



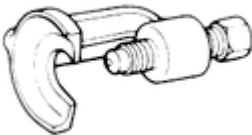
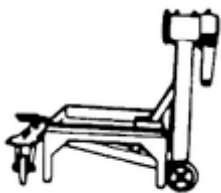
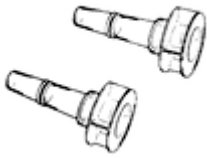
Automatic Transaxle System

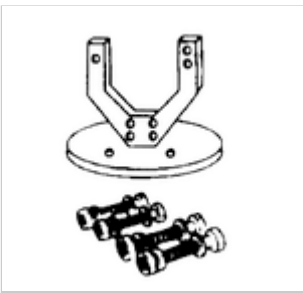
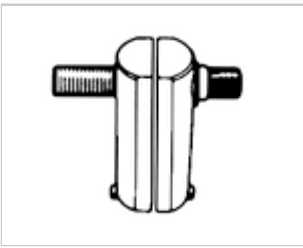
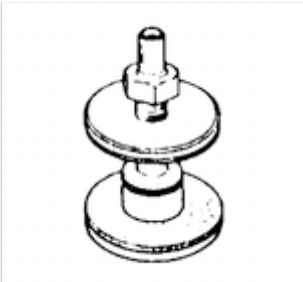
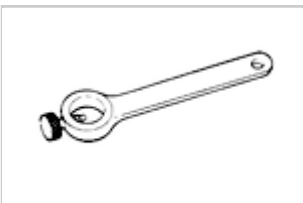
General Information

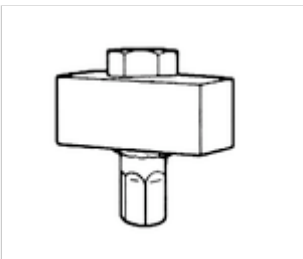
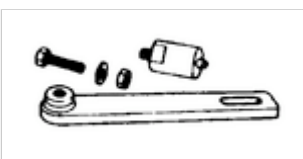
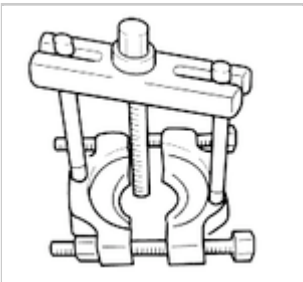
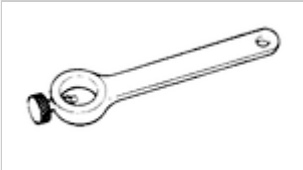
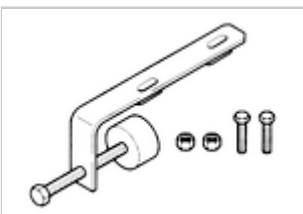


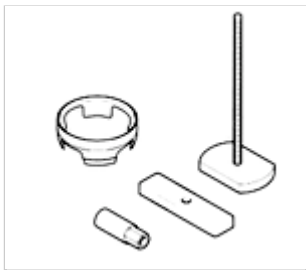
Special service tools

Automatic transaxle

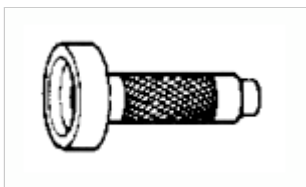
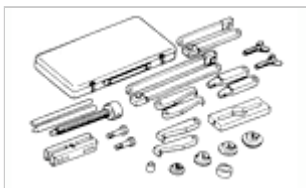
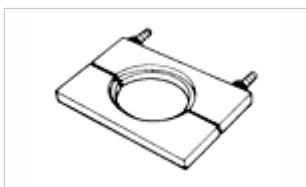
Tool (Name and Number)	Illustration	Use
0K2CA 089 HSP Hi-Scan pro		
0K130 283 021 Puller, ball joint		Used to remove tie-rod end.
0K130 990 007 Stand, engine		Used to disassemble transaxle.
0K670 990 AA0 Puller set, bearing		Used to remove bearing
0K201 190 AA0 Gauge set, oil pressure		Used to measure line pressure.
0K201 270 014 Holder, diff. side gear		Used to hold differential side gear.

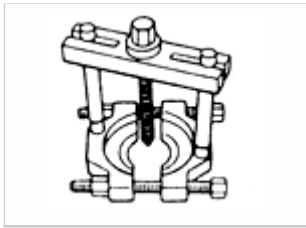
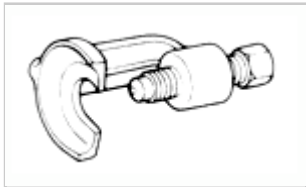
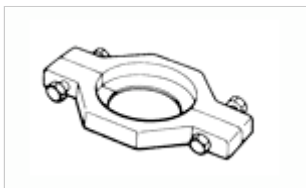
OK130 175 011A Hanger, transaxle		Used to disassemble transaxle.
OK130 170 012 Remover, bearing		Used to remove bearing outer race.
OK201 170 AA0 Support, engine		Used to remove transaxle.
OK201 190 016 Leak checker		Used to disassemble/assemble 3-4 clutch.
OK130 322 020 Attachment		Used to measure bearing preload.
OK201 170 AA1 Installer, oil seal		Used to install oil seal.
OK201 190 AA1 Compressor set, return spring		Used disassemble/assemble clutch assembly.

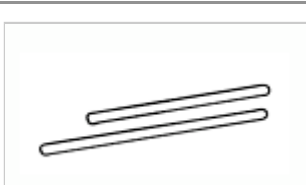
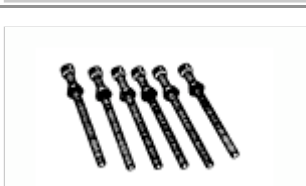
OK130 191 034 Holder, idler gear shaft		Used to adjust bearing preload.
OK201 190 017 Installer, oil seal		Used to remove oil seal
OK201 190 019 Holder, turbine shaft		Used to remove/install turbine shaft.
OK201 175 AA0 Selector set, shim		Used to adjust preload.
OK130 171 013 Puller, bearing		Used to remove differential bearing.
OK130 322 020 Preload, adapter		Used to measure preload.
OK2CA 190 AA2 Servo Piston Liffer		Used to press servo piston lifter.

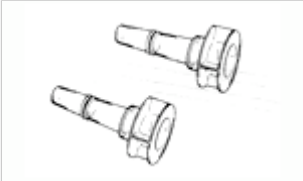
0K2CA 190 AA1 Spring retainer assembly		Used to remove/install spring retainer assembly.
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SPECIAL SERVICE TOOLS

Tool(Number & Name)	Illustrator	Use
0K201 170 AA0 Support, engine		Used to support engine.
0K130 990 007 Engine stand		Used to disassemble and assemble transaxle.
0K201 323 321 Holder, Primary shaft		Used to hold primary shaft.
0K201 170 AA1 Installer, oil seal		Used to install oil seal.
0K670 990 AA0 Puller set, bearing		Used to remove bearing.
0K201 172 008 Removing plate		Used to remove gears.

0K130 171 013 Puller, bearing		Used to remove bearing
0K130 283 021 Puller, ball joint		Used to remove tie-rod end.
0K130 175 011A Hanger, transaxle		Used to disassemble and assemble transaxle.
0K130 170 012 Remover, bearing		Used to remove bearing
0K130 175 008 Puller, fan pulley boss		Used to remove gears.
0K900 175 AA1 Installer set, bearing		Used to install bearing.
0K130 178 A13 Body(Part 0K900 175 AA1)		Used to install gear and bearing inner race.
0K201 171 A01 Attachment A(Part of 0K900 175 AA1)		Used to install bearing inner race and gear.

OK130 175 A11 Attachment B(Part of OK900 175 AA1)		Used to install bearing.
OK011 270 A02 Attachment E(Part of OK900 175 AA1)		Used to install ear.
OK900 175 AA0 Shim selector set		Used to adjust bearing preload.
OK900 175 A01 Selector (Part of OK900 175 AA0)		Used to adjust bearing preload.
OK900 175 A02 Selector (Part of OK900 175 AA0)		Used to adjust bearing preload.
OK900 175 A03 Selector (Part of OK900 175 AA0)		Used to adjust bearing preload.
OK130 175 A02 Collar(Part of OK900 175 AA0)		Used to adjust bearing preload.
OK130 175 A03 Bar(Part of OK900 175 AA0)		Used to adjust bearing preload.
OK130 191 A07 Bolt set(Part of OK900 175 AA0)		Used to adjust bearing preload.

OK130 191 A05 Adapter, preload		Used to adjust bearing preload.
OK130 322 020 Attachment		Used to measure preload.
OK201 270 014 Holder, differential side gear		Used to hold differential side gears.



Manual transaxle Diagnostic chart

Problem	Possible cause	Action
Shift lever does not shift smoothly or is hard to shift	Seized shift lever ball seat Seized control rod joint Bent control rod	Replace Replace Replace
Too much play in shift lever	Worn control rod bushing Weak shift lever ball spring Worn shift lever ball bushing	Replace Replace Replace
Difficult to shift	Bent control rod No grease in shifter Insufficient oil Deterioration of oil quality Wear or play of shift fork or shift rod Worn synchronizer ring Worn synchronizer cone area of gear Bad contact of synchronizer ring and cone area of gear Excessive gear side clearance Worn bearing Worn synchronizer key spring Excessive primary shaft bearing preload Improperly adjusted change guide plate	Replace Lubricate with grease Add oil Replace with oil of specified quality Replace Replace Replace Replace Replace Replace Adjust Adjust
Does not stay in gear	Bent control rod Worn control rod bushing Weak shift lever ball spring Improperly installed extension bar Worn shift fork Worn clutch hub Worn clutch gun sleeve Worn sliding surface of shaft gears Worn sliding surface of gear Worn sliding groove of control rod end Weak detent spring Excessive thrust clearance Worn bearing Improperly installed or loose engine mount	Replace Replace Replace Tighten Replace Replace Replace Replace Replace Replace Replace Replace Tighten
Abnormal noise	Insufficient oil Deterioration of oil quality Worn bearing Worn sliding surfaces of gears of shaft Excessive gear backlash Damage gear teeth Foreign material in gears Damaged differential gear of excessive backlash	Add oil Replace with oil of specified quality Replace Replace Replace Replace Replace Replace



Specifications

Auto transaxle

Item		Engine
		F4A-EL
		TB DOHC
Type		EL Front wheel drive, 4-speed with electronic shift control
Transaxle control		Floor shift and "O/D system" feature
Torque converter	Type	Lock-up with electronic control
	Stall torque ratio	2.08:1
	Stall speed RPM	2200~2500
Gear ratio	First gear	2.800:1
	Second gear	1.540:1
	Third gear	1.000:1
	Fourth gear	0.700:1
	Reverse	2.333:1
Final gear ratio		3.833:1
Number of drive/driven plates	Forward clutch	3/3
	Coasting clutch	2/2
	3-4 clutch	4/4
	Reverse clutch	2/2
	Low and reverse clutch	4/4
Servo diameter (piston/retainer)-in (mm)		2.76/1.42 (70/36)
Automatic transaxle fluid	Type	Dexron-III or M-III
	Capacity US qt (liter, Imp qt)	5.7 (5.4, 4.7)
Cooling system		Oil cooler built-in to radiator
Gear shift control system		Electronic hydraulic pressure control
Manual shift pattern		P-R-N-D-2-1

Specifications

Manual Transaxle

Item	Engine
	TB DOHC
Transaxle control	Floor shift
Synchromesh system	Forward : Synchromesh Reverse : Selective sliding, Synchromesh

Gear ratio	1st	3.307
	2rd	1.833
	3rd	1.310
	4th	1.030
	5th	0.795
	Reverse	3.166
Final gear ration		4.105
Oil	Grade	API Service GL-4
	Viscosity	SAE 75 W-90
	Capacity US qt (liters, Imp qt)	2.58(2.7, 2.4)

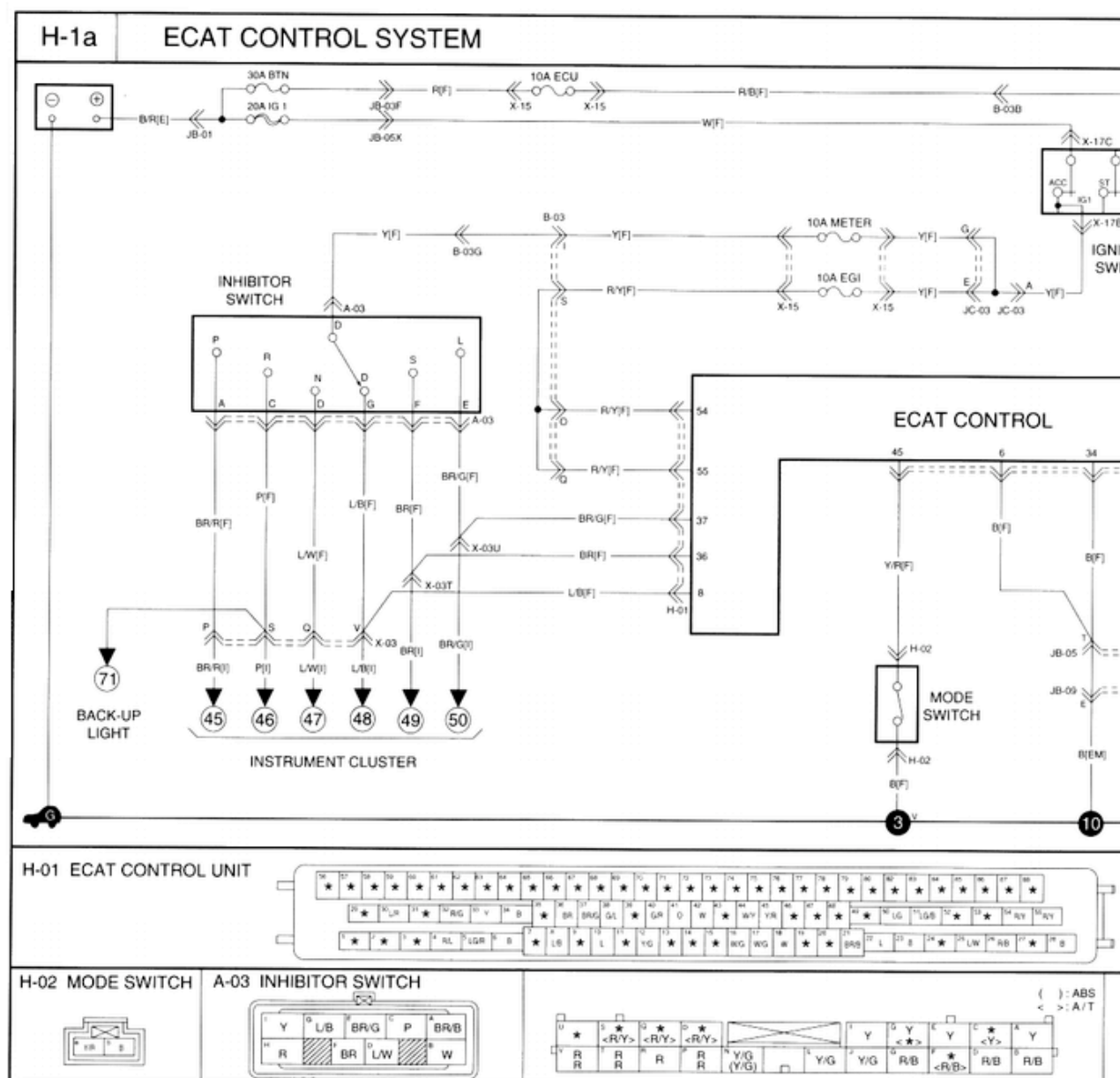


Automatic Transaxle System

Automatic Transaxle System

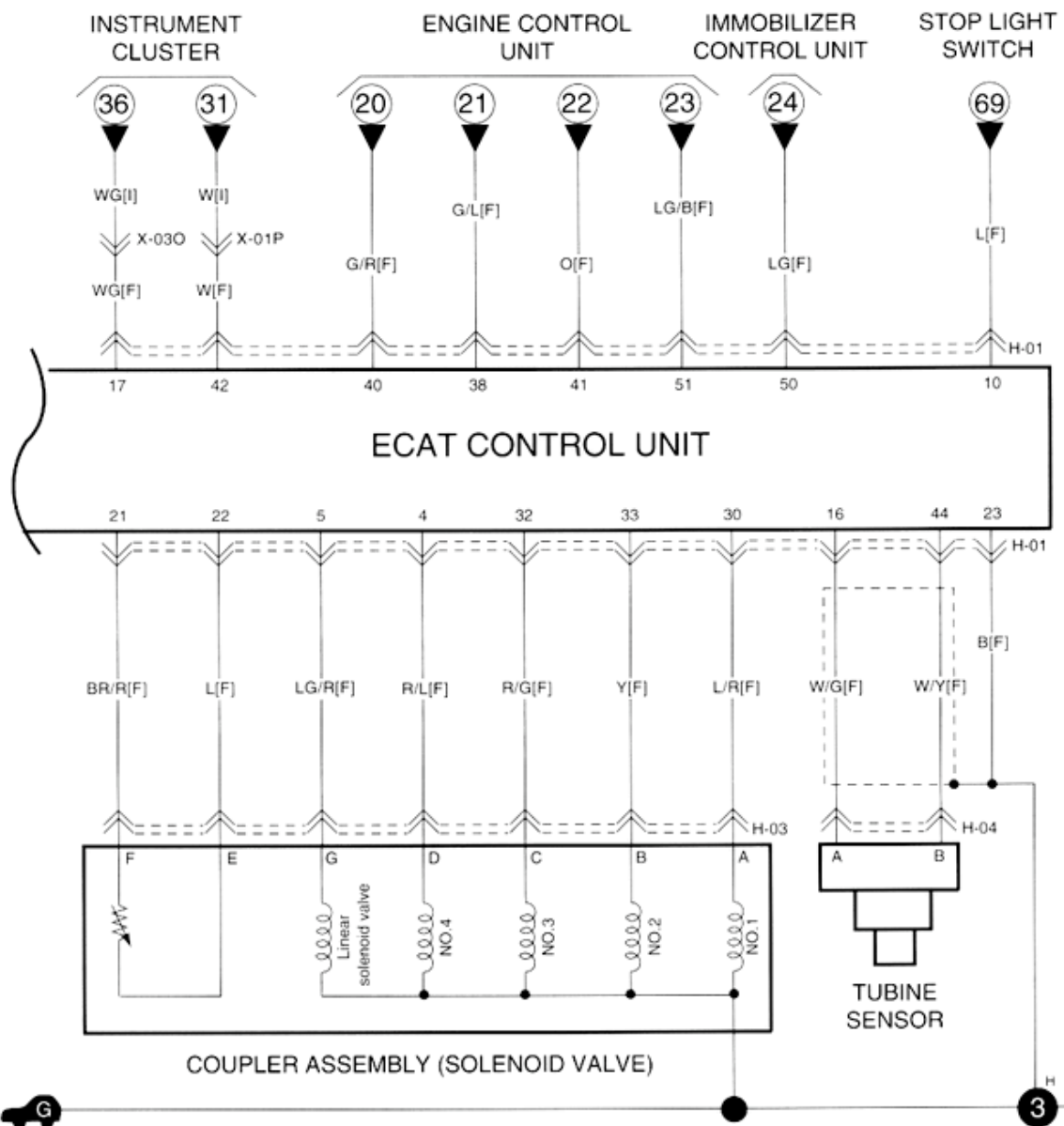


Circuit schematic



H-1b

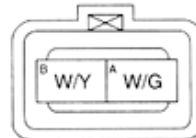
ECAT CONTROL SYSTEM



H-03 COUPLER ASSEMBLY



H-03 TURBINE SENSOR





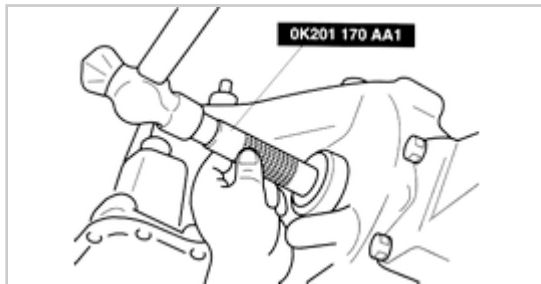
Oil seal

Removal and replacement

1. Remove driveshaft.
2. Remove oil seal with a screwdriver.
3. Tap new oil seal into transaxle case with SST (0K201 170 AA1).

NOTICE

- 1) Tap in until SST (0K201 170 AA1) contacts case.
- 2) Coat oil seal lip with ATF.

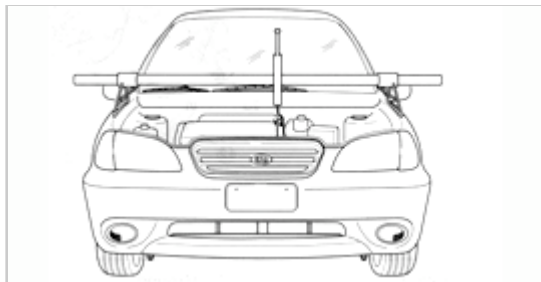


Control valve body

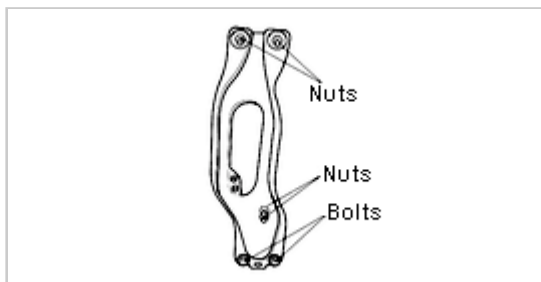
NOTICE

Clean transaxle exterior thoroughly with a steam cleaner or cleaning solvents before removal.

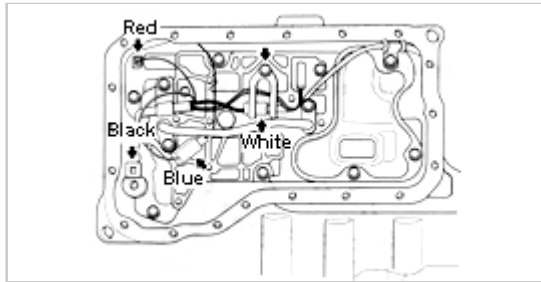
1. Support engine with SST (0K201 170 AA0).
2. Raise vehicle and support it with safety stands.
3. Drain ATF into a suitable container.
4. Remove both gravel shield from under engine.
(Seven bolts each)



5. Remove two nuts from No.2 engine mount to mounting member.
6. Remove engine mounting member-to-chassis bolts (two front) and nuts (two rear) then remove engine mounting member.



7. Remove oil pan (19 bolts) and gasket.
8. Disconnect all electrical connectors, remove eight bolts, and remove control valve body.



Replacement

1. Install control valve body, (8) bolts, and wiring clips as shown.

Bolt length (measured from below the head)

Ⓐ : 1.18 in (30 mm)

Ⓑ : 1.97 in (50 mm)

Tightening torque : 69.6~94.8 lb-in (7.9~10.7 N·m, 80~110 kg-cm)

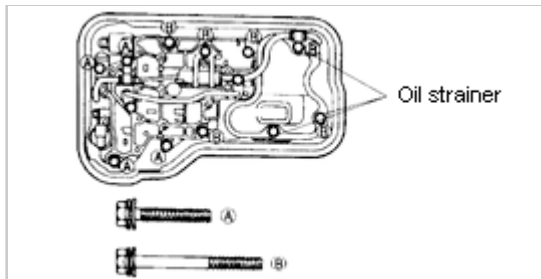
2. Install oil strainer, and (3) bolts.

Tightening torque : 69.6~94.8 lb-in (7.9~10.7 N·m, 80~110 kg-cm)

3. Connect connectors.

4. Install oil pan (19 bolts) and a new gasket.

Tightening torque : 74.4~94.8 lb-in (8.4~10.7 N·m, 8.5~110 kg-cm)



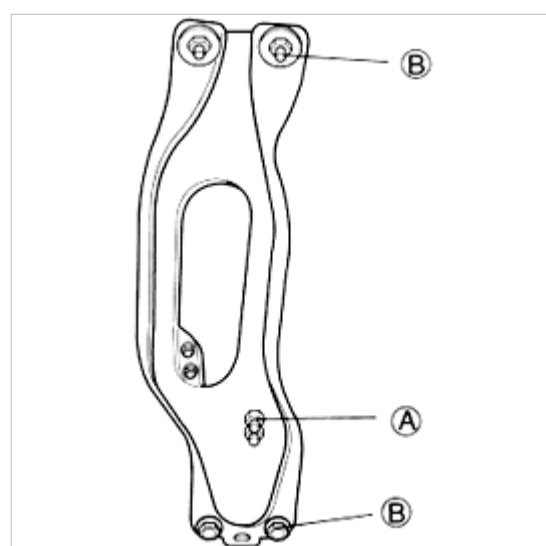
5. Loosely install nuts A and bolts B of engine mounting member.
6. Install engine mounting member.

Tightening torque :

A : 28~38 lb-ft (38~51 N·m, 3.8~5.3 kg-m)

B : 48~65 lb-ft (64~89 N·m, 6.5~9.1 kg-m)

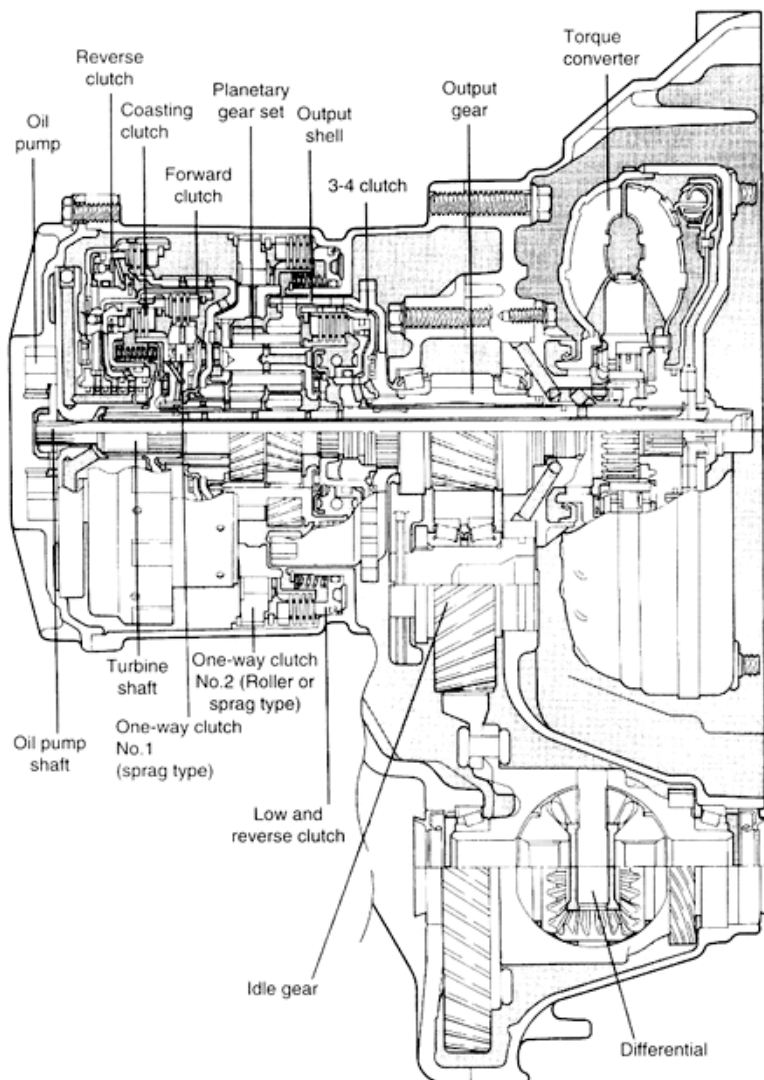
7. Install both gravel shield to under engine. (seven bolts each)
8. Remove SST (0K201 170 AA0) from engine.
9. Pour in ATF. Check ATF level with engine idling and check for leaks, refer to Automatic Transmission Fluid.
10. Drive vehicle and check shift points, shift schedule, and shift quality.



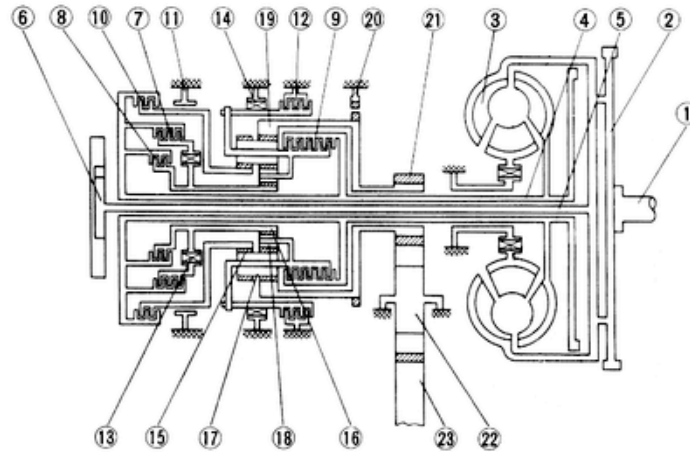


Description and operation

Cross-sectional view



Power flow diagram



- (1) Crankshaft
- (2) Drive plate
- (3) Torque converter
- (4) Turbine shaft
- (5) Oil pump shaft
- (6) Oil pump
- (7) Forward clutch
- (8) Coasting clutch
- (9) 3-4 clutch
- (10) Reverse clutch
- (11) 2-4 Brake band
- (12) Low and reverse clutch

- (13) One-way clutch No.1 (Sprag type)
- (14) One-way clutch No.2 (Sprag or roller type)
- (15) Large sun gear
- (16) Small sun gear
- (17) Long pinion gear
- (18) Short pinion gear
- (19) Internal gear
- (20) Parking gear
- (21) Output gear
- (22) Idler gear
- (23) Ring gear

Component operation table : O/D OFF system

Range/ Position	O/D OFF switch condition	Gear position	Forward clutch	Coasting clutch	3-4 clutch	Reverse clutch	2-4 brake band		Low and reverse brake	One-way clutch No. 1	One-way clutch No. 2
							Applied	Released			
P	—	—									
R	—					O			O		
N	—	Below approximately 2.5 MPH (4km/h) Above approximately 3.1 MPH (5km/h)									
D	OFF	1GR	O							O	O
		2GR	O				O			O	
		3GR Below approx. 3.1 MPH (5km/h) at operating temperature	O	O	O			O		O	
		Above approx. 3.1 MPH (5km/h) or cold engine	O	O	O		X	O		O	
	ON	4GR	O		O		O			⊗	
		2GR	O				O			O	
		3GR Below approx. 3.1 MPH (5km/h) at operating temperature	O	O	O			O		O	
		Above approx. 3.1 MPH (5km/h) or cold engine	O	O	O		X	O		O	
2	—	2GR	O	O			O			O	
1	—	1GR	O	O					⊗	O	

O: Component in operation

X: Fluid pressure to servo but band not applied due to pressure difference in servo.

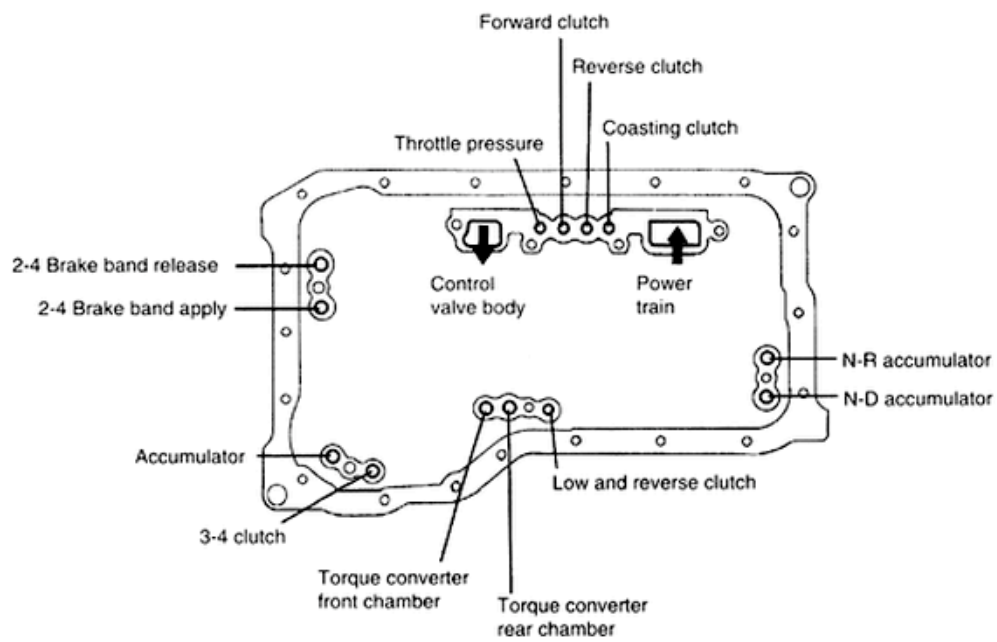
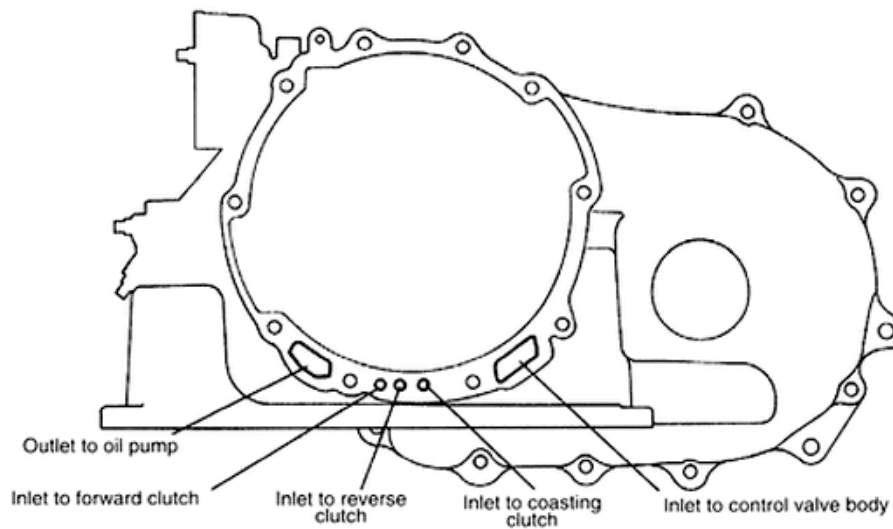
⊗: Does not transmit power.

Solenoid valve operation table : O/D OFF system

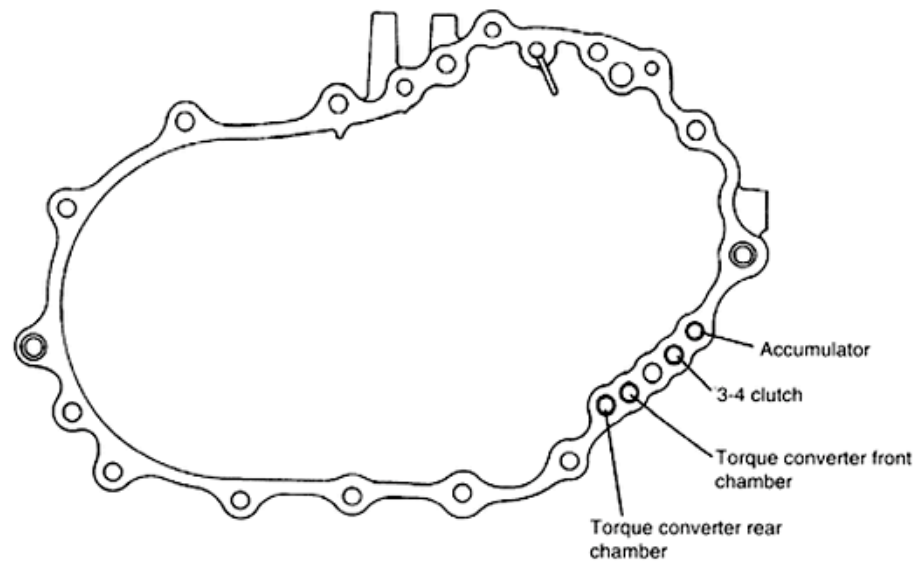
Range/ position	O/D OFF switch condition	Gear position	Shift solenoid A (1-2)	Shift solenoid B (2-3)	Shift solenoid C (3-4)
P	-	-			O
R	-	-	O		
N	-	Below approximately 2.5 MPH (4km/h)			O
		Above approximately 3.1 MPH (5km/h)	O		
D	OFF	1GR		O	O
		2GR	O	O	O
		3GR Below approx. 3.1 MPH (5 km/h) at operating temperature			
		Above approx. 3.1 MPH (5 km/h) or cold engine	O		
	ON	4GR	O		O
		1GR		O	O
		2GR	O	O	O
		3GR Below approx. 3.1 MPH (5 km/h) at operating temperature			
		Above approx. 3.1 MPH (5 km/h) or cold engine	O		
2	-	2GR	O	O	
1	-	1GR		O	

O: Solenoid in operation

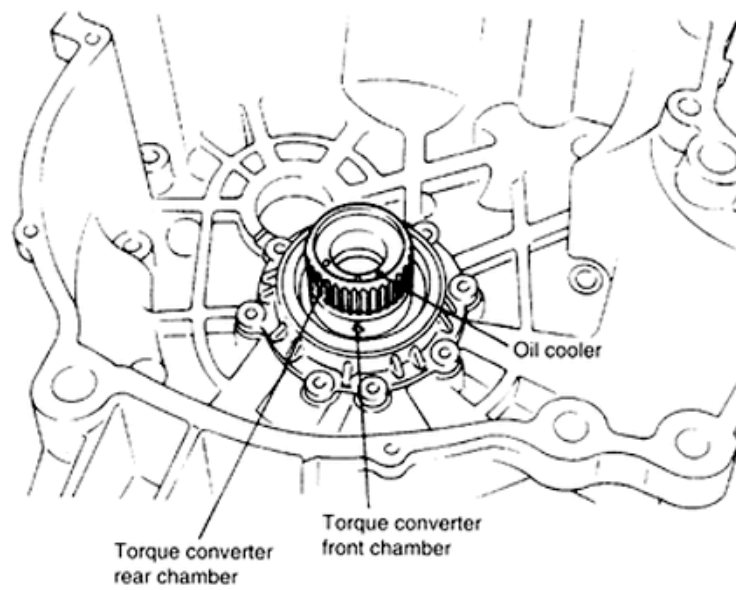
Fluid passage locations (Transaxle case)



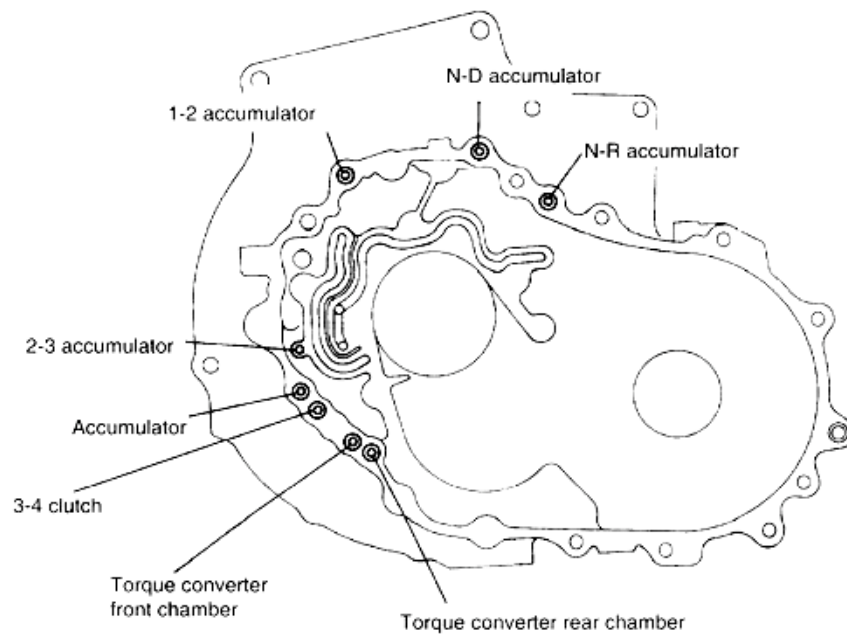
Transaxle case



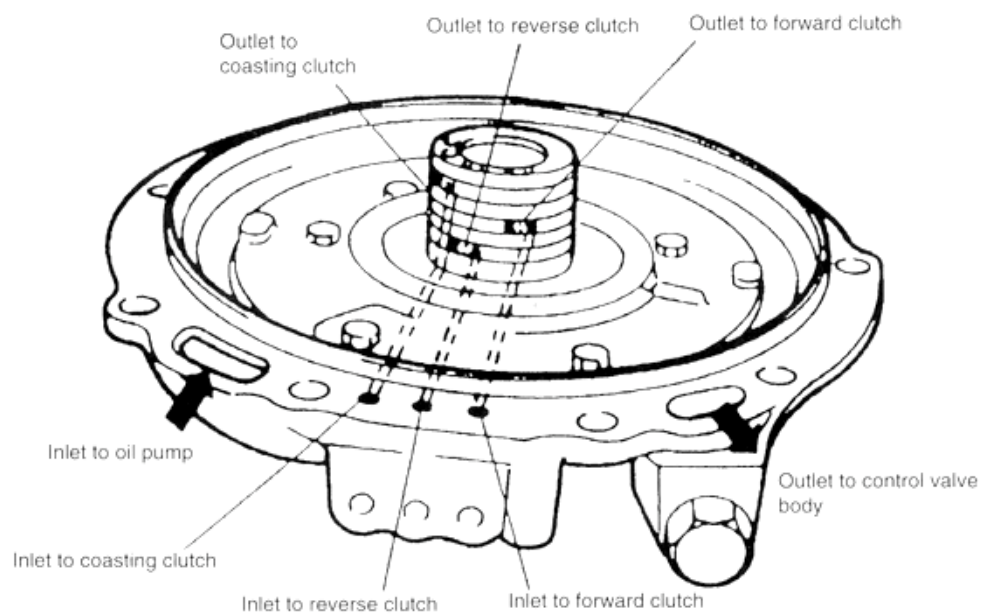
Clutch housing



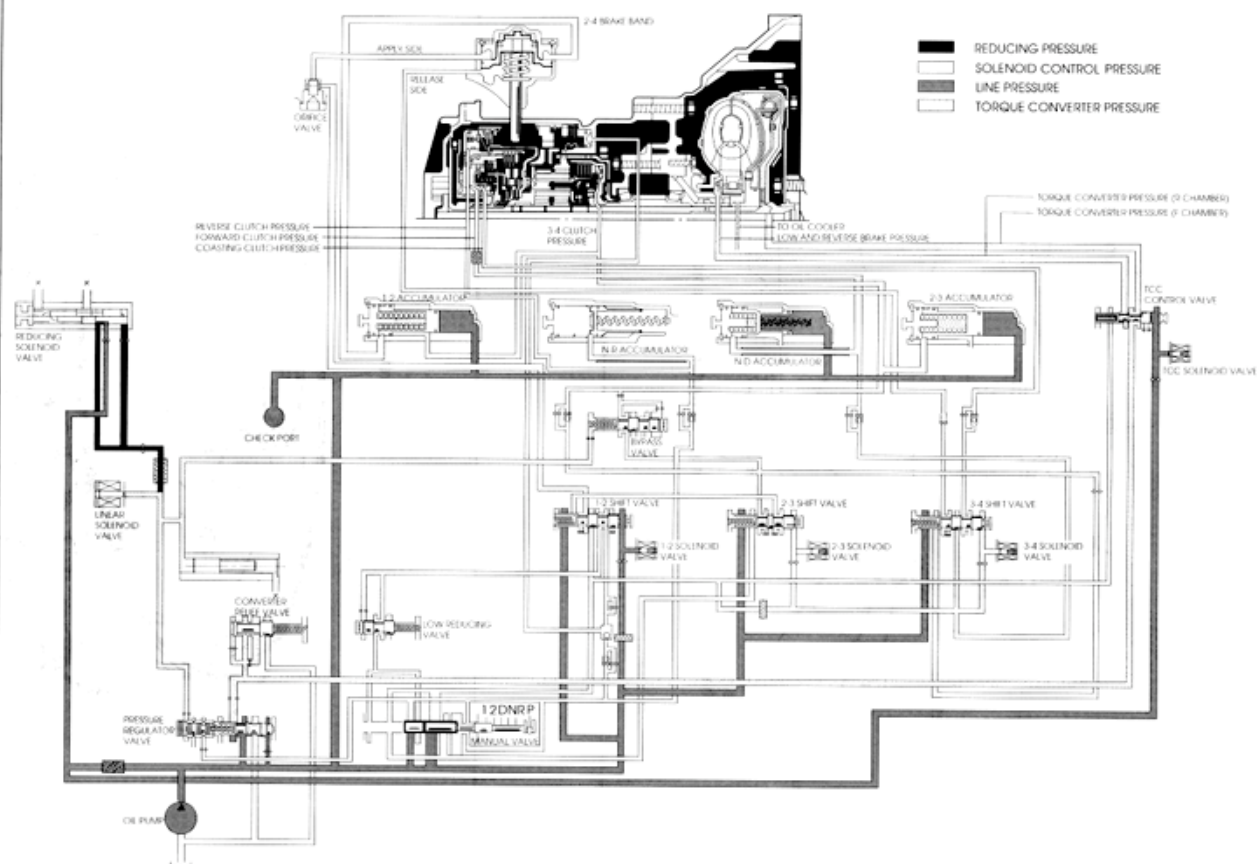
Clutch housing



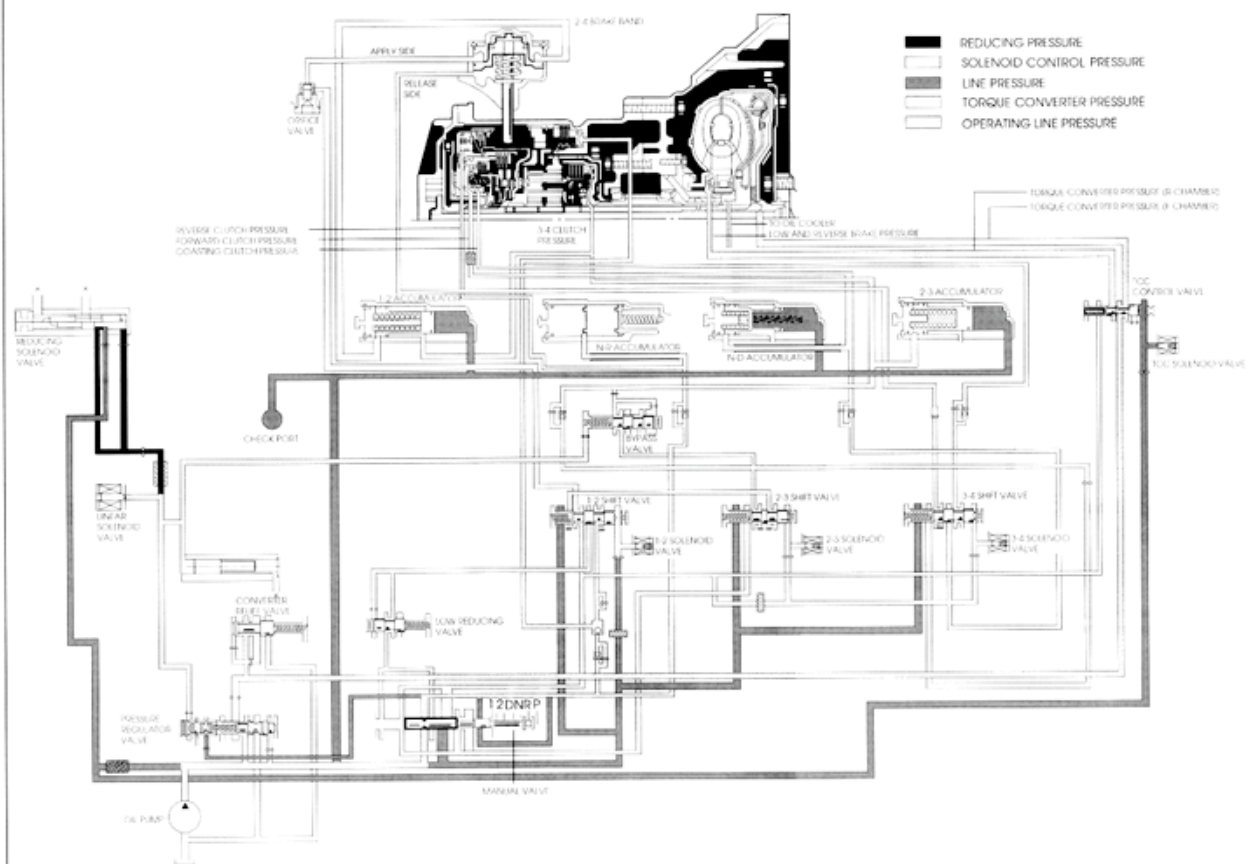
Oil pump



Hydraulic circuit (P range)



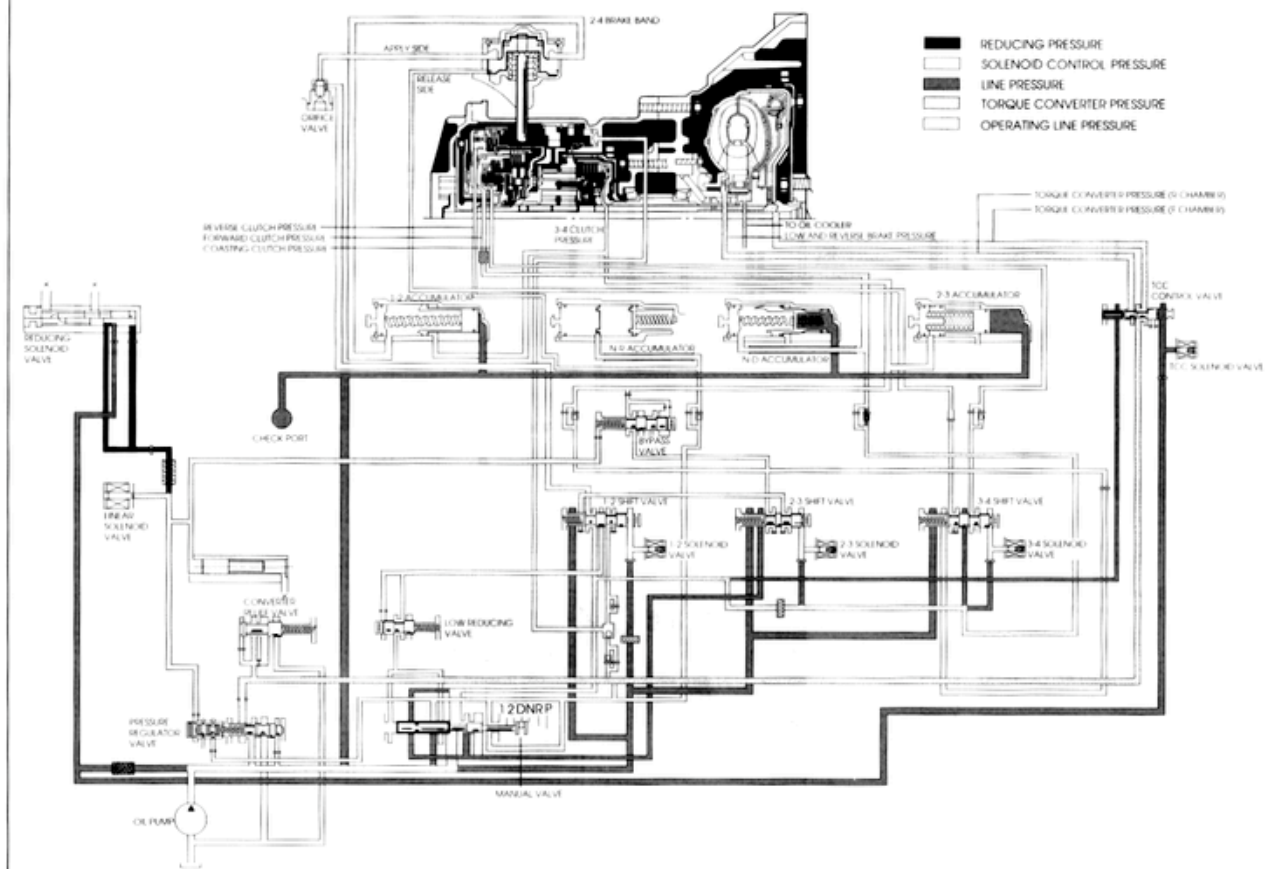
R range



N range

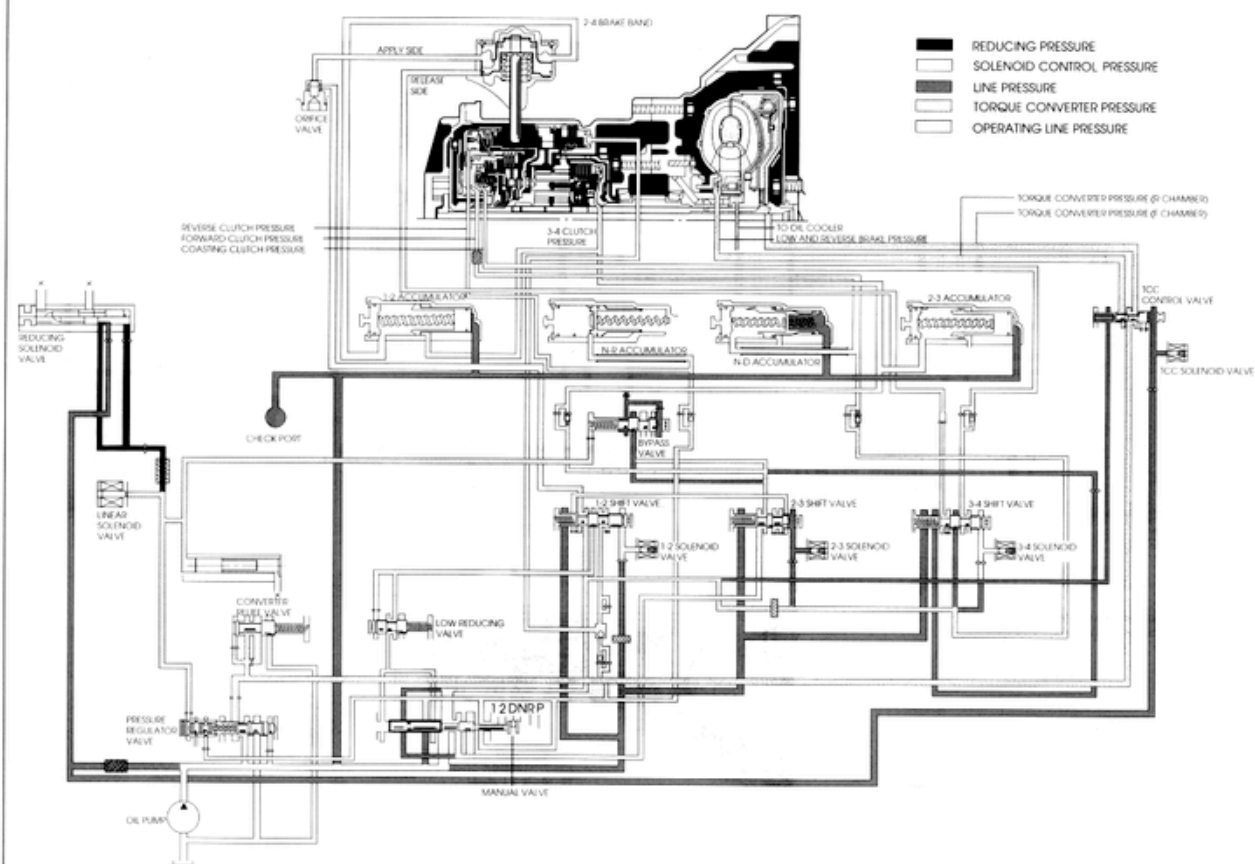






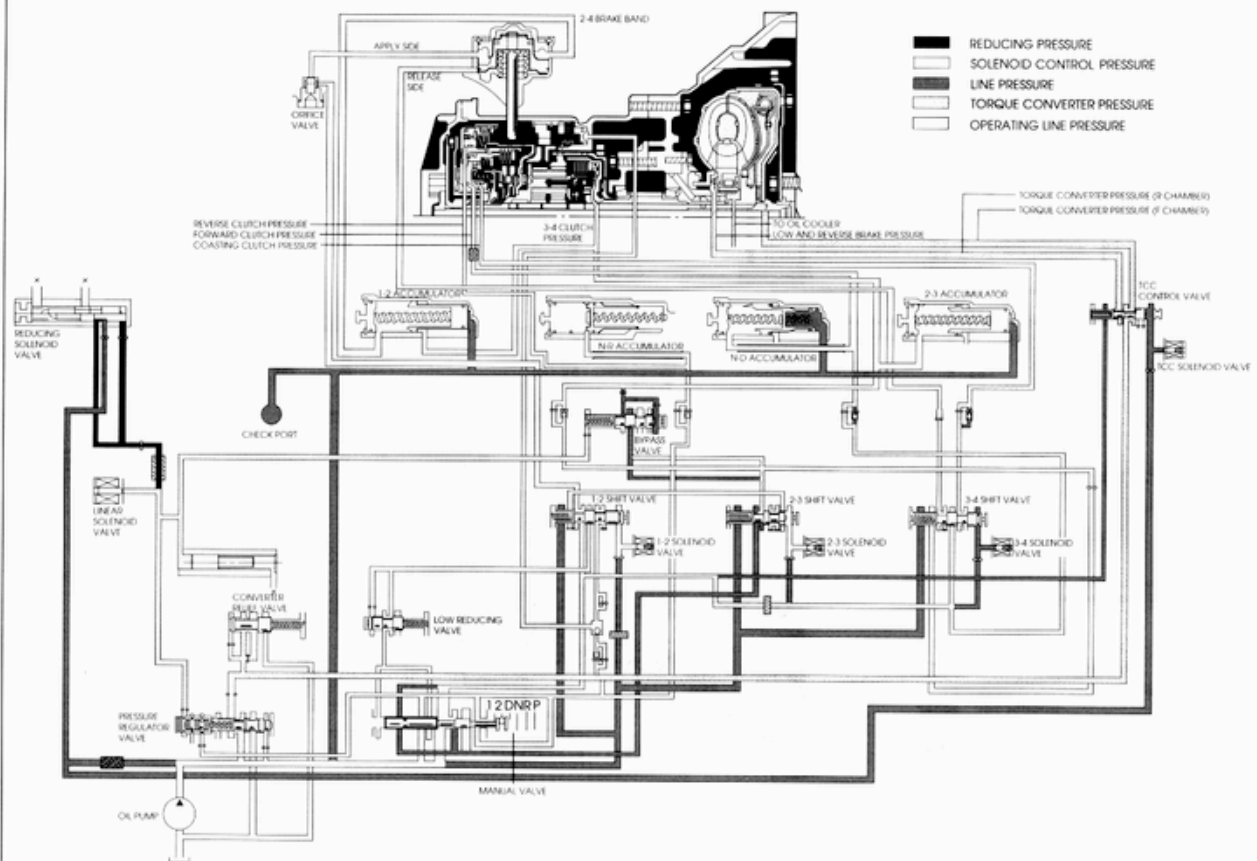
D range : 3rd gear



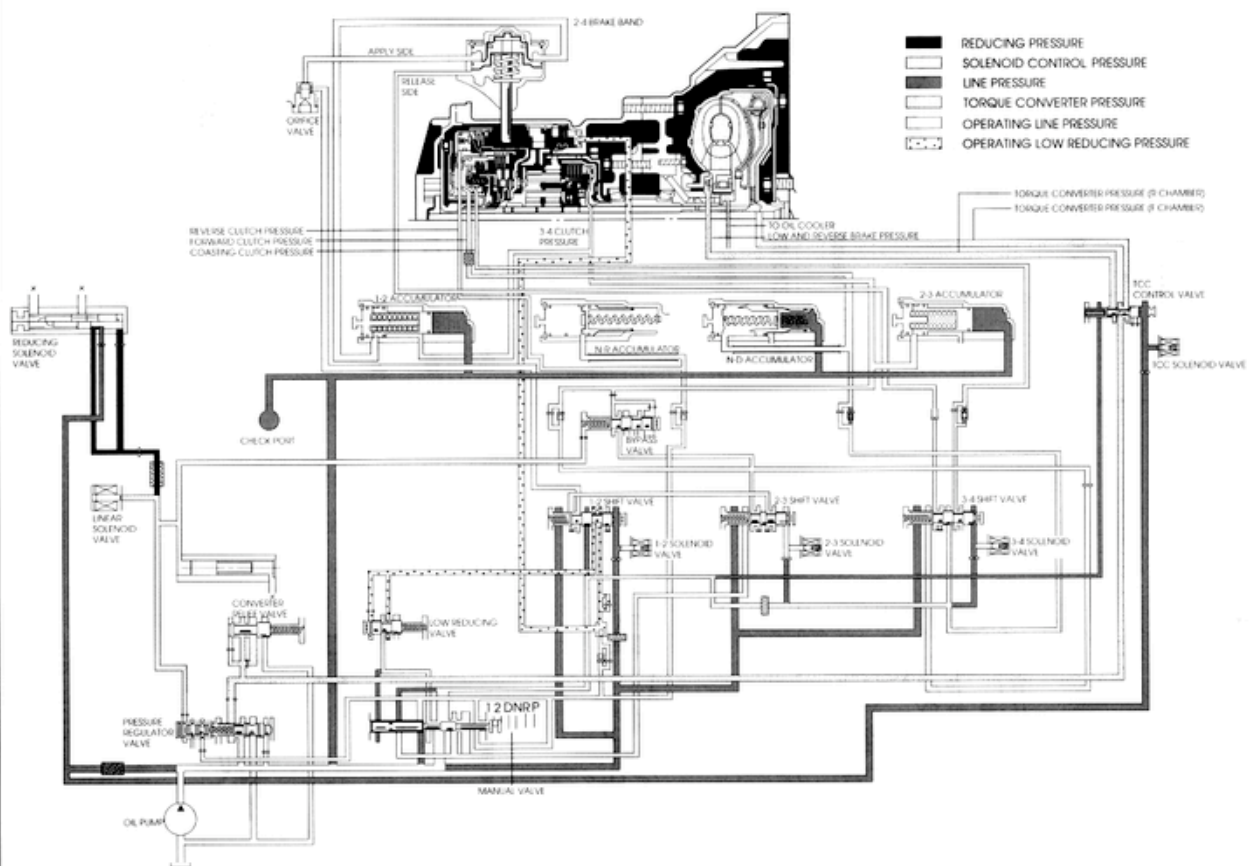


D range : O/D gear torque converter clutch ON





1 range

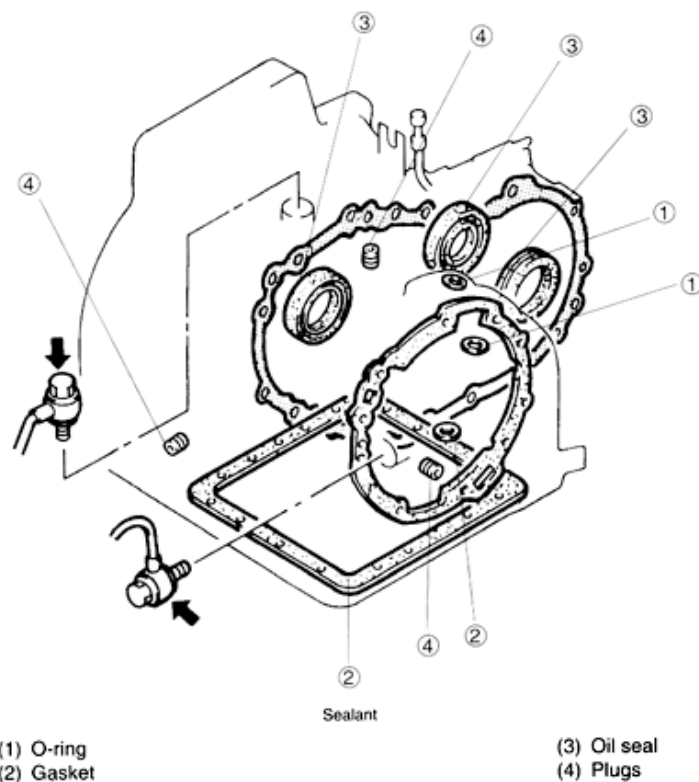




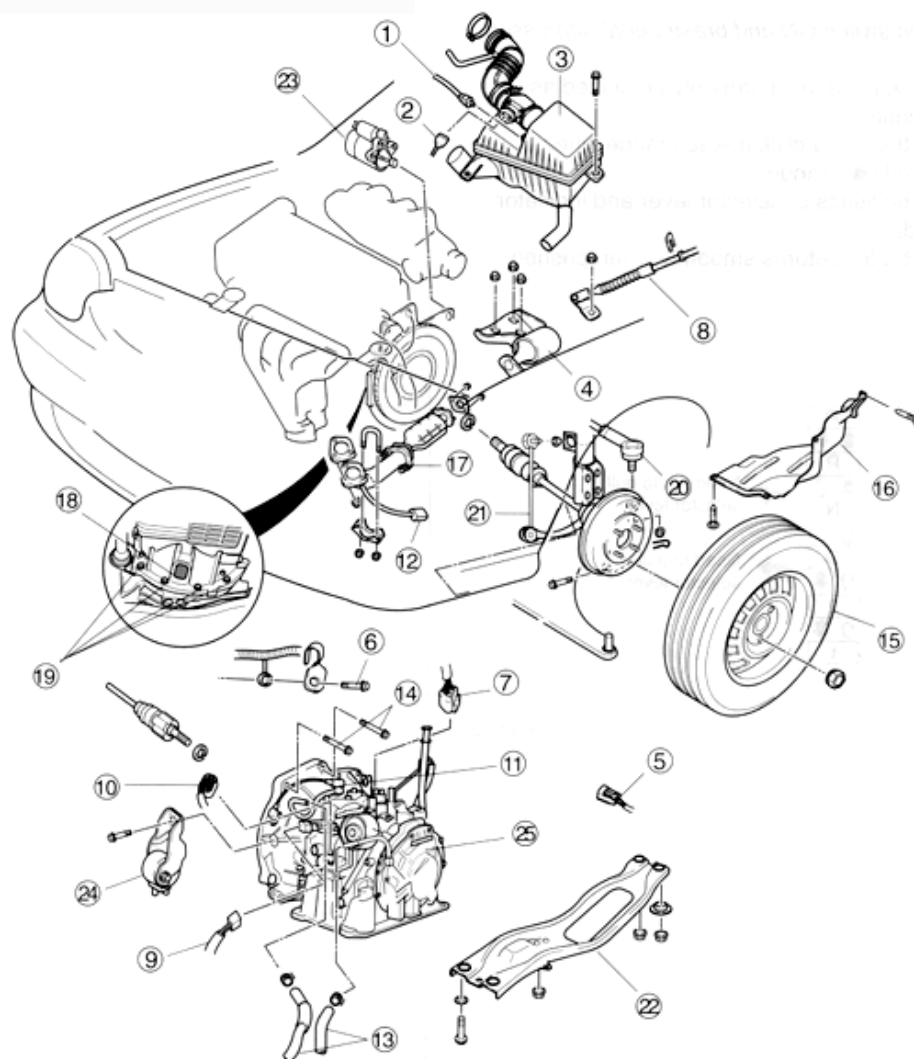
Fluid leaks

Check for transaxle fluid leaks at points shown below and repair or replace as necessary. Additionally, check all of following :

