

**ACURA
INTEGRA - CA**

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Technical Service Information

The Automatic Transmission is a combination of a 3-element torque converter and dual-shaft automatic transmission which provides 4 speeds forward and 1 speed reverse. The entire unit is positioned in line with the engine.

TORQUE CONVERTER, GEARS, AND CLUTCHES

The torque converter consists of a pump, turbine and stator, assembled in a single unit.

They are connected to the engine crankshaft so they turn together as a unit as the engine turns. Around the outside of the torque converter is a ring gear which meshes with the starter pinion when the engine is being started. The entire torque converter assembly serves as a flywheel while transmitting power to the transmission mainshaft.

The transmission has two parallel shafts, the mainshaft and countershaft. The mainshaft is in line with the engine crankshaft. The mainshaft includes the clutches for 1st, and 2nd/4th, and gears for 3rd, 2nd, 4th, Reverse and 1st (3rd gear is integral with the mainshaft, while reverse gear is integral with 4th gear).

The countershaft includes 3rd clutch and gears for 3rd, and 4th, Reverse and 1st.

4th and reverse gears can be locked to the countershaft at its center, providing 4th gear or Reverse, depending on which way the selector is moved.

The gears on the mainshaft are in constant mesh with those on the countershaft. When certain combinations of gears in the transmission are engaged by the clutches, power is transmitted from the mainshaft to the countershaft to provide **D3**, **D4**, **2** and **R**.

HYDRAULIC CONTROL

The valve assembly includes the main valve body, secondary valve body, serve valve body, modulator valve body, regulator valve body and lock-up shift valve body, through the respective separator plates.

They are bolted to the torque converter case as an assembly.

The main valve body contains the manual valve, 1-2 shift valve, 2-3 shift valve, 3-4 shift valve, pressure relief valve, 2nd orifice control valve, and oil pump gear.

The secondary valve body includes the CPC valve, REV control valve, lock-up cut valve, kickdown valve, 3-2 timing valve and shift timing valves.

The serve valve body contains the accumulator pistons, 3rd orifice control valve, throttle A and B valves, and the modulator valve.

The regulator valve body contains the lock-up timing valves, pressure regulator valve and lock-up control valve. Fluid from the regulator passes through the manual valve to the various control valves.

The lock-up shift valve body contains a lock-up timing valve and lock-up shift valve. The 1st, 3rd and 4th clutches receive oil from their respective feed pipes.

LOCK-UP MECHANISM

In **D4**, pressurized fluid is drained from the back of the torque converter through an oil passage, causing the lock-up piston to be held against the torque converter cover. As this takes place, the mainshaft rotates at the same speed as the engine crankshaft. Together with hydraulic control, an electronic control unit optimizes the timing of the lock-up mechanism.

The lock-up shift valve body controls the range of lock-up according to vehicle speed and throttle pressure. The lock-up timing valve controls the flow of oil to the lock-up shift valve in 3rd and 4th gear (in **D4** range).

The lock-up cut valve is housed in the secondary valve body and prevents lock-up from taking place when the throttle is not opened sufficiently.

Technical Service Information

[Lock-up Clutch]

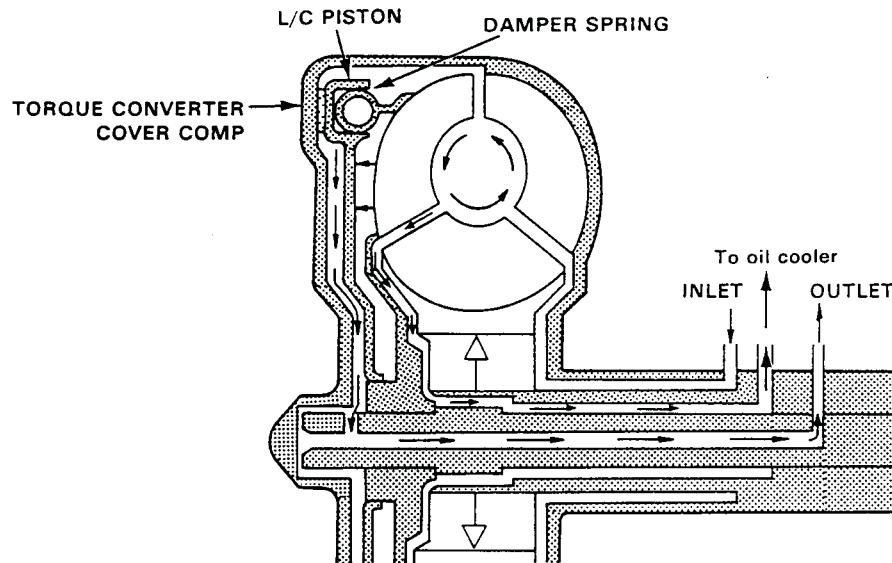
Operation (clutch on)

With the lock-up clutch on, the oil in the chamber between the converter cover and lock-up piston is discharged, and the converter oil exerts pressure through the piston against the converter cover. As a result, the converter turbine is locked on the converter cover firmly. The effect is to bypass the converter, thereby placing the car in direct drive.

Power flow

The power flows by way of:

Engine
 ↓
 Drive plate
 ↓
 Torque converter cover
 ↓
 Lock-up piston
 ↓
 Damper spring
 ↓
 Turbine
 ↓
 Mainshaft

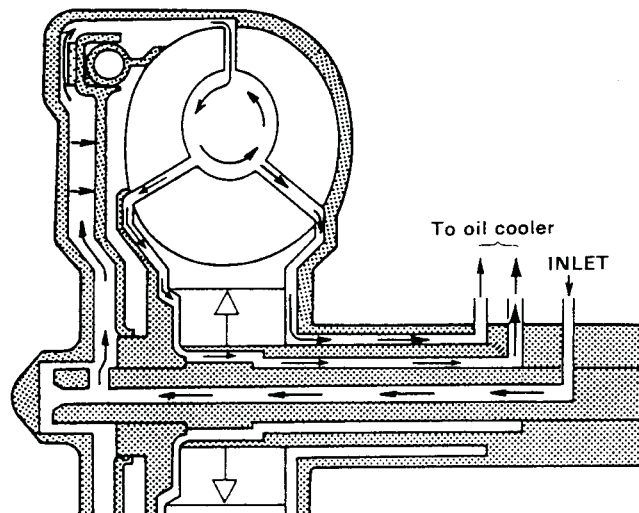


Operation (clutch off)

With the lock-up clutch off, the oil flows in the reverse of CLUTCH ON. As a result, the lock-up piston is moved away from the converter cover; that is, the torque converter lock-up is released.

Power flow

Engine
 ↓
 Drive plate
 ↓
 Torque converter cover
 ↓
 Pump
 ↓
 Turbine
 ↓
 Mainshaft

