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AUTOMATIC TRANSMISSION SERVICE GROUP



INTRODUCTION MAZDA G4A-EL

The Mazda G4A four speed automatic transaxle can come with hydraulic shift control or computer control. Although both units share common parts there are many major differences. The computer control (EL) unit does not have a governor assembly, but has a heavy wire harness by the inhibitor switch that makes this unit readily identifiable. This unit has a converter clutch. This booklet contains information on diagnosing, teardown and assembly of this unit.

We thank Mazda Motors
for the information and illustrations that
have made this booklet possible

The information and part numbers contained in
this booklet have been carefully compiled from
industry sources known for their reliability, but
ATSG does not guarantee its accuracy

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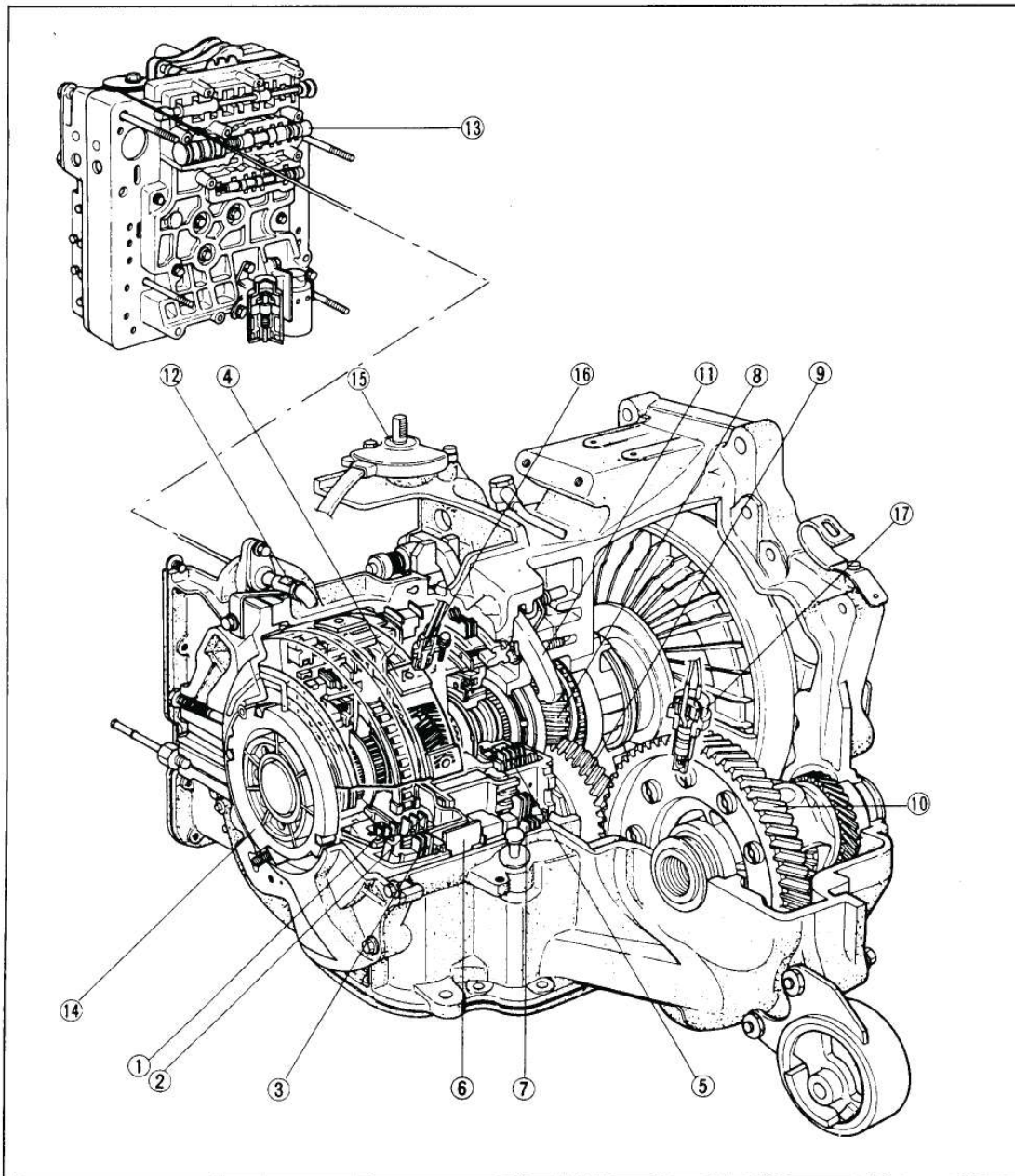
REVISED 1993



Technical Service Information

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STRUCTURAL VIEW



- | | | |
|-----------------------------|--------------------------|------------------------------|
| 1. Coasting clutch | 7. Low and reverse brake | 13. Control body |
| 2. Forward clutch | 8. Output gear | 14. Oil pump |
| 3. Reverse clutch | 9. Idle gear | 15. Inhibitor switch |
| 4. Reverse and forward drum | 10. Differential | 16. Pulse generator |
| 5. 3-4 clutch | 11. Parking pawl | 17. Fluid temperature switch |
| 6. 2-4 brake band | 12. Throttle cable | |

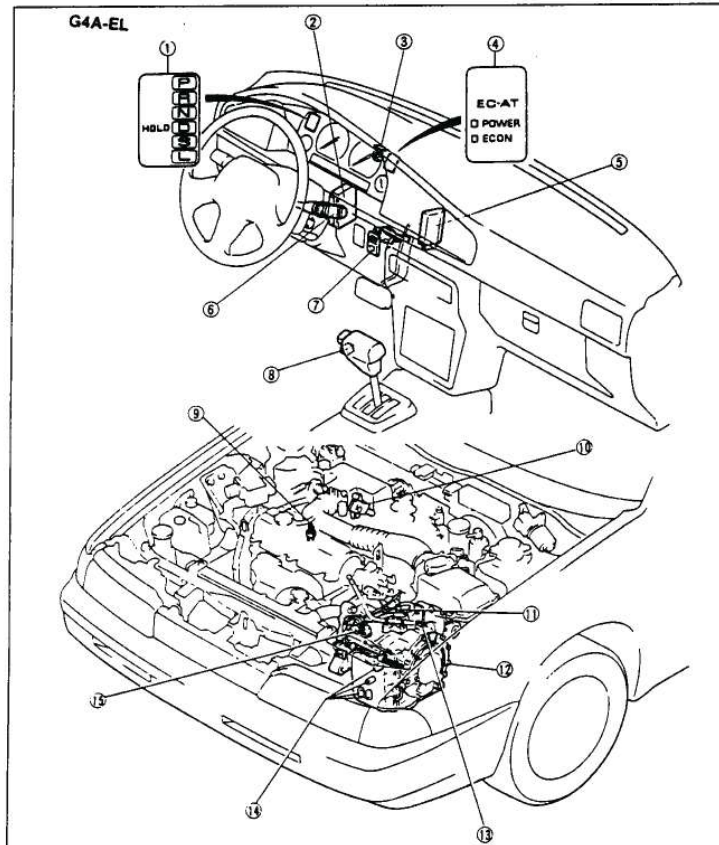


Technical Service Information

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SPECIFICATIONS

Model		G4A-EL (EC-AT)	G4A-HL (4-speed)	
			FE engine	F8 engine
Torque converter stall torque ratio		1.710—1.900 : 1	1.900—2.100 : 1	
Gear ratio	First	2.800		
	Second	1.540		
	Third	1.000		
	Fourth (OD)	0.700		
	Reverse	2.333		
Final gear ratio		3.700		
Number of drive plates/ driven plates	Forward clutch	3/3		
	Coasting clutch	2/2		
	3-4 clutch	5/5	4/4	
	Reverse clutch	2/2		
	Low and reverse brake	3/3	4/4	
Servo diameter (Piston outer dia./retainer inner dia.) mm (in)		78/53 (3.07/2.09)	78/49 (3.07/1.93)	78/56 (3.07/2.20)
Speedometer gear ratio (Driven/Drive gear)		20 : 25 or 21 : 25		
Automatic transmission fluid	Type	Dexron II or MIII		
	Capacity liters (US qt, imp qt)	6.8 (7.2, 6.0)		



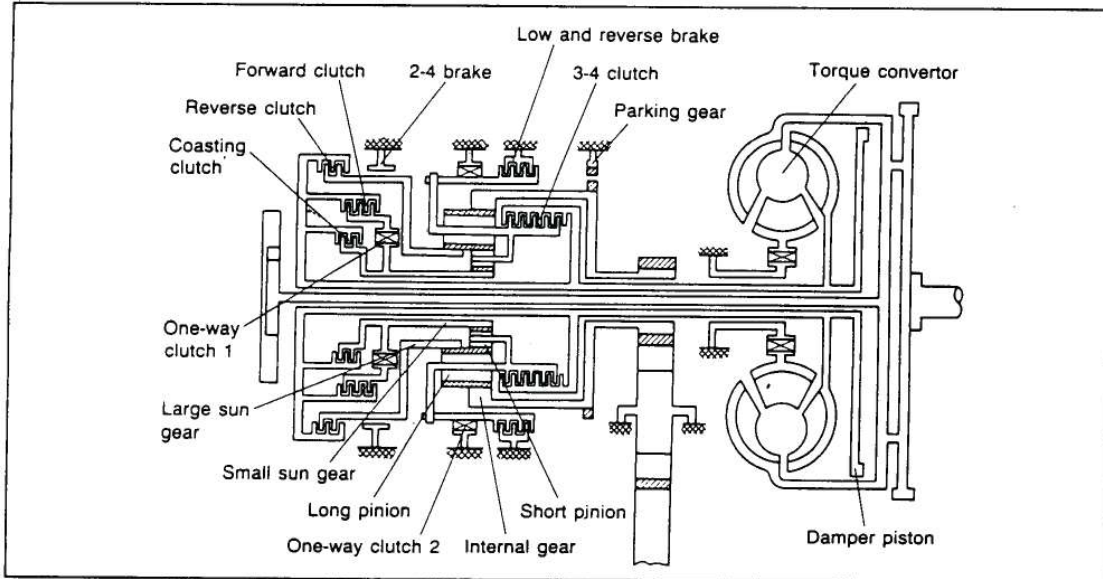
1. Hold indicator light
2. EC-AT control unit
3. Vehicle speed sensor
4. Mode indicator light
5. Cruise control unit
6. Cruise control switch
7. Mode switch
8. Hold switch
9. Water temperature switch
10. Throttle sensor and idle switch
11. Fluid temperature switch
12. EC-AT
13. Pulse generator
14. Solenoid valves
15. Inhibitor switch



Technical Service Information

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OPERATION OF COMPONENTS



Operation Table (G4A-EL)

Range	Gear	Engine braking effect	Operation elements								
			Forward clutch	Coasting clutch	3-4 clutch	Reverse clutch	2-4 brake		Low & reverse brake	One-way clutch 1	One-way clutch 2
P	—	—									
R	Reverse	Yes				○			○		
N	—	—									
D	1st	No	○							○	○
	2nd	No	○				○			○	
	3rd	Below approx. 40 km/h (25 mph)	○	○	○			○		○	
		Above approx. 40 km/h (25 mph)	○	○	○		⊗	○		○	
	OD	Yes	⊙		○		○				
S	1st	No	○							○	○
	2nd	No	○				○			○	
	3rd	Below approx. 40 km/h (25 mph)	○	○	○			○		○	
		Above approx. 40 km/h (25 mph)	○	○	○		⊗	○		○	
	L	1st	○						○	○	○
HOLD	D	2nd	○	○			○			○	
		2nd	○				○			○	
		3rd	○	○	○			○		○	
			○	○	○		⊗	○		○	
		2nd	○	○			○			○	
	S	Below approx. 40 km/h (25 mph)	○	○	○			○		○	
		Above approx. 40 km/h (25 mph)	○	○	○		⊗	○		○	
		2nd	○	○			○			○	
	L	1st	○	○					○	○	○
		2nd	○	○			○			○	

⊗ : Indicates fluid pressure to servo but band not applied due to pressure difference in servo.

⊙ : Indicates that it does not function transmission power.

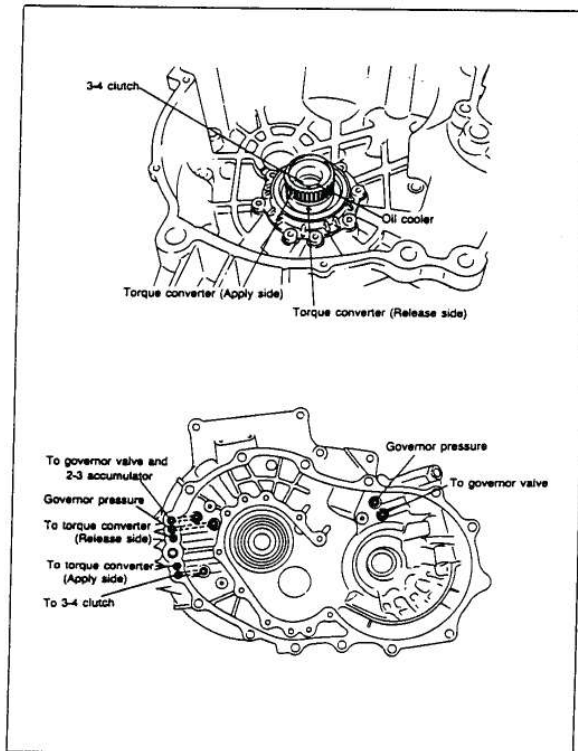


Technical Service Information

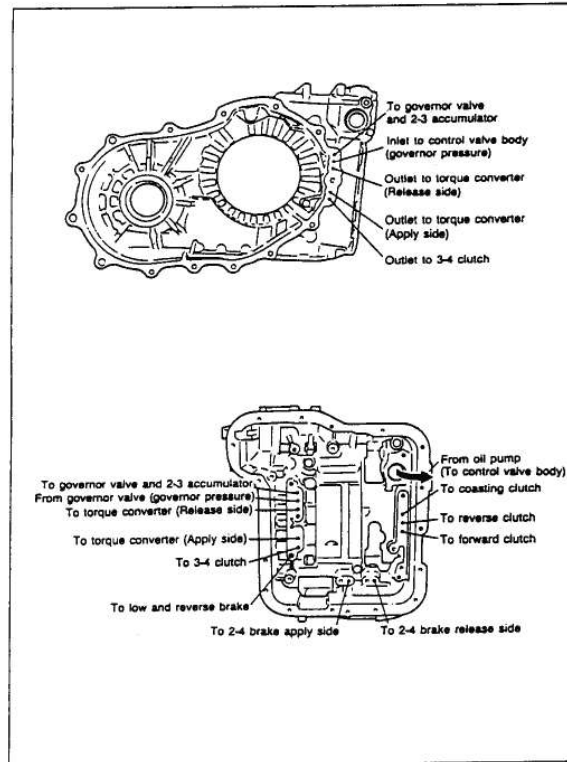
6 EL

FLUID PASSAGES

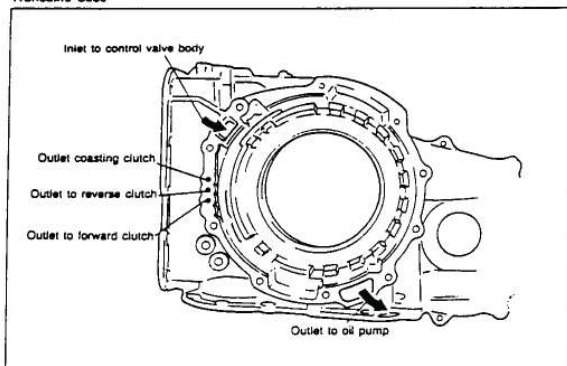
FLUID PASSAGE LOCATION
Converter Housing



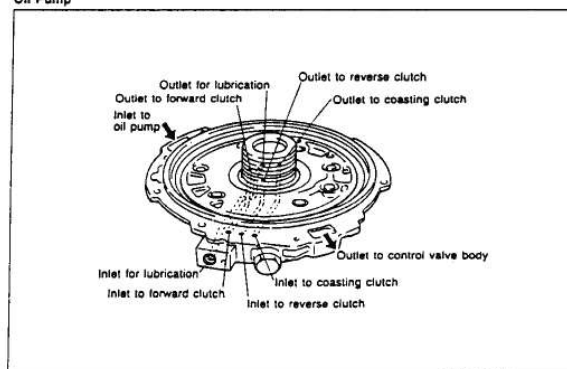
Transaxle Case



Transaxle Case



Oil Pump





Technical Service Information

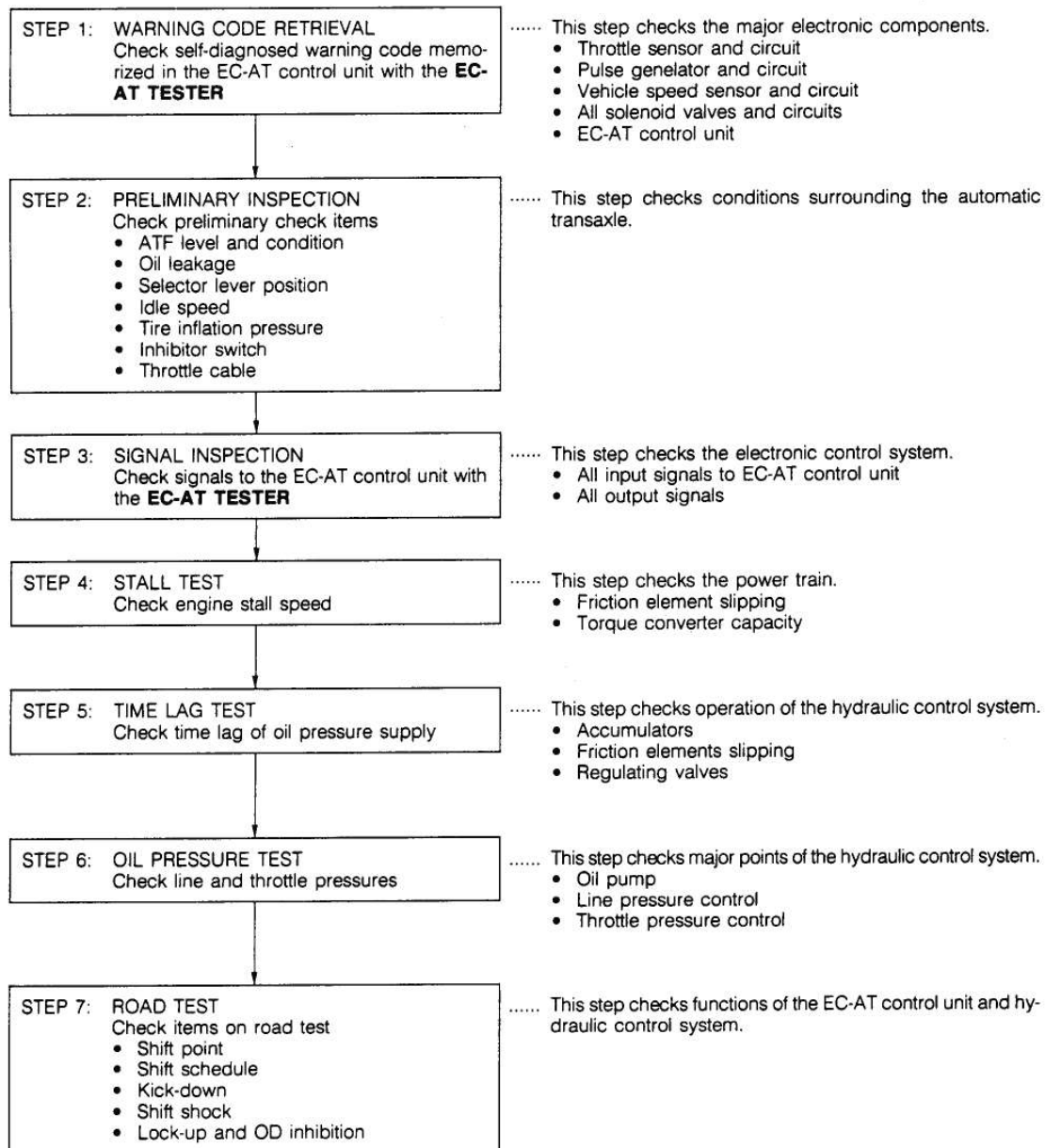
7 EL

TROUBLESHOOTING (G4A-EL)

GENERAL NOTE

In the event of a problem with the EC-AT, the cause may be in the engine, EC-AT power train, hydraulic control system, or electronic control system.

When troubleshooting, therefore, it is recommended to begin from those points that can be judged quickly and easily. The recommended troubleshooting sequence is described below.





Technical Service Information

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By following the above seven steps, the cause of the problem should be located.
As another guide to faster location of the causes of problems, the Quick Diagnosis Chart is included.

In this chart, a circle is used to indicate the components that might be the cause of trouble for 23 types of problems. It is only necessary to check those components indicated by circles, at each step of the troubleshooting process, in order to quickly locate the cause of the problem.

Quick Diagnosis Chart

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

- Components indicated in the "Self-Diag." column are diagnosed by the EC-AT control unit self-diagnosis function.
The **EC-AT Tester** can be used for easy retrieval of these signals.
- Components indicated in the "Adjustment" column indicate that there is a possibility that the problem may be the result of an incorrect adjustment.
Check the adjustment of each component, and readjust if necessary.
- Input and output signals of the EC-AT control unit for the components indicated in the "EC-AT TESTER" column can be easily checked by using of the **EC-AT Tester**.
- Components indicated in the "Stall Test" column can be checked for malfunction by the results of the stall test.
- Components indicated in the "Time Lag Test" column can be checked for malfunction by the results of the time lag test.
- Components indicated in the "Oil Pressure Test" column can be checked for malfunction by the results of the oil pressure test.
- Components indicated in the "Road Test" column can be checked for malfunction by the results of the road test.
- The checking, adjusting, repair or replacement procedures for each component

Item	Inspection point	Electronic control system										Preliminary	Hydraulic control system	Power train																					
		Brake light switch	Inhibitor switch	Mode switch	Hold switch	Idle switch	Throttle sensor	Cruise control switch	Water temp. switch	Vehicle speed sensor	Pulse generator	1-2 solenoid	2-3 solenoid	3-4 solenoid	Lock-up solenoid	ATF level and condition	Selector lever	Throttle cable	Idle speed and ignition timing	Control valves	Accumulators	Oil pump	Hydraulic circuit	Torque converter	Forward clutch	Coasting clutch	Reverse clutch	3-4 clutch	2-4 brake band and servo	Low and reverse brake	One-way clutch 1	One-way clutch 2	Parking gear	Planetary gear	Differential assembly
Self-diag.																																			
Adjustment																																			
EC-AT TESTER																																			
Stall Test																																			
Time Lag Test																																			
Oil Pressure Test																																			
Road Test																																			



Technical Service Information

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Inspection point and reference page Condition		ON VEHICLE																	OFF VEHICLE																	
		Electronic control system										Preliminary	Hydraulic control system	Power train																						
		Brake light switch	Inhibitor switch	Mode switch	Hold switch	Idle switch	Throttle sensor	Cruise control switch	Water temp. switch	Vehicle speed sensor	Pulse generator	1-2 solenoid	2-3 solenoid	3-4 solenoid	Lock-up solenoid	ATF level and condition	Selector lever	Throttle cable	Idle speed and ignition timing	Control valves	Accumulators	Oil pump	Hydraulic circuit	Torque converter	Forward clutch	Coasting clutch	Reverse clutch	3-4 clutch	2-4 brake band and servo	Low and reverse brake	One-way clutch 1	One-way clutch 2	Parking gear	Planetary gear	Differential assembly	
Accelerating	Vehicle does not move in D, S, L, or R range																																			
	Vehicle moves in N range																																			
	Excessive creep																																			
	No creep at all																																			
Shifting	No shift																																			
	Abnormal shift sequence																																			
	Frequent shifting																																			
	Excessively high or low shift point																																			
	No lock-up																																			
	No kick-down																																			
Slipping	Engine run away or slip when starting vehicle																																			
	Engine run away or slip when up- or down-shifting																																			
Shift shock	Excessive N to D or N to R shift shock																																			
	Excessive shift shock when upshifting or downshifting																																			
	Excessive shift shock when changing range																																			
Noise	Transaxle noisy in N or P range																																			
	Transaxle noisy in D, S, L, or R range																																			
Others	No engine braking																																			
	No mode change																																			
	Transaxle overheats																																			
	Vehicle moves in "P", or parking gear not disengaged when "P" is disengaged																																			
	Hold indicator flashes																																			
	Engine will not start																																			



Technical Service Information

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(WARNING CODE RETRIEVAL)

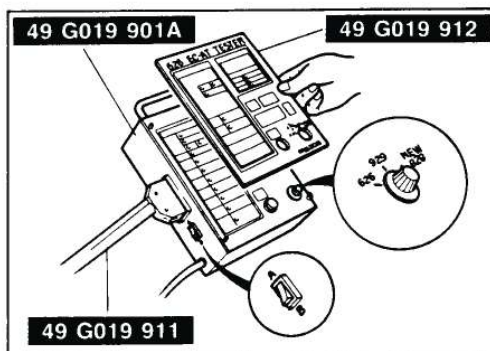
Self-diagnosis Function

The self-diagnosis 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 which have happened or are continuing are memorized in the EC-AT control unit as specific codes.

The **EC-AT Tester** is used to retrieve these warning codes. Each malfunction is indicated by a code number and buzzer as shown the table below.

Code Number

Code number	Location of malfunction	Buzzer
06	Vehicle speed sensor or circuit	
12	Throttle sensor or circuit	
55	Pulse generator or circuit	
60	1-2 shift solenoid valve or circuit	
61	2-3 shift solenoid valve or circuit	
62	3-4 shift solenoid valve or circuit	
63	Lock-up solenoid valve or circuit	



EC-AT Tester

Assembly of EC-AT tester

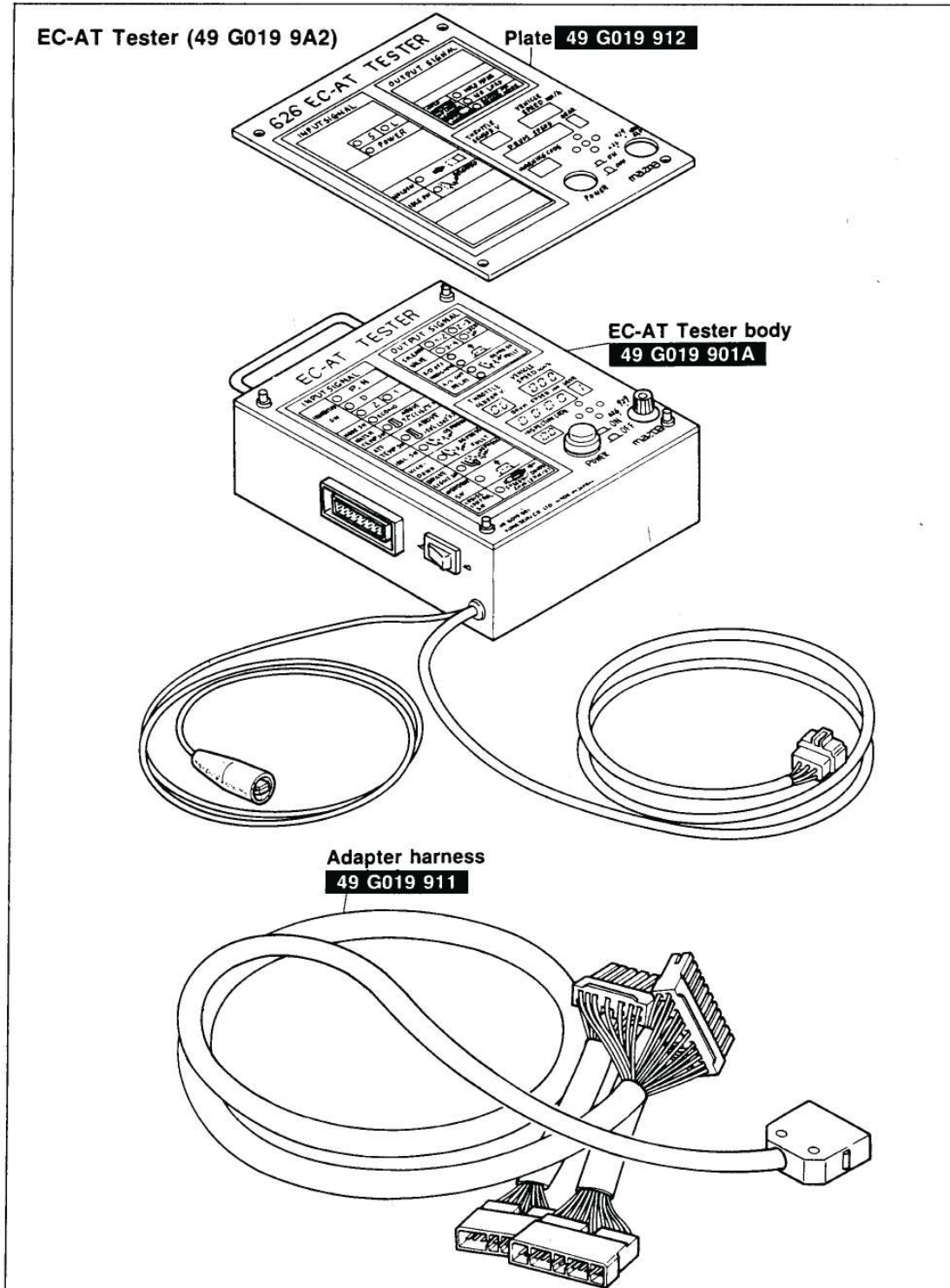
1. Set the **plate** (49 G019 912) onto the **EC-AT tester body** (49 G019 901A).
2. Connect the **adapter harness** (49 G019 911) to the **EC-AT tester body**.
3. Select the code select switch to A position.
4. Select the select switch to NEW 626 position.



Technical Service Information

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Components



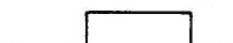


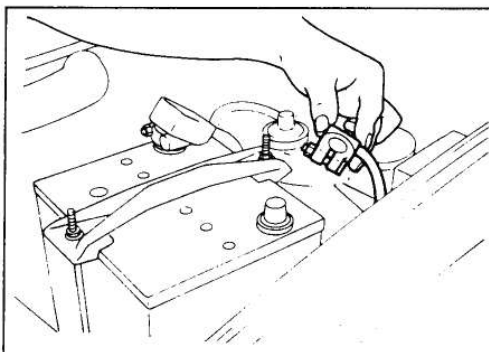
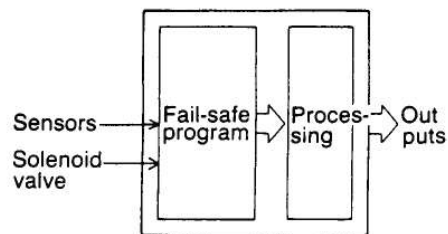
Technical Service Information

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06 → 4 second period →
55 → 4 second period →
63 → 4 second period →
Repeats above

**When the service connector
is not grounded**

Malfunctions	YES	
	NO	
Hold indicator flashing	YES	
	NO	
Memory in control unit	YES	
	NO	



General Note

1. If there is more than one malfunction, the code numbers will be displayed on the tester one by one in a numerical order. In the case of malfunctions, 55, 06, and 63, the code numbers are displayed in an order of 06, 55, then 63. The display is as shown.

2. The hold indicator flashes to indicate the same pattern as the buzzer of the EC-AT Tester when the EC-AT service connector is grounded.

When the EC-AT service connector is not grounded, the indicator flashes in a constant frequency while a malfunction is occurring and goes out if the malfunction recovers. However, the warning code is memorized in the EC-AT control unit.

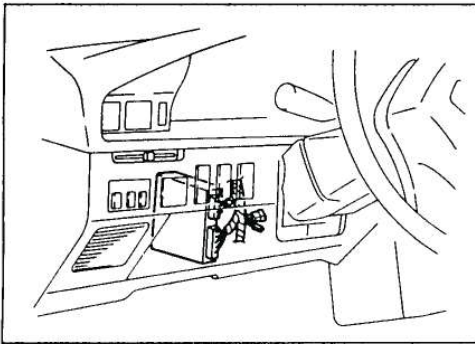
3. The EC-AT control unit has a built-in fail-safe function for the throttle sensor, the pulse generator, and the 1-2, 2-3, and 3-4 shift solenoid valves. If a malfunction occurs, the EC-AT control unit will control operation of the remaining components according to a preset fail-safe program. The vehicle may still be driven, although the driving performance will be slightly affected.

4. The memory of warning codes is canceled by disconnecting the negative battery terminal for approx. five seconds.



Technical Service Information

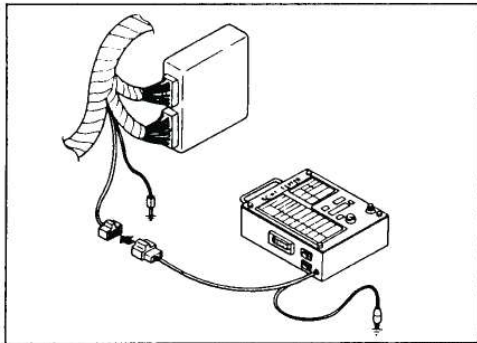
13 EL



Retrieval Procedure

Locate the service connector.

NOTE: On some models grounding the 1 pin service connector will display the service codes. If this procedure is ineffective, it will be necessary to use a scanner or EC-AT Tester to retrieve stored codes.



Ground the ground connector of the **EC-AT Tester**.

Connect the 6-pin connector of the **EC-AT Tester** to the service connector.

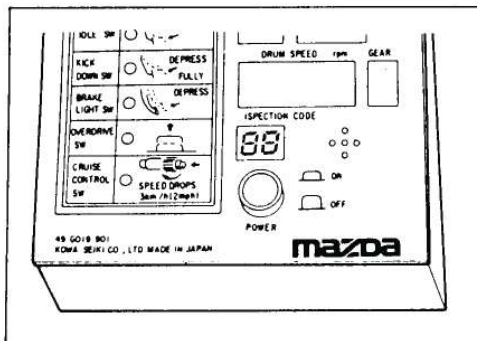
Note

The service connector is blue-colored connector.

Ground the 1 pin service connector.

Note

The service connector is blue-colored connector.



Turn the ignition switch ON.

Check that "88" flashes on the digital display and the buzzer sounds for three seconds after turning the ignition switch ON.

If "88" does not flash, check the service connector wiring.

If "88" flashes and the buzzer sounds continuously for more than **20 seconds**, check wiring to 2M terminal of the EC-AT control unit for short-circuit then replace the EC-AT control unit and repeat steps 3 and 4.

Note the code numbers and check for the causes by referring to the Inspection Procedure shown repair as necessary.

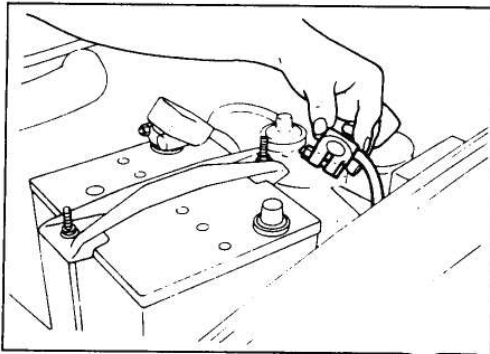
Note

After repairs are made, recheck for code numbers by performing the "After-repair procedure."



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After-repair Procedure

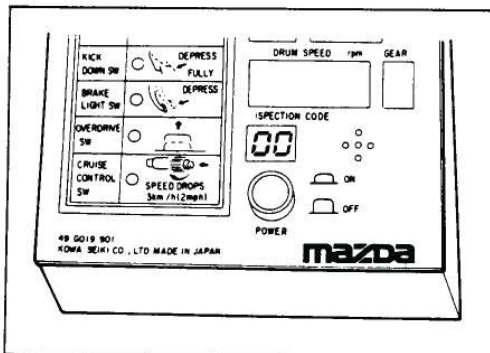
Cancel the memory of malfunctions by disconnecting the negative battery terminal for at least five seconds, then reconnect it.
Remove the EC-AT tester if it is connected.

Drive at 50 km/h (31 mph)

Kick-down

Stop the vehicle

Drive the vehicle at 50 km/h (31 mph), then depress the accelerator pedal fully to activate kick-down. Stop the vehicle gradually.



Reconnect the **EC-AT tester** to the 6-pin service connector.

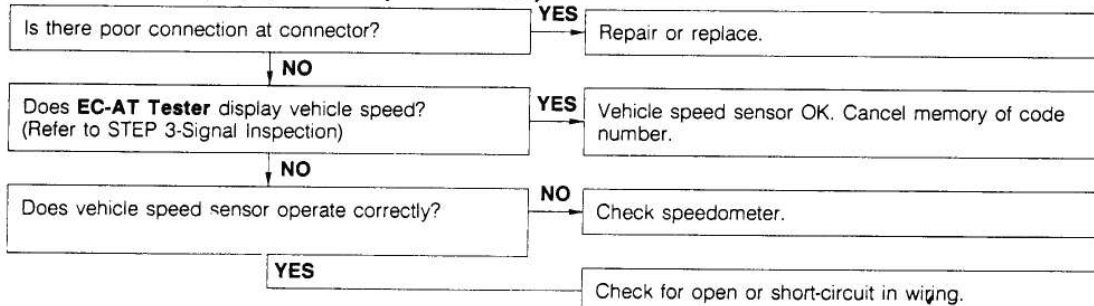
Ground the 1-pin service connector with a jumper wire.

Turn the ignition switch ON.

Check that no code numbers are displayed.

Inspection Procedure

No. 06 code display (Vehicle speed sensor)

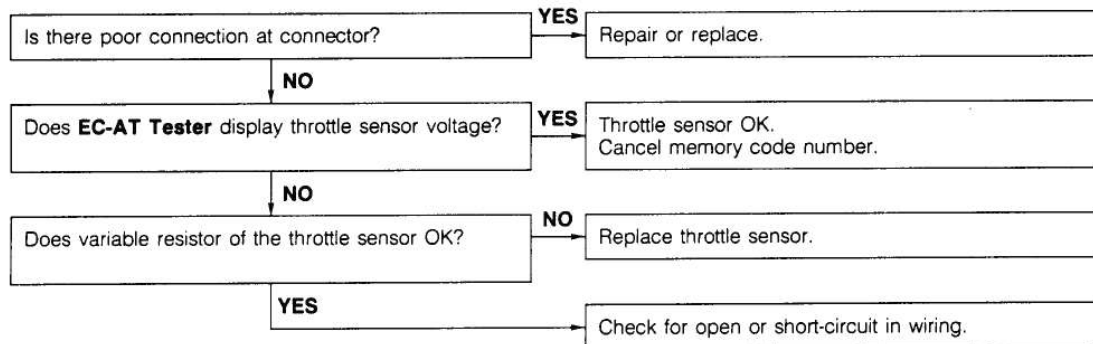




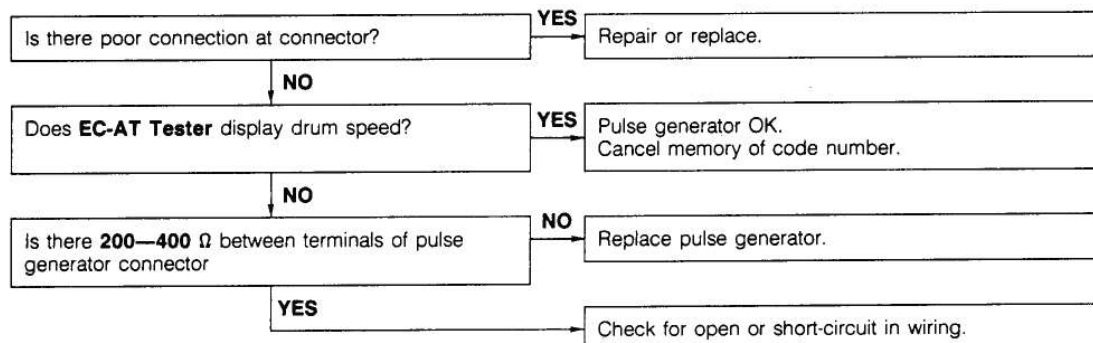
Technical Service Information

15 EL

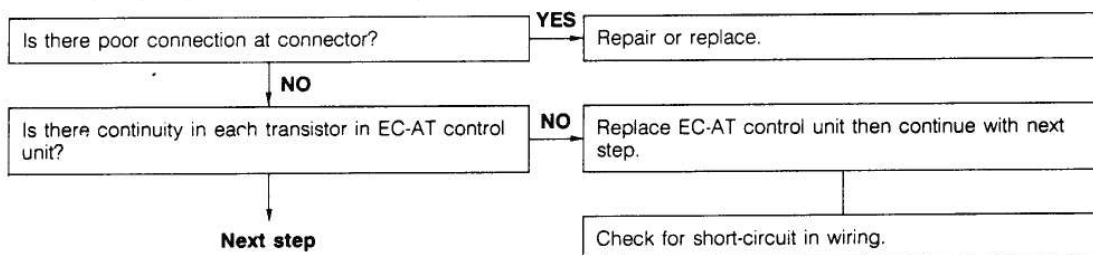
No. 12 code display (Throttle sensor)



No. 55 code display (Pulse generator)



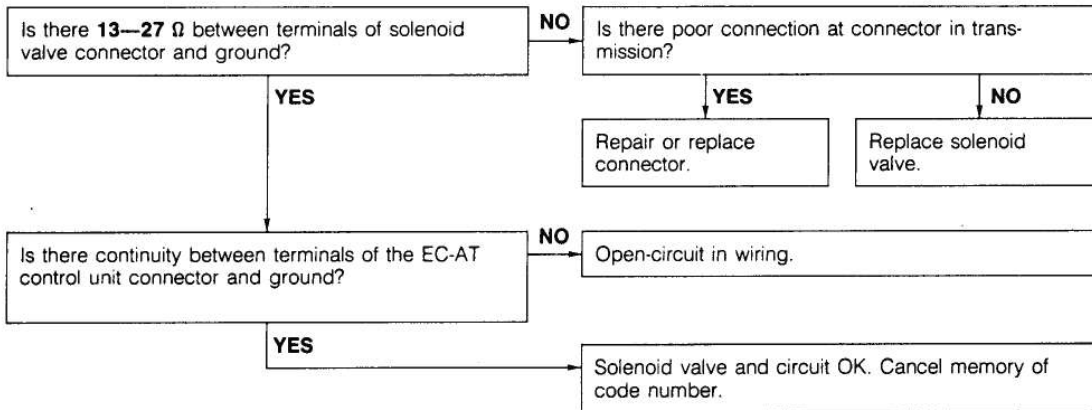
No. 60, 61, 62, or 64 code display (1-2 shift, 2-3 shift, or 3-4 shift solenoid valve)



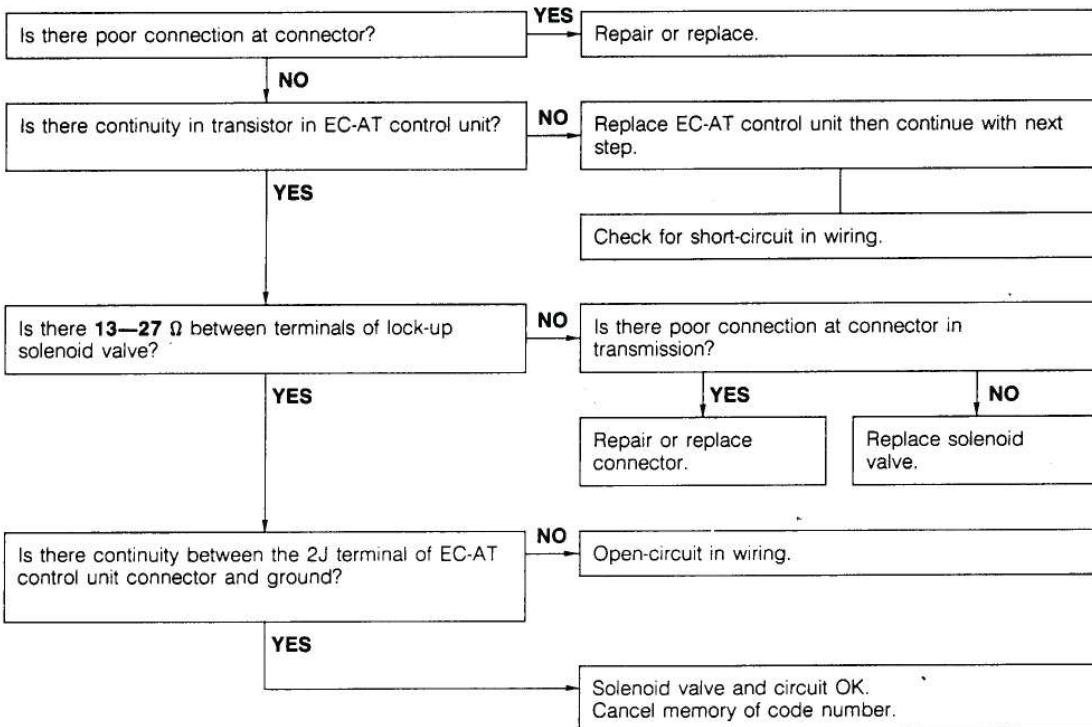


Technical Service Information

16 EL



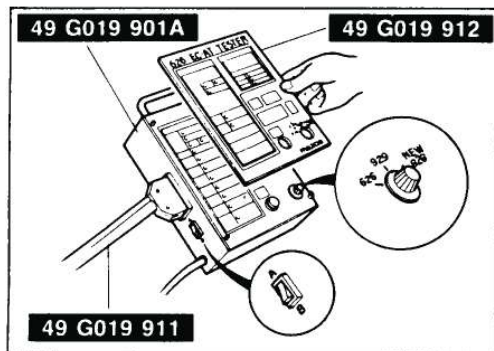
No. 63 code display (Lock-up solenoid valve)





Technical Service Information

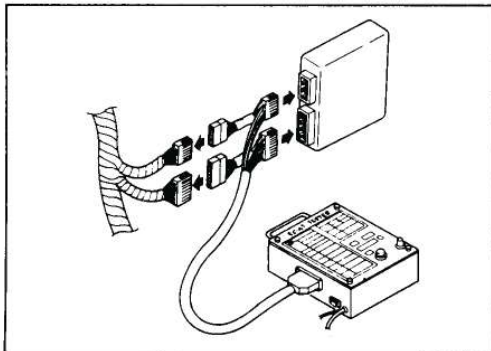
17 EL



(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. Powertrain slippage is also checked.



