. Snap ring
    Inspect for fracture or wear
    Disassembly Note ..... page K2–73
11. Spring retainer
    Inspect for deformation or wear
12. Return spring
    Inspection ..... page K2–73
13. Clutch piston
    Inspect balls for sticking by shaking the piston
    Disassembly Note ..... page K2–73
    Inspection ..... page K2–73
14. D-ring
15. D-ring
16. Bearing race
    Inspect bearing surface for scoring or scratches
17. High clutch drum



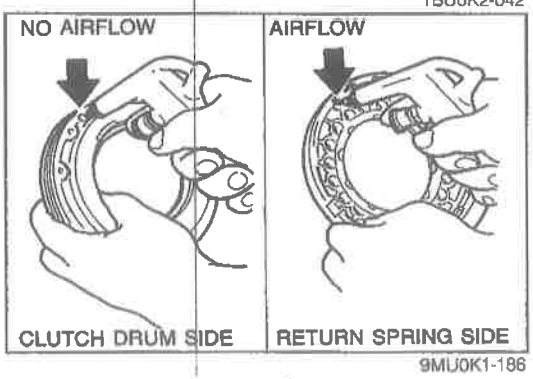
9MU0K1-182


9MU0K1-183


9MU0K1-184



1BU0K2-042



9MU0K1-186

Disassembly note
Snap ring

Caution
a) Depress the spring retainer only enough to remove the snap ring.
b) Do not damage the snap ring.

1. Compress the spring with the **SST**, then remove the snap ring with snap ring pliers.
2. Remove the spring retainer and spring.

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

Air pressure: 392 kPa (4.0 kg/cm^2, 57 psi) max.

Inspection
Drive plates
1. Measure the facing thickness in three places, and determine the average of the three reading.

Standard thickness: 1.6mm (0.063 in)
Minimum thickness: 1.4mm (0.055 in)

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

Return spring
1. Check the spring specifications.

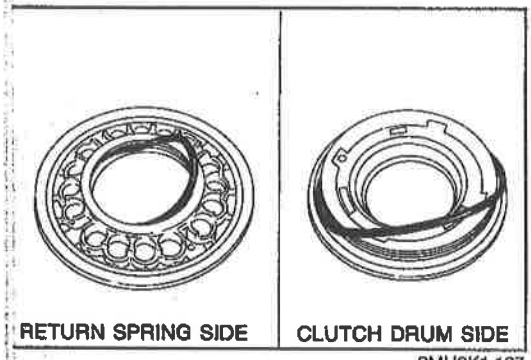
Specifications

Outer dia. mm (in)	Free length mm (in)	No. of coils	Wire dia. mm (in)
11.6 (0.457)	22.1 (0.870)	6.0	1.3 (0.051)

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

Clutch piston
1. Verify that there is no air leakage when applying compressed air through the oil hole opposite the return spring.
2. Verify that there is air flow when applying compressed air through the oil hole on the return spring side.

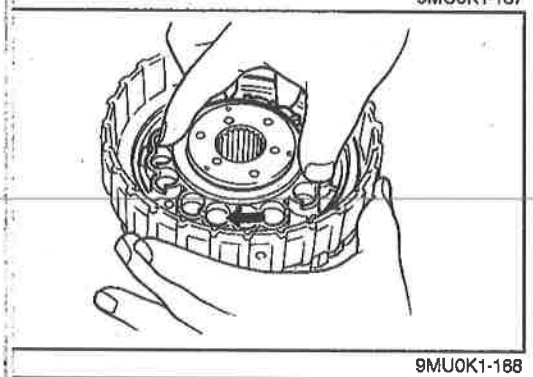
Air pressure: 392 kPa (4.0 kg/cm^2, 57 psi) max.



9MU0K1-187

Assembly
High clutch

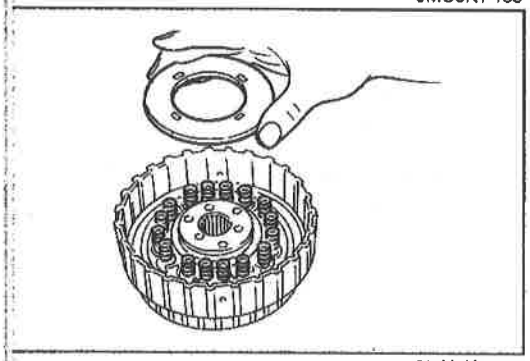
1. Apply ATF to the new D-rings and install them into the clutch piston.


9MU0K1-188

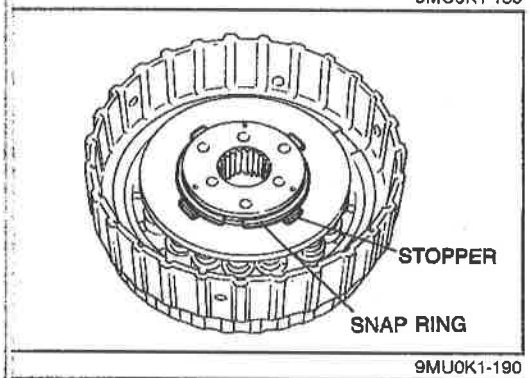
2. Apply ATF to the inner surface of the high clutch drum.

Caution
Apply even pressure to the perimeter of the clutch piston to avoid damaging the D-rings when installing.

3. Install the clutch piston in the high clutch drum by turning it evenly and gradually.

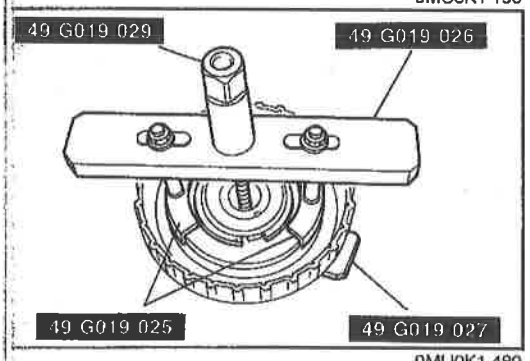

9MU0K1-189

4. Install the return springs and spring retainer.



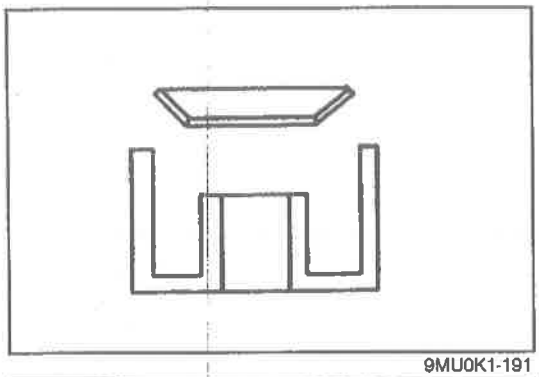
9MU0K1-190

Caution
a) Depress the spring retainer only enough to install the snap ring.
b) Do not over expand the snap ring when installing.
c) Do not align the snap ring end-gap with the spring retainer stop.



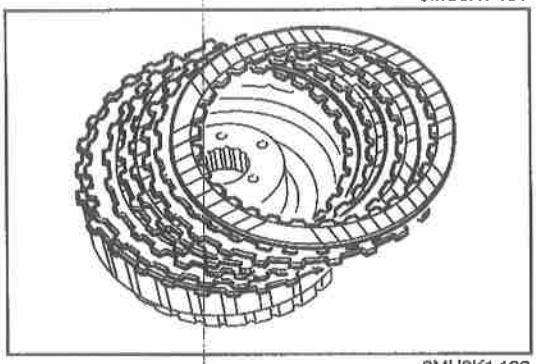
9MU0K1-489

5. Install the snap ring while compressing the springs with the **SST**.



9MU0K1-191

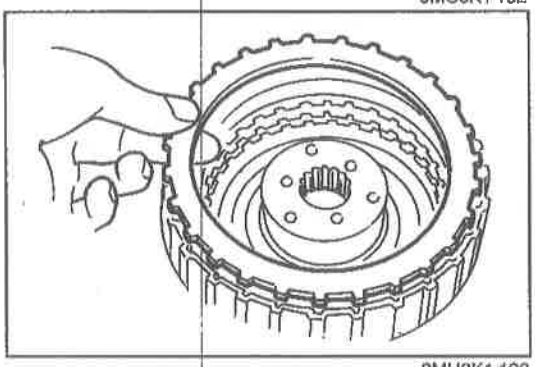
6. Install the dished plate as shown in the figure.



9MU0K1-192

Note
Installation order:
Driven-Drive-Driven-Driven-Drive-Driven-Driven-Drive-Driven-Driven-Drive

7. Apply ATF to the drive plates and driven plates, and install them into the high clutch drum.

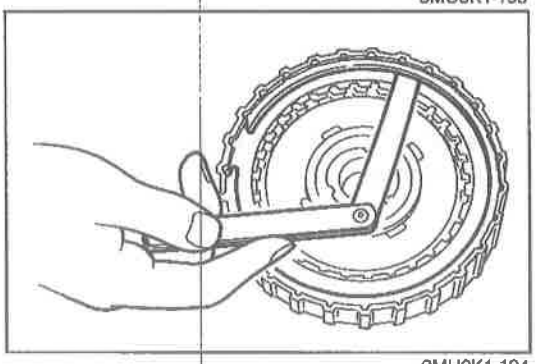


9MU0K1-193

8. Install the retaining plate.

Caution
Do not deform the snap ring.

9. Install the snap ring.



9MU0K1-194

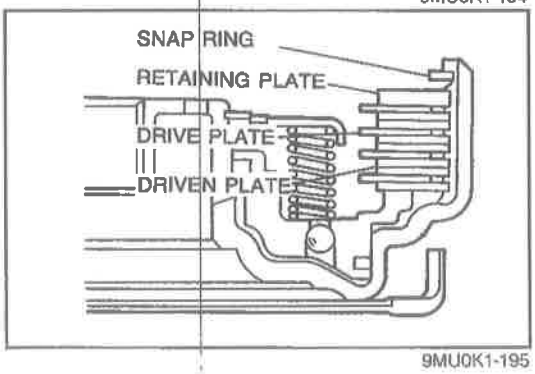
10. Measure the clearance between the retaining plate and the snap ring with a feeler gauge. If not within specification adjust the clearance by installing the correct retaining plate.

Standard clearance: 1.8—3.0mm (0.071—0.118 in)

Retaining plate sizes

mm (in)

3.0 (0.118)	3.2 (0.126)	3.4 (0.134)	3.6 (0.142)
3.8 (0.150)	4.0 (0.157)	4.2 (0.165)	4.4 (0.173)



9MU0K1-195

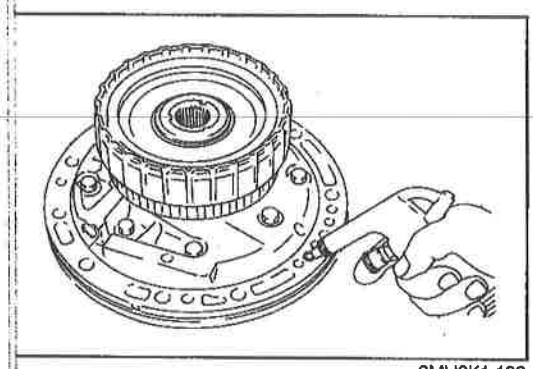
11. If the clearance cannot be brought to within specification after installation of the thickest retaining plate, replace the dished plate, driven plates and drive plates.
Adjust the clearance by installing the correct retaining plate.

Standard clearance: 1.8—2.2mm (0.071—0.087 in)

Retaining plate sizes

mm (in)

3.0 (0.118)	3.2 (0.126)	3.4 (0.134)	3.6 (0.142)
3.8 (0.150)	4.0 (0.157)	4.2 (0.165)	4.4 (0.173)

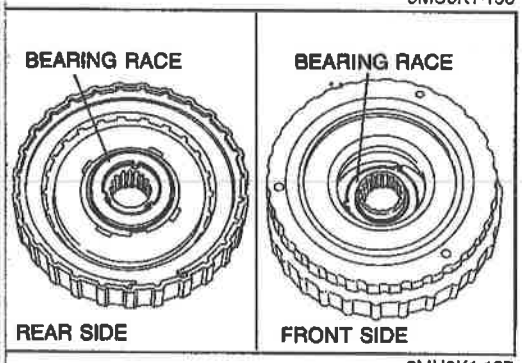


9MU0K1-196

Caution
Apply air for no more than 3 seconds.

12. Install the high clutch onto the oil pump along with the seal rings. Apply compressed air to the oil passage and check the clutch operation.

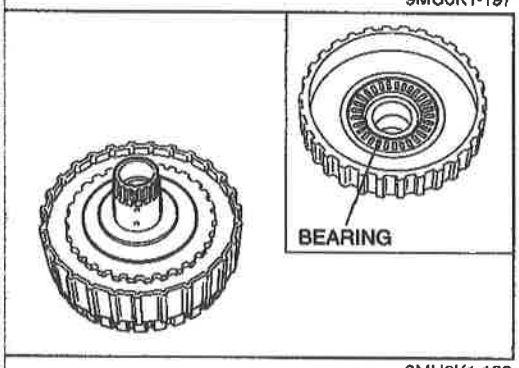
    Air pressure: 392 kPa (4.0 kg/cm^2, 57 psi) max.



9MU0K1-197

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

    Bearing race outer diameter
    Front side: 43.5mm (1.713 in)
    Rear side : 51.5mm (2.028 in)

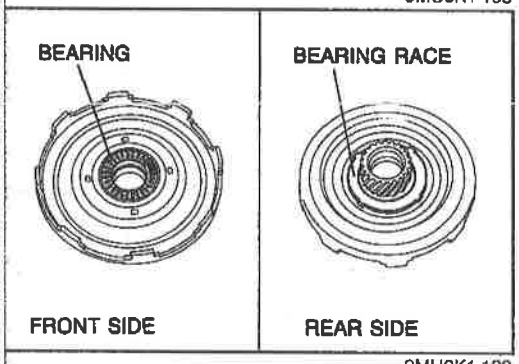


9MU0K1-198

14. Apply petroleum jelly to the bearing and install it in the high clutch hub.

    Bearing outer diameter: 53.0mm (2.087 in)

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

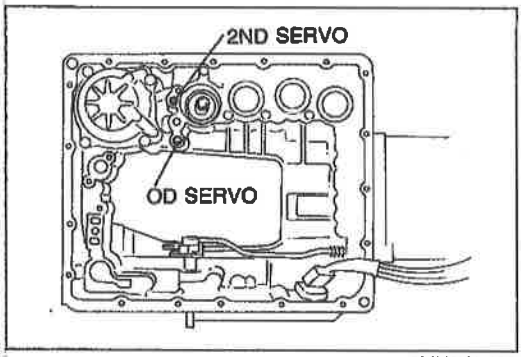


9MU0K1-199

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

Bearing outer diameter : 53.0mm (2.087 in)
Bearing race outer diameter: 75.0mm (2.953 in)

MEMO



9MU0K1-490

BAND SERVO
Preinspection
Band servo

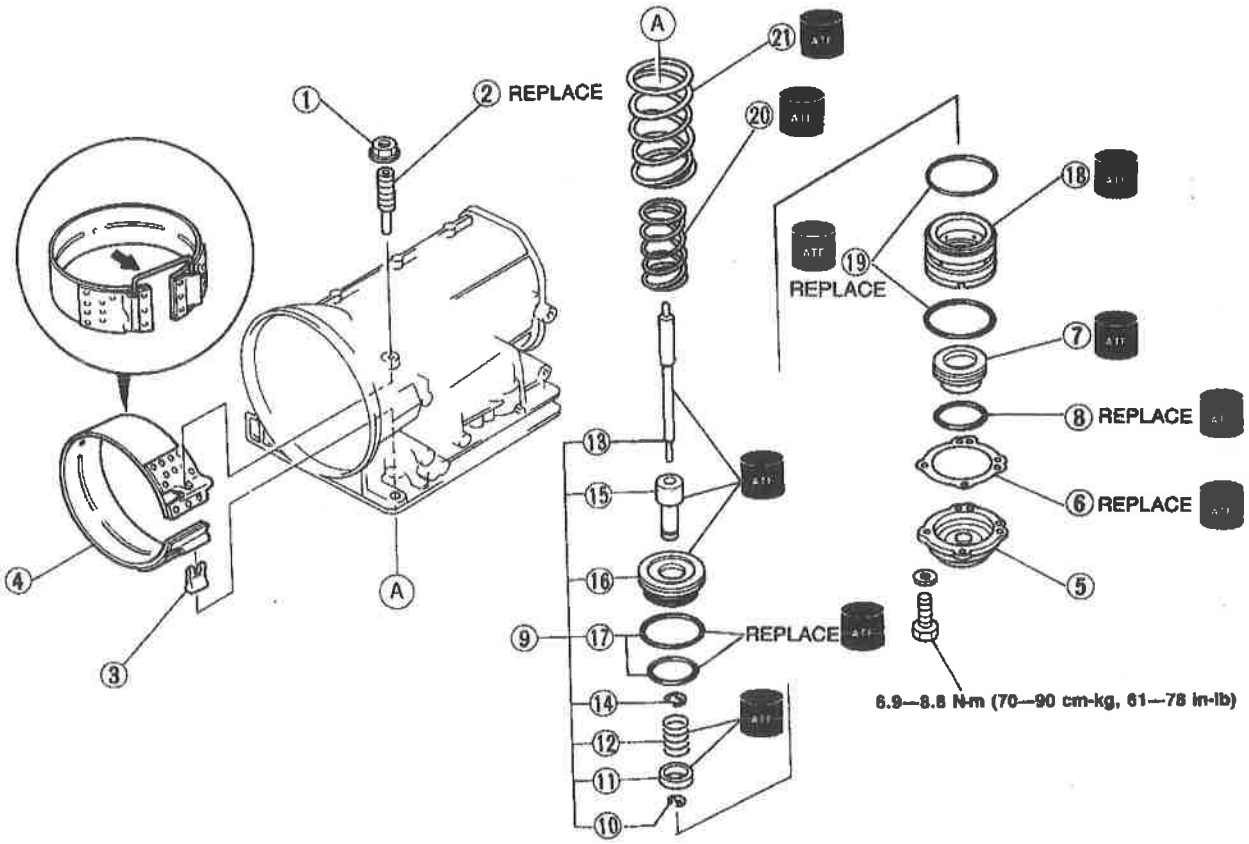
1. Apply compressed air to the oil passage as shown.

   Air pressure: 392 kPa (4.0 kg/cm^2, 57 psi) max.

2. Verify that the piston stem moves to the brake band.
   If not the D-ring or the oil seal may be damaged or fluid mat be sticking at the piston assembly.
   Inspect them, and replace when assembling.

Disassembly and Inspection

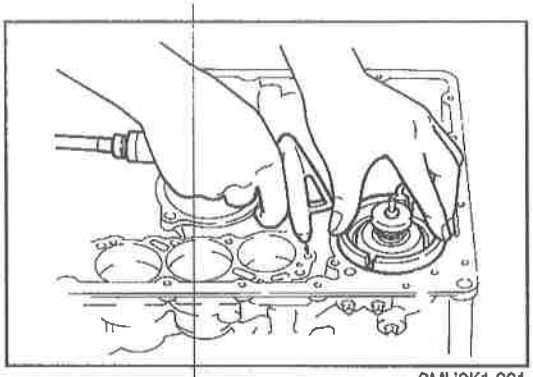
Disassemble in the order shown in the figure, referring to **Disassembly Note**.
Inspect all parts, and repair or replace as necessary.



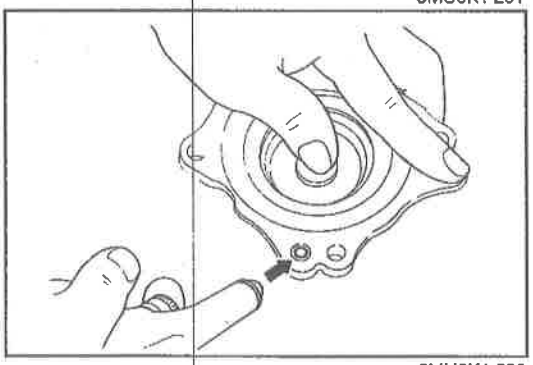
9MU0K1-491

1. Locknut
2. Anchor end bolt
3. Band strut
4. Brake band
5. Band servo retainer
6. Gasket
7. OD band servo piston
   Disassembly Note
   ..... page K2–79
8. D-ring
9. Piston assembly and servo piston retainer
10. Retaining ring (small)
11. Spring retainer
12. Return spring C
    Inspection ..... page K2–79
13. Piston stem
14. Retaining ring (large)
15. Servo cushion retainer
16. Band servo piston
17. D-ring
18. Servo piston retainer
    Disassembly Note
    ..... page K2–79
19. O-ring
20. Return spring B
    Inspection ..... page K2–79
21. Return spring A
    Inspection ..... page K2–79

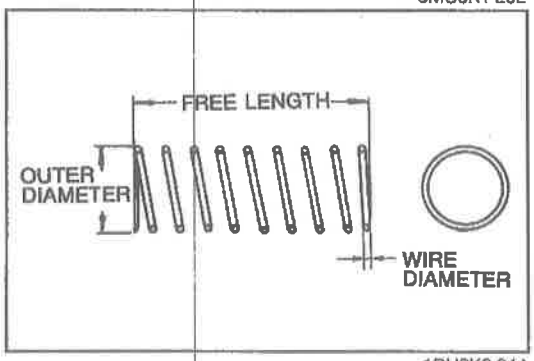
1BU0K2-043



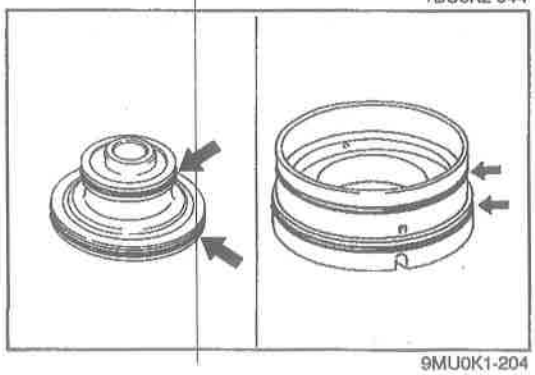
9MU0K1-201



9MU0K1-202



1BU0K2-044



9MU0K1-204

Disassembly note
Piston assembly and servo piston retainer
Apply compressed air to the oil hole in the transmission case to remove the piston assembly and servo piston retainer from the transmission case.

Air pressure: 392 kPa (4.0 kg/cm², 57 psi) max.

OD band servo piston
1. Block one oil hole OD servo piston retainer and the center hole in the OD band servo piston.
2. Apply compressed air to the other oil hole in the OD servo piston retainer to remove OD band servo piston from.
3. Remove the D-ring from the OD band servo piston.

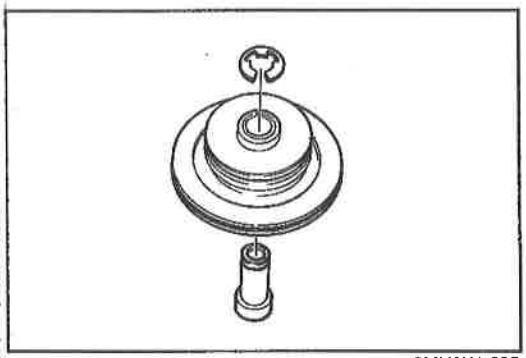
Inspection
Return spring
1. Measure the spring specifications.

Specifications

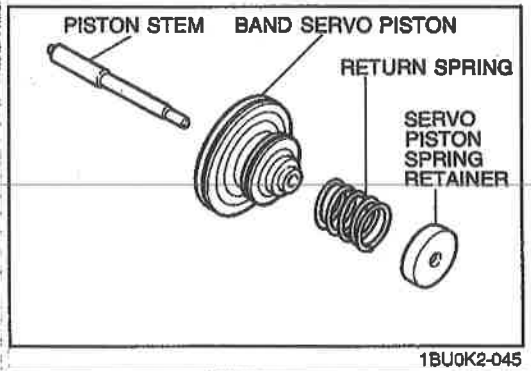
	Outer dia. mm (in)	Free length mm (in)	No. of coil	Wire dia. mm (in)
Return A	40.3 (1.587)	53.8 (2.118)	3.0	2.3 (0.091)
Return B	34.3 (1.350)	45.6 (1.795)	3.0	2.3 (0.091)
Return C	27.6 (1.087)	29.7 (1.169)	3.2	2.6 (0.102)

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

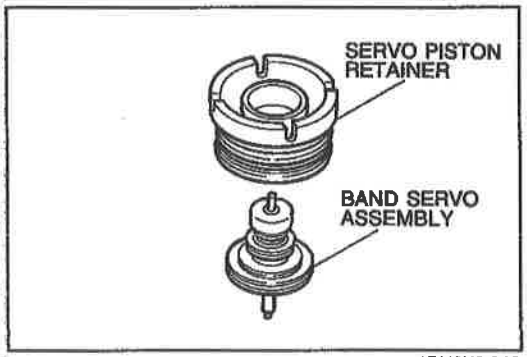
Assembly
1. Apply ATF to the new O-rings and install them onto the servo piston retainer.
2. Apply ATF to the new D-rings and install them onto the band servo piston.



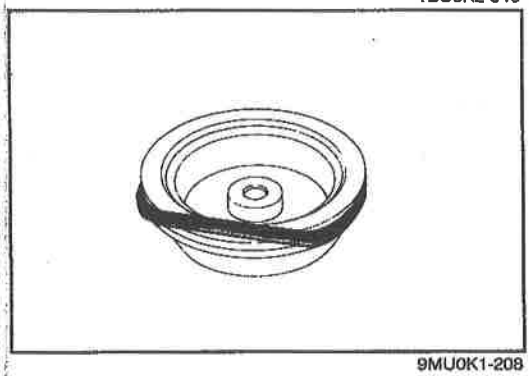
9MU0K1-205



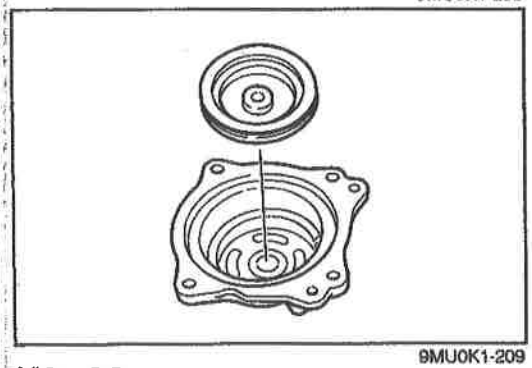
1BU0K2-045



1BU0K2-046



9MU0K1-208



9MU0K1-209

Caution
Do not deform the retaining ring.

3. Apply ATF to the servo cushion spring retainer, and retaining ring, and assemble them in the band servo piston.

4. Apply ATF to the piston stem return spring, and spring retainer, and assemble them in the band servo piston.

Caution
Do not deform the retaining ring.

5. Install the retaining ring.

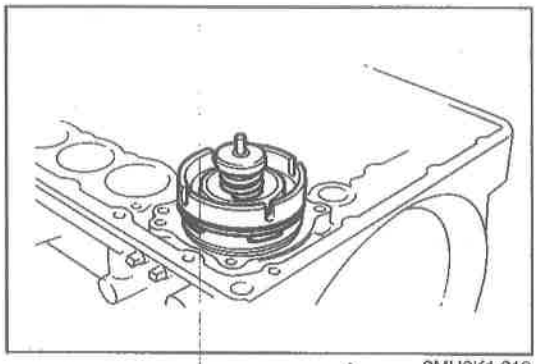
Caution
Apply even pressure to the perimeter of the piston to avoid damaging the O-rings and D-rings when installing.

6. Apply ATF to the band servo piston, and install it onto the servo piston retainer.

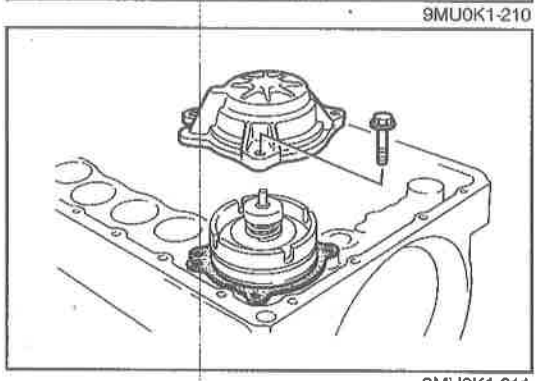
7. Apply ATF to the new D-ring, and install it onto the OD band servo piston.

Caution
Apply even pressure to the perimeter of the piston to avoid damaging the D-ring when installing.

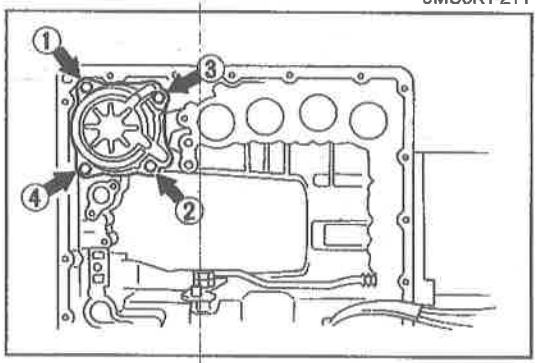
8. Apply ATF to the OD band servo piston, and install it into the band servo retainer.



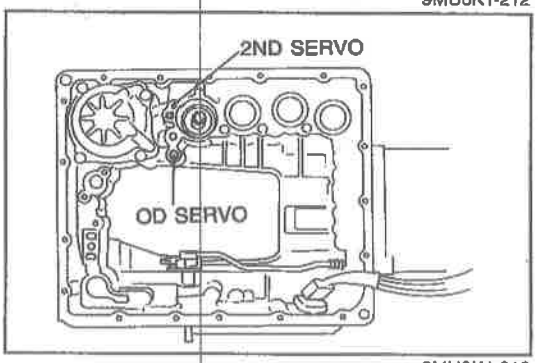
9MU0K1-210



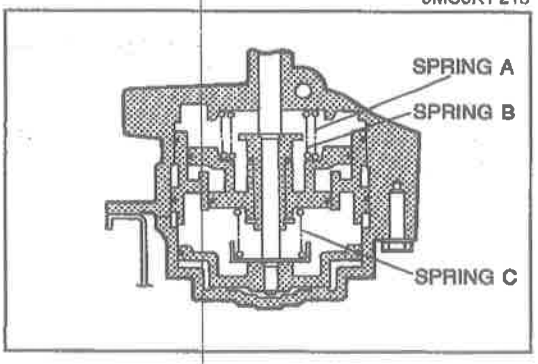
9MU0K1-211



9MU0K1-212



9MU0K1-213



9. Install return springs A and B.

Caution
Apply even pressure to the perimeter of the body to avoid damaging the O-rings when installing.

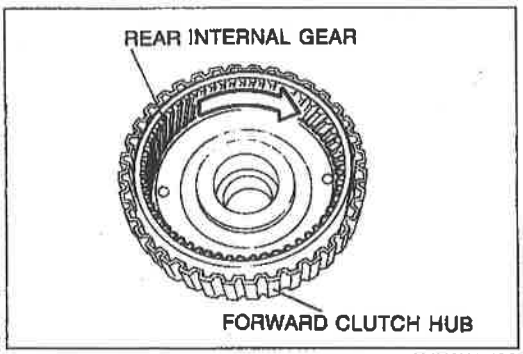
10. Apply ATF to the piston assembly, and install it into the transmission case.

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

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

Tightening torque:
6.9—8.8 N·m (70—90 cm-kg, 61—78 in-lb)

13. Check the servo piston operation by applying compressed air through the oil holes.



9MU0K1-492

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

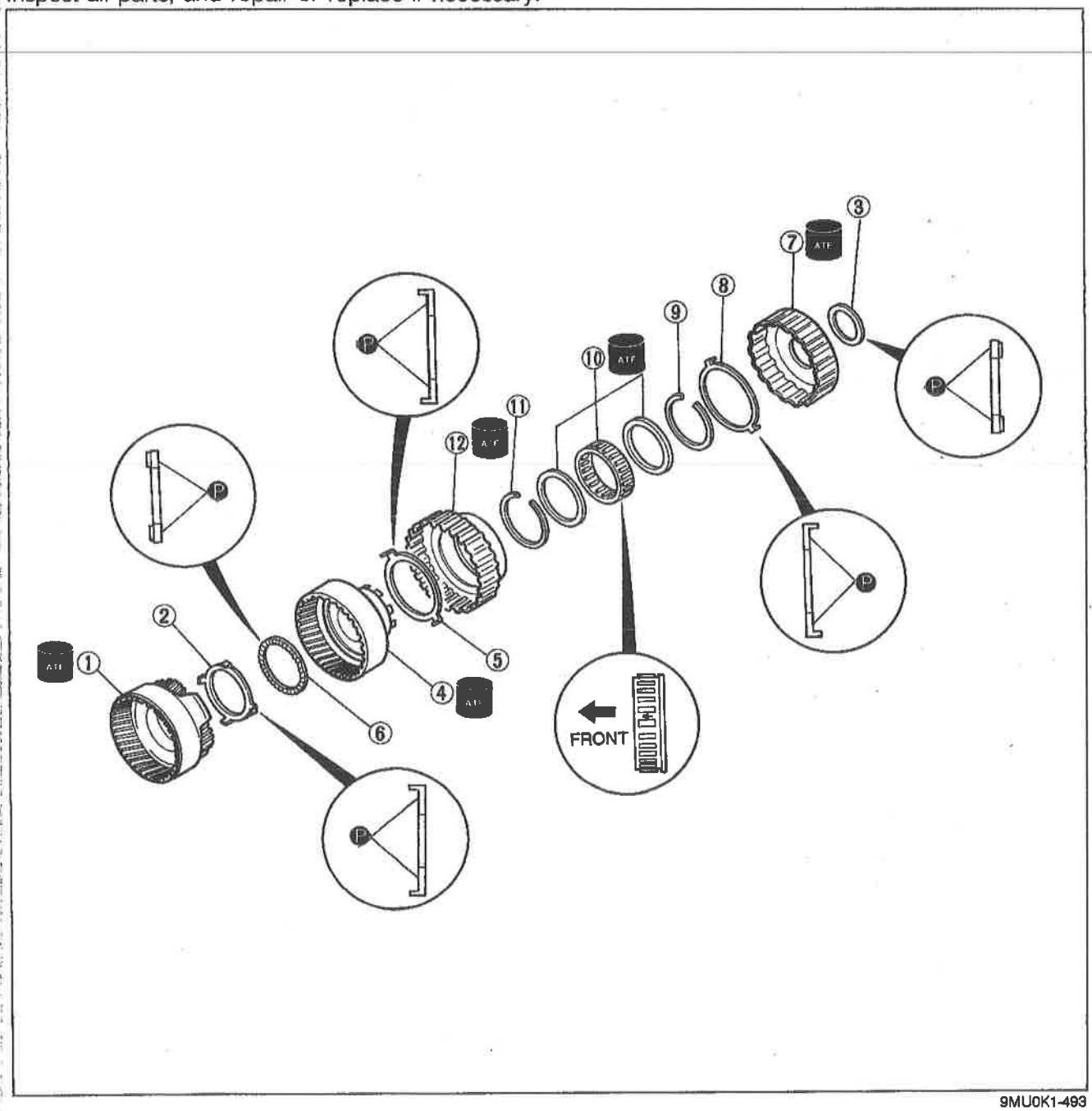
Preinspection

Forward one-way clutch operation

While holding the forward clutch hub, check that the rear internal gear rotate smoothly when turned clockwise and lock when turned counterclockwise.
If not, replace the one-way clutch.

Disassembly and Inspection

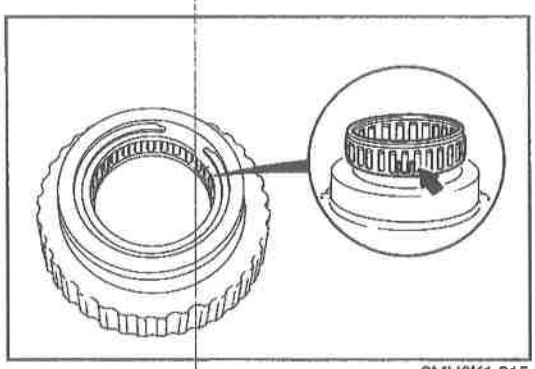
Disassemble in the order shown in the figure.
Inspect all parts, and repair or replace if necessary.



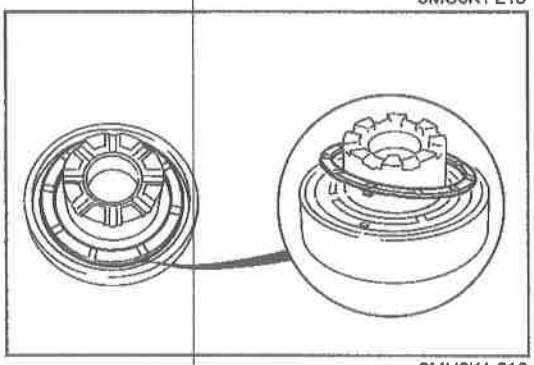
9MU0K1-493

1. Front internal gear (with rear planetary carrier)
   Inspect individual gear teeth for damage, wear, or cracks, and rotation of pinion gears
2. Bearing race
   Inspect for bearing surface scoring or scratches
3. Bearing
   Inspect for damage or rough rotation
4. Rear internal gear
   Inspect individual gear teeth for damage, wear, or cracks
5. Thrust washer
6. Bearing
   Inspect for damage or rough rotation
7. Overrunning clutch hub
8. Thrust washer
9. Snap ring
10. Forward one-way clutch
    Inspection ..... page K2–82
11. Snap ring
12. Forward clutch hub

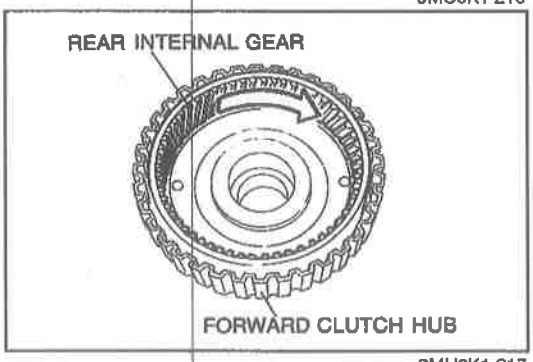
1BU0K2-047



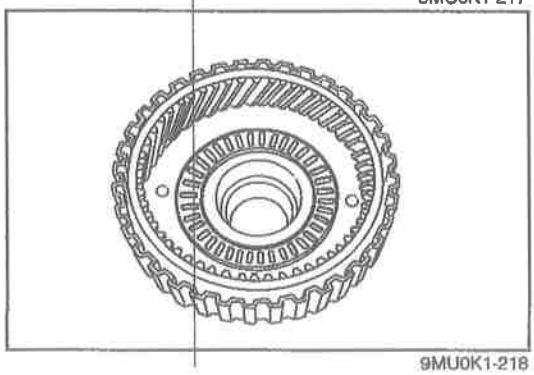
9MU0K1-215



9MU0K1-216



9MU0K1-217



9MU0K1-218

Assembly

Caution
a) Do not deform the snap ring.
b) Install the side indicated by an arrow in the figure toward the front when inserting the one-way clutch into the one-way clutch outer race.

1. Install the snap ring into the forward clutch hub.
2. Apply ATF to the forward one-way clutch. Install it in the forward clutch hub and the snap ring.

Note
Be sure the locating tabs of the thrust washer are set into the holes in the rear internal gear.

3. Apply petroleum jelly to the thrust washer and set it on the rear internal gear.

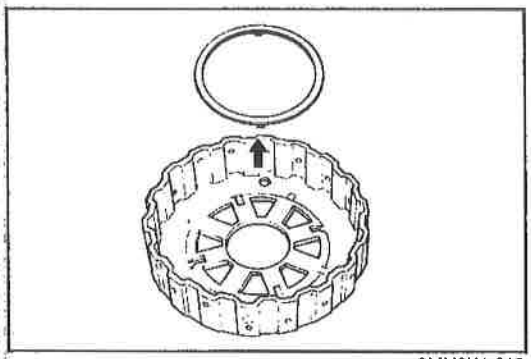
4. Apply ATF to the rear internal gear, and install it in the forward clutch hub by turning it evenly and gradually.

Note
If it turns counterclockwise, the one-way clutch is installed upside down.

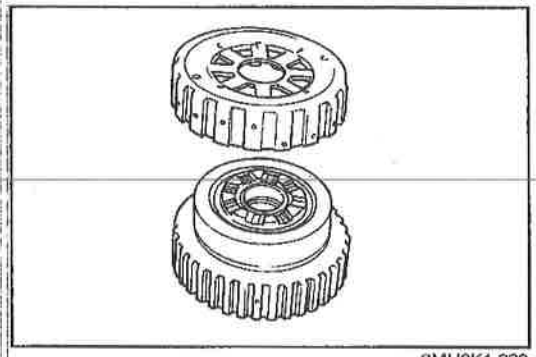
5. While holding the forward clutch hub, check the forward one-way clutch operation by turning right and left. It should turn clockwise only and locked counterclockwise.

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

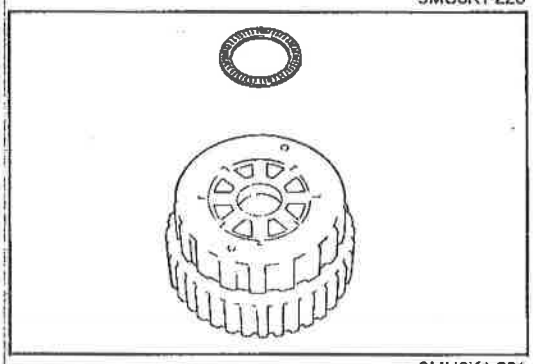
Bearing outer diameter: 78.0mm (3.071 in)



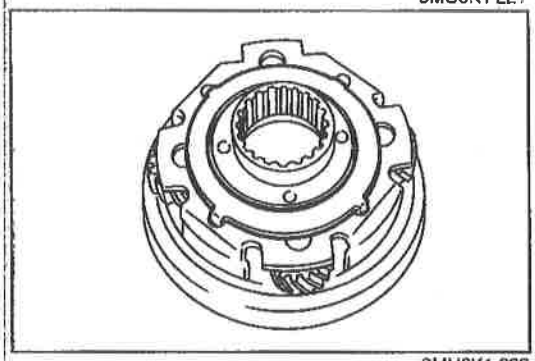
9MU0K1-219



9MU0K1-220



9MU0K1-221



9MU0K1-222

Note
Be sure the locating tabs of the thrust washer are set into the holes in the overrunning clutch hub.

7. Apply petroleum jelly to the thrust washer, and set it in 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: 59.0mm (2.322 in)

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

    Bearing race outer diameter: 75.0mm (2.953 in)

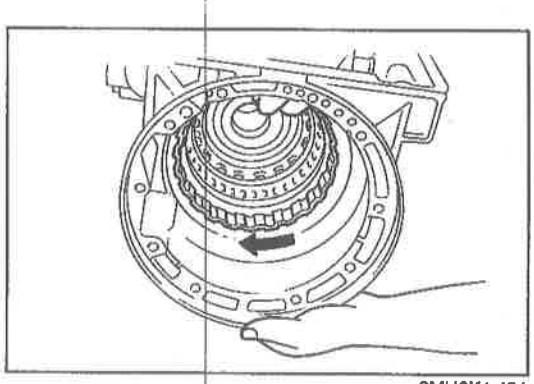
FORWARD CLUTCH DRUM (FORWARD CLUTCH, OVERRUNNING CLUTCH, LOW ONE-WAY CLUTCH)

Preparation

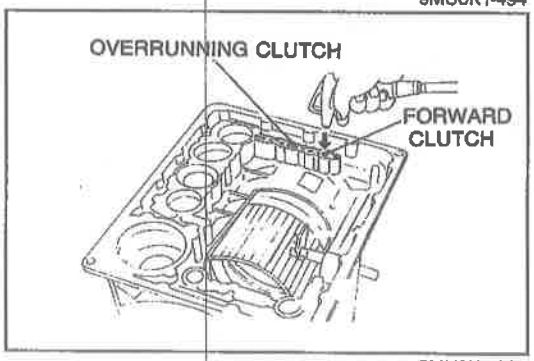
SST

49 G019 0A7A Compressor set, return spring	49 G019 025 Body B (Part of 49 G019 0A7A)	49 G019 026 Plate (Part of 49 G019 0A7A)
49 G019 027 Attachment A (Part of 49 G019 0A7A)	49 G019 029 Nut (Part of 49 G019 0A7A)	49 L019 001 Bolts

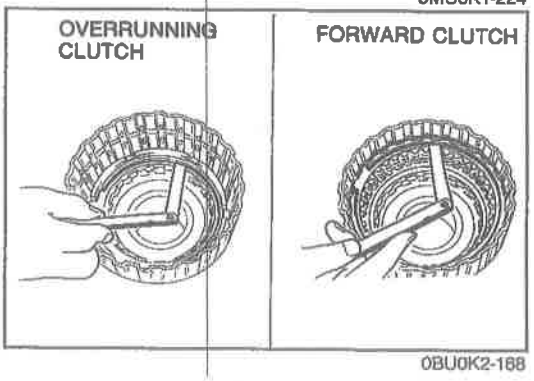
2BU0K2-025



9MU0K1-494



9MU0K1-224



0BU0K2-168

Preinspection

Low one-way clutch operation

Install the forward clutch drum into the transmission case, check that the forward clutch drum rotate smoothly when turned clockwise and lock when turned counterclockwise. 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.