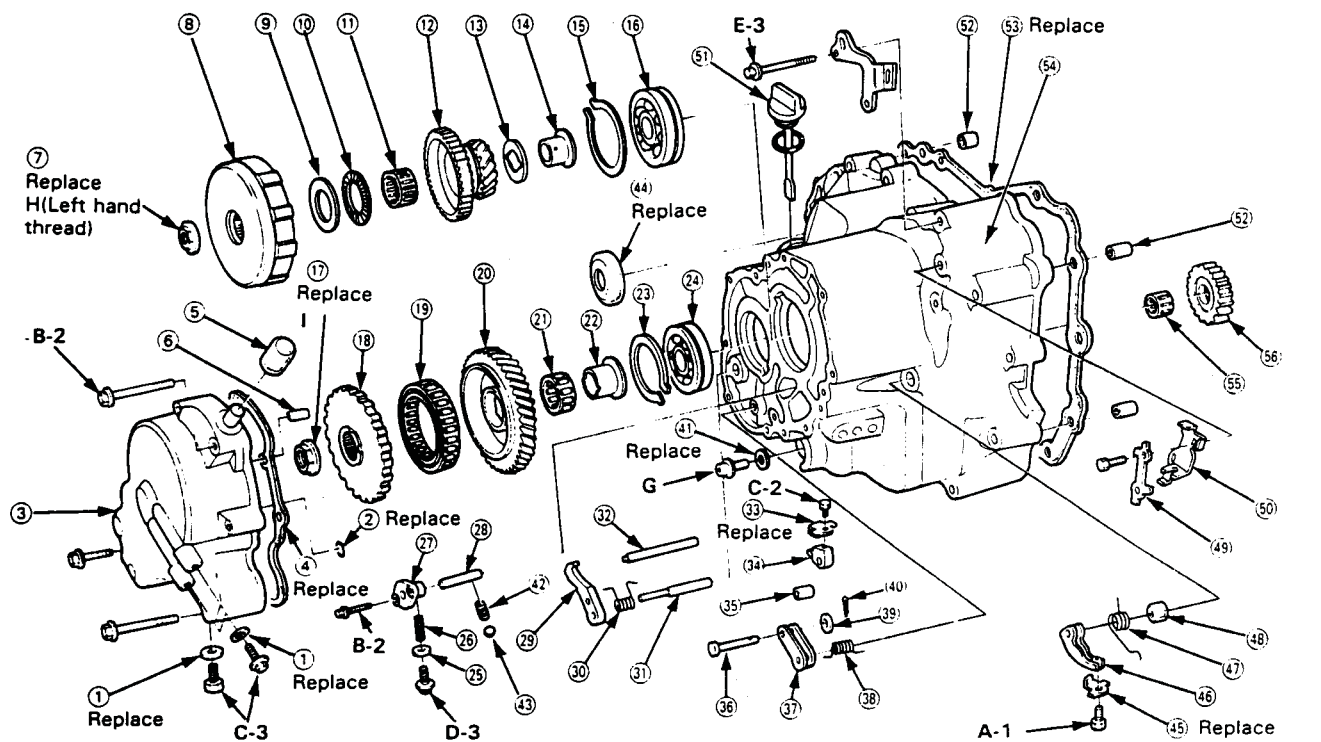


Technical Service Information

SYMPTOM	Check these items on PROBABLE CAUSE LIST	Check these items on NOTES PAGE	The following symptoms can be caused by improper repair or assembly.	Check these items on PROBABLE CAUSE DUE TO IMPROPER REPAIR	Check these ITEMS ON NOTES PAGE
Engine runs, but car does not move in any gear.	1, 6, 7, 16	K, L, R, S	Car creeps in N.	R1, R2	
Car moves in R and 2, but not in D3 or D4.	8, 29, 44, 48	C, M, O	Car does not move in D3 or D4.	R5	
Car moves in D3, D4 and R, but not in 2.	9, 30, 49	C, L	Trans lock up in R.	R4	
Car moves in D3, D4 and 2, but not in R.	1, 11, 12, 22, 38, 39, 40	C, L, Q	Trans has no park.	R3	
Car moves in N.	1, 8, 9, 10, 11, 46, 47	C, D	Excessive drag in trans.	R8	RK
Excessive idle vibration.	5, 17	B, K, L	Excessive vibration, rpm related.	R9	
Slips in all gears.	6, 7, 16	C, L, U	Noise with wheels moving only.	R7	
Slips in low gear.	8, 29, 44, 45, 48	C, N, O, U	Main seal pops out.	R10	S
Slips in 2nd gear. *	9, 20, 23, 30, 45, 49	C, L, U	Various shifting problems.	R11, R12	
Slips in 3rd gear.	10, 21, 23, 31, 44, 45	C, L, U	Harsh upshifts.	R13	
Slips in 4th gear.	11, 23, 32, 45	C, L, U	In D3 or D4 trans starts in 2nd gear.	R6	
Slips in reverse gear.	11, 32	C	PROBABLE CAUSE		
Slips on 2-3 upshift.	3, 15, 24	E, L, V	1. Shift cable broken/out of adjustment		
Slips on 3-4 upshift.	3, 15, 25	E, L, V	2. Throttle cable too short		
No upshift; trans stays in low gear.	12, 13, 14, 19, 23	E, F, G, L	3. Throttle cable too long		
No downshift to low gear.	12, 19	G, L	4. Wrong type ATF		
Late upshift.	2, 12, 13, 14	E, F, L, V	5. Idle rpm too low/high		
Early upshift.	3, 13, 14	E, F, L, V	6. Oil pump worn or seized		
Erratic shifting.	2, 14, 26	E, F, V	7. Pressure regulator stuck		
Harsh shift (up & down shifts).	2, 4, 15, 23, 24, 25, 27, 47	A, E, H, I, L, V	8. Low clutch defective		
Harsh shift (1-2).	2, 9	C, D, V	9. 2nd clutch defective		
Harsh shift (2-3).	2, 10, 23, 24	C, D, H, L, V	10. 3rd clutch defective		
Harsh shift (3-4).	2, 11, 23, 25	C, D, I, L, V	11. 4th clutch defective		
Harsh kickdown shifts.	2, 23, 27	L, V, Q	12. Governor valve stuck		
Harsh kickdown shift (2-1).	48	O	13. Throttle A valve stuck		
Harsh downshift (3-2) at closed throttle.	15	E, T	14. Modulator valve stuck		
Axle(s) slips out of trans on turns.	43, 50	L, P, Q	15. Throttle B valve stuck		
Axle(s) stuck in trans.	43	L, Q	16. Oil screen clogged		
Ratcheting noise when shifting into R.	6, 7, 38, 39, 40	K, L, Q	17. Torque converter defective		
Loud popping noise when taking off in R.	38, 39, 40	L, Q	18. Torque governor check valve stuck		
Ratcheting noise when shifting from R to P, or from R to N.	38, 39, 40, 51	K, L, Q	19. 1-2 shift valve stuck		
Noise from trans in all selector lever positions.	6, 17	K, L, Q	20. 2-3 shift valve stuck		
Noise from trans only when wheels rolling.	39, 42	L, Q	21. 3-4 shift valve stuck		
Gear whine, rpm related (pitch changes with shifts).	6, 41	K, L, Q	22. Reverse control valve stuck		
Gear whine, speed related (pitch changes with speed).	39, 42	L, Q	23. Clutch pressure control valve stuck		
Trans will not shift into 4th gear in D4.	1, 21, 28	L	24. 2nd orifice control valve stuck		
Engine stalls on emergency stops (shift lever in D4 only).	2, 33	L, V	25. 3rd orifice control valve stuck		
Lockup clutch does not lock up smoothly.	35, 37, 17	L	26. 3-2 timing valve stuck		
Lockup clutch does not operate properly.	2, 3, 12, 15, 18, 33, 34, 35, 36, 37	E, L, V	27. Kickdown valve stuck		
Transmission has multitude of problems shifting, at disassembly large deposits of metal found on magnet.	43	L, Q	28. Shift timing valve/accr stuck		
			29. Low clutch accumulator defective		
			30. 2nd clutch accumulator defective		
			31. 3rd clutch accumulator defective		
			32. 4th/reverse accumulator defective		
			33. Lockup clutch cut valve stuck		
			34. Lockup clutch timing valve A stuck		
			35. Lockup clutch timing valve B stuck		
			36. Lockup clutch shift valve stuck		
			37. Lockup clutch control valve stuck		
			38. Shift fork bent		
			39. Reverse gears worn/damaged (3 gears)		
			40. Reverse selector gear worn		
			41. 3rd gears worn/damaged (2 gears)		
			42. Final gears worn/damaged (2 gears)		
			43. Differential pinion shaft worn		
			44. Feedpipe O-ring broken		

Technical Service Information

Torque	Bolt size
A— 8 N·m (0.8 kg-m, 6 lb-ft)	1— 5 x 0.8 mm
B— 12 N·m (1.2 kg-m, 9 lb-ft)	2— 6 x 1.0 mm
C— 14 N·m (1.4 kg-m, 10 lb-ft)	3— 8 x 1.25 mm
D— 18 N·m (1.8 kg-m, 12 lb-ft)	
E— 27 N·m (2.7 kg-m, 20 lb-ft)	
F— 29 N·m (2.9 kg-m, 21 lb-ft)	
G— 40 N·m (4.0 kg-m, 29 lb-ft)	
H— 95→0→95 N·m (9.5→0→ 9.5 kg-m, 70→0→70 lb-ft)	
I— 110→0→110 N·m (11.0→0→ 11.0 kg-m, 80→0→80 lb-ft)	