Inspection Procedure

1. Disconnect the connectors from the EC-AT control unit.
2. Connect the adaptor harness between the control unit and the connectors.
3. Turn the ignition switch and main switch ON.
4. 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	L	ON	L range	Inhibitor switch or wiring
		OFF	Other ranges	
	S	ON	S range	
		OFF	Other ranges	
	D	ON	D range	
		OFF	Other ranges	
	P,N	ON	P or N range	
		OFF	Other ranges	
HOLD SW		ON	Hold switch pushed	Hold switch or wiring
		OFF	Hold switch released	
MODE SW		ON	Power mode	Mode switch or wiring
		OFF	Economy mode	
IDLE SW		ON	Throttle valve fully closed	Idle switch or wiring
		OFF	Throttle valve open	



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Item	Indication	Condition	Possible cause
BRAKE LIGHT SW	ON	Brake pedal depressed	Brake light switch or wiring
	OFF	Brake pedal released	
WATER TEMP SW	ON	Coolant temperature 72°C (162°F) or above	Water temp switch or wiring
	OFF	Coolant temperature lower than 65°C (149°F)	
ATF TEMP SW	ON	ATF temperature 150°C (302°F) or above	Fluid temperature switch or wiring
	OFF	ATF temperature lower than 143°C (289°F)	
CRUISE CONTROL SW	Not used	—	—
Input (Digital display)			
THROTTLE SENSOR	EC-AT control unit terminal voltage	All the time	Throttle sensor, idle switch or wirings
VEHICLE SPEED*	Vehicle speed calculated from speed sensor signal	All the time	Vehicle speed sensor, speedometer cable, or wiring
DRUM SPEED*	Drum speed	All the time	Pulse generator or wirings
Output (Light)			
1-2 SOLENOID VALVE*	ON	Refer to page 7B—26 solenoid valve operation table	Control unit, 1-2 shift sol., or wiring
	OFF		
2-3 SOLENOID VALVE*	ON		Control unit, 2-3 shift sol., or wiring
	OFF		
3-4 SOLENOID VALVE*	ON		Control unit, 3-4 shift sol., or wiring
	OFF		
LOCK-UP SOLENOID VALVE*	ON	Lock-up condition	Control unit, lock-up sol., or wiring
	OFF	Non-lock-up condition	
HOLD INDICATOR	ON	Hold mode	Control unit, Hold switch, or wiring
	OFF	Other modes	
MODE INDICATOR	ON	Power or economy mode	Control unit, hold switch, mode switch, or wiring
	OFF	Hold mode	
NO LOAD SIGNAL	Not used	—	—



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Item	Indication	Condition
OUTPUT (Digital display)		
GEAR*	1	1st gear position
	2	2nd gear position
	3	3rd gear position
	4	Overdrive (OD) gear position

Note

a) The back-up condition is as following condition

S range, hold mode, and the accelerator pedal depressed fully.

b) The * marked items should be checked during the engine running or driving.

Comprehensive Usage

The **EC-AT Tester** can be used to inspect slippage of friction elements, shift points, and shift sequence during the road test.

The inspection procedure is shown in (ROAD TEST).

Solenoid valve operation table

RANGE		GEAR		SOLENOID VALVES			
				1-2	2-3	3-4	Lock-up
P		Non				ON	
R		Reverse		ON			
N	—	Below approx. 18 km/h (11 mph)				ON	
		Above approx. 18 km/h (11 mph)		ON			
D	3rd	1st			ON	ON	
		2nd		ON	ON	ON	
		Below approx. 40 km/h (25 mph)	Lock-up OFF	ON			
			Lock-up ON	ON			ON
	OD	Lock-up OFF		ON		ON	
		Lock-up ON		ON		ON	ON
S	3rd	1st			ON	ON	
		2nd		ON	ON	ON	
		Below approx. 40 km/h (25 mph)					
		Above approx. 40 km/h (25 mph)		ON			
L	2nd	1st			ON	ON	
		Below approx. 110 km/h (68 mph)		ON	ON		
		Above approx. 110 km/h (68 mph)		ON			
HOLD	D	2nd		ON	ON	ON	
		3rd	Below approx. 40 km/h (25 mph)				
			Above approx. 40 km/h (25 mph)	ON			
		2nd		ON	ON		
	S	3rd	Below approx. 40 km/h (25 mph)				
			Above approx. 40 km/h (25 mph)	ON			
		1st			ON		
		2nd	Below approx. 110 km/h (68 mph)	ON	ON		
			Above approx. 110 km/h (68 mph)	ON			
	L	1st			ON		



Technical Service Information

(STALL TEST)

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

Preparation

Check the following items prior to testing:

1. Engine coolant, engine oil and ATF levels.
2. Warm the engine thoroughly to raise the ATF temperature to operating level (50—80°C, 122—176°F).
3. Engage the parking brake and use wheel chocks at the front and rear wheels.

1. Connect a tachometer to the engine.
2. Shift the selector lever to D range.
3. Depress the brake pedal firmly with the left foot and gradually depress the accelerator pedal with the right foot.
4. Read and note the engine speed as soon as it becomes constant, then release the accelerator pedal.

Caution

Steps 3 to 4 must be performed within 5 seconds.

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

Note

This one minute idle period is performed to cool the ATF and prevent oil degradation.

6. Perform stall tests for the following ranges in the same manner.
 - (1) 2 range
 - (2) 1 range
 - (3) R range

Standard stall speed:

FE engine

D.S.L range 2430—2530 rpm
R range 2390—2490 rpm

F8 engine

D.S.L range 2180—2280 rpm
R range 2140—2240 rpm

Caution

Always provide adequate cooling time between individual range stall tests.

AUTOMATIC TRANSMISSION SERVICE GROUP



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7. Perform the stall test for the following ranges in the same manner.

- | | |
|--------------------|--------------------|
| (1) D range | (4) L range |
| (2) D range (Hold) | (5) L range (Hold) |
| (3) S range (Hold) | |

Caution

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

Engine stall speed: D.S.L range 2170—2270 rpm
R range 2130—2230 rpm

Note

The stall test can be performed with the EC-AT Tester in place of a tachometer.
Drum stall speed indication: 0 rpm

Evaluation

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 forward ranges	Forward clutch slipping One-way clutch 1 slipping	
	In D range	One-way clutch 2 slipping	
	In S (Hold) and L (Hold) ranges	Coasting clutch slipping	
	In D (Hold) and S (Hold) ranges	2-4 brake band slipping	
	In R, L and L (Hold) ranges	Low and reverse brake 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 1st ...Reverse clutch b) Engine brake not applied in 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	



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(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 checks this time lag for checking condition of the 1-2, N-R, and N-D accumulators, forward, and one-way clutches, 2-4 brake band, and low and reverse brake.

Procedure

1. Start the engine and check the idle speed in P range.

Idle speed: 900 $\pm$ 5% rpm

2. Shift from N range to D range
3. Measure the time it takes from shifting until shock is felt, with a stop watch.
4. Shift the selector to N range and run the engine at idle speed for at least one minute.
5. Perform the test for the following shifts in the same manner.
 - (1) N $\rightarrow$ D range (Hold mode)
 - (2) N $\rightarrow$ R range

Note

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

Specified time lag: N $\rightarrow$ D range 0.5—1.0 second
 N $\rightarrow$ R range 0.5—1.0 second

Evaluation

Condition		Possible Cause
N $\rightarrow$ D (Economy) shifting	More than specification	Insufficient line pressure Forward clutch slipping One-way clutch 1 slipping One-way clutch 2 slipping
	Less than specification	N-D accumulator not operating properly Excessive line pressure
N $\rightarrow$ D (Hold) shifting	More than specification	Insufficient line pressure Forward clutch slipping 2-4 brake band slipping One-way clutch 1 slipping
	Less than specification	1-2 accumulator not operating properly Excessive line pressure
N $\rightarrow$ R shifting	More than specification	Insufficient line pressure Low and reverse brake slipping Reverse clutch slipping
	Less than specification	N-R accumulator not operating properly Excessive line pressure

1. Start the engine and check the idle speed in P range

Idle speed: 900 $\pm$ 5% rpm

2. Shift the selector lever to D range and read the line pressure at idle.
3. Depress the brake pedal firmly with the left foot and gradually depress the accelerator pedal with the right foot.
4. Read the line pressure as soon as the engine speed becomes constant, then release the accelerator pedal.

Caution

Steps 3 to 4 must be performed within 5 seconds.

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 engine stall speeds for each range in the same manner.



Technical Service Information

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Throttle Pressure Test

This step checks line pressure for checking the hydraulic components and for improper adjustment of throttle cable.

1. Start the engine and check the idle speed in P range.

Idle speed: 900 $\pm$ 5% rpm

2. Shift the selector lever to D range and read the throttle pressure at idle.
3. Depress the brake pedal firmly with the left foot and gradually depress the accelerator pedal with the right foot.
4. Read the throttle pressure as soon as the engine speed becomes constant, then release the accelerator pedal.

Caution

Steps 3 to 4 must be performed within 5 seconds.

Specified throttle pressure:

	Throttle pressure kPa (kg/cm ² , psi)
When idling	39—88 (0.4—0.9, 6—13)
At stall speed	471—589 (4.8—6.0, 68—85)

Evaluation

Throttle pressure	Possible location of problem
Not within specification	Throttle valve sticking Pressure regulator valve sticking Improper adjustment of throttle cable

Specified line pressure:

	Line pressure kPa, (kg/cm ² , psi)	
Range	D S L	R
When idling	353—432 (3.6—4.4, 51—63)	598—942 (6.1—9.6, 87—137)
At stall speed	873—1040 (8.9—10.6, 127—151)	1668—2011 (17.0—20.5, 242—292)

Evaluation

Line pressure	Possible location of problem
Low pressure in every position	Worn oil pump Fluid leaking from oil pump, control valve body, or transaxle case Pressure regulator valve sticking
Low pressure in D and S only	Fluid leaking from hydraulic circuit of forward clutch
Low pressure in R only	Fluid leaking from hydraulic circuit of low and reverse brake
Higher than specification	Throttle valve sticking Throttle modulator valve sticking Pressure regulator valve sticking



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(ROAD TEST)

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

Caution

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

D Range Test

Shift point, shift pattern, and shift shock

1. Shift the selector lever to D range and select the Power mode.
2. Accelerate the vehicle with half and full throttle valve opening.

Note

Throttle sensor voltage of the EC-AT Tester represents the throttle valve opening.

3. Check that 1-2, 2-3 and 3-OD up-shifts and downshifts and lock-up are obtained. The shift points must be as shown in the D range (Power) shift diagram.

Note

a) Drum speed (rpm) of the EC-AT Tester represents the shift point.

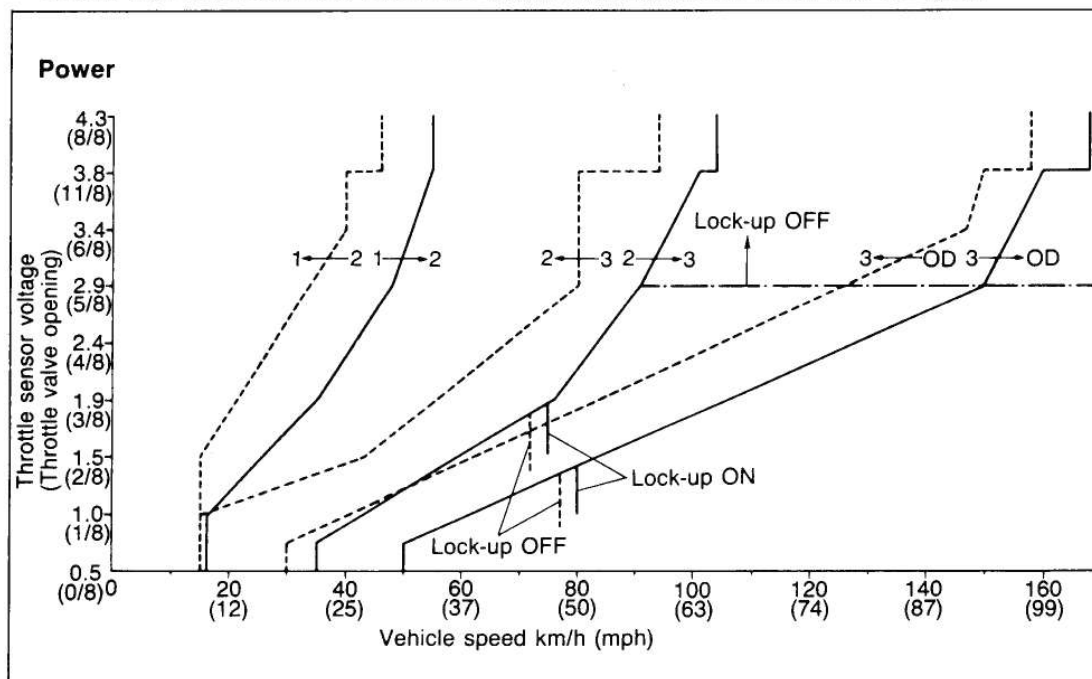
b) Vehicle speed of the EC-AT Tester and speedometer and vehicle speed on a chassis roller may not meet the specified shift pattern because of tire size. Therefore, check the shift points with the Drum speed.

c) There is no lock-up when the coolant temperature is below 72°C (162°F).

d) There is no overdrive when the cruise control is operating and there is a 3 km/h (1.9 mph) difference between the pre-set cruise speed and vehicle speed, or set or resume switch is ON.

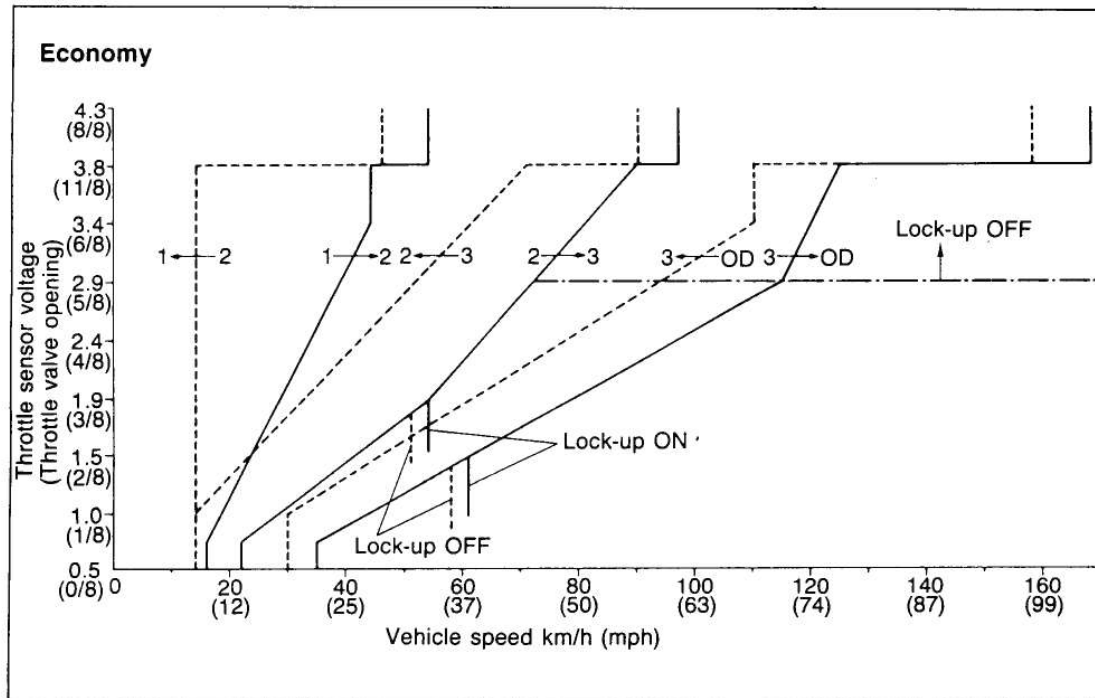
e) There is no lock-up when the brake pedal is depressed.

4. Check the up-shifts for shift shock or slippage in the same manner.
5. While driving in OD, shift the selector lever to S range and check that 4-3 downshift immediately occurs, then decelerate and check that engine braking effect is felt in only 3rd gear.



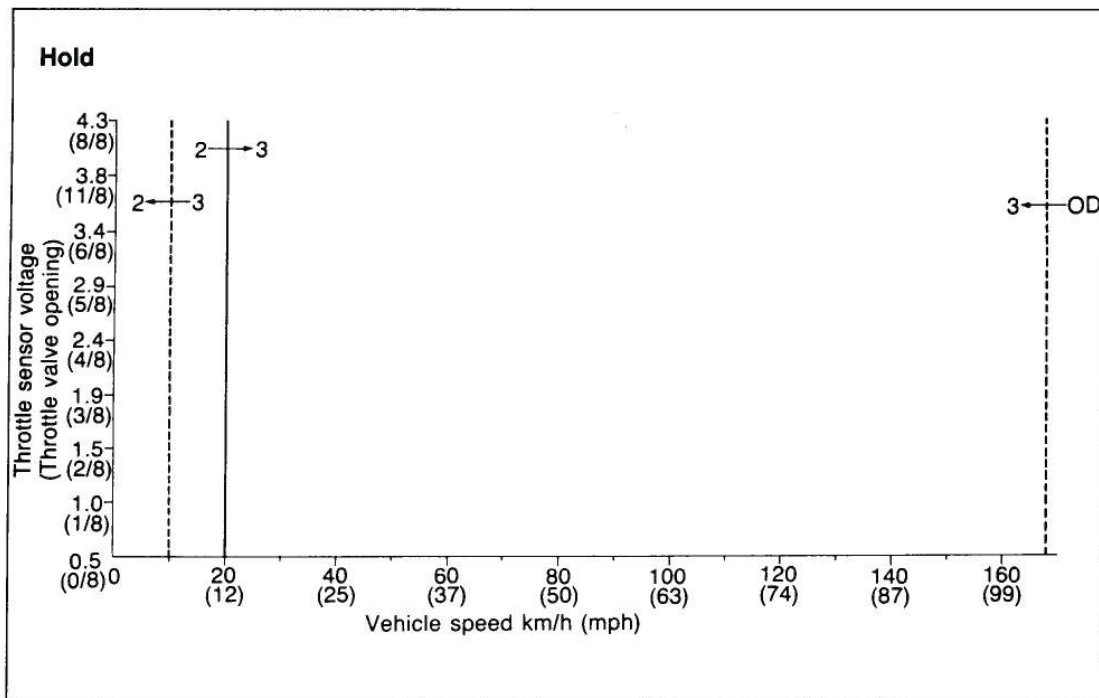


Technical Service Information



6. Select D range (Hold mode).

7. Accelerate the vehicle and check 2-3 up- and down-shifts, no 1st, and no OD is obtained and that the 2-3 shift points are as shown in the D range (Hold) shift diagram.





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Slippage Test

This step is performed to inspect slippage of the friction elements.

Preparation

1. Perform the preparation procedure shown in STEP 4 (STALL TEST).
2. Connect a tachometer to the engine and set it in the cabin.
3. Connect the **EC-AT Tester** and the **adaptor harness** between the EC-AT control unit and wiring harness.

Procedure

Drive the vehicle in each of the gears indicated below and check whether the vehicle speed or engine speed is above or below specification excessively as shown by the drum speed.

Driving condition			Speed	Drum speed (rpm)			
No.	Gears	Other condition		1,000	2,000	3,000	4,000
1	1st	L range, Hold mode	Vehicle speed km/h (mph)	11 (7)	22 (14)	33 (20)	44 (27)
2	1st	D range, Economy mode		11 (7)	22 (14)	33 (20)	44 (27)
3	2nd	S range, Hold mode		20 (12)	40 (25)	60 (37)	80 (50)
4	3rd	D range, Hold mode		31 (19)	61 (38)	92 (57)	123 (76)
5	OD	D range, Economy mode		44 (27)	88 (55)	131 (81)	173 (107)
6	OD	D range, Economy mode, Lock-up	Engine speed (rpm)	1,000	2,000	3,000	4,000

Evaluation

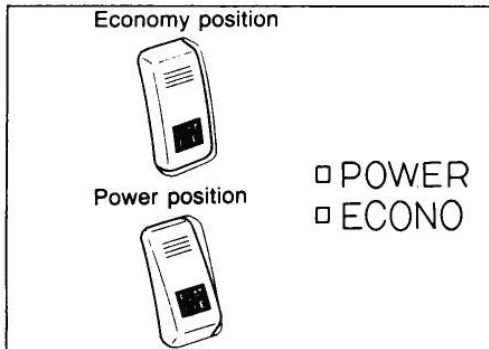
When there is no malfunction in the electrical system or hydraulic system, but vehicle speed or engine speed is below specification, the problem can be attributed to slippage of the friction elements.

Driving conditions below specification	Possible Cause
No.1 condition only	Low and reverse brake
No.2 condition only	One-way clutch
No.3 condition only	2-4 brake band
No.4 condition only	Coasting clutch
No.5 condition only	3-4 clutch
No.1-No.5 conditions	Forward clutch
No.6 condition only	Lock-up piston (in torque converter)



Technical Service Information

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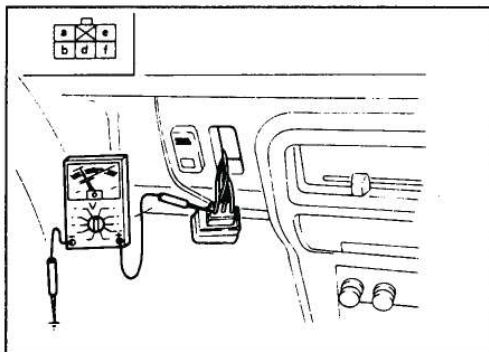


ELECTRICAL SYSTEM COMPONENTS

MODE SWITCH (G4A-EL)

Inspection of Operation

1. Turn the ignition switch ON.
2. Check that the mode indicator illuminates at each model.
3. If it is not working properly, check terminal voltage of mode switch.

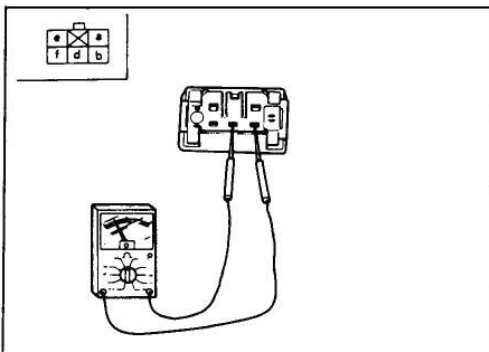


Inspection of Continuity

1. Disconnect the mode switch.
2. Turn the ignition switch ON and light switch OFF.
3. Check the voltage between each terminal and ground.

Mode	Voltage				
	a	b	d	e	f
Power	Approx. 12V	Below 1.5 V	Below 1.5 V	Below 1.5 V	Below 1.5 V
Economy	Below 1.5 V	Below 1.5 V	Below 1.5 V	Below 1.5 V	Approx. 12V

4. If correct, check for continuity between the terminal.



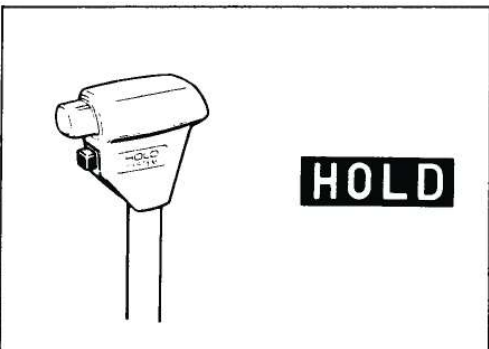
Inspection of Terminal Voltage

1. Disconnect the mode switch connector.
2. Check continuity of the terminals.

Mode	Connector terminal				
	a	f	d	e	b
Economy	○	○	○	○	
Power	○	○	○	○	○

○—○: Indicates continuity

3. If not correct, replace the mode switch.



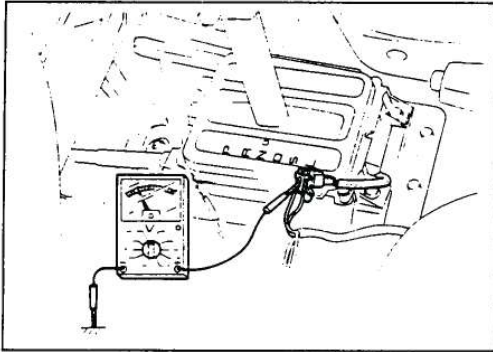
HOLD SWITCH (G4A-EL)

Inspection of Operation

1. Turn the ignition switch ON.
2. Check that the hold indicator illuminates while switch depressed. Release the switch and mode indicator lights are out.
3. If it is not working properly, check terminal voltage of hold switch.



Technical Service Information

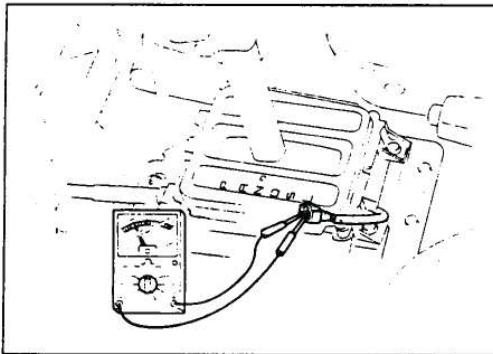


Inspection of Terminal Voltage

1. Remove the consol box.
2. Turn the ignition switch ON.
3. Check the voltage between the terminal (B) and ground while depressing the switch.

Terminal voltage	Switch
Approx. 12V	Depressed
Below 1.5V	Released

4. If correct, check continuity between the terminal.

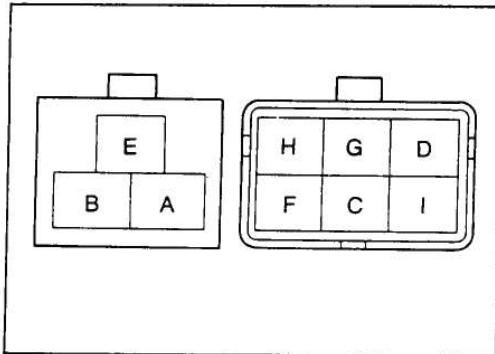


Inspection of Continuity

1. Disconnect the hold switch connector.
2. Check for continuity between the terminals while depressing the switch.

Continuity	Switch
YES	Released
NO	Depressed

3. If not correct, replace the hold switch.



Inspection of continuity

1. Disconnect the inhibitor switch connector.
2. Check continuity of the terminals.

G4A-EL

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

○—○: Indicates continuity

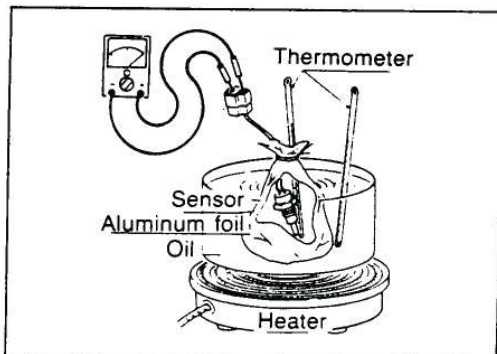
FLUID TEMPERATURE SWITCH (G4A-EL)

Inspection

1. Remove the fluid temperature switch.
2. Place the switch in oil with a thermometer as shown and heat it up gradually.
3. Check the continuity of the terminals. If necessary replace the switch.

Connection guide

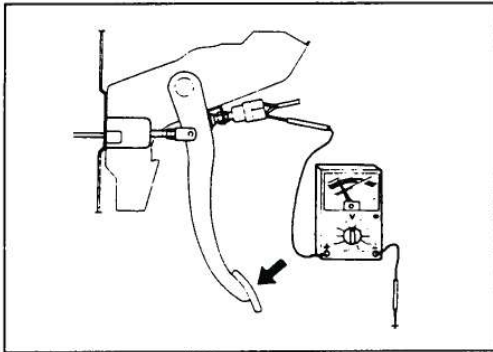
Fluid temperature	Continuity
Above 150°C (302°F)	Yes
Below 143°C (289°F)	No





Technical Service Information

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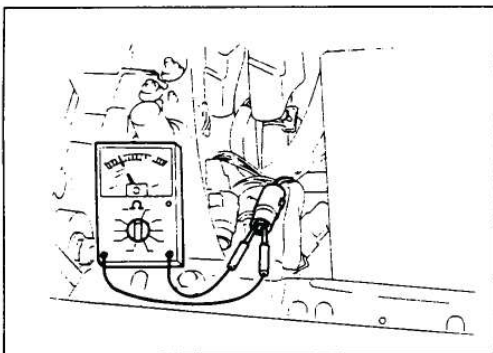
BRAKE LIGHT SWITCH (G4A-EL)

Inspection of Terminal Voltage

1. Turn the ignition switch ON.
2. Check the voltage between terminal (WG) and ground while depressing the brake pedal.

Terminal voltage	Brake pedal
Approx. 12V	Depressed
Below 1.5V	Released

3. If not correct, check continuity of the switch.

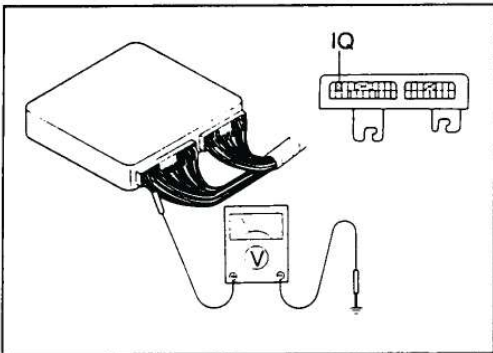


PULSE GENERATOR (G4A-EL)

Inspection

1. Disconnect the pulse generator connector.
2. Check for continuity between the terminals, if necessary replace the pulse generator.

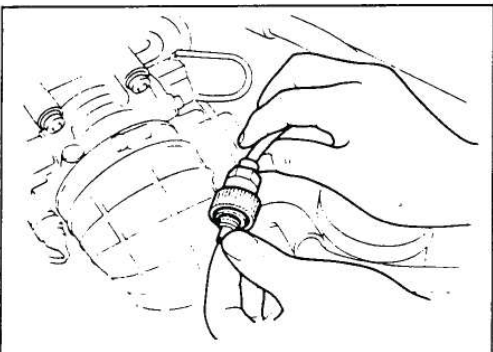
Resistance: 200—400Ω



VEHICLE SPEED SENSOR (G4A-EL)

Inspection of voltage

1. Connect a voltmeter between the 1Q terminal of the EC-AT control unit and ground as shown.
2. Turn the ignition switch ON.



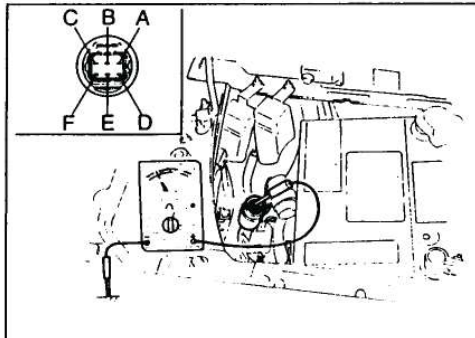
3. Remove the speedometer cable from the transaxle.
4. Slowly turn the speedometer cable one turn.
5. Check that approx. 4.5V is shown 4 times.
6. If not correct, check the combination meter.

CRUISE CONTROL SWITCH (CRUISE CONTROL UNIT)

IDLE SWITCH AND THROTTLE SENSOR (G4A-EL)



Technical Service Information



Internal wire colors.

- 1-2 sol. wire in trans is green.
- 2-3 sol. wire in trans is blue.
- 3-4 sol. wire in trans is yellow.
- LU. sol. wire in trans is red.

SOLENOID VALVES (G4A-EL)

Inspection of Resistance

1. Disconnect the negative battery cable.
2. Disconnect the solenoid valve connector.
3. Measure the resistance of the terminals except (A) terminal, if necessary replace the solenoid valve.

Resistance: 13—27Ω

Note

1-2 solenoid valve : F

2-3 solenoid valve : C,E

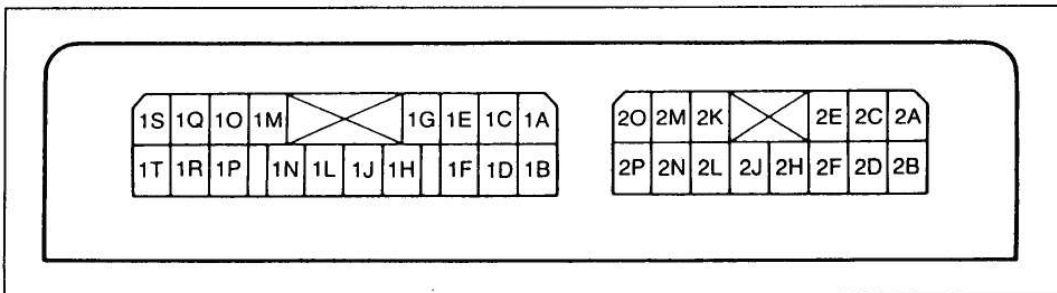
3-4 solenoid valve : B

Lock-up solenoid valve : D

GEAR	1-2 SOL	2-3 SOL	3-4 SOL
FIRST	OFF	ON	ON
SECOND	ON	ON	ON
THIRD	*	OFF	OFF
FOURTH	ON	OFF	ON

*** ON IN THIRD CANCELS ENGINE BRAKING**

EC-AT CONTROL UNIT (G4A-EL)



Terminal Voltage Chart

Terminal	Connected to	Voltage	Condition
1A (Input)	Hold switch	Approx. 12V	Switch depressed
		Below 1.5V	Switch released
1B (Input)	Mode switch (Power side)	Below 1.5V	POWER mode
		Approx. 12V	ECONOMY mode
1C (Input)	Inhibitor switch	Approx. 12V	L range
		Below 1.5V	Other ranges
1D (Input)		Approx. 12V	S range
		Below 1.5V	Other ranges
1E (Input)		Approx. 12V	D range
		Below 1.5V	Other ranges
1F (Input)	N and P range	Below 1.5V	N or P range
		Approx. 12V	Other ranges
1G (Input)	Water temperature switch	Approx. 12V	Above 72°C (162°F)
		Below 1.5V	Below 65°C (149°F)
1H	—	—	—
1I	—	—	—



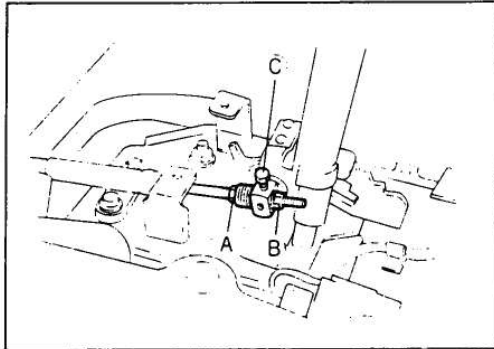
Technical Service Information

Terminal	Connected to	Voltage	Condition
1J	—	—	—
1K	—	—	—
1L (Input)	Idle switch	Below 1.5V	At idle
		Approx. 12V	Other speeds
1M	—	—	—
1N (Input)	Brake light switch	Approx. 12V	Brake pedal depressed
		Below 1.5V	Brake pedal released
1O (Input)	Throttle sensor	Approx. 5V	Ignition switch ON
		Below 1.5V	Ignition switch OFF
1P (Input)		Approx. 0.5—4.3V	Throttle valve fully closed to fully open
1Q (Input)	Vehicle speed sensor	Approx. 4.5V	During driving
		Approx. 4.5V or below 1.5V	Vehicle stopped
1R (Ground)	Throttle sensor	Below 1.5V	—
1S (Input)	Pulse generator	Approx. 12V	Engine running
		Below 1.5V	Engine stopped
1S (Ground)	Pulse generator	Below 1.5V	—
2A (Battery power)	Battery	Approx. 12V	Ignition switch ON
		Below 1.5V	Ignition switch OFF
2B (Ground)	Body ground	Below 1.5V	—
2C (Memory power)	Battery	Approx. 12V	—
2D (Ground)	Body ground	Below 1.5V	—
2E (Output)	1-2 shift solenoid valve	Approx. 12V	Refer to operation table solenoid valve
		Below 1.5V	
2F (Output)	2-3 shift solenoid valve	Approx. 12V	Refer to operation table solenoid valve
		Below 1.5V	
2G	—	—	—
2H (Output)	3-4 shift solenoid valve	Approx. 12V	Refer to operation table solenoid valve
		Below 1.5V	
2I	—	—	—
2J (Output)	Lock-up solenoid valve	Approx. 12V	Lock-up
		Below 1.5V	Other
2K (Output)	Hold indicator	Below 1.5V	Hold mode
		Approx. 12V	Other modes
2L (Output)	Mode indicator	Approx. 12V	Hold mode
		Below 1.5V	Power or economy mode
2M (Output)	EC-AT Tester (malfunction code)	Approx. 12V	Normal
		Below 1.5V	If malfunction present
		Code signal	Self-diagnosis check connector grounded
2N	—	—	—
2O (Input)	Fluid temperature switch	Below 1.5V	Above 150°C (302°F)
		Approx. 10—12V	Below 143°C (289°F)
2P (Input)	EC-AT check connect	Approx. 12V	—



Technical Service Information

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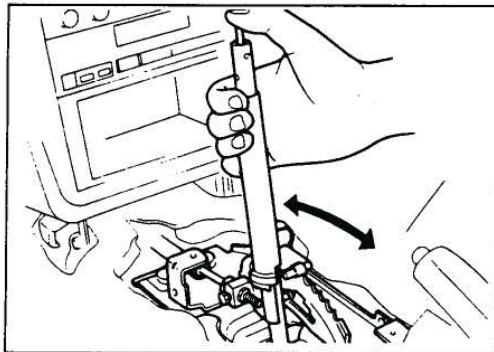


Adjustment

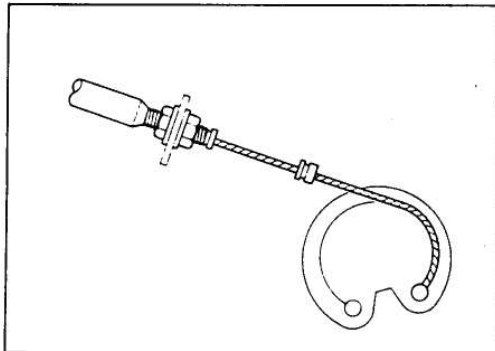
1. Loosen locknuts A, B, and C.
2. Shift the selector lever to the P range.
3. Shift the transmission to the P range by moving the manual shaft of the transmission.
4. Tighten locknut C to the specified torque.

Tightening torque:

8—11 N·m (80—110 cm·kg, 67—96 in·lb)



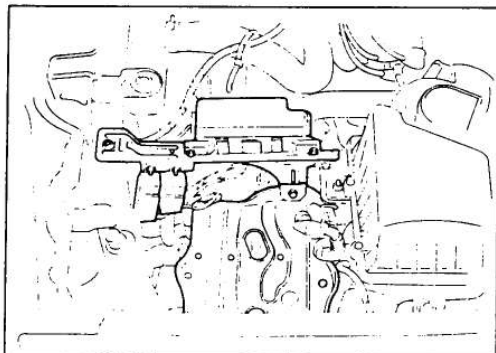
7. Verify that there is a click at each range when shifted from the P ↔ L range.
8. Check that the position of the selector lever and the indicator are exact.
9. Check that the button returns smoothly when used to shift the selector.
10. If necessary, check the spring condition.



THROTTLE CABLE

Inspection

1. Check the inner and outer cable for damage.
2. Make sure that the accelerator operates smoothly.



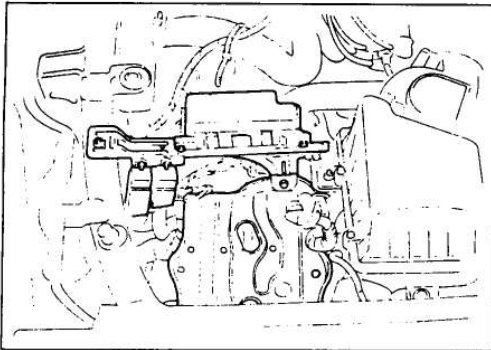
Removal

1. Remove the battery and battery carrier.
2. Disconnect the main fuse block. (G4A-EL)



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Main fuse block (G4A-EL)

Install the main fuse block.

Tightening torque:

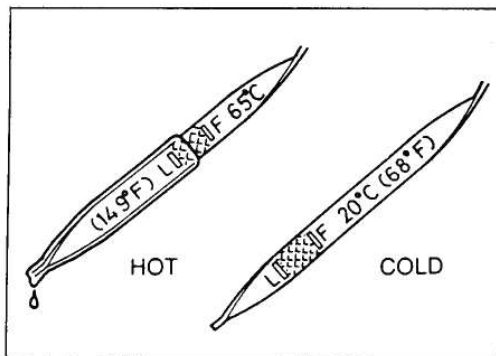
8—11 Nm (80—110 cm-kg, 69—95 in-lb)

Battery carrier

Install the battery carrier.

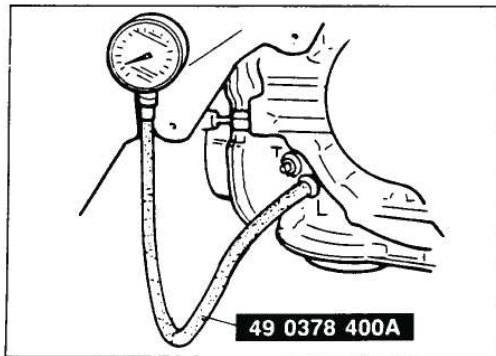
Tightening torque:

31—40 Nm (3.2—4.1 m-kg, 23—30 ft-lb)



ATF level

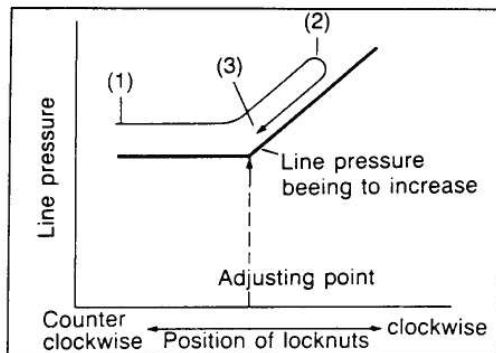
After installation, add ATF, and with the engine idling, check the fluid level and for leaks.



