



HONDA F4

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AUTOMATIC TRANSMISSION SERVICE GROUP

18639 S.W. 107TH AVENUE

MIAMI, FLORIDA 33157

(305) 670-4161

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INTRODUCTION

HONDA F4

4 SPEED

This manual covers only the Honda F4 transaxle installed in fuel injected Preludes from 1985-1987 and all Accords from 1986-1989 sold in the US the transaxle is transverse mounted and has four forward speeds and a converter clutch. The 4th gear is a .700 to 1 ratio. The shifts are computer controlled. Converter clutch is available for 2nd gear up. The throttle valve cable controls two different T.V. Systems regulating shift feel and timing. First gear does not have engine breaking.

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"ATSG would like to thank Honda Motor Co. for the illustrations and information contained in this manual."

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DALE ENGLAND
FIELD SERVICE CONSULTANT

WAYNE COLONNA
TECHNICAL SUPERVISOR

PETER LUBAN
TECHNICAL CONSULTANT

JON GLATSTEIN
TECHNICAL CONSULTANT

JERRY GOTT
TECHNICAL CONSULTANT

GERALD CAMPBELL
TECHNICAL CONSULTANT

JIM DIAL
TECHNICAL CONSULTANT

ED KRUSE
TECHNICAL CONSULTANT

GREGORY LIPNICK
TECHNICAL CONSULTANT

DAVID CHALKER
TECHNICAL CONSULTANT

MIKE SOUZA
TECHNICAL CONSULTANT

ROLAND ALVAREZ
TECHNICAL CONSULTANT

AUTOMATIC TRANSMISSION SERVICE GROUP

18639 S.W. 107TH AVENUE
MIAMI, FLORIDA 33157
(305) 670-4161

NOTES----NOTES----NOTES----NOTES

The Honda Automatic Transmission is a combination of a 3-element torque converter and a dual-shaft automatic transmission which provides 4 forward speeds and one reverse speed. 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 there 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 main shaft.

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, 2nd and 4th, and gears for 3rd, 2nd, and 4th. Reverse and 1st (3rd gear is integral with the mainshaft, while reverse is integral with 4th gear).

The countershaft includes 3rd clutch, and gears for 3rd, 4th, reverse and 1st. 4th and reverse gears can be locked to 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 the gears 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, or Reverse.

HYDRAULIC CONTROL

The valve assembly includes the main valve body, secondary valve body, servo 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, torque converter check valve, and oil pump gears. The 1985-87 secondary valve body includes the CPC valve, REV control valve, lock-up cut valve, kick-down valve, 3-2 timing valve, shift timing valve and timing accumulator piston. The 1988 secondary valve body does not use a timing accumulator and a 2-1 timing valve was added, in 1989 the kick-down valve was removed and two servo control valves were added. The servo valve body contains the 2nd, 3rd, and 4th accumulator pistons, 3rd orifice control valve, throttle A & B valves, and modulator valve. In 1989 the kick-down and 4th exhaust valves were added to the servo body. The regulator valve body contains the lock-up timing valve A, pressure regulator 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 lock-up timing valve B and Lock-up shift valve. The 1st, 3rd, and 4th clutches receive oil from their respective feed pipes.

LOCK-UP MECHANISM

In D4 in 2nd, 3rd, and 4th, pressurized fluid is drained from the front of the torque converter through an oil passage, causing the lockup piston to be held against the torque converter cover. As this takes place, the mainshaft rotates at the same speed as the engine crankshaft. The lock-up shift valve body controls the range of lock-up according to vehicle speed and throttle pressure. The lock-up timing valve A controls the flow of oil to the lock-up shift valve in 2nd, 3rd, and 4th gears in the D4 range. The lock-up cut valve is housed in the secondary valve body and prevents lock-up when the throttle is not opened sufficiently.

GEAR SELECTION

The selector lever has position: P PARK, R REVERSE, N NEUTRAL, D4 1st through 4th gear ranges, D3 1st through 3rd gear ranges and 2 2nd gear.

Position	Description
P PARK	Front wheels locked; parking pawl engaged with parking gear on countershaft. All clutches released.
R REVERSE	Reverse; reverse selector engaged with countershaft reverse gear and 4th gear clutch locked.
N NEUTRAL	All clutches released.
D4 DRIVE (1 through 4)	General driving; starts off in 1st, shifts automatically to 2nd, 3rd, then 4th, depending on vehicle speed and throttle position. Downshifts through 3rd, 2nd and 1st on deceleration to stop.
D3 DRIVE (1 through 3)	The lock-up mechanism comes into operation in 2nd, 3rd and 4th when the transmission is in D4.
2 SECOND	For rapid acceleration at highway speeds and general driving; starts off in 1st, shifts automatically to 2nd, then 3rd, depending on vehicle speed and throttle position. Downshifts through 2nd to 1st on deceleration to stop.
	For engine braking or better traction starting off on loose or slippery surfaces; stays in 2nd gear, does not shift up or down.

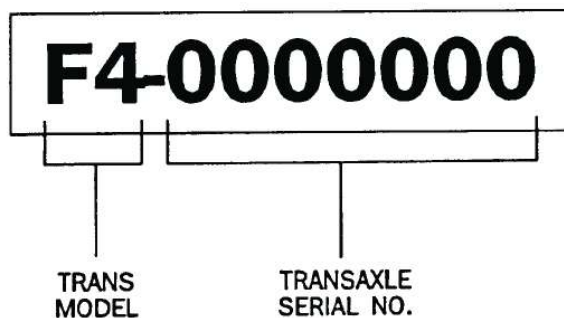
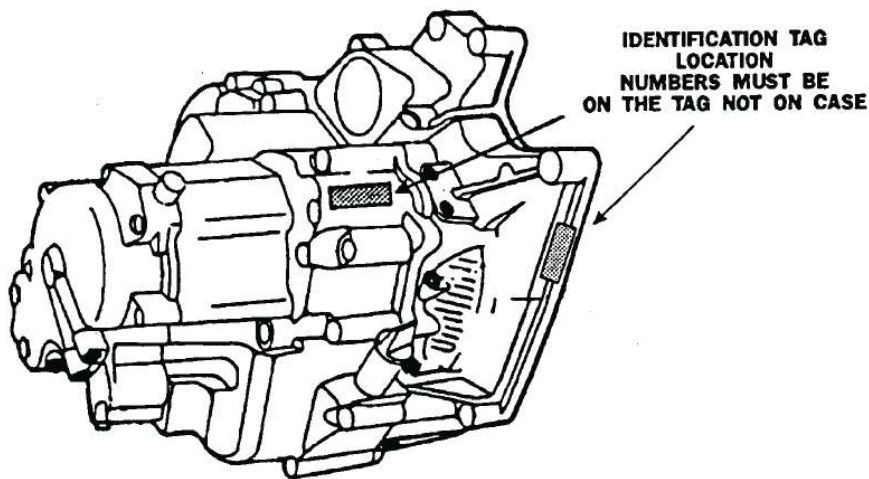
Starting is possible only in P and N through use of a slide-type, neutral-safety switch.

POSITION INDICATOR

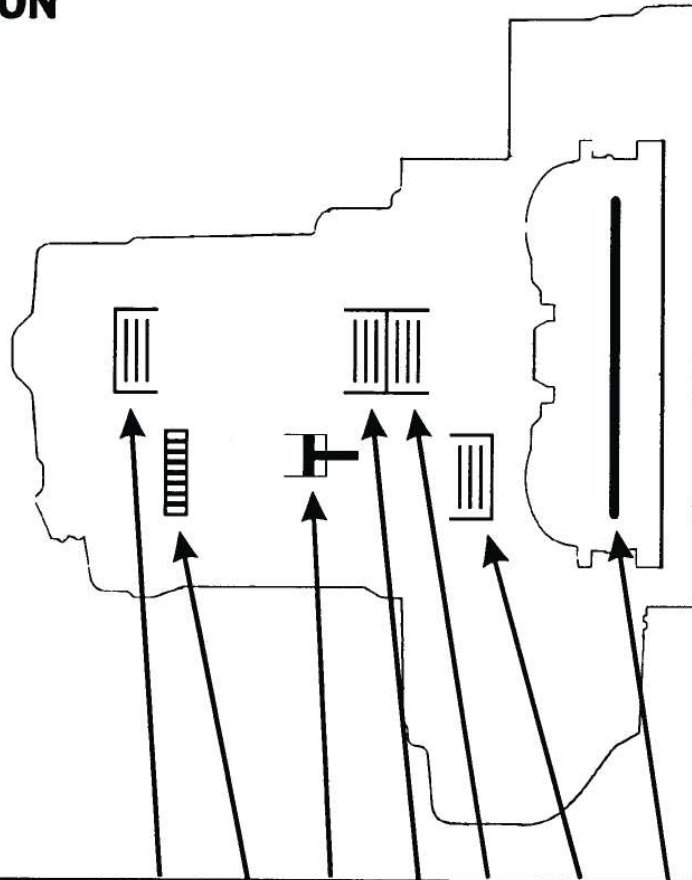
A position indicator in the instrument panel shows what gear has been selected without having to look down at the console.

TRANSAXLE IDENTIFICATION

The I.D. tag located on the center casting on the converter housing gives the most superior information about the F4 transaxle. If no tag is available four items allow the F4 transaxle to be identified externally. 1- The 1st accumulator and end cover are cast as one piece, the vent is also on the end cover. 2- The dipstick is mounted to the center casting. 3 - The converter housing has casting numbers near the shift lever which can be seen when the converter is removed, the numbers will start with PF4. 4 - There are no solenoids or sensors outside or inside, therefore there are no wires going to the transaxle.



APPLICATION CHART



SELECTOR POSITION	GEAR	FIRST CLUTCH	SPRAG	SERVO	FOURTH CLUTCH	SECOND CLUTCH	THIRD CLUTCH	T.C.C	GEAR RATIO
R	REVERSE			ON	ON				1.904
D4	1ST GEAR	ON	ON						2.529
	2ND GEAR	ON*				ON		ON**	1.481
	3RD GEAR	ON*					ON	ON**	1.030
	4TH GEAR	ON*			ON			ON**	.700
D3	1ST GEAR	ON	ON						2.529
	2ND GEAR	ON*				ON			1.481
	3RD GEAR	ON*					ON		1.030
2	2ND GEAR					ON			1.481

* ON BUT NOT EFFECTIVE

** MAY BE ON DEPENDING ON THROTTLE OPENING & VEHICLE SPEED

Troubleshooting

SYMPTOM	Check these items on PROBABLE CAUSE LIST	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 moves in R and 2, but not in D3 or D4.	8, 29, 44, 48	C, M, O
Car moves in D3, D4 and R, but not in 2.	9, 30, 49	C, L
Car moves in D3, D4 and 2, but not in R.	1, 11, 12, 22, 38, 39, 40	C, L, Q
Car moves in N.	1, 8, 9, 10, 11, 46, 47	C, D
Excessive idle vibration	5, 17	B, K, L
Slips in all gear.	6, 7, 16	C, L, U
Slips in low gear.	8, 29, 44, 45, 48	C, N, O, U
Slips in 2nd gear.	9, 20, 23, 30, 45, 49	C, L, U
Slips in 3rd gear.	10, 21, 23, 31, 44, 45	C, L, U
Slips in 4th gear.	11, 23, 32, 45	C, L, U
Slips in reverse gear.	11, 32	C
Slips on 2-3 upshift.	3, 15, 24	E, L, V
Slips on 3-4 upshift.	3, 15, 25	E, L, V
No upshift; trans stays in low gear.	12, 13, 14, 19, 23	E, F, G, L
No downshift to low gear.	12, 19	G, L
Late upshift.	2, 12, 13, 14	E, F, L, V
Early upshift.	3, 13, 14	E, F, L, V
Erratic shifting.	2, 14, 26	E, F, V
Harsh shift (up & down shifts).	2, 4, 15, 23, 24, 25, 27, 47	A, E, H, I, L, V
Harsh shift (1-2).	2, 9	C, D, V
Harsh shift (2-3).	2, 10, 23, 24	C, D, H, L, V
Harsh shift (3-4).	2, 11, 23, 25	C, D, I, L, V
Harsh kickdown shifts.	2, 23, 27	L, V, Q
Harsh kickdown shift (2-1).	48	O
Harsh downshift (3-2) at closed throttle.	15	E, T
Axle(s) slips out of trans on turns.	43, 50	L, P, Q
Axle(s) stuck in trans.	43	L, Q
Ratcheting noise when shifting into R.	6, 7, 38, 39, 40	K, L, Q
Loud popping noise when taking off in R.	38, 39, 40	L, Q
Ratcheting noise when shifting from R to P, or from R to N.	38, 39, 40, 51	L, Q
Noise from trans in all selector lever positions.	6, 17	K, L, Q
Noise from trans only when wheels rolling.	39, 42	L, Q
Gear whine, rpm related (pitch changes with shifts).	6, 41	K, L, Q
Gear whine, speed related (pitch changes with speed).	39, 42	L, Q
Trans will not shift into 4th gear in D4.	1, 21, 28	L
Engine stalls on emergency stops (shift lever in D4 only).	2, 33	L, V
Lockup clutch does not lock up smoothly.	35, 37, 17	L
Lockup clutch does not operate properly.	2, 3, 12, 15, 18, 33, 34, 35, 36, 37	E, L, V
Transmission has multitude of problems shifting, at disassembly large deposits of metal found on magnet.	43	L, Q

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
Car creeps in N.	R1, R2	
Car does not move in D3 or D4.	R5	
Trans lock up in R.	R4	
Trans has no park.	R3	
Excessive drag in trans.	R8	R, K
Excessive vibration, rpm related.	R9	
Noise with wheels moving only.	R7	
Main seal pops out.	R10	S
Various shifting problems.	R11, R12	
Harsh upshifts.	R13	
In D3 or D4 trans starts in 2nd gear.	R6	

PROBABLE CAUSE	
1.	Shift cable broken/out of adjustment
2.	Throttle cable too short
3.	Throttle cable too long
4.	Wrong type ATF
5.	Idle rpm too low/high
6.	Oil pump worn or seized
7.	Pressure regulator stuck
8.	Low clutch defective
9.	2nd clutch defective
10.	3rd clutch defective
11.	4th clutch defective
12.	Governor valve stuck
13.	Throttle A valve stuck
14.	Modulator valve stuck
15.	Throttle B valve stuck
16.	Oil screen clogged
17.	Torque converter defective
18.	Torque governor check valve stuck
19.	1-2 shift valve stuck
20.	2-3 shift valve stuck
21.	3-4 shift valve stuck
22.	Reverse control valve stuck
23.	Clutch pressure control valve stuck
24.	2nd orifice control valve stuck
25.	3rd orifice control valve stuck
26.	3-2 timing valve stuck
27.	Kickdown valve stuck
28.	Shift timing valve/accumulator 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

PROBABLE CAUSE	
45.	Servo valve check valve loose
46.	Gear clearance incorrect
47.	Clutch clearance incorrect
48.	Sprag clutch defective
49.	Sealing rings/guide worn
50.	Axle-inboard joint clip missing
51.	4th gears worn/damaged (2 gears)

PROBABLE CAUSES DUE TO IMPROPER REPAIR	
R1	Improper clutch clearance
R2	Improper gear clearance
R3	Parking pawl installed upside down
R4	Parking shift arm installed upside down
R5	Sprag clutch installed upside down
R6	Feed pipe missing in governor shaft
R7	Reverse hub installed upside down
R8	Oil pump binding
R9	Torque converter not fully seated in oil pump
R10	Main seal improperly installed
R11	Springs improperly installed
R12	Valves improperly installed
R13	Ball check valves not installed
R14	Shift fork bolt not installed

NOTES	
A	Flushing procedure (repeat 3 times): 1. Drain the trans. 2. Refill with 3 qts. of Dexron recommended type ATF. 3. Start the engine and shift trans to D4. 4. Let trans shift through gears at least 5 times. 5. Shift to reverse and neutral at least 5 times. 6. Drain and refill.
B	Set idle rpm in gear to specified idle speed. If still no good, adjust the motor mounts as outlined in engine section of service manual.
C	If the large clutch piston O-ring is broken, inspect the piston groove for rough machining.
D	If the clutch pack is seized, or is excessively worn, inspect the other clutches for wear, and check the orifice control valves and throttle valves for free movement.
E	If throttle valve B is stuck, inspect the clutches for wear.
F	If the modulator valve is stuck open (does not modulate line pressure), the trans will shift normally with less than 5/8 throttle but will shift up very late over 5/8 throttle. If the modulator valve is stuck closed, throttle valve A pressure will be zero and result in early upshifts and no forced downshift.
G	If the 1-2 valve is stuck closed, the transmission will not upshift. If stuck open, the transmission has no low gear.
H	If the 2nd orifice control valve is stuck, inspect the 2nd and 3rd clutch packs for wear.
I	If the 3rd orifice control valve is stuck, inspect the 3rd and 4th clutch packs for wear.
J	If the clutch pressure control valve is stuck closed, the transmission will not shift out of low gear.

NOTES	
K	Improper alignment of main valve body and torque converter case may cause oil pump seizure. The symptoms are mostly an rpm related ticking noise high pitched squeak. In severe instances, it may stall the engine. Follow instruction procedure on page 15-52.
L	If the oil screen is clogged with particles of steel or aluminum, inspect the oil pump and differential pinion shaft. If both are OK, and no cause for the contamination is found, replace the torque converter.
M	If the low clutch feedpipe guide in the end cover is scored by the mainshaft, inspect the ball bearing for excessive movement in the transmission housing. If OK, replace the end cover as it is dented. The O-ring under the guide is probably broken.
N	Replace the mainshaft if the bushings for the low and 4th feedpipe are loose or damaged. If the low feedpipe is damaged or out of round, replace it. If the 4th feedpipe is damaged or out of round, replace the end cover.
O	A worn or damaged sprag clutch is mostly a result of shifting the trans in D3 or D4 while the wheels rotate in reverse, such as rocking the car in snow.
P	Inspect the frame for collision damage.
Q	Inspect for damage or wear: 1. Governor shaft woodruff key 2. Reverse selector gear teeth chamfers 3. Engagement teeth chamfers of countershaft 4th & reverse gear 4. Shift fork, for scuff marks in center 5. Differential pinion shaft for wear under pinion gears 6. Bottom of 3rd clutch for swirl marks Replace items 1, 2, 3 and 4 if worn or damaged. If trans makes clicking, grinding or whirring noise, also replace mainshaft 4th gear and reverse idler gear and counter 4th gear in addition to 1, 2, 3, or 4. If differential pinion shaft is worn, overhaul differential assy and replace oil screen and thoroughly clean trans, flush torque converter and cooler and lines. If bottom of 3rd clutch is swirled and trans makes gear noise, replace countershaft and ring gear.
R	Be very careful not to damage the torque converter case when replacing the main ball bearing. You may also damage the oil pump when you torque down the main valve body; this will result in oil pump seizure if not detected. Use proper tools.
S	Install the main seal flush with the torque converter case. If you push it into the torque converter case until it bottoms out, it will block the oil return passage and result in damage.
T	Harsh downshifts when coasting to a stop with zero throttle may be caused by a bent-in throttle valve retainer/cam stopper. Throttle cable adjustment may clear this problem. See page 15-71.
U	Check if servo valve check valve stopper cap is installed. If it was not installed, the check valve may have been pushed out by hydraulic pressure causing a leak (internally) affecting all forward gears.
V	Throttle cable adjustment is essential for proper operation of the transmission. Not only does it affect the shift points if misadjusted but also the shift quality and lockup clutch operation. A too long adjusted cable will result in throttle pressure being too low for the amount of engine torque input into the transmission, and may cause clutch slippage. A too short adjusted cable will result in too high throttle pressures which may cause harsh shifts, erratic shifts and torque converter hunting.

ATSG HONDA BULLETINS

- 86-50 CLEANING VALVE BODY
- 87-27 NOISE, DRIVE TO REVERSE-REVERSE TO DRIVE
- 88-40 SPRAG INSTALLATION
- 89-40 HARSH ENGAGEMENT
- 90-70 HARSH SHIFTS
- 91-65 SLIPPING, SHUDDERS, HARD UP OR DOWN SHIFTS AND TRANS FAILURE
- 91-66 NO REVERSE AND SECOND GEAR STARTS
- 91-67 SLIPPING OR NO 1ST GEAR
- 91-68 HIGH LINE PRESSURE
- 92-07 LATE 1-2 SHIFT
- 92-08 NO-UPSHIFT
- 92-09 SQUAWKING NOISE GOING INTO 1ST

Road Test

NOTE: After transmission is installed;

- Make sure the floor mat does not interfere with accelerator pedal travel. Fully depress accelerator pedal and check to make sure the throttle lever is fully opened.

Warm up the engine to operating temperature.

D3 and D4 Range

1. Apply parking brake and block the wheels. Start the engine, then move the selector to **D4** while depressing the brake pedal. Depress the accelerator pedal, and release it suddenly. Engine should not stall.
2. Check that shift points occur at approximate speeds shown. Also check for abnormal noise and clutch slippage.

● Upshift

1st → 2nd 2nd → 3rd 3rd → 4th LC. ON

Full-throttle Acceleration from a stop	31–36 mph	58–64 mph	88–94 mph	74–81 mph
Half-throttle Acceleration from a stop	18–22 mph	37–43 mph	57–64 mph	41–47 mph
Closed-throttle Coasting down-hill from a stop	10–12 mph	19–23 mph	26–32 mph	14–18 mph

● Downshift

4th → 3rd 3rd → 2nd 2nd → 1st

Full-throttle When car is slowed by increased grade, wind, etc.	73–80 mph	53–60 mph	21–27 mph
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4th → 2nd 2nd → 1st

Closed-throttle Coasting or braking to a stop	15–19 mph	5–8 mph
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3. Accelerate to about 35 mph so the transmission is in 4th, then shift from **D4** to **2**. The car should immediately begin slowing down from engine braking.

CAUTION: Do not shift from **D4** or **D3** to **2** at speeds over 60 mph; you may damage the transmission.

2 (2nd Gear)

1. Accelerate from a stop at full throttle. Check that there is no abnormal noise or clutch slippage.
2. Upshifts and downshifts should not occur with the selector in this range.

R (Reverse)

Accelerate from a stop at full throttle, and check for abnormal noise and clutch slippage.

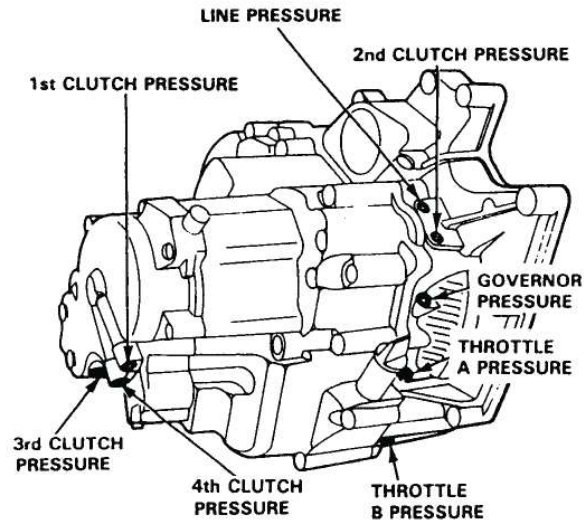
P (Park)

Park car on a slope (approx. 16°), apply the parking brake, and shift into Park. Then release the brake; the car should not move.

Pressure Test

NOTE:

- Stop engine when attaching hoses for pressure tests.
Torque hose fitting to 18 N·m (1.8 kg-m, 12 lb-ft).
- Do not reuse aluminum washers.
- For throttle and governor test, use Low Pressure Gauge,



CAUTION: Before checking, be sure transmission is filled to proper level.

PRESSURE	SELECTOR POSITION	MEASUREMENT	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
					Standard	Service Limit
LINE	N or P	• With parking brake applied • Run engine at 2,000 rpm	No (or low) LINE pressure	Torque converter, oil pump pressure regulator, torque converter check valve, oil pump	834 - 883 kPa (8.5 - 9.0 kg/cm ² , 121 - 128 psi)	785 kPa (8.0 kg/cm ² , 114 psi)
1st	D3 or D4	MEASUREMENTS • With parking brake applied raise front wheels off ground and support with safety stands • Run engine at 2,000 rpm	No (or low) First pressure	1st clutch O-rings	785 - 883 kPa (8.0 - 9.0 kg/cm ² , 114 - 128 psi)	785 kPa (8.0 kg/cm ² , 114 psi)
2nd	2		No (or low) SECOND pressure	2nd clutch O-rings	441 - 883 kPa (4.5 - 9.0 kg/cm ² , 64 - 128 psi) varies with throttle opening.	392 kPa (4.0 kg/cm ² , 57 psi) with lever released, 785 kPa (8.0 kg/cm ² , 114 psi) with lever in full throttle
3rd	D3		No (or low) THIRD pressure	3rd clutch		
4th	D4		No (or low) FOURTH pressure	4th clutch		
THROTTLE	D3 or D4	• With parking brake applied raise front wheels off ground and support with safety stands • Run engine at 1,000 rpm • Disconnect throttle control cable at throttle lever • Read pressure with lever released • Manually push lever up simulating full throttle • Read pressure with lever in full throttle position	No (or low) THROTTLE pressure	Throttle valve A Throttle modulator valve	0 kPa (0 kg/cm ² , 0 psi) lever is released, 495 - 510 kPa (5.05 - 5.20 kg/cm ² , 72 - 74 psi) with lever in full throttle position	490 kPa (5.00 kg/cm ² , 71 psi) with lever in full throttle position
				Throttle valve B	0 kPa (0 kg/cm ² , 0 psi) with lever released, 834 - 883 kPa (8.5 - 9.0 kg/cm ² , 121 - 128 psi) with lever in full throttle position	785 kPa (8.0 kg/cm ² , 114 psi)
GOVERNOR	D3 or D4	• Place vehicle on chassis dynamometer, or jack up front of car, support with safety stands, block rear wheels, and set hand brake • Run vehicle at 38 mph	No (or low) GOVERNOR pressure	Governor valve	221 - 230 kPa (2.25 - 2.35 kg/cm ² , 32 - 33 psi)	216 kPa (2.20 kg/cm ² , 31 psi)

Stall Speed

Test

1. Engage parking brake and block front wheels.
2. Connect safety chains to both front tow hooks and attach, with minimum slack, to some strong stationary object.
3. Connect tachometer, and start engine.
4. After engine has warmed up to normal operating temperature, shift into **D3**.
5. Fully depress brake pedal and accelerator for 6 to 8 seconds, and note engine speed.

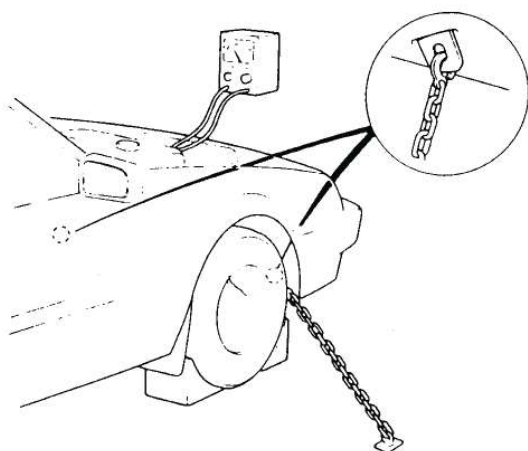
CAUTION: To prevent transmission damage, do not test stall speed for more than 10 seconds at a time.

6. Allow 2 minutes for cooling, then repeat same test in **D4**, **2** and **R**.
Stall speed in **D3**, **D4**, **2**, and **R** must be the same, and must also be within limits:

Stall Speed RPM:

SERVICE LIMIT:
1,850 - 2,800 RPM

TROUBLE	PROBABLE CAUSE
Stall rpm high in 2 , D3 , D4 & R .	Low fluid level or oil pump output, clogged oil strainer, pressure regulator valve stuck closed. Slipping clutch.
Stall rpm high in D3 , D4 only.	Slippage of 1st clutch
Stall rpm low in 2 , D3 , D4 & R .	• Engine output low, throttle cable misadjusted at throttle body. • Oil pump seized. • Torque Converter one-way clutch slipping.



Maintenance

Checking/Changing

Checking

With the car on level ground, unscrew the transmission dipstick and check the level of fluid immediately after the engine is shut off (within one minute). The fluid level should be between the full and low marks. Do not screw dipstick in to check the fluid level. If the level is at, or below, the low mark, add DEXRON-type automatic transmission fluid.

USE HONDA BRAND FLUID TO PREVENT SHIFT COMPLAINTS

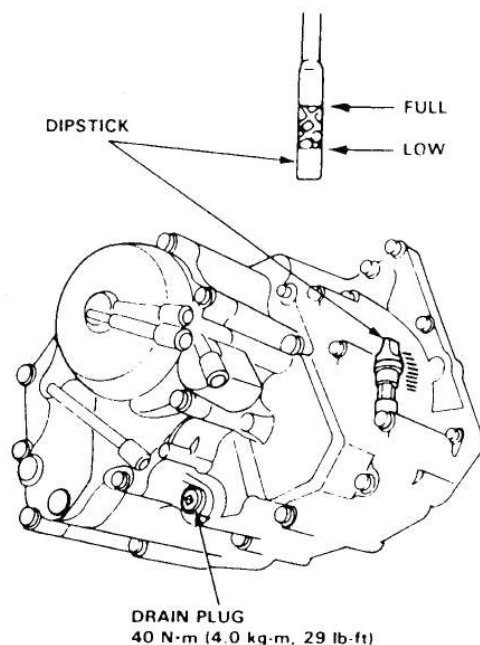
Changing

1. Bring the transmission up to operating temperature by driving the car. Park the car on level ground, turn the engine off, then remove drain plug.
2. Reinstall the drain plug with a new washer, then refill the transmission to the full mark on the dipstick.

Automatic transmission Capacity:

3.0 l (3.2 U.S. qts., 2.6 Imp. qt) at change

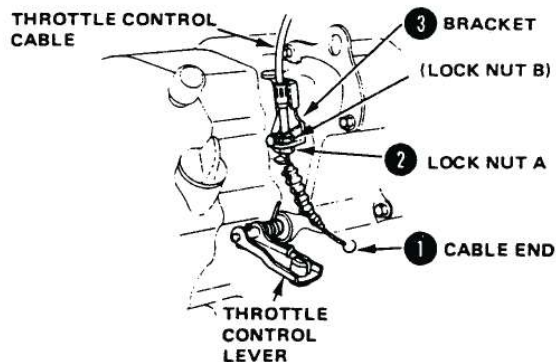
6.0 l (6.3 U.S. qts., 5.3 Imp. qt) at after overhaul



Transmission

Removal

1. Disconnect ground cable at battery and transmission.
2. Release steering lock, and shift gear selector to N.
3. Disconnect wiring:
 - Battery positive cable from starter.
 - Black/white wire from starter solenoid.
4. Disconnect cooler hoses, and wire them up next to the radiator so ATF won't drain out.
5. Remove starter mounting bolts and top transmission mounting bolt.
6. Loosen front wheel nuts.
7. Apply parking brake, block rear wheels, then raise front end on jack stands and remove front wheels.
8. Drain transmission. Reinstall drain plug with a new washer.
9. Remove throttle control cable:
 - Remove the cable end from the throttle lever.
 - Loosen the lock nut A only.
 - Remove the cable from bracket.



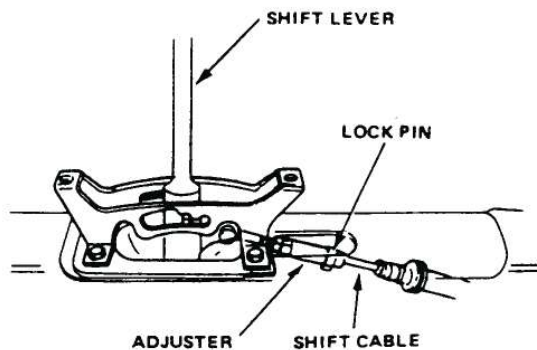
NOTE: For cable adjustment see page 74

10. Remove power steering speed sensor complete with speedometer cable and hoses.
11. Remove two upper transmission mounting bolts.
12. Place transmission jack securely beneath transmission, and hook hanger plate with hoist; make sure hoist chain is tight.
13. Remove subframe center beam and splash pan.
14. Remove the ball joint pinch bolt from the right-side lower control arm, then use a puller to disconnect the ball joint from the knuckle. Remove the damper fork bolt.

15. Turn right side steering knuckle to its most out-board position. With screwdriver, pry CV joint out approximately 1/2", then pull CV joint out of transmission housing.

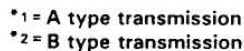
CAUTION: Do not pull on the driveshaft or knuckle since this may cause the inboard CV joint to separate; pull on the inboard CV joint.

16. Remove transmission damper bracket located in front of torque converter cover plate.
17. Remove torque converter cover plate.
18. Remove center console and shift indicator.



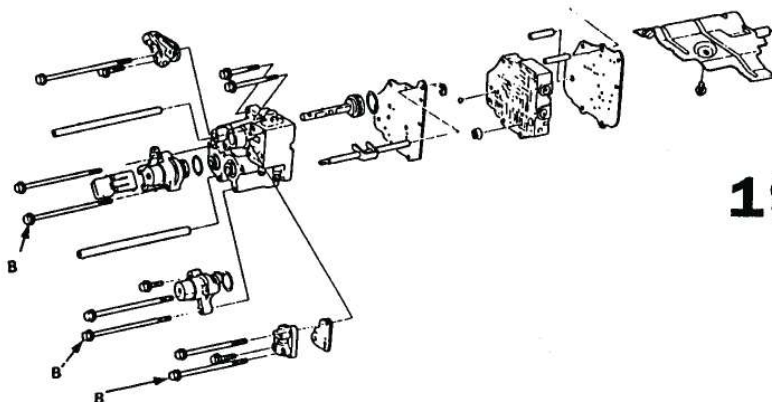
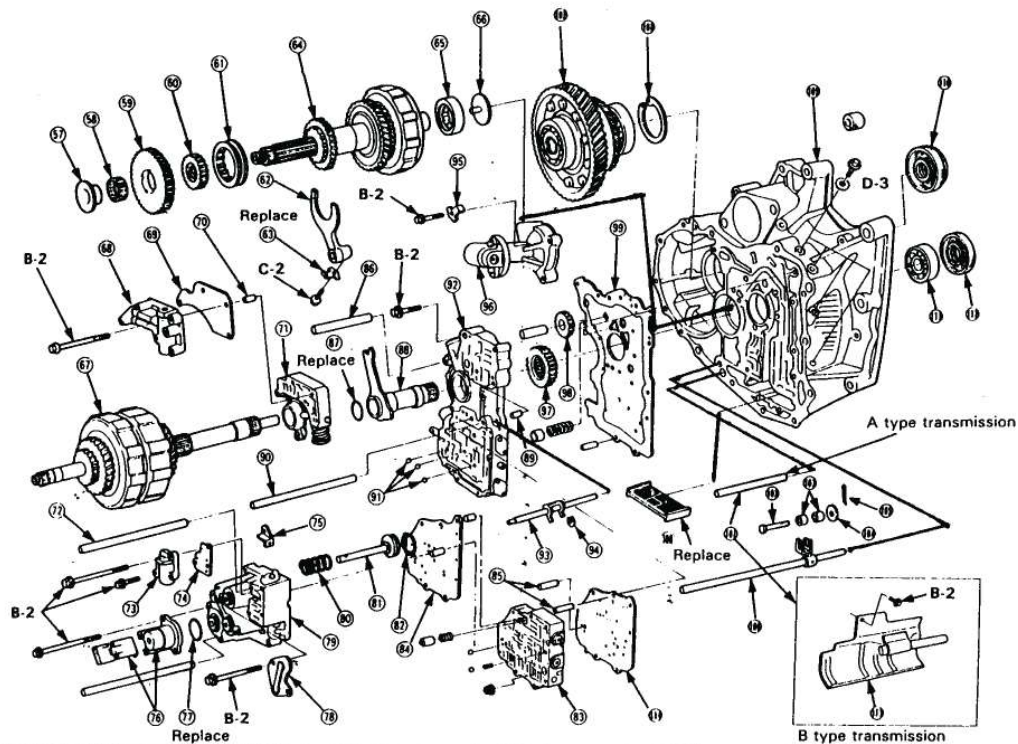
19. Remove lock pin from adjuster and shift cable.
NOTE: On reassembly, check cable adjustment

20. Remove both bolts and pull shift cable out of housing.
21. Unbolt torque converter assy from drive plate by removing eight bolts.
22. Remove the three rear engine mounting bolts from transmission housing.
Remove the rear engine mount.
23. Remove the front transmission mount's two bolts.
24. Remove the lower transmission mounting bolt.
25. Pull transmission away from the engine to clear the two 14 mm dowel pins.
 - Pry left-side CV joint out approximately 1/2".
 - Pull transmission out and lower on transmission jack.
 - Remove torque converter from transmission.