- ① WASHER 8 mm
- ② O-RING 6 x 2.3 mm
- ③ END COVER

- ④ GASKET
- ⑤ BREATHER CAP
- ⑥ DOWEL PIN 8 x 14 mm
- ⑦ LOCK NUT

- ⑧ 1st CLUTCH

- ⑨ THRUST WASHER 23 mm
- ⑩ THRUST NEEDLE BEARING 31 x 47 x 2 mm
- ⑪ NEEDLE BEARING 28 x 33 x 16.8 mm
- ⑫ MAINSHAFT 1st GEAR

- ⑬ THRUST WASHER
- ⑭ COLLAR 23 mm
- ⑮ SNAP RING 70 mm
- ⑯ MAINSHAFT BEARING

- ⑰ LOCKNUT

- ⑱ PARKING GEAR
- ⑲ ONE-WAY CLUTCH
- ⑳ COUNTERSHAFT 1st GEAR

- ㉑ NEEDLE BEARING
- ㉒ 1st GEAR COLLAR
- ㉓ SNAP RING 64 mm
- ㉔ COUNTERSHAFT BEARING
- ㉕ WASHER 8 mm
- ㉖ SPRING
- ㉗ REVERSE IDLER BEARING HOLDER

- ㉘ REVERSE GEAR SHAFT
- ㉙ PARKING PAWL
- ㉚ PARKING PAWL SPRING
- ㉛ PARKING PAWL SHAFT
- ㉜ STOP PIN
- ㉝ LOCK PLATE
- ㉞ PARKING LEVER
- ㉟ PARKING PAWL ROLLER
- ㊱ ROLLER PIN
- ㊲ PARKING SHIFT ARM
- ㊳ RETURN SPRING
- ㊴ WASHER 5 mm
- ㊵ COTTER PIN
- ㊶ WASHER 14 mm
- ㊷ SPRING
- ㊸ STEEL BALL
- ㊹ DIFFERENTIAL OIL SEAL

- ㊺ LOCK PLATE
- ㊻ THROTTLE CONTROL LEVER

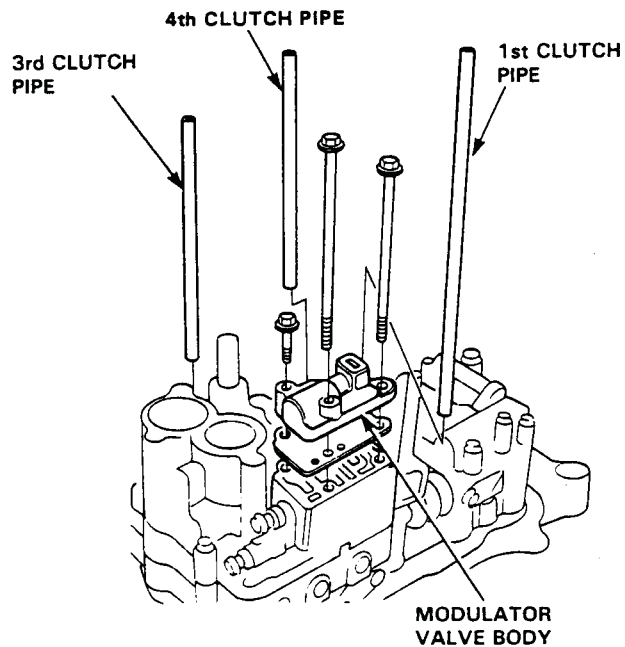
- ㊼ THROTTLE CONTROL SHAFT SPRING

- ㊽ THROTTLE CONTROL SHAFT SEAL
- ㊾ LOCK PLATE
- ㊿ THROTTLE CONTROL CABLE BRACKET

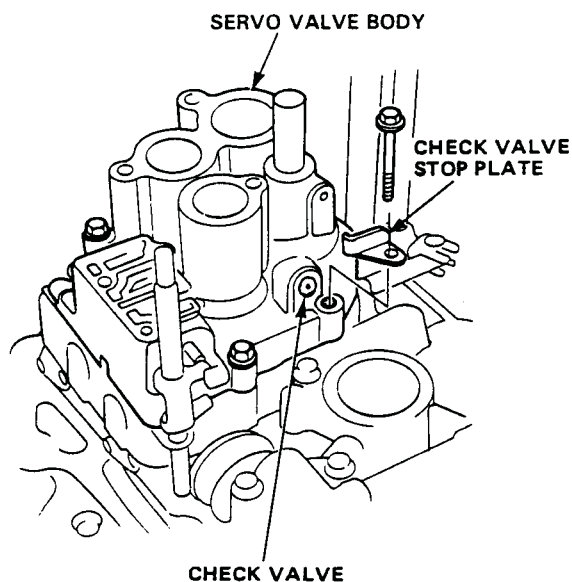
- (51) DIPSTICK
- (52) DOWEL PIN 14 x 25 mm
- (53) GASKET
- (54) TRANSMISSION HOUSING
- (55) NEEDLE BEARING
- (56) REVERSE IDLER GEAR

Technical Service Information

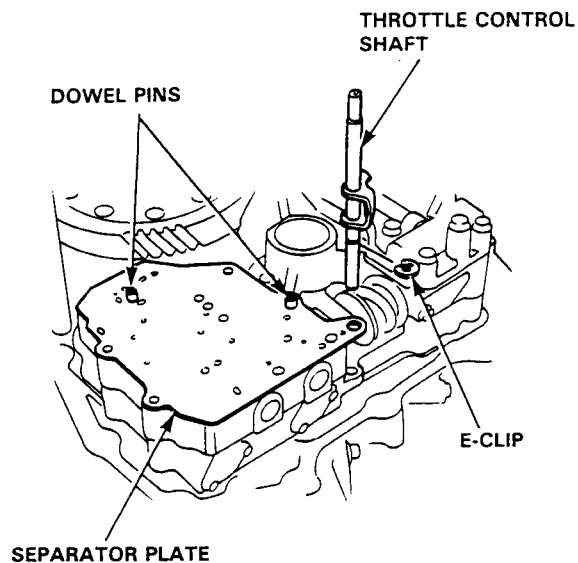
4. Remove the three bolts attaching the modulator valve body.
5. Remove the 1st, 4th and 3rd clutch pipes.



6. Remove the servo valve body (3 bolts).
7. Remove the check valve stop plate.

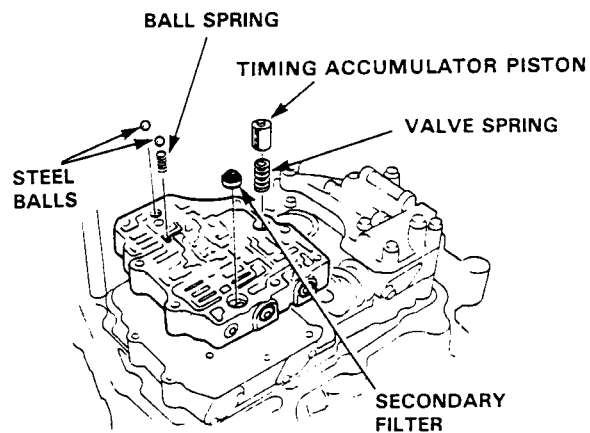


8. Remove the E-clip. Then remove the throttle control shaft from the separator plate.
9. Remove the separator plate and dowel pins.