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



Component



- | | |
|--|--|
| (1) Air temperature sensor connector | (14) Upper converter housing bolts |
| (2) MAF sensor connector | (15) Wheel and tire |
| (3) Air cleaner assembly | (16) Splash shield |
| (4) No.4 mounting | (17) Catalytic converter |
| (5) Input/turbine speed sensor connector | (18) Converter housing |
| (6) Ground strap bolt | (19) Engine oil pan-to-transaxle mounting bolt |
| (7) Vehicle speed sensor connector | (20) Tie-rod end |
| (8) Selector cable | (21) Stabilizer control link |
| (9) Transaxle range switch connector | (22) Engine mounting member |
| (10) Solenoid valve connector | (23) Starter |
| (11) Crankshaft position connector | (24) No.2 engine mounting |
| (12) Oxygen sensor connector | (25) Auto transaxle |
| (13) ATF cooler hose | |

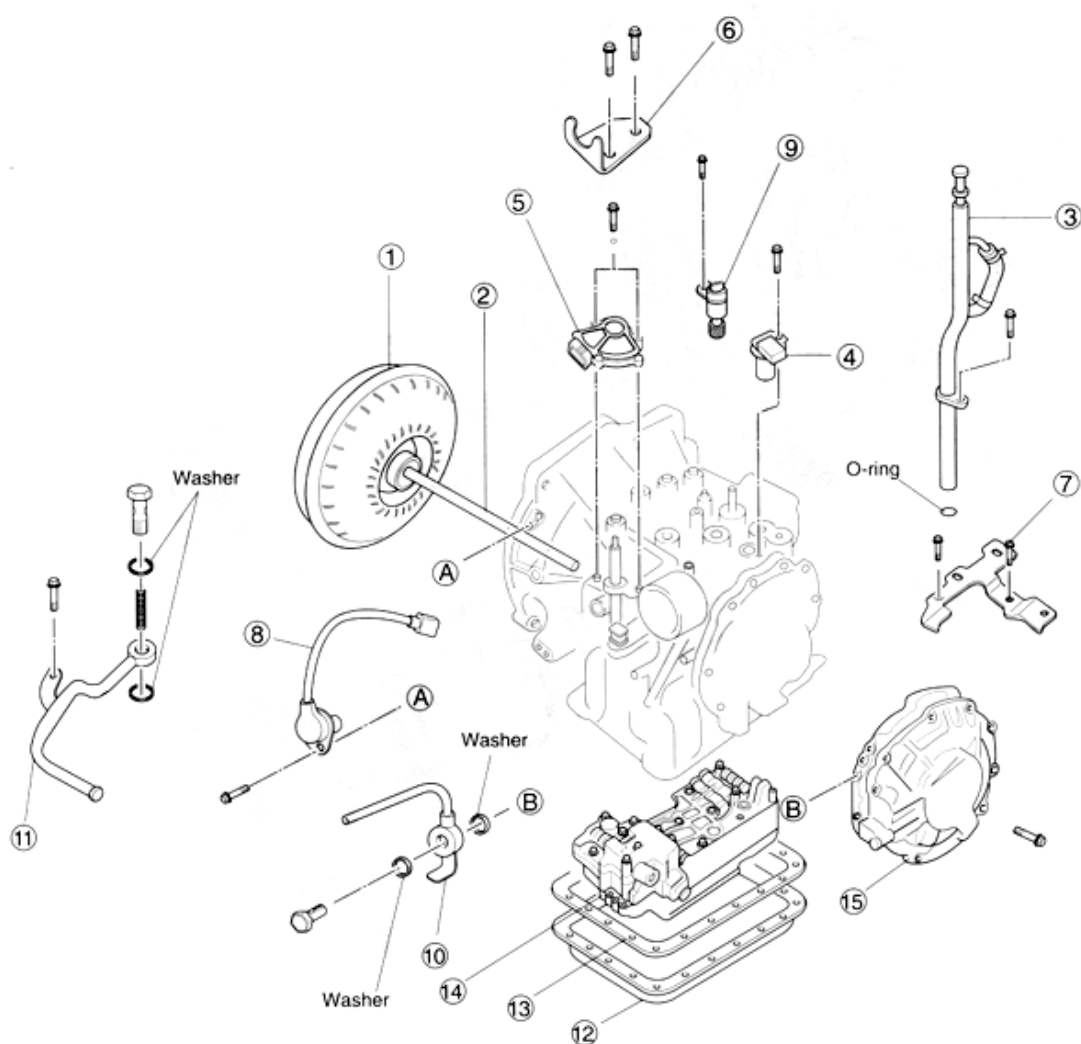


Automatic Transaxle System

Automatic Transaxle System - Automatic Transaxle

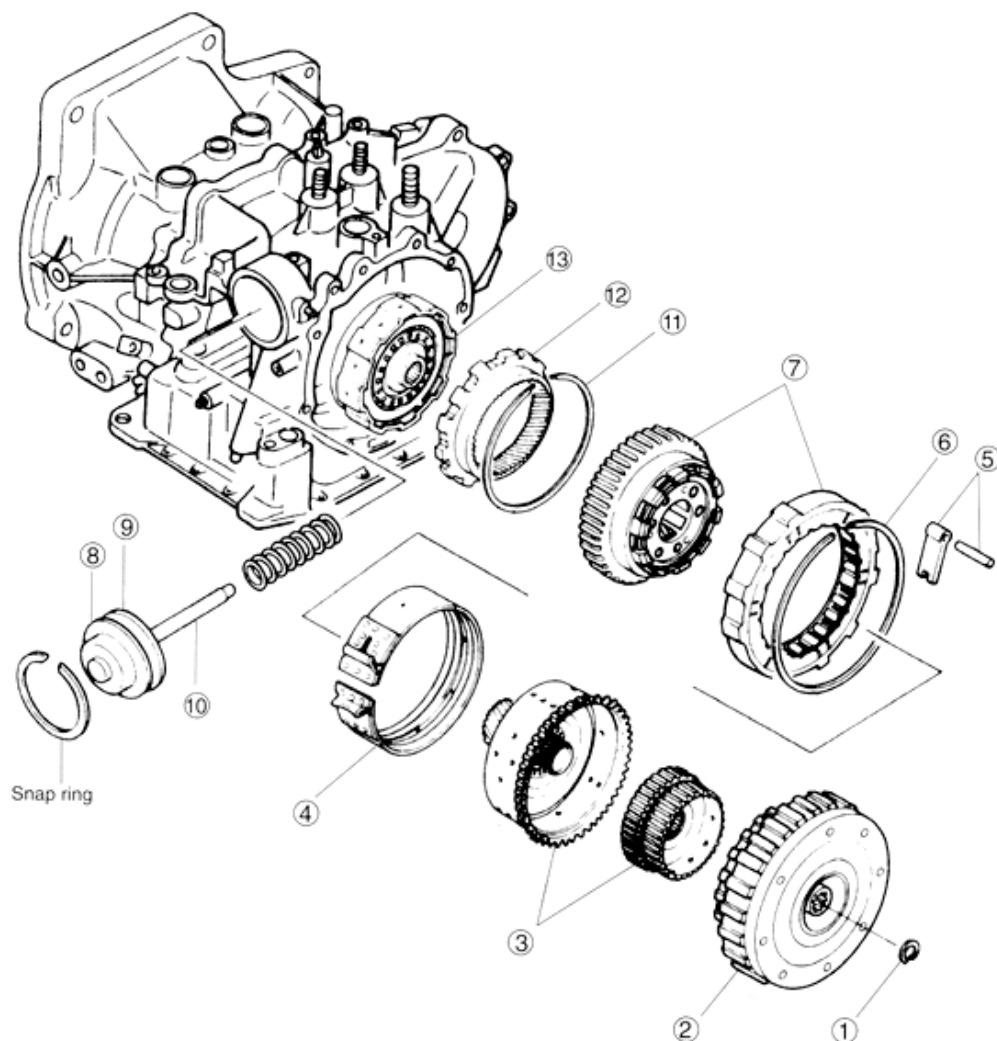


Component

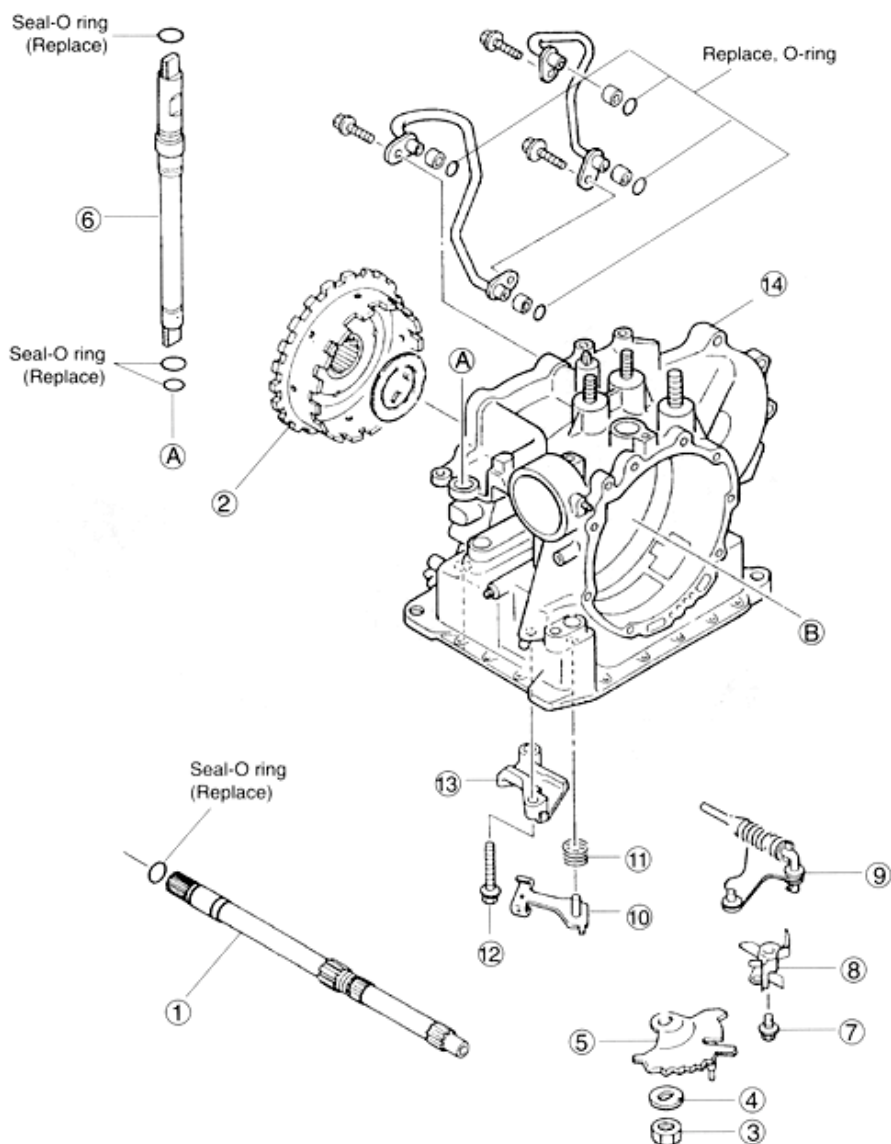


- (1) Torque converter
- (2) Oil pump shaft
- (3) Oil level gauge and oil filler tube
- (4) Input/Turbine speed sensor
- (5) Transaxle range switch
- (6) Selector cable bracket
- (7) Bracket
- (8) Crankshaft position sensor

- (9) Vehicle speed sensor and driven gear
- (10) Inlet pipe
- (11) Outlet pipe
- (12) Oil pan
- (13) Gasket (Replace)
- (14) Control valve body
- (15) Oil pump

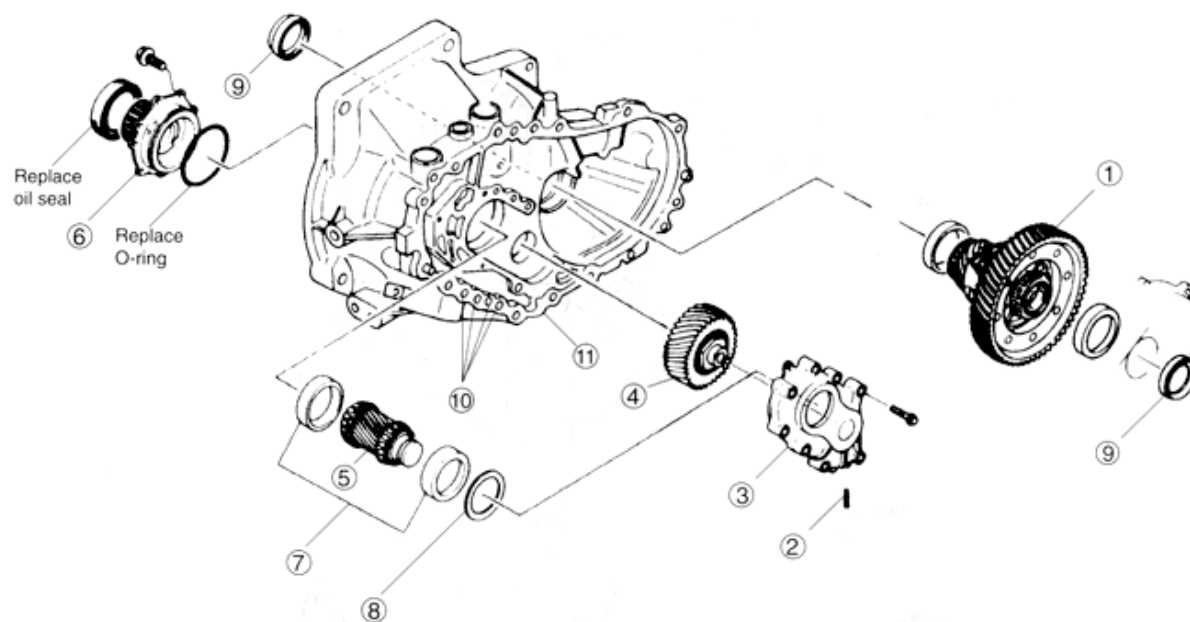


- | | |
|--|--------------------------|
| (1) Snap ring | (8) Servo retainer |
| (2) Reverse/Forward clutch assembly | (9) Servo piston |
| (3) Small sun gear and one-way clutch No.1 | (10) Piston stem |
| (4) 2-4 Brake band | (11) Snap ring |
| (5) Anchor strut and shaft | (12) Internal gear |
| (6) Snap ring | (13) 3-4 clutch assembly |
| (7) One-way clutch No.2 and planetary carrier assembly | |



- (1) Turbine shaft
- (2) Output shell
- (3) Nut
- (4) Washer
- (5) Manual plate
- (6) Manual shaft
- (7) Bolt
- (8) Lever holder

- (9) Parking assist lever
- (10) Detent lever
- (11) Return spring
- (12) Bolts
- (13) Actuator support
- (14) Transaxle case



- (1) Differential assembly
- (2) Roll pin (Replace)
- (3) Bearing housing
- (4) Idler gear
- (5) Output gear
- (6) Bearing cover assembly

- (7) Bearing outer races (Replace)
- (8) Adjustment shim (Replace)
- (9) Oil seal (Replace)
- (10) O-rings (Replace)
- (11) Converter housing



Disassembly

General notice

1. Disassemble transaxle in a clean area (dustproof work space) to prevent entry of dust into mechanisms.
2. Inspect individual transaxle components in accordance with Quick Diagnosis Chart during disassembly.
3. Use only plastic hammers when applying force to separate light alloy case joints.
4. Never use shop towels during disassembly ; they may leave particles that can clog fluid passages.
5. Several parts resemble one another ; organize them so that they do not get mixed up.
6. Disassemble control valve assembly and thoroughly clean it when a clutch or brake band has burned or when ATF has degenerated.

Cleaning notice

1. Clean transaxle exterior thoroughly with a steam cleaner or cleaning solvents before disassembly.
2. Clean removed parts with cleaning solvent, and dry with compressed air. Clean out all holes and passages with compressed air, and check that there are no obstructions.

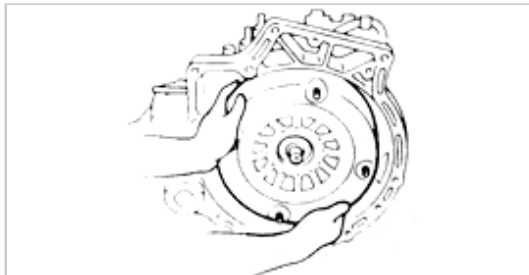
CAUTION

Wear eye protection when using compressed air to clean components.

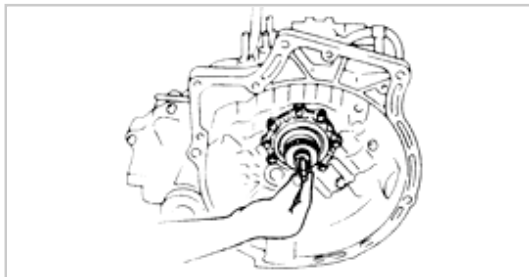
NOTICE

Do not allow ATF to spill when removing torque converter.

3. Remove torque converter from converter housing.

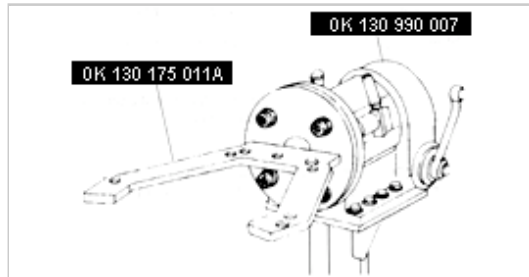


4. Pull out oil pump shaft by hand.



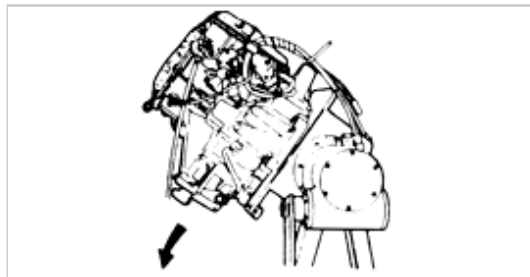
5. Remove oil level gauge and oil filler tube.
6. Remove input/turbine speed sensor.
7. Remove transaxle range switch.
8. Remove selector cable bracket.
9. Remove bracket.
10. Remove crankshaft position sensor.

11. Remove vehicle speed sensor and driven gear.
12. Remove inlet pipe.
13. Remove outlet pipe.
14. Assemble SST (0K130 175 011A/0K 130 990 007).



CAUTION

Do not lean transaxle to one side during disassembly. It may rotate suddenly and cause injury.



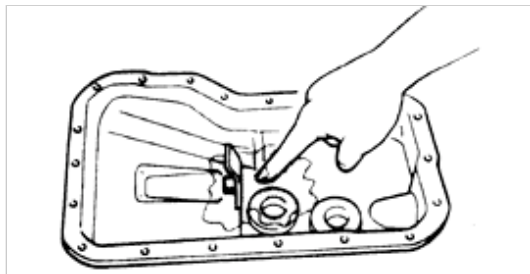
NOTICE

Remove oil pan before turning transaxle over. This will ensure that any foreign material remains in pan.

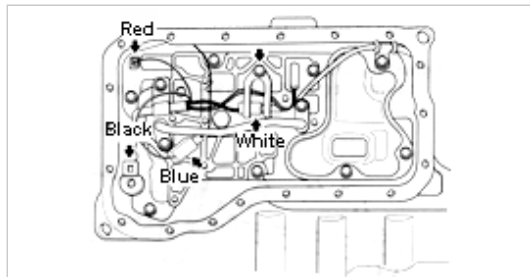
15. Remove oil pan and gasket (19 bolts).
 - A. Examine any material found in pan or on magnet to determine condition of transaxle.

Material	Possible source
Clutch facing material	Drive plate or brake band
Steel (magnetic)	Bearings, gears, or driven plate wear
Aluminum (Nonmagnetic)	Bushings or cast aluminum parts wear

- B. If large amounts of material are found, replace torque converter and carefully check transaxle for cause.



16. Remove clip (one bolt).
17. Disconnect solenoid connectors.



18. Remove strainer (three bolts).

19. Remove A, B and C bolts and brackets shown in figure.

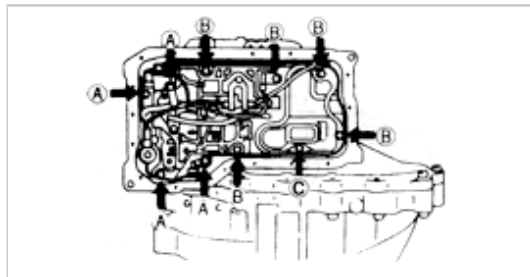
Bolt length (Measured from below head) :

A : 1.18 in (30 mm)

B : 1.67 in (50 mm)

C : 0.55 in (14 mm)

20. Remove control valve body.

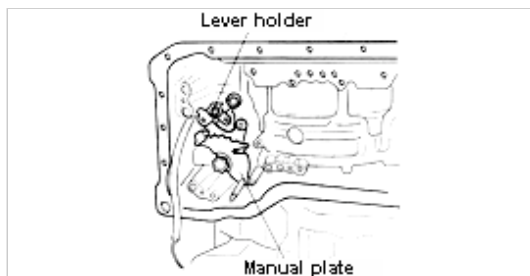


21. Remove manual shaft and manual plate.

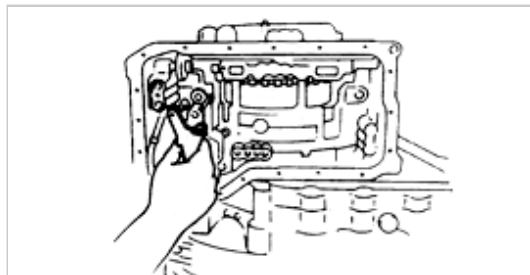
A. Loosen nut and pull out manual shaft.

B. Remove nut, washer, and manual plate.

22. Remove bolt and parking pawl lever holder.

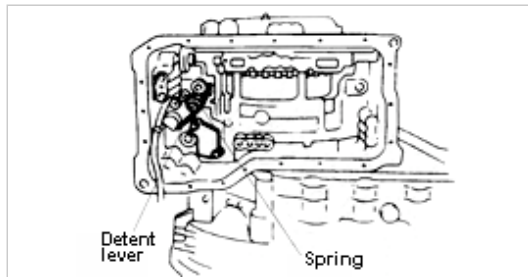


23. Remove parking pawl lever (two bolts).

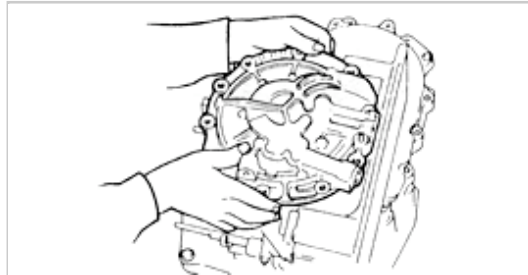


24. Remove detent lever and return spring.

25. Remove actuator support.

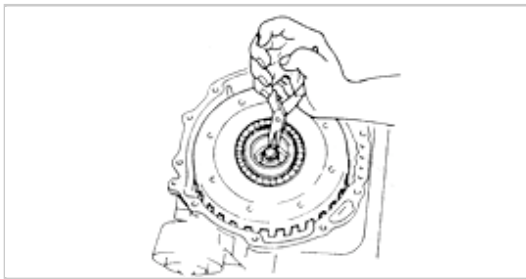


26. Remove oil pump assembly (10 bolts).

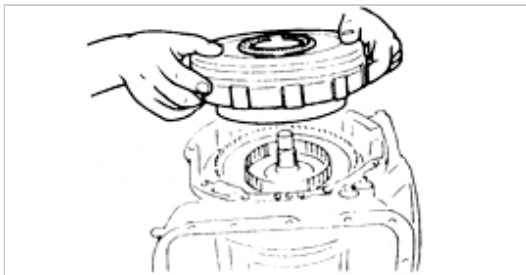


27. Remove reverse/forward clutch assembly.

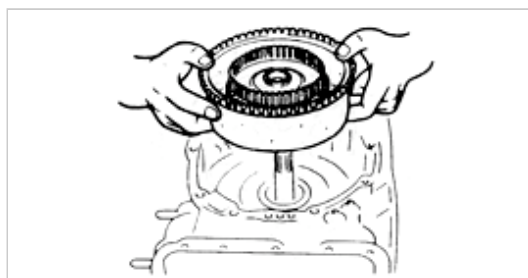
A. Remove turbine shaft snap ring.



B. Pull reverse/forward drum and remove clutch assembly.



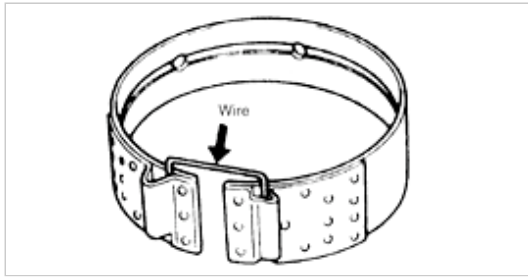
28. Remove small sun gear and one-way clutch No. 1.



NOTICE

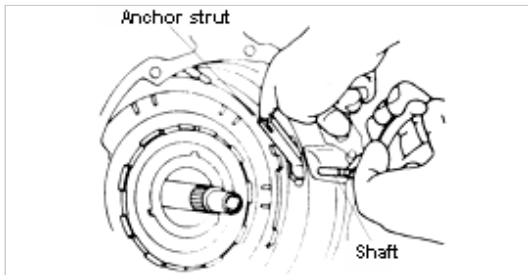
Use a piece of wire to secure brake band so that it is not damaged by being stretched.

29. Remove 2-4 brake band.



30. Pull anchor shaft holding strut.

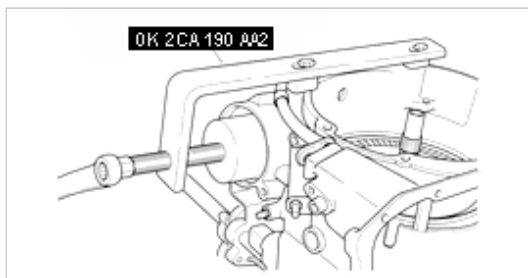
31. Remove strut.



32. Remove servo with SST (0K2CA 190 AA2).

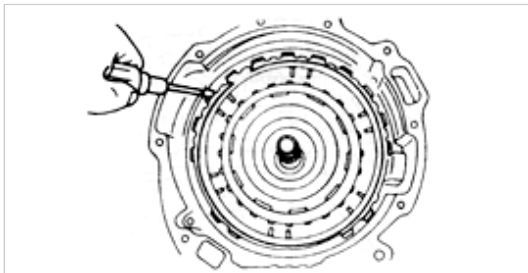
A. Compress servo piston and remove snap ring.

B. Remove servo retainer, servo piston, and spring.



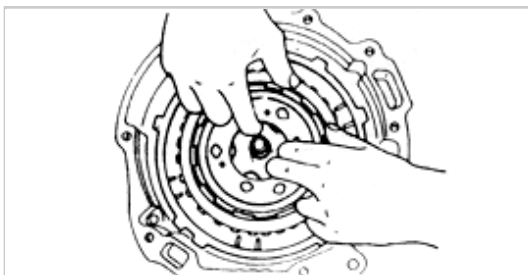
33. Remove one-way clutch No. 2 and planetary carrier assembly.

A. Remove snap ring.



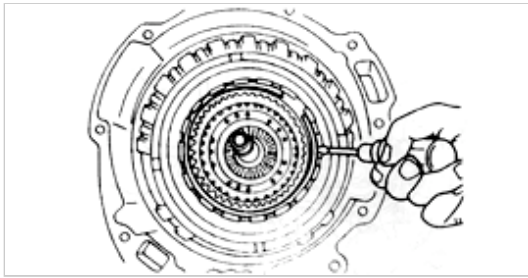
B. Remove one-way clutch No. 2 together with planetary carrier assembly.

C. Remove friction plate.



34. Remove internal gear.

A. Remove snap ring.



B. Remove internal gear from output shell.



35. Remove 3-4 clutch assembly.

A. Remove O-ring from turbine shaft at converter housing side.

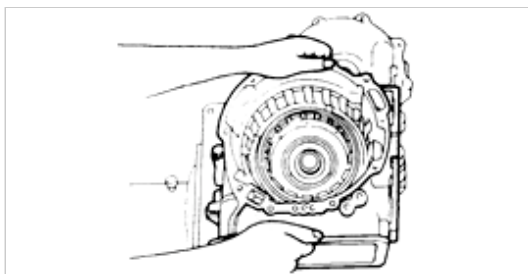


B. Pull out turbine shaft to remove 3-4 clutch assembly.

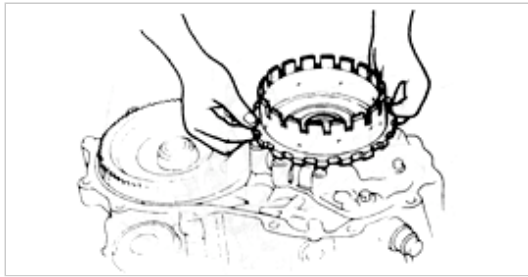
C. Remove 3-4 clutch assembly from turbine shaft.



36. Remove bolts (converter housing side : eight bolts transaxle case side : seven bolts) and remove transaxle case by tapping lightly with a plastic hammer.



37. Remove output shell from output gear.

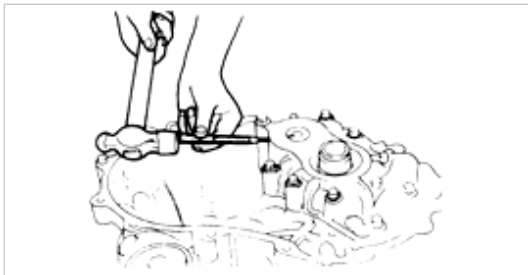


38. Remove differential assembly.

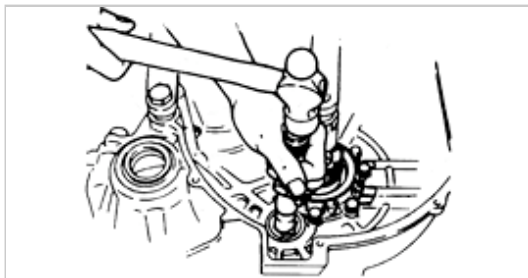


39. Remove bearing housing.

- A. Remove roll pin with a pin punch.
- B. Remove (11) bolts securing bearing housing.
- C. Remove bearing housing by tapping lightly with a plastic hammer.

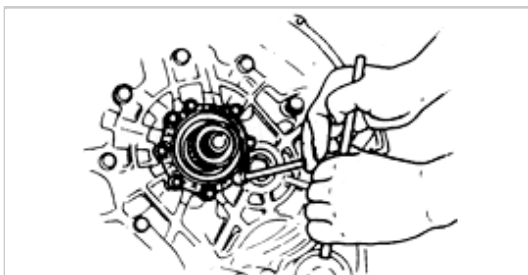


40. Remove idler gear assembly and output gear assembly by tapping out from torque converter side.

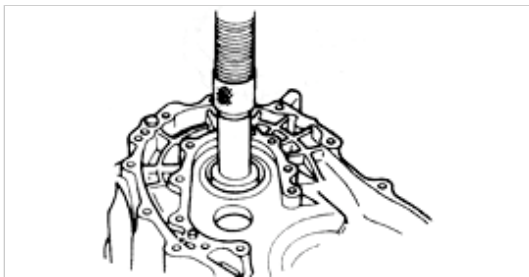


41. Remove bearing cover.

- A. Remove bearing cover bolts.
- B. Remove converter housing from SST (0K130 175 011A).



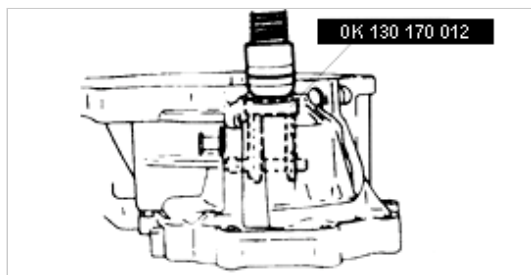
C. Press bearing cover assembly out of converter housing.



NOTICE

Install bearing outer race during reassembly to adjust preload.

42. Press out bearing outer races by using SST (0K130 170 012).

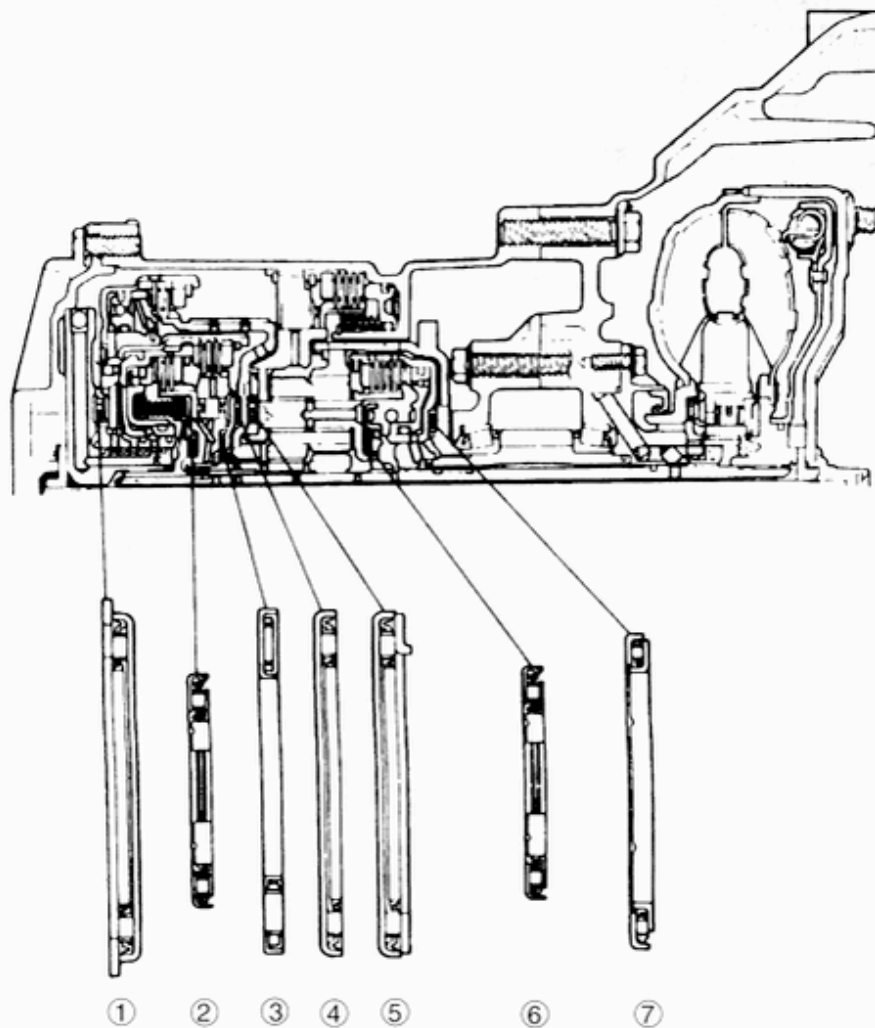


Reassembly

Precaution

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

Bearing and Race Locations



Outer diameter of bearing and race

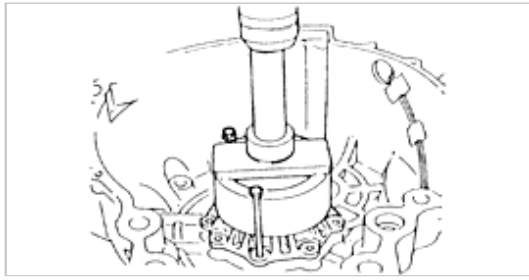
	1	2	3	4	5	6	7
Bearing in(mm)	3.39 (86.1)	2.21 (56.1)	2.29 (58.1)	3.39 (86.1)	3.39 (86.1)	2.21 (56.1)	2.84 (72)
Race in(mm)	3.46 (88.0)	-	-	-	3.31 (84.0)	-	-

NOTICE

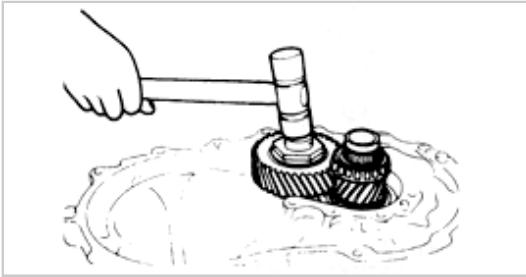
Bearing and race at location 2, 3, 4, 6 and 7 are one-piece units.

1. Align bush cover with guide bolts as shown, and press it in.

Tightening torque : 96~120 lb-in (10.8~13.7 N·m, 110~140 kg-cm)

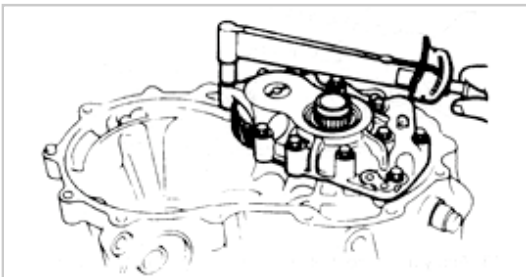


2. Install idler gear and output gear as an assembly by tapping it with a plastic hammer.
3. Install bearing housing.
 - A. Install bearing housing on converter housing.

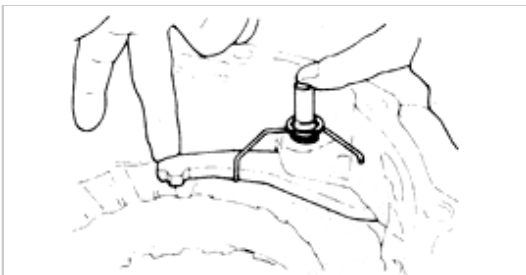


- B. Align groove on idler shaft with mark on bearing housing.
- C. Tap a new roll pin in with a pin punch and hammer.
- D. Install 11 mounting bolts.

Tightening torque : 14~18 lb-ft (19~25 N·m, 1.9~2.6 kg-m)

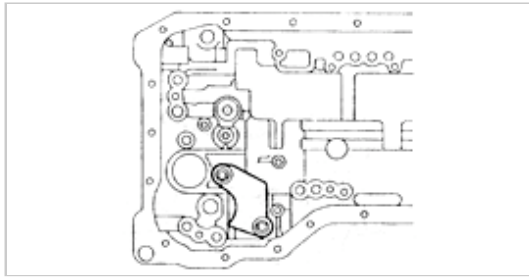


4. Install parking pawl.
 - A. Install parking pawl and shaft.
 - B. Install spring and snap ring.
 - C. Move manual shaft and verify that parking pawl operates.

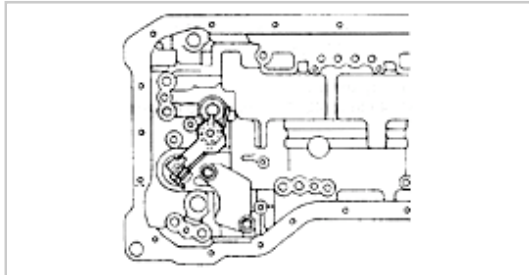


5. Install actuator support with new bolts.

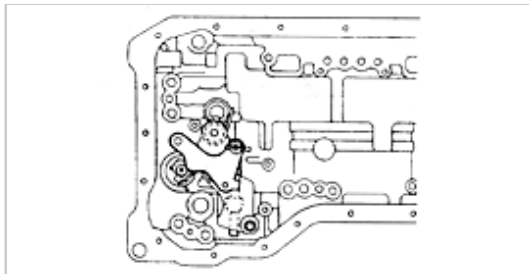
Tightening torque : 11~13 lb-ft (15~17 N·m, 1.5~1.8 kg-m)



6. Install detent lever and return spring.

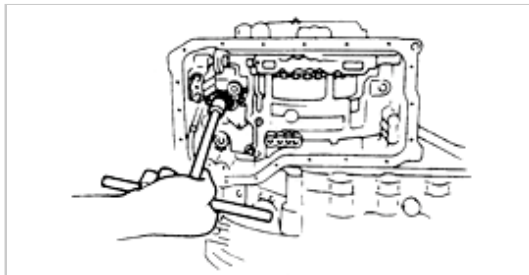


7. Install parking assist lever.



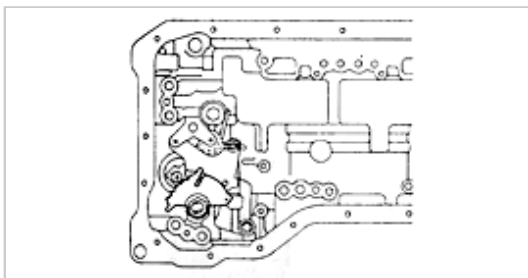
8. Install lever holder and bolt.

Tightening torque : 69.6~94.8 lb-in (7.9~10.7 N·m, 80~110 kg-cm)



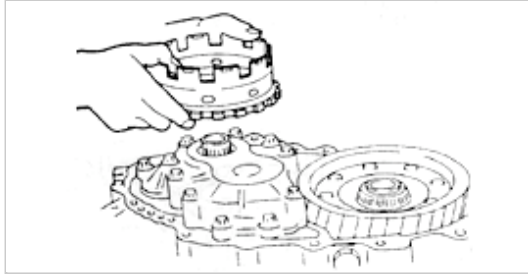
9. Install manual shaft and manual plate.
 A. Install manual plate, washer, and nut.
 B. Tighten nut to specified torque.

Tightening torque : 31~40 lb-ft (42~54 N·m, 4.2~5.6 kg-m)



10. Install differential assembly into converter housing.
Install SST (0K201 270 014) or equivalent.
11. Install a new oil control ring onto output gear assembly.
12. Install output shell to output gear and install bearing race onto output shell.

Thrust bearing outer diameter : 2.84 in (72.1 mm)



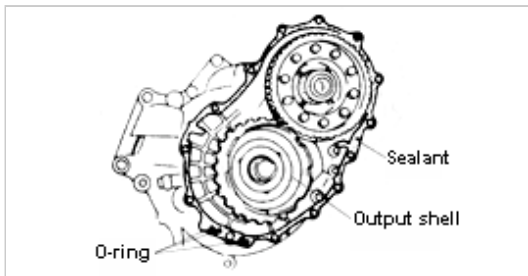
13. Apply a thin coat of silicone sealant (TB-1217B) to contact surfaces of converter housing and transaxle case.
14. Install new O-rings onto converter housing.

NOTICE

Insure that sealer will not be forced into oil passages when transaxle case is installed.

15. Mount transaxle case to converter housing.

Tightening torque : 28~38 lb-ft (38~51 N·m, 3.8~5.3 kg-m)



16. Install SST (0K201 190 019) to hold turbine shaft.

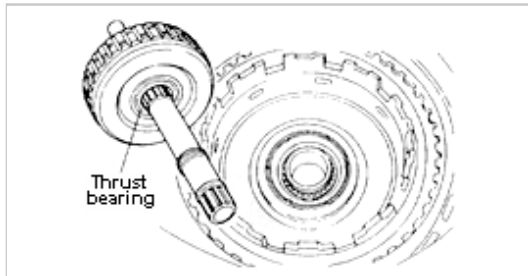


17. Install turbine shaft and 3-4 clutch assembly.
 - A. Assemble turbine shaft and 3-4 clutch assembly.



B. Verify that thrust bearing is properly installed.

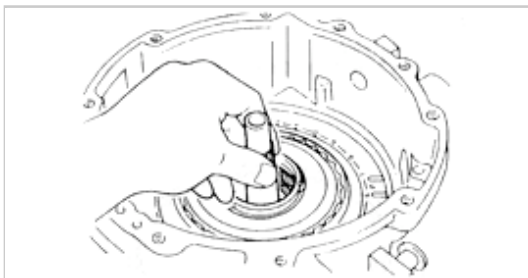
C. Install turbine shaft and 3-4 clutch assembly into transaxle case as an assembly.



18. Install internal gear.

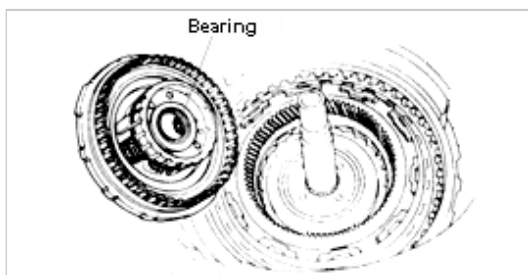
A. Install internal gear to output shell.

B. Install snap ring.



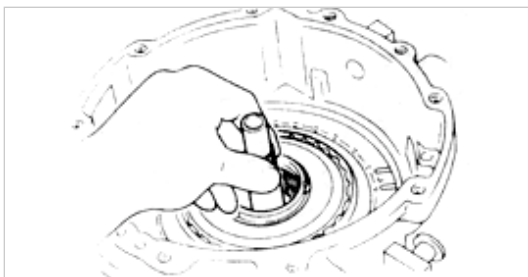
19. Install planetary carrier assembly.

A. Verify that thrust bearing and bearing race are properly installed.



B. Hold turbine shaft with one hand to prevent it from rotating.

C. Install planetary carrier assembly into 3-4 clutch drum by rotating it.



20. Install low and reverse brake drive and driven plates (four each).

NOTICE

Installation order :

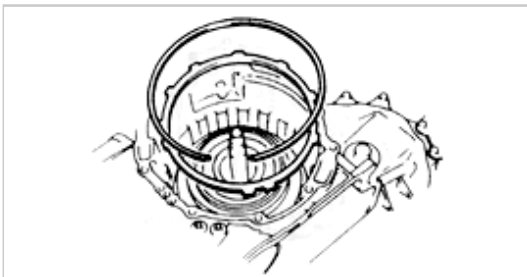
Driven-Drive-Driven-Drive-Driven-Drive-Driven-Drive



21. Install retaining plate.

22. Install snap ring.

23. Install friction plate.

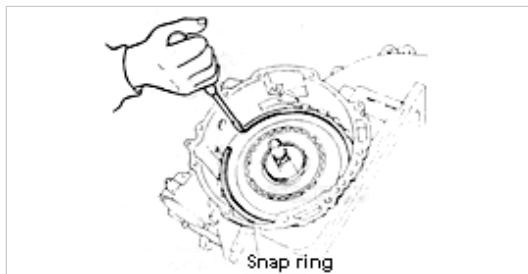


24. Install one-way clutch No. 2.

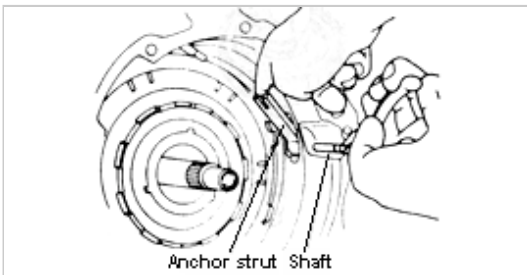
A. Hold one-way clutch No. 2 horizontally.

B. Install it by turning planetary carrier counterclockwise.

C. Install snap ring.



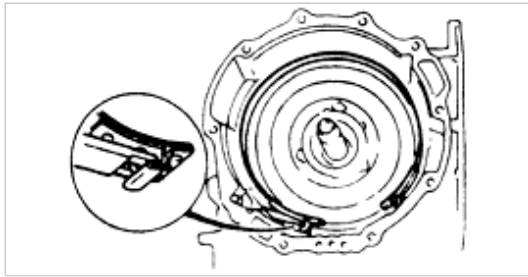
25. Install anchor strut and shaft.



NOTICE

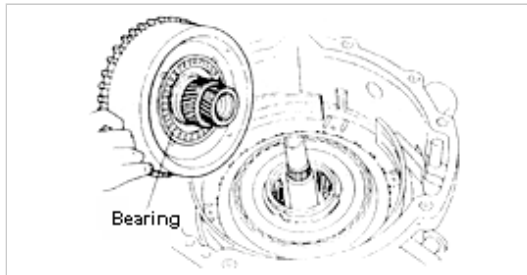
Interlock 2-4 brake band and anchor strut as shown.

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

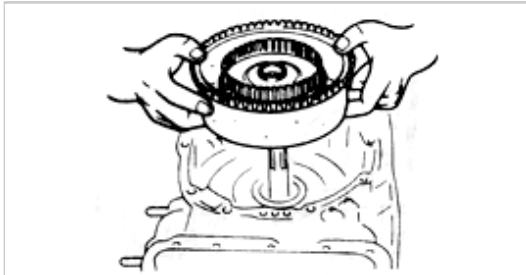


27. Install small sun gear and one-way clutch No. 1.

A. Verify that thrust bearing and bearing race are installed in correct position.

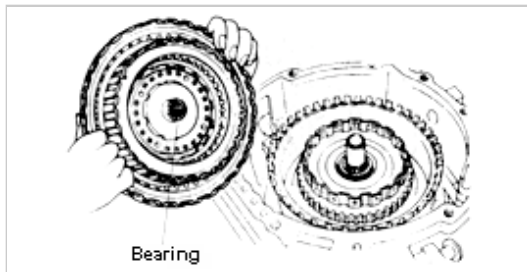


B. Install small sun gear and one-way clutch No. 1 while rotating it.

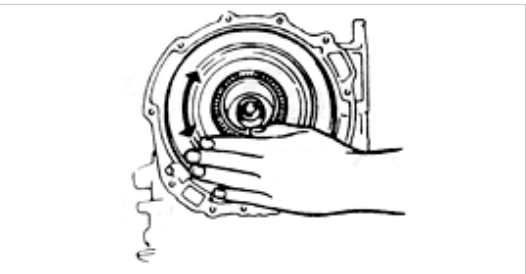


28. Install reverse/forward clutch assembly.

A. Verify that thrust bearing is installed in correct position.



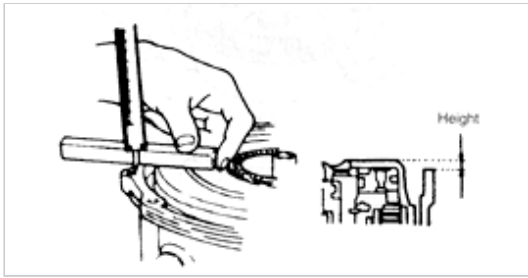
B. Install reverse/forward clutch assembly while rotating it.



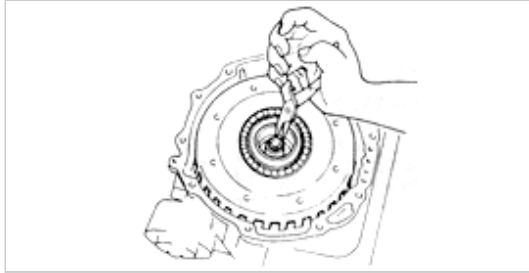
NOTICE

Measure height difference between reverse/forward drum and transaxle case.

Maximum : 0.035 in (0.9 mm)

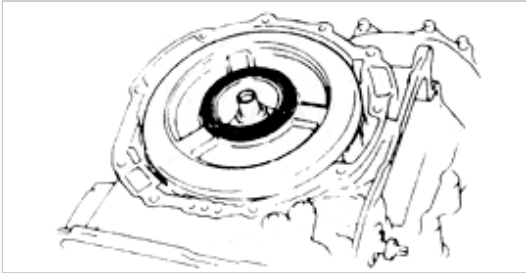


29. Install snap ring into bottom ring groove of turbine shaft.



30. Measure total end play select a suitable bearing race as follows :

A. Set thrust bearing onto reverse/forward clutch assembly.



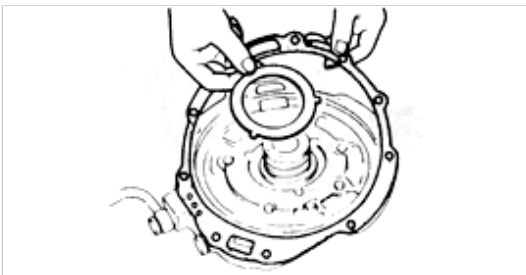
B. Remove previously used race and gasket.

C. Set thickest bearing race 0.089 in (2.2 mm) onto oil pump.

D. Set oil pump onto clutch assembly.

NOTICE

Do not install oil pump gasket at this time.

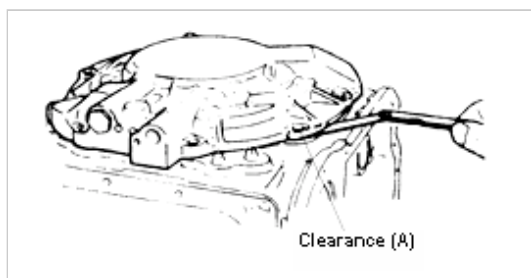


E. Measure clearance (A) between transaxle case and oil pump.

F. Select a suitable bearing race from chart below.

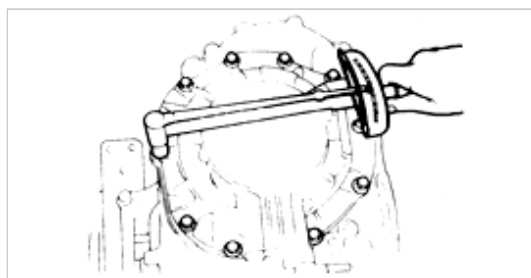
Clearance (A) in (mm)	Select this bearing race in (mm)
0.036~0.043 (0.091~1.10)	0.047 (1.2)
0.028~0.035 (0.71~0.90)	0.055 (1.4)
0.020~0.027 (0.51~0.70)	0.063 (1.6)
0.012~0.019 (0.31~0.50)	0.071 (1.8)

0.004~0.011 (0.11~0.30)	0.079 (2.0)
0~0.003 (0~0.10)	0.087 (2.2)

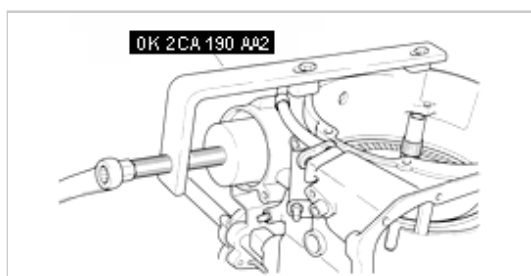


- G. Remove oil pump.
- H. Place selected bearing race and a new gasket onto oil pump.
- I. Install oil pump onto transaxle assembly.

Tightening torque : 14~18 lb-ft (N·m, 190~260 kg-cm)



31. Verify 2-4 brake band adjustment as follows :
- A. Install servo piston to SST (0K2CA 190 AA2).
 - B. Install servo retainer O-ring onto SST (0K2CA 190 AA2).

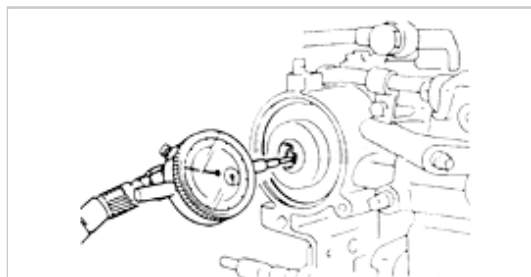


- C. Coat O-ring with ATF, install band servo assembly and SST into transaxle case and secure it with snap ring.

NOTICE

Insure that 2-4 brake band is correctly positioned against band servo piston stem.

- D. Set a dial indicator against piston stem.



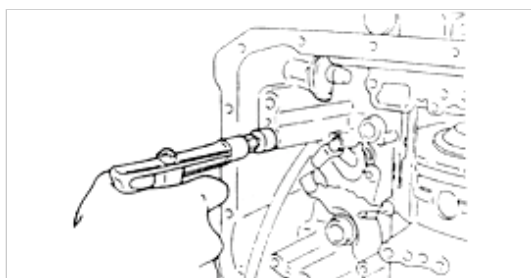
- E. Apply compressed air through fluid passage with a rubber-tipped air nozzle as shown and measure piston stem stroke.

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

Stroke : 0.039~0.067 in (1.0~1.7 mm)

- F. If not within specification, select proper piston stem from below.

Piston stem length in (mm)		
3.740 (95.0)	3.760 (95.5)	3.780 (96.0)
3.799 (96.5)	3.819 (97.0)	3.839 (97.5)
3.868 (98.0)	3.878 (98.5)	3.898 (99.0)



- G. Remove band servo assembly and remove SST.

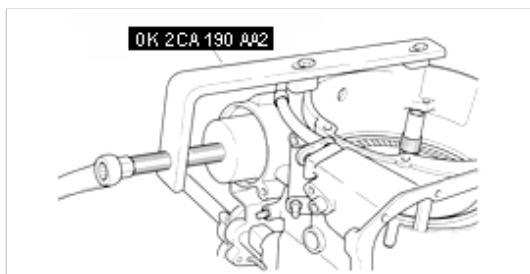
NOTICE

Do not deform snap ring when removing it.

32. Install servo into transaxle case with SST (0K2CA 190 AA2).

A. Install servo spring and servo assembly.

B. Install snap ring.



C. Position 2-4 brake band onto band servo piston stem.

33. Align manual valve with pin on manual plate and install control valve body.

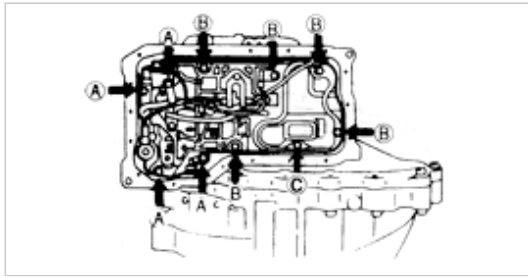
Tightening torque : 69.6~94.8 lb-in (7.9~10.7 N·m, 80~110 kg-cm)

Bolt length : (measured from below the head)

A : 1.18 in (30 mm)

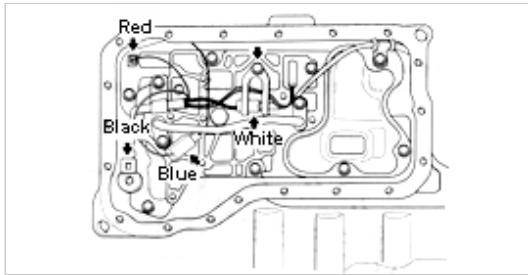
B : 1.97 in (50 mm)

C : 0.55 in (14 mm)



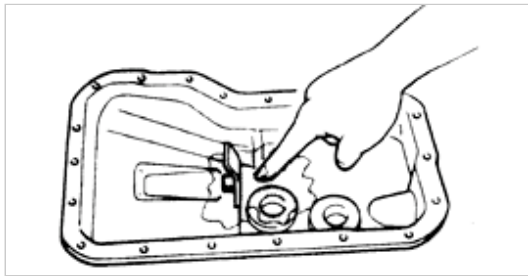
34. Connect solenoid valve and ATF temperature sensor connectors.

35. Connect solenoid connector.



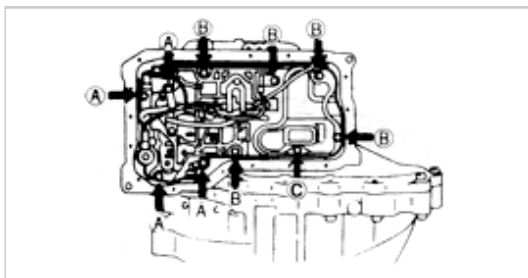
NOTICE

Attach magnets inside oil pan in positions shown on illustration (in oil pan).



36. Install a new gasket and oil pan tighten 19 bolts.

Tightening torque : 74.4~94.8 lb-in (8.4~10.7 N·m, 80~110 kg-cm)



37. Install inlet pipe and outlet pipe.

38. Install driven gear and vehicle speed sensor.

39. Install crankshaft position sensor.

40. Install bracket and select bracket.

41. Install transaxle range switch.

A. Turn manual shaft to N position.

B. Install transaxle range switch.

C. Tighten transaxle range switch mounting bolts.

Tightening torque : 70~95 lb-in (7.9~10.7 N·m, 80~110 kg-cm)

D. Verify that the selector lever range position and transaxle range switch correspond.

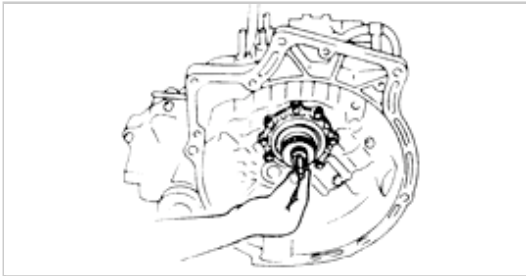
42. Remove transaxle from SST (0K 130 990 007/0K130 175 011A).

43. Install a new O-ring and install oil level gauge and oil filler tube to transaxle case.

Tightening torque : 69.6~94.8 lb-in (7.9~10.7 N·m, 80~110 kg-cm)

44. Install oil pump shaft.

45. Install a new O-ring onto turbine shaft.

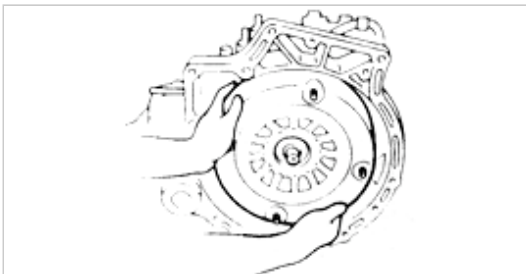


46. Fill torque converter with ATF.

ATF type : M-III or Dexron III

NOTICE

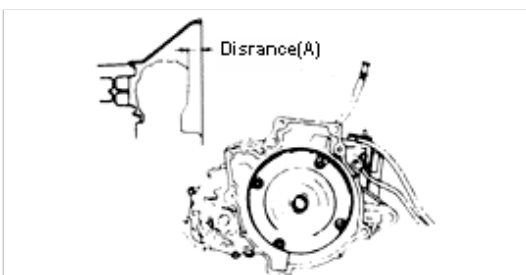
- 1) Hold torque converter in an upright position when filling it with ATF. Do not allow fluid to overflow.
- 2) If converter does not fit in easily, do not try to force it; install carefully.
- 3) Do not damage O-ring onto turbine shaft.



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

48. To ensure that the torque converter is installed accurately, measure distance "A" between face of torque converter and mounting surface of converter housing.

Distance (A) : 0.535 in (13.6 mm)



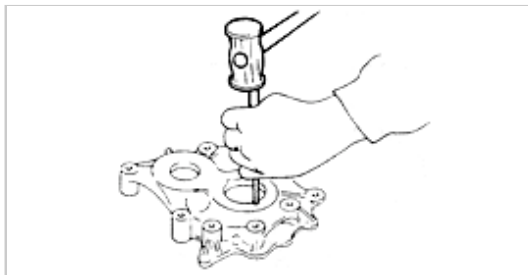
Bearing preload

1. Remove bearing outer race from bearing cover.
2. Install bearing cover with SST (0K201 190 017).
3. Align bearing cover with guide bolts as shown, and press it in. Torque bearing cover bolts.

Tightening torque : 96~120 lb-in (10.8~13.7 N·m, 110~140 kg-cm)



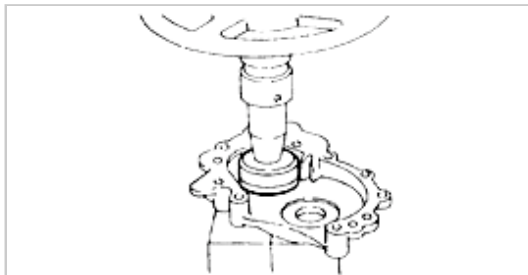
4. Remove bearing outer race and adjustment shims from bearing housing using a pin punch and hammer.



5. Install bearing outer race to bearing housing.

NOTICE

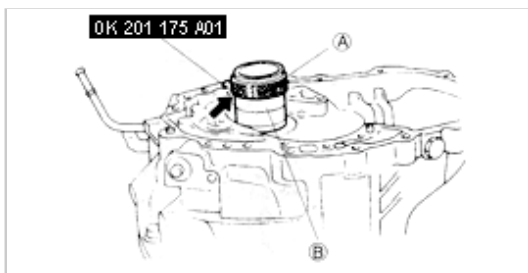
Do not install adjustment shims.



NOTICE

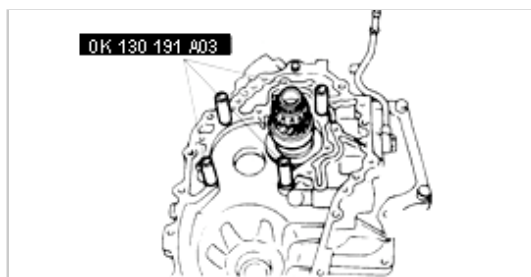
Eliminate gap (arrow) by turning A or B of selector.