Adjustment (G4A-EL)

1. Remove the splash shield next to the left front tire.
2. Remove the square head plug L and install the SST.
3. Shift into P range and start the engine. Warm up the engine to normal operating temperature, and adjust the idle speed.

Idle speed: 950 $\pm$ 50 rpm



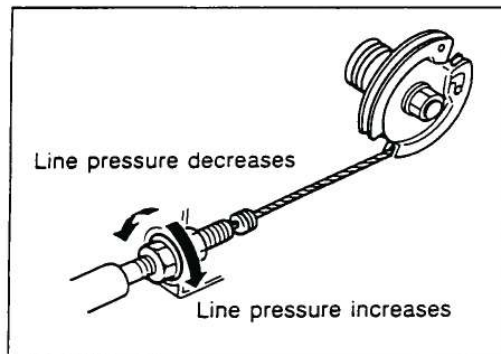
4. Adjust locknuts as follows:

When the locknuts are moved, line pressure is increased or decreased as shown. Adjust the locknuts to the correct position using the following procedure.

- (1) Initially install the locknuts fully away from the throttle cam. (Loosen the cable all the way)
- (2) Adjust the locknuts in a clockwise direction as viewed from the front of the vehicle until the line pressure begins to increase above the specification shown below.



Technical Service Information

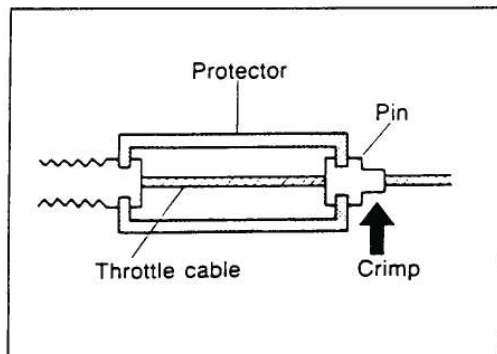


- (3) Adjust the locknuts in a counterclockwise direction until the line pressure decreases to the specification. Tighten the locknuts.

**Specified pressure: 432—450 kPa
(4.4—4.6 kg/cm², 63—66 psi)**

Note
Transmission in P range

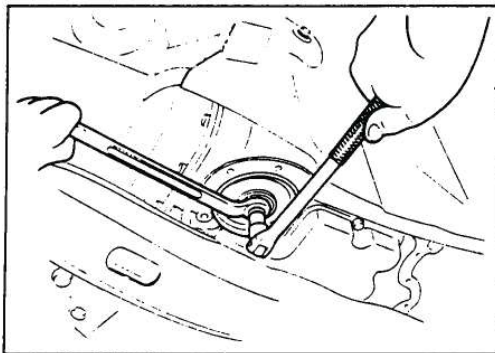
5. Turn off the engine.



6. Reinstall the square head plug.

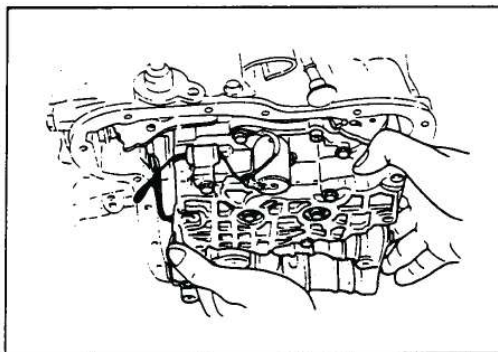
Tightening torque:
5—10 N·m (50—100 cm·kg, 43—87 in·lb)

7. Fully open the throttle valve; then crimp the pin with the protector installed as shown.
8. Remove the protector.



ADJUSTMENT OF 2-4 BRAKE BAND

1. Remove the oil pan.
2. Adjust the 2-4 brake band.



3. Remove the control valve body.

Disassembly, Inspection and Assembly
Refer to control valve body section of INSPECTION AND REPAIR.

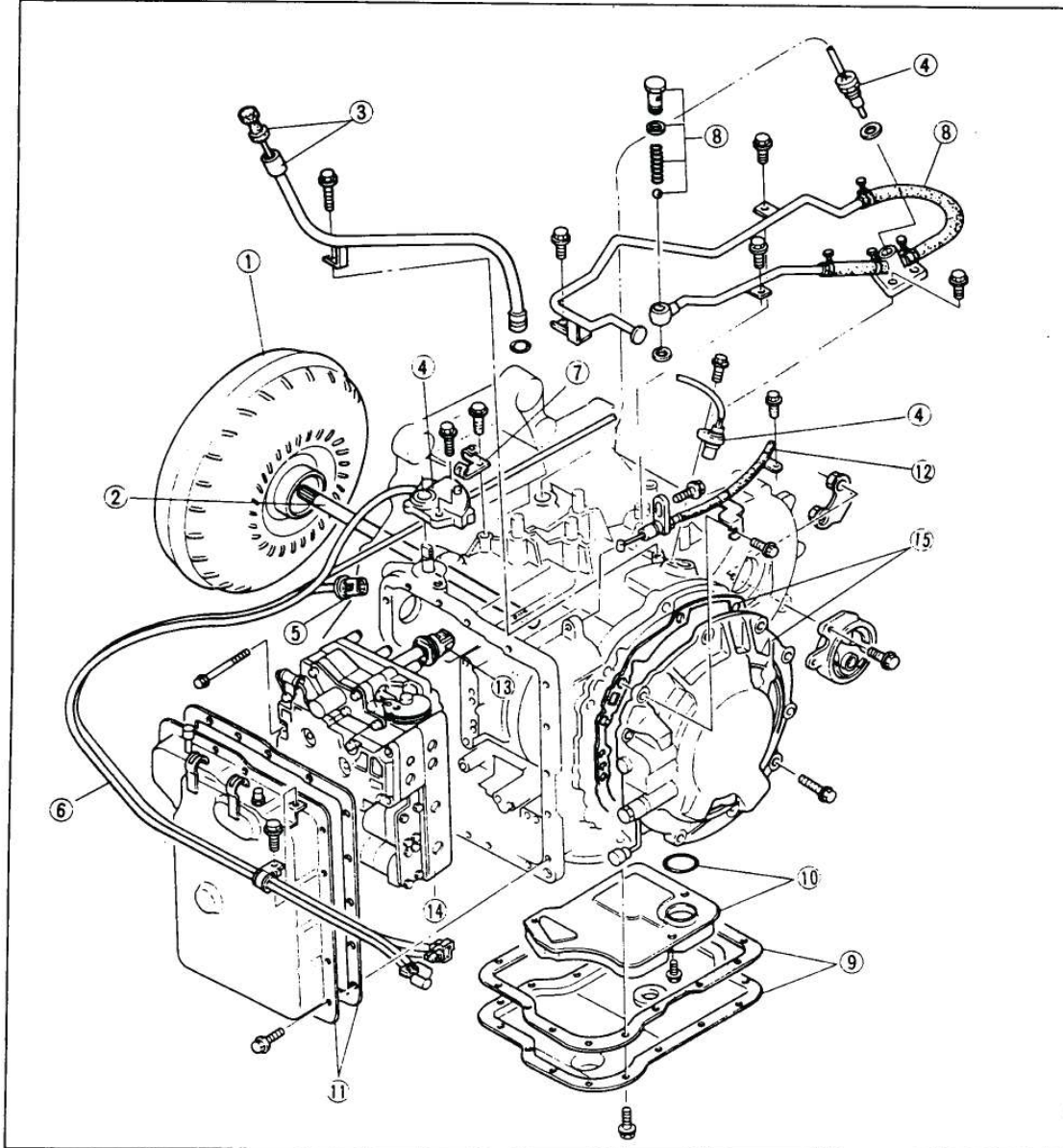


Technical Service Information

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DISASSEMBLY

DISASSEMBLY Components



- | | |
|--|--|
| 1. Torque converter | 8. Oil pipes, oil hoses, and switch box |
| 2. Oil pump shaft | 9. Oil pan and gasket |
| 3. Oil level gauge and oil filler tube | 10. Oil strainer and O-ring |
| 4. Pulse generator, fluid temperature switch, and inhibitor switch | 11. Control valve body cover and gasket |
| 5. Solenoid connector | 12. Throttle cable |
| 6. Wire harnesses | 13. Solenoid connector (Valve body side) |
| 7. Harness clip | 14. Control valve body |
| | 15. Oil pump and gasket |



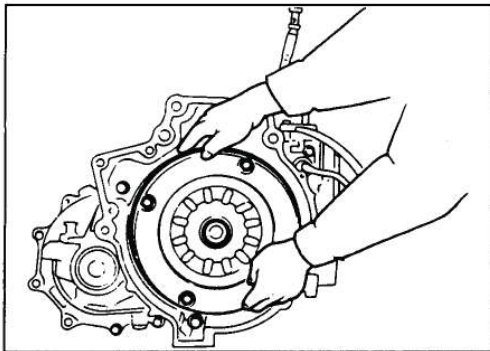
Technical Service Information

36 EL

Procedure

Precaution

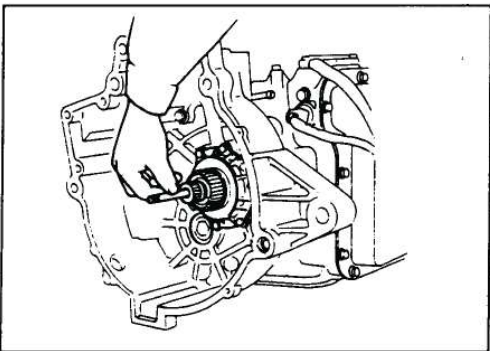
- (1) Drain the ATF before removing the transaxle from the vehicle.
- (2) Disassemble the transaxle in a clean area (dustproof workspace) to prevent dust entry into the mechanisms.
- (3) Clean the transaxle exterior thoroughly with steam and/or cleaning solvents prior to disassembly.
- (4) Inspect the individual transaxle components in accordance with the Troubleshooting during disassembly.
- (5) Use plastic hammers when applying force to separate the light alloy case joints.
- (6) Do not use rags during disassembly.
- (7) Neatly arrange the removed parts in order during disassembly.



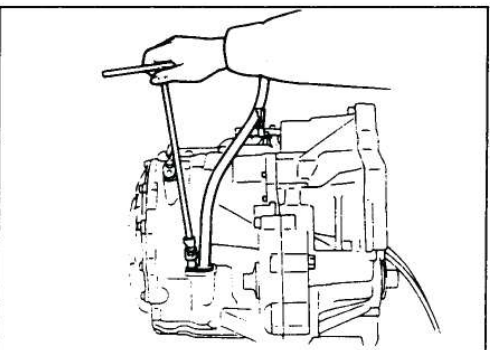
Remove the torque converter from the converter housing.

Note

Do not allow the ATF to spill when removing the torque converter.



Pull out the oil pump shaft by hand.

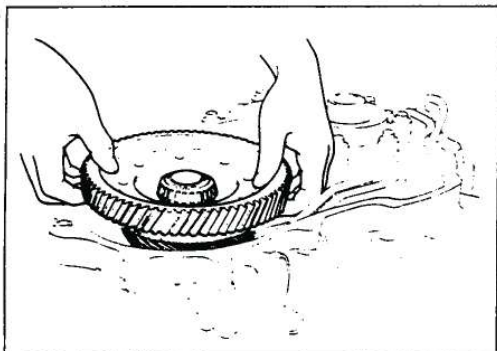


Remove the oil level gauge and oil filler tube.

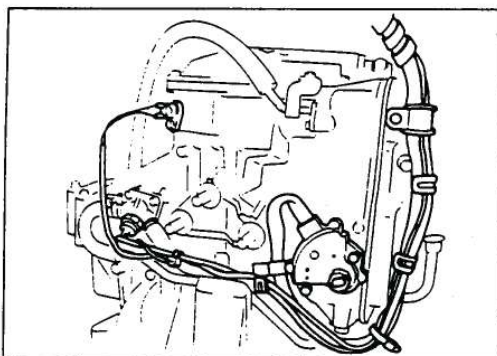


Technical Service Information

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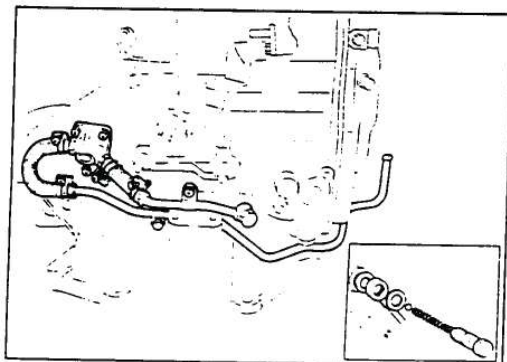


Remove the differential assembly.



G4A-EL

Remove the pulse generator, fluid temperature switch, and inhibitor switch.

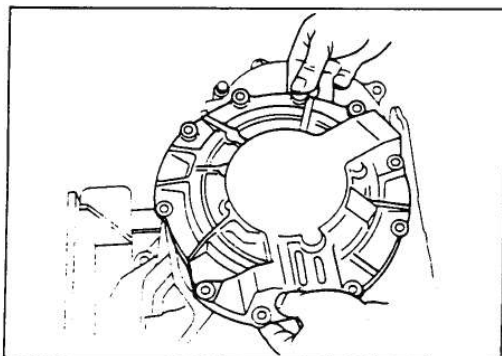


G4A-EL

Remove the harness clip, then remove the oil pipes, oil hoses and switch box as an assembly.

Note

Remove the ball from the case.



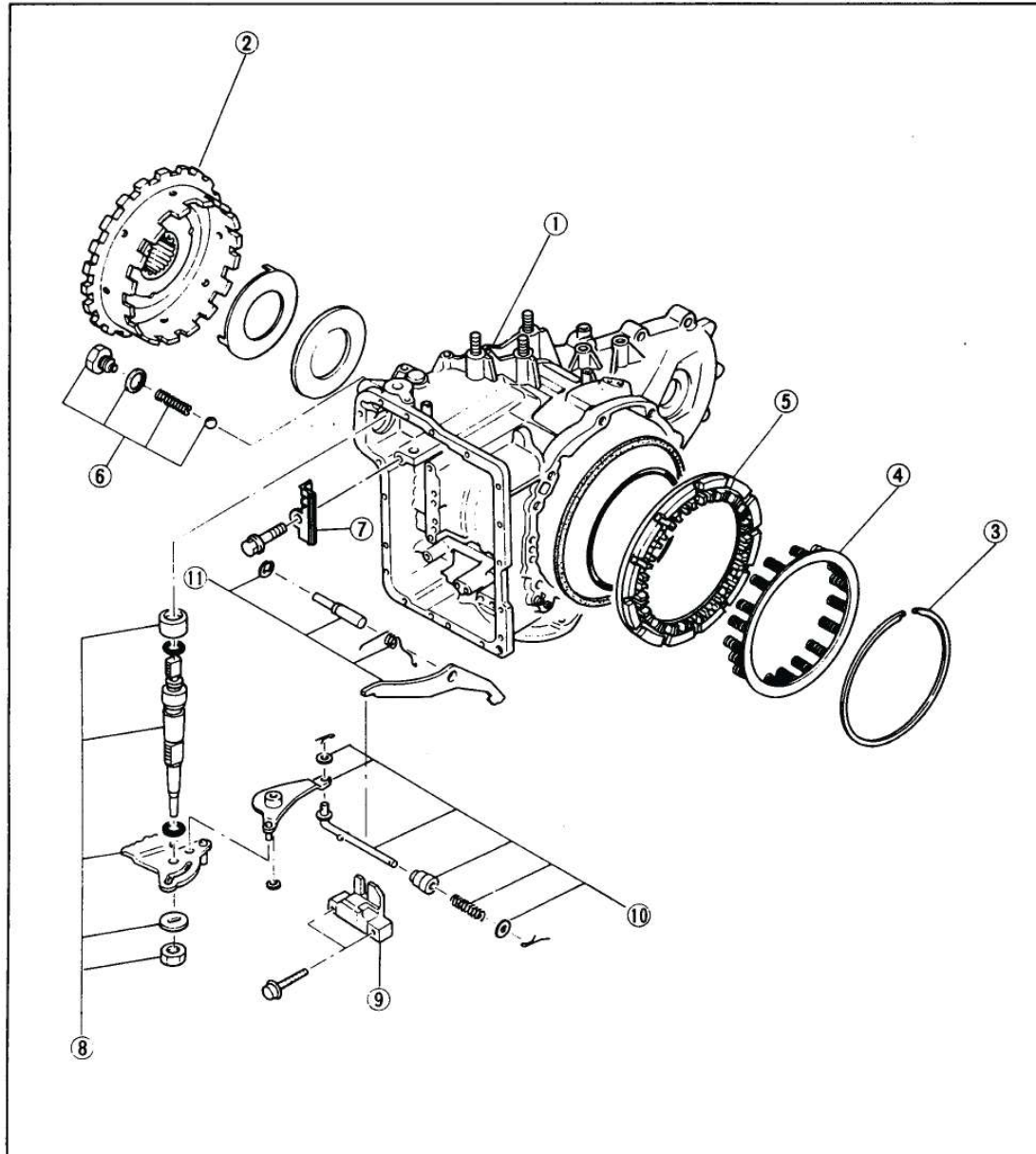
Remove the oil pump as an assembly.



Technical Service Information

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DISASSEMBLY Component

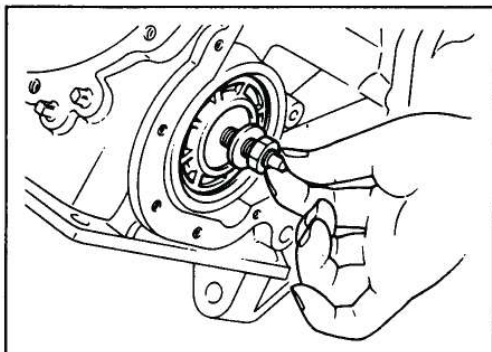


- | | |
|--|----------------------------------|
| 1. Transaxle case | 7. Bracket |
| 2. Output shell | 8. Manual shaft and manual plate |
| 3. Snap ring | 9. Actuator support |
| 4. Spring and retainer assembly | 10. Parking assist lever |
| 5. Low and reverse brake piston | 11. Parking pawl |
| 6. Plug, washer, spring, and detent ball | |

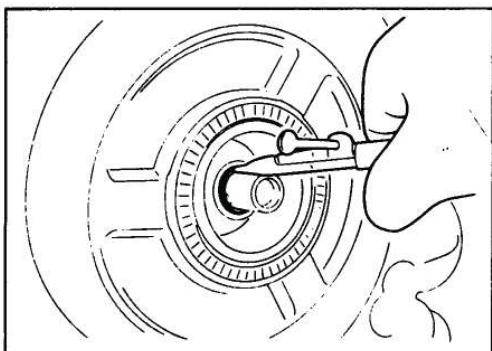


Technical Service Information

39 EL

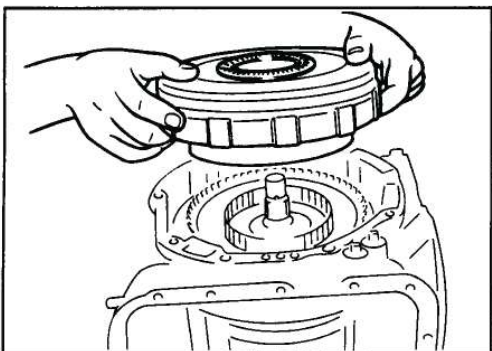
**Procedure**

Remove the piston stem from the servo.

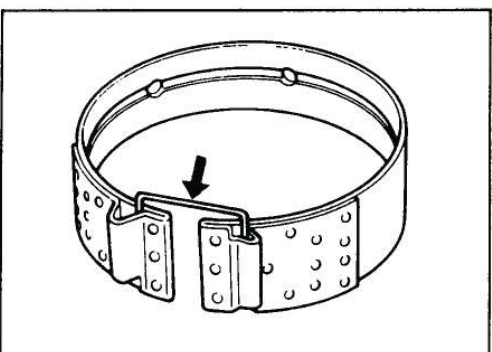


Remove the clutch assembly.

(1) Remove the turbine shaft snap ring.



(2) Pull the reverse and forward drum and remove the clutch assembly.



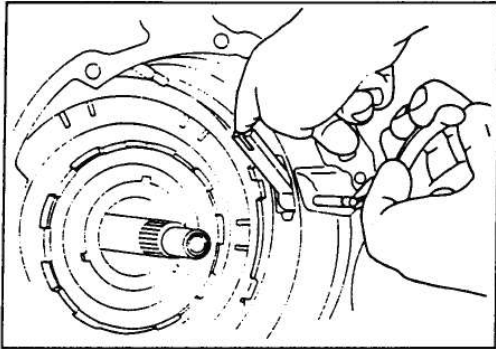
Remove the 2-4 brake band.

Note

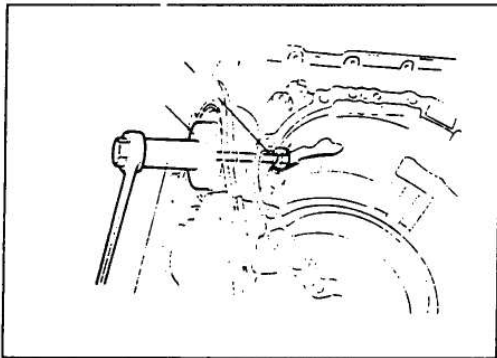
Use a piece of wire to secure the brake band so that it is not damaged by being stretched.



Technical Service Information

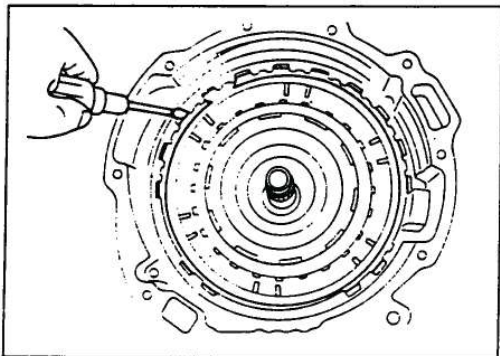


Pull the anchor shaft while holding the strut, then remove the strut.



Remove the servo.

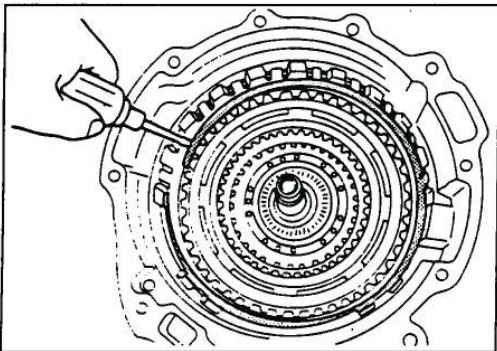
- (1) Remove the snap ring with the
- (2) Remove the servo and spring.



Remove the one-way clutch and carrier hub assembly.

Remove the snap ring.

Remove the internal gear from the 3-4 clutch drum.

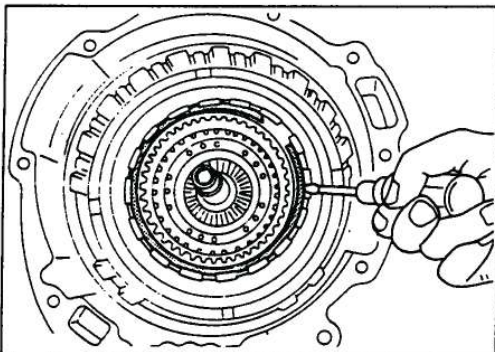


Remove the low and reverse brake assembly.
Remove the snap ring.

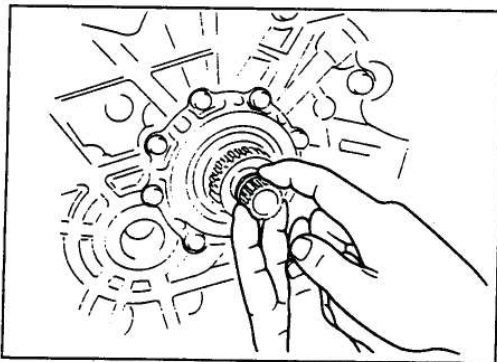


Technical Service Information

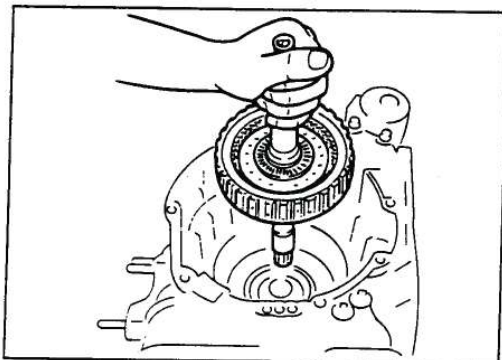
41 EL



Remove the internal gear.
Remove the snap ring.



Remove the retaining plate and the drive and driven plates.



Remove the 3-4 clutch assembly.
Remove the O-ring from the turbine shaft at the converter housing side.

Pull out the turbine shaft to remove the 3-4 clutch assembly.
Remove the 3-4 clutch assembly.

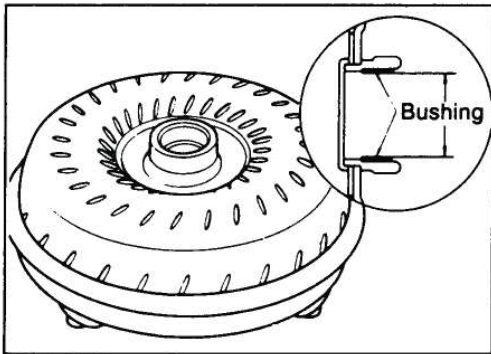


INSPECTION AND REPAIR

PRECAUTION

- (1) Several of the parts resemble each other; organize them so that they do not get mixed up.
- (2) Clean each part with cleaning oil, clean out the oil holes and oil passages with compressed air, and check that there are no obstructions.
- (3) When using cleaning oil and compressed air, wear protective eyewear.
- (4) If a clutch plate or brake band is replaced with a new one, soak it in ATF for 2 hours or more before installing.
- (5) Before assembly, apply ATF to all seal rings, rotating parts, and sliding parts.
- (6) All seals, gaskets and roll pins must be replaced with new ones during assembly.
- (7) Use petroleum jelly, not grease where required.
- (8) When it is necessary to replace a bushing, replace the assembly which includes that bushing.

76G07B-217



TORQUE CONVERTER

The torque converter is welded together and cannot be disassembled.

Inspection

1. Check the outer part of the converter for damage or cracks, and replace it if necessary.
2. Check whether there is any rust on the pilot hub of the converter or on the boss. If there is any, remove it completely.
3. Measure the bushing of the converter boss. Replace the converter assembly if the bushing is worn.

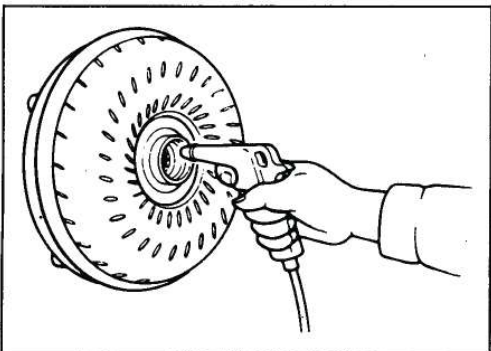
Bushing inner diameter

Standard: 53.030 mm (2.088 in)

Maximum: 53.076 mm (2.090 in)

Washing Inside of Converter

1. Drain any ATF remaining in the converter.
2. Pour in solvent [approximately **0.5 liter (0.53 US qt, 0.44 Imp qt)**].
3. Shake the converter to clean the inside. Pour out the solvent.
4. Clean the inside of the converter with compressed air so that the inside is perfectly empty.
5. Pour in ATF.
6. Shake the converter to clean the inside. Pour out the ATF.





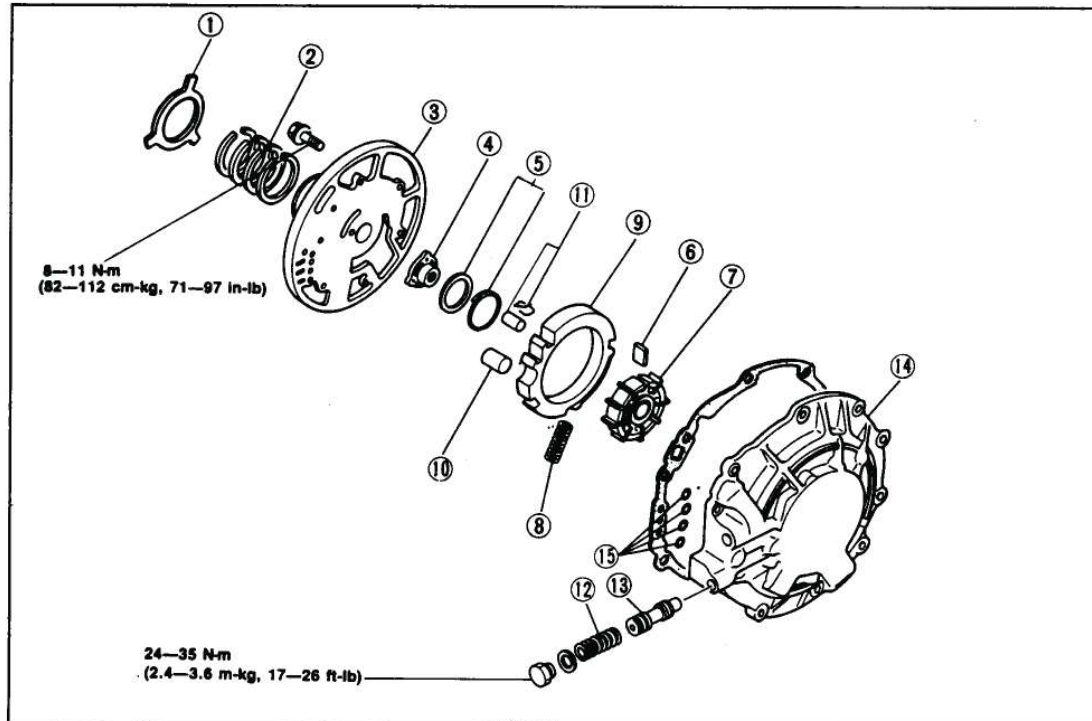
Technical Service Information

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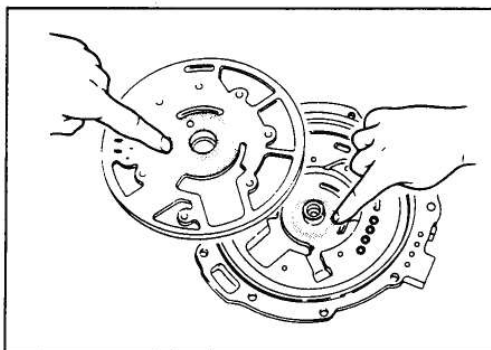
OIL PUMP

Disassembly

Disassemble in the sequence shown in the figure.



- | | |
|--------------------------------|-------------------------|
| 1. Bearing race | 9. Cam ring |
| 2. Seal rings | 10. Pivot roller |
| 3. Oil pump cover | 11. Seal pin and spring |
| 4. Pump flange | 12. Spring |
| 5. Guide ring and guide spring | 13. Valve |
| 6. Vane | 14. Oil pump body |
| 7. Rotor | 15. O-ring |
| 8. Spring | |



Inspection

Check the following and replace any faulty parts.

1. Sliding surfaces of the oil pump cover and oil pump body for damage or wear
2. Broken or worn seal ring
3. Weakened spring

Free length of springs:

- (1) For the cam ring (No. 8)
41.6 mm (1.64 in)
- (2) For the valve (No. 12)
35.0 mm (1.38 in)

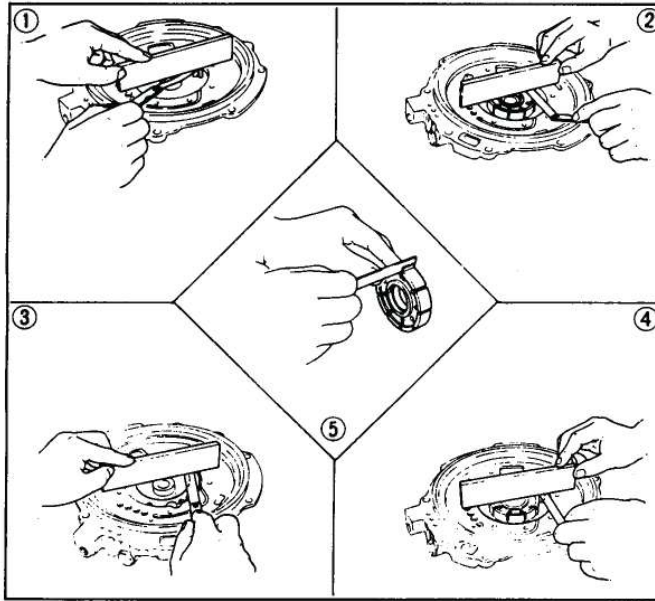


Technical Service Information

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4. Clearance

Measure the clearances below; if not within specification, replace the oil pump.



1. Seal pin—Oil pump cover

Standard:
0.005—0.020 mm
(0.0002—0.0008 in)
Maximum: 0.060 mm (0.002 in)

2. Rotor—Oil pump cover

Standard:
0.005—0.020 mm
(0.0002—0.0008 in)
Maximum: 0.030 mm (0.0012 in)

3. Cam ring—Oil pump cover

Standard:
0.005—0.020 mm
(0.0002—0.0008 in)
Maximum: 0.080 mm (0.003 in)

4. Vane—Oil pump cover

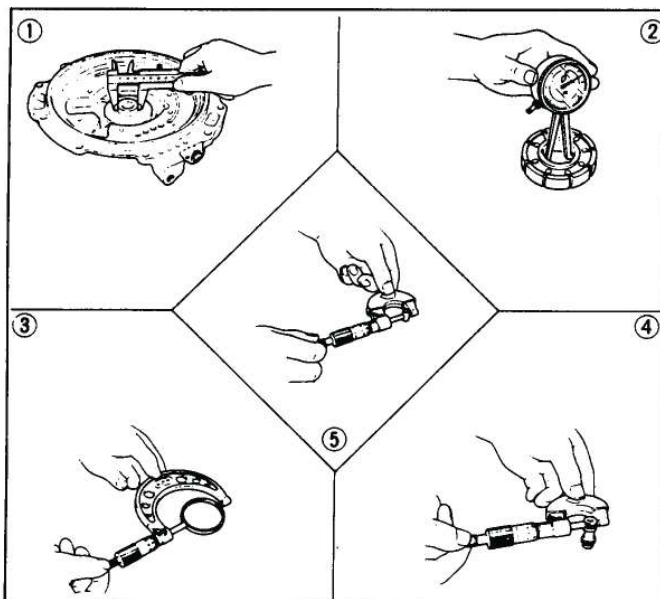
Standard:
0.015—0.050 mm
(0.0006—0.0020 in)
Maximum: 0.080 mm (0.003 in)

5. Vane—Rotor groove

Standard:
0.010—0.045 mm
(0.0004—0.0018 in)
Maximum: 0.065 mm (0.0026 in)

5. Wear limit

Check each part for wear; if not within specification, replace the oil pump.



1. Oil pump body sleeve.. outer diameter

Standard: 28.00 mm (1.102 in)

2. Rotor bushing inner diameter

Standard: 28.00 mm (1.102 in)
Maximum: 28.05 mm (1.104 in)

3. Guide ring outer diameter

Standard: 57.85 mm (2.278 in)
Minimum: 57.70 mm (2.272 in)

4. Valve..... outer diameter

Standard: 12.00 mm (0.472 in)
Minimum: 11.86 mm (0.467 in)

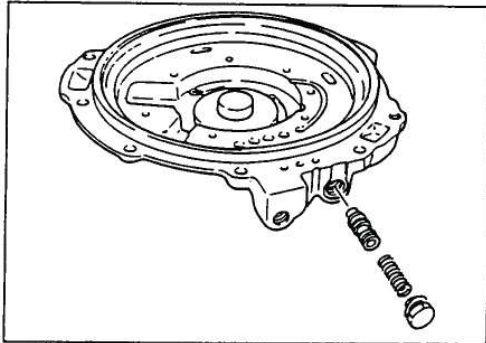
5. Seal pin..... outer diameter

Standard: 5.00 mm (0.197 in)
Minimum: 4.90 mm (0.193 in)



Technical Service Information

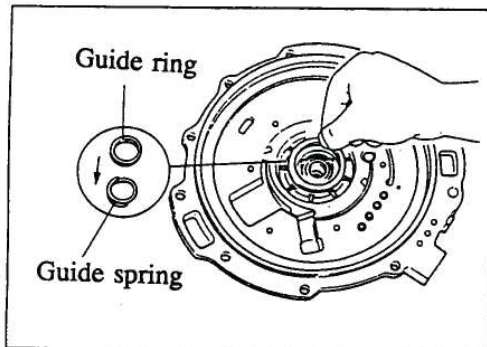
45 EL

**Assembly**

Install the valve and spring into the oil pump body, and check that the valve moves smoothly. Install the plug.

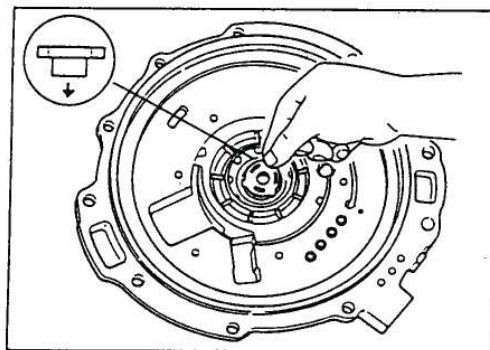
Tightening torque:

24—35 N·m (2.4—3.6 m·kg, 17—26 ft·lb)

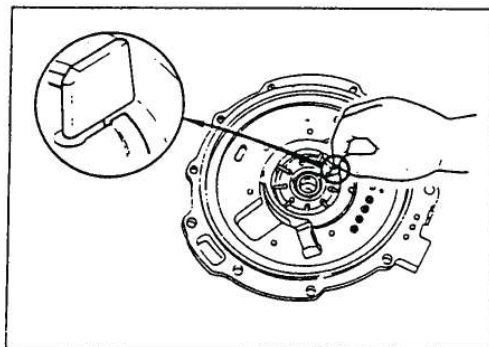


Install the guide spring and guide ring while expanding the vanes toward the cam ring.

The guide ring and spring are on top of the rotor and the guide spring is split.



Install the pump flange onto the rotor.



Install the vanes into the rotor as shown.



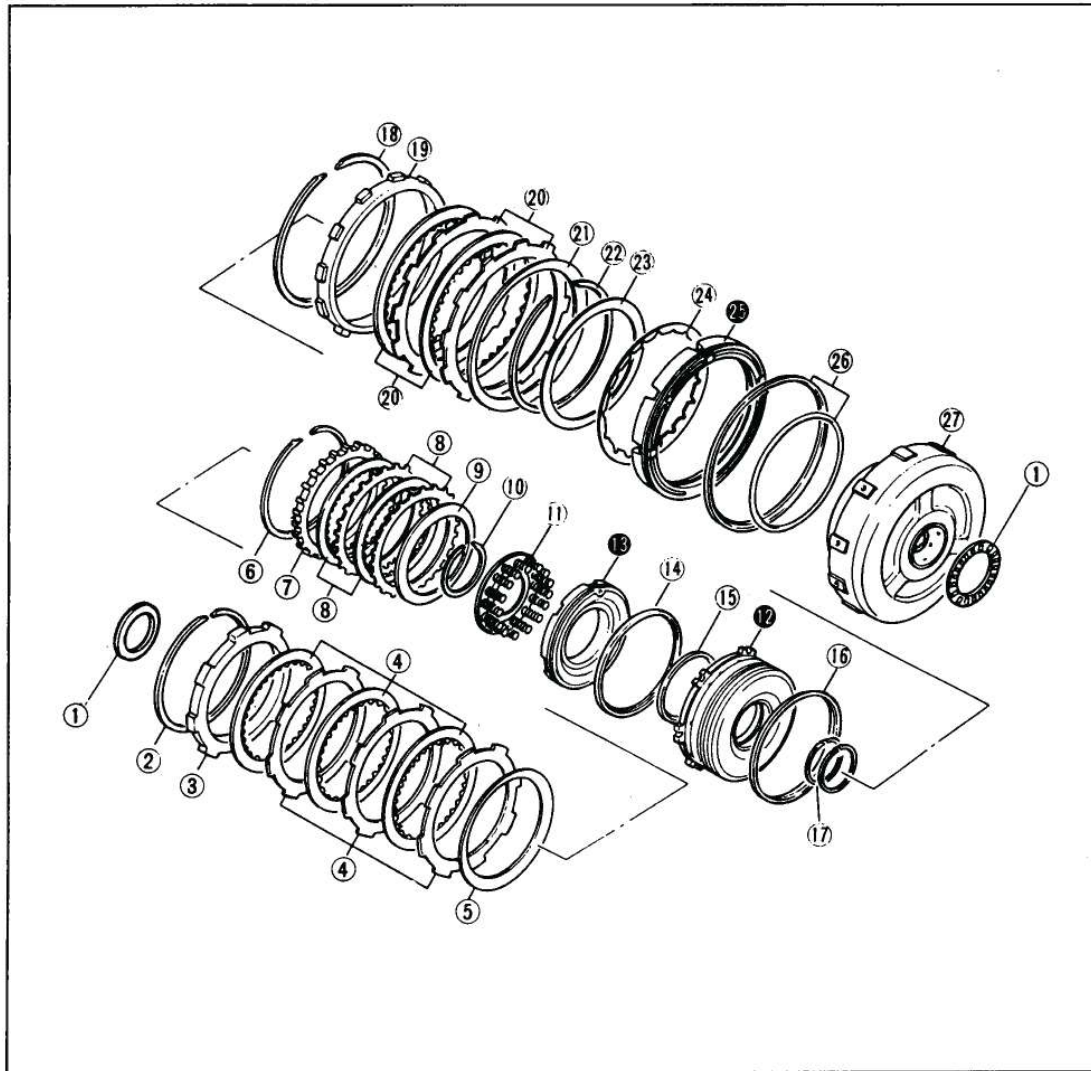
Technical Service Information

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CLUTCH ASSEMBLY

Disassembly

Disassemble in the sequence shown in the figure referring to the disassembly note for the specially marked parts.



—Forward clutch—

1. Thrust bearings
2. Snap ring
3. Retaining plate
4. Drive and driven plates
5. Dished plate

—Coasting clutch—

6. Snap ring
7. Retaining plate
8. Drive and driven plates
9. Dished plate

10. Snap ring

11. Spring and retainer assembly

12. Coasting clutch drum

13. Coasting piston

14. Outer seal

15. Inner seal

16. Outer seal

17. Seal rings

—Reverse clutch—

18. Snap ring

19. Retaining plate

20. Drive and driven plates

21. Dished plate

22. Snap ring

23. Return spring stopper

24. Piston return spring

25. Reverse piston

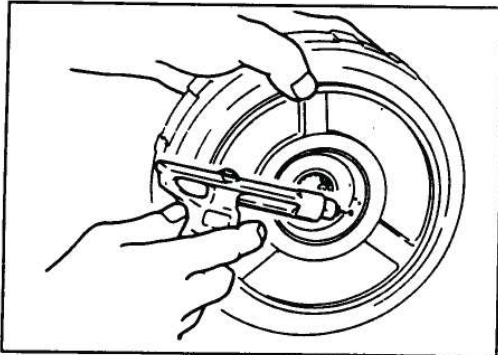
26. Seal rings (inner and outer)

27. Reverse and forward drum

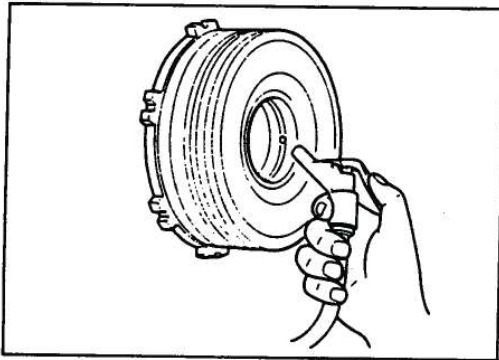


Technical Service Information

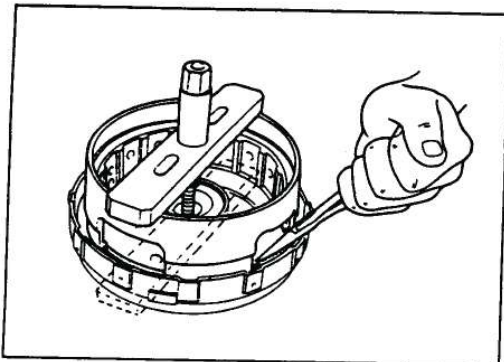
47 EL



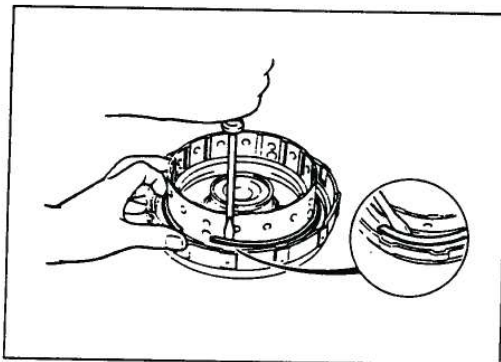
Remove the coasting clutch drum from the reverse and forward drum by applying compressed air through the fluid passage.