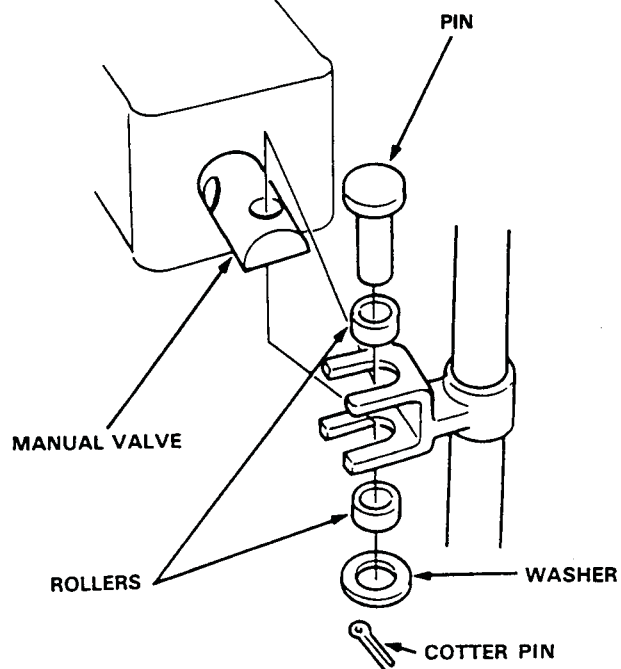
10. Remove the secondary valve body, being careful not to lose the 2 steel balls, ball spring, timing accumulator piston and valve spring, and secondary filter.

CAUTION: Do not use a magnet to remove the steel balls; it may magnetize the balls.



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15. Remove the cotter pin, washer, rollers, and pin from the manual valve.

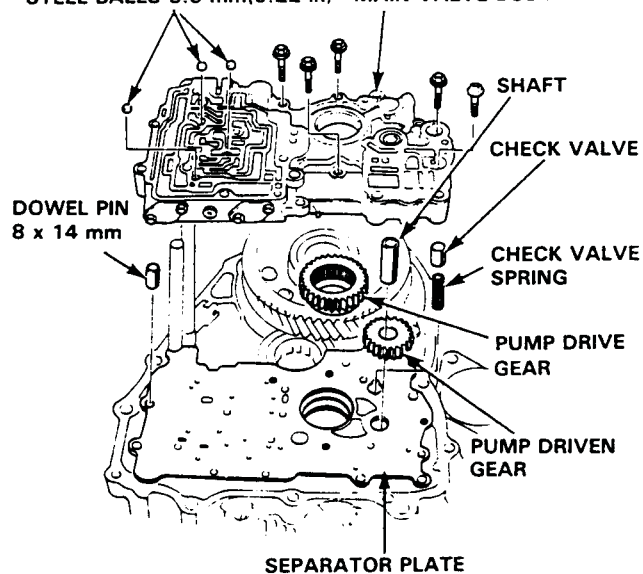


16. Remove the main valve body being careful not to lose the 3 steel balls, check ball spring, torque converter check valve and spring.

CAUTION: Do not use a magnet to remove the steel balls; it may magnetize the balls.

NOTE: Top oil passage steel ball in this drawing has a spring beneath it.

OIL PASSAGE
STEEL BALLS 5.5 mm(0.22 in) MAIN VALVE BODY

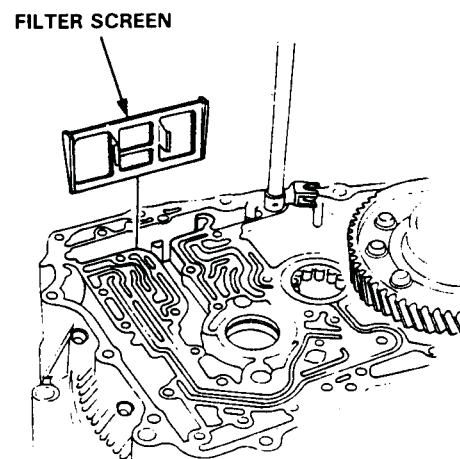


17. Remove the pump gears and shaft.

18. Remove the separator plate, dowel pins, check valve, and spring.

19. Remove the filter screen.

NOTE: Do not reuse filter screen; install a new one on reassembly.



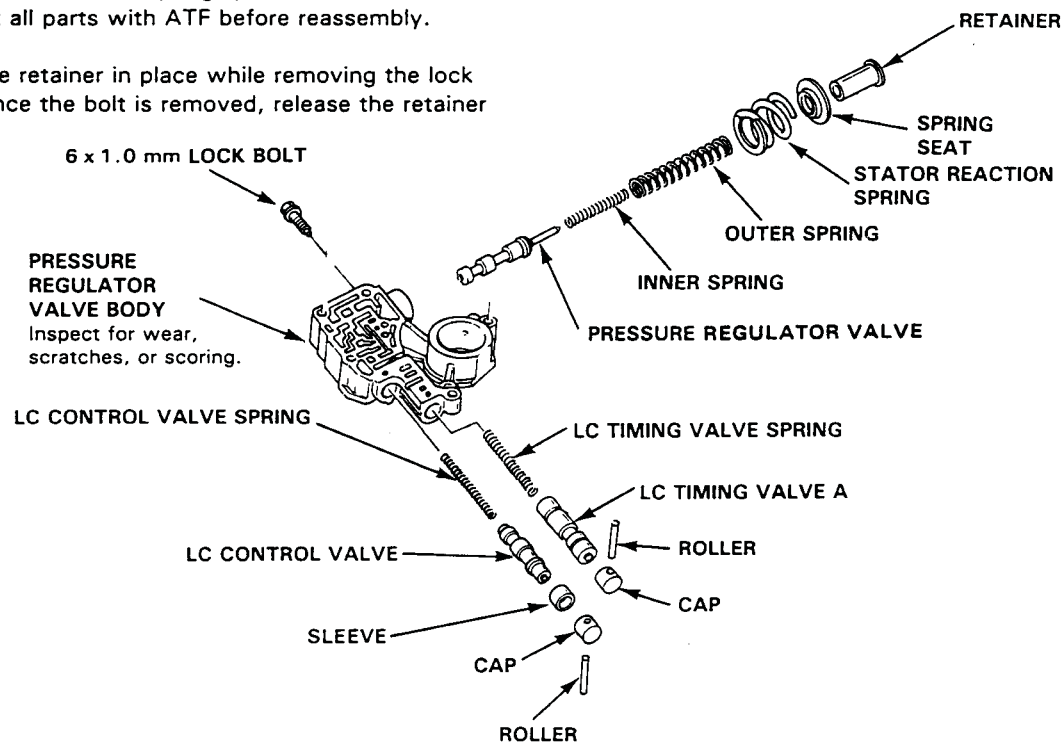
Technical Service Information

Disassembly/Inspection

NOTE:

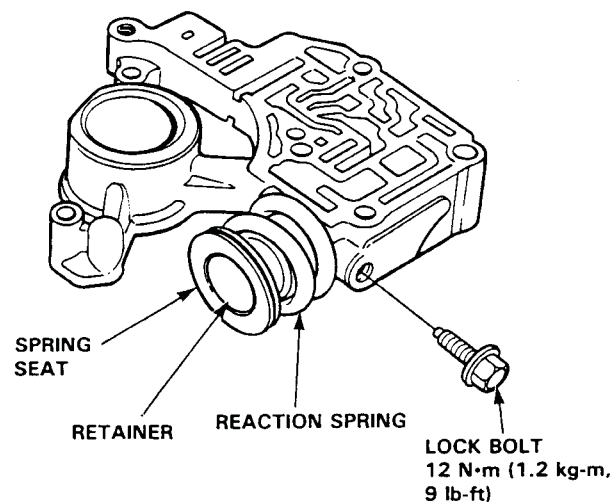
- Clean all parts thoroughly in solvent or carburetor cleaner.
- Replace valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement.
- See Section 3 for spring specifications.
- Coat all parts with ATF before reassembly.