6. Set SST (0K201 175 A01) onto converter housing.
7. Install outer race removed in step 1 to SST (0K201 175 A01).



8. Set output gear assembly onto SST (0K130 191 A03).

9. Set four SST (0K130 191 A03) on converter housing in positions shown.



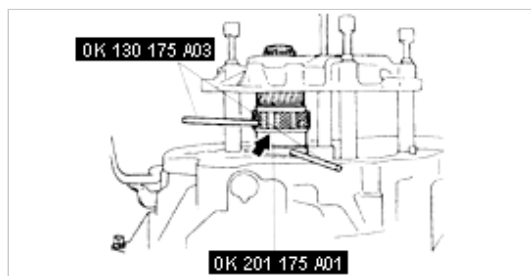
10. Set bearing housing on output gear assembly and install four SST (0K130 175 A04) ; then tighten them to specified torque.

Tightening torque : 14~18 lb-ft (19~25 N·m, 1.9~2.6 kg-m)



11. To seat bearing, turn SST (0K201 175 A01) to increase clearance indicated by arrow with SST (0K130 175 A03) until SST (0K130 175 A03) no longer turns.

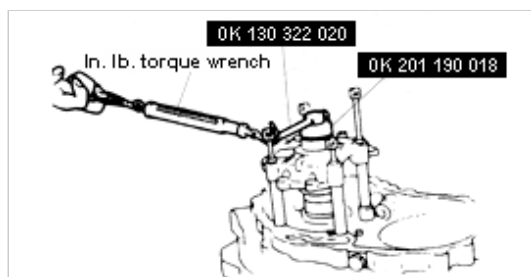
12. Turn selector in opposite direction until gap is reduced.



13. Mount SST (0K130 322 020) and torque meter on output gear.

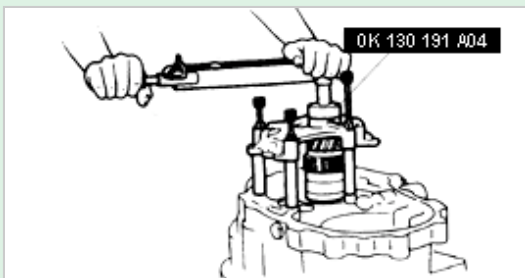
14. Adjust clearance of SST (0K130 175 A03) to obtain specified preload.

Preload : 0.27~7.8 lb-in (0.03~0.8 N·m, 0.3~9.0 kg-cm)



NOTICE

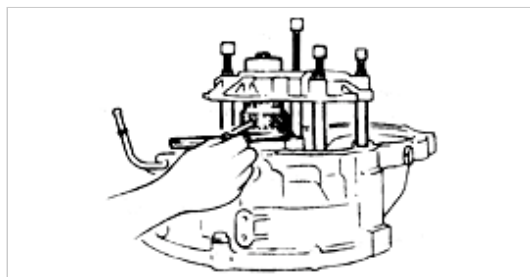
- 1) Read preload when output gear is rotating.



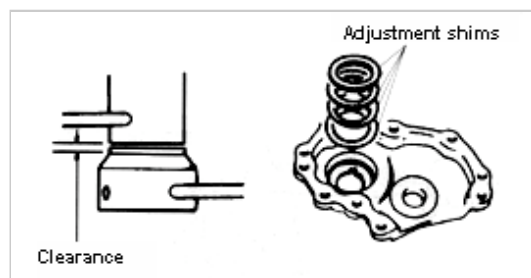
- 2) Measure clearance around entire circumference and select shims equivalent to maximum clearance.
- 3) The maximum allowable number of shims is 7.

15. Measure clearance. Select adjustment shim (s) equivalent to measured clearance.

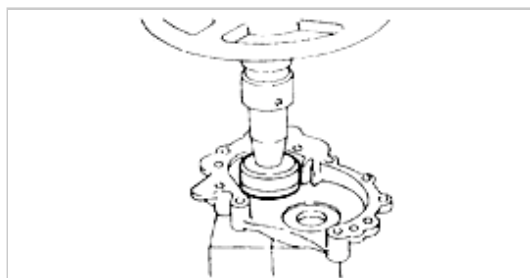
Thickness of shim in (mm)			
0.020 (0.50)	0.022 (0.55)	0.024 (0.60)	0.026 (0.65)
0.028 (0.70)	0.030 (0.75)	0.031 (0.80)	0.034 (0.85)
0.035 (0.90)	0.037 (0.95)	0.039 (1.00)	0.041 (1.05)
0.043 (1.10)	0.045 (1.15)	0.047 (1.20)	0.049 (1.25)
0.051 (1.30)	0.053 (1.35)	0.055 (1.40)	0.057 (1.45)



16. Remove bearing housing and SST (0K201 175 AA0).
17. Remove bearing outer race from bearing housing, refer to Bearing and Race Locations.



18. Install required shim (s).
19. Press bearing race into bearing housing with SST (or equivalent).
20. Press bearing outer race into bearing cover.

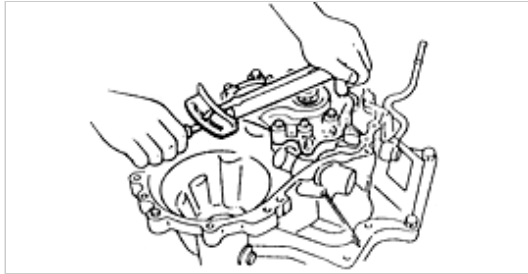


21. Install output gear assembly and bearing housing.

Tightening torque : 14~18 lb-ft (19~25 N·m, 1.9~2.6 kg-m)

NOTICE

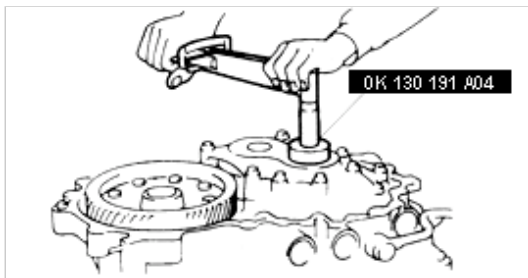
Do not install idler gear at this time.



22. Using SST (0K130 191 A04) and a torque meter, verify that preload reading is within specification.

Preload : 0.27~7.8 lb-in (0.03~0.8 N·m, 0.3~9.0 kg-cm)

23. Remove bearing housing and output gear assembly.



Torque converter

The torque converter is welded together and cannot be disassembled.

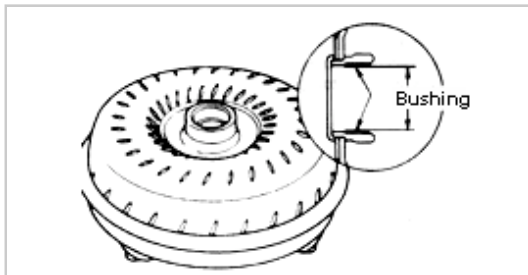
Inspection

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

Bushing inner diameter

Standard : 2.088 in (53.030 mm)

Maximum : 2.090 in (53.075 mm)



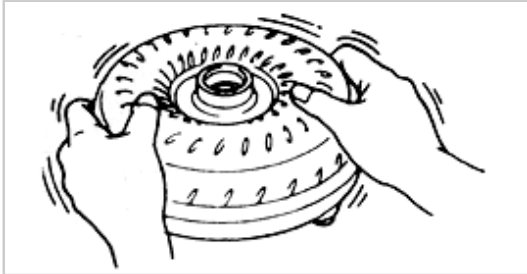
Washing inside converter

1. Drain any ATF remaining in converter.

2. Pour in ATF 0.5 US qt (0.5 liter, 0.44 Imp qt).
3. Shake converter to clean inside. Pour out ATF.
4. Pour in ATF.
5. Shake converter to clean inside. Pour out ATF.

NOTICE

Replace torque converter if it contains any metallic particles.





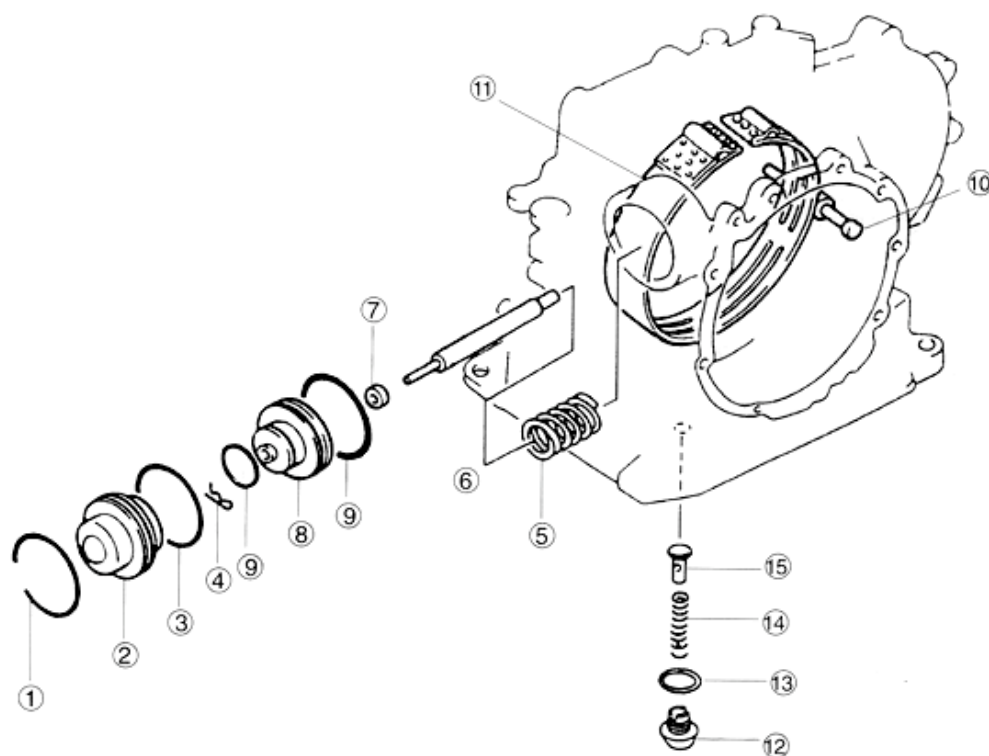
Automatic Transaxle System

Automatic Transaxle System - Kick Down Band



Component

Brake band



- (1) Snap ring
- (2) Servo retainer
- (3) O-ring (Replace)
- (4) Spring clip (Replace)
- (5) Servo return spring
- (6) Piston stem (Replace If Necessary)
- (7) Washer
- (8) Servo piston

- (9) D-ring (Replace)
- (10) Band strut
- (11) 2-4 brake band*(see Notice below)
- (12) Orifice holder
- (13) Washer
- (14) Orifice check spring
- (15) Orifice valve



Disassembly

Brake band

1. Disassembly in order shown in figure.

NOTICE

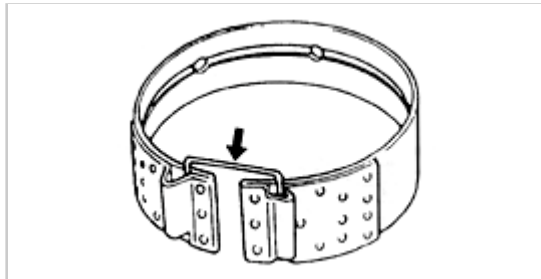
Use a piece of wire to secure 2-4 brake band so that it is not damaged by being allowed to fully expand.

Inspection

Brake band

2-4 Brake band

1. Check 2-4 brake band for wear and burnt friction material.

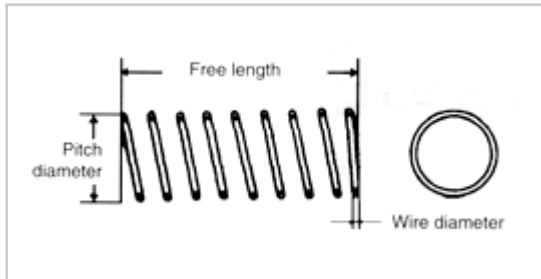


Servo return spring

1. Measure servo return spring free length and check for deformation.

Free length : 1.703 in (43.25 mm)

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



Orifice check spring

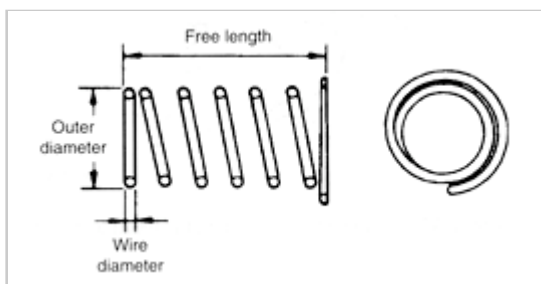
NOTICE

Do not compress spring when measuring it with vernier calipers.

1. Measure spring free length.

Specifications			
Outer diameter in (mm)	Free length in (mm)	Number of coils in (mm)	Wire diameter in (mm)
2.925 (7.5)	1.291 (32.8)	10	0.024 (0.6)

2. If not as specified, replace spring.



Reassembly

Brake band

NOTICE

Install spring exactly in direction shown.

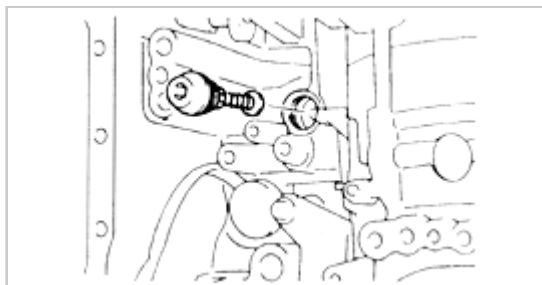
1. Install orifice valve, orifice check spring, and orifice holder as shown.



2. Install orifice assembly and washer to transaxle case.
3. Tighten orifice assembly using a hexagonal wrench.

Tightening torque : 29~39 lb-ft (40~53 N·m, 4.0~5.0 kg/cm²)

4. Install band strut.
5. Install 2-4 brake band.

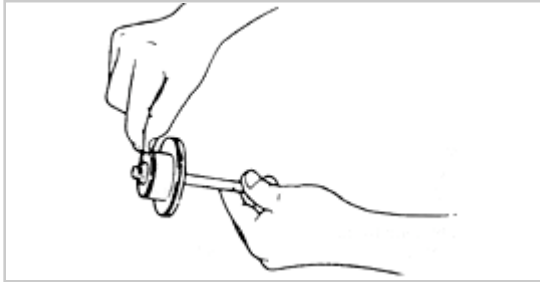


6. Apply ATF to new D-rings and install them to servo piston.

D-ring inner diameter :
 Piston stem side : 2.303 in (58.5 mm)
 Servo retainer side : 1.157 in (29.4 mm)

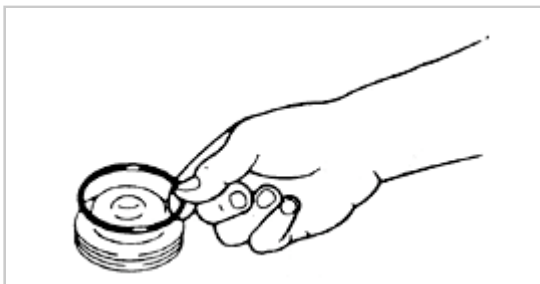


7. Insert piston stem into servo piston and secure it with a new spring clip.



8. Apply ATF to new O-ring and install it to servo retainer.

O-ring inner diameter : 2.587 in (65.7 mm)

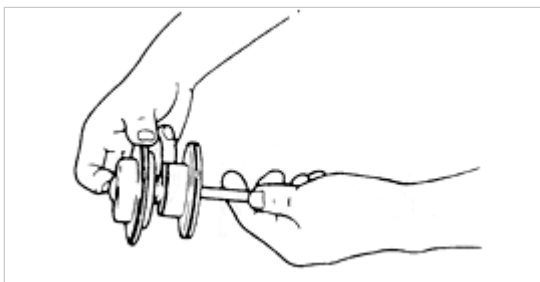


9. Assemble servo piston and servo retainer.

NOTICE

Do not install servo piston and retainer into transaxle case at this time.

10. Install snap ring.



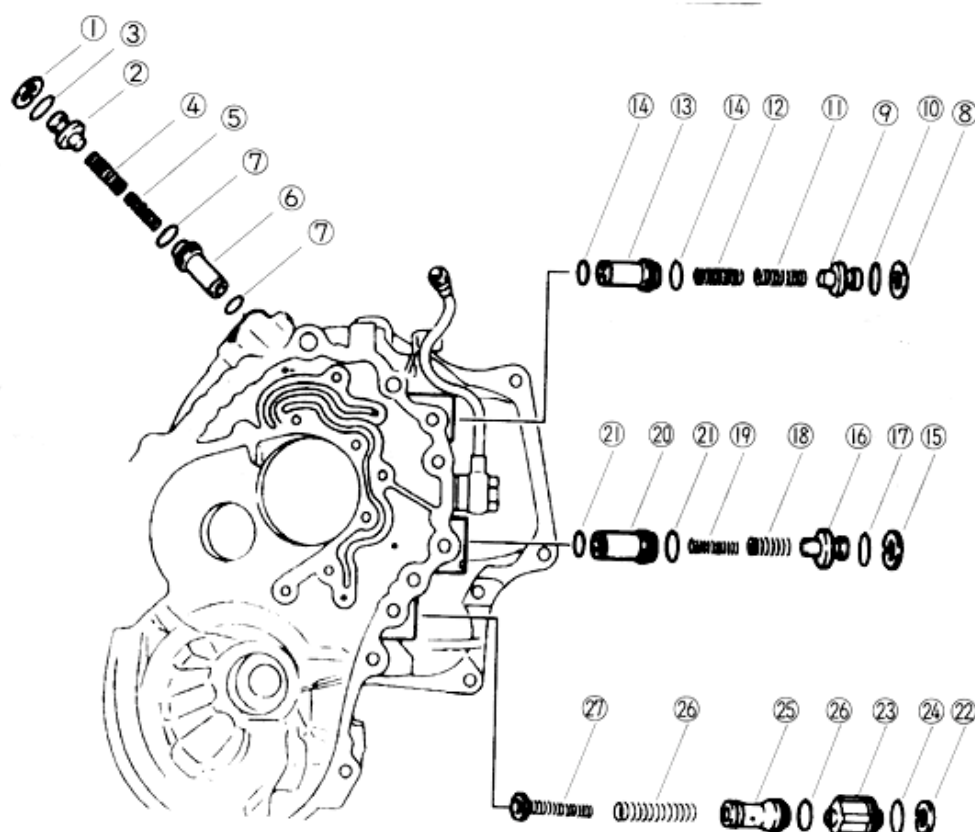


Automatic Transaxle System

Automatic Transaxle System - The Other Automatic Transaxle



Component



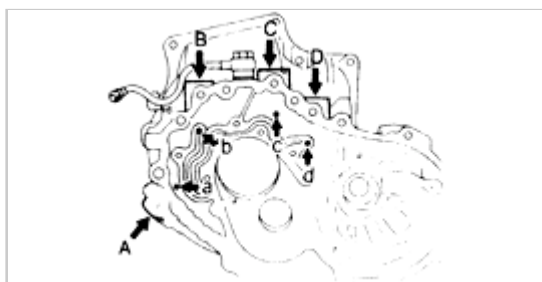
- | | |
|---------------------------------|---------------------------------|
| (1) Snap ring | (15) Snap ring |
| (2) Stop | (16) Stop |
| (3) O-ring (Replace) | (17) O-ring (Replace) |
| (4) 2-3 accumulator spring (L) | (18) N-D accumulator spring (L) |
| (5) 2-3 accumulator spring (S) | (19) N-D accumulator spring (S) |
| (6) 2-3 accumulator piston | (20) N-D accumulator piston |
| (7) Seal rings (Replace) | (21) Seal rings (Replace) |
| (8) Snap ring | (22) Snap ring |
| (9) Stop | (23) Stop |
| (10) O-ring (Replace) | (24) O-ring (Replace) |
| (11) 1-2 accumulator spring (L) | (25) N-R accumulator piston |
| (12) 1-2 accumulator spring (S) | (26) N-R accumulator spring (L) |
| (13) 1-2 accumulator piston | (27) N-R accumulator spring (S) |
| (14) Seal rings (Replace) | |



Disassembly

1. Remove accumulator pistons and springs from clutch housing by applying compressed air through oil passage as shown in figure.

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



Inspection

Accumulator spring

1. Measure spring free length

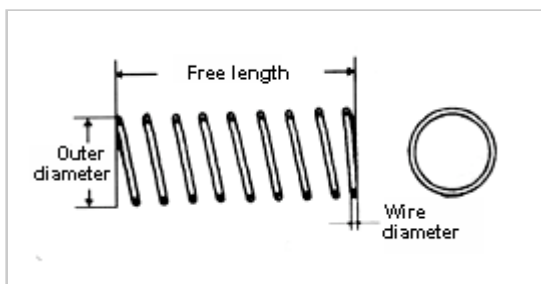
BF Engine

Spring	Spec				
	Outer dia. in (mm)	Free length in (mm)	Number of coils	Wire dia. in (mm)	Color
2-3 accumulator spring (S)	0.394 (10.0)	2.669 (67.8)	22	0.063 (1.3)	Green
2-3 accumulator spring (L)	0.591 (15.0)	2.736 (69.5)	17.8	0.079 (2.0)	Brown
1-2 accumulator spring (S)	0.441 (11.2)	3.335 (84.7)	27.5	0.059 (1.5)	Brown
1-2 accumulator spring (L)	0.630 (16.0)	3.335 (84.7)	21.5	0.075 (1.9)	Brown
N-D accumulator spring (S)	0.425 (10.8)	3.984 (101.2)	30.2	0.047 (1.2)	Green
N-D accumulator spring (L)	0.591 (15.0)	3.709 (94.2)	18.5	0.063 (1.6)	Green
N-R accumulator spring (S)	0.386 (9.8)	3.669 (93.2)	33.5	0.051 (1.3)	-
N-R accumulator spring (L)	0.551 (14.0)	4.193 (106.5)	25.0	0.067 (1.7)	-

TE DOHC Engine

Spring	Spec				
	Outer dia. in (mm)	Free length in (mm)	Number of coils	Wire dia. in (mm)	Color
2-3 accumulator spring (S)	0.456 (11.6)	0.350 (59.7)	18.9	0.070 (1.8)	White
2-3 accumulator spring (L)	0.591 (15.0)	2.827 (71.8)	11.8	0.047 (1.2)	White
1-2 accumulator spring (S)	0.433 (11.0)	3.216 (81.7)	27.9	0.055 (1.4)	White
1-2 accumulator spring (L)	0.629 (16.0)	3.232 (82.1)	20.0	0.079 (2.0)	White
N-D accumulator spring (S)	0.425 (10.8)	3.984 (101.2)	30.2	0.047 (1.2)	Green
N-D accumulator spring (L)	0.591 (15.0)	3.709 (94.2)	18.5	0.063 (1.6)	Green
N-R accumulator spring (S)	0.386 (9.8)	3.669 (93.2)	33.5	0.051 (1.3)	-
N-R accumulator spring (L)	0.551 (14.0)	4.193 (106.5)	25.0	0.067 (1.7)	-

2. If not within specification, replace spring.



Reassembly

NOTICE

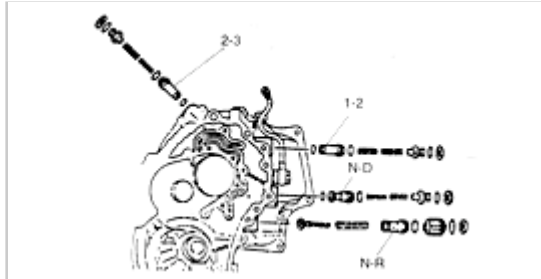
- Installation order
2-3 accumulator : piston-spring-stopper
1-2 accumulator : piston-spring-stopper
N-D accumulator : piston-spring-stopper
N-R accumulator : spring-piston-stopper
- Apply even pressure to perimeter of accumulator pistons and stops to avoid damaging O-ring and seal rings while installing.

1. Apply ATF to new seal rings and install them onto accumulator pistons.

Accumulator	Item	
	Large in (mm)	Small in (mm)
2-3 accumulator	1.176 (29.87)	0.862 (21.91)
1-2 accumulator	1.185 (30.1)	0.882 (22.4)

N-D accumulator	1.176 (29.87)	0.862 (21.91)
N-R accumulator	1.176 (29.87)	-

2. Install accumulator pistons and springs.
3. Install stopper and snap ring.



Item	Symptom	Inspection point	Reference page	Preliminary										Electrical system											
				ATF level and condition	Selector lever	Selector cable	Idle speed and ignition timing	Stall test	Time lag test	Line pressure test	Road test	O/D switch	Transaxle range switch	Throttle position sensor	Closed throttle position switch	Input/turbine speed sensor	Vehicle speed sensor	Brake pedal position switch	Transaxle fluid temp. sensor	Engine coolant temperature sensor [Coolant temperature signal]	Shift solenoid A	Shift solenoid B	Shift solenoid C	TCC solenoid	Linear solenoid valve
				42-93	42-90	42-222	Section 21	42-100	42-103	42-104	42-107	42-89	42-90	Section 21	Section 21	42-91	42-92	ETM	42-91	Section 21	42-92	42-92	42-92	42-92	42-92
1	Will start in other than P and N ranges																								
2	Engine stalls	Idle when shifted from N or P to other ranges																							
3		On deceleration																							
4	Engine rough	On deceleration																							
5	Poor	At drive-away																							
6	acceleration	On acceleration																							
7	Surges while cruising																								
8	Lack of power																								
9	Poor fuel economy																								
10	Vehicle does not move in D, 2, 1 and/or R ranges																								
11	Vehicle moves in N range																								
12	Vehicle moves in P range																								
13	Excessive creep																								
14	No shift																								
	Does not shift from 1GR to 2GR																								
	Does not shift from 2GR to 3GR																								
	Does not shift from 3GR to O/D																								
	Does not shift from O/D to 2 GR or from 3GR to 2GR																								
	Does not shift from 3GR to 1GR or from 2GR to 1GR																								
15	Abnormal shift																								
	Shifts directly from 1GR to 3GR																								
	Does not kickdown when accelerator is depressed in O/D within kickdown range																								
	Excessive engine speed when accelerated in O/D due to delayed																								
16	Frequent shifting																								
17	Shift point high or low																								
18	No lock-up																								
19	No kickdown																								
20	Engine speed	When accelerating																							
21	flares up	When upshifting and/or downshifting																							

QuickDiagnosis Chart (II)

Elec.	Hydraulic control system										Powertrain										Inspection point	Reference page	
Transaxle control module	42-73	42-158	42-195	42-155	42-155	42-155	42-155	42-155	42-187	42-154	42-163	42-161	42-161	42-177	42-187	42-182	42-171	42-175	42-175	42-130			42-216
Oil pump																							
Control valve body																							
1-2 Accumulator																							
2-3 Accumulator																							
N-D Accumulator																							
N-R Accumulator																							
Orifice valve																							
Servo piston																							
Torque converter																							
Forward clutch																							
Coasting clutch																							
Reverse clutch																							
3-4 clutch																							
2-4 brake band																							
Low and reverse brake																							
One-way clutch No. 1																							
One-way clutch No.2																							
Planetary gear set																							
Parking mechanism																							
Differential assembly																							
																						Symptom	Item
																						Will start in other than P and N ranges	1
																						Idle when shifted from N or P to other ranges	2
																						On deceleration	3
																						On deceleration	4
																						At driveway	5
																						On acceleration	6
																						Surges while cruising	7
																						Lack of power	8
																						Poor fuel economy	9
																						Vehicle does not move in D, 2, 1 and/or R range	10
																						Vehicle moves in N ranges	11
																						Vehicle moves in P ranges	12
																						Excessive creep	13
																						No shift	14
																						Does not shift from 1GR to 2GR	
																						Does not shift from 2GR to 3GR	
																						Does not shift from 3rd to O/D	
																						Does not shift from O/D to 2GR or from 3GR to 2GR	
																						Does not shift from 3GR to 1GR or from 2GR to 1GR	
																						Abnormal shift	15
																						Shifts directly from 1GR to 3GR	
																						Does not kickdown when accelerator is depressed in O/D within kickdown range	
																						Frequent shifting	16
																						Shift point high or low	17
																						No lock-up	18
																						No kickdown	19
																						When accelerating	20
																						When upshifting and/or downshifting	21

Quick Diagnosis Chart (II-2)

Item	Symptom	Inspection point	Reference page	Preliminary										Electrical system											
				ATF level and condition	Selector lever	Selector cable	Idle speed and ignition timing	Stall test	Time lag test	Line pressure test	Road test	O/D switch	Transaxle range switch	Throttle position sensor	Closed throttle position switch	Input/turbine speed sensor	Vehicle speed sensor	Brake pedal position switch	Transaxle fluid temp. sensor	Engine coolant temperature sensor [Coolant temperature signal]	Shift solenoid A	Shift solenoid B	Shift solenoid C	TCC solenoid	Linear solenoid valve
				42-93	42-90		Section 21	42-100	42-103	42-104	42-107	42-89	42-90	Section 21	Section 21	42-91	42-92	ETM	42-90		Section 21	42-92	42-92	42-92	42-92
21	Engine speed flares up	Slips when shifting from 1GR to 2GR	O					O	O			O		O						O					
		Slips when shifting from 2GR to 3GR	O						O	O			O		O					O	O	O			
		Slips when shifting from 3GR to O/D	O						O	O			O		O							O			
		Slips when shifting from O/D to 3GR	O						O	O			O		O							O			
		Slips when shifting from O/D to 2GR	O						O	O			O		O						O				
		Slip O/D when shifting from 3GR to 2GR	O						O	O			O		O					O	O	O			
		Slips when Shifting from O/D to 3 GR to 1GR	O						O	O			O		O					O	O	O			
22	Excessive	P, N to R and/or N to D	O	O	O	O		O	O	O		O	O		O					O	O	O		O	
23	shift shock	When upshifting and/or downshifting	O						O	O			O		O					O	O	O			
		Excessive 1GR to 2GR shift shock	O						O	O			O		O					O					
		Excessive 2GR to 3GR shift shock	O						O	O			O		O					O	O	O			
		Excessive 3GR to O/D shift shock	O						O	O			O		O		O					O			
		Excessive O/D to 3GR shift shock	O						O	O			O		O		O					O			
		Excessive O/D to 2GR shift shock	O						O	O			O		O						O				
		Excessive 3GR to 2GR shift shock	O						O	O			O		O					O	O	O			
		Excessive O/D or 3rd to 1GR shift shock	O						O	O			O		O					O	O	O			
24	No engine braking			O	O				O	O		O									O	O		O	
25	No mode changes									O	O													O	
26	Transaxle	All ranges	O						O																
27	noise	D,2,1 and R ranges	O						O																
28	Transaxle overheats		O						O																
29	Excessive select shock			O	O	O			O			O	O		O					O	O	O		O	

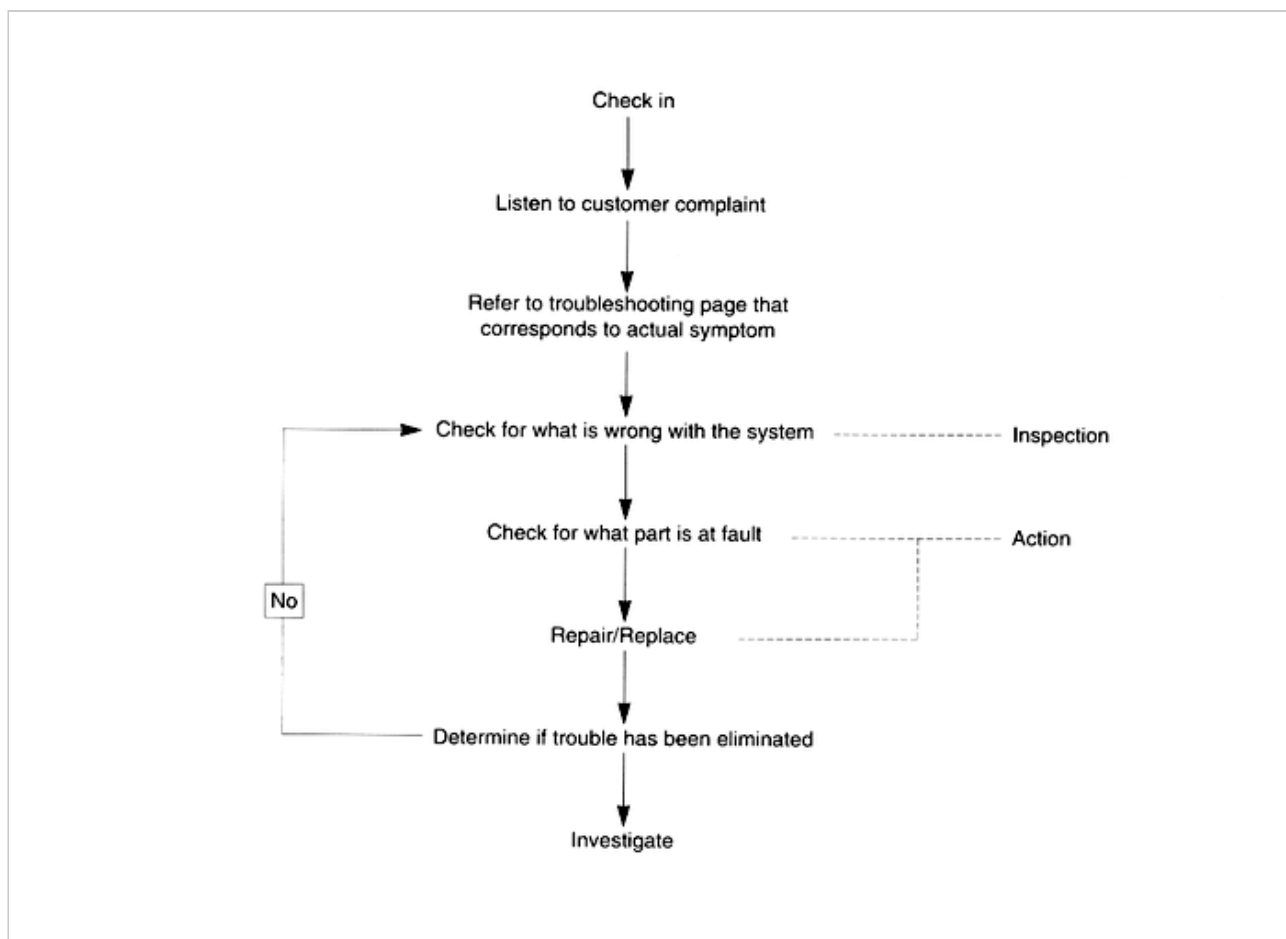
Quick Diagnosis Chart (II-2)

Electrical system	Hydraulic control system										Powertrain										Reference page				
42-90	42-73	42-158	42-195	42-155	42-155	42-155	42-155	42-155	42-187	42-154	42-163	42-161	42-161	42-177	42-187	42-182	42-171	42-175	42-175	42-130	42-216	Inspection point	Symptom	Item	
Transaxle range switch signal	Transaxle control module	Oil pump	Control valve body	1-2 Accumulator	2-3 Accumulator	N-D Accumulator	N-R Accumulator	Orifice valve	Servo piston	Torque converter	Forward clutch	Coasting clutch	Reverse clutch	3-4 clutch	2-4 brake band	Low and reverse brake	One-way clutch No.1	One-way clutch No.2	Planetary gear set	Parking mechanism	Differential assembly				
	O	O	O	O	O	O		O	O		O				O		O	O					Slips when shifting from 1GR to 2GR	Engine speed flares up	21
	O	O	O	O	O	O		O	O		O			O	O		O						Slips when shifting from 2GR to 3GR		
	O	O	O	O	O	O		O	O		O			O	O								Slips when shifting from 3GR to O/D		
	O	O	O	O	O	O		O	O		O			O	O		O						Slips when shifting from O/D to 3GR		
	O	O	O	O	O	O		O			O			O			O						Slips when shifting from O/D to 2GR		
	O	O	O	O	O	O		O	O		O			O	O		O						Slips when shifting from 3GR to 2GR		
	O	O	O	O	O	O		O	O		O			O	O		O	O					Slips when shifting from O/D to 3GR to 1GR		
	O		O	O	O	O	O				O		O			O	O	O					P,N to R and/or N to D	Excessive shift shock	22
	O		O	O	O	O		O	O					O	O		O						When upshifting and/or downshifting		23
	O		O	O	O	O		O	O						O		O	O					Excessive 1GR to 2GR shift shock		
	O		O	O	O	O		O	O					O	O		O						Excessive 2GR to 3GR shift shock		
	O		O	O	O	O		O	O					O	O								Excessive 3GR to O/D shift shock		
	O		O	O	O	O		O	O					O	O		O						Excessive O/D to 3GR shift shock		
	O		O	O	O	O			O					O	O		O						Excessive O/D to 2GR shift shock		
	O		O	O	O	O		O	O					O	O		O						Excessive 3GR to 2GR shift shock		
	O		O	O	O	O		O	O					O	O		O	O					Excessive O/D or 3GR to 1GR shift shock		
	O		O									O		O		O							No engine braking		24
																							No mode changes		25
										O									O	O	O		All ranges	Transaxle noise	26
																			O	O	O		D,2,1 and R ranges		27
	O																						Transaxle overheats		28
	O		O	O	O	O	O				O		O		O								Excessive select shock		29

Troubleshooting guide

Most of the automatic transaxle control system is electrically controlled. This often makes it difficult to diagnose intermittent problems in system. Before undertaking actual checks, take a few minutes to talk with customers who approach you with a driveability complaint. the customer is often a good source of information regarding intermittent problems. Through talks with customer, one can find out what the symptoms are and under conditions they occur.

Work flow



Troubleshooting item

: Each troubleshooting item is assigned a number. There are 28 troubleshooting itmes. Choose item that most closely corresponds to actual symptom.

Troubleshooting chart

1	Will start in other than P and N ranges		
Description	Engine starts in P, N and other ranges.		
(TROUBLESHOOTING HINTS)			
1. Selector lever installation or adjustment incorrect.			
2. Transalxe range switch worn or not adjusted properly.			
Step	Inspection		Action
1	Is selector lever operation OK?	Yes	Go to next step.
		No	Adjust selector lever.
2	Operate selector lever. Are selector lever and range indicator positions aligned?	Yes	Go to next step.
		No	Adjust transaxle range switch.

1. Description

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

2. Troubleshooting hints

This describes possible point of malfunction.

3. Step

This shows order of troubleshooting. Proceed with troubleshooting as indicated.

4. Inspection

This describes an inspection to quickly determine malfunction of parts. If a detailed procedure is necessary to perform INSPECTION, refer to page shown.

5. Action

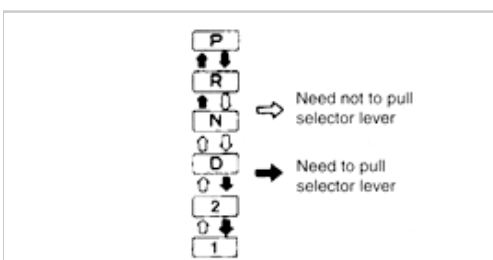
This recommends appropriate action to take as a result (Yes/No) of INSPECTION. How to perform action is described on reference page shown.

Diagnostic index

Troubleshooting item			Description
#	Trouble		
1	Will start in other than P and N range		Engine starts in P, N, and other ranges
2	Engine stalls	Idle when shifted from N or P to other ranges	Engine stops unexpectedly when shifted from N or P to other ranges at idle
3		On deceleration	Engine stops unexpectedly at beginning of deceleration or recovery from deceleration exhaust afterburn
4	Engine rough	On deceleration	Engine shakes at beginning of deceleration, during deceleration, or recovery from deceleration
5	Poor acceleration	At drive-away	Engine speed increases normally but vehicle speed slowly increases during drive-away
6		On acceleration	Engine speed increases normally but vehicle speed slowly increases during acceleration
7	Surges while cruising		Momentary minor irregularity in engine output at steady vehicle speed
8	Lack of power		Performance poor under load (i. e., power down when climbing hills)
9	Poor fuel economy		Fuel economy unsatisfactory
10	Vehicle does not move in D, 2, 1 and/or R range		No creep at all Vehicle does not move when accelerator pedal depressed after shifted to D, 2, 1 and/or R range
11	Vehicle moves in N range		Vehicle creeps in N range Vehicle moves when accelrator pedal not depressed
12	Vehicle moves in P range		Vehicle rolls in P range
13	Excessive creep		Vehicle moves quickly in D, 2, 1 and R range (accelerator pedal not depressed) NOTICE Excessive N to R range and N to D range shift shock felt
14	No shift		Single range shift (1GR→2GR, 2GR→3GR, or 3GR→O/D) only Sometimes shifts correctly NOTICE Gear position held in O/D OFF mode
15	Abnormal shift		Shifts incorrectly (incorrect shift pattern) Example : vehicle shifts 1GR→O/D directly when accelerating with accelerator pedal depressed slightly
16	Frequent shifting		Downshift occurs when accelerator depressed slightly in D, S or 2 and L or 1 ranges (except hold mode)
17	Shift point high or low		Shift points do not match shift diagram Shift delayed when accelerating Shifts occur too fast when accelerating and engine speed does not increases
18	No lock-up		No lock-up when vehicle speed reaches lock-up range

19	No kickdown		Down to downshift when accelerator pedal depressed more than 7/8 within kickdown range
20	Engine speed flares up	When accelerating	Engine speed flares up on acceleration
21		When upshifting and/or downshifting	Engine flares up when accelerator pedal depressed for upshifting Engine flares up suddenly when accelerator pedal depressed for downshifting
22	Excessive shift shock	P, N to R and/or N to D	Strong shift shock felt at idle when shift from N to range
23		When upshifting and/or downshifting	Excessive shift shock felt when accelerating at upshifting During cruising, excessive shift shock felt when accelerator pedal depressed at downshifting
24	No engine braking		Engine speed drops to idle but vehicle does not slow when accelerator pedal released during cruising at medium to high speed Engine speed drops to idle but vehicle does not slow when accelerator pedal released when in 2 or 1 range at low vehicle speed
25	No mode change		O/D OFF mode not selected or not cancelled
26	Transaxle noise	All ranges	Transaxle noisy in all ranges when vehicle is idling
27		D, 2, 1 and R ranges	Abnormal noise from transaxle in D, 2 or 1.
28	Transaxle overheats		ATF smells burnt and/or is discolored

Symptom troubleshooting

1	Will start in other than P and N ranges		
Description	Engine starts in P, N and other ranges.		
(TROUBLESHOOTING HINTS)			
1. Selector lever installation or adjustment incorrect.			
2. Transaxle range switch worn or misadjusted.			
Step	Inspection		Action
1	Is selector lever operation OK? 	Yes	Go to next step.
		No	Adjust selector lever.
2	Operate selector lever. Are selector lever and range indicator positions aligned?	Yes	Go to next step.
		No	Adjust transaxle range switch.
3	Operate selector lever. Does transaxle operate normally and are selector lever and transaxle positions aligned?	Yes	Go to next step.
		No	Overhaul transaxle and repair or replace parts as necessary.
	Are measurements at TCM OK?	Yes	Replace TCM.

Vb : Battery voltage

2	Engine stalls when shifted from N or P to other ranges																									
Description	Engine stops unexpectedly when shifted from N or P to other ranges at idle																									
(TROUBLESHOOTING HINTS)																										
1. Idle air control (IAC) valve malfunction																										
2. Torque converter clutch solenoid malfunction																										
3. Transaxle range signal malfunction																										
4. Oil pump worn																										
5. Control valve stuck																										
6. Idle speed and ignition timing misadjust																										
Step	Inspection		Action																							
1	Check that no diagnostic trouble codes exist by retrieving DTC's with a scan tool.	Yes	Go to next step.																							
		No	Diagnostic trouble code(s) displayed on scan tool. • Check for cause of diagnostic trouble code (s) If problem remains, go to next step.																							
2	Are measurements at TCM terminal OK? Vb : Battery voltage <table border="1"><thead><tr><th>TCM</th><th>Spec.</th><th>Condition</th></tr></thead><tbody><tr><td rowspan="2">H-01/18</td><td>0V</td><td>P and N ranges</td></tr><tr><td>Vb</td><td>Other ranges</td></tr><tr><td rowspan="2">H-01/8</td><td>Vb</td><td>D range</td></tr><tr><td>0V</td><td>Other ranges</td></tr><tr><td rowspan="2">H-01/36</td><td>Vb</td><td>2 range</td></tr><tr><td>0V</td><td>Other ranges</td></tr><tr><td rowspan="2">H-01/37</td><td>Vb</td><td>1 range</td></tr><tr><td>0V</td><td>Other ranges</td></tr></tbody></table> • H-01/18, H-01/8, H-01/36, H01-37 terminals : Transaxle range switch	TCM	Spec.	Condition	H-01/18	0V	P and N ranges	Vb	Other ranges	H-01/8	Vb	D range	0V	Other ranges	H-01/36	Vb	2 range	0V	Other ranges	H-01/37	Vb	1 range	0V	Other ranges	Yes	Go to next step.
		TCM	Spec.	Condition																						
H-01/18	0V	P and N ranges																								
	Vb	Other ranges																								
H-01/8	Vb	D range																								
	0V	Other ranges																								
H-01/36	Vb	2 range																								
	0V	Other ranges																								
H-01/37	Vb	1 range																								
	0V	Other ranges																								
No	Check for malfunctioning parts - Throttle position (TP) sensor. - Wiring																									
3	Are measurements at TCM OK? Vb : Battery voltage	Yes	Go to next step.																							
		No	Check transaxle range switch and wiring.																							
4	Is continuity of transaxle range switch OK?	Yes	Go to next step.																							
		No	Adjust and/or replace transaxle range switch.																							

5	Are resistance of torque converter clutch solenoid valve and output voltage of TCM terminal OK? Vb : Battery voltage	Yes	Go to next step.								
	<table border="1"><tr><td>TCM</td><td>Spec.</td><td>Condition</td></tr><tr><td>H-01/</td><td>Vb</td><td>Lockup</td></tr><tr><td>4</td><td>0V</td><td>Others</td></tr></table> Solenoid valve resistance : 14-18Ω	TCM	Spec.	Condition	H-01/	Vb	Lockup	4	0V	Others	No
TCM	Spec.	Condition									
H-01/	Vb	Lockup									
4	0V	Others									
6	Is engine stall speed OK? Stall speed : 2200~2500 rpm	Yes	Check ECM parts & Engine.								
		No	Overhaul transaxle and repair or replace parts as necessary.								

3	Engine stalls on deceleration								
Description	Engine stalls when brake pedal depressed while driving at low speed or stopping								
(TROUBLESHOOTING HINTS)									
1. Idle air control (IAC) valve malfunction									
2. Torque converter clutch solenoid malfunction									
3. Idle speed and ignition timing misadjust									
Step	Inspection		Action						
1	Check that no diagnostic trouble codes exist by retrieving DTC's with a scan tool.	Yes	Go to next step.						
		No	Diagnostic trouble code(s) displayed on scan tool. • Check for cause of diagnostic trouble code(s) If problem remains, go to next step.						
2	Are resistance of torque converter clutch solenoid valve and output voltage of TCM terminal H-01/4 OK? Vb : Battery voltage <table border="1"><tr><td>TCM</td><td>Spec.</td><td>Condition</td></tr><tr><td>H-01/4</td><td>Vb 0V</td><td>Lockup Others</td></tr></table> Solenoid valve resistance : 14~18Ω	TCM	Spec.	Condition	H-01/4	Vb 0V	Lockup Others	Yes	Go to next step.
		TCM	Spec.	Condition					
H-01/4	Vb 0V	Lockup Others							
No	If resistance is not OK, check for malfunctioning parts and wiring • Torque converter clutch solenoid If resistance is OK but voltage is not, check wiring and/or replace TCM.								
3	Is engine stall speed OK? Stall speed : 2200~2500 rpm	Yes	Replace TCM and/or check the engine parts.						
		No	Overhaul transaxle and repair or replace parts as necessary.						

4	Engine rough on deceleration		
Description	Engine shakes at beginning of deceleration, during deceleration, or recovery from deceleration Exhaust afterburn		
(TROUBLESHOOTING HINTS)			
1. Idle speed and ignition timing misadjust			
Step	Inspection		Action
1	Is engine stall speed OK? Stall speed : 2200~2500 rpm	Yes	Replace TCM and/or check the Engine parts.
		No	Overhaul transaxle and repair or replace parts as necessary.

5	Poor acceleration at drive-away															
Description	Engine speed increases normally but vehicle speed slowly increases during acceleration															
(TROUBLESHOOTING HINTS)																
1. ATF level low or high																
2. Throttle position sensor malfunction or improperly adjusted																
3. Line pressure incorrect																
4. Torque converter clutch solenoid malfunction																
5. Engine stall speed incorrect																
Step	Inspection		Action													
1	Check that no diagnostic trouble codes exist by retrieving DTC's with a scan tool	Yes	Go to next step.													
		No	Diagnostic trouble code(s) displayed on scan tool. • Check for cause of diagnostic trouble code(s) If problem remains, go to next step.													
2	Are ATF level and condition OK? Do transaxle seals, sealant, and gaskets prevent leakage? ① Clear pink : Normal condition ② Dark or black (with friction material) : Worn powertrain components ③ Milky pink : Water contamination ④ Light to dark brown (oxidation) : Overheated or old fluid	Yes	Go to next step.													
		No	If ATF level is not OK, add fluid as necessary. If ATF condition is not OK, repair as follows : • ② condition - Overhaul transaxle and repair or replace parts as necessary ; then go to next step • ③ or ④ conditions - Replace ATF ; then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle ; then go to next step.													
3	Are measurements at TCM terminal OK? <table border="1"><thead><tr><th>TCM</th><th>Spec.</th><th>Condition</th></tr></thead><tbody><tr><td rowspan="3">H-01/ 38</td><td>Duty</td><td>Throttle valve fully closed</td></tr><tr><td>90%</td><td></td></tr><tr><td>Duty</td><td>Throttle valve fully open</td></tr><tr><td></td><td>1.9%</td><td></td></tr></tbody></table>	TCM	Spec.	Condition	H-01/ 38	Duty	Throttle valve fully closed	90%		Duty	Throttle valve fully open		1.9%		Yes	Go to next step.
		TCM	Spec.	Condition												
H-01/ 38	Duty	Throttle valve fully closed														
	90%															
	Duty	Throttle valve fully open														
	1.9%															
No	Check for malfunctioning parts • Throttle position (TP) sensor. • Wiring															
4	Is line pressure OK? Line pressure Pis (kPa, kg/cm²) <table border="1"><thead><tr><th>Range</th><th>Idle</th><th>Stall</th></tr></thead><tbody><tr><td rowspan="2">D, 2, 1</td><td>56.98~127.98 (392.4~882.9, 4.0~9.0)</td><td>113.76~184.86 (784.8~1275.3, 8.0~13.0)</td></tr><tr><td>R</td><td>71.1~142.2 (490.5~981.0, 5.0~10.0)</td><td>199.08~270.18 (1373.4~1863.9, 14.0~19.0)</td></tr></tbody></table>	Range	Idle	Stall	D, 2, 1	56.98~127.98 (392.4~882.9, 4.0~9.0)	113.76~184.86 (784.8~1275.3, 8.0~13.0)	R	71.1~142.2 (490.5~981.0, 5.0~10.0)	199.08~270.18 (1373.4~1863.9, 14.0~19.0)	Yes	Go to next step.				
		Range	Idle	Stall												
D, 2, 1	56.98~127.98 (392.4~882.9, 4.0~9.0)	113.76~184.86 (784.8~1275.3, 8.0~13.0)														
	R	71.1~142.2 (490.5~981.0, 5.0~10.0)	199.08~270.18 (1373.4~1863.9, 14.0~19.0)													
No	Check linear solenoid valve. If line pressure is not within specifications after linear solenoid inspection, replace control valve body assembly.															
5	Are resistance of torque converter clutch solenoid valve and output voltage of TCM terminal H-01/4 OK? Vb : Battery voltage <table border="1"><thead><tr><th>TCM</th><th>Spec.</th><th>Condition</th></tr></thead><tbody><tr><td rowspan="2">H-01 /4</td><td>V_b</td><td>Lock up</td></tr><tr><td>OV</td><td>Others</td></tr></tbody></table> Solenoid valve resistance : 14~18Ω	TCM	Spec.	Condition	H-01 /4	V _b	Lock up	OV	Others	Yes	Go to next step.					
		TCM	Spec.	Condition												
H-01 /4	V _b	Lock up														
	OV	Others														
No	If resistance is OK but Voltage is not, check wiring and/or replace TCM.															

6	Is engine stall speed OK? Stall speed : 2200~250 rpm	Yes	Check EMS parts & Engine and/or replace TCM.
		No	Overhaul transaxle and repair or replace parts as necessary.

6	Poor acceleration on acceleration																									
Description	Engine speed increases normally but vehicle speed slowly increases during acceleration																									
(TROUBLESHOOTING HINTS)																										
1. ATF level low or high																										
2. Line pressure low																										
3. Engine stall speed incorrect correctly																										
4. Throttle position (TP) sensor malfunction or not adjusted																										
5. Torque converter clutch solenoid malfunction																										
Step	Inspection		Action																							
1	Check that no diagnostic trouble codes exist by retrieving DTC's with a scan tool	Yes	Go to next step.																							
		No	Diagnostic trouble code(s) displayed on scan tool. • Check for cause of diagnostic trouble code(s) If problem remains, go to next step.																							
2	Are ATF level and condition OK? Do transaxle seals, sealant, and gaskets prevent leakage? ① Clear pink : Normal condition ② Dark or black (with friction material) : Worn powertrain components ③ Milky pink : Water contamination ④ Light to dark brown (oxidation) : Overheated or old fluid	Yes	Go to next step.																							
		No	If ATF level is not OK, add fluid as necessary. If ATF condition is not OK, repair as follows : • ② condition - Overhaul transaxle and repair or replace parts as necessary ; then go to next step • ③ or ④ conditions - Replace ATF ; then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle ; then go to next step.																							
3	Are measurements at TCM terminal OK? <table border="1"><tr><td>TCM</td><td>Spec.</td><td>Condition</td></tr><tr><td rowspan="3">H-01/ 38</td><td>Duty</td><td>Throttle valve fully closed</td></tr><tr><td>Duty</td><td>Throttle valve fully open</td></tr><tr><td>19%</td><td></td></tr></table>	TCM	Spec.	Condition	H-01/ 38	Duty	Throttle valve fully closed	Duty	Throttle valve fully open	19%		Yes	Go to next step.													
		TCM	Spec.	Condition																						
H-01/ 38	Duty	Throttle valve fully closed																								
	Duty	Throttle valve fully open																								
	19%																									
No	Check for malfunctioning parts - Throttle position (TP) sensor. - Wiring																									
4	Is line pressure OK? <table border="1"><tr><td colspan="3">Line pressure</td><td>psi (kPa, kg/cm²)</td></tr><tr><td>Range</td><td>Idle</td><td colspan="2">Stall</td></tr><tr><td rowspan="2">D, 2, 1</td><td>56.98~127.98</td><td colspan="2">113.76~184.86</td></tr><tr><td>(392.4~882.9, 4.0~9.0)</td><td colspan="2">(784.8~1275.3, 8.0~13.0)</td></tr><tr><td>R</td><td>71.1~142.2</td><td colspan="2">199.08~270.18</td></tr><tr><td></td><td>(490.5~981.0, 5.0~10.0)</td><td colspan="2">(1373.4~1863.9, 14.0~19.0)</td></tr></table>	Line pressure			psi (kPa, kg/cm ²)	Range	Idle	Stall		D, 2, 1	56.98~127.98	113.76~184.86		(392.4~882.9, 4.0~9.0)	(784.8~1275.3, 8.0~13.0)		R	71.1~142.2	199.08~270.18			(490.5~981.0, 5.0~10.0)	(1373.4~1863.9, 14.0~19.0)		Yes	Replace TCM
		Line pressure			psi (kPa, kg/cm ²)																					
Range	Idle	Stall																								
D, 2, 1	56.98~127.98	113.76~184.86																								
	(392.4~882.9, 4.0~9.0)	(784.8~1275.3, 8.0~13.0)																								
R	71.1~142.2	199.08~270.18																								
	(490.5~981.0, 5.0~10.0)	(1373.4~1863.9, 14.0~19.0)																								
No	Check linear solenoid valve. If line pressure is not within specifications after linear solenoid valve inspection, replace control valve body assembly.																									
5	Are resistance of torque converter clutch solenoid valve and output voltage of TCM terminal H-01/4 OK? Vb : Battery Voltage	Yes	Go to next step.																							
		No	If resistance is not OK, check for malfunctioning parts and wiring. • Torque converter clutch solenoid																							

	<table border="1"><tr><td>TCM</td><td>Spec.</td><td>Condition</td></tr><tr><td rowspan="2">H-01 /4</td><td>V_B</td><td>Lock up</td></tr><tr><td>OV</td><td>Others</td></tr></table> Solenoid valve resistance : 14~18Ω	TCM	Spec.	Condition	H-01 /4	V _B	Lock up	OV	Others		If resistance is OK but Voltage is not, check wiring and/or replace TCM.
TCM	Spec.	Condition									
H-01 /4	V _B	Lock up									
	OV	Others									
6	Is engine stall speed OK? Stall speed : 2200~2500 rpm	Yes	Check Engine parts and/or replace TCM.								
		No	Overhaul transaxle and repair or replace parts as necessary.								

7	Surges while cruising
Description	Momentary minor irregularity in engine output at steady vehicle speed

8	Poor acceleration on acceleration
Description	Engine speed increases normally but vehicle speed slowly increases during acceleration

(TROUBLESHOOTING HINTS)

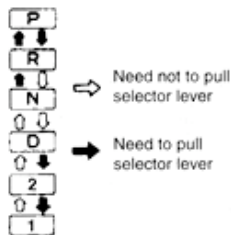
1. ATF level low or high
2. Throttle position (TP) sensor malfunction or not adjusted
3. Torque converter clutch solenoid malfunction

Step	Inspection		Action								
1	Check that no diagnostic trouble codes exist by retrieving DTC's with a scan tool	Yes	Go to next step.								
		No	Diagnostic trouble code(s) displayed on scan tool. • Check for cause of diagnostic trouble code(s) If problem remains, go to next step.								
2	Are ATF level and condition OK? Do transaxle seals, sealant, and gaskets prevent leakage? ① Clear pink : Normal condition ② Dark or black (with friction material) : Worn powertrain components ③ Milky pink : Water contamination ④ Light to dark brown (oxidation) : Overheated or old fluid	Yes	Go to next step.								
		No	If ATF level is not OK, add fluid as necessary If ATF condition is not OK, repair as follows : • ② condition - Overhaul transaxle and repair or replace parts as necessary ; then go to next step • ③ or ④ conditions - Replace AFT ; then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle ; then go to next step.								
3	Are measurements at TCM terminal OK? <table border="1"><thead><tr><th>TCM</th><th>Spec.</th><th>Condition</th></tr></thead><tbody><tr><td rowspan="2">H-01/ 38</td><td>Duty 90%</td><td>Throttle valve fully closed</td></tr><tr><td>Duty 19%</td><td>Throttle valve fully open</td></tr></tbody></table>	TCM	Spec.	Condition	H-01/ 38	Duty 90%	Throttle valve fully closed	Duty 19%	Throttle valve fully open	Yes	Go to next step.
		TCM	Spec.	Condition							
H-01/ 38	Duty 90%	Throttle valve fully closed									
	Duty 19%	Throttle valve fully open									
No	Check for malfunctioning parts - Throttle position (TP) sensor. - Wiring										
4	Are resistance of torque converter clutch solenoid valve and output voltage of TCM terminal H-01/4 OK? Vb : Battery Voltage	Yes	Go to next step.								
		No	If resistance is not OK, check for malfunctioning parts and wiring. • Torque converter clutch solenoid.								

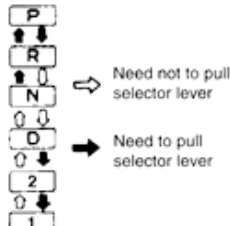
	<table border="1" data-bbox="323 197 646 297"> <tr> <th>TCM</th><th>Spec.</th><th>Condition</th></tr> <tr> <td rowspan="2">H-01 /4</td><td>V_b</td><td>Lock up</td></tr> <tr> <td>OV</td><td>Others</td></tr> </table> Solenoid valve resistance : 14~18Ω	TCM	Spec.	Condition	H-01 /4	V _b	Lock up	OV	Others	If resistance is OK but Voltage is not, check wiring and/or replace TCM.
TCM	Spec.	Condition								
H-01 /4	V _b	Lock up								
	OV	Others								

9	Poor fuel economy														
Description	Fuel economy unsatisfactory														
(TROUBLESHOOTING HINTS)															
1. ATF level low															
2. Throttle position (TP) sensor malfunction or not adjusted correctly															
3. Line pressure low															
4. Engine stall speed incorrect															
Step	Inspection		Action												
1	Check that no diagnostic trouble codes exist by retrieving DTC's with a scan tool		Yes												
			Go to next step.												
			No												
			Diagnostic trouble code(s) displayed on scan tool. • Check for cause of diagnostic trouble code(s) If problem remains, go to next step.												
2	Are ATF level and condition OK? Do transaxle seals, sealant, and gaskets prevent leakage? ① Clear pink : Normal condition ② Dark or black (with friction material) : Worn powertrain components ③ Milky pink : Water contamination ④ Light to dark brown (oxidation) : Overheated or old fluid		Yes												
			Go to next step.												
			No												
			If ATF level is not OK, add fluid as necessary If ATF condition is not OK, repair as follows : • ② condition - Overhaul transaxle and repair or replace parts as necessary ; then go to next step • ③ or ④ conditions - Replace ATF; then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle ; then go to next step.												
3	Is input voltage of throttle position (TP) sensor at TCM terminal OK? Vb : Battery voltage <table><tr><td>TCM</td><td>Spec.</td><td>Condition</td></tr><tr><td rowspan="3">H-01/ 38</td><td>Duty</td><td>Throttle valve</td></tr><tr><td>90%</td><td>fully closed</td></tr><tr><td>Duty</td><td>Throttle valve</td></tr><tr><td></td><td>19%</td><td>fully open</td></tr></table>		TCM	Spec.	Condition	H-01/ 38	Duty	Throttle valve	90%	fully closed	Duty	Throttle valve		19%	fully open
			TCM	Spec.	Condition										
H-01/ 38	Duty	Throttle valve													
	90%	fully closed													
	Duty	Throttle valve													
	19%	fully open													
			Yes												
			Go to next step.												
			No												
			Check throttle position (TP) sensor and wiring.												
4	Are resistance of torque converter clutch solenoid and output voltage of TCM terminals H-01/4 OK? Vb : Battery voltage		Yes												
			Overhaul transaxle and repair or replace parts as necessary.												
			No												
			If resistance is not OK, check for malfunctioning parts and wiring. • Torque converter clutch solenoid If resistance is OK but voltage is not, check												

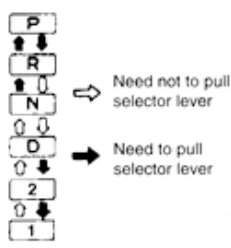
	<table><tr><td>TCM</td><td>Spec.</td><td>Condition</td></tr><tr><td>H-01/</td><td>VB</td><td>Lockup</td></tr><tr><td>4</td><td>0V</td><td>Others</td></tr></table> Solenoid valve resistance : 14~18Ω	TCM	Spec.	Condition	H-01/	VB	Lockup	4	0V	Others		wiring and/or replace TCM.		
TCM	Spec.	Condition												
H-01/	VB	Lockup												
4	0V	Others												
5	Is Line pressure OK?	Yes	Go to next step.											
	<table><tr><td colspan="2">Line pressure</td><td>psi (kPa, kg/cm²)</td></tr><tr><td>Range</td><td>Idle</td><td>Stall</td></tr><tr><td>D, 2, 1</td><td>56.98~127.98 (392.4~882.9, 4.0~9.0)</td><td>113.76~184.86 (784.8~1275.3, 8.0~13.0)</td></tr><tr><td>R</td><td>71.1~142.2 (490.5~981.0, 5.0~10.0)</td><td>199.08~270.18 (1373.4~1863.9, 14.0~19.0)</td></tr></table>	Line pressure		psi (kPa, kg/cm ²)	Range	Idle	Stall	D, 2, 1	56.98~127.98 (392.4~882.9, 4.0~9.0)	113.76~184.86 (784.8~1275.3, 8.0~13.0)	R	71.1~142.2 (490.5~981.0, 5.0~10.0)	199.08~270.18 (1373.4~1863.9, 14.0~19.0)	No
Line pressure		psi (kPa, kg/cm ²)												
Range	Idle	Stall												
D, 2, 1	56.98~127.98 (392.4~882.9, 4.0~9.0)	113.76~184.86 (784.8~1275.3, 8.0~13.0)												
R	71.1~142.2 (490.5~981.0, 5.0~10.0)	199.08~270.18 (1373.4~1863.9, 14.0~19.0)												
6	Is engine stall speed OK?	Yes	Check EMS parts & Engine and/or replace TCM.											
	Stall speed : 2200~2500 rpm	No	Overhaul transaxle and repair or replace parts as necessary.											

10	Vehicle does not move in D, 2, and/or R range		
Description	• No creep at all • Vehicle does not move when accelerator pedal depressed after shifting to D, 2, 1, and/or R range.		
(TROUBLESHOOTING HINTS)			
1. ATF level low 2. Selector lever installation or adjustment incorrect 3. Line pressure low 4. Powertrain slippage (forward clutch, 2-4 brake band, one-way clutch No. 1 or No. 2) 5. Engine stall speed incorrect 6. Control valve stuck 7. Torque converter worn			
Step	Inspection		Action
1	Are ATF level and condition OK? Do transaxle seals, sealant, and gaskets prevent leakage? ① Clear pink : Normal condition ② Dark or black (with friction material) : Worn powertrain components ③ Milky pink : Water contamination ④ Light to dark brown (oxidation) : Overheated or oil fluid	Yes	Go to next step.
		No	If ATF level is not OK, add fluid as necessary If ATF condition is not OK, repair as follows : • ② condition - Overhaul transaxle and repair or replace parts as necessary; then go to next step • ③ or ④ conditions - Replace ATF ; then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle; then go to next step.
2	Is selector lever operation OK? 	Yes	Go to next step.
		No	Adjust selector lever.