   Air pressure: 392 kPa (4.0 kg/cm^2, 57 psi) max.

2. Verify that the retaining plates move toward the snap ring. If not, the D-ring or the seal ring may be damaged or fluid may be leaking at the piston check ball. Inspect the parts, and replace if necessary when assembling.

Clearance between retaining plate and snap ring

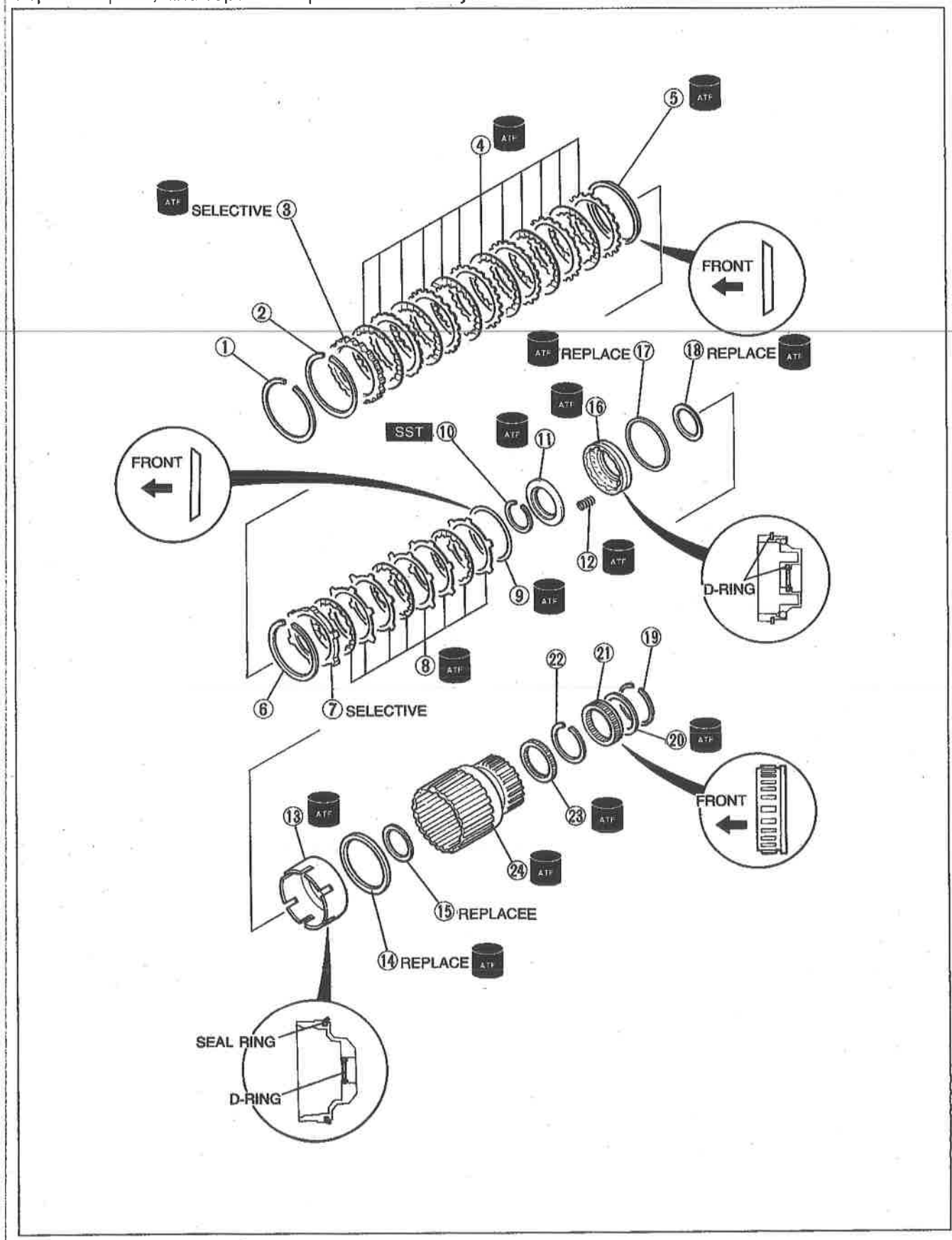
Measure the clearance between the retaining plate and the snap ring of the forward clutch and the overrunning clutch.

Standard clearance
Forward clutch : 0.45—2.05mm (0.18—0.081 in)
Overrunning clutch: 1.0—2.0mm (0.039—0.079 in)

Select the correct retaining plate when assembling if not within specification.

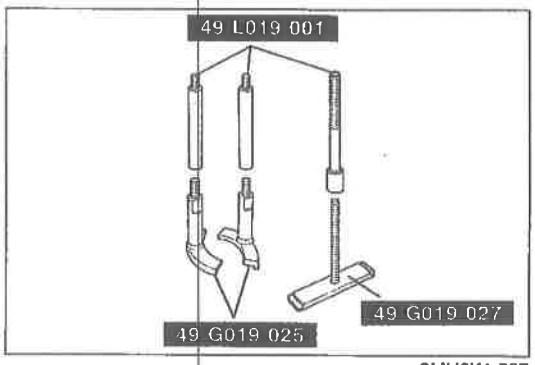
Disassembly and Inspection

Disassemble in the order shown in the figure, referring to **Disassembly Note**.
Inspect all parts, and repair or replace if necessary.

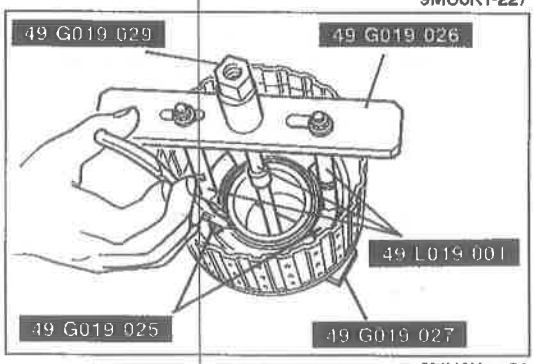


1. Snap ring
2. Snap ring
3. Retaining plate
4. Drive plates and driven plates
   Inspect for wear or burning
   Inspection ..... page K2–88
5. Dished plate
6. Snap ring
7. Retaining plate
8. Drive plates and driven plates
   Inspect for wear or burning
   Inspection ..... page K2–88
9. Dished plate
10. Snap ring
    Disassembly Note ..... page K2–87
11. Spring retainer
12. Return spring
    Inspection ..... page K2–88
13. Forward clutch piston
    Disassembly Note ..... page K2–87
14. Seal ring
15. D-ring
16. Overrunning clutch piston
    Inspect balls for sticking by shaking piston
    Disassembly Note ..... page K2–87
    Inspection ..... page K2–88
17. Seal ring
18. D-ring
19. Snap ring
20. Side plate
21. Low one-way clutch
    Inspection ..... page K2–85
22. Snap ring
23. Bearing (radial bearing)
    Inspect for damage or rough rotation
24. Forward clutch drum
    Inspection ..... page K2–88

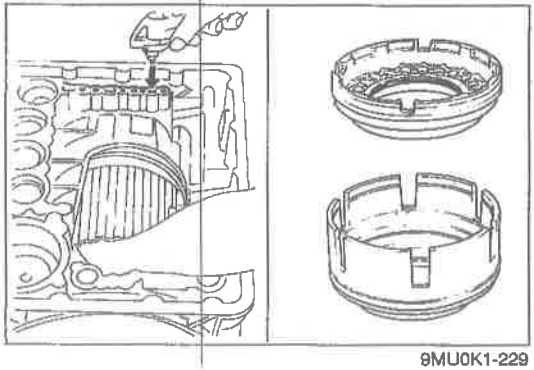
2BU0K2-026



9MU0K1-227



9MU0K1-228



9MU0K1-229

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

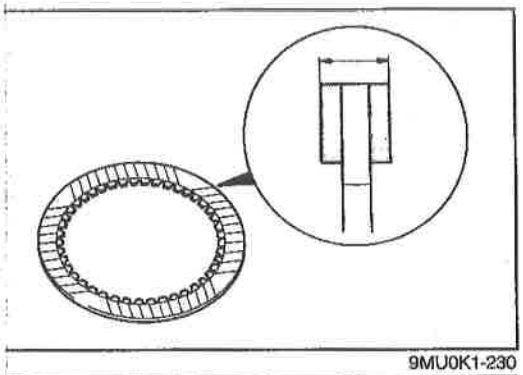
Caution
a) Depress the spring retainer only enough to remove the snap ring.
b) Do not damage the snap ring.

2. Compress the springs with the **SST**, then remove the snap ring with snap ring pliers.
3. Remove the spring retainer and springs.

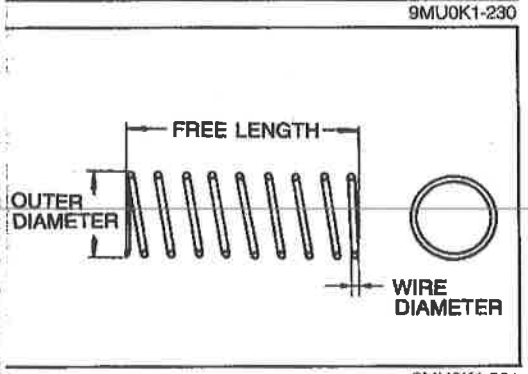
Piston
1. Set the forward clutch drum in the transmission case.
2. Remove the piston by applying compressed air through the oil passage.

   Air pressure: 392 kPa (4.0 kg/cm^2, 57 psi) max.

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



9MU0K1-230



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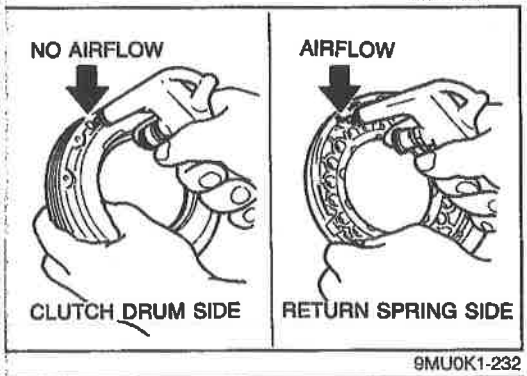

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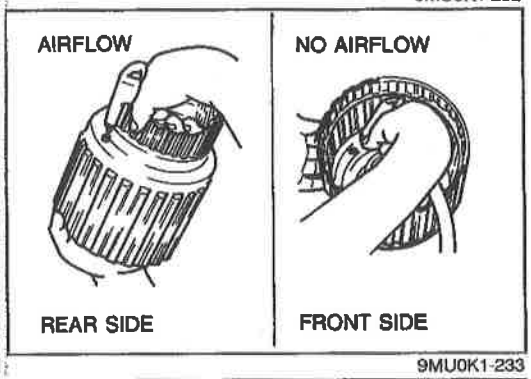
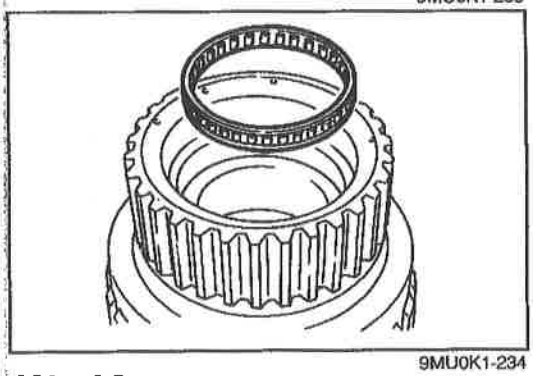


9MU0K1-233



9MU0K1-234

Inspection

Drive plates

1. Measure the facing thickness in three places, and determine the average of the three reading.

   Standard thickness: 2.0mm (0.079 in)
   Minimum thickness: 1.8mm (0.071 in)

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

Return spring

1. Measure the spring specifications.

Specifications

Outer dia. mm (in)	Free length mm (in)	No. of coils	Wire dia. mm (in)
9.7 (0.382)	35.8 (1.409)	10.3	1.3 (0.051)

2. If not within specification, replace the spring.

Clutch piston

1. Verify that there is no air leakage when applying compressed air through the oil hole opposite the return spring.
2. Verify that there is air flow when applying compressed air through the oil hole on return spring side.

   Air pressure: 392 kPa (4.0 kg/cm^2, 57 psi) max.

Forward clutch drum

1. Verify that there in no air leakage when applying compressed air through the oil hole opposite the low and reverse brake.
2. Verify that there is air flow when applying compressed air through the oil hole on the low and reverse brake side.

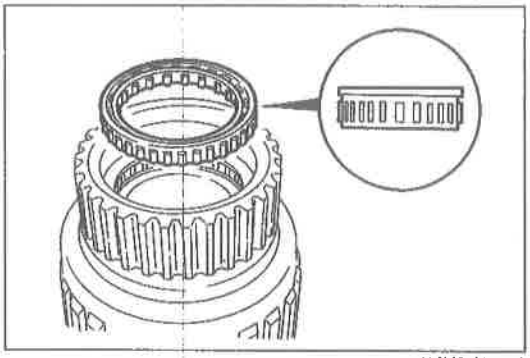
   Air pressure: 392 kPa (4.0 kg/cm^2, 57 psi) max.

Assembly

1. Apply ATF to the bearing, and install it into the forward clutch drum.

   Caution
   a) Do not scratch the forward clutch inner surface when fixing the low one-way clutch.
   b) Do not deform the snap ring.

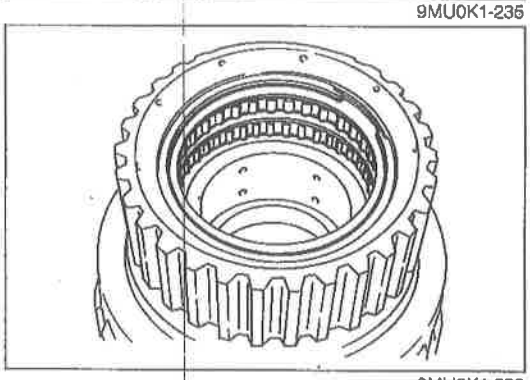
2. Install the snap ring.



9MU0K1-235

Caution
Install the low one-way clutch with the flange facing outward.

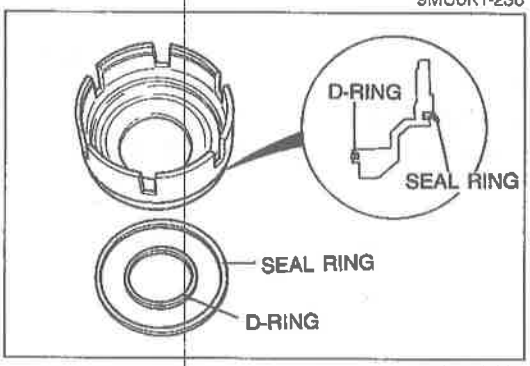
3. Apply ATF to the low one-way clutch, and install it in the forward clutch drum.



9MU0K1-236

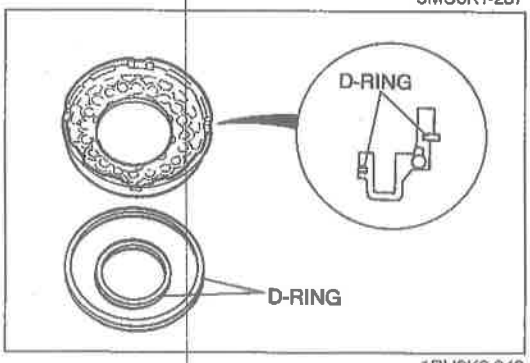
Caution
Do not deform the snap ring.

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



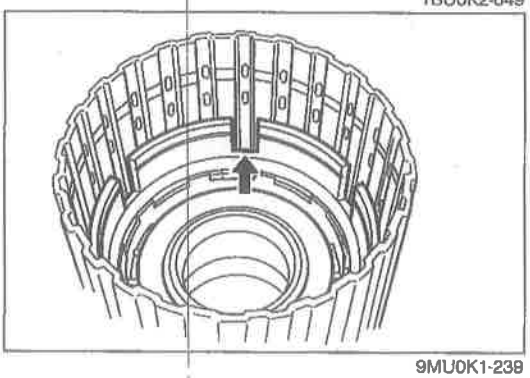
9MU0K1-237

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



1BU0K2-049

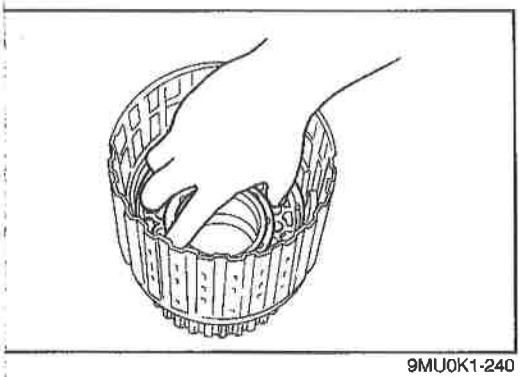
6. Apply ATF to the new D-ring and install them into the overrunning clutch piston as shown.



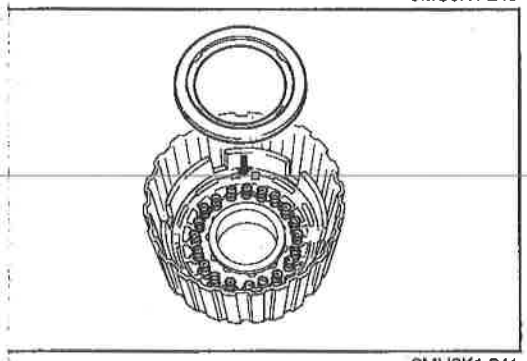
9MU0K1-239

Caution
Apply even pressure to the perimeter of the piston to avoid damaging the seal ring, and D-ring when installing.

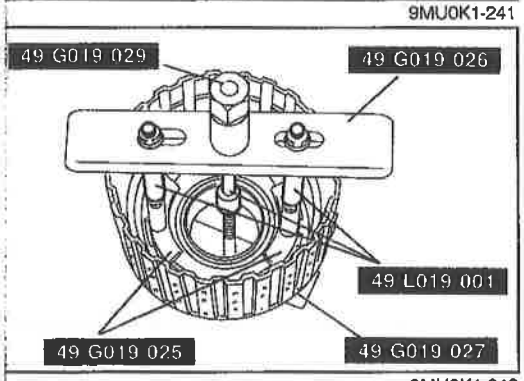
7. Apply ATF to the inner surface of the forward clutch drum and overrunning clutch piston.
8. Install the overrunning clutch piston in the forward clutch drum by turning it evenly and gradually. Align the notches in forward clutch piston with the grooves in forward clutch drum.



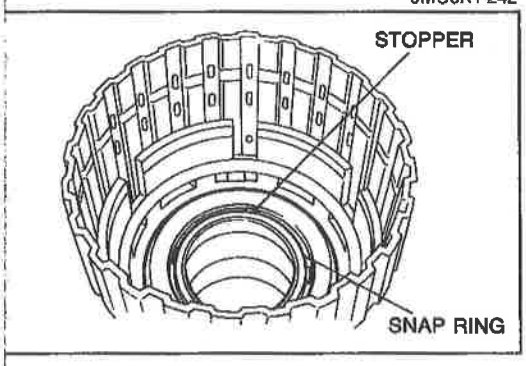
9MU0K1-240

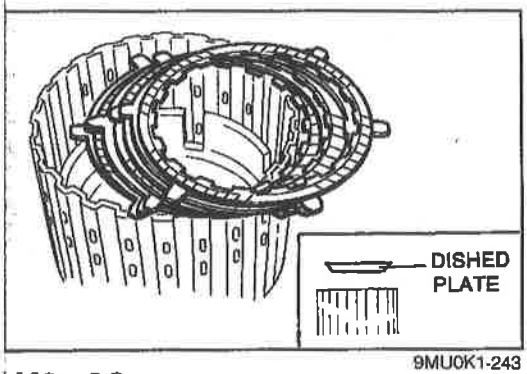


9MU0K1-241



9MU0K1-242





9MU0K1-243

Caution
Apply even pressure to the perimeter of the piston to avoid damaging the D-ring and the seal ring when installing.

9. Apply ATF to the inner surface of the forward clutch piston and overrunning clutch piston.
10. Install the overrunning clutch piston in the forward clutch piston by turning it evenly and gradually.

11. Install the springs and spring retainer.

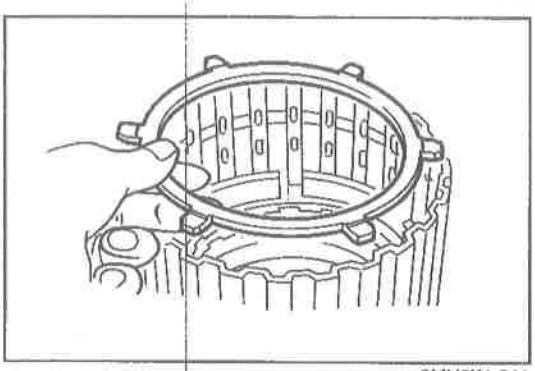
Caution
a) Depress the spring retainer only enough to install the snap ring.
b) Do not over expand the snap ring.
c) Do not align the snap ring end-gap with the spring retainer stop.

12. Install the snap ring while compressing the springs with the **SST**.

13. Install the dished plate as shown.

Note
Installation order:
Driven-Drive-Driven-Driven-Drive-Driven-Driven-Drive

14. Apply ATF to the drive plates and driven plates and install them into the forward clutch piston.

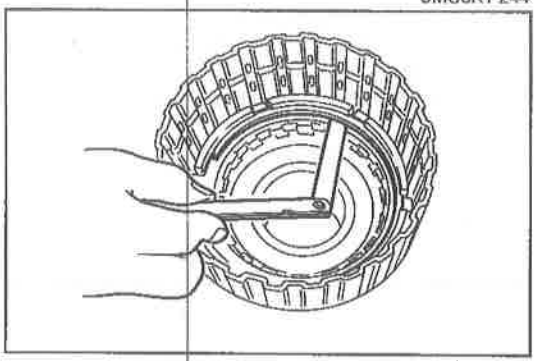


9MU0K1-244

15. Install the retaining plate.

Caution
Do not deform the snap ring.

16. Install the snap ring.



9MU0K1-245

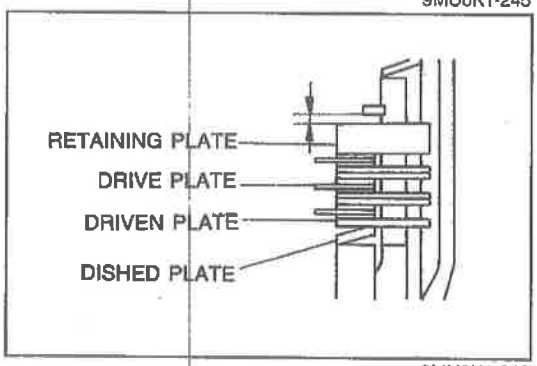
17. Measure the clearance between the retaining plate and the snap ring with a feeler gauge. If not within specification, adjust the clearance by installing the correct retaining plate.

Standard clearance: 1.0—2.0mm (0.039—0.079 in)

Retaining plate sizes

mm (in)

4.0 (0.157)	4.2 (0.165)	4.4 (0.173)	4.6 (0.181)
4.8 (0.189)	5.0 (0.197)	5.2 (0.205)	



9MU0K1-246

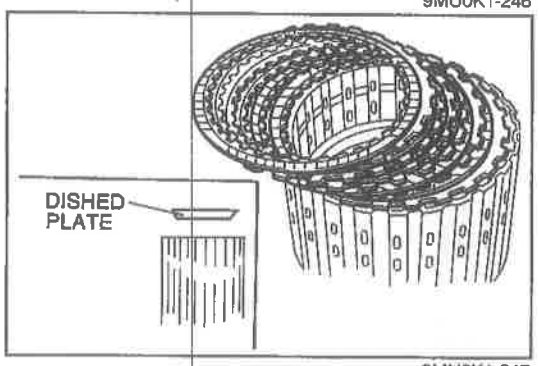
18. If the clearance cannot be brought to within specification after installation of the thickest retaining plate, replace the dished plate, driven plates and drive plates.
Adjust the clearance by installing the correct retaining plate.

Standard clearance: 1.0—1.4mm (0.039—0.055 in)

Retaining plate sizes

mm (in)

4.0 (0.157)	4.2 (0.165)	4.4 (0.173)	4.6 (0.181)
4.8 (0.189)	5.0 (0.197)	5.2 (0.205)	

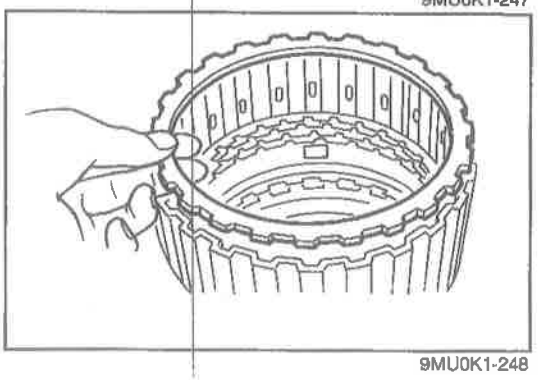


9MU0K1-247

19. Install the dished plate as shown.

Note
Installation order:
Driven-Drive-Driven-Drive-Driven-Drive-Driven-Drive-Driven-Drive-Driven-Drive

20. Apply ATF to the drive plates and driven plates, and install them into the forward clutch drum.

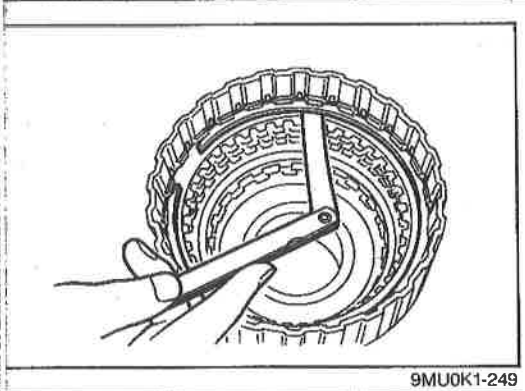


9MU0K1-248

21. Install the retaining plate.

Caution
Do not deform the snap ring.

22. Install the snap ring.



9MU0K1-249

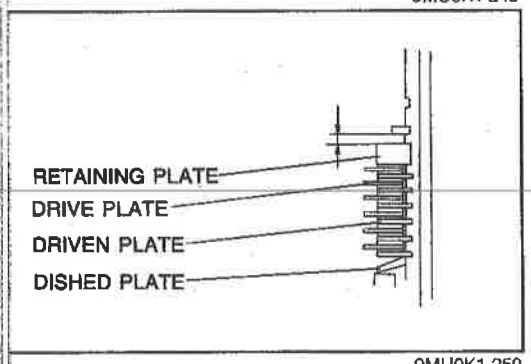
23. Measure the clearance between the retaining plate and the snap ring with a feeler gauge. If not within specification, adjust the clearance by installing the correct retaining plate.

Standard clearance: 0.45—2.05mm (0.018—0.081 in)

Retaining plate sizes

mm (in)

4.0 (0.157)	4.2 (0.165)	4.4 (0.173)	4.6 (0.181)
4.8 (0.189)	5.0 (0.197)	5.2 (0.205)	



9MU0K1-250

24. 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 installing the correct retaining ring.

Standard clearance: 0.45—0.85mm (0.018—0.033 in)

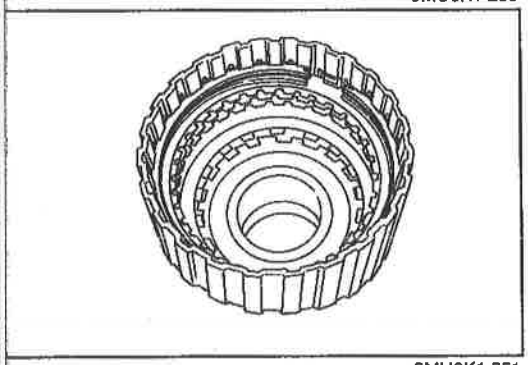
Retaining plate sizes

mm (in)

4.0 (0.157)	4.2 (0.165)	4.4 (0.173)	4.6 (0.181)
4.8 (0.189)	5.0 (0.197)	5.2 (0.205)	

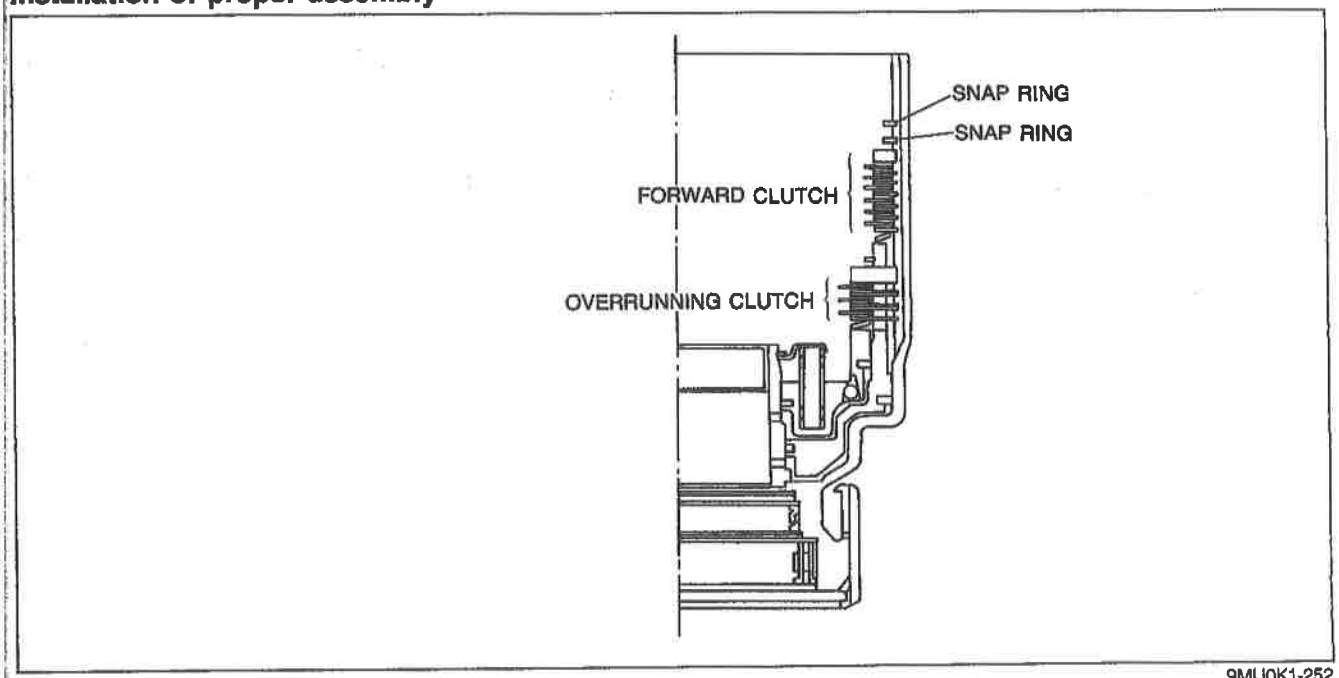
Caution
Do not deform the snap rings.

25. Install the snap ring.



9MU0K1-251

Installation of proper assembly



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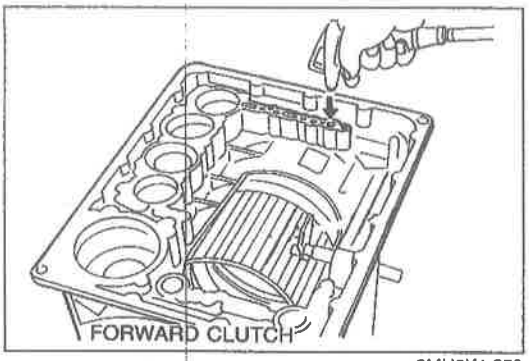
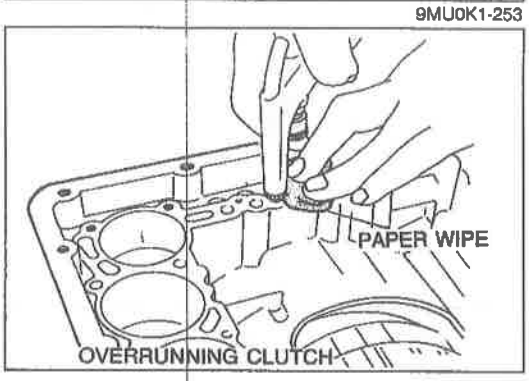
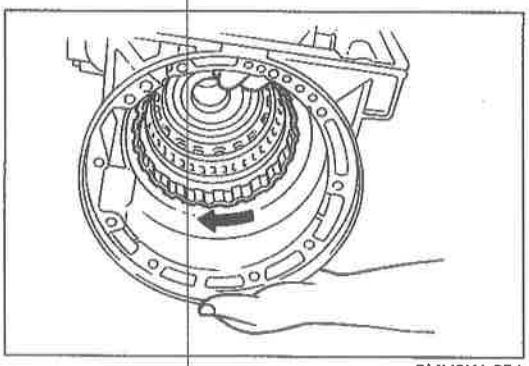
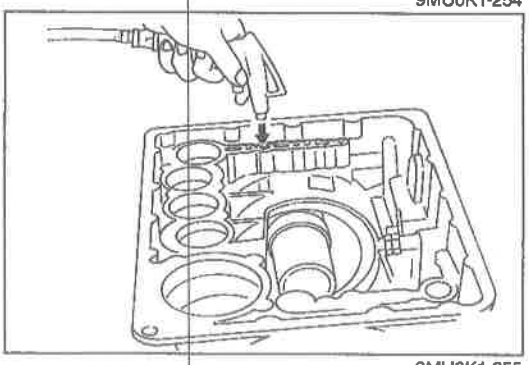


9MU0K1-253

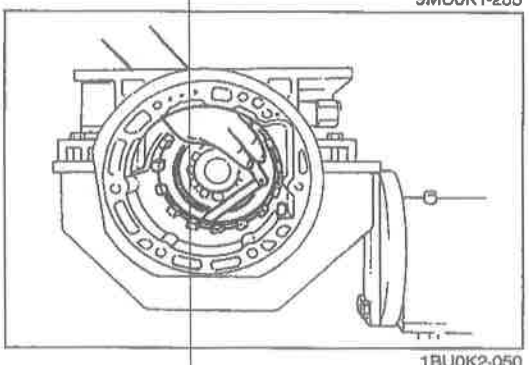




9MU0K1-254



9MU0K1-255



1BU0K2-050

Caution
Apply air for no more than 3 seconds.

26. Set the forward clutch drum in the transmission. Apply compressed air through the oil passage, and check the forward clutch and overruning clutch operation.

Air pressure: 392 kPa (4.0 kg/cm^2, 57 psi) max.

Note
If it turns counterclockwise, the one-way clutch is installed upside down.

27. Check the low one-way clutch operation by turning right and left. It should turn clockwise only, and locked counterclockwise.

LOW AND REVERSE BRAKE

Preinspection

Low and reverse brake operation

1. Apply compressed air through the oil passage as shown.

Air pressure: 392 kPa (4.0 kg/cm^2, 57 psi) max.

2. Verify that the retaining plates move forward the snap ring. If not the D-ring or the seal ring may be damaged or fluid may be leaking at the piston check ball. Inspect them, and replace when assembling if necessary.

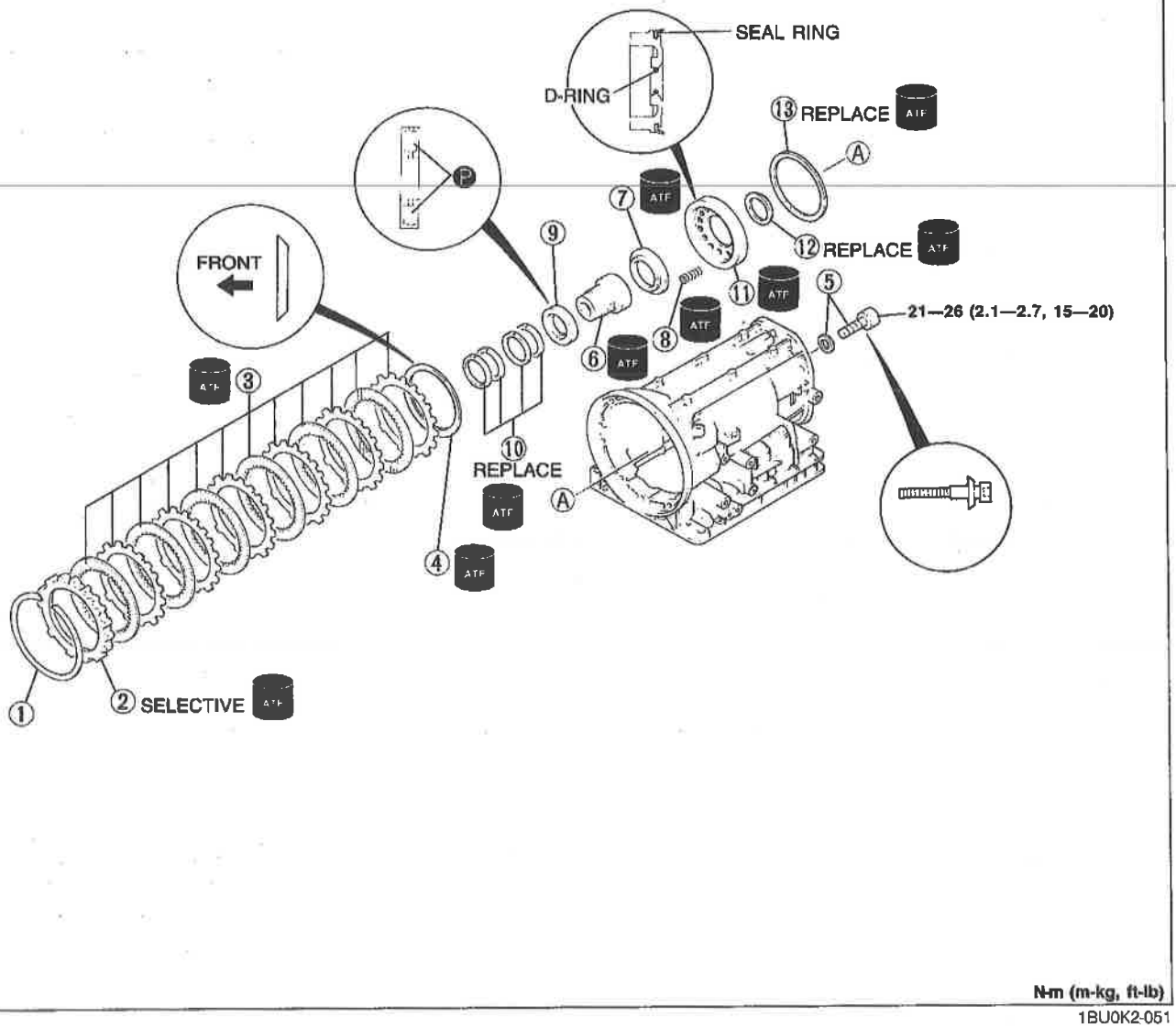
Clearance between retaining plate and snap ring

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

Standard clearance: 0.7—2.3mm (0.028—0.091 In)

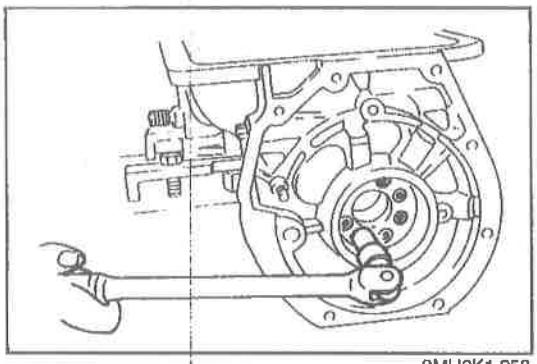
Select the correct retaining plate when assembling if not within specification.

Disassembly and Inspection
Disassemble in the order shown in the figure, referring to **Disassembly Note**.
Inspect all parts, and repair or replace if necessary.

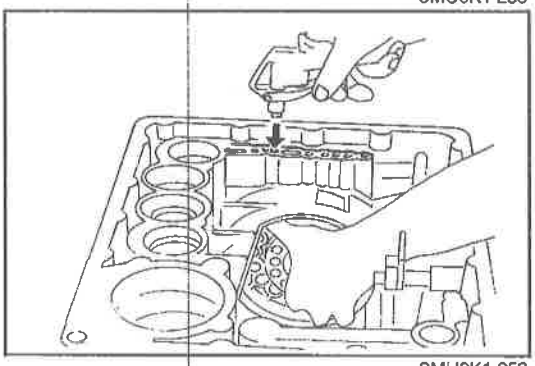


1BU0K2-051

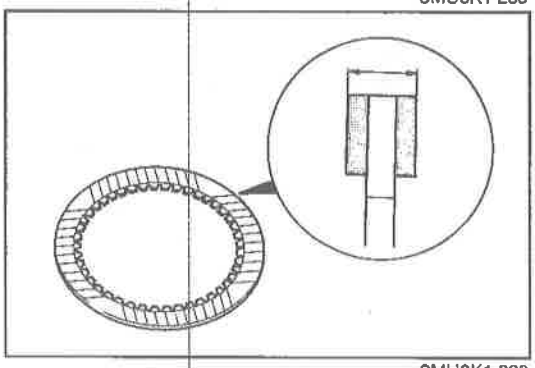
1. Snap ring
2. Retaining plate
3. Drive plates and driven plates
   Inspect for damage or burning
   Inspection ..... page K2–95
4. Allen head bolts and washers
5. Low one-way clutch inner race
   Disassembly Note ..... page K2–95
   Inspection ..... page K2–96
6. Spring retainer
7. Return spring
   Inspection ..... page K2–95
8. Bearing
   Inspect for damage or rough rotation
9. Seal rings
10. Low and reverse brake piston
    Inspect balls for sticking by shaking piston
    Disassembly Note ..... page K2–95
    Inspection ..... page K2–95
11. D-ring
12. Seal ring



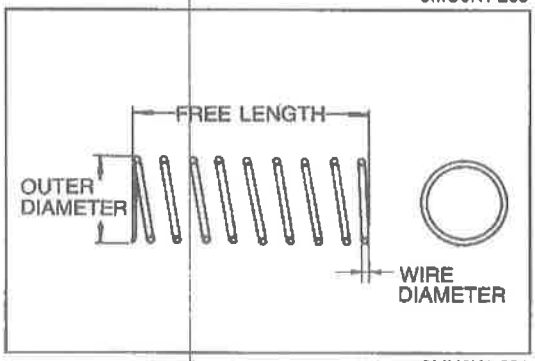
9MU0K1-258



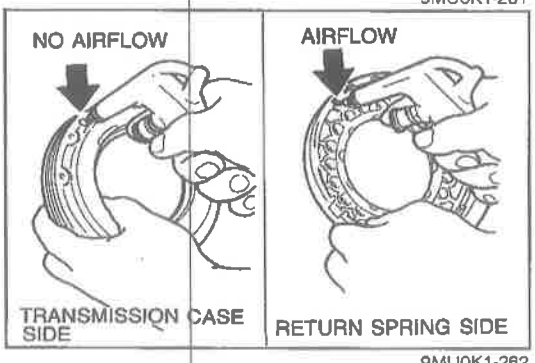
9MU0K1-259



9MU0K1-260



9MU0K1-261



9MU0K1-262

Disassembly note
Low one-way clutch inner race

Caution
Do not lose the springs.

1. Remove the Allen head bolts holding the low one-way clutch inner race and spring retainer.
2. Remove the low one-way clutch inner race, spring retainer, and return springs.

Low and reverse brake piston
Remove the low and reverse brake piston apply compressed air through the oil passage as shown in the figure.

Air pressure: 392 kPa (4.0 kg/cm^2, 57 psi) max.

Inspection
Drive plates
1. Measure the facing thickness in three places, and determine the average of the three reading.

Standard thickness: 2.0mm (0.079 in)
Minimum thickness: 1.8mm (0.071 in)

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

Return spring
1. Measure the spring specifications.

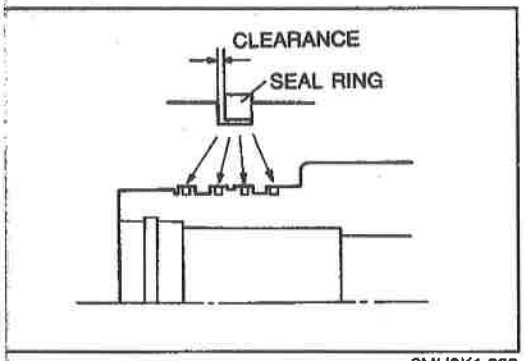
Specifications

Outer dia. mm (in)	Free length mm (in)	No. of coils	Wire dia. mm (in)
11.6 (0.457)	23.7 (0.933)	5.0	1.1 (0.043)

2. If not within specification, replace the spring.

Low and reverse brake piston
1. Verify that there is no air leakage when applying compressed air through the oil hole opposite the return spring.
2. Verify that there is air flow when applying compressed air through the oil hole on the return spring side.