Torque	Bolt size
A—8 N·m (0.8 kg·m, 6 lb·ft)	1—5 × 0.8 mm
B—	2—6 × 1.0 mm
C—14 N·m (1.4 kg·m, 10 lb·ft)	3—8 × 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—40 N·m (4.0 kg·m, 29 lb·ft)	
*1G—110→0→110 N·m (11.0→0→11.0 kg·m, 80→0→80 lb·ft)	20 × 1.25 mm
*2H—140→0→140 N·m (14.0→0→14.0 kg·m, 102→0→102 lb·ft)	23 × 1.25 mm
I—95→0→95 N·m (9.5→0→9.5 kg·m, 70→0→70 lb·ft)	19 × 1.25 mm

- 13-



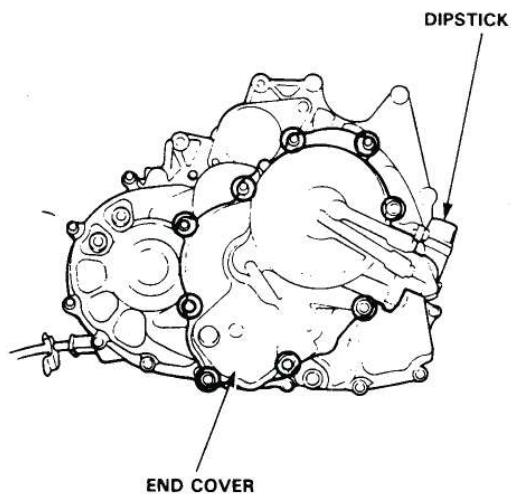
1989

- | | | | |
|--------------------------------|------------------------------|-------------------------------|-------------------------------|
| 57 REVERSE GEAR COLLAR | 70 DOWEL PIN | 84 SERVO SEPARATOR PLATE | 102 FILTER SCREEN |
| 58 NEEDLE BEARING | 71 REGULATOR VALVE BODY | 85 DOWEL PIN | 103 SUCTION PIPE |
| 59 COUNTERSHAFT | | 86 STOP PIN | 104 A type transmission only |
| 60 REVERSE GEAR | | 87 O-RING | 105 MANUAL VALVE PIN |
| 61 SELECTOR HUB | | 88 STATOR SHAFT | 106 ROLLERS |
| 62 REVERSE GEAR | 72 4th CLUTCH PIPE | 89 DOWEL PIN | 107 WASHER 5 mm |
| 63 SELECTOR | 73 MODULATOR VALVE BODY | 90 1st CLUTCH PIPE | 108 COTTER PIN |
| 64 REVERSE SHIFT FORK | | 91 STEEL BALLS | 109 CONTROL SHAFT |
| 65 LOCK PLATE | 74 SEPARATOR PLATE | 92 MAIN VALVE BODY ASSY | 110 DIFFERENTIAL |
| 66 COUNTERSHAFT ASSY | 75 CHECK VALVE STOP PLATE | | 111 SNAP RING 80 mm |
| | 76 4th ACCUMULATOR COVER | | 112 TORQUE CONVERTER |
| | 77 O-RING | | 113 HOUSING |
| 65 COUNTERSHAFT NEEDLE BEARING | 78 2nd/3rd ACCUMULATOR COVER | 93 THROTTLE CONTROL SHAFT | 114 DIFFERENTIAL OIL |
| 66 OIL GUIDE PLATE | 79 SERVO VALVE BODY ASSY | 94 E-CLIP | 115 SEAL |
| 67 MAINSHAFT ASSY | | 95 LOCK PLATE | 116 MAINSHAFT BEARING |
| | | 96 GOVERNOR VALVE | 117 MAINSHAFT OIL SEAL |
| 68 LOCK UP SHIFT VALVE BODY | 80 RETURN SPRING | | 118 BAFLE PLATE |
| | 81 SERVO VALVE | 97 PUMP DRIVE GEAR | B type transmission only |
| | 82 O-RING 31 x 2.7 mm | 98 PUMP DRIVEN GEAR | |
| | 83 SECONDARY VALVE BODY ASSY | 99 MAIN VALVE SEPARATOR PLATE | |
| 69 SEPARATOR PLATE | | | 117 SECONDARY SEPARATOR PLATE |

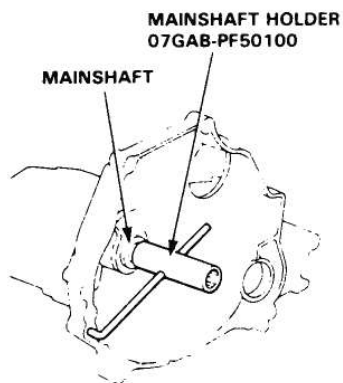
Transmission Housing

Removal

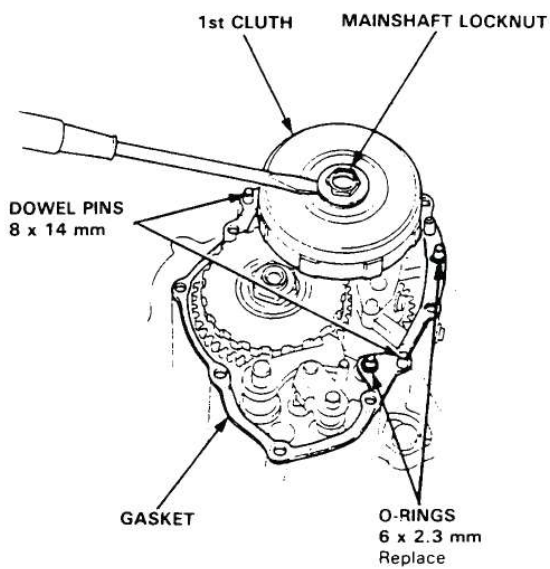
1. Remove the dipstick.
2. Remove the nine bolts from the end cover, then remove the cover.



3. Shift the transmission to PARK.
4. Lock the mainshaft using the mainshaft holder.

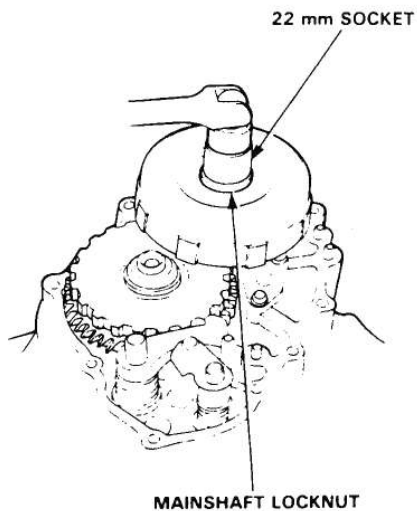


5. Remove the end cover gasket, dowel pins, and O-rings.
6. Pry the staked edge of the locknut flange out of the notch in the 1st clutch.



7. Remove the mainshaft locknut.

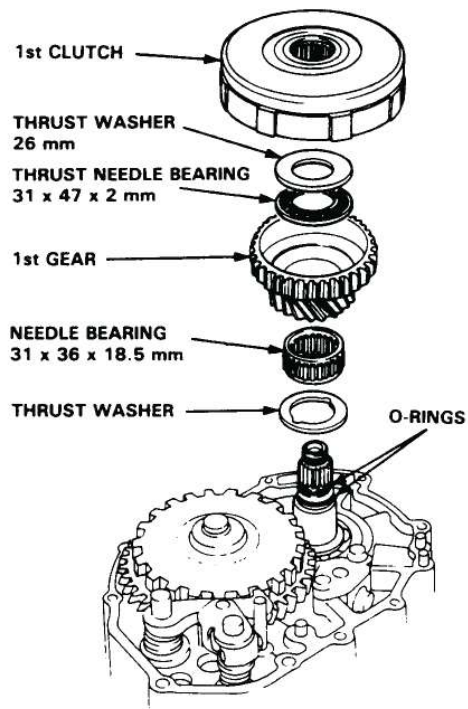
CAUTION: The mainshaft locknut has left-hand threads.



8. Remove the 1st clutch.

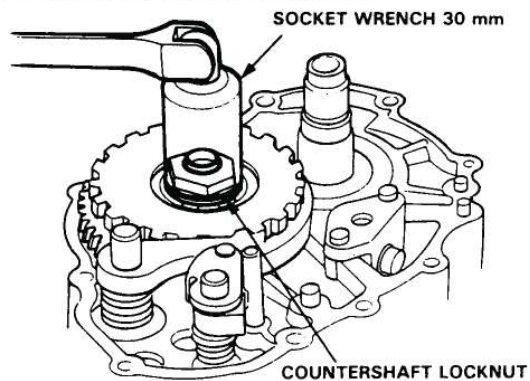
9. Remove the needle bearing and thrust washer from the mainshaft.

10. Remove the O-rings and first gear from the mainshaft.

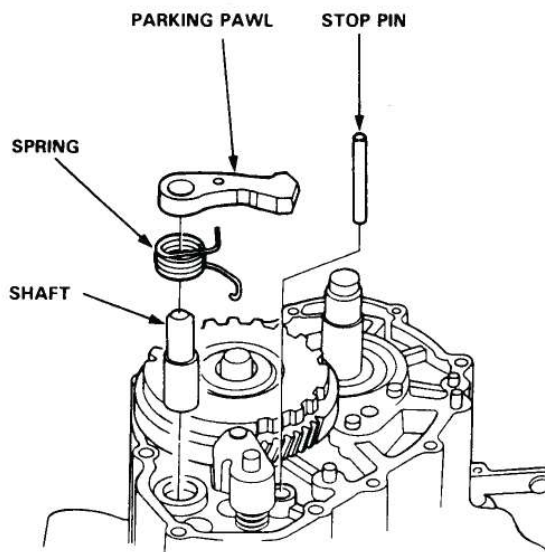


11. Pry the staked edge of the locknut out of the notch in the parking gear.

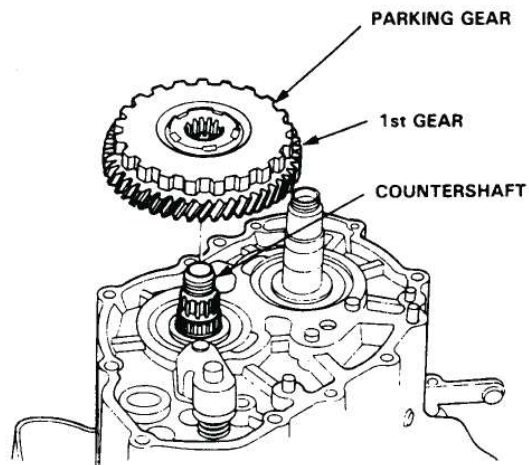
12. Remove the countershaft locknut.



13. Remove the parking pawl, shaft, stop pin and spring.



14. Remove the parking gear and countershaft 1st gear as a unit.



(cont'd)

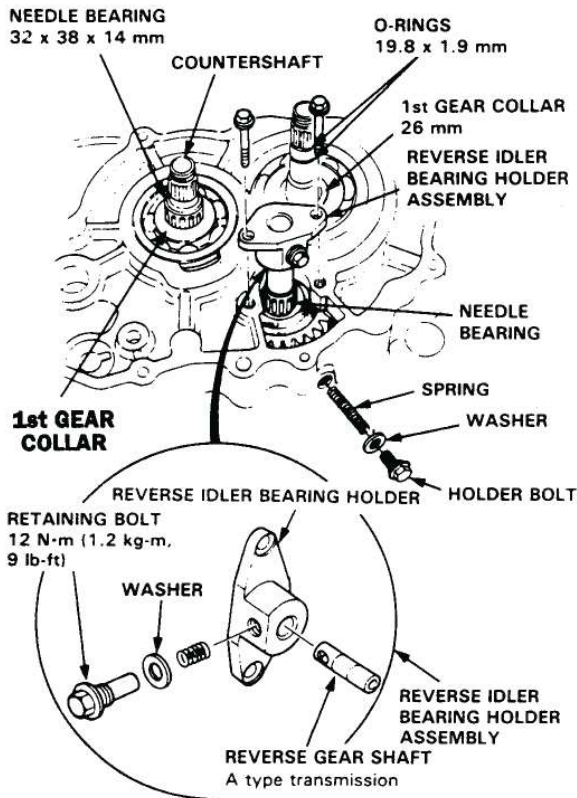
Transmission Housing

Removal (cont'd)

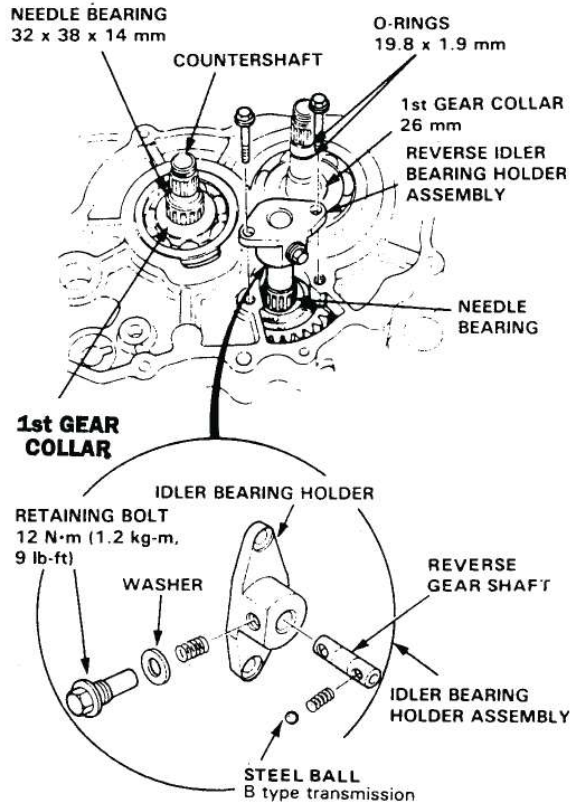
15. From the countershaft, remove the needle bearing and 1st gear collar. From the mainshaft, remove the 1st gear collar.

16. Remove the reverse idler bearing holder assembly.

(A type transmission)

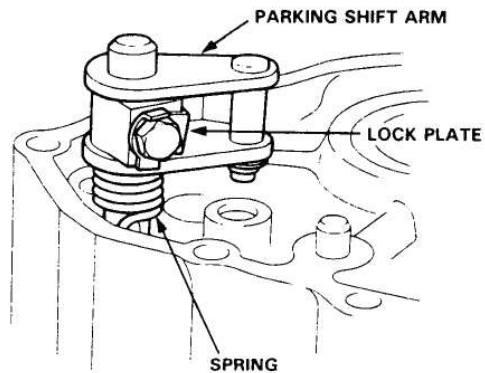


(B type transmission)

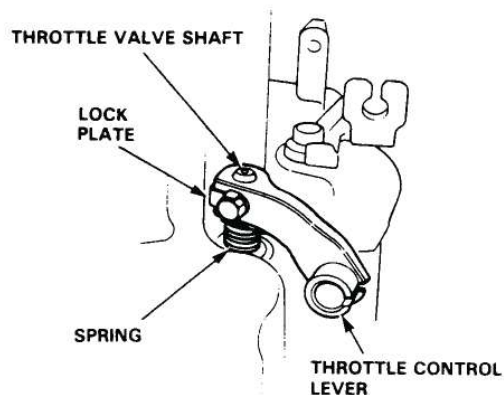


17. Bend down the tab on the lock plate under the parking shift arm bolt.

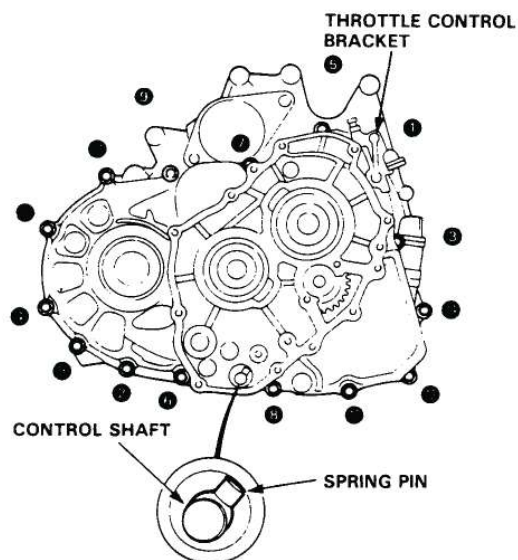
18. Remove the bolt, then remove the parking shift arm.



19. Bend down the tab on the throttle control lever bolt lock plate, then remove the bolt. Remove the throttle control lever and spring from the throttle valve shaft.

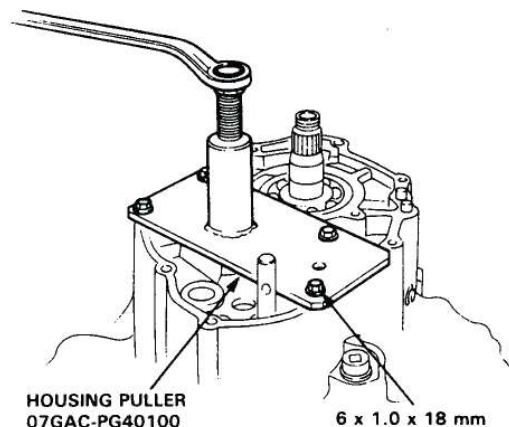


20. Remove the 10 x 1.25 mm bolts, (1) thru (15), in the sequence shown.



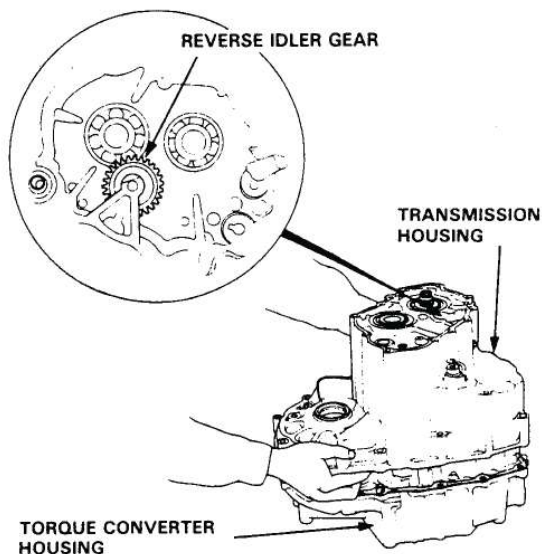
21. Align the control shaft spring pin with the cutout in the transmission housing.

22. Install the transmission housing puller over the countershaft with four bolts and tighten securely. Screw in the puller bolt against the end of the countershaft until the transmission housing comes loose.



23. Remove the puller and separate the housings. Remove the reverse idler gear and needle bearing from the transmission housing.

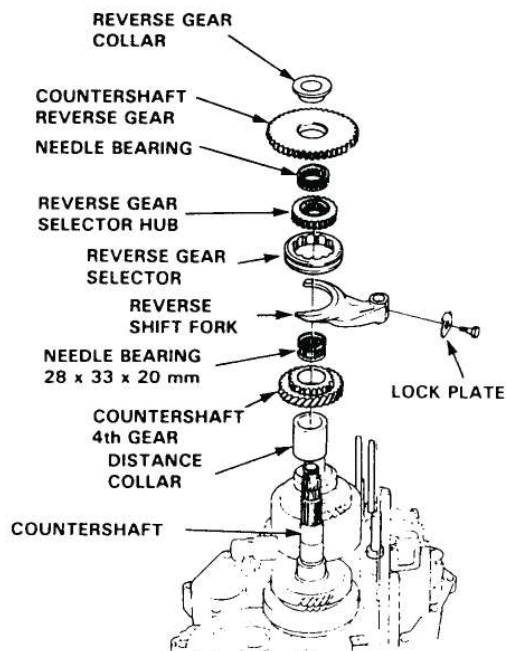
24. Remove the gasket and the dowel pins.



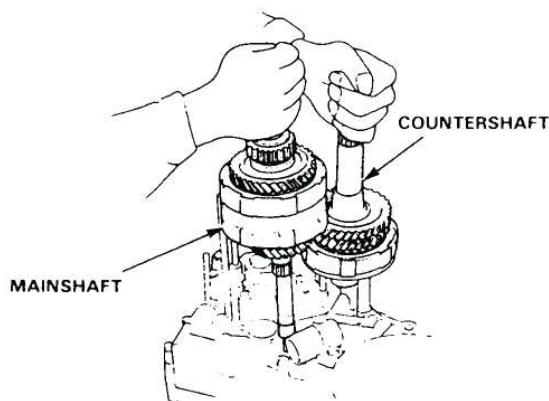
Mainshaft/ Countershaft

Removal

1. Remove the reverse gear collar, countershaft reverse gear and needle bearing.



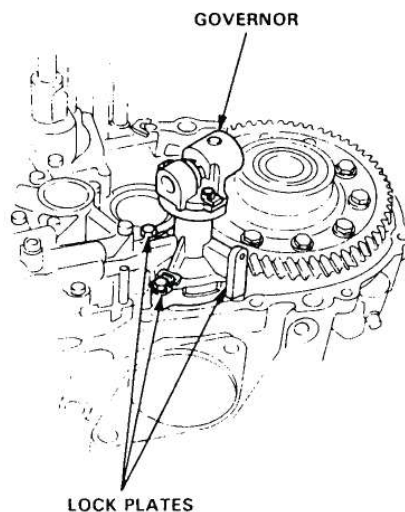
2. Bend down the tab on the lock plate and remove the bolt from the reverse shift fork.
3. Remove the reverse shift fork and reverse gear selector as a unit.
4. Remove the selector hub, countershaft 4th gear, needle bearing and distance collar.
5. Remove the mainshaft and countershaft together.
NOTE: It will be necessary to pull up the countershaft at a slight angle to clear the governor.



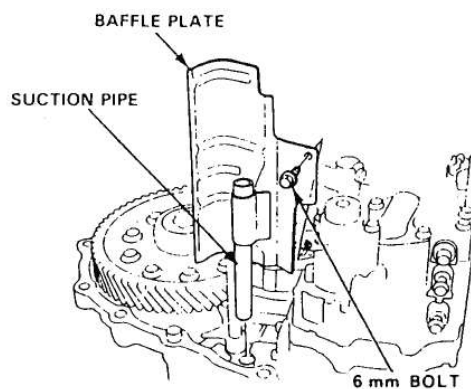
Governor Valve

Removal

Bend down the tabs on the lock plates, remove the bolts holding the governor to the torque converter housing, and remove the governor.



1. Remove the baffle plate with the suction pipe (baffle plate is applied from B type transmission).



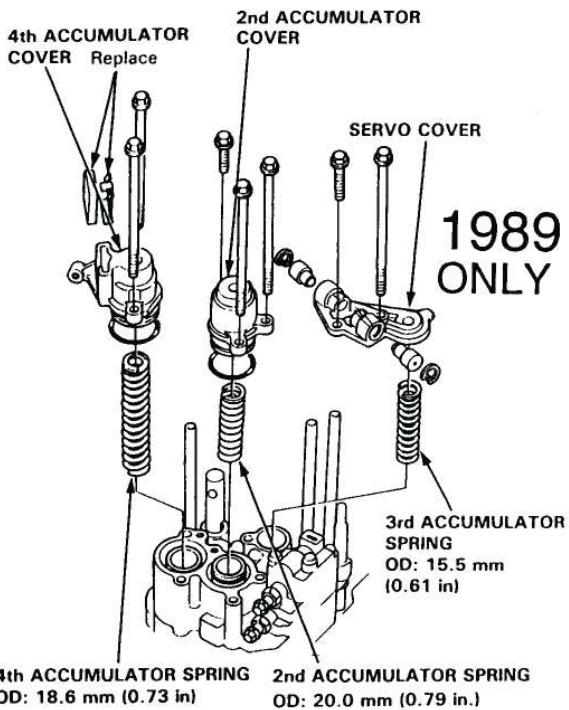
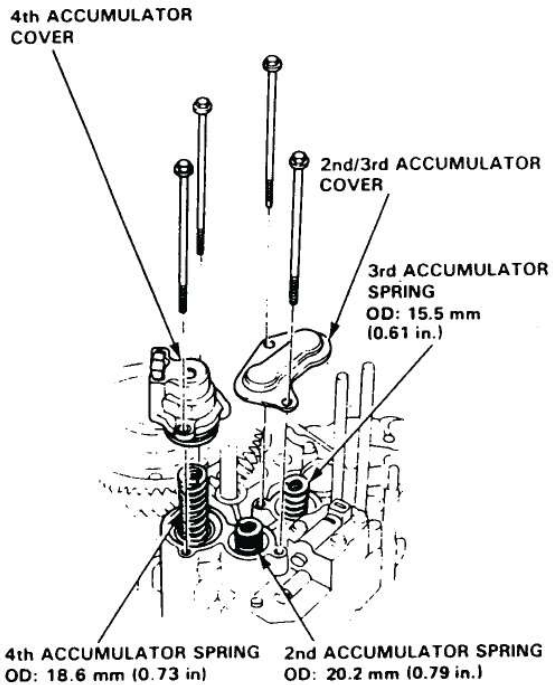
2. Remove the accumulator covers.

CAUTION: Accumulator covers are spring loaded; to prevent stripping the threads in the torque converter housing, press down on the accumulator covers while unscrewing the bolts in a crisscross pattern.

Main Valve Body

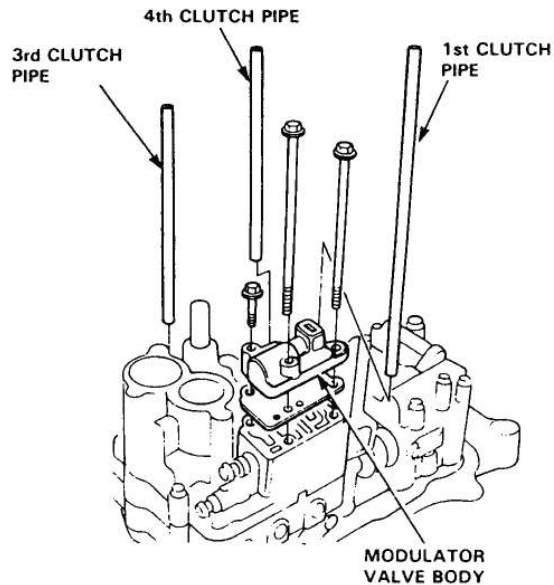
Removal

3. Remove the accumulator springs.

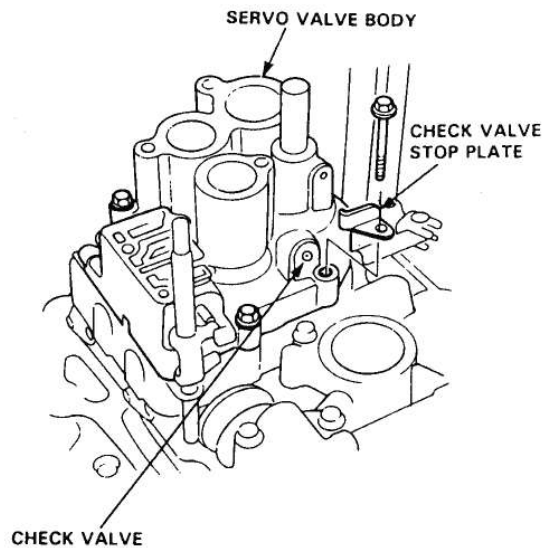


4. Remove the three bolts attaching the modulator valve body.

5. Remove the 1st, 4th and 3rd clutch pipe



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



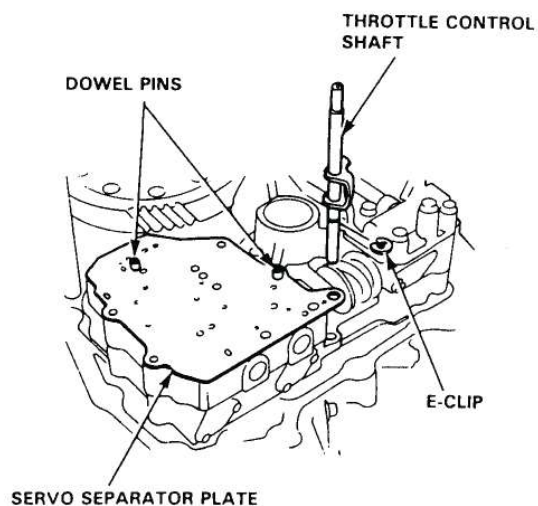
(cont'd)

Main Valve Body

Removal (cont'd)

8. Remove the E-clip. Then remove the throttle control shaft from the separator plate.

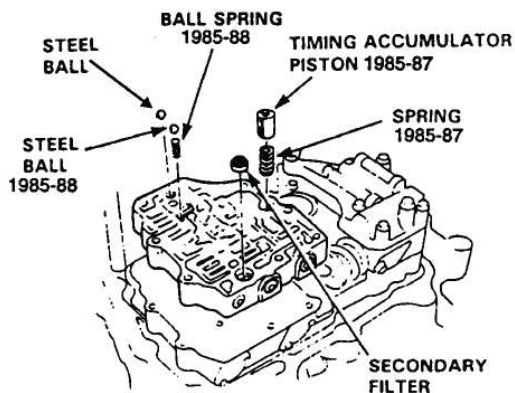
9. Remove the separator plate and dowel pins.



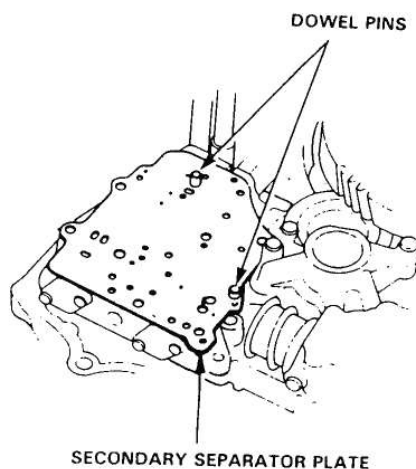
10. Remove the secondary valve body, being careful not to lose the 2 steel balls, ball spring, check valve and spring, secondary filter. 1988 & 89 see page 25

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

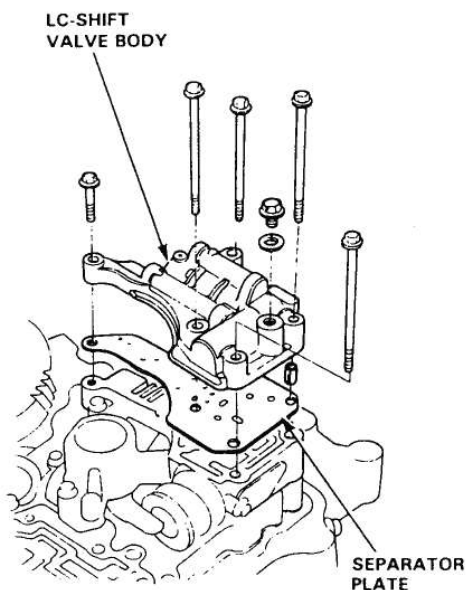
SEE PAGE 25 FOR CHECK BALL LOCATIONS



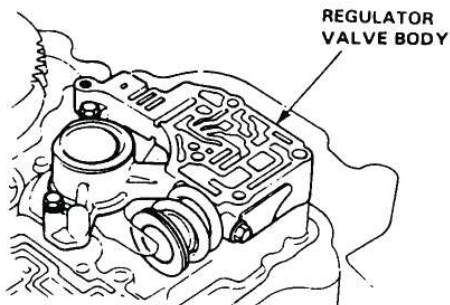
11. Remove the separator plate and dowel pins.



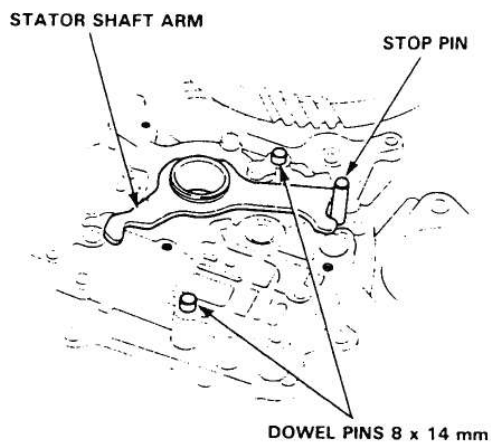
12. Remove the LC-Shift valve body and separator plate (5 bolts).



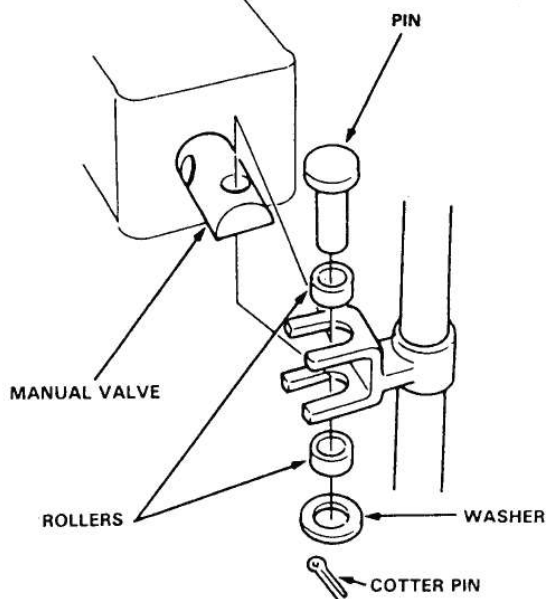
13. Remove the regulator valve body.



14. Remove the stator shaft arm, dowel pins and stop pin.



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



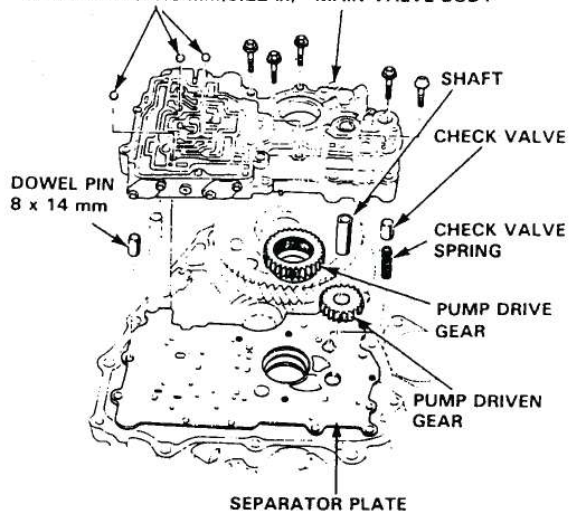
16. Remove the main valve body being careful not to lose the steel balls, torque converter check valve and spring.

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

SEE PAGE 26 FOR CHECK BALL LOCATIONS

OIL PASSAGE

STEEL BALLS 5.5 mm(0.22 in) MAIN VALVE BODY



(cont'd)

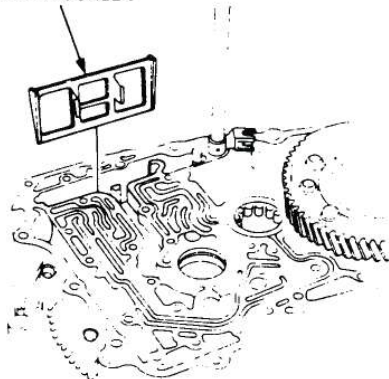
Main Valve Body

Removal (cont'd)

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.

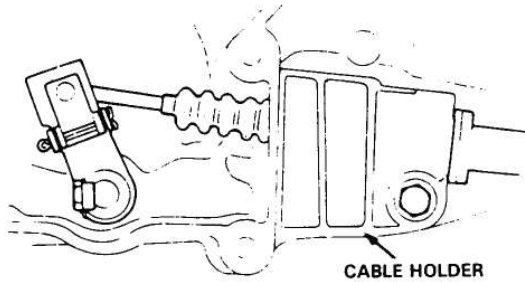
FILTER SCREEN



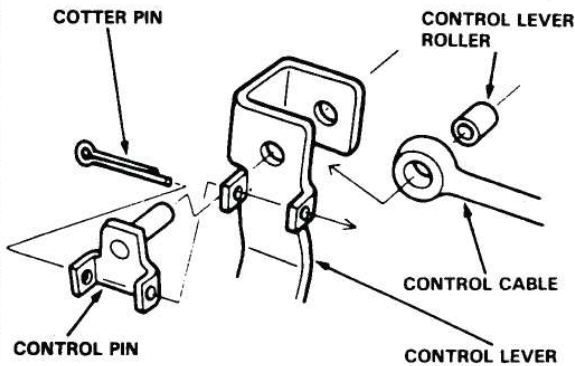
Control Shaft

Removal

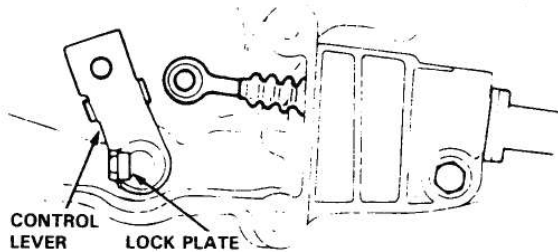
1. Remove the cable holder.



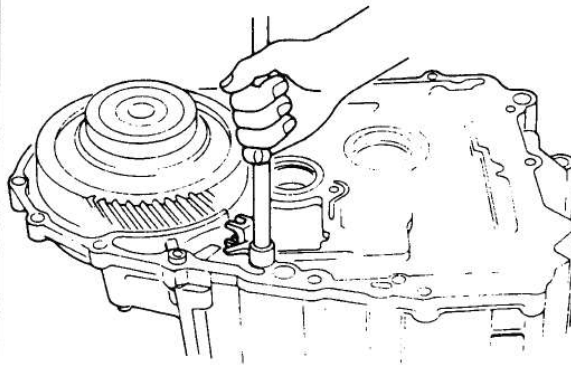
2. Remove the cotter pin, control pin, and control lever roller from the control lever.