**Coasting piston**

Remove the coasting clutch piston from the coasting clutch drum by applying compressed air through the fluid passage.



Remove one end of the snap ring from the groove with snap ring pliers.

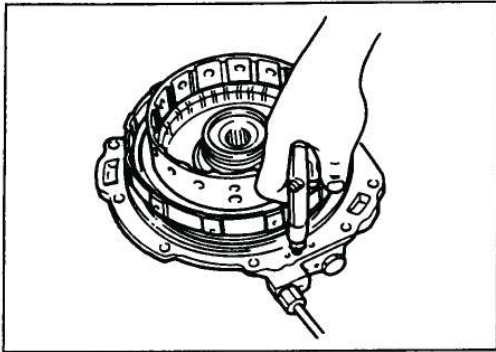


Remove the **SST** from the reverse and forward drum.
Remove the snap ring with a screw driver.

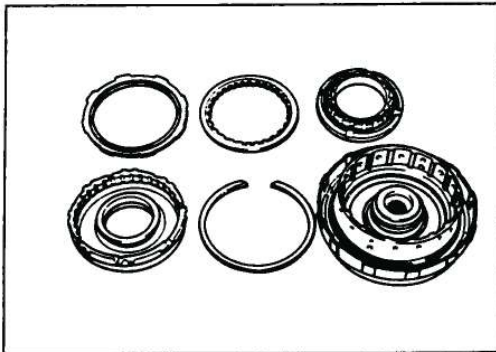


Technical Service Information

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Place the reverse and forward drum on the oil pump.
Remove the reverse piston by applying compressed air through the fluid passage.



Inspection

Check the following and repair or replace any faulty parts.

1. Drive and driven plates for damage or wear

Drive plate thickness

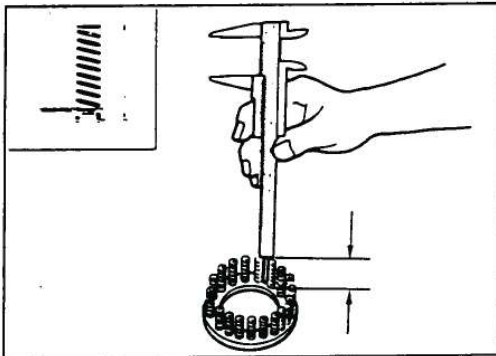
Standard: 1.6 mm (0.063 in)

Minimum: 1.4 mm (0.055 in)

2. Clutch piston for damage or cracks
3. Clutch drum for damage or deformation
4. Seal contact area for damage
5. Check ball for leaking sticking
6. Broken or worn snap ring
7. Broken or weakened spring

6. Spring and retainer assembly for separation or deformation

Free length of spring:
29.8 mm (1.173 in)

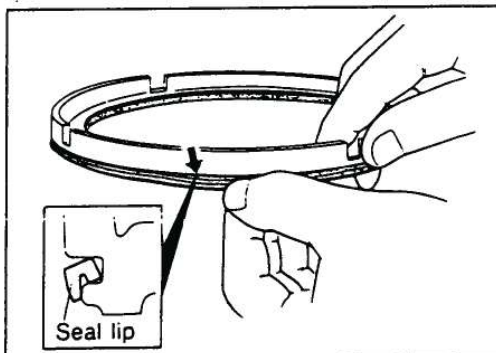


Assembly

Reverse clutch

Install the reverse piston.

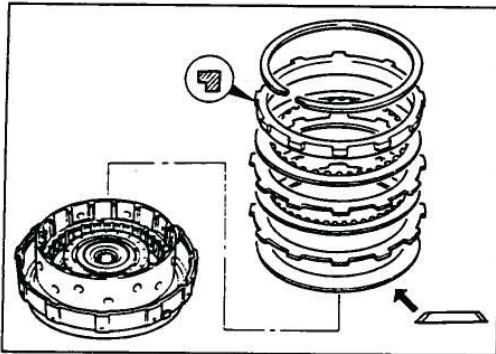
- (1) Apply ATF to inner and outer faces of the seals, and install them to the reverse piston.
- (2) Face the outer seal lip toward the inside by gently rolling it down around the circumference for easier installation into the reverse clutch drum.





Technical Service Information

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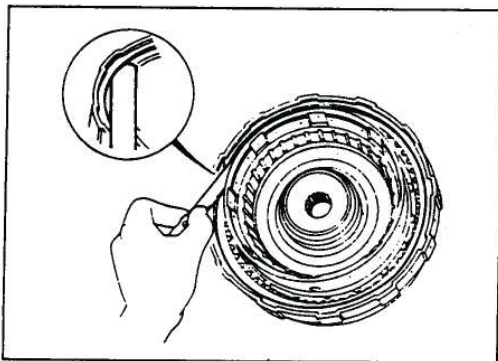
Install the dished plate with the dished side facing the piston as shown.
Install the drive and driven plates.

Note

Installation order:

Driven-Drive-Driven-Drive

Install the retaining plate with the step facing downward.
Install the snap ring.



Check the reverse clutch clearance.

- (1) Measure the clearance between the snap ring and the retaining plate of the reverse clutch.
- (2) If the clearance is not within specification, adjust it by selecting a proper retaining plate.

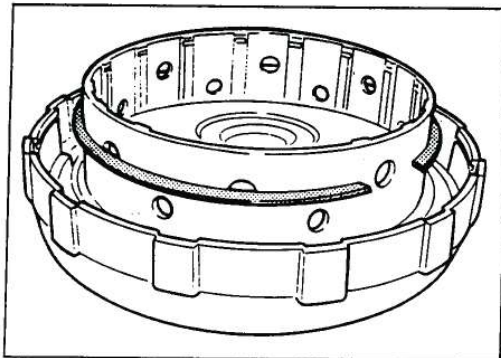
Reverse clutch clearance:

2.1—2.4 mm (0.083—0.094 in)

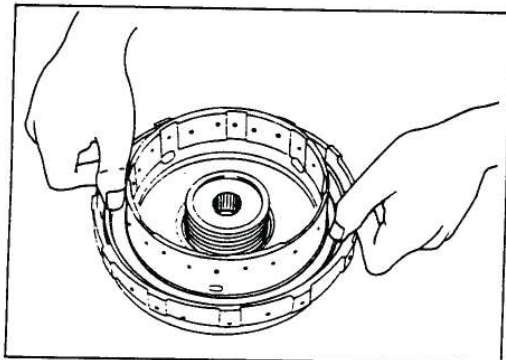
Retaining plate sizes

mm (in)

6.6 (0.260)	6.8 (0.268)	7.0 (0.276)
7.2 (0.283)	7.4 (0.291)	7.6 (0.299)



Install the snap ring half-way down the reverse forward drum as shown.

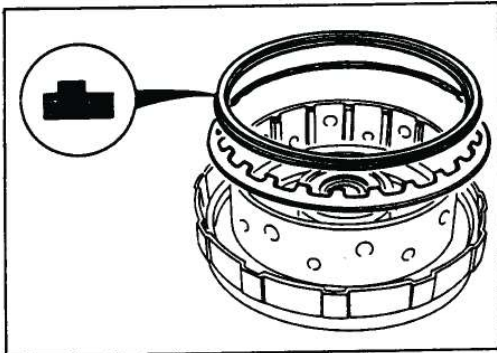


- (3) Install the reverse piston by pushing evenly around the circumference, being careful not to damage the seal rings.

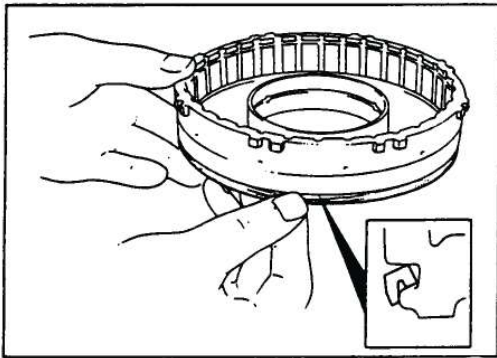


Technical Service Information

50 EL



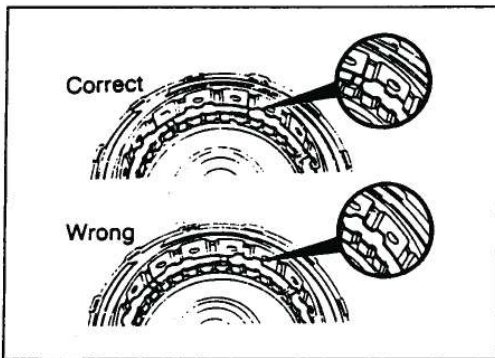
Install the piston return spring with the tabs facing away from the reverse piston.
Install the return spring stopper with the step facing upwards.



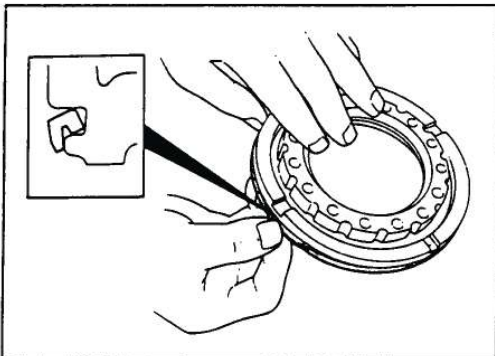
Coasting clutch

Install the coasting clutch drum.

- (1) Apply ATF to inner and outer faces of the seal, and install it onto the coasting clutch drum.
- (2) Face the outer seal lip toward the inside by gently rolling it down around the circumference for easier installation into the drum.



- (3) Install the coasting clutch drum the correct position in the reverse and forward drum.
- (4) Push evenly around the circumference, being careful not to damage the outer seal.



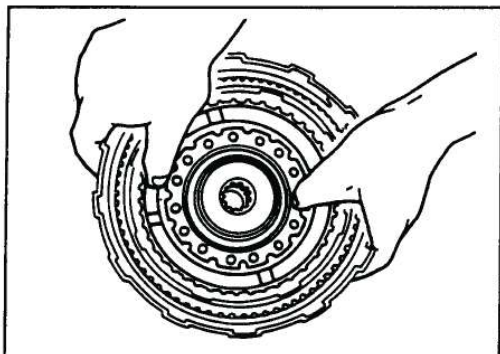
Install the coasting piston

- (1) Apply ATF to inner and outer faces of the seals and install them onto the coasting piston.
- (2) Face the outer seal lip toward the inside by gently rolling it down around the circumference for easier installation into the drum.

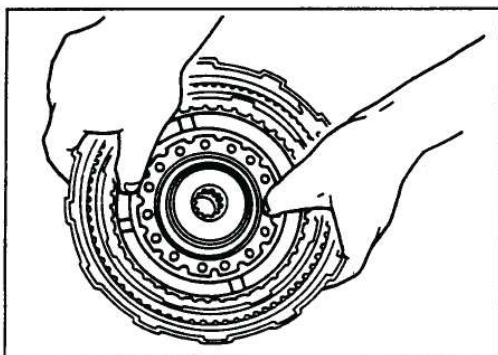


Technical Service Information

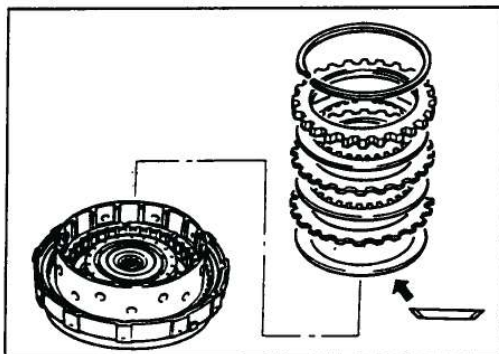
51 EL



- (3) Install the coasting piston by pushing evenly around the circumference, being careful not to damage the outer seal.



Install the spring and retainer assembly.



Install the dished plate with the dished side upward.
Install the drive and driven plates.

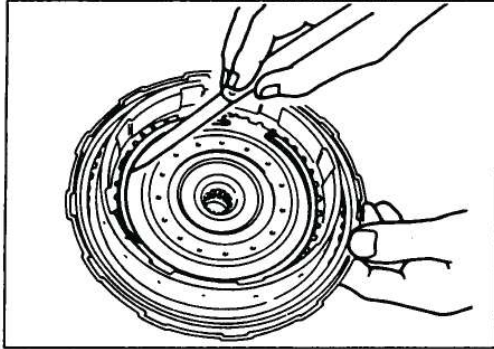
Note
Installation order:
Driven-Drive-Driven-Drive

Install the retaining plate.
Install the snap ring.



Technical Service Information

52 EL



Check the coasting clutch clearance.

- (1) Measure the clearance between the snap ring and the retaining plate of the coasting clutch.
- (2) If the clearance is not within specification, adjust it by selecting a proper retaining plate.

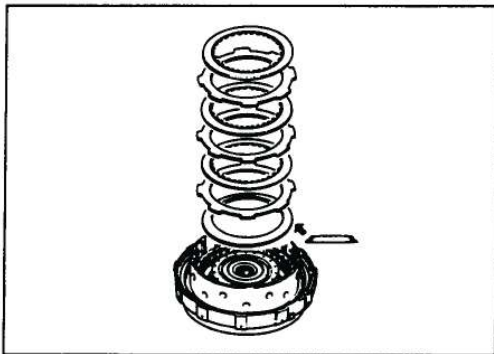
Coasting clutch clearance:

1.0—1.2 mm (0.040—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)



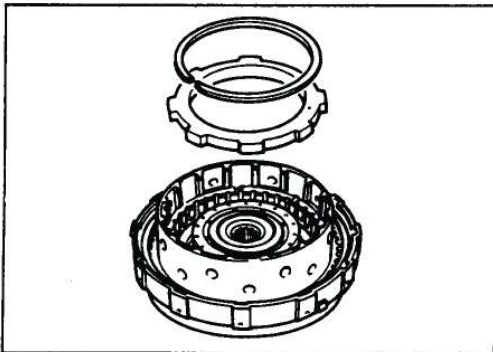
Forward clutch

1. Install the dished plate with the dished side downward.
2. Install the drive and driven plates.

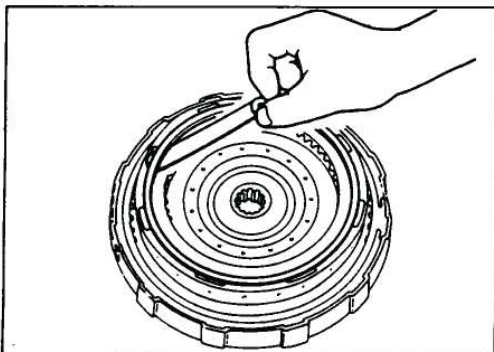
Note

Installation order:

Driven-Drive-Driven-Drive-Driven-Drive



3. Install the retaining plate.
4. Install the snap ring.



5. Check the forward clutch clearance.

- (1) Measure the clearance between the snap ring and the retaining plate of the forward clutch.
- (2) If the clearance is not within specification, adjust it by selecting a proper retaining plate.

Forward clutch clearance:

1.0—1.2 mm (0.040—0.047 in)

Retaining plate sizes

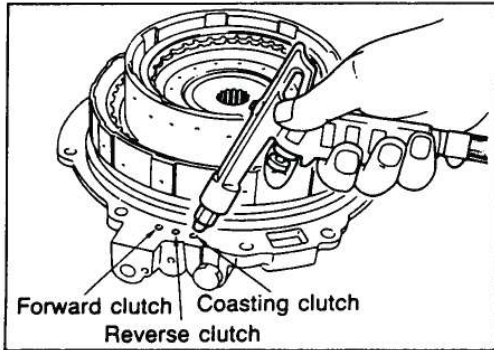
mm (in)

5.9 (0.232)	6.1 (0.240)	6.3 (0.248)
6.5 (0.256)	6.7 (0.264)	8.9 (0.350)



Technical Service Information

53 EL

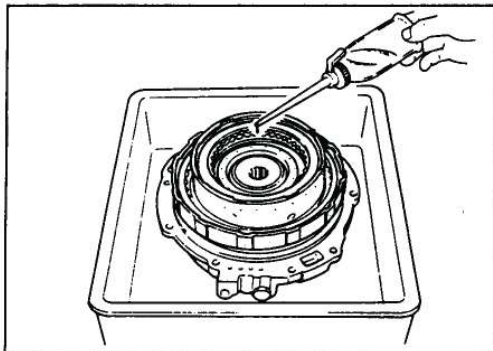


6. Check for the clutch operation as follows.

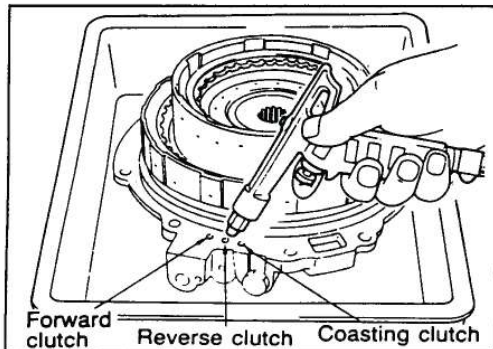
- (1) Set the clutch assembly onto the oil pump.
- (2) Check the clutch operation by applying compressed air through the fluid passages as shown.

Applied air pressure:

392 kPa (4.0 kg/cm², 57 psi)



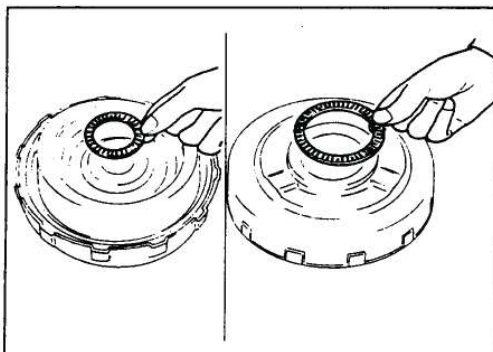
- (3) Pour in ATF so that the reverse piston, coasting clutch drum, and coasting clutch piston are fully submerged.



- (4) Check that no bubbles come from between the piston and drum seal when applying compressed air through the fluid passages as shown.

Caution

The compressed air must be under 392 kPa (4.0 kg/cm², 57 psi), and should not applied for over 3 seconds.



7. Apply petroleum jelly to the thrust bearings to secure them; then install them on both sides of the reverse and forward drum.

Thrust bearing outer diameter

Oil pump side: 86.0 mm (3.39 in)

Small sun gear and one-way clutch side:

56.1 mm (2.21 in)



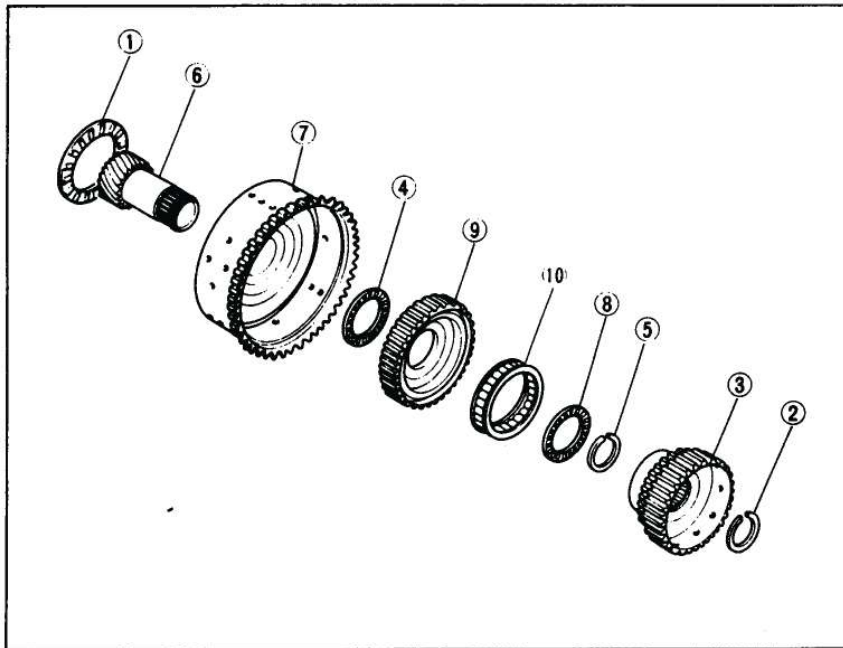
Technical Service Information

54 EL

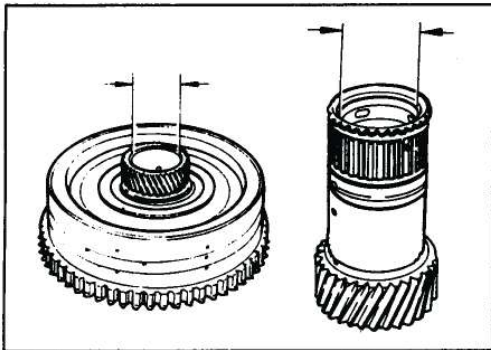
SMALL SUN GEAR AND ONE-WAY CLUTCH

Disassembly

Disassemble in the sequence shown in the figure.



1. Thrust bearing
2. Snap ring
3. One-way clutch inner race
4. Thrust bearing
5. Snap ring
6. Small sun gear
7. Sun gear drum
8. Thrust bearing
9. One-way clutch outer race
10. One-way clutch



Inspection

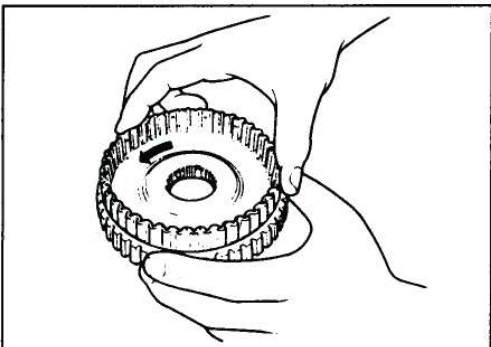
Check the following and replace any faulty parts.

1. Sun gear drum and small sun gear for damage or wear
2. Bushing for damage or wear

Specification:

Sun gear drum: 33.425 mm (1.316 in) max.

Small sun gear: 24.021 mm (0.946 in) max.

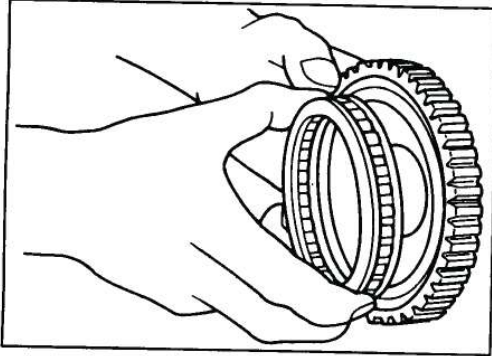


3. Inner and outer race for damage or wear
4. Damaged or worn clutch hub
5. Damaged or worn gear
6. Damaged or worn thrust bearing
7. Broken or worn snap ring
8. One-way clutch operation
Hold the one-way clutch outer race. Check that the inner race turns only counterclockwise.



Technical Service Information

55 EL

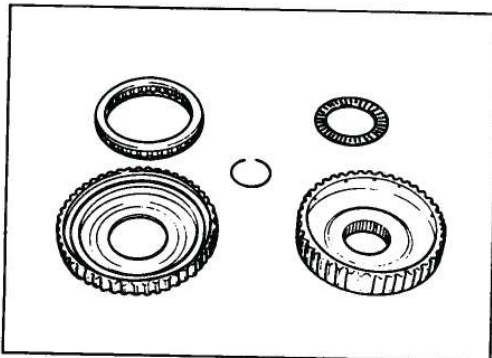


Replacement of one-way clutch

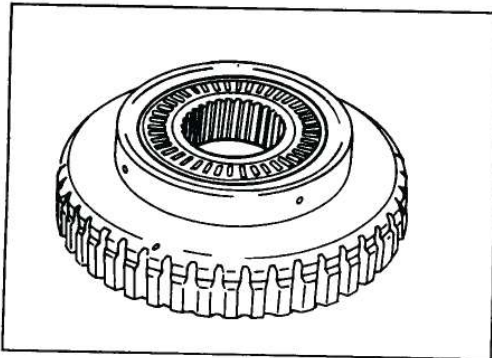
Remove the one-way clutch inner race.

Remove the one-way clutch.

Remove the thrust bearing.

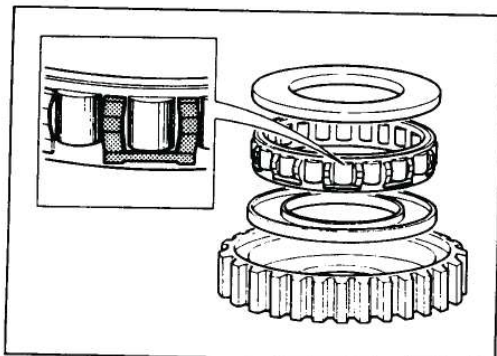


Inspect the one-way clutch inner and outer race, and replace if necessary.



Apply petroleum jelly to the thrust bearing to secure it; then install it to the one-way clutch inner race.

Thrust bearing outer diameter:
62.1 mm (2.44 in)



Install the one-way clutch into the one-way clutch outer race.

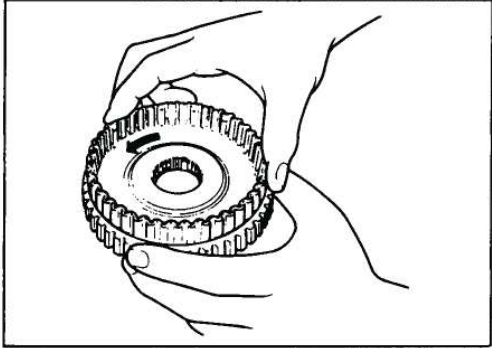
Caution

Check that the spring cage of the one-way clutch faces toward the outer race.

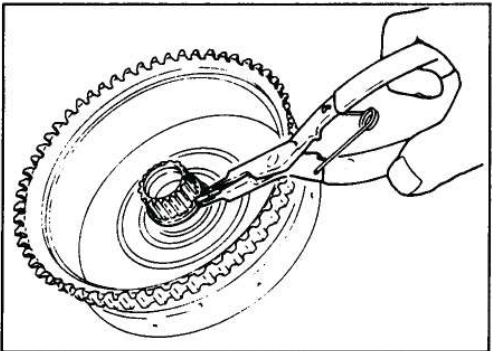


Technical Service Information

56 EL

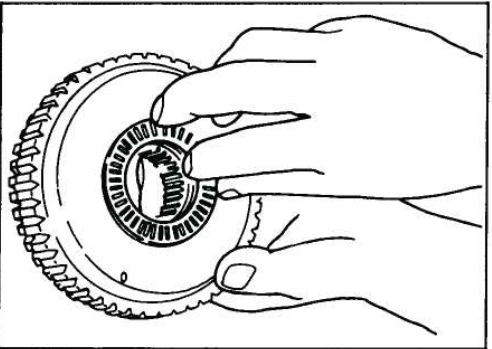


Install the one-way clutch inner race into the one-way clutch outer race by turning inner race counterclockwise.
Hold the one-way clutch outer race. Check that the inner race turns only counterclockwise.



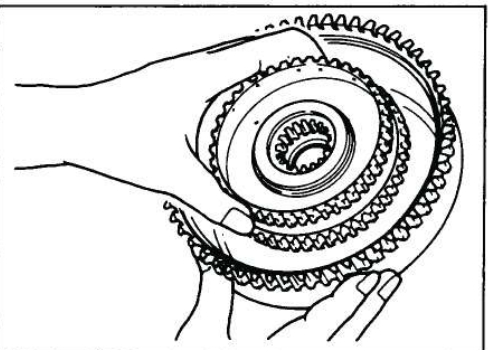
Assembly

Install the small sun gear into the sun gear drum.
Install the snap ring.



Apply petroleum jelly to the thrust bearing to secure it; then install it to the one-way clutch inner race.

Thrust bearing outer diameter:
62.1 mm (2.44 in)



Install the one-way clutch inner and outer race to the sun gear drum.

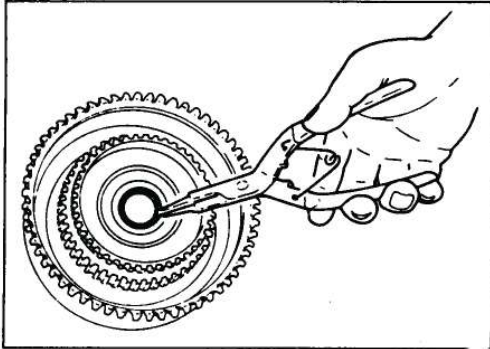
Note

Align the splines of the one-way clutch inner race and small sun gear clutch hub.

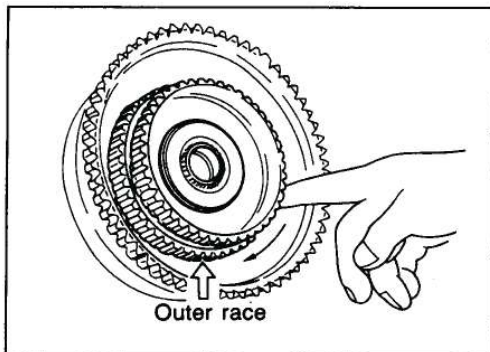


Technical Service Information

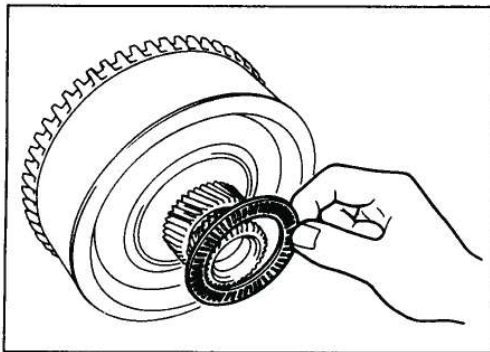
57 EL



Install the snap ring.



Check that when the small sun gear is held, the one-way clutch outer race turns smoothly and only clockwise.



Apply petroleum jelly to the thrust bearing to secure it; then install it to the sun gear drum.

Thrust bearing outer diameter:
72.0 mm (2.83 in)



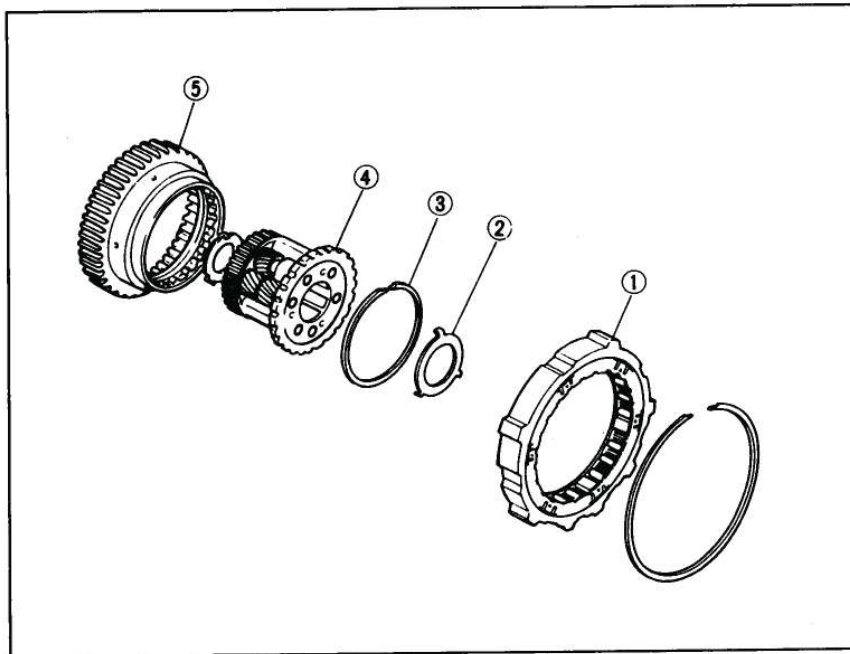
Technical Service Information

58 EL

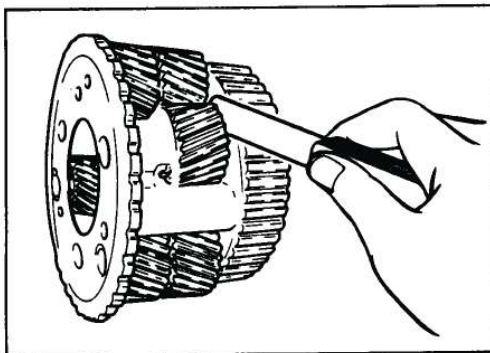
ONE-WAY CLUTCH AND CARRIER HUB ASSEMBLY

Disassembly

Disassemble in the sequence shown in the figure.



1. One-way clutch
2. Bearing races
3. Snap ring
4. Carrier hub assembly
5. Inner race (Low and reverse hub)



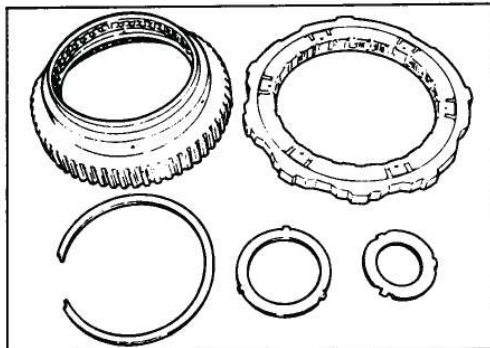
Inspection

Check the following and replace any faulty parts.

1. Damaged or worn gear and operation
2. Clearance between pinion washer and planetary carrier

Clearance:

0.2—0.7 mm (0.008—0.028 in)

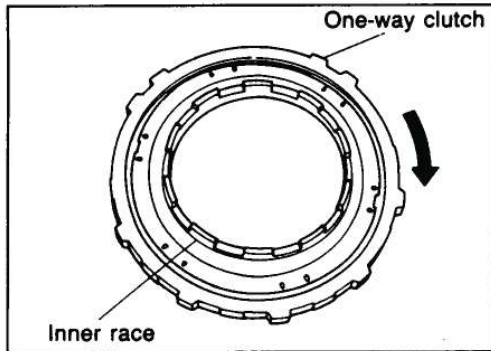


3. Damaged or worn inner race
4. Broken or worn snap ring
5. Damaged or worn bearing race



Technical Service Information

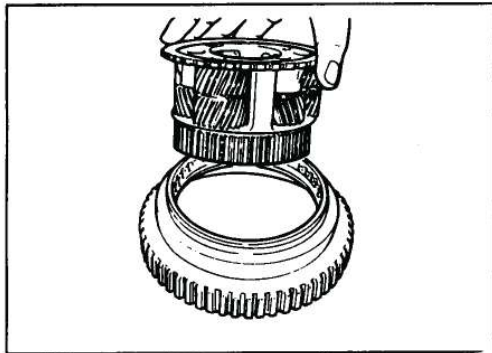
59 EL



- 6. Damaged or worn one-way clutch and operation
- 7. Detached roller

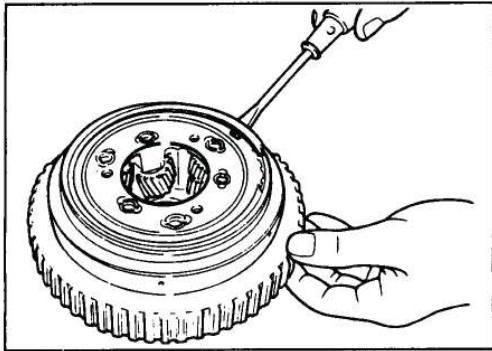
Note

Assemble the one-way clutch and the inner race, then confirm that the one-way clutch rotates only clockwise and smoothly.

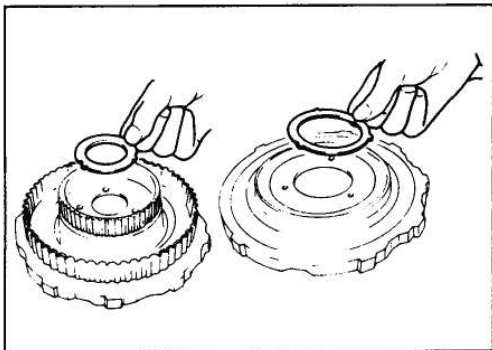


Assembly

Assemble the carrier hub assembly to the inner race.



Install the snap ring.



Apply petroleum jelly to the bearing races to secure them; then install them to both sides of the one-way clutch and carrier hub assembly.

Bearing race outer diameter

- Sun gear drum side: 72.0 mm (2.83 in)
- 3-4 clutch side: 57.0 mm (2.21 in)

Note

Install the tabs of the bearing race into the alignment holes.



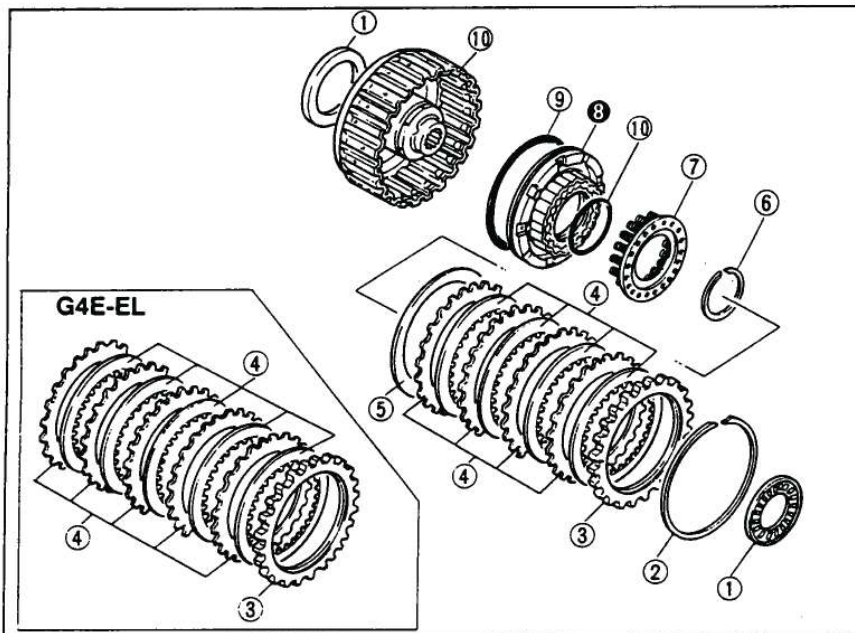
Technical Service Information

60 EL

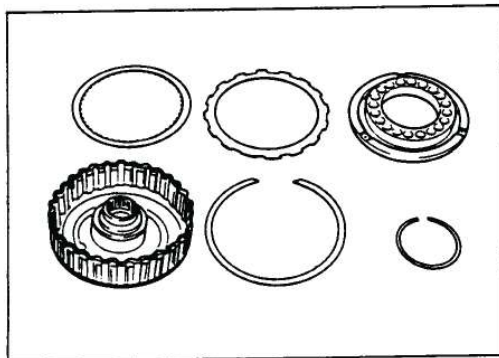
3-4 CLUTCH

Disassembly

Disassemble in the sequence shown in the figure referring to the disassembly note for the specially marked part.



1. Thrust bearings
2. Snap ring
3. Retaining plate
4. Drive and driven plates
5. Dished plate (G4A-HL)
6. Snap ring
7. Spring and retainer assembly
8. 3-4 clutch piston
9. Outer seal
10. Inner seal
11. 3-4 clutch drum



Inspection

Check the following and repair or replace any faulty parts.

1. Drive and driven plates for damage or wear

Drive plate thickness

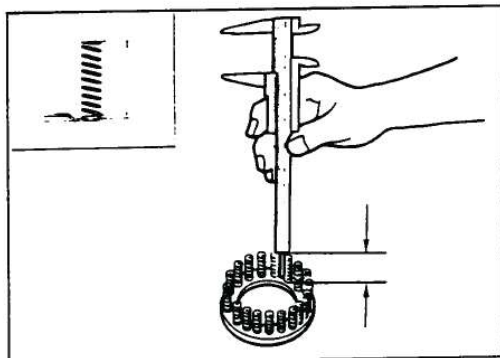
Standard: 1.6 mm (0.063 in)

Minimum: 1.4 mm (0.055 in)

2. Clutch piston for damage or cracks
3. Clutch drum for damage or deformation
4. Seal contact areas for damage
5. Check ball for leaking or sticking
6. Spring and retainer assembly for separation or deformation
7. Broken or worn snap ring
8. Broken or weakened spring

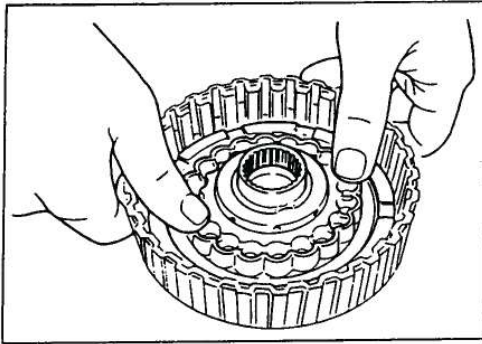
Free length of spring:

33.2 mm (1.307 in)





Technical Service Information

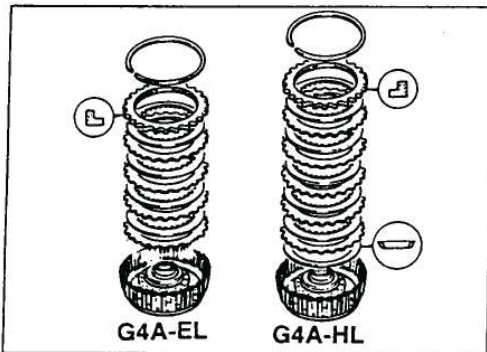


Assembly

Install the 3-4 clutch piston.

- (1) Apply ATF to the inner and outer seals, and install them onto the 3-4 clutch piston.
- (2) Install the piston by pushing evenly around the circumference, being careful not to damage the seal rings.

Install the spring and retainer assembly.



Install the dished plate the dished side up ward (G4A-HL).

Install the drive and driven plates.

Note

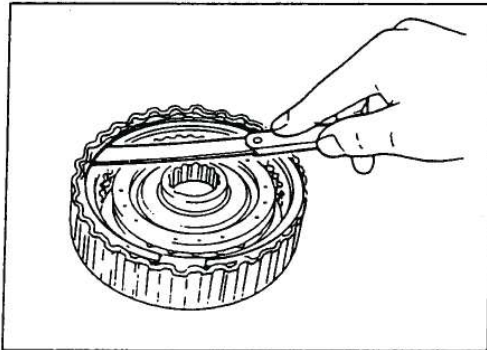
Installation order:

G4A-EL

Driven-Drive-Driven-Drive-Driven-Drive-Driven-Drive-Driven-Drive

G4A-HL

Driven-Drive-Driven-Drive-Driven-Drive-Driven-Drive



Install the retaining plate with the step facing upward.

Install the snap ring.

Check the 3-4 clutch clearance.

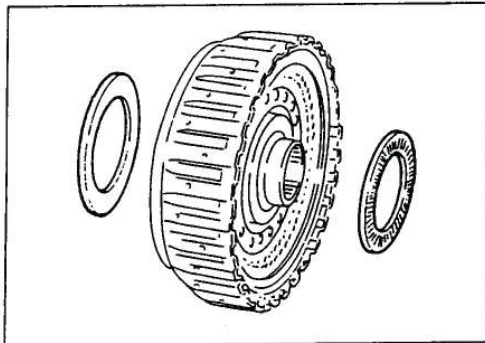
- (1) Measure the clearance between the snap ring and the retaining plate of the 3-4 clutch.
- (2) If the clearance is not within specification, adjust it by selecting a proper retaining plate.

3-4 clutch clearance:

1.3—1.5 mm (0.051—0.059 in)

G4A-EL

3.8 (0.150)	4.0 (0.157)	4.2 (0.165)
4.4 (0.173)	4.6 (0.181)	4.8 (0.189)



Apply petroleum jelly to the thrust bearings and secure them to both sides of the 3-4 clutch drum.