Air pressure: 392 kPa (4.0 kg/cm^2, 57 psi) max.



9MU0K1-263

Low one-way clutch inner race

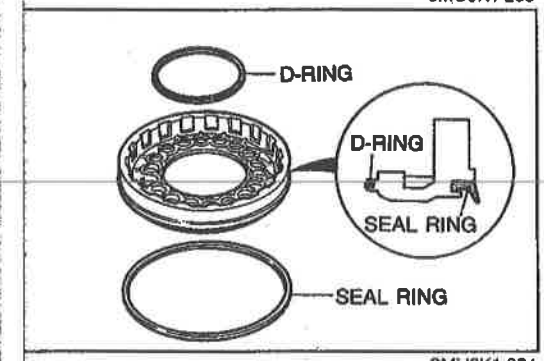
1. Apply petroleum jelly to a new seal ring and install the seal ring.
2. Measure the clearance between the seal ring and the ring groove.

   Standard clearance:
   0.10—0.25mm (0.0039—0.0098 in)
   Maximum clearance: 0.25mm (0.0098 in)

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

Assembly

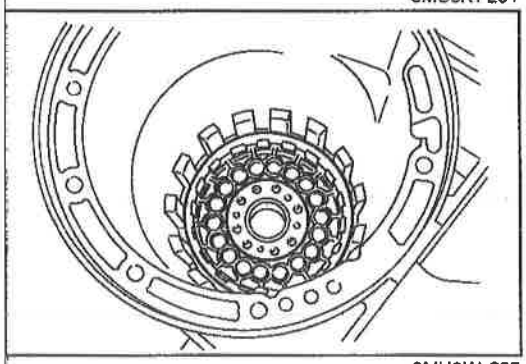
1. Apply ATF to the new D-ring and seal ring and install them to the low and reverse brake piston.



9MU0K1-264

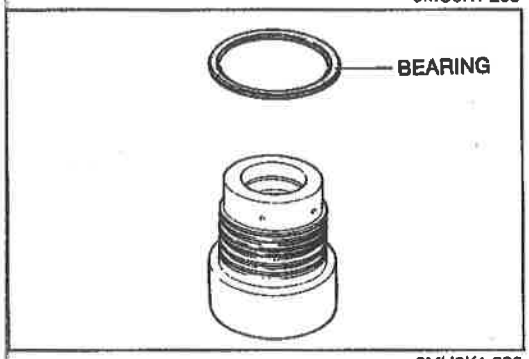
Caution
Apply even pressure to the perimeter of the brake piston to avoid damaging the D-ring and seal ring when installing.

2. Apply ATF to the inner surface of the transmission case.
3. Install the low and reverse brake piston in the transmission case by turning it evenly and gradually.


9MU0K1-265

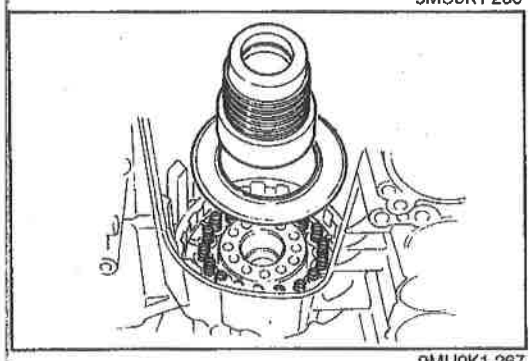
4. Apply petroleum jelly to the bearing, and install it on the low one-way clutch inner race.

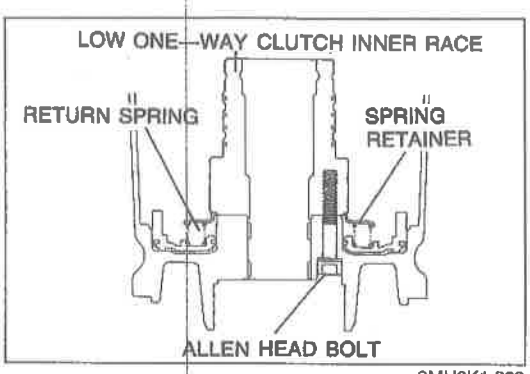
   Bearing outer diameter: 78.0mm (3.071 in)



9MU0K1-266

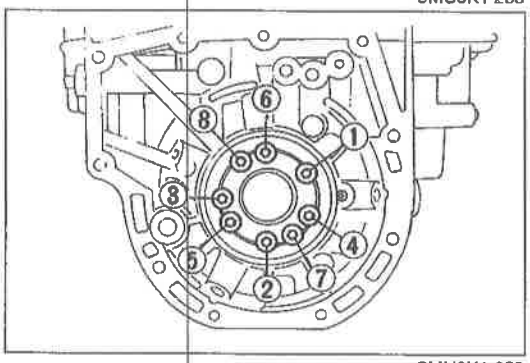
5. Assemble the return spring, spring retainer and low one-way clutch inner race to the low and reverse brake piston.


9MU0K1-267



9MU0K1-268

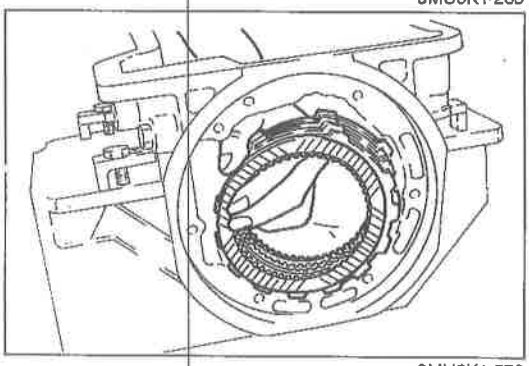
6. Check that the return spring, spring retainer, and low one-way clutch inner race are properly positioned before securing them with the Allen head bolts.



9MU0K1-269

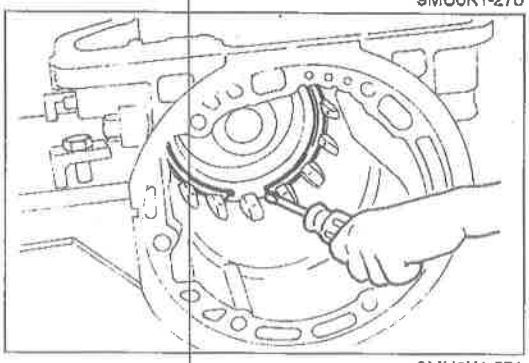
7. Tighten the Allen head bolts evenly and gradually in the order shown.

Tightening torque:
21—26 N·m (2.1—2.7 m-kg, 15—20 ft-lb)


9MU0K1-270

Note
Installation order
Driven-Drive-Driven-Drive-Driven-Drive-Driven-Drive-Driven-Drive-Driven-Drive

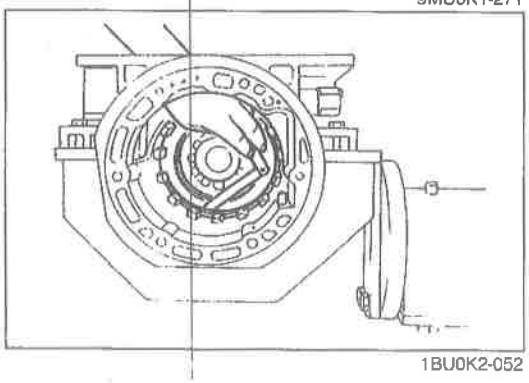
8. Apply ATF to the drive plates and driven plates, and install them into the transmission case.


9MU0K1-271

9. Install the retaining plate.

Caution
Do not deform the snap ring.

10. Install the snap ring.


1BU0K2-052

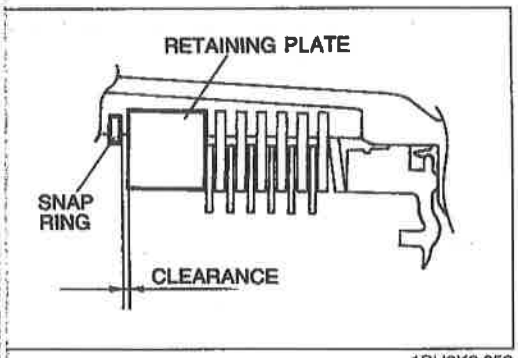
11. Measure the clearance between the retaining plate and the snap ring with a feeler gauge. If not within spcification, adjust the clearance by installing the correct retaining plate.

Standard clearance: 0.7—2.3mm (0.028—0.091 in)

Retaining plate sizes

mm (in)

9.0 (0.354)	9.2 (0.362)	9.4 (0.370)
9.6 (0.378)	9.8 (0.386)	10.0 (0.394)



1BU0K2-053

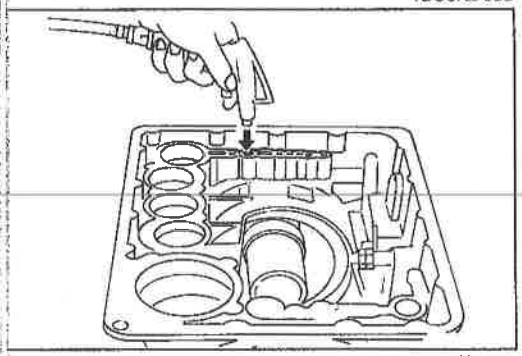
12. If the clearance cannot be brought to within specification after installation of the thickest retaining plate, replace the dished plate, driven plates and drive plates.
Adjust the clearance by installing the correct retaining plate.

Standard clearance: 0.7—1.1mm (0.028—0.043 in)

Retaining plate sizes

mm (in)

9.0 (0.354)	9.2 (0.362)	9.4 (0.370)
9.6 (0.378)	9.8 (0.386)	10.0 (0.394)

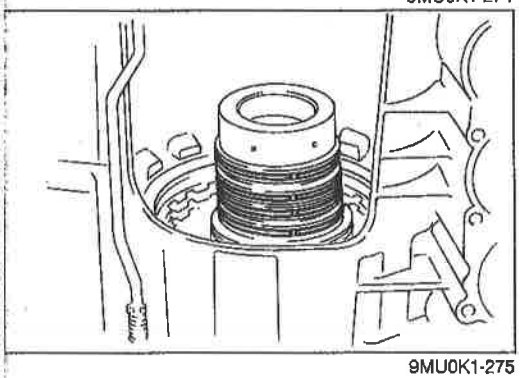


9MU0K1-274

Caution
Apply air for no more than 3 seconds.

13. Check operation of the piston by applying compressed air through the oil passage of the low and reverse brake.

Air pressure: 392 kPa (4.0 kg/cm^2, 57 psi) max.



9MU0K1-275

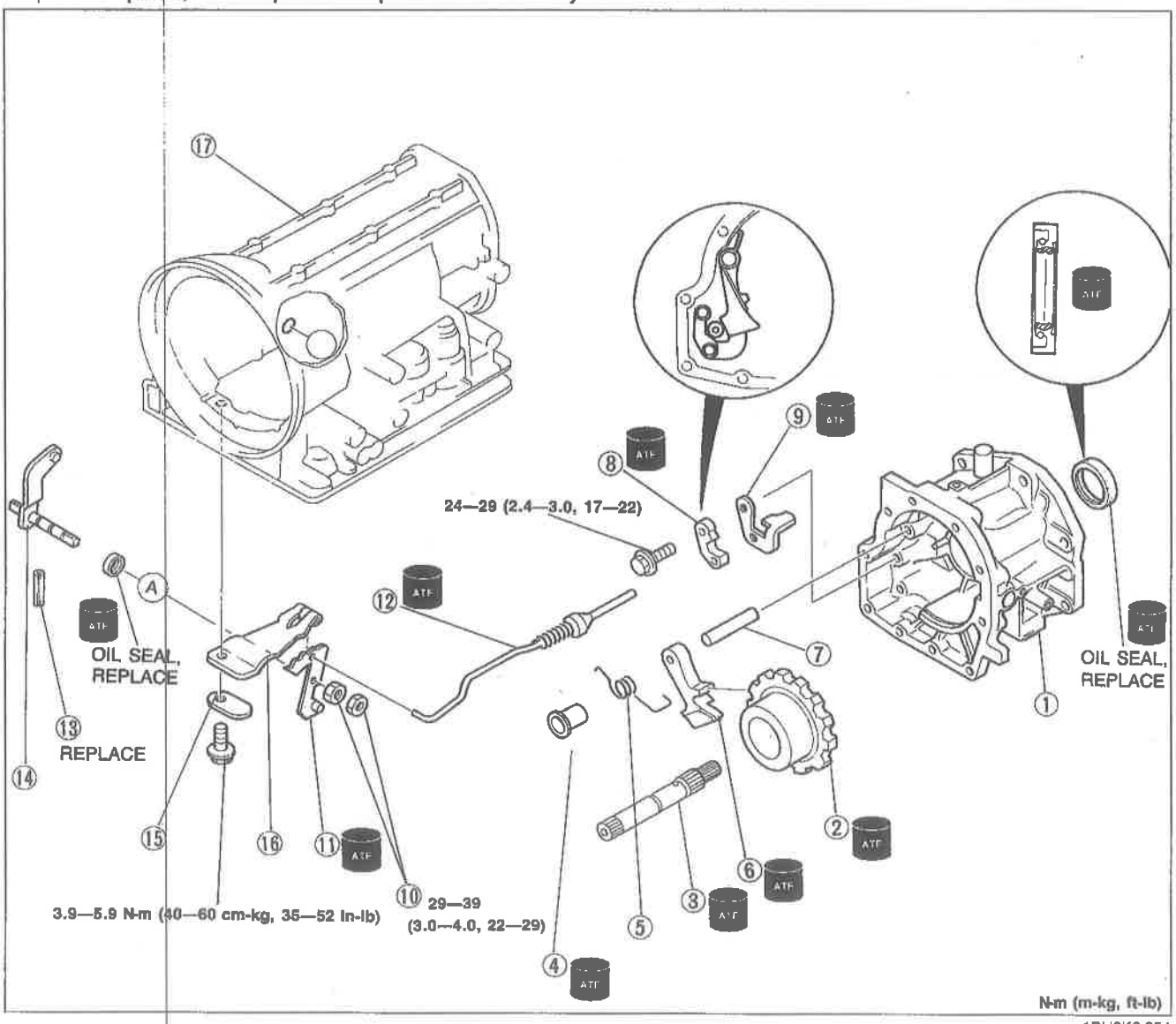
Caution
Make sure the seal rings are pressed firmly into place and held by petroleum jelly.

14. Apply petroleum jelly to the seal rings and install them onto the low one-way clutch inner race.

ADAPTER CASE AND PARKING MECHANISM
Disassembly and Inspection

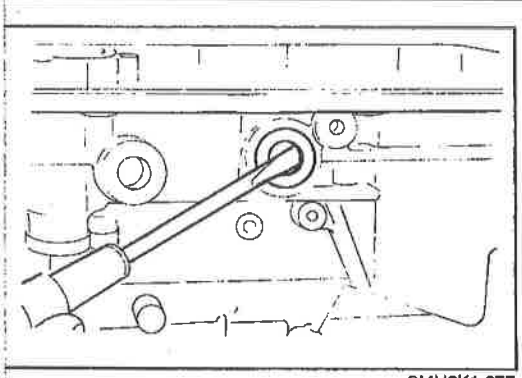
Caution
Do not remove the oil seals if not necessary to do so for repairs.

Disassemble in the order shown in the figure, referring to **Disassembly Note**.
Inspect all parts, and repair or replace if necessary.



1BU0K2-054

1. Adapter case
2. Parking gear
   Inspect individual gear teeth for damage or wear and rough rotation of bearing
3. Output shaft
   Inspect splines for damage or wear
4. Parking pawl spacer
5. Return spring
6. Parking pawl
7. Parking pawl shaft
8. Parking actuator
9. Parking rod guide
10. Locknuts
11. Manual plate
12. Parking rod
13. Roll pin
14. Manual shaft
15. Spacer
16. Detent spring
    Inspect for fracture or wear
17. Transmission case
    Inspection
    a) Damage or wear of oil seal
       Disassembly ..... page K2–100
    b) Damage or rough rotation of inner bearing

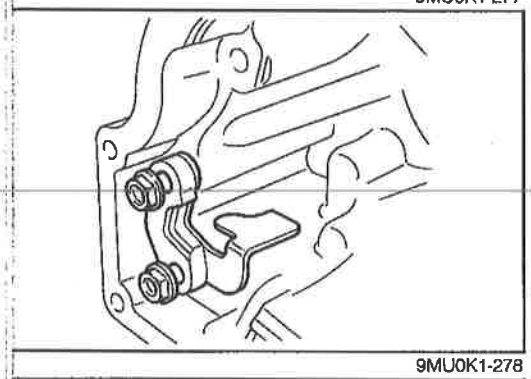


9MU0K1-277

Disassembly note
Oil seal (Transmission side)

Caution
Do not remove the seal unless necessary.

Remove the oil seal with a screwdriver.

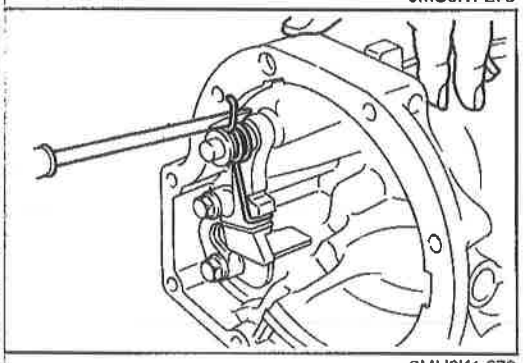


9MU0K1-278

Assembly
Extension housing

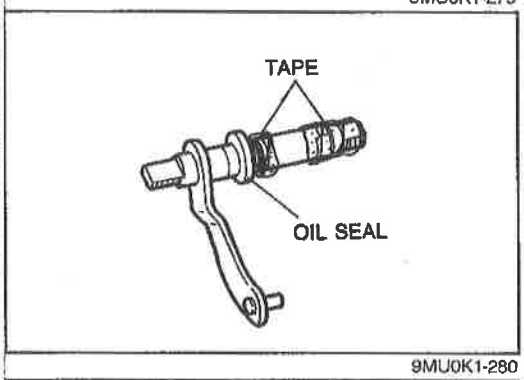
1. Apply ATF to the parking rod guide and parking actuator, and install them in the extension housing.

Tightening torque:
24—29 N·m (2.4—3.0 m-kg, 17—22 ft-lb)



9MU0K1-279

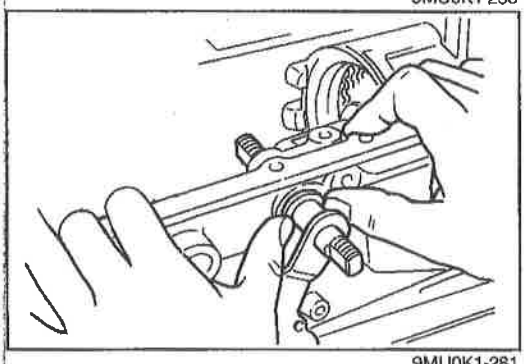
2. Apply ATF to the parking pawl shaft and install it in the extension housing
3. Apply ATF to the parking pawl, return spring and spacer, and install them in the extension housing.



9MU0K1-280

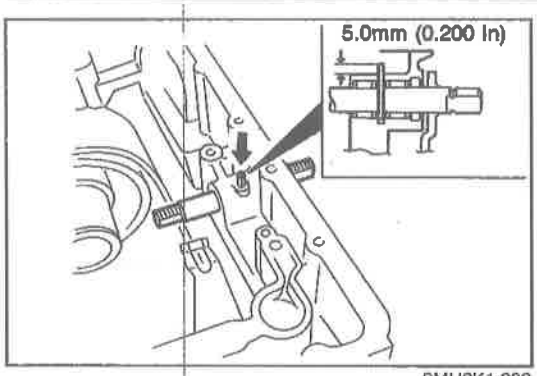
Manual shaft

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



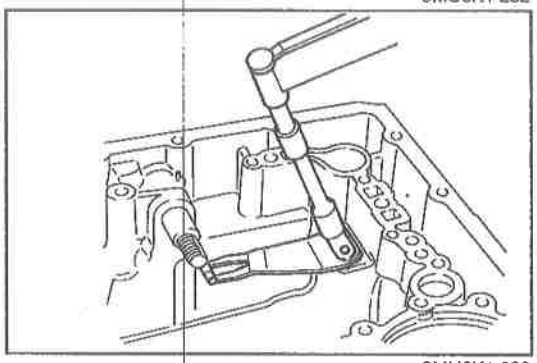
9MU0K1-281

3. Apply ATF to the bearing in the transmission case.
4. Install the manual shaft into the transmission case.
5. Push the oil seal squarely into the transmission case.
6. Remove the tape.



9MU0K1-282

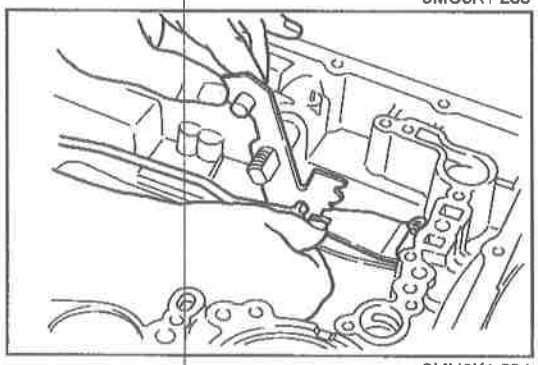
7. Align the groove in manual shaft with the roll pin hole, then tap the roll pin into the case as shown in the figure.



9MU0K1-283

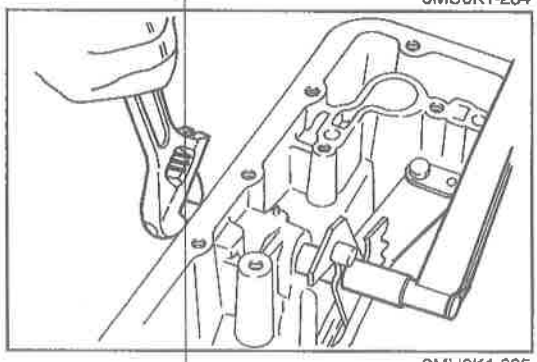
8. Install the detent spring and spacer.

Tightening torque:
3.9—5.9 N·m (40—60 cm-kg, 35—52 in-lb)



9MU0K1-284

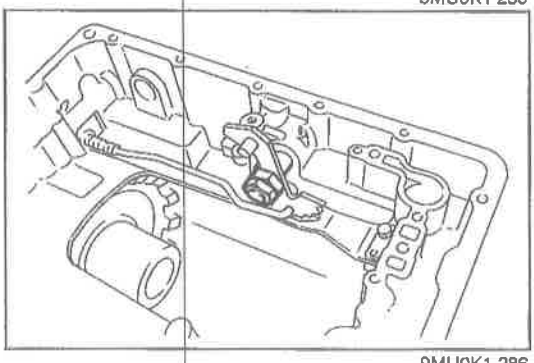
9. Install the manual plate and parking rod.



9MU0K1-285

10. Tighten the locknuts.

Tightening torque:
29—39 N·m (3.0—4.0 m-kg, 22—29 ft-lb)



9MU0K1-286

11. Check the parking mechanism operation.

OIL SEAL

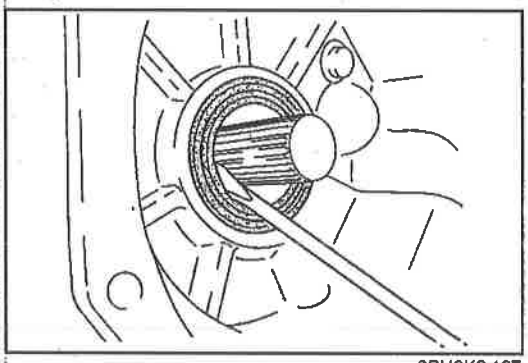
Preparation

SST

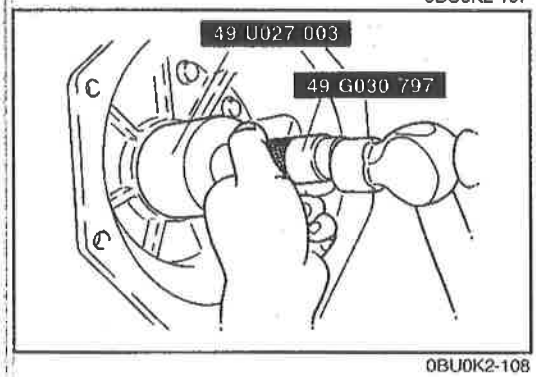
Following **SSTs** used for 4WD model.

49 U027 003 Installer, oil seal 	49 G030 795 Installer, oil seal 	49 G030 797 Handle (Part of 49 G030 795) 

0MU0K1-050



0BU0K2-107



0BU0K2-108

Inspection

Check for damage, wear, or oil leaking of oil seal. Replace if necessary.

On-vehicle Replacement

Caution
Do not damage the mainshaft splines.

1. Remove the transfer case.
2. Remove the oil seal from the adapter case.

3. Apply ATF to outer periphery and lip surface.
4. Install the new oil seal with the **SST**.
5. Install the transfer case.

CONTROL VALVE BODY (DISASSEMBLY AND INSPECTION)

Disassembly and Inspection

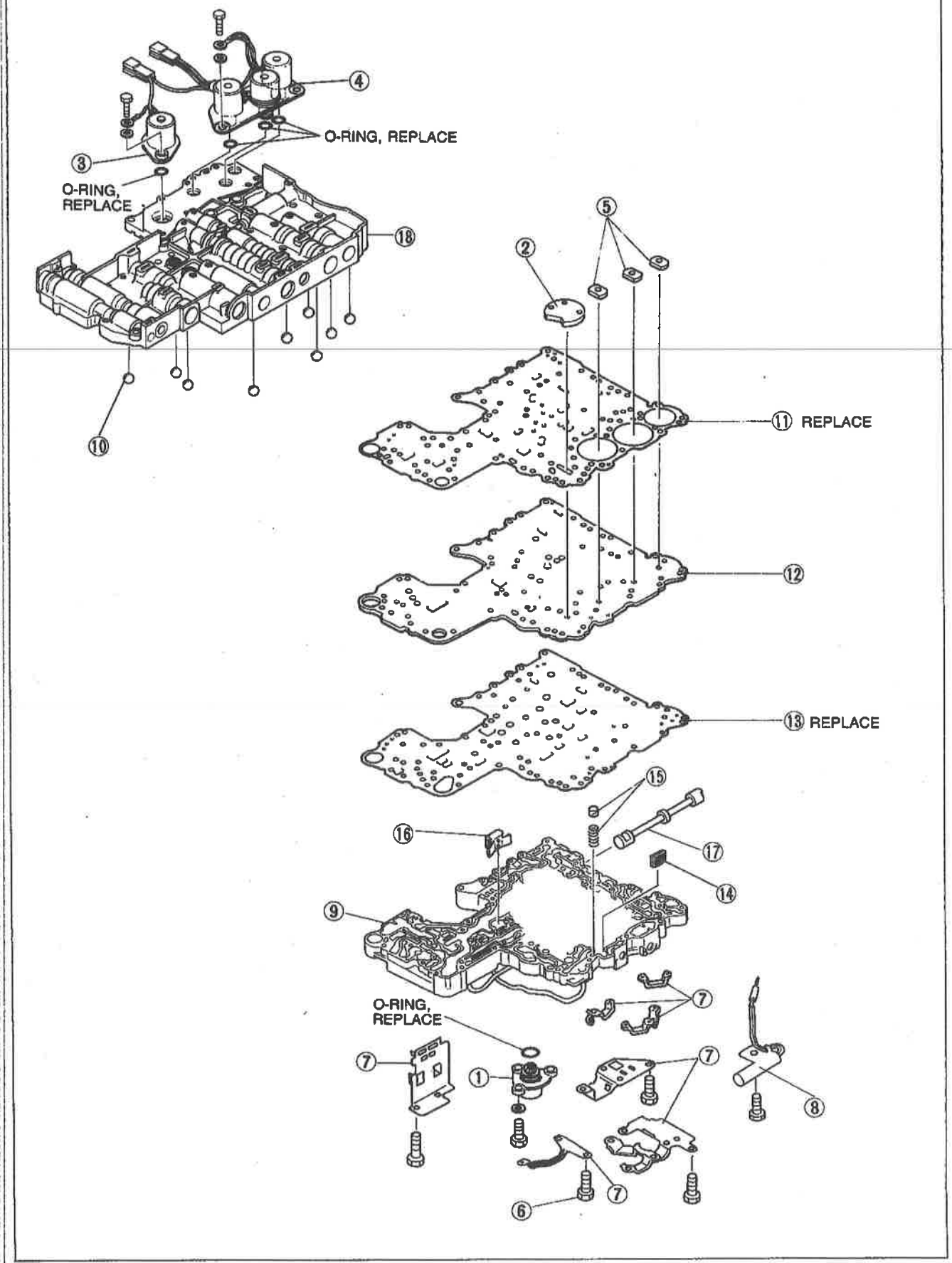
Caution

a) Be especially careful when handling the control valve because it consists of the most precise and delicate parts of the transmission.
b) Neatly arrange the removed parts to avoid confusing them with similar parts.
c) Clean the removed parts with cleaning solvent, and dry them with compressed air. Clean out all holes and passages with compressed air.

Disassemble in the order shown in the figure.
Inspect all parts, and repair or replace as necessary.

0BU0K2-169

Components


④
O-RING, REPLACE
③
O-RING, REPLACE
⑱
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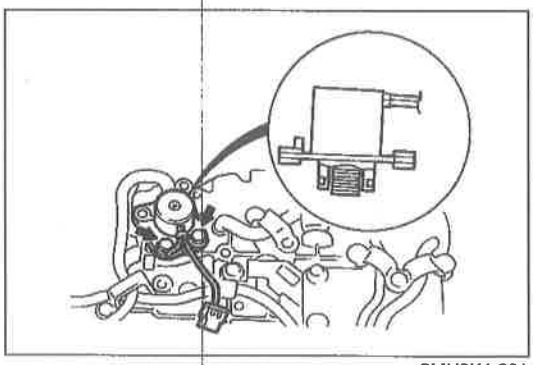
⑤
②
⑪ REPLACE
⑫
⑬ REPLACE
⑮
⑯
⑰
⑭
⑨
⑦
O-RING, REPLACE
⑦
①
⑦
⑧
⑦
⑥

1. Lockup solenoid
   Inspect filter for clogging or damage
   Inspection ..... page K2– 38
2. Side plate
3. Line pressure solenoid
   Inspect filter for clogging or damage
   Inspection ..... page K2– 38
4. Overrunning clutch solenoid, shift solenoid A, and shift solenoid B
   Inspect filter for clogging or damage
   Inspection ..... page K2– 38
5. Support plate
6. Retaining bolts and nuts
   Installation position ..... page K2–120
7. Brackets
   Installation position ..... page K2–119
8. ATF thermoswitch
   Inspection ..... page K2– 38
9. Lower valve body
   Disassembly and Inspection .. page K2–116
   Installation ..... page K2–117
10. Steel ball
    Installation position ..... page K2–119
11. Upper gasket
12. Separate plate
    Inspect fluid passages for clogging or damage
13. Lower gasket
14. Accumulator filter
    Inspect for clogging or damage
15. Orifice check valve and spring
16. Pilot filter
    Inspect for clogging or damage
17. Manual valve
    Inspect for sticking, scoring, or scratches
18. Upper valve body
    Disassembly and Inspection .. page K2–108
    Assembly ..... page K2–111

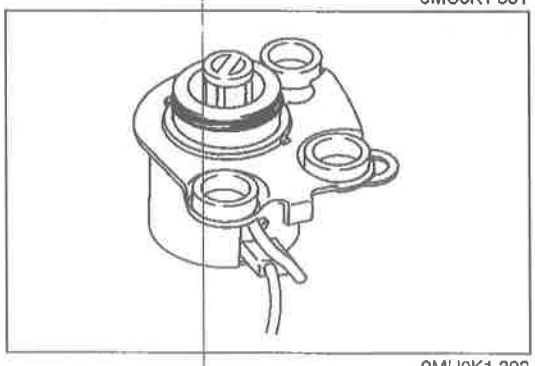
2BU0K2-027



9MU0K1-301

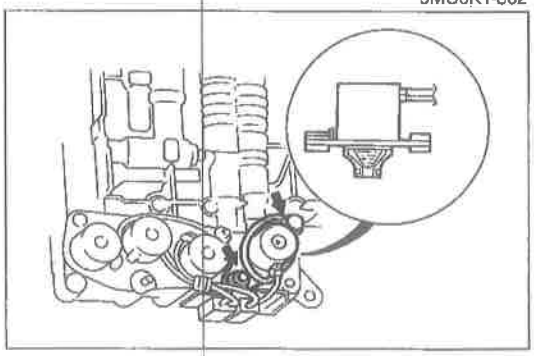
Procedure

1. Remove the lockup solenoid and side plate.



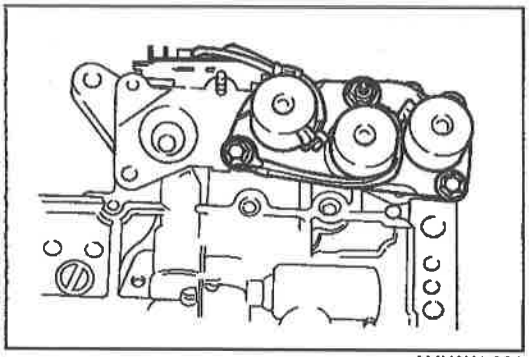
9MU0K1-302

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



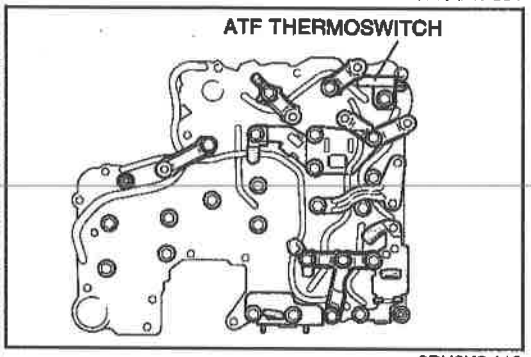
9MU0K1-303

3. Remove the line pressure solenoid.
4. Remove the O-ring from the line pressure solenoid.



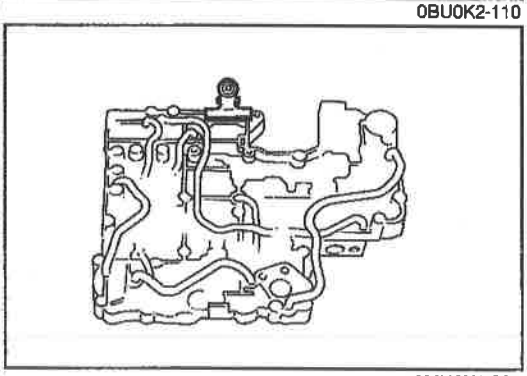
9MU0K1-304

5. Remove the solenoids.
6. Remove the O-rings from the solenoids.



0BU0K2-110

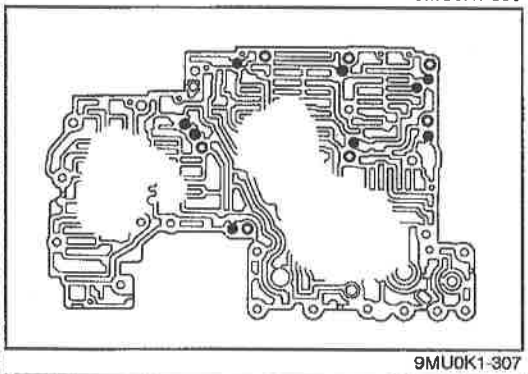
7. Remove the support plate.
8. Remove the bolts, nuts, brackets, and ATF thermoswitch.



9MU0K1-306

Caution
a) Do not scratch the lower valve body.
b) Be careful not to drop the pilot filter, orifice check valve or spring.

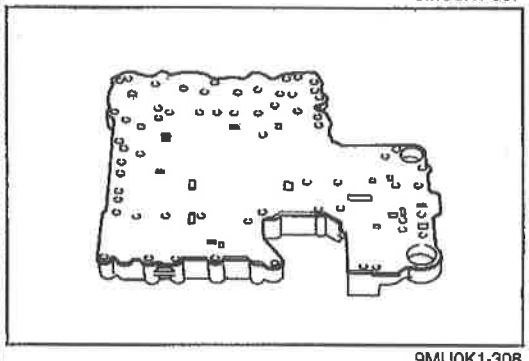
9. Hold the lower valve body, lower and upper gaskets and separate plate with a large clip.
10. Separate the lower valve body from the upper valve body.



9MU0K1-307

Caution
Do not drop or lose the steel balls.

11. Remove the steel balls from the upper valve body.

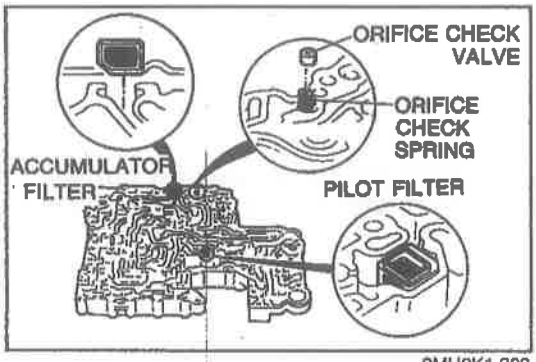


9MU0K1-308

12. Face the lower valve body downward, and remove the holding clip.

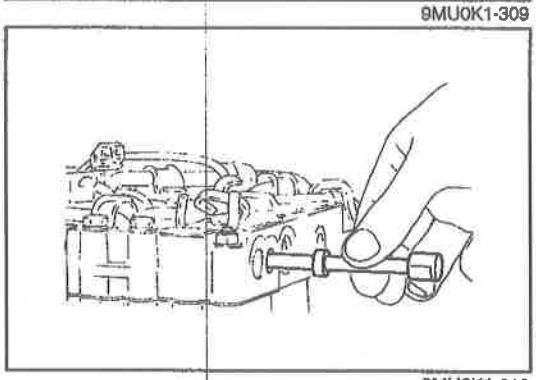
Caution
Do not lose the pilot filter, orifice check valve or spring.

13. Remove the separate plate and gaskets.



9MU0K1-309

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



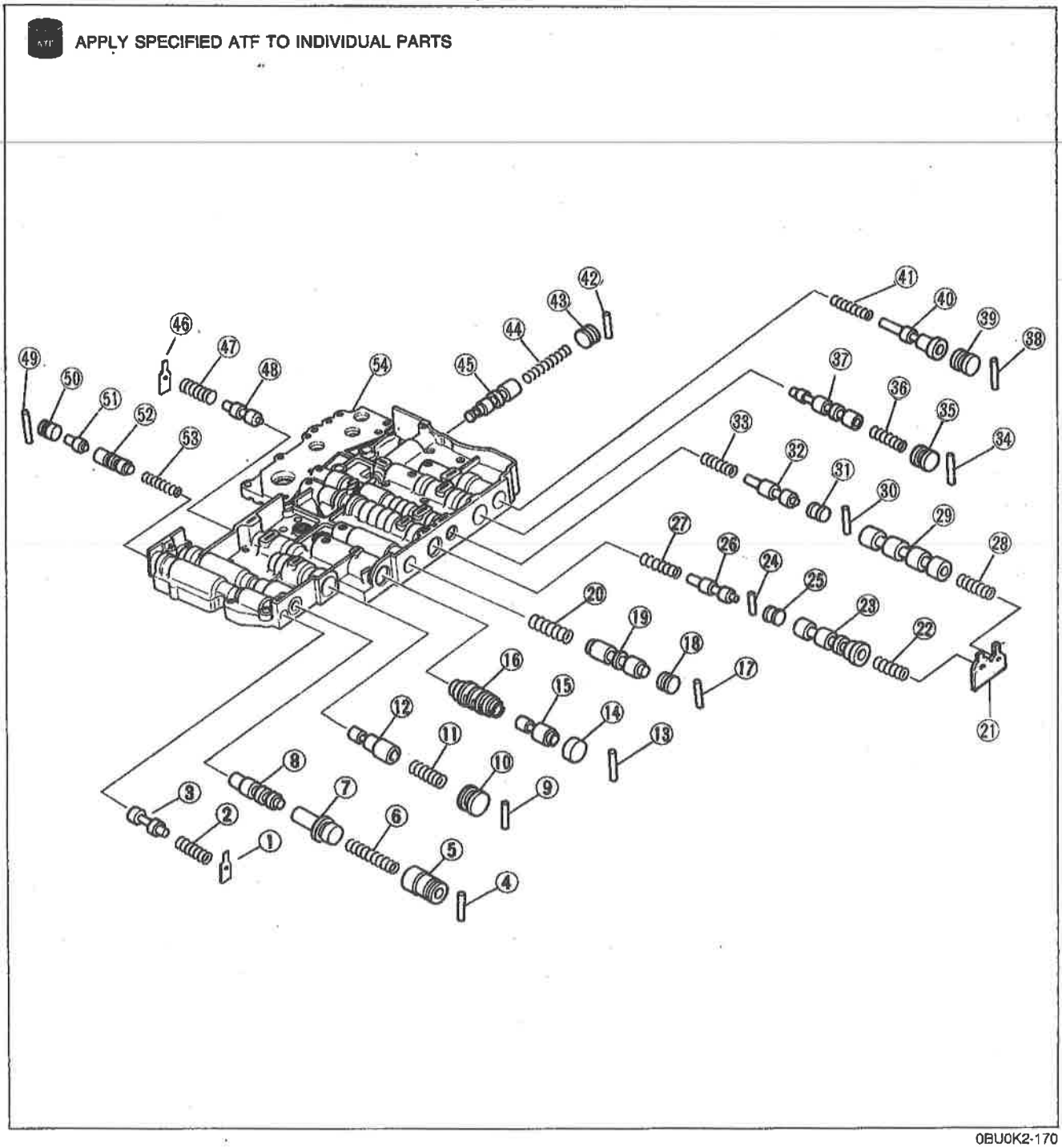
9MU0K1-310

15. Remove the manual valve from the upper valve body.

UPPER VALVE BODY
Disassembly and Inspection

Caution
a) Each valve should slide out by its own weight.
b) When a valve will not slide out by its own weight, depending on the valve, push it out with a wire or place the valve body open-side down and lightly tap it with a soft hammer. Never scratch or otherwise damage the valve surface or bore.
c) Do not drop or lose the valves or internal parts.

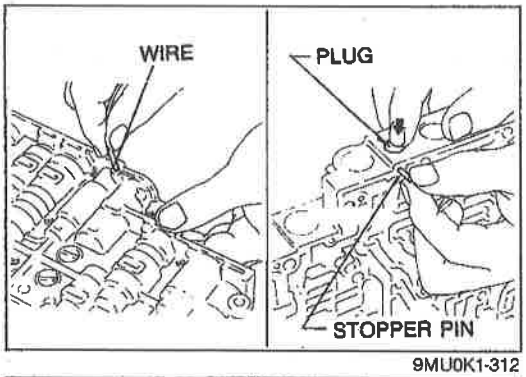
Disassemble in the order shown in the figure, referring to **Disassembly Note**.
Inspect all parts, repair or replace as necessary.