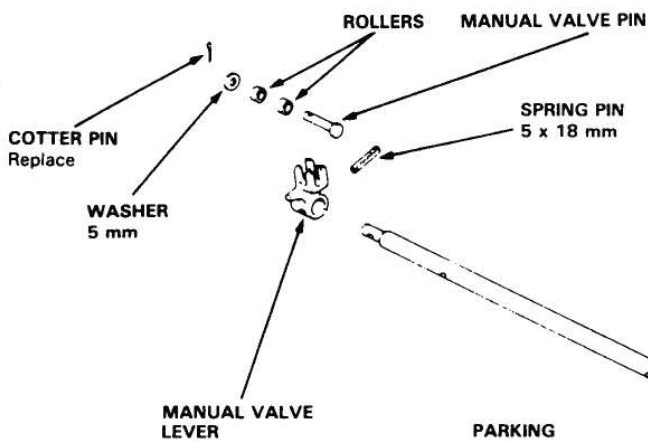
3. Bend down the tab on the lock plate under the bolt in the control lever. Then remove the bolt and lever.



4. Turn the torque converter housing over and remove the control shaft.

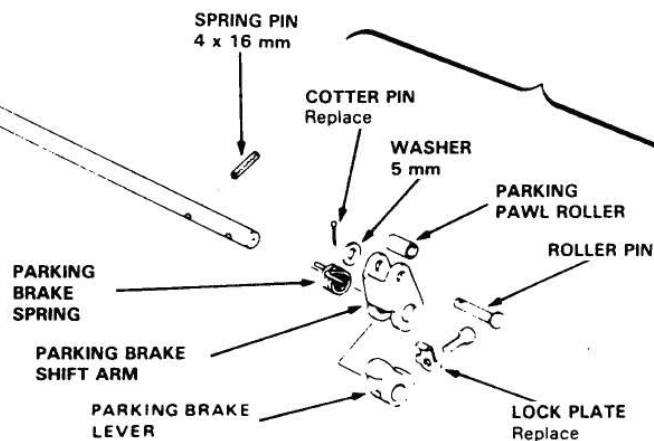


Disassembly/Reassembly



NOTE:

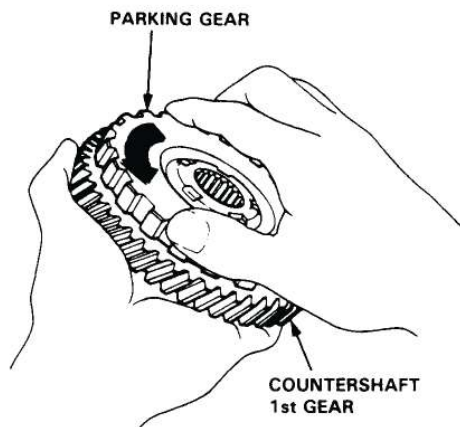
These parts are installed on the shaft after the transmission and torque converter housings are assembled.



One-Way Clutch/Parking Gear

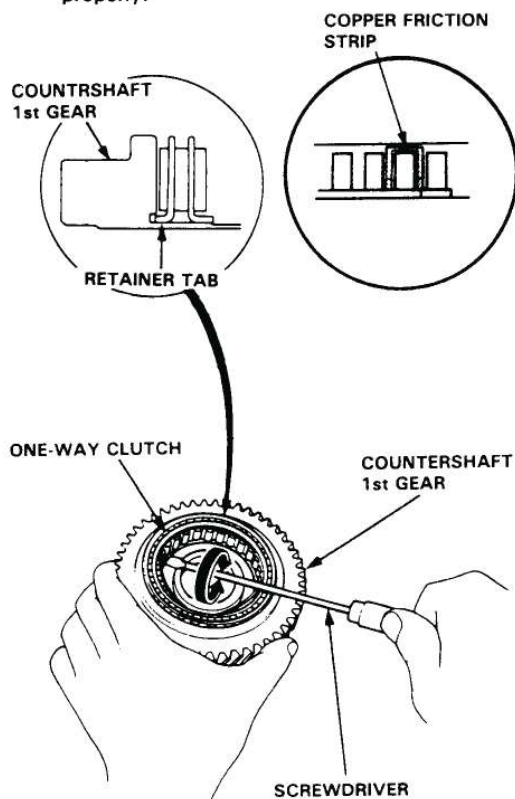
Disassembly and Inspection

1. Separate the countershaft 1st gear from the parking gear by turning the parking gear in the direction shown.

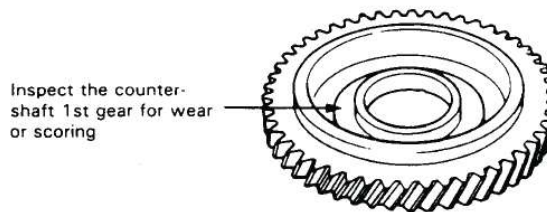
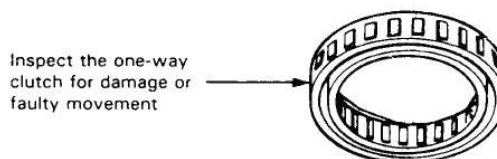
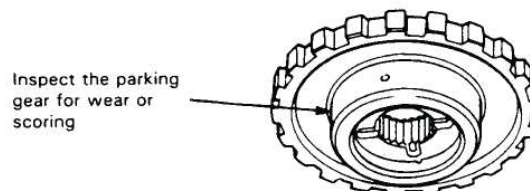


2. Remove the one-way clutch by prying it up with the end of a screwdriver.

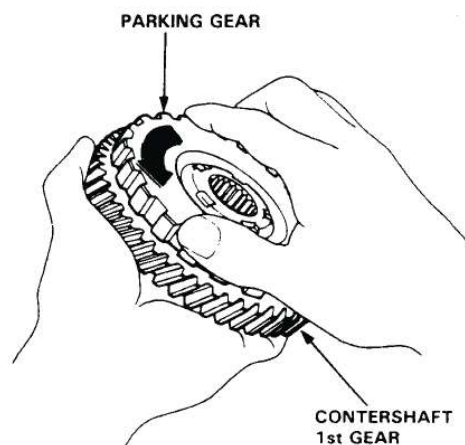
CAUTION: Do not pry on the three copper friction strips; if you break a strip, the clutch will not work properly.



Inspect the parts as follows:

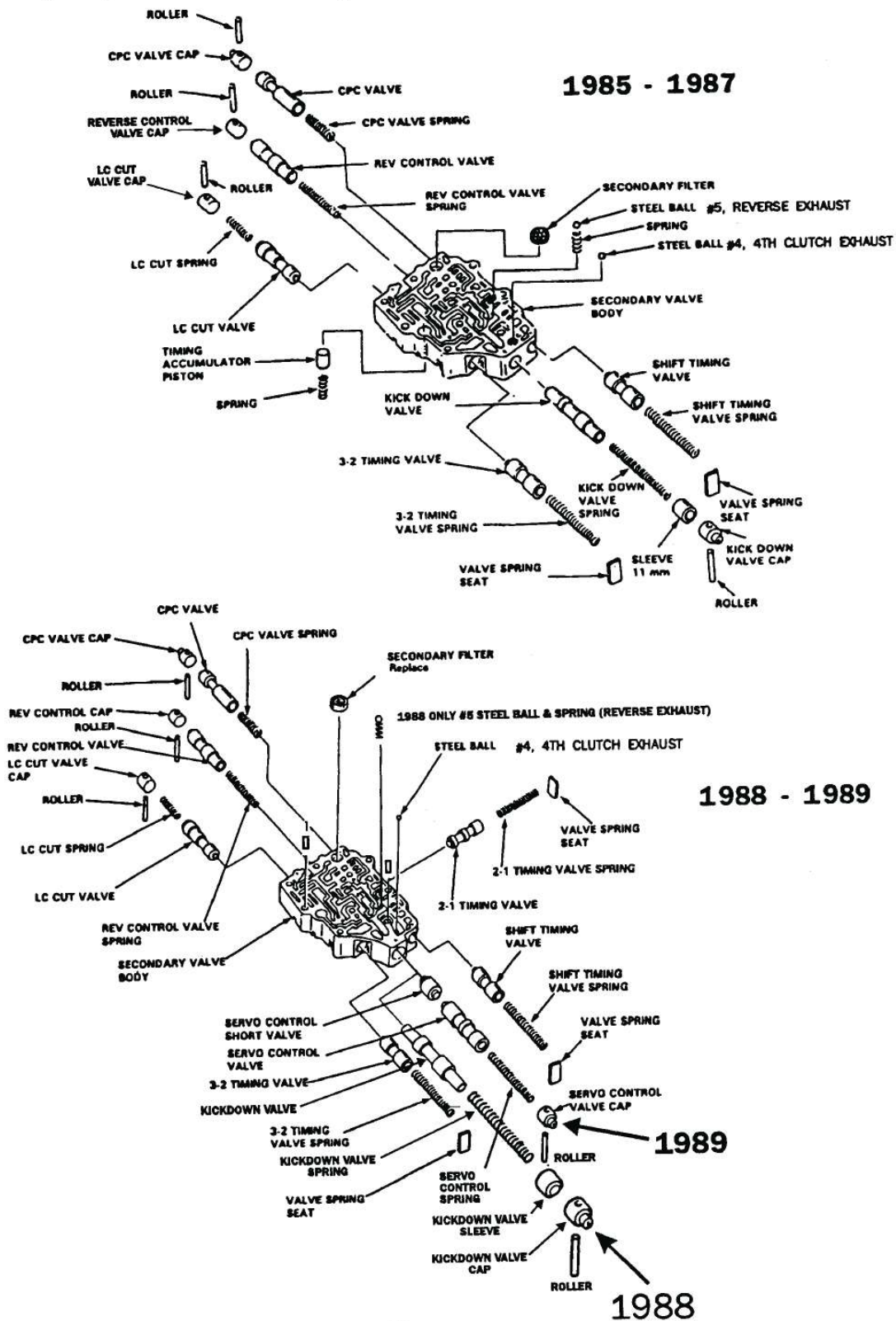


After the parts are assembled, hold the countershaft 1st gear and turn the parking gear in direction shown to be sure it turns freely.



Secondary Valve Body

Disassembly/Inspection/Reassembly

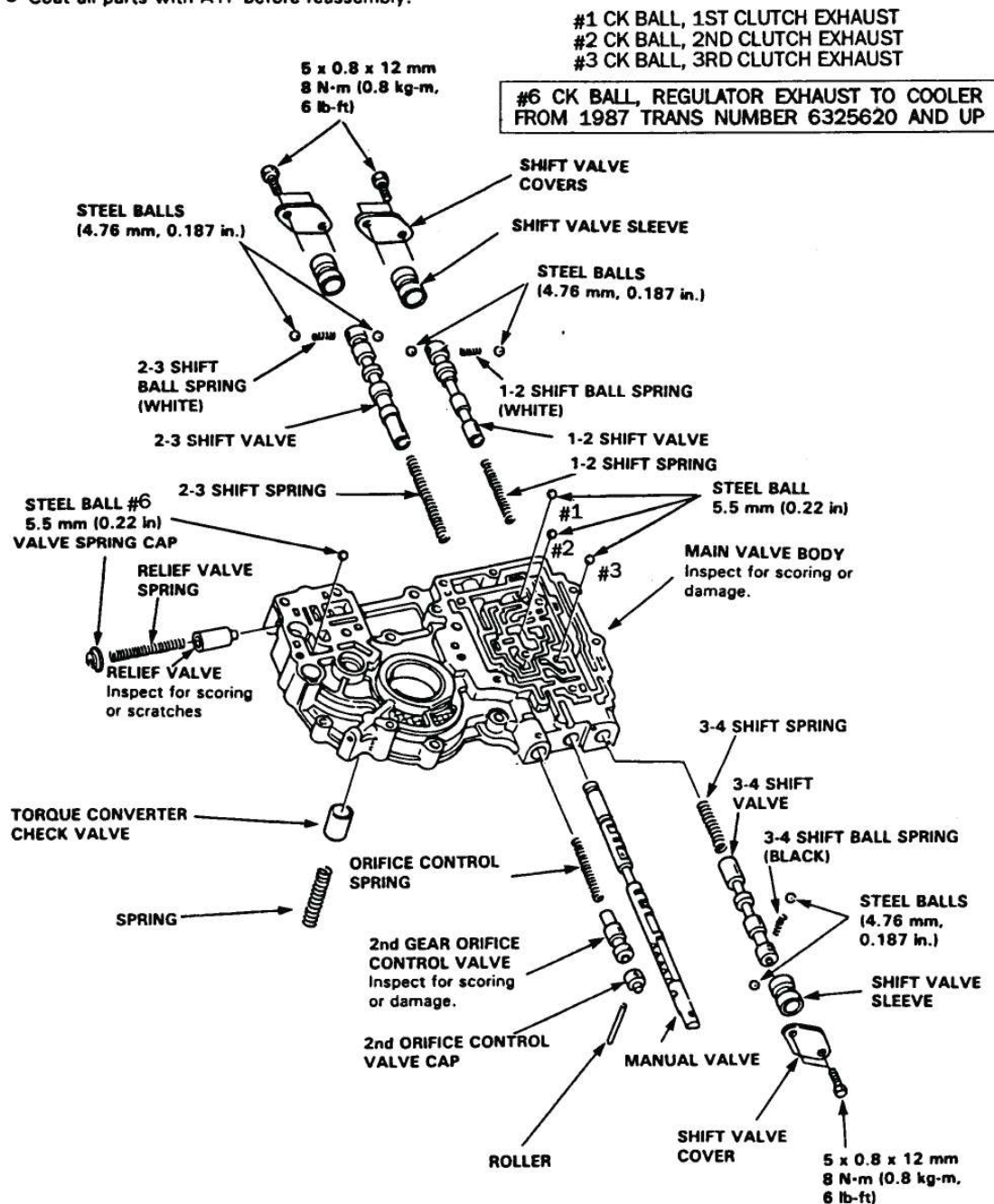


MAIN VALVE BODY

Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Replace valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement.
- Coat all parts with ATF before reassembly.



Valve Body

Repair

NOTE: This repair is only necessary if one or more of the valves in a valve body do not slide smoothly in their bores. You may use this procedure to free the valves in the main valve body, regulator valve body, lock-up shift valve body, and servo valve body. **DO NOT** use this procedure to free the valves in the governor; if any governor valves are stuck, the governor must be replaced as an assembly.

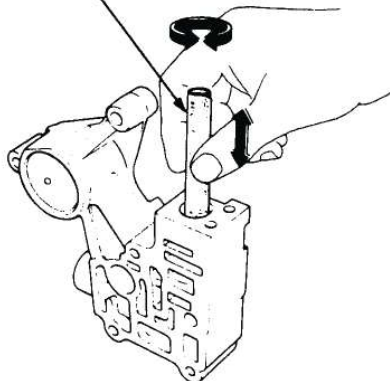
1. Soak a sheet of #600 abrasive paper in ATF for about 30 minutes.
2. Carefully tap the valve body so the sticking valve drops out of its bore.

CAUTION: It may be necessary to use a small screwdriver to pry the valve free. Be careful not to scratch the bore with the screwdriver.

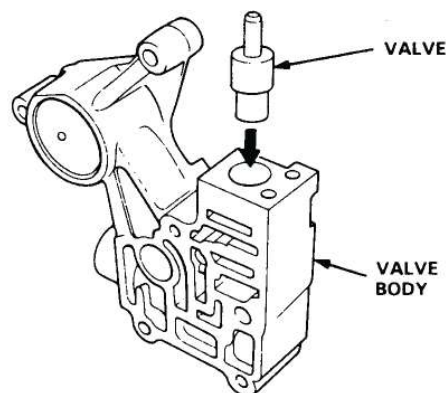
3. Inspect the valve for any scuff marks. Use the ATF-soaked #600 paper to polish off any burrs that are on the valve, then wash the valve in solvent and dry it with compressed air.
4. Roll up half a sheet of ATF-soaked paper and insert it in the valve bore of the sticking valve. Twist the paper slightly, so that it unrolls and fits the bore tightly, then polish the bore by twisting the paper as you push it in and out.

CAUTION: The valve body is aluminum and doesn't require much polishing to remove burrs.

ATF-soaked
#600 abrasive
paper



5. Remove the #600 paper and thoroughly wash the entire valve body in solvent, then dry with compressed air.
6. Coat the valve with ATF then drop it into its bore. It should drop to the bottom of the bore under its own weight. If not, repeat step 4, then retest.



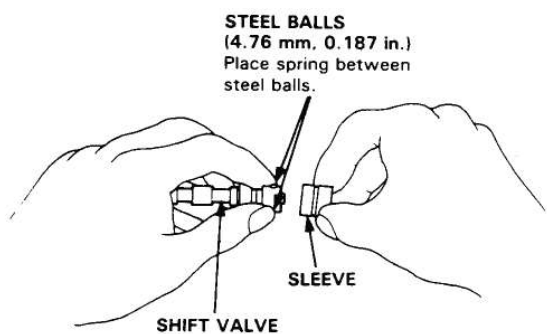
7. Remove the valve and thoroughly clean it and the valve body with solvent. Dry all parts with compressed air, then reassemble using ATF as a lubricant.

Main Valve Body

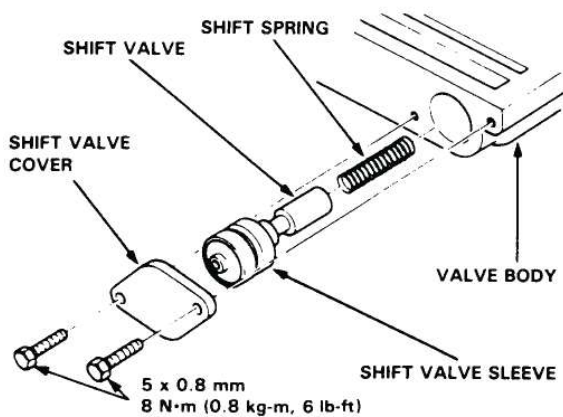
Reassembly

NOTE: Coat all parts with ATF before assembling.

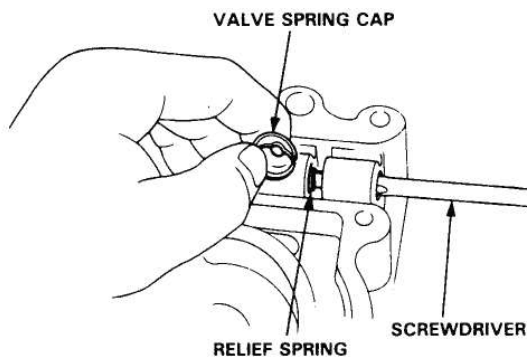
1. Slide the spring into the hole in the big end of the shift valve.
While holding the steel balls with the tips of your fingers, put the sleeve over valve.



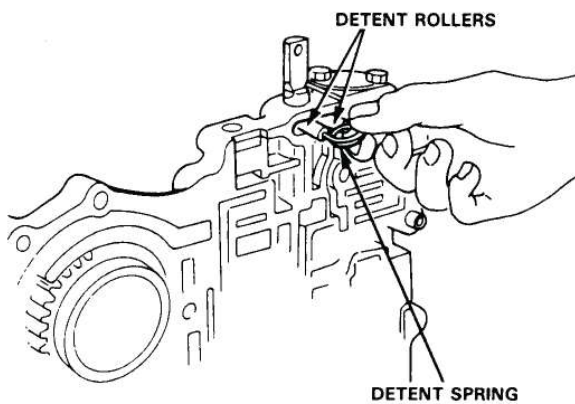
2. Place the shift spring in the valve, then slip it into the valve body and install the valve cover.



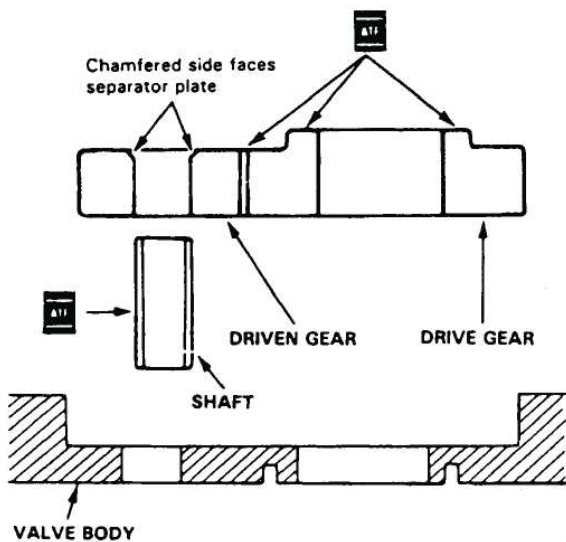
3. Set the relief spring in the relief valve and install it in the main valve body.
4. Install the spring with a screwdriver, then install the check valve cap with the cutout aligned with the screwdriver.



5. Install the manual valve, detent rollers and spring.



6. Install the pump gears and shaft in the main valve body.

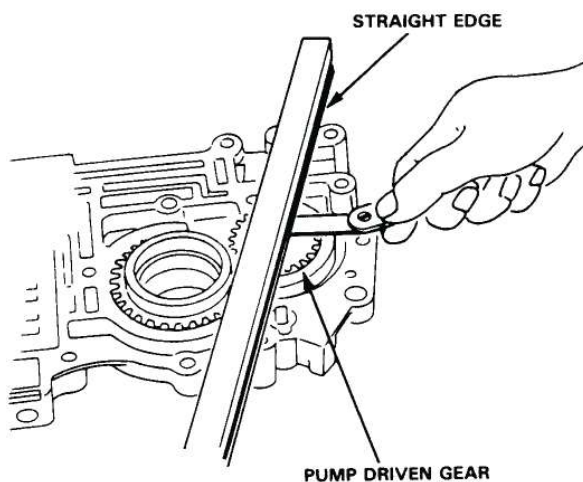


7. Measure the thrust clearance of the driven gear-to-valve body.

Drive/Driven Gear thrust (Axial) Clearance:

Standard (New): 0.03–0.05 mm
(0.001–0.002 in.)

Service Limit: 0.07 mm (0.0028 in.)

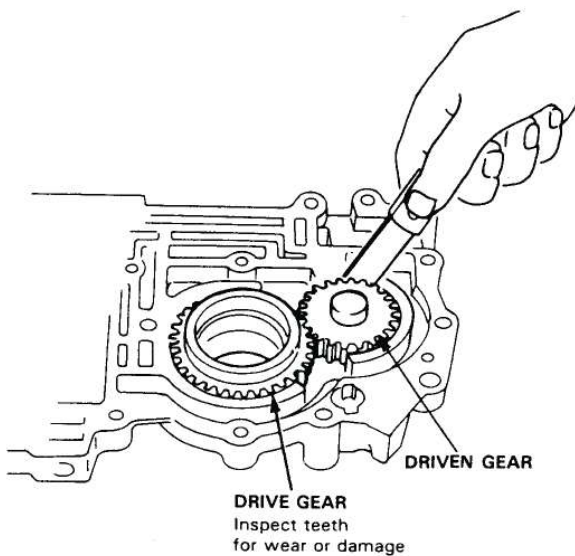


8. Install the oil pump shaft and measure the side clearance of the drive and driven gears.

Pump Gears Side (Radial) Clearance:

Standard (New): Drive gear 0.240–0.265 mm
(0.0094–0.0104 in.)

Driven gear 0.063–0.088 mm
(0.0025–0.0035 in.)

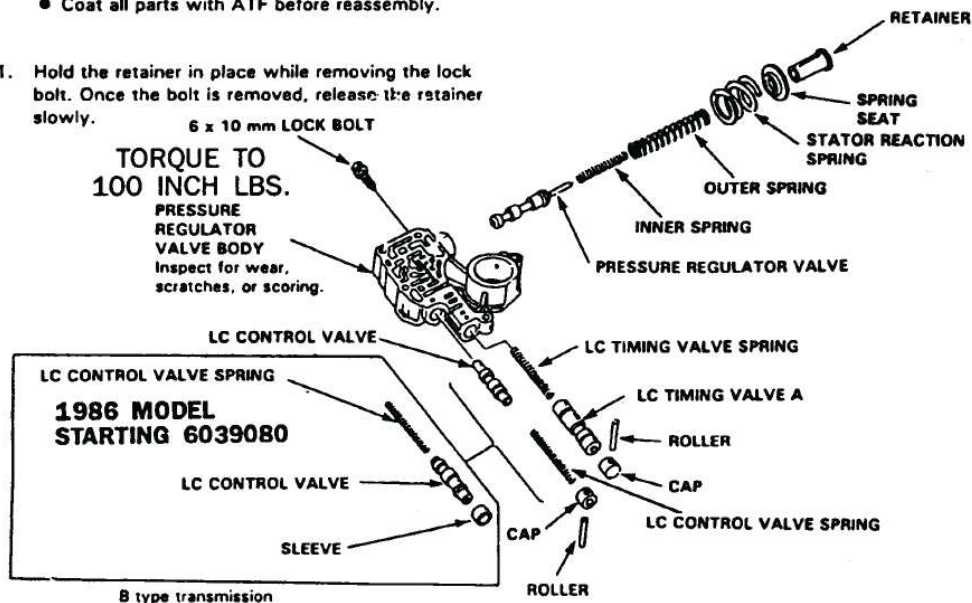


Regulator Valve Body

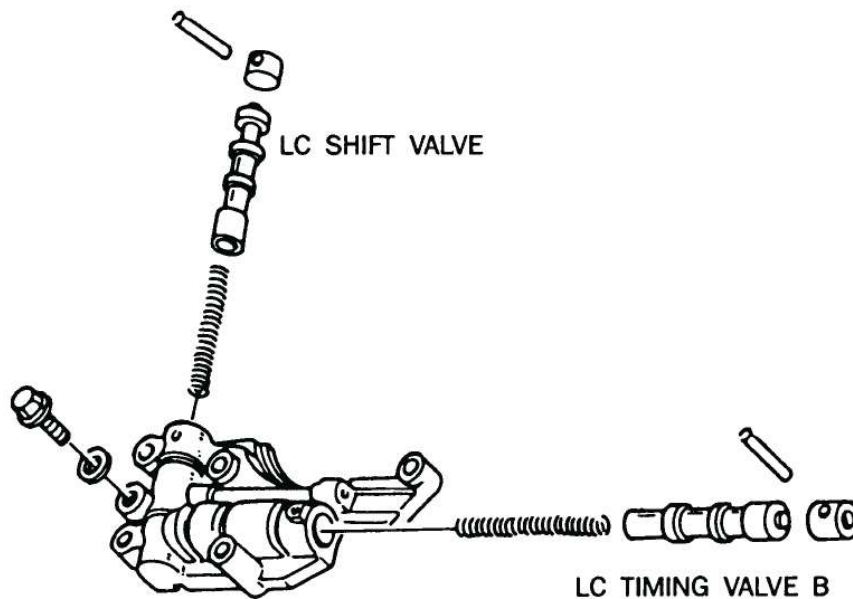
NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner.
- Replace valve body as assembly if any parts are worn or damaged.
- Check all valves for free movement, if any fail to slide freely.
- 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.



Lock-up Shift Valve Body



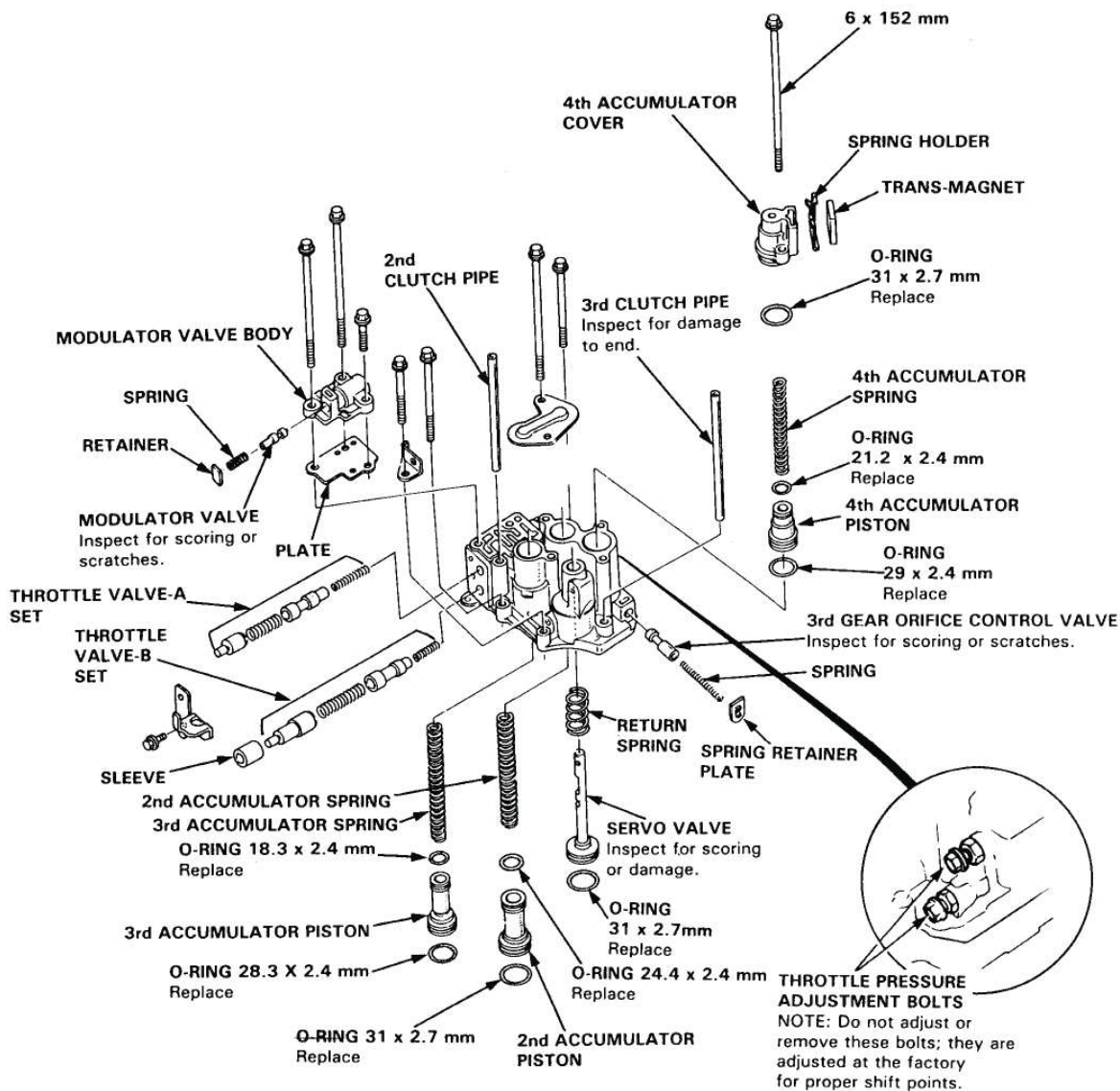
Servo Valve Body

Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
Blow out all passages.
- Check all valves for free movement. If any fail to slide freely,
- All bolts torque to 70 inch pounds

1985 - 1988



Servo Valve Body

Disassembly/Inspection/Reassembly

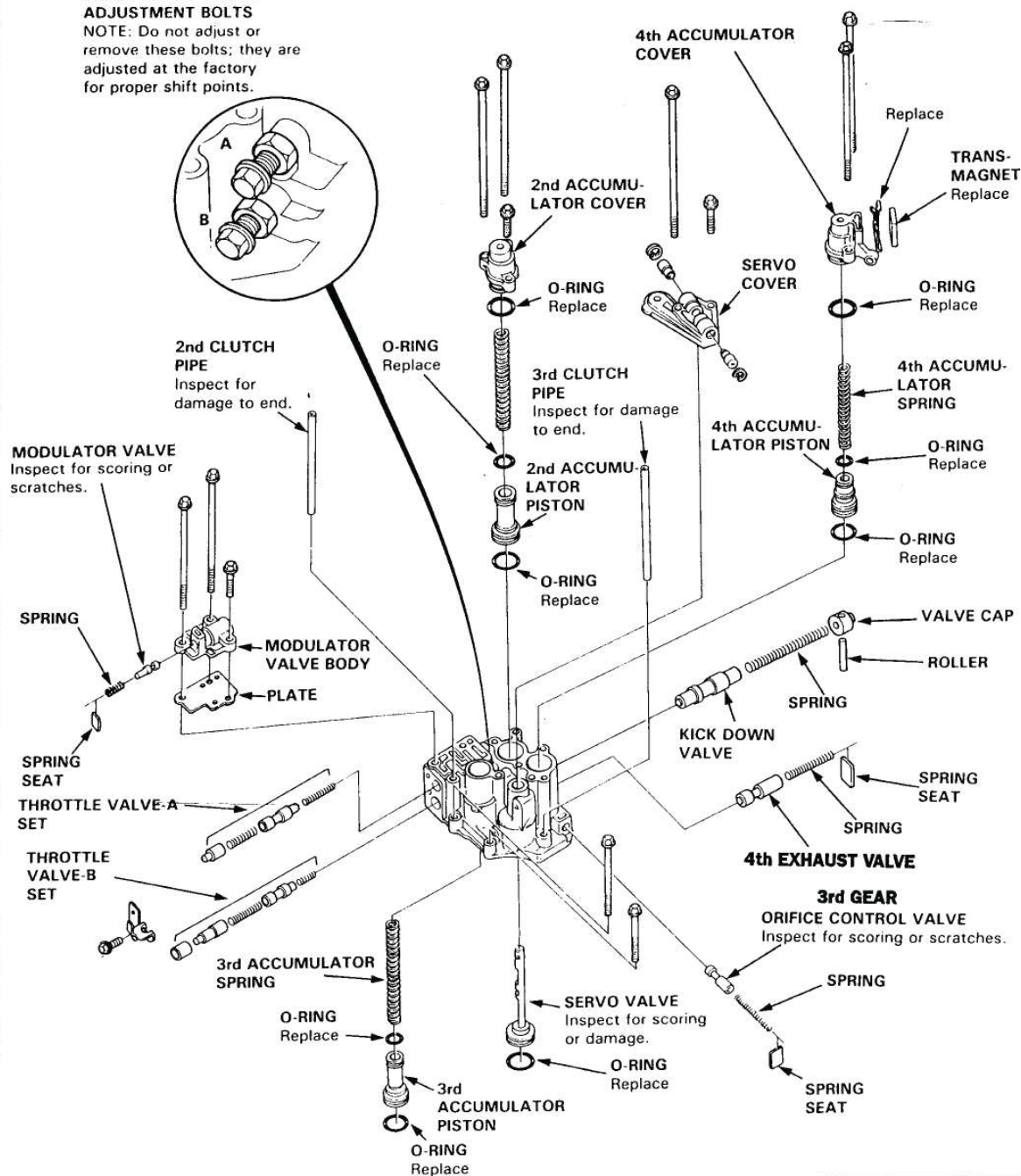
NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
Blow out all passages.
- Check all valves for free movement. If any fail to slide freely
- All bolts torque to 70 inch pounds

THROTTLE PRESSURE ADJUSTMENT BOLTS

NOTE: Do not adjust or remove these bolts; they are adjusted at the factory for proper shift points.

1989 ONLY

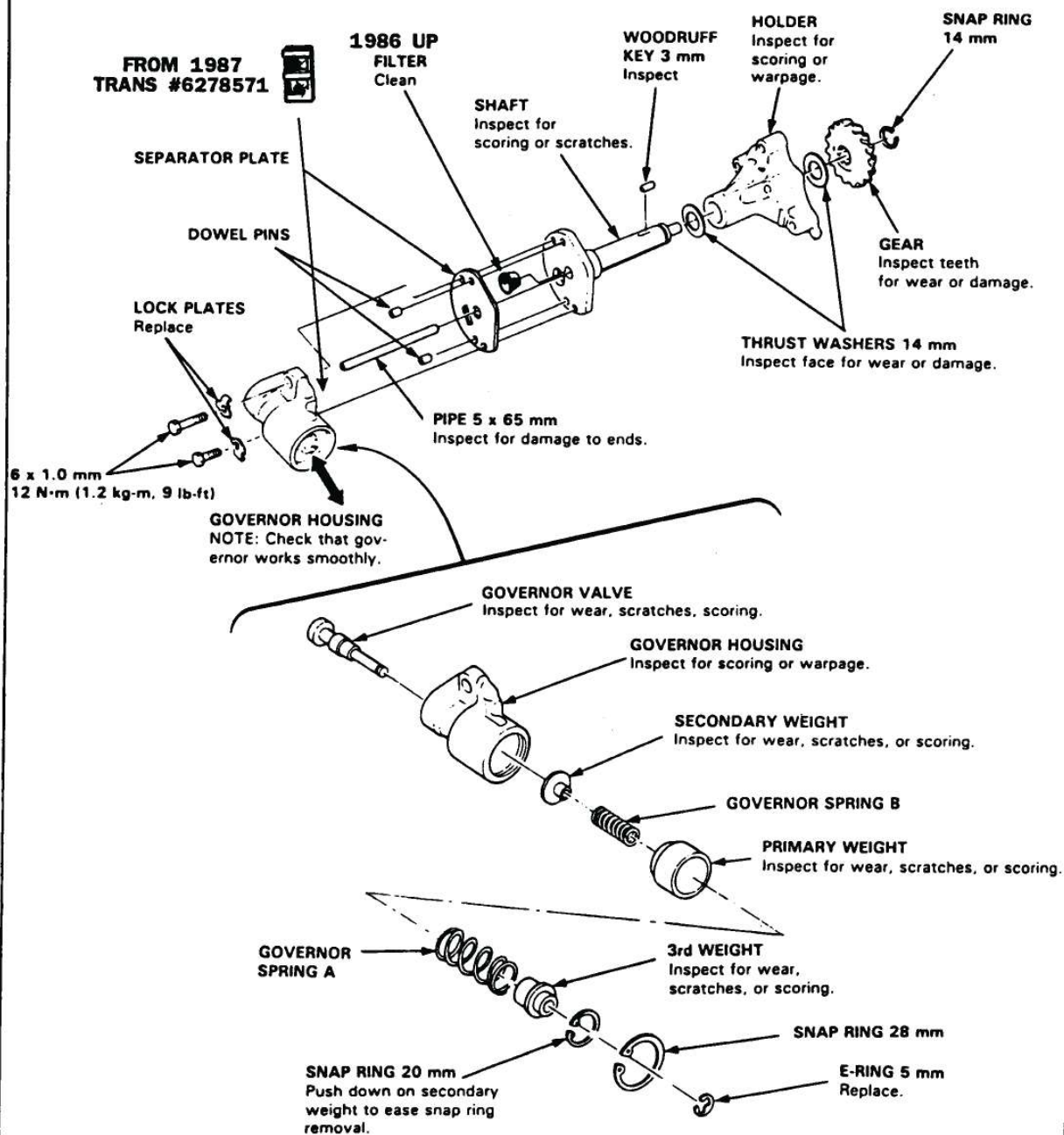


Governor Valve

Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Check that the governor works smoothly; replace it if it does not.
- Coat all parts with ATF before reassembly.