Thrust bearing outer diameter

Carrier hub side: 56.1 mm (2.21 in)

Output shell side: 72.1 mm (2.84 in)



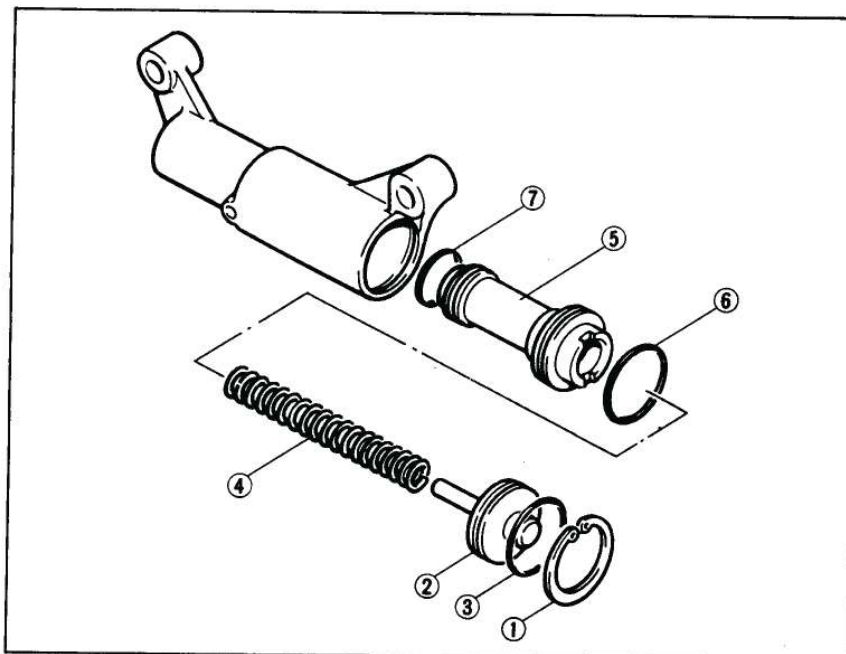
Technical Service Information

62 EL

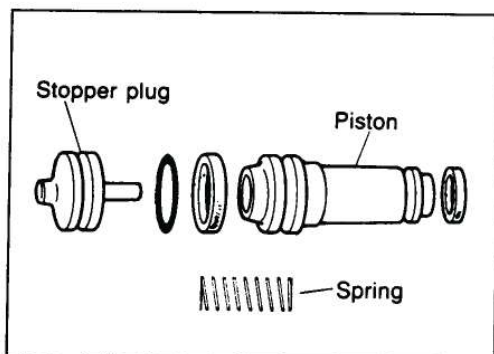
2-3 ACCUMULATOR

Disassembly

Disassemble in the sequence shown in the figure.



1. Snap ring
2. Stopper plug
3. O-ring
4. 2-3 accumulator spring
5. 2-3 accumulator piston
6. Large seal ring
7. Small sea ring



Inspection

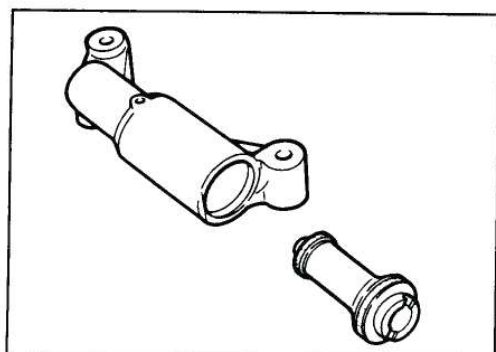
Check the following and replace any faulty parts.

1. Damaged or worn piston
2. Damaged or worn stopper plug
3. Broken or weakened spring

Free length of spring:

G4A-EL 83.3 mm (3.280 in)

G4A-HL 76.0 mm (2.992 in)



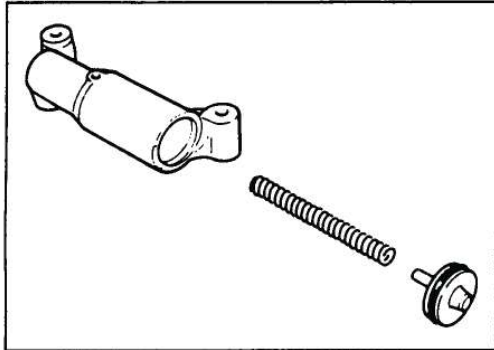
Assembly

1. Install the 2-3 accumulator.
 - (1) Apply ATF to large and small seal rings; then install them to the accumulator piston.
 - (2) Insert the 2-3 accumulator.

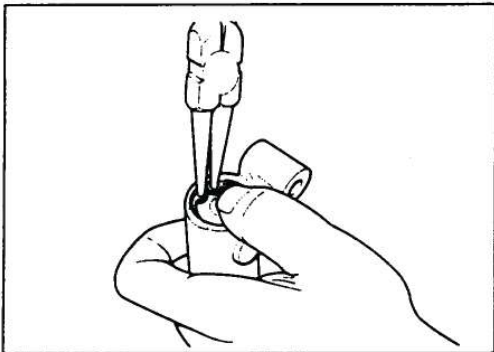


Technical Service Information

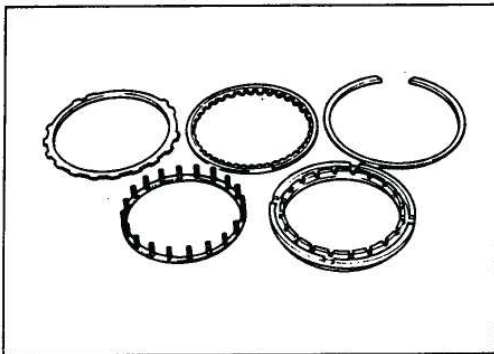
63 EL



2. Install the spring to the piston.
3. Install the stopper plug.
 - (1) Apply ATF to O-ring, and install it onto the stopper plug.
 - (2) Install the stopper plug.



4. Install the snap ring while holding in the stopper plug.



LOW AND REVERSE BRAKE

Inspection

Check the following and replace any faulty parts.

1. Damaged or worn drive and driven plates

Drive plate thickness

Standard: 1.6 mm (0.063 in)

Minimum: 1.4 mm (0.055 in)

2. Broken or worn snap ring
3. Deformed or detached spring and retainer assembly
4. Broken or weakened spring

Free length of spring:

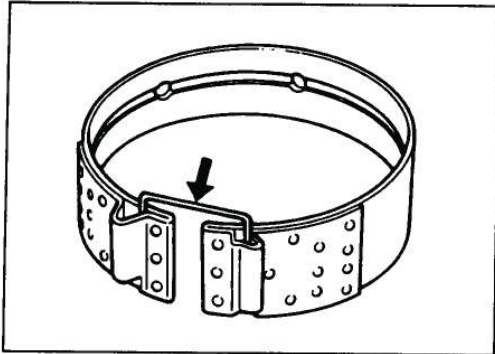
20.5 mm (0.807 in)

5. Damaged or worn piston
6. Damaged seal contact area of transaxle case



Technical Service Information

64 EL

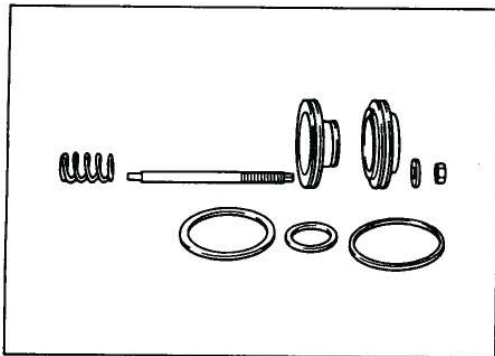


2-4 BRAKE BAND

Inspection

Check the following and replace if necessary.

1. Damaged or worn 2-4 brake band



BAND SERVO

Inspection

Check the following and replace any faulty parts.

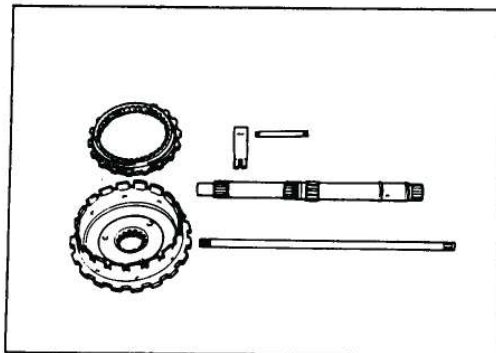
1. Damaged or worn piston
2. Weakened return spring

Free length of spring:

G4A-EL: 43.25 mm (1.703 in)

G4A-HL: FE engine 42.0 mm (1.654 in)

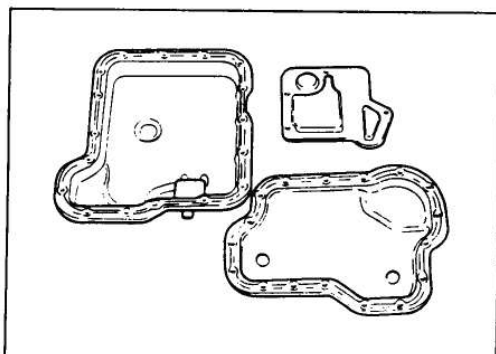
F8 engine 43.25 mm (1.703 in)



OTHER INSPECTION

Check the following and replace any faulty parts.

1. Damaged or worn output shell
2. Damaged or worn internal gear
3. Damaged or worn turbine shaft
4. Damaged or worn oil pump shaft
5. Damaged or worn anchor strut and shaft



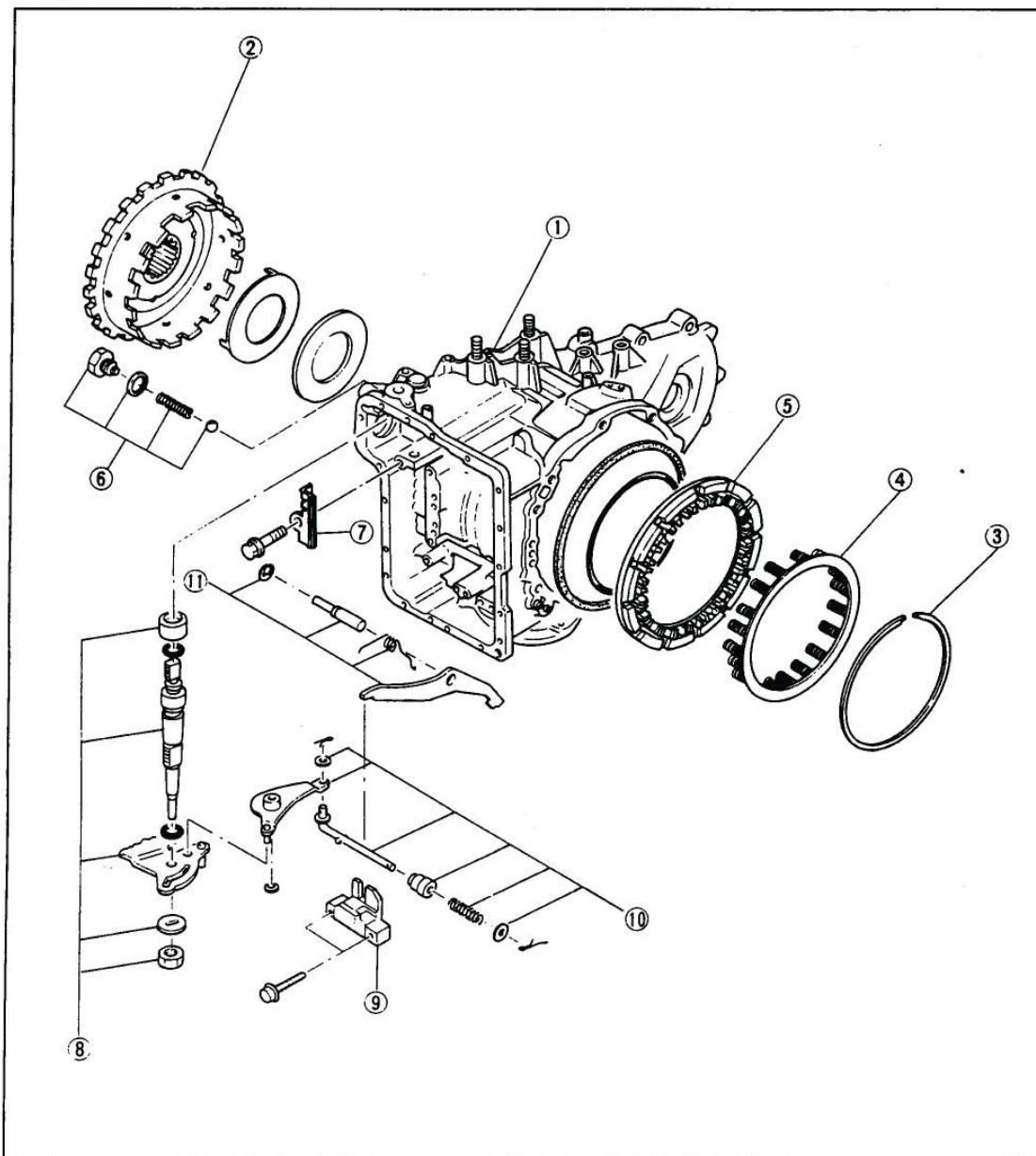
6. Damaged or cracked valve body cover
7. Damaged or cracked oil pan
8. Damaged or clogged oil strainer



Technical Service Information

65 EL

DISASSEMBLY Component

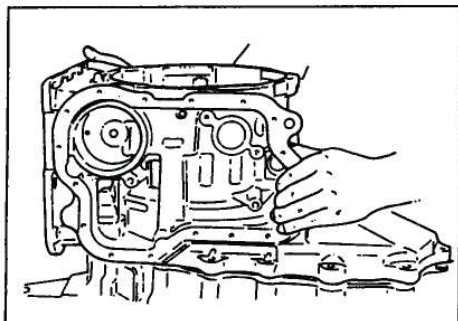


- | | |
|--|----------------------------------|
| 1. Transaxle case | 7. Bracket |
| 2. Output shell | 8. Manual shaft and manual plate |
| 3. Snap ring | 9. Actuator support |
| 4. Spring and retainer assembly | 10. Parking assist lever |
| 5. Low and reverse brake piston | 11. Parking pawl |
| 6. Plug, washer, spring, and detent ball | |

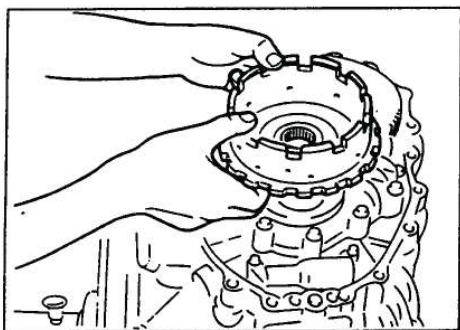


Technical Service Information

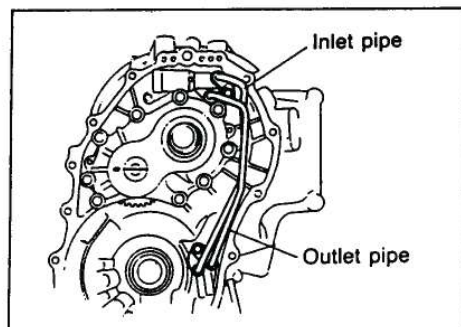
66 EL



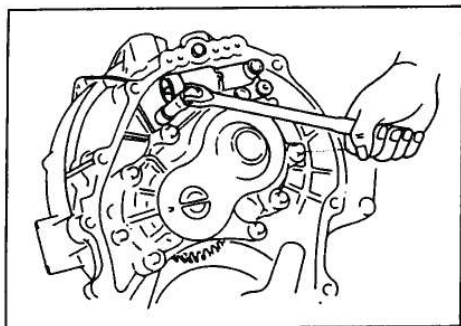
1. Remove the bolts; then remove the transaxle case by tapping lightly with a plastic hammer.



2. Remove the output shell from the output gear.



3. Remove the governor outlet pipe, governor inlet pipe, and O-rings.

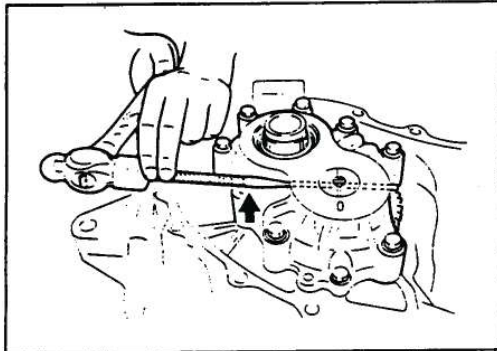
G4A-HL only

4. Remove the 2-3 accumulator piston assembly and O-rings.

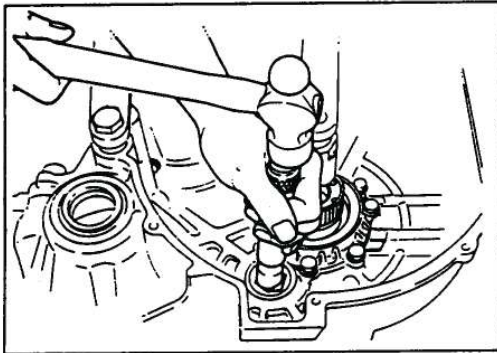


Technical Service Information

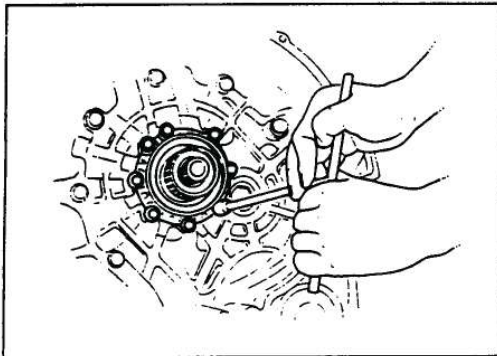
67 EL



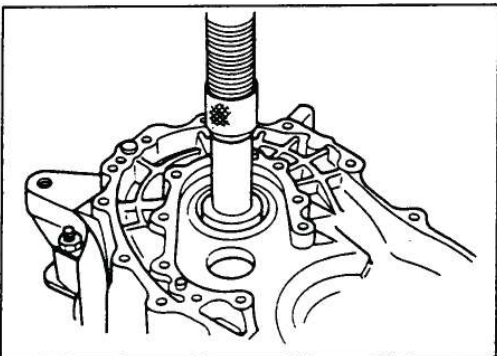
5. Remove the bearing housing.
- (1) Remove the bolt indicated in the figure.
 - (2) Remove the roll pin with a pin punch.
 - (3) Remove the bearing housing by tapping lightly with a plastic hammer.



6. Remove the idle gear assembly and output gear assembly by tapping out from the torque converter side.



7. Remove the bearing cover.
- (1) Remove the converter housing from the trans-axle hanger.
 - (2) Remove the bearing cover bolts.



- (3) Press the bearing cover assembly out of the converter housing.



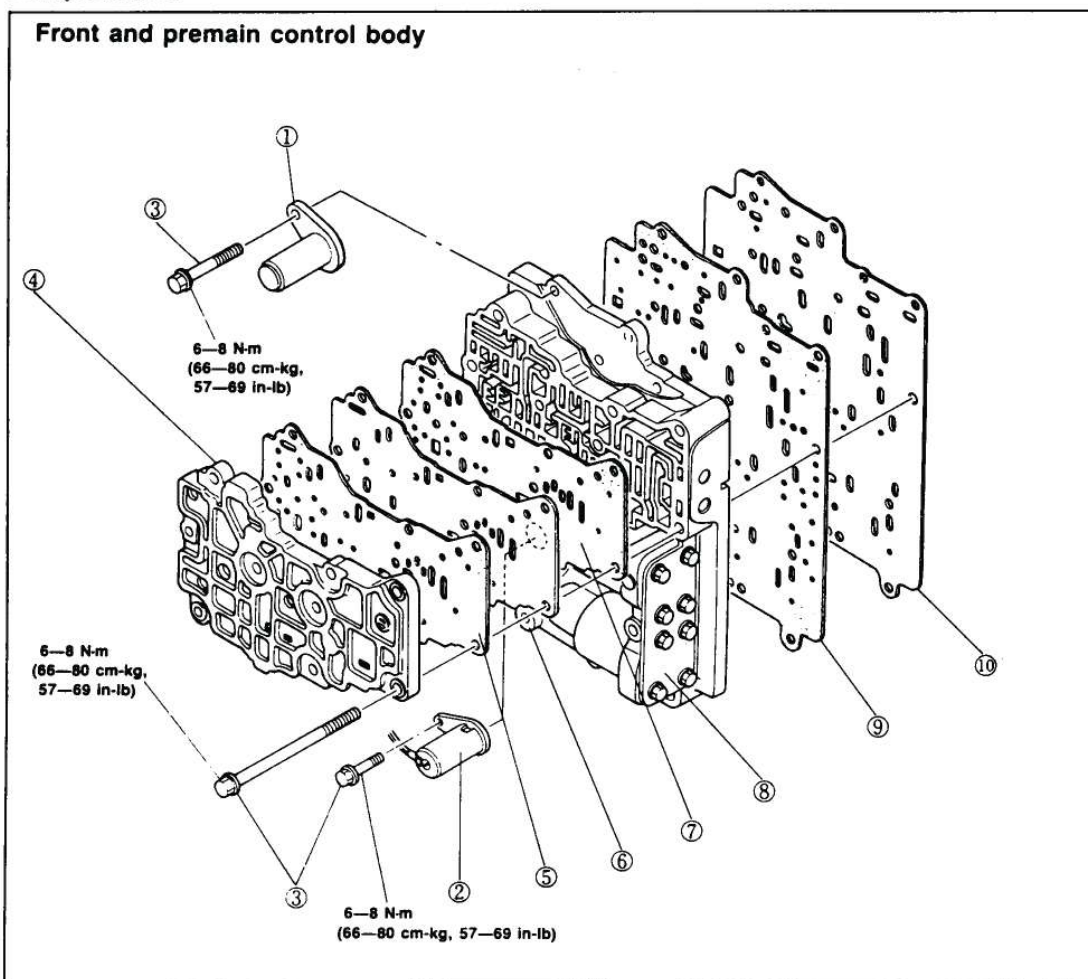
Technical Service Information

CONTROL VALVE BODY (G4A-EL)

Precaution

- (1) Pay close attention when handling the control valve because it consists of the most precise and delicate parts of the transaxle.
- (2) Neatly arrange the removed parts in order to avoid mixing up similar parts.
- (3) Disassemble the control valve assembly and thoroughly clean it when the clutch and/or brake bands are burned, and/or when the automatic transaxle fluid is degenerated.

Components I



1. 1-2 Solenoid valve
2. 2-3 Solenoid valve
3. Bolts
4. Front control body
5. Front/premain front gasket

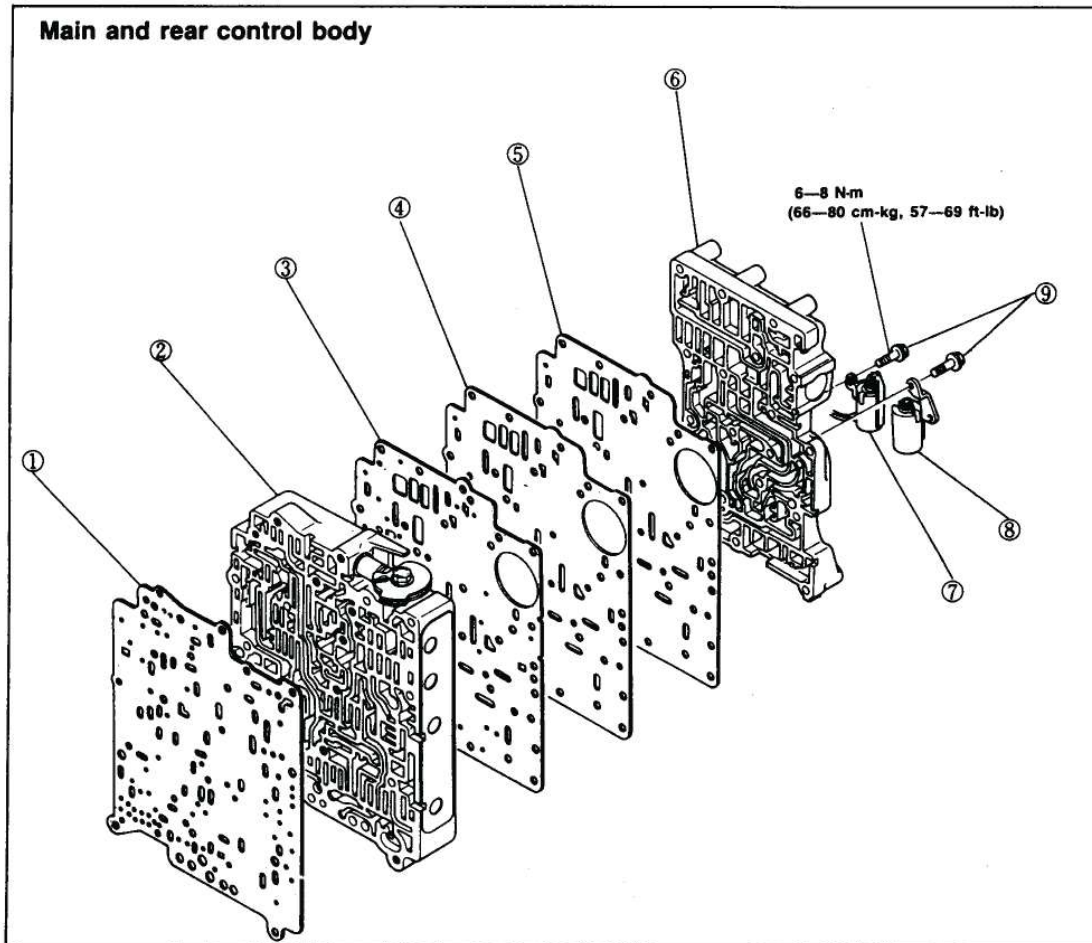
6. Premain separator
7. Front/premain rear gasket
8. Premain control body
9. Premain/main front gasket
10. Main separator



Technical Service Information

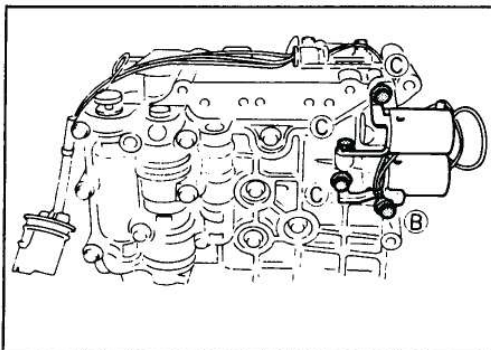
69 EL

Components II



1. Premain/main rear gasket
2. Main control body
3. Main/rear front gasket
4. Rear separator
5. Main/rear rear gasket

6. Rear control body
7. 3-4 solenoid valve
8. Lock-up solenoid valve
9. Bolts

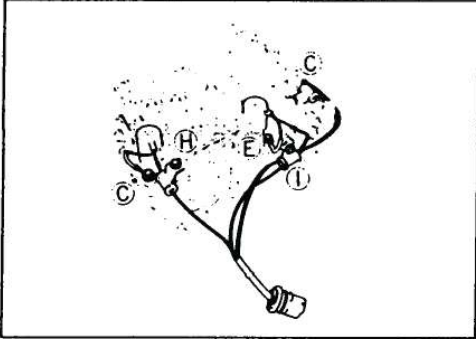


Disassembly of Control Valve Body

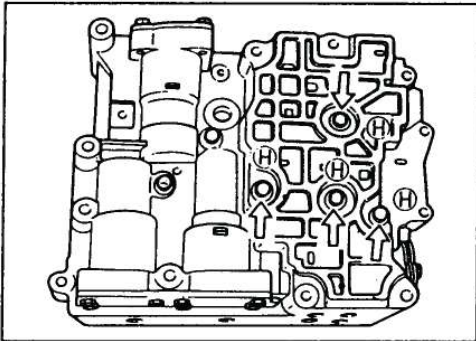
1. Remove the 3-4 solenoid valve and lock-up solenoid valve.
2. Remove the O-rings and oil strainers.



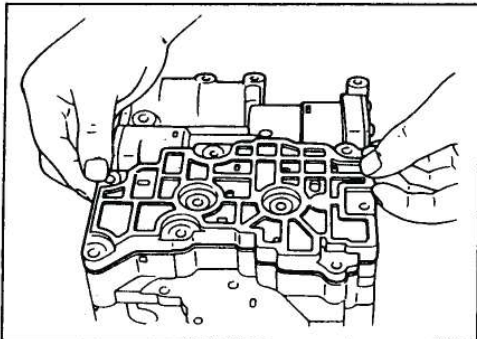
Technical Service Information



3. Remove the 1-2 solenoid valve and 2-3 solenoid valve and wire harness.
4. Remove the O-rings and oil strainers.

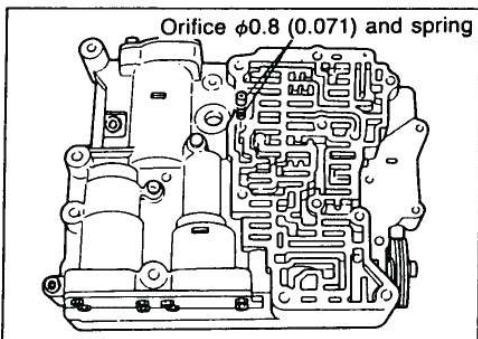


5. Remove the front indicated bolts and pull out the front control body with premain separator as a unit.



6. Remove the front/premain gaskets and separator from the front control body.

There are two(2) balls located under this plate on some models.

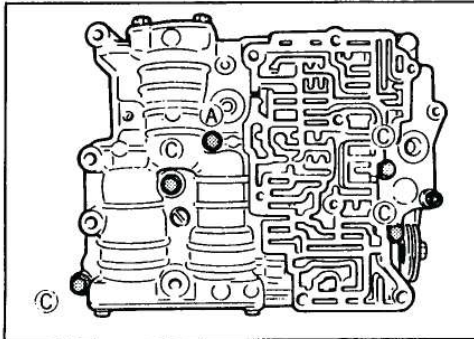


7. Remove the orifice check valve ($\phi 0.8$ mm, 0.071 in) and spring from the premain control body.

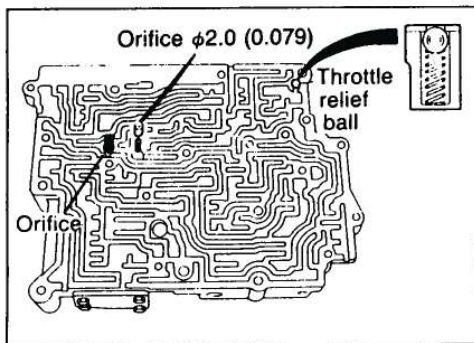
(3-4 Clutch Feed Orifice.)



Technical Service Information

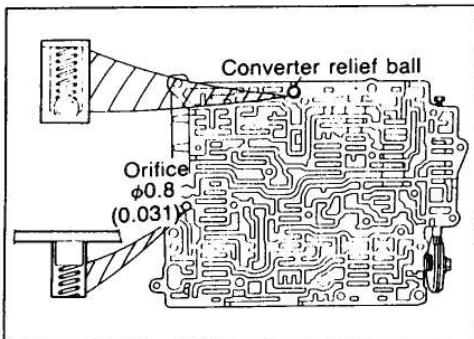


8. Remove the bolts and hexagonal head bolt and remove the premain control body and the main separator as a unit.



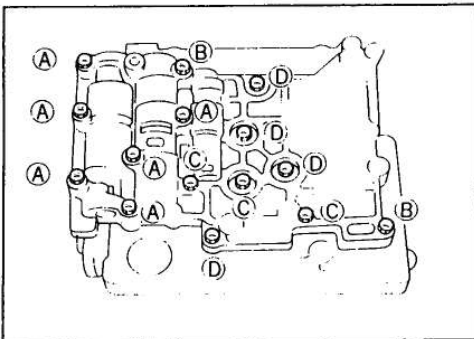
9. Remove the premain/main gaskets and separator from the premain control body.
10. Remove the orifice check valve ($\phi 2.0$ mm, 0.079 in) and spring, and the throttle relief ball and spring from the premain control body.

(.079 in. Orifice Is Forward Clutch Feed.)
(Orifice is 2-4 Servo For The 3-4 Shift.)



11. Remove the converter relief ball and spring, and the orifice check valve ($\phi 0.8$ mm, 0.031 in) and spring from the main control body.

(Orifice is TV 2nd.)

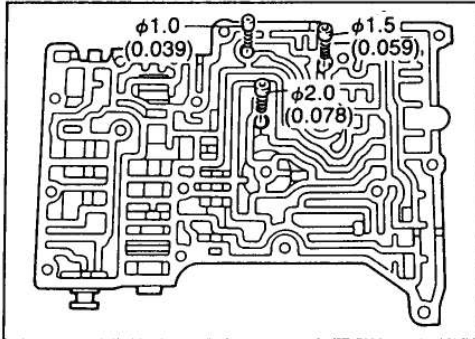


12. Turn the assembly over and remove the bolts shown in the figure. Remove the rear separator as a unit.



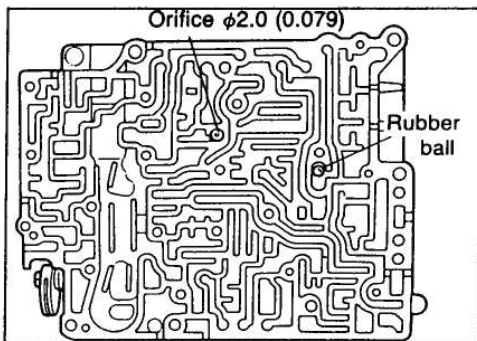
Technical Service Information

72 EL



13. Remove the main/rear gaskets and separator from the rear control body.
14. Remove the orifice check valves ($\phi 1.5$ mm, 0.059 in; $\phi 1.0$ mm, 0.039 in; $\phi 2.0$ mm, 0.079 in) and spring from the rear control body.

(.039 in. Orifice Is For Over-run Clutch Feed.)
(.059 in. Orifice Is The Reverse Clutch Feed.)
(.078 in. Orifice Is The L/R Clutch Exhaust.)



15. Remove the orifice check valve ($\phi 2.0$ mm, 0.079 in) and spring and the rubber ball from the main control body.

(Low Rev. Brake Used In Manual Low.)

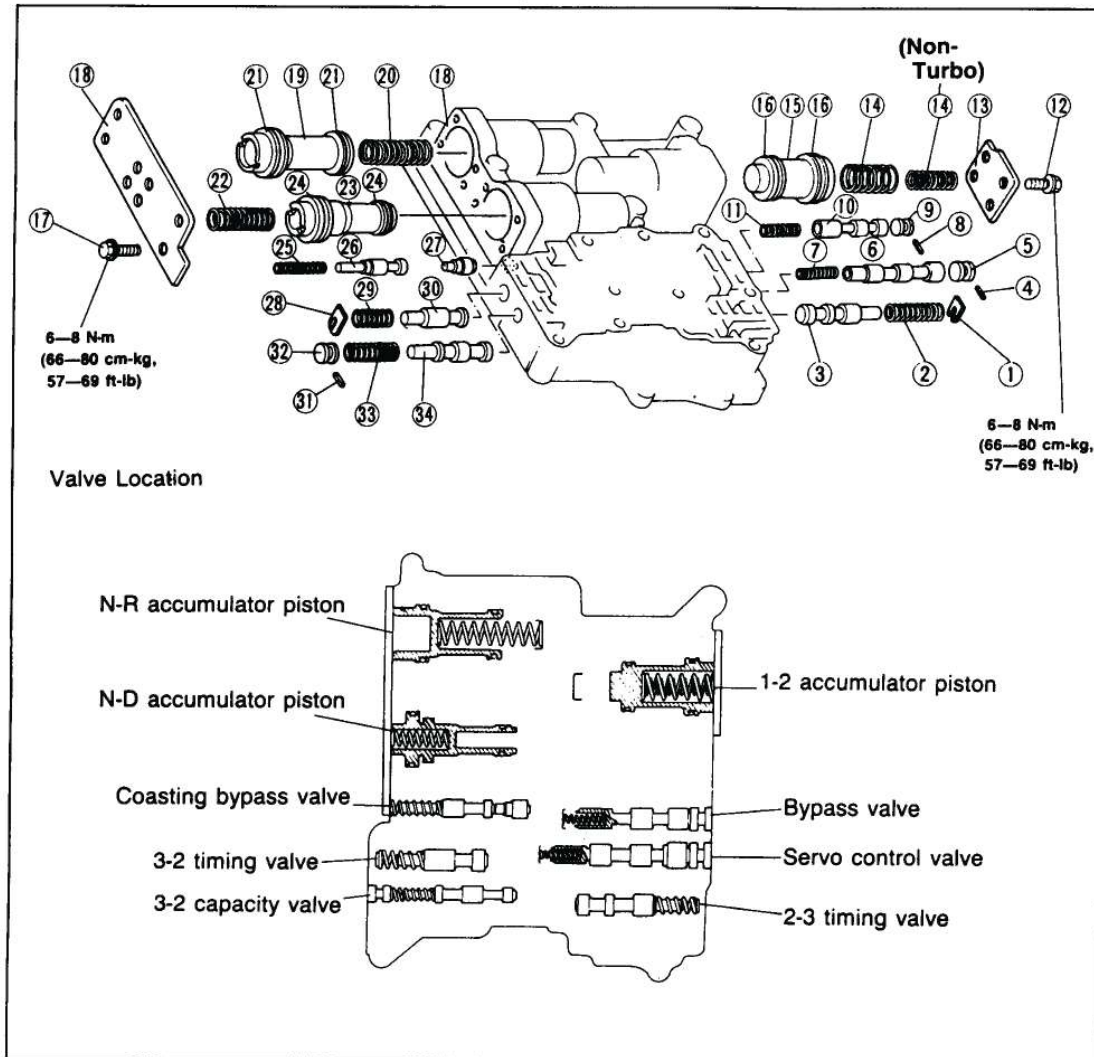


Technical Service Information

73 EL

Premain Control Body Disassembly

Disassemble in the sequence shown in the figure.



- | | | |
|--------------------------------------|--------------------------------------|--------------------------------|
| 1. Retainer | 14. 1-2 accumulator spring | 23. N-D accumulator piston |
| 2. 2-3 timing spring | 15. 1-2 accumulator piston | 24. N-D accumulator seal rings |
| 3. 2-3 timing valve | 16. 1-2 accumulator seal rings | 25. Coasting bypass spring |
| 4. Stopper pin | 17. Bolt | 26. Coasting bypass valve |
| 5. Stopper plug | 18. N-R accumulator plate and gasket | 27. Coasting bypass plug |
| 6. Servo control valve | 19. N-R accumulator piston | 28. Retainer |
| 7. Servo control spring | 20. N-R accumulator rear spring | 29. 3-2 timing spring |
| 8. Stopper pin | 21. N-R accumulator seal rings | 30. 3-2 timing valve |
| 9. Stopper plug | 22. N-D accumulator front spring | 31. Stopper pin |
| 10. Bypass valve | | 32. Stopper plug |
| 11. Bypass spring | | 33. 3-2 capacity spring |
| 12. Bolt | | 34. 3-2 capacity valve |
| 13. 1-2 accumulator plate and gasket | | |



Technical Service Information

74 EL

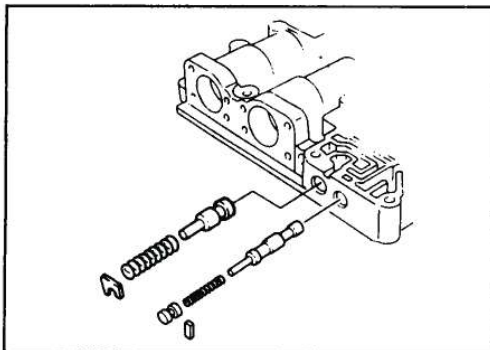
Inspection

Check the following and replace any faulty parts.

1. Damaged or worn valves
2. Damaged oil passage
3. Cracked or damaged valve body
4. Operation of each valve
5. Weakened spring

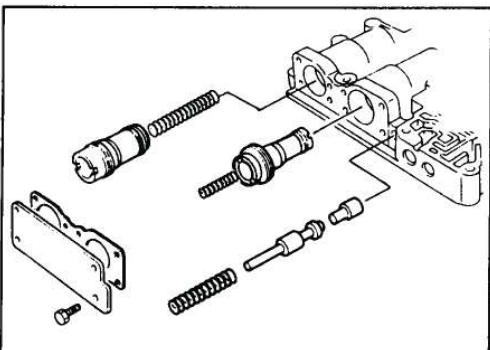
Spring

Spring name	Outer dia. mm (in)	Free length mm (in)	Wire dia. mm (in)	Spring color
1-2 accumulator small spring	11.0 (0.433)	88.1 (3.348)	1.4 (0.055)	Gray
1-2 accumulator large spring	16.0 (0.630)	78.0 (3.071)	2.0 (0.079)	Blue
Bypass, Servo control spring	5.0 (0.197)	33.4 (1.315)	0.55 (0.022)	Maroon
2-3 timing spring	8.3 (0.327)	26.5 (1.043)	0.8 (0.031)	—
N-R accumulator rear spring	11.1 (0.437)	62.0 (2.441)	1.2 (0.047)	Light green
N-D accumulator front spring	9.8 (0.386)	52.9 (2.083)	1.0 (0.039)	Brown
Coasting bypass spring	5.8 (0.228)	37.7 (1.484)	0.6 (0.024)	Dark blue
3-2 timing spring	8.2 (0.323)	28.6 (1.126)	0.8 (0.031)	Red
3-2 capacity spring	5.4 (0.213)	30.6 (1.205)	0.5 (0.020)	White
Throttle relief ball spring	6.6 (0.260)	21.6 (0.850)	0.8 (0.031)	—



Assembly

1. Install the 3-2 capacity valve, 3-2 capacity spring, and stopper plug; then install the stopper pin.
2. Install the 3-2 timing valve, the 3-2 timing spring, and retainer.



3. Install the coasting bypass plug, coasting bypass valve and coasting bypass spring.
4. Apply ATF to the O-rings, and install them to the piston; then insert the N-R accumulator rear spring and N-R accumulator piston.
5. Apply ATF to the O-rings, and install them to the piston; then insert the N-D accumulator piston and N-D accumulator front spring.



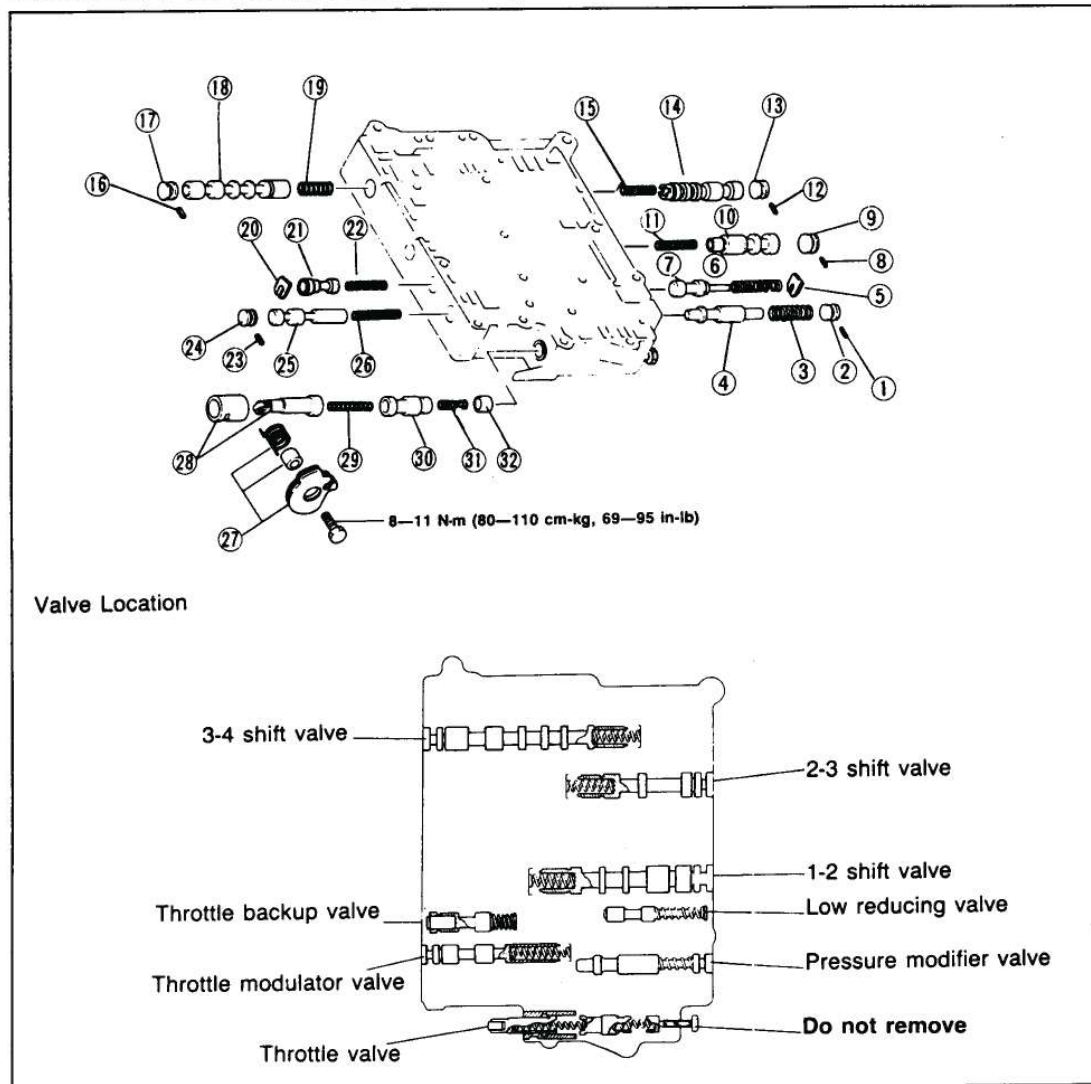
Technical Service Information

75 EL

Main Control Body

Disassembly

Disassemble in the sequence shown in the figure.