3	Operate selector lever; are selector lever and range indicator positions aligned?	Yes	Go to next step.												
		No	Adjust transaxle range switch.												
4	Operate selector lever; does transaxle operate normally and are selector lever and transaxle position aligned?	Yes	Go to next step.												
		No	Overhaul transaxle and repair or replace parts as necessary.												
5	Are resistance of torque converter clutch solenoid vlave and output voltage of TCM terminal H-01/4 OK? Vb : Battery Voltage <table border="1"><tr><td>TCM</td><td>Spec.</td><td>Condition</td></tr><tr><td rowspan="2">H-01/4</td><td>V_b</td><td>Lock up</td></tr><tr><td>OV</td><td>Others</td></tr></table> Solenoid valve resistance : 14~18Ω	TCM	Spec.	Condition	H-01/4	V _b	Lock up	OV	Others	Yes	Go to next step.				
		TCM	Spec.	Condition											
H-01/4	V _b	Lock up													
	OV	Others													
		No	If resistance is not OK, check for malfunctioning parts and wiring. • Torque converter clutch solenoid. If resistance is OK but Voltage is not, check wiring and/or replace TCM.												
6	Is line pressure OK? <table border="1"><tr><th colspan="2">Line pressure</th><th>psi (kPa, kg/cm²)</th></tr><tr><th>Range</th><th>Idle</th><th>Stall</th></tr><tr><td>D, 2, 1</td><td>56.98~127.98 (392.4~882.9, 4.0~9.0)</td><td>113.76~184.86 (784.8~1275.3, 8.0~13.0)</td></tr><tr><td>R</td><td>71.1~142.2 (490.5~981.0, 5.0~10.0)</td><td>199.08~270.18 (1373.4~1863.9, 14.0~19.0)</td></tr></table>	Line pressure		psi (kPa, kg/cm ²)	Range	Idle	Stall	D, 2, 1	56.98~127.98 (392.4~882.9, 4.0~9.0)	113.76~184.86 (784.8~1275.3, 8.0~13.0)	R	71.1~142.2 (490.5~981.0, 5.0~10.0)	199.08~270.18 (1373.4~1863.9, 14.0~19.0)	Yes	Go to next step.
		Line pressure		psi (kPa, kg/cm ²)											
Range	Idle	Stall													
D, 2, 1	56.98~127.98 (392.4~882.9, 4.0~9.0)	113.76~184.86 (784.8~1275.3, 8.0~13.0)													
R	71.1~142.2 (490.5~981.0, 5.0~10.0)	199.08~270.18 (1373.4~1863.9, 14.0~19.0)													
		No	Check linear solenoid valve. If line pressure is not within specifications after linear solenoid valve inspection, replace control valve body assembly.												
7	Is engine stall speed OK? Stall speed : 2200~2500 rpm	Yes	Check EMS parts & Engine and/or replace TCM.												
		No	Overhaul transaxle and repair or replace parts as necessary.												
8	Stop vehicle on flat paved surface with engine OFF. Does vehicle move when pushed (except P range, parking brake released)?	Yes	Overhaul transaxle and repair or replace parts as necessary.												
		No	Parking mechanism malfunction. Overhaul transaxle and repair or replace parts as necessary.												

11	Vehicle moves in N range		
Description	• Vehicle creeps in N range • Vehicle moves when accelerator pedal not depressed		
(TROUBLESHOOTING HINTS)			
1. Selector lever installation or adjustment incorrect 2. Powertrain damaged (forward clutch, coasting clutch, 3-4 clutch)			
Step	Inspection		Action
1	Is selector lever operation OK?	Yes	Go to next step.
		No	Adjust selector lever.
2	Operate selector lever ; are selector lever and range indicator positions aligned?	Yes	Go to next step.
		No	Adjust transaxle range switch.

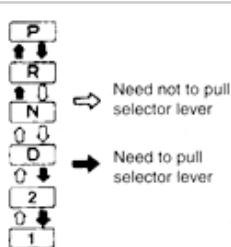
3	Operate selector lever ; does transaxle operate normally and are selector lever and transaxle position aligned?	Yes	Go to next step.
		No	Overhaul transaxle and repair or replace parts as necessary.

12	Vehicle moves in P range		
Description	• Vehicle rolls in P range		
(TROUBLESHOOTING HINTS)			
1. Selector lever installation or adjustment incorrect			
2. Parking mechanism worn			
3. Powertrain damaged (forward clutch, coasting, 3-4 clutch)			
Step	Inspection		Action
1	Is selector lever operation OK? 	Yes	Go to next step.
		No	Adjust selector lever.
2	Operate selector lever ; are selector lever and range indicator positions aligned?	Yes	Go to next step.
		No	Adjust transaxle range switch.
3	Does transaxle operate normally and are selector lever and transaxle position aligned?	Yes	Go to next step.
		No	Overhaul transaxle and repair or replace parts as necessary.
4	Stop vehicle on flat paved surface with engine OFF. Does vehicle move when pushed (except P range, parking brake released)?	Yes	Overhaul transaxle and repair or replace parts as necessary.
		No	Parking mechanism malfunction. Overhaul transaxle and repair or replace parts as necessary.

13	Excessive creep
Description	Vehicle moves quickly in D, 2, 1, and R ranges (accelerator pedal depressed) NOTICE Excessive N to R range and N to D range shift shock felt
(TROUBLESHOOTING HINTS)	
Engine idle speed not adjusted correctly.	

14	No shift
Description	• Single range shift (1GR→2GR, 2GR→3GR, or 3GR→O/d) only • Sometimes shifts correctly
(TROUBLESHOOTING HINTS)	
1. Selector lever installation or adjustment incorrect 2. Input/turbine speed sensor malfunction 3. Vehicle speed sensor malfunction 4. Throttle position sensor malfunction or misadjusted	

5. Transaxle range switch worn or maladjusted
6. Line pressure low
7. Linear solenoid valve malfunction
8. O/D switch malfunction
9. Shift solenoid valve (A, B, C) malfunction
10. TCM malfunction
11. Control valve stuck
12. Powertrain damaged (forward clutch, 3-4 clutch, 2-4 band, one-way clutch 1)

Step	Inspection	Action											
1	Check that no diagnostic trouble codes exist by retrieving DTC's with a scan tool	Yes	Go to next step.										
		No	Diagnostic trouble code(s) displayed on O/D indicator or scan tool. • Check for cause of diagnostic trouble code(s) If problem remains, go to next step.										
2	Is selector lever operation OK? 	Yes	Go to next step.										
		No	Adjust selector.										
3	Operate selector lever ; does transaxle operate normally and are selector lever and transaxle position aligned?	Yes	Go to next step.										
		No	Adjust transaxle range switch.										
4	Operate selector lever ; are selector lever and range indicator positions aligned?	Yes	Go to next step.										
		No	Overhaul transaxle and repair or replace parts as necessary.										
5	Disconnect solenoid 8-pin connector ; does vehicle drive as follows? <table border="1" data-bbox="293 1319 772 1532"><thead><tr><th>Range</th><th>Gear position</th></tr></thead><tbody><tr><td>D range</td><td>3GR (fixed)</td></tr><tr><td>2 range</td><td>3GR (fixed)</td></tr><tr><td>1 range</td><td>1 GR (fixed)</td></tr><tr><td>R range</td><td>Reverse (fixed)</td></tr></tbody></table>	Range	Gear position	D range	3GR (fixed)	2 range	3GR (fixed)	1 range	1 GR (fixed)	R range	Reverse (fixed)	Yes	Go to next step.
		Range	Gear position										
D range	3GR (fixed)												
2 range	3GR (fixed)												
1 range	1 GR (fixed)												
R range	Reverse (fixed)												
No	Replace control valve body assembly. If problem remains, overhaul transaxle and repair or replace parts as necessary.												
6	Drive vehicle in D, 2, and 1 range ; does vehicle start from stop in 1st gear?	Yes	Go to next step.										
		No	Overhaul transaxle and repair or replace parts as necessary.										
7	Are resistance and output voltage of shift solenoids (A, B, C) at TCM terminals OK? Vb : Battery voltage	Yes	Go to next step.										
		No	If resistance is not OK, check for malfunctioning parts and wiring. • Shift solenoid A • Shift solenoid B • Shift solenoid C If resistance is OK but voltage is not, replace TCM.										

TCM	Spec.	Condition
H-01/ 30	V _B	Solenoid ON
	0V	Solenoid OFF
H-01/ 33	V _B	Solenoid ON
	0V	Solenoid OFF
H-01/ 32	V _B	Solenoid ON
	0V	Solenoid OFF

Solenoid valve resistance : 14~18Ω

NOTICE

- H-01/30 terminal : Shift solenoid A
- H-01/33 terminal : Shift solenoid B
- H-01/32 terminal : Shift solenoid C

Are resistance and output voltage of shift solenoids (A,B,C) at TCM terminals OK?
V_B : Battery voltage

Yes

Go to next step.

No

If resistance is not OK, check for malfunctioning parts and wiring.

- Throttle position sensor
- Input/turbine speed sensor
- Vehicle speed sensor
- O/D OFF switch
- Transaxle range switch

If resistance is OK but voltage is not, replace TCM.

TCM	Spec.	Condition
H-01/ 38	Duty 90%	Throttle valve fully closed
	Duty 19%	Throttle valve fully open
H-01/ 44 H-01/ 16	2.3V	Constant (Ign: ON)
H-01/ 42	V _B	Ignition switch ON
	0~B+	Driving
H-01/ 45	0V	Switch pressed
	V _B	Switch released
H-01/ 18	0V	P and N ranges
	V _B	Other ranges
H-01/ 8	V _B	D range
	0V	Other ranges
H-01/ 36	V _B	2 range
	0V	Other ranges
H-01/ 37	V _B	1 range
	0V	Other ranges

	NOTICE • H-01/38 terminal : Throttle position (TP) sensor • H-01/44 terminal : Input/turbine speed sensor ground • H-01/16 terminal : Input/turbine speed sensor signal • H-01/42 terminal : Vehicle speed sesnor • H-01/45 terminal : O/D switch • H-01/18, H-01/8, H-01/36, H01-37 terminal : Transaxle range switch														
9	Is continuity of transaxle range switch OK?	Yes	Go to next step.												
		No	Adjust transaxle range switch.												
10	Is line pressure OK?	Yes	Go to next step.												
	<table><tr><th colspan="2">Line pressure</th><th>psi (kPa, kg/cm²)</th></tr><tr><th>Range</th><th>Idle</th><th>Stall</th></tr><tr><td>D, 2, 1</td><td>56.98~127.98 (392.4~882.9, 4.0~9.0)</td><td>113.76~184.86 (784.8~1275.3, 8.0~13.0)</td></tr><tr><td>R</td><td>71.1~142.2 (490.5~981.0, 5.0~10.0)</td><td>199.08~270.18 (1373.4~1863.9, 14.0~19.0)</td></tr></table>	Line pressure		psi (kPa, kg/cm ²)	Range	Idle	Stall	D, 2, 1	56.98~127.98 (392.4~882.9, 4.0~9.0)	113.76~184.86 (784.8~1275.3, 8.0~13.0)	R	71.1~142.2 (490.5~981.0, 5.0~10.0)	199.08~270.18 (1373.4~1863.9, 14.0~19.0)	No	Check linear solenoid valve. If line pressure is not within specifications after linear solenoid valve inspection, replace control valve body assembly.
Line pressure		psi (kPa, kg/cm ²)													
Range	Idle	Stall													
D, 2, 1	56.98~127.98 (392.4~882.9, 4.0~9.0)	113.76~184.86 (784.8~1275.3, 8.0~13.0)													
R	71.1~142.2 (490.5~981.0, 5.0~10.0)	199.08~270.18 (1373.4~1863.9, 14.0~19.0)													

15	Abnormal shift		
Description	• Shifts incorrectly (incorrect shift pattern) (e.g. : Vehicle shifts from 1st to O/D directly when accelerating with accelerator pedal depressed slightly)		
(TROUBLESHOOTING HINTS)			
1. Throttle position (TP) sensor malfunction or not adjusted correctly			
2. Shift solenoid valves (A, B, C) worn			
3. Control valve stuck			
4. Differential assembly malfunction			
5. TCM malfunction			
Step	Inspection		Action
1	Check that no diagnostic trouble codes exist by retrieving DTC's with a scan tool	Yes	Go to next step.
		No	Diagnostic trouble code(s) displayed on O/D indicator or scan tool. • Check for cause of diagnostic trouble code(s) If problem remains, go to next step.
2	Are resistance and output voltage of shift solenoids (A, B, C) at TCM terminals OK? Vb : Battery voltage	Yes	Go to next step.
		No	If resistance is not OK, check for malfunctioning parts and wiring. • Shift solenoid A • Shift solenoid B • Shift solenoid C If resistance is OK but voltage is not, replace TCM.

	<table><tr><th>TCM</th><th>Spec.</th><th>Condition</th></tr><tr><td>H-01/30</td><td>Vb</td><td>Solenoid ON</td></tr><tr><td></td><td>0V</td><td>Solenoid OFF</td></tr><tr><td>H-01/33</td><td>VB</td><td>Solenoid ON</td></tr><tr><td></td><td>0V</td><td>Solenoid OFF</td></tr><tr><td>H-01/32</td><td>VB</td><td>Solenoid ON</td></tr><tr><td></td><td>0V</td><td>Solenoid OFF</td></tr></table> Solenoid valve resistance : 14~18Ω NOTICE • H-01/30 terminal : Shift solenoid A • H-01/33 terminal : Shift solenoid B • H-01/32 terminal : Shift solenoid C	TCM	Spec.	Condition	H-01/30	Vb	Solenoid ON		0V	Solenoid OFF	H-01/33	VB	Solenoid ON		0V	Solenoid OFF	H-01/32	VB	Solenoid ON		0V	Solenoid OFF		
TCM	Spec.	Condition																						
H-01/30	Vb	Solenoid ON																						
	0V	Solenoid OFF																						
H-01/33	VB	Solenoid ON																						
	0V	Solenoid OFF																						
H-01/32	VB	Solenoid ON																						
	0V	Solenoid OFF																						
3	Are resistance and output voltage of throttle position (TP) sensor at TCM terminals OK? Vb : Battery Voltage	Yes	Go to next step.																					
	<table><tr><th>TCM</th><th>Spec.</th><th>Condition</th></tr><tr><td>H-01/38</td><td>Duty 90%</td><td>Throttle valve fully closed</td></tr><tr><td></td><td>Duty 19%</td><td>Throttle valve fully open</td></tr></table> NOTICE H-01/38 terminal : Throttle position (TP) sensor	TCM	Spec.	Condition	H-01/38	Duty 90%	Throttle valve fully closed		Duty 19%	Throttle valve fully open	No	If resistance is not OK, check for malfunctioning parts and wiring. • Throttle position sensor If resistance is OK but voltage is not, replace TCM.												
TCM	Spec.	Condition																						
H-01/38	Duty 90%	Throttle valve fully closed																						
	Duty 19%	Throttle valve fully open																						
4	Replace with known operational TCM. IS problem corrected?	Yes	Replace TCM.																					
		No	Replace control valve body assembly. If problem remains, overhaul transaxle and repair or replace parts as necessary.																					

16	Frequent shifting		
Description	Downshift occurs when accelerator depressed slightly in D, 2, and 1 ranges (except O/D OFF mode)		
(TROUBLESHOOTING HINTS)			
1. Throttle position (TP) sensor malfunction or not adjusted correctly			
2. TCM malfunction			
3. Control valve stuck			
Step	Inspection		Action
1	Check that no diagnostic trouble codes exist by retrieving DTC's with a scan tool	Yes	Go to next step.
		No	Diagnostic trouble code(s) displayed on scan tool. • Check for cause of diagnostic trouble code(s) If problem remains, go to next step.

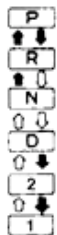
2	Are measurements at TCM terminals OK?	<table><tr><th>TCM</th><th>Spec.</th><th>Condition</th></tr><tr><td rowspan="2">H-01/ 38</td><td>Duty 90%</td><td>Throttle valve fully closed</td></tr><tr><td>Duty 19%</td><td>Throttle valve fully open</td></tr></table>	TCM	Spec.	Condition	H-01/ 38	Duty 90%	Throttle valve fully closed	Duty 19%	Throttle valve fully open	Yes	Go to next step.
	TCM	Spec.	Condition									
H-01/ 38	Duty 90%	Throttle valve fully closed										
	Duty 19%	Throttle valve fully open										
		NOTICE H-01/38 terminal : Throttle position (TP) sensor (from ECM)	No	Check for malfunctioning parts and wiring. • Throttle position (TP) sensor								
3	Replace with known operational TCM. Is problem corrected?		Yes	Replace TCM.								
			No	Replace control valve body assembly. If problem remains, overhaul transaxle and repair or replace parts as necessary.								

17	Shift point high or low
Description	• Shift points do not match shift diagram • Shift delayed when accelerating • Shift occurs too fast when accelerating and engine speed does not increase

(TROUBLESHOOTING HINTS)

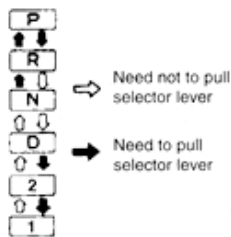
1. Throttle position (TP) sensor malfunction or not adjusted correctly
2. Input/turbine speed sensor malfunction
3. Transaxle fluid temperature sensor malfunction
4. Selector lever installation or adjustment incorrect
5. Shift solenoids valves (A, B, C) worn
6. PCM malfunction
7. Control valve stuck
8. Transaxle range switch malfunction or not adjusted correctly

Step	Inspection		Action												
1	Check that no diagnostic trouble codes exist by retrieving DTC's with a scan tool	Yes	Go to next step.												
		No	Diagnostic trouble code(s) displayed on scan tool. • Check for cause of diagnostic trouble code(s) If problem remains, go to next step.												
2	Are measurements at TCM terminals OK?		Yes Go to next step.												
	<table><tr><th>TCM</th><th>Spec.</th><th>Condition</th></tr><tr><td rowspan="2">H-01/ 38</td><td>Duty 90%</td><td>Throttle valve fully closed</td></tr><tr><td>Duty 19%</td><td>Throttle valve fully open</td></tr><tr><td>H-01/ 16</td><td>Approx. 2.3</td><td>Ignition switch ON</td></tr><tr><td>H-01/ 44</td><td>Approx. 2.5</td><td>Idle</td></tr></table>			TCM	Spec.	Condition	H-01/ 38	Duty 90%	Throttle valve fully closed	Duty 19%	Throttle valve fully open	H-01/ 16	Approx. 2.3	Ignition switch ON	H-01/ 44
TCM	Spec.	Condition													
H-01/ 38	Duty 90%	Throttle valve fully closed													
	Duty 19%	Throttle valve fully open													
H-01/ 16	Approx. 2.3	Ignition switch ON													
H-01/ 44	Approx. 2.5	Idle													
		No	Check for malfunctioning parts and wiring. • Throttle position (TP) sensor • Input/turbine speed sensor												

	NOTICE • H-01/38 terminal : Throttle position (TP) sensor ground • H-01/44 terminal : Input/turbine speed sensor ground • H-01/16 terminal : Input/turbine speed sensor signal																									
3	Are measurements at TCM terminals OK? <table><tr><th>TCM</th><th>Spec.</th><th>Condition</th></tr><tr><td>H-01/-21</td><td>Approx 5.0V</td><td>ATF temp 68°F</td></tr><tr><td>H-01/-22</td><td>Approx 1.5V</td><td>ATF temp. 266°F(130°C)</td></tr></table>	TCM	Spec.	Condition	H-01/-21	Approx 5.0V	ATF temp 68°F	H-01/-22	Approx 1.5V	ATF temp. 266°F(130°C)	Yes	Go to next step.														
	TCM	Spec.	Condition																							
H-01/-21	Approx 5.0V	ATF temp 68°F																								
H-01/-22	Approx 1.5V	ATF temp. 266°F(130°C)																								
	NOTICE • H-01/21 terminal : Transaxle fluid temperature sensor ground • H-01/22 terminal : Transaxle fluid temperature sensor signal	No	Check transaxle fluid temperature sensor.																							
4	Is selector lever operation OK?  Need not to pull selector lever Need to pull selector lever	Yes	Go to next step.																							
		No	Adjust selector lever.																							
5	Operate selector lever ; does transaxle operate normally and are selector lever and transaxle position aligned?	Yes	Go to next step.																							
		No	Adjust transaxle range switch.																							
6	Operate selector lever ; are selector lever and range indicator positions aligned?	Yes	Go to next step.																							
		No	Overhaul transaxle and repair or replace parts as necessary.																							
7	Are measurements at TCM terminals OK? Vb : Battery Voltage <table><tr><th>TCM</th><th>Spec.</th><th>Condition</th></tr><tr><td rowspan="2">H-01/18</td><td>0V</td><td>P and N ranges</td></tr><tr><td>Vb</td><td>Other ranges</td></tr><tr><td rowspan="2">H-01/8</td><td>Vb</td><td>D range</td></tr><tr><td>0V</td><td>Other ranges</td></tr><tr><td rowspan="2">H-01/36</td><td>Vb</td><td>2 range</td></tr><tr><td>0V</td><td>Other ranges</td></tr><tr><td rowspan="2">H-01/37</td><td>Vb</td><td>1 range</td></tr><tr><td>0V</td><td>Other ranges</td></tr></table>	TCM	Spec.	Condition	H-01/18	0V	P and N ranges	Vb	Other ranges	H-01/8	Vb	D range	0V	Other ranges	H-01/36	Vb	2 range	0V	Other ranges	H-01/37	Vb	1 range	0V	Other ranges	Yes	Go to next step.
	TCM	Spec.	Condition																							
H-01/18	0V	P and N ranges																								
	Vb	Other ranges																								
H-01/8	Vb	D range																								
	0V	Other ranges																								
H-01/36	Vb	2 range																								
	0V	Other ranges																								
H-01/37	Vb	1 range																								
	0V	Other ranges																								
		No	Check transaxle range switch and wiring.																							

8	Is continuity of transaxle range switch OK?	Yes	Go to next step.																		
		No	Adjust and/or replace transaxle range switch.																		
9	Are resistance and output voltage of shift solenoids (A, B, C) at TCM terminals OK? Vb : Battery Voltage <table border="1"><thead><tr><th>TCM</th><th>Spec.</th><th>Condition</th></tr></thead><tbody><tr><td rowspan="2">H-01/ 30</td><td>Vb</td><td>Solenoid ON</td></tr><tr><td>0V</td><td>Solenoid OFF</td></tr><tr><td rowspan="2">H-01/ 33</td><td>Vb</td><td>Solenoid ON</td></tr><tr><td>0V</td><td>Solenoid OFF</td></tr><tr><td rowspan="2">H-01/ 32</td><td>Vb</td><td>Solenoid ON</td></tr><tr><td>0V</td><td>Solenoid OFF</td></tr></tbody></table> Solenoid valve resistance : 14~18Ω NOTICE • H-01/30 terminal : Shift solenoid A • H-01/33 terminal : Shift solenoid B • H-01/32 terminal : Shift solenoid C	TCM	Spec.	Condition	H-01/ 30	Vb	Solenoid ON	0V	Solenoid OFF	H-01/ 33	Vb	Solenoid ON	0V	Solenoid OFF	H-01/ 32	Vb	Solenoid ON	0V	Solenoid OFF	Yes	Go to next step.
		TCM	Spec.	Condition																	
H-01/ 30	Vb	Solenoid ON																			
	0V	Solenoid OFF																			
H-01/ 33	Vb	Solenoid ON																			
	0V	Solenoid OFF																			
H-01/ 32	Vb	Solenoid ON																			
	0V	Solenoid OFF																			
No	If resistance is not OK, check for malfunctioning parts and wiring. • Shift solenoid A • Shift solenoid B • Shift solenoid C If resistance is OK but voltage is not, replace TCM.																				
10	Is engine stall speed OK? Stall speed : 2200~2500 rpm	Yes	Check ECM parts & Engine and/or replace TCM.																		
		No	Overhaul transaxle and repair or replace parts as necessary.																		

18	No lock-up		
Description	No lock-up when vehicle speed reaches lock-up range		
(TROUBLESHOOTING HINTS)			
1. Throttle position (TP) sensor malfunction or not adjusted correctly.			
2. Input/turbine speed sensor malfunction			
3. Selector lever installation or adjustment incorrect			
4. Line pressure low			
5. Transaxle range switch worn or maladjusted			
6. Torque converter clutch solenoid malfunction			
7. TCM malfunction			
8. Control valve stuck			
Step	Inspection		Action
1	Check that no diagnostic trouble codes exist by retrieving DTC's with a scan tool	Yes	Go to next step.
		No	Diagnostic trouble code(s) displayed on scan tool. • Check for cause of diagnostic trouble code(s) If problem remains, go to next step.
2	Are resistance of torque converter clutch solenoid and output voltage of TCM terminal OK? Vb : Battery voltage	Yes	Replace control valve body assembly.
		No	If resistance is not OK, check for malfunctioning parts and wiring. • Torque converter clutch solenoid If resistance is OK but voltage is not, check

	<table><tr><th>TCM</th><th>Spec.</th><th>Condition</th></tr><tr><td>H-01/4</td><td>V_B</td><td>Lock-up</td></tr><tr><td></td><td>0V</td><td>Others</td></tr></table> Solenoid valve resistance : 14~18Ω	TCM	Spec.	Condition	H-01/4	V _B	Lock-up		0V	Others		wiring and or replace TCM.																										
TCM	Spec.	Condition																																				
H-01/4	V _B	Lock-up																																				
	0V	Others																																				
3	Are resistance and output voltage of shift solenoids (A, B, C) at TCM terminals OK? V _b : Battery Voltage	Yes	Go to next step.																																			
	<table><tr><th>TCM</th><th>Spec.</th><th>Condition</th></tr><tr><td rowspan="2">H-01/38</td><td>Duty 90%</td><td>Throttle valve fully closed</td></tr><tr><td>Duty 19%</td><td>Throttle valve fully open</td></tr><tr><td>H-01/44 H-01/16</td><td>2.3V</td><td>Constant (Ign: ON)</td></tr><tr><td rowspan="2">H-01/42</td><td>V_B</td><td>Ignition switch ON</td></tr><tr><td>0~B+</td><td>Driving</td></tr><tr><td rowspan="2">H-01/18</td><td>0V</td><td>P and N ranges</td></tr><tr><td>V_B</td><td>Other ranges</td></tr><tr><td rowspan="2">H-01/8</td><td>V_B</td><td>D range</td></tr><tr><td>0V</td><td>Other ranges</td></tr><tr><td rowspan="2">H-01/36</td><td>V_B</td><td>2 range</td></tr><tr><td>0V</td><td>Other ranges</td></tr><tr><td rowspan="2">H-01/37</td><td>V_B</td><td>1 range</td></tr><tr><td>0V</td><td>Other ranges</td></tr></table> NOTICE • H-01/38 terminal : Throttle position (TP) sensor • H-01/44 terminal : Input/turbine speed sensor ground • H-01/16 terminal : Input/turbine speed sensor signal • H-01/42 terminal : Vehicle speed sensor • H-01/18, H-01/36, H-01/37 terminal : Transaxle range switch	TCM	Spec.	Condition	H-01/38	Duty 90%	Throttle valve fully closed	Duty 19%	Throttle valve fully open	H-01/44 H-01/16	2.3V	Constant (Ign: ON)	H-01/42	V _B	Ignition switch ON	0~B+	Driving	H-01/18	0V	P and N ranges	V _B	Other ranges	H-01/8	V _B	D range	0V	Other ranges	H-01/36	V _B	2 range	0V	Other ranges	H-01/37	V _B	1 range	0V	Other ranges	No
TCM	Spec.	Condition																																				
H-01/38	Duty 90%	Throttle valve fully closed																																				
	Duty 19%	Throttle valve fully open																																				
H-01/44 H-01/16	2.3V	Constant (Ign: ON)																																				
H-01/42	V _B	Ignition switch ON																																				
	0~B+	Driving																																				
H-01/18	0V	P and N ranges																																				
	V _B	Other ranges																																				
H-01/8	V _B	D range																																				
	0V	Other ranges																																				
H-01/36	V _B	2 range																																				
	0V	Other ranges																																				
H-01/37	V _B	1 range																																				
	0V	Other ranges																																				
4	Is selector lever operation OK?	Yes	Go to next step.																																			
		No	Adjust selector lever.																																			
5	Operate selector lever ; are selector lever and	Yes	Go to next step.																																			

	range indicator positions aligned?	No	Adjust transaxle range switch.												
6	Operate selector lever ; does transaxle operate normally and are selector lever and transaxle position aligned?	Yes	Go to next step.												
		No	Overhaul transaxle and repair or replace parts as necessary.												
7	Is line pressure OK? <table><tr><td colspan="2">Line pressure</td><td>psi (kPa, kg/cm²)</td></tr><tr><td>Range</td><td>Idle</td><td>Stall</td></tr><tr><td>D, 2, 1</td><td>56.98~127.98 (392.4~882.9, 4.0~9.0)</td><td>113.76~184.86 (784.8~1275.3, 8.0~13.0)</td></tr><tr><td>R</td><td>71.1~142.2 (490.5~981.0, 5.0~10.0)</td><td>199.08~270.18 (1373.4~1863.9, 14.0~19.0)</td></tr></table>	Line pressure		psi (kPa, kg/cm²)	Range	Idle	Stall	D, 2, 1	56.98~127.98 (392.4~882.9, 4.0~9.0)	113.76~184.86 (784.8~1275.3, 8.0~13.0)	R	71.1~142.2 (490.5~981.0, 5.0~10.0)	199.08~270.18 (1373.4~1863.9, 14.0~19.0)	Yes	Go to next step.
		Line pressure		psi (kPa, kg/cm²)											
		Range	Idle	Stall											
D, 2, 1	56.98~127.98 (392.4~882.9, 4.0~9.0)	113.76~184.86 (784.8~1275.3, 8.0~13.0)													
R	71.1~142.2 (490.5~981.0, 5.0~10.0)	199.08~270.18 (1373.4~1863.9, 14.0~19.0)													
No	Check linear solenoid valve. If line pressure is not within specifications after linear solenoid valve inspecton, replace control valve body assembly.														

19	No kickdown										
Description	Does not downshift when accelerator pedal depressed more than 7/8 while within kickdown range										
(TROUBLESHOOTING HINTS)											
1. Throttle position sensor malfunction or not adjusted correctly											
2. Line pressure low											
3. TCM malfunction											
4. Control valve stuck											
Step	Inspection		Action								
1	Check that no diagnostic trouble codes exist by retrieving DTC's with a scan tool	Yes	Go to next step.								
		No	Diagnostic trouble code(s) displayed on scan tool. • Check for cause of diagnostic trouble code(s) If problem remains, go to next step.								
2	Is input voltage of engine coolant temperature sensor signal at TCM terminals OK? Vb : Battery Voltage <table border="1"><thead><tr><th>TCM</th><th>Spec.</th><th>Condition</th></tr></thead><tbody><tr><td rowspan="2">H-01/38</td><td>Duty 90%</td><td>Throttle valve fully closed</td></tr><tr><td>Duty 19%</td><td>Throttle valve fully open</td></tr></tbody></table>	TCM	Spec.	Condition	H-01/38	Duty 90%	Throttle valve fully closed	Duty 19%	Throttle valve fully open	Yes	Go to next step.
		TCM	Spec.	Condition							
H-01/38	Duty 90%	Throttle valve fully closed									
	Duty 19%	Throttle valve fully open									
No	Check throttle position (TP) sensor and wiring.										
3	Is accelerator cable installed correctly and does it operate smoothly?	Yes	Go to next step.								
		No	Adjust or replace accelerator cable.								
4	Replace with known good TCM. Is problem corrected?	Yes	Replace TCM.								
		No	Replace control valve body assembly. If problem remains, overhaul transaxle and repair or replace parts as necessary.								
5	Is line pressure OK?	Yes	Go to next step.								
		No	Check linear solenoid valve. If line pressure is not within specifications after linear solenoid valve inspection, replace control valve body assembly.								

Line pressure psi (kPa, kg/cm ²)		
Range	Idle	Stall
D, 2, 1	56.98~127.98 (392.4~882.9, 4.0~9.0)	113.76~184.86 (784.8~1275.3, 8.0~13.0)
R	71.1~142.2 (490.5~981.0, 5.0~10.0)	199.08~270.18 (1373.4~1863.9, 14.0~19.0)

20	Engine speed flares up on acceleration																		
Description	Engine speed flares up on acceleration																		
(TROUBLESHOOTING HINTS)																			
1. ATF level low																			
2. Line pressure low																			
3. Control valve stuck																			
4. Powertrain slippage (forward clutch, 2-4 brake band, one-way clutch No. 1 or No. 2, 3-4 clutch)																			
5. Torque convertoer worn																			
Step	Inspection		Action																
1	Are ATF level and condition OK? Do transaxle seals, sealant, and gaskets prevent leakage? ① Clear pink : Normal condition ② Dark or black (with friction material) : Worn powertrain components ③ Milky pink : Water contamination ④ Light to dark brown (oxidation) : Overheated or oid fluid	Yes	Go to next step.																
		No	If ATF level is not OK, add fluid as necessary If ATF condition is not OK, repair as follows : • ② condition - Overhaul transaxle and repair or replace parts as necessary ; then go to next step • ③ or ④ conditions - Replace ATF ; then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle ; then go to next step.																
2	Are resistance of torque converter clutch solenoid vlave and output voltage of TCM terminal H-01/4 OK? Vb : Battery Voltage <table border="1"><tr><td>TCM</td><td>Spec.</td><td>Condition</td></tr><tr><td>H-01/4</td><td>Vb</td><td>Lock-up</td></tr><tr><td></td><td>0V</td><td>Others</td></tr></table> Solenoid valve resistance : 14~18Ω	TCM	Spec.	Condition	H-01/4	Vb	Lock-up		0V	Others	Yes	Go to next step.							
		TCM	Spec.	Condition															
H-01/4	Vb	Lock-up																	
	0V	Others																	
No	If resistance is not OK, check for malfunctioning parts and wiring. • Torque converter clutch solenoid If resistance is OK but voltage is not, check wiring and/or replace TCM.																		
3	Is line pressure OK? <table border="1"><tr><td colspan="3">Line pressure</td><td>psi (kPa, kg/cm²)</td></tr><tr><td>Range</td><td>Idle</td><td colspan="2">Stall</td></tr><tr><td>D, 2, 1</td><td>56.98~127.98 (392.4~882.9, 4.0~9.0)</td><td colspan="2">113.76~184.86 (784.8~1275.3, 8.0~13.0)</td></tr><tr><td>R</td><td>71.1~142.2 (490.5~981.0, 5.0~10.0)</td><td colspan="2">199.08~270.18 (1373.4~1863.9, 14.0~19.0)</td></tr></table>	Line pressure			psi (kPa, kg/cm ²)	Range	Idle	Stall		D, 2, 1	56.98~127.98 (392.4~882.9, 4.0~9.0)	113.76~184.86 (784.8~1275.3, 8.0~13.0)		R	71.1~142.2 (490.5~981.0, 5.0~10.0)	199.08~270.18 (1373.4~1863.9, 14.0~19.0)		Yes	Go to next step.
		Line pressure			psi (kPa, kg/cm ²)														
Range	Idle	Stall																	
D, 2, 1	56.98~127.98 (392.4~882.9, 4.0~9.0)	113.76~184.86 (784.8~1275.3, 8.0~13.0)																	
R	71.1~142.2 (490.5~981.0, 5.0~10.0)	199.08~270.18 (1373.4~1863.9, 14.0~19.0)																	
No	Check linear solenoid valve. If line pressure is not within specifications after linear solenoid valve inspection, replace control valve body assembly.																		
4	Is engine stall speed OK? Stall speed : 2200~2500 rpm	Yes	Check EMS parts & Engine and/or replace TCM.																
		No	Overhaul transaxle and repair or replace parts as necessary.																

21	Engine speed flares up when upshifting and/or downshifting
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Description	• Engine flares up when accelerator pedal depressed for upshifting • Engine flares up suddenly when accelerator pedal depressed for downshifting																	
(TROUBLESHOOTING HINTS)																		
1. ATF level low																		
2. Line pressure incorrect																		
3. Throttle (TP) sensor malfunction or misadjusted																		
4. Input/turbine speed sensor malfunction																		
5. TCM malfunction																		
6. Servo piston malfunction																		
7. Orifice valve malfunction																		
8. 1-2, 2-3 accumulator malfunction																		
9. Control valve stuck																		
10. Powertrain damaged (forward clutch, 3-4 clutch, 2-4 brake band, one-way clutch No. 1)																		
11. Oil pump malfunction																		
Step	Inspection		Action															
1	Check that no diagnostic trouble codes exist by retrieving DTC's with a scan tool.	Yes	Go to next step.															
		No	Diagnostic trouble code(s) displayed on scan tool. • Check for cause of diagnostic trouble code(s) If problem remains, go to next step.															
2	Are ATF level and condition OK? Do transaxle seals, sealant, and gaskets prevent leakage? ① Clear pink : Normal condition ② Dark or black (with friction material) : Worn powertrain components ③ Milky pink : Water contamination ④ Light to dark brown (oxidation) : Overheated or oil fluid	Yes	Go to next step.															
		No	If ATF level is not OK, add fluid as necessary If ATF condition is not OK, repair as follows : • ② condition - Overhaul transaxle and repair or replace parts as necessary ; then go to next step • ③ or ④ conditions - Replace ATF ; then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle ; then go to next step.															
3	Is line pressure OK? <table border="1"><thead><tr><th colspan="3">Line pressure</th></tr><tr><th colspan="3">psi (kPa, kg/cm²)</th></tr><tr><th>Range</th><th>Idle</th><th>Stall</th></tr></thead><tbody><tr><td>D, 2, 1</td><td>56.98~127.98 (392.4~882.9, 4.0~9.0)</td><td>113.76~184.86 (784.8~1275.3, 8.0~13.0)</td></tr><tr><td>R</td><td>71.1~142.2 (490.5~981.0, 5.0~10.0)</td><td>199.08~270.18 (1373.4~1863.9, 14.0~19.0)</td></tr></tbody></table>	Line pressure			psi (kPa, kg/cm ²)			Range	Idle	Stall	D, 2, 1	56.98~127.98 (392.4~882.9, 4.0~9.0)	113.76~184.86 (784.8~1275.3, 8.0~13.0)	R	71.1~142.2 (490.5~981.0, 5.0~10.0)	199.08~270.18 (1373.4~1863.9, 14.0~19.0)	Yes	Go to next step.
		Line pressure																
psi (kPa, kg/cm ²)																		
Range	Idle	Stall																
D, 2, 1	56.98~127.98 (392.4~882.9, 4.0~9.0)	113.76~184.86 (784.8~1275.3, 8.0~13.0)																
R	71.1~142.2 (490.5~981.0, 5.0~10.0)	199.08~270.18 (1373.4~1863.9, 14.0~19.0)																
No	Check that linear solenoid valve. If line pressure is not within specifications after linear solenoid valve inspection, replace control valve body assembly.																	
4	Are measurements at TCM terminals OK? Vb : Battery Voltage	Yes	Go to next step.															
		No	If resistance is not OK, check for malfunctioning parts and wiring • Throttle position sensor • Input/turbine speed sensor If resistance is OK but voltage is not, replace TCM.															

<table border="1"> <thead> <tr> <th>TCM</th><th>Spec.</th><th>Condition</th></tr> </thead> <tbody> <tr> <td rowspan="2">H-01/ 38</td><td>Duty 90%</td><td>Throttle valve fully closed</td></tr> <tr> <td>Duty 19%</td><td>Throttle valve fully open</td></tr> <tr> <td>H-01/ 44</td><td>Approx. 2.3</td><td>Ignition switch ON</td></tr> <tr> <td>H-01/ 16</td><td>Approx. 2.5</td><td>Idle</td></tr> </tbody> </table>			TCM	Spec.	Condition	H-01/ 38	Duty 90%	Throttle valve fully closed	Duty 19%	Throttle valve fully open	H-01/ 44	Approx. 2.3	Ignition switch ON	H-01/ 16	Approx. 2.5	Idle
TCM	Spec.	Condition														
H-01/ 38	Duty 90%	Throttle valve fully closed														
	Duty 19%	Throttle valve fully open														
H-01/ 44	Approx. 2.3	Ignition switch ON														
H-01/ 16	Approx. 2.5	Idle														
NOTICE • H-01/38 terminal : Throttle position sensor • H-01/44 terminal : Input/turbine speed sensor ground • H-01/16 terminal : Input/turbine speed sensor signal																

22	Excessive shift shock at P, N to R and/or N to D		
Description	Strong shift shock felt at idle when shifting from P or N to D or R range		
(TROUBLESHOOTING HINTS)			
Step	Inspection		Action
1	Check that no diagnostic trouble codes exist by retrieving DTC's with a scan tool	Yes	Go to next step.
		No	Diagnostic trouble code(s) displayed on scan tool. • Check for cause of diagnostic trouble code(s) If problem remains, go to next step.
2	Are ATF level and condition OK? Do transaxle seals, sealant, and gaskets prevent leakage? ① Clear pink : Normal condition ② Dark or black (with friction material) : Worn powertrain components ③ Milky pink : Water contamination ④ Light to dark brown (oxidation) : Overheated or old fluid	Yes	Go to next step.
		No	If ATF level is not OK, add fluid as necessary If ATF condition is not OK, repair as follows : • ② condition - Overhaul transaxle and repair or replace parts as necessary ; then go to next step • ③ or ④ conditions - Replace ATF ; then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle ; then go to next step.
3	Is selector lever operation OK?	Yes	Go to next step.
		No	Adjust selector lever.

	P ↑ ↓ R ↑ ↓ N ↑ ↓ D ↑ ↓ 2 ↑ ↓ 1 ↑ ↓ ⇒ Need not to pull selector lever ⇒ Need to pull selector lever		
4	Operate selector lever ; are selector lever and range indicator positions aligned?	Yes	Go to next step.
		No	Adjust transaxle range switch.
5	Operate selector lever ; does transaxle operate normally and are selector lever and transaxle position aligned?	Yes	Go to next step.
		No	Overhaul transaxle and repair or replace parts as necessary.
6	Drive vehicle in D, 2, and 1 range ; does vehicle start from stop in 1st gear?	Yes	Go to next step.
		No	Overhaul transaxle and repair or replace parts as necessary.
7	Are resistance and output voltage of shift solenoids (A, B, C) at TCM terminals OK? Vb : Battery voltage	Yes	Go to next step.
		No	If resistance is not OK, check for malfunctioning parts and wiring. • Shift solenoid A • Shift solenoid B • Shift solenoid C If resistance is OK but voltage is not, replace TCM.
8	Are resistance and output voltage of shift solnoids (A, B, C) at TCM terminals OK? Vb : Battery voltage	Yes	Go to next step.
		No	If resistance is not OK, check for malfunctioning parts and wiring. • Throttle position sensor • Input/turbine speed sensor • Vehicle speed sensor • Transaxle range switch If resistance is OK but voltage is not, replace TCM.

TCM	Spec.	Condition
H-01/ 38	Duty 90%	Throttle valve fully closed
	Duty 19%	Throttle valve fully open
H-01/ 44 H-01/ 16	2.3V	Constant (Ign: ON)
H-01/ 42	V _B	Ignition switch ON
	0~B+	Driving
H-01/ 18	0V	P and N ranges
	V _B	Other ranges
H-01/ 8	V _B	D range
H-01/ 36	0V	Other ranges
	V _B	2 range
H-01/ 37	0V	Other ranges
	V _B	1 range

NOTICE

- H-01/38 terminal : Throttle position (TP) sensor
- H-01/44 terminal : Input/turbine speed sensor ground
- H-01/16 terminal : Input/turbine speed sensor signal
- H-01/42 terminal : Vehicle speed sensor
- H-01/18, H-01/8, H-01/36, H-01/37 terminal : Transaxle range switch

9	Is continuity of transaxle ranges switch OK?	Yes	Go to next step.
		No	Adjust transaxle range switch.
10	Is line pressure OK?	Yes	Go to next step.
		No	Check linear solenoid valve. If line pressure is not within specifications after linear solenoid valve inspection, replace control valve body assembly.

Line pressure		psi (kPa, kg/cm ²)
Range	Idle	Stall
D, 2, 1	56.98~127.98	113.76~184.86
	(392.4~882.9, 4.0~9.0)	(784.8~1275.3, 8.0~13.0)
R	71.1~142.2	199.08~270.18
	(490.5~981.0, 5.0~10.0)	(1373.4~1863.9, 14.0~19.0)

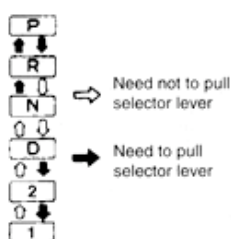
23	Engine shift shock when upshifting and/or downshifting
Description	• Excessive shift shock felt when accelerating and upshifting • During crusing, excessive shift shock felt when accelerator pedal is depressed and downshifting

(TROUBLESHOOTING HINTS)

1. ATF level low
2. Line pressure high
3. Throttle position sensor malfunction or misadjusted
4. Input/turbine speed sensor malfunction
5. Transaxle fluid temperature sensor malfunction
6. TCM malfunction
7. Shift solenoids valves (A, B, C) worn
8. Orifice valve malfunction
9. 1-2, 2-3 accumulator malfunction
10. Control valve stuck
11. Powertrain damaged (3-4 clutch, 2-4 brake band, one-way clutch No.1)

Step	Inspection	Action																					
1	Check that no diagnostic trouble codes exist by retrieving DTC's with a scan tool	Yes	Go to next step.																				
		No	Diagnostic trouble code(s) displayed on scan tool. • Check for cause of diagnostic trouble code(s) If problem remains, go to next step.																				
2	Are ATF level and condition OK? Do transaxle seals, sealant, and gaskets prevent leakage? ① Clear pink : Normal condition ② Dark or black (with friction material) : Worn powertrain components ③ Milky pink : Water contamination ④ Light to dark brown (oxidation) : Overheated or oil fluid	Yes	Go to next step.																				
		No	If ATF level is not OK, add fluid as necessary If ATF condition is not OK, repair as follows : • ② condition - Overhaul transaxle and repair or replace parts as necessary ; then go to next step • ③ or ④ conditions - Replace ATF ; then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle ; then go to next step.																				
3	Is line pressure OK? <table><tr><th colspan="3">Line pressure</th><th>psi (kPa, kg/cm²)</th></tr><tr><th>Range</th><th>Idle</th><th>Stall</th><th></th></tr><tr><td>D, 2, 1</td><td>56.98~127.98 (392.4~882.9, 4.0~9.0)</td><td>113.76~184.86 (784.8~1275.3, 8.0~13.0)</td><td></td></tr><tr><td>R</td><td>71.1~142.2 (490.5~981.0, 5.0~10.0)</td><td>199.08~270.18 (1373.4~1863.9, 14.0~19.0)</td><td></td></tr></table>	Line pressure			psi (kPa, kg/cm²)	Range	Idle	Stall		D, 2, 1	56.98~127.98 (392.4~882.9, 4.0~9.0)	113.76~184.86 (784.8~1275.3, 8.0~13.0)		R	71.1~142.2 (490.5~981.0, 5.0~10.0)	199.08~270.18 (1373.4~1863.9, 14.0~19.0)		Yes	Go to next step.				
		Line pressure			psi (kPa, kg/cm²)																		
Range	Idle	Stall																					
D, 2, 1	56.98~127.98 (392.4~882.9, 4.0~9.0)	113.76~184.86 (784.8~1275.3, 8.0~13.0)																					
R	71.1~142.2 (490.5~981.0, 5.0~10.0)	199.08~270.18 (1373.4~1863.9, 14.0~19.0)																					
		No	Check linear solenoid valve. If line pressure is not within specifications after linear solenoid valve inspection, replace control valve body assembly.																				
4	Are measurements at TCM trminals OK? Vb : Battery voltage <table><tr><th>TCM</th><th>Spec.</th><th>Condition</th></tr><tr><td rowspan="2">H-01/38</td><td>Duty 90%</td><td>Throttle valve fully closed</td></tr><tr><td>Duty 19%</td><td>Throttle valve fully open</td></tr><tr><td>H-01/44</td><td>Approx. 2.3</td><td>Ignition switch ON</td></tr><tr><td>H-01/16</td><td>Approx. 2.5</td><td>Idle</td></tr><tr><td>H-01/21</td><td>Approx. 5.0V</td><td>ATF temp. 68°F (20°C)</td></tr><tr><td>H-01/22</td><td>Approx. 1.5V</td><td>ATF temp. 266°F(130°C)</td></tr></table>	TCM	Spec.	Condition	H-01/38	Duty 90%	Throttle valve fully closed	Duty 19%	Throttle valve fully open	H-01/44	Approx. 2.3	Ignition switch ON	H-01/16	Approx. 2.5	Idle	H-01/21	Approx. 5.0V	ATF temp. 68°F (20°C)	H-01/22	Approx. 1.5V	ATF temp. 266°F(130°C)	Yes	Replace TCM.
		TCM	Spec.	Condition																			
H-01/38	Duty 90%	Throttle valve fully closed																					
	Duty 19%	Throttle valve fully open																					
H-01/44	Approx. 2.3	Ignition switch ON																					
H-01/16	Approx. 2.5	Idle																					
H-01/21	Approx. 5.0V	ATF temp. 68°F (20°C)																					
H-01/22	Approx. 1.5V	ATF temp. 266°F(130°C)																					
		No	If resistance is not OK, check for malfunctioning parts and wiring. If resistance is OK but voltage is not, replace TCM.																				

	NOTICE • H-01/38 terminal : Throttle position (TP) sensor • H-01/44 terminal : Input/turbine speed sensor ground • H-01/16 terminal : Input/turbine speed sensor signal • H-01/22 terminal : Transaxle fluid temperature sensor • H-01/21 terminal : Ground																								
5	Are resistance and output voltage of shift solenoids (A, B, C) at TCM terminals OK? Vb : Battery Voltage	Yes	Go to next step.																						
	<table><thead><tr><th>TCM</th><th>Spec.</th><th>Condition</th></tr></thead><tbody><tr><td rowspan="2">H-01/30</td><td>Vb</td><td>Solenoid ON</td></tr><tr><td>0V</td><td>Solenoid OFF</td></tr><tr><td rowspan="2">H-01/33</td><td>Vb</td><td>Solenoid ON</td></tr><tr><td>0V</td><td>Solenoid OFF</td></tr><tr><td rowspan="2">H-01/32</td><td>Vb</td><td>Solenoid ON</td></tr><tr><td>0V</td><td>Solenoid OFF</td></tr></tbody></table> Solenoid valve resistance : 14~18Ω NOTICE • H-01/30 terminal : Shift solenoid A • H-01/33 terminal : Shift solenoid B • H-01/32 terminal : Shift solenoid C	TCM	Spec.	Condition	H-01/30	Vb	Solenoid ON	0V	Solenoid OFF	H-01/33	Vb	Solenoid ON	0V	Solenoid OFF	H-01/32	Vb	Solenoid ON	0V	Solenoid OFF	No	If resistance is not OK, check for malfunctioning parts and wiring. • Shift solenoid A • Shift solenoid B • Shift solenoid C If resistance is OK but voltage is not, replace TCM.				
TCM	Spec.	Condition																							
H-01/30	Vb	Solenoid ON																							
	0V	Solenoid OFF																							
H-01/33	Vb	Solenoid ON																							
	0V	Solenoid OFF																							
H-01/32	Vb	Solenoid ON																							
	0V	Solenoid OFF																							
6	Are measurments at TCM terminals OK? Vb : Battery Voltage	Yes	Go to next step.																						
	<table><thead><tr><th>TCM</th><th>Spec.</th><th>Condition</th></tr></thead><tbody><tr><td rowspan="2">H-01/18</td><td>0V</td><td>P and N ranges</td></tr><tr><td>Vb</td><td>Other ranges</td></tr><tr><td rowspan="2">H-01/8</td><td>Vb</td><td>D range</td></tr><tr><td>0V</td><td>Other ranges</td></tr><tr><td rowspan="2">H-01/36</td><td>Vb</td><td>2 range</td></tr><tr><td>0V</td><td>Other ranges</td></tr><tr><td rowspan="2">H-01/37</td><td>Vb</td><td>1 range</td></tr><tr><td>0V</td><td>Other ranges</td></tr></tbody></table> NOTICE H-01/18, H-01/8, H-01/36, H-01/37 terminals : Transaxle range switch	TCM	Spec.	Condition	H-01/18	0V	P and N ranges	Vb	Other ranges	H-01/8	Vb	D range	0V	Other ranges	H-01/36	Vb	2 range	0V	Other ranges	H-01/37	Vb	1 range	0V	Other ranges	No
TCM	Spec.	Condition																							
H-01/18	0V	P and N ranges																							
	Vb	Other ranges																							
H-01/8	Vb	D range																							
	0V	Other ranges																							
H-01/36	Vb	2 range																							
	0V	Other ranges																							
H-01/37	Vb	1 range																							
	0V	Other ranges																							

24	No engine braking																	
Description	- Engine speed drops to idle but vehicle does not slow when accelerator pedal released while cruising at medium to high speed - Engine speed drops to idle but vehicle does not slow when accelerator pedal released when in 1 range at low vehicle speed																	
(TROUBLESHOOTING HINTS)																		
1. Shift solenoid (B, C) malfunction																		
2. Transaxle range switch worn or not adjusted correctly																		
3. TCM malfunction																		
4. Line pressure low																		
5. Control valve stuck																		
6. Powertrain slippage (3-4 clutch, coasting clutch, low and reverse brake)																		
Step	Inspection		Action															
1	Check that no diagnostic trouble codes exist by retrieving DTC's with a scan tool	Yes	Go to next step.															
		No	Diagnostic trouble code(s) displayed on scan tool. Check for cause of diagnostic trouble code(s) If problem remains, go to next step.															
2	Are resistance and output voltage of solenoid valves (1-2, 2-3, 3-4 shift) at TCM terminals OK? Vb : Battery voltage	Yes	Go to next step.															
		No	If resistance is not OK, check for malfunctioning parts and wiring. - Shift solenoid B - Shift solenoid C If resistance is OK but voltage is not, replace TCM.															
		<table><tr><td>TCM</td><td>Spec.</td><td>Condition</td></tr><tr><td>H-01/33</td><td>Vb</td><td>Solenoid ON</td></tr><tr><td></td><td>0V</td><td>Solenoid OFF</td></tr><tr><td>H-01/32</td><td>Vb</td><td>Solenoid ON</td></tr><tr><td></td><td>0V</td><td>Solenoid OFF</td></tr></table>		TCM	Spec.	Condition	H-01/33	Vb	Solenoid ON		0V	Solenoid OFF	H-01/32	Vb	Solenoid ON		0V	Solenoid OFF
TCM	Spec.	Condition																
H-01/33	Vb	Solenoid ON																
	0V	Solenoid OFF																
H-01/32	Vb	Solenoid ON																
	0V	Solenoid OFF																
		Solenoid valve resistance : 14~18Ω																
		NOTICE - H-01/33 terminal : Shift solenoid B - H-01/32 terminal : Shift solenoid C																
3	Is selector lever operation OK?	Yes	Go to next step.															
		No	Adjust selector lever.															
																		
4	Operate selector lever ; are selector lever and range indicator positions aligned?	Yes	Go to next step.															
		No	Adjust transaxle range switch.															
5	Operate selector lever ; does transaxle operate normally and are selector lever and transaxle position aligned?	Yes	Go to next step.															
		No	Overhaul transaxle and repair or replace parts as necessary.															

6	Is line pressure OK?	Yes	Go to next step.																						
	Line pressure psi (kPa, kg/cm²) <table> <tr> <th>Range</th><th>Idle</th><th>Stall</th></tr> <tr> <td>D, 2, 1</td><td>56.98~127.98 (392.4~882.9, 4.0~9.0)</td><td>113.76~184.86 (784.8~1275.3, 8.0~13.0)</td></tr> <tr> <td>R</td><td>71.1~142.2 (490.5~981.0, 5.0~10.0)</td><td>199.08~270.18 (1373.4~1863.9, 14.0~19.0)</td></tr> </table>	Range	Idle	Stall	D, 2, 1	56.98~127.98 (392.4~882.9, 4.0~9.0)	113.76~184.86 (784.8~1275.3, 8.0~13.0)	R	71.1~142.2 (490.5~981.0, 5.0~10.0)	199.08~270.18 (1373.4~1863.9, 14.0~19.0)	No	Check linear solenoid valve. If line pressure is not within specifications after linear solenoid valve inspection, replace control valve body assembly.													
Range	Idle	Stall																							
D, 2, 1	56.98~127.98 (392.4~882.9, 4.0~9.0)	113.76~184.86 (784.8~1275.3, 8.0~13.0)																							
R	71.1~142.2 (490.5~981.0, 5.0~10.0)	199.08~270.18 (1373.4~1863.9, 14.0~19.0)																							
7	Are measurements at TCM terminals OK? Vb : Battery voltage	Yes	Go to next step.																						
	<table> <tr> <th>TCM</th><th>Spec.</th><th>Condition</th></tr> <tr> <td rowspan="2">H-01/ 18</td><td>0V</td><td>P and N ranges</td></tr> <tr> <td>V_B</td><td>Other ranges</td></tr> <tr> <td rowspan="2">H-01/ 8</td><td>V_B</td><td>D range</td></tr> <tr> <td>0V</td><td>Other ranges</td></tr> <tr> <td rowspan="2">H-01/ 36</td><td>V_B</td><td>2 range</td></tr> <tr> <td>0V</td><td>Other ranges</td></tr> <tr> <td rowspan="2">H-01/ 37</td><td>V_B</td><td>1 range</td></tr> <tr> <td>0V</td><td>Other ranges</td></tr> </table> NOTICE H-01/18, H-01/8, H-01/36, H-01/37 terminals : Transaxle range switch	TCM	Spec.	Condition	H-01/ 18	0V	P and N ranges	V _B	Other ranges	H-01/ 8	V _B	D range	0V	Other ranges	H-01/ 36	V _B	2 range	0V	Other ranges	H-01/ 37	V _B	1 range	0V	Other ranges	No
TCM	Spec.	Condition																							
H-01/ 18	0V	P and N ranges																							
	V _B	Other ranges																							
H-01/ 8	V _B	D range																							
	0V	Other ranges																							
H-01/ 36	V _B	2 range																							
	0V	Other ranges																							
H-01/ 37	V _B	1 range																							
	0V	Other ranges																							

TCM	Spec.	Condition
H-01/ 18	0V	P and N ranges
	V _B	Other ranges
H-01/ 8	V _B	D range
	0V	Other ranges
H-01/ 36	V _B	2 range
	0V	Other ranges
H-01/ 37	V _B	1 range
	0V	Other ranges