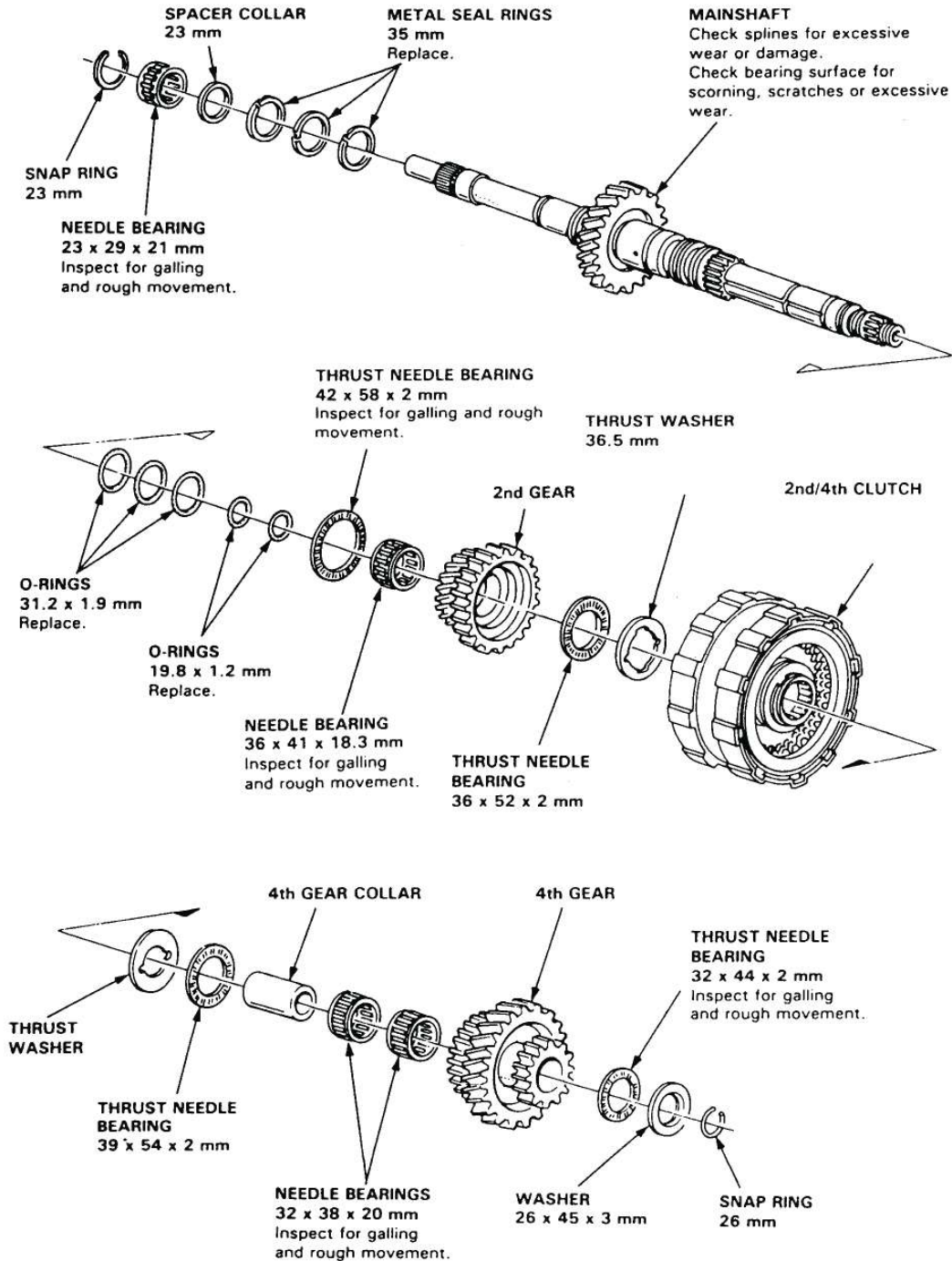


Mainshaft

Disassembly/Inspection/Reassembly

NOTE:

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

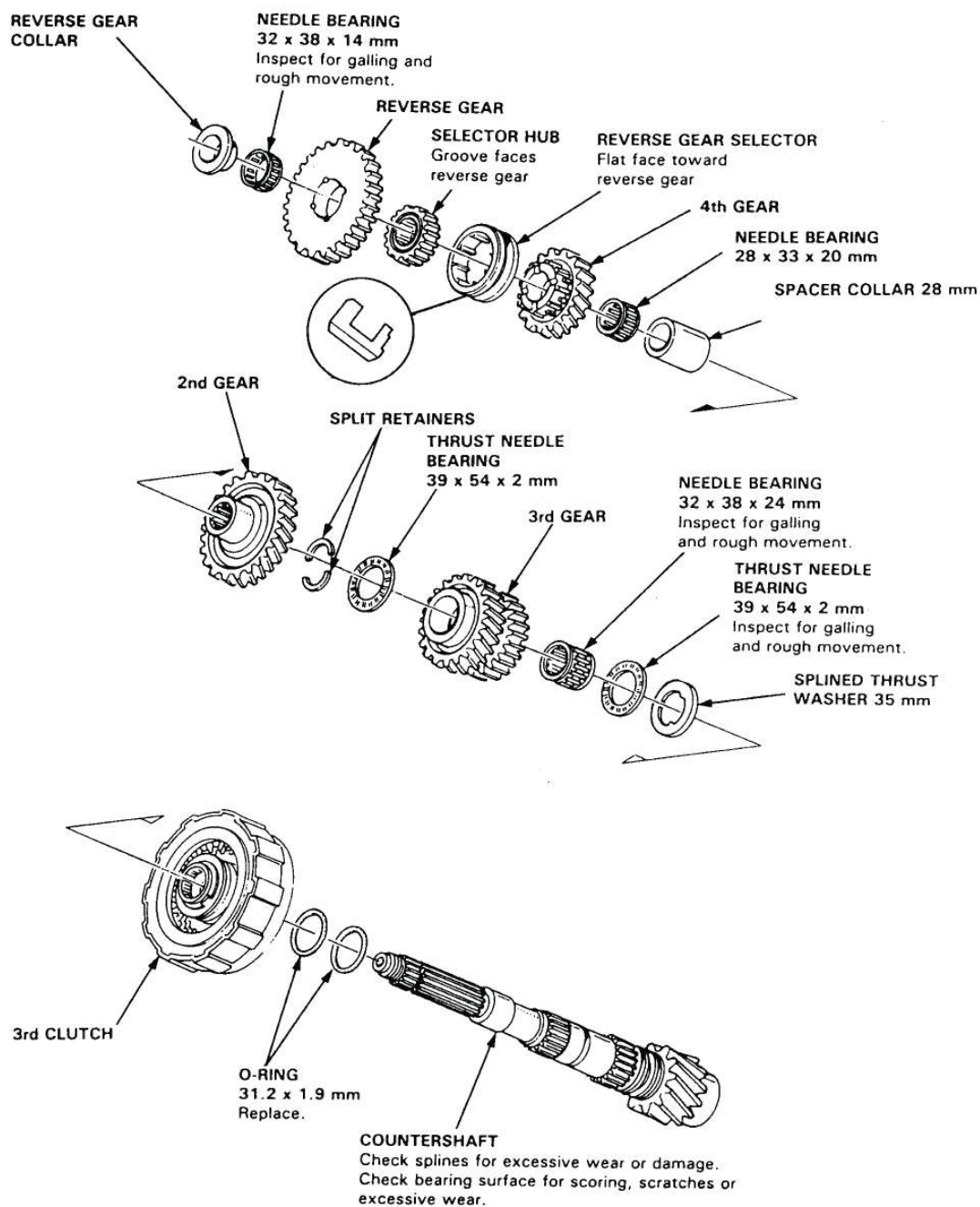


Countershaft

Disassembly/Inspection/Reassembly

NOTE:

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



Countershaft/Mainshaft

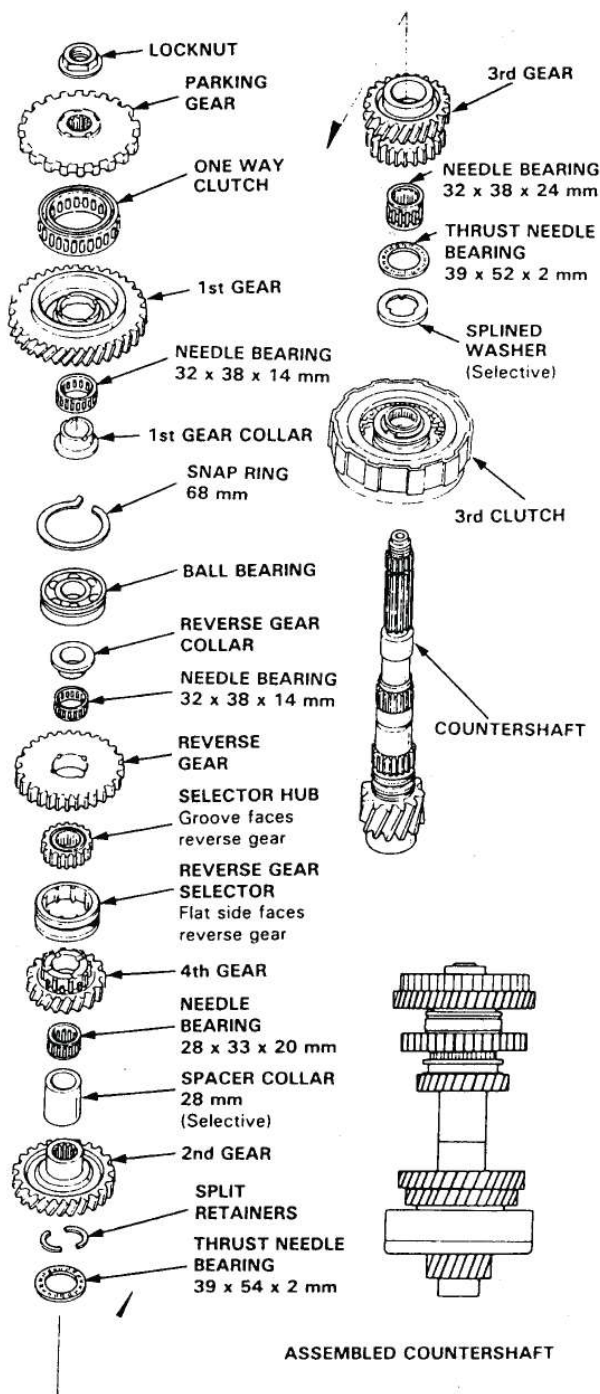
Clearance Measurements

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. **FOR TEST PURPOSES ONLY**
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. **FOR TEST PURPOSES ONLY**
Measure clearances as described on the next page.



Lubricate all parts with ATF before final re-assembly.

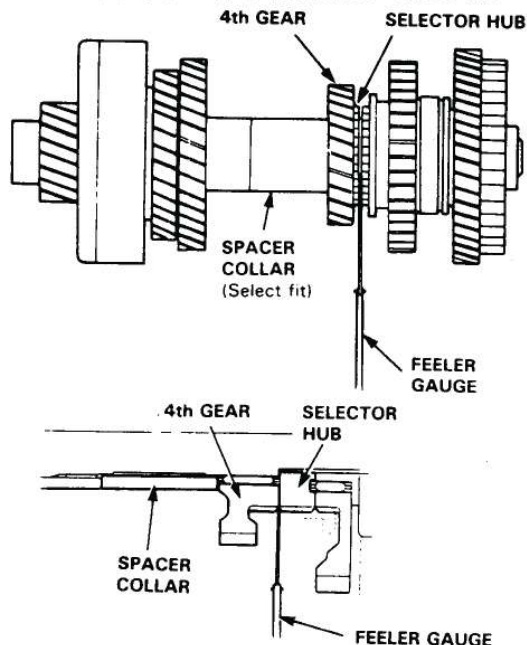
Countershaft Assembly



8. On the countershaft, measure the clearance between the shoulder on the selector hub and the shoulder on 4th gear.

Countershaft 4th Gear Clearance:

Standard: 0.07–0.15 mm (0.003–0.006 in.)



If clearance exceeds the service limit, measure the thickness of the spacer collar and select one which gives correct clearance.

Replacement spacer collars:

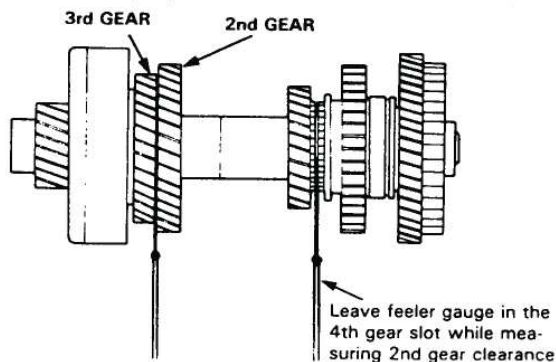
CLASS	P/N	THICKNESS
A	90503-PC9-000	38.97–39.00 mm (1.534–1.535 in.)
B	90504-PC9-000	39.02–39.05 mm (1.536–1.537 in.)
C	90505-PC9-000	39.07–39.10 mm (1.538–1.539 in.)
D	90507-PC9-000	39.12–39.15 mm (1.540–1.541 in.)
E	90508-PC9-000	39.17–39.20 mm (1.542–1.543 in.)
F	90509-PC9-000	39.22–39.25 mm (1.544–1.545 in.)
G	90510-PC9-000	39.27–39.30 mm (1.546–1.547 in.)

NOTE: Leave feeler gauge in place (4th gear) while measuring 2nd gear clearance.

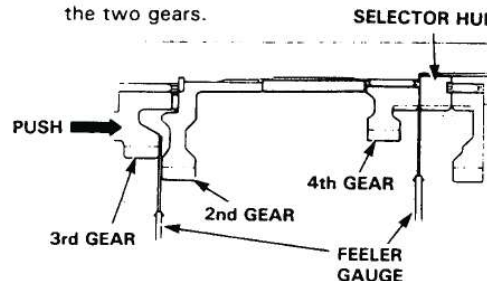
Countershaft 2nd Gear Clearance:

Standard: 0.07–0.15 mm (0.003–0.006 in.)

9. Slide the 3rd gear out fully. Measure and record the clearance between the 2nd and 3rd gears with a feeler gauge.



- Slide the 3rd gear in fully and again measure the clearance between the 2nd and 3rd gears with another feeler gauge.
- Calculate the difference between the two readings to determine the actual clearance between the two gears.



If clearance exceeds service limit, measure the thickness of the splined thrust washer (35 mm I.D.) and select one which gives the proper clearance.

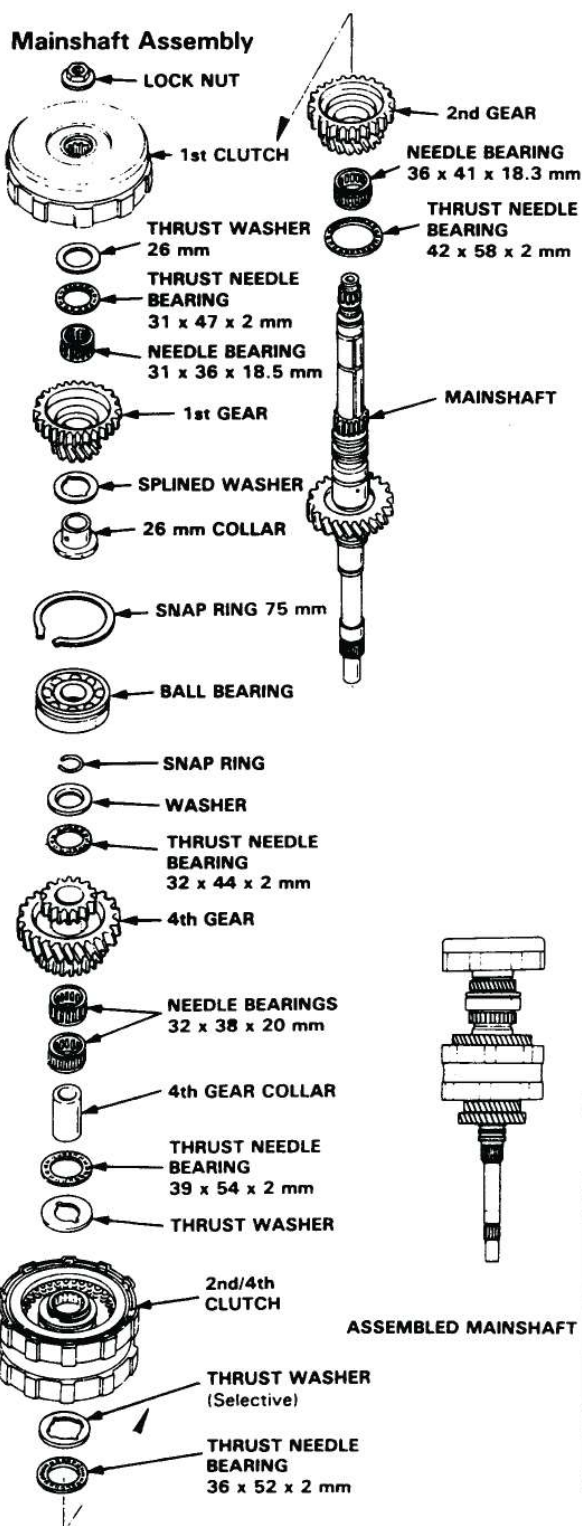
Replacement splined thrust washers:

CLASS	P/N	THICKNESS
A	90411-PF4-010	2.97–3.00 mm (0.117–0.118 in.)
B	90412-PF4-010	3.02–3.05 mm (0.119–0.120 in.)
C	90413-PF4-010	3.07–3.10 mm (0.121–0.122 in.)
D	90414-PF4-010	3.12–3.15 mm (0.123–0.124 in.)
E	90415-PF4-010	3.17–3.20 mm (0.125–0.126 in.)
F	90416-PF4-010	3.22–3.25 mm (0.127–0.128 in.)
G	90417-PF4-010	3.27–3.30 mm (0.129–0.130 in.)
H	90418-PF4-010	3.32–3.35 mm (0.131–0.132 in.)
I	90419-PF4-010	3.37–3.40 mm (0.133–0.134 in.)

(cont'd)

Countershaft/Mainshaft

Clearance Measurement (cont'd)

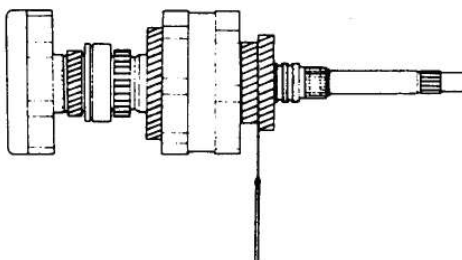


NOTE: Make all measurements before changing the thrust washers. Recheck after making the adjustments.

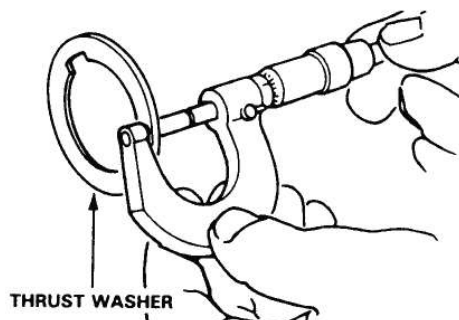
- On the mainshaft measure the clearance between the shoulder of 2nd gear and main 3rd gear, the same way you did on the countershaft in step 9.

Mainshaft 2nd Gear Clearance:

Standard (New): 0.07–0.15 mm
(0.003–0.006 in.)



If the clearance exceeds the service limit, measure the thickness of the 2nd clutch thrust washer (36 mm I.D.) and select one which gives the correct clearance.



Replacement washer (36 mm I.D.)

CLASS	P/N	THICKNESS
A	90441-PF4-000	3.97–4.00 mm (0.156–0.157 in.)
B	90442-PF4-000	4.02–4.05 mm (0.158–0.159 in.)
C	90443-PF4-000	4.07–4.10 mm (0.160–0.161 in.)
D	90444-PF4-000	4.12–4.15 mm (0.162–0.163 in.)
E	90445-PF4-000	4.17–4.20 mm (0.164–0.165 in.)
F	90446-PF4-000	4.22–4.25 mm (0.166–0.167 in.)
G	90447-PF4-000	4.27–4.30 mm (0.168–0.169 in.)
H	90448-PF4-000	4.32–4.35 mm (0.170–0.171 in.)
I	90449-PF4-000	4.37–4.40 mm (0.172–0.173 in.)

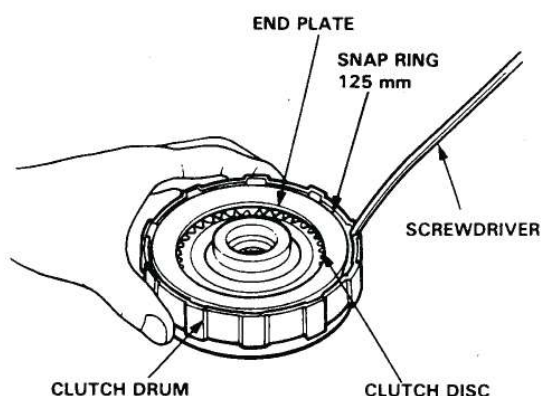
Clutch

Disassembly

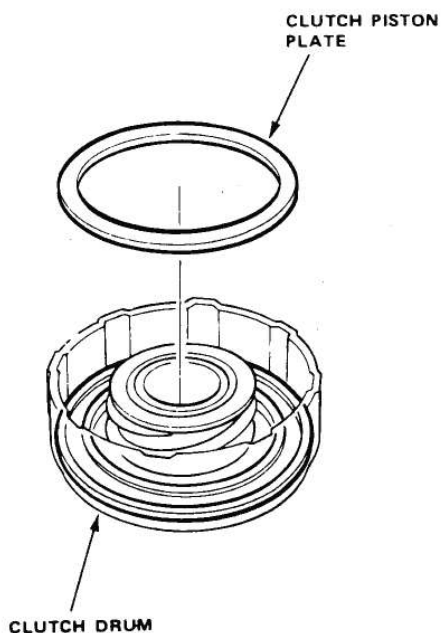
NOTE:

- The 1st and 3rd clutches are identical except for the piston plate installed in the 1st clutch.
- To disassemble the 2nd/4th clutch, use the special tool in Step 3 in the same manner as for the 1st and 3rd clutches.

1. Remove the snap ring.

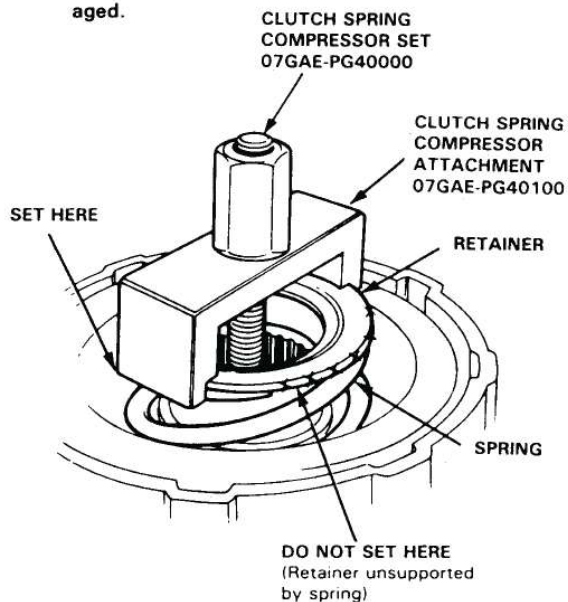


2. Remove the end plate, clutch discs and plates.
1st clutch only: Also remove the clutch piston plate (applied from B type transmission).

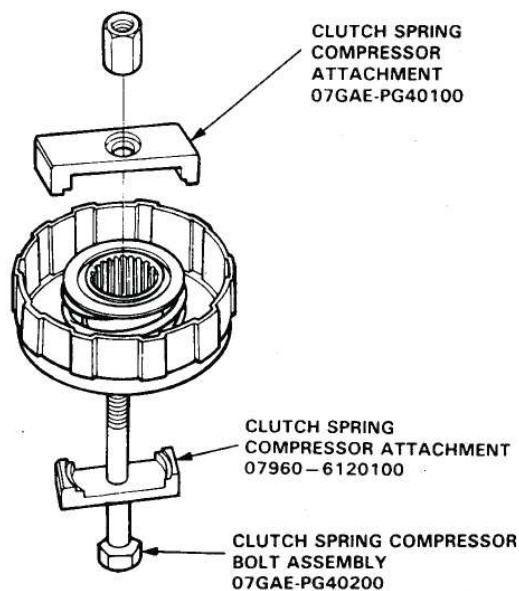


3. Install the clutch spring compressor as shown.

CAUTION: If either end of the compressor attachment is set over an area of the retainer which is unsupported by the spring, the retainer may be damaged.



1st and 3rd Clutches

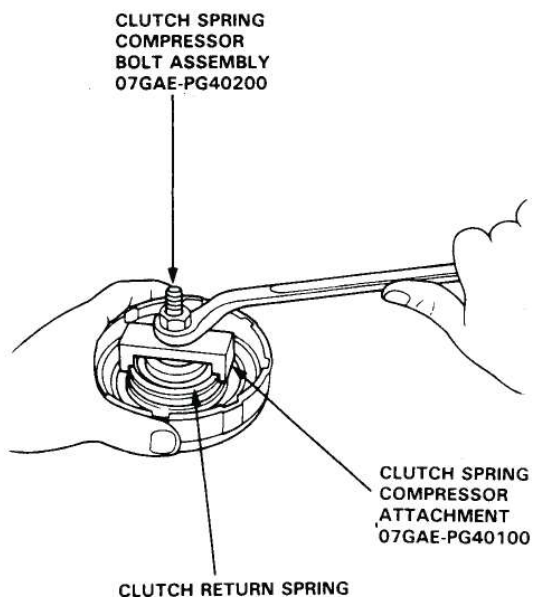


(cont'd)

Clutch

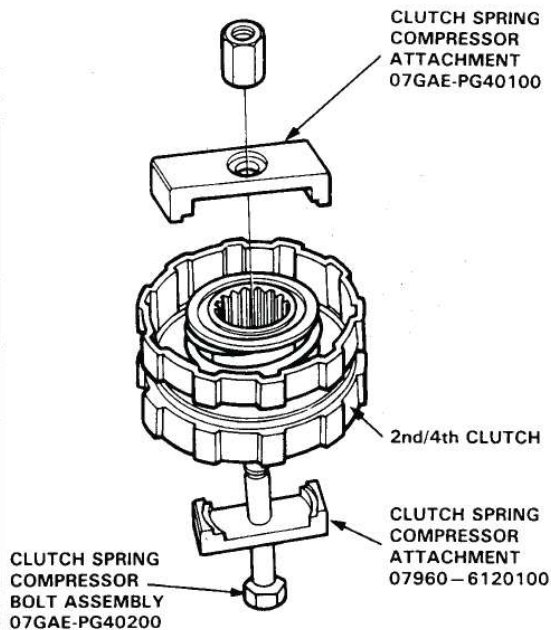
Disassembly (cont'd)

- Compress the clutch return spring.

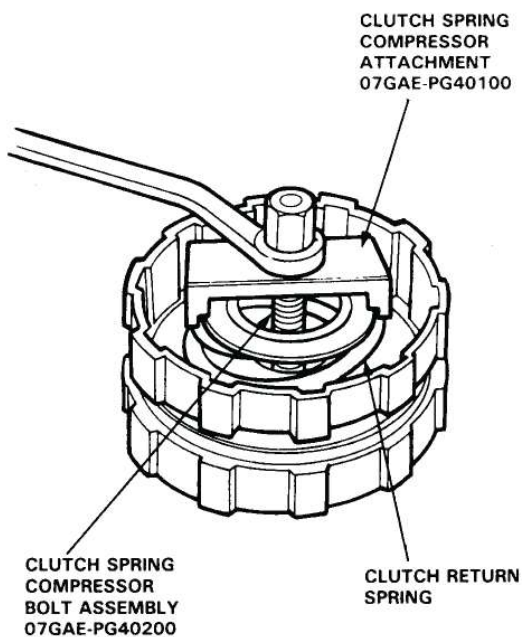


2nd/4th Clutch

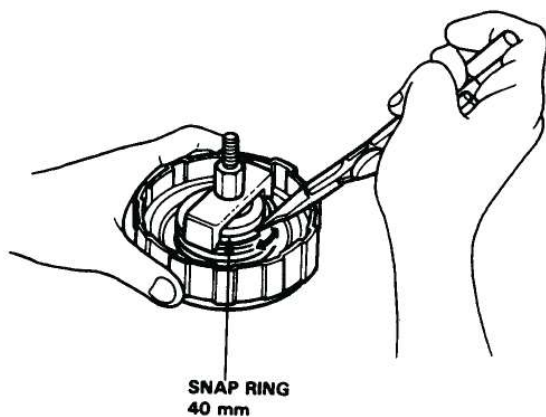
- Assemble the spring compressor on the clutch drum.



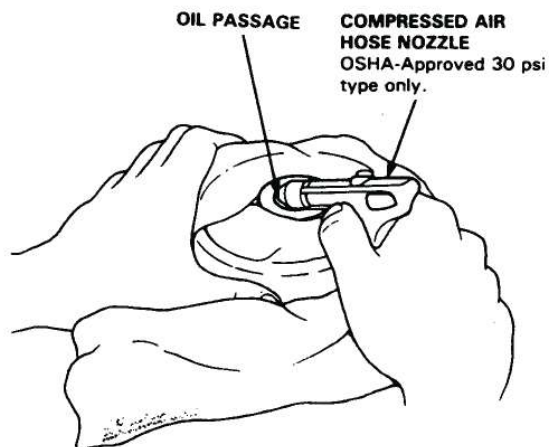
- Compress the clutch return spring.



4. Remove the snap ring, then remove the clutch spring compressor, spring retainer and spring.



5. Wrap a shop rag around the clutch drum and apply air pressure to the oil passage to remove the piston. Place a finger tip on the other end while applying air pressure.

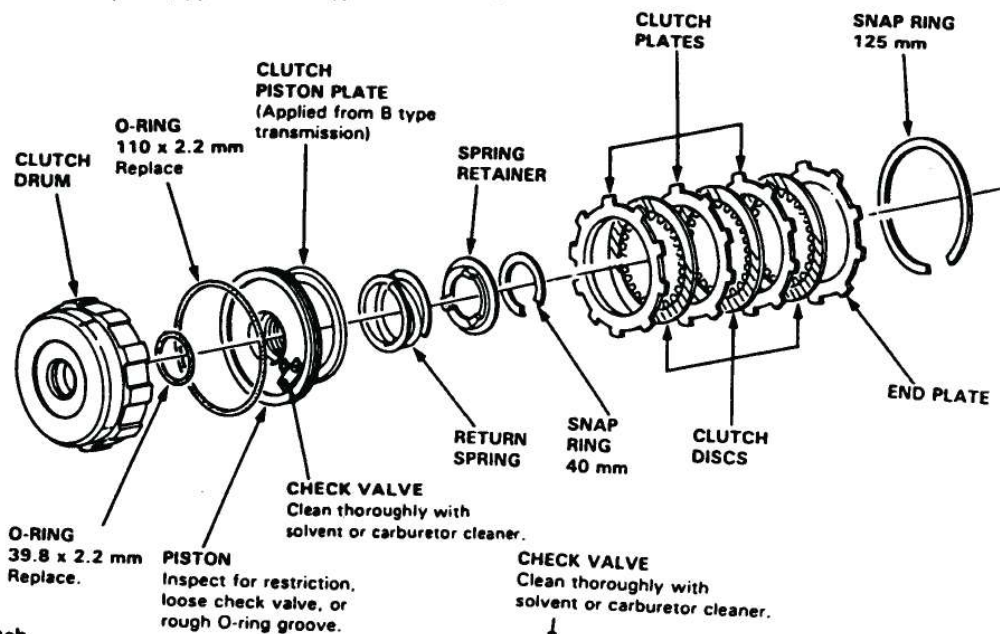


Clutch

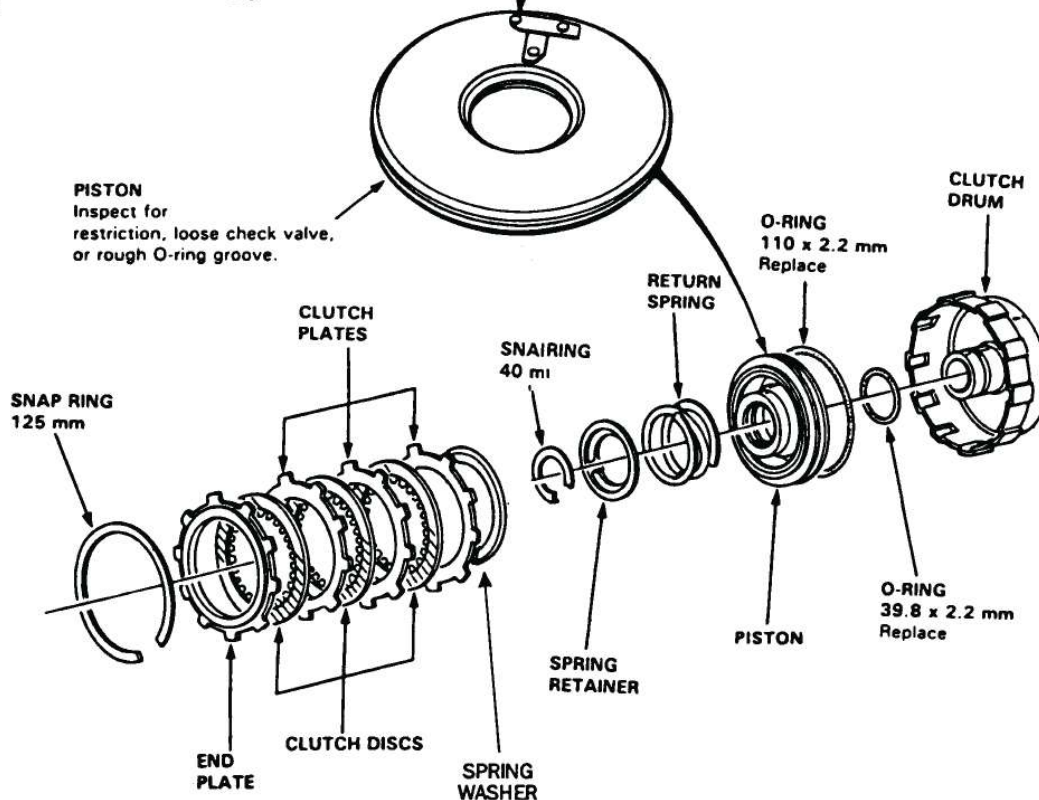
Disassembly/Inspection (cont'd)

1st Clutch

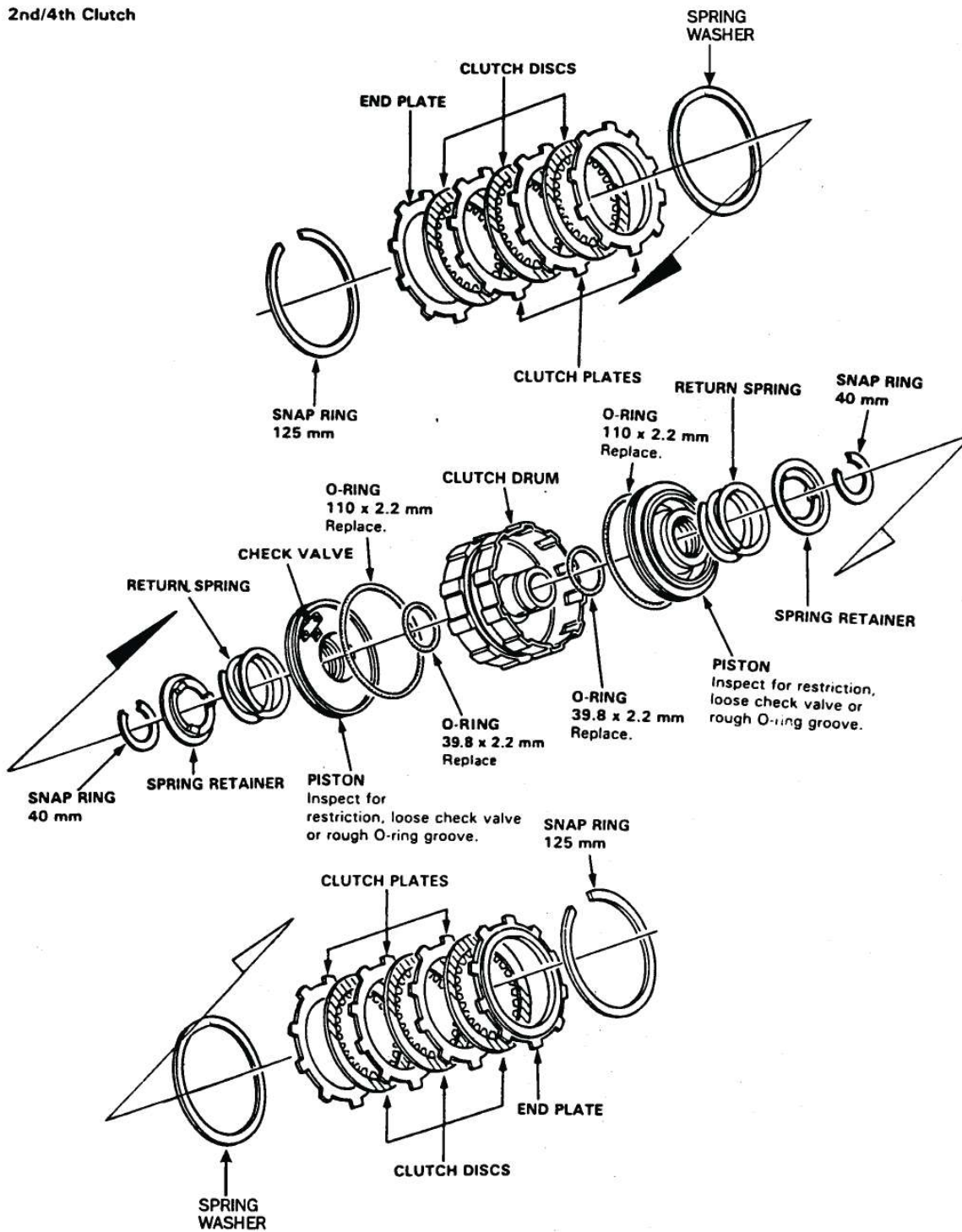
NOTE: Piston plate (applied from B type transmission) is installed in the 1st clutch.