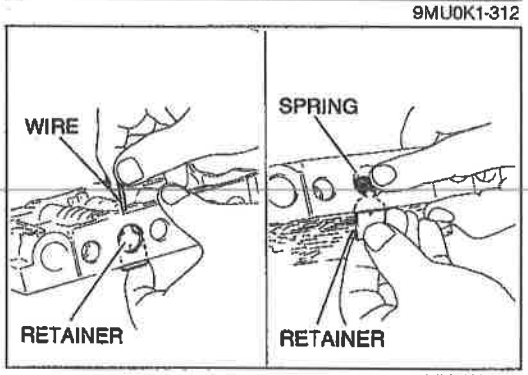
0BU0K2-170

1. Retainer
   Disassembly Note ..... page K2–110
2. Torque converter relief spring
   Inspection ..... page K2–110
3. Torque converter relief valve
   Inspect for sticking, scoring or scratches
4. Stopper pin
   Disassembly Note ..... page K2–110
5. Pressure regulator sleeve
   Inspect for sticking, scoring or scratches
6. Pressure regulator spring
   Inspection ..... page K2–110
7. Pressure regulator plug
   Inspect for sticking, scoring or scratches
8. Pressure regulator valve
   Inspect for sticking, scoring or scratches
9. Stopper pin
   Disassembly Note ..... page K2–110
10. Pressure modifier plug
11. Pressure modifier spring
   Inspection ..... page K2–110
12. Pressure modifier valve
   Inspect for sticking, scoring or scratches
13. Stopper pin
   Disassembly Note ..... page K2–110
14. Accumulator control plug
15. Accumulator control valve
   Inspect for sticking, scoring or scratches
16. Accumulator control sleeve
   Inspect for sticking, scoring or scratches
17. Stopper pin
   Disassembly Note ..... page K2–110
18. Shuttle shift valve D plug
19. Shuttle shift valve D
   Inspect for sticking, scoring or scratches
20. Shuttle shift valve D spring
   Inspection ..... page K2–110
21. Retainer
   Disassembly Note ..... page K2–110
22. Shift valve B spring
   Inspection ..... page K2–111
23. Shift valve B
   Inspect for sticking, scoring or scratches
24. Stopper pin
   Disassembly Note ..... page K2–110
25. 4-2 sequence plug
26. 4-2 sequence valve
   Inspect for sticking, scoring or scratches
27. 4-2 sequence spring
   Inspection ..... page K2–110
28. Shift valve A spring
   Inspection ..... page K2–111
29. Shift valve A
   Inspect for sticking, scoring or scratches
30. Stopper pin
   Disassembly Note ..... page K2–110
31. 4-2 relay plug
32. 4-2 relay valve
   Inspect for sticking, scoring or scratches
33. 4-2 relay spring
   Inspection ..... page K2–111
34. Stopper pin
   Disassembly Note ..... page K2–110
35. Overrunning clutch control plug
36. Overrunning clutch control spring
   Inspection ..... page K2–111
37. Overrunning clutch control valve
   Inspect for sticking, scoring or scratches
38. Stopper pin
   Disassembly Note ..... page K2–110
39. Overrunning clutch reducing plug
40. Overrunning clutch reducing valve
   Inspect for sticking, scoring or scratches
41. Overrunning clutch reducing spring
   Inspection ..... page K2–111
42. Stopper pin
   Disassembly Note ..... page K2–110
43. Shuttle shift valve S plug
44. Shuttle shift valve S spring
   Inspection ..... page K2–111
45. Shuttle shift valve S
   Inspect for sticking, scoring or scratches
46. Retainer
   Disassembly Note ..... page K2–110
47. Pilot spring
   Inspection ..... page K2–111
48. Pilot valve
   Inspect for sticking, scoring or scratches
49. Stopper pin
   Disassembly Note ..... page K2–110
50. Lockup control sleeve
51. Lockup control plug
   Inspect for sticking, scoring or scratches
52. Lockup control valve
   Inspect for sticking, scoring or scratches
53. Lockup control spring
   Inspection ..... page K2–111
54. Upper valve body
   Inspect for damage or scoring

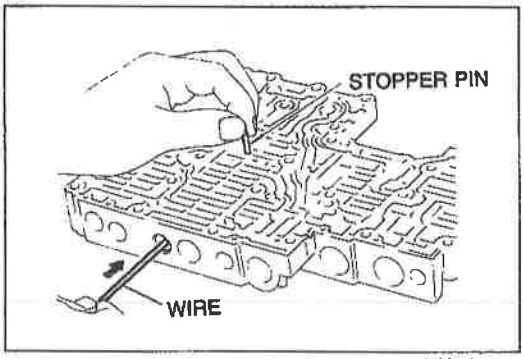
2BU0K2-029



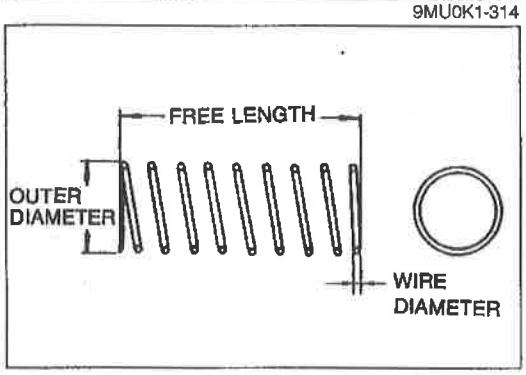
9MU0K1-312



9MU0K1-313



9MU0K1-314



9MU0K1-315

Disassembly note
Stopper pin

Caution
Do not use a magnet to hold the pin.

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

Retainer

Caution
Do not use a magnet to hold the retainer.

1. Push the retainer part way 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.

4-2 sequence valve and 4-2 relay valve

Caution
a) Removal may be difficult.
b) Do not use a magnet to hold the stopper pin.

1. Push the stopper pin part way out with a wire.
2. Depress the plug with a vinyl tape wrapped **1.5mm (0.060 in)** thick around the diameter rod to prevent the valve from popping out.
3. Remove the stopper pin, the valve, and the internal parts.

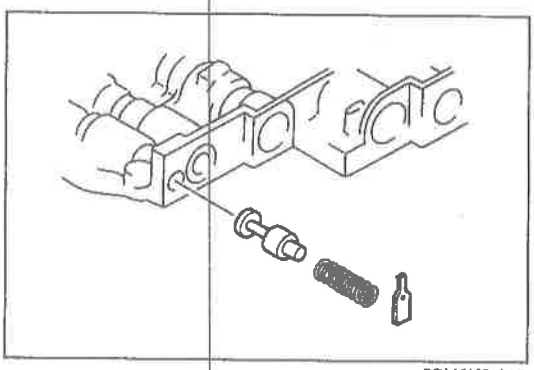
Inspection
1. Measure the spring specifications.
2. If not within specification, replace the spring(s).

Spring \ Item		Outer dia. mm (in)	Free length mm (in)	No. of coils	Wire dia. mm (in)
Torque converter relief valve		9.0 (0.354)	38.0 (1.496)	12.7	1.4 (0.055)
Pressure regulator valve		14.0 (0.551)	44.0 (1.732)	7.9	1.4 (0.055)
Pressure modifier valve*	A	6.8 (0.268)	31.95 (1.258)	15.5	0.8 (0.031)
	B	6.9 (0.272)	32.60 (1.283)	22.2	0.9 (0.035)
	C	6.9 (0.272)	32.80 (1.291)	15.6	0.9 (0.035)
Shuttle shift valve D		6.0 (0.236)	26.5 (1.043)	12.0	0.7 (0.028)

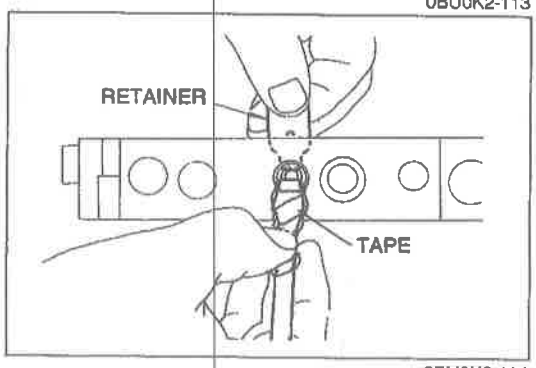
*: Either A, B or C type spring is installed at shipment. Only A type spring is available for replacement.

Spring \ Item	Outer dia. mm (in)	Free length mm (in)	No. of coils	Wire dia. mm (in)
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 (0.984)	12.6	0.85 (0.033)
Shuttle shift valve S	5.5 (0.217)	43.0 (1.693)	22.2	0.85 (0.033)
Pilot valve	9.1 (0.358)	25.7 (1.012)	8.3	1.1 (0.043)
Lockup control valve	13.0 (0.512)	18.5 (0.728)	3.5	0.75 (0.030)

2BU0K2-030



0BU0K2-113



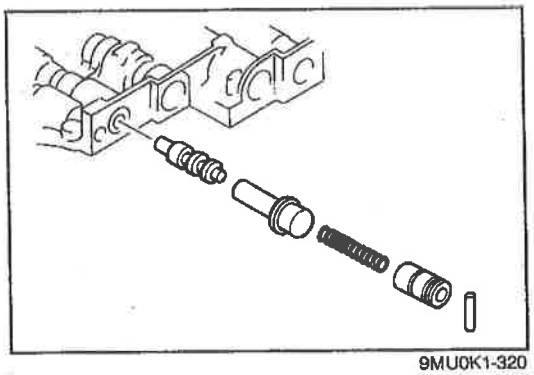
0BU0K2-114

Assembly Procedure

Caution

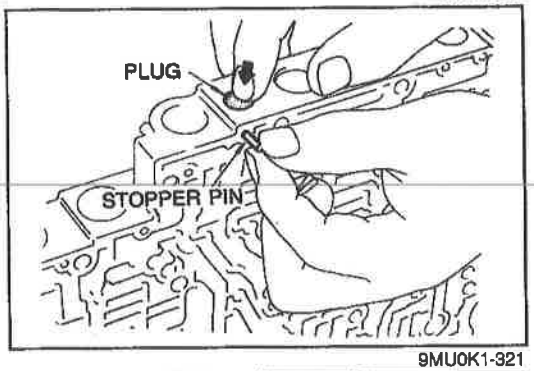
a) Before assembly, make sure all parts are thoroughly clean.
b) Apply ATF to all parts and bores.
c) Note the proper direction of the valve and internal parts.
d) Do not reuse any parts that have been dropped.
e) Do not scratch the valve or valve body.
f) Wrap a screwdriver or rod with tape before using it to insert a valve.

1. Insert the torque converter relief valve and spring.
2. Install the retainer while compressing the spring.


9MU0K1-320

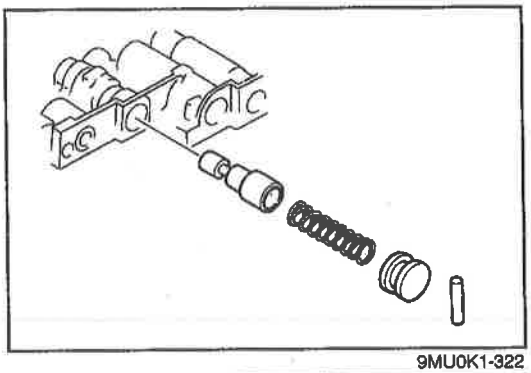
3. Insert the pressure regulator valve, plug, spring, and sleeve.

Note
a) If the plug is not centered properly, the sleeve cannot be inserted into the bore in the upper body.
b) Center the plug with a vinyl tape wrapped screwdriver until the sleeve can be inserted.
c) Turn the sleeve slightly while installing.

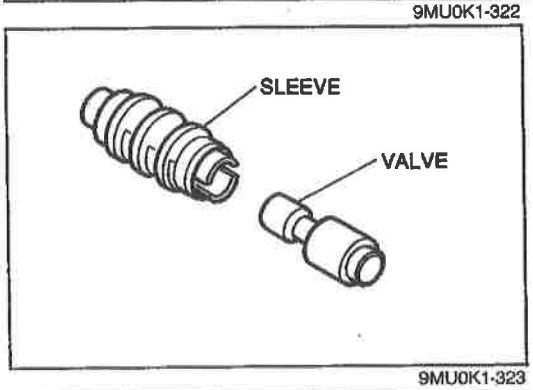


9MU0K1-321

4. Insert the stopper pin while pushing the sleeve.

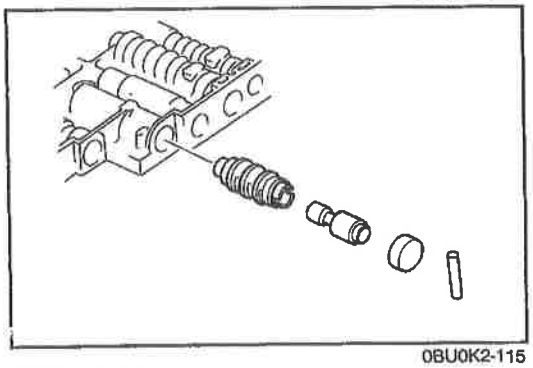

9MU0K1-322

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

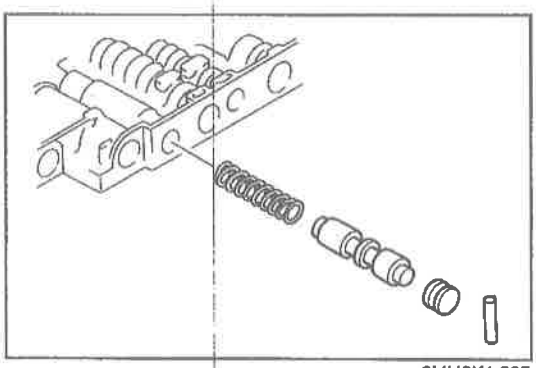


9MU0K1-323

Note
Align the notch of the sleeve with the plug and insert the stopper pin while pushing the plug.

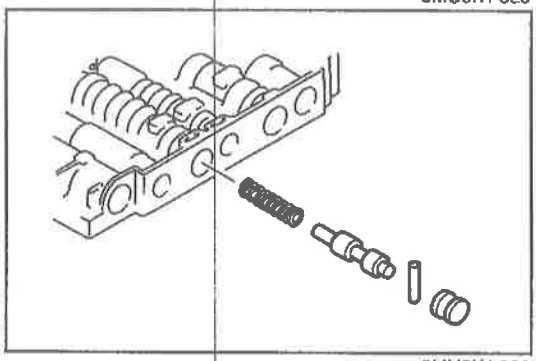

0BU0K2-115

7. Insert the accumulator control valve, sleeve, and plug.
8. Insert the stopper pin while pushing the plug.



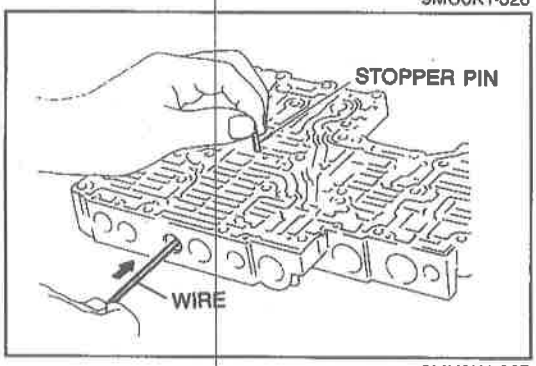
9MU0K1-325

9. Insert the shuttle valve D, spring, and plug.
10. Insert the stopper pin while pushing the plug.



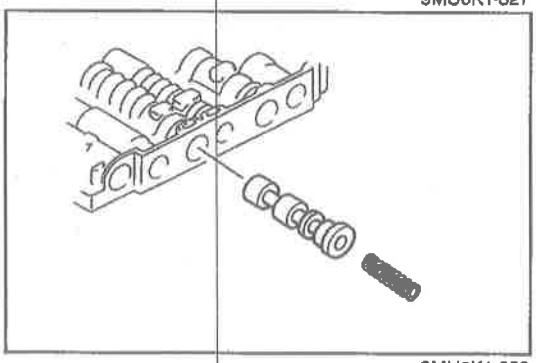
9MU0K1-326

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



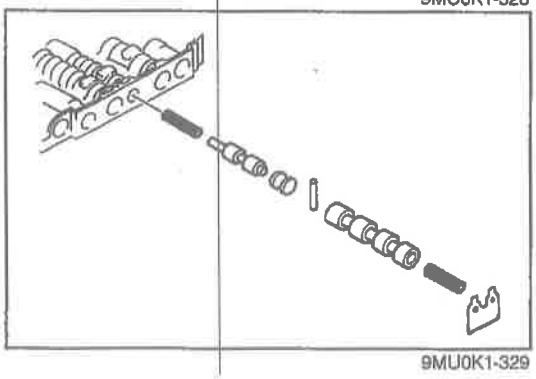
9MU0K1-327

12. Push in the plug with a vinyl tape wrapped **1.5mm (0.060 in)** diameter rod.
13. Insert the stopper pin.



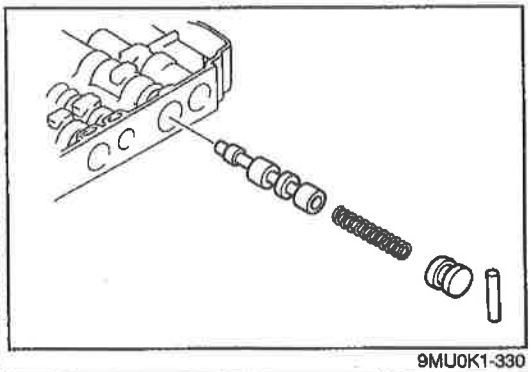
9MU0K1-328

14. Insert the shift valve B.
15. Insert the spring.



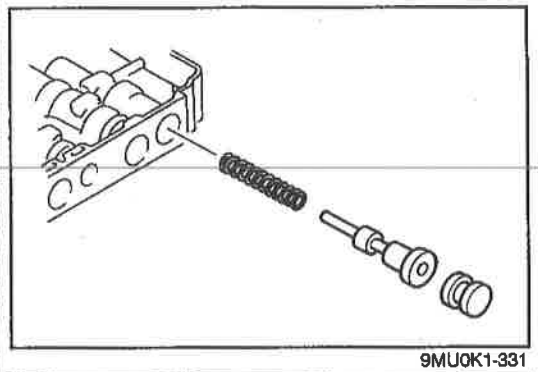
9MU0K1-329

16. Insert the 4-2 relay valve and spring.
17. Insert the stopper pin while pushing the plug.
18. Insert the shift valve A and spring.
19. Insert the retainer while compressing the spring.



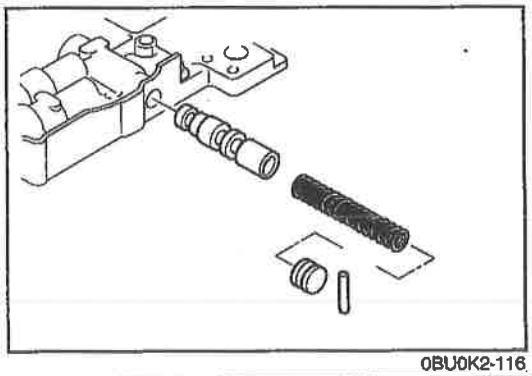
9MU0K1-330

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



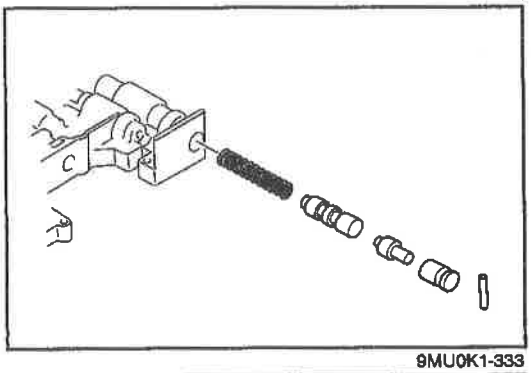
9MU0K1-331

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



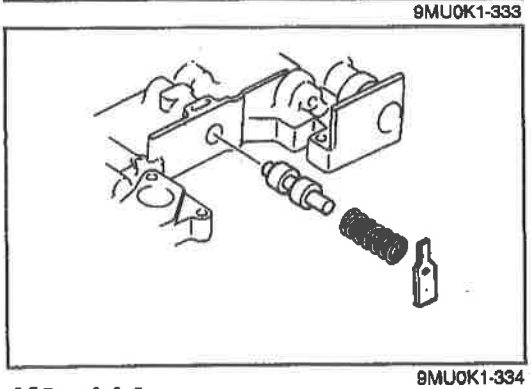
0BU0K2-116

24. Insert the shuttle shift valve S, spring, and plug.
25. Insert the stopper pin while pushing the plug.



9MU0K1-333

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



9MU0K1-334

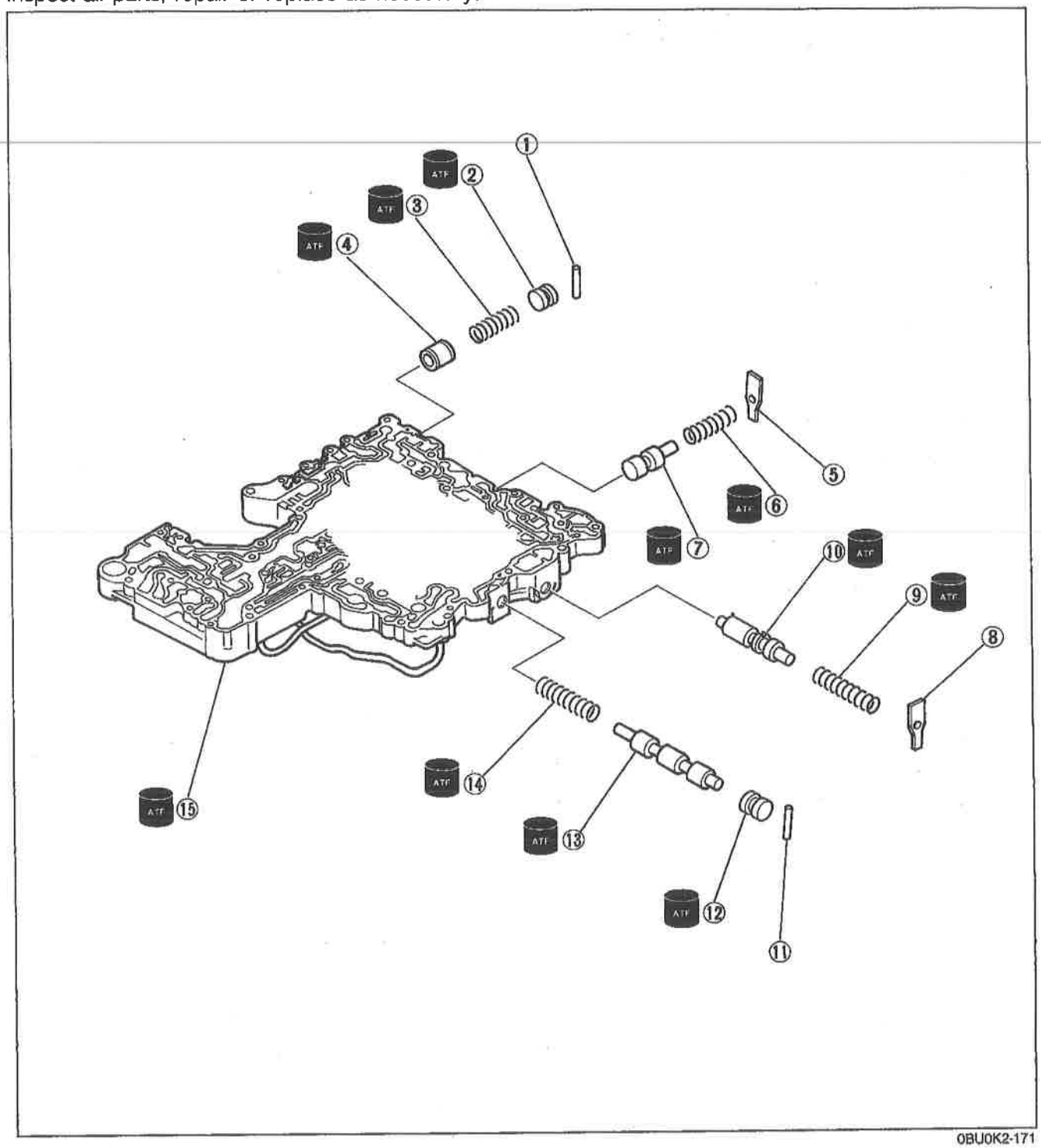
28. Insert the pilot valve and spring.
29. Insert the retainer while pushing the spring.

MEMO

LOWER VALVE BODY
Disassembly and Inspection

Caution
a) Each valve should slide out by its own weight.
b) When a valve will not slide out by its own weight, depending on the valve, push it out with a wire or place the valve body open-side down and lightly tap it with a soft hammer. Never scratch or otherwise damage the valve surface or bore.
c) Do not drop or lose the valves or internal parts.

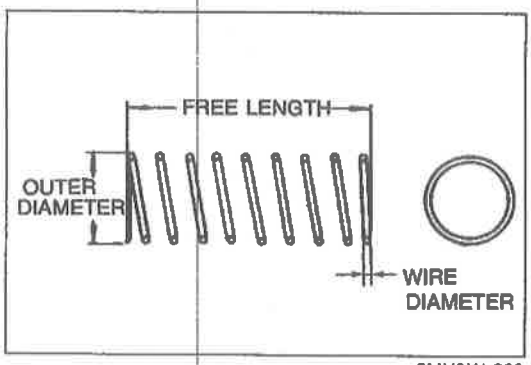
Disassemble in the order shown in the figure.
Inspect all parts, repair or replace as necessary.



0BU0K2-171

1. Stopper pin
   Disassembly Note ..... page K2–110
2. Modifier accumulator plug
3. Modifier accumulator spring
   Inspection ..... page K2–117
4. Modifier accumulator valve
   Inspect for sticking, scoring or scratches
5. Retainer
6. 1st reducing spring
   Inspection ..... page K2–117
7. 1st reducing valve
   Inspect for sticking, scoring or scratches
8. Retainer
   Disassembly Note ..... page K2–110
9. 3-2 timing spring
   Inspection ..... page K2–117
10. 3-2 timing valve
    Inspect for sticking, scoring or scratches
11. Stopper pin
    Disassembly Note ..... page K2–110
12. Servo charger plug
13. Servo charger valve
    Inspect for sticking, scoring or scratches
14. Servo charger spring
    Inspection ..... page K2–110
15. Lower valve body
    Inspect for damage or scoring

1BU0K2-058

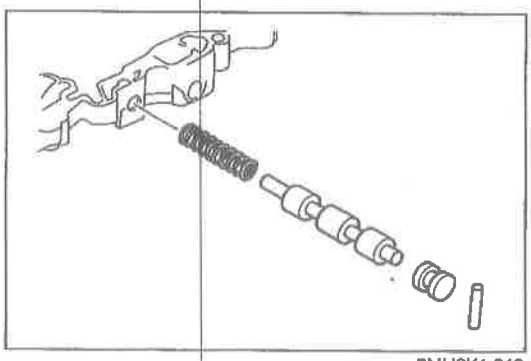


9MU0K1-338

Inspection
1. Measure the spring specifications.
2. If not within specification, replace the spring(s).

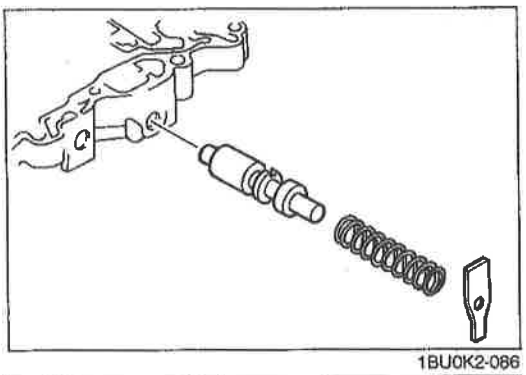
Spring \ Item	Outer dia. mm (in)	Free length mm (in)	No. of coils	Wire dia. mm (in)
Modifier accumulator piston	9.8 (0.386)	30.5 (1.201)	8.75	1.3 (0.051)
1st reducing valve	6.75 (0.266)	25.4 (1.0)	12.5	0.75 (0.030)
Servo charger valve	6.5 (0.256)	33.2 (1.307)	12.0	0.5 (0.020)
3-2 timing valve	6.75 (0.266)	20.55 (0.809)	7.5	0.75 (0.030)

1BU0K2-059

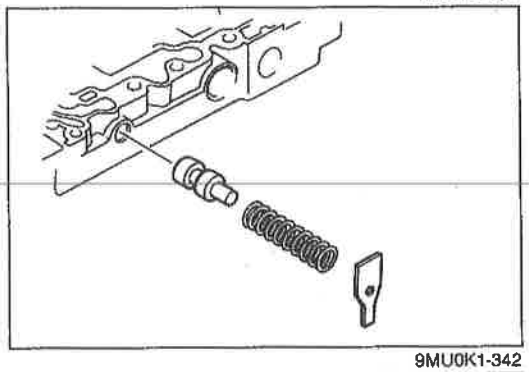


9MU0K1-340

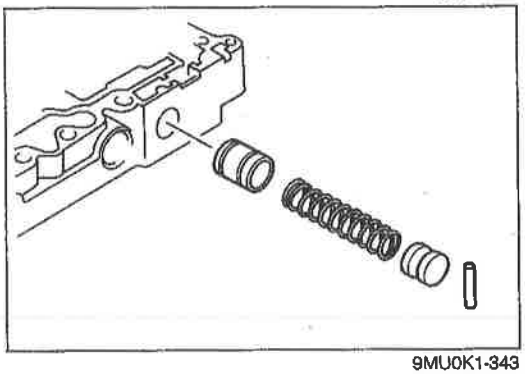
Installation
1. Insert the servo charger valve,spring, and plug.
2. Insert the stopper pin while pushing the plug.


1BU0K2-086

3. Insert the 3-2 timing valve and spring.
4. Insert the retainer while compressing the spring.

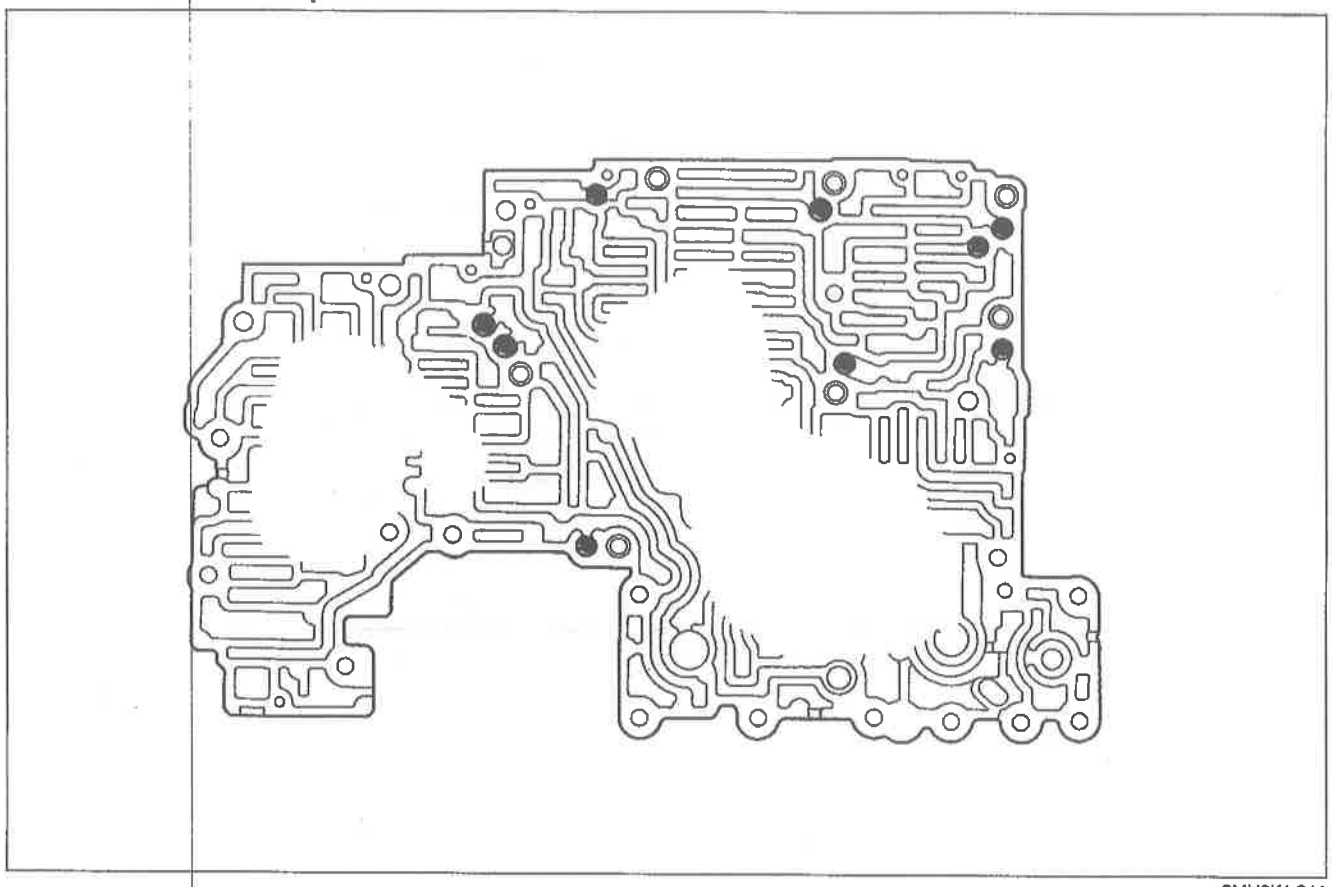

9MU0K1-342

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


9MU0K1-343

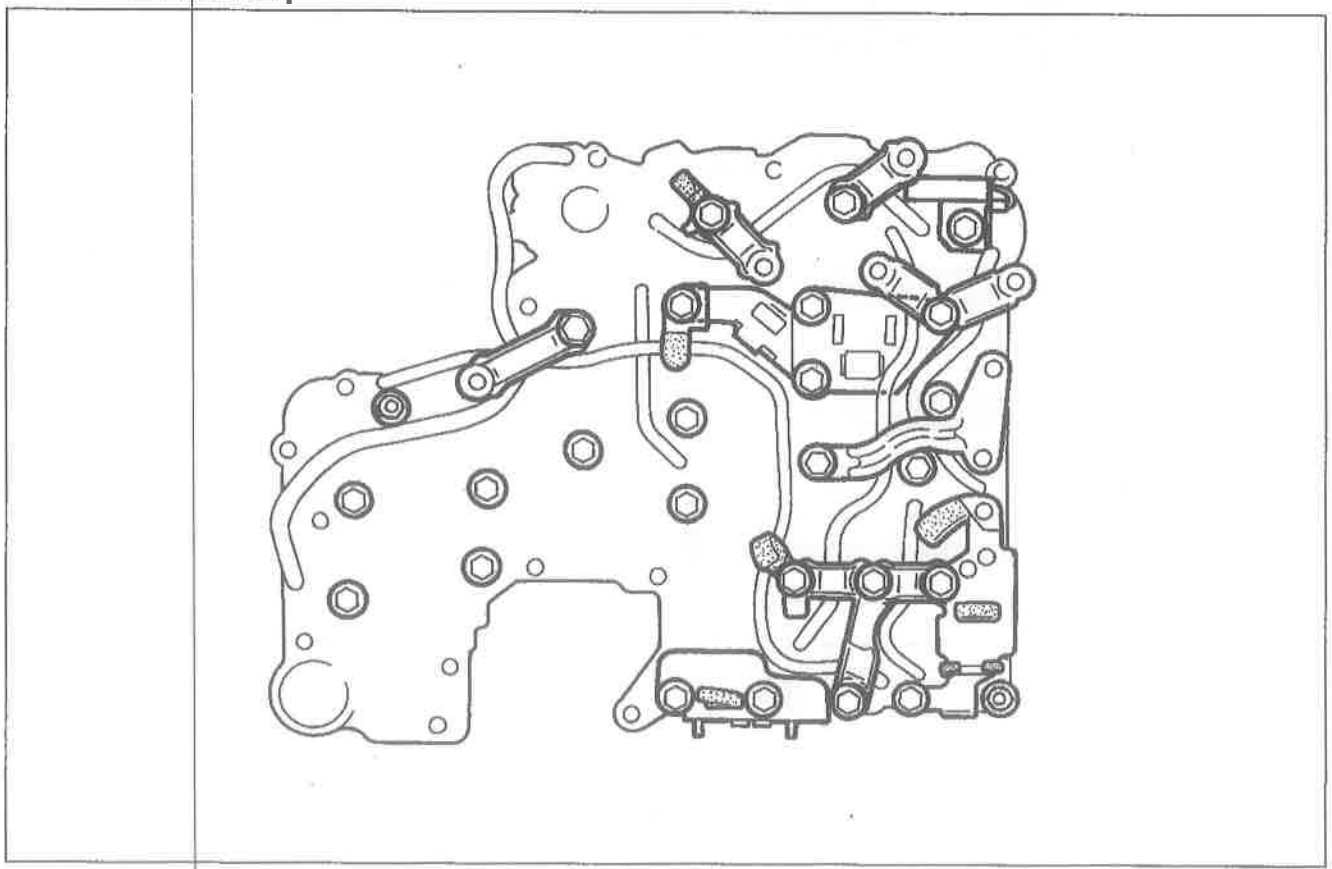
7. Insert the modifier accumulator valve, spring, and plug.
8. Insert the stopper pin while pushing the plug.

Steel ball installation positions



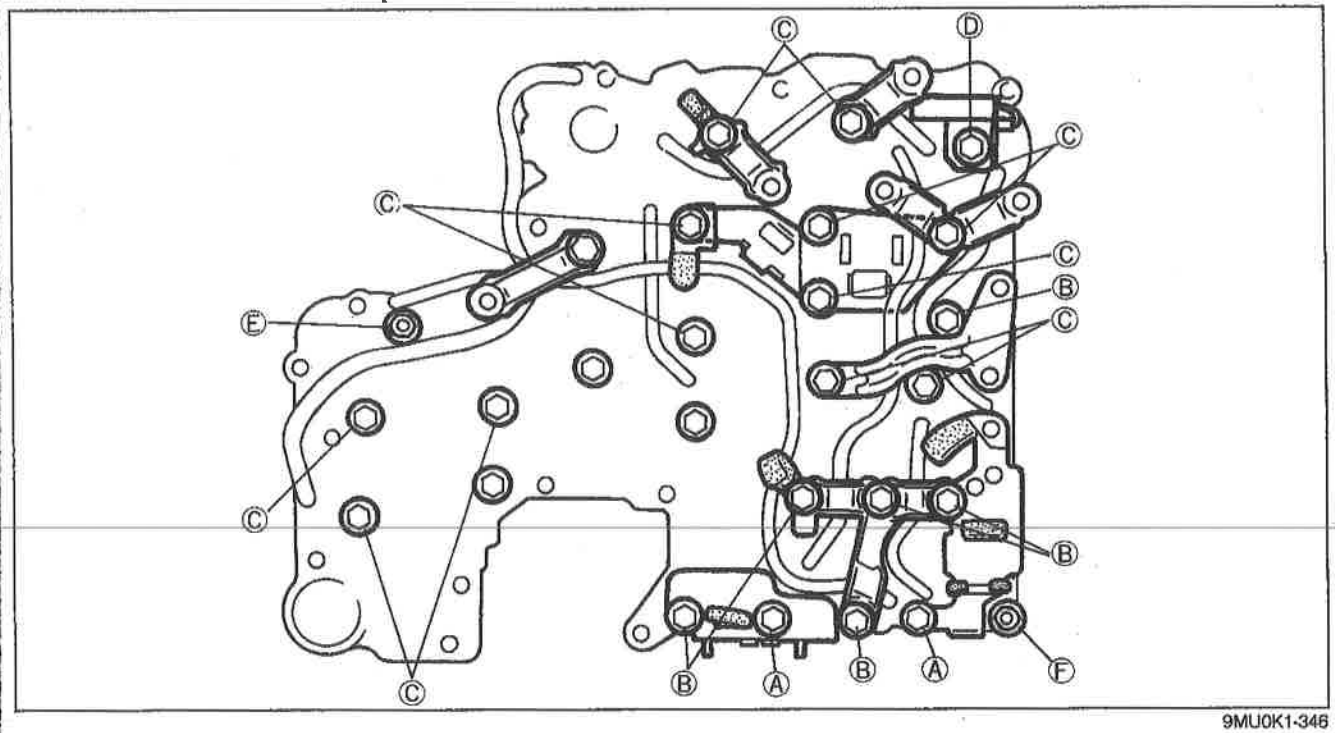
9MU0K1-344

Bracket installation positions

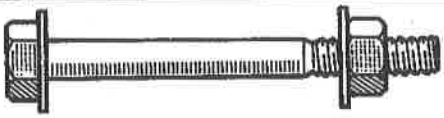


9MU0K1-345

Bolts and nuts installation positions



9MU0K1-346

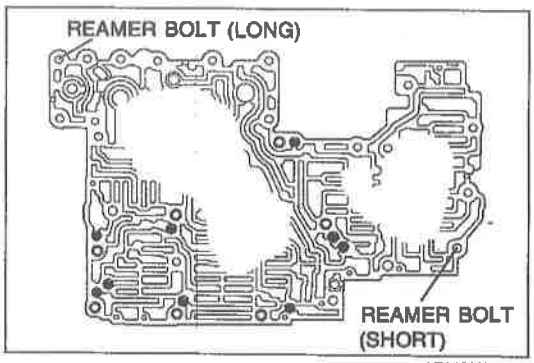
Identification letter	Bolts and nuts	Length mm (in)	Torque specification N·m (cm-kg, in-lb)
A		65 (2.559)	6.9—8.8 (70—90, 61—78)
B		50 (1.969)	
C		33 (1.299)	
D		27 (1.063)	
E		55 (2.165)	
F		40 (2.559)	
G		40 (2.559)	

0BU0K2-120

CONTROL VALVE BODY (ASSEMBLY)

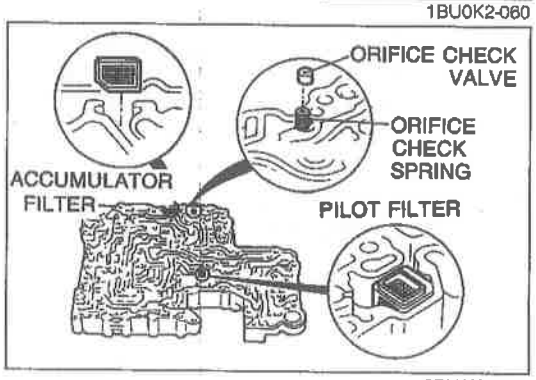
Caution
a) Before assembly, make sure all parts are perfectly clean.
b) Apply ATF to all parts.
Do not reuse the gasket or O-ring.

9MU0K1-348



1BU0K2-060

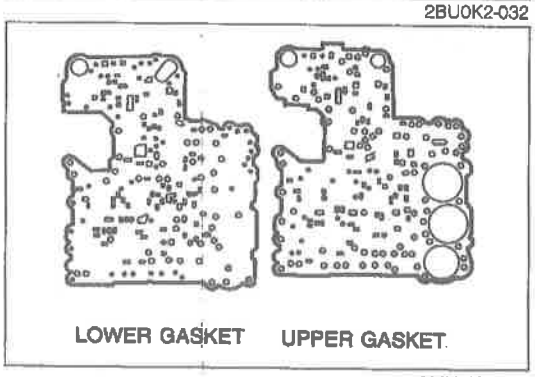
Procedure
1. Install the steel balls and reamer bolts into their proper positions of the upper valve body.
(Refer to page K2–121 for installation positions.)



2BU0K2-032

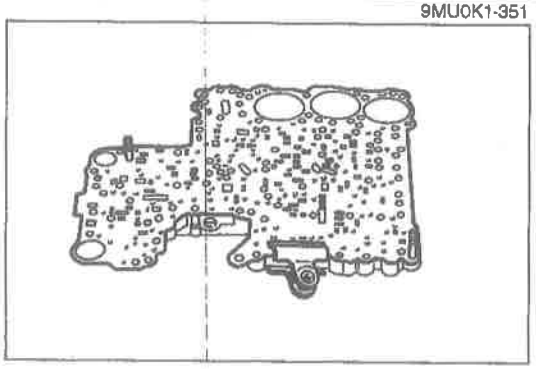
2. Install the pilot filter, accumulator filter, and orifice check valve and spring into their proper positions in the lower valve body.

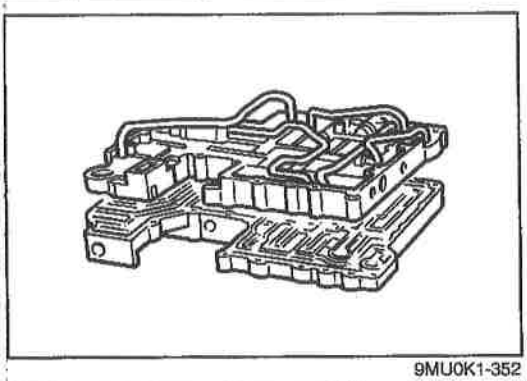
Caution
a) Do not mixup the upper and lower gaskets.
b) Do not scratch the lower valve body.



9MU0K1-351

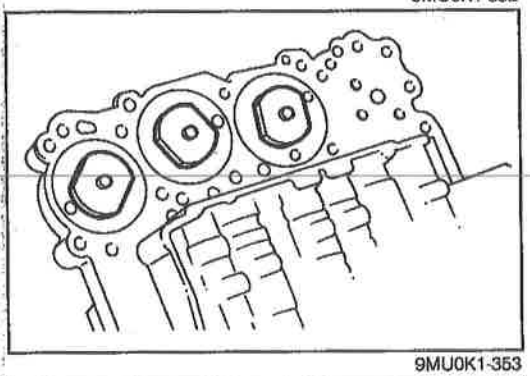
3. Install a new gasket and the separate plate onto the lower valve body and hold both them with a large clip.





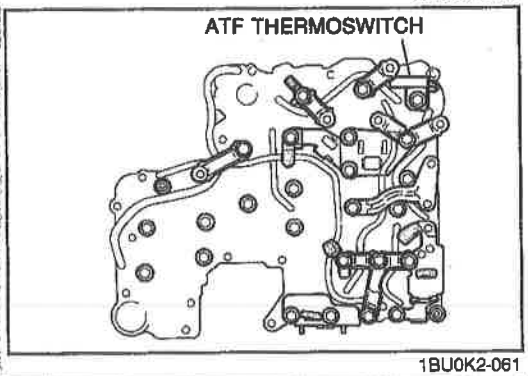
9MU0K1-352

4. Set the lower valve body onto the upper valve body.
5. Remove a holding clip.



9MU0K1-353

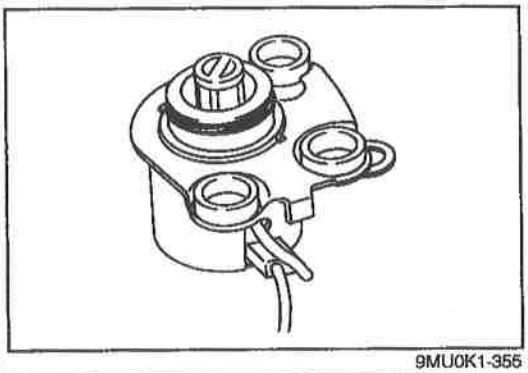
6. The support plate locations are as shown.