1. Hold the retainer in place while removing the lock bolt. Once the bolt is removed, release the retainer slowly.



Reassembly

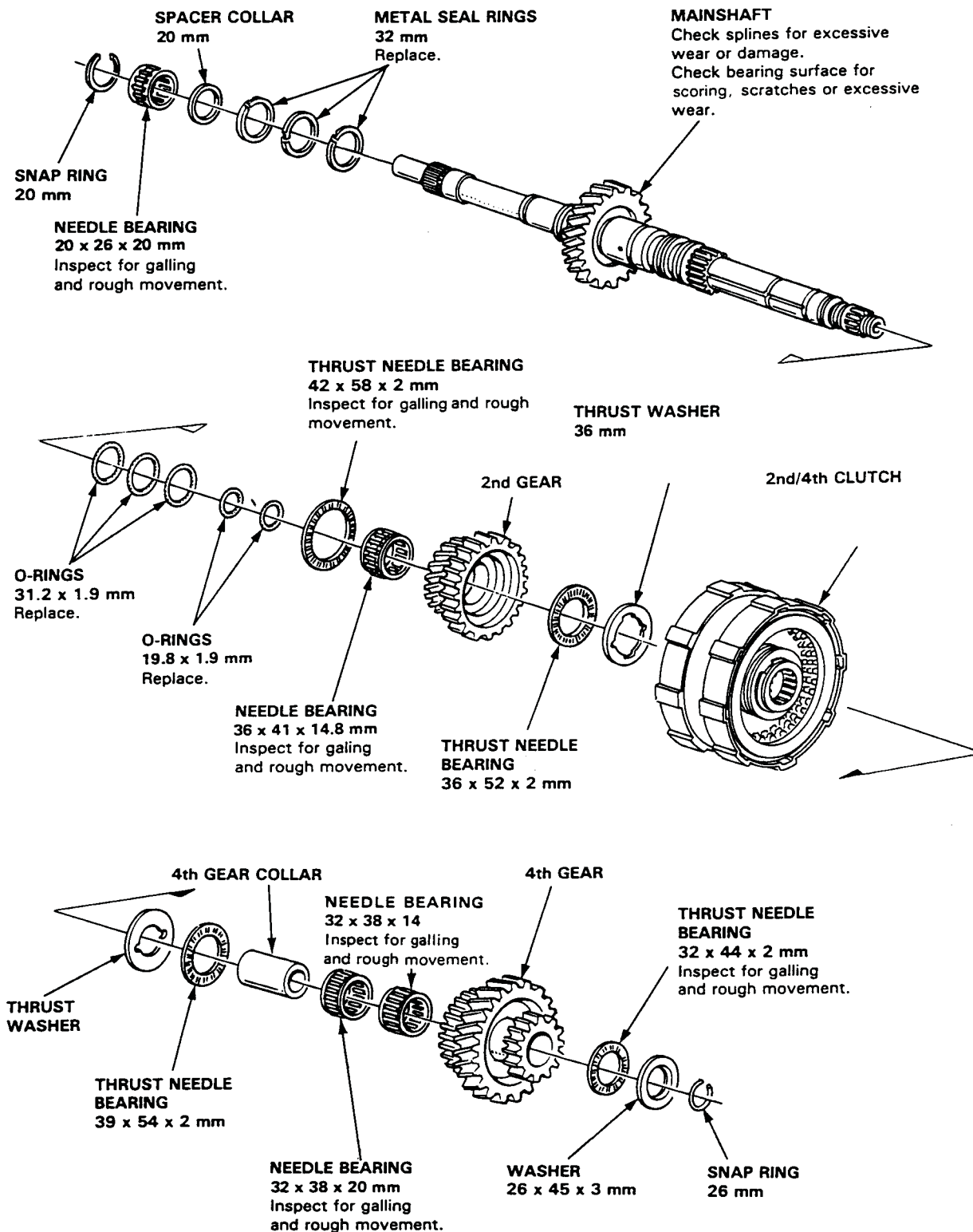
1. Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
2. Coat all valves with ATF.
3. Install the pressure regulator valve, and the inner and outer springs.
4. Install the reaction spring, spring seat, and retainer. Align the hole in the retainer with the hole in the valve body, then press the retainer into the valve body and tighten the lock bolt.



Technical Service Information

NOTE:

- Lubricate all parts with ATF during reassembly.
- Install thrust needle bearings with unrolled edge of bearing retainer facing washer.



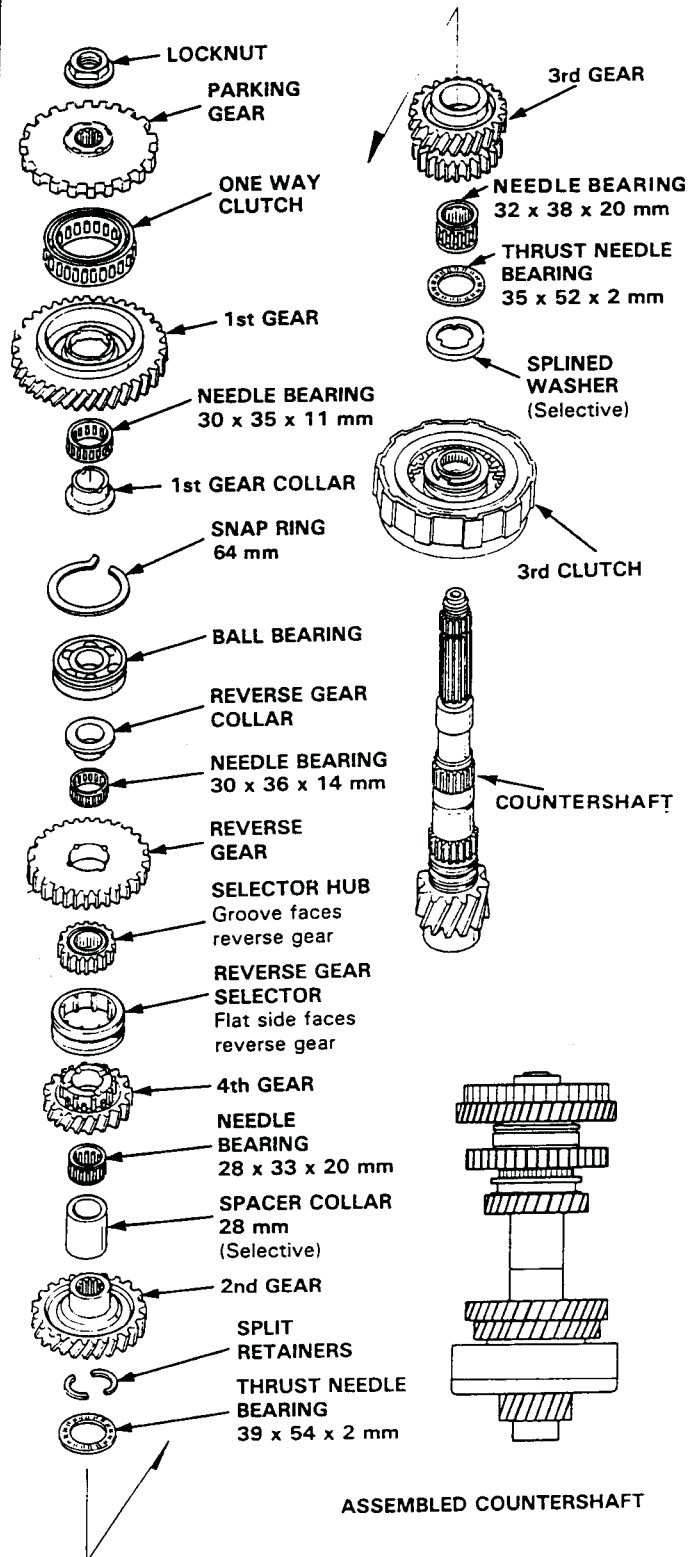
Technical Service Information

1. Remove both the mainshaft and countershaft bearings from the transmission housing.
2. Assemble the mainshaft and the countershaft including bearings and all parts shown below.
3. Install the mainshaft and countershaft assemblies into the torque converter housing.
4. Install the mainshaft holder to prevent the shafts from turning.
5. Torque the mainshaft locknut to 35 N·m (3.5 kg·m, 25 lb-ft). (Left-hand threads.)
6. Hold the parking gear on the countershaft with your hand and torque the countershaft locknut to 35 N·m (3.5 kg·m, 25 lb-ft).
7. Measure clearances as described on the next page.