3rd Clutch



2nd/4th Clutch



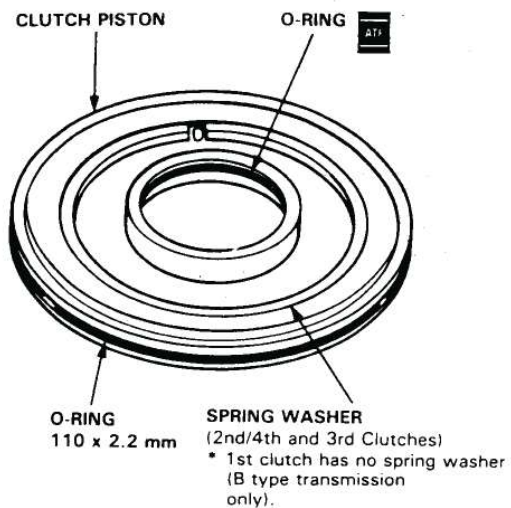
Clutch

Reassembly

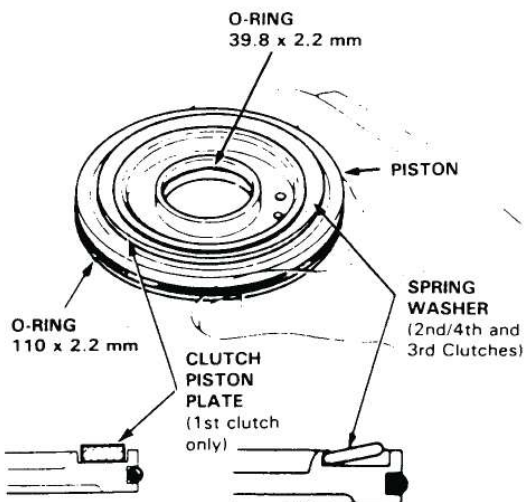
NOTE:

- The 1st and 3rd clutch assemblies are identical except installing the clutch piston plate in the 1st clutch.
- To reassemble the 2nd/4th clutch, use the special tool in Step 7 in the same manner as for the 1st and 3rd clutches.

1. Clean all parts thoroughly in solvent, and dry with compressed air. Blow out all passages.
2. Lubricate all parts with ATF before reassembly.



3. Install new O-ring on clutch piston.
2nd/4th and 3rd Clutches:
Make sure the spring washer is properly positioned as shown.

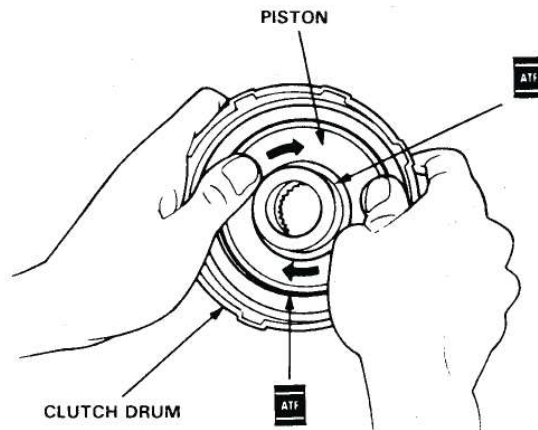


(Applied from B type transmission.)

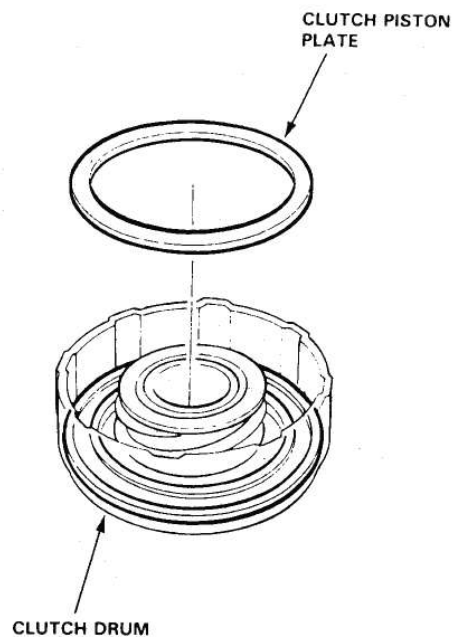
4. Install the piston in the clutch drum. Apply pressure and rotate to ensure proper seating.

NOTE: Lubricate the piston O-ring with ATF before installing.

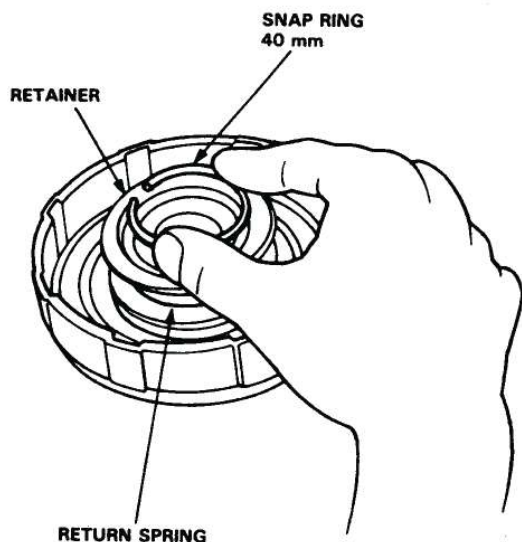
CAUTION: Do not pinch O-ring by forcing piston installation.



- 1st clutch only:
Install the clutch piston plate (applied from B type transmission).

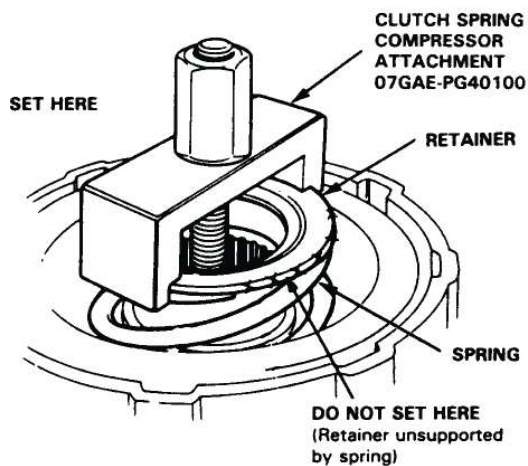


5. Install the return spring and retainer.
6. Position the 40 mm snap ring on the spring re-tainer.



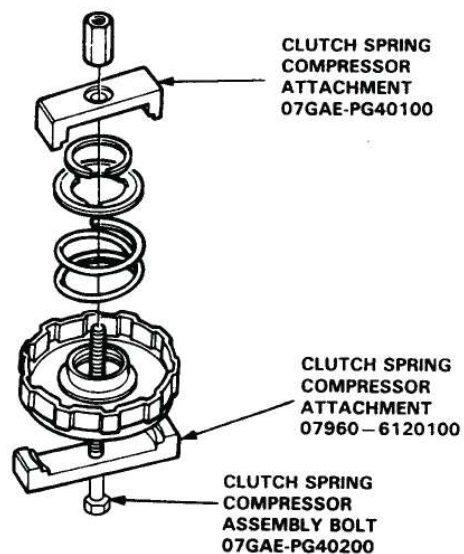
7. Assemble the spring compressor on the clutch drum.

CAUTION: If either end of the compressor attachment is set over an area of the retainer which is unsupported by the spring, the retainer may be damaged.

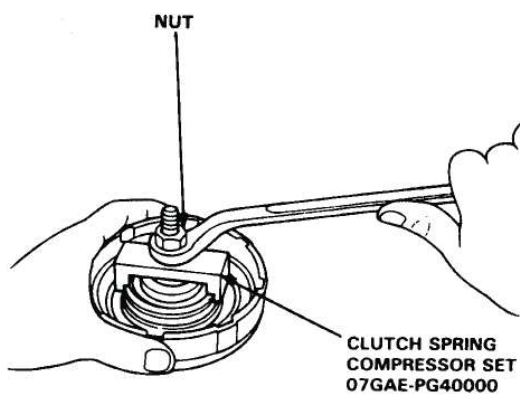


1st and 3rd clutches

- Assemble the spring compressor on the clutch drum.



8. Compress the spring until the retainer is below the snap ring groove in the hub.



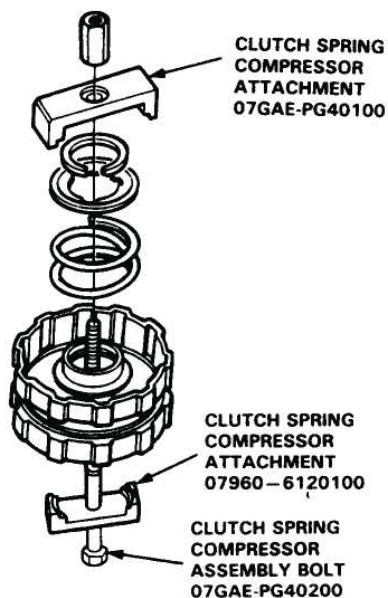
(cont'd)

Clutch

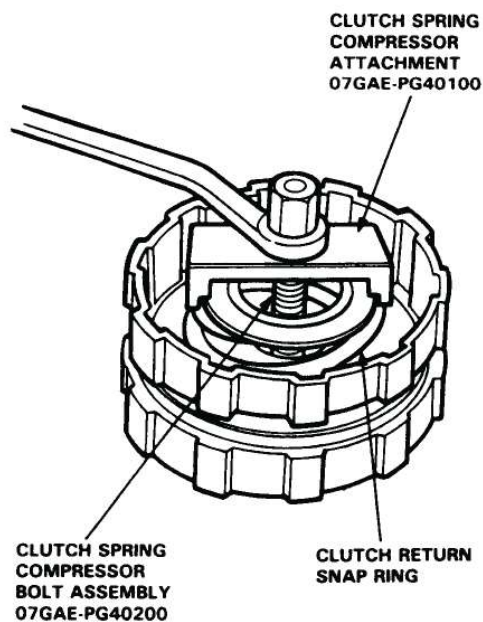
Reassembly (cont'd)

2nd/4th Clutch

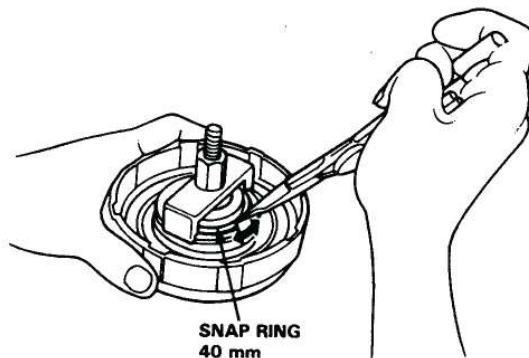
- Assemble the spring compressor on the clutch drum.



- Compress the clutch return spring.

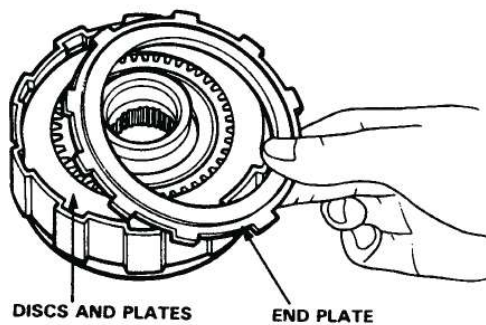


9. Install the snap ring (with its rounded edge facing in) in the hub groove and remove the spring compressor.



10. Soak the clutch discs thoroughly in automatic transmission fluid for a minimum of 30 minutes.
11. Starting with a clutch plate, alternately install the clutch plates and discs. Install the clutch end plate with flat side toward the disc.

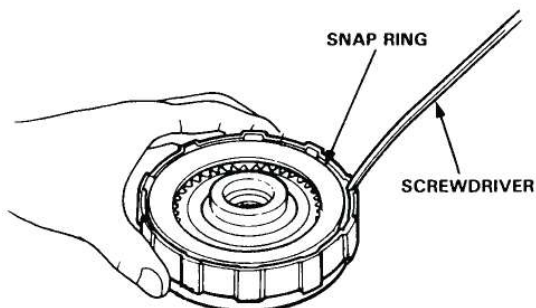
NOTE: Before installing the plates and discs, make sure the inside of the clutch drum is free of grit or other foreign matter.



Clutch

Reassembly (cont'd)

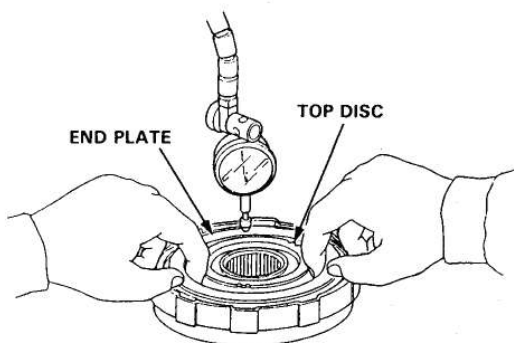
12. Install the 125 mm snap ring.



13. Measure the clearance between the clutch end plate and top disc with a dial indicator. Zero the dial indicator with the clutch end plate lowered and lift it up to the snap ring. Distance where the clutch end plate moves is the clearance between the clutch end plate and top disc.
NOTE: Measure at three locations.

End Plate-to-Top Disc Clearance:

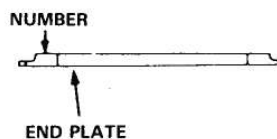
	Service Limit	
LOW	0.65–0.85 mm	(0.026–0.033 in.)
2ND	0.50–0.70 mm	(0.020–0.028 in.)
3RD	0.40–0.60 mm	(0.016–0.024 in.)
4TH	0.40–0.60 mm	(0.016–0.024 in.)



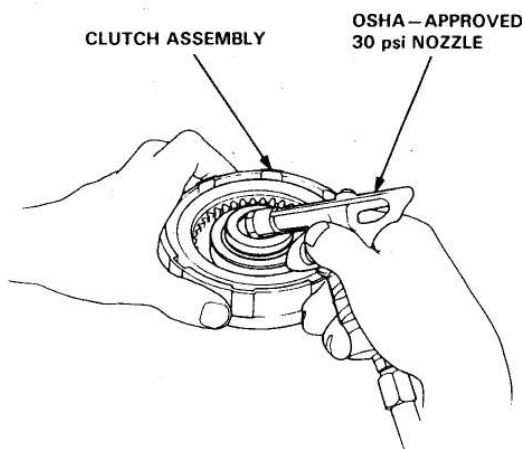
14. If the clearance is not within the service limits, select a new clutch end plate from the following table.

NOTE: If the thickest clutch and plate is installed but the clearance is still over the standard, replace the clutch discs and clutch plates.

P/N	PLATE NO.	THICKNESS
22551–PF4–000	1	2.1 mm (0.082 in.)
22552–PF4–000	2	2.2 mm (0.086 in.)
22553–PF4–000	3	2.3 mm (0.090 in.)
22554–PF4–000	4	2.4 mm (0.094 in.)
22555–PF4–000	5	2.5 mm (0.098 in.)
22556–PF4–000	6	2.6 mm (0.102 in.)
22557–PF4–000	7	2.7 mm (0.106 in.)
22558–PF4–000	8	2.8 mm (0.110 in.)
22559–PF4–000	9	2.9 mm (0.114 in.)
22560–PF4–000	10	3.0 mm (0.118 in.)
22561–PF4–000	11	3.1 mm (0.122 in.)
22562–PF4–000	12	3.2 mm (0.126 in.)
22563–PF4–000	13	3.3 mm (0.130 in.)
22564–PF4–000	14	3.4 mm (0.134 in.)



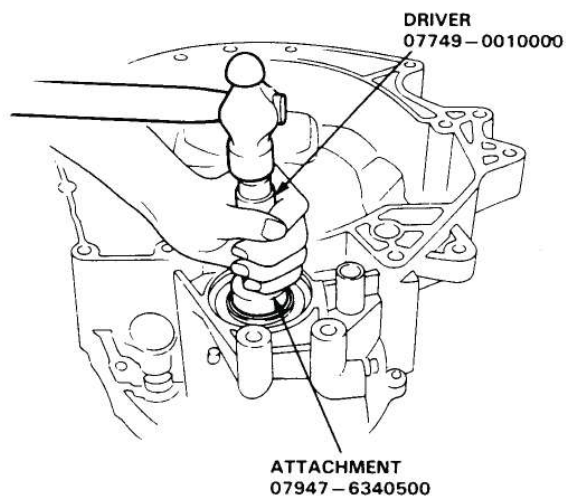
15. Check the clutch engagement by blowing air into the oil passage in the clutch drum hub. Remove the air pressure and check that the clutch releases.



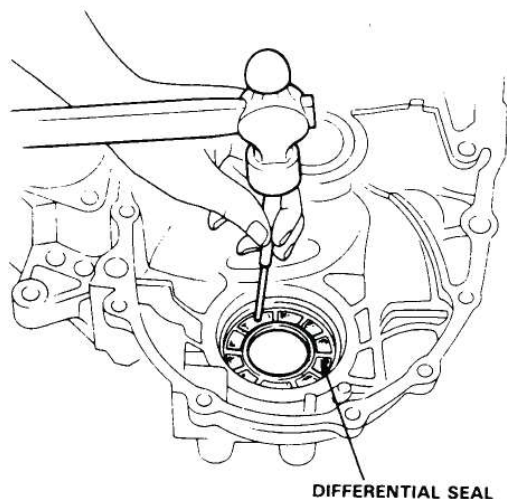
Differential and Seal

Replacement

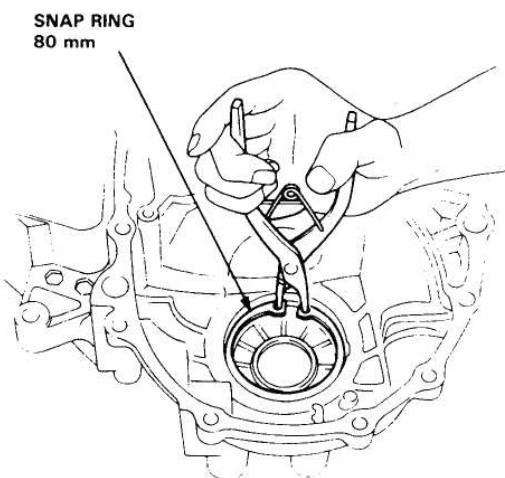
1. If seals are to be replaced, or if differential needs repair, remove the differential.



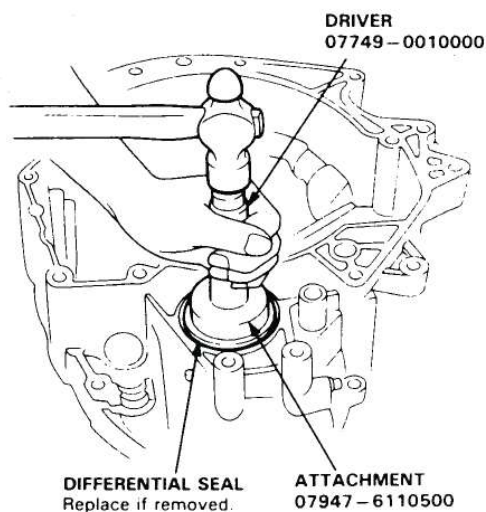
2. On the torque converter housing, remove the 80 mm snap ring, then drive out the seal as shown.
3. Remove the differential seal from the transmission housing in the same way.



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.

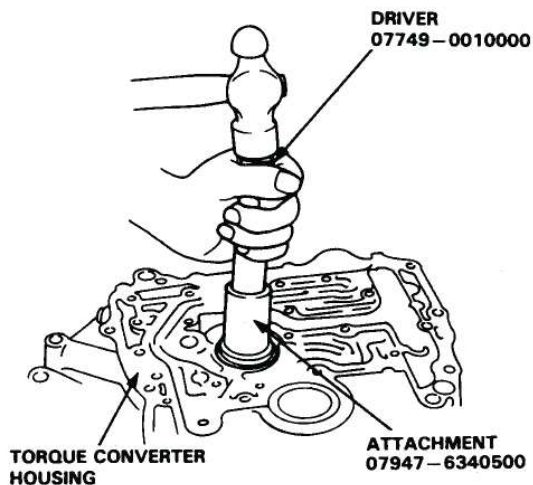


Bearings and Seals

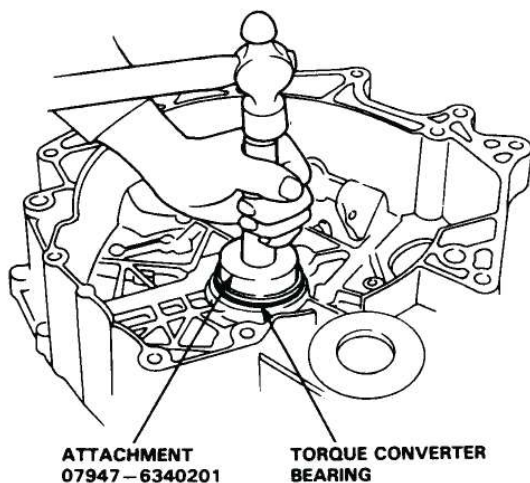
Replacement

Torque converter housing

1. Remove the mainshaft bearing and seal from the torque converter housing.



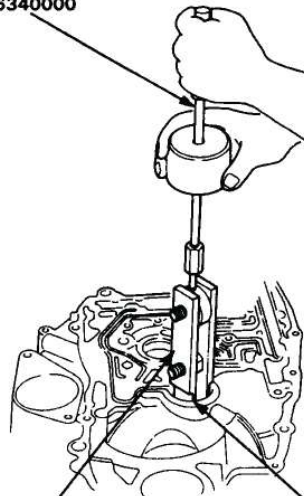
2. Drive in the new mainshaft bearing until it bottoms in housing.



3. Then install the new mainshaft seal flush with the housing, using attachment 07947-6340201.

4. Turn the torque converter housing over and remove the countershaft bearing.

BEARING PULLER
07936-6340000



**ADJUSTABLE BEARING
REMOVER**
25-40 mm
07736-A01000A
or
ATTACHMENT
07GAC-PF40210

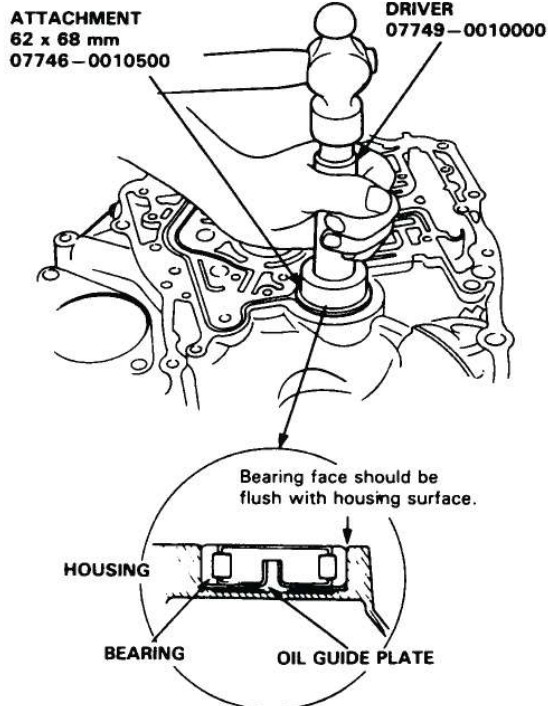
**COUNTERSHAFT
NEEDLE BEARING**
Replace with new
bearing if removed.

(cont'd)

Bearings and Seals

Replacement (cont'd)

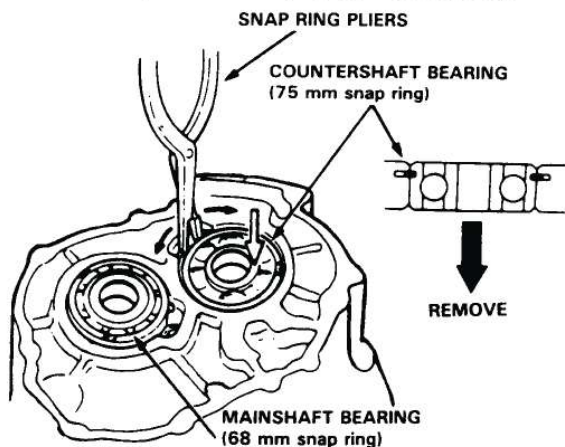
5. Make sure the oil guide plate is installed in the bearing hole, then install a new countershaft bearing flush with the housing.



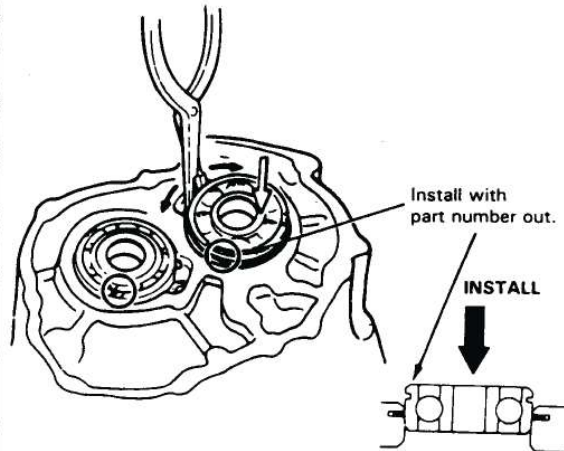
Transmission housing

1. To remove the mainshaft and countershaft bearings from the transmission housing, expand each snap ring with snap ring pliers, then push the bearing out by hand.

NOTE: Do not remove the snap rings unless it's necessary to clean the grooves in the housing.



2. Expand each snap ring with snap ring pliers, insert the new bearing part-way into it, then release the pliers. Push the bearing down into the transmission until the ring snaps in place around it.

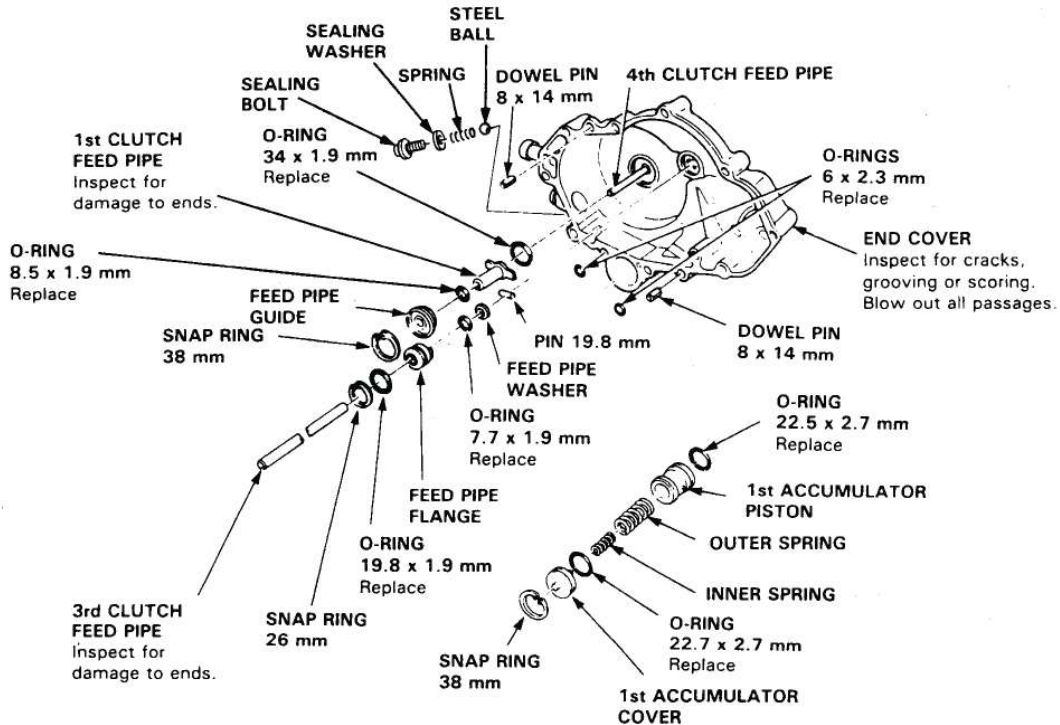


3. Make sure the snap rings are seated in the bearing and housing grooves.

End Cover

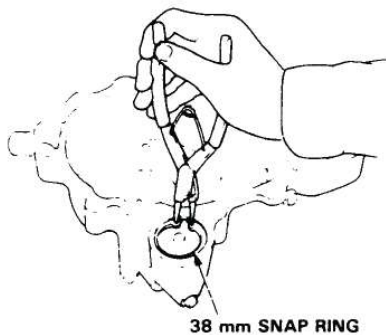
Disassembly/Inspection

CAUTION: Remove and install parts carefully to avoid damaging them.



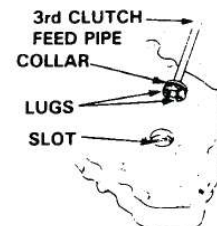
Reassembly

1. Seat a new O-ring in the groove of the 1st accumulator, and slide the accumulator piston into the right side transmission cover. Install the outer spring, inner spring, another new O-ring and the accumulator cover, in that order.
2. Install 38 mm snap ring.



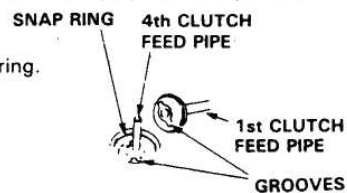
3. With feed pipes assembled, align lugs on the collars with slot in end cover.

4. Install the snap ring.



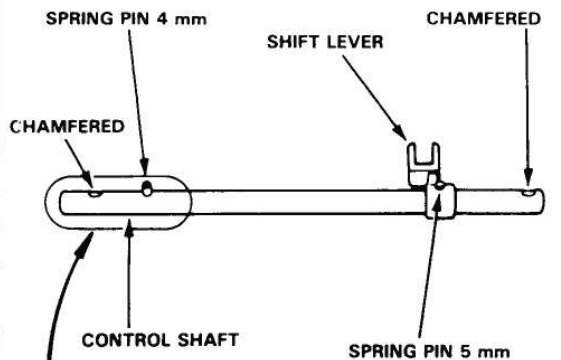
5. Install the feed pipes in the end cover, aligning the lugs of the 1st clutch feed pipe with the grooves of the end cover.

6. Install the snap ring.

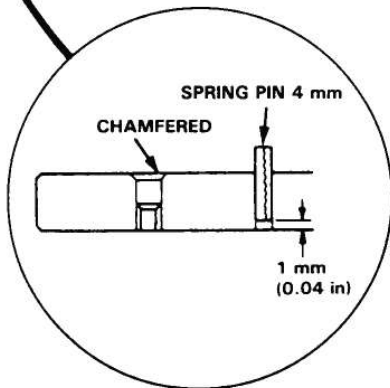


Throttle Control Shaft

Installation



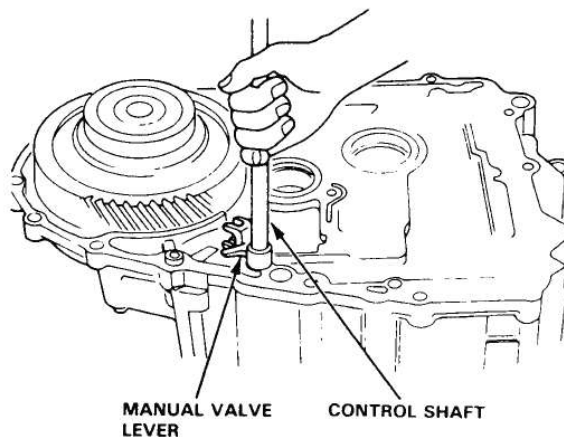
Drive the 4 mm spring pin to a depth 1 mm in from the side that is opposite the chamfer in the threaded hole.



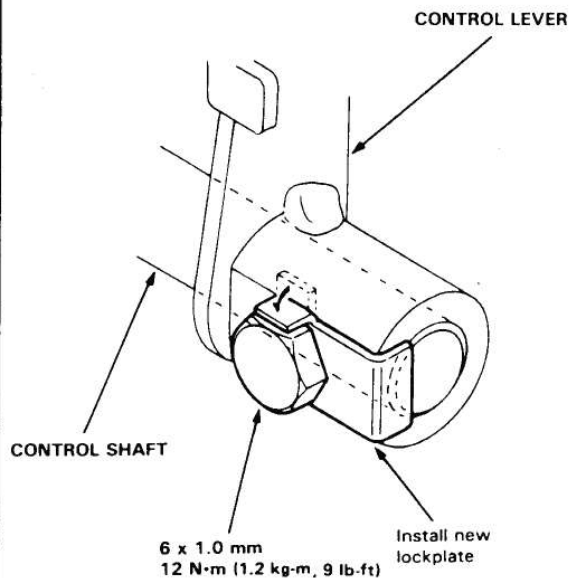
Reassembly

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

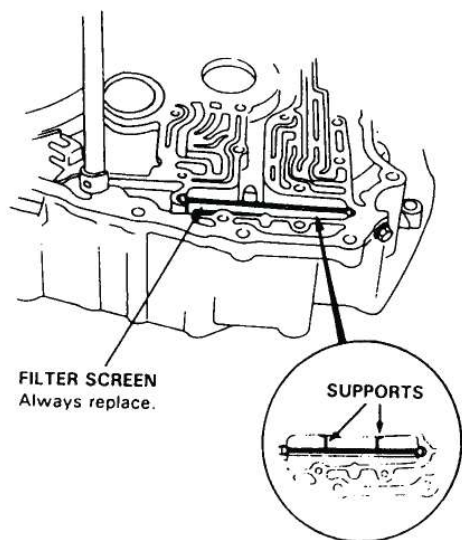
1. Install the differential assembly. If the torque converter housing, transmission housing and/or differential side bearings were replaced, the differential side clearance must be checked as shown in section 16.
2. Assemble the manual valve lever on the control shaft, then install in the torque converter 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.