1BU0K2-061

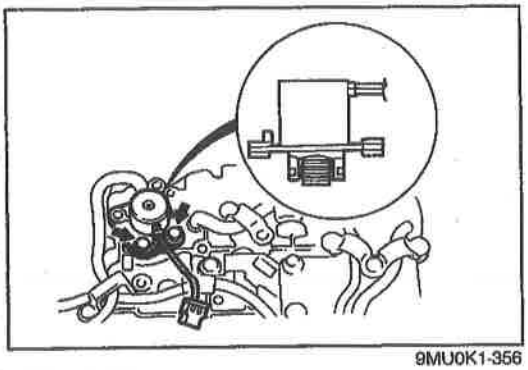
7. Install the bolts, nuts, support plates, ATF thermoswitch, and brackets in their proper positions. (Refer to page K2–122 for installation positions.) Tighten the fasteners evenly and gradually.

Tightening torque:
6.9—8.8 N·m (70—90 cm-kg, 61—78 in-lb)



9MU0K1-355

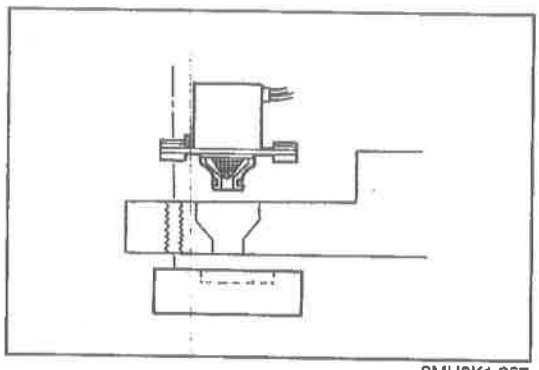
8. Install a new O-ring onto the lockup solenoid.



9MU0K1-356

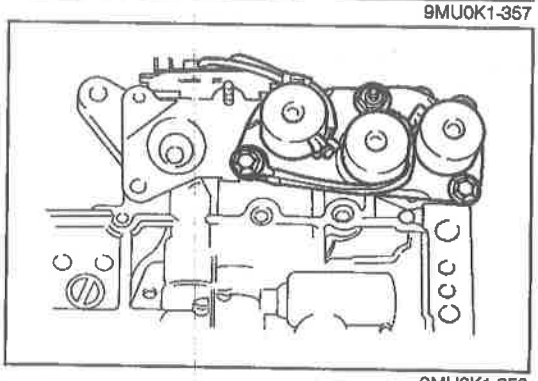
9. Install the lockup solenoid and side plate to the control valve body assembly.

Tightening torque:
9.8—13 N·m (1.0—1.3 m-kg, 87—113 in-lb)



9MU0K1-357

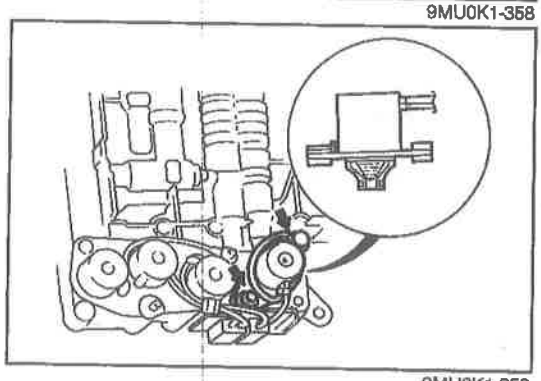
10. The side plate installation are as shown.



9MU0K1-358

11. Install the new O-rings onto the solenoids.
12. Install the solenoids into the control valve body assembly.

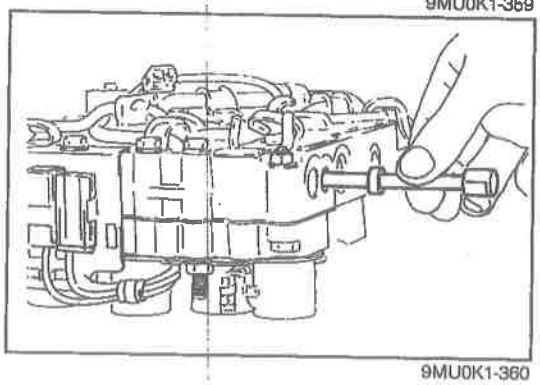
Tightening torque:
6.9—9.8 N·m (70—100 cm-kg, 61—87 in-lb)



9MU0K1-359

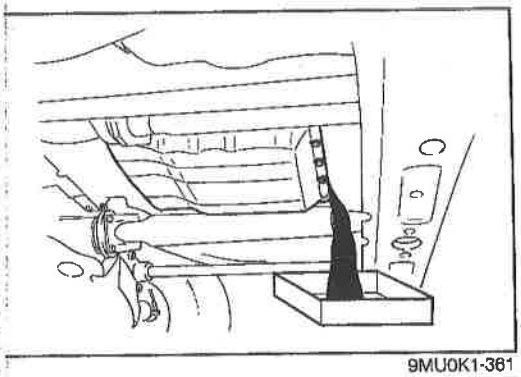
13. Install a new O-ring onto the line pressure solenoid.
14. Install the line pressure solenoid into the control valve body assembly.

Tightening torque:
6.9—9.8 N·m (70—100 cm-kg, 61—87 in-lb)



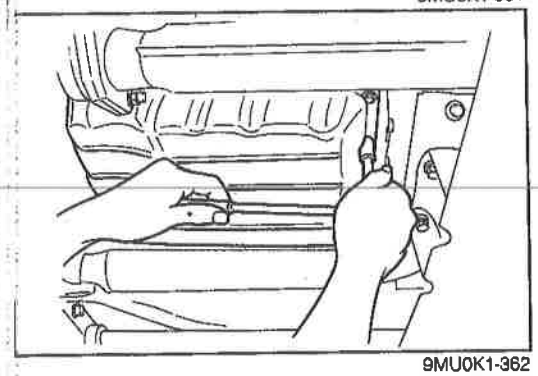
9MU0K1-360

15. Insert the manual valve.

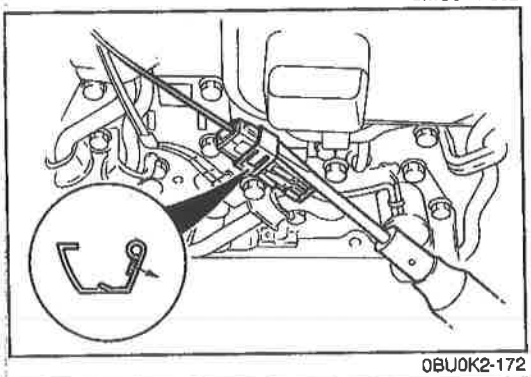

9MU0K1-361

ON-VEHICLE REMOVAL

1. Disconnect the negative battery cable.
2. Jack up the vehicle and support it with a safety stand.
3. Loosen the oil pan installation bolts, and drain the ATF into a container.


9MU0K1-362

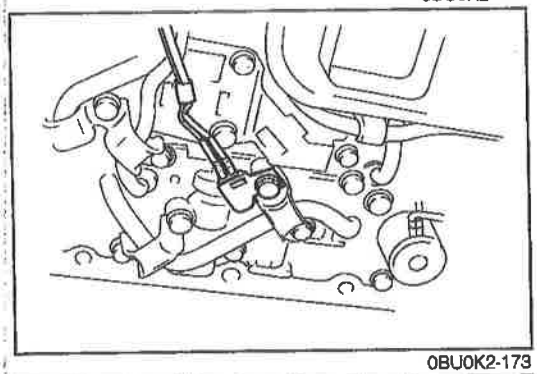
4. Remove the oil pan and gasket.
5. Remove the magnet from the oil pan.


0BU0K2-172

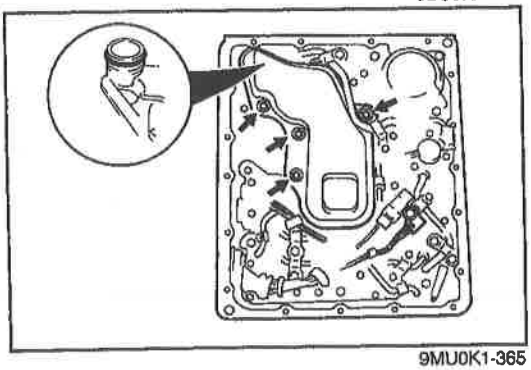
6. Remove the clip.

Caution
Do not damage the harness.

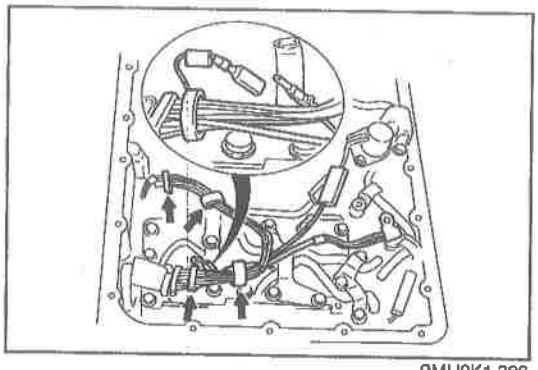
7. Disconnect the lockup solenoid connector.


0BU0K2-173

8. Disconnect the ATF thermosensor.

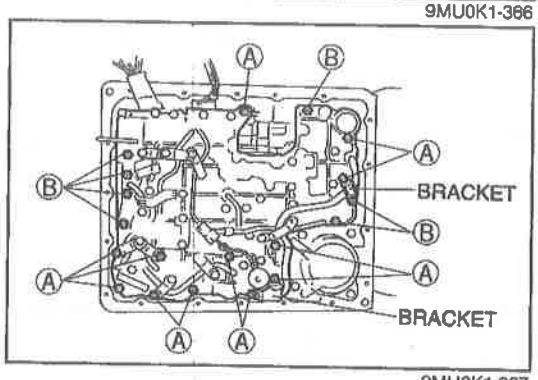

9MU0K1-365

9. Remove the oil strainer.
10. Remove the O-ring from the oil strainer.



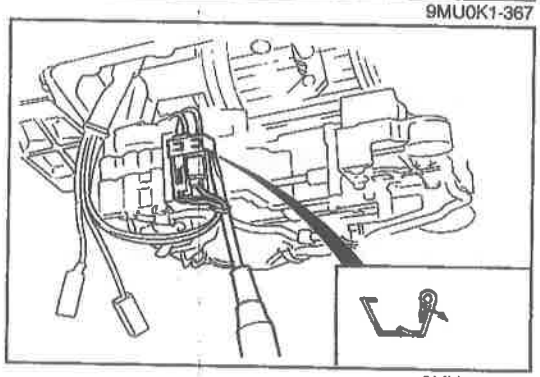
9MU0K1-366

11. Separate the harness of the solenoid connectors from the harness clip.



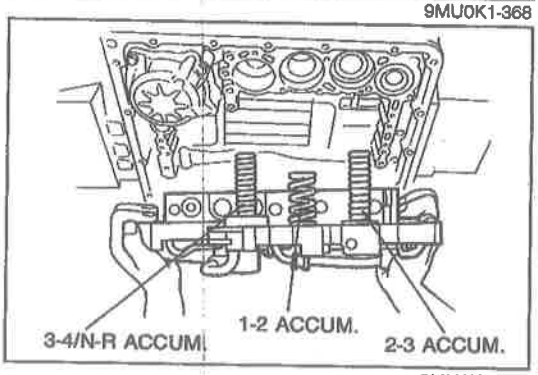
9MU0K1-367

12. Remove the Ⓐ and Ⓑ bolts and bracket shown in the figure.



9MU0K1-368

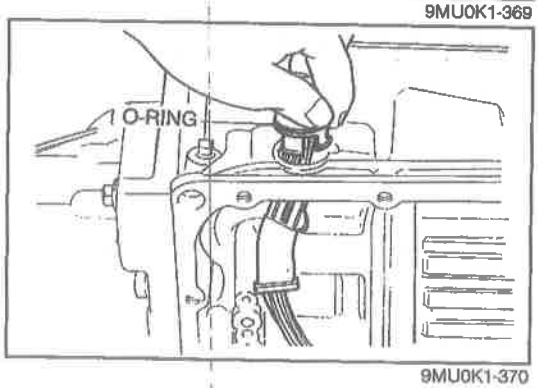
13. Remove the clip.
14. Separate the solenoid connectors.



9MU0K1-369

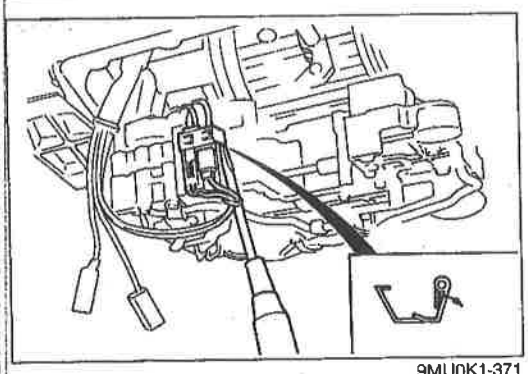
Caution
a) Do not damage the oil pipes.
b) Do not drop the springs.

15. Remove the control valve body assembly and accumulator springs.

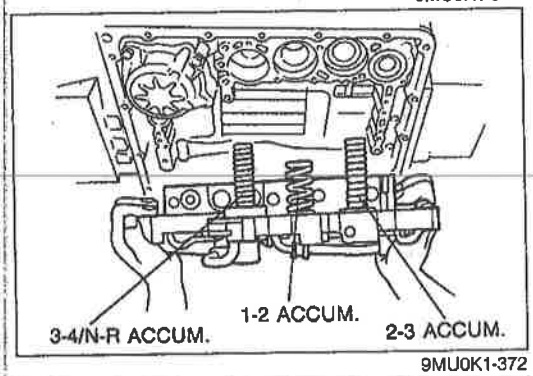


9MU0K1-370

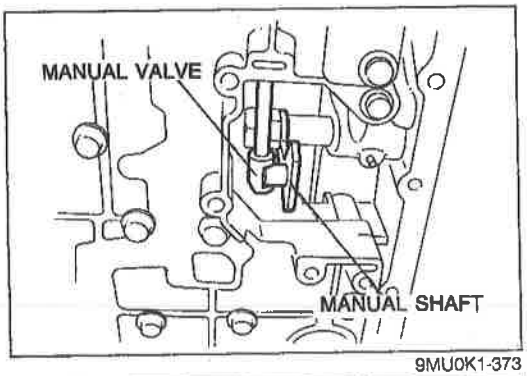
16. If necessary, remove the solenoid connector from the transmission case.



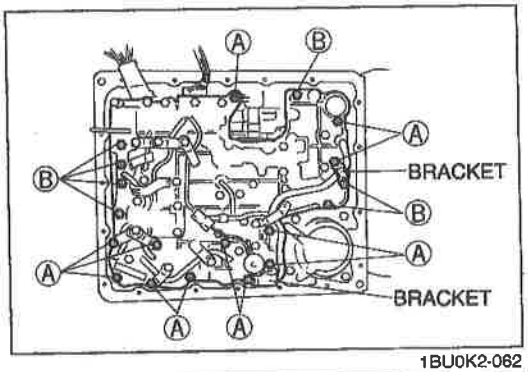
9MU0K1-371



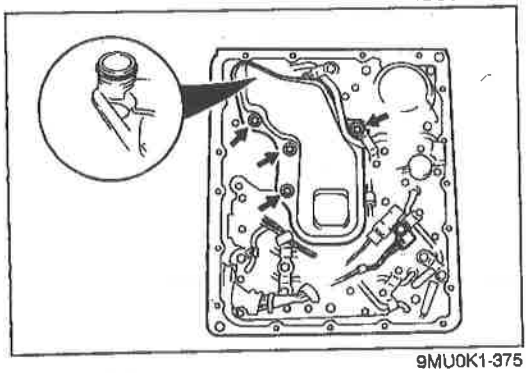
9MU0K1-372



9MU0K1-373



1BU0K2-062



9MU0K1-375

ON-VEHICLE INSTALLATION

1. Install the solenoid connector into the transmission case if removed.
2. Connect the solenoid connector to the solenoids.
3. Install the clip.

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

Spring specifications

mm (in)

Item / Spring	Outer dia	Free length	No. of coil	Wire dia.
3-4/N-R accumulator piston	17.3 (0.681)	58.4 (2.299)	12.3	2.3 (0.091)
1-2 accumulator piston	29.3 (1.154)	45.0 (1.772)	3.6	4.0 (0.157)
2-3 accumulator piston	20.0 (0.787)	66.0 (2.598)	11.4	3.5 (0.138)

Note
a) Verify that the manual valve and manual shaft are assembled correctly.
b) Verify that the accumulator springs are installed correctly.

5. Set the control valve into the transmission case and secure it.

6. Install the control valve mounting bolts and brackets as shown.

Bolt length (Measured from below the head)
Ⓐ: 33mm (1.299 in)
Ⓑ: 45mm (1.772 in)

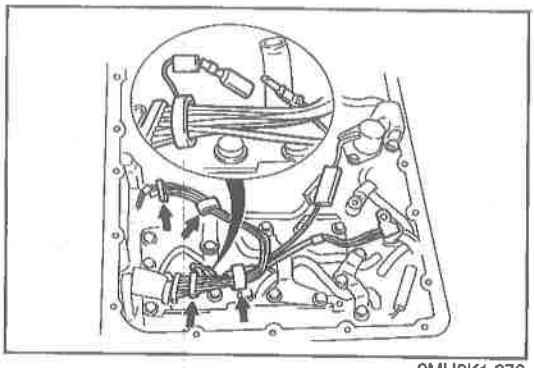
7. Tighten the bolts in sequence.

Tightening torque:
6.9—8.8 N·m (70—90 cm-kg, 61—78 in-lb)

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

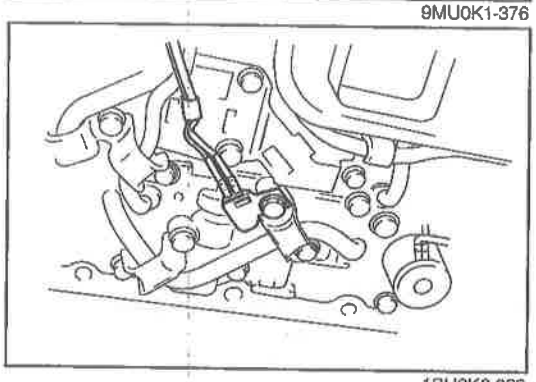
Bolt length (Measured from below the head):
50mm (1.969 in)

Tightening torque:
6.9—8.8 N·m (70—90 cm-kg, 61—78 in-lb)



9MU0K1-376

10. Mount the harness of the solenoid connectors with the harness clip.

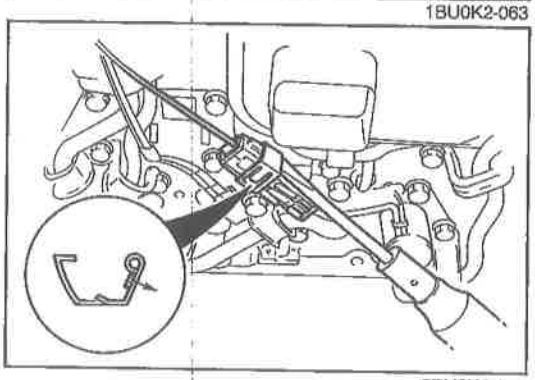


1BU0K2-063

11. Install the ATF thermosensor.

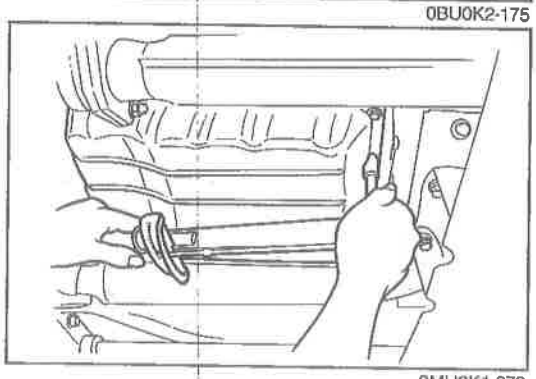
Tightening torque:
6.9—8.8 N·m (70—90 cm-kg, 61—78 in-lb)

Bolt length (Measured from below the head):
33mm (1.299 in)



0BU0K2-175

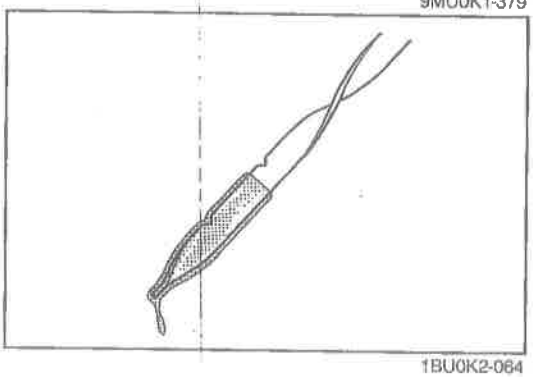
12. Connect the lockup solenoid connector.
13. Install the clip.



9MU0K1-379

14. Set the magnet into the oil pan.
15. Install the oil pan along with a new gasket.

Tightening torque:
4.9—7.8 Nm (50—80 cm-kg, 43—69 in-lb)



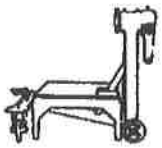
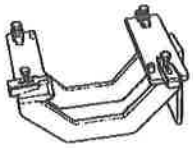
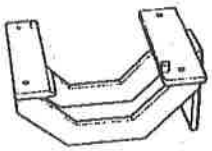
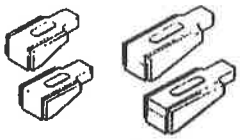
1BU0K2-064

16. Add **approx. 4.0 liters (4.2 US qt, 3.5 Imp qt)** ATF, and check the ATF level. (Refer to page K2–42.)

TRANSMISSION UNIT (ASSEMBLY)

Preparation

SST

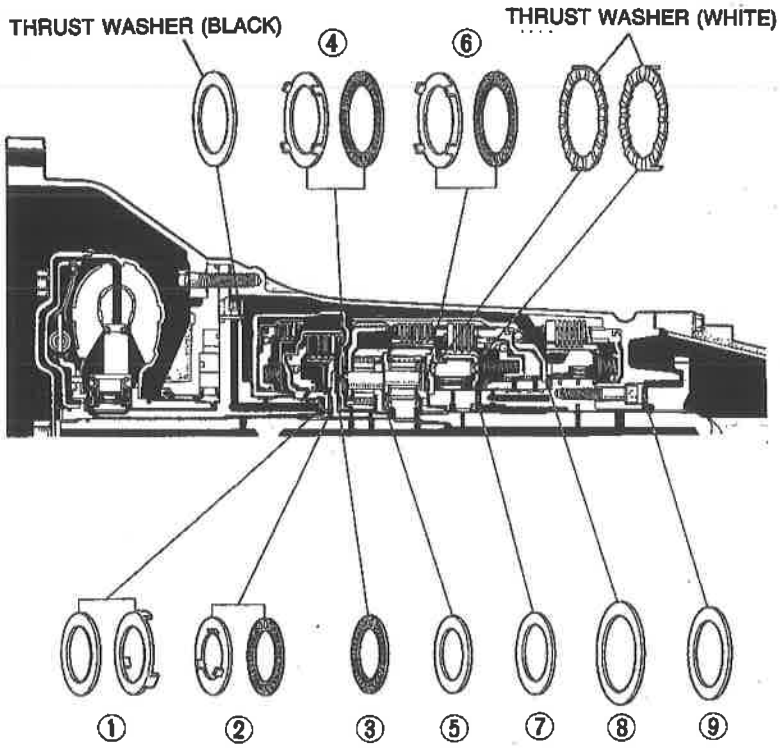
49 0107 680A Engine stand 	49 U019 0A0A Transmission hanger 	49 H075 495B Body (Part of 49 U019 0A0A) 
49 U019 003 Holder (Part of 49 U019 0A0A) 		

2BU0K2-033

Precaution

1. If the drive plates or brake band is replaced with new ones, soak 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 race locations



9MU0K1-382

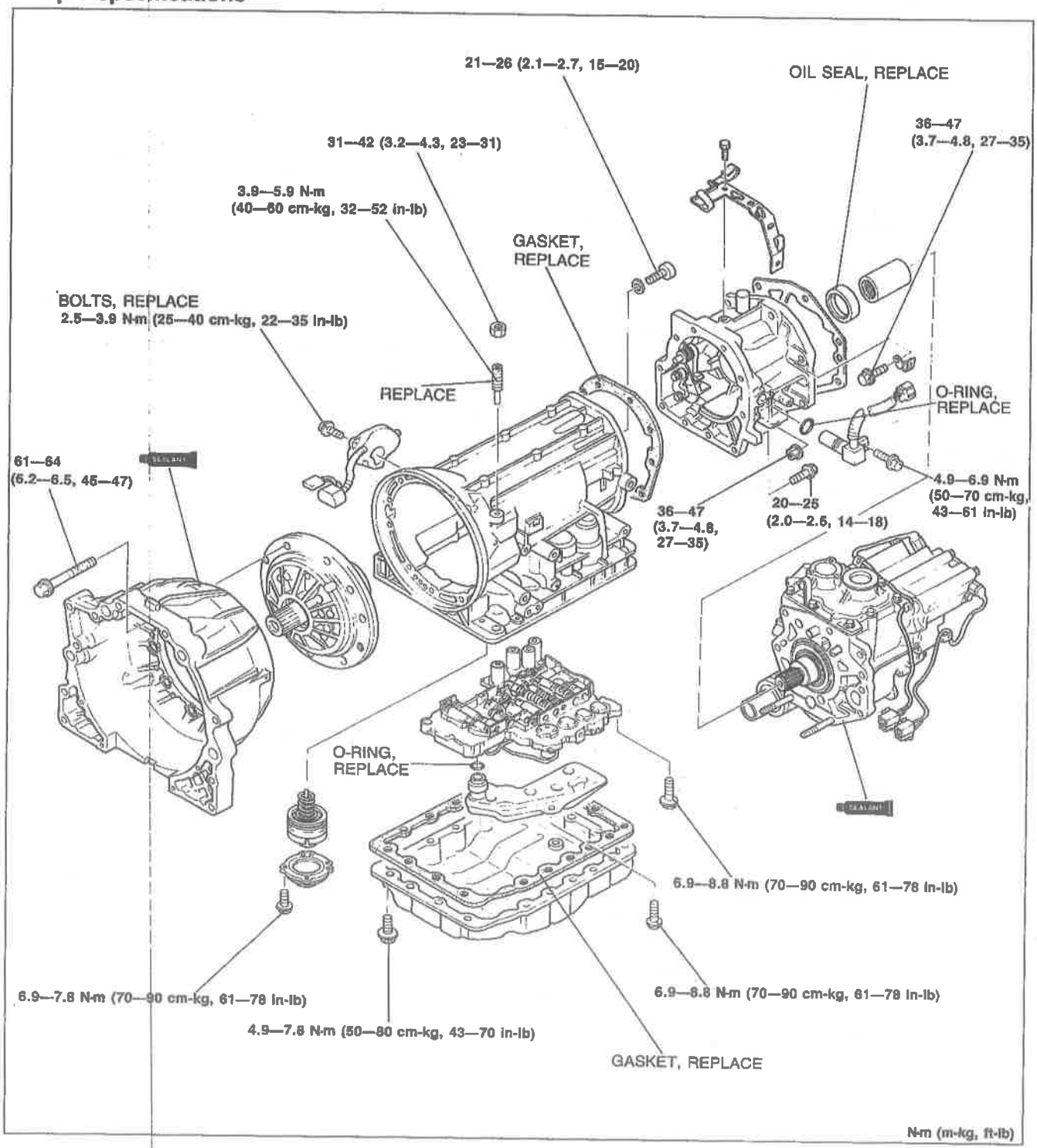
Outer diameter of bearing and race

		1	2	3	4	5	6
Bearing	mm (in)	47.0 (1.850)	53.0 (2.087)	53.0 (2.087)	78.0 (3.071)	53.0 (2.087)	78.0 (3.071)
Race	mm (in)	43.5 (1.713)	51.5 (2.028)	—	75.0 (2.953)	—	75.0 (2.953)

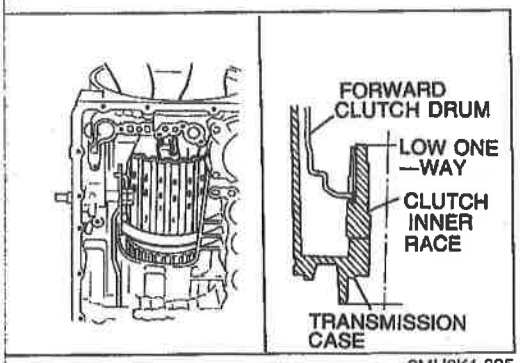
		7	8	9
Bearing	mm (in)	59.0 (2.323)	78.1 (3.075)	64.0 (2.520)
Race	mm (in)	—	—	—

9MU0K1-383

Torque specifications



9MU0K1-384

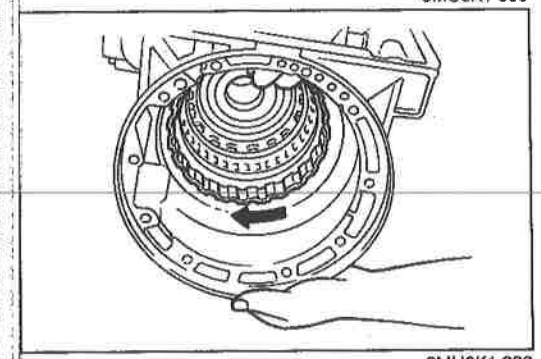


9MU0K1-385

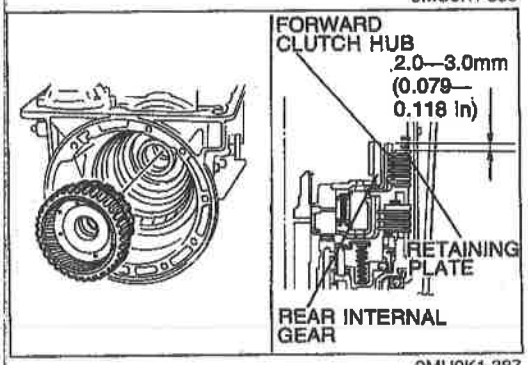
Procedure

Caution
Do not damage the seal ring on the low one-way clutch inner race.

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


9MU0K1-386

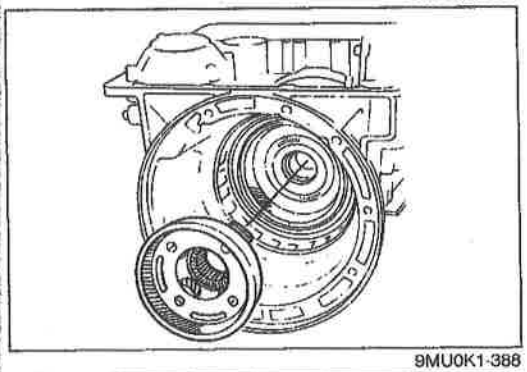
2. Verify that the forward clutch assembly will turn only clockwise.



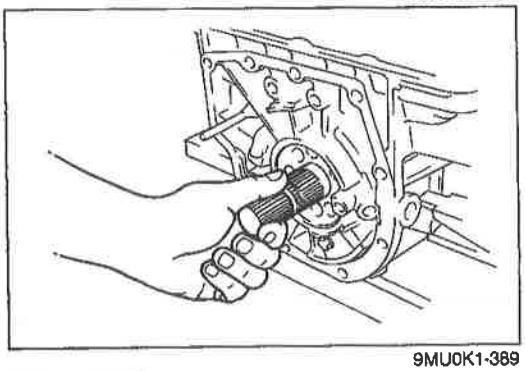
9MU0K1-387

3. Install the rear internal gear, forward clutch hub, and overrunning clutch hub in the forward clutch assembly.
4. Measure the height difference between forward clutch retaining plate and top of the forward clutch drum.

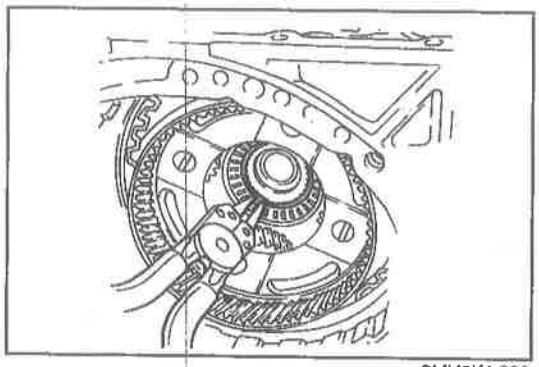
Height: Approx. 2.0—3.0mm (0.079—0.118 In)


9MU0K1-388

5. Install the front internal gear and rear planetary carrier into the forward clutch assembly.

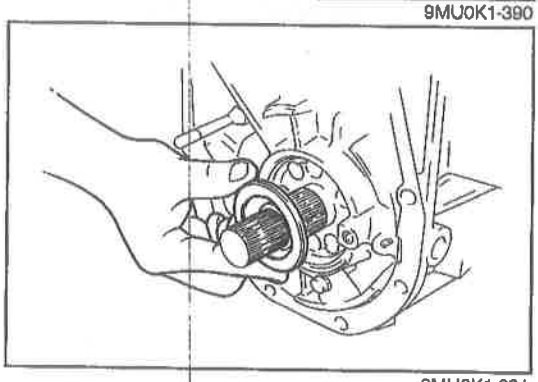

9MU0K1-389

6. Insert the output shaft.



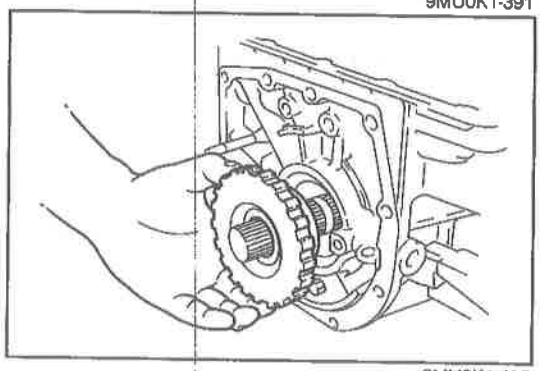
9MU0K1-390

7. Push the output shaft forward slightly, and install a new snap ring on it. Verify that the output shaft will not be removed from the rear.



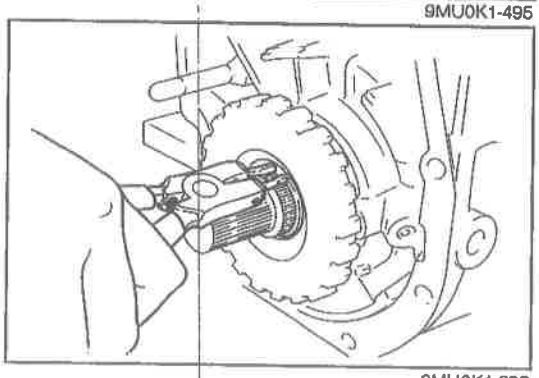
9MU0K1-391

8. Apply petroleum jelly to the bearing and install it to the transmission case with the black surface facing toward the rear.



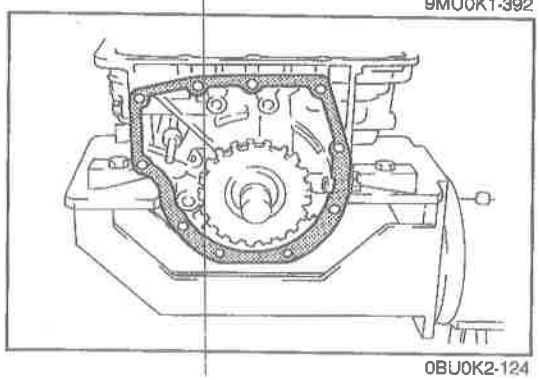
9MU0K1-495

9. Install the parking gear.



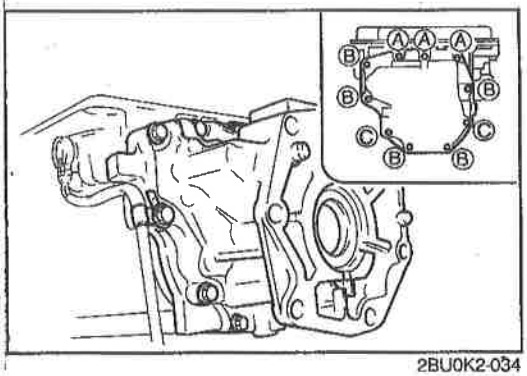
9MU0K1-392

10. Pull the output shaft back slightly, and install a new snap ring on it. Verify that the output shaft will not move forward.



0BU0K2-124

11. Install the new gasket.



2BU0K2-034

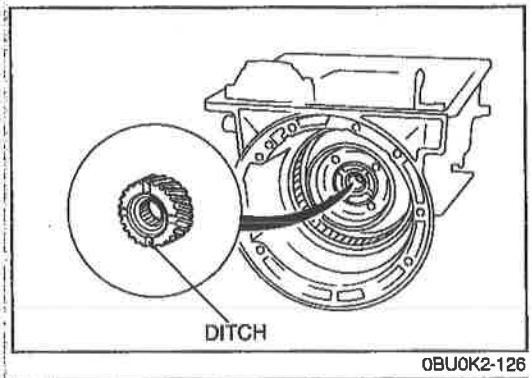
12. Install the extension housing.

Bolt length (Measured from below the head)
Ⓐ: 30mm (1.181 in)
Ⓑ: 45mm (1.772 in)
Ⓒ: 50mm (1.969 in)

Tightening torque:
20—25 N·m (2.0—2.5 m-kg, 14—18 ft-lb)

13. Install the O-ring onto the speedometer driven gear.
14. Install the speedometer driven gear into the extension housing.

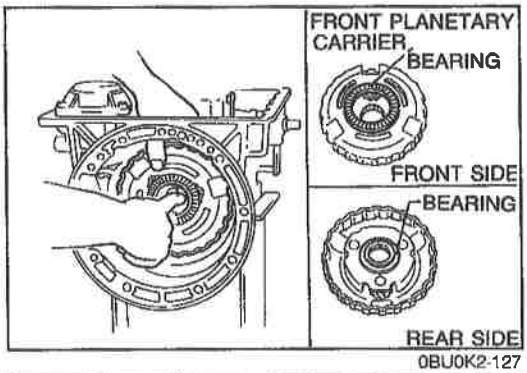
Tightening torque:
4.9—6.9 N·m (50—70 cm-kg, 43—61 in-lb)



0BU0K2-126

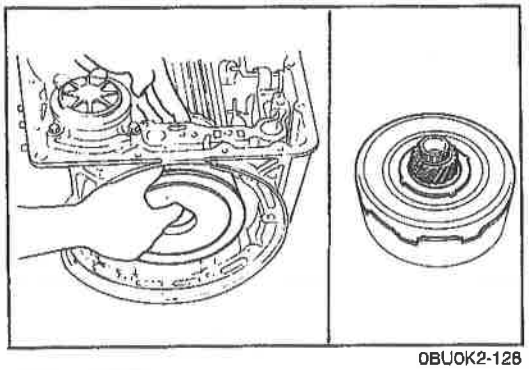
Caution
Be sure the oil grooves of the rear sun gear face forward as shown.

15. Install the rear sun gear into the front internal gear.



0BU0K2-127

16. Check that the bearing, and bearing race are installed correctly.
17. While rotating the forward clutch drum clockwise, install the front planetary carrier into the forward clutch assembly.

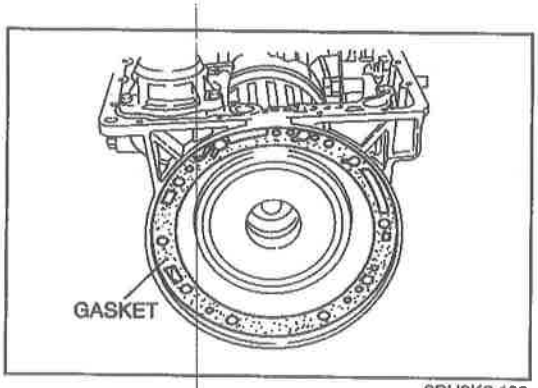

0BU0K2-128

18. The reverse clutch, high clutch, and front sun gear. Install into the transmission case as an assembly.

Caution
When any parts listed in the following table is replaced, total end play or reverse clutch end play must be adjusted.

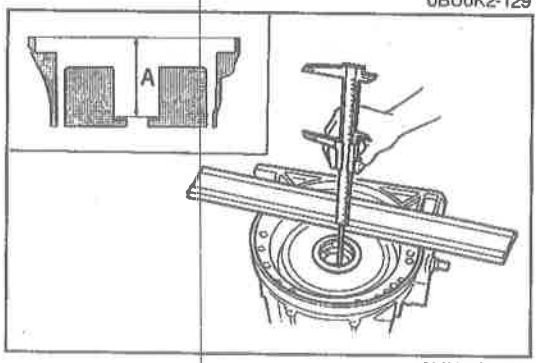
Part name \ Item	Total end play	Reverse end play
Transmission case	○	○
Low one-way clutch inner race	○	○
Overrunning clutch hub	○	○
Rear internal gear	○	○
Rear planetary carrier	○	○
Rear sun gear	○	○
Front planetary carrier	○	○
Front sun gear	○	○
High clutch hub	○	○
High clutch drum	○	○
Oil pump cover	○	○
Reverse clutch drum	—	○

9MU0K1-399



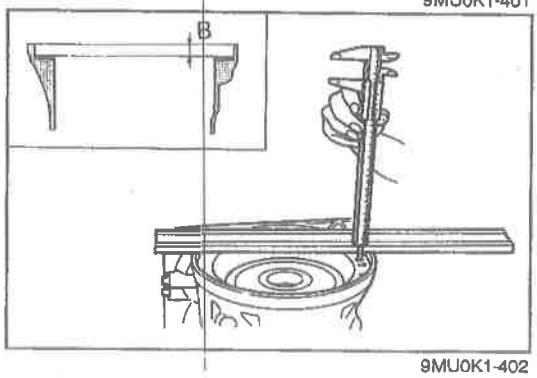
0BU0K2-129

19. Adjust total end play.
    (1) Install the oil pump gasket.



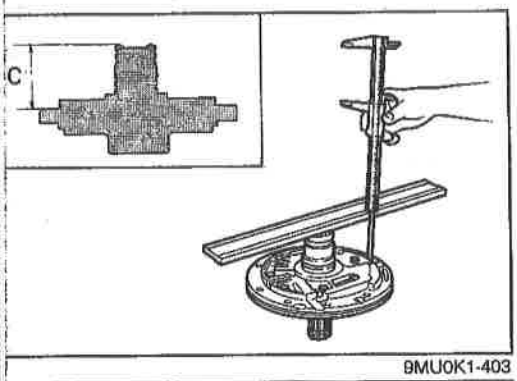
9MU0K1-401

(2) Measure height A with vernier calipers and a straight edge.

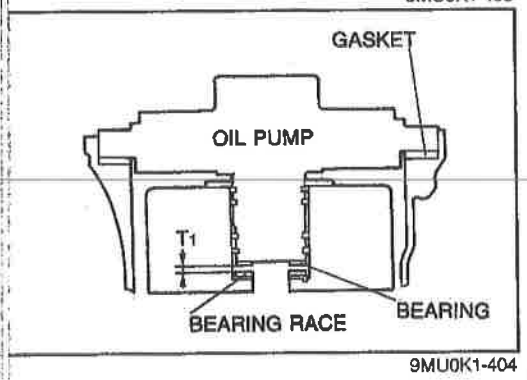


9MU0K1-402

(3) Measure height B with vernier calipers.



9MU0K1-403



9MU0K1-404

(4) Install the needle bearing on the oil pump.
(5) Measure height C with vernier calipers and a straight edge.
(6) Calculate the total end play by using the formula below.

Formula: T1 = A—B—C—0.1mm (0.0039 In)

T1 : Oil pump end play
A : Distance between bearing race of front side of transmission case and reverse clutch
B : Distance between front side of transmission case and oil pump gasket
C : Distance between upper surface of needle bearing of oil pump and oil pump gasket contact surface
0.1: Amount of compression of new oil pump gasket

Oil pump end play specification:
0.25—0.55mm (0.010—0.022 in)

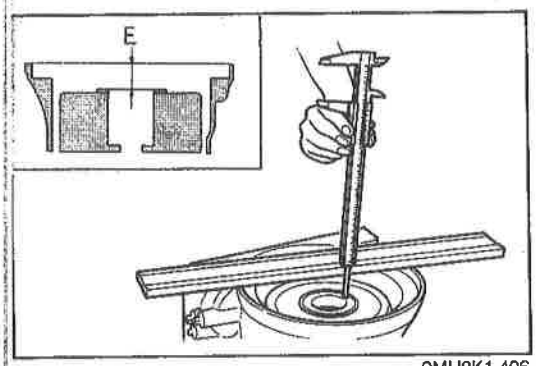
(7) If the total end play is not within specification, adjust it by selecting and installing the proper bearing race.