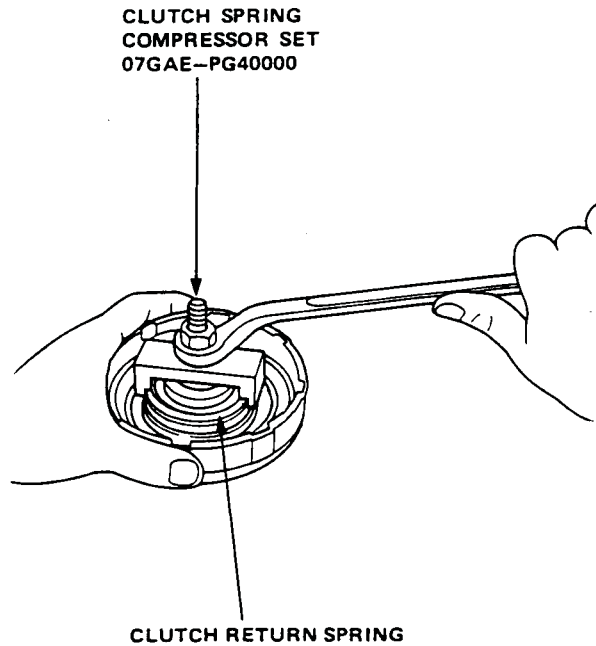
Lubricate all parts with ATF before final reassembly.

Countershaft Assembly



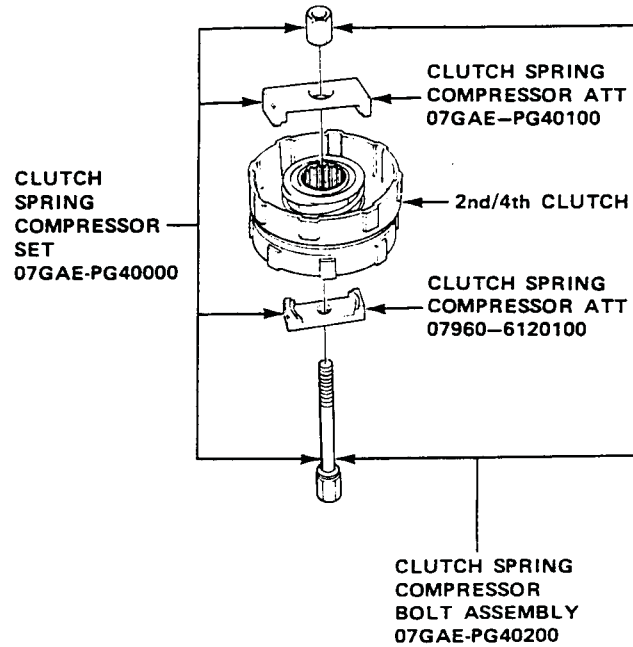
Technical Service Information

- Compress the clutch return spring.

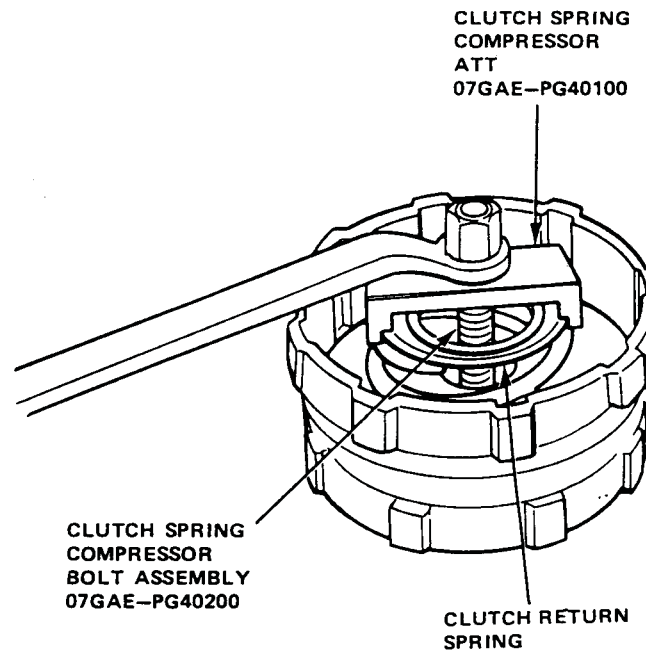


2nd/4th Clutch

- Assemble the spring compressor on the clutch drum.



- Compress the clutch return spring.