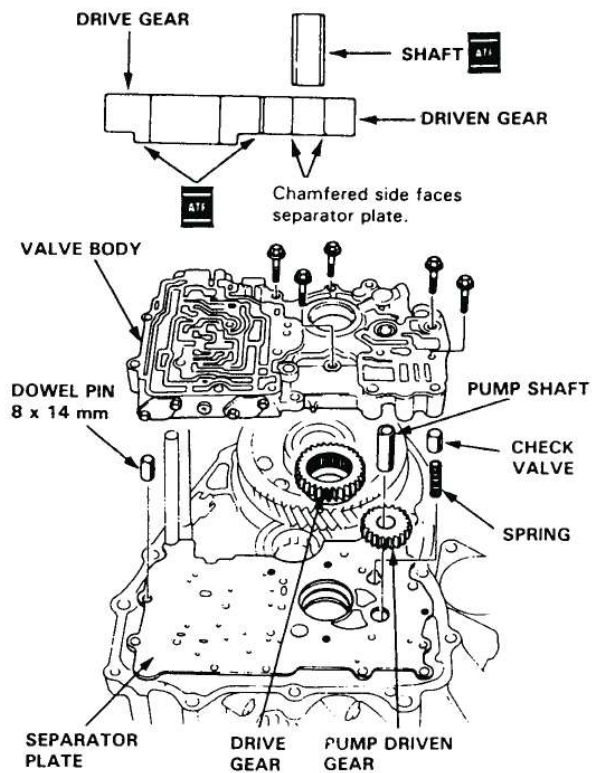


4. Install a new filter screen.



**ALWAYS USE UPDATED
DESIGN SCREEN**

5. Install the separator plate, dowel pin, pump gears and shaft.
6. Install the check valve and spring, then install the main valve body on the torque converter housing.



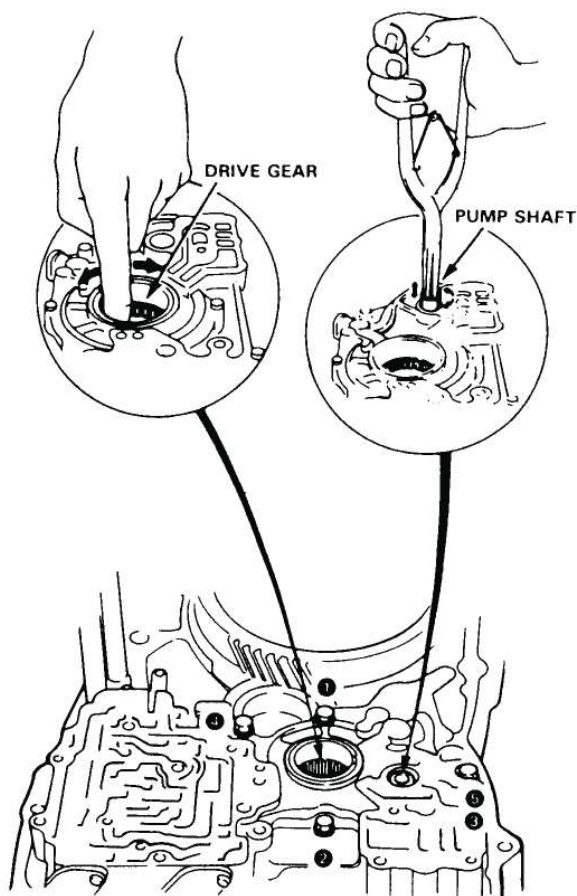
(cont'd)

Transmission

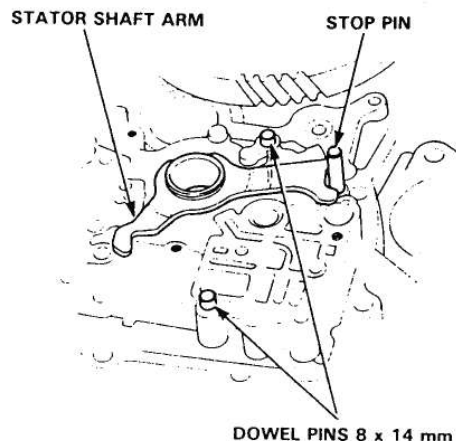
Reassembly (cont'd)

7. Tighten the 4 valve body bolts in the sequence shown. Make sure the pump drive gear rotates smoothly in the normal operating direction and the pump shaft moves smoothly in both the axial and normal operating directions.
8. Torque the valve body bolts to **80 inch pounds** (ft-lb), and again check that the pump gear and pump shaft move freely.

CAUTION: If the pump gear and pump shaft do not move freely, loosen the valve body bolts, realign the shaft, and then retighten to the specified torque. Failure to align the pump shaft correctly will result in seized pump gear or pump shaft.

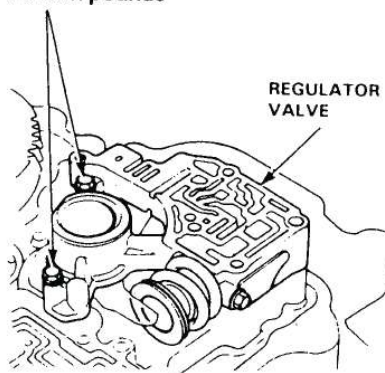


9. Install the stator shaft arm, stop pin and dowel pins.

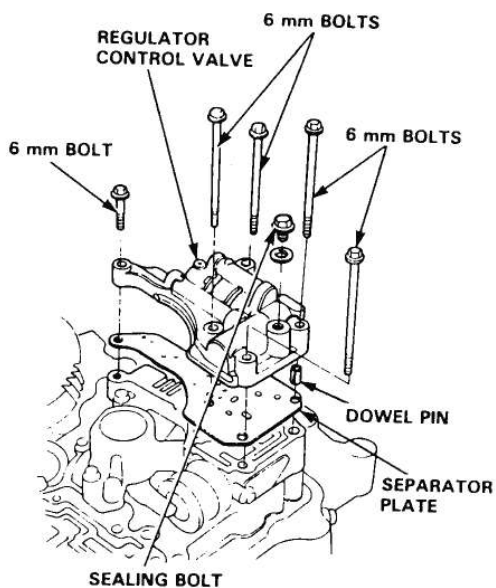


10. Install the regulator valve and torque its 2 bolts to **70 inch pounds**

6 mm BOLTS
70 inch pounds

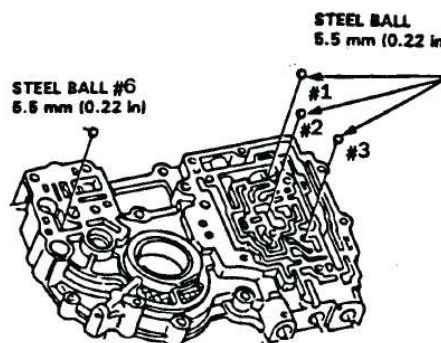


11. Install the dowel pin, and separator plate.
12. Install the regulator control valve body bolts as shown, and torque to 70 inch pounds

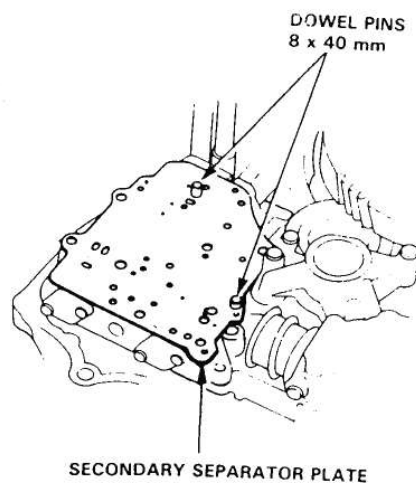


13. Install the steel balls in main valve body oil passages.

SEE PAGE 26 FOR CHECK BALL LOCATIONS



14. Install the separator plate and dowel pins.



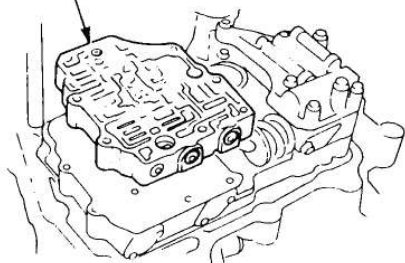
(cont'd)

Transmission

Reassembly (cont'd)

15. Install the secondary valve body.

SECONDARY VALVE BODY



16. Install the steel balls, ball spring, shift timing accumulator piston, valve spring and secondary filter in the secondary valve body.

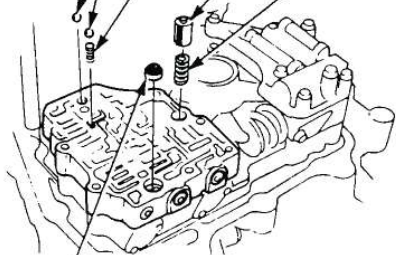
SEE PAGE 25 FOR CHECK BALL LOCATIONS

STEEL BALLS

SPRING

ACCUMULATOR PISTON

VALVE SPRING



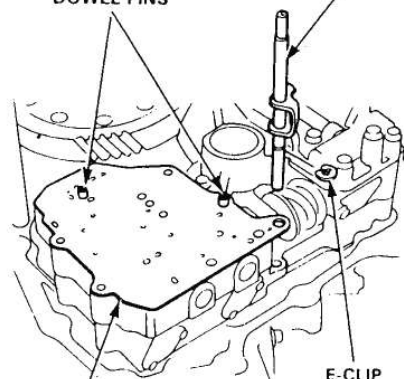
SECONDARY FILTER

NOTE: The ball for the top oil passage has a spring to press the ball against the separator plate.

17. Install the separator plate and dowel pins, then install the throttle control shaft.

DOWEL PINS

THROTTLE CONTROL SHAFT



SERVO SEPARATOR PLATE

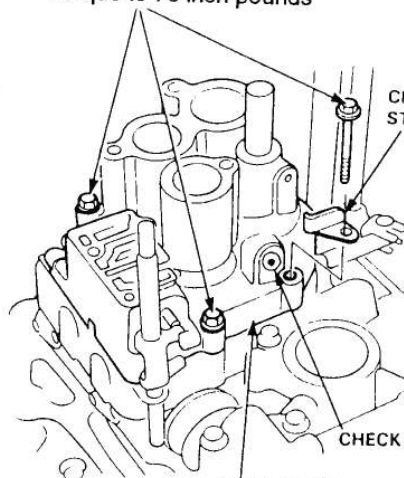
E-CLIP

18. Install the servo valve body (2 bolts) and check valve stop plate (1 bolt) as shown.

BOLTS

Torque to 70 inch pounds

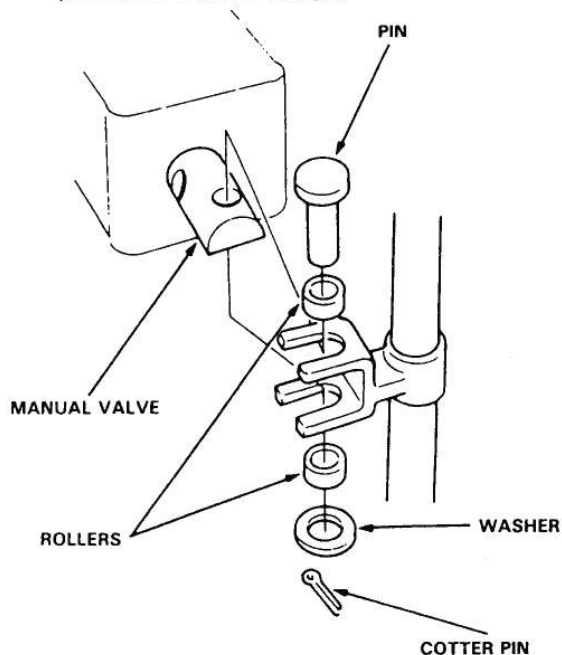
CHECK VALVE STOP PLATE



CHECK VALVE

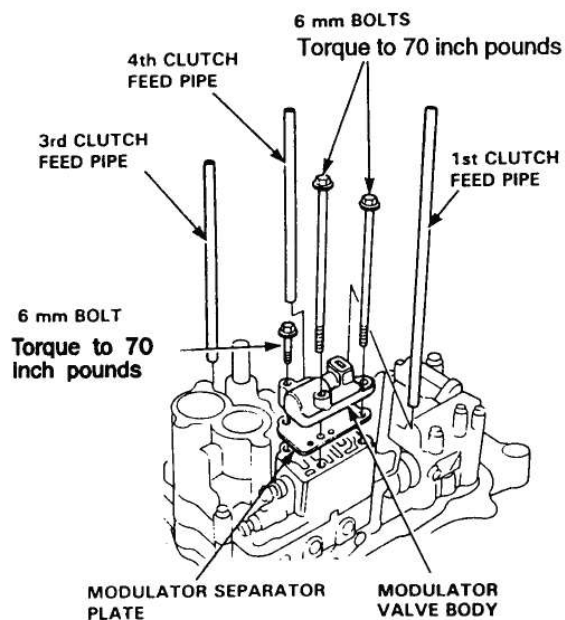
SERVO VALVE BODY

19. Put the rollers on each side of the manual valve stem, then attach the valve to the lever with the pin. Secure with the lock pin.



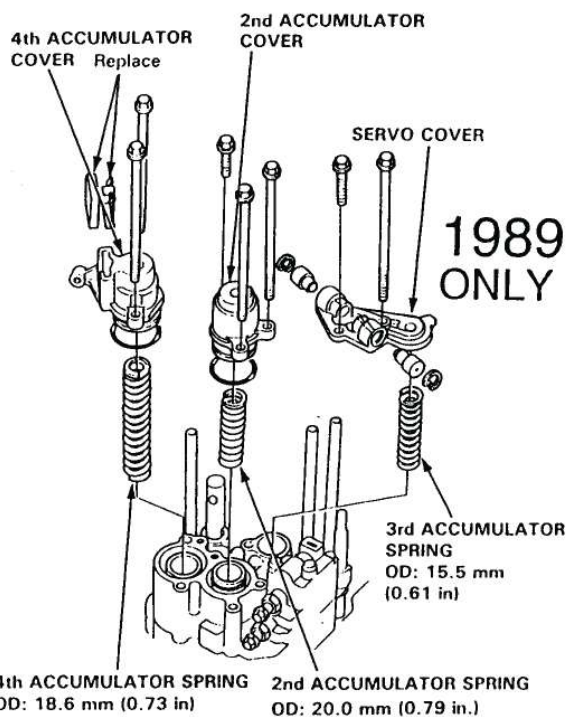
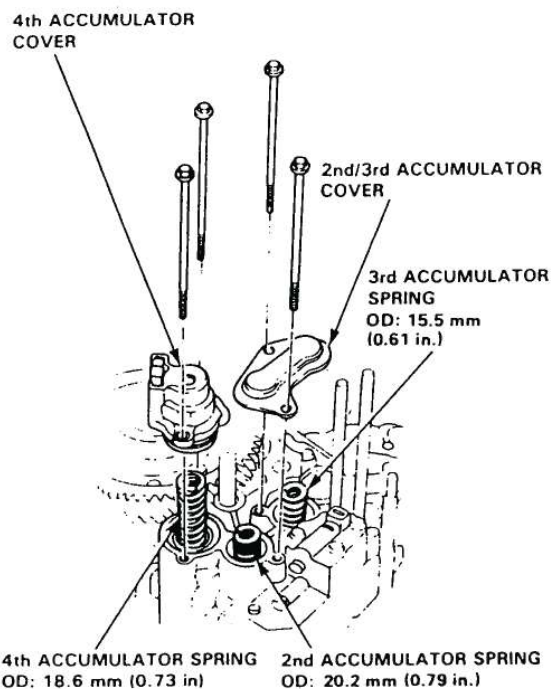
20. Install the separator plate.

21. Install the 1st, 3rd and 4th clutch feed pipes.



22. Install parts and torque to 70 inch pounds

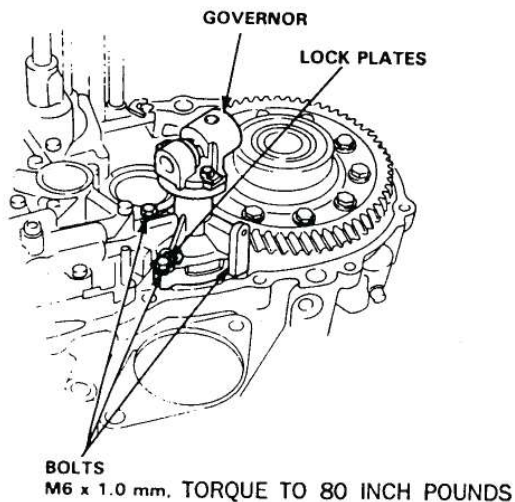
CAUTION: To prevent stripping the threads, press down on accumulator cover, then install the bolts



Transmission

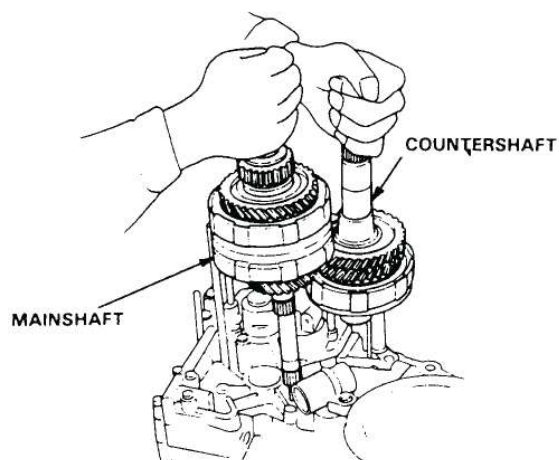
Reassembly (cont'd)

25. Install the governor valve using new lock plates, and the three 6 mm bolts.



26. Set the countershaft and mainshaft in place as an assembly.

NOTE: Do not tap on the shafts with a hammer to drive in.

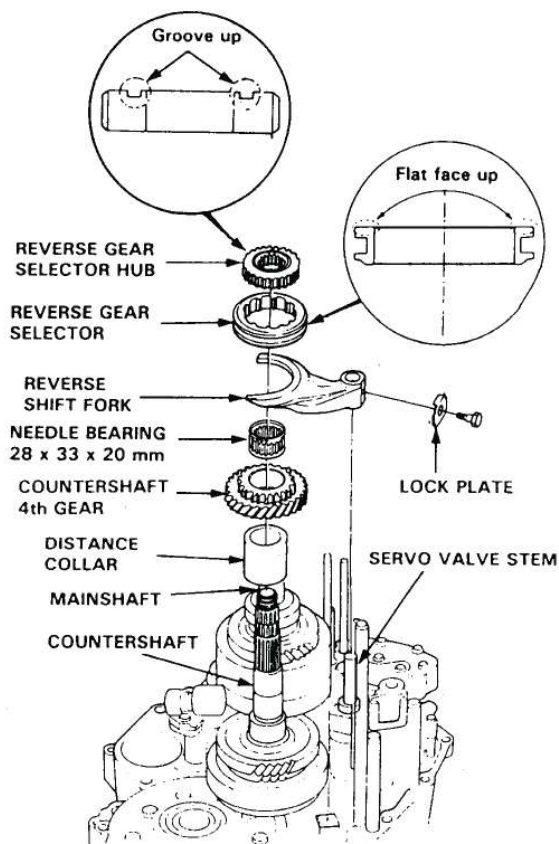


27. Install 4th gear and its needle bearing, and the countershaft 4th gear and its selector hub.

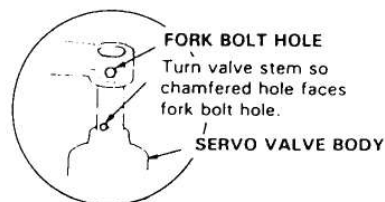
28. Assemble the reverse shift fork and selector sleeve, then install them as an assembly on the countershaft.

NOTE:

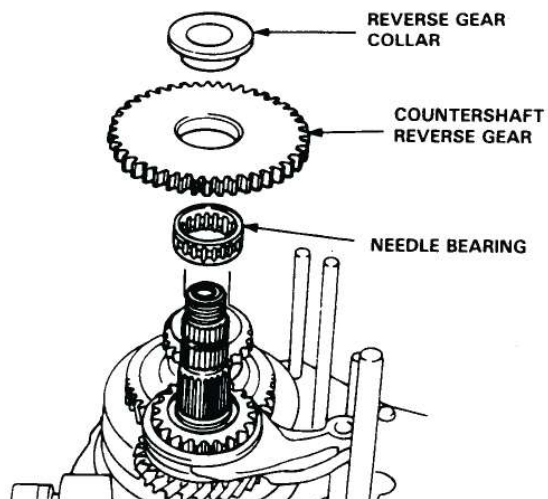
- Install the sleeve with its flat face up.
- Install the reverse gear selector hub with the groove facing up.



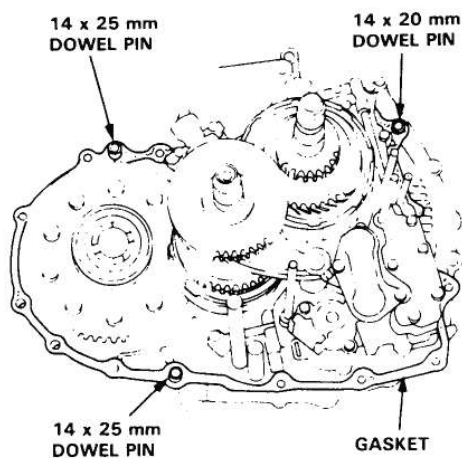
29. Install the reverse shift fork over the servo valve stem. Align the hole in the stem with hole in fork as shown, and install the bolt and new lock plate. Bend the lock tab against the bolt head.



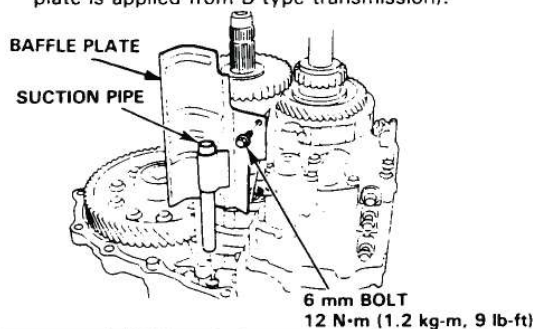
30. Install the countershaft reverse gear, needle bearing, and reverse gear collar.



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

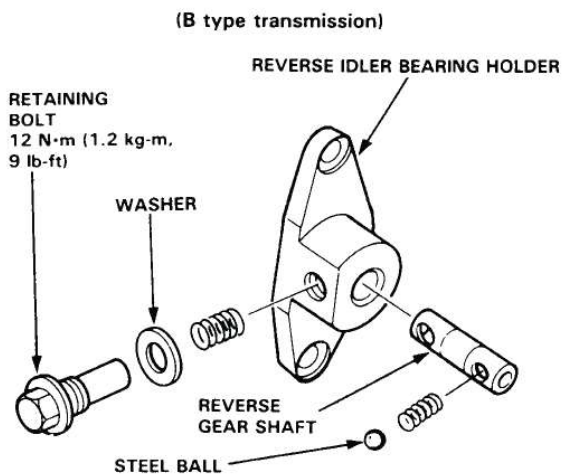
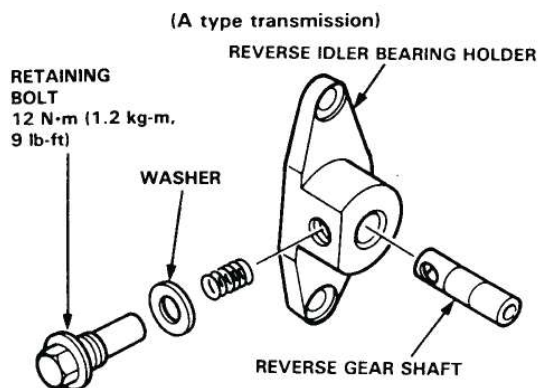


32. Install the baffle plate with the suction pipe (baffle plate is applied from B type transmission).



33. Assemble the idler bearing holder.

NOTE: Align the hole in the shaft with the spring.



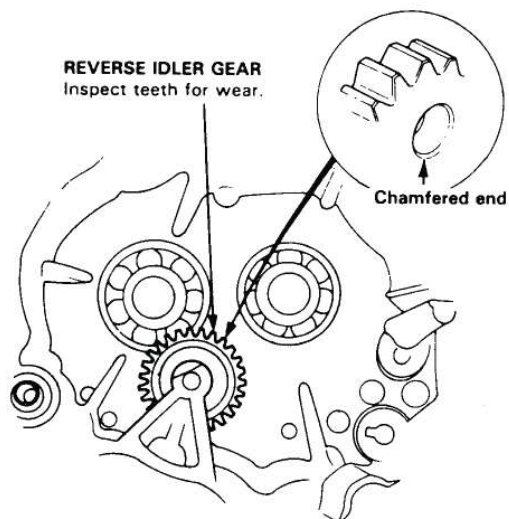
(cont'd)

Transmission

Reassembly (cont'd)

34. Install the reverse idler gear.

NOTE: Install the reverse idler gear so that the larger chamfer on the shaft bore faces the torque converter housing.

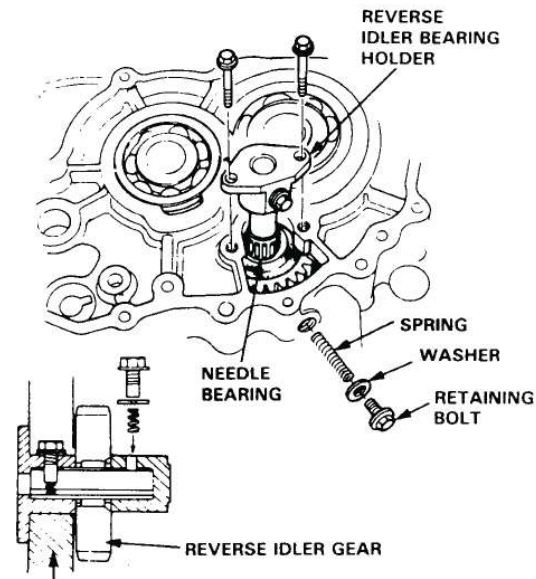


35. Install the needle bearing into the idler gear.
36. Install the idler bearing holder into the transmission housing.

37. Tighten the reverse idler bearing holder bolts.

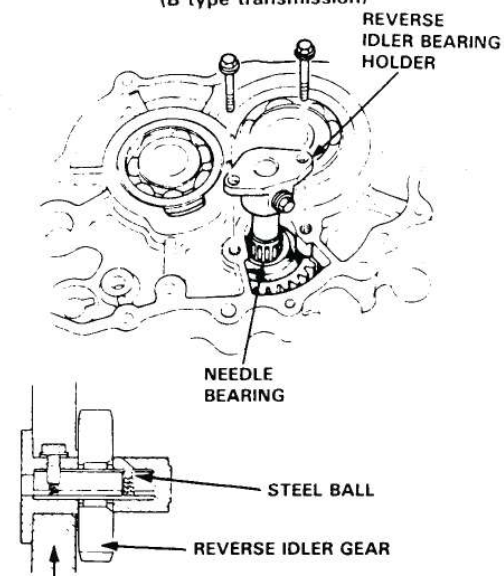
38. Install the spring and then tighten the retaining bolt with sealed washer.

(A type transmission)



TRANSMISSION CASE

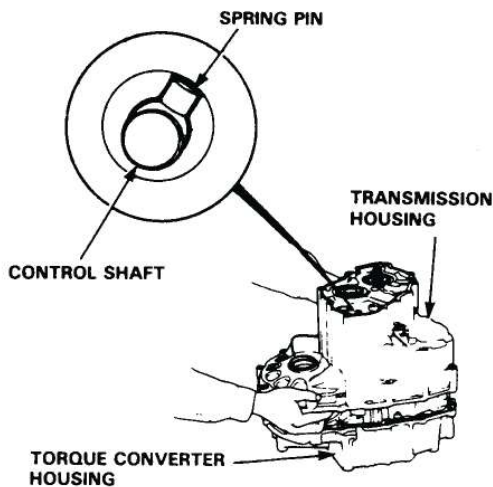
(B type transmission)



TRANSMISSION CASE

39. Place the transmission housing on the torque converter housing.

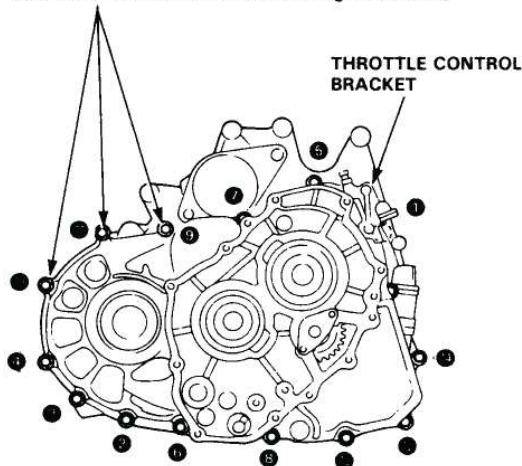
NOTE: Be sure the main valve control shaft lines up with the hole in the housing and that the reverse idler gear meshes with the mainshaft and countershaft, or the housing will not go on.



40. Torque bolts to 45 N·m (4.5 kg-m, 33 lb-ft) in order of (1) thru (15) in two or more steps.

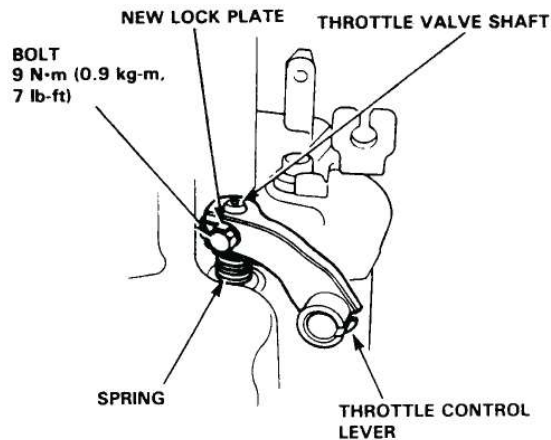
NOTE: When tightening the transmission housing bolts, take care that you do not distort or damage the throttle control bracket; distortion or damage to the bracket will change transmission shift points.

10 x 1.25 mm BOLTS 45 N·m (4.5 kg-m, 33 lb-ft)



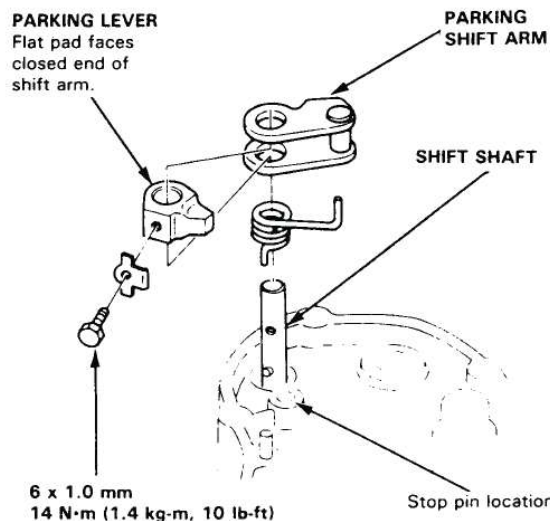
41. Install the throttle control lever and spring on the throttle control shaft.

42. Install the bolt and new lock plate. Bend the lock tab against the bolt head.



43. Install the parking shift arm and spring on the shift shaft with the bolt and a new lock plate. Bend the lock tab against the bolt head.

NOTE: The spring should put clockwise tension on the shift arm, forcing it against the stop pin.

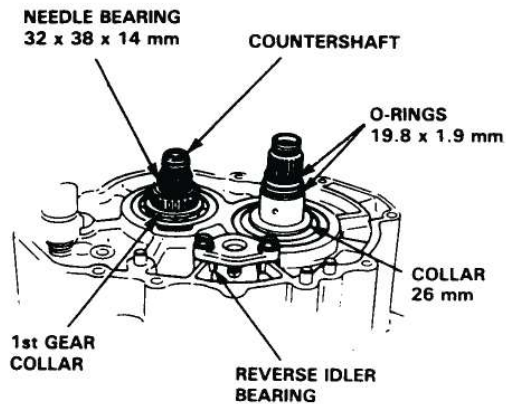


(cont'd)

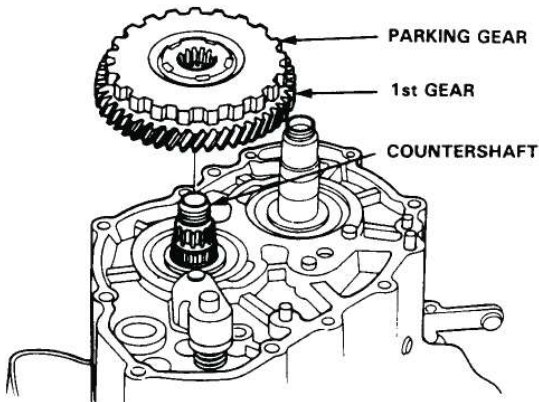
Transmission

Reassembly (cont'd)

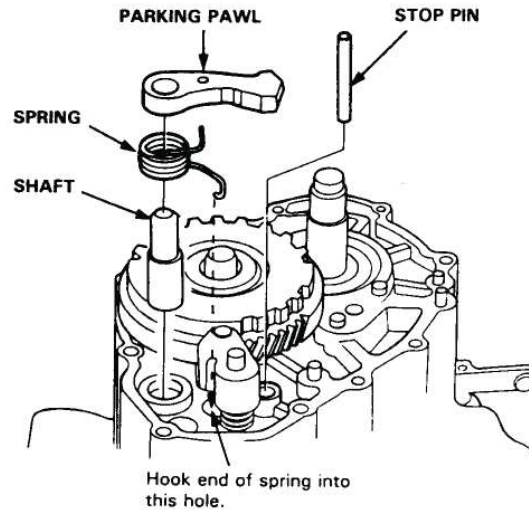
44. Install the 1st gear collar and needle bearing on the countershaft. Install the 26 mm collar on the mainshaft.
45. Install new 19.8 x 1.9 mm O-rings on the mainshaft.



46. Install the countershaft 1st gear and parking gear on the countershaft.



47. Install the stop pin, parking pawl shaft, parking pawl, and pawl release spring.

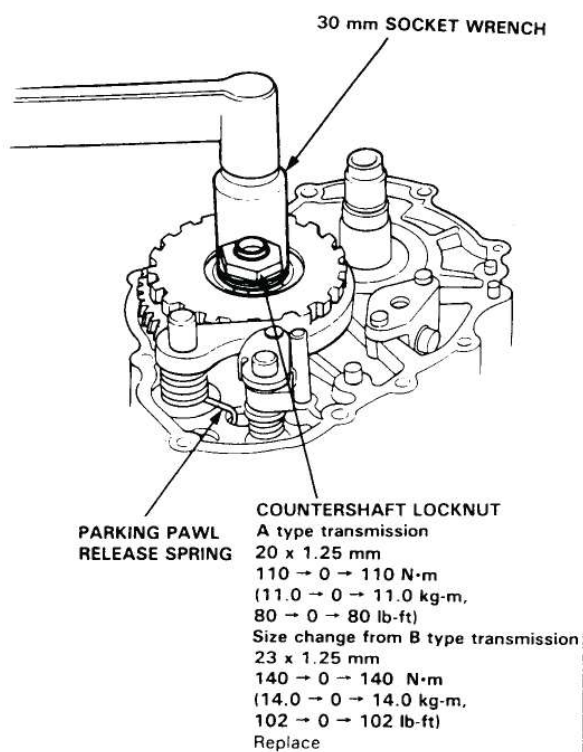


NOTE:

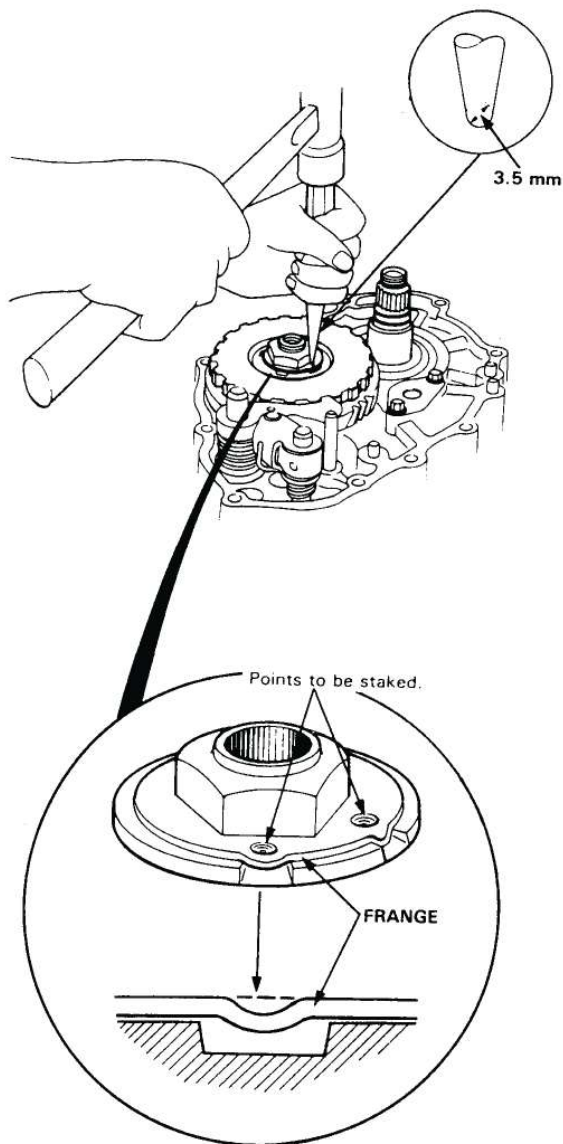
- One end of the parking pawl release spring fits into the hole in the parking pawl, the other end into the hole in the transmission housing as shown.
- The release spring should put clockwise tension on the pawl, forcing it away from the parking gear.