Bearing race size

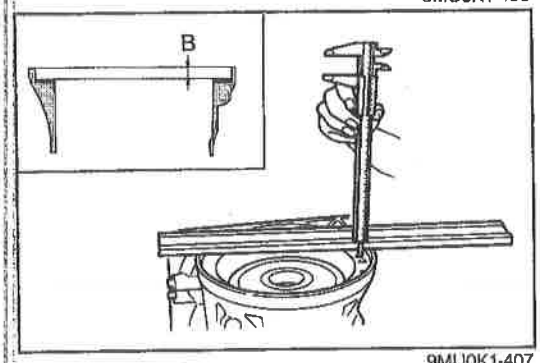
mm (in)

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)	

9MU0K1-405



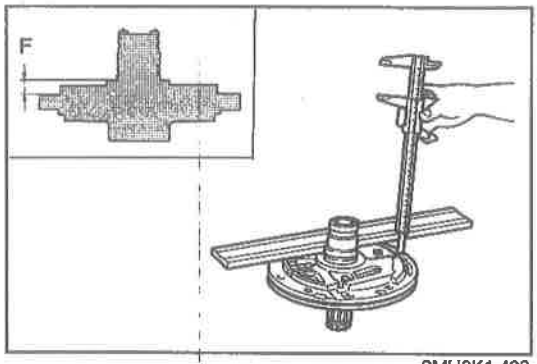
9MU0K1-406



9MU0K1-407

20. Adjust reverse clutch end play.
(1) Install the thrust washer on the reverse clutch.
(2) Measure height E with vernier calipers and a straight edge.

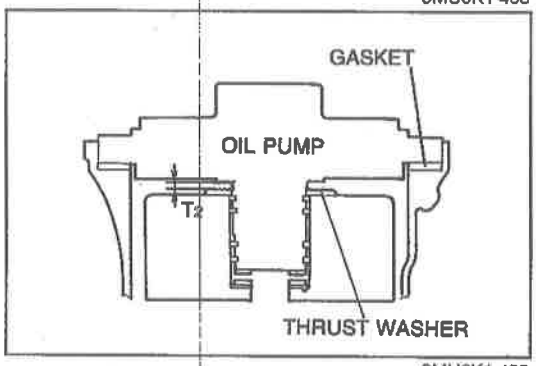
(3) Measure height B with vernier calipers and a straight edge.



9MU0K1-408

(4) Measure height F with vernier calipers and a straight edge.
(5) Calculate the reverse clutch end play by using the formula below.

Formula: T2 = E—B—F—0.1mm (0.0039 in)



9MU0K1-409

T2 : Reverse clutch end play
B : Distance between front side of transmission case and oil pump gasket
E : Distance between thrust washers of front side of transmission case and reverse clutch
F : Distance between reverse clutch thrust washer contact surface of oil pump and oil pump gasket contact surface
0.1: Amount of compression of new oil pump gasket

Reverse clutch end play specification:
0.55—0.90mm (0.022—0.035 in)

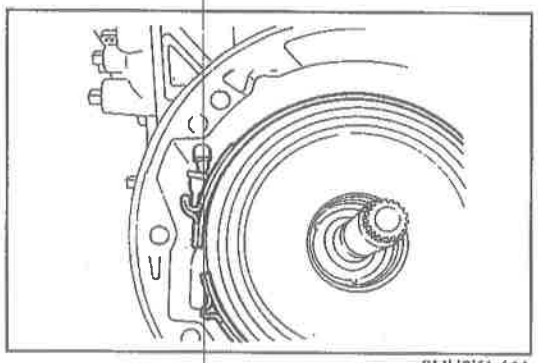
(6) If the reverse clutch end play is not within specification, adjust it by selecting and installing the proper reverse clutch thrust washer.

Thrust washer size

mm (in)

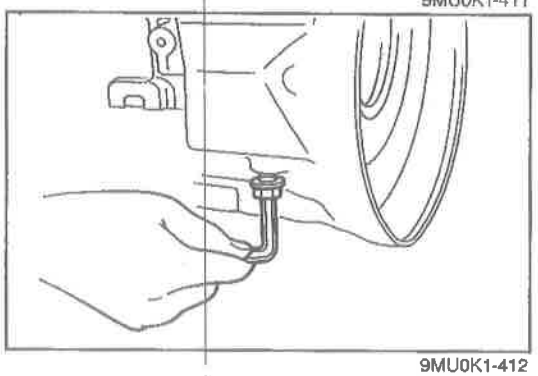
0.7 (0.028)	0.9 (0.035)	1.1 (0.043)	1.3 (0.051)
1.5 (0.059)	1.7 (0.067)	1.9 (0.075)	

9MU0K1-410



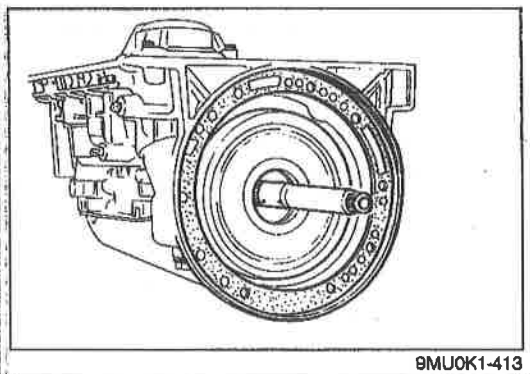
9MU0K1-411

21. Apply ATF to the brake band and band strut, and install them into the transmission.



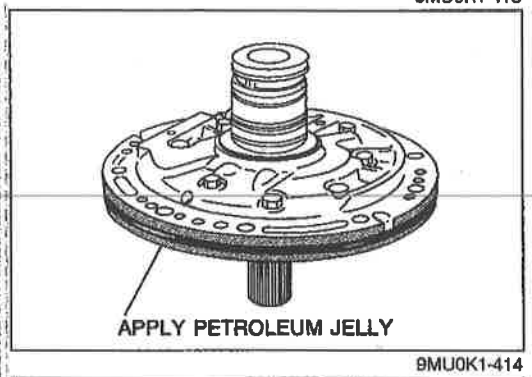
9MU0K1-412

22. Install a new anchor end bolt.



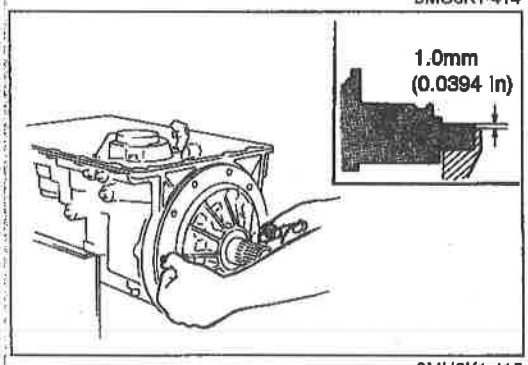
9MU0K1-413

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



9MU0K1-414

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

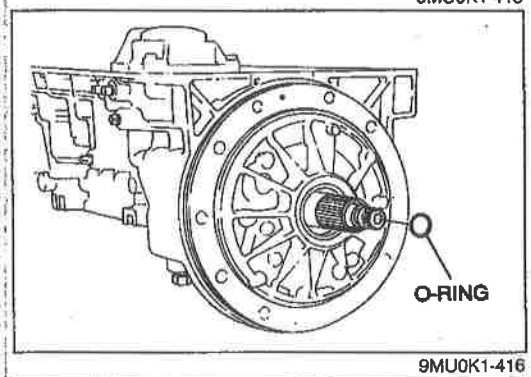


9MU0K1-415

Caution
a) Do not damage the seal rings or O-ring.
b) Do not use a hammer, plastic or any other kind to install the oil pump.

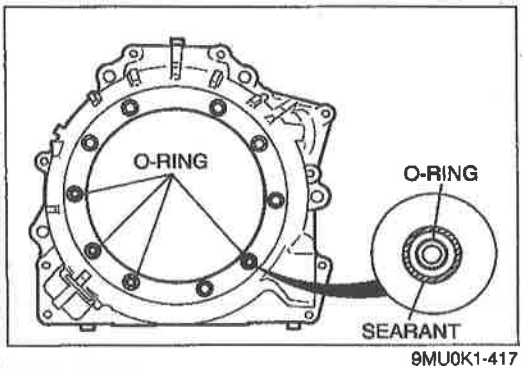
25. Turn the transmission as shown.
Install the oil pump assembly into the transmission case by using two converter housing bolts as a guide.
Measure the height difference between top of the transmission case and oil pump as shown.

Height: Approx. 1.0mm (0.039 in)



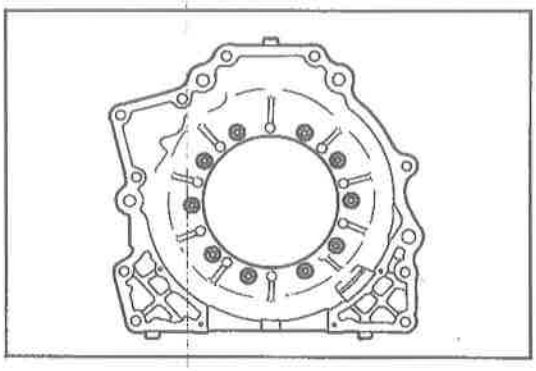
9MU0K1-416

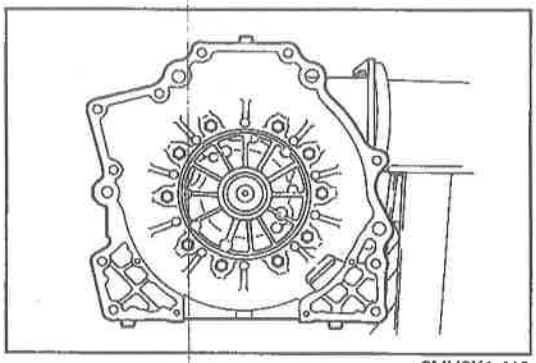
26. Apply ATF to a new O-ring, and install it onto the input shaft.



9MU0K1-417

27. Apply ATF to the new O-rings, and install them into the converter housing, as shown.
28. Apply sealant lightly, as shown.

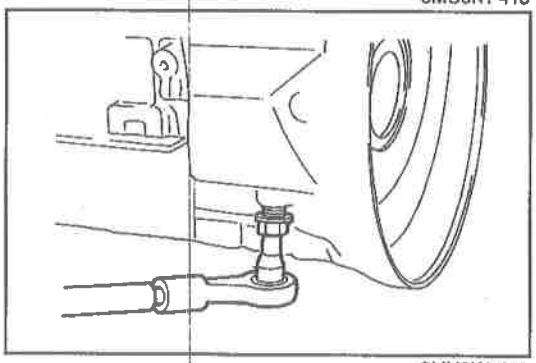




9MU0K1-418

29. Remove the converter housing bolts used as guide.
30. Install the converter housing onto the transmission case, and tighten the bolts evenly in a crisscross pattern.

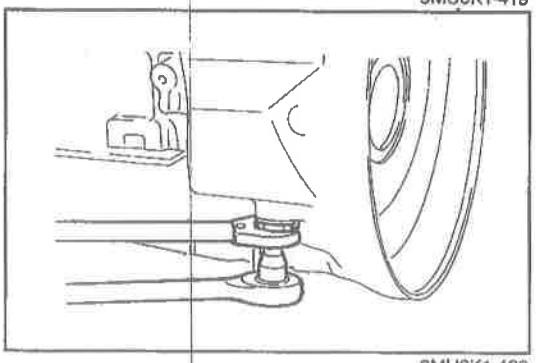
Tightening torque:
61—64 N·m (6.2—6.5 m-kg, 45—47 ft-lb)



9MU0K1-419

31. Adjust the brake band.
(1) Tighten the anchor end bolt with the hex wrench.

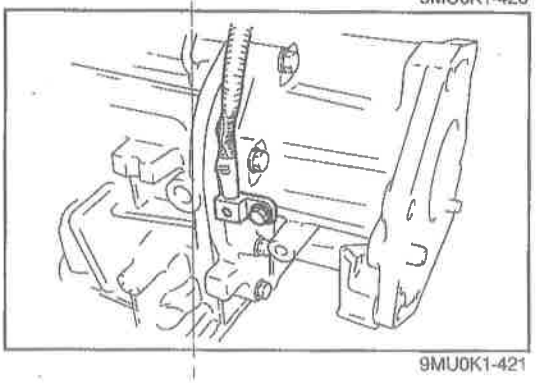
Tightening torque:
3.9—5.9 N·m (40—60 cm-kg, 35—52 in-lb)



9MU0K1-420

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

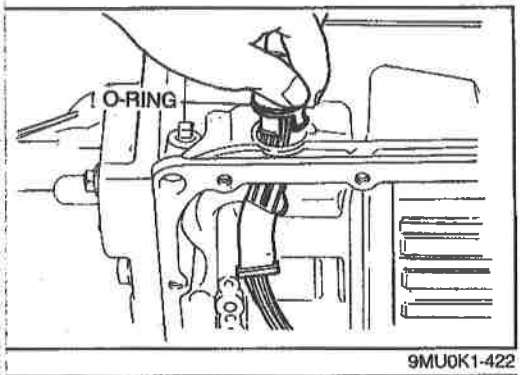
Tightening torque:
31—42 N·m (3.2—4.3 m-kg, 23—31 ft-lb)



9MU0K1-421

32. Apply ATF to a new O-ring, and install it onto the speed sensor 1.
33. Mount the speed sensor 1 into the extension housing.

Tightening torque:
4.9—6.9 N·m (50—70 cm-kg, 43—61 in-lb)

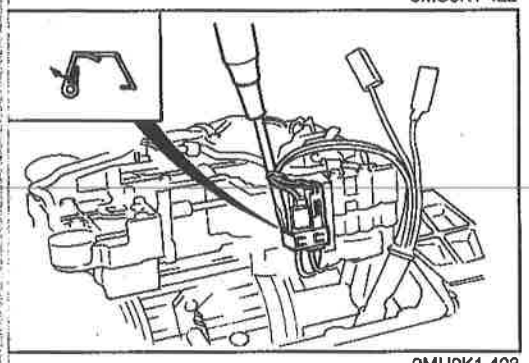


9MU0K1-422

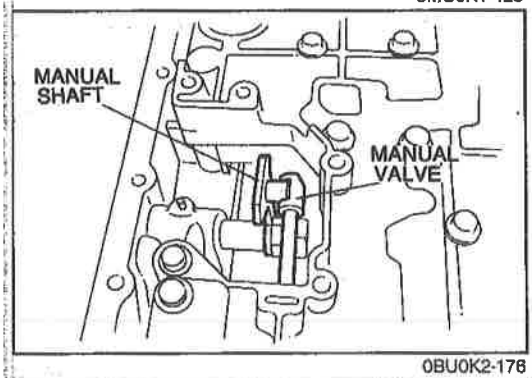
34. Apply ATF to a new O-ring, and install it onto the solenoid connector.

Caution
Do not damage the solenoid connector.

35. Install the solenoid connector into the transmission case.

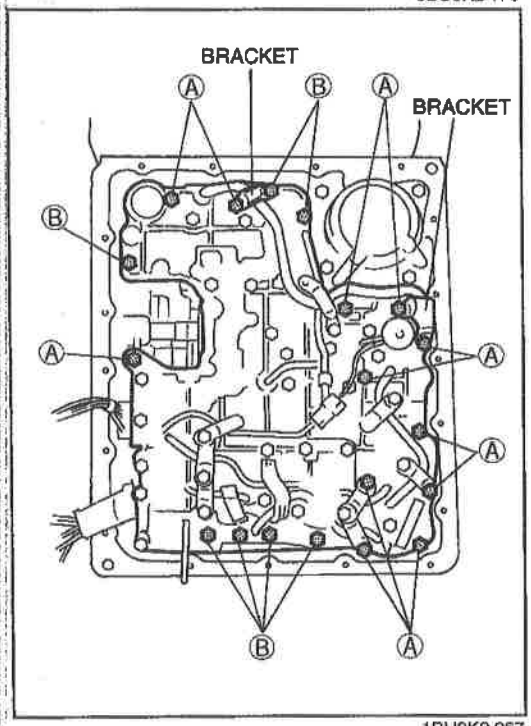

9MU0K1-423

36. Connect the solenoid connector to the solenoids.
37. Install the clip.



0BU0K2-176

Note
a) Verify that the manual valve and manual shaft are assembled correctly.
b) Verify that the accumulator springs are installed correctly.

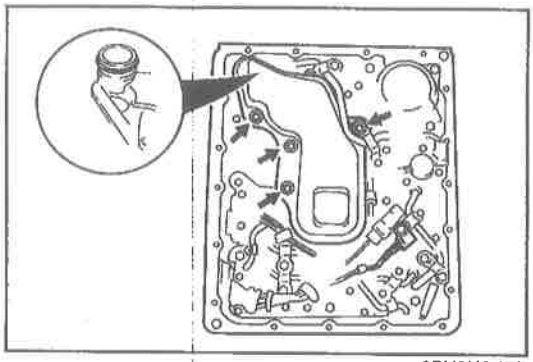


1BU0K2-067

38. Install the valve body assembly, and tighten bolts Ⓐ and Ⓑ evenly.

Bolt length (Measured from below the head)
Ⓐ: 33mm (1.299 in)
Ⓑ: 45mm (1.772 in)

Tightening torque:
6.9—8.8 N·m (70—90 cm-kg, 61—78 in-lb)

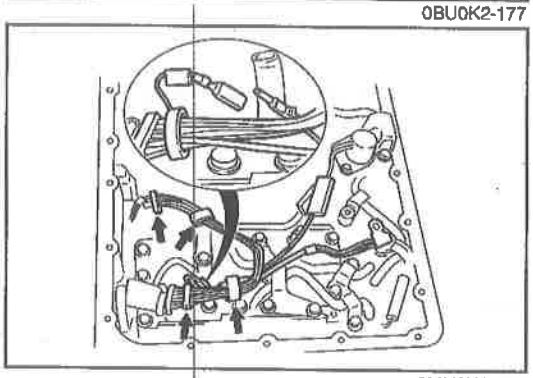


0BU0K2-177

39. Apply ATF to a new O-ring, and install it onto the oil strainer.
40. Install the oil strainer.

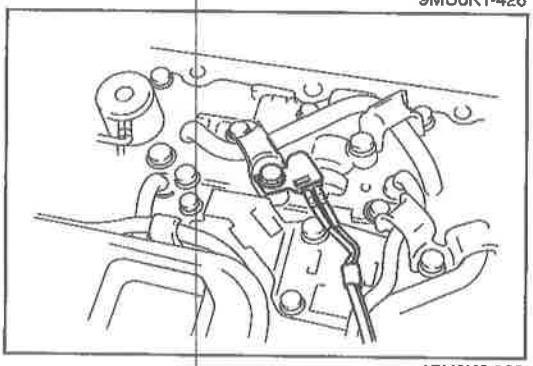
Bolt length (Measured from below the head):
50mm (1.969 in)

Tightening torque:
6.9—8.8 N·m (70—90 cm-kg, 61—78 in-lb)



9MU0K1-426

41. Mount the solenoid harness with the clips.

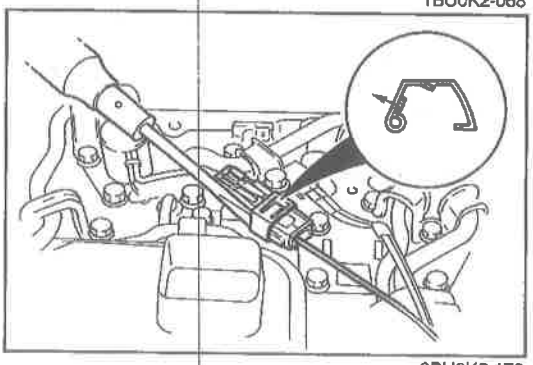


1BU0K2-068

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

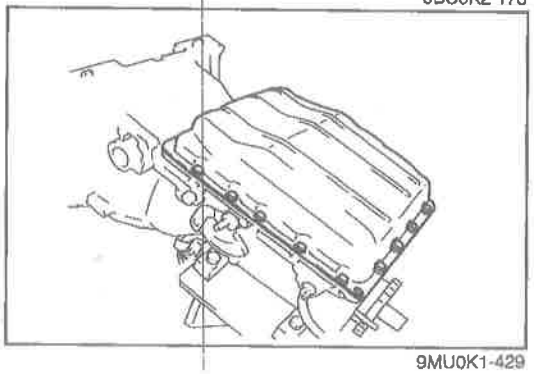
Bolt length (Measured from below the head):
45mm (1.772 in)

Tightening torque:
6.9—8.8 N·m (70—90 cm-kg, 61—78 in-lb)



0BU0K2-178

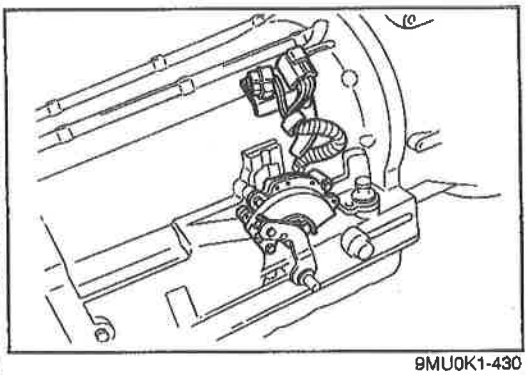
43. Connect the lockup solenoid connector.
44. Install the clip.



9MU0K1-429

45. Set the magnet into the oil pan.
46. Install the oil pan along with the new gasket.

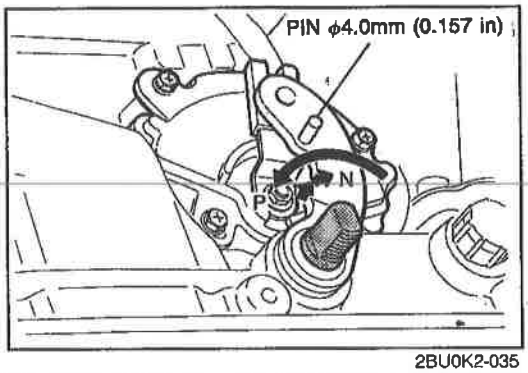
Tightening torque:
4.9—7.8 N·m (50—80 cm-kg, 43—70 in-lb)


9MU0K1-430

47. Install the inhibitor switch.
    (1) Install the bracket.

    Tightening torque:
    7.8—12 N·m (80—120 cm-kg, 69—104 in-lb)

    (2) Verify that the manual shaft is positioned at the L position (fully forward).
    (3) Install the inhibitor switch over the manual shaft.

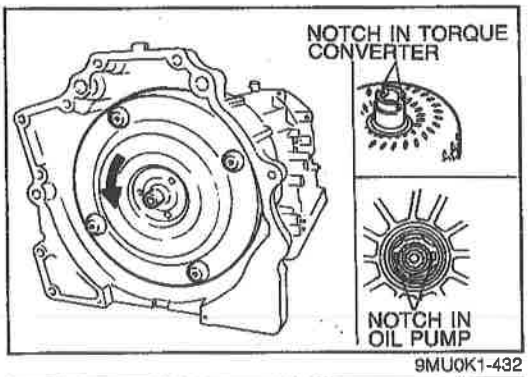


2BU0K2-035

    (4) Turn the manual shaft fully rearward, then return it two (2) notches (N range position).
    (5) Insert a **4.0mm (0.157 in)** pin through the holes of the inhibitor switch and the manual shaft lever.
    (6) Tighten the new inhibitor switch retaining bolts.

    Tightening torque:
    2.5—3.9 N·m (25—40 cm-kg, 22—35 in-lb)

    (7) Remove the pin.

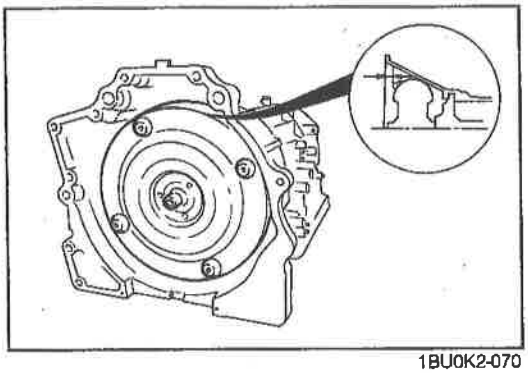


9MU0K1-432

48. Stand the torque converter upright, and fill it with ATF.

    Note
    a) Approximately 2 liters (2.1 US qt, 1.8 Imp qt) of ATF are required for a new torque converter.
    b) When reusing previous torque converter, add the same amount of ATF as was drained.

49. Install the torque converter into the transmission.


1BU0K2-070

50. Measure the installation depth of the torque converter with vernier calipers and a straight edge.

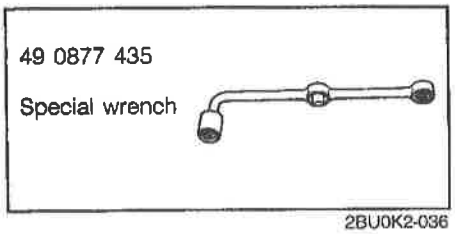
    Specification: 36.0mm (1.417 in)

51. Install the transfer case. (Refer to Section J3.)

TRANSMISSION UNIT (INSTALLATION)

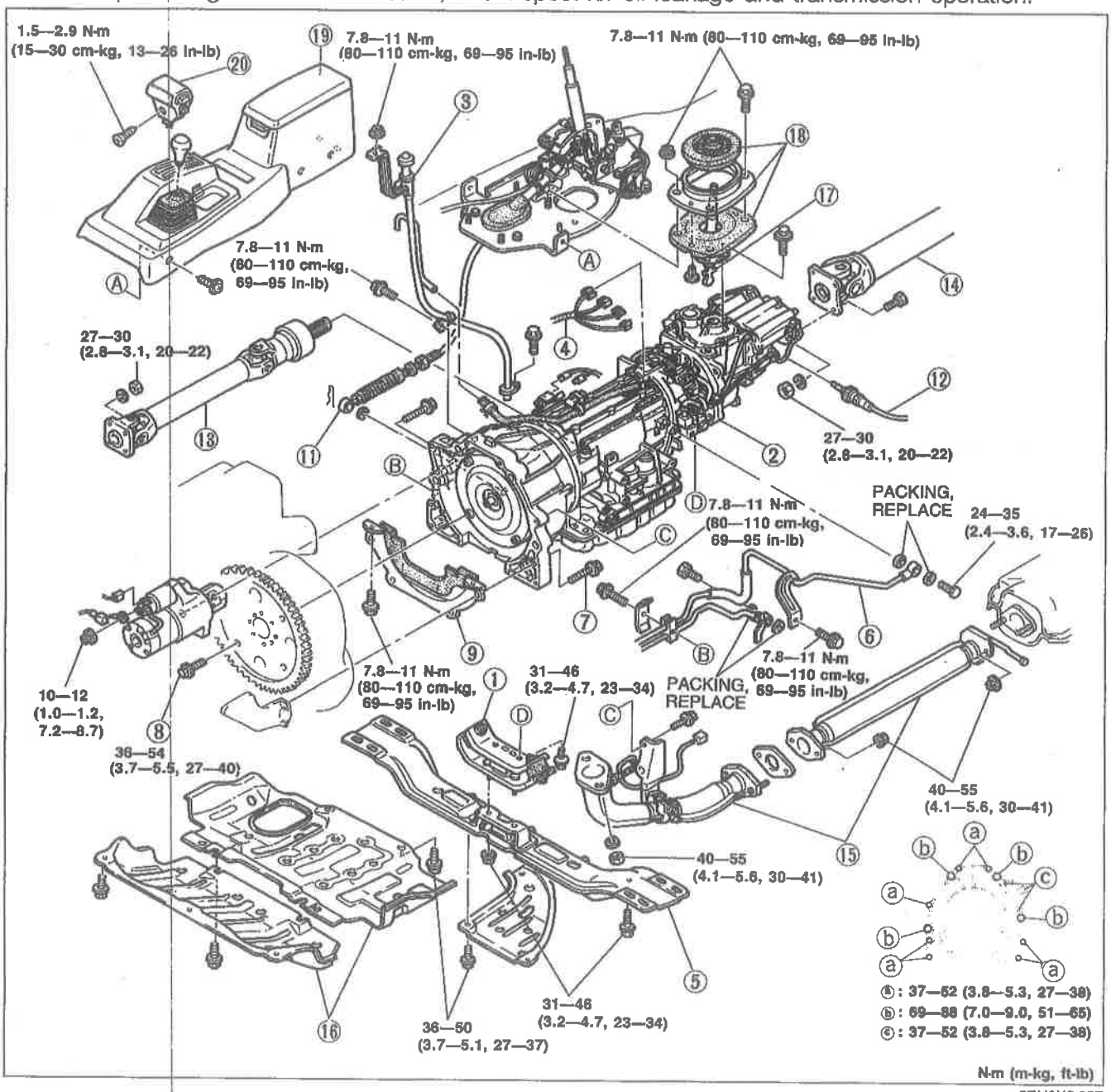
Preparation

SST



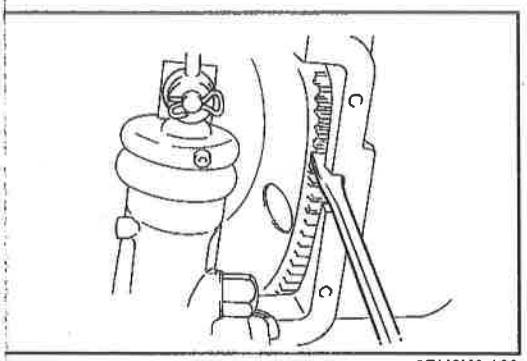
2BU0K2-036

1. Raise the vehicle and support it with safety stands.
2. Install in the order shown in the figure, referring to **Installation Note**.
3. Fill the transmission with the specified amount of the ATF after installation.
4. Warm up the engine and transmission, and inspect for oil leakage and transmission operation.

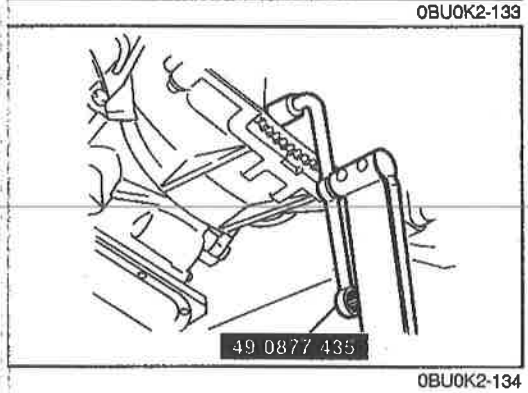


2BU0K2-037

1. Transmission mount
2. Automatic transmission
3. Oil level gauge and pipe
4. Connectors
5. Cross member
6. Oil pipe connector and bracket
7. Transmission installation bolt
8. Torque converter installation bolt
   Installation Note..... page K2–144
9. Under cover
10. No.2 cross member
11. Selector cable
12. Speedometer cable
13. Front propeller shaft
    Service..... Section L
14. Rear propeller shaft
    Service..... Section L
15. Exhaust pipe
16. Under cover
17. 4x4 shift lever
18. Insulator plate and boot
19. Console box
20. Selector knob



0BU0K2-133



0BU0K2-134

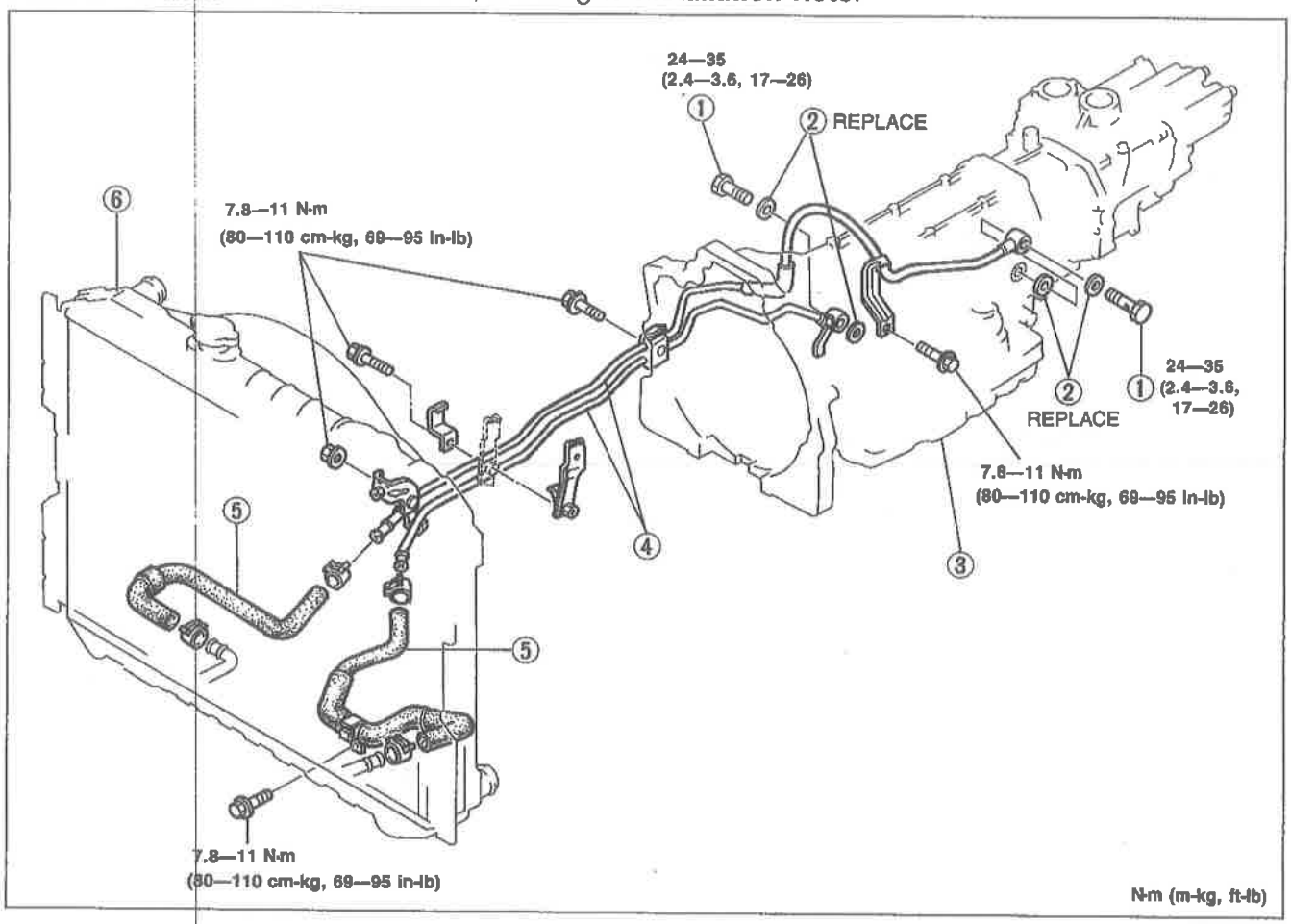
Installation Note
Torque converter installation bolts
1. Hold the drive plate with the screwdriver.

2. Loosely and evenly tighten the torque converter installation bolts, then further tighten them to the specified torque with the **SST**.

Tightening torque:
34—49 N·m (3.5—5.0 m-kg, 25—36 ft-lb)

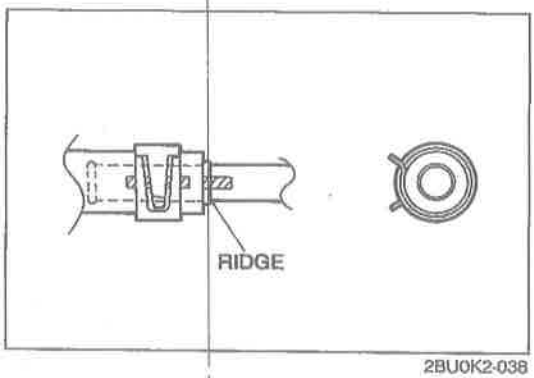
OIL COOLER

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



1BU0K2-072

1. Connector bolts
   Inspect for clogging
2. Packing
3. Transmission
   Removal ..... page K2– 45
   Installation..... page K2–141
4. Oil pipe
   Inspect for damage or cracks
   Installation Note..... page K2–143
5. Oil hose
   Inspect for damage or cracks
6. Radiator
   Service ..... Section E



2BU0K2-038

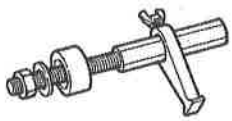
Installation Note
Oil pipe

Caution
If reuse the hose clamp, position the hose clamp in the original location on the hose. Squeeze the clamp lightly with large pliers to ensure a good fit.

1. Align the marks, and slide the oil cooler hoses onto the oil cooler pipes until it contacts the ridge.
2. Install the hose clamp onto the hose at the center of the mark and at the angle shown.
3. Verify that the hose clamp does not interfere with any other parts.

DRIVE PLATE

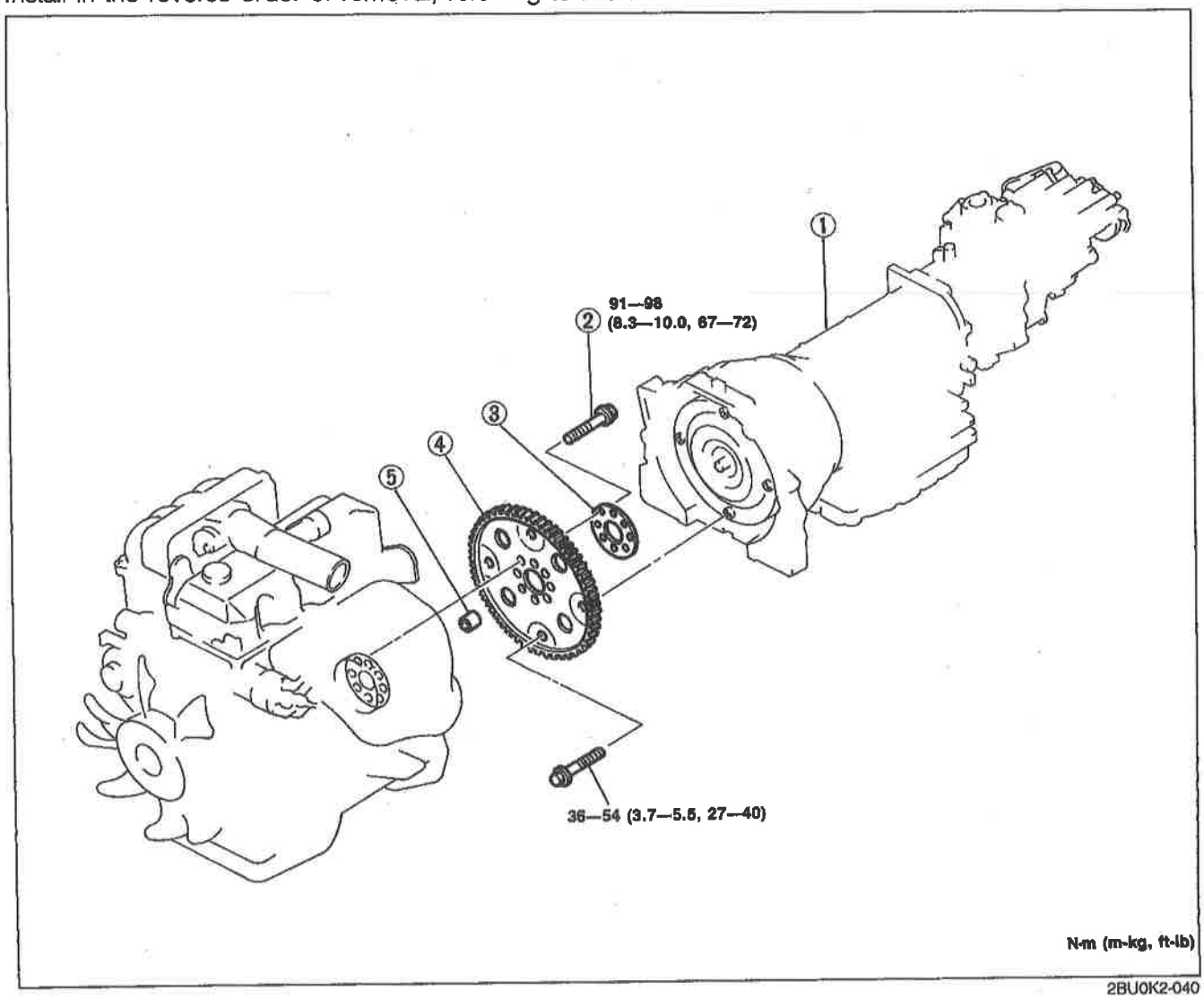
Preparation
SST

49 E011 1A0 Brake set, ring gear 	49 E011 103 Shaft (Part of 49 E011 1A0) 	49 E011 104 Collar (Part of 49 E011 1A0) 
49 E011 105 Stopper (Part of 49 E011 1A0) 		

2BU0K2-039

Removal and Inspection and Installation

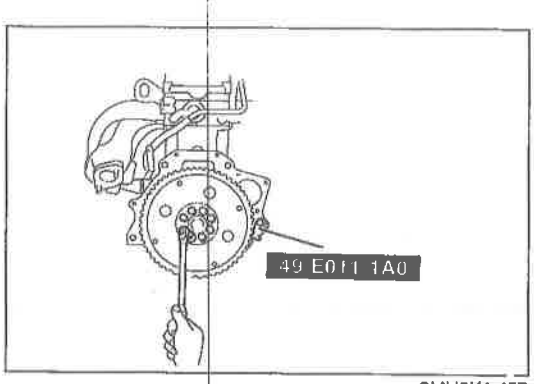
Remove in the order shown in the figure, referring to **Removal Note**.
Inspect all parts, and repair or replace as necessary.
Install in the reverse order of removal, referring to **Installation Note**.



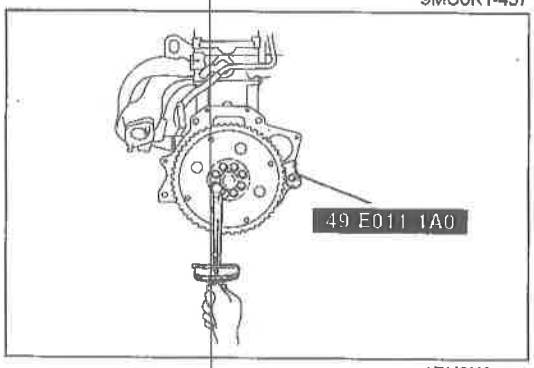
2BU0K2-040

1. Transmission
   Removal ..... page K2– 45
   Installation ..... page K2–141
2. Bolts
   Removal Note ..... below
   Installation Note ..... below
3. Backing plate
4. Drive plate
   Inspect for cracks and ring gear for wear or damage
5. Adapter

2BU0K2-041



9MU0K1-457



1BU0K2-074

Removal Note
Bolts
1. Remove the drive plate using the **SST** or equivalent.

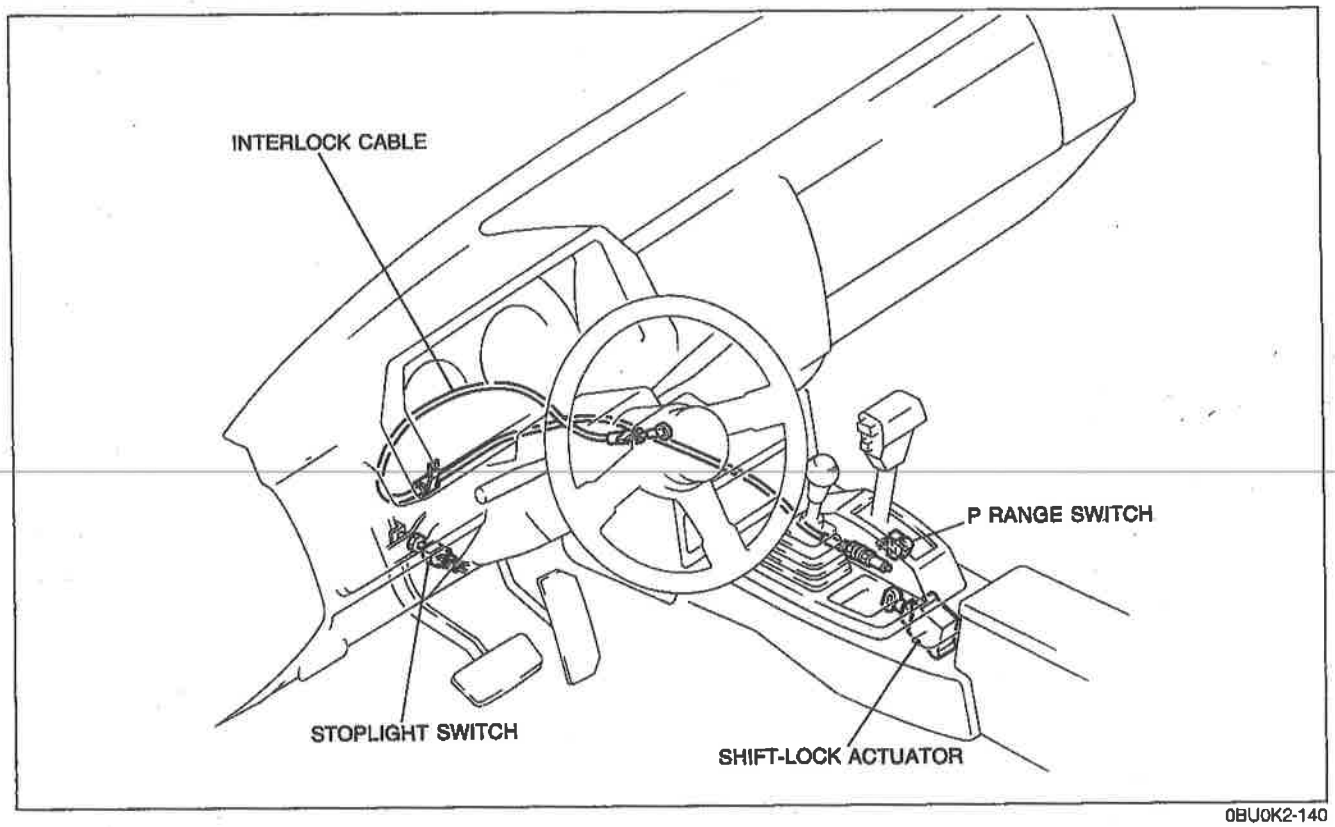
Installation Note
Bolts
1. Assemble the adapter, drive plate and backing plate.
2. Install the **SST** or equivalent and tighten the bolts diagonally and evenly.