- | | | |
|-----------------------------|----------------------------|-------------------------------|
| 1. Stopper pin | 12. Stopper pin | 23. Stopper pin |
| 2. Stopper plug | 13. Stopper plug | 24. Stopper plug |
| 3. Pressure modifier spring | 14. 2-3 shift valve | 25. Throttle modulator valve |
| 4. Pressure modifier valve | 15. 2-3 shift spring | 26. Throttle modulator spring |
| 5. Retainer | 16. Stopper pin | 27. Throttle cam assembly |
| 6. Low reducing spring | 17. Stopper plug | 28. Throttle plug assembly |
| 7. Low reducing valve | 18. 3-4 shift valve | 29. Throttle spring |
| 8. Stopper pin | 19. 3-4 shift spring | 30. Throttle valve |
| 9. Stopper plug | 20. Retainer | 31. Throttle assist spring |
| 10. 1-2 shift valve | 21. Throttle backup valve | 32. Throttle adjust plug |
| 11. 1-2 shift spring | 22. Throttle backup spring | |



Technical Service Information

76 EL

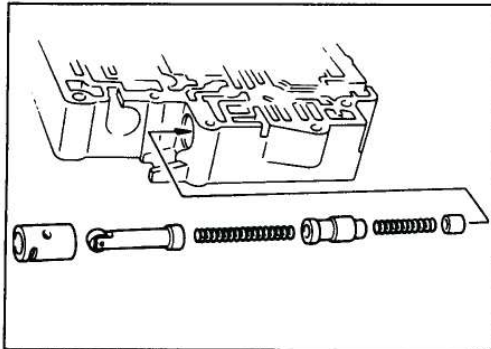
Inspection

Check the following and replace any faulty parts.

1. Damaged or worn valves
2. Damaged oil passage
3. Cracked or damaged valve body
4. Operation of each valve
5. Weakened spring

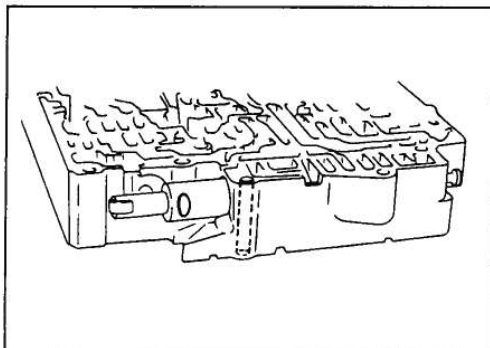
Spring

Spring name	Outer dia. mm (in)	Free length mm (in)	Wire dia. mm (in)	Spring color
Pressure modifier spring	8.3 (0.327)	26.5 (1.043)	0.8 (0.031)	—
Low reducing spring	8.7 (0.343)	38.3 (1.508)	0.9 (0.035)	Black
1-2 shift spring	8.7 (0.343)	41.3 (1.626)	1.0 (0.039)	Yellow
2-3, 3-4 shift spring	7.4 (0.291)	36.6 (1.441)	0.8 (0.031)	Gray
Throttle backup spring	9.65 (0.380)	26.9 (1.059)	0.55 (0.022)	Red
Throttle modulator spring	6.3 (0.248)	47.9 (1.886)	0.8 (0.031)	—
Throttle assist spring	5.15 (0.203)	32.3 (1.272)	0.55 (0.022)	Dark green
Throttle spring	5.4 (0.213)	47.2 (1.858)	0.8 (0.031)	Pink
Converter relief ball spring	6.9 (0.272)	24.1 (0.949)	0.9 (0.035)	Maroon
Orifice check valve spring	5.0 (0.197)	12.5 (0.492)	0.23 (0.009)	—



Assembly

1. Install the throttle adjust plug, throttle assist spring, throttle valve, and throttle plug assembly.



Caution

Install the throttle plug assembly with the groove aligned with the bolt hole.



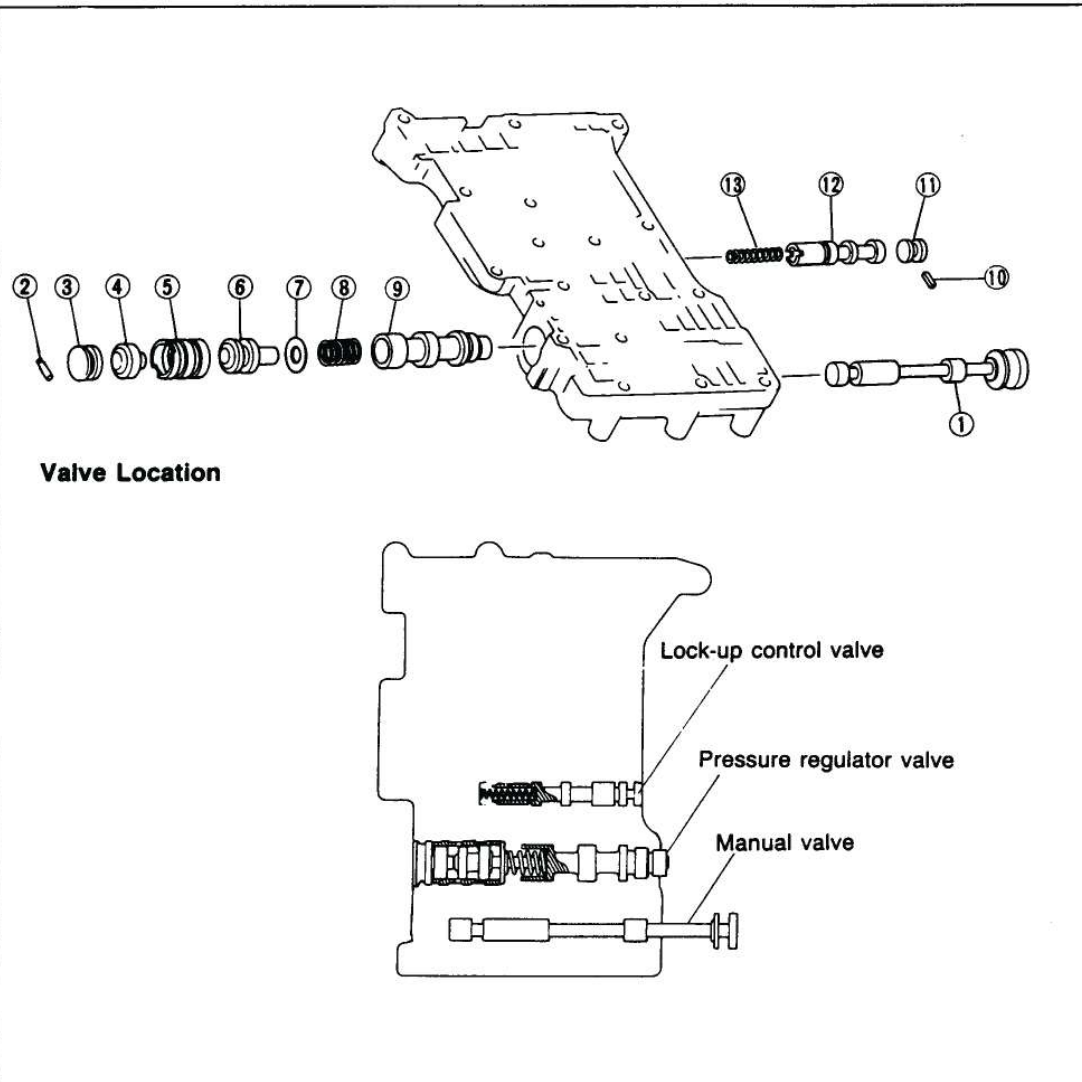
Technical Service Information

77 EL

Rear Control Body

Disassembly

Disassemble in the sequence shown in the figure.



- | | |
|-----------------------------------|------------------------------|
| 1. Manual valve | 8. Pressure regulator spring |
| 2. Stopper pin | 9. Pressure regulator valve |
| 3. Stopper plug | 10. Stopper pin |
| 4. Pressure regulator backup plug | 11. Stopper plug |
| 5. Pressure regulator plug sleeve | 12. Lock-up control valve |
| 6. Pressure regulator plug | 13. Lock-up control spring |
| 7. Pressure regulator spring seat | |



Technical Service Information

78 EL

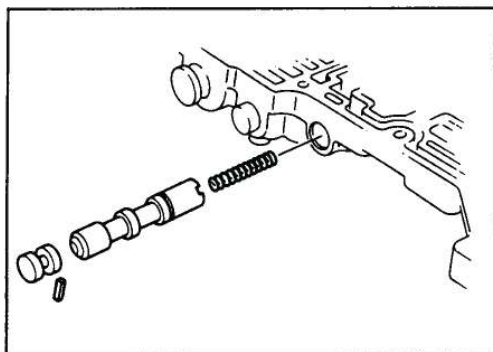
Inspection

Check the following and replace any faulty parts.

1. Damaged or worn valves
2. Damaged oil passage
3. Cracked or damaged valve body
4. Operation of each valve
5. Weakened spring

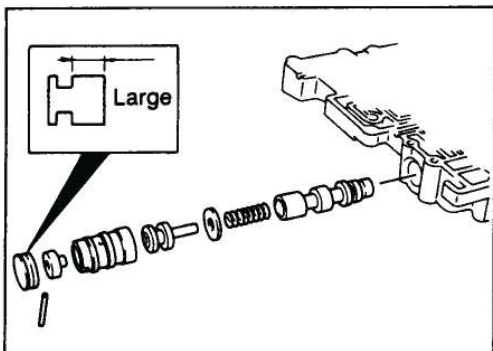
Spring

Spring name	Outer dia. mm (in)	Free length mm (in)	Wire dia. mm (in)	Spring color
Pressure regulator spring	11.5 (0.453)	26.5 (1.043)	1.0 (0.039)	Maroon
Lock-up control spring	5.0 (0.197)	35.2 (1.386)	0.6 (0.024)	Purple



Assembly

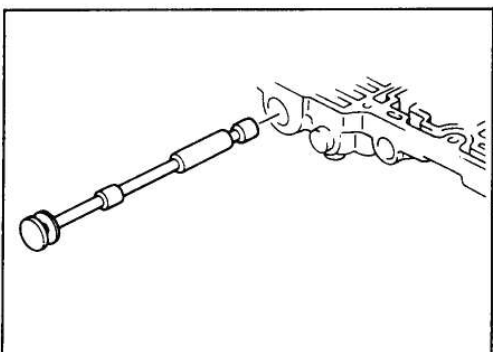
1. Install the lock-up control spring, lock-up control valve, stopper plug, and stopper pin.



2. Install the pressure regulator valve, pressure regulator spring, pressure regulator spring seat, pressure regulator plug, pressure regulator plug sleeve, pressure regulator backup plug, stopper plug, and stopper pin.

Note

Install the stopper plug larger end first.

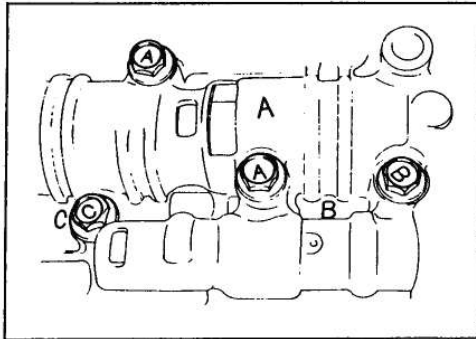


3. Install the manual valve.



Technical Service Information

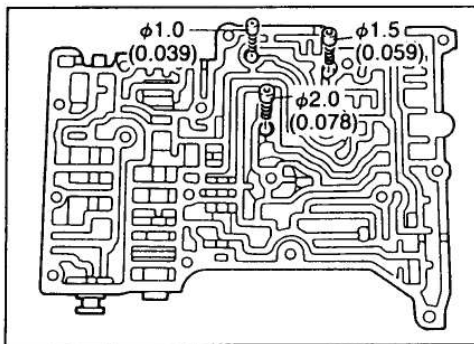
79 EL



Assembly of Control Valve Body

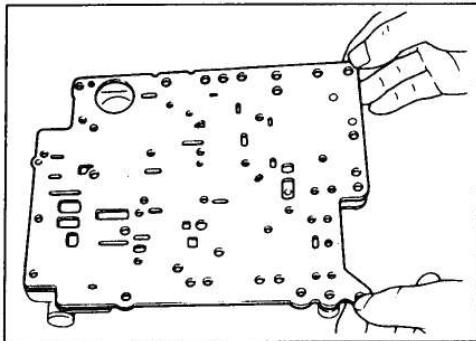
Note

- a) Do not mix-up the front and rear gaskets during assembly.
- b) Match the bolt head letter and the control valve body letter.

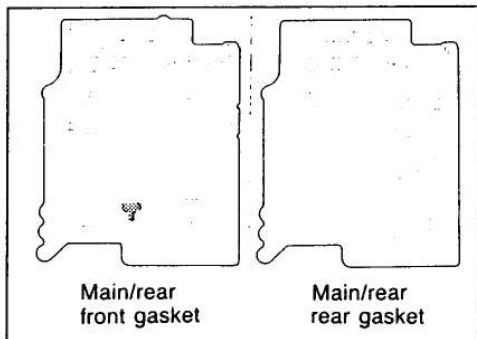


Install the orifice check valves ($\phi 1.5$ mm, 0.059 in; $\phi 1.0$ mm, 0.039 in; $\phi 2.0$ mm, 0.079 in) and springs in the rear control body as shown.

- (.039 in. Orifice Is For Over-run Clutch Feed.)
- (.059 in. Orifice Is The Reverse Clutch Feed.)
- (.078 in. Orifice Is The L/R Clutch Exhaust.)



Install the gaskets on both sides of the rear separator; then install it onto the rear control body.



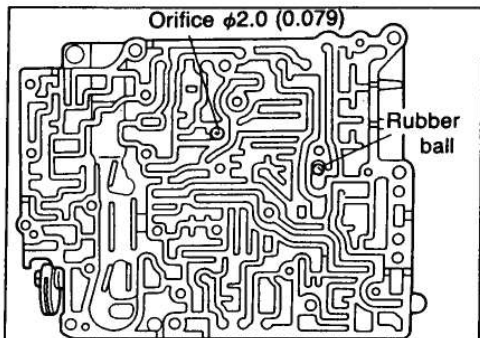
Note

The main/rear rear gasket and main/rear front gasket are not interchangeable.



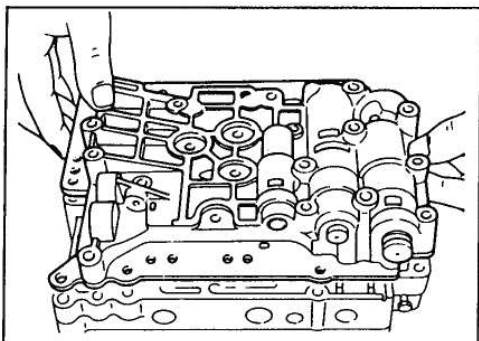
Technical Service Information

80 EL

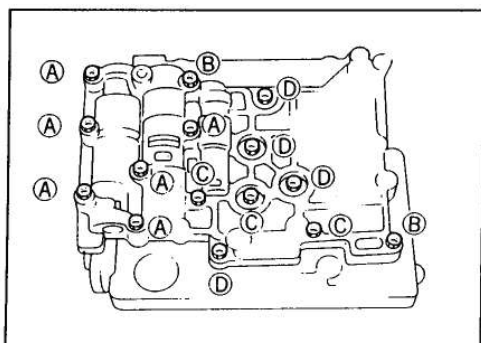


Install the orifice check valve ($\phi 2.0$ mm, 0.079 in) and spring, and the rubber ball in the main control body as shown.

(Low/Rev. Brake Used In Manual Low.)

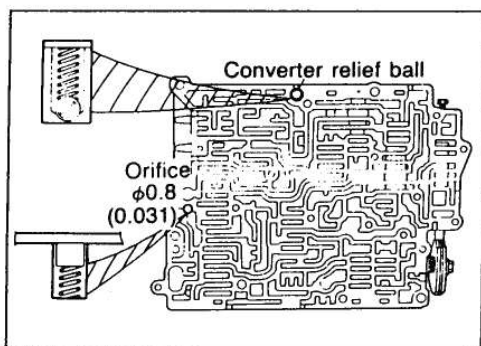


Install the rear control body to the main control body.



Loosely tighten the bolts.

Note
Match the bolt head letter as shown.



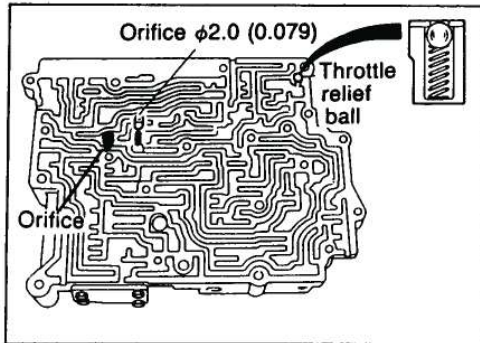
Turn the assembly over and install the orifice check valve ($\phi 0.8$ mm, 0.031 in) and spring, and the converter relief ball and spring in the main control body as shown.

(2-4 Servo Orifice For 1-2 Shift.)



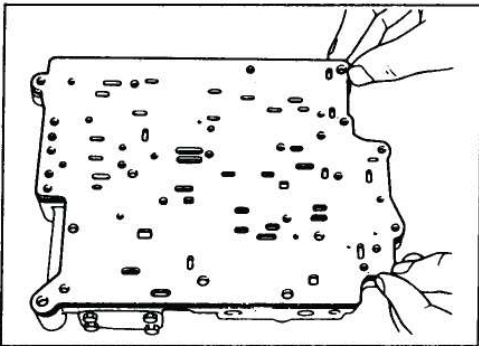
Technical Service Information

81 EL

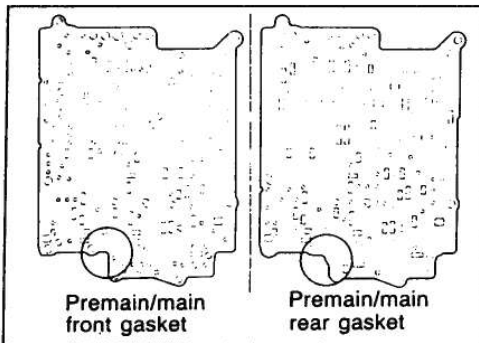


Install the orifice check valve ($\phi 2.0$ mm, 0.079 in) and spring, and the throttle relief ball and spring in the premain control body as shown.

(.079 in. Orifice Is Forward Clutch Feed.)
(Orifice is 2-4 Servo For The 3-4 Shift.)

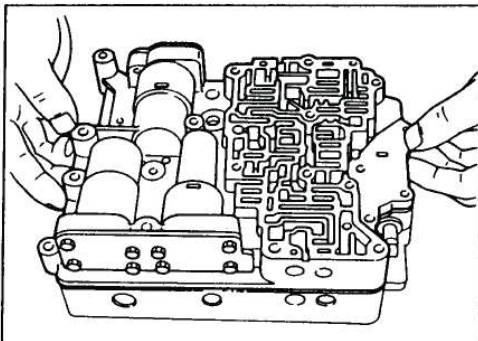


Install the gaskets on both sides of the main separator; then install it onto the premain control body.



Note

The premain/main rear gasket and premain/main front gasket are not interchangeable.

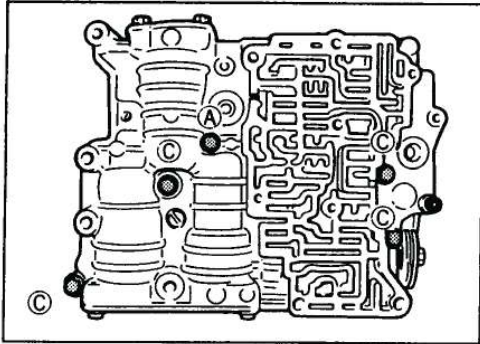


Set the premain control body onto the main control body.



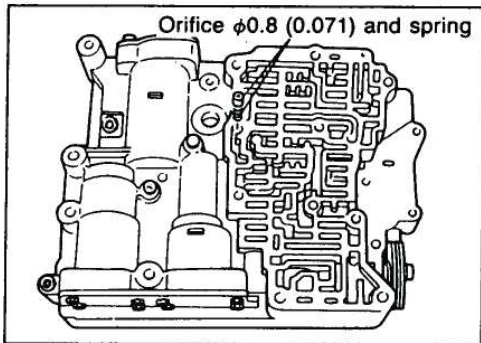
Technical Service Information

82 EL



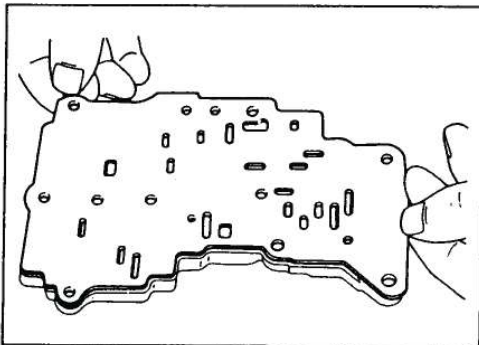
Loosely tighten the bolts.

Note
Match the bolt head letter as shown.



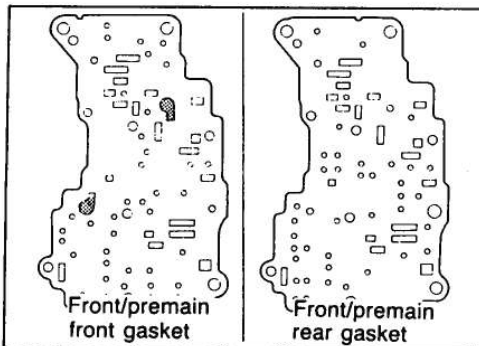
Install the orifice check valve ($\phi 0.8$ mm, 0.071 in) and spring in the premain control body as shown.

(3-4 Clutch Feed Orifice.)



Install the gaskets on both sides of the premain separator; then install it onto the front control body.

There are two(2) balls located under this plate.

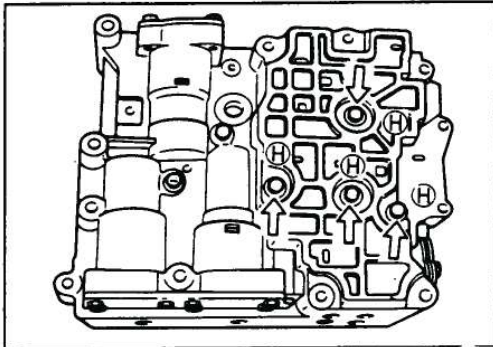


Note
The front/premain front gasket and front/premain rear gasket are not interchangeable.



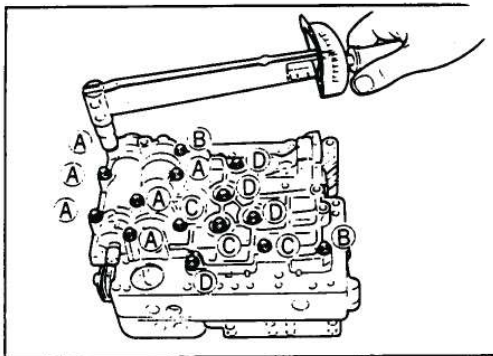
Technical Service Information

83 EL



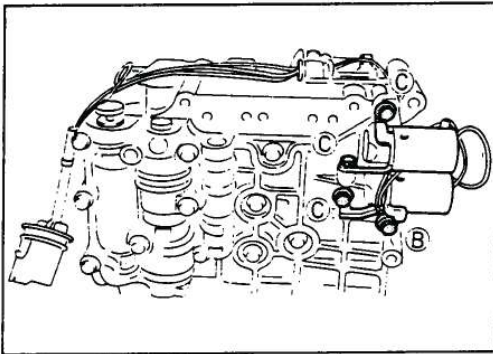
Loosely tighten the bolts.

Note
Match the bolt head letter as shown.



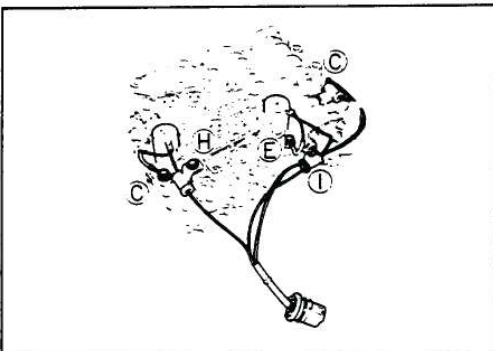
(2) Tighten the rear control body.

Tightening torque:
6—8 N·m (66—80 cm·kg, 57—69 in·lb)



Install the 3-4 solenoid valve and lock-up solenoid valve along with new O-rings and oil strainers.

Tightening torque:
6—8 N·m (66—80 cm·kg, 57—69 in·lb)



Install the 1-2 solenoid valve and 2-3 solenoid valve along with new O-rings and oil strainers.

Tightening torque:
6—8 N·m (66—80 cm·kg, 57—69 in·lb)



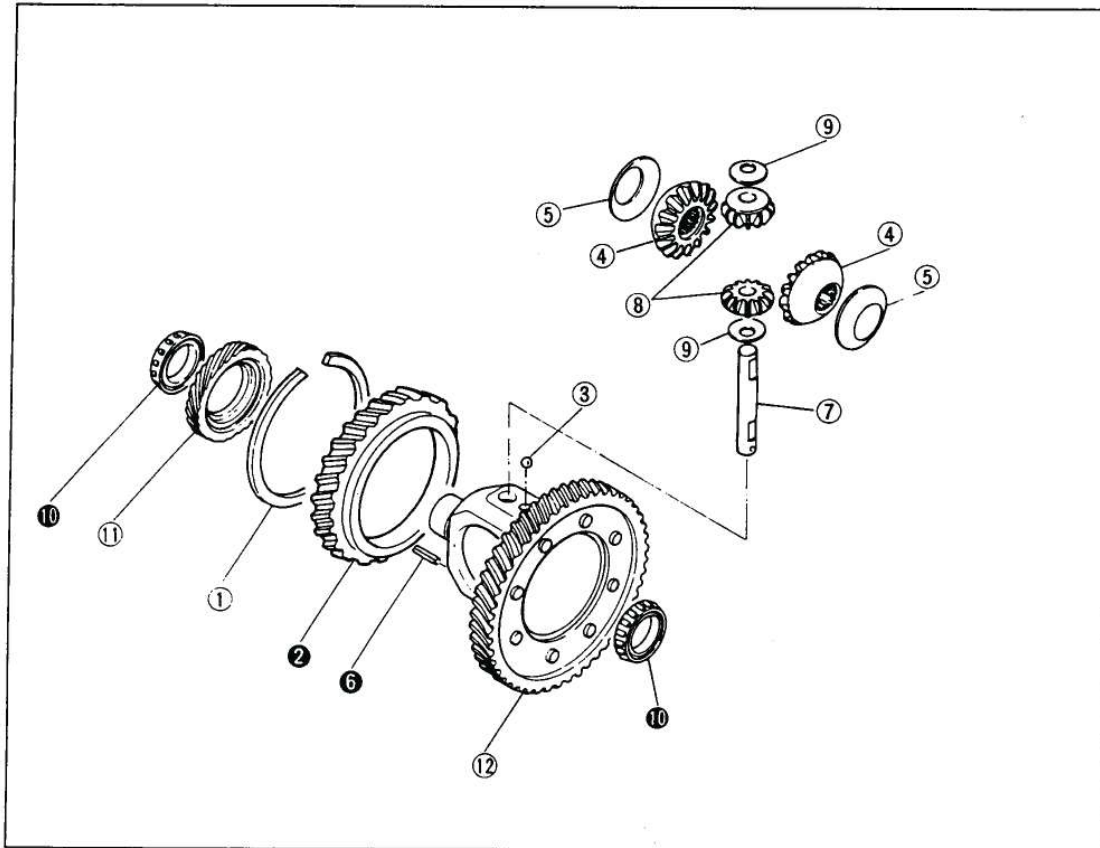
Technical Service Information

84 EL

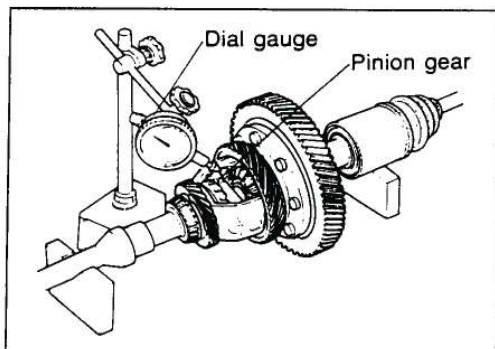
DIFFERENTIAL

Disassembly

Disassemble in the sequence shown in the figure referring to the disassembly note for the specially marked parts.



- | | |
|---------------------------------|--------------------------------------|
| 1. Snap ring (G4A-HL) | 7. Pinion shaft |
| 2. Governor drive gear (G4A-HL) | 8. Pinion gear |
| 3. Steel ball (G4A-HL) | 9. Pinion gear thrust washer |
| 4. Side gear | 10. Side bearing inner race |
| 5. Side gear thrust washer | 11. Speedometer drive gear |
| 6. Roll pin | 12. Ring gear and gear case assembly |



Disassembly note

Checking backlash

Before disassembly, measure the backlash of the side gears and pinion gears. If it is not within specification, replace the differential assembly.

Backlash:

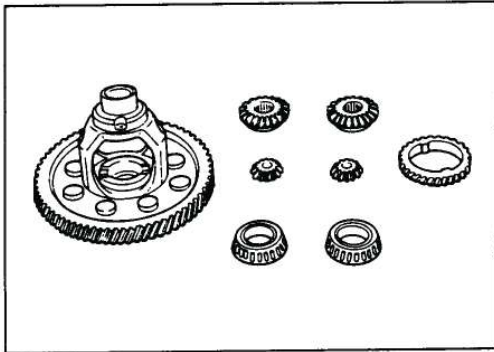
Standard 0.025—0.1 mm (0.001—0.004 in)

Maximum 0.5 mm (0.020 in)



Technical Service Information

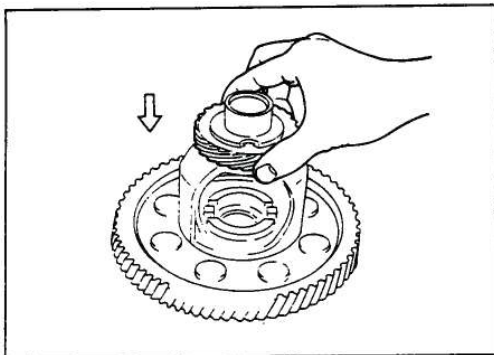
85 EL



Inspection

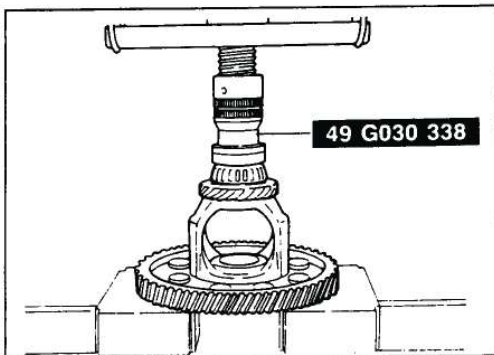
Check the following and replace any faulty parts.

1. Damaged or worn gears
2. Cracked or damaged gear case
3. Damaged bearings



Assembly

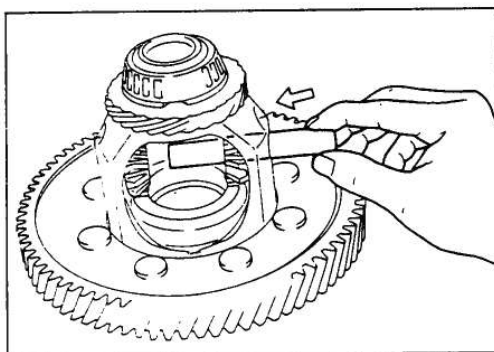
1. Set the speedometer drive gear onto the ring gear and case assembly.



2. Install the side bearing inner races.
 - (1) Press the side bearing inner race (side opposite the ring gear) onto the ring gear and case assembly with the **SST**.
 - (2) Press on the other side bearing inner race (ring gear side) in the same manner.

Caution

Do not reuse the bearings if they were removed.



3. Install the pinion gears and thrust washers into the case.
4. Install the pinion shaft.



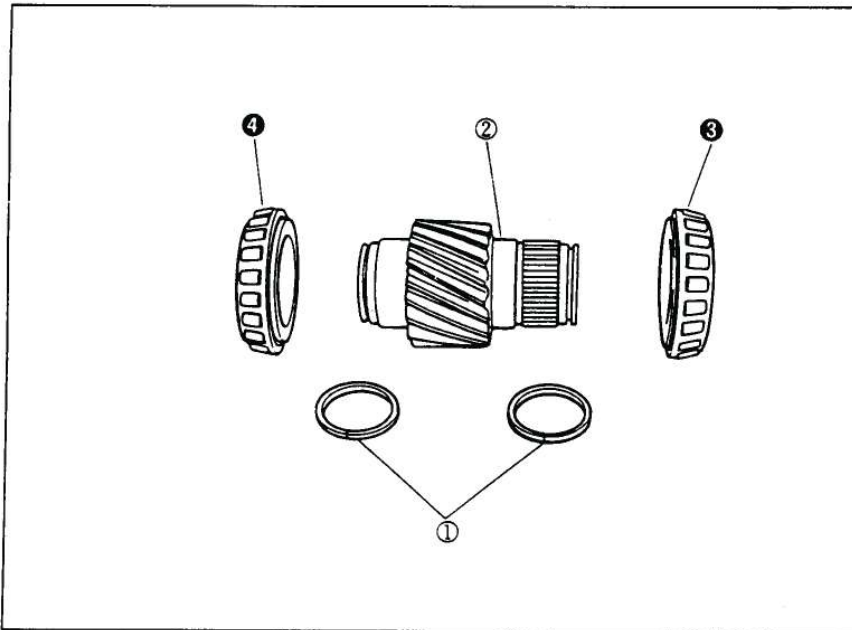
Technical Service Information

86 EL

OUTPUT GEAR

Disassembly

Disassemble in the sequence shown in the figure referring to the disassembly note for the specially marked parts.

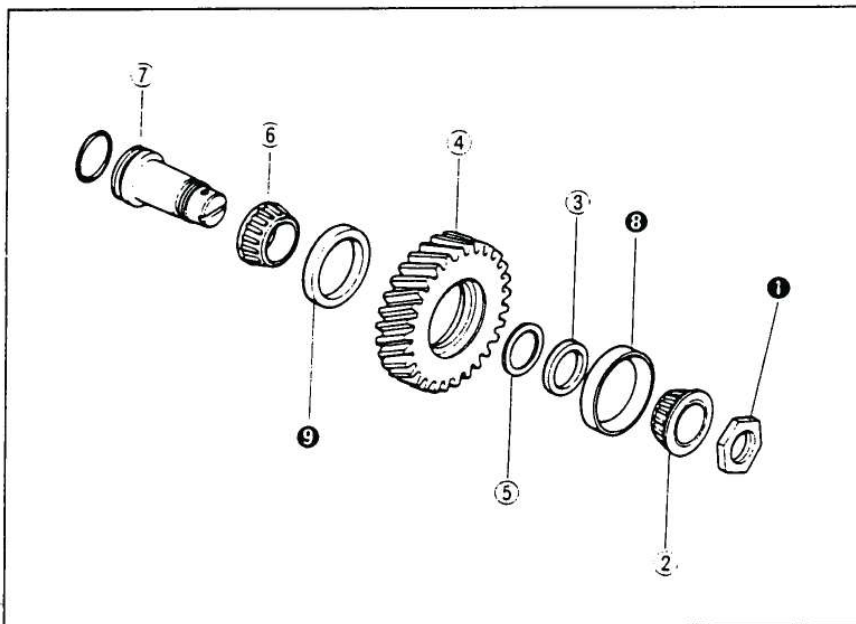


1. Seal ring
2. Output gear
3. Output gear bearing
4. Output gear bearing

IDLE GEAR

Disassembly

Disassemble in the sequence shown in the figure referring to the disassembly note for the specially marked parts.



1. Locknut
2. Idle gear bearing
3. Spacer
4. Idle gear
5. Adjust shim
6. Idle gear bearing
7. Idle shaft
8. Bearing outer race
9. Bearing outer race



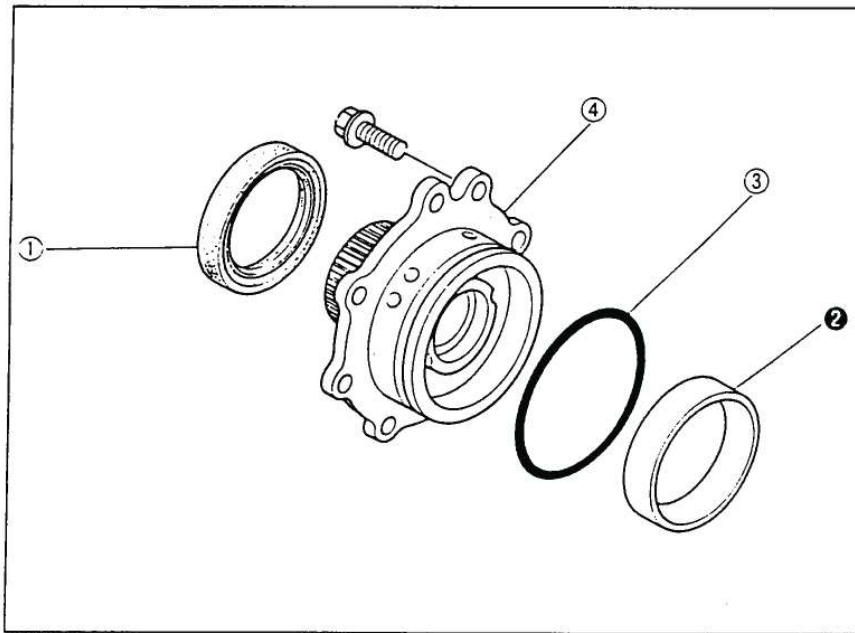
Technical Service Information

87 EL

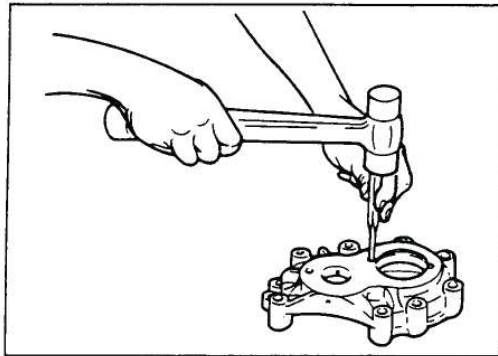
BEARING COVER ASSEMBLY

Disassembly

Disassemble in the sequence shown in the figure referring to the disassembly note for the specially marked parts.



1. Oil seal
2. Bearing outer race
3. O-ring
4. Bearing cover



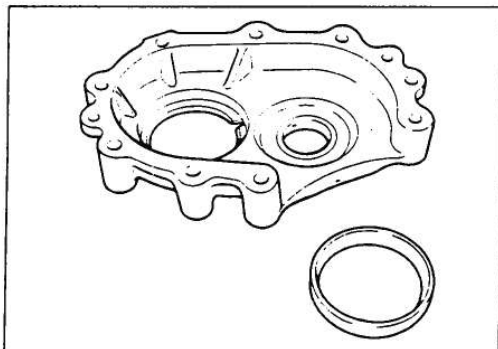
BEARING HOUSING

Disassembly

Remove the bearing outer race with a pin punch and hammer.

Note

Install the bearing outer race during reassembly of transaxle to adjust the preload.



Inspection

Check the following and replace any faulty parts.

1. Damaged bearing housing
2. Damaged bearing outer race



Technical Service Information

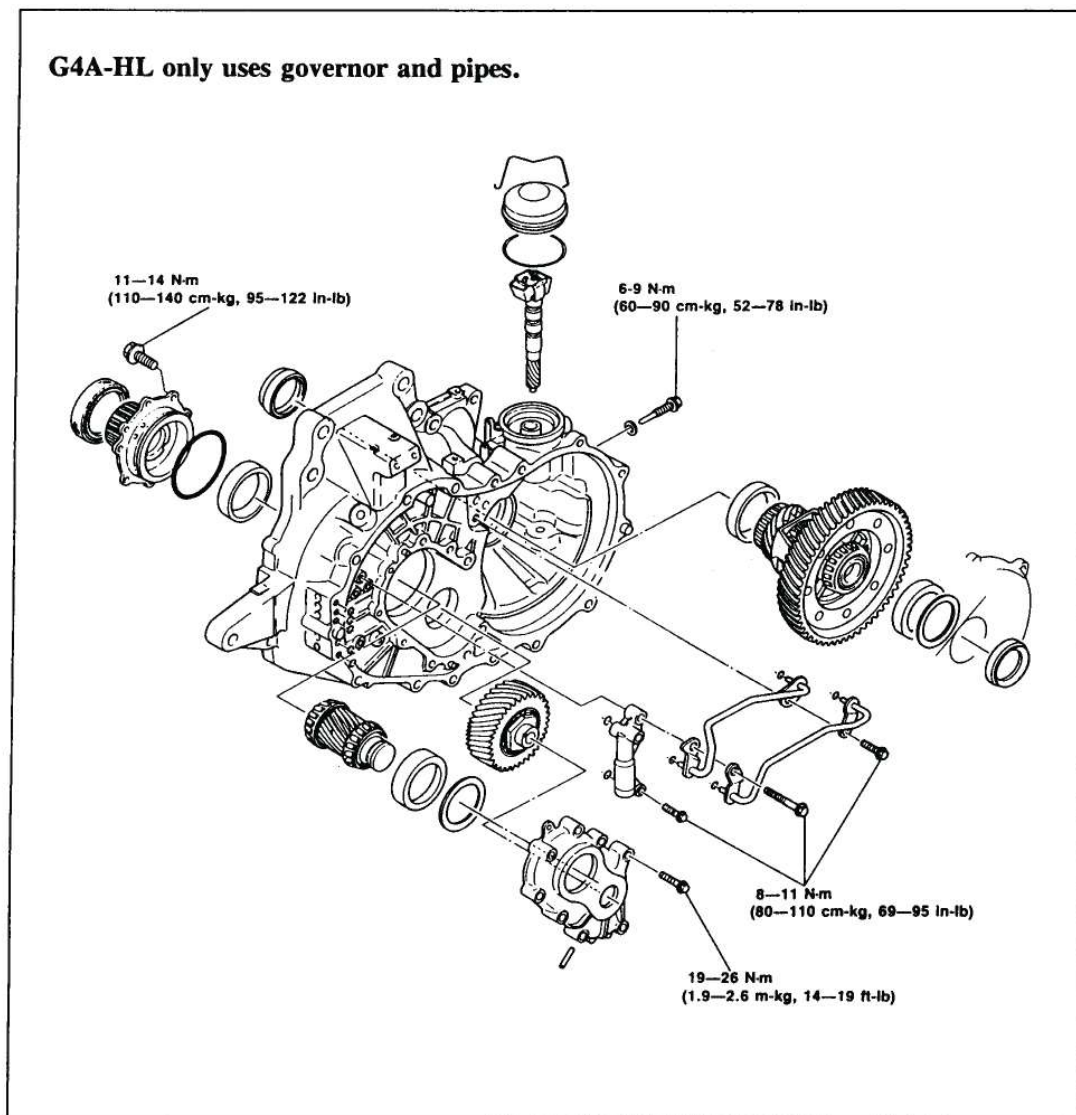
ASSEMBLY

PRECAUTION

- (1) The automatic transaxle consists of high-precision-finished parts, necessitating careful inspection before assembly because even a small nick could cause fluid leakage or affect performance.
- (2) Clean out oil holes and oil passages with compressed air, and check that there are no obstructions.
- (3) Before assembly, apply ATF to each O-ring, seal ring, rotating part, and friction part.
- (4) If the brake band or drive plates are replaced with new ones, first soak them in ATF for at least 2 hours before installing.
- (5) Each seal gasket and O-ring must be replaced with a new one.
- (6) Be sure to install all thrust bearings and races in the correct direction and position.