NOTICE

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H-01/18, H-01/8, H-01/36, H-01/37 terminals
: Transaxle range switch
```

25	No mode change
Description	O/D OFF mode not selected or not canceled
(TROUBLESHOOTING HINTS) Inspect parts and repair, adjust or replace malfunctioning parts as necessary 1. ATF level low 2. Differential worn and/or damaged	

26	Transaxle noise in all ranges
Description	Transalxe noisy in all ranges when vehicle is idling
(TROUBLESHOOTING HINTS) Inspect parts and repair, adjust or replace malfunctioning parts as necessary 1. ATF level low 2. Differential worn or damaged 3. Parking mechanism malfunction	

27	Transaxle noise in D, 2, 1 and R ranges
Description	Abnormal noise from transaxle in D, 2, 1, and R ranges
(TROUBLESHOOTING HINTS) Inspect parts and repair, adjust or replace malfunctioning parts as necessary. 1. ATF level low 2. Differential worn and/or damaged	

28	Transaxle overheats		
Description	ATF smells burnt and/or is discolored		
(TROUBLESHOOTING HINTS)			
1. ATF leve low			
2. TCM malfunction			
Step	Inspection		Action
1	Are ATF level and condition OK? Do transaxle seals, sealant, and gaskets prevent leakage? ① Clear pink : Normal condition ② Dark or black (with friction material) : Worn powertrain components ③ Milky pink : Water contamination ④ Light to dark brown (oxidation) : Overheated or oil fluid	Yes	Go to next step.
		No	If ATF level is not OK, add fluid as necessary If ATF condition is not OK, repair as follows : • ② condition - Overhaul transaxle and repair or replace parts as necessary ; then go to next step • ③ or ④ conditions - Replace ATF ; then go to next step If there is leakage, repair or replace parts as necessary and/or replace transaxle ; then go to next step.
2	Check that no diagnostic trouble codes exist by retrieving DTC's with a scan tool	Yes	Go to next step.
		No	Diagnostic trouble code(s) displayed on scan tool. • Check for cause of diagnostic trouble code(s) If problem remains, go to next step.

Self diagnostic function (Inspection procedure)

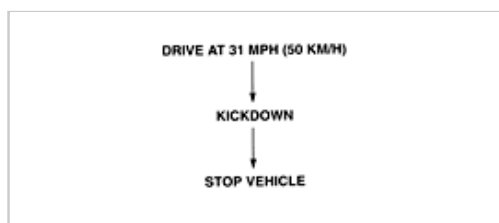
1. Connect SST (0K2A1 089 AA0) to data link connector.
2. Turn ignition switch to ON.
3. Check diagnostic trouble code(s), referring to Hi-scan Pro operating manual.
4. If a diagnostic trouble code(s) is displayed, check for cause by using number on diagnostic trouble code table. Repair as necessary.
5. After repairs, perform After-Repair procedure to verify that there are no remaining diagnostic trouble codes.

After-repair procedure

1. Cancel diagnostic trouble code memory by using SST (0K2A1 089 AA0).
2. Remove SST (0K2A1 089 AA0) from data link connector.



3. Drive vehicle at 31 mph (50 km/h), and depress accelerator pedal fully to activate kickdown. Stop vehicle gradually.
4. Connect SST (0K2A1 089 AA0) to data link connector.
5. Turn ignition switch to ON.
6. Verify that no diagnostic trouble codes are displayed.
7. Remove SST (0K2A1 089 AA0) from data link connector.



Diagnostic trouble code

Code No.	Diagnosed circuit	MIL
P0712	Oil temperature sensor low	ON
P0713	Oil temperature sensor high	ON
P0717	Input/turbine speed sensor circuit malfunction	ON
P0727	Engine speed input malfunction	ON
P0743	Torque converter clutch system circuit malfunction	ON
P0748	Linear solenoid electrical	ON
P0753	Shift solenoid A electrical	ON
P0758	Shift solenoid B electrical	ON
P0963	Shift solenoid C electrical	ON
P1121	TPS signal circuit from PCM to TCM	ON
P1500	Vehicle speed signal malfunction	ON
P0604	TCM Malfunction	OFF
P1780	Torque reduction signal malfunction	OFF
P1800	Engine torque signal malfunction	OFF

Mechanical system tests

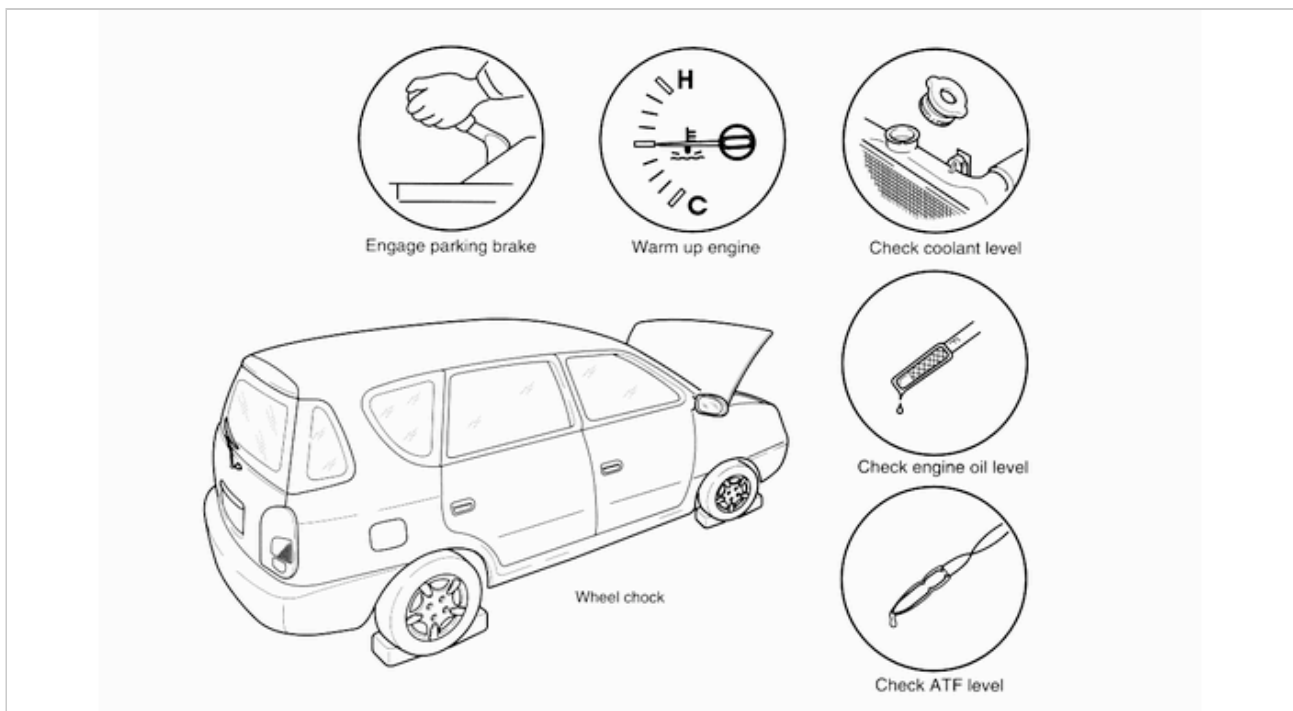
Stall test

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

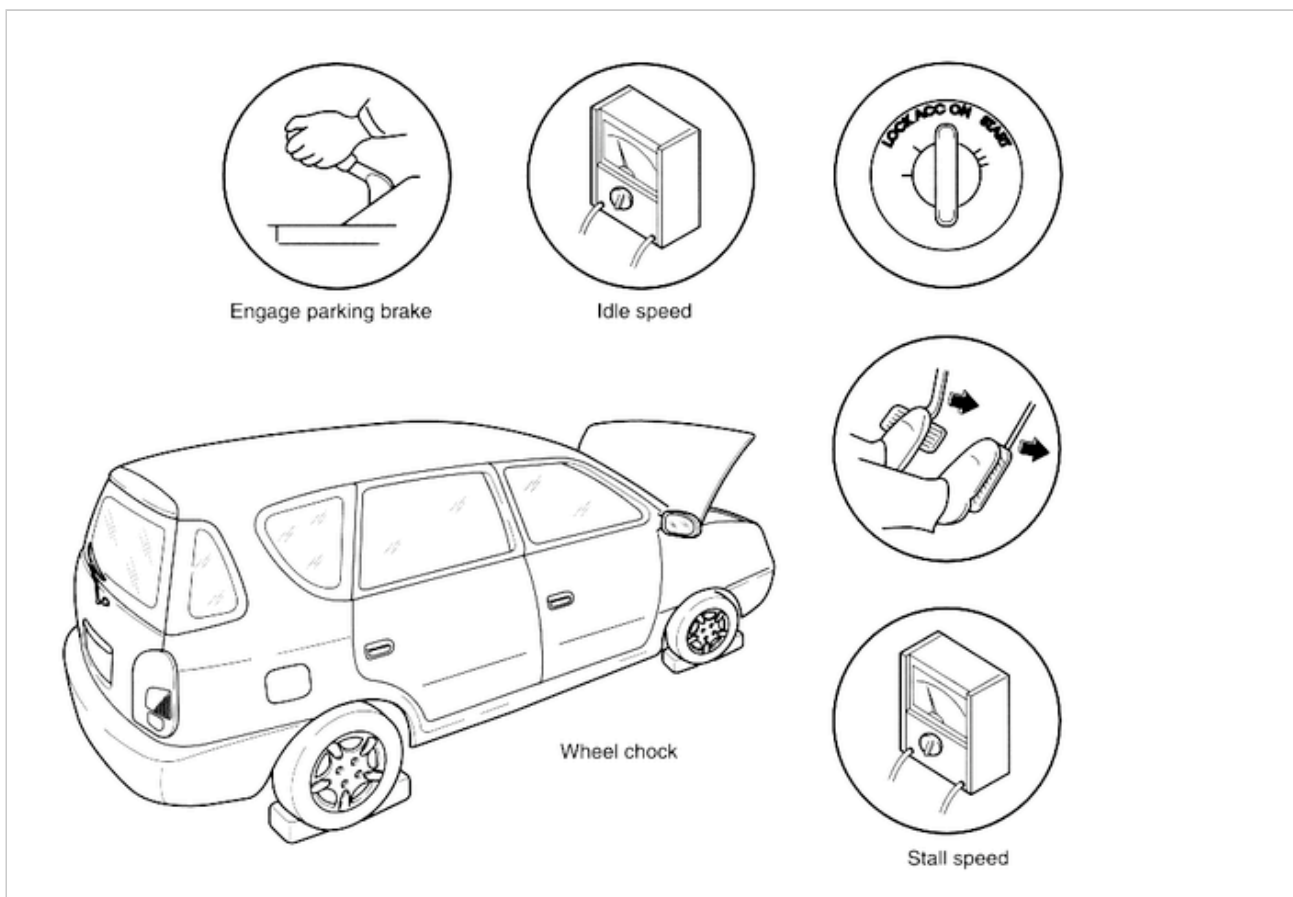
NOTICE

- 1) Never unscrew radiator cap while engine is hot.
- 2) Wrap a thick cloth around cap when loosening.

1. Engage parking brake and put wheel chocks at front and rear of each wheel.
2. Warm engine thoroughly to raise ATF temperature to an operating level of 140~158°F(60~70°C).
3. Check, and correct as necessary, engine coolant, engine oil, and ATF levels before testing.
4. Connect a tachometer to engine.



Procedure



1. Start engine.
 2. Check idle speed in P range. (Refer to emission control system)
-
- Idle speed : 750~850 rpm (with parking brake applied)
-
3. Shift selector lever to R range.

CAUTION

Perform steps 4 and 5 within 5 seconds to prevent possible transaxle damage.

4. Firmly depress foot brake with left foot and gradually depress accelerator pedal fully with right foot.
5. When engine speed no longer increases, quickly read engine to speed and release accelerator.
6. Move selector lever to N range and allow engine to idle for at least one minute.

CAUTION

- 1) Idling for at least one minute cools ATF and prevents its deterioration.
- 2) Allow sufficient cooling time between each stall test.

7. Perform stall tests for remaining ranges in same manner.
 - A. D range
 - B. 2 range
 - C. 1 range

Stall speeds : 2200~2500 rpm

Evaluation of stall test O/D OFF system

Condition		Possible cause	
Above specification	In R position and all ranges	Insufficient line pressure	Worn oil pump Oil leakage from oil pump, control valve and/or transaxle case Stuck pressure regulator valve
	In D range	Forward clutch slipping One-way clutch 1 slipping One-way clutch 2 slipping	
	In 2 range	2-4 brake band 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 1) Engine brake felt in 1 range, 1st gear reverse clutch 2) Engine brake not felt in 1 range Low and reverse brake	
Below specification in R position and all ranges		Engine out of tune	
		One-way clutch slipping within torque converter	

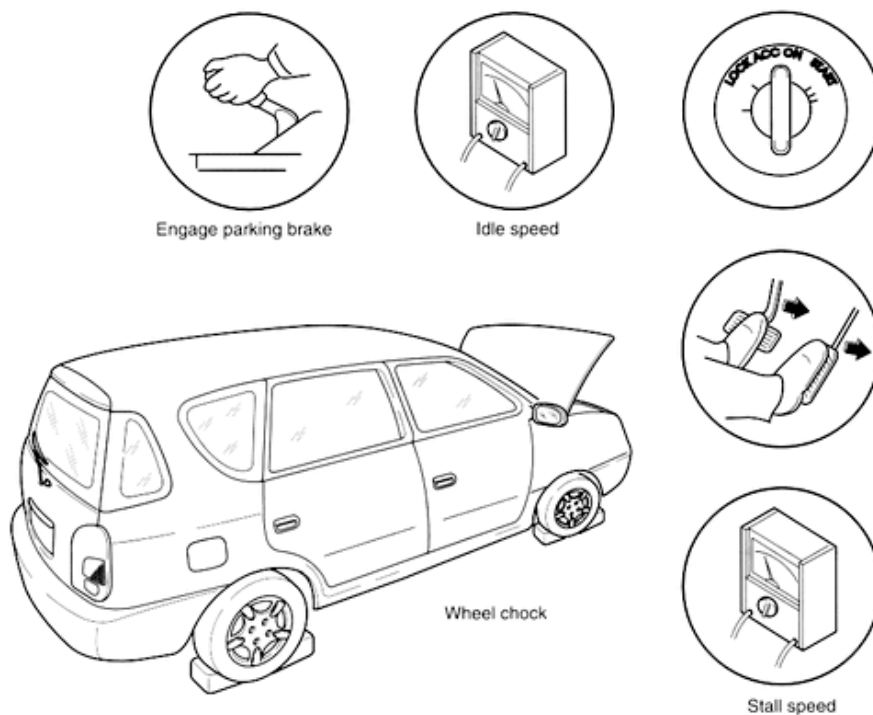
Time lag test

If selector lever is shifted while engine is idling, there will be a certain time lapse, or time lag, before shock is felt. This step measures time lag to check condition of N-D, 1-2, and N-R accumulators; forward and one-way clutches; reverse clutch; and low and reverse brake.

Preparation

Follow preparation procedure outlined in Stall Test.

Procedure



1. Start engine.
2. Check idle speed in P range, refer to emission control system.
- Idle speed : 750~850 rpm (with parking brake applied)
3. Shift from N range to D range.
4. Use a stopwatch to measure time it takes from shifting until shock is felt.
5. Shift selector to N range and run engine at idle speed for at least one minute.

NOTICE

Make three measurements for each test and take average value.

6. Perform test for following shifts in same manner.
 - A. N → D range
 - B. N → 2 range
 - C. N → R range

Time lag : N → D range 0.5~0.6 second

Time lag : N → R range 0.6~0.7 second

Evaluation of time lag test

Condition		Possible cause
N→D shift	More than specification	Insufficient line pressure Forward clutch slipping One-way clutch No. 1 slipping One-way clutch No. 2 slipping
	Less than specification	N/D accumulator not operating properly Excessive line pressure

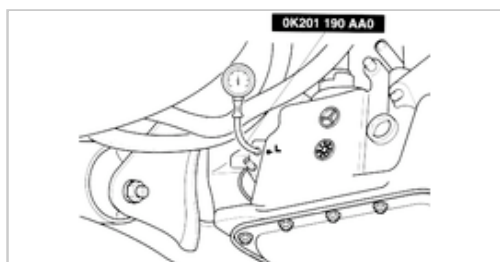
N→2 range	More than specification	Excessive line pressure Insufficient line pressure Forward clutch slipping 2-4 brake band slipping One-way clutch No. 1 slipping
	Less than specification	1-2 accumulator not operating properly Excessive line pressure
N→R shift	More than specification	Insufficient line pressure Low and reverse brake slipping Reverse clutch slipping
	Less than specification	N/R accumulator not operating properly Excessive line pressure

Line pressure test

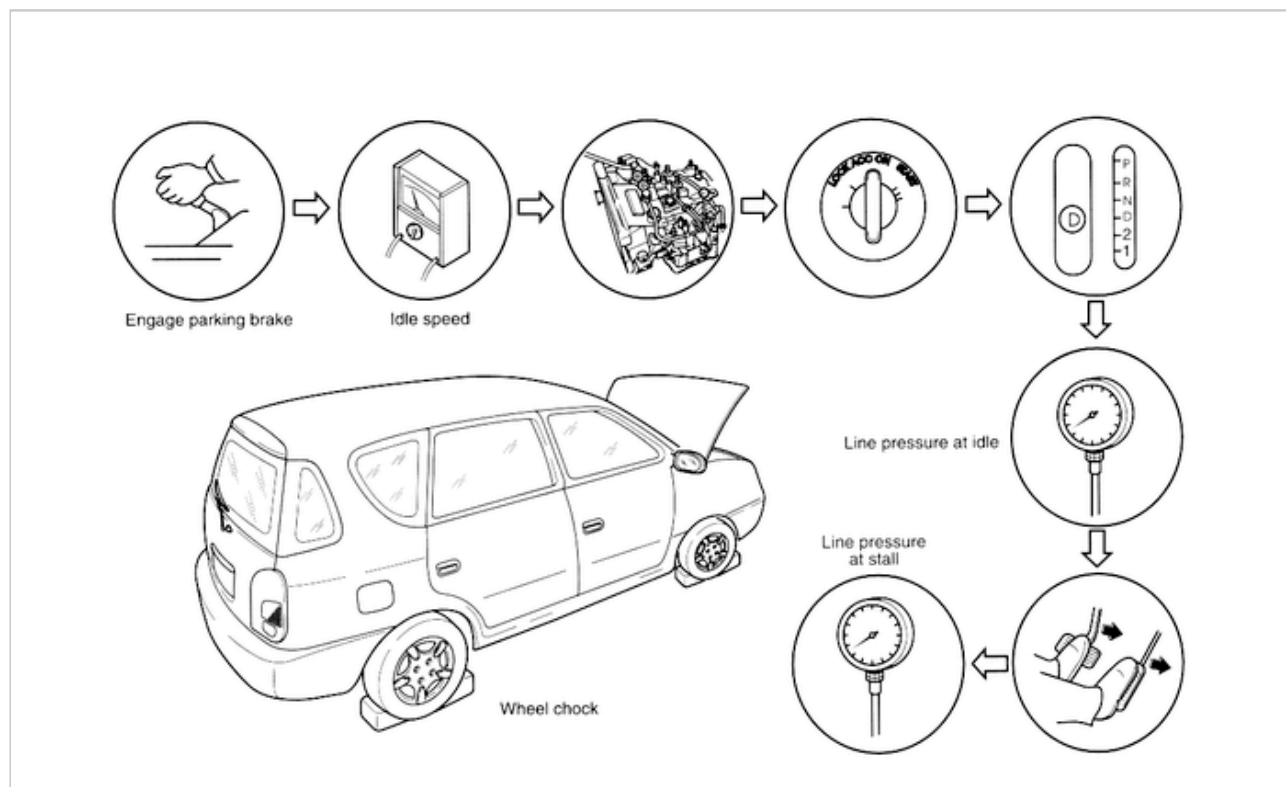
This test measures line pressure as a means of checking hydraulic components and inspecting for oil leakage.

Preparation

1. Perform preparation procedure outlined in Stall Test.
2. Remove splash shield under front left bumper.
3. Connect SST (0K201 190 AA0) to line pressure inspection port (square-head "L" plug). It may be necessary to raise car to get at inspection port.



Procedure



1. Start engine.
2. Check idle speed in P range, refer to emission control.

Idle speed : 750~850 rpm (with parking brake applied)

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

CAUTION

Perform steps 4 and 5 within 5 seconds to prevent possible transaxle damage.

4. Depress brake pedal firmly with left foot and gradually depress accelerator pedal fully with the right foot.
5. Read line pressure as soon as engine speed becomes constant and release accelerator pedal.

NOTICE

Idling for at least one minute cools ATF and prevents deterioration.

6. Shift selector lever to N range and run engine at idle for at least one minute.
7. Read line pressure at idle and at engine stall speed for each range in same manner.

Specified line pressure

Range	Idle	Stall
D, 2, 1	56.98~127.98 (392.4~882.9, 4.0~9.0)	113.76~184.86 (784.8~1275.3, 8.0~13.0)
R	71.1~142.2 (490.5~981.5, 5.0~10.0)	199.08~270.18 (1373.4~1863.9, 14.0~19.0)

8. Install a new square-head "L" plug in inspection port, refer to line pressure test.

Tightening torque : 44~86 lb-in (5.0~9.8 N·m, 51~100 kg-cm)

Evaluation of line pressure test

Line pressure	Possible location of problem
Low pressure in every position	Worn oil pump Fluid leaking from oil pump, control valve, or transaxle case Pressure regulator valve sticking Linear solenoid valve sticking
Low pressure in D and 2 only	Fluid leaking from hydraulic circuit of forward clutch
Low pressure in R only	Fluid leaking from hydraulic circuit of low and reverse brake or reverse clutch
Higher than specification	Pressure regulator valve stick or Linear solenoid valve sticking

Road test

Preparation

1. Check and correct (as necessary) engine coolant, engine oil and ATF levels before testing.
2. Warm up engine thoroughly to raise ATF temperature to an operating level of 140~158°F (60~70°C).
3. Check idle speed and ignition timing in P position.

D range (Power mode)

1. Turn O/D switch from OFF to ON.
2. Quickly depress accelerator pedal fully, and verify that 1↔2, 2↔3 and 3↔4 upshift and downshift are obtained.
The shift points must be as shown in graph below.
3. Drive vehicle in third and second gear and verify that kickdown occurs for 4↔3, 3↔2, 2↔1 and that the shift points

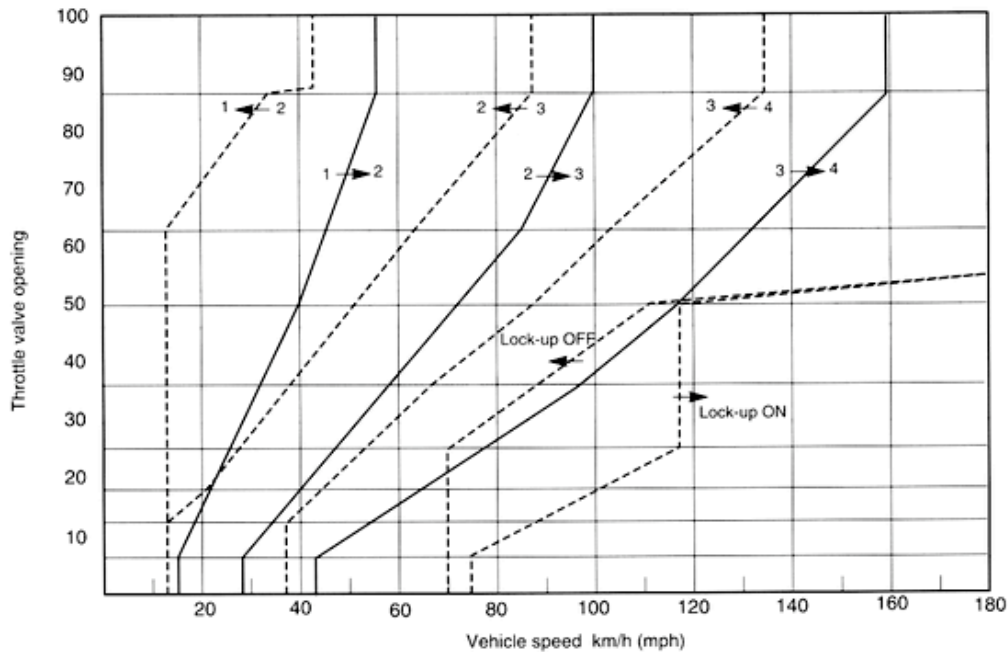
are as shown in graph below

NOTICE

The torque converter clutch will not operate in following conditions :

- 1) The engine coolant temperature is below 144°F (62°C).
- 2) The closed throttle position switch is ON.
- 3) The brake switch is ON.

The transaxle fluid temperature is over 262°F (128°C) the torque converter clutch will operate in 3rd gear and 4th gear.

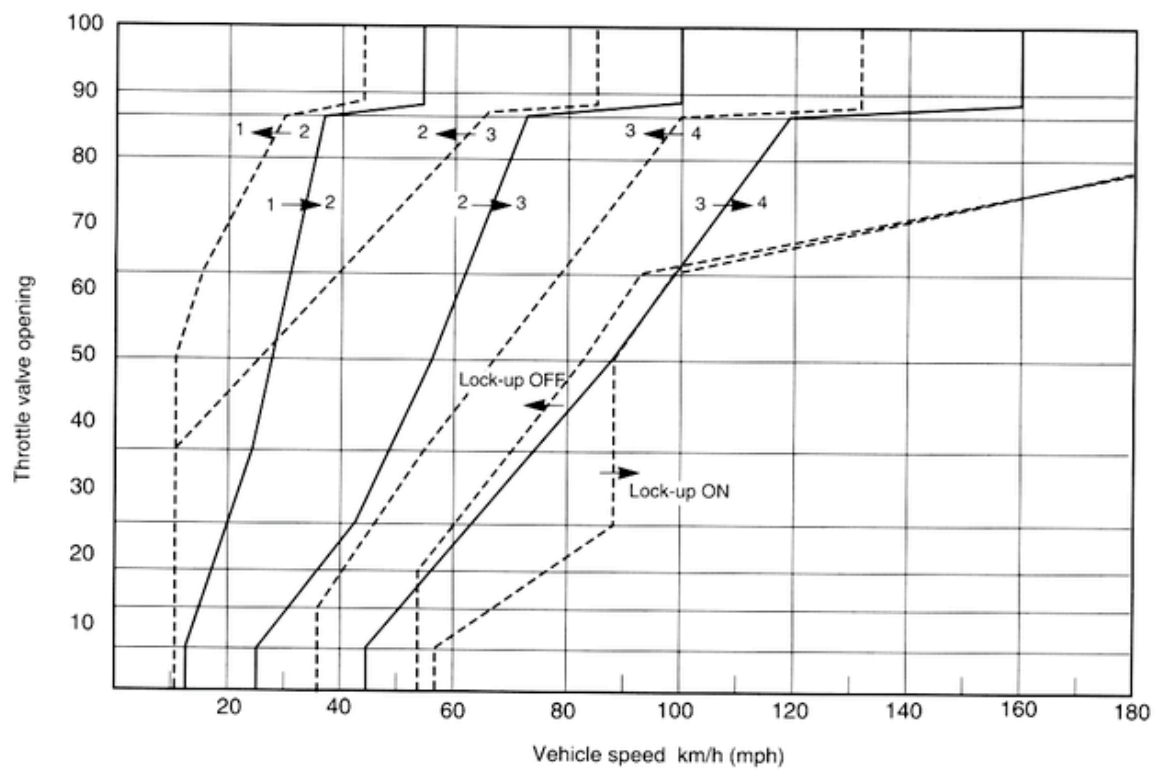


D range (Econo mode)

1. Turn O/D switch from ON to OFF.
2. Gradually depress accelerator pedal, and verify that 1↔2, 2↔3 and 3↔4 upshift and downshift are obtained. The shift points must be as shown in graph below.
3. Drive vehicle in third and second gear and verify that kickdown occurs for 4↔3, 3↔2, 2↔1 and that the shift points are as shown in graph below.

NOTICE

The economic mode will not activate in the case that the engine temperature is bellow 114°F (62°C)





Inspection [Automatic transaxle fluid (ATF)]

CAUTION

Place vehicle on a flat surface.

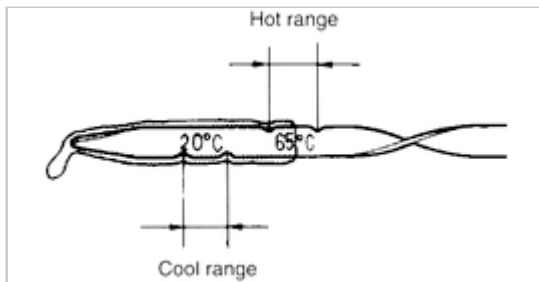
1. Apply parking brake and position wheel chocks securely to prevent vehicle from rolling after roller test.
2. Warm-up engine until ATF reaches 140~158°F (60~70°C).
3. Firmly depress the foot brake, and shift the selector lever P→R→N→D→1→2→1→D→N→R→P.
(Stay at each range for over 3 second)

NOTICE

Use COOL 68°F(20°C) range only as a rough reference.

4. Ensure that the ATF level is in HOT 149°F (65°C) range. Add ATF to specification, if necessary.

ATF type : M-III or dexron III



Fluid condition

NOTICE

Carefully check condition of ATF and determine whether or not automatic transaxle should be disassembled.

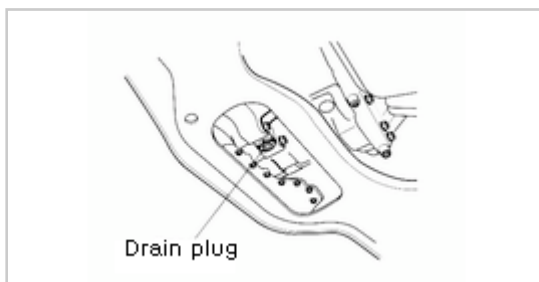
If ATF is muddy and varnished, it could indicate burned drive plates or brake band.

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

Replacement

General process

1. Place a drain pan under transaxle drain plug.
2. Remove auto transaxle drain plug and allow automatic transaxle fluid to fully drain.



3. Install drain plug with specified torque.

Tightening torque : 29~40 lb-ft (39~54 N·m, 4.0~5.5 kg-m)

4. Remove ATF level gauge, then pour specified ATF.

ATF type : M-III or Dexron III

Capacity : 5.7 US qt (5.4 liter, 4.7 Imp qt)

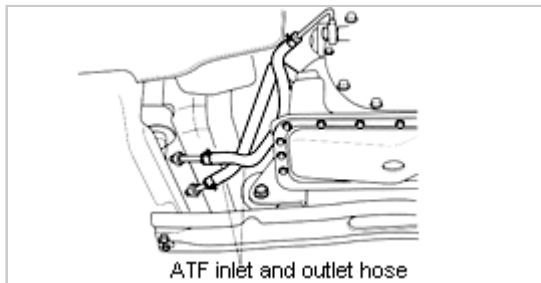
CAUTION

Do not over fill above Hot range.

5. Check ATF level.
(Refer to auto transaxle fluid)

ATF changer using process

1. Fill ATF changer with specified ATF.
2. Disconnect ATF inlet and outlet hose from radiator.



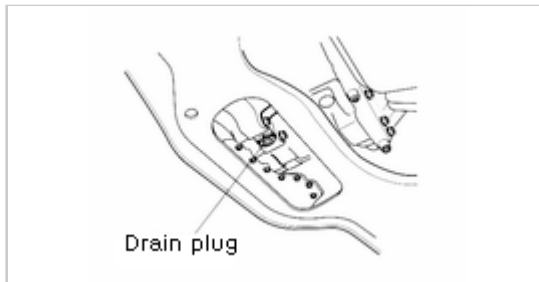
3. Connect ATF inlet and outlet hose to ATF changer.
4. Start engine.
5. While engine is idling, replace ATF.
(Referring to ATF changer instruction manual)



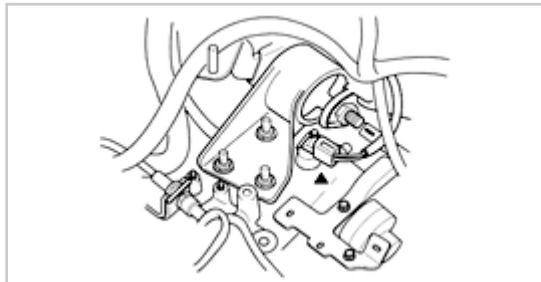
6. Check ATF level. (Refer to ATF)

Removal

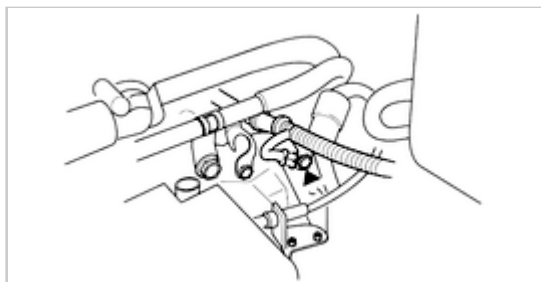
1. Disconnect negative battery cable then positive battery cable.
2. Raise and properly support vehicle.
3. Place a drain pan under transaxle drain plug.
4. Remove auto transaxle drain plug and allow automatic transaxle fluid to fully drain.



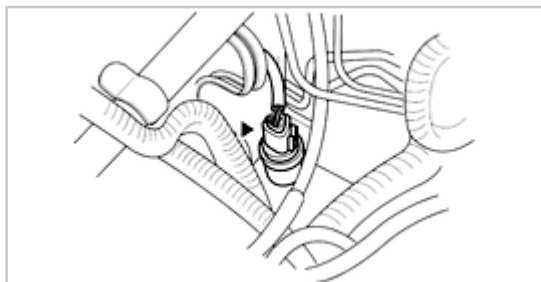
5. Pull data link connector upward from mass air flow sensor.
6. To remove air cleaner assembly, disconnect hose from intake manifold, air temperature sensor connector, MAF sensor connector then remove two air cleaner assembly mounting bolts and one nut.
7. Remove three No.4 engine mounting nuts then loosen engine mounting bolt. Disconnect input/turbine speed sensor connector.



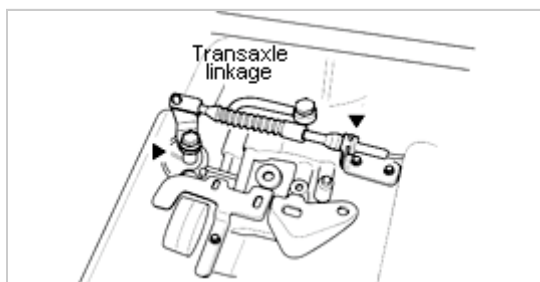
8. Remove ground strap bolt from top of auto transaxle then disconnect ground strap.



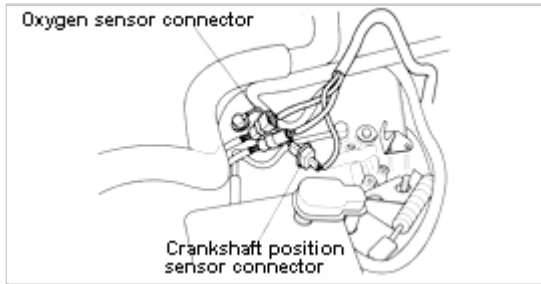
9. Disconnect vehicle speed sensor connector from right side of auto transaxle.



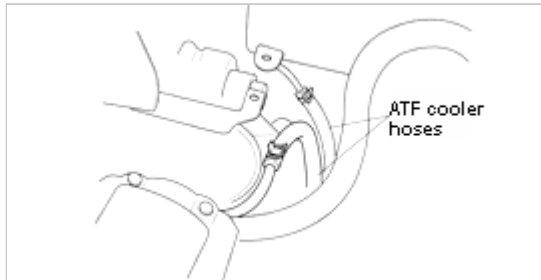
10. Remove U-clip from selector cable to auto transaxle linkage.
11. Remove nut and washer from auto transaxle linkage.



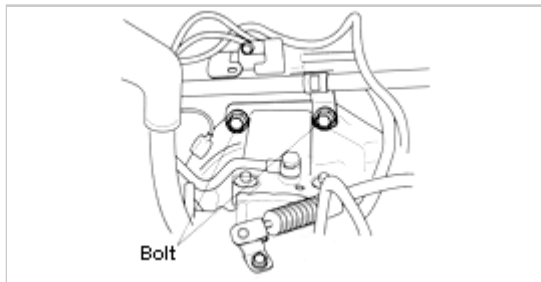
12. Disconnect auto transaxle range switch connector.
13. Disconnect solenoid valve connector.
14. Disconnect crankshaft position sensor connector.
15. Disconnect oxygen sensor connector.



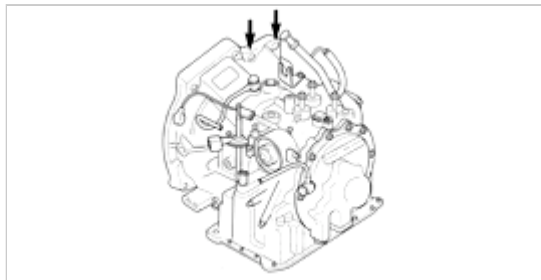
16. Disconnect two ATF cooler hoses.



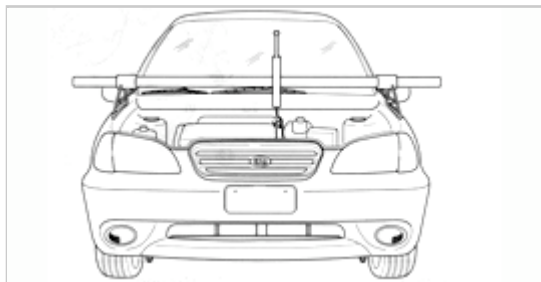
17. Remove two upper converter housing bolts. (top two)



18. Remove two upper starter bolts.



19. Support engine by using SST (0K201 170 AA0).



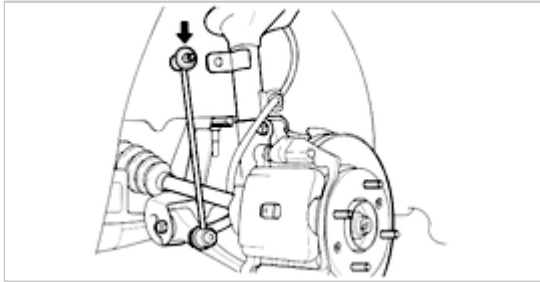
20. Remove both front wheels. (four lug nuts each)

21. Remove splash shield from under engine.
(three bolts and three fastners)

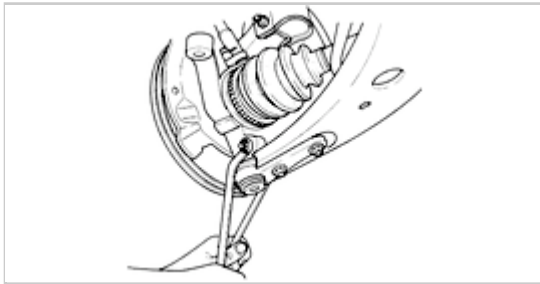
22. Remove left tir rod end from steering knuckle by removing one cotter pin and one nut.



23. Remove stabilizer control link from bracket attached to shock absorber assembly after loosening one nut.

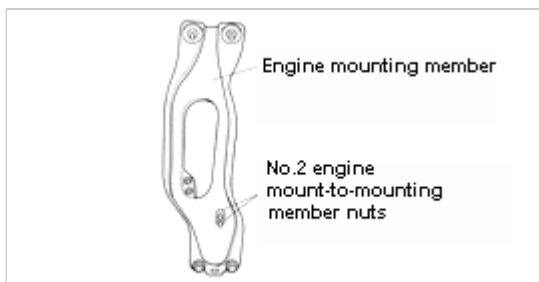


24. Remove pinch bolt and nut from left ball joint.
Separate ball joint from control arm.

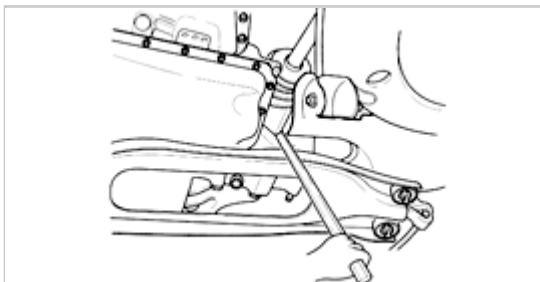


25. Remove two nuts from No. 2 engine mount-to-mounting member.

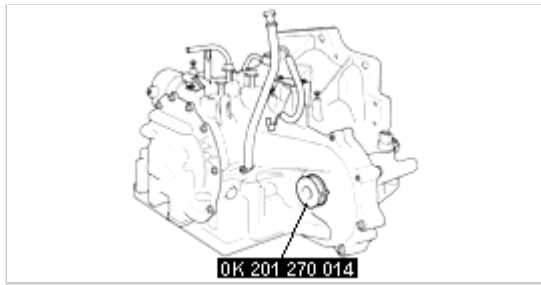
26. Remove engine mounting member-to-chassis bolts (two front) and nuts (two rear) then remove engine mounting member.



27. Gently pry left driveshaft from auto transaxle.

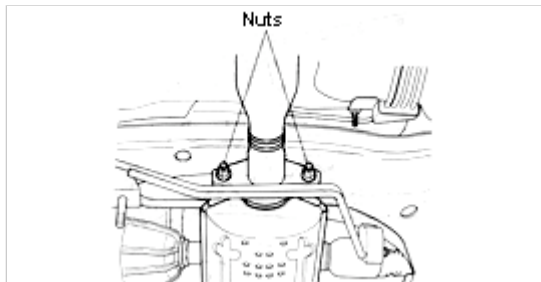
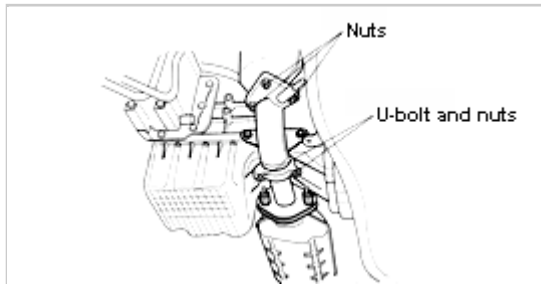


28. Install SST (0K201 270 014) to prevent side gear from becoming misaligned.

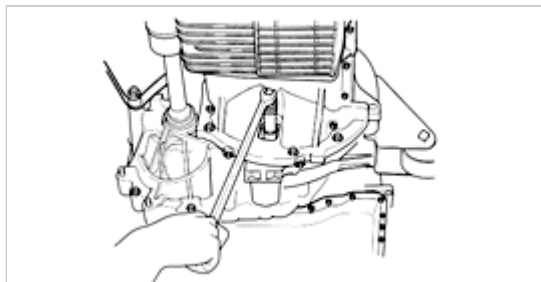


29. Remove two nuts from U-bolt.

30. Remove five nuts (three front, two rear) then remove catalytic converter.

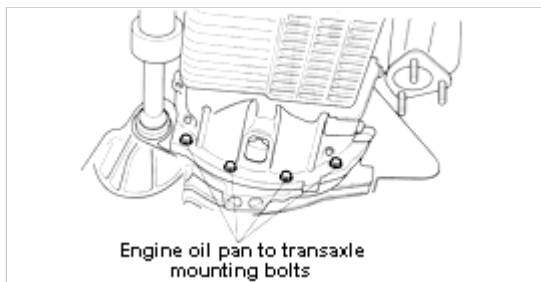


31. Remove converter housing access cover and remove four drive plate-to-torque converter mounting nuts. Rotate engine at crank pulley to gain access to all four nuts.

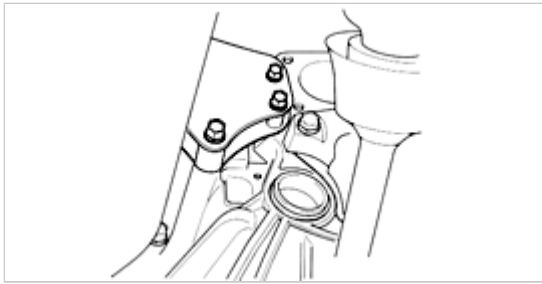


32. Remove one lower starter bolt.

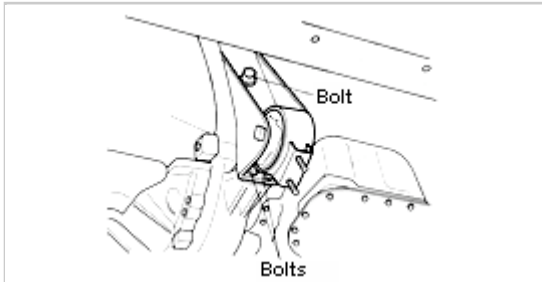
33. Remove four engine oil pan-to-transaxle mounting bolts.



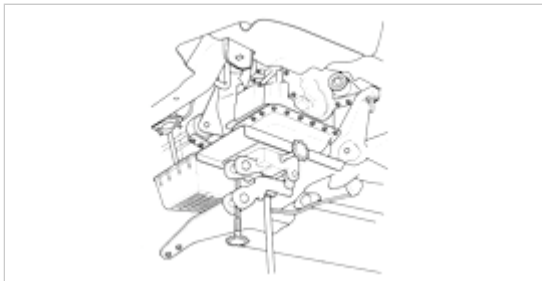
34. Remove three No. 1 engine mounting-to-chassis bolts.



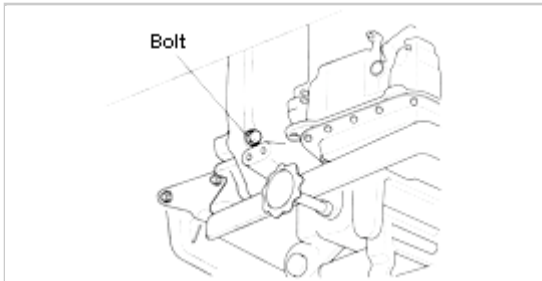
35. Remove three No. 2 engine mounting bolts then remove No. 2 engine mounting from auto transaxle.



36. Support (and secure if possible) auto transaxle with a transaxle jack or suitable floor jack.



37. Remove two remaining converter housing bolts on front and rear sides of transaxle.



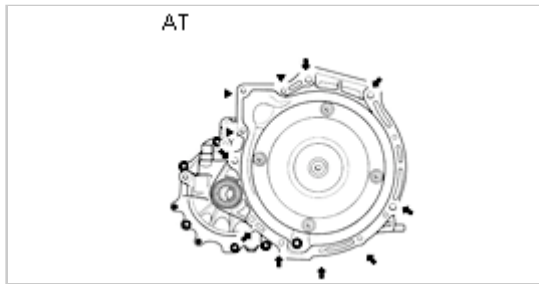
38. Slowly lower drive train, allowing transaxle to tilt toward ground.

39. Gently separate transaxle from engine and pull unit out through wheel well.

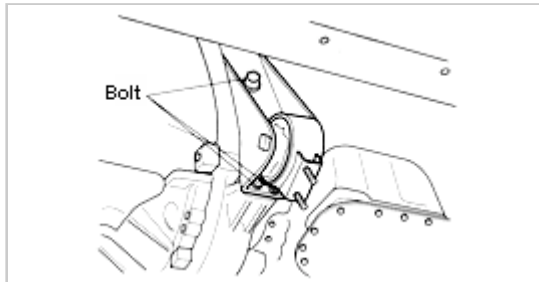
Installation

1. Set transaxle on transaxle jack or suitable floor jack and place under vehicle.
2. Raise transaxle and align with engine.
3. Connect transaxle to engine using four convert housing bolts to pull together; two on top and two on side.

Tightening torque : 65~86 lb-ft (89~116 N·m, 9.1~11.9 kg-m)

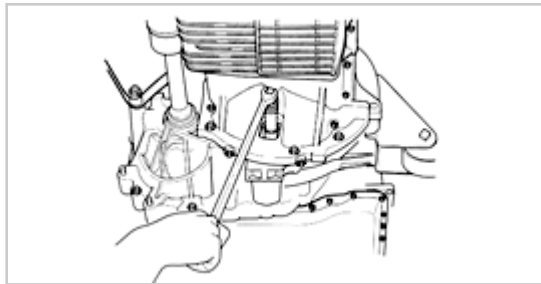


4. Remove floor jack from auto transaxle.
5. Remove SST (0K201 270 014).
6. Install No.2 engine mounting to auto transaxle then install three bolts.



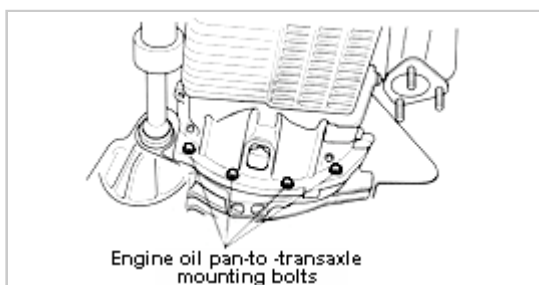
7. Install four drive plate-to-torque converter mounting nuts.
Rotate engine at crank pulley to gain access to all four nuts.

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



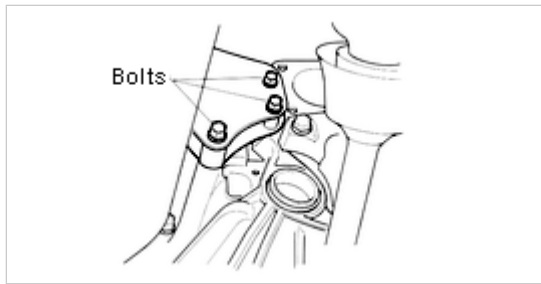
8. Install four engine oil pan-to-transaxle mounting bolts then install access cover.

Tightening torque : 27.5~38.0 lb-ft (37~52 N·m, 3.8~5.3 kg-m)



9. Install starter and ground strap.
(Refer to starting system)
10. Install three No. 1 engine mounting-to-chassis bolts.

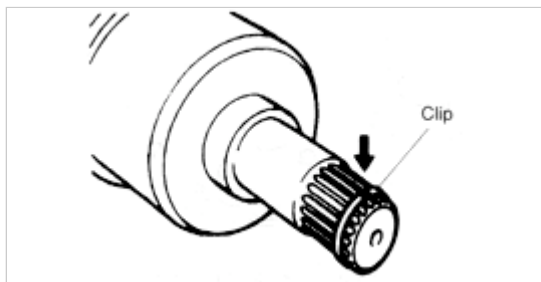
Tightening torque : 49.2~69 lb-ft (67~93.2 N·m, 6.8~9.5 kg-m)



11. Install new clip on left driveshaft.

12. Push driveshaft into transaxle with opening of clip pointing upward.

Tightening torque : 32~46 lb-ft (43~52 N·m, 4.4~5.3 kg-m)



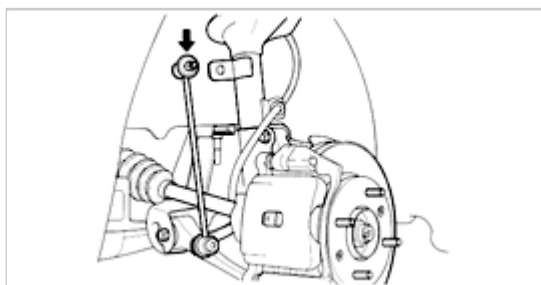
13. Install left lower ball joint into spindle then install pinch bolt.

Tightening torque : 32~39 lb-ft (43~54 N·m, 4.4~5.5 kg-m)



14. Install left stabilizer control link to bracket attached to shock absorber assembly.

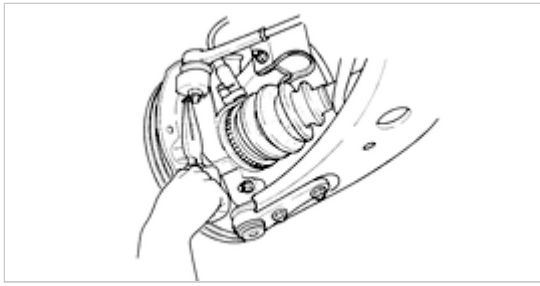
Tightening torque : 32~45 lb-ft (43~61 N·m, 4.4~6.2 kg-m)



15. Install left tie rod end to steering knuckle then install tie rod end nut.

Tightening torque : 22~33 lb-ft (30~44 N·m, 3.0~4.5 kg-m)

16. Insert cotter pin and bend over.

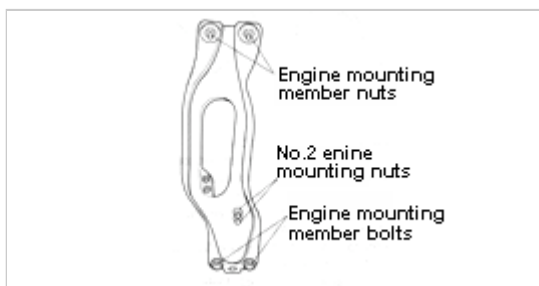


17. Install engine mounting member-to-chassis bolts (two front) and nuts. (two rear)

Tightening torque : 48~65 lb-ft (64~89 N·m, 6.5~9.1 kg-m)

18. Install two nuts to No.2 engine mount-to-mounting member.

Tightening torque : 28~38 lb-ft (38~51 N·m, 3.8~5.3 kg-m)

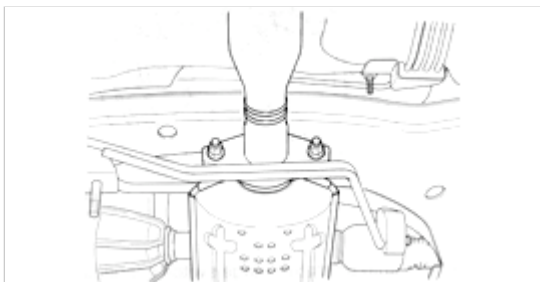
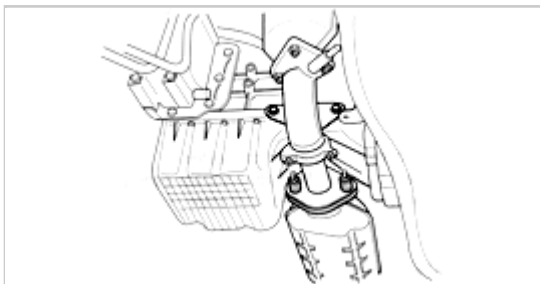


19. Install catalytic converter. (five nuts)

Tightening torque : 27.4~38.3 lb-ft (37.2~51.9 N·m, 3.8~5.3 kg-m)

20. Install two catalytic converter bracket nuts to engine.

Tightening torque : 27.4~38.3 lb-ft (37.2~51.9 N·m, 3.8~5.3 kg-m)

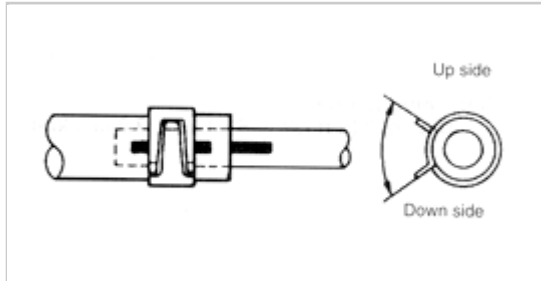


21. Install splash shield to under engine then tighten bolts. (three bolts and three fasteners)

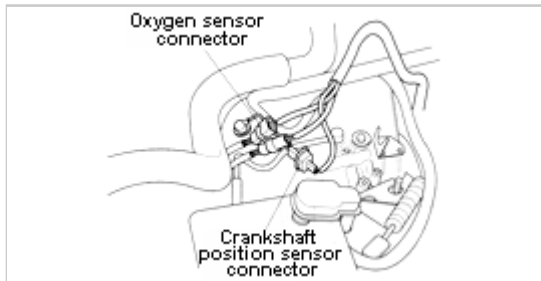
22. Install both right and left wheels then tighten both right and left lug nuts. (four lug nuts each)
-

Tightening torque : 65~87 lb-ft (88~118 N·m, 9~12 kg-m)

23. Lower vehicle.
24. Remove SST (0K201 170 AA0).
25. Slide ATF inlet and outlet hose onto ATF cooler pipe until it is fully seated against the ridge.
26. Install hose clamp onto hose at center of mark and at angle shown.

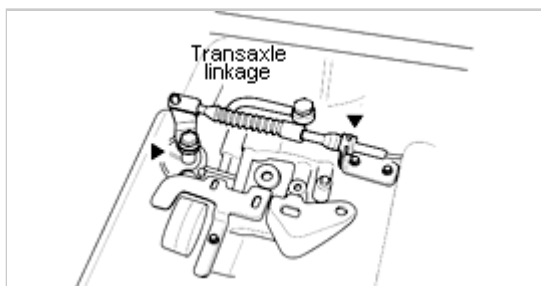


27. Connect oxygen sensor connector.
28. Connect crankshaft position sensor connector.
29. Connect solenoid valve connector.



30. Connect auto transaxle range switch connector.
31. Install washer and nut to auto transaxle linkage and tighten nut then insert U-clip.

Tightening torque : 24~83 lb-ft (32~46 N·m, 3.2~4.7 kg-m)

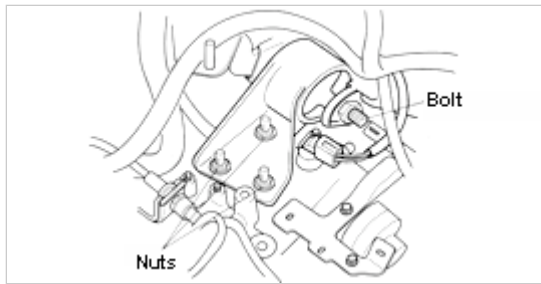


32. Connect vehicle speed sensor connector.
33. Connect input/turbine speed sensor connector.
34. Install No. 4 engine mounting then tighten three nuts and bolt.

Tightening torque :

Nuts : 49~68 lb-ft (68~93 N·m, 6.8~9.5 kg-m)

Bolt : 47~66 lb-ft (64~89 N·m, 6.5~9.1 kg-m)



35. Install air cleaner assembly.
36. Connect air temperature sensor connector.
37. Connect MAF sensor connector.
38. Insert diagnosis connector.
39. Connect negative and positive battery cable.
40. Fill transaxle with ATF.
(Refer to automatic transaxle fluid)
41. Adjust auto transaxle control cable.
(Refer to selector lever)

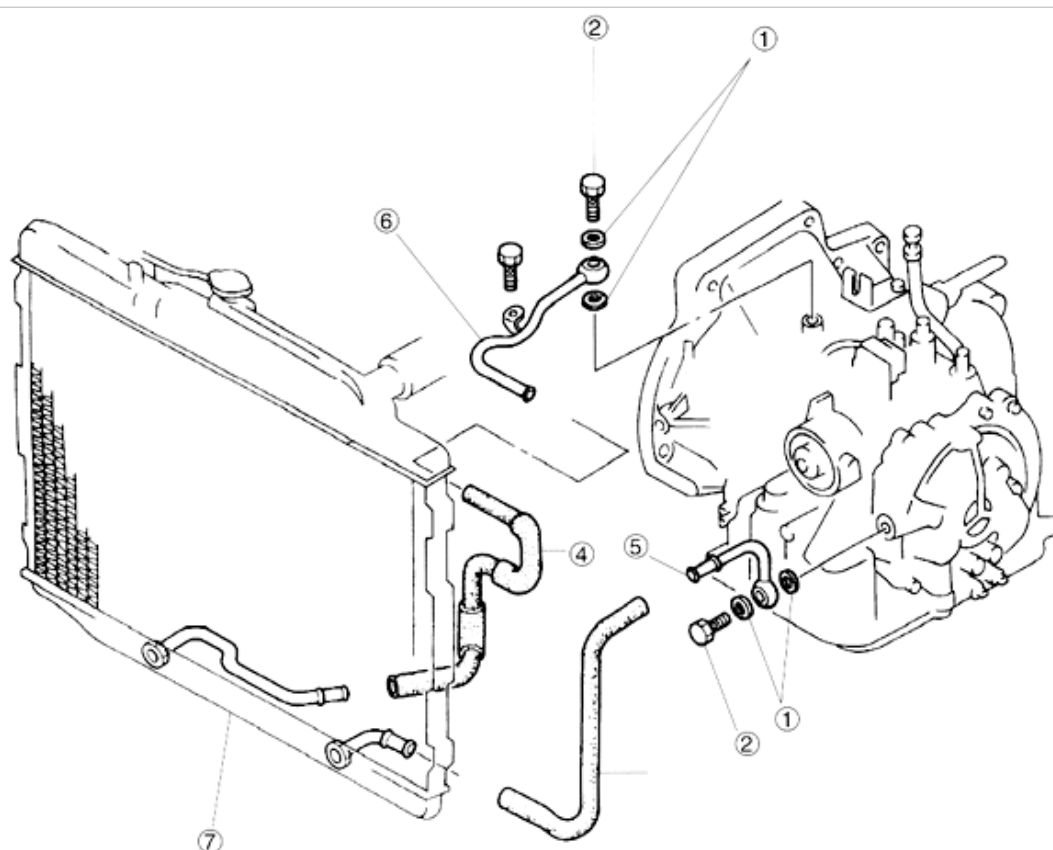


Automatic Transaxle System

Hydraulic System - Oil Cooler



Component



- (1) Washer
- (2) Connect bolt
- (3) Inlet ATF cooler hose
- (4) Outlet ATF cooler hose

- (5) Inlet ATF cooler pipe
- (6) Outlet ATF cooler pipe
- (7) Radiator



Removal

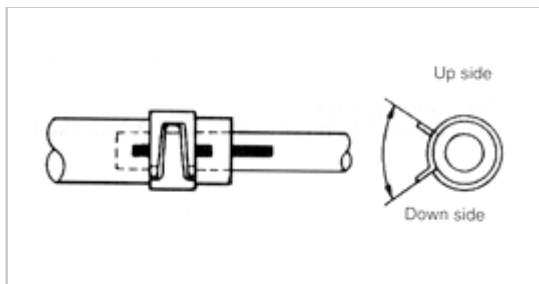
1. Raise vehicle and support it with safety stands.
2. Remove RH side gravel shield (seven bolts) from under engine.
3. Place a drain pan under radiator.
4. Disconnect ATF inlet hose and outlet hose.
5. Remove ATF inlet pipe and outlet pipe.
6. Remove radiator.

Installation

1. Install radiator.
(Refer to cooling system)
2. Install ATF inlet pipe and outlet pipe.

Tightening torque : 24~84 lb-ft (32~47 N·m, 3.3~4.8 kg-m)

3. Slide ATF inlet and outlet hose onto ATF cooler pipe until it is fully seated against the ridge.
4. Install hose clamp onto hose at center of mark and at angle shown.
5. Verify that the hose clamp does not interfere with any other parts.



6. Install RH side gravel shield under engine.
7. Lower vehicle.
8. Check ATF level.
(Refer to Automatic transaxle fluid)

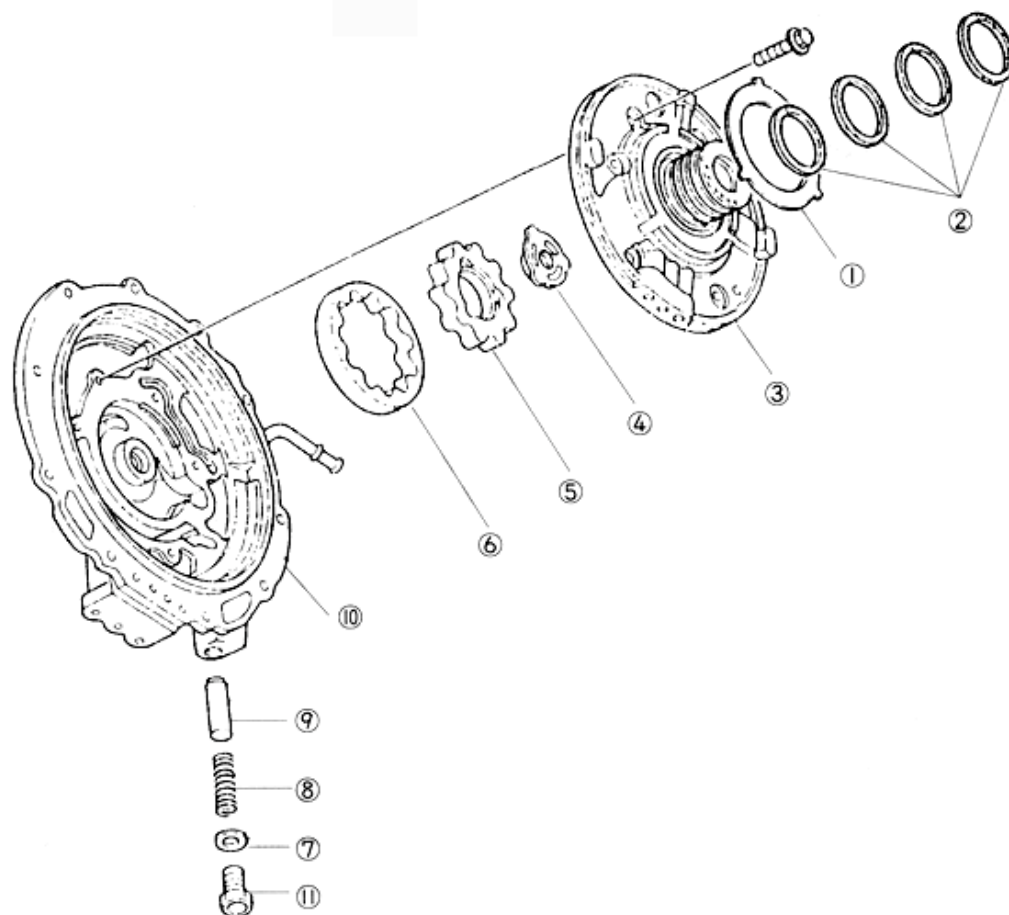


Automatic Transaxle System

Hydraulic System - Oil Pump



Component



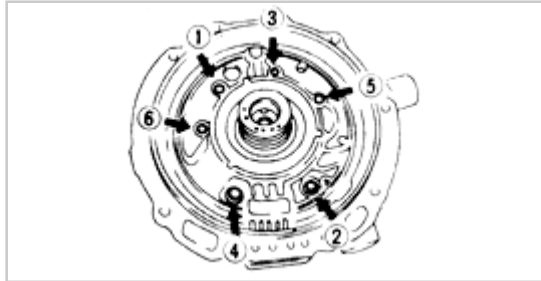
- (1) Bearing race (Replace if Necessary)
- (2) Seal rings (Replace)
- (3) Oil pump cover
- (4) Oil pump flange
- (5) Inner rotor
- (6) Outer rotor

- (7) Washer (Replace)
- (8) Spring
- (9) Fluid pressure bypass valve
- (10) Oil pump housing
- (11) Plug



Disassembly

1. Remove bearing race.
2. Remove four seal rings.
3. Loosen six mounting bolts evenly in pattern shown and remove oil pump cover from oil pump housing.



CAUTION

Do not use a punch to mark outer and inner rotors.

4. Mark outer and inner rotors as shown, and separate them from oil pump housing.
5. Remove plug then remove washer, spring and fluid pressure bypass valve.