   Tightening torque:
   91—98 N·m (8.3—10.0 m-kg, 67—72 ft-lb)

3. Install the transmission. (Refer to page K2–141.)

SHIFT MECHANISM

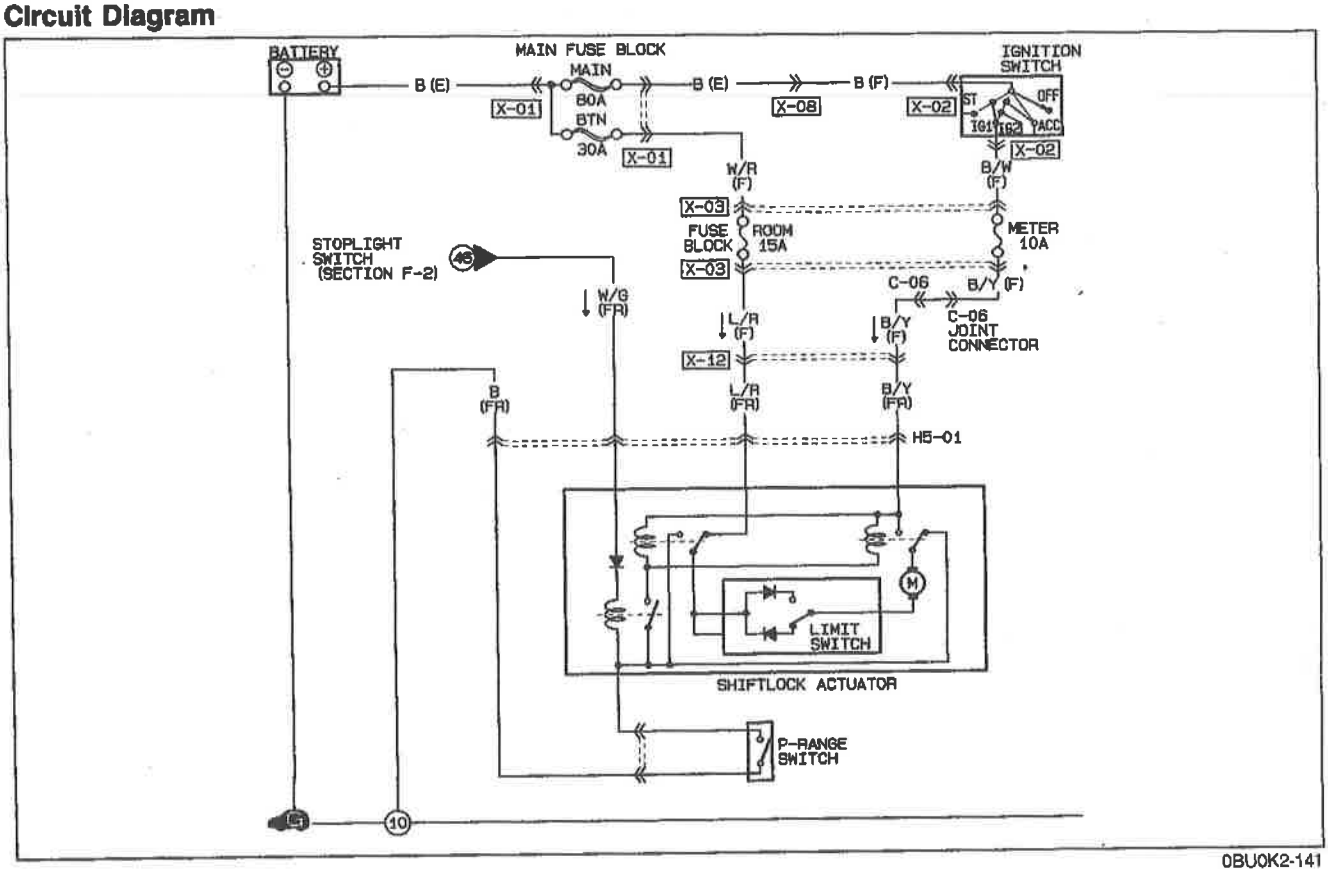
SHIFT-LOCK SYSTEM COMPONENTS



0BU0K2-140

TROUBLESHOOTING

Circuit Diagram

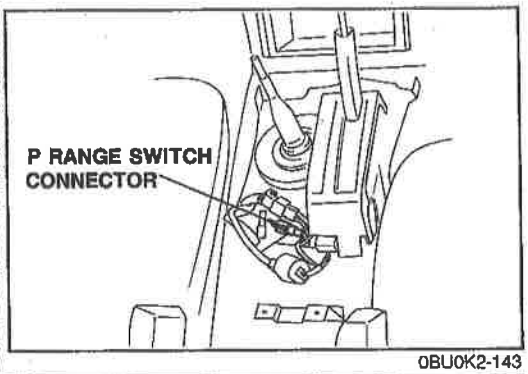


0BU0K2-141

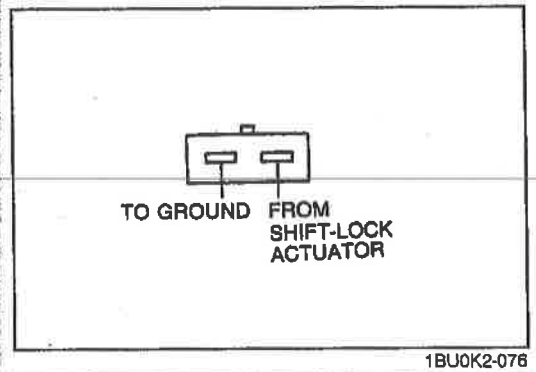
Diagnosis chart

Problem	Possible Cause	Action	Page
Selector lever cannot be moved from P range with brake pedal depressed and ignition switch ON	ROOM 15A fuse not installed or burned	Install or replace	K2–146
	IG1 system malfunction • Wire harness broken • Poor connection • METER 10A fuse burned	Repair or replace Connect firmly Replace	K2–146 K2–146 K2–146
	Ignition switch malfunction	Inspect and replace	Section T
	Stoplight switch remains OFF	Inspect and replace	Section T
	Stoplight system malfunction • Wire harness broken • Poor connection • STOP 15A fuse burned	Repair or replace Connect firmly Replace	K2–146 K2–146 K2–146
	P range switch remains OFF	Inspect and replace	K2–148
	P range switch system malfunction • Wire harness broken (Poor ground) • Poor connection	Repair or replace Connect firmly	K2–146 K2–146
	Shift-lock actuator malfunction • Wire harness broken • Poor connection	Inspect and replace Repair wiring harness Connect firmly	K2–148 K2–146 K2–146
	Misadjustment of selector lever or improper assembly of shift-lock actuator	Adjust or repair	K2–148
Selector lever can be moved from P range with ignition switch ON, but without brake pedal depressed	ROOM 15A fuse burned	Replace	K2–146
	Stoplight switch remains ON	Inspect and replace	Section T
	Shift-lock actuator malfunction	Inspect and replace	K2–148
	Misadjustment of selector lever or improper assembly of shift-lock actuator	Adjust or repair	K2–148
Selector lever can be moved from P range with ignition switch OFF and brake pedal depressed	ROOM 15A fuse burned	Replace	K2–146
	Ignition switch malfunction	Inspect and repair	Section T
	Shift-lock actuator malfunction	Inspect and replace	K2–148
	Misadjustment of selector lever or improper assembly of shift-lock actuator	Adjust and repair	K2–148
Shift-lock actuator operation heard when brake pedal depressed with ignition switch ON in other than P range	P range switch remains ON	Inspect and replace	K2–148
Selector remains locked with emergency override button operated	Emergency override button not slide fully back	Slide fully back and hold emergency override button, move selector lever	—
	Broken emergency override link	Replace	K2–152
	Misadjustment of indicator panel	Adjust	K2–151
Ignition key can be turned to LOCK position with selector lever in ranges other than P range	Interlock cable • Disconnected • Kinked • Stuck • Spring damaged	Inspect and replace	K2–151,152
	Key cylinder malfunction	Replace	Section N
Ignition key cannot be turned to LOCK position with selector lever in P range	Interlock cable • Disconnected • Kinked • Stuck • Spring damaged	Inspect and replace	K2–151,152
	Key cylinder malfunction	Replace	Section N

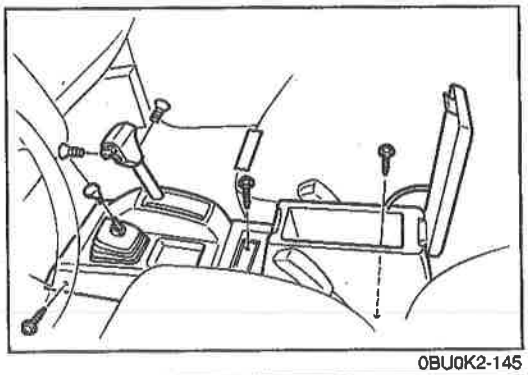
2BU0K2-042

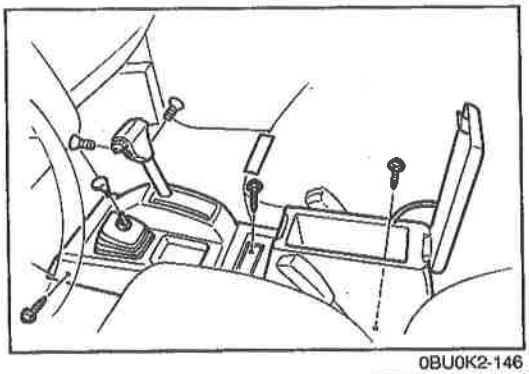


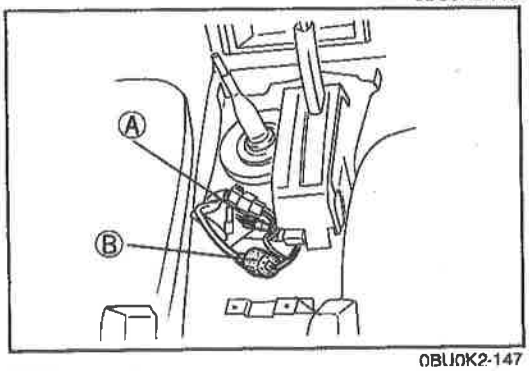
0BU0K2-143



1BU0K2-076


0BU0K2-145


0BU0K2-146



0BU0K2-147

P RANGE SWITCH

Inspection

Continuity

1. Disconnect the negative battery cable.
2. Remove the selector knob, and then remove the console.
3. Disconnect the P range switch connector.

4. Check continuity of the terminals.

Range	Selector lever release button	Continuity
P	Released	Yes
	Depressed	No
R, N, D, S, L	—	No

5. If not as specified, replace the P range switch. (Refer to page K2–152.)

6. Install the console.
7. Clean and apply locking compound to the selector knob screws threads. Tighten the screws.

Tightening torque:
1.5—2.9 N·m (15—30 cm-kg, 13—26 in-lb)

8. Connect the negative battery cable.
9. Check for correct operation of the shift-lock system.

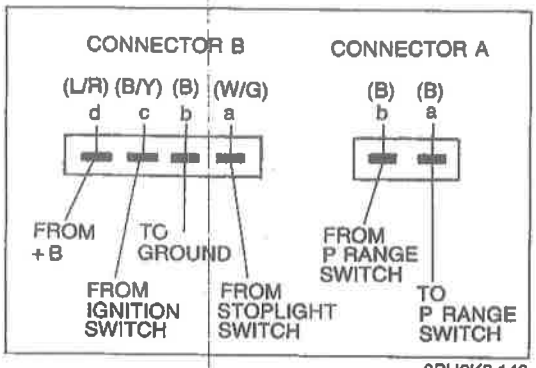
SHIFT-LOCK ACTUATOR

Inspection

Terminal voltage and continuity

1. Remove the selector knob, and then remove the console.

Caution
Disconnect connector B to check continuity between terminal b (harness side) and a ground.



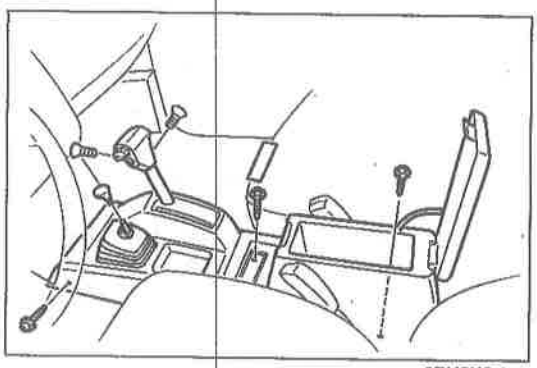
0BU0K2-148

2. Turn the ignition switch ON, and check terminal voltages and continuity, referring to the chart below.
3. If not as specifed, repair the wire harness and/or shift-lock actuator.

VB: Battery voltage

Connector	Terminal	⊖ terminal connected to	Condition	Measurement valve
A	a	B—b	P range, selector lever release button not depressed	0Ω
A	b	B—b	Constant	0Ω
B	a	B—b	Brake pedal released → depressed	0V → VB
B	b (harness side)	Body	Constant	0Ω
B	c	B—b	Ignition switch ON	VB
B	d	B—b	Ignition switch OFF	VB

2BU0K2-043

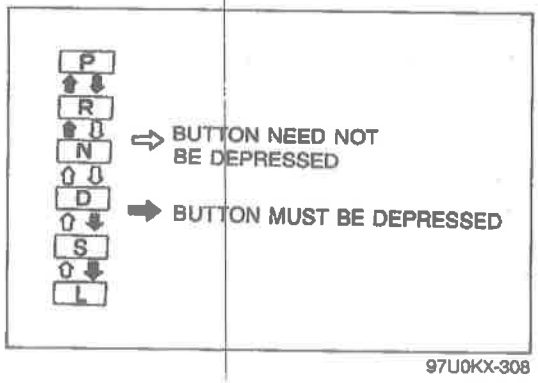


0BU0K2-149

4. Install the console.
5. Clean and apply locking compound to the selector knob screws threads. Tighten the screws.

Tightening torque:
1.5—2.9 N·m (15—30 cm-kg, 13—26 in-lb)

6. Check for correct operation of the shift-lock system.



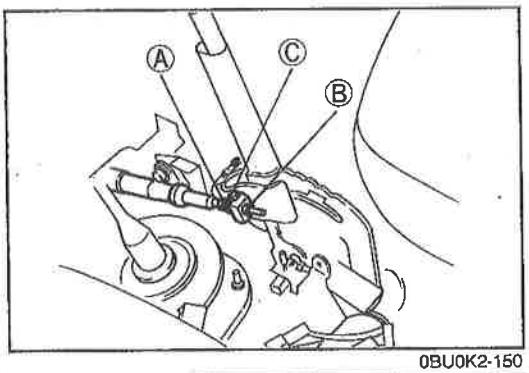
97U0KX-308

SELECTOR LEVER

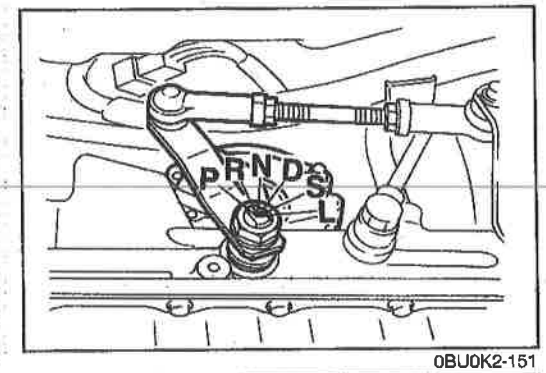
Inspection

Caution
Shift the selector lever from P range to other ranges with ignition switch ON and brake pedal depressed.

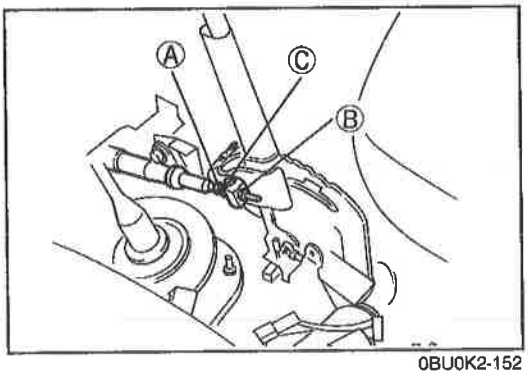
1. Check that the selector lever can only be shifted as shown in the figure.
2. Make sure there is a click at each range when shifted from P → L range.
3. Check that the positions of the selector lever and the indicator are aligned.
4. Check that the button returns smoothly when pushed to shift.



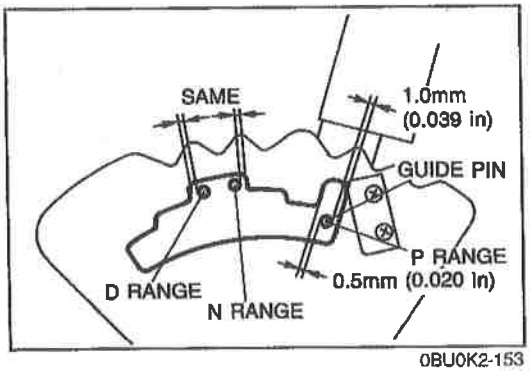
0BU0K2-150



0BU0K2-151



0BU0K2-152



0BU0K2-153

Adjustment
Lever position

1. Disconnect the negative battery cable to deactivate the shift-lock.
2. Remove the selector knob and console.
3. Loosen the locknut Ⓐ, Ⓑ, and lock bolt Ⓒ.

4. Shift the manual shaft to P range position.

5. Push and hold the selector lever forward by using a force of **39—98 N (4—10 kg, 8.8—22 lb)**, tighten the lock bolt Ⓒ to the specified torque.

   Tightening torque:
   8—11 N·m (80—110 cm-kg, 67—95 in-lb)

6. Turn locknut Ⓐ by hand until it just touches the spacer.
7. Tighten the locknut Ⓑ to the specified torque.

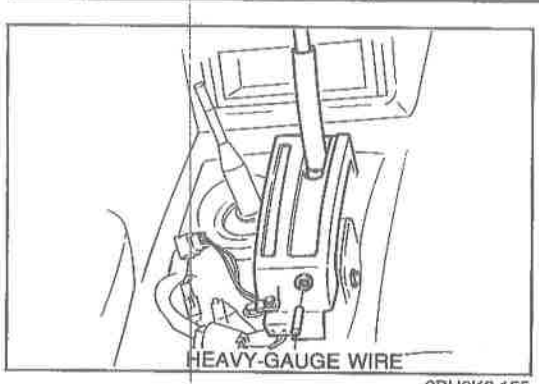
   Tightening torque:
   8—11 N·m (80—110 cm-kg, 67—95 in-lb)

8. Check the lever so that the clearance between the guide plate and the guide pin in P range with the push rod lightly depressed is as shown.
9. Move the selector lever to N and D ranges and verify that there is the same clearance between the guide plate and guide pin.
10. If not as specified, readjust the lever.
11. Install the console.
12. Clean and apply locking compound to the selector knob screws threads. Tighten the screws.

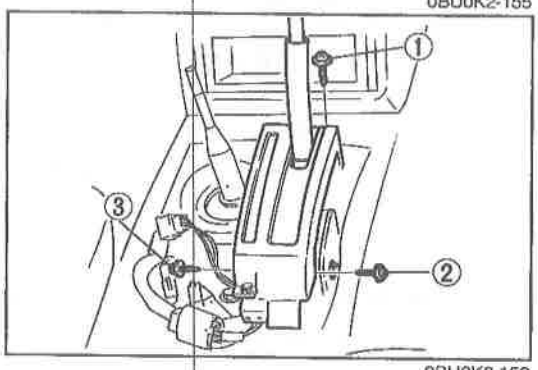
    Tightening torque:
    1.5—2.9 N·m (15—30 cm-kg, 13—26 in-lb)

13. Check for correct operation of the shift-lock system.

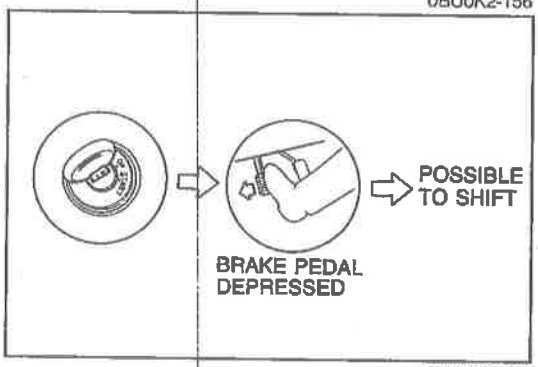
0BU0K2-154



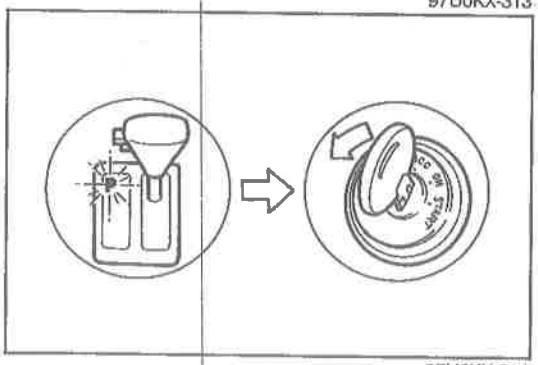
0BU0K2-155



0BU0K2-156



97U0KX-313


97U0KX-314

Indicator panel

1. Remove the selector knob and console.
2. Shift the selector lever to P range.
3. Loosen the indicator screws.
4. Align the alignment grooves in the slider with the holes in the indicator panel. Install suitable heavy-gauge wire to hold the slider.
5. Tighten the indicator screws in the order shown in the figure.
6. Remove the wire.
7. Verify that the selector lever properly aligns with the indicator in each range.
8. Install the console.
9. Clean and apply locking compound to the selector knob screws threads. Tighten the screws.

Tightening torque:
1.5—2.9 N·m (15—30 cm-kg, 13—26 in-lb)

Shift-lock System Operation Inspection

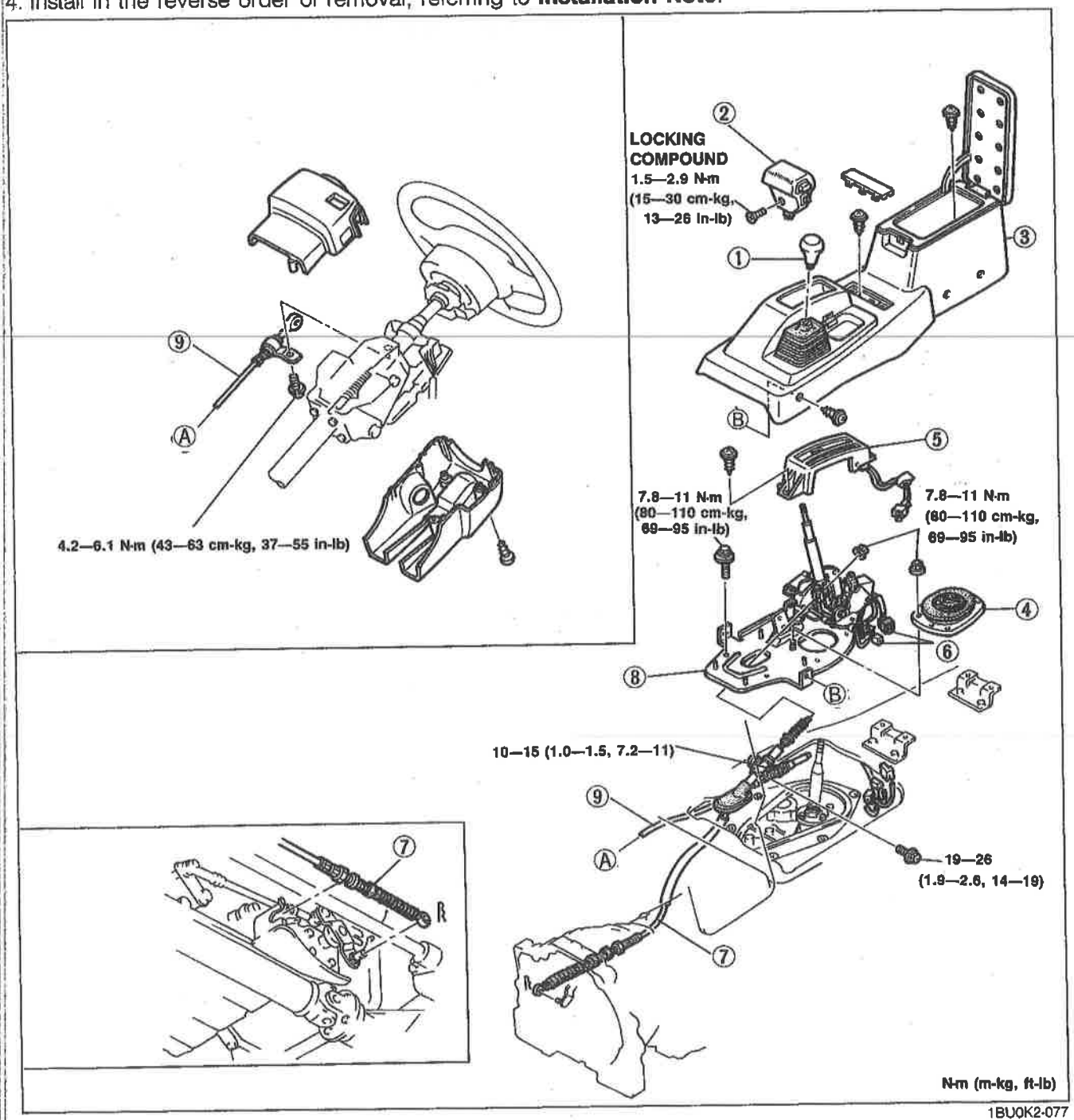
Caution
Service with engine OFF.

Shift-lock system

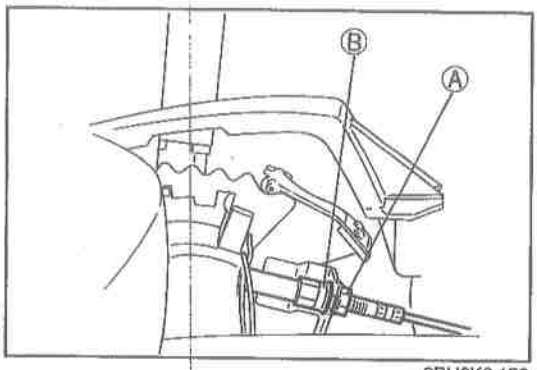
1. Turn the ignition switch ON.
2. Verify that the selector lever is in P range.
3. Without the brake pedal depressed, verify that the selector lever cannot be shifted from P range.
4. Depress the brake pedal. Verify that the selector lever can be shifted from P range.
5. Shift the selector lever to R range.
6. Verify that the ignition key cannot be turned to LOCK position.
7. Shift the selector lever to P range.
8. Verify that the ignition key can be turned to LOCK position.
9. If not as specified, inspect and repair as necessary, referring to Troubleshooting.

REMOVAL, INSPECTION, AND INSTALLATION

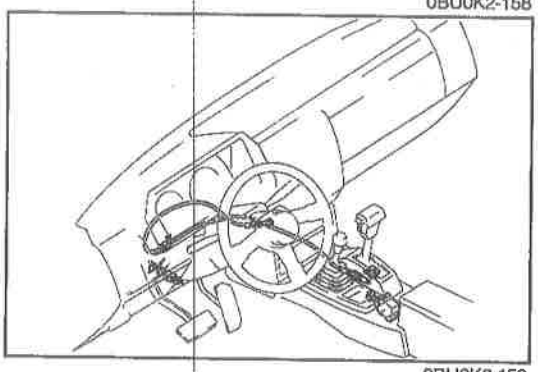
1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure, referring to **Removal Note**.
3. Inspect all parts, and repair or replace as necessary.
4. Install in the reverse order of removal, referring to **Installation Note**.

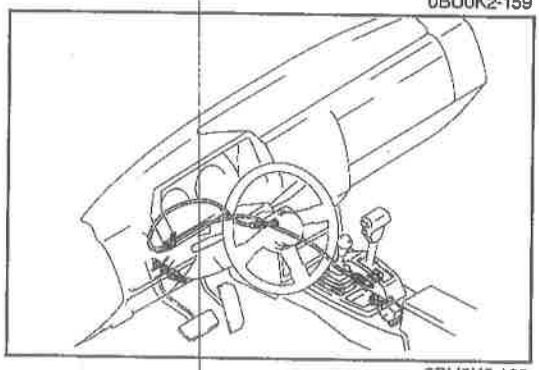


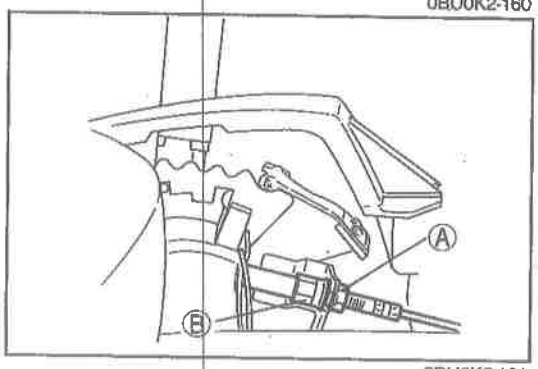
1. 4x4 shift lever knob
2. Selector knob
3. Console
4. Insulator plate and boot
   Installation Note..... page K2–154
5. Indicator panel
   Installation Note..... page K2–154
6. Connectors
7. Selector cable
   Installation Note..... page K2–154
8. Selector lever
   Removal Note..... page K2–153
   Installation Note..... page K2–153
9. Interlock cable
   Removal Note..... page K2–153
   Installation Note..... page K2–153



0BU0K2-158


0BU0K2-159


0BU0K2-160



0BU0K2-161

Removal Note
Selector lever

Caution
Do not loosen locknut Ⓑ, it is factory preset for proper shift-lock system operation.

1. Loosen the locknut Ⓐ.

Caution
Do not kink the cable.

2. Separate the cable from the selector lever.

Interlock cable

Note
Do not remove the interlock cable if not necessary.

1. Remove the instrument panel. (Refer to Section S.)
2. Remove the interlock cable.

Installation Note
Interlock cable
1. Install the interlock cable.
2. Install the instrument panel. (Refer to Section S.)

Selector lever
1. Shift the selector lever to N range.
2. Install the selector lever.

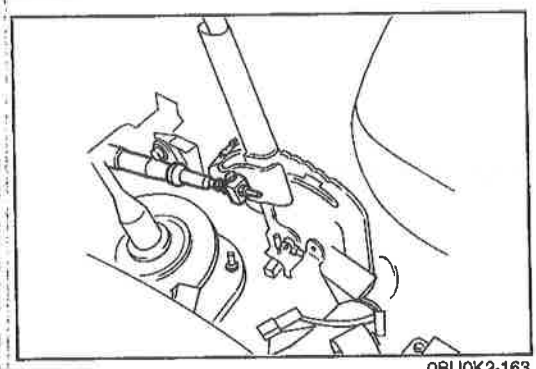
Tightening torque:
7.8—11 N·m (80—110 cm-kg, 69—95 in-lb)

Caution
Do not kink the cable.

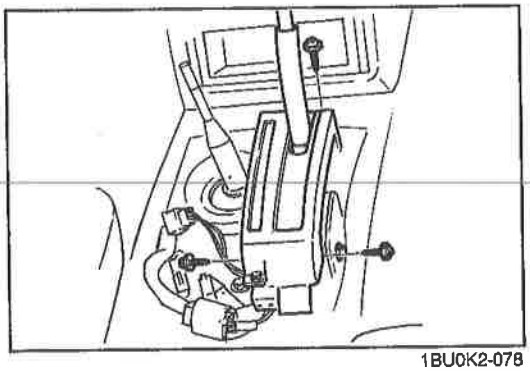
3. Install the cable and tighten locknut Ⓐ.

Tightening torque:
9.8—15 N·m (1.0—1.5 m-kg, 7.2—11 ft-lb)

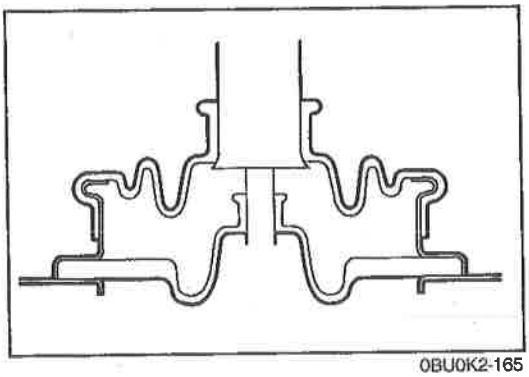
4. Check shift-lock system operation.


0BU0K2-163

Selector cable
1. Install the selector cable as shown in the figure.
2. Adjust the lever position. (Refer to page K2–154.)


1BU0K2-078

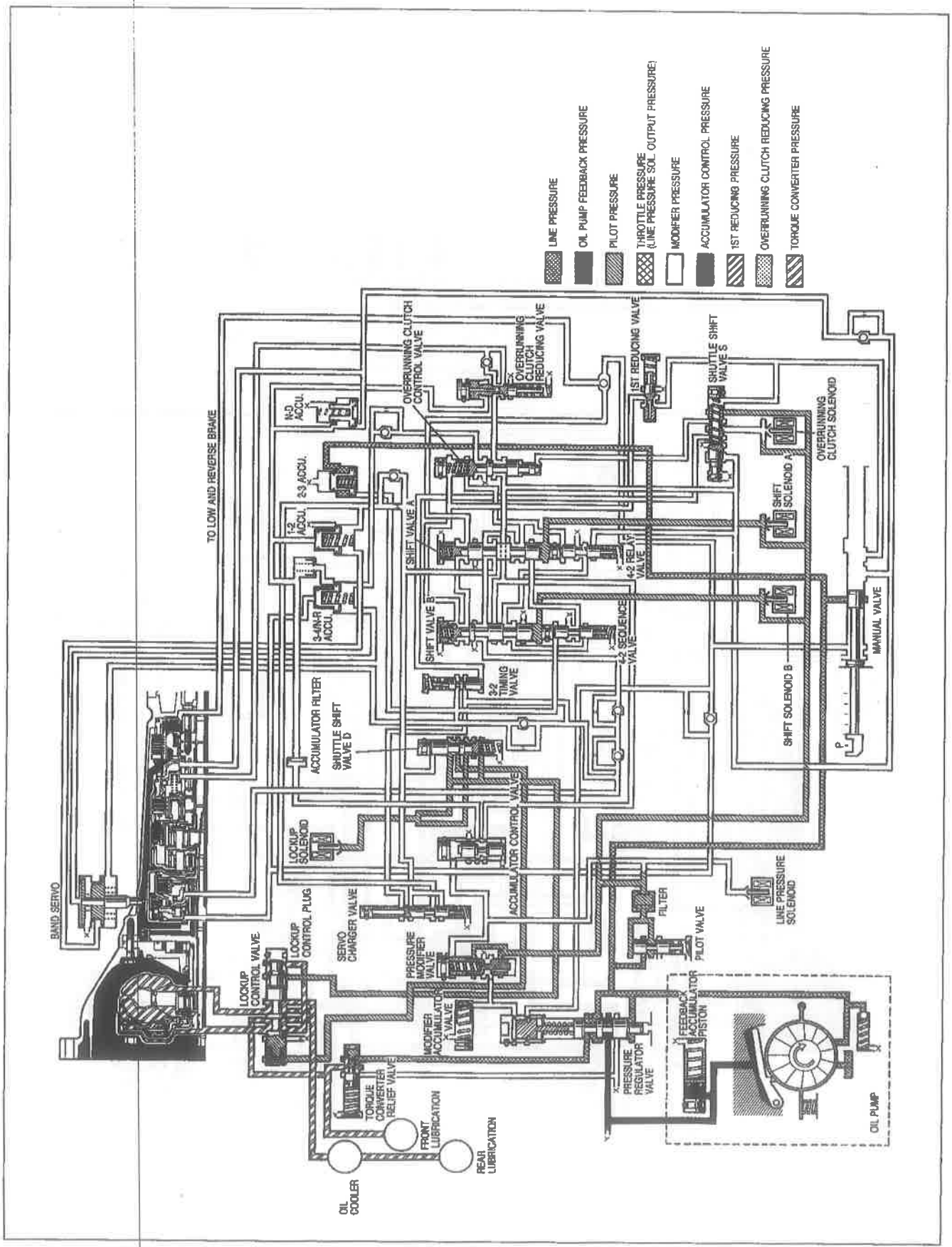
Indicator panel
1. Install the indicator panel.
2. Adjust the indicator panel. (Refer to page K2–151.)


0BU0K2-165

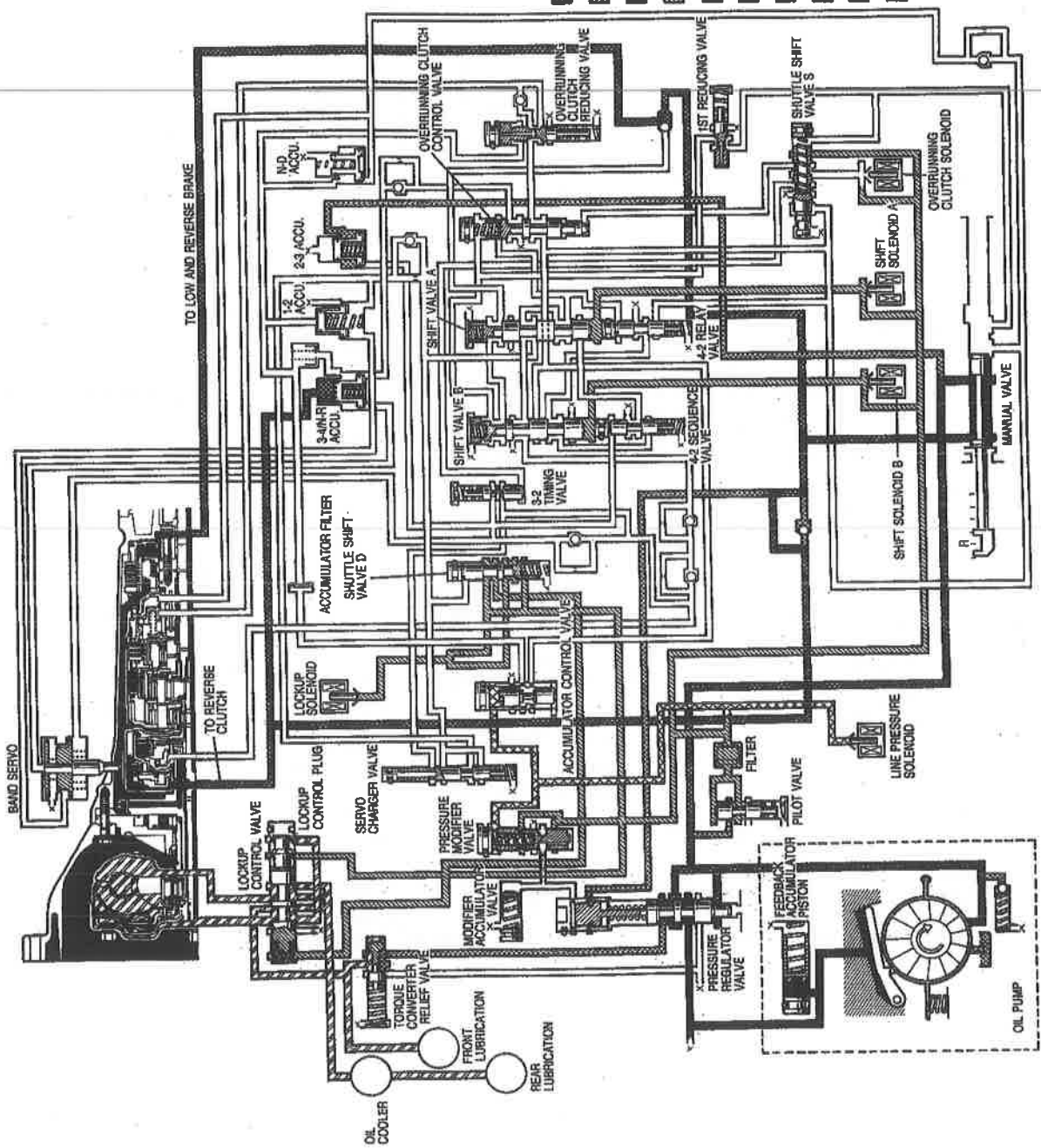
Insulator panel and boot
1. Install the insulator panel and boot as shown in the figure.