ASSEMBLY—STEP 1

Torque Specifications





Technical Service Information

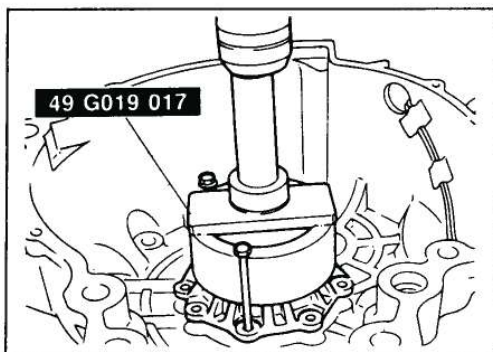
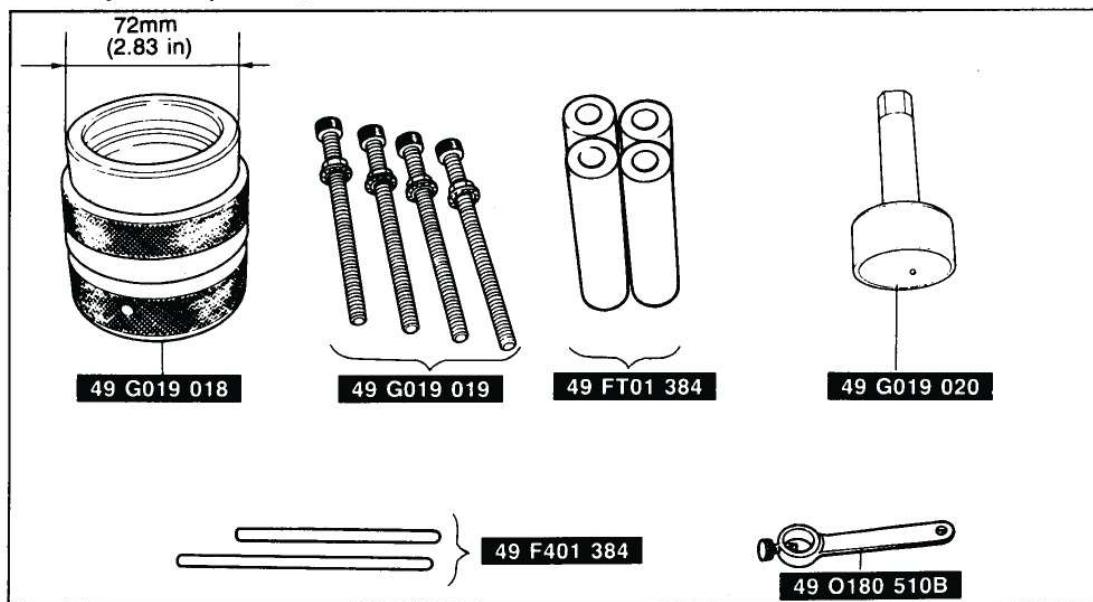
89 EL

Procedure

1. Adjust the preload of the output gear bearing and select the adjust shim(s) as described below.

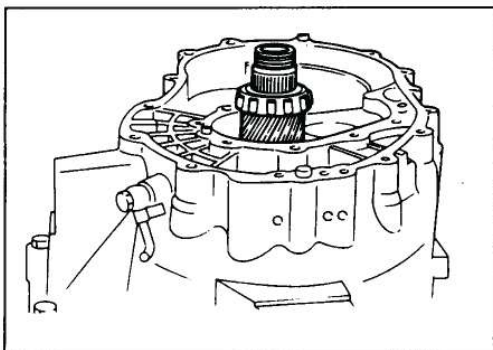
Note

To adjust the preload, use the SST shown below.



Press the bearing cover in after aligning it with guide bolts as shown.

Tightening torque: 11—14 N·m
(110—140 cm·kg, 95—122 in·lb)



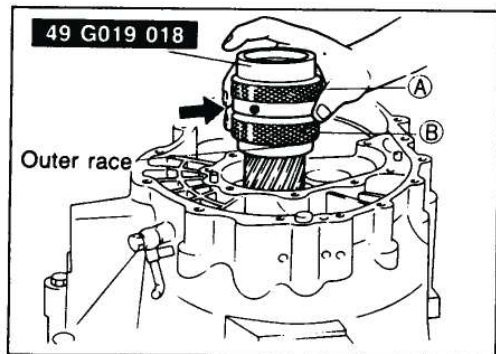
Install the converter housing onto the **SST**.
Remove the bearing outer race and adjust shims from the bearing housing.

Mount the output gear assembly onto the converter housing.



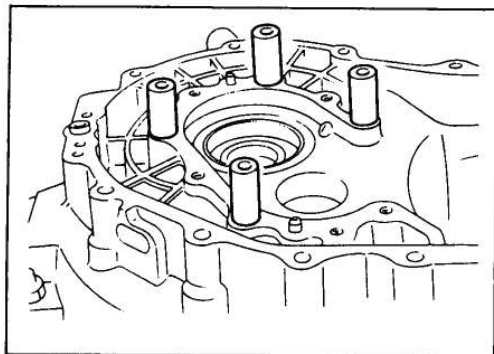
Technical Service Information

90 EL

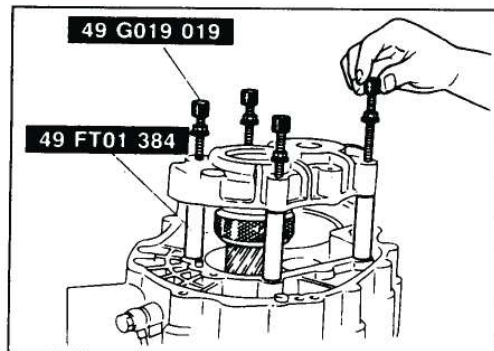


Install the outer race removed in step (2) to the **SST**; then mount them on the output gear assembly.

Caution
Eliminate the gap (arrow) by turning A or B of the selector.

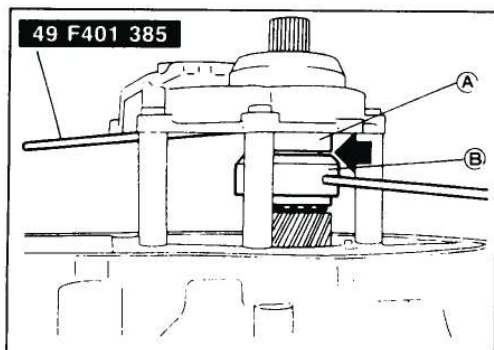


Set the four **SST** on the converter housing in the positions shown.



Set the bearing housing on the **SST** (selector) and install the four **SST** (bolts); then tighten them to the specified torque.

Tightening torque:
19—26 N·m (1.9—2.6 m·kg, 14—19 ft·lb)



Turn the **SST** (selector) to increase the clearance indicated by the arrow with the **SST** (bars) until it no longer turns.

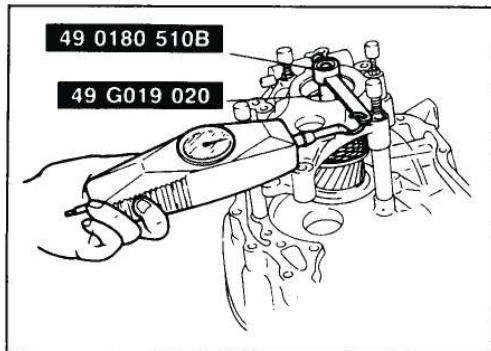
Note
This is to seat the bearing.

Turn the selector in the opposite direction until the preload is eliminated (gap is reduced).



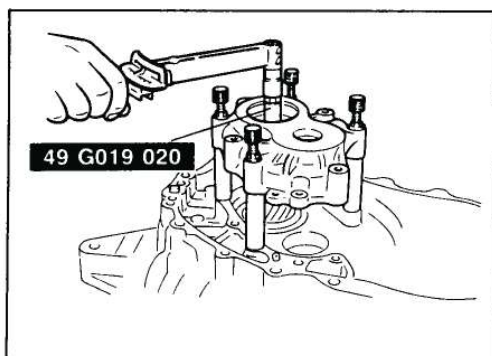
Technical Service Information

91 EL

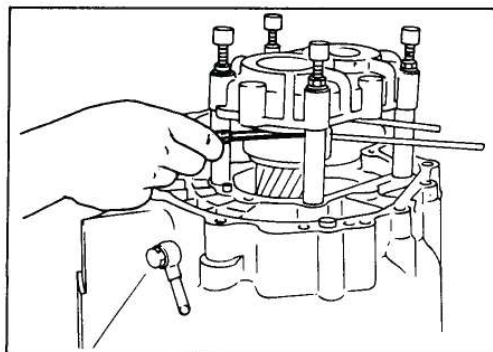


Mount the **SST** and pull scale or torque wrench on the output gear.
Increase the clearance between A and B to obtain the specified preload/pull scale reading.

Preload: 0.5—0.9 N·m
(5.0—9.0 cm·kg, 4.34—7.81 in·lb)
Reading on pull scale: 5—9 N
(0.5—0.9 kg, 1.1—1.98 lb)

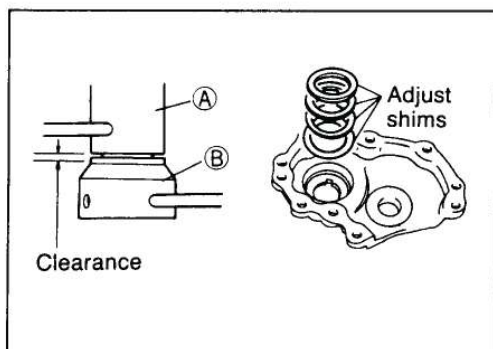


Note
Read the preload when the output gear starts to turn.



Measure the clearance. Select adjust shim(s) equivalent to the measured clearance.

Thickness of shim	
0.10 mm (0.004 in)	0.18 mm (0.007 in)
0.12 mm (0.005 in)	0.20 mm (0.008 in)
0.14 mm (0.006 in)	0.50 mm (0.020 in)
0.16 mm (0.0063 in)	



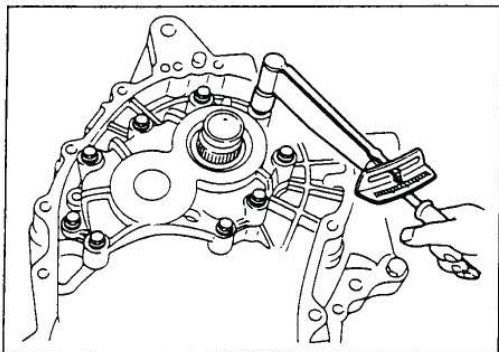
Caution

- Measure the clearance around the entire circumference, and select shims equivalent to the maximum clearance.
- The maximum allowable number of shims is 7.



Technical Service Information

92 EL



Install the bearing housing.

Tightening torque:

19—26 N·m (1.9—2.6 m·kg, 14—19 ft·lb)

Check that the preload/pull scale reading is within specification. If not within specification return to step (2).

Preload: 0.03—0.9 N·m

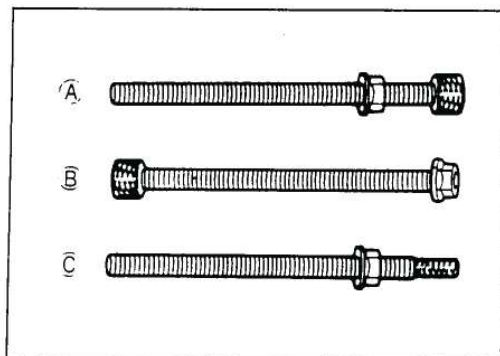
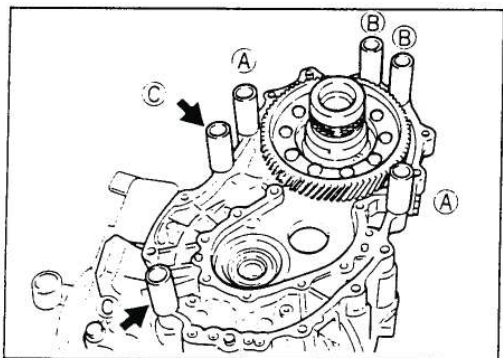
(0.3—9.0 cm·kg, 0.26—7.81 in·lb)

Reading on pull scale:

0.3—9 N (0.03—0.9 kg, 0.066—1.98 lb)

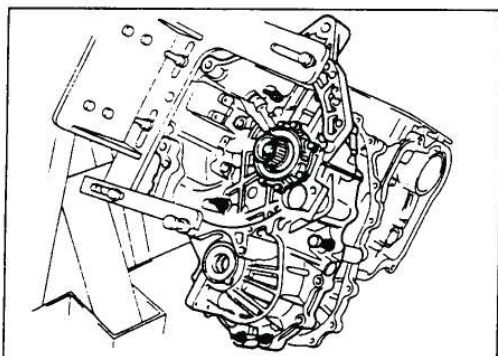
Remove the bearing housing.

Set the six **SST** in the positions shown.



Note

Install the bolts in the positions shown in the illustration above.



Set the transaxle case on the selectors.

Tighten the **SST** (bolts) to the specified torque.

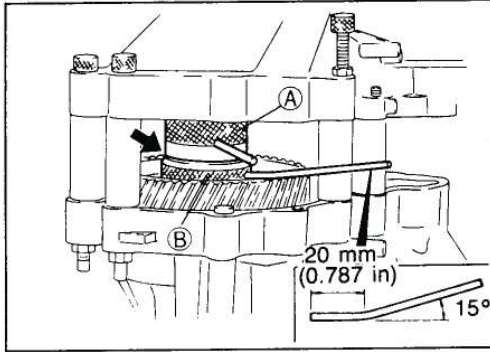
Tightening torque:

37—52 N·m (3.8—5.3 m·kg, 27—38 ft·lb)



Technical Service Information

93 EL

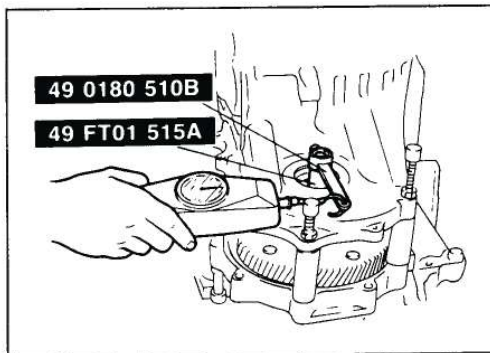


Turn the **SST** (selector) to increase the clearance indicated by the arrow with the **SST** (bars), until it no longer turns.

Note

- a) This is to seat the bearings.
- b) To turn the SST (B), bend the bar as shown.

Turn the selector in the opposite direction until the preload is eliminated (gap is reduced).



Insert the **SST** through the oil seal hole of the transaxle case and attach it to the pinion shaft. Mount the **SST** and pull scale or torque wrench.

Widen the clearance between A and B to obtain the specified preload/pull scale reading.

Preload:

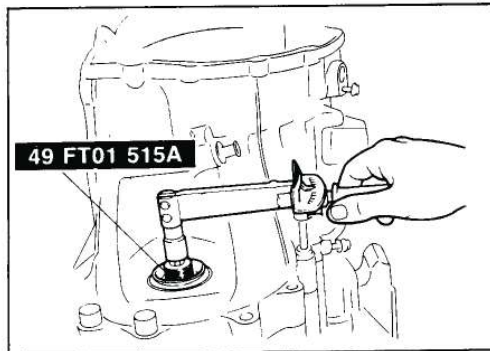
0.5 N·m (5 cm·kg, 4.3 in·lb)

Reading on pull scale:

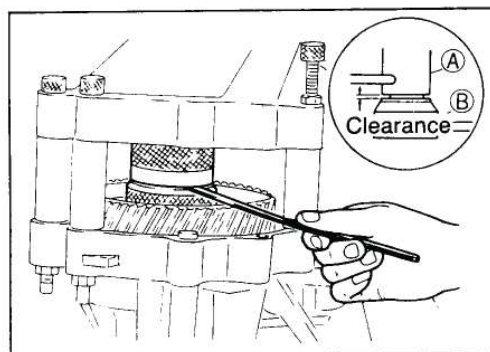
5 N (0.5 kg, 1.1 lb)

Note

Read the preload when the differential starts to turn.



Measure the clearance between A and B. Add **0.3 mm (0.0118 in)** to the measured clearance, and select the shim(s) closest in value to that measurement.



Thickness of shim	
0.10 mm (0.004 in)	0.20 mm (0.008 in)
0.12 mm (0.005 in)	0.50 mm (0.020 in)
0.14 mm (0.006 in)	0.70 mm (0.028 in)
0.16 mm (0.0063 in)	1.00 mm (0.039 in)
0.18 mm (0.007 in)	

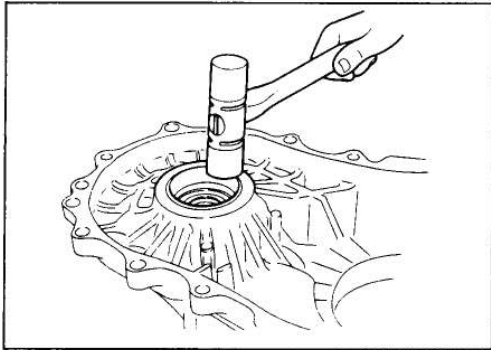
Caution

- a) Measure the clearance around the entire circumference, and select shims equivalent to the maximum clearance.
- b) The maximum allowable number of shims is 3.

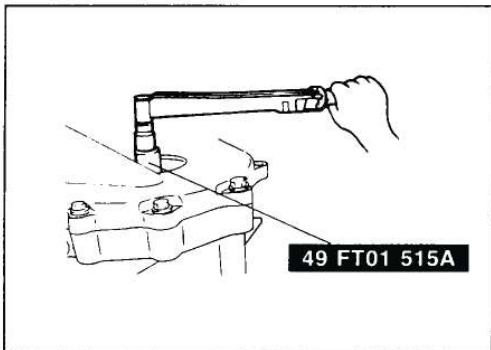


Technical Service Information

94 EL



Remove the transaxle case and selector.
Install the required shim(s) and tap the bearing race into the transaxle case.



Install the transaxle case.

Tightening torque:

37—52 N·m (3.8—5.3 m·kg, 27—38 ft·lb)

Check that the preload is within specification.
If not within specification, return to step (2).

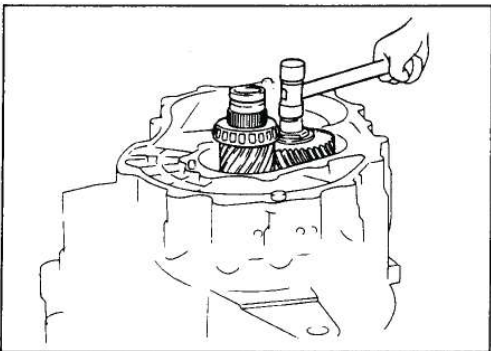
Preload: 2.9—3.9 N·m

(30—40 cm·kg, 26—35 in·lb)

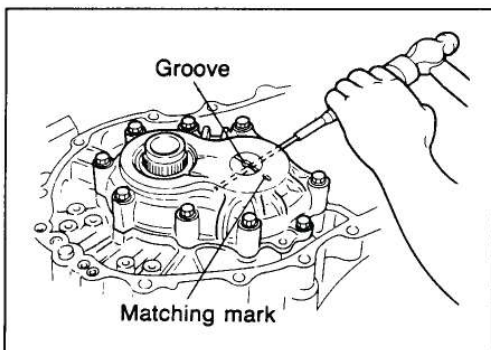
Reading on pull scale: 29—39 N

(3.0—4.0 kg, 6.6—8.8 lb)

Remove the transaxle case and differential assembly.



Install the idle gear and output gear as an assembly by tapping in with a plastic hammer.



Install the bearing housing.

(1) Install the bearing housing on the converter housing.

Tightening torque:

19—26 N·m (1.9—2.6 m·kg, 14—19 ft·lb)

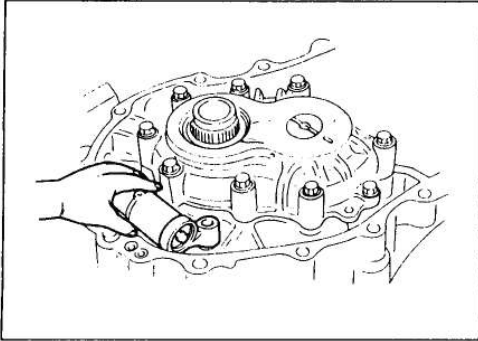
(2) Align the groove on the idle shaft with the matching mark on the bearing housing.

(3) Tap the roll pin in with a pin punch and hammer.

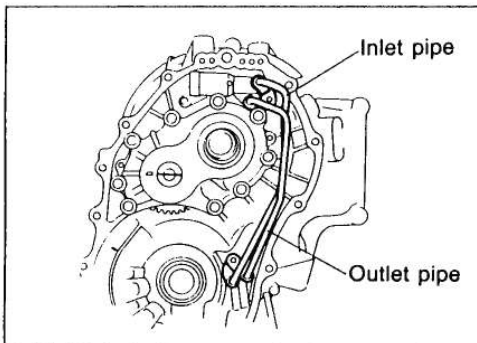


Technical Service Information

95 EL

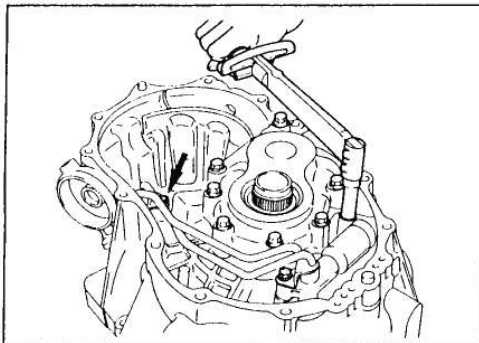


Apply ATF to the O-rings and install them into the 2-3 accumulator; then temporarily install the 2-3 accumulator piston assembly in the converter housing.



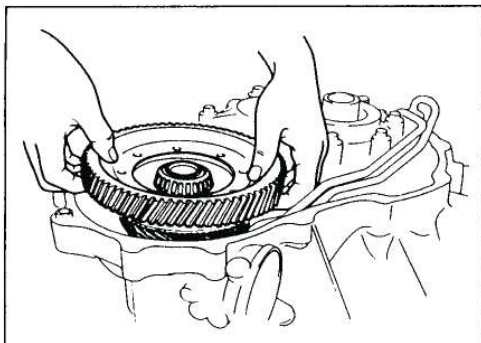
Apply ATF to the O-rings and install them onto the governor inlet pipe and governor outlet pipe; then temporarily install the inlet and outlet pipes.

G4A-HL only



Tighten the bolts.

**Tightening torque: 8—11 N·m
(80—110 cm·kg, 69—95 in·lb)**

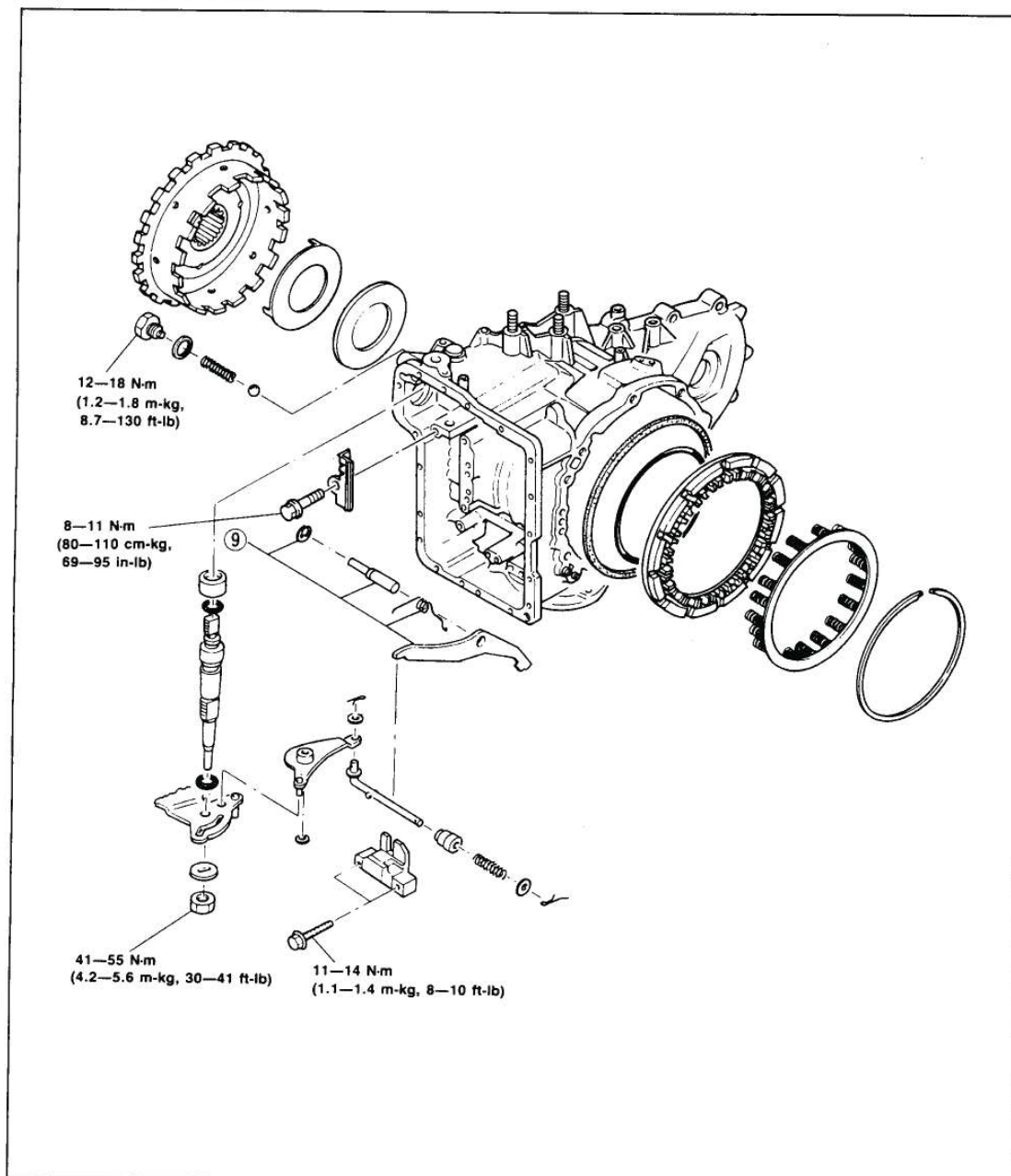


Set the differential assembly into the converter housing.



Technical Service Information

96 EL

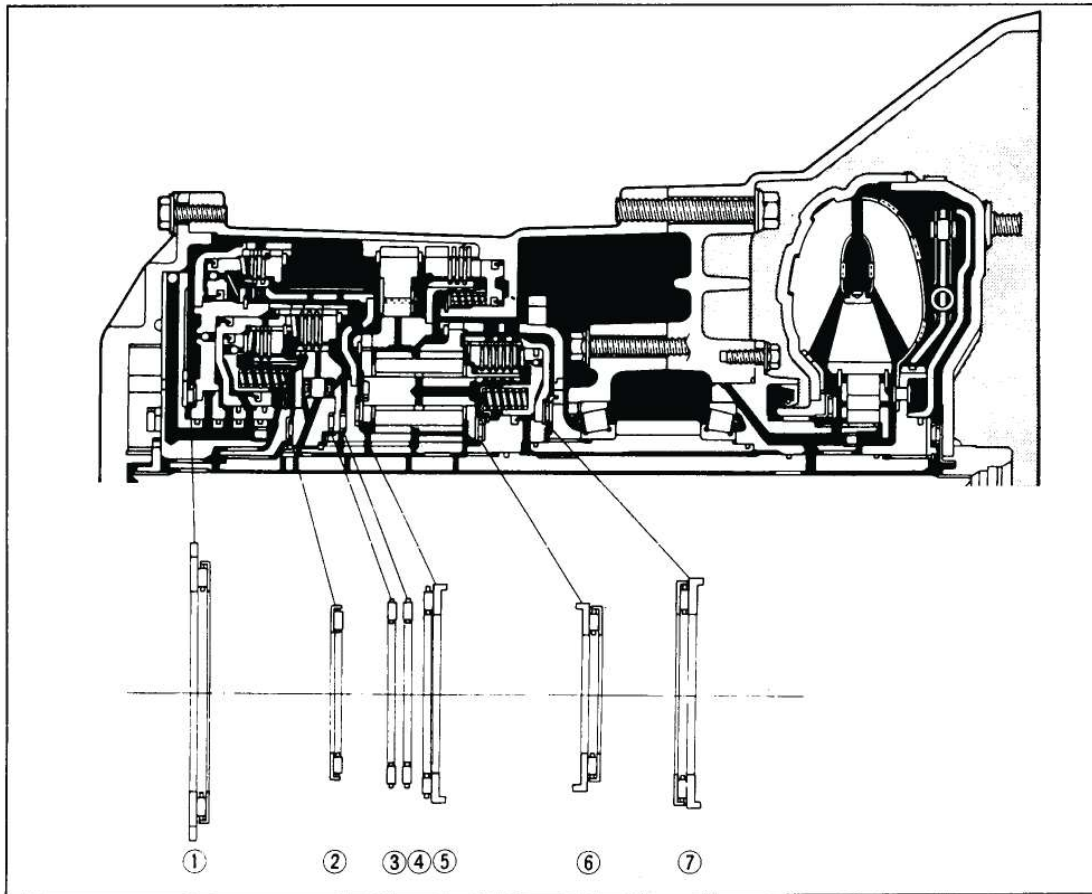
**ASSEMBLY
Torque Specifications**



Technical Service Information

97 EL

Thrust Washer, Bearing, and Race Locations

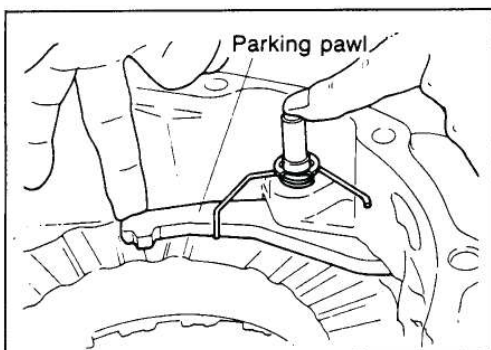


Outer diameter of bearing and race

mm (in)

	1	2	3	4	5	6	7
Bearing	86.0 (3.39)	56.1 (2.21)	62.1 (2.44)	62.1 (2.44)	72.0 (2.83)	56.1 (2.21)	72.1 (2.84)
Race	88.0 (3.46)	—	—	—	72.0 (2.83)	57.0 (2.21)	72.0 (2.83)

Note: Install with petroleum jelly to prevent the thrust bearing or bearing race from falling out.



Procedure

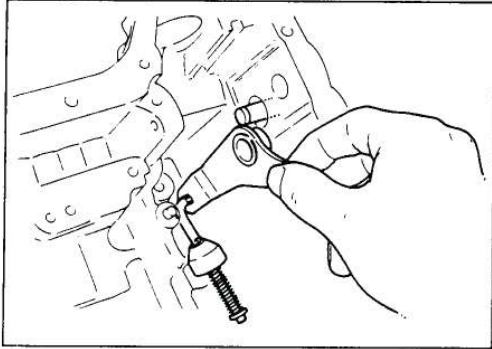
1. Install the parking pawl.

- (1) Install the parking pawl and shaft.
- (2) Install the spring and snap ring.
- (3) Move the manual shaft and check that the parking pawl operates.

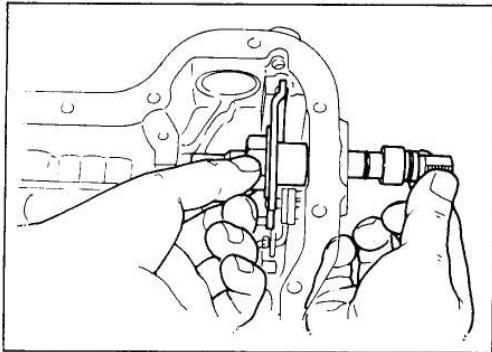


Technical Service Information

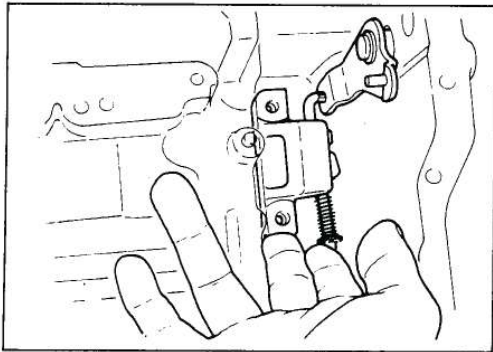
98 EL



Install the parking assist lever and snap ring.

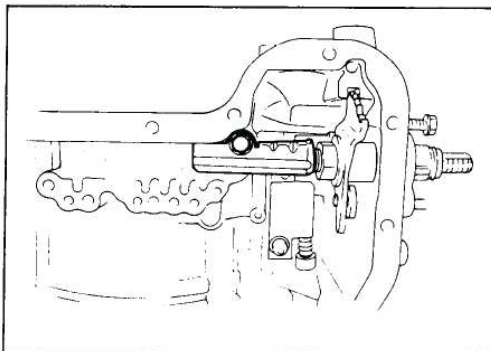


Install the actuator support.

Tightening torque:**11—14 N·m (1.1—1.4 m·kg, 8.0—10 ft·lb)**

Install the manual shaft and manual plate.

- (1) Install the manual plate, spacer, washer, and nut.
- (2) Tighten the nut to specified torque.

Tightening torque:**41—55 N·m (4.2—5.6 m·kg, 30—41 ft·lb)**

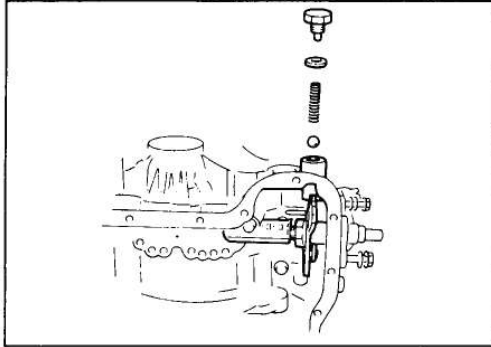
- (3) Install the bracket.

Tightening torque:**8—11 N·m (80—110 cm·kg, 69—95 in·lb)**



Technical Service Information

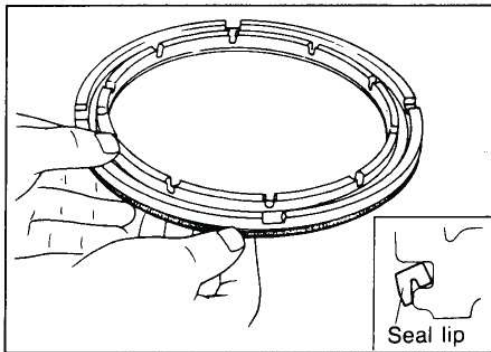
99 EL



- (4) Install the detent ball, spring, washer and plug; then tighten the plug.

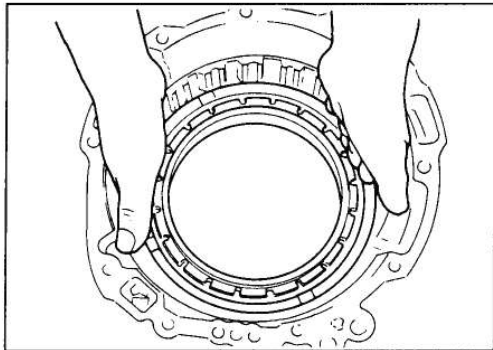
Tightening torque:

12—18 N·m (1.2—1.8 m·kg, 8.7—13 ft·lb)

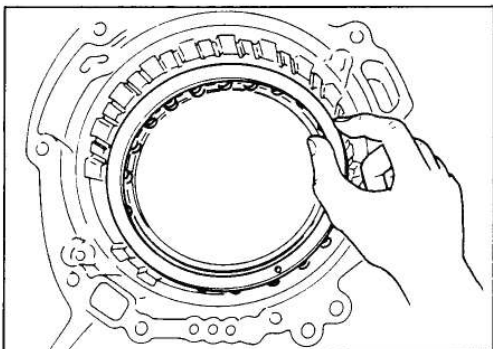


Install the low and reverse brake piston.

- (1) Apply ATF to the inner and outer seals, and install them to the low and reverse brake piston.
- (2) Face the outer seal lip toward the inside by gently rolling it down around the circumference for easier installation into the case.



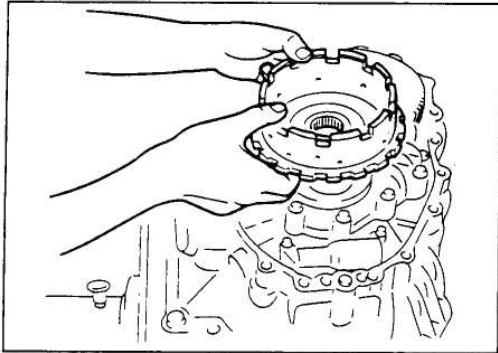
- (3) Install the low and reverse brake piston by pushing evenly around the circumference, being careful not to damage the outer seal.



- (4) Install the spring and retainer assembly.

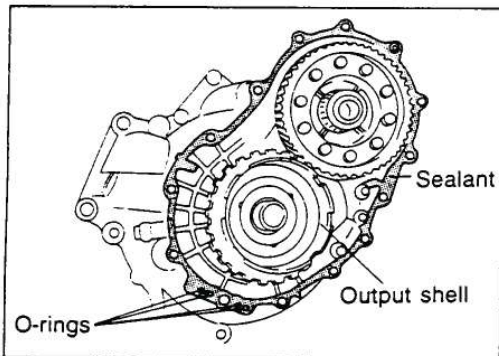


Technical Service Information



Install the output shell to the output gear, and install the bearing race onto the output shell.

Bearing race outer diameter.
72.0 mm (2.83 in)

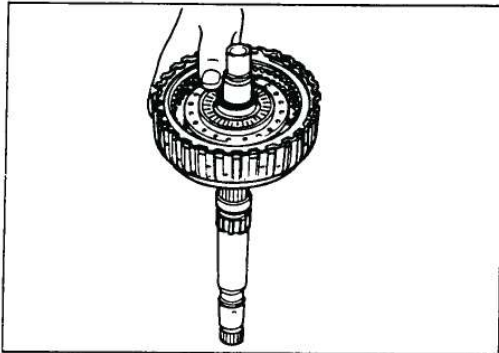


Apply a thin coat of silicon sealant to the contact surfaces of the converter housing and transaxle case.

Install the O-rings.

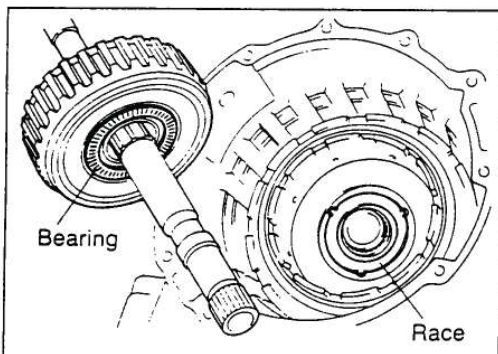
Install the transaxle case to the converter housing.

Tightening torque:
37—52 N·m (3.8—5.3 m·kg, 27—38 ft·lb)



Install the turbine shaft and 3-4 clutch assembly.

(1) Assemble the turbine shaft and 3-4 clutch assembly.



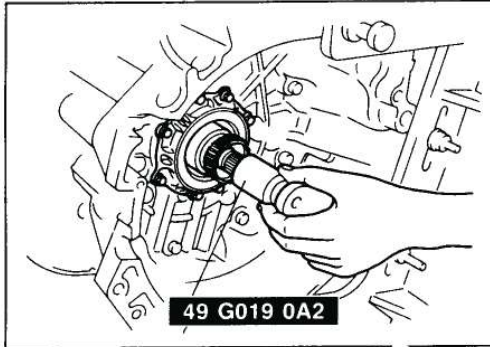
(2) Check that the thrust bearing and bearing race are installed in the correct position.

(3) Install the turbine shaft and 3-4 clutch assembly into the transaxle case.

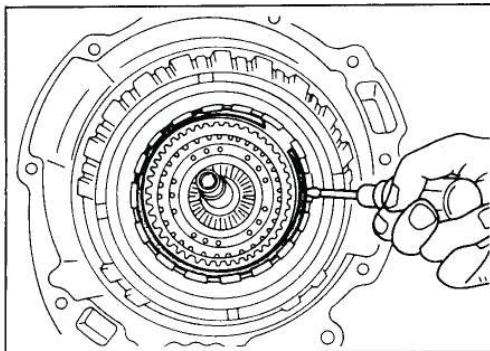


Technical Service Information

101 EL

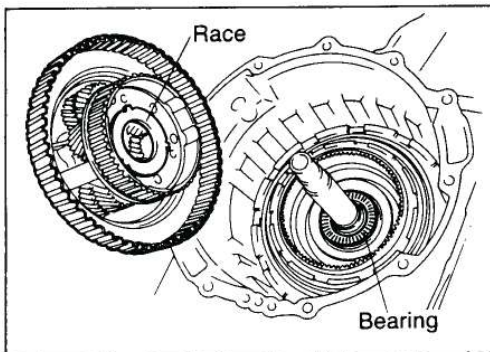


Adjust the **SST** position so that it contacts and holds the turbine shaft.



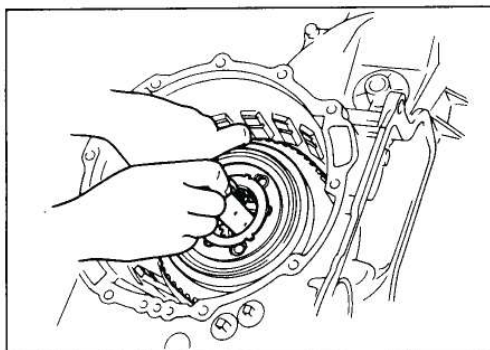
Install the internal gear.

- (1) Install the internal gear to the 3-4 clutch drum.
- (2) Install the snap ring.



Install the carrier hub assembly.

- (1) Check that the thrust bearing and bearing race are installed in the correct position.