Inspection

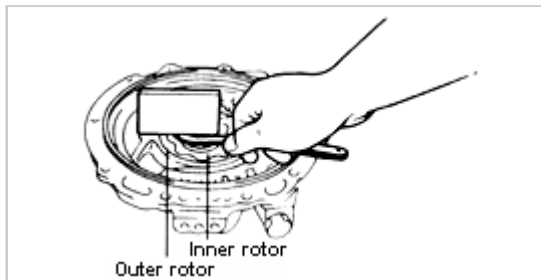
Oil pump housing, outer rotor, inner rotor

1. Install outer rotor and inner rotor.
2. Measure clearance between end of oil pump housing and outer rotor and inner rotor at no less than four places along their circumferences.

Clearance - Standard : 0.00079~0.0157 in (0.02~0.04 mm)

Maximum : 0.0020 in (0.05 mm)

3. If not as specified, replace oil pump assembly.



4. Measure clearance between oil pump boss and inner rotor in at least four places and calculate average value.

Inner diameter - Standard : 0.00157~0.00453 in (0.04~0.115 mm)
Maximum : 0.0049 in (0.125 mm)

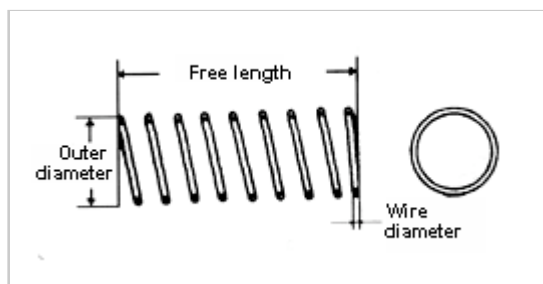
5. If not within specification, replace oil pump as an assembly.

Spring

1. Measure spring free length.

Specification	
Outer diameter - in (mm)	0.465 (11.8)
Free length - in (mm)	2.087 (53.0)
Number of coils	12.0
Wire diameter - in (mm)	0.047 (1.2)

2. If not as specified, replace oil pump as an assembly.

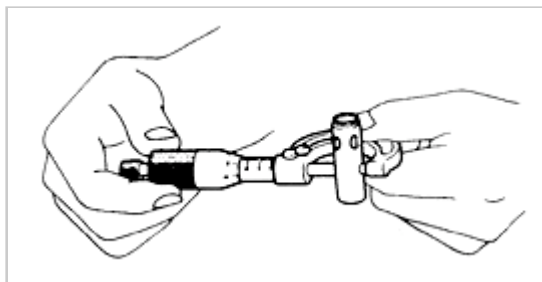


Fluid pressure by pass valve

1. Measure fluid pressure by pass valve and check for wear.

Outer diameter - Standard : 0.551 in (14.00 mm)
Minimum : 0.550 in (13.98 mm)

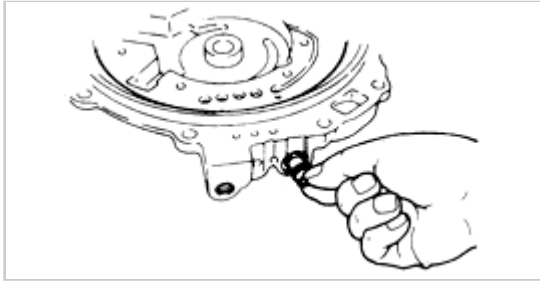
2. If not as specified, replace oil pump as an assembly.



Reassembly

1. Install fluid pressure by pass valve spring into oil pump housing, and verify that fluid pressure by pass valve moves smoothly.
2. Install a new washer and plug.

Tightening torque : 24~33.6 lb-in (32~47 N·m, 3.2~4.8 kg-m)

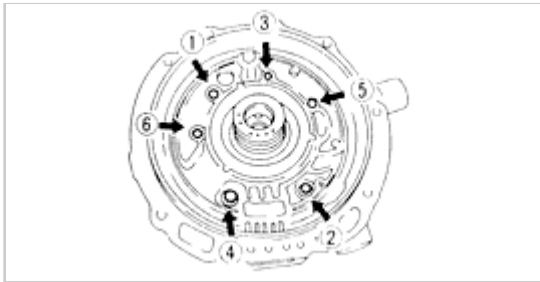


3. Align marks and install outer and inner rotors.
4. Install oil pump flange.

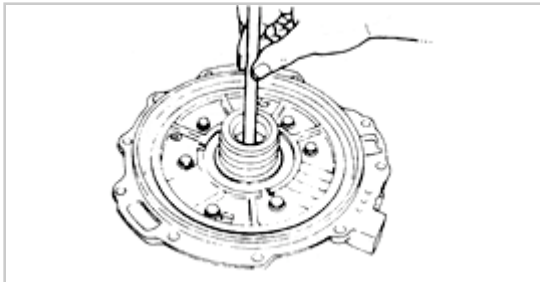


5. Mount oil pump cover onto oil pump housing.
6. Tighten six bolts evenly and gradually in order shown.

Tightening torque : 72~97.2 lb-in (8.1~10.9 N·m, 82~112 kg-m)

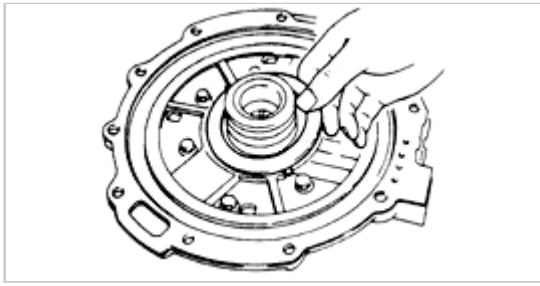


7. Install oil pump shaft and rotate pump rotors to verify smooth oil pump operation.
8. Install four seal rings.



9. Apply petroleum jelly to bearing race and secure it on oil pump cover.

Bearing race outer diameter : 3.46 in (88.0 mm)





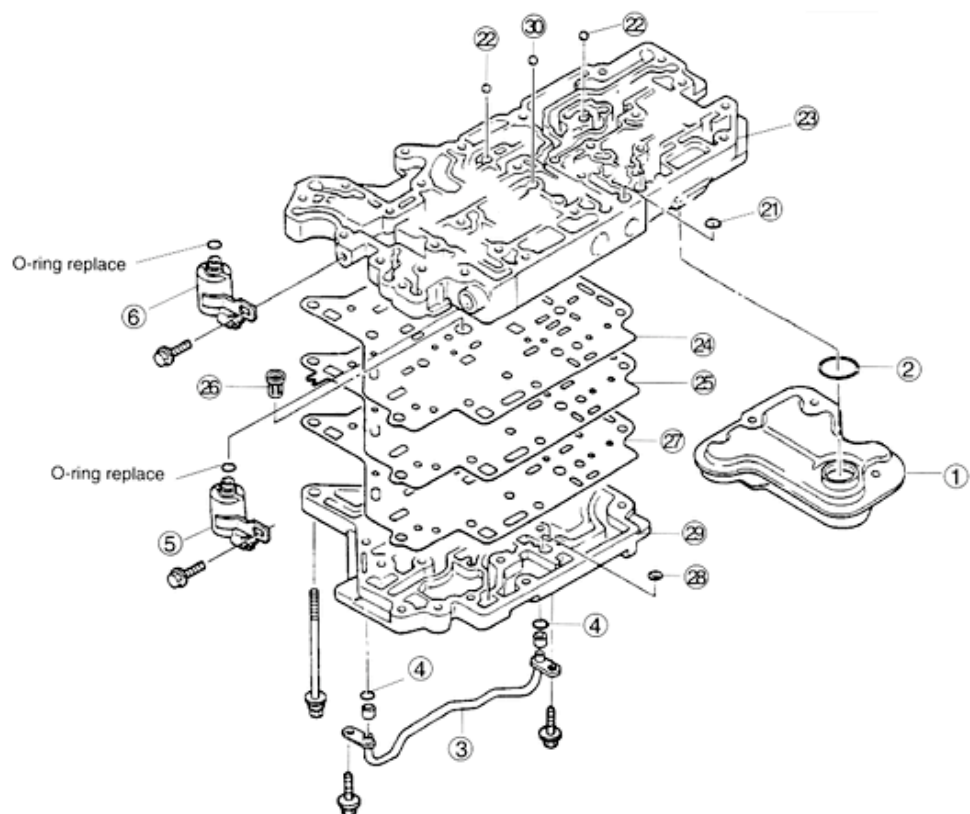
Automatic Transaxle System

Valve Body System - Valve Body



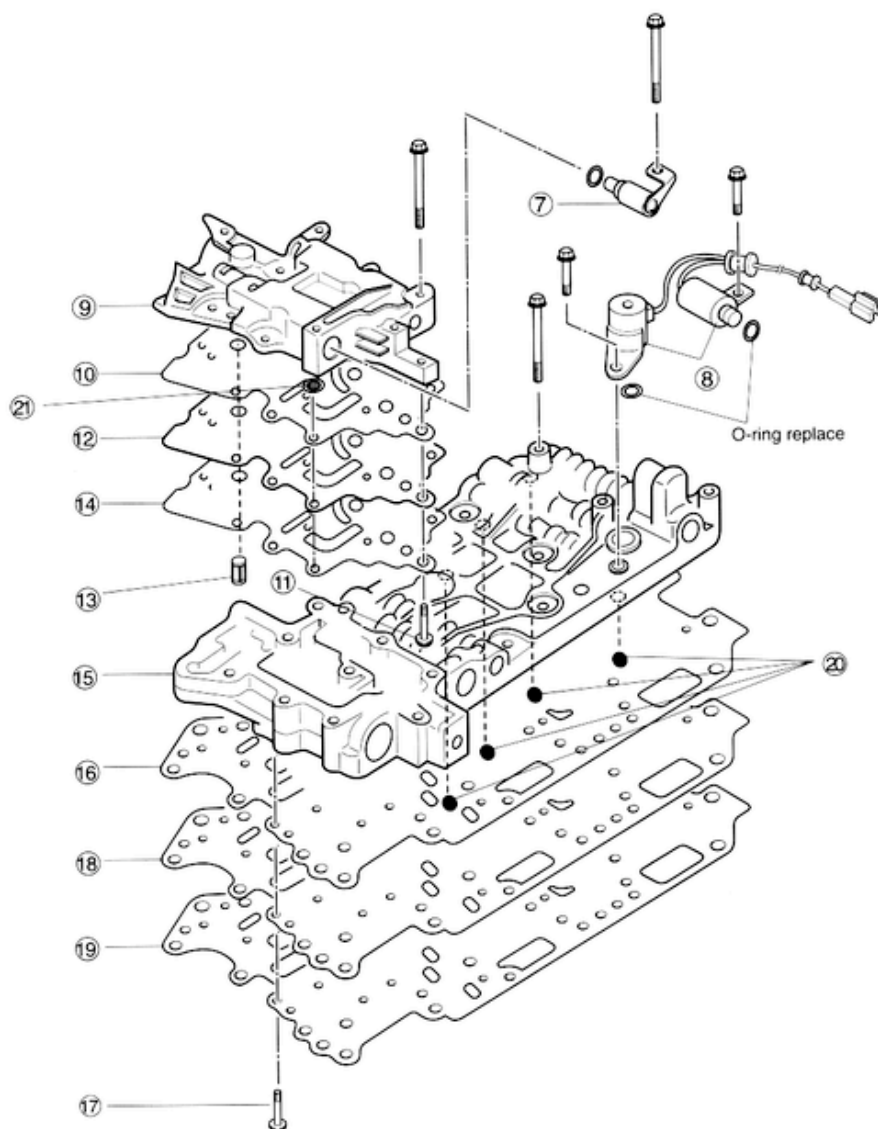
Component

Control valve body



- (1) Oil strainer assembly
- (2) O-ring (Replace)
- (3) Oil pipe assembly
- (4) O-rings (Replace)
- (5) Shift solenoid A (1-2 solenoid)
- (6) Torque converter clutch solenoid
- (7) Linear solenoid valve

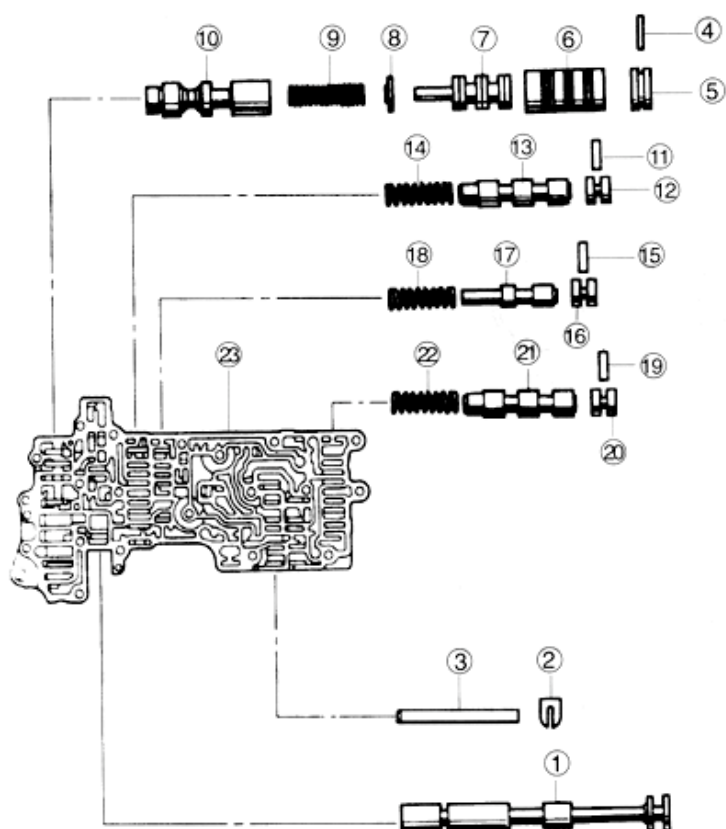
- (8) Shift solenoids B and C
- (9) Upper control valve body
- (10) Gasket A (Replace)
- (11) Screws
- (12) Upper separator plate
- (13) Oil filter
- (14) Gasket B (Replace)



- (15) Main control valve body
- (16) Gasket C (Replace)
- (17) Screws
- (18) Main separator plate
- (19) Gasket D (Replace)
- (20) Rubber balls
- (21) Oil strainers
- (22) Rubber balls

- (23) Pre-main control valve body
- (24) Gasket E (Replace)
- (25) Lower separator plate
- (26) Oil filter
- (27) Gasket F (Replace)
- (28) Oil strainer
- (29) Lower control valve body
- (30) Steel ball

Component (Main control valve body)



- | | | |
|------------------------------------|-------------------------------|---------------------------------|
| (1) Manual valve | (9) Pressure regulator spring | (17) Low reducing valve |
| (2) Spring retainer | (10) Pressure regulator valve | (18) Low reducing spring |
| (3) 2-3 timing valve | (11) Stop pin | (19) Stop pin |
| (4) Roll pin | (12) Stop plug | (20) Stop plug |
| (5) Stop plug | (13) 1-2 shift valve | (21) 3-4 shift valve |
| (6) Pressure regulator plug | (14) 1-2 shift spring | (22) 3-4 shift spring |
| (7) Regulator plug sleeve | (15) Stop pin | (23) Premain control valve body |
| (8) Pressure regulator spring seat | (16) Stop plug | |



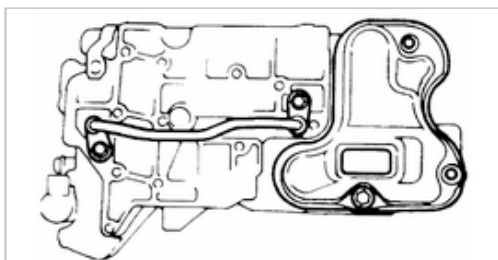
Disassembly

Control valve body

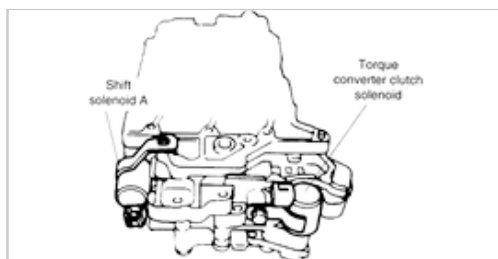
NOTICE

- 1) Be especially careful when handling control valve because it consists of most precise and delicate parts of transaxle.
- 2) Neatly arrange removed parts to avoid confusing similar parts.
- 3) Clean removed parts with cleaning solvent, and dry them with compressed air. Clean out all holes and passages with compressed air.

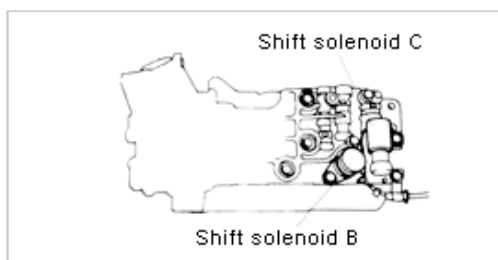
1. Remove oil pipe assembly.
2. Remove O-rings from oil pipe assembly.



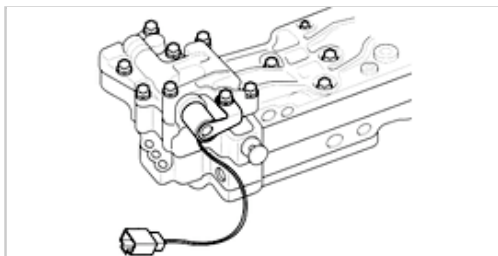
3. Remove shift solenoid A.
4. Remove torque converter clutch solenoid valve and oil strainer.



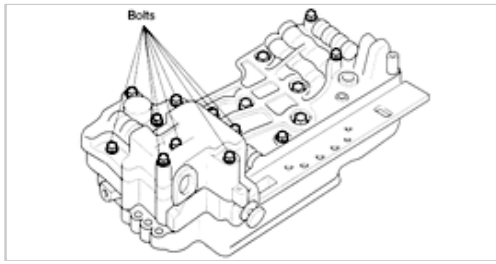
5. Remove shift solenoids B and C.



6. Remove linear solenoid valve.

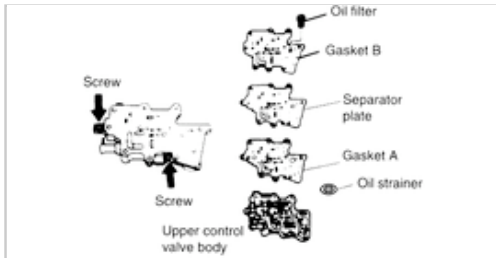


7. Remove nine upper control valve body bolts.

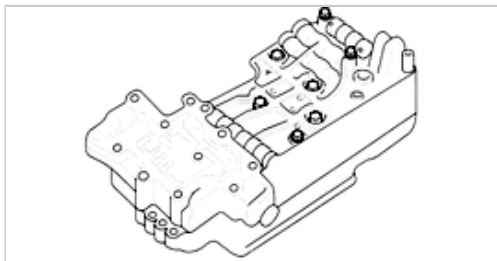


8. Remove two screws from upper control valve body.

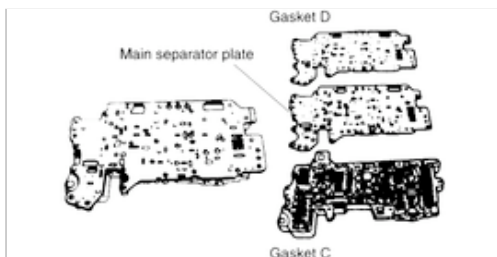
9. Remove gasket B, upper separator plate, oil filter, oil strainer and gasket A.



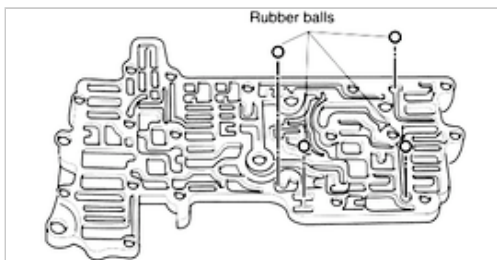
10. Remove seven main control valve body bolts then remove main control valve.



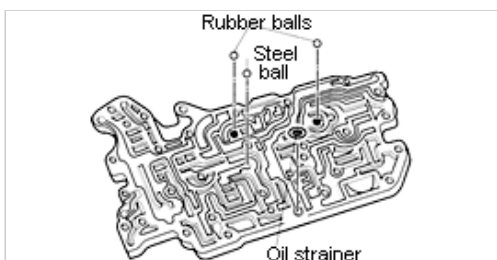
11. Remove gasket D, main separator plate, and gasket C.



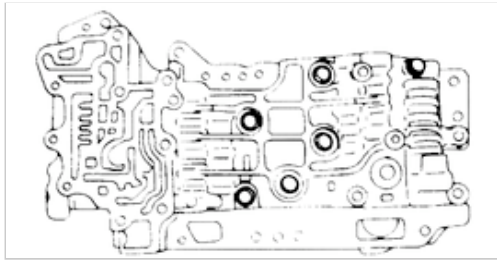
12. Remove four rubber balls from main control valve body.



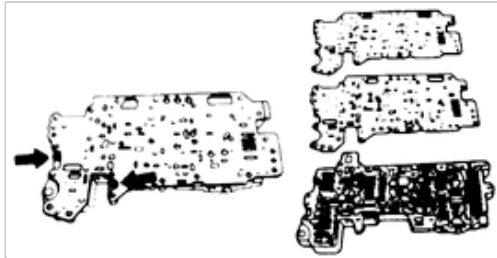
13. Remove oil strainer, steel ball and two rubber balls from premain control valve body.



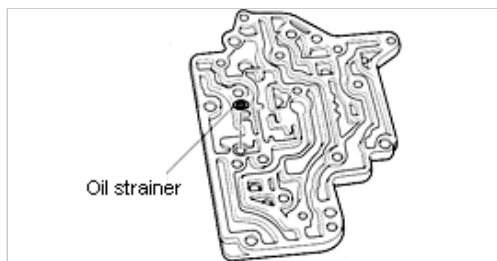
14. Remove six bolts then remove premain control valve body.



15. Remove gasket E, lower separator plate, oil filter, and gasket F.



16. Remove oil strainer from lower control valve body.



Disassembly

NOTICE

- 1) Each valve should slide in/out under its own weight.
- 2) When a valve will not slide in/out under its own weight, depending on valve, push it out with a wire or replace valve body open-side down and lightly tap it with a soft hammer.
- 3) If a valve surface or bore is scratched or damaged, replace control valve body.
- 4) Do not drop or lose valves or internal parts.
- 5) Before assembly, make sure all parts are thoroughly clean.
- 6) Apply ATF to all parts and bores.
- 7) Note proper direction of valves and internal parts.
- 8) Do not reuse any part that has been dropped.
- 9) Wrap a screwdriver or rod with tape before using it to insert a valve.

1. Disassemble in order shown in figure.

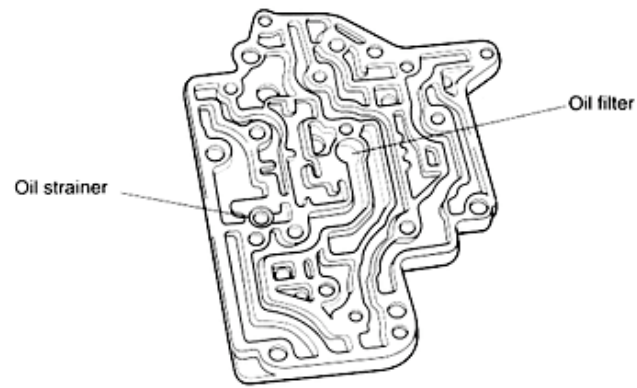
Reassembly

Control valve body

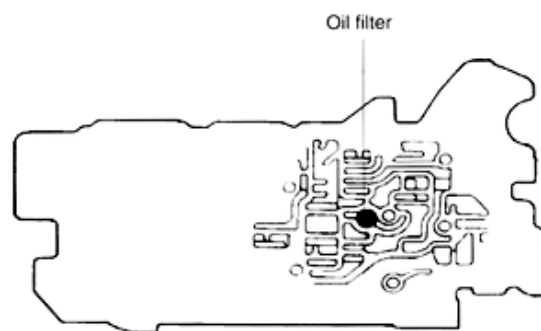
NOTICE

- 1) Before assembly, make sure all parts are perfectly clean.
- 2) Apply ATF to all parts.
- 3) Do not reuse gaskets or O-rings.

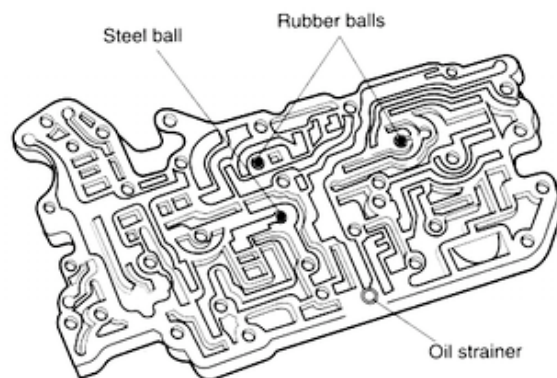
Oil strainer installation positions
Low control valve body



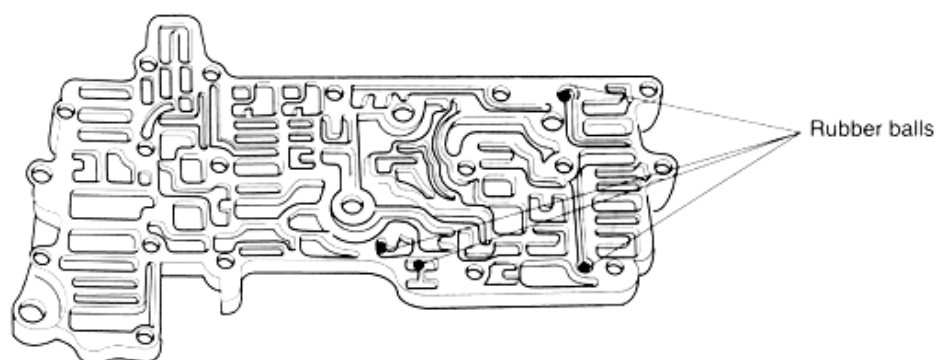
Premain control valve body
Lower control valve body side



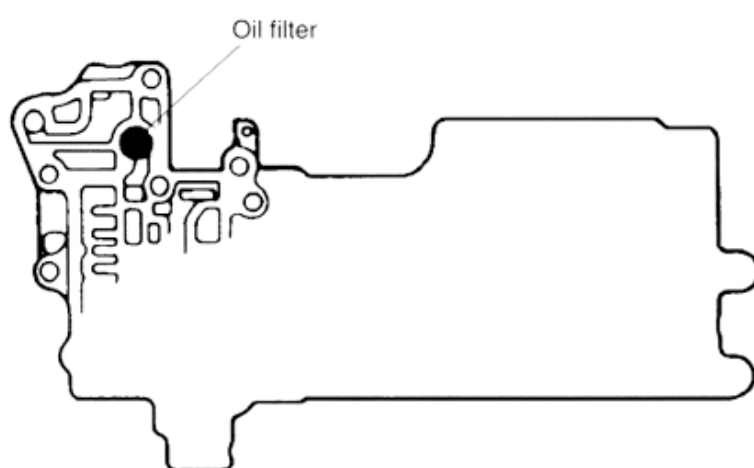
Main control valve body side



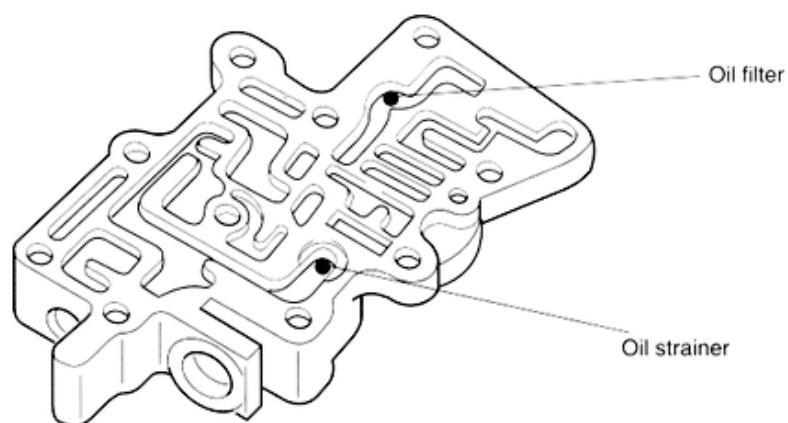
Main control valve body
Premain control valve body side



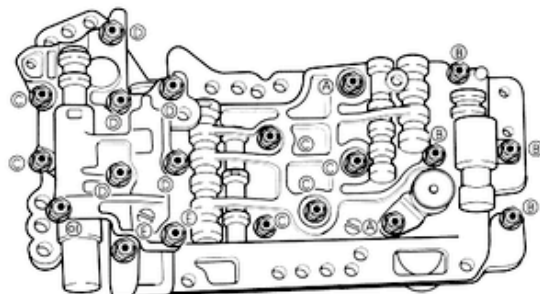
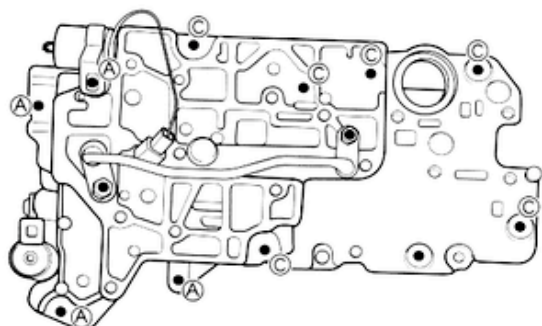
Upper control valve body side

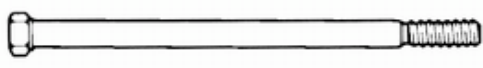


Upper control valve body

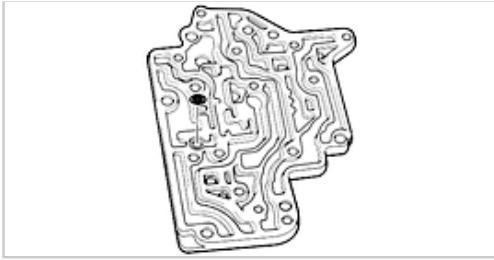


Bolt installation positions and external parts locations

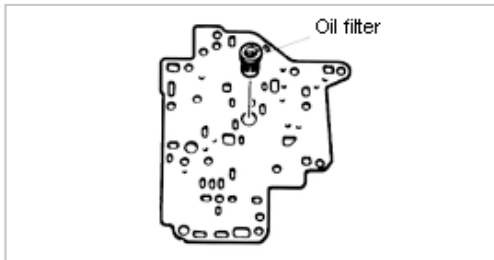


Identification mark		Length in (mm)	Tightening torque lb-in (N·m, kg-cm)
		0.551 (14)	70~95 (7.9~10.7, 80~110)
A		1.181 (30)	
B		1.575 (40)	
C		1.969 (50)	
D		3.228 (82)	
E		3.543 (90)	
01		3.740 (95)	

1. Install oil strainer into lower control valve body, refer to oil strainer installation positions.

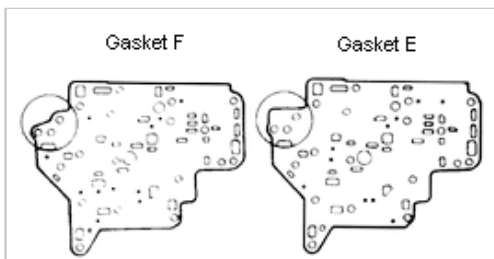


2. Set oil filter into lower separator plate.

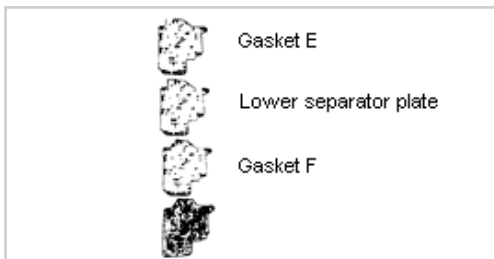


NOTICE

Gasket F and gasket E are not interchangeable.
They are identified by their shape in area designated in illustration.

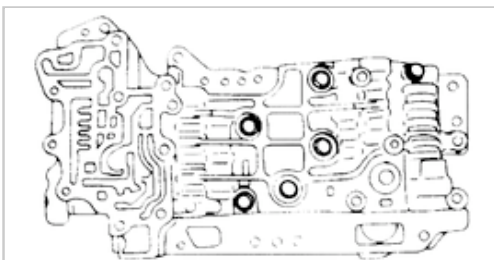


3. Set new gasket F, lower separator plate, and new gasket E onto lower valve body.

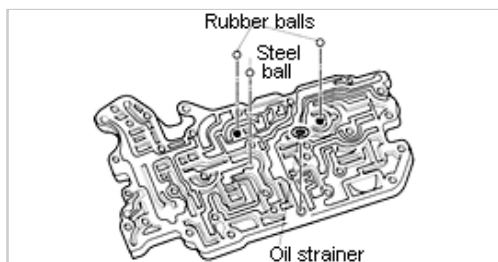


4. Set premain control valve body onto lower valve body and install seven bolts.

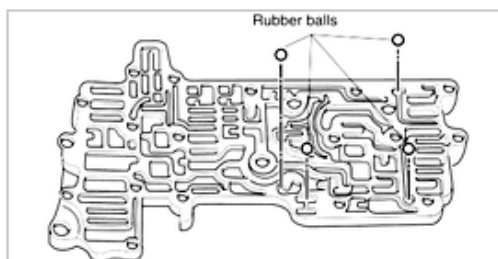
Tightening torque : 69.6~94.8 lb-in (7.9~10.7 N·m, 80~110 kg-cm)



5. Install two rubber balls and oil strainers into their proper positions in premain control valve body.
(Refer to Rubber Ball and Oil Strainer Installation Positions.)

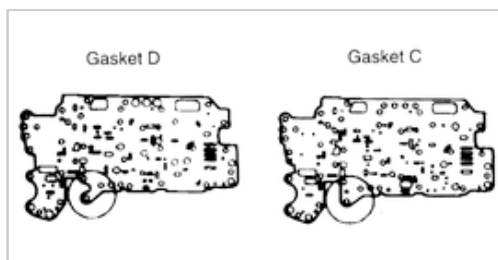


6. Install rubber balls into their proper positions in main control valve body. (Refer to main control valve body.)

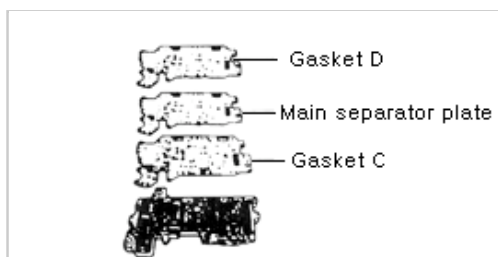


NOTICE

Gasket C and gasket D are not interchangeable.
They are identified by their shape in area designated in illustration.

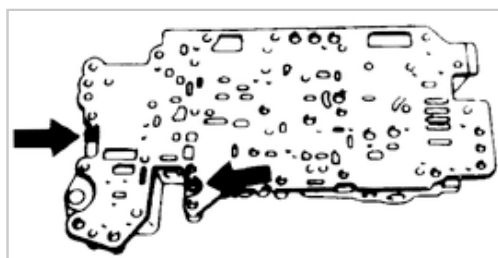


7. Set the new gasket C, main separator plate, and gasket D onto main control valve body.



8. Secure gasket C, main separator plate and gasket D to main control valve body with two screws in locations shown.

Tightening torque : 11.3~16.5 lb-in (1.27~1.86 N·m, 13~19 kg-cm)

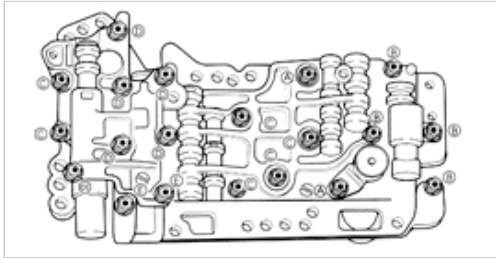


9. Set main control valve body onto premain control vavle body.

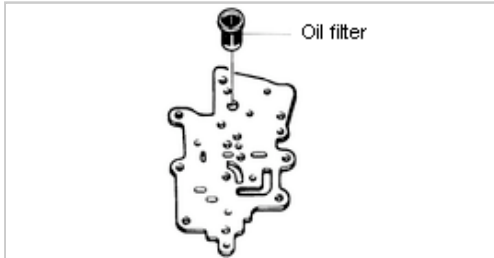
NOTICE

Match bolt head letters as shown.

10. Loosely tighten bolts, refer to bolt installation positions and external parts locations.

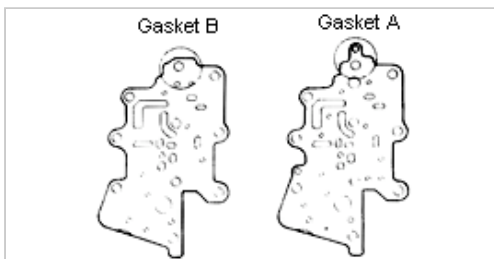


11. Set the oil filter in upper separator plate.

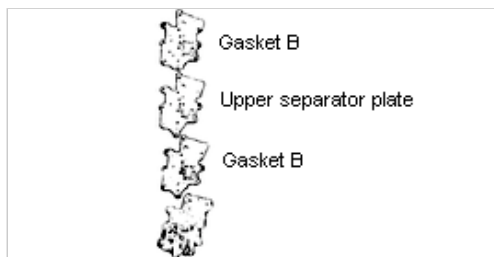


NOTICE

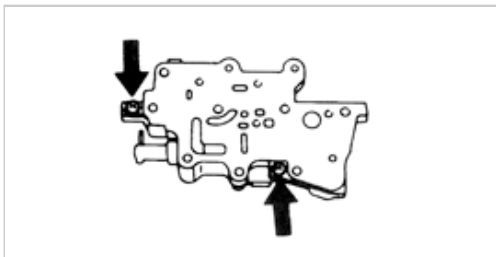
Gasket A and gasket B are not interchangeable.
They are identified by their shape in area designated in illustration.



12. Set new gasket A, upper separator plate, and new gasket B onto upper control valve body.

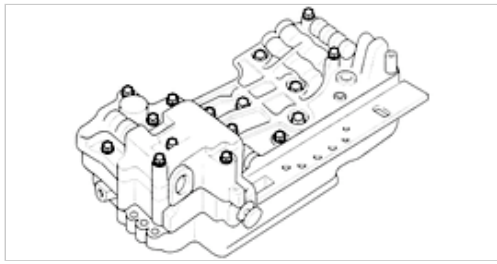


13. Secure gasket A, upper separator plate and gasket B to upper control valve body with two screws in locations shown.



14. Set upper control valve body onto main control valve body and install nine bolts.

Tightening torque : 69.6~94.8 lb-in (7.9~10.7 N·m, 80~110 kg-cm)

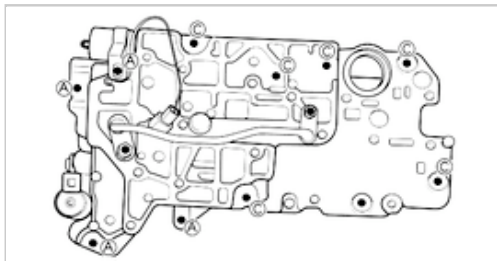


NOTICE

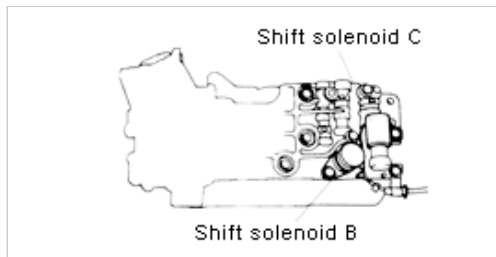
Match bolt head letters as shown.

15. Loosely tighten lower control valve body bolts.
(Refer to bolt installation positions and external parts locations.)
16. Install linear solenoid valve.

Tightening torque : 69.6~94.8 lb-in (7.9~10.7 N·m, 80~110 kg-cm)

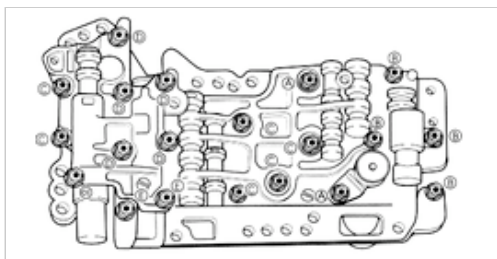


17. Install shift solenoids B and C, oil strainers, and bracket.



18. Tighten mounting bolts.

Tightening torque : 69.6~94.8 lb-in (7.9~10.7 N·m, 80~110 kg-cm)

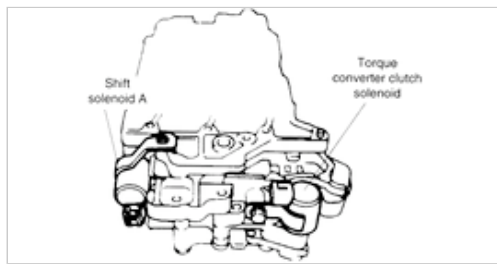


19. Install torque converter clutch solenoid and oil strainer.

Tightening torque : 69.6~94.8 lb-in (7.9~10.7 N·m, 80~110 kg-cm)

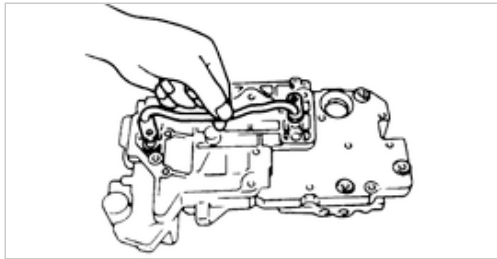
20. Install shift solenoid A and oil strainer onto upper valve body.

Tightening torque : 69.6~94.8 lb-in (7.9~10.7 N·m, 80~110 kg-cm)



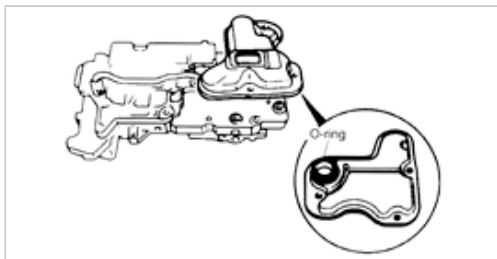
21. Apply ATF to new O-rings and install them onto oil pipe assembly.
22. Install oil pipe assembly.

Tightening torque : 69.6~94.8 lb-in (7.9~10.7 N·m, 80~110 kg-cm)



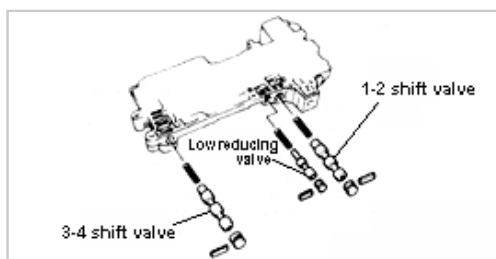
23. Apply ATF to new O-ring and install it onto oil strainer assembly.
24. Install oil strainer onto control valve body and then tighten three bolts.

Tightening torque : 69.6~94.8 lb-in (7.9~10.7 N·m, 80~110 kg-cm)

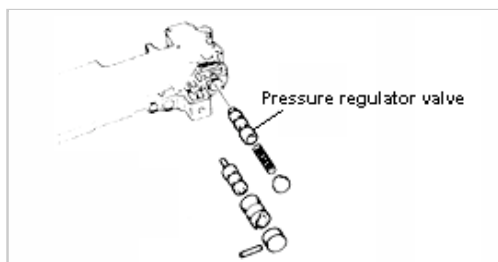


Reassembly

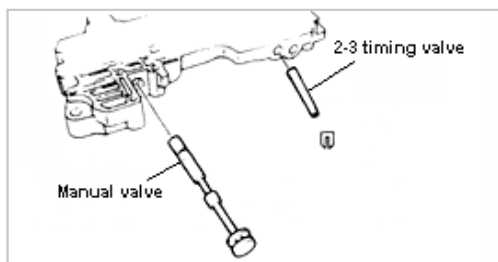
1. Insert 3-4 shift spring, 3-4 shift valve, and stop plug. Secure them with stop pin.
2. Insert low reducing spring, low reducing valve, and stop plug. Secure them with stop pin.
3. Insert 1-2 shift spring, 1-2 shift valve, and stop plug. Secure them with stop pin.



4. Insert pressure regulator valve, pressure regulator spring, pressure regulator spring seat, regulator plug sleeve, pressure regulator plug, and stop plug. Secure them with roll pin.



5. Insert 2-3 timing valve and 2-3 timing spring. Secure them with spring retainer.
6. Proceed to insert manual valve.

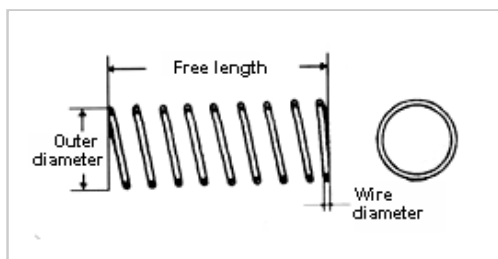


Inspection

1. Measure spring free lengths.

Item	Spring				
	Outer diameter in (mm)	Free length in (mm)	Number of coils	Wire diameter in (mm)	Color
Pressure regulator spring	0.453 (11.5)	1.346 (34.2)	11.5	0.039 (1.0)	Red
1-2 shift spring	0.291 (7.4)	1.441 (36.6)	14.0	0.031 (0.8)	White
Low reducing spring	0.311 (7.9)	1.358 (34.5)	13.0	0.031 (0.8)	Yellow
3-4 shift spring	0.291 (7.4)	1.441 (36.6)	14.0	0.031 (0.8)	White

2. If not within specification, replace spring (s).



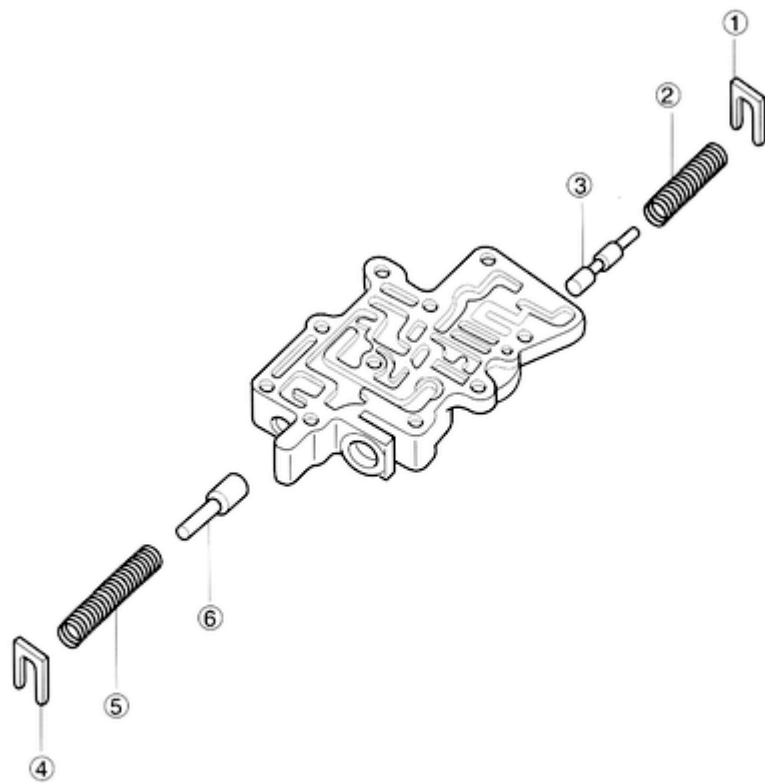


Automatic Transaxle System

Zezi Fsh} W}wx i q 1 Yt t iv GsrXvs Zezi Fsh}



Component



- (1) Spring retainer
- (2) Solenoid reducing spring
- (3) Solenoid reducing valve

- (4) Spring retainer
- (5) P.E accumulator valve
- (6) P.E accumulator spring



Disassembly

NOTICE

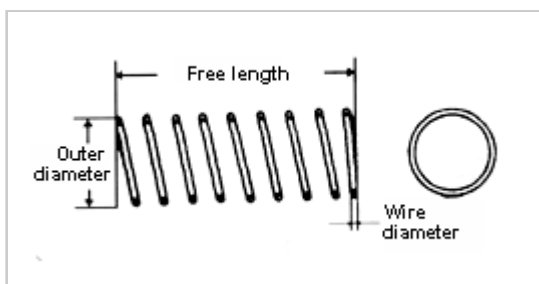
- 1) Each valve should slide in/out under its own weight.
- 2) When a valve will not slide in/out under its own weight, depending on valve, push it out with a wire or replace valve body open-side down and lightly tap it with a soft hammer.
- 3) If a valve surface or bore is scratched or damaged, replace control valve body.
- 4) Do not drop or lose valves or internal parts.
- 5) Before assembly, make sure all parts are thoroughly clean.
- 6) Apply ATF to all parts and bores.
- 7) Note proper direction of valves and internal parts.
- 8) Do not reuse any part that has been dropped.
- 9) Wrap a screwdriver or rod with tape before using it to insert a valve.

1. Disassemble in order shown in the figure.

Inseption

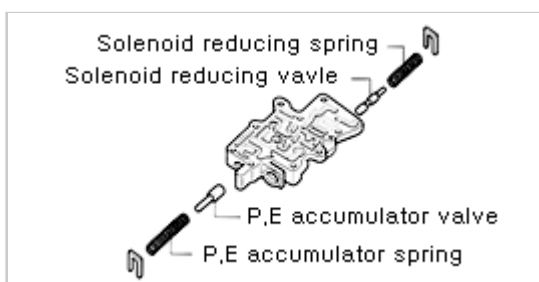
1. Measure spring free lengths.
2. If not within specification, replace spring(s).

Spring	Item	
	Solenoid reducing spring	P.E accumulator spring
Pitch diameter in (mm)	0.277 (7.0)	0.307 (7.8)
Free length in (mm)	1.531 (38.9)	2.007 (51.0)
Number of coils	11	20.5
Wire diameter in (mm)	0.035 (0.9)	0.047 (1.2)



Reassembly

1. Insert solenoid reducing valve and solenoid reducing spring then secure them with spring retainer.
2. Insert P.E accumulator valve and P.E accumulator spring then secure them with spring retainer.





Automatic Transaxle System

Valve Body System - Pre Main Control Valve Body

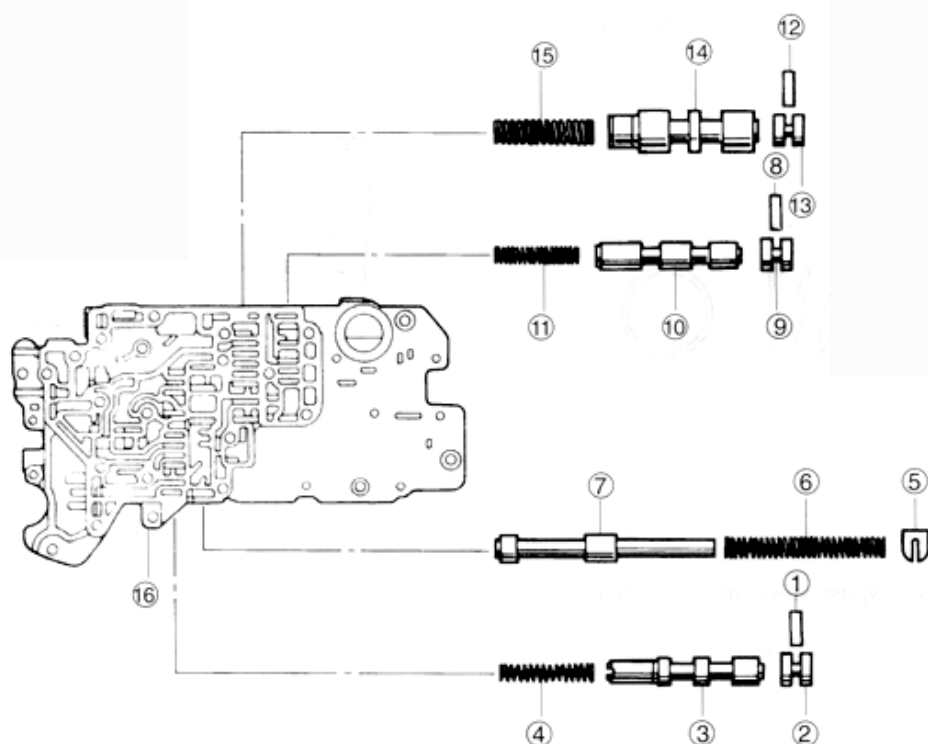


Automatic Transaxle System

Valve Body System - Shift Control Solenoid Valve



Component



- (1) Stop pin
- (2) Stop plug
- (3) Lockup control valve
- (4) Lockup control spring
- (5) Spring retainer
- (6) Converter relief spring
- (7) Converter relief valve
- (8) Stop pin

- (9) Stop plug
- (10) Bypass valve
- (11) Bypass spring
- (12) Stop pin
- (13) Stop plug
- (14) 2-3 shift valve
- (15) 2-3 shift spring
- (16) Premain control valve body



Disassembly

NOTICE

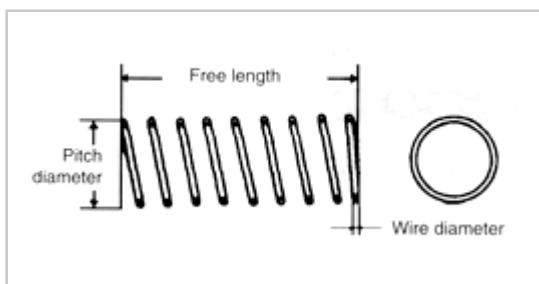
- 1) Each valve should slide in/out under its own weight.
- 2) When a valve will not slide in/out under its own weight, depending on valve, push it out with a wire or replace valve body open-side down and lightly tap it with a soft hammer.
- 3) If a valve surface or bore is scratched or damaged, replace control valve body.
- 4) Do not drop or lose valves or internal parts.
- 5) Before assembly, make sure all parts are thoroughly clean.
- 6) Apply ATF to all parts and bores.
- 7) Note proper direction of valves and internal parts.
- 8) Do not reuse any part that has been dropped.
- 9) Wrap a screwdriver or rod with tape before using it to insert a valve.

1. Disassemble in order shown in figure.

Inspection

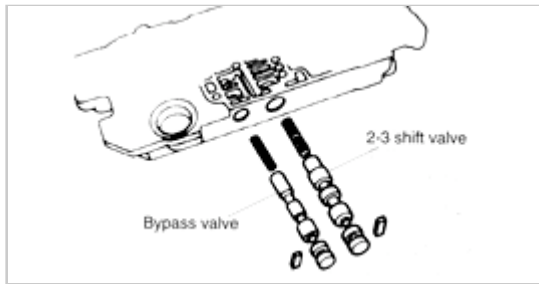
1. Measure spring free lengths.
2. If not within specification, replace spring (s).

Item	Spring			
	Lockup control spring	Converter relief spring	2-3 shift spring	Bypass spring
Outer diameter in (mm)	0.201 (5.1)	0.339 (8.6)	0.291 (7.4)	0.193 (4.9)
Free length in (mm)	1.185 (30.1)	2.693 (68.4)	1.441 (36.6)	1.201 (30.5)
Number of coils	23.5	29.5	14.0	25.0
Wire diameter in (mm)	0.022 (0.55)	0.057 (1.2)	0.031 (0.8)	0.022 (0.55)
Color	Brown	Navy blue	White	Navy blue

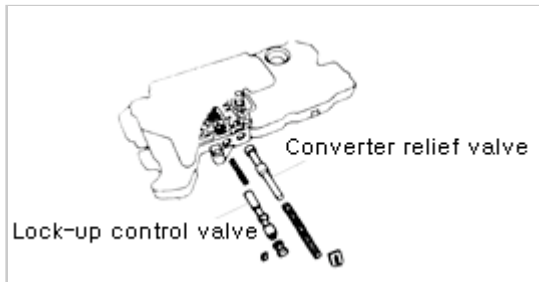


Reassembly

1. Insert bypass spring, bypass valve, and stop plug.
Secure them with stop pin.
2. Insert 2-3 shift spring, 2-3 shift valve, and plug.
Secure them with stop pin.



3. Insert converter relief valve and converter relief spring. Secure them with spring retainer.
4. Insert lock-up control spring, lock-up control valve and stop plug. Secure them with stop pin.





Inspection

Solenoid valves

Resistance inspection

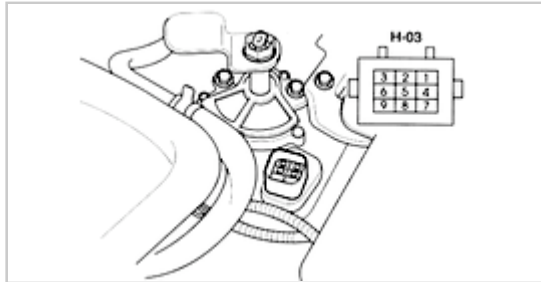
1. Disconnect negative battery cable.
2. Disconnect solenoid valve connector.
3. Measure resistance between each terminal and a ground.

Resistance : 14~18Ω

NOTICE

- 1) 2 : Torque converter clutch solenoid
- 2) 3 : Shift solenoid valve A
- 3) 6 : Shift solenoid valve B
- 4) 9 : Shift solenoid valve C

4. If not correct, check wiring for an open or short circuit. Replace solenoid valve.



Continuity inspection

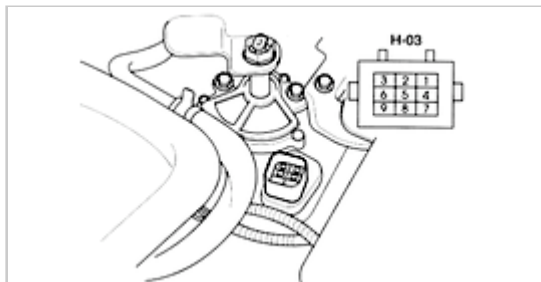
1. Disconnect 55-pin connector from transaxle control module.
2. Check continuity between terminals H-01/30, H-01/33, H-01/32 and H-01/4, and ground.
3. If not correct, check wiring for an open circuit.

Linear solenoid valve

Resistance inspection

1. Disconnect negative battery cable.
2. Disconnect solenoid valve connector.
3. Measure resistance between ground terminals and of connector terminal H-03/1.

Resistance : 4.1~5.1Ω



4. If not connect, check wiring for an open or short circuit, replace pressure control valve.
5. Connect solenoid valve connector.
6. Connect negative battery cable.



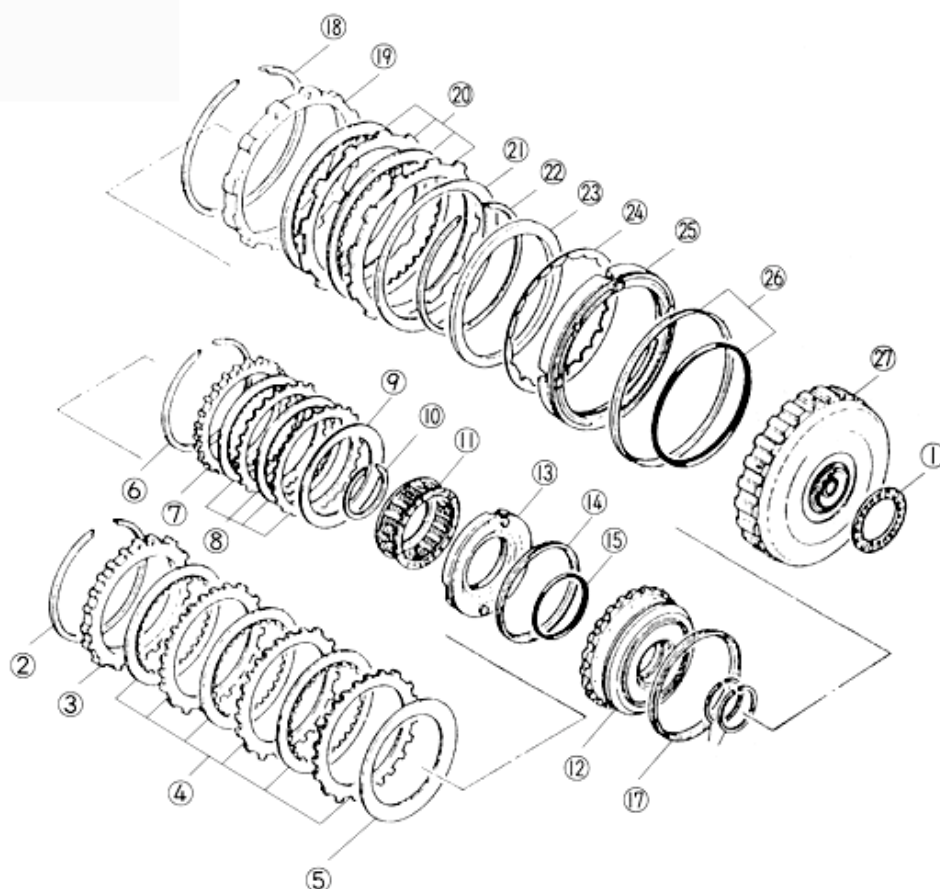
Automatic Transaxle System

Clutch & Brake - Reverse and Overdrive Clutch



Component

Forward & coasting & reverse clutch



Forward clutch

- (1) Thrust bearing
- (2) Snap ring (Replace if necessary)
- (3) Retaining plate
- (4) Drive and driven plates
- (5) Dished plate

Coasting clutch

- (6) Snap ring (replace if necessary)
- (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 clutch piston

- (14) Outer seal
- (15) Inner seal
- (16) Outer seal (Replace)
- (17) Seal ring (Replace)

Reverse clutch

- (18) Snap ring (Replace if necessary)
- (19) Retaining plate
- (20) Drive and driven plates
- (21) Dished plate
- (22) Snap ring
- (23) Return spring stop
- (24) Piston return spring
- (25) Reverse clutch piston
- (26) Seal rings (Inner and outer) (Replace)
- (27) Reverse/forward drum



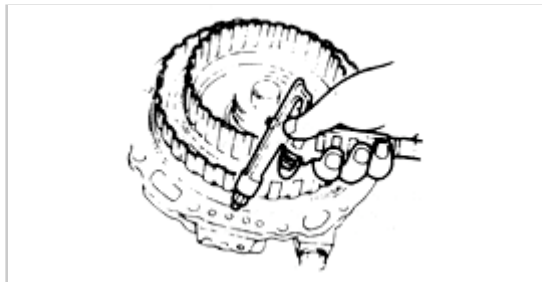
Reverse/forward clutch assembly

Pre-inspection

Clutch operation

1. Set reverse/forward clutch assembly onto oil pump.
2. Check clutch operation by applying compressed air through fluid passages shown.

Applied air pressure : 57 psi (392 kPa, 4.0 kg/cm²) maximum



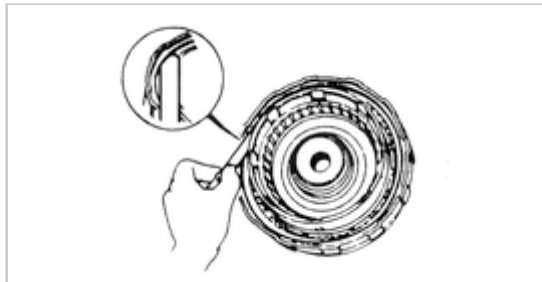
Clutch clearance

Reverse clutch

1. Measure clearance between retaining plate and snap ring.

Clearance : 0.035~0.047 in (1.9~1.2 mm)

2. If not as specified, replace parts as necessary.

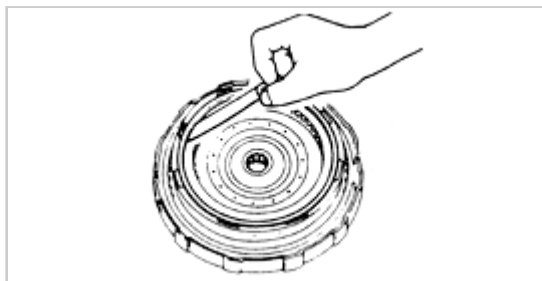


Forward clutch

1. Measure clearance between retaining plate and snap ring.

Clearance : 0.039~0.047 in (1.0~1.2 mm)

2. If not as specified, replace parts as necessary.



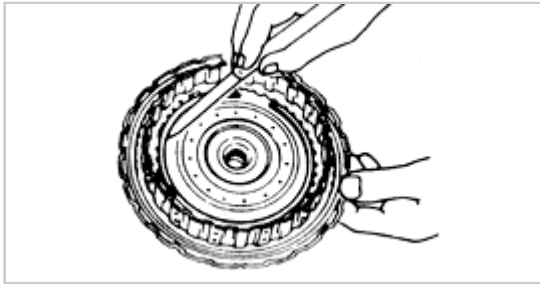
Coasting clutch

1. Remove snap ring, retaining plate, drive plates, driven plates and dished plate of forward clutch, refer to disassembly.

2. Measure clearance between retaining plate and snap ring.

Clearance : 0.039~0.047 in (1.0~1.2 mm)

3. If not as specified, replace parts as necessary.



Inspection

Forward & coasting & reverse clutch

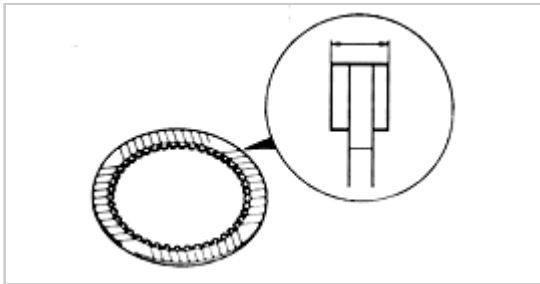
Drive plates

1. Measure facing thickness in three places and determine average of three readings.

Standard : 0.063 in (1.6 mm)

Minimum : 0.055 in (1.4 mm)

2. If not within specification, replace drive plates.

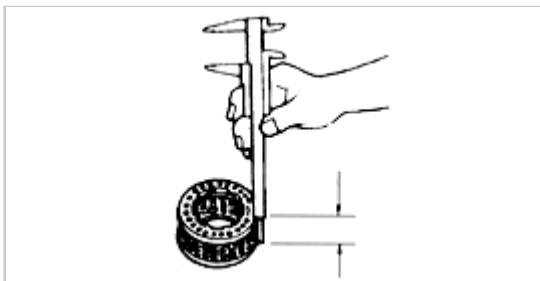


Spring and retainer assembly

1. Measure spring free length and check for deformation.

Free length : 0.805 in (20.45 mm)

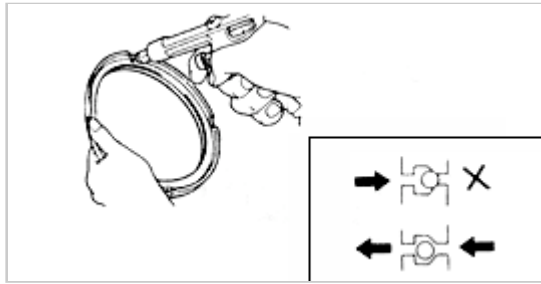
2. If not within specification, replace spring and retainer assembly.



Reverse clutch piston

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

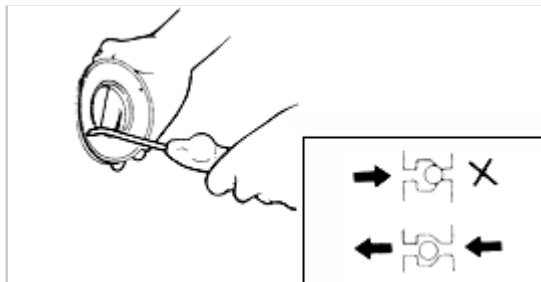
Air pressure : 57 psi (392 kPa, 4.0 kg/cm²) maximum



Coasting clutch piston

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

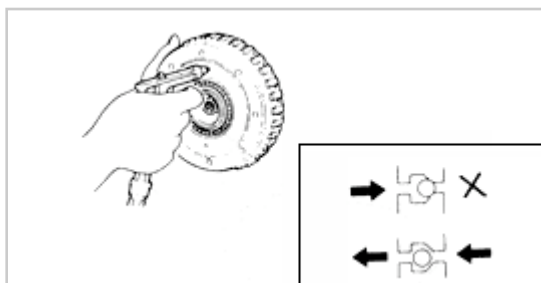
Air pressure : 57 psi (392 kPa, 4.0 kg/cm²) maximum



Reverse/forward drum

1. Verify that there is air flow when applying compressed air through backside of drum.
2. Verify that there is no air leakage when applying compressed air through inside of drum.

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

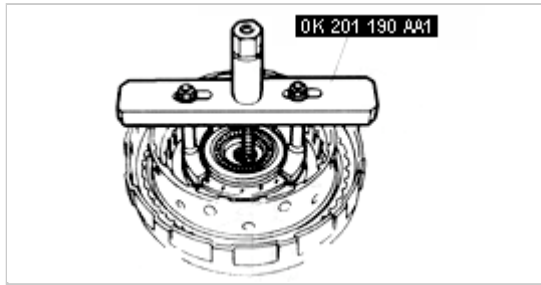


Disassembly

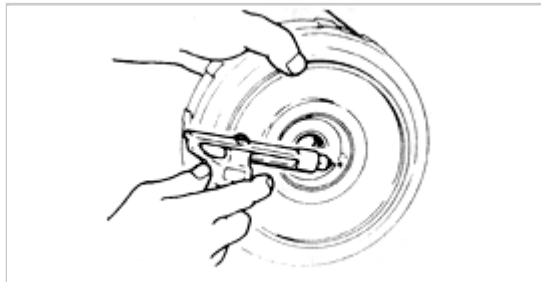
Forward & coasting & reverse clutch

1. Remove thrust bearing.
2. Remove snap ring.
3. Remove retaining plate.
4. Remove forward clutch drive plates and driven plates. (each three)
5. Remove dished plate.
6. Install SST (0K201 190 AA1) in coasting clutch drum as shown.
7. Compress spring and retainer assembly.
8. Remove snap ring.
9. Remove SST (0K201 190 AA1) then remove spring and retainer assembly.

10. Remove snap ring.
11. Remove retaining plate.
12. Remove coasting clutch drive plates and driven plates. (each two)



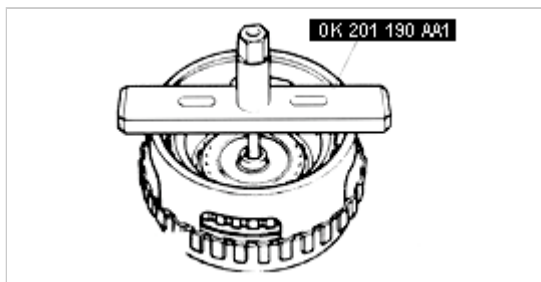
13. Remove coasting clutch drum from reverse/forward drum by applying compressed air through fluid passage.



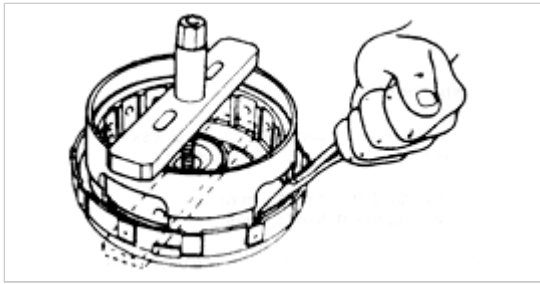
14. Remove coasting clutch piston from coasting clutch drum by applying compressed air through fluid passage.
15. Remove outer seal and inner seal from coasting piston.
16. Remove two seal rings and outer seal from coasting clutch drum.



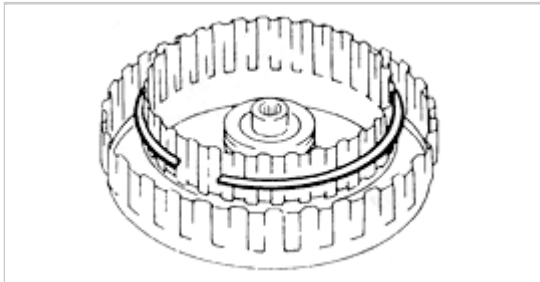
17. Install SST (OK201 190 AA1) in reverse/forward drum as shown.
18. Compress piston return spring.



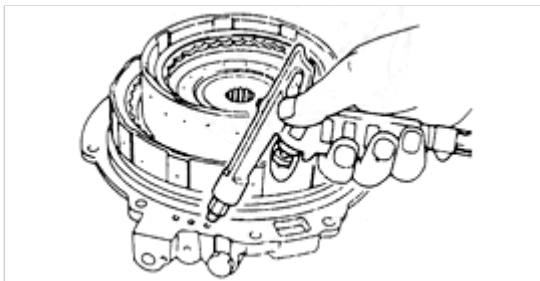
19. Remove snap ring from groove with snap ring pliers.



20. Remove SST (0K201 190 AA1) from reverse/forward drum.
21. Remove snap ring with a screwdriver.
22. Remove retaining plate.
23. Remove reverse clutch driven plates and driven plates. (each two)
24. Remove snap ring.



25. Remove return spring stopper and piston.
26. Place reverse/forward drum on oil pump.
27. Remove reverse piston by applying compressed air through reverse clutch fluid passage.
28. Remove two seal rings from reverse piston.



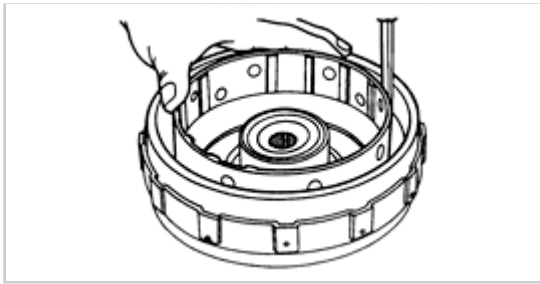
Reassembly

Forward & coasting & reverse clutch

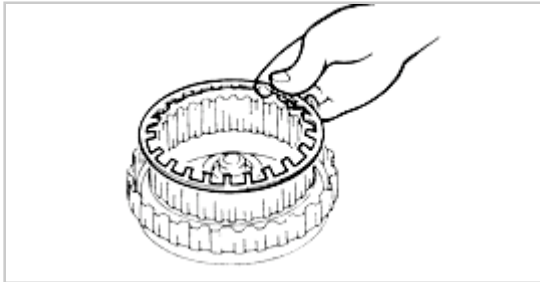
1. Install reverse clutch piston
 - A. Apply ATF to inner and outer faces of seals, and install them to reverse clutch piston.