HYDRAULIC CIRCUIT

P RANGE

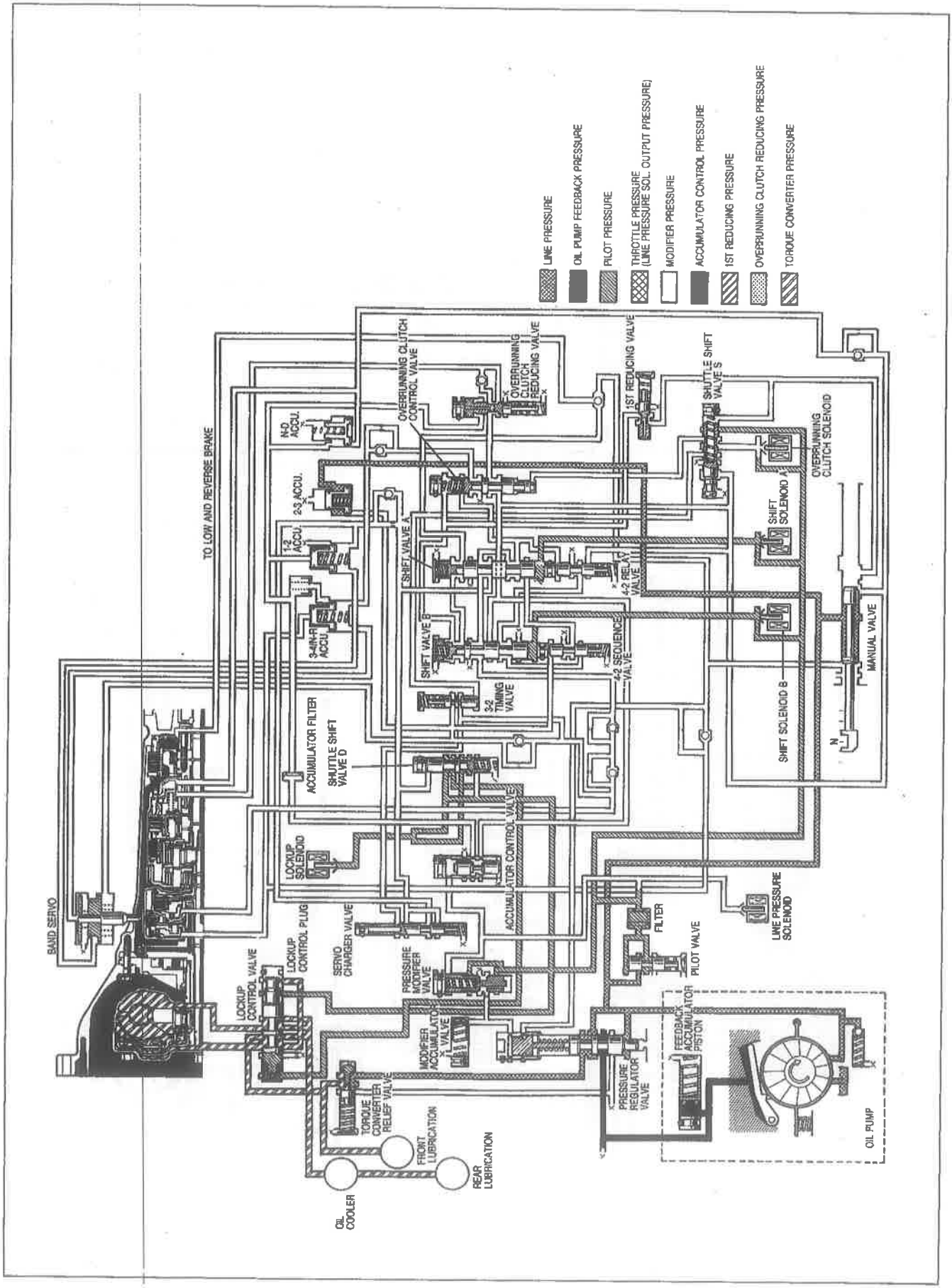


R RANGE

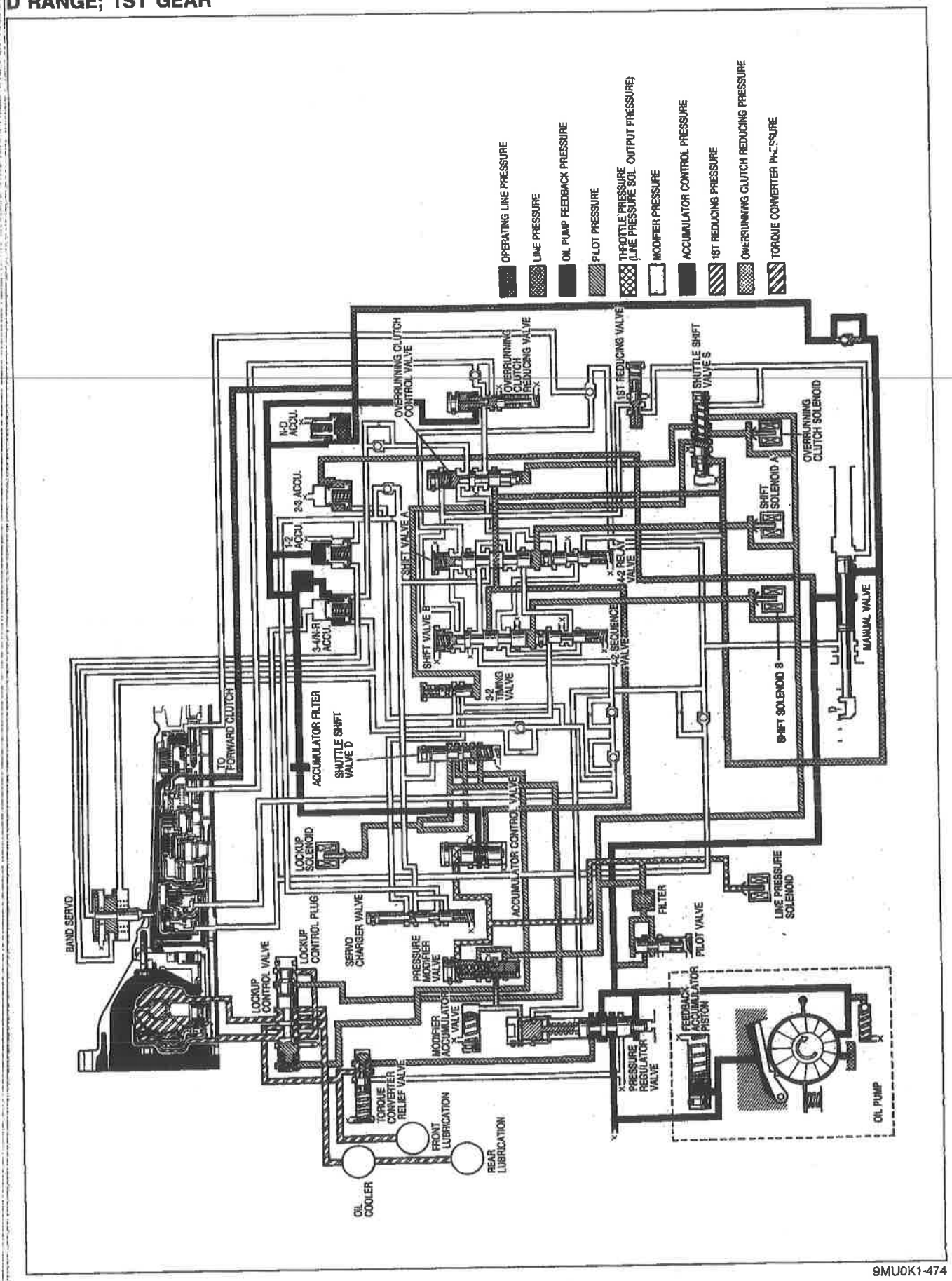


9MU0K1-472

N RANGE

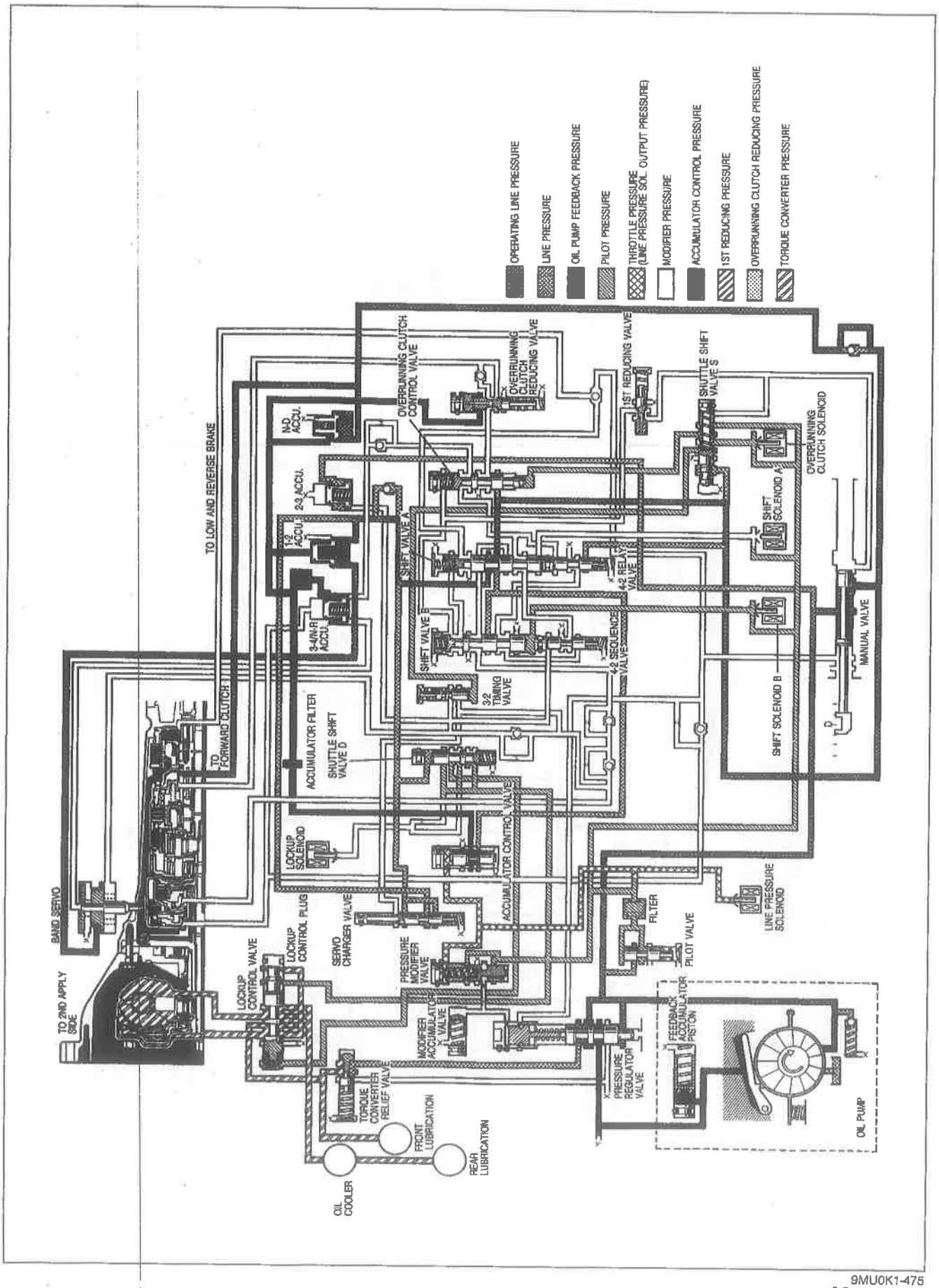

LINE PRESSURE
OIL PUMP FEEDBACK PRESSURE
PILOT PRESSURE
THROTTLE PRESSURE (LINE PRESSURE SOL. OUTPUT PRESSURE)
MODIFIER PRESSURE
ACCUMULATOR CONTROL PRESSURE
1ST REDUCING PRESSURE
OVERRUNNING CLUTCH REDUCING PRESSURE
TORQUE CONVERTER PRESSURE
TO LOW AND REVERSE BRAKE
OVERRUNNING CLUTCH CONTROL VALVE
OVERRUNNING CLUTCH REDUCING VALVE
1ST REDUCING VALVE
SHUTTLE SHIFT VALVE S
OVERRUNNING CLUTCH SOLENOID
SHIFT SOLENOID A
N-D ACCU.
2-3 ACCU.
1-2 ACCU.
3-4IN-R ACCU.
SHIFT VALVE A
4-2 RELAY VALVE
SHIFT VALVE B
4-2 SEQUENCE VALVE
3-2 TIMING VALVE
MANUAL VALVE
SHIFT SOLENOID B
ACCUMULATOR FILTER
SHUTTLE SHIFT VALVE D
LOCKUP SOLENOID
ACCUMULATOR CONTROL VALVE
BAND SERVO
LOCKUP CONTROL VALVE
LOCKUP CONTROL PLUG
SERVO CHARGER VALVE
PRESSURE MODIFIER VALVE
MODIFIER ACCUMULATOR VALVE
FILTER
PILOT VALVE
LINE PRESSURE SOLENOID
TORQUE CONVERTER RELIEF VALVE
FRONT LUBRICATION
REAR LUBRICATION
OIL COOLER
PRESSURE REGULATOR VALVE
FEEDBACK ACCUMULATOR PISTON
OIL PUMP

D RANGE; 1ST GEAR



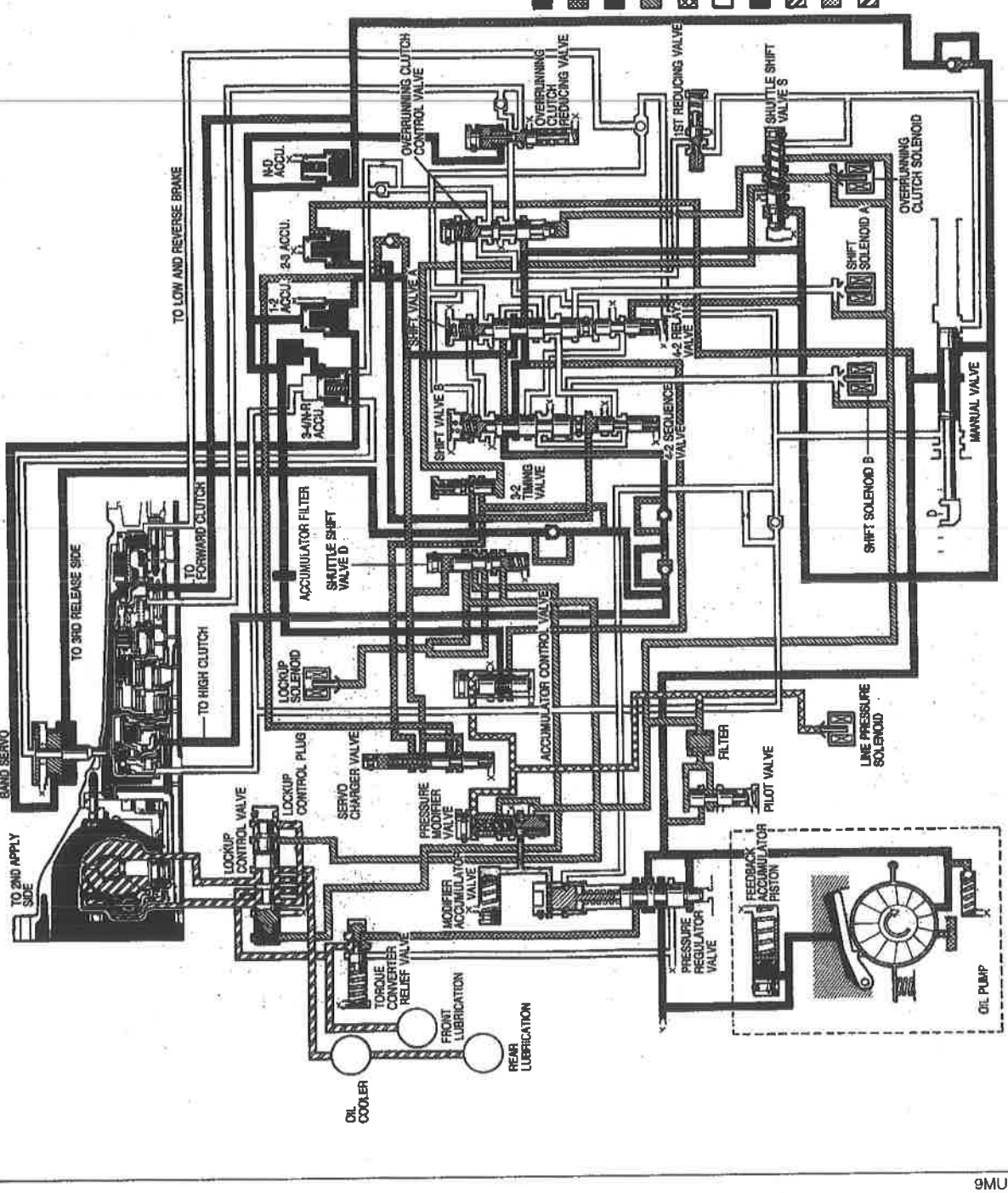
9MU0K1-474

D RANGE; 2ND GEAR



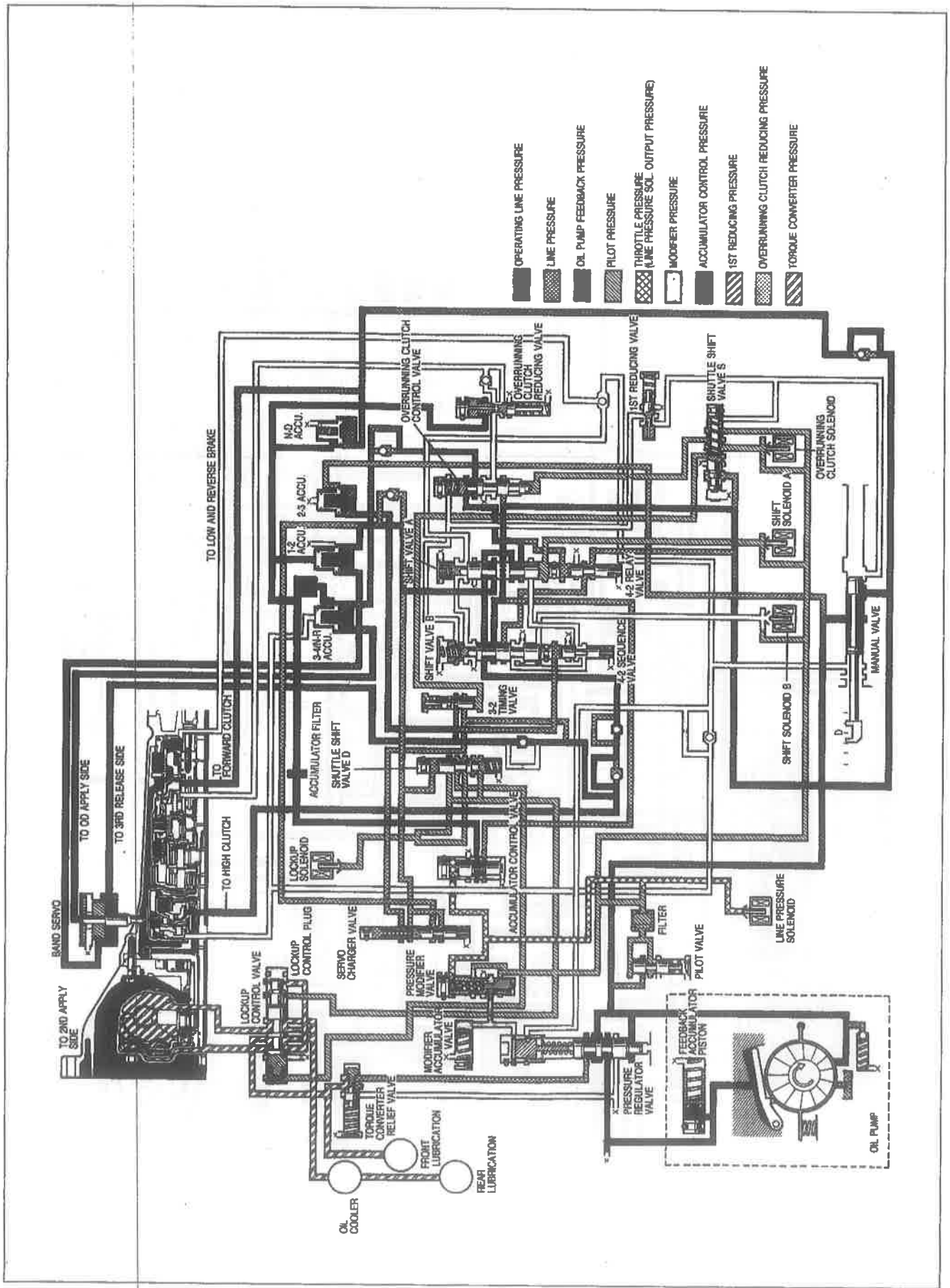
HYDRAULIC CIRCUIT

D RANGE; 3RD GEAR

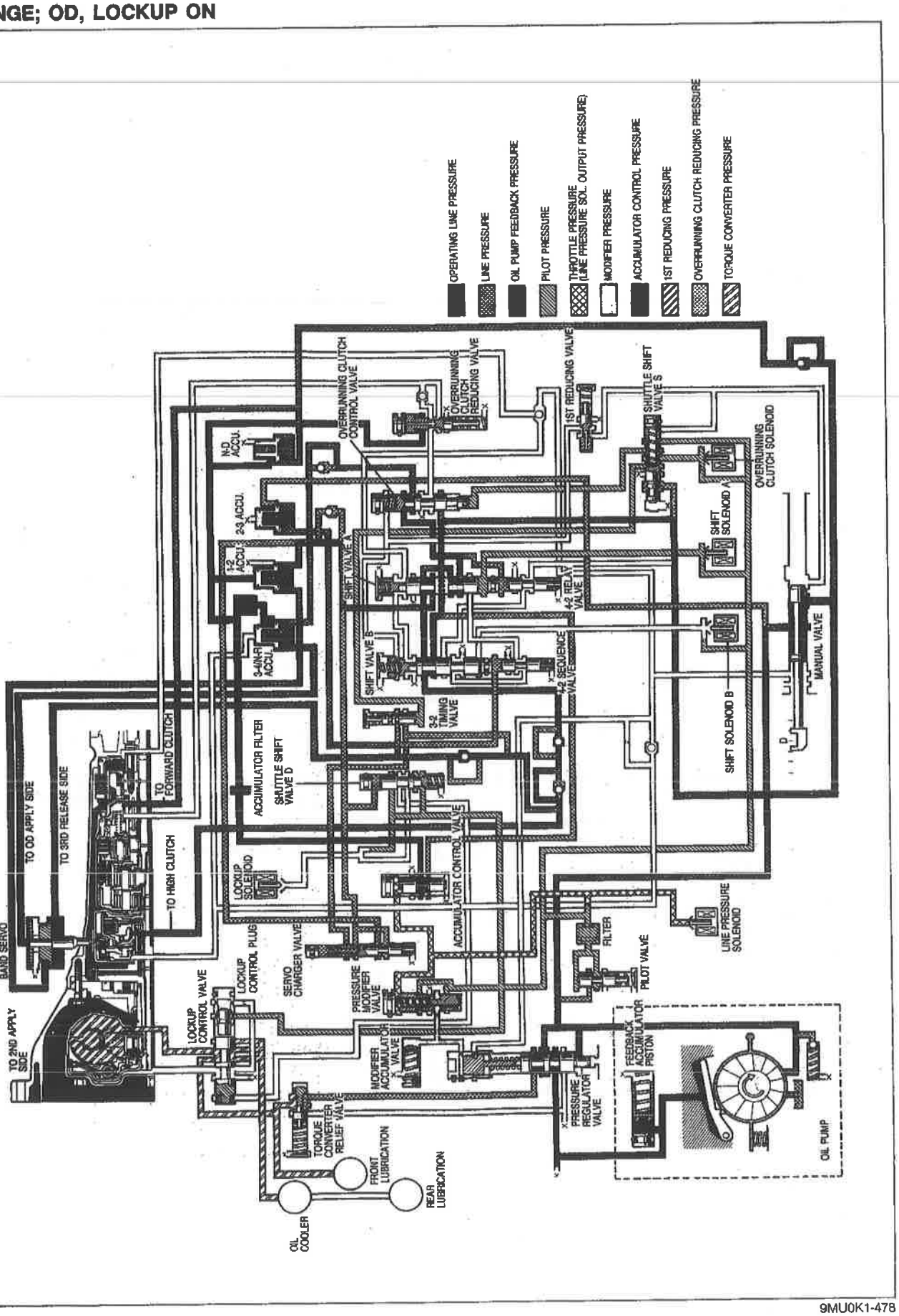


9MU0K1-476

D RANGE; OD, LOCKUP OFF

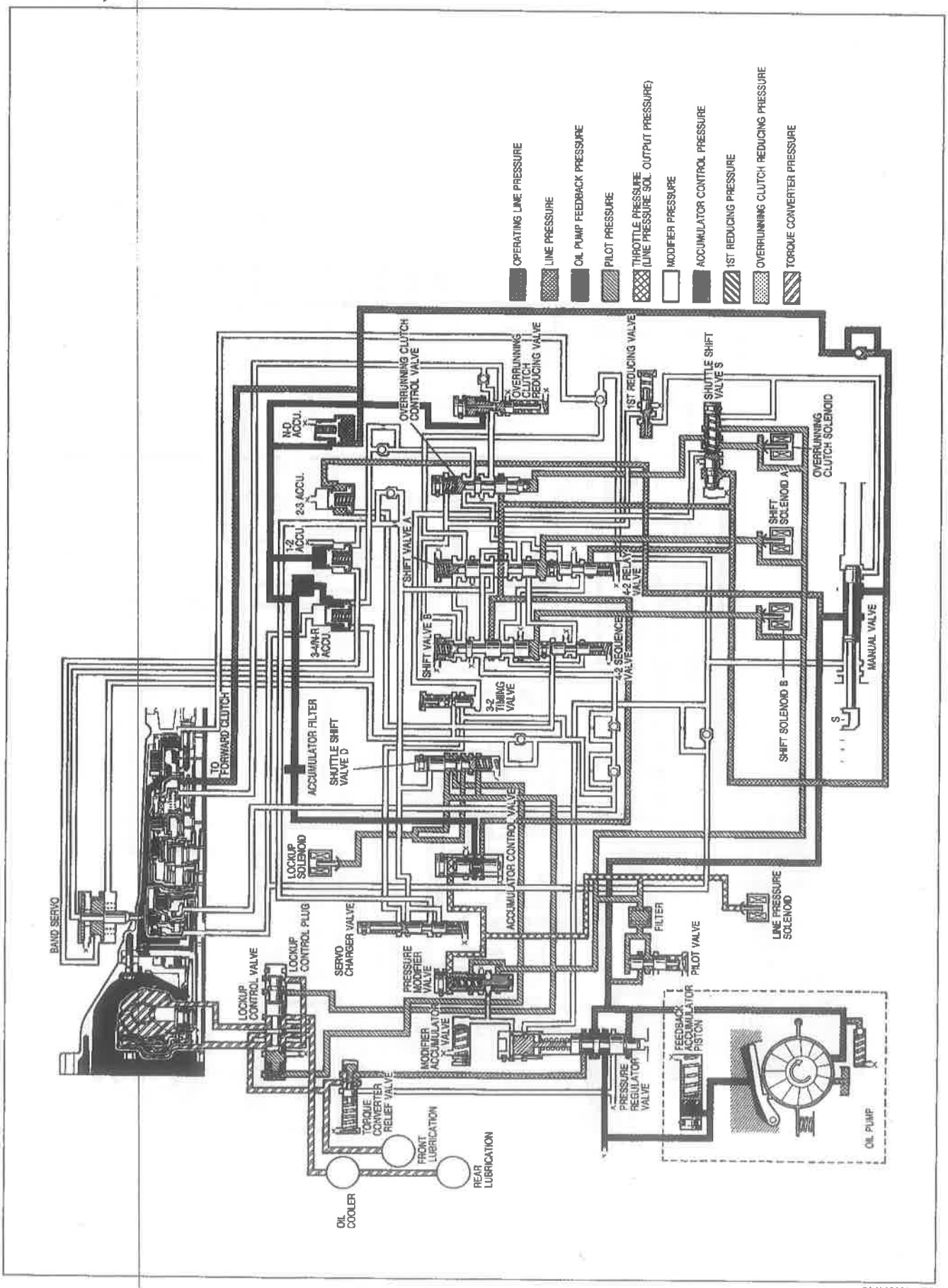


D RANGE; OD, LOCKUP ON

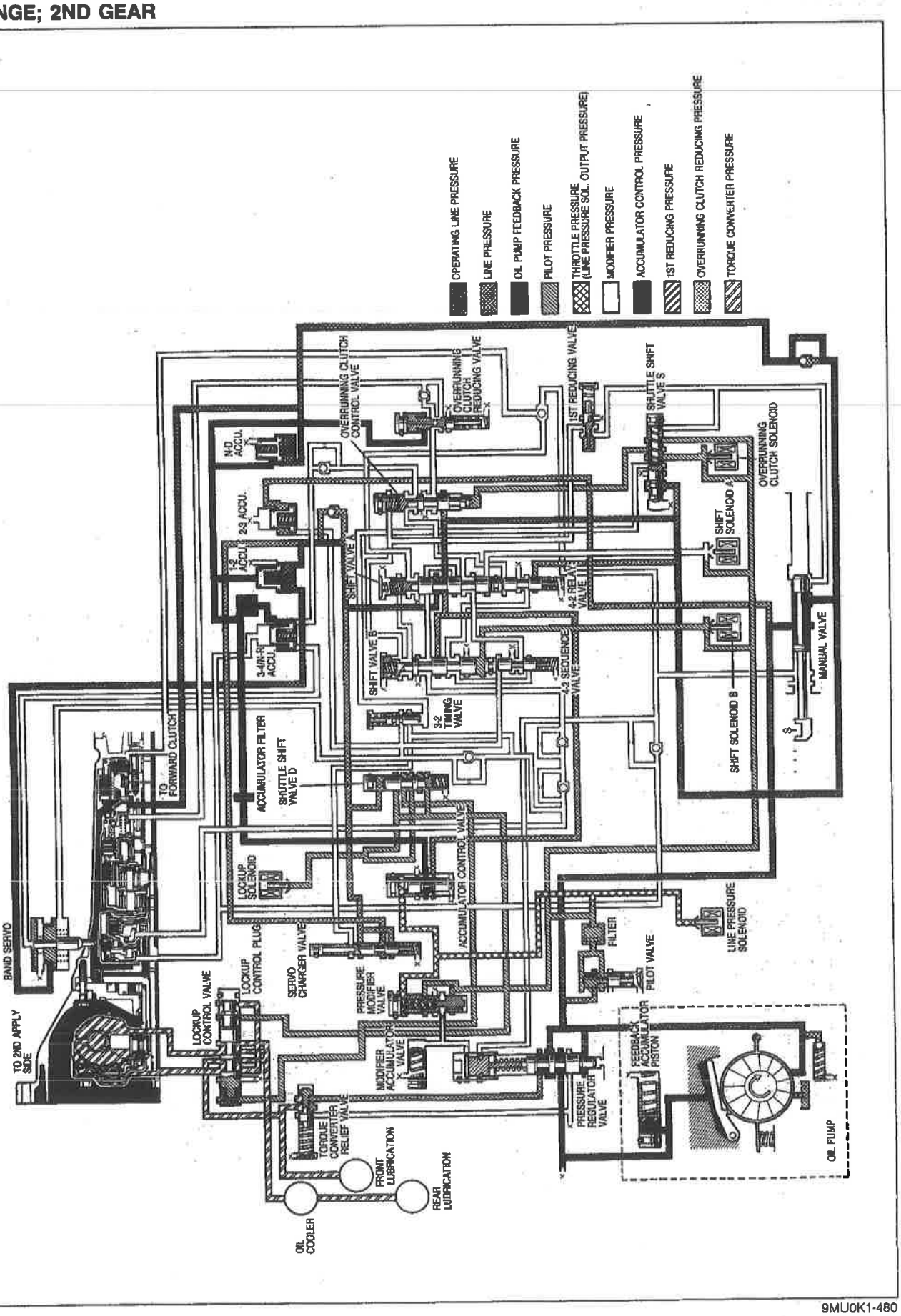


9MU0K1-478

S RANGE; 1ST GEAR

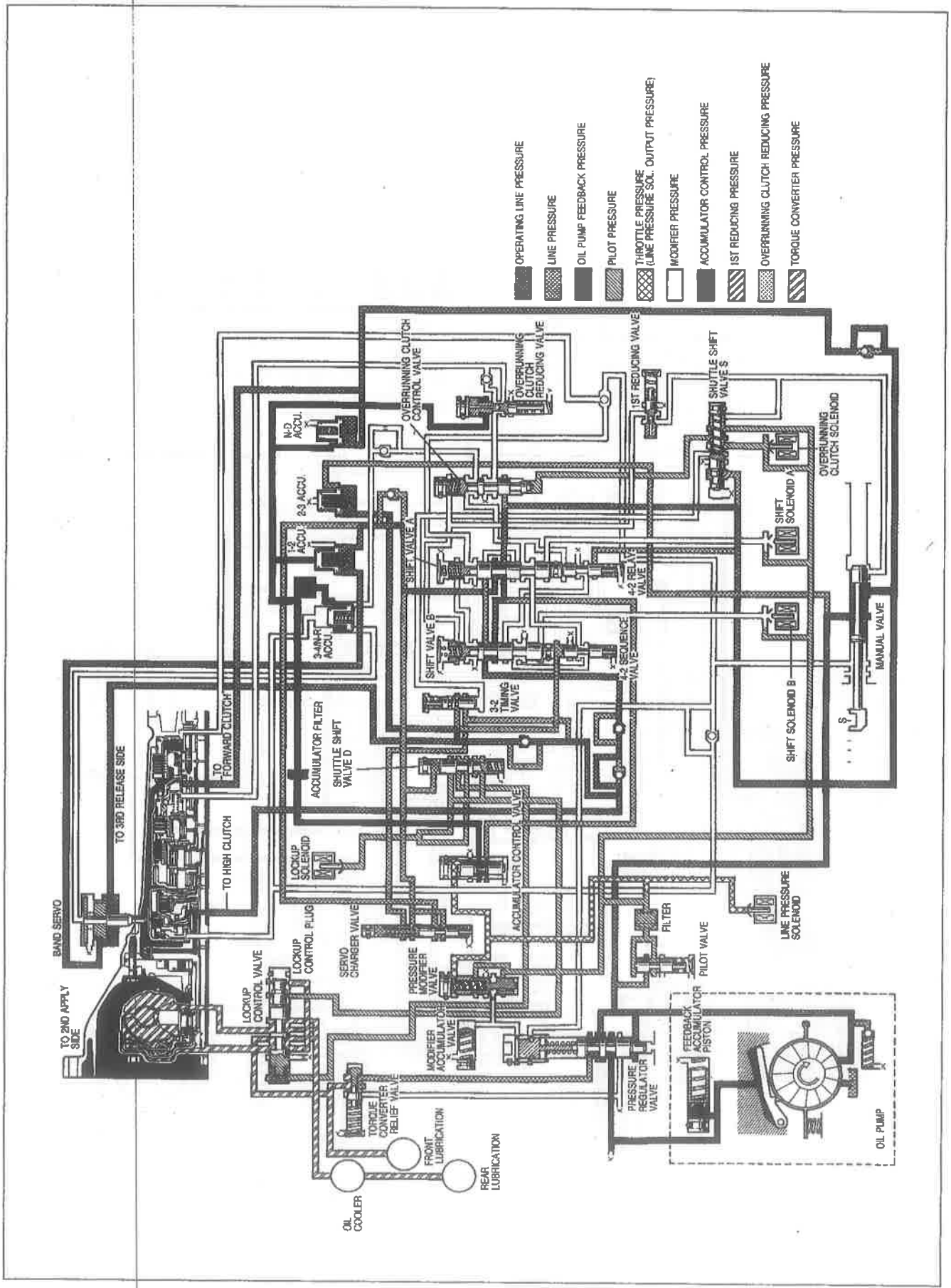


S RANGE; 2ND GEAR

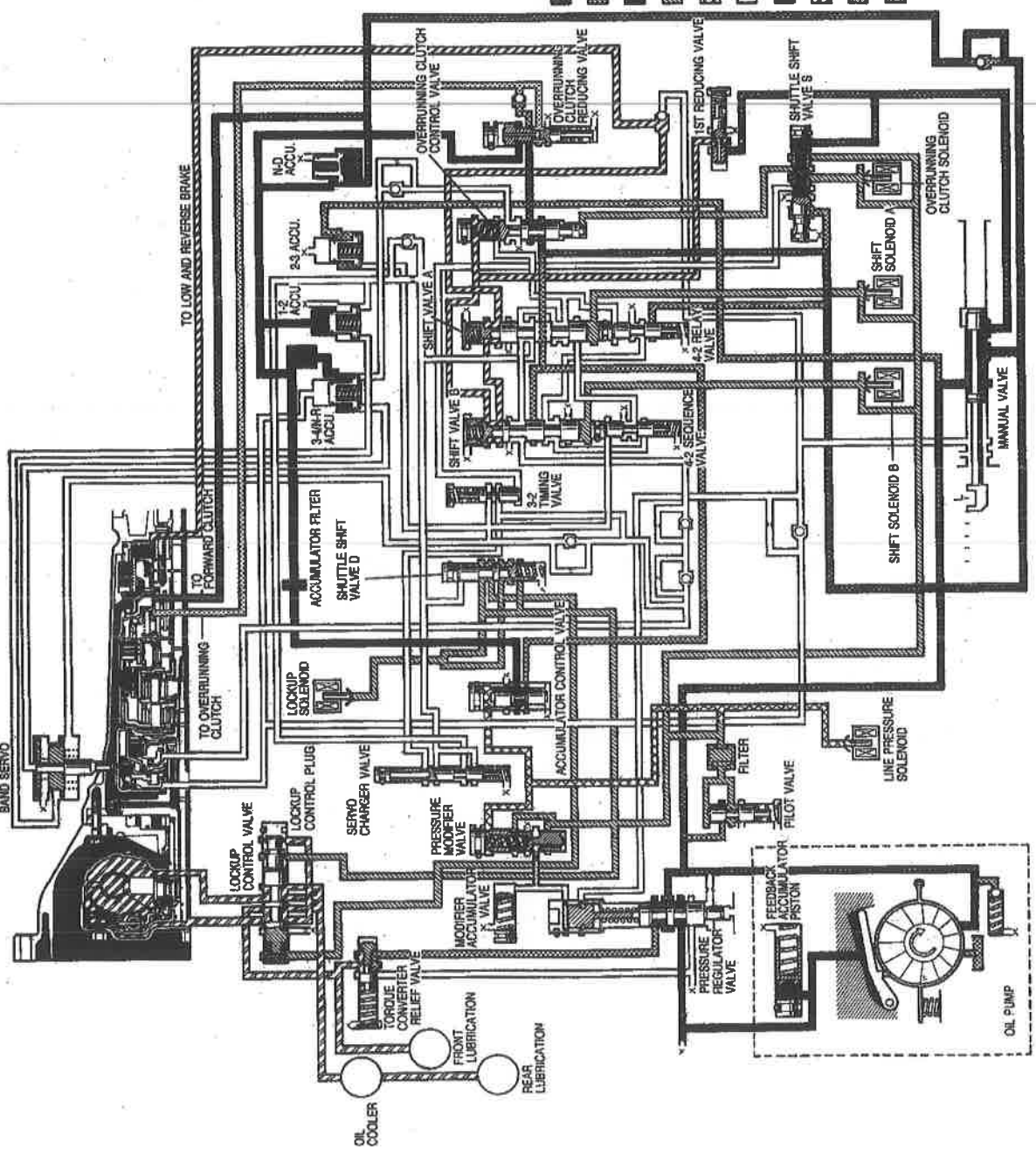


9MU0K1-480

S RANGE; 3RD GEAR

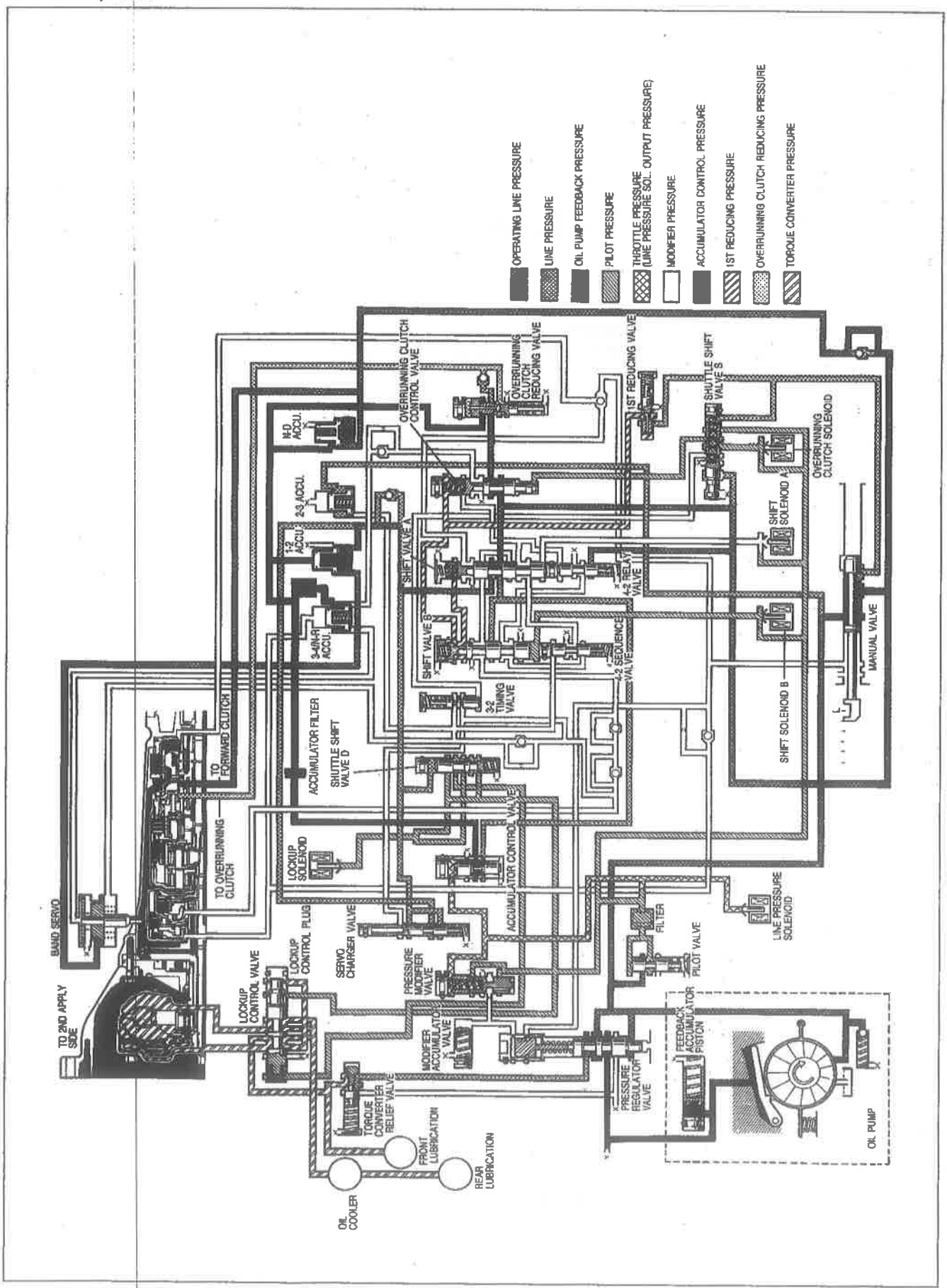


L RANGE; 1ST GEAR



9MU0K1-482

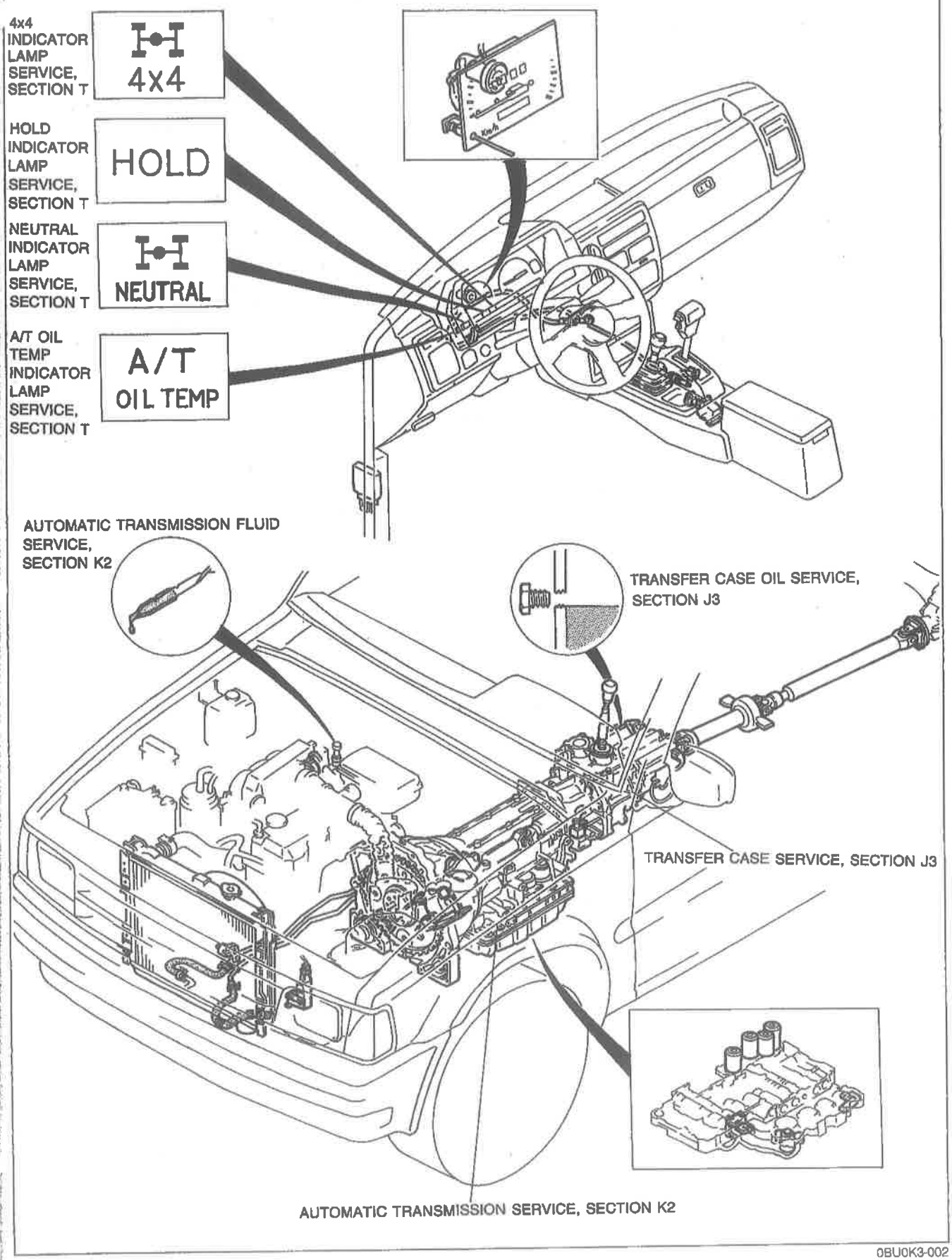
L RANGE; 2ND GEAR



AUTOMATIC TRANSMISSION (TRANSFER CASE)

0BU0K3-001

INDEX



0BU0K3-002

OUTLINE

SPECIFICATIONS

Item \ Engine/Transmission			B2600I R4AX-EL 4x4
Synchromesh system			Constant-mesh
Shift type			
Gear ratio	Low		2.210
	High		1.000
Oil	Grade		API Service GL-4 or GL-5
	Viscosity	Above 10°C (50°F)	SAE 80W-90
		All season type	SAE 75W-90
	Capacity	liters (US qt, Imp qt)	2.0 (2.1, 1.8)

1BU0K3-001