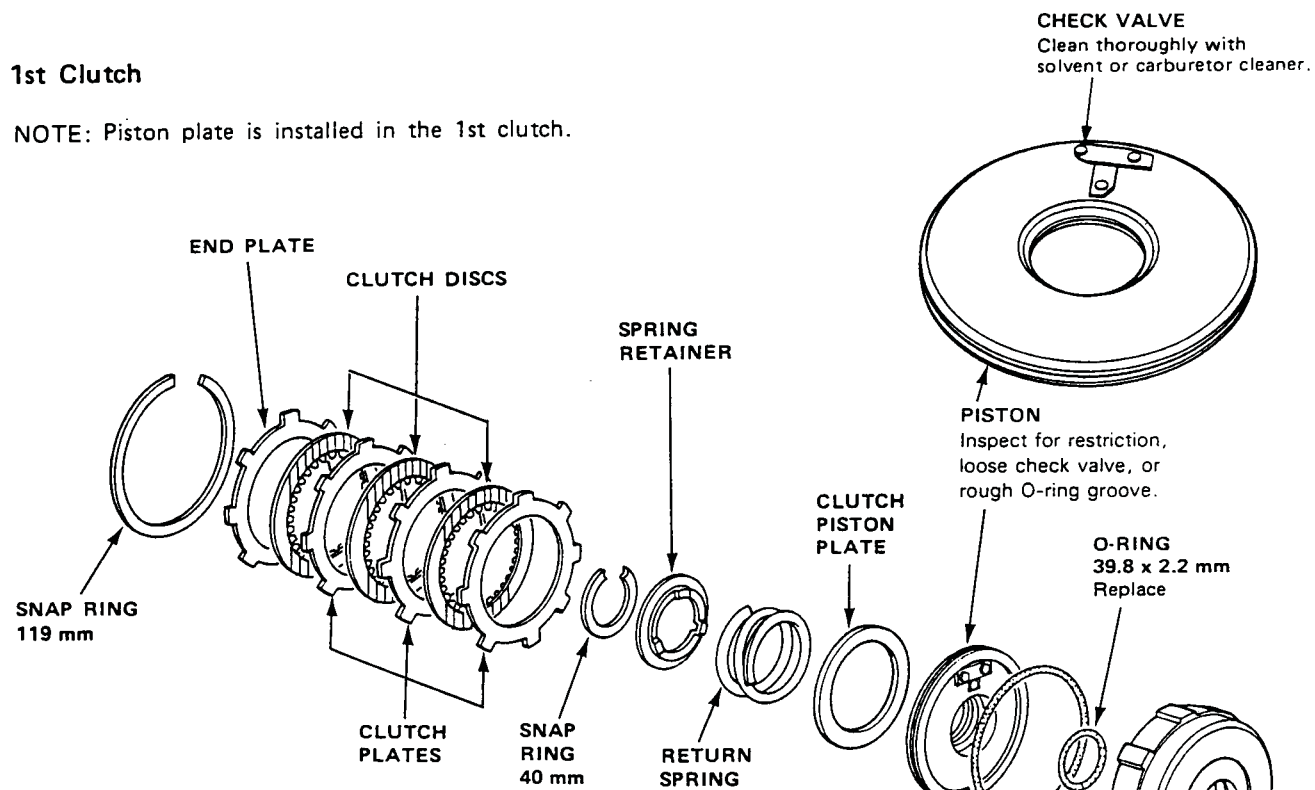


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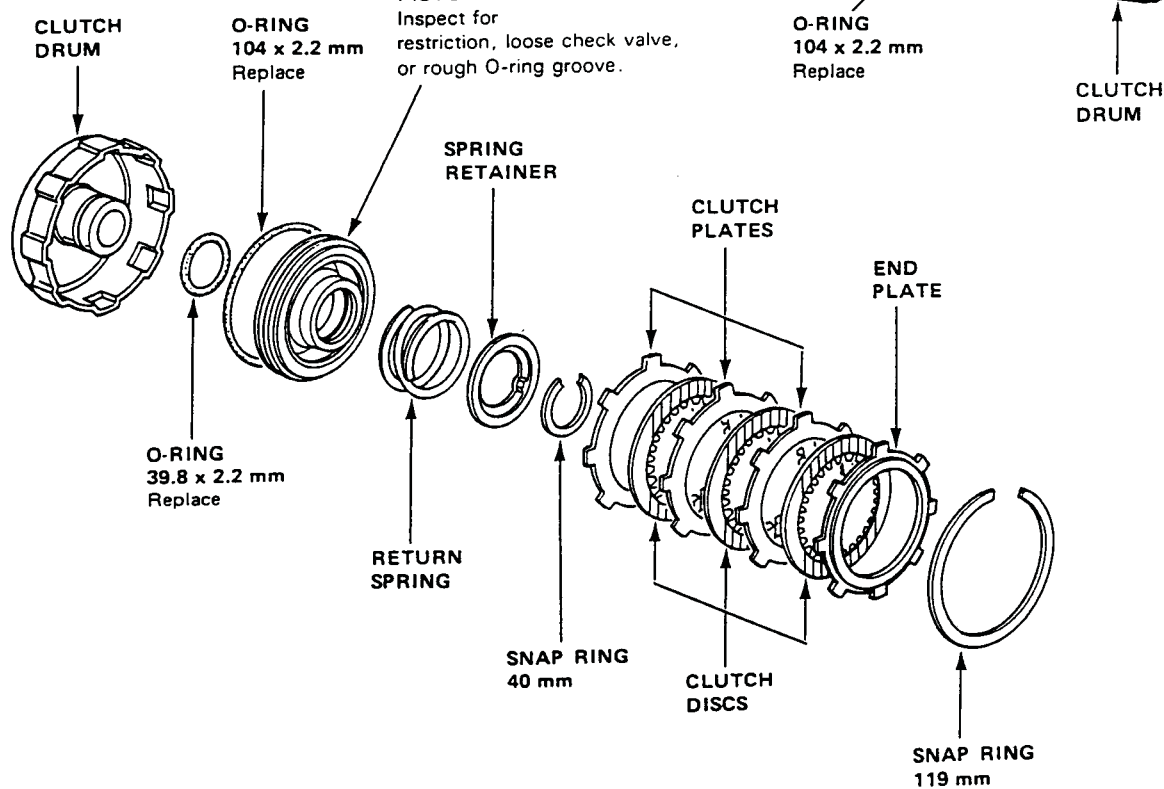
Disassembly/Inspection

1st Clutch

NOTE: Piston plate is installed in the 1st clutch.

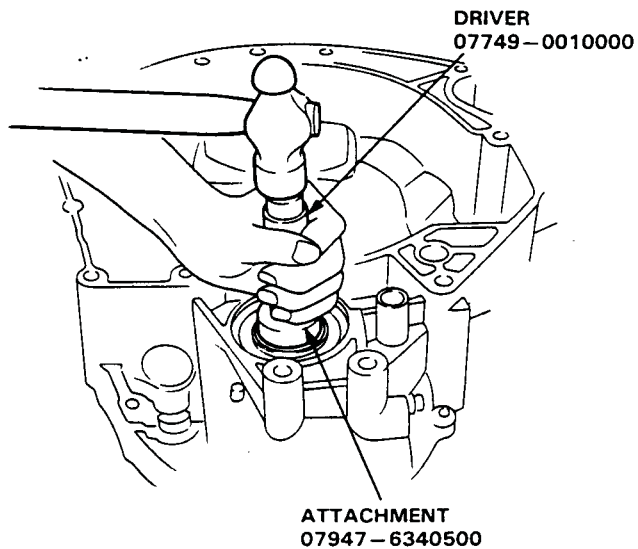


3rd Clutch

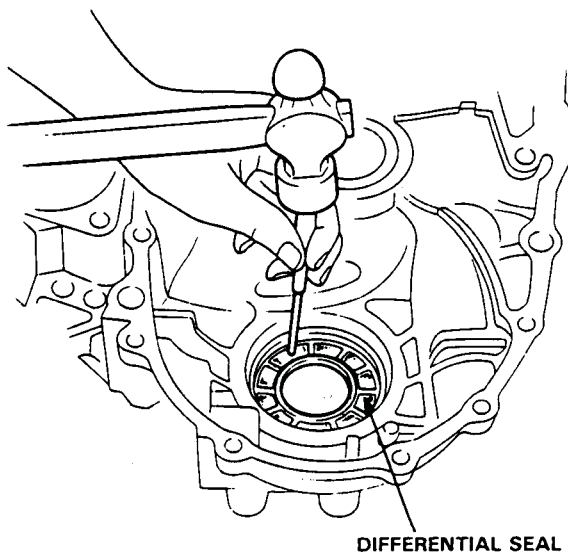


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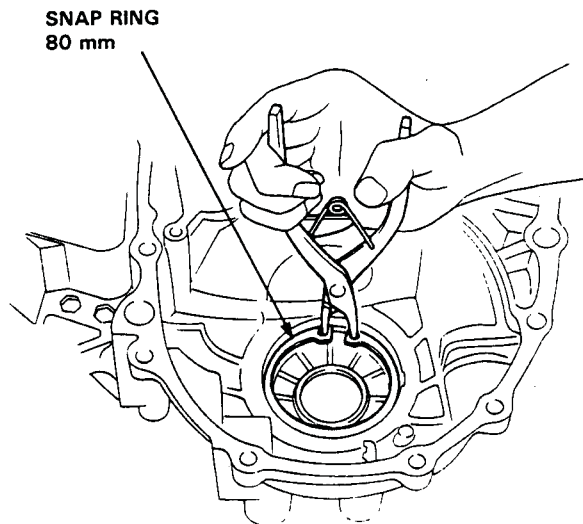
1. If seals are to be replaced, or if differential needs repair, remove the differential.



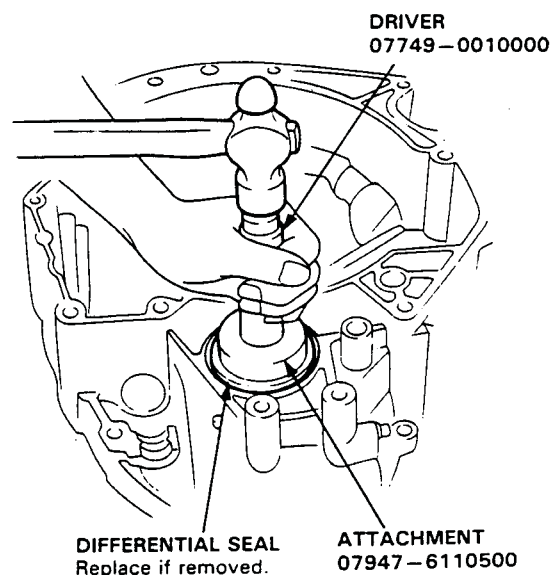
2. On the torque converter housing, remove the 80 mm snap ring, then drive out the seal as shown.
3. Remove the differential seal from the transmission housing in the same way.