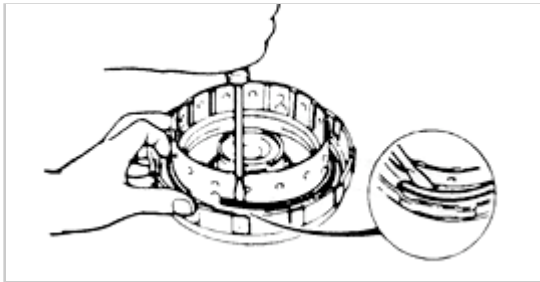
- B. Insert reverse clutch piston by pushing evenly around circumference, bearing careful not to damage seal rings.



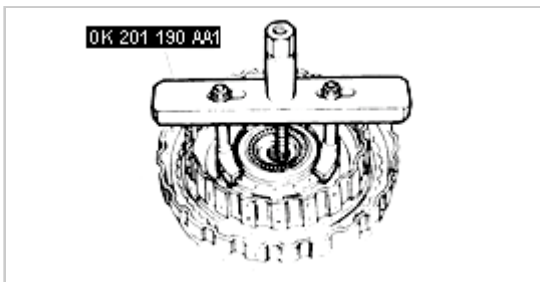
2. Install piston return spring with tabs facing away from reverse clutch piston.
3. Install return spring stop with step facing upward.



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



5. Install SST (0K201 190 AA1) on reverse/forward drum.
6. Compress spring and retainer assembly.
7. Install snap ring with a screwdriver.
8. Remove SST (0K201 190 AA1).

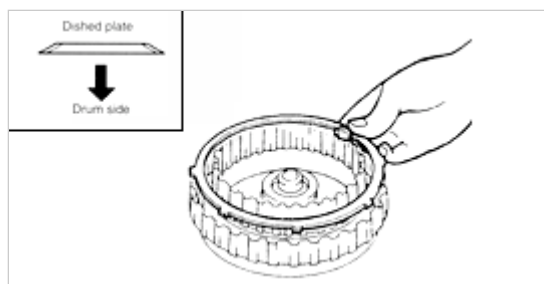


9. Install dished plate with dished side facing downward into drum as shown.
10. Install drive and driven plates. (two each)

NOTICE

Installation order : Driven-Drive-Driven-Drive

11. Install retaining plate.
12. Install snap ring.



13. Measure reverse clutch clearance.

- A. Measure clearance between snap ring and retaining plate of reverse clutch.
- B. If clearance is not within specification, adjust it by selecting correct thickness snap ring.

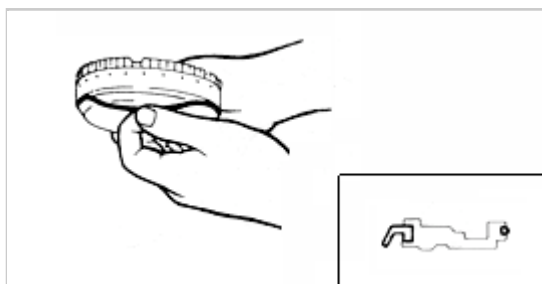
Reverse clutch clearance : 0.035~0.047 in (0.9~1.2 mm)

Reverse clutch snap ring sizes in (mm)		
0.079 (2.0)	0.087 (2.2)	0.095 (2.4)
0.102 (2.6)	0.110 (2.8)	0.118 (3.0)



14. Install coasting clutch drum.

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

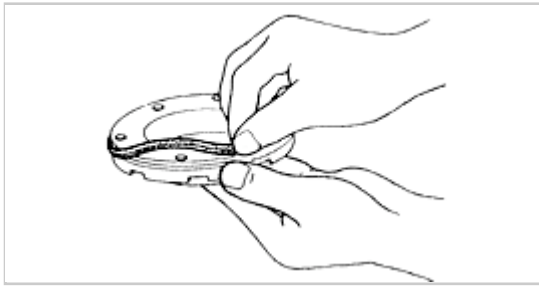


- C. Install coasting clutch drum in correct position in reverse/forward drum as shown.
- D. Push evenly around circumference, being careful not to damage outer seal.

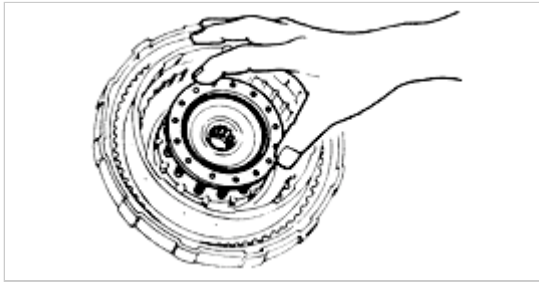


15. Install coasting clutch piston

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



16. Install spring and retainer assembly.

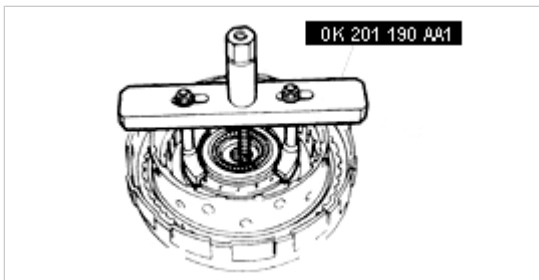


17. Install SST (0K201 190 AA1) in coasting clutch as shown.

18. Compress spring and retainer assembly.

19. Install snap ring.

20. Remove SST (0K201 190 AA1).



21. Install dished plate with dished side facing out of drum as shown.]

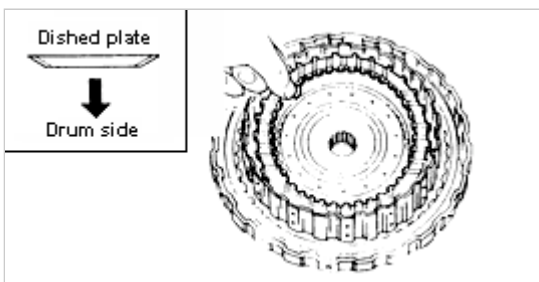
22. Install drive and driven plate.

NOTICE

Installation order : Driven-Drive-Driven-Drive

23. Install retaining plate.

24. Install snap ring.

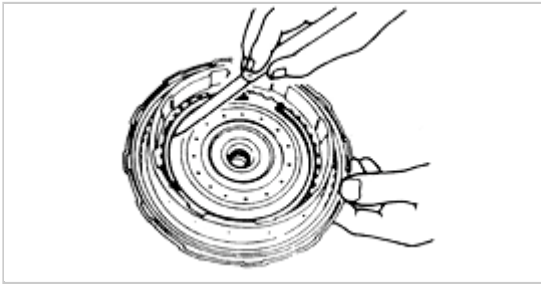


25. Measure coasting clutch clearance.

- A. Measure clearance between snap ring and retaining plate of coasting clutch.
- B. If clearance is not within specification, adjust it by selecting correct thickness snap ring.

Coasting clutch clearance : 0.039~0.048 in (1.0~1.2 mm)

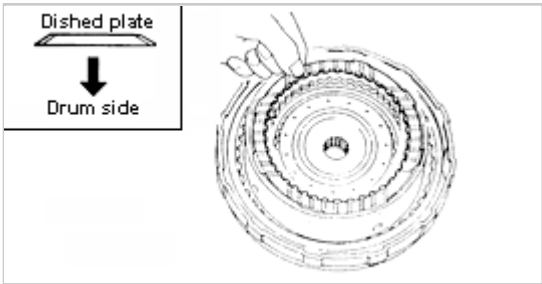
Coasting clutch snap ring sizes in (mm)		
0.071 (1.80)	0.077 (1.95)	0.083 (2.10)
0.088 (2.25)	0.094 (2.40)	0.100 (2.55)
0.106 (2.70)	0.112 (2.85)	



- 26. Install dished plate with dished side facing downward into drum, as shown.
- 27. Install drive and driven plates.

NOTICE

Installation order : Driven-Drive-Driven-Drive-Drien-Drive



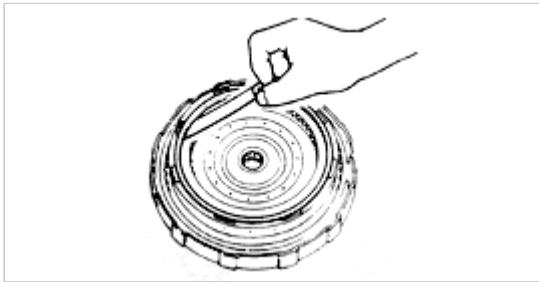
- 28. Install retaining plate.
- 29. Install snap ring.



- 30. Measure forward clutch clearance.
 - A. Measure clearance between snap ring and retaining plate of forward clutch.
 - B. If clearance is not within specification, adjust it by selecting correct thickness snap ring.

Forward clutch clearance : 0.039~0.048 in (1.0~1.2 mm)

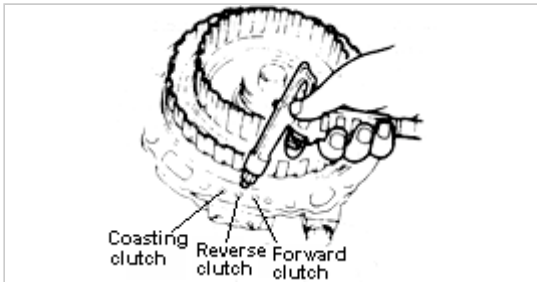
Coasting clutch snap ring sizes in (mm)		
0.063 (1.60)	0.069 (1.75)	0.075 (1.90)
0.087 (2.20)	0.081 (2.05)	0.093 (2.35)



31. Check clutch operation as follows :

- A. Set clutch assembly onto oil pump.
- B. Check clutch operation by applying compressed air through fluid passages shown.

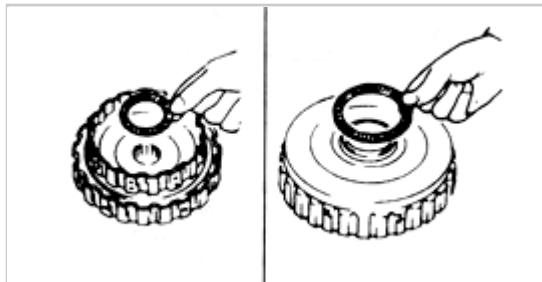
Air pressure : 57 psi (392 kPa, 4.0 kg/cm²) maximum



32. Apply petroleum jelly to thrust bearings, and secure them on each side of reverse/forward drum.

Thrust bearing outer diameter : Oil pump side : 3.39 in (86.0 mm)

Small sun gear and one-way clutch side : 2.21 in (56.1 mm)





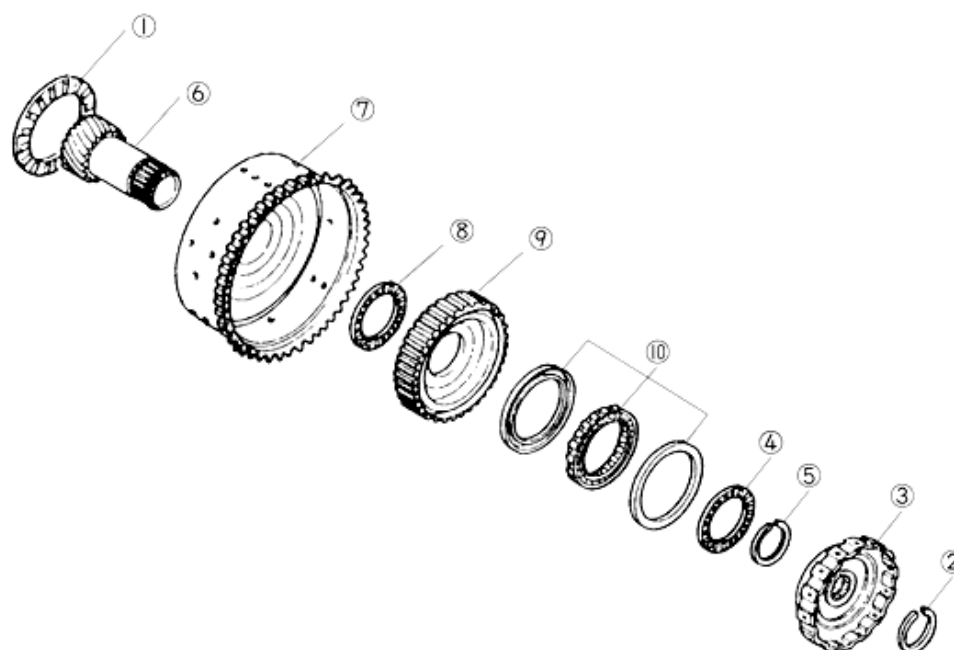
Automatic Transaxle System

Clutch & Brake - One Way Clutch



Component

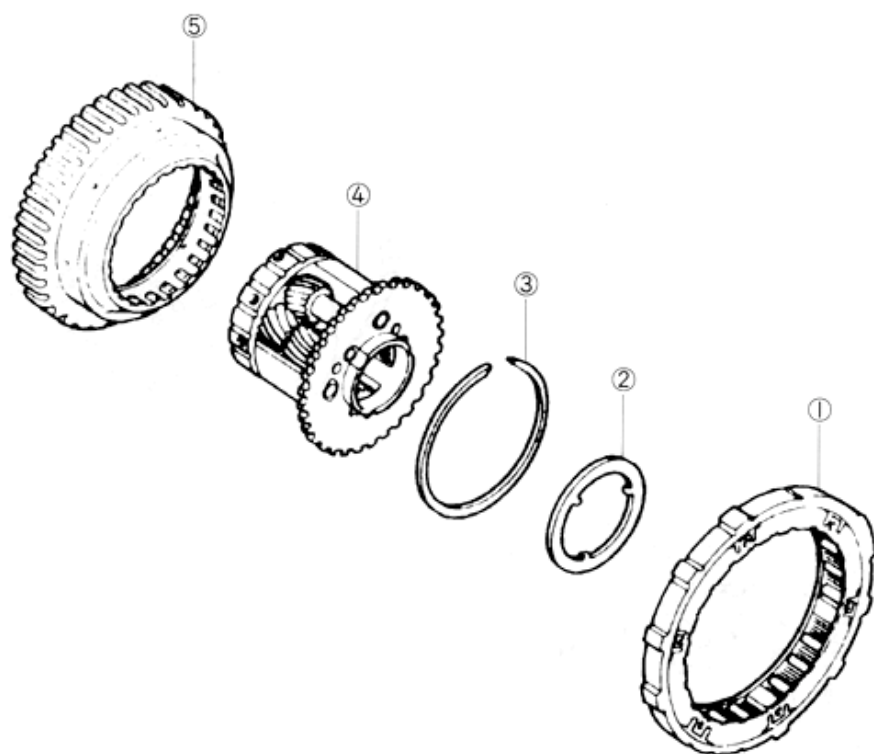
One-way clutch No. 1



- (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 No. 1

One-way clutch No. 2 and planetary carrier assembly



- (1) One-way clutch No.2
- (2) Bearing race
- (3) Snap ring

- (4) Planetary carrier
- (5) Inner race (Low and reverse hub)



Disassembly

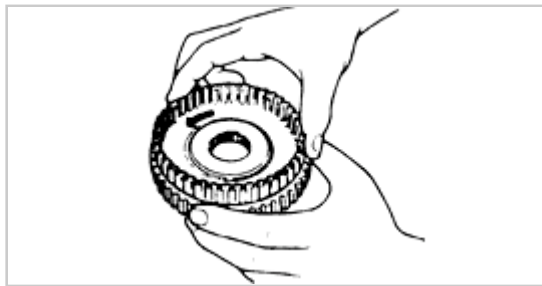
One-way clutch No. 1

1. Remove thrust bearing from small sun gear.
2. Remove snap ring with a snap ring pliers.
3. Remove one-way clutch inner race from sun gear drum.
4. Remove thrust bearing.
5. Remove snap ring with a snap ring pliers.
6. Remove small sun gear.
7. Remove one-way clutch No. 1, one-way clutch outer race and thrust bearing from sun gear drum.

Pre-inspection

One-way clutch No. 1 operation

1. While holding one-way clutch outer race, verify that one-way clutch inner race rotates smoothly when turned counterclockwise and locks when turned clockwise. If not as specified, replace one-way clutch No. 1



Disassembly

One-way clutch No. 2 and planetary carrier assembly

1. Disassembly in order shown in figure.

Inspection

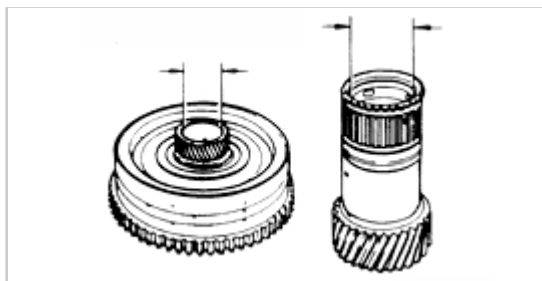
One-way clutch No. 1

Small sun gear, sun gear drum

1. Measure small sun gear and sun gear drum inner diameters.

Inner diameter : Small sun gear : 0.828 in (21.021 mm) maximum

Sun gear drum : 1.198 in (30.425 mm) maximum



Inspection

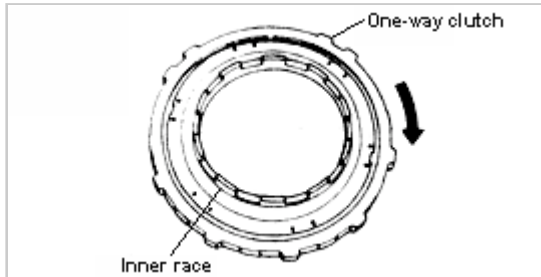
One-way clutch No. 2

1. Check for following and repair or replace as necessary.

NOTICE

Assembly one-way clutch and inner race, then verify that one-way clutch rotates only clockwise and smoothly.

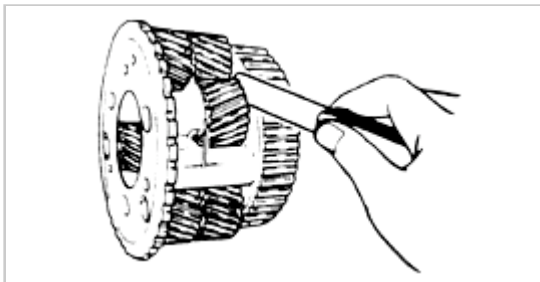
- A. Damaged or worn one-way clutch and operation.
- B. Detached roller.



Planetary carrier

1. Check for following and repair or replace as necessary.
 - A. Damage or worn gear and operation.
 - B. Clearance between pinion washers and planetary carrier.

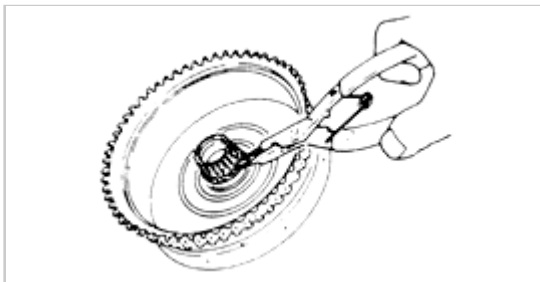
Clearance : 0.008~0.028 in (0.2~0.7 mm)



Reassembly

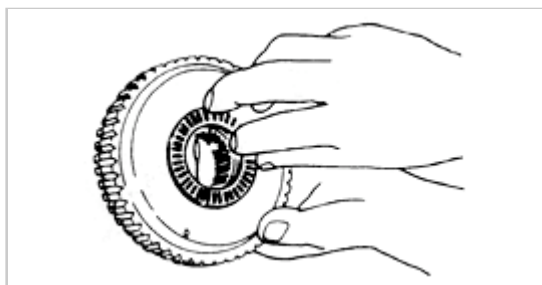
One-way clutch No. 1

1. Install small sun gear into sun gear drum.
2. Install new snap ring.



3. Apply petroleum jelly to thrust bearing, and secure it to one-way clutch inner race.

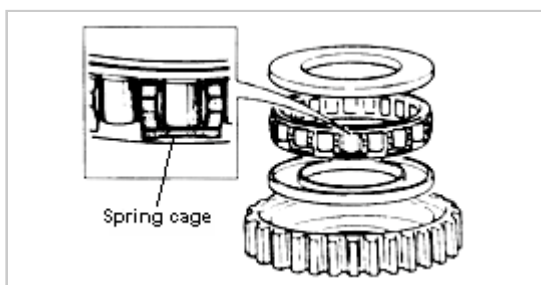
Thrust bearing outer diameter : 3.39 in (86.0 mm)



NOTICE

Install one-way clutch into outer race with spring cage facing as shown.

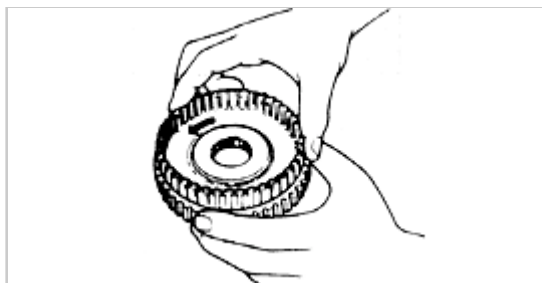
4. Install one-way clutch No. 1 into one-way clutch outer race.



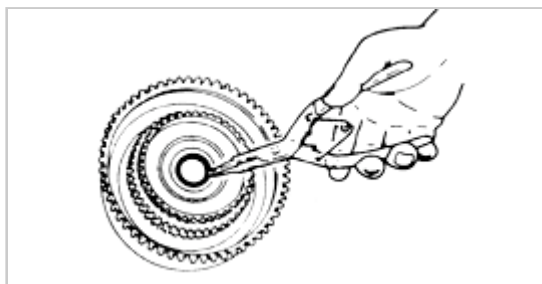
NOTICE

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

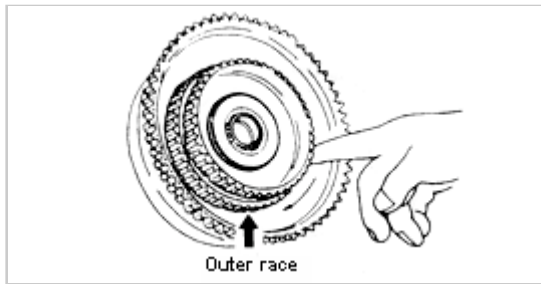
5. Install one-way clutch inner race into one-way clutch outer race by turning inner race counterclockwise.
6. Hold one-way clutch outer race. Verify that the inner race turns only counterclockwise.



7. Install new snap ring.

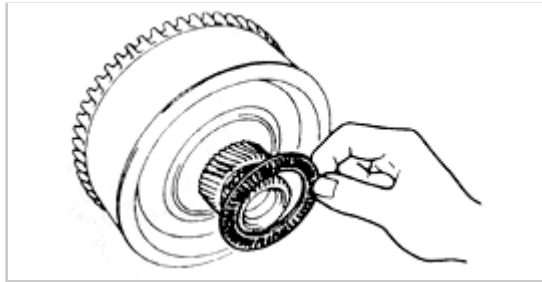


8. Verify that when small sun gear is held, one-way clutch outer race turns smoothly and only clockwise.



9. Apply petroleum jelly to thrust bearing, and secure it to sun gear drum.

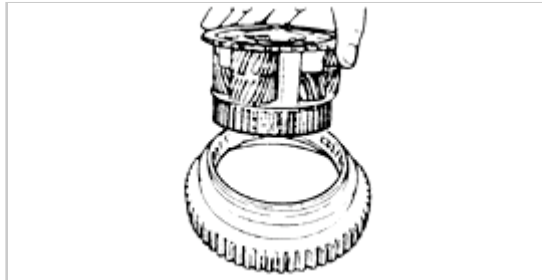
Thrust bearing outer diameter : 3.39 in (86.0 mm)



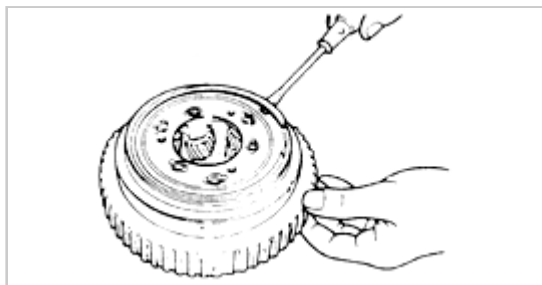
Reassembly

One-way clutch No.2 and planetary carrier assembly

1. Assembly planetary carrier to inner race.



2. Install snap ring.

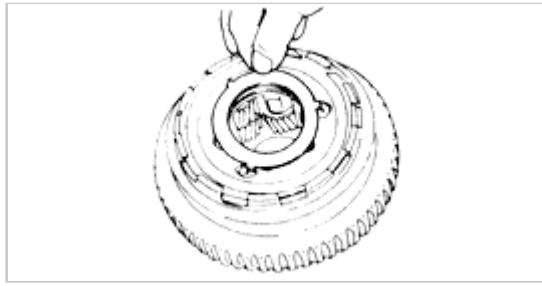


NOTICE

Install tangs of bearing race into alignment holes.

3. Apply petroleum jelly to bearing race and secure them to each side of one-way clutch No. 2 and planetary carrier assembly.

Bearing race outer diameter - Sun gear drum side : 3.307 in (84.0 mm)



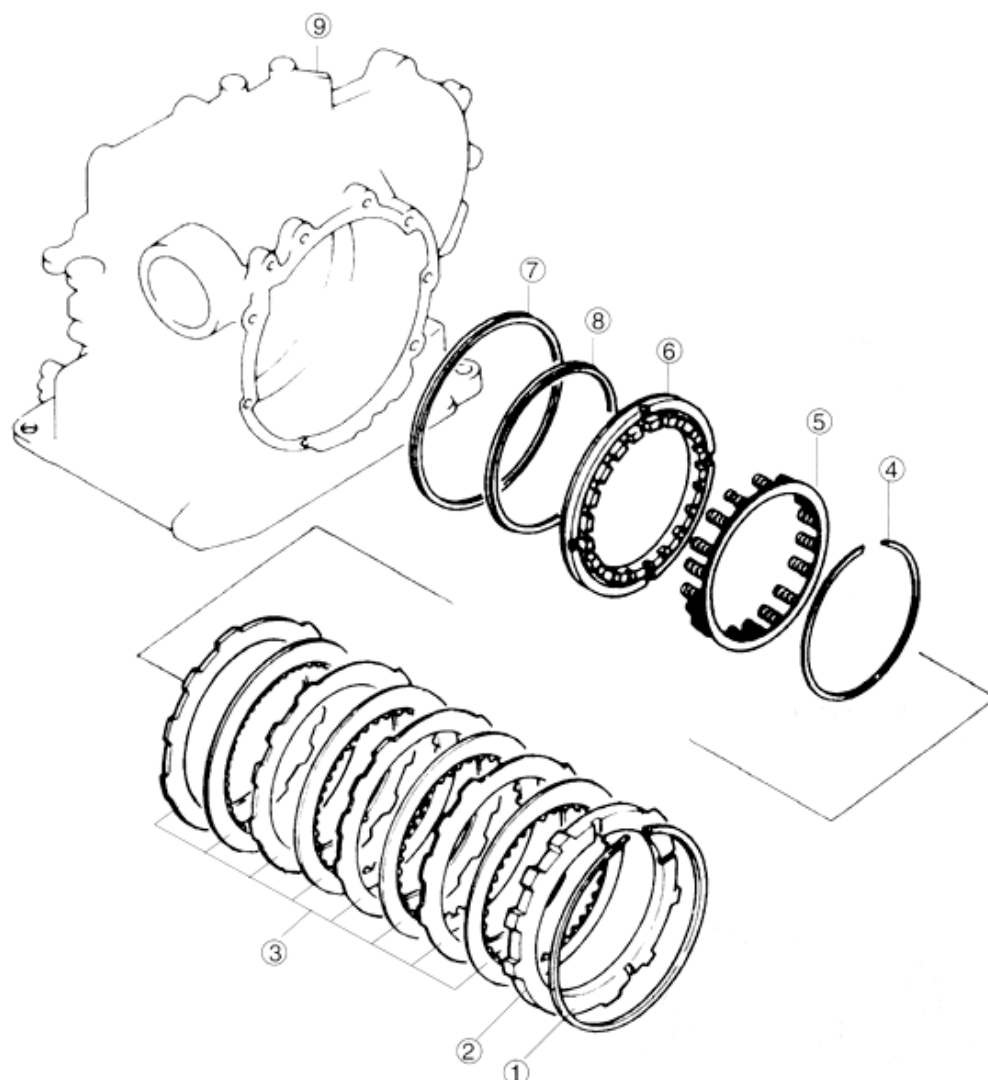


Automatic Transaxle System

Clutch & Brake - Low and Reverse Brake



Component



- (1) Snap ring (Replace if necessary)
- (2) Retaining plate
- (3) Drive and driven plates
- (4) Snap ring (Replace if necessary)
- (5) Spring and retainer assembly

- (6) Low and reverse brake piston
- (7) Outer seal (Replace)
- (8) Inner seal (Replace)
- (9) Transaxle case



Pre-inspection

Low and reverse brake operation

1. Check low and reverse brake operation by applying compressed air as shown.

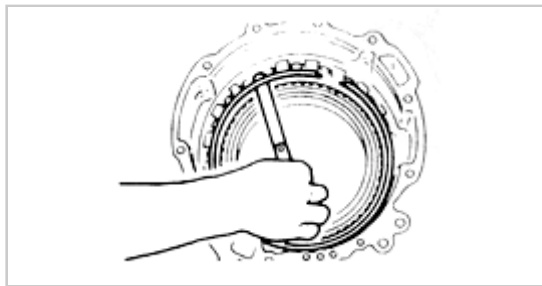
Air pressure : 57 psi (392 kPa, 4.0 kg/cm²) maximum



Brake clearance

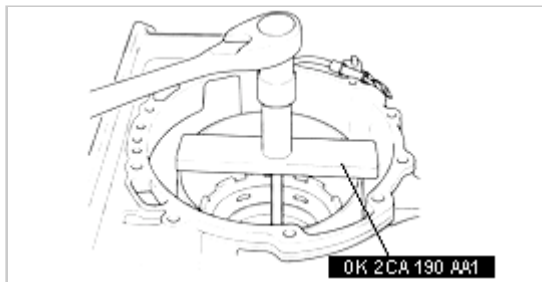
1. Measure clearance between retaining plate and snap ring.
2. If not as specified, replace parts as necessary.

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



Disassembly

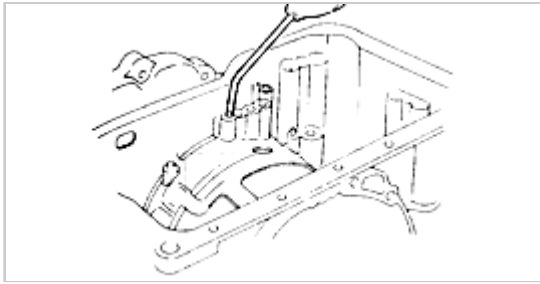
1. Remove snap ring.
2. Remove retaining plate.
3. Remove drive plates and driven plates. (each four)
4. Install SST (0K2CA 190 AA1) in transaxle case as shown.
5. Compress spring and retainer assembly.
6. Remove snap ring.
7. Remove SST (0K201 190 AA1), then remove spring and spring retainer assembly.



8. Remove low and reverse brake piston by applying compressed air through fluid passage.

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

-
9. Remove outer seal and inner seal from low and reverse brake piston.



Inspection

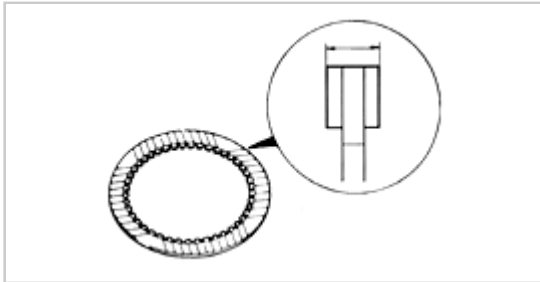
Drive plates

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

Standard : 0.063 in (1.6 mm)

Minimum : 0.055 in (1.4 mm)

2. If not within specification, replace drive plate (s).

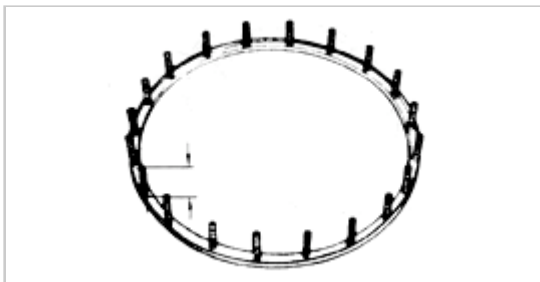


Spring and retainer assembly.

1. Measure spring free length and check for deformation.

Free length of spring : 0.563 in (14.3 mm)

2. If not within specification, replace spring and retainer assembly.



Reassembly

1. Install low and reverse brake piston.

- A. Apply ATF to inner and outer seals, and install them onto low and reverse brake piston.

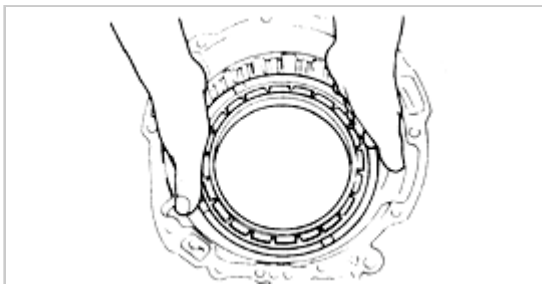
Seal Ring Inner Diameter :

Inner Seal : 5.539 in (140.7 mm)

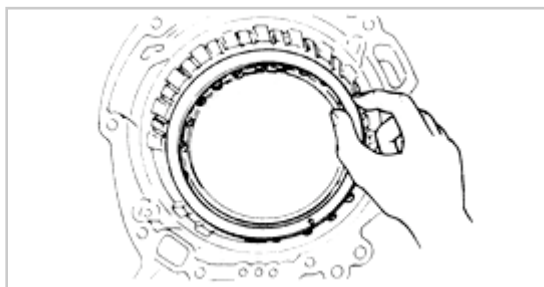
Outer Seal : 6.713 in (170.5 mm)

- B. Face outer seal lip toward inside by gently rolling it down around circumference for easier installation into case.

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



2. Install spring and retainer assembly.

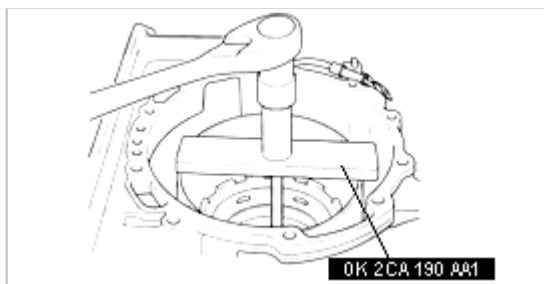


3. Install SST (0K2CA 190 AA1) in transaxle case.

4. Compress spring and retainer assembly.

5. Install snap ring with snap-ring pliers.

6. Remove SST (0K2CA 190 AA1).

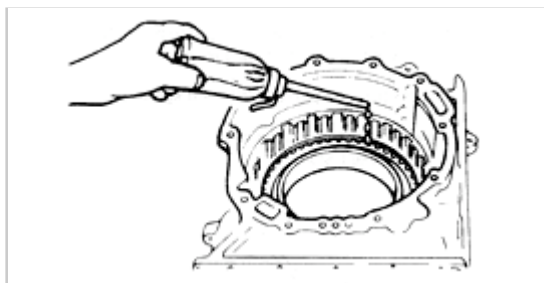


7. Check low and reverse brake piston operation.

- A. Pour in ATF until low and reverse brake piston is fully submerged.

8. Check that no bubbles come from between piston and seals when applying compressed air through fluid passage.

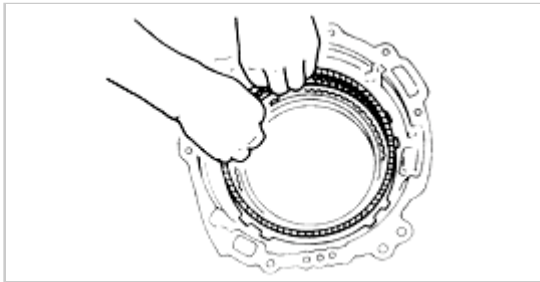
Air pressure : 57 psi (392 kPa, 4.0 kg/cm²)



9. Install drive and driven plates. (each four)

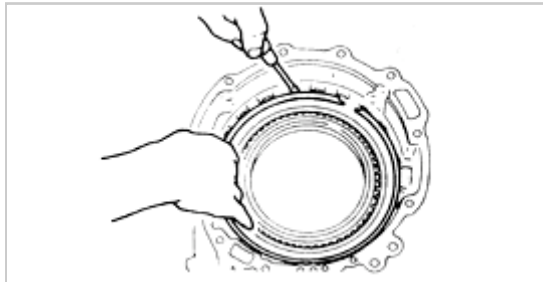
NOTICE

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



10. Install retaining plate.

11. Install snap ring.



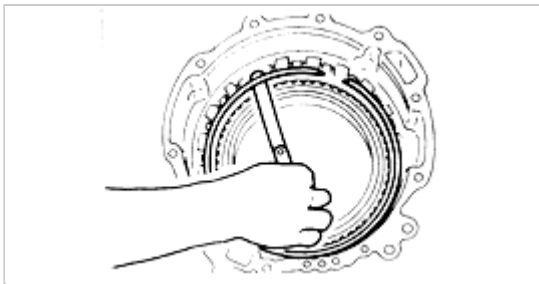
12. Measure low and reverse brake clearance.

A. Measure clearance between snap ring and low and reverse brake retaining plate.

B. If clearance is not within specification, adjust it by selecting a proper snap ring.

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

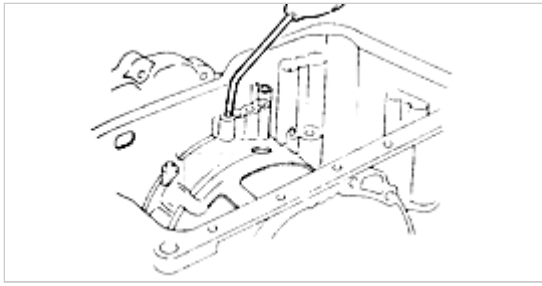
Snap ring size in (mm)		
0.079 (2.0)	0.087 (2.2)	0.095 (2.4)
0.102 (2.6)	0.110 (2.8)	0.118 (3.0)



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

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

14. Remove snap ring, retaining plate, drive and driven plates and set aside for later assembly.



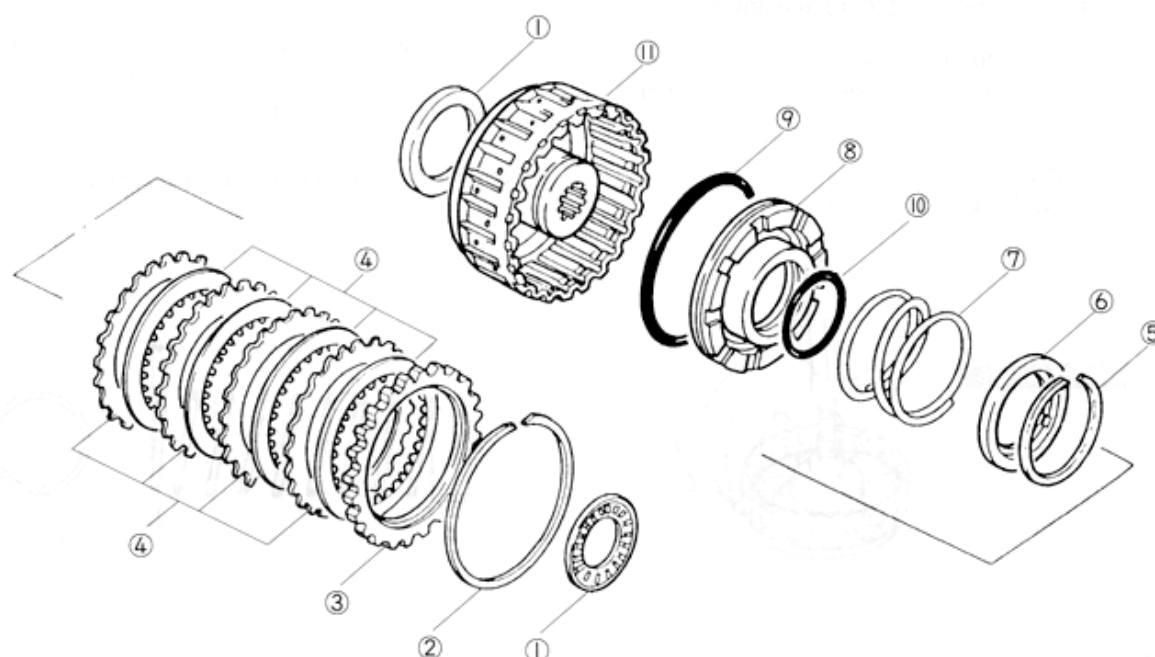


Automatic Transaxle System

Clutch & Brake - The Other & Brake Component



Component



3-4 Clutch

Drive plate	Driven plate
4	4

- (1) Thrust bearings
- (2) Snap ring (Replace if necessary)
- (3) Retaining plate
- (4) Drive and driven plates
- (5) Snap ring
- (6) Spring retainer

- (7) Return spring
- (8) 3-4 clutch piston
- (9) Outer seal (Replace)
- (10) Inner seal (Replace)
- (11) 3-4 clutch drum



Disassembly

Coutch operation

1. Install SST (0K201 190 016) as shown, and check clutch operation by applying compressed air.

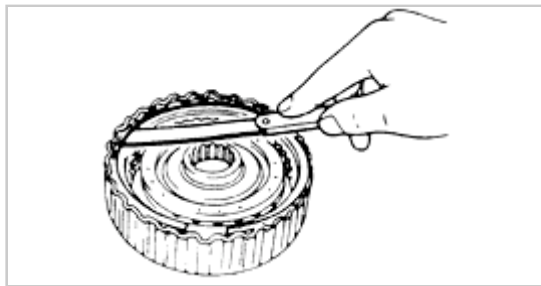
Air pressure : 57 psi (392 kPa, 4.0 kg/cm²) maximum



Clutch clearance

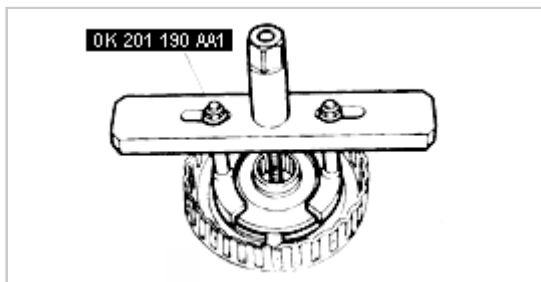
1. Measure clearance between snap ring and retaining plate of 3-4 clutch.
2. If clearance is not within specification, replace parts as necessary.

3-4 clutch clearance : 0.051~0.063 in (1.3~1.6 mm)



Disassembly

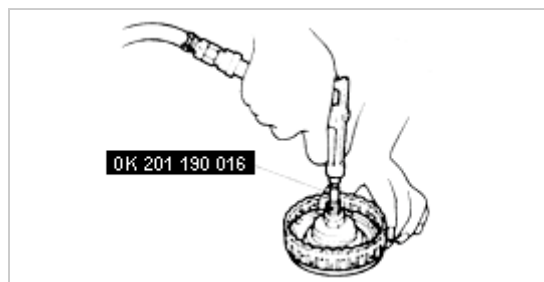
1. Remove two trust bearings.
2. Install SST (0K201 190 AA1) to 3-4 clutch as shown.
3. Compress spring and retainer assembly.
4. Remove snap ring.
5. Remove SST (0K201 190 AA1), then remove spring and retainer.
6. Remove snap ring.
7. Remove retaining plate.
8. Remove drive and driven plates. (each three)



9. Install SST (0K201 190 016) onto 3-4 clutch drum and remove 3-4 clutch piston using compressed air.

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

10. Remove SST (0K201 190 016).
11. Remove outer seal and inner seal 3-4 clutch piston.



Inspection

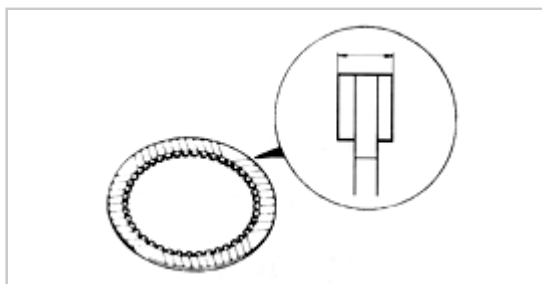
Drive plate

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

Standard : 0.063 in (1.6 mm)

Minimum : 0.055 in (1.4 mm)

2. If not within specification, replace drive plate(s).

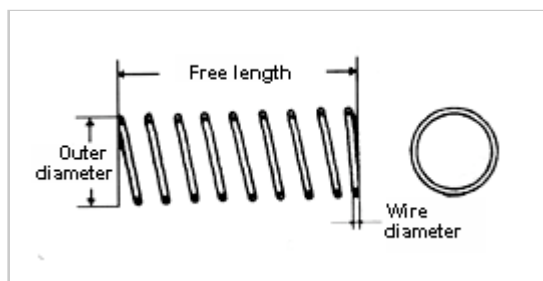


Return spring

1. Measure spring free length.

Specifications			
Outer diameter in (mm)	Free length in (mm)	Number of coils in (mm)	Wire diameter in (mm)
2.929 (74.4)	1.594 (40.5)	1.0	0.197 (5.0)

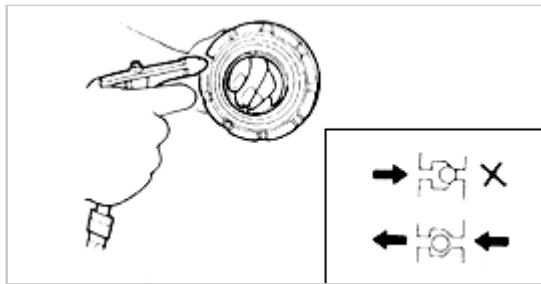
2. If not within specification, replace spring.



3-4 clutch piston

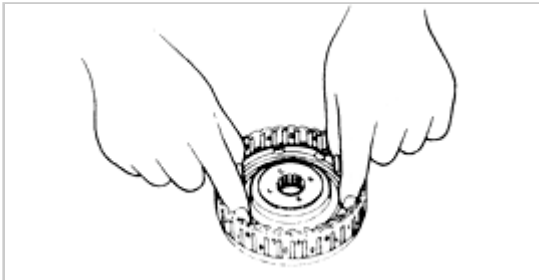
1. Verify that there is not air leakage when applying compressed air through oil hole opposite return spring.
2. Verify that there is air flow when applying compressed air through oil hole on return spring side.

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



Reassembly

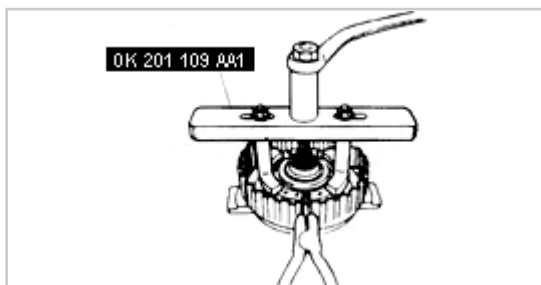
1. Install 3-4 clutch piston.
 - A. Apply ATF to inner and outer seals, and install them onto 3-4 clutch piston.
 - B. Install piston by pushing evenly around circumference, being careful not to damage seal rings.



2. Install return spring and spring retainer.



3. Install SST (0K 201 190 AA1) to 3-4 clutch as shown.
4. Compress return spring and spring retainer.
5. Install snap ring.
6. Remove SST (0K201 190 AA1).

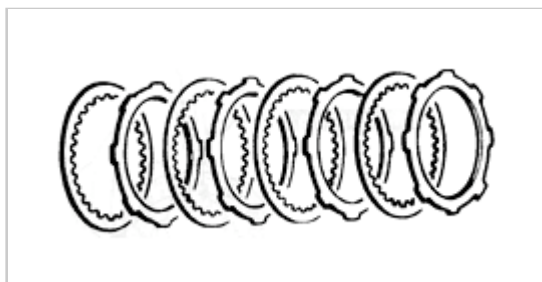


7. Install drive and driven plates. (each three)

NOTICE

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

8. Install retaining plate.
9. Install snap ring.



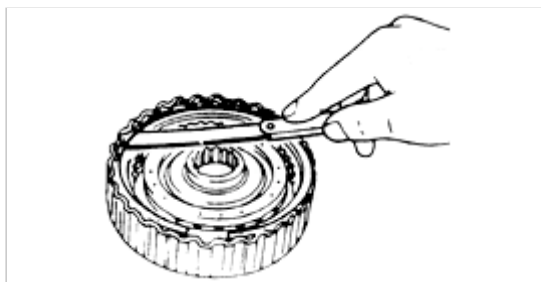
10. Measure 3-4 clutch clearance.

A. Measure clearance between snap ring and retaining plate of 3-4 clutch.

B. If clearance is not within specification, adjust it by selecting correct thickness snap ring.

3-4 clutch clearance : 0.051~0.063 in (1.3~1.6 mm)

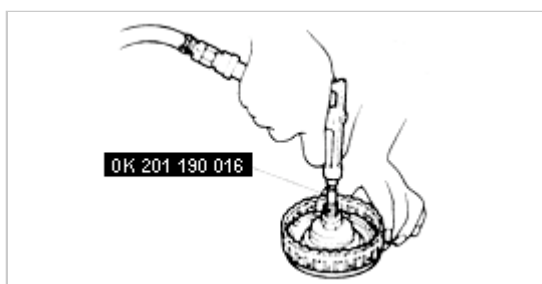
3-4 clutch snap ring size in (mm)		
0.055 (1.4)	0.063 (1.6)	0.071 (1.8)
0.079 (2.0)	0.087 (2.2)	0.134 (3.4)



11. Check clutch operation as follows :

A. Install SST (0K201 190 016) as shown, and check clutch operation by applying compressed air.

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

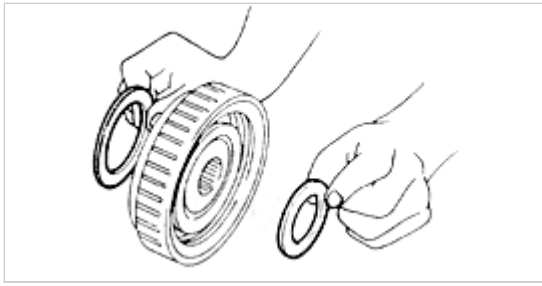


12. Apply petroleum jelly to thrust bearings and secure them to each side 3-4 clutch drum.

Thrust bearing outer diameter

Planetary carrier side : 2.21 in (56.1 mm)

Output shell side : 2.84 in (72.1 mm)



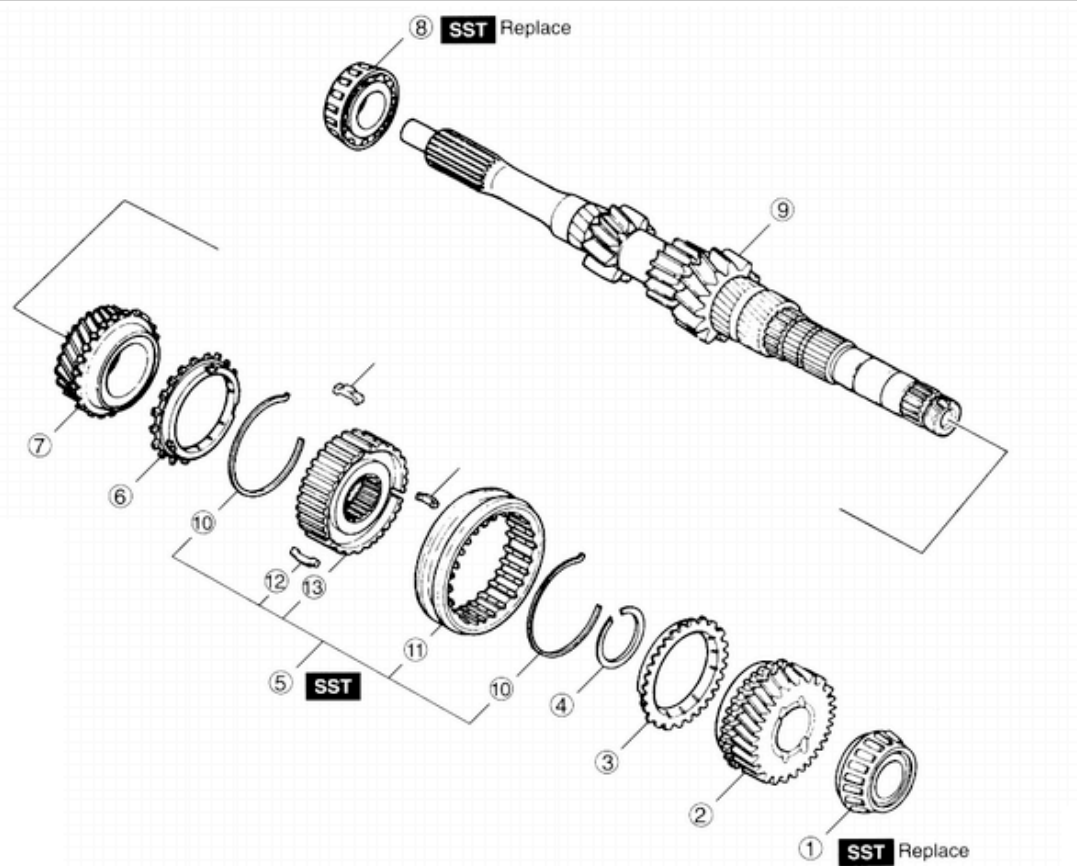


Automatic Transaxle System

Gear System - Input Shaft



Component

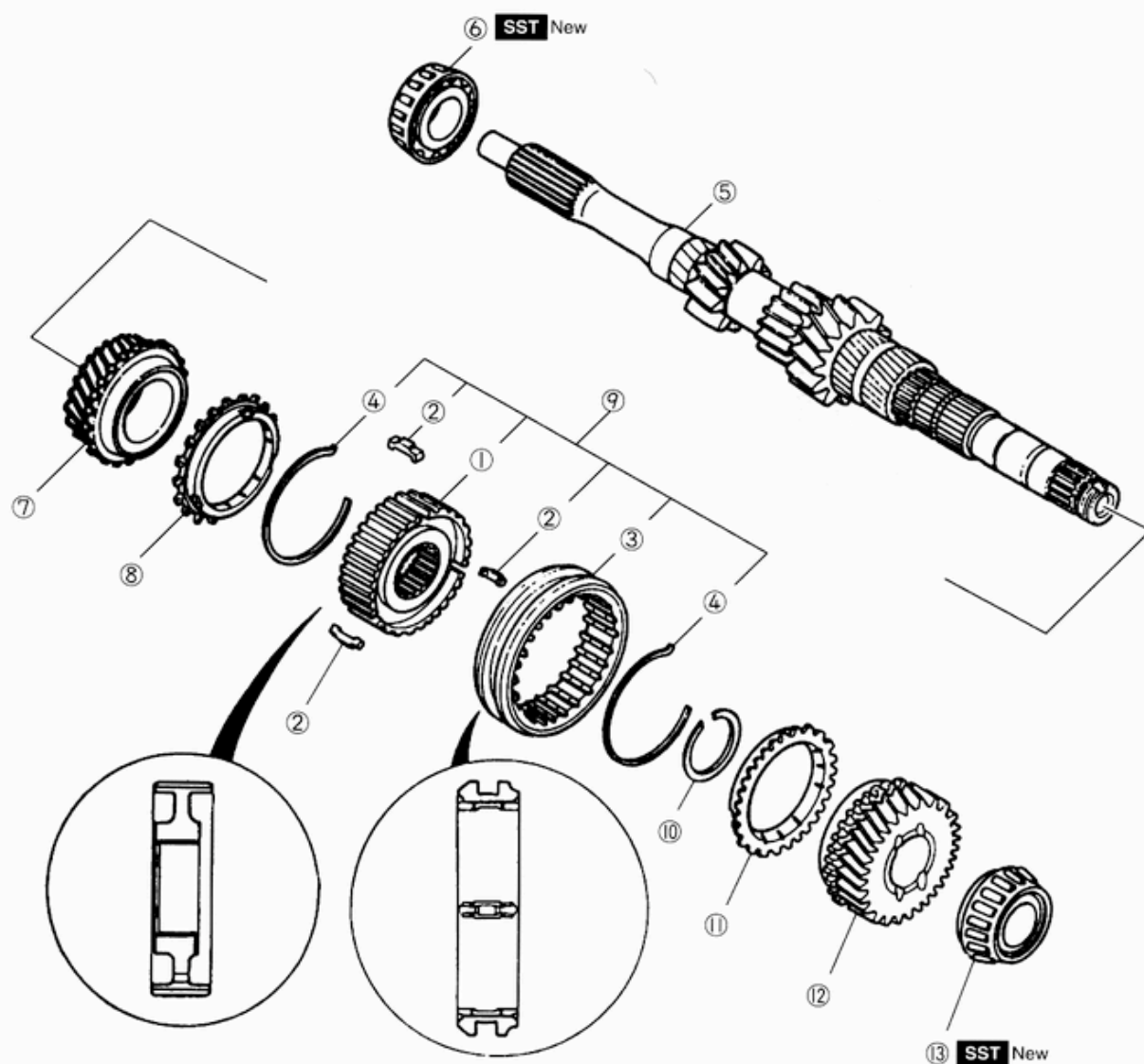


- (1) Bearing (4th gear end)
- (2) Primary 4th gear
- (3) 4th synchronizer ring
- (4) Retaining ring
- (5) 3rd/4th clutch hub assembly
- (6) 3rd synchronizer ring
- (7) Primary 3rd gear

- (8) Bearing (1st gear end)
- (9) Primary shaft
- (10) Synchronizer key spring
- (11) 3rd/4th clutch hub sleeve
- (12) Synchronizer key
- (13) 3rd/4th clutch hub

Component

Apply specified oil to individual parts



- (1) 3rd/4th clutch hub
- (2) Synchronizer key
- (3) 3rd/4th clutch hub sleeve
- (4) Synchronizer key spring
- (5) Primary shaft
- (6) Bearing (1st gear end)
- (7) Primary 3rd gear

- (8) 3rd synchronizer ring
- (9) 3rd/4th clutch hub assembly
- (10) Retaining ring
- (11) 4th synchronizer ring
- (12) Primary 4th gear
- (13) Bearing (4th gear end)



Disassembly

Primary shaft assembly

1. Measure thrust clearance of all gears before disassembly, refer to Preinspection.
2. Disassemble in order shown in figure, refer to Disassembly note.

CAUTION

Check thrust clearance of all gears before disassembly and after assembly.

Preinspection

3rd gear thrust clearance

1. Measure clearance between 3rd gear and 2nd gear.

Clearance : 0.002~0.008 in (0.05~0.20 mm)

Maximum : 0.010 in (0.25 mm)

2. If clearance exceeds maximum check contact surfaces of 3rd gear, 2nd gear and clutch hub(3rd/4th).
Replace worn and damaged parts.



4th gear thrust clearance

1. Measure clearance between 4th gear and ball bearing.

Clearance : 0.007~0.015 in (0.17~0.37 mm)

Maximum : 0.017 in (0.42 mm)

2. If clearance exceeds maximum, check contact surfaces of 4th gear, ball bearing, and clutch hub(3rd/4th).
Replace worn and damaged parts.



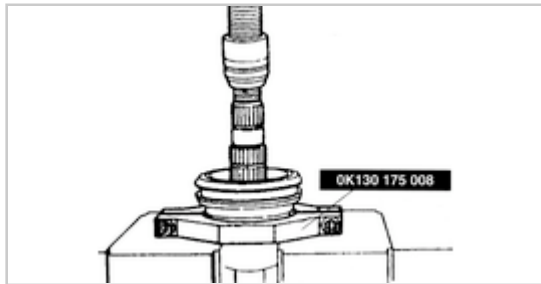
Bearing(4th gear end)

1. Remove bearing by using SST(0K130 171 013).



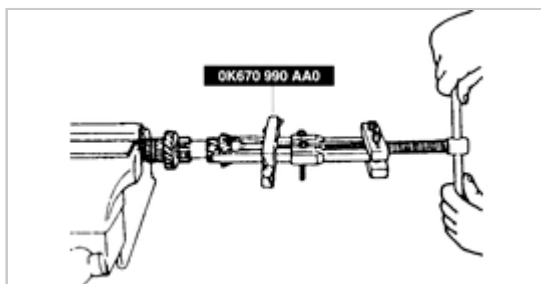
3rd/4th clutch hub assembly, 3rd synchronizer ring and 3rd gear

1. Remove retaining ring.
2. Remove 3rd/4th clutch nub assembly, 3rd synchronizer ring, and 3rd gear by using SST (0K130 175 008).



Bearing (1st end)

1. Remove bearing by using SST(0K670 990 AA0).



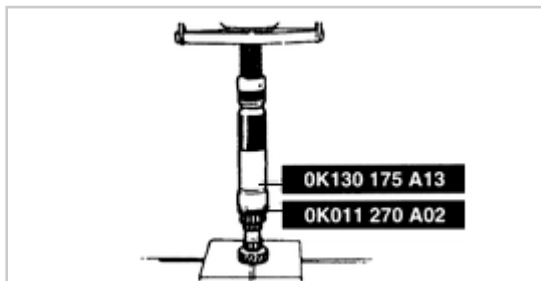
Assembly

Primary shaft assembly

Assemble in order shown in figure, refer to Assembly note.

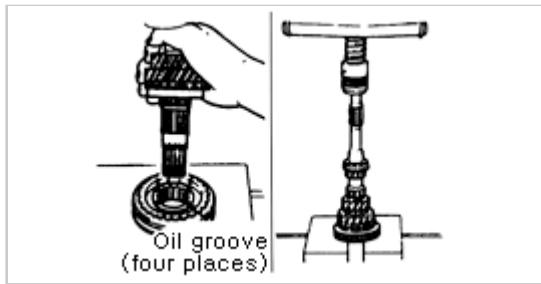
Bearing(1st gear end)

1. Install new bearing by using SST(0K130 A13/0K011 270 A02).



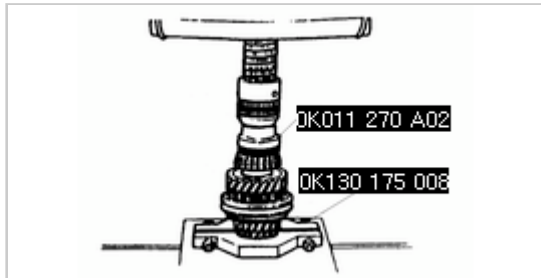
Primary 3rd gear, 3rd synchronizer ring and 3rd/4th clutch hub assembly

1. Install 3rd gear, 3rd synchronizer ring, and 3rd/4th clutch nub assembly.

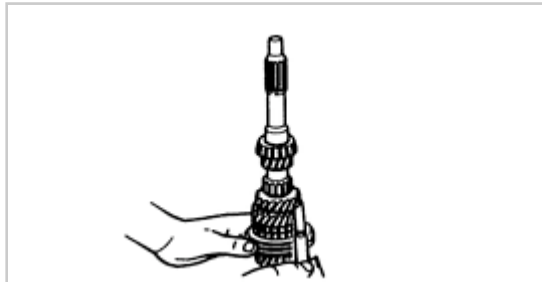


4th synchronizer ring, primary 4th gear and bearing(4th gear end)

1. Install 4th synchronizer ring, 4th gear, and new bearing by using SST(OK130 175 008/OK011 270 A02)



2. Measure clearance between primary 3rd gear and 2nd gear.



Clearance : 0.002~0.009 in (0.05~0.20 mm)
Maximum : 0.010 (0.25 mm)

3. Measure clearance between primary 4th gear and bearing (4th gear end).

Clearance : 0.007~0.015 in (0.17~0.37 mm)
Maximum : 0.017 in. (0.42 mm)

4. If not as specified, disassemble and reassemble primary shaft assembly.



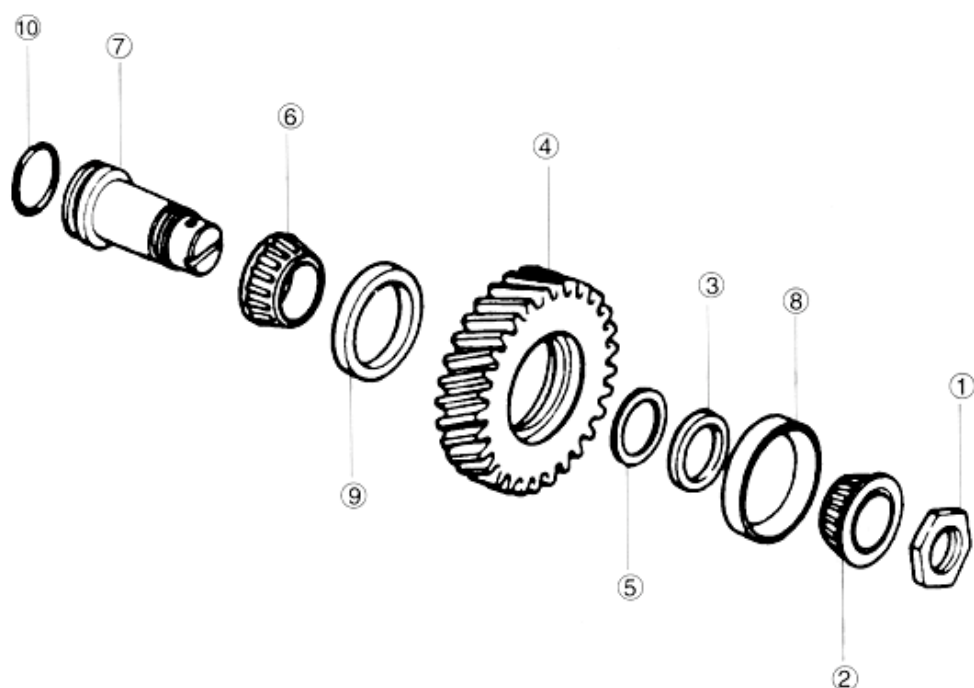


Automatic Transaxle System

Gear System - Idle Gear



Component



- (1) Locknut
- (2) Bearing (Replace)
- (3) Spacer
- (4) Idler gear
- (5) Adjust shim (Replace if necessary)

- (6) Bearing (Replace)
- (7) Idler shaft
- (8) Bearing outer race (Replace)
- (9) Bearing outer race (Replace)
- (10) O-ring (Replace)

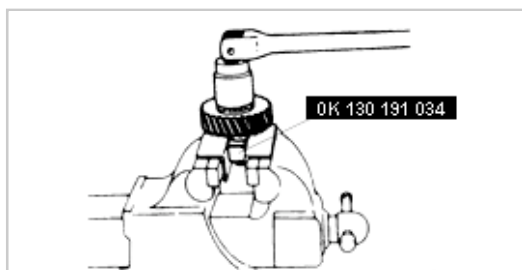


Disassembly

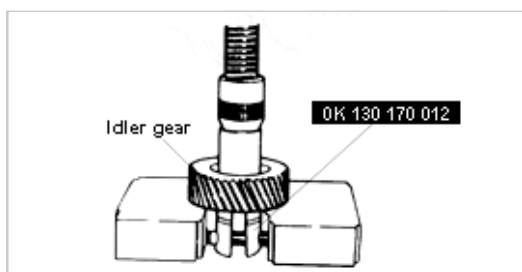
NOTICE

Use protective plates in vise to prevent damage to SST (0K130 191 034).

1. Secure idler shaft in a vise with SST (0K130 191 034), and remove locknut.

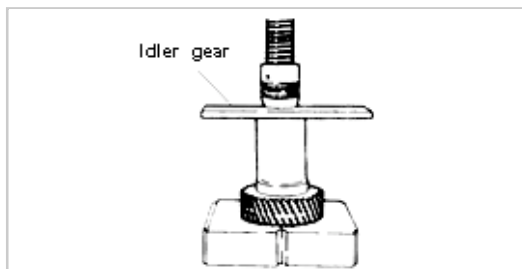


2. Remove bearing outer race from idler gear with SST (0K130 170 012).



Reassembly

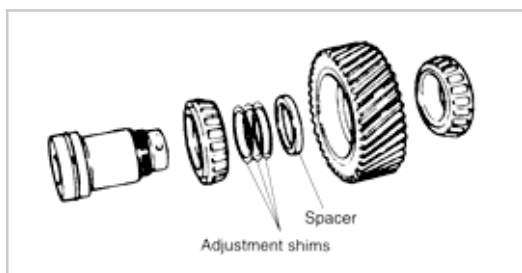
1. Press bearing outer races.



2. Install idler gear bearing onto idler shaft, then install idler gear, adjustment shims, spacer, and bearing.

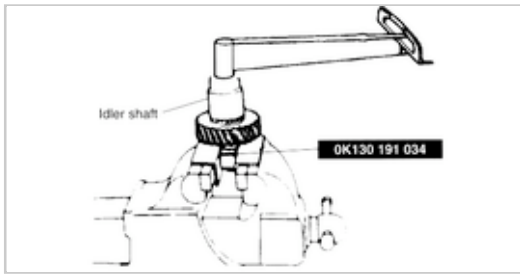
NOTICE

Use protective plates in vise to prevent damage to SST.



3. Secure idler shaft a vise with SST (0K130 191 034) and tighten locknut to lower limit of tightening torque.

Tightening torque : 95~130 lb-ft (128~176 N·m, 13~18 kg-m)



NOTICE

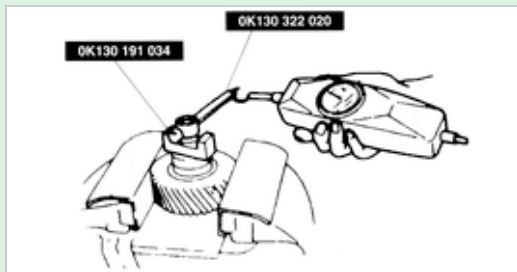
Use protective plates in vise to prevent damage to idler gear.

4. Check and adjust idler gear bearing preload.

- A. Turn idler gear assembly and SST (OK130 191 034) over and secure gear in vise.
- B. Attach SST (OK130 191 034) and spring scale or torque wrench and measure preload while tightening locknut.

NOTICE

- 1) Read preload when idler shaft is rotating.



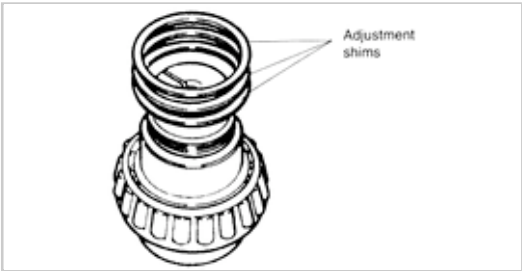
Tightening torque : 95~130 lb-ft (128~176 N·m, 13~18 kg-m)
Preload : 0.27~7.8 lb-in (0.03~0.8 N·m, 0.3~0.9 kg-cm)

- 2) The maximum allowable number of shims is 7.
- 3) Preload is reduced by increasing thickness of shims, or increased by reducing thickness.



5. If specified preload cannot be obtained within specified tightening torque, adjust by selecting proper adjustment shims.

Specifications in (mm)			
0.150 (3.80)	0.152 (3.85)	0.154 (3.90)	0.156 (3.95)
0.158 (4.00)	0.159 (4.05)	0.161 (4.10)	0.163 (4.15)
0.165 (4.20)	0.167 (4.25)	0.169 (4.30)	0.171 (4.35)
0.173 (4.40)	0.176 (4.45)	0.177 (4.50)	0.179 (4.55)
0.181 (4.60)	0.183 (4.65)	0.185 (4.70)	0.187 (4.75)



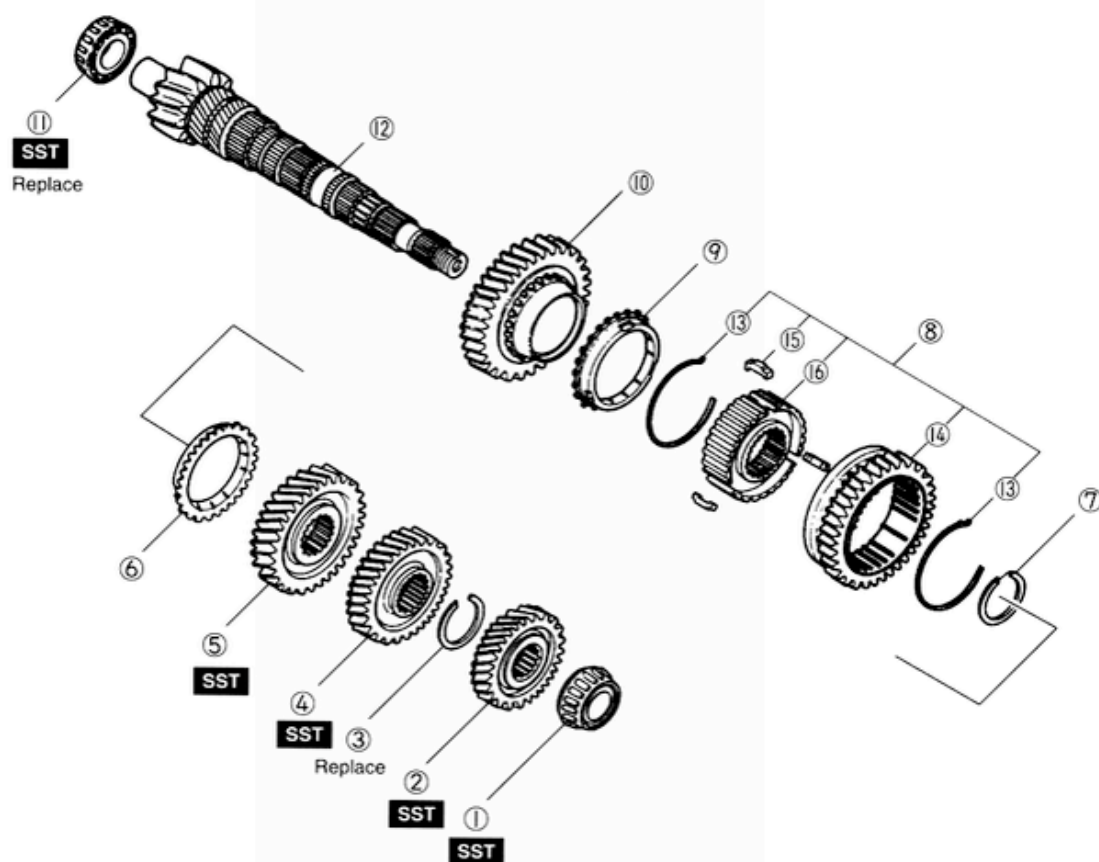


Automatic Transaxle System

Gear System - Output Shaft



Component

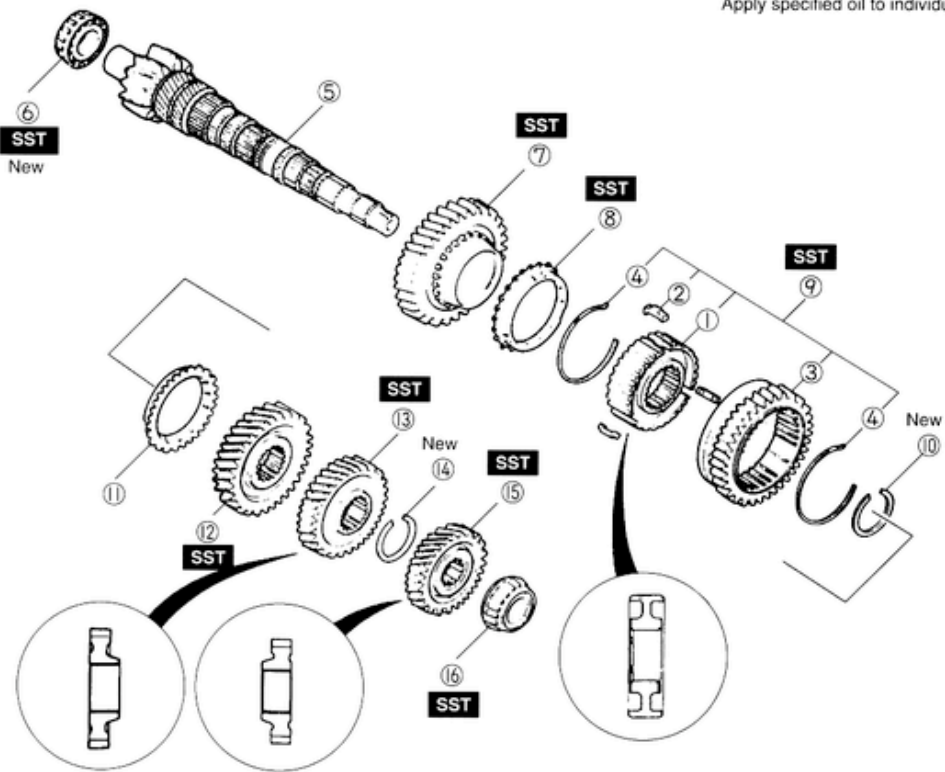


- (1) Bearing (4th gear end)
- (2) Secondary 4th gear
- (3) Retaining ring
- (4) Secondary 3rd gear
- (5) Secondary 2nd gear
- (6) 2nd synchronizer ring
- (7) Retaining ring
- (8) 1st/2nd clutch hub assembly

- (9) 1st synchronizer ring
- (10) Secondary 1st gear
- (11) Bearing (differential drive gear end)
- (12) Secondary shaft
- (13) Synchronizer key spring
- (14) 1st/2nd clutch hub sleeve
- (15) Synchronizer key
- (16) 1st/2nd clutch hub

Component

Apply specified oil to individual parts



- (1) 1st/2nd clutch hub
- (2) Synchronizer key
- (3) 1st/2nd clutch hub sleeve
- (4) Synchronizer key spring
- (5) Secondary shaft
- (6) Bearing (differential drive gear end)
- (7) Secondary 1st gear
- (8) 1st synchronizer ring

- (9) 1st/2nd clutch hub assembly
- (10) Retaining ring
- (11) 2nd synchronizer ring
- (12) Secondary 2nd gear
- (13) Secondary 3rd gear
- (14) Retaining ring
- (15) Secondary 4th gear
- (16) Bearing (4th gear end)



Disassembly

Secondary shaft assembly

1. Measure thrust clearance of 1st gear and 2nd gear before disassembly, refer to Preinspection.
2. Disassemble in order shown in figure, refer to Disassembly note.

Preinspection

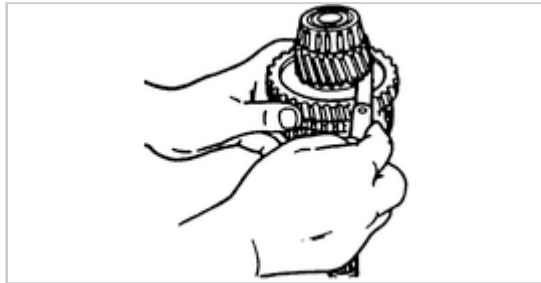
Secondary 1st gear thrust clearance

1. Measure clearance between secondary 1st gear and differential drive gear.

Clearance : 0.002~0.011 in (0.05~0.28 mm)

Maximum : 0.013 in (0.33mm)