48. Shift to PARK and install the mainshaft holder.

49. Install and torque the new countershaft locknut.



50. Stake the locknut flange at two places into the gear grooves using a 3.5 mm punch.

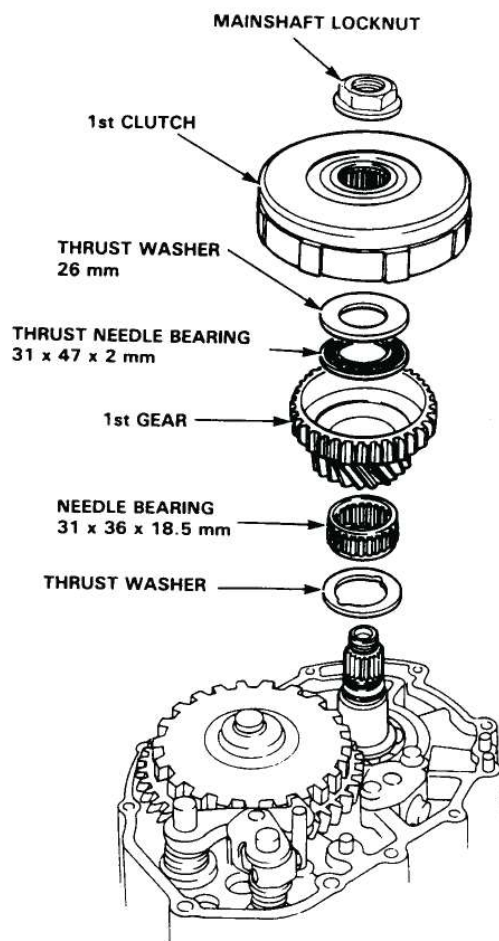


(cont'd)

Transmission

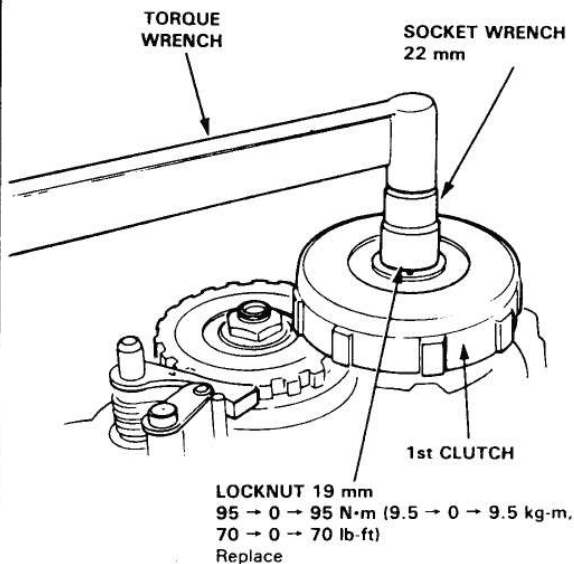
Reassembly (cont'd)

51. Install 31 x 36 x 18.5 mm needle bearing and thrust washer on the mainshaft.
52. Install 1st gear, thrust needle bearing, and the thrust washer on the mainshaft.

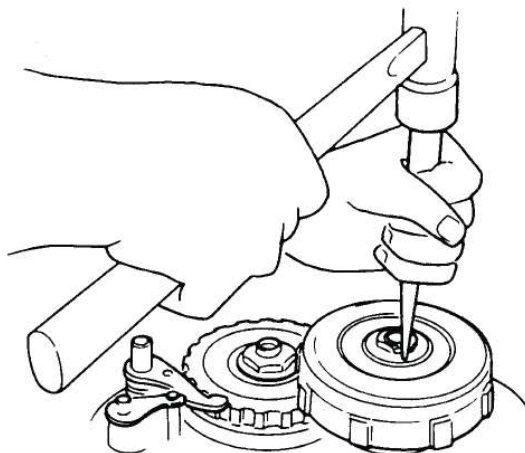


53. Install the 1st clutch on the mainshaft.
54. Attach the mainshaft holder from the underside of the torque converter case.
55. Install and torque the new mainshaft locknut.

CAUTION: Locknut has left-hand threads.



56. Stake the locknut flange into the groove in the 1st clutch.

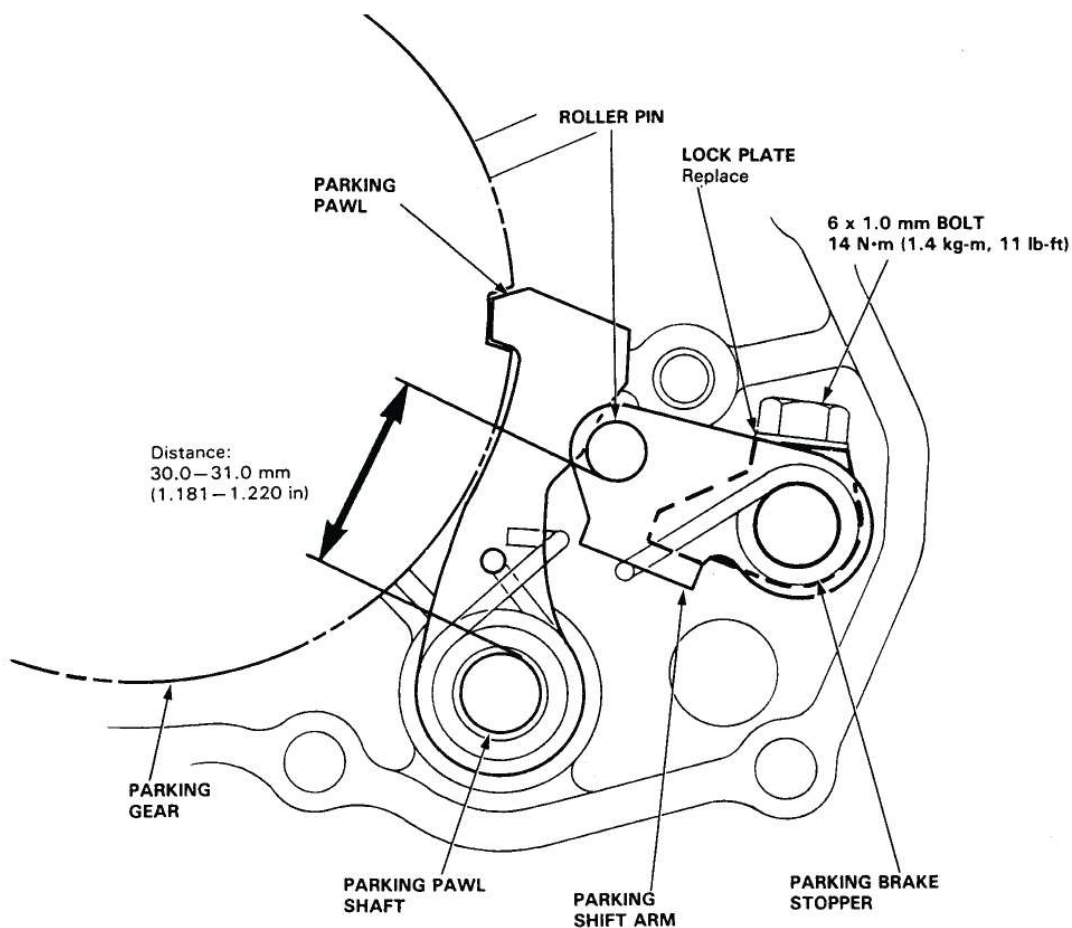


Parking Brake Stopper

Inspection/Adjustment

1. Set the parking shift arm in the PARK position.
2. Measure the distance between the outer face of the parking pawl shaft and outer face of the parking shift arm roller pin.

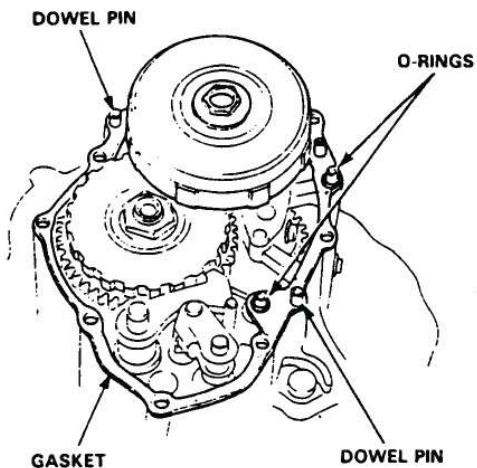
Distance: 30.0–31.0 mm (1.181–1.220 in)



3. If the measurement is out of specification (distance), select the appropriate parking brake stopper using the table below, and install it on the parking shift arm.

No.	PART NUMBER
1	24537-PA9-003
2	24538-PA9-003
3	24539-PA9-003

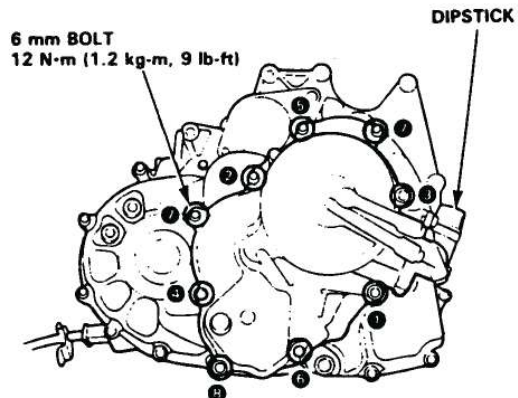
57. Install the gasket, dowel pins, and O-rings on the transmission housing.



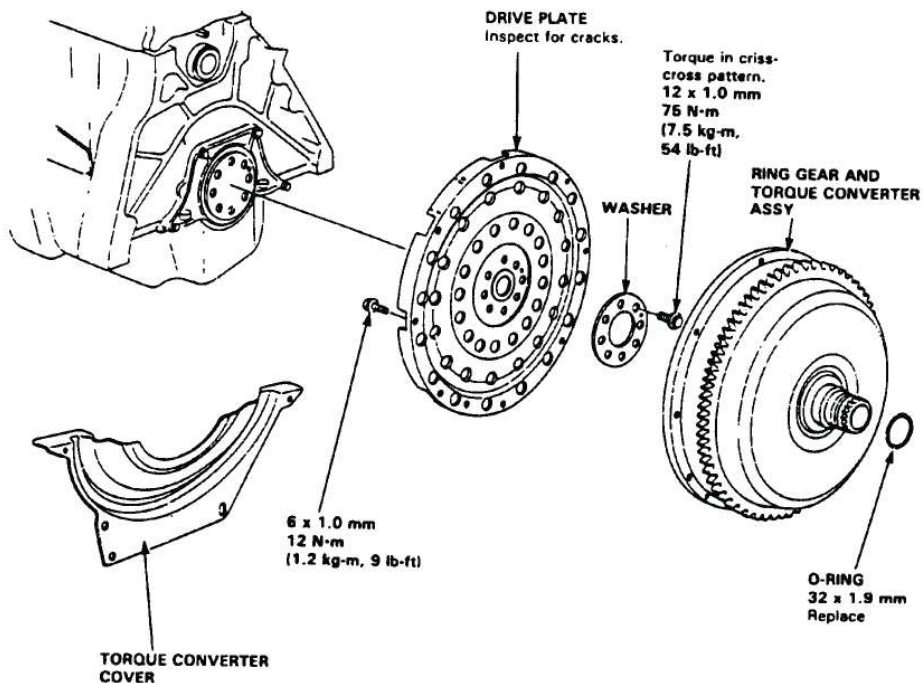
58. Install the end cover and torque all bolts (9) to 12 N·m (1.2 kg·m, 9 lb·ft).

59. Install the dipstick.

60. Install the transmission cooler banjo fitting, but do not tighten until the transmission is installed in the car and the hose is positioned properly.



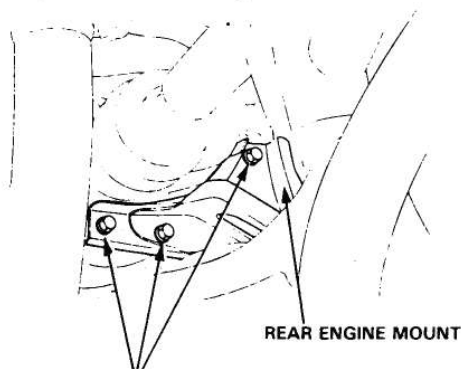
TORQUE CONVERTER DISASSEMBLY



Transmission

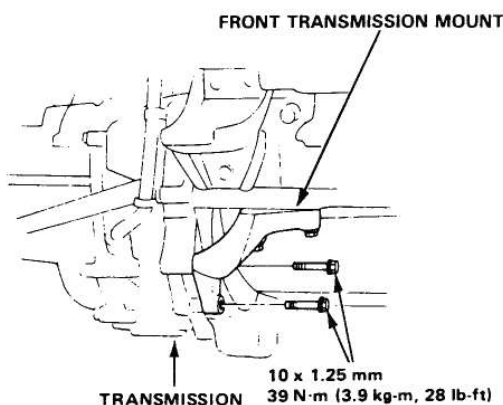
Installation

1. Attach shift cable to shift arm with pin, then secure cable to edge of housing with cable holder and bolt, and torque to 12 N·m (1.2 kg-m, 9 lb-ft).
2. Install torque converter on transmission.
3. Place transmission on transmission jack, and raise to engine level.
4. Hook hanger plate with hoist and make hoist chain tight.
5. Check that the two 14 mm dowel pins are installed in transmission housing.
6. Install new 26 mm spring clips on the end of each axle.
7. Align the dowel pins with holes in block; align torque converter bolt head with holes in drive plate.
8. Fit the left axle into the differential as you raise the transmission to the engine.
9. Secure transmission to engine with two (10 x 1.25 x 90 mm) lower mounting bolts, torque bolts when others are installed in step 23.
10. Install rear engine mounts on transmission housing; torque to 39 N·m (3.9 kg-m, 28 lb-ft).

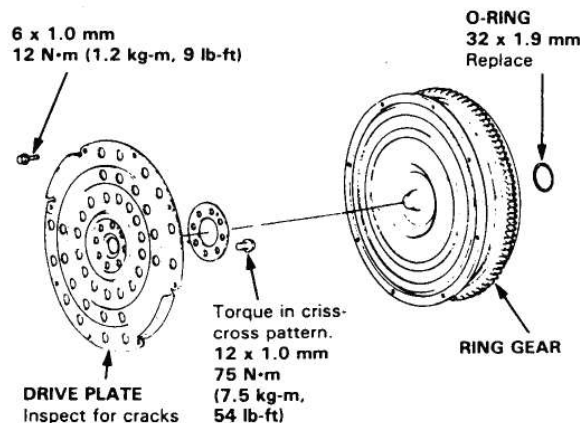


10 x 1.25 mm
39 N·m
(3.9 kg-m, 28 lb-ft)

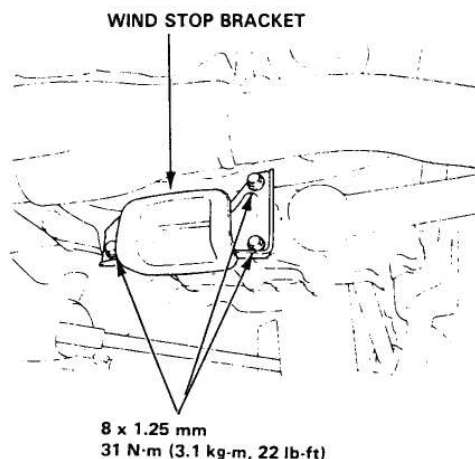
11. Install the front transmission mount bolts and torque to 39 N·m (3.9 kg-m, 28 lb-ft).



12. Attach torque converter to drive plate with eight (6 x 1.0 x 12 mm) bolts, and torque to 12 N·m (1.2 kg-m, 9 lb-ft). Rotate crank as necessary to tighten bolts to 1/2 torque, then the final torque, in a crisscross pattern. Check for free rotation after tightening the last bolt.



13. Remove the transmission jack.
14. Install torque converter cover plate, torque two 6 x 1.0 mm bolts (in oil pan flange) to 12 N·m (1.2 kg-m, 9 lb-ft).
15. Install the wind stop rubber on the center beam, torque 10 x 1.25 mm nuts to 55 N·m (5.5 kg-m, 40 lb-ft), and install wind stop bracket on the transmission housing, torque three 8 x 1.25 mm bolts to 31 N·m (3.1 kg-m, 22 lb-ft).



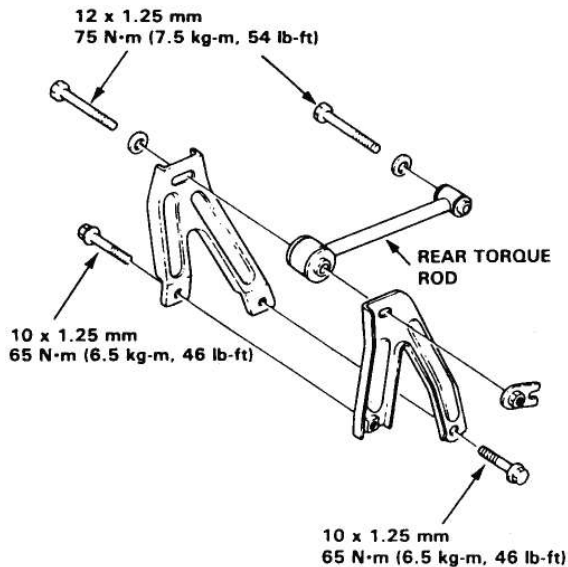
16. Remove hoist from transmission.
17. Install starter mount bolts (10 x 1.25 x 125 mm) and torque to 45 N·m (4.5 kg-m, 33 lb-ft).

(cont'd)

Transmission

Installation

18. Install the rear torque rod and brackets as shown.

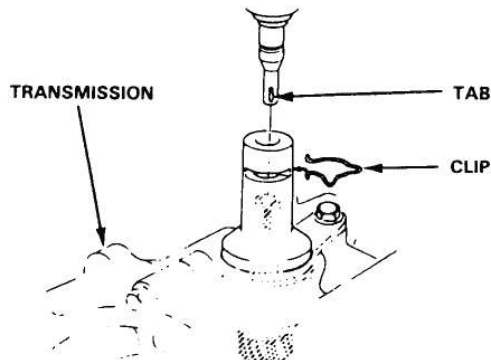


19. Turn right steering knuckle fully outward, and slide axle into differential until you feel its spring clip engage the side gear.

20. Reconnect ball joint to knuckle, then torque its bolt to 55 N·m (5.5 kg-m, 40 lb-ft). Reinstall the damper fork and torque its bolt to 44 N·m (4.4 kg-m, 32 lb-ft).

21. Install speedometer cable.

- Align tab on cable end with slot in holder.
- Install clip so bent leg is on groove side.



NOTE: After installing, pull speedometer cable to see that it is secure.

22. Install front wheels, lower car to ground, and torque nuts to 110 N·m (11.0 kg-m, 80 lb-ft).

23. Install transmission mounting bolt (10 x 1.25 x 90 mm), and torque all bolts to 45 N·m (4.5 kg-m, 33 lb-ft).

24. Connect cooler hoses, and torque banjo bolts to 29 N·m (2.9 kg-m, 21 lb-ft).

25. Connect wiring:

- Battery positive cable to starter.
- Black/white wire to starter solenoid.
- Yellow/green wire to water temperature sending unit.
- Black/yellow and yellow wires to ignition timing thermosensor.

26. With ignition key in 0 position, connect ground cable to battery and transmission.

27. Unscrew the dipstick from top of transmission end cover and add 3.2 quarts Dexron® ATF through the hole. Reinstall dipstick.

NOTE: If transmission and torque converter have been disassembled, add a total of 6.0 l (6.3 US. qts, 5.3 Imp. qt).

28. Install and reconnect shift cable

29. Install console.

30. Start engine, set parking brake, and shift transmission through all gears three times. Check for proper shift cable adjustment

31. Let engine reach operating temperature with transmission in Neutral or Park, then turn it off and check fluid level.

32. Install throttle control cable and adjust.

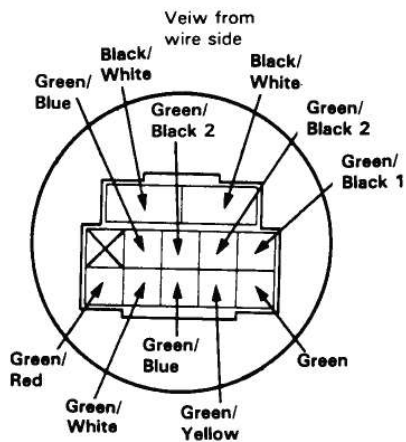
33. Road test

Shift Position Switch

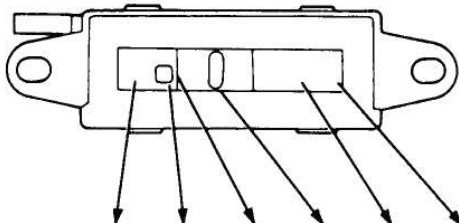
Testing/Installation

Move the selector lever to Park, Reverse, and Neutral to check continuity of combined shift position switch. Replace the switch if there is no continuity between connector terminals shown on the chart.

NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example G/BI¹ and G/BI² are not the same.)



SHIFT POSITION SWITCH

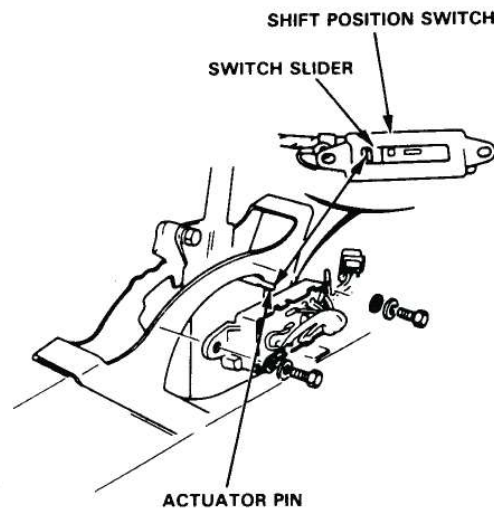


Wire color	2	D3	D4	N	R	P
Green/Blue (cruise control)						
GND						
Green/Yellow						
Green/Blue						
Green/Black						
Green						
Green/Red						
Green/White						

INHIBITER SWITCH

Wire color	N	R	P
Black/White			
Green/Black 2			
Black/White			
Green/Black 2			

1. Position the switch slider to Park, as shown.
2. Shift the selector lever to Park.

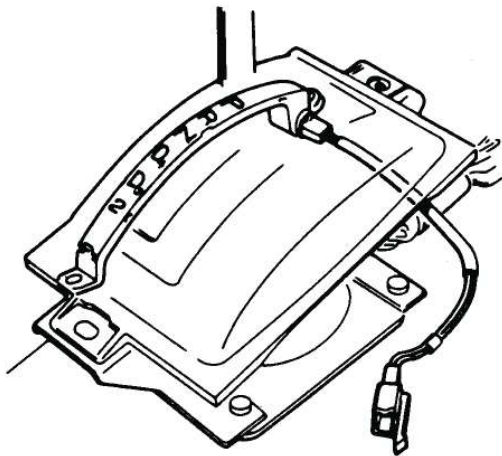


3. Tighten the switch with two bolts and lockwashers.

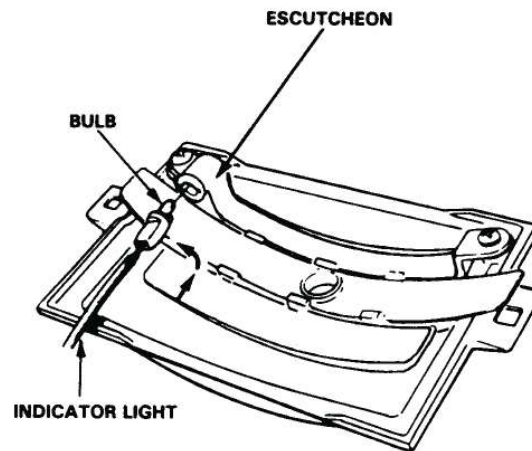
Shift Indicator Light

Check and Installation

Check for continuity between indicator light connector terminals as shown. If there is no continuity, check for burned out bulb or open circuit.



Install the indicator bulb in the bulb housing. Insert the bulb housing into slot in escutcheon, then turn 90° to bulb housing.

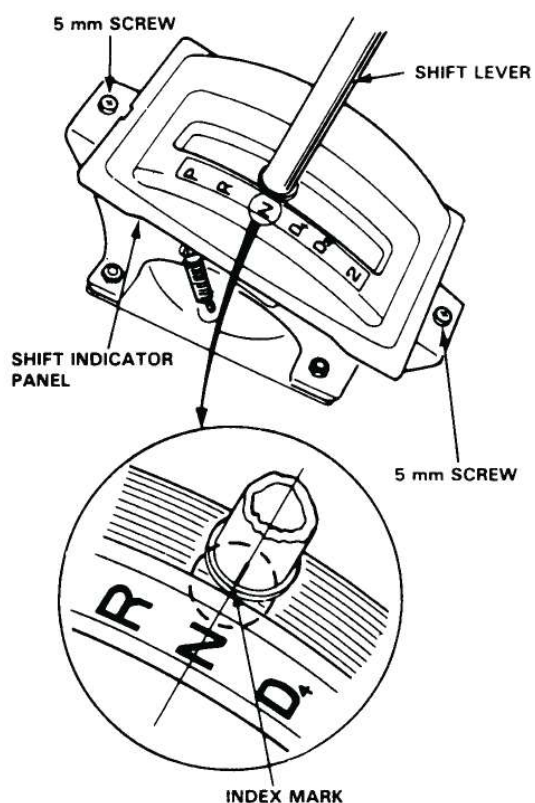


Shift Indicator Panel

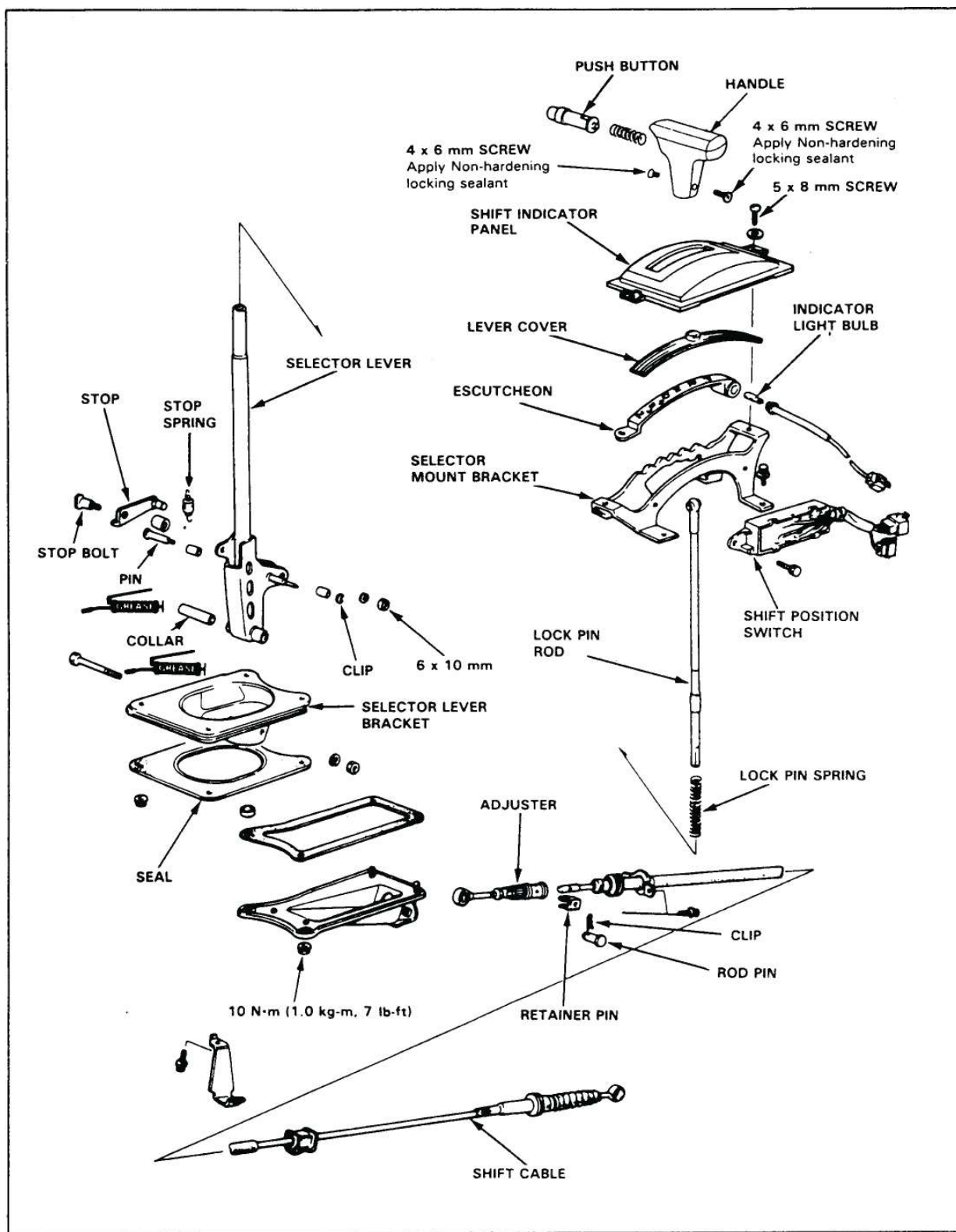
Adjustment

1. Check that the index mark of the indicator aligns with the N mark of the shift indicator panel with the transmission in NEUTRAL.
2. If not aligned, remove the panel mounting screws and adjust by moving panel.

NOTE: Whenever escutcheon is removed for indicator bulb replacement etc., reinstall the panel as described above.



Gearshift Selector

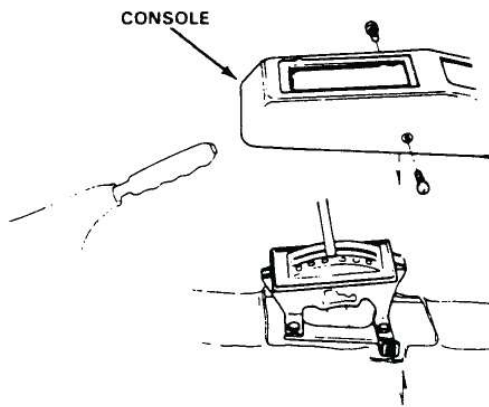


Shift Cable

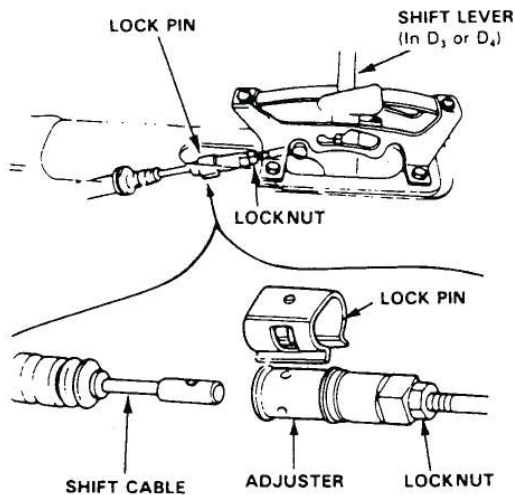
Adjustment

1. Start the engine. Shift to reverse to see if the reverse gear engages. If not, refer to troubleshooting.

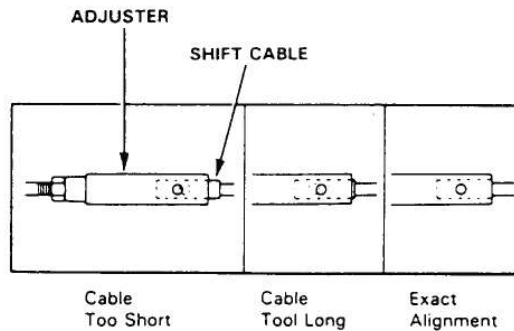
2. With the engine off, remove the console.



3. Shift to Drive, then remove the lock pin from the cable adjuster.



4. Check that the hole in the adjuster is perfectly aligned with the hole in the shift cable.



NOTE: There are two holes in the end of the shift cable. They are positioned 90° apart to allow cable adjustments in 1/4 turn increments.

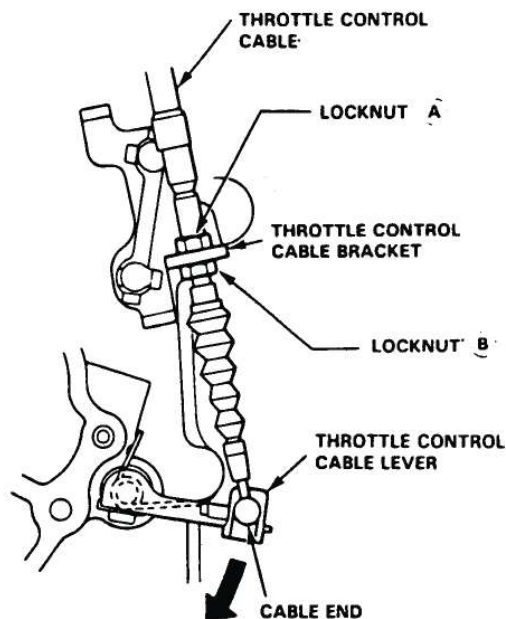
5. If not perfectly aligned, loosen the locknut on shift cable and adjust as required.
6. Tighten the locknut.
7. Install the lock pin on the adjuster.

NOTE: If you feel the lock pin binding as you re-install it, the cable is still out of adjustment and must be readjusted again.

8. Start the engine and check the shift lever in all gears. If any gear does not work properly, refer to troubleshooting.

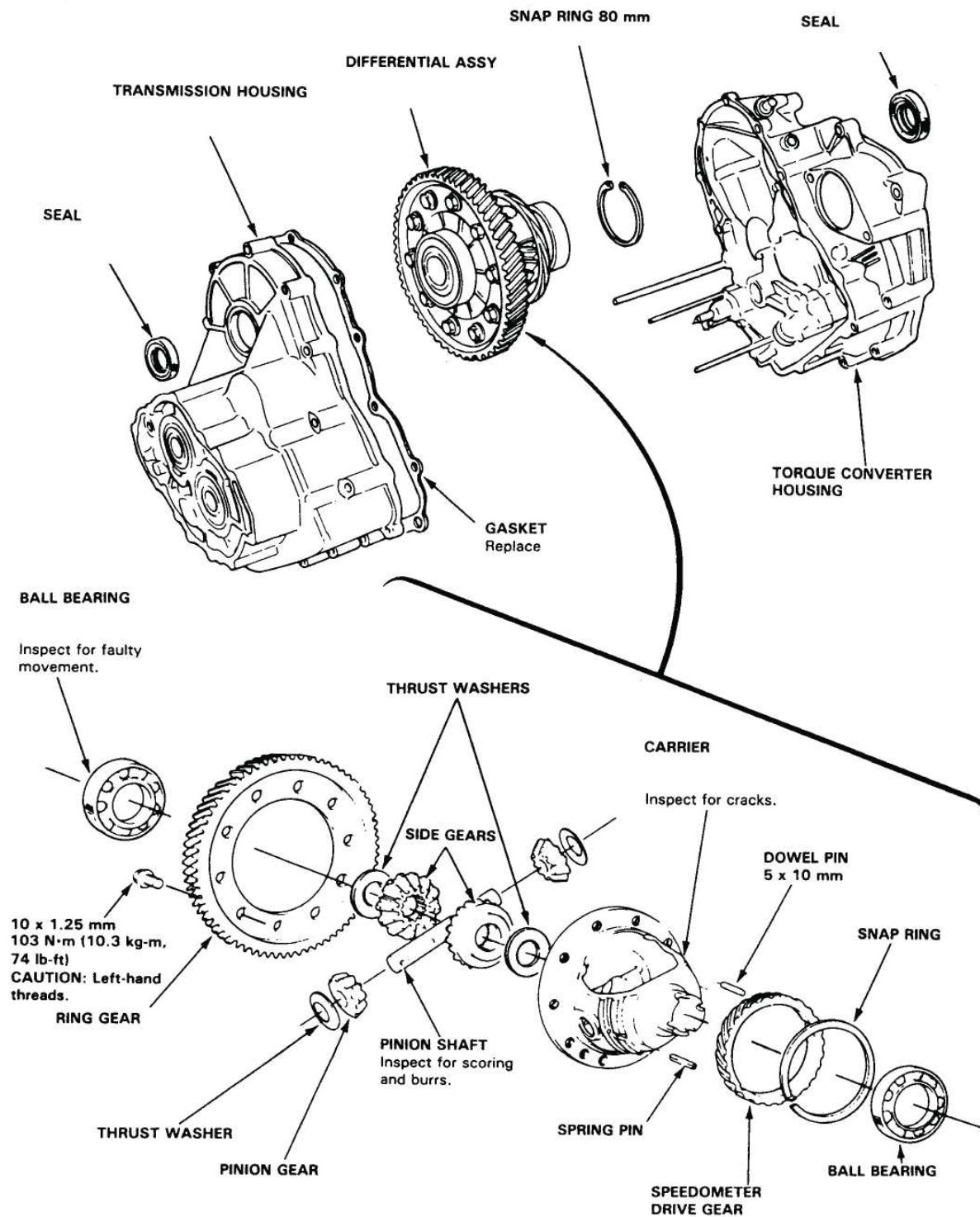
THROTTLE VALVE PRESSURE & CABLE ADJUSTMENT

1. Attach 0-100 p.s.i. pressure gauge on T.V. B pressure port. make sure gauge needle is on zero with engine off.
2. Lift up on T.V. lever to disengage T.V. cable end from lever.
3. Warm up engine so that it is off of high idle.
4. Block wheels, set parking brake, apply service brakes, do not allow anyone to be in front of vehicle, move shift lever to D4 or D3 position.
5. Pressure should be zero
6. Pull up on lever, pressure should be 100 p.s.i.
7. Reattach cable. Check for zero reading on pressure gauge at idle with brake applied. If gauge reading is above zero adjust lock nut A and B on T.V. cable until a zero reading is obtained.
8. FORM INSIDE THE VEHICLE very lightly touch the accelerator pedal until the engine speed just begins to increase, pressure gauge needle should move off of zero at the same time. Adjust T.V. cable lock nuts until the engine RPM and the gauge needle start to move at exactly the same time.