4. On the torque converter housing, install the differential 80 mm snap ring if removed.

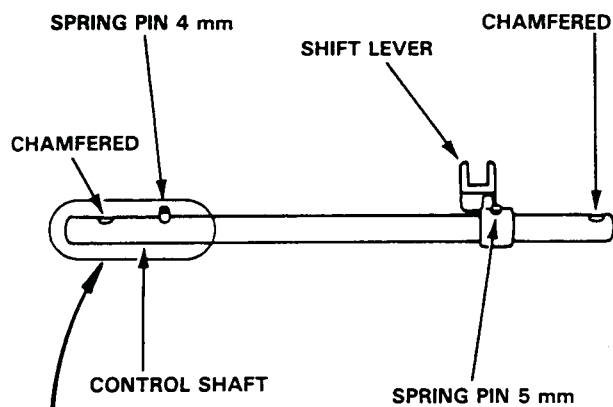


5. Install the differential seals into the torque converter housing and transmission housing.

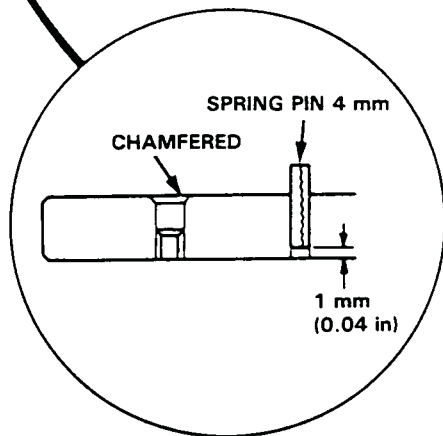


Technical Service Information

Installation



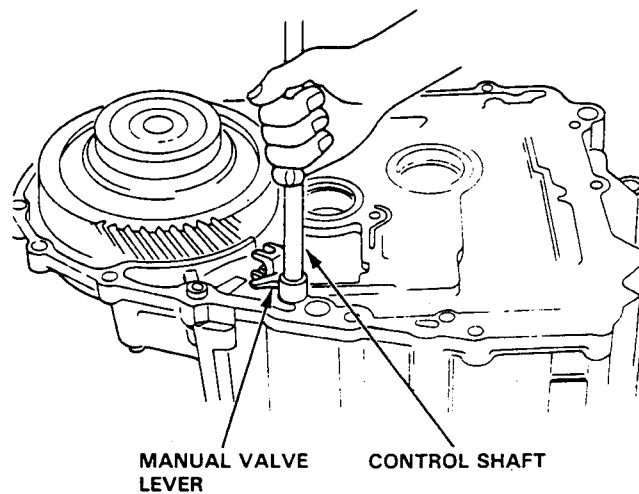
Drive the 4 mm spring pin to a depth 1 mm in from the side that is opposite the chamfer in the threaded hole.



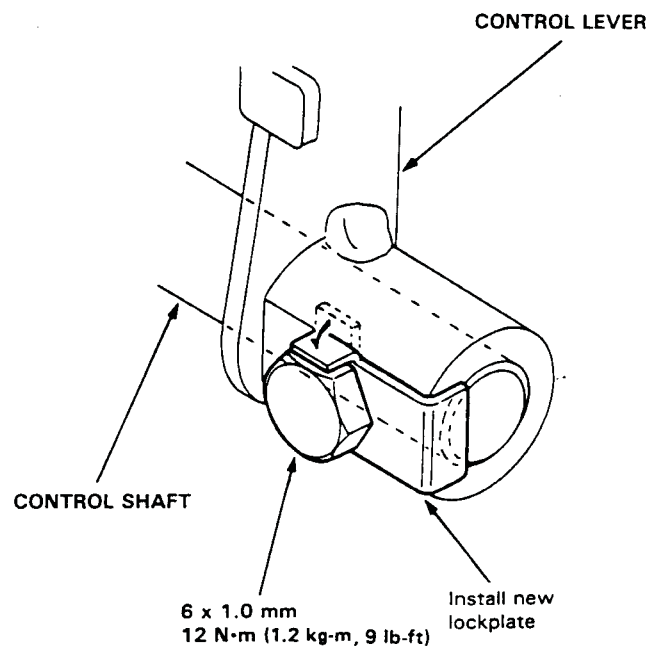
Reassembly

NOTE: Lubricate all parts with ATF during re-assembly.

1. Install the differential assembly. If the torque converter housing, transmission housing and/or differential side bearings were replaced, the differential side clearance must be checked as shown in section 15.
2. Assemble the manual valve lever on the control shaft, then install in the torque converter housing as shown.



3. Install the control lever and new lock plate on the other end of the shaft. Tighten the bolt to the torque shown, then bend the tab over against the bolt head.



(cont'd)

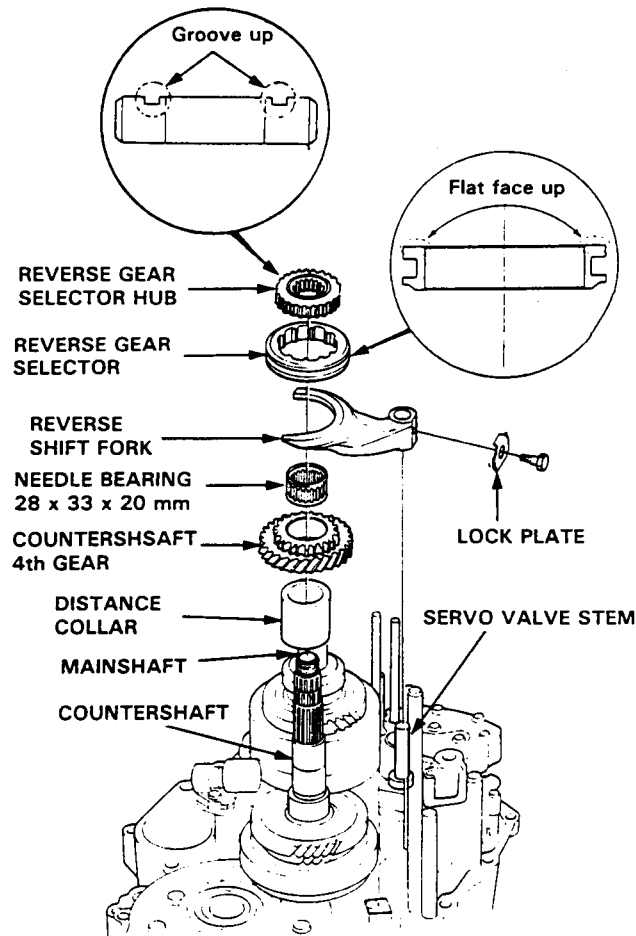
Technical Service Information

27. Install 4th gear and its needle bearing, and the countershaft 4th gear and its selector hub.

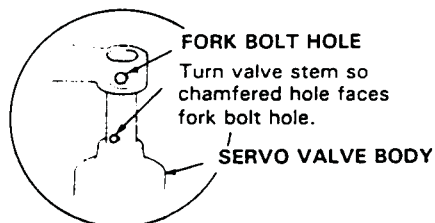
28. Assemble the reverse shift fork and selector sleeve, then install them as an assembly on the countershaft.

NOTE:

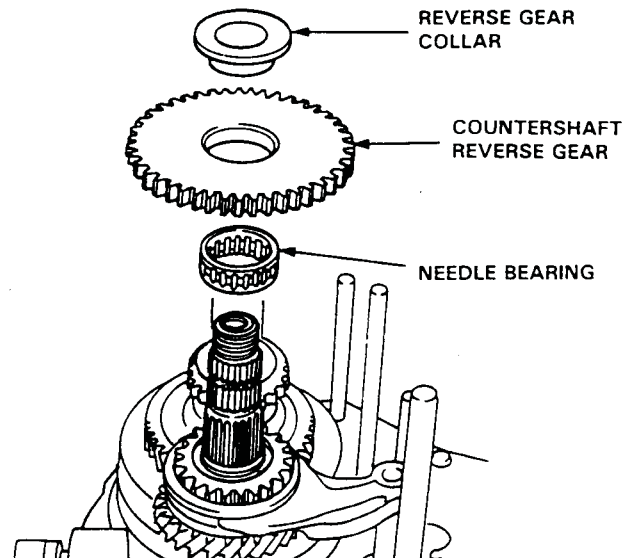
- Install the sleeve with its flat face up.
- Install the reverse gear selector hub with the groove facing up.



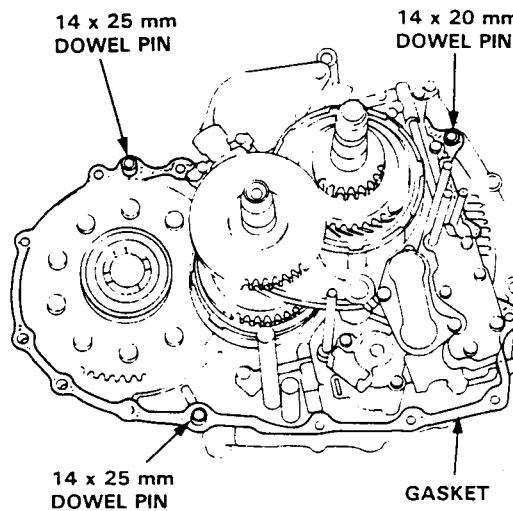
29. Install the reverse shift fork over the servo valve stem. Align the hole in the stem with hole in fork as shown, and install the bolt and new lock plate. Bend the lock tab against the bolt head.



30. Install the countershaft reverse gear, needle bearing, and reverse gear collar.



31. Install the new gasket and three dowel pins in the torque converter housing.



32. Install the suction pipe.