2. If clearance exceeds maximum, check contact surfaces of secondary 1st, gear, differential drive gear of secondary shaft, and 1 st/2nd clutch hub assembly.
Replace worn and damaged parts.



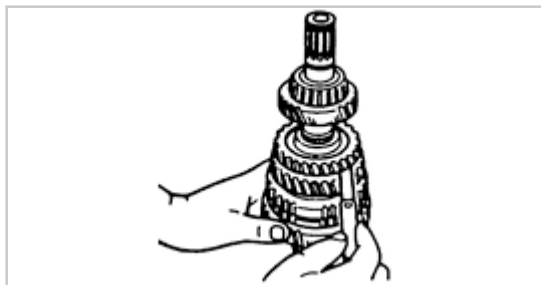
Secondary 2nd gear thrust clearance

1. Measure clearance between secondary 2nd gear and secondary 3rd gear.

Clearance : 0.007~0.018 in (0.18~0.46 mm)

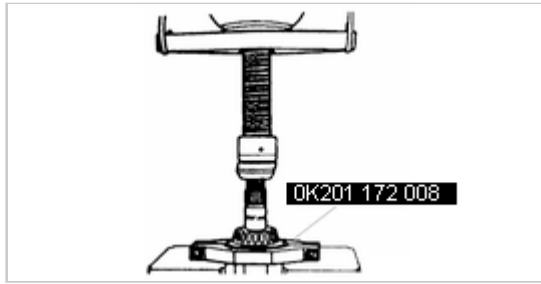
Maximum : 0.020 in (0.54 mm)

2. If clearance exceeds maximum, check contact surfaces of secondary 2nd gear, secondary 3rd gear, and 1st/2nd clutch hub assembly. Replace worn and damaged parts.



Bearing and secondary 4th gear

1. Remove bearing and secondary 4th gear by using SST(0K201 172 008).



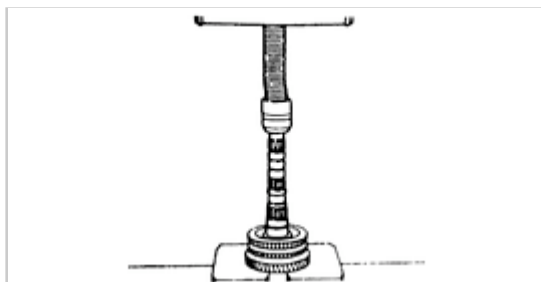
Secondary 3rd gear and Secondary 2nd gear

1. Remove retaining ring.
2. Shift gears to 1st gear.
3. Remove secondary 3rd gear and secondary 2nd gear by using SST(OK201 172 008)



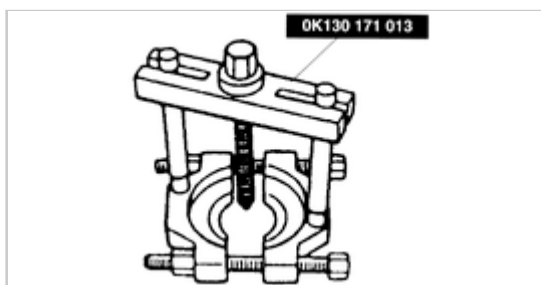
1st/2nd clutch nub assembly, 1st synchronizer ring, and secondary 1st gear

1. Remove retaining ring.
2. Remove 1st/2nd clutch hub assembly, 1st gear synchronizer ring, and secondary 1st gear using press.



Bearing (differential drive gear end)

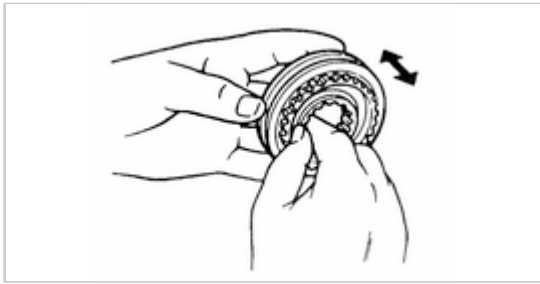
1. Remove bearing by using SSTs.



Disassembly

Clutch hub assembly

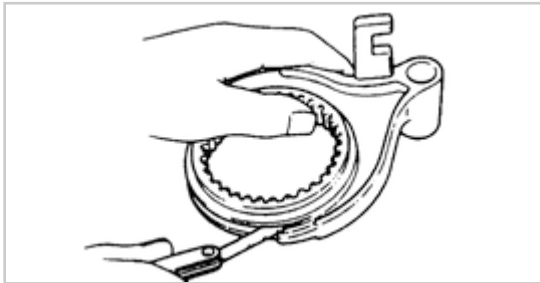
1. Inspect clutch hub sleeve and bun operation.
2. Inspect gear teeth for damage, wear, and cracks.
3. Inspect synchronizer keys for damage, wear and cracks.



4. Measure clearance between clutch nub sleeves and shift forks.

Clearnace

	Standard (in (mm))	Maximum (in(mm))
1st/2nd	0.004~0.018 (1.01~0.45)	0.037(0.95)
3rd/4th	0.004~0.016(0.10~0.40)	0.035(0.90)
5th/Rev.	0.004~0.014(0.10~0.36)	0.034(0.86)

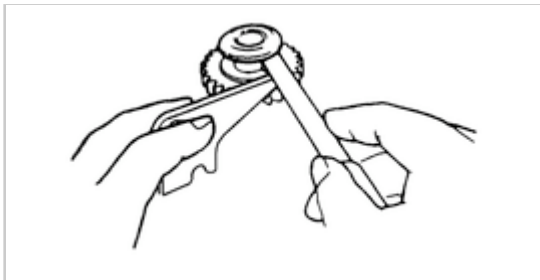


Reverse idle gear and reverse lever

1. Inspect gear teeth for damage, wear and cracks.
2. Measure clearance between reverse idle gear bushing and reveese lever.

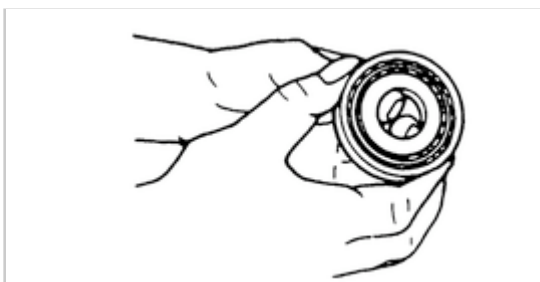
Standard clearance : 0.011~0.013 in (0.28~0.3 mm)

Maximum : 0.020 9n (0.5 mm)



Bearing

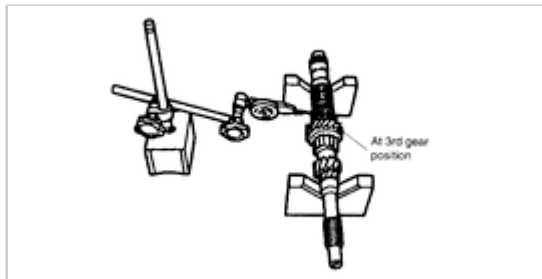
1. Inspect for damage and rough rotation.



Primary shaft and ssecondary shaft

1. Inspect gear contact surface for damage and wear.
2. Inspect splines for damage and wear.
3. Inspect gear teeth for damage, wear and cracks.
4. Inspect oil passenger for clogging.
5. Measure primary and secondary shaft runout.

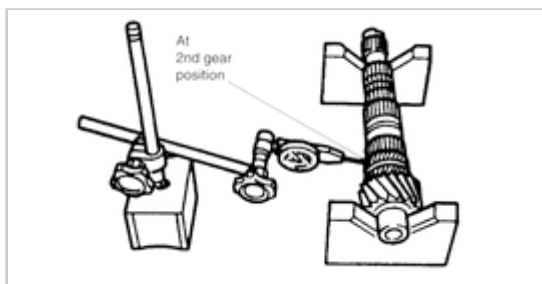
Primary shaft runout : 0.002 in (0.05 mm) max.



Secondary shaft runout : 0.0006 in (0.015 mm) max.

NOTICE

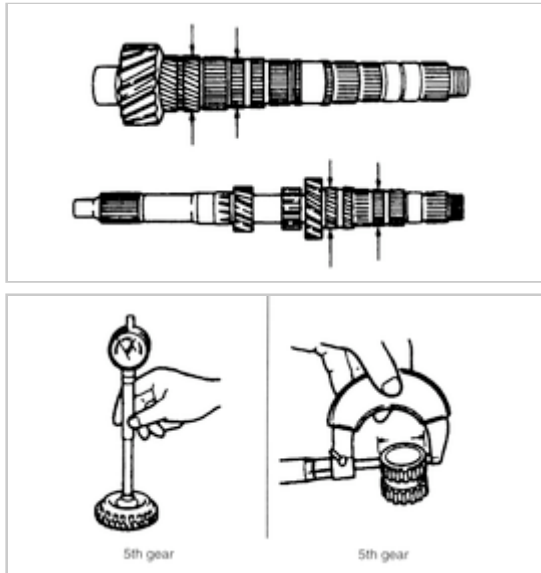
If shaft is replaced, adjust bearing preload.



6. Determine Clearance between shafts and gears.

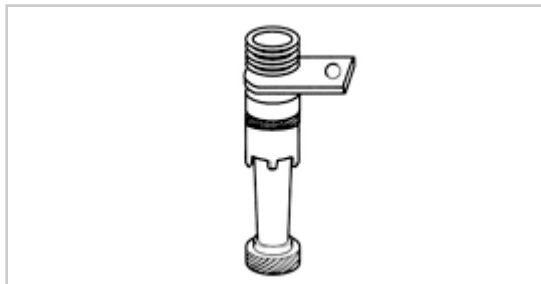
Clearance (in (mm))

	Shaft (Outer dia.)	Gear (Linner dia.)	Sleeve (Outer dia.)	Clearance
1st	1.553~1.554 (39.445~39.470)	1.555~1.556 (39.500~39.525)	-	0.001~0.003 (0.03~0.08)
2nd	1.376~1.377 (34.945~39.970)	1.378~1.379 (35.000~35.025)	-	
3rd	1.415~1.416 (30.945~30.970)	1.417~1.418 (36.000~36.025)	-	
4th	1.218~1.219 (30.945~30.970)	1.221~1.222 (31.000~31.025)	-	
5th	-	1.339~1.40034. (34.000~34.025)	1.336~1.337 (33.945~33.970)	



Vehicle speed sensor (speedometer driven gear)

1. Inspect teeth for damage and wear.
2. Inspect O-ring for damage and wear.



Inspection

NOTICE

Inspect all parts and repair or replace as necessary.

Gears

1. Inspect synchronizer cones for wear.
2. Inspect gear teeth for damage, wear and cracks.
3. Inspect synchronizer ring matching teeth for damage and wear.



Synchronizer ring

1. Inspect synchronizer ring teeth for damage, wear and cracks.
2. Inspect tapered surface for wear and cracks.



3. Set synchronizer ring squarely in gear.
4. Measure clearance between synchronizer ring and flank surface of gear.

Standard clearance : 0.059 in (1.5 mm)

Minimum : 0.031 in (0.8 mm)

Secondary shaft assembly

Assembly Precaution

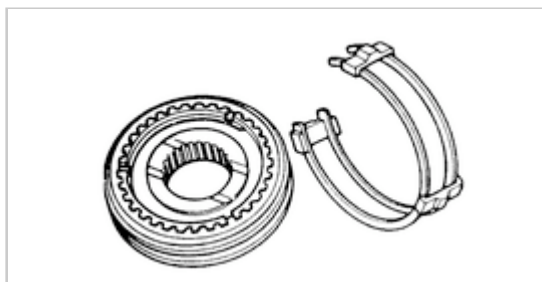
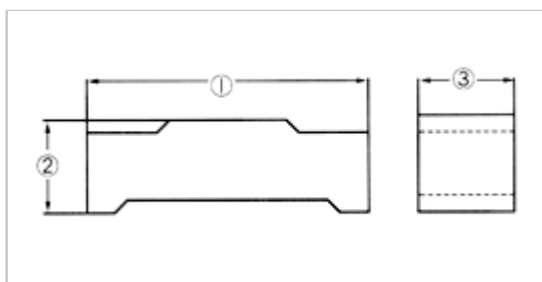
1. Replace all O-rings and gaskets.
2. Verify that all parts are completely clean before assembly.
3. Assemble parts within 10 minutes after applying sealant. Allow all sealant to cure for at least 30 minutes after assembly before filling transaxle with oil.
4. Replace bearing races and bearings as sets.

Assemble in order shown in figure, refer to Assembly note.

Clutch hub Assembly note

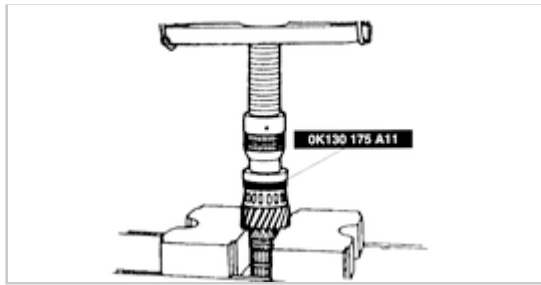
	①	②	③
1st/2nd	0.748 (19.0)	0.167(4.25)	0.197(5.0)
3rd/4th 5th/Rev.	0.669(17.0)	0.167(4.25)	0.197(5.0)

1. Install synchronizer keys and springs in clutch hub.



Bearing (differential drive gear end)

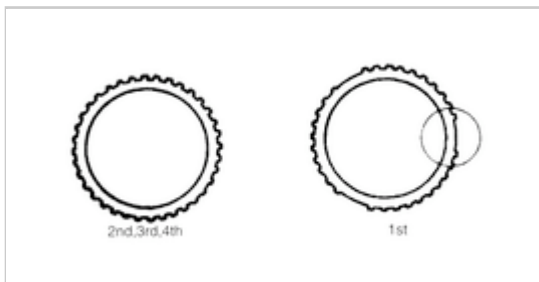
1. Install new bearing by using SST(0K130 175 A11).



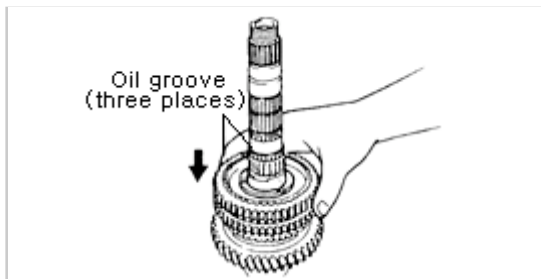
Secondary 1st gear, 1st synchronizer ring and 1st/2nd clutch nub assembly

NOTICE

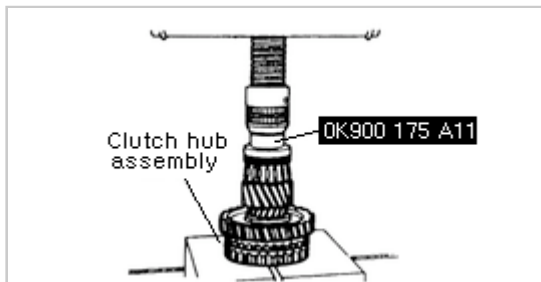
The 1st synchronizer ring has teeth missing at three places around its outer edge to help distinguish it from other synchronizer rings.



1. Assemble secondary 1st gear, 1st synchronizer ring, and 1st/2nd clutch nub assembly as shown in figure.
2. Align synchronizer ring grooves and synchronizer keys.

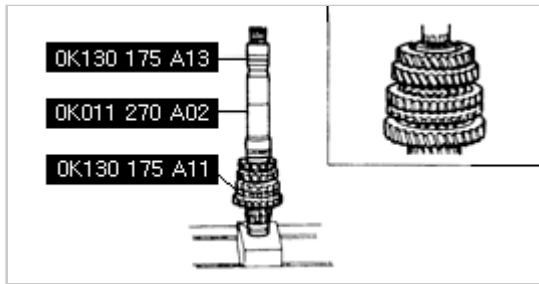


3. Press on 1st/2nd clutch nub assembly by using SST(0K990 175 A11)



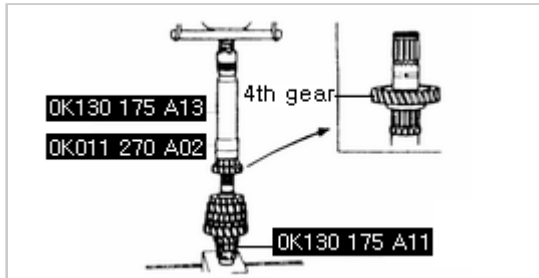
2nd synchronizer ring, 2nd gear and secondary 3rd gear

1. Install 2nd synchronizer ring and secondary 2nd gear.
2. Install secondary 3rd gear by using SST(0K130 175 A13/0K011 270 A02/0K130 175 A11).



Secondary 4th gear and bearing

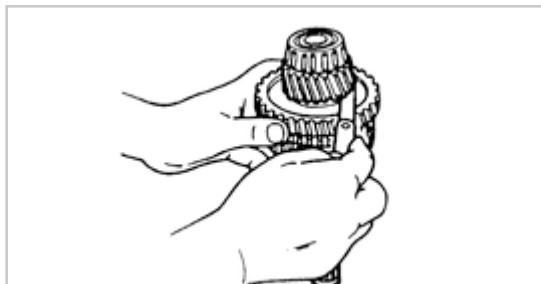
1. Install secondary 74th gear and bearing by using SST(OK130 175 A13/OK011 270 A02/OK130 175 A11).



2. Measure clearance between 1st gear and differential drive gear.

Clearance : 0.002~0.011 in (0.05~0.28 mm)

Maximum : 0.013 in (0.33 mm)



3. Measure clearance between secondary 2nd gear and secondary 3rd gear.

Clearance : 0.007~0.018 in (0.18~0.46 mm)

Maximum : 0.020 in (0.51 mm)

4. If not as specified, disassemble and reassemble secondary shaft assembly.



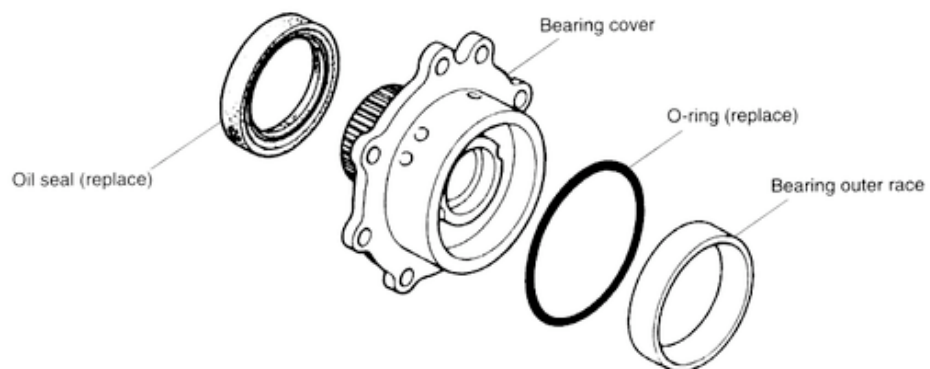


Automatic Transaxle System

Gear System - Bearing Cover Assembly



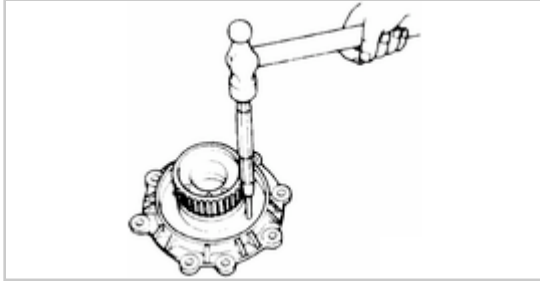
Component





Disassembly

1. Remove oil seal.
2. Remove bearing outer race with a pin punch and hammer as shown.
3. Remove O-ring.



Reassembly

1. Apply ATF to new O-ring and install O-ring.
2. Press bearing outer race into the cover.
3. Press new oil seal into bearing cover with SST (OK201 190 017).



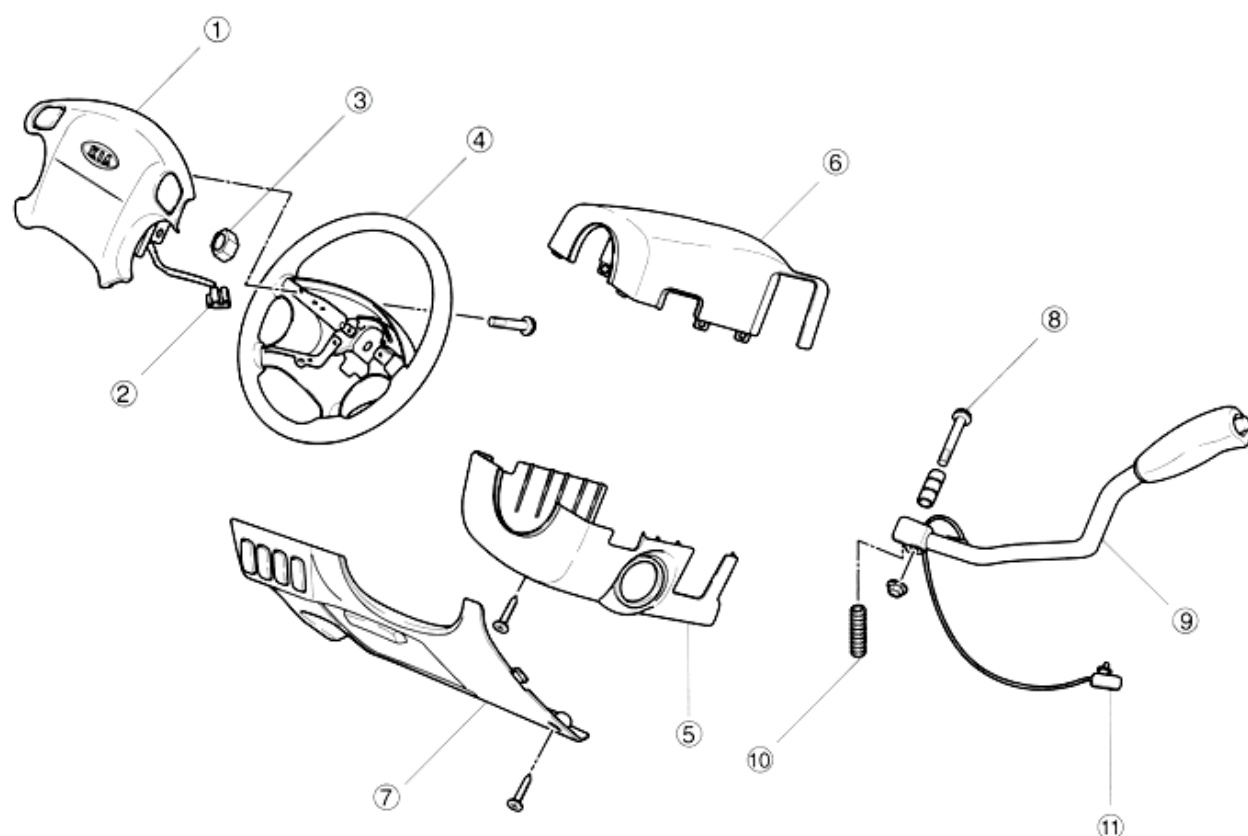


Automatic Transaxle System

Automatic Transaxle Control System - Shift Lever



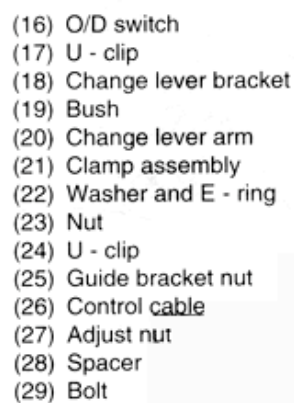
Component



- (1) Air Bag module
- (2) Horn switch and air bag module connector
- (3) Retaining nut
- (4) Steering wheel
- (5) Lower steering column
- (6) Upper steering column

- (7) Under cover
- (8) Bolt
- (9) Change lever
- (10) Return spring
- (11) O/D switch

Component





Shift mechanism

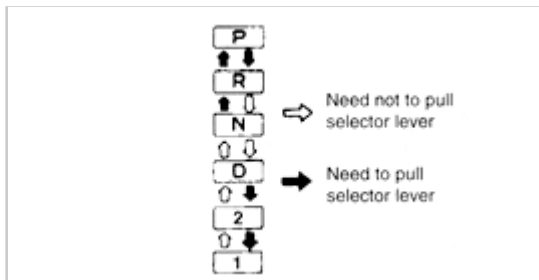
Selector lever

Operation inspection

NOTICE

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

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

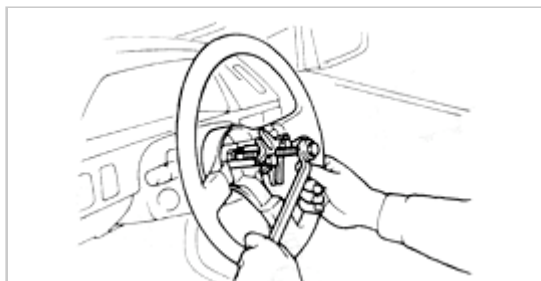


Removal

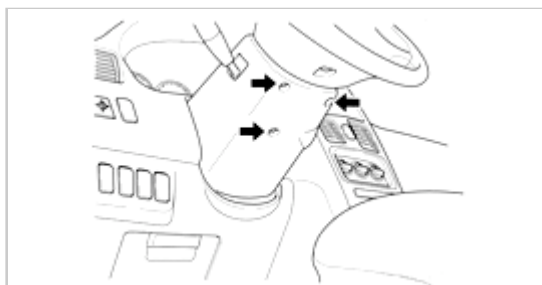
1. Disconnect negative battery cable.
2. Place vehicle in the straight forward position.
3. Loosen four air bag module bolts from steering wheel and remove driver's air bag module.
4. Disconnect horn switch and air bag module connector.
5. Mark an alignment on steering wheel and steering shaft for proper installation.
6. Remove retaining nut and snap ring from the end of steering shaft.
7. Remove steering wheel with a suitable puller.

NOTICE

Do not remove steering wheel by hitting end of shaft with a hammer. Damage to shaft threads and shaft support bearings could occur.



8. Remove three lower steering column panel screws and separate upper and lower steering column panels.



9. Remove two undercover bolts after loosening parking cable puller nut and then disconnect two connectors.
10. Remove change lever and return spring after loosening bolt, nut and two retainer rings.
11. Disconnect O/D switch attached to column shaft bracket.

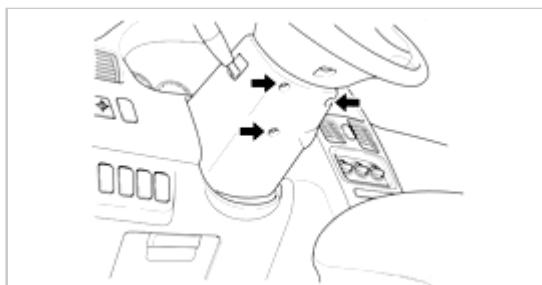
Installation

1. Connect O/D switch to column shaft bracket.
2. Put return spring into the groove of shift lever arm and then install change lever with bolt, nut and two retainer rings.

Tightening torque : 5.1~7.2 lb-ft (6.8~9.8 N·m, 0.7~1.0 kg-m)

3. Tighten two undercover bolts after installing parking cable puller and connecting two harness connectors.
4. Tighten three lower steering column panel screws after installing upper and lower steering column panels.

Tightening torque : 12~17 lb-ft (16~23 N·m, 1.6~2.3 kg-m)



5. Align mark and install properly steering wheel to column shaft.
6. Insert snap ring and install retaining nut.

Tightening torque - Nuts : 29~36 lb-ft (39~49 N·m, 4~5 kg-m)

7. Connect horn switch and air bag module connector.
8. Install air bag module steering wheel and tighten four bolts.
9. Connect (-) terminal of battery.

Disassembly

Select lever & control cable

1. Disconnect negative battery cable.
2. Place vehicle in a straight forward position.
3. Loosen four air bag module bolts from steering wheel and remove driver's air bag module.
4. Disconnect horn switch and air bag module connector.
5. Mark an alignment mark on steering wheel and steering shaft for proper installation.

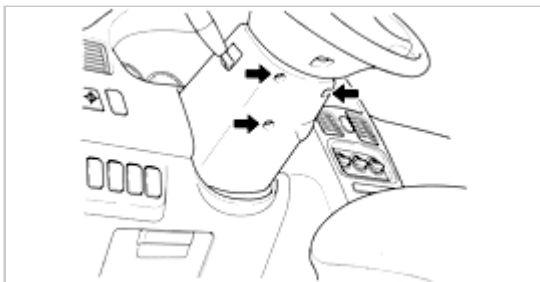
6. Remove retaining nut and snap ring from the end of steering shaft.
7. Remove steering wheel with a suitable puller.

NOTICE

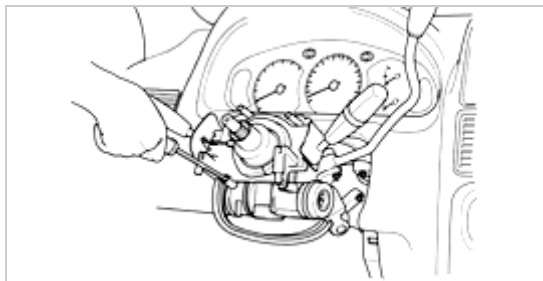
Do not remove steering wheel by hitting end of shaft with a hammer. Damage to shaft threads and shaft support bearings could occur.



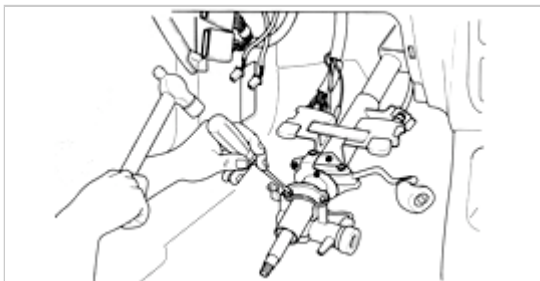
8. Remove three lower steering column panel screws and separate upper and lower steering column panels.



9. Remove two undercover bolts after loosening parking cable puller nut then disconnect two connectors.
10. Remove clock spring after loosening three clock spring screws.
11. Remove combination switch after disconnecting two combination switch connectors.

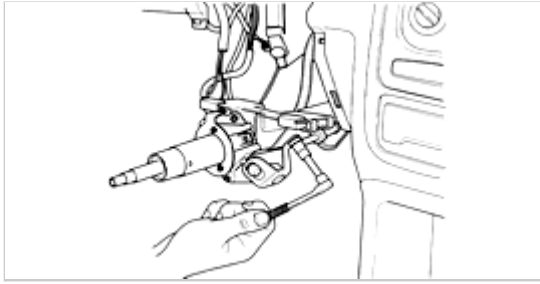


12. Rigidly support steering wheel lock portion of column, and use a chisel to make a groove (screwdriver slot) in head of two steering lock bolts.

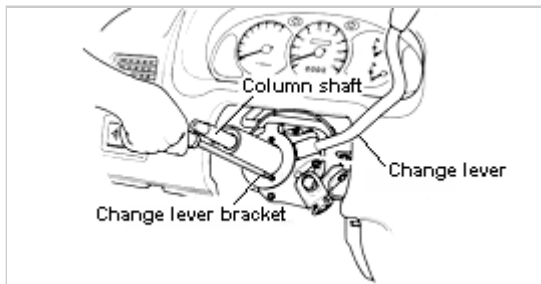


13. Remove the steering lock after loosening two bolts.
14. Remove change lever and retrun spring after loosening bolt, nut and two retainer rings.
15. Disconnect O/D switch attached to column shaft bracket.
16. Remove control cable from clamp assembly after loosening control cable nut then remove U-clip from

column shaft bracket.



17. Remove change lever bracket, change lever arm and bush after loosening three screws.



18. Remove clamp assembly from column shaft after loosening three bolts.
19. Separate clamp assembly after removing washer and E-ring.
20. Remove U-clip from selector cable to auto transaxle linkage.
21. Remove nut and washer from auto transaxle linkage.
22. Remove guide bracket after loosening two nuts.

Reassembly

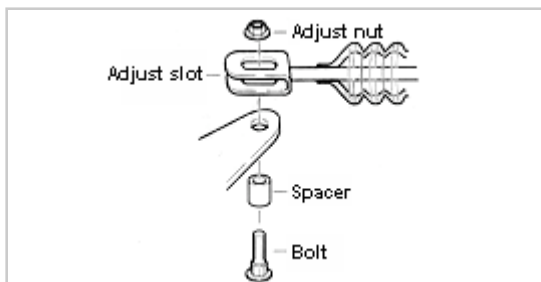
Select lever & Control cable

1. Install guide bracket and tighten two nuts.

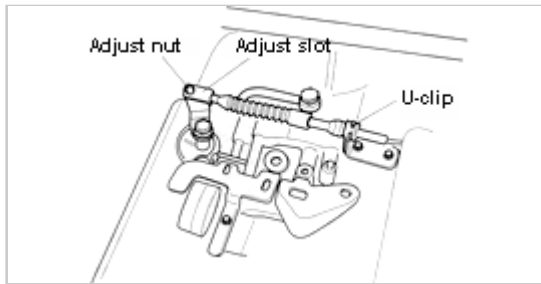
Tightening torque : 69.4~95.9 lb-in (7.8~10.8 N·m, 0.8~1.1 kg-m)

2. Install spacer and bolt into adjust slot and then tighten adjust nut after inserting U-clip.

Tightening torque : 69.4~95.9 lb-in (7.8~10.8 N·m, 0.8~1.1 kg-m)



3. Install washer and nut to auto transaxle linkage and tighten nut.

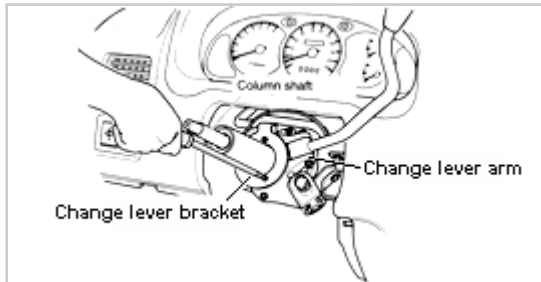


Tightening torque : 24~83 lb-ft (32~46 N·m, 3.2~4.7 kg-m)

4. Assemble clamp assembly with washer and E-ring and then insert it into the column shaft and tighten three bolts.
5. Insert U-clip to fix control cable to column shaft bracket.
6. Install clamp assembly to control cable and tighten bolt and nut.

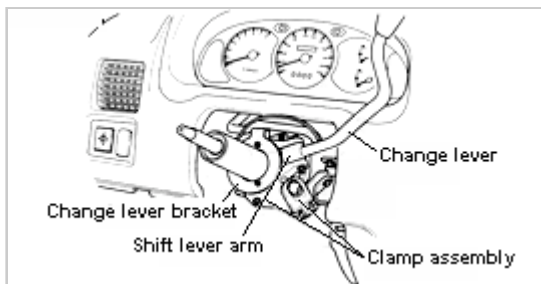
Tightening torque : 69.4~95.9 lb-in (7.8~10.8 N·m, 0.8~1.1 kg-m)

7. Insert shift lever arm, change lever bracket and bush in column shaft and tighten three screws.

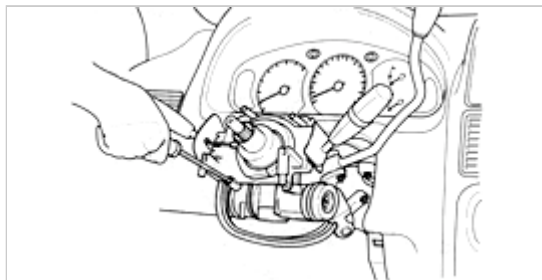


8. Put return spring into the groove of shift lever arm and then install change lever with bolt and nut.

Tightening torque : 5.1~7.2 lb-ft (6.8~9.8 N·m, 0.7~1.0 kg-m)



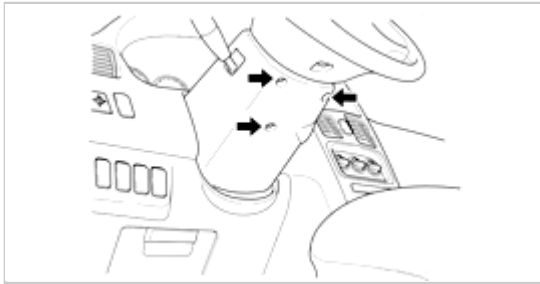
9. Install new steering lock mounting bolts, and tighten them until heads break OFF.
10. Install combination switch after connecting two combination switch connector.



11. Install clock spring (refer to section Air bag system).

12. Tighten two undercover bolts after installing parking cable puller and connecting two harness connectors.
13. Tighten three lower steering column panel screws after installing upper and lower steering column panels.

Tightening torque : 12~17 lb-ft (16~23 N·m, 1.6~2.3 kg-m)



14. Align mark and install properly steering wheel to column shaft.
15. Insert snap ring and install retaining nut.

Tightening torque : 29~36 lb-ft (39~49 N·m, 4~5 kg-m)

16. Connect horn switch and air bag module connector.
17. Install air bag module steering wheel and tighten four bolts.
18. Connect (-) terminal of battery.



Automatic Transaxle System

Automatic Transaxle Control System - Overdrive Switch



Inspection

Operation inspection

1. Turn ignition switch ON.
2. Verify that the O/D OFF indicator light is not illuminated. Depress O/D OFF switch and verify that the O/D OFF indicator light illuminates.
3. If O/D OFF indicator light does not operate, continue with inspection of voltage test.

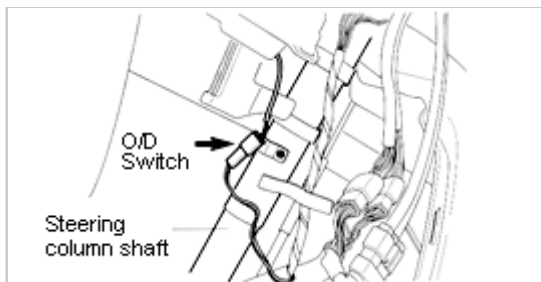
Voltage

1. Remove undercover. (Refer to section Steering system)
2. Turn ignition switch ON.
3. Measure voltage at O/D switch connector H-02.

Position	Connector terminal	
	a	b
Normal (V)	B+	0
Depressed (V)	0	0

B+ : Battery Positive Voltage

4. If not as specified, check for continuity at O/D switch.



Continuity inspection

1. Disconnect negative battery cable.
2. Disconnect O/D switch connector.
3. Check for continuity at O/D switch H-02.

Position	Connector terminal	
	a	b
Normal		
Depressed	○	○

○ ○: Continuity

4. Replace selector lever if not as specified. (refer to removal and replacement)
5. Check wiring harness for continuity if switch is operating correctly (O/D switch to transaxle control module, O/D switch to body ground).
6. Connect O/D switch connector.
7. Install undercover. (Refer to section steering system)
8. Connect negative battery cable.





Automatic Transaxle System

Automatic Transaxle Control System - Turbine Speed Sensor



Inspection

Input/Turbine speed sensor

Resistance inspection

1. Disconnect negative battery cable.
2. Pull data link connector upward from MAF sensor.
3. Disconnect air temperature sensor connector and MAF sensor connector.
4. Remove air cleaner assembly.
5. Disconnect input/turbine speed sensor connector.
6. Measure resistance between terminals 1 and 2.

Resistance : $360 \pm 30 \Omega$ (20°C)



7. If not as specified, replace input/turbine speed sensor.

Tightening torque : 69.6~94.8 lb-in (8~11 N·m, 80~110 kg-cm)

8. Install air cleaner assembly.
9. Connect air temperature sensor connector and MAF sensor connector.
10. Install data link connector to MAF sensor.
11. Connect negative battery cable.



Automatic Transaxle System

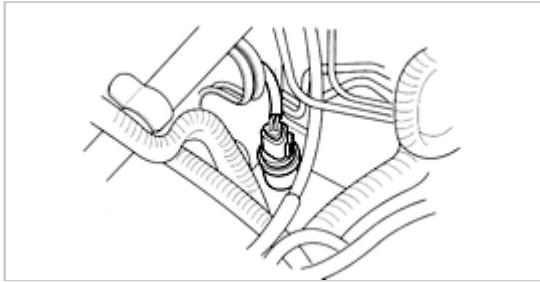
Automatic Transaxle Control System - Output Shaft
Speed Sensor



Inspection

Voltage inspection

1. Turn ignition to ON and use a voltmeter to back probe pin. 1.
2. Have an assistant rotate one drive wheel, checking other drive wheel, if necessary. This will rotate vehicle speed sensor.
3. Voltmeter reading should alternate between approximately 1 and 10 volts.
4. If this requirement is not met, replace vehicle speed sensor.





Automatic Transaxle System

Automatic Transaxle Control System - Transaxle Control Module



Transaxle control module (TCM)

TCM terminal voltage chart

Terminal	Signal	Connected to	Test condition		Voltage	Possible malfunction
H-01/1	-	-	-		-	-
H-01/2	-	-	-		-	-
H-01/3	-	-	-		-	-
H-01/4	Torque converter clutch solenoid control	Torque converter clutch solenoid	During shifting		B+	Torque converter clutch solenoid valve, refer solenoid valve.
			Others		0	
H-01/5	Linear solenoid valve	Linear solenoid valve	IG switch ON		0	Refer linear solenoid valve
			Idle		Approx. 4.8	
H-01/6	TCM Ground	Ground	Constant		0	
H-01/7	-	-	-		-	-
H-01/8	D range	Transaxle range switch (D range)	Idle	D range	B+	Refer to transaxle range switch
				Others	0	
H-019	-	-	-		-	-
H-01/10	Brake	Brake pedal position switch	Brake pedal released		0	
			Brake pedal depressed		B+	
H-01/11	-	-	-		-	-
H-01/12	Test	Data link connector, terminal "n"	Ignition switch ON	Open terminal "18"	B+	
				Short terminal "18"	0	
H-01/13	-	-	-		-	-
H-01/14	-	-	-		-	-
H-01/15	-	-	-		-	-
H-01/16	Input/turbine speed sensor	Input/turbine speed sensor	Ignition switch ON		Approx. 2.3	Refer to Input/turbine speed sensor
			Idle		Approx. 2.5	
H-01/17	O/D indicator light control	O/D OFF indicator light	Ignition switch ON	O/D OFF mode	0	Refer to instrument cluster O/D OFF indicator refer to O/D switch
				other	B+	
H-01/18	Load/No load distinction	Transaxle range switch	Ignition switch ON	A/T other than P or N position	B+	
				A/T P or N	0	
H-01/19	-	-	-		-	-

H-01/20	-	-	-		-	-
H-01/21	Transaxle fluid temperature	Transaxle fluid temperature sensor (Ground)	Constant			Refer to ATF sensor
H-01/22		Transaxle fluid temperature sensor	Ignition switch ON	Transaxle fluid temperature 20°C (68°F)	Approx. 5.0	
				Transaxle fluid temperature 130°C (266°F)	Approx. 1.5	
H-01/23	Input/turbine speed sensor	Input/Turbine speed sensor (Shield ground)	Constant		0	
H-01/24	-	-	-		-	-
H-01/25	Fail	Data link connector "m"	If malfunction present		0~B+	
H-01/26	Power supply	Battery	Constant		B+	TCM H-01-26 terminal to battery harness and connector
H-01/27	-	-	-		-	-
H-01/28	TCM ground	Ground	Constant		0	
H-01/29	-	-	-		-	-
H-01/30	Shift solenoid A control	Shift solenoid A	During shifting		B+	Refer to solenoid valves
			Others		0	
H-01/31	-	-	-		-	-
H-01/32	Shift solenoid C control	Shift solenoid C	During shifting		B+	Refer to solenoid valve
			Others		0	
H-01/33	Shift solenoid B control	Shift solenoid B	During shifting		B+	
			Others		0	
H-01/34	TCM ground	Ground	Constant		0	
H-01/35	-	-	-		-	-
H-01/36	2 range	Transaxle range switch (2 range)	Idle	2 range	B+	Refer to transaxle range switch
				Others	Below 0	
H-01/37	1 range	Transaxle range switch (1 range)	Idle	1 range	B+	
				Others	Below 0	
H-01/38	Throttle position	ECM "38" (37) *1 terminal	Idle	Throttle valve fully closed	Duty 90%	
				Throttle valve fully open	Duty 19&	
H-01/39	-	-	-		-	-

H-01/40	Engine rpm	ECM "47" (43) *1 terminal	Idle	Approx. 8.0~8.5	
H-01/41	Torque signal	ECM "68" (13) *1 terminal	Idle	Approx. 1.5~1.8	
H-01/42	Vehicle speed	Vehicle speed sensor	Ignition switch ON Driving	B+ 0~B+	Refer to ETM
H-01/43	-	-	-	-	-
H-01/44	Input/turbine speed sensor ground	Input/turbine speed sensor (ground)	Constant	Below 2.5	TCM H-01/16 terminal continuity harness
H-01/45	O/D switch	O/D switch	Ignition switch ON	O/D OFF switch pressed 0 O/D OFF switch released B+	Refer to O/D switch
H-01/46	-	-	-	-	-
H-01/47	-	-	-	-	-
H-01/48	-	-	-	-	-
H-01/49	-	-	-	-	-
H-01/50	K line	Data link connector "K"	Ignition switch ON Idle	B+ B+	
H-01/51	Torque reduction	ECM "85" (42) *1 terminal	Ignition switch ON Idle	Approx. 5 Approx. 5	
H-01/52	-	-	-	-	-
H-01/53	-	-	-	-	-
H-01/54	Power supply	Ignition switch	Ignition switch ON Ignition switch OFF	B+ 0	
H-01/55	Power supply	Ignition switch	Ignition switch ON Ignition switch OFF	B+ 0	

CAUTION

*1 : Only BF DOHC engine



Automatic Transaxle System

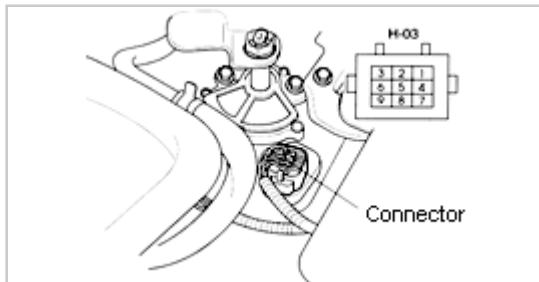
Automatic Transaxle Control System - Transaxle Oil Temperature Sensor



Inspection

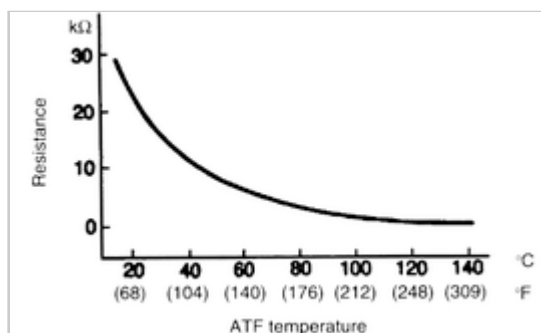
Resistance inspection

1. Remove air cleaner assembly.
2. Connect ohmmeter between terminals 5 and 8 of connector.
3. Measure resistance while warming up ATF (driving vehicle).
4. Verify that the resistance drops as shown in following table and graph.



5. If not as specified, replace transaxle fluid temperature sensor and connector wiring as an assembly.

ATF temperature °C (°F)	Resistance (KΩ)
-20 (-4)	146.67~189.12
0 (32)	56.757~70.225
20 (68)	24.461~29.205
40 (104)	11.536~13.352
60 (140)	5.8719~6.6124
80 (176)	3.1902~3.5064
100 (212)	1.8336~1.9721
120 (248)	1.1068~1.1674
140 (284)	0.69439~0.72580



6. Install air cleaner assembly.



Automatic Transaxle System

Automatic Transaxle Control System - Inhibiter Switch



Inspection

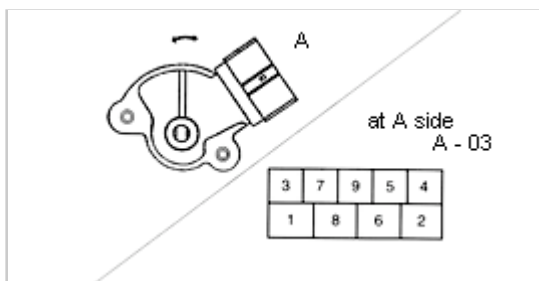
Operation inspection

1. Verify that the starter operates only with ignition switch in START position and selector lever in P or N position.
2. Verify that the back-up lights illuminate when shifted to R position with ignition switch in ON position.
3. Verify that the position of selector lever and shift pattern indicator of instrument cluster correspond.
4. If not as specified, Check the transaxle range switch.

Continuity inspection

1. Disconnect negative battery cable.
2. Disconnect transaxle range switch connector.
3. Check for continuity at transaxle range switch.
4. If not as specified, replace or adjust transaxle range switch.
5. Connect transaxle range switch connector.
6. Connect negative battery cable.

Position	Connector terminal								
Range	5	4	3	2	1	9	8	7	6
P				O	O				
		O	O						
R	O		O						
N			O						O
				O	O				
D			O					O	
2			O				O		
1			O			O			



Adjustment

1. Disconnect negative battery cable.
2. Pull data link connector upward from MAF sensor.
3. Disconnect air temperature sensor connector and MAF sensor connector.
4. Remove fresh air duct and air cleaner assembly.
5. Remove nut. Disconnect selector cable.
6. Rotate manual shaft to N position.
7. Disconnect transaxle range switch connector.
8. Loosen transaxle range switch mounting bolts.
9. Connect ohmmeter between terminals 5 and 7.
10. Adjust switch to point where there is continuity between terminals.
11. Tighten two transaxle range switch mounting bolts.

Tightening torque : 70~95 lb-in (7.9~10.7 N·m, 80~110 kg-cm)

12. Verify that the selector lever range position and transaxle range switch correspond.
13. Connect transaxle range switch connector.
14. Connect selector cable and tighten nut.

Tightening torque : 24~33 lb-ft (32~46 N·m, 3.2~4.7 kg-m)

15. Install air cleaner assembly, and fresh air duct.
16. Connect air temperature sensor connector and MAF sensor connector.
17. Install data link connector to MAF sensor.
18. Connect negative battery cable.