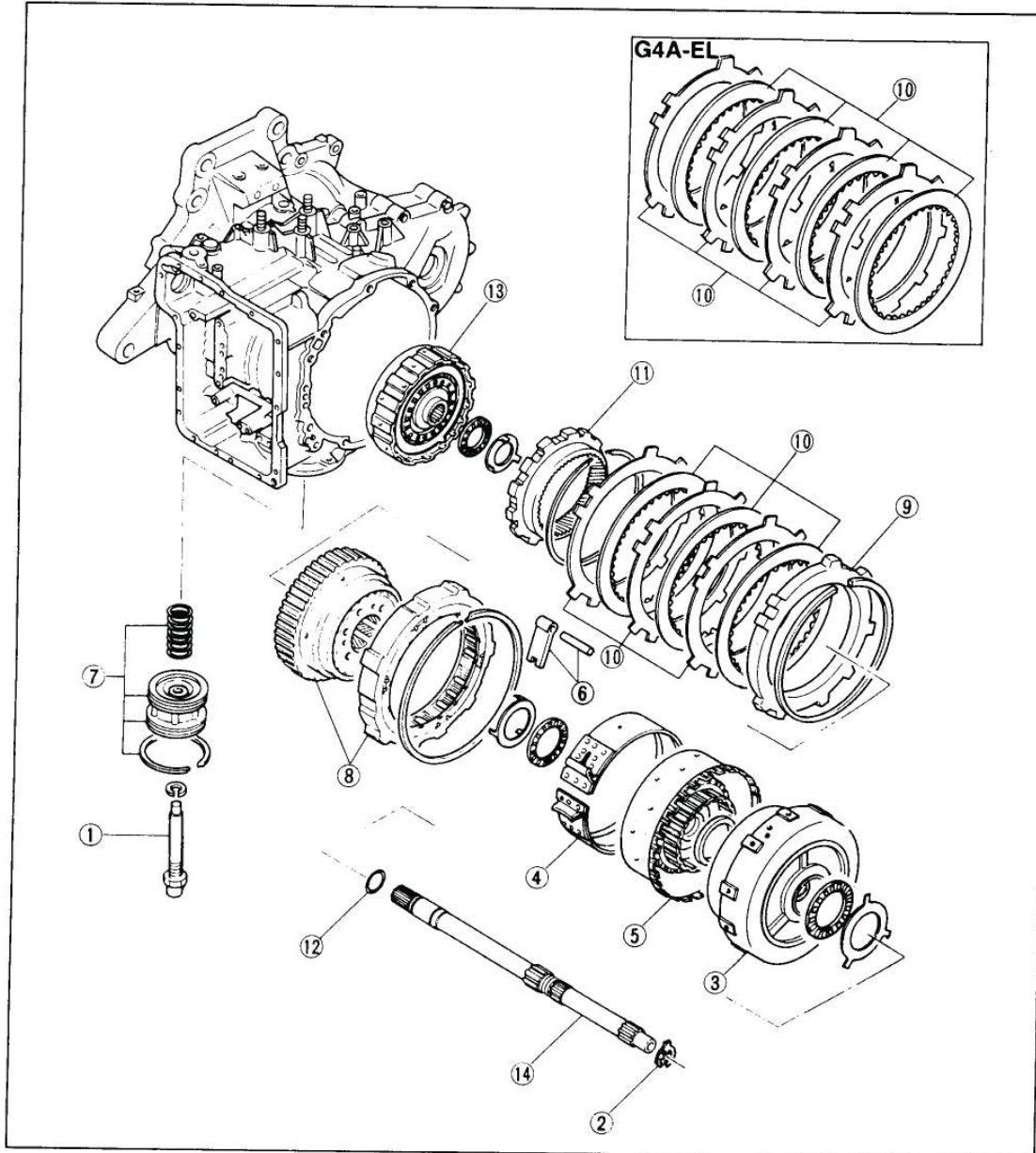
- (2) Hold the turbine shaft with one hand to prevent it from rotating.
- (3) Install the carrier hub assembly into the 3-4 clutch drum by rotating it.



Technical Service Information

102 EL

DISASSEMBLY Components



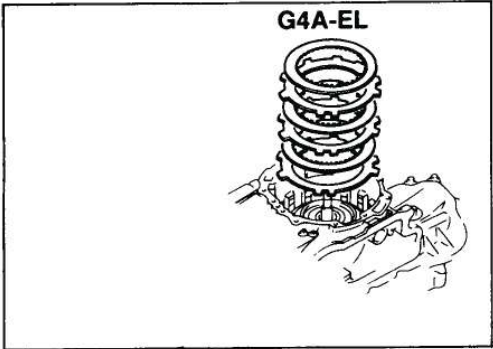
1. Piston stem
2. Snap ring
3. Clutch assembly
4. 2-4 brake band
5. Small sun gear and one-way clutch
6. Anchor strut and shaft
7. Servo
8. One-way clutch and carrier hub assembly

—Low and reverse brake—

9. Retaining plate
10. Drive and driven plates
11. Internal gear
12. O-ring
13. 3-4 clutch assembly
14. Turbine shaft

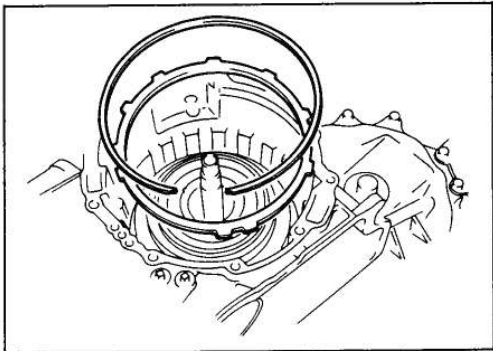


Technical Service Information

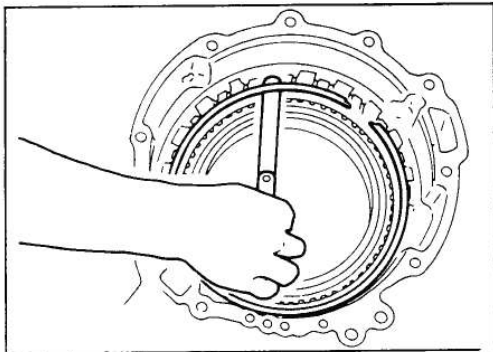


Install the drive and driven plates.

Note
Installation order:
G4A-EL
Driven-Drive-Driven-Drive-Driven-Drive



Install the retaining plate.
Install the snap ring.

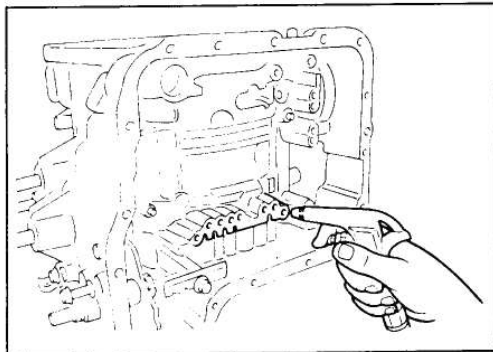


Check the low and reverse brake clearance.
(1) Measure the clearance between the snap ring and the low and reverse brake retaining plate.
(2) If the clearance is not within specification, adjust it by selecting a proper retaining plate.

Low and reverse brake clearance:
2.1—2.4 mm (0.083—0.094 in)

Retaining plate sizes mm (in)
G4A-EL

10.0 (0.394)	10.2 (0.402)	10.4 (0.410)
10.6 (0.417)	10.8 (0.425)	



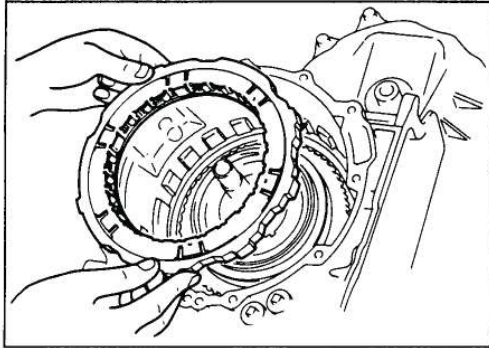
Check the low and reverse brake operation by applying compressed air through the fluid passage as shown in the figure.

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



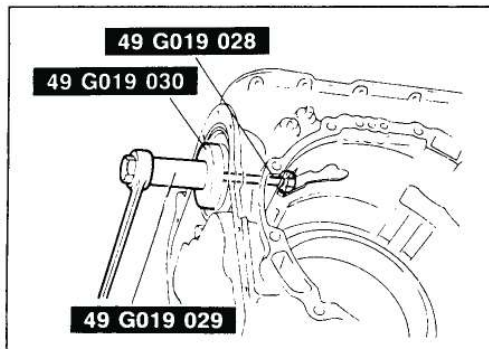
Technical Service Information

104 EL



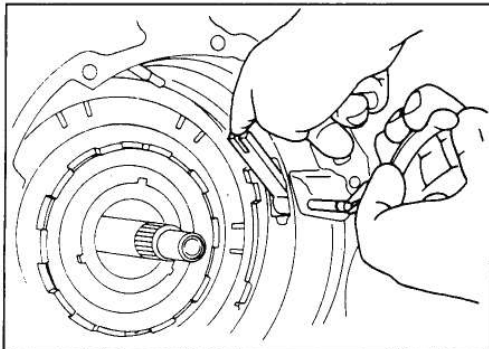
Install the one-way clutch.

- (1) Hold the one-way clutch horizontally.
- (2) Install it by turning the carrier hub assembly counterclockwise.
- (3) Install the snap ring.

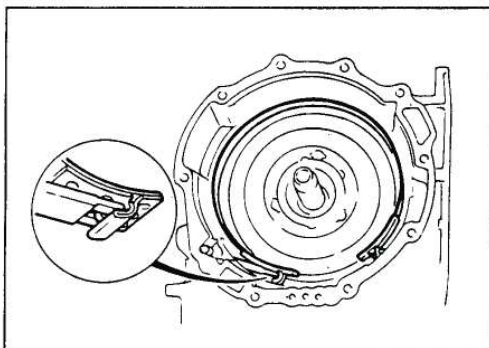


Install the servo to the transaxle case.

- (1) Install the servo spring and servo.
- (2) Compress the servo with the **SST**.
- (3) Install the snap ring.
- (4) Remove the **SST**.
- (5) Install the piston stem.



Install the anchor strut.



Install the 2-4 brake band in the transaxle case so that it is expanded fully.

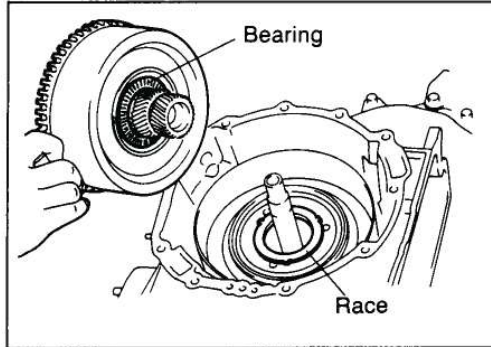
Note

Interlock the 2-4 brake band and anchor strut as shown.



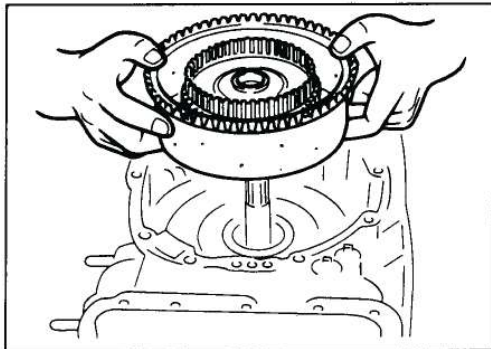
Technical Service Information

105 EL

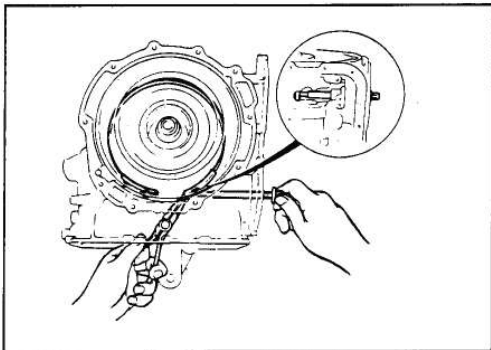


Install the small sun gear and one-way clutch.

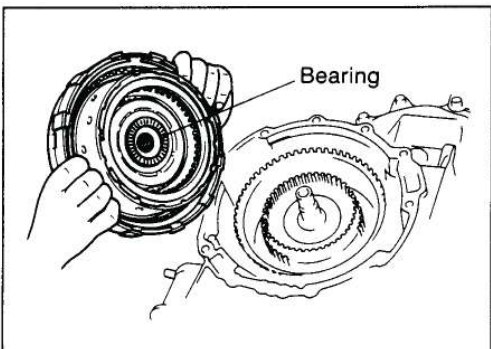
- (1) Check that the thrust bearing and bearing race are installed in the correct position.



- (2) Install the small sun gear and one-way clutch by rotating it.



Install the piston stem in the position while pulling out the 2-4 brake band with a pliers; then loosely tighten the piston stem by hand.



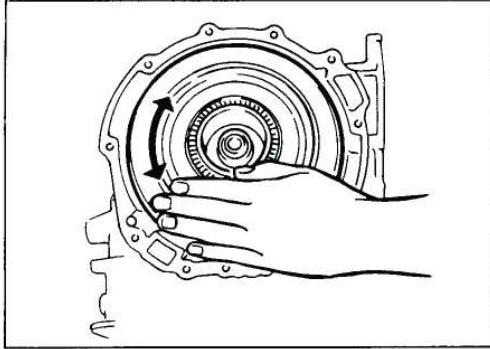
Install the clutch assembly.

- (1) Check that the thrust bearing is installed in the correct position.

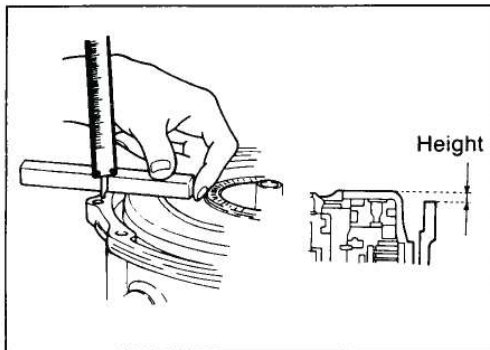


Technical Service Information

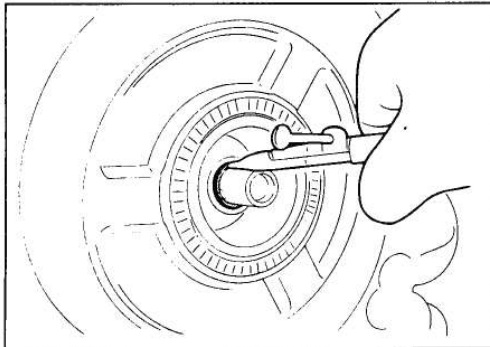
106 EL



(2) Install the clutch assembly by rotating it.



Note
Measure the height difference between the reverse and forward drum and transaxle case.
Standard height: 0.8 mm (0.032 in)



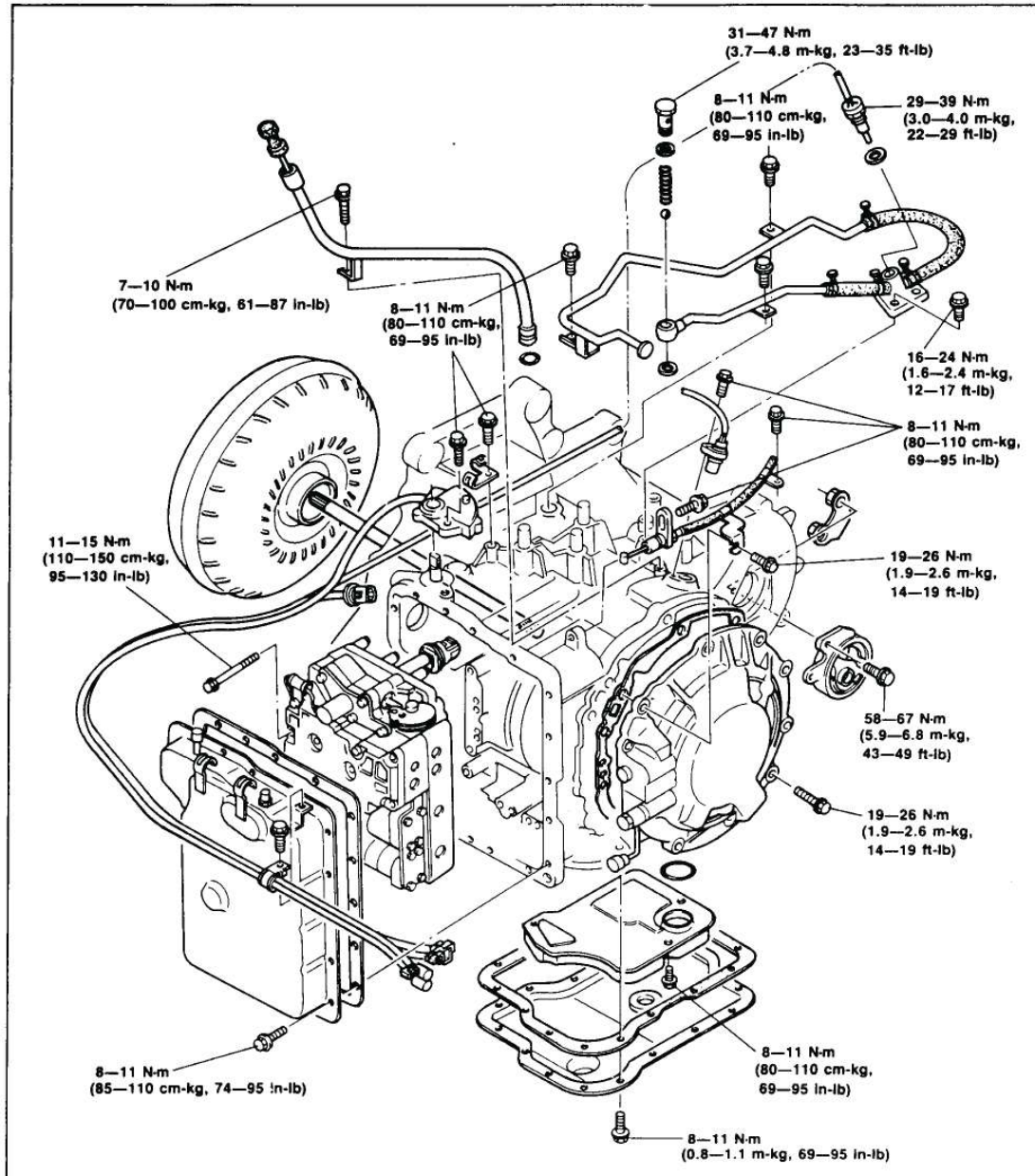
Install the snap ring into the bottom ring groove of the turbine shaft.



Technical Service Information

107 EL

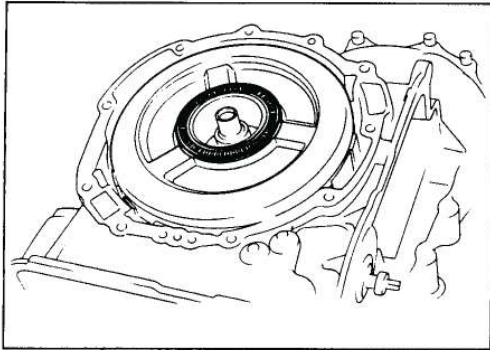
ASSEMBLY Torque Specifications





Technical Service Information

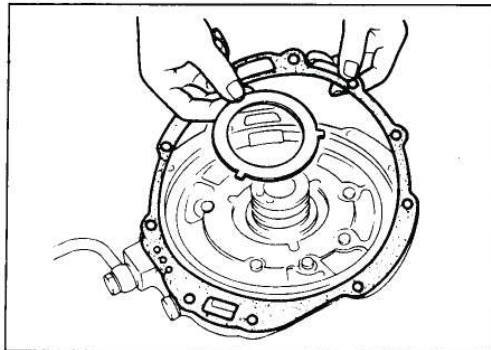
108 EL



Procedure

Use the following procedure to adjust the total end play and select a suitable bearing race.

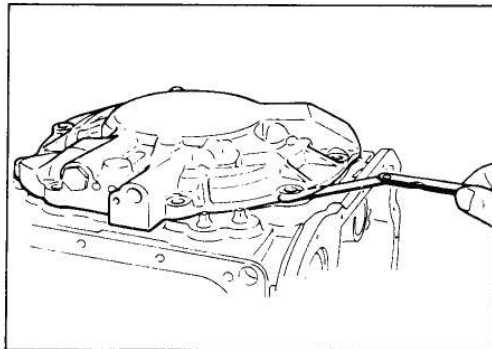
(1) Set the thrust bearing onto the clutch assembly.



(2) Remove the previous race and gasket.

(3) Set the thickest bearing race **2.2 mm (0.087 in)** onto the oil pump.

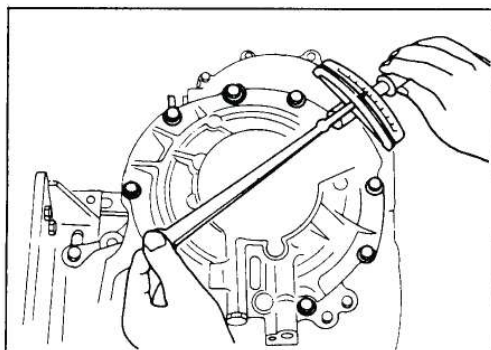
(4) Set the oil pump onto the clutch assembly.



(5) Measure clearance between the transaxle case and oil pump.

(6) Select a suitable bearing race from the chart below.

Clearance	mm (in)	Select this bearing race	mm (in)
0.91—1.10	(0.036—0.043)	1.2	(0.047)
0.71—0.90	(0.028—0.035)	1.4	(0.055)
0.51—0.70	(0.020—0.027)	1.6	(0.063)
0.31—0.50	(0.012—0.019)	1.8	(0.071)
0.11—0.30	(0.004—0.011)	2.0	(0.078)
0—0.10	(0—0.003)	2.2	(0.087)



(7) Remove the oil pump.

(8) Place the selected bearing race and a new gasket onto the oil pump.

(9) Install the oil pump onto the clutch assembly.

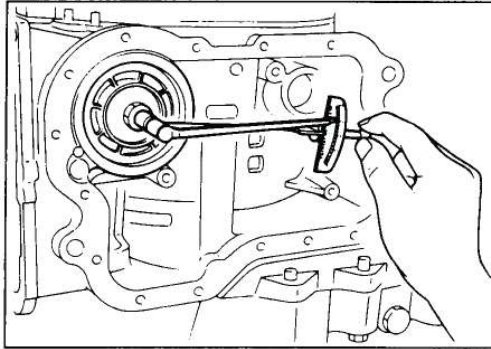
Tightening torque:

19—26 N·m (1.9—2.6 m·kg, 14—19 ft·lb)



Technical Service Information

109 EL

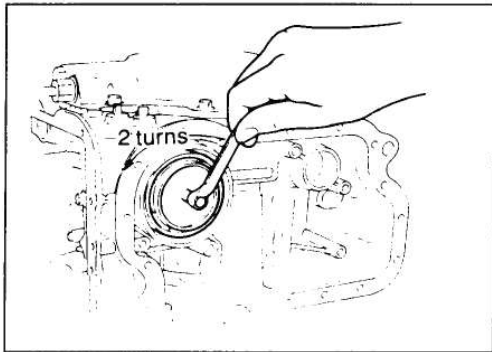


Adjust the 2-4 brake band.

- (1) Loosen the locknut and tighten the piston stem to the specified torque.

Tightening torque:

9—11 N·m (90—110 cm·kg, 78—95 in·lb)

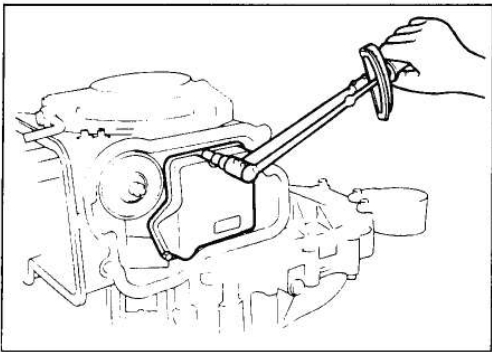


- (2) Loosen the piston stem 2 turns.

- (3) Tighten the locknut to the specified torque.

Tightening torque:

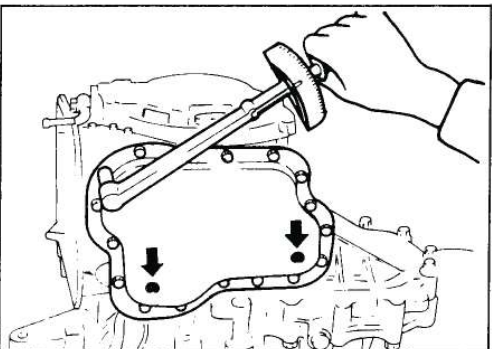
25—39 N·m (2.5—4.0 m·kg, 18—29 ft·lb)



Install the oil strainer along with a new O-ring to the transaxle.

Tightening torque:

8—11 N·m (80—110 cm·kg, 69—95 in·lb)



Install the oil pan along with a new gasket.

Tightening torque:

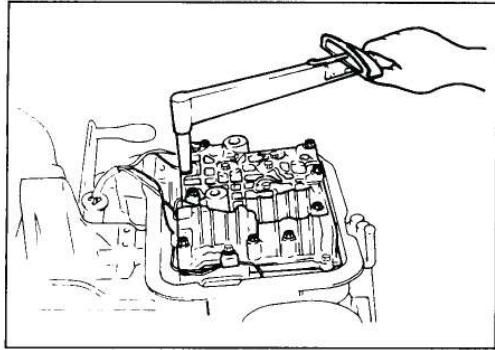
8—11 N·m (85—110 cm·kg, 74—95 in·lb)

Note

Install the magnets in the positions shown in the illustration.



Technical Service Information

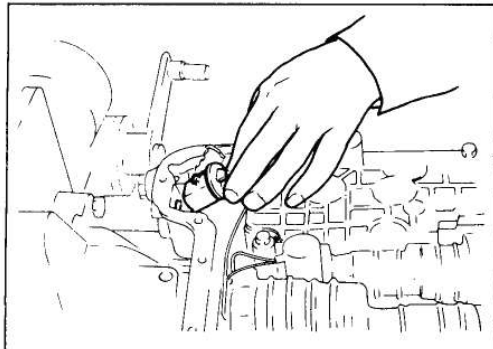


Align the manual valve with the pin on the manual plate, and install the control valve body into the transaxle case.

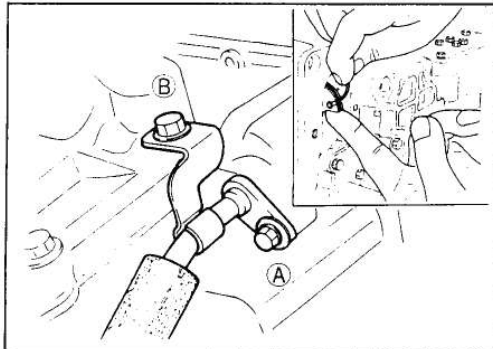
Tightening torque:

11—15 N·m

(110—150 cm·kg, 95—130 in·lb)



Install the solenoid connector and a new O-ring in the transaxle case.



Install a new O-ring on the bracket; then feed the throttle cable through the transaxle case and connect it to the throttle cam.

Install the throttle cable attaching bolts and bracket.

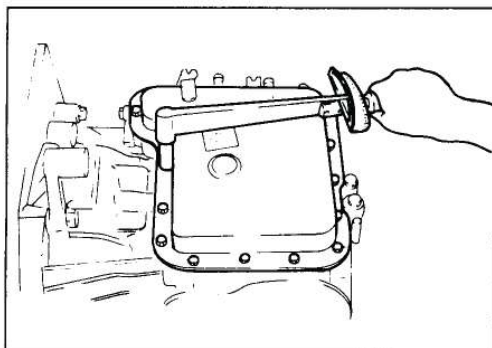
Tightening torque:

Ⓐ 8—11 N·m

(80—110 cm·kg, 69—95 in·lb)

Ⓑ 19—26 N·m

(1.9—2.6 m·kg, 14—19 ft·lb)



Install the control valve body cover along with a new gasket.

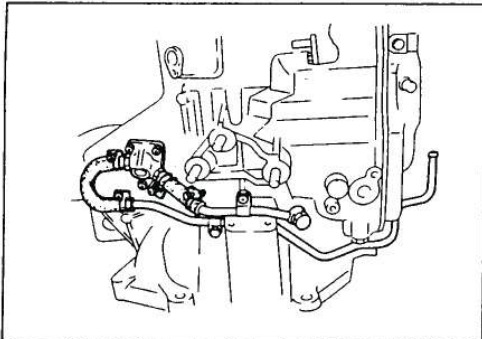
Tightening torque:

8—11 N·m (85—110 cm·kg, 74—95 in·lb)



Technical Service Information

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G4A-EL

- (1) Install the oil pipes, oil hoses, and switch box as an assembly; then install the harness clip.

Tightening torque:

Switch box

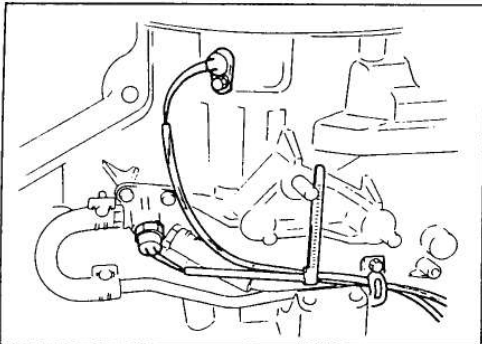
16—24 N·m (1.6—2.4 m·kg, 12—17 ft·lb)

Harness clip

8—11 N·m (80—110 cm·kg, 69—95 in·lb)

NOTE: Before installing the oil pipe, be certain that the check ball and spring are in the case under the fitting.

Install the pulse generator and fluid temperature switch.



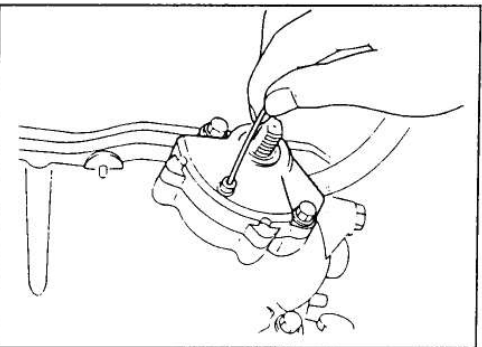
Tightening torque:

Pulse generator

8—11 N·m (80—110 cm·kg, 69—95 in·lb)

Fluid temperature switch

29—39 N·m (3.0—4.0 m·kg, 22—29 in·lb)



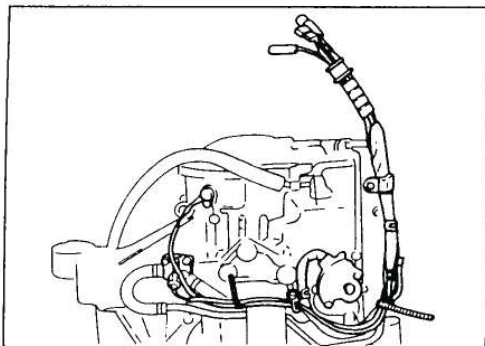
Install the inhibitor switch.

- (1) Turn the manual shaft to the "N" position.
- (2) Install the inhibitor switch and loosely tighten the bolts.
- (3) Remove the screw and move the inhibitor switch so that the alignment hole is aligned with the screw hole.
- (4) Insert a **2.0 mm (0.079 in)** diameter pin through the holes.
- (5) Install the screw; then tighten the bolts to the specified torque.

Tightening torque:

8—11 N·m (80—110 cm·kg, 69—95 in·lb)

Install the harness with the remaining clip.



Tightening torque:

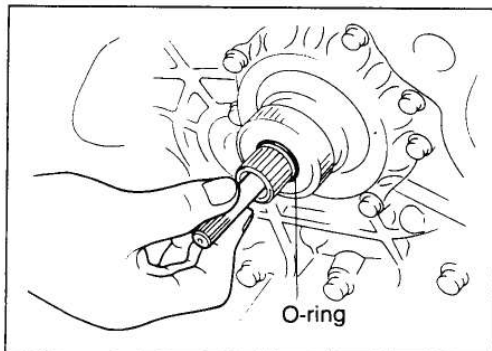
8—11 N·m (80—110 cm·kg, 69—95 in·lb)

Remove the transaxle from the SST.

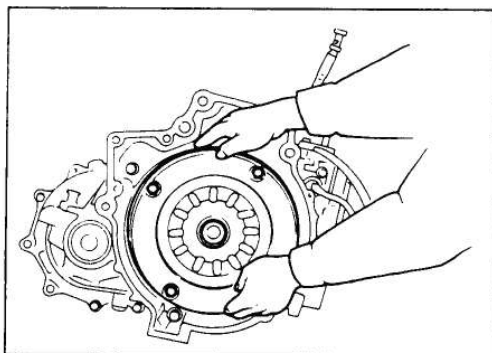


Technical Service Information

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Install the oil pump shaft.
Install a new O-ring onto the turbine shaft.



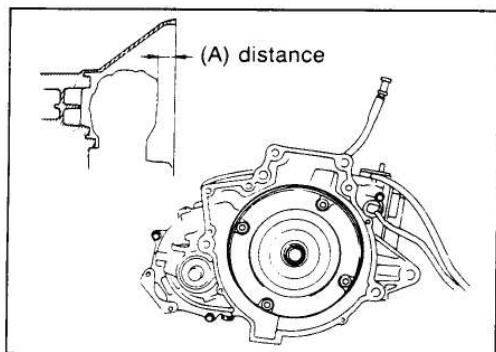
Fill the torque converter with ATF if it has been drained and washed.

ATF type: Dexron II or M III

Install the torque converter in the converter housing while rotating it to align the splines.

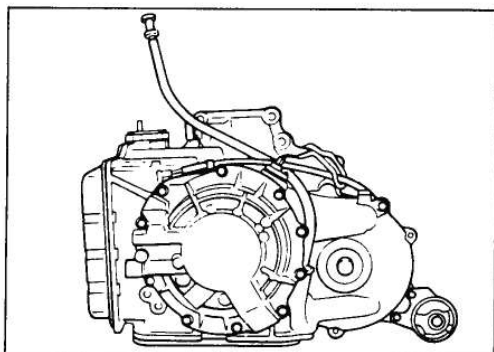
Caution

- a) Hold the torque converter in an erect position when filling it with ATF, do not allow the fluid to overflow.
- b) If the converter does not fit in easily, do not try to force it; install carefully.



To ensure that the torque converter is installed accurately, measure distance A between the end of the torque converter and the end of the converter housing.

(A): approx. 25 mm (0.98 in)



Install the engine mount No.1

Tightening torque:

58—67 N·m (5.9—6.8 m·kg, 43—49 ft·lb)



Technical Service Information

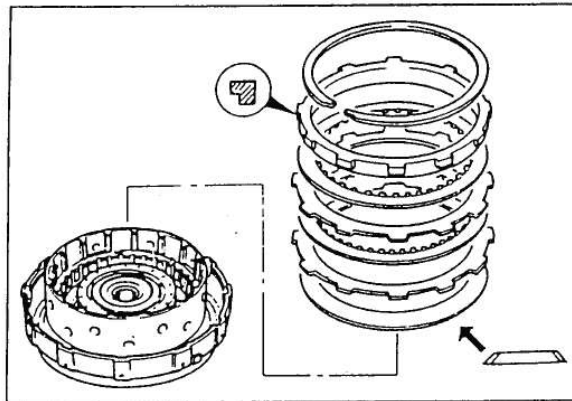
113 EL

COMPLAINT: Bind up in Reverse.

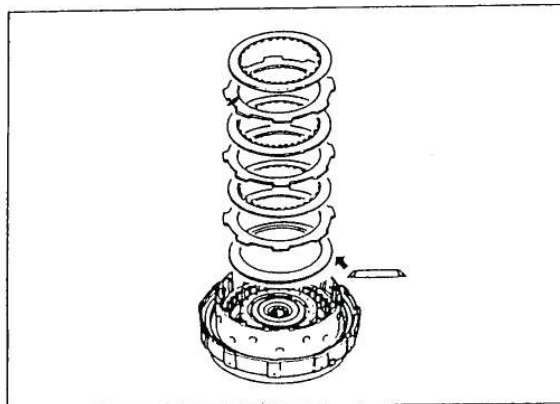
CAUSE: Dished Plates installed incorrectly.

CORRECTION: Install dished plates as shown below.

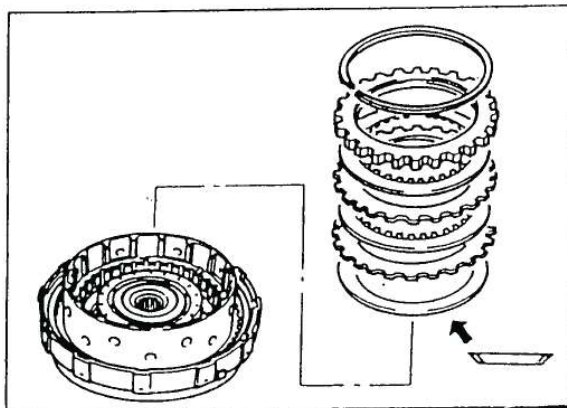
REVERSE CLUTCH



FORWARD CLUTCH



COASTING CLUTCH



AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

114 EL

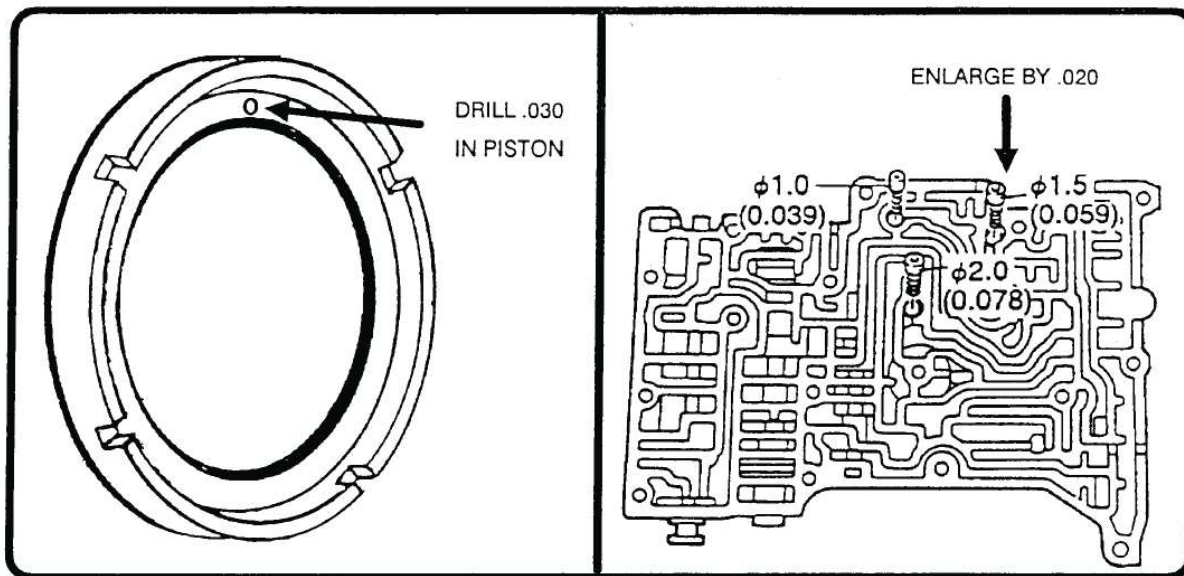
MAZDA G4A-EL / FORD PROBE**REVERSE CLUTCH FAILURE**

COMPLAINT: Repeated reverse clutch failure.

CAUSE: Cross leak causing the reverse clutch to drag while in forward gears.

CORRECTION: Drill a .030 hole through the reverse piston (figure 1), also enlarge the reverse feed orifice by .020 (figure 2). Example: measure existing orifice size, if it is .059 then enlarge to .079.

NOTE: Always use factory rings from Ford. These rings will work on on both Mazda and Probe. (part # E92Z-7D019-A).



(Figure 1)

(Figure 2)

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

115 EL

MAZDA G4A-EL / FORD PROBE**LOW PUMP PRESSURE**

COMPLAINT: *Low pump pressure.*

CAUSE: *The spool valve in the pump did not have a seat for the spring. The spring will hang the valve and cause low line pressure (figure 1).*

CORRECTION: *Order updated valve from Ford. It has a seat formed on the valve for the spring and will work on both units (figure 2) part # FO2Z-7Z306-A.*

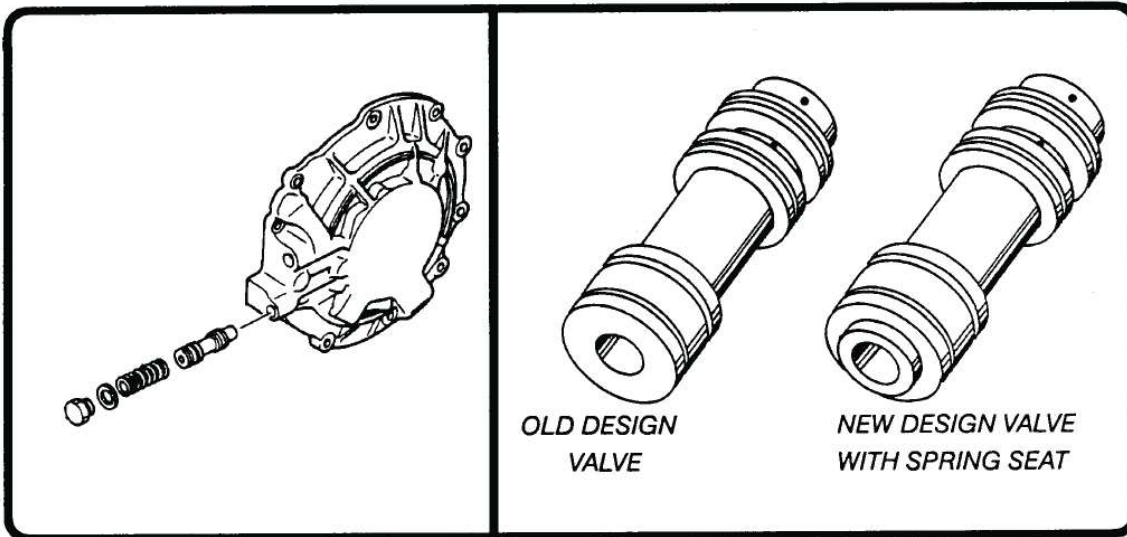


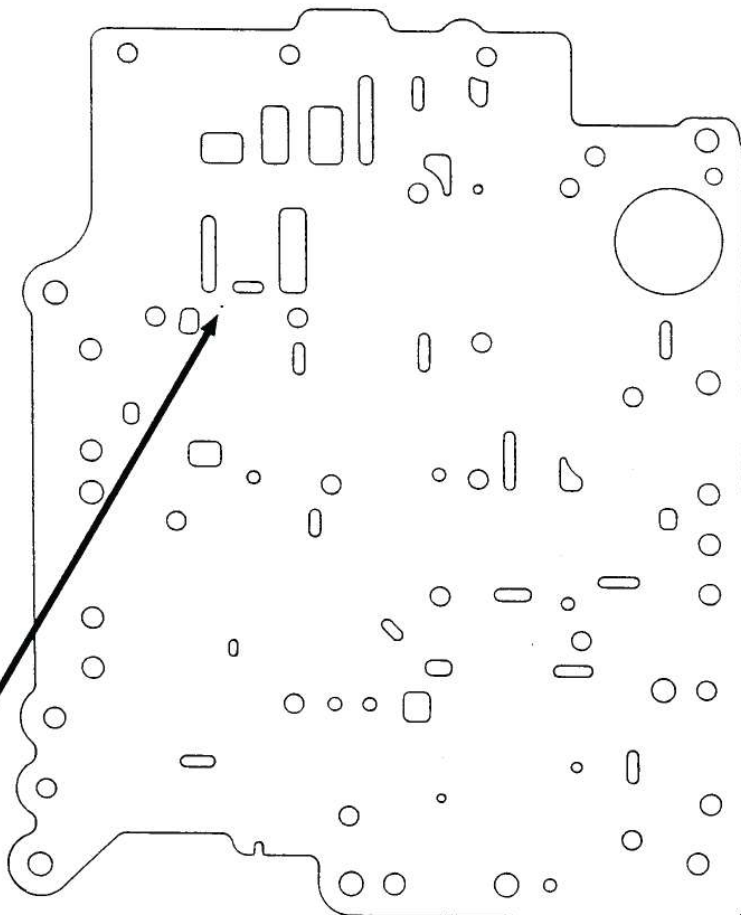
FIGURE 1

FIGURE 2

AUTOMATIC TRANSMISSION SERVICE GROUP



MAIN SEPARATOR PLATE



**DRILL THIS HOLE TO .040" TO PREVENT CONVERTER
CLUTCH HANG-UP COMING TO A STOP.**

AUTOMATIC TRANSMISSION SERVICE GROUP