Differential

Index

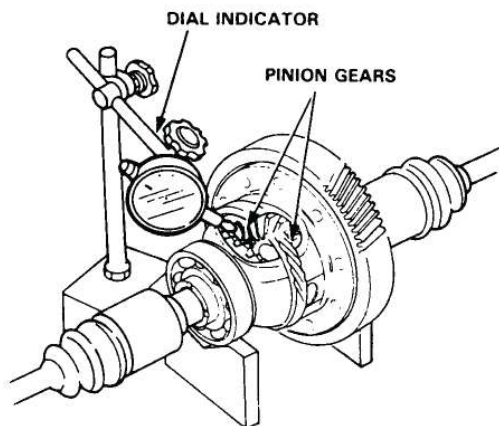


Differential

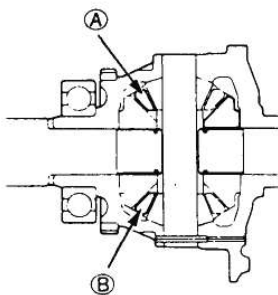
Backlash Inspection

1. Place differential assembly on V-blocks and install both axles.
2. Check backlash of both pinion gears.

Standard (New): 0.05—0.15 mm
(0.002—0.006 in.)



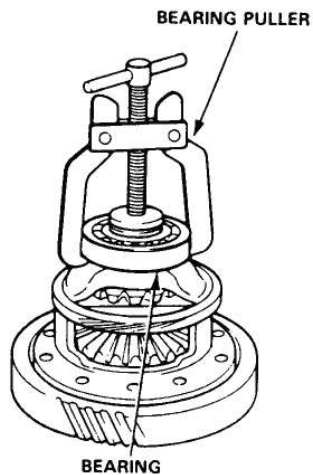
3. If out of tolerance, disassemble differential and select new thrust washers
4. Measure clearances in the A and B position of the drive pinion.



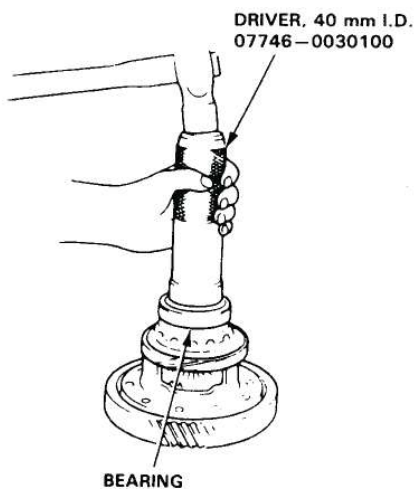
Bearing Replacement

NOTE: Check bearings for wear and rough rotation. If bearings are OK, removal is not necessary.

1. Remove bearings using a standard bearing puller.



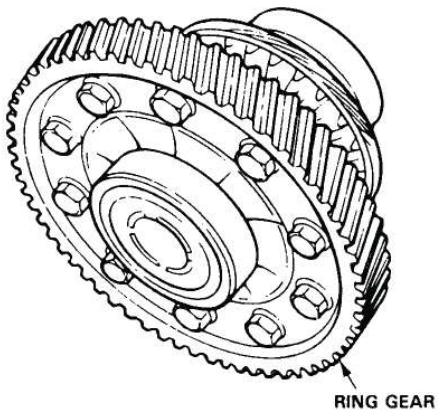
2. Install new bearings using the special tool.



Inspection/Disassembly

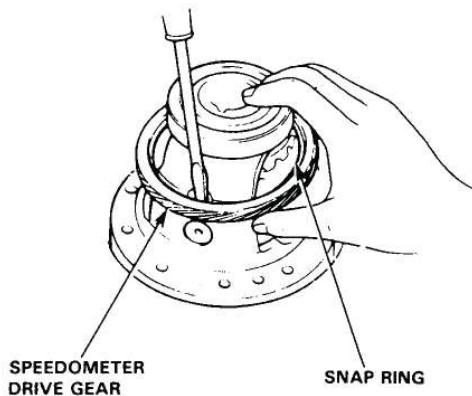
1. Remove ring gear and inspect teeth for wear or damage.

CAUTION: The ring gear bolts have left-hand threads.

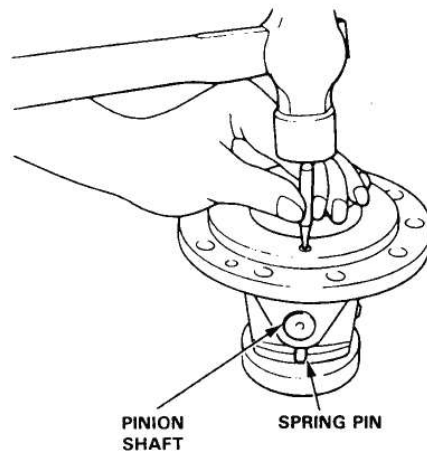


2. Pry snap ring off carrier, then remove speedometer drive gear and dowel pin.

CAUTION: The speedometer drive gear has sharp edges; use care when handling it.

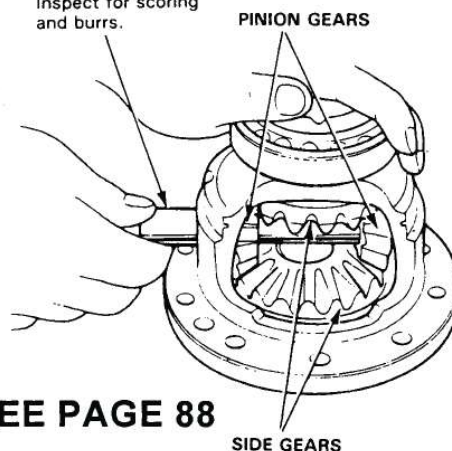


3. Drive out spring pin with pin punch.



4. Remove pinion shaft, pinion gears, and thrust washers.

PINION SHAFT
Inspect for scoring and burrs.



SEE PAGE 88

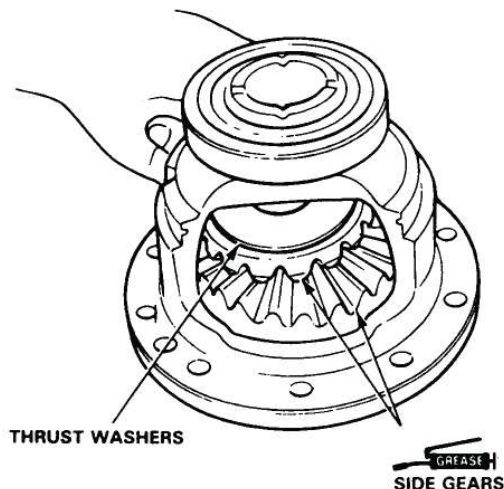
5. Wash parts thoroughly in solvent and dry with compressed air. Inspect all parts for wear or damage and replace any that are defective.

Differential

Reassembly

1. Install the side gears in differential carrier.

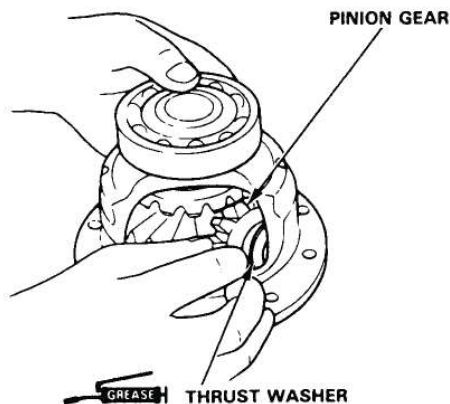
CAUTION: Coat all gears with molybdenum disulfide grease on all sides.



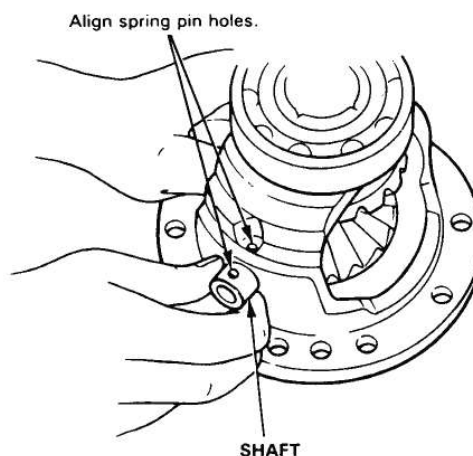
2. Set pinion gears in place exactly opposite each other in mesh with side gears, then install a thrust washer behind each one. Washers must be of equal thickness.

Thrust Washers

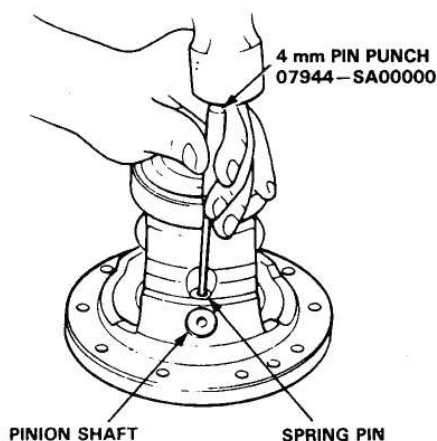
PART NUMBER	THICKNESS
41351-689-000	0.7 (0.028 in)
41355-PC8-000	0.75 (0.029 in)
41352-689-000	0.8 (0.031 in)
41356-PC8-000	0.85 (0.032 in)
41353-689-000	0.9 (0.035 in)
41357-PC8-000	0.95 (0.036 in)
41354-689-000	1.0 (0.039 in)



3. Rotate gears as shown until shaft holes in pinion gears line up with shaft holes in carrier.
4. Insert pinion shaft and align spring pin holes in one end with matching hole in carrier.



5. Drive in spring pin with pin punch.



6. Check backlash of both pinion gears again.

Standard (New): 0.05–0.15 mm
(0.002–0.006 in.)

- If still out of tolerance, replace both pinion gears, then recheck backlash.
- If still out of tolerance, replace side gears, and recheck backlash.
- If still out of tolerance, replace carrier assembly.

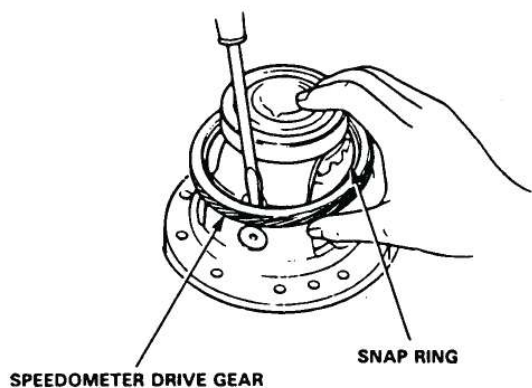
(cont'd)

Differential

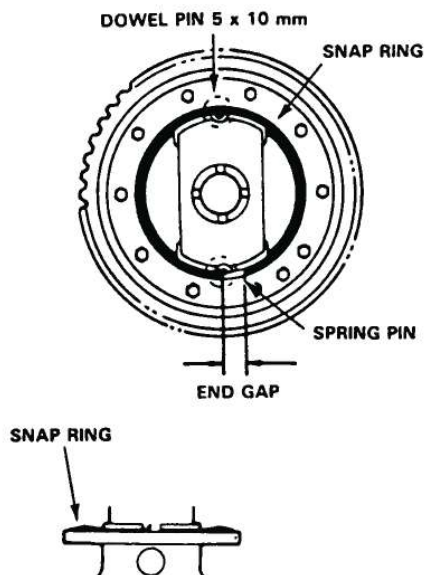
Reassembly (cont'd)

7. Install speedometer drive gear with its chamfer (on inside diameter) facing carrier and secure with snap ring.

CAUTION: The speedometer drive gear has sharp edges; use care when handling it.



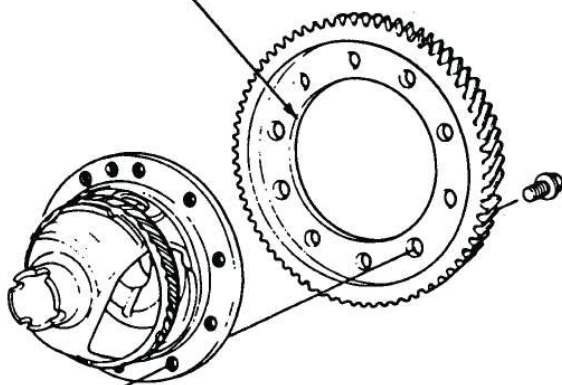
8. Align snap ring on carrier as shown.



9. Install ring gear. Torque bolts to 103 N·m (10.3 kg-m, 74 lb-ft).

CAUTION: Ring gear bolts have left-hand threads.

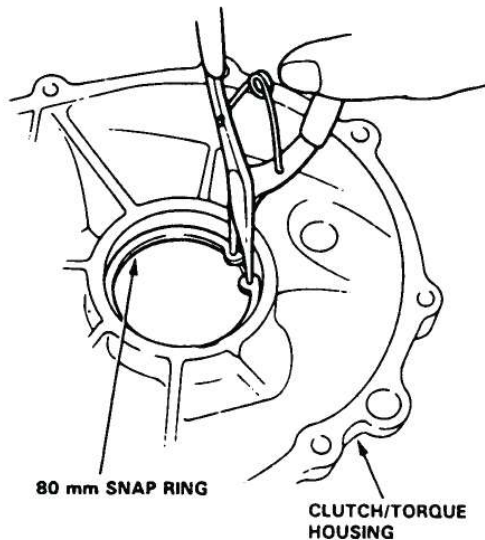
Chamfer on inside diameter of ring gear faces carrier.



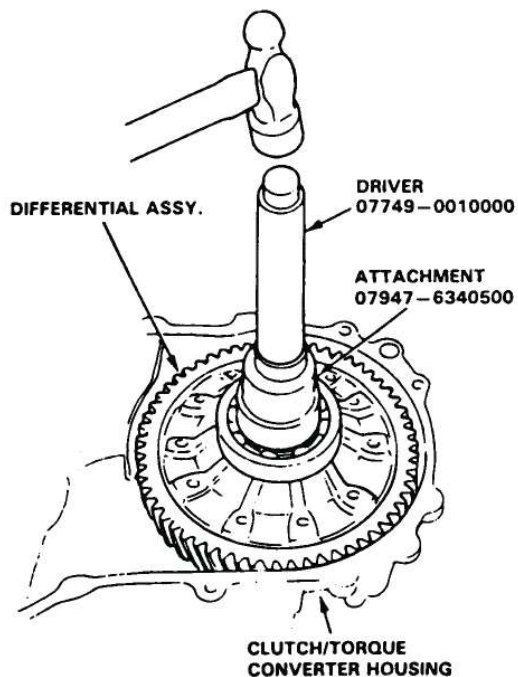
Differential

Installation

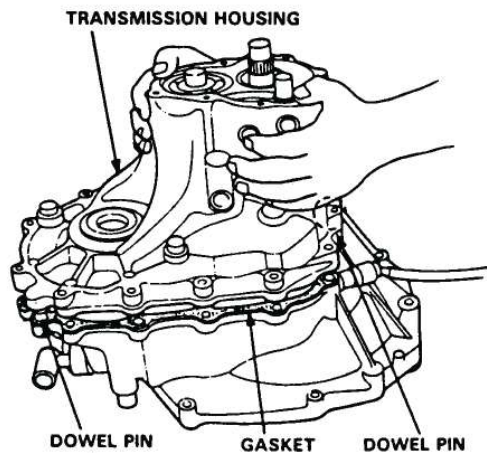
1. Install 80 mm snap ring in clutch/torque converter housing. Do not install oil seal yet.



2. Install differential assembly in clutch/torque converter housing using driver. Tap on differential with the special tools to seat the snap ring in clutch/torque converter housing.



3. Install all transmission gear assemblies in clutch/torque converter housing.
4. Place new gasket on clutch/torque converter housing and install both dowel pins, then carefully lower the transmission housing into place.

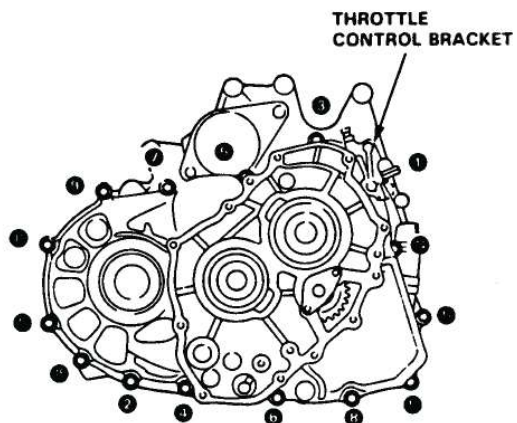


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Differential

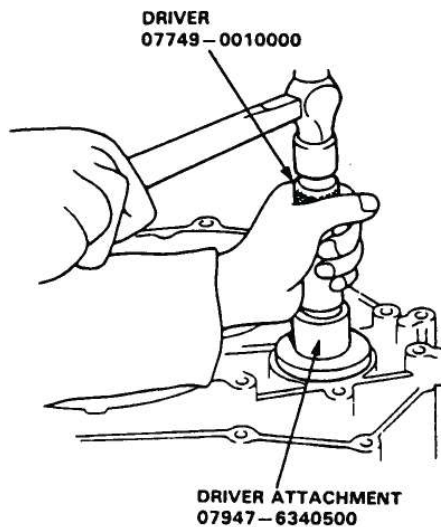
Installation (cont'd)

5. Torque bolts to 55 N·m (5.5 kg-m, 40 lb-ft) in order in two or more steps.

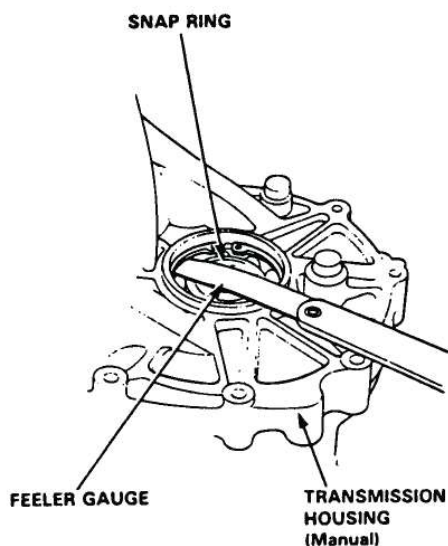


NOTE: When tightening transmission housing bolts, take care that you do not distort or damage the throttle control bracket; distortion or damage to bracket will change transmission shift points.

6. Use special tools to bottom differential assembly in transmission housing.



- 7 Measure clearance between snap ring and outer race of bearing in transmission housing (Manual), or torque converter housing (Automatic).



If out of limits, select new snap ring from following table and install:

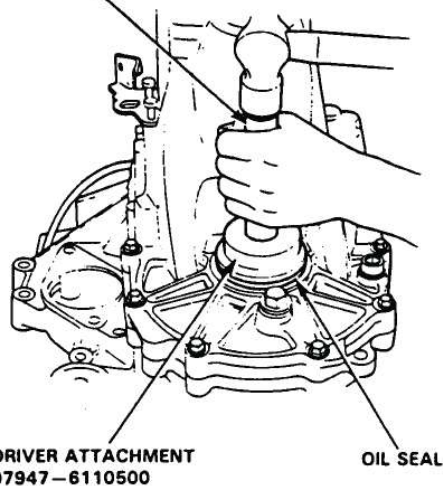
Side Clearance: 0.15 mm (0.006 in.) Max.

Automatic only:

Part Number	Thickness
90414-689-000	2.50 mm (0.098 in.)
90415-689-000	2.60 mm (0.102 in.)
90416-689-000	2.70 mm (0.106 in.)
90417-689-000	2.80 mm (0.110 in.)
90418-689-000	2.90 mm (0.114 in.)

8. Turn transmission over and seat new snap ring against the clutch/torque converter housing as shown in step 1.
9. Then turn transmission back over, seat differential again as shown in step 9, and recheck bearing-to-snap ring clearance.
10. Apply oil to new differential seals and install them in clutch/torque converter housing and transmission housing with special tools as shown.

DRIVER
07749-0010000



SPECIFICATIONS

Differential

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Ring gear	Backlash	0.085—0.149 (0.0033—0.0059)	0.2 (0.0079)
Differential carrier	Pinion shaft bore diameter	18.000—18.018 (0.7087—0.7094)	18.1 (0.71)
	Carrier-to-pinion shaft clearance	0.016—0.052 (0.0006—0.0020)	0.1 (0.004)
	Driveshaft bore diameter	28.000—28.021 (1.1024—1.1032)	—
	Carrier-to-driveshaft clearance	0.025—0.066 (0.0010—0.0026)	0.12 (0.005)
	Side clearance	0.10—0.20 (0.004—0.008)	0.15 (0.006)
Differential pinion gear	Backlash	0.05—0.15 (0.002—0.006)	Selection with 8 types of washers
	Pinion gear bore diameter	18.041—18.061 (0.7103—0.7111)	—
	Pinion gear-to-pinion shaft clearance	0.057—0.093 (0.0022—0.0037)	0.15 (0.006)

Automatic Transmission

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (U.S. qt., Imp. qt.)	3.0 (3.2, 2.6) at oil change 6.0 (6.3, 5.3) at assembly	
Hydraulic pressure	Line pressure at 2,000 rpm	* 834—883 kPa (8.5—9.0 kg/cm ² , 121—128 psi) ** 785—834 kPa (8.0—8.5 kg/cm ² , 114—121 psi)	* 785 kPa (8.0 kg/cm ² , 114 psi) * 735 kPa (7.5 kg/cm ² , 107 psi)
	4th, 3rd, 2nd clutch pressure at 2,000 rpm	* 441—883 kPa (4.5—9.0 kg/cm ² , 64—128 psi) ** 441—834 kPa (4.5—8.5 kg/cm ² , 64—121 psi)	392 kPa (4.0 kg/cm ² , 57 psi) with lever released 785 kPa (8.0 kg/cm ² , 114 psi) with lever in throttle position (3/8—8/8)
	1st clutch pressure at 2,000 rpm	* 834—883 kPa (8.5—9.0 kg/cm ² , 121—128 psi) ** 785—834 kPa (8.0—8.5 kg/cm ² , 114—121 psi)	* 785 kPa (8.0 kg/cm ² , 114 psi) * 735 kPa (7.5 kg/cm ² , 107 psi)
	Governor pressure at 38 mph (60 km/h)	221—230 kPa (2.25—2.35 kg/cm ² , 32—33 psi)	216 kPa (2.20 kg/cm ² , 31 psi)
	Throttle pressure A Fully closed Fully opened	0 515—530 kPa (5.25—5.40 kg/cm ² , 75—77 psi)	— 510 kPa (5.2 kg/cm ² , 74 psi)
	Throttle pressure B Fully closed Fully opened	0 834—883 kPa (8.5—9.0 kg/cm ² , 121—128 psi)	— 785 kPa (8.0 kg/cm ² , 114 psi)
	Stall speed	Check with car on level ground * 2,650 rpm ** 2,750 rpm	* 2,500—2,800 rpm ** 2,600—2,900 rpm
Clutch	Clutch initial clearance	1st 0.65—0.85 (0.026—0.033) 2nd 0.50—0.70 (0.020—0.028) 3rd, 4th 0.40—0.60 (0.016—0.024)	— — —
	Clutch return spring free length	31.0 (1.22)	29.0 (1.14)
	Clutch disc thickness	1.88—2.0 (0.074—0.079)	Until grooves worn out
	Clutch plate thickness	1.95—2.05 (0.077—0.079)	Discoloration
	Clutch end plate thickness	2.05—2.10 (0.081—0.083)	
	Mark 1	2.15—2.20 (0.085—0.087)	
	Mark 2	2.25—2.30 (0.089—0.091)	
	Mark 3	2.35—2.40 (0.093—0.094)	
	Mark 4	2.45—2.50 (0.096—0.098)	
	Mark 5	2.55—2.60 (0.100—0.102)	
	Mark 6	2.65—2.70 (0.104—0.106)	
	Mark 7	2.75—2.80 (0.108—0.110)	
	Mark 8	2.85—2.90 (0.112—0.114)	
	Mark 9	2.95—3.00 (0.116—0.118)	Discoloration
	Mark 10		
Transmission	Diameter of needle bearing contact area on main and stator shaft	22.980—22.993 (0.9047—0.9052)	Wear or damage
	Diameter of needle bearing contact area on main-shaft 2nd gear	35.975—35.991 (1.4163—1.4169)	
	Diameter of needle bearing contact area on main-shaft 4th gear collar	31.975—31.991 (1.2588—1.2594)	
	Diameter of needle bearing contact area on main-shaft 1st gear collar	30.975—30.991 (1.2195—1.2201)	
	Diameter of needle bearing contact area on countershaft (L side)	38.505—38.515 (1.5159—1.5163)	Wear or damage

* Fuel-Injected Engine ** Carbureted Engine

SPECIFICATIONS

Standards and Service Limits (cont'd)

Automatic Transmission (cont'd)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission (cont'd)	Diameter of needle bearing contact area on countershaft 3rd gear	31.975–31.991 (1.2589–1.2595)	Wear or damage ↑ ↓
	Diameter of needle bearing contact area on countershaft 4th gear	27.980–27.993 (1.1016–1.1021)	
	Diameter of needle bearing contact area on countershaft reverse gear collar	31.975–31.991 (1.2589–1.2595)	
	Diameter of needle bearing contact area on countershaft 1st gear collar	31.975–31.991 (1.2589–1.2595)	
	Diameter of needle bearing contact area on reverse idle gear	13.990–14.000 (0.5508–0.5512)	Wear or damage ↑ ↓
	Reverse idler shaft holder diameter	14.416–14.434 (0.5676–0.5683)	
	Mainshaft 2nd gear I.D.	41.000–41.016 (1.6142–1.6148)	
	Mainshaft 1st gear I.D.	36.000–36.016 (1.4173–1.4180)	
	Countershaft 4th gear I.D.	33.000–33.016 (1.2992–1.2998)	Wear or damage ↑ ↓
	Countershaft 3rd gear I.D.	38.000–38.016 (1.4961–1.4967)	
	Countershaft 2nd gear I.D.	31.000–31.016 (1.2205–1.2211)	
	Countershaft 1st gear I.D.	38.000–38.016 (1.4961–1.4967)	
	Countershaft reverse gear I.D.	38.000–38.016 (1.4961–1.4967)	Wear or damage ↑ ↓
	Reverse idle gear I.D.	18.006–18.017 (0.7089–0.7093)	
	Mainshaft 4th gear end play	0.07–0.12 (0.0028–0.0047)	
	Mainshaft 2nd gear end play	0.07–0.12 (0.0028–0.0047)	
	Mainshaft 1st gear end play	0.08–0.24 (0.0031–0.0094)	Wear or damage ↑ ↓
	Countershaft 3rd gear end play	0.07–0.12 (0.0028–0.0047)	
	Countershaft 2nd gear end play	0.07–0.12 (0.0028–0.0047)	
	Reverse idler gear end play	0.05–0.18 (0.0020–0.0071)	
	Countershaft reverse gear end play	0.10–0.20 (0.0039–0.0079)	Wear or damage ↑ ↓
	Reverse gear hub O.D.	51.87–51.90 (2.0421–2.0433)	
	Thrust washer thickness Mainshaft 2nd gear A	3.97–4.00 (0.1563–0.1575)	
	B	4.02–4.05 (0.1583–0.1594)	
	C	4.07–4.10 (0.1602–0.1614)	Wear or damage ↑ ↓
	D	4.12–4.15 (0.1622–0.1634)	
	E	4.17–4.20 (0.1642–0.1654)	
	F	4.22–4.25 (0.1661–0.1673)	
	G	4.27–4.30 (0.1681–0.1693)	Wear or damage ↑ ↓
	H	4.32–4.35 (0.1701–0.1713)	
	I	4.37–4.40 (0.1720–0.1732)	
	Mainshaft right side bearing	2.95–3.05 (0.1161–0.1201)	
	Mainshaft 1st gear	2.43–2.50 (0.0957–0.0984)	Wear or damage ↑ ↓
	Countershaft 3rd gear A	2.97–3.00 (0.1169–0.1181)	
	B	3.02–3.05 (0.1189–0.1201)	
	C	3.07–3.10 (0.1209–0.1220)	
	D	3.12–3.15 (0.1228–0.1240)	Wear or damage ↑ ↓
	E	3.17–3.20 (0.1248–0.1260)	
	F	3.22–3.25 (0.1268–0.1280)	
	G	3.27–3.30 (0.1287–0.1299)	
	H	3.32–3.35 (0.1307–0.1319)	Wear or damage ↑ ↓
	I	3.37–3.40 (0.1327–0.1339)	
	Countershaft 4th gear collar thickness A	38.97–39.00 (1.5343–1.5354)	
	B	39.02–39.05 (1.5362–1.5374)	
	C	39.07–39.10 (1.5382–1.5394)	Wear or damage ↑ ↓
	D	39.12–39.15 (1.5402–1.5413)	
	E	39.17–39.20 (1.5421–1.5433)	
	F	39.22–39.25 (1.5441–1.5453)	
	G	39.27–39.30 (1.5461–1.5472)	Wear or damage ↑ ↓
	Thrust washer thickness (mainshaft 1st gear L side)	1.45–1.50 (0.0571–0.0591)	
	Mainshaft 1st gear collar length	24.5–24.55 (0.9646–0.9665)	
	Mainshaft 1st gear collar flange thickness	2.5–2.6 (0.098–0.102)	
	Countershaft reverse gear collar length	12.00–12.10 (0.4724–0.4764)	Wear or damage ↑ ↓
	Countershaft reverse gear collar flange thickness	2.40–2.60 (0.0945–0.1024)	
	Countershaft 1st gear collar length	12.00–12.10 (0.4724–0.4764)	
	Countershaft 1st gear collar flange thickness	2.4–2.6 (0.095–0.102)	
	Diameter of countershaft one-way clutch contact area	83.339–83.365 (3.2811–3.2821)	Wear or damage ↑ ↓
	Diameter of parking gear one-way clutch contact area	66.685–66.695 (2.6254–2.6258)	
	Mainshaft feed pipe O.D. (at 20 mm from end)	6.97–6.98 (0.2744–0.2748)	
	Countershaft feed pipe O.D. (at 20 mm from end)	7.97–7.98 (0.3138–0.3142)	

SPECIFICATIONS

	MEASUREMENT		STANDARD (NEW)		SERVICE LIMIT	
Transmission (cont'd)	Mainshaft sealing ring 32 mm Thickness		1.980—1.995 (0.0780—0.0785)		1.800 (0.0709)	
	Mainshaft bushing I.D.		6.018—6.030 (0.2369—0.2374)		6.045 (0.2380)	
	Mainshaft bushing I.D.		9.000—9.015 (0.3543—0.3549)		9.030 (0.3555)	
	Countershaft bushing I.D.		8.000—8.015 (0.3150—0.3156)		8.030 (0.3161)	
	Mainshaft sealing ring groove width		2.025—2.060 (0.0797—0.0811)		2.080 (0.0819)	
Regulator valve body	Sealing ring contact area diameter		35.000—35.025 (1.3780—1.3789)		35.050 (1.3799)	
Shifting device and parking brake control	Reverse shift fork thickness		5.90—6.00 (0.2323—0.2362)		5.40 (0.2126)	
	Parking brake ratchet pawl		—		Wear or other defect	
	Parking gear		—		Wear or other defect	
	Throttle cam stopper		18.5—18.6 (0.728—0.732)		—	
Servo body	Shift fork shaft bore I.D.	A	14.000—14.005 (0.5512—0.5514)		—	
		B	14.006—14.010 (0.5514—0.5516)		—	
		C	14.011—14.015 (0.5516—0.5518)		—	
	Shift fork shaft valve bore I.D.		37.000—37.039 (1.4567—1.4582)		37.045 (1.4585)	
Valve body	Oil pump gear side clearance		0.03—0.05 (0.0012—0.0020)		0.05 (0.0020)	
	Oil pump gear-to-body clearance		Drive: 0.240—0.265 (0.0094—0.0104)		—	
			Driven: 0.125—0.175 (0.0049—0.0069)		—	
	Stator camshaft needle bearing bore I.D.		27.000—27.021 (1.0630—1.0638)		Wear or damage	
	Stator camshaft needle bearing contact and O.D.		29.000—29.013 (1.1417—1.1422)		—	
	Oil pump driven gear I.D.		14.016—14.034 (0.5518—0.5525)		Wear or damage	
	Oil pump shaft O.D.		13.980—13.990 (0.5504—0.5508)		Wear or damage	
Springs			Wire Dia.	O.D.	Free Length	No. of coils
	Low one-way ball spring		0.29 (0.01)	4.0 (0.16)	14.0 (0.55)	13
	Regulator valve outer spring		* 1.8 (0.07)	* 14.7 (0.58)	* 88.6 (3.49)	* 17
			1.8 (0.07)	14.7 (0.58)	88.5 (3.48)	17
	Regulator valve inner spring		1.8 (0.07)	9.6 (0.38)	44.0 (1.73)	7.5
	Stator reaction spring		6.0 (0.24)	38.4 (1.51)	30.3 (1.19)	2
	Throttle modulator valve spring		1.2 (0.05)	9.4 (0.37)	27.2 (1.07)	8
	Torque converter check valve spring A—E		1.2 (0.05)	8.4 (0.33)	37.0 (1.46)	15
	Relief valve spring		0.8 (0.03)	8.4 (0.33)	47.7 (1.88)	15
	Governor spring A		1.1 (0.04)	18.8 (0.74)	33.8 (1.33)	4
	Governor spring B		0.9 (0.04)	11.8 (0.46)	30.0 (1.18)	6.2
	2nd orifice control valve spring		* 0.8 (0.03)	* 6.6 (0.26)	* 48.5 (1.91)	* 27.6
			0.8 (0.03)	6.6 (0.26)	45 (1.77)	27.6
	Servo orifice control valve spring		0.9 (0.04)	6.1 (0.24)	35.9 (1.41)	20
	Throttle control valve A outer spring		1.0 (0.04)	8.5 (0.33)	21.0 (0.83)	5.8 or 5.4
	Throttle control valve A inner spring		0.8 (0.03)	6.2 (0.24)	27.0 (1.06)	8.5
	Throttle control valve B outer spring		0.8 (0.08)	6.2 (0.24)	30.0 (1.18)	8
	Throttle control valve B inner spring		1.4 (0.06)	8.5 (0.33)	41.4 (1.63)	8.4
	1—2 shift spring A,B		0.7 (0.03)	6.1 (0.24)	38.1 (1.50)	25
	1—2 shift ball spring (Main and Second)		0.45 (0.02)	4.5 (0.18)	12.7 (0.50)	11
	2—3 shift spring A,B,C		0.9 (0.04)	7.6 (0.30)	68.6 (2.71)	28
	2—3 shift ball spring		0.5 (0.02)	4.5 (0.18)	11.7 (0.46)	10.5
	3—4 shift spring A,B,C		0.9 (0.04)	9.6 (0.38)	37.3 (1.47)	10
	3—4 shift ball spring		0.5 (0.02)	4.5 (0.18)	11.8 (0.47)	7.4
	Low accumulator A spring		2.8 (0.11)	21.5 (0.85)	55.4 (2.18)	6.2
	Low accumulator B spring		2.8 (0.11)	13.1 (0.52)	39 (1.54)	7.9
	4th accumulator spring		2.9 (0.11)	18.6 (0.73)	76.8 (3.02)	6.6
	2nd accumulator spring		3.5 (0.14)	20.0 (0.80)	77.1 (3.06)	12.5
	3rd accumulator spring		2.8 (0.11)	15.5 (0.61)	79.0 (3.11)	18.6
	L/C shift valve spring		1.1 (0.04)	8.1 (0.32)	51.8 (2.04)	22.3
	L/C control spring		0.8 (0.03)	6.6 (0.26)	47.0 (1.85)	22
	L/C timing valve A spring		0.9 (0.04)	8.6 (0.34)	55.1 (2.17)	18.7
	L/C timing valve B spring		1.0 (0.04)	6.6 (0.26)	57.5 (2.26)	30
	CPC valve spring A,B		1.4 (0.06)	9.4 (0.32)	31.6 (1.24)	10.9
	Shift timing valve spring		0.9 (0.04)	8.6 (0.34)	50.1 (1.97)	18.7
	Kick down valve spring		1.0 (0.04)	6.6 (0.26)	58.5 (2.3)	33.4
	REV control spring		0.8 (0.03)	7.6 (0.30)	33.4 (1.31)	17
	L/C cut valve spring		0.7 (0.03)	7.6 (0.30)	29.0 (1.14)	18
	Accumulator control spring		1.2 (0.05)	7.7 (0.30)	45.6 (1.80)	21.8
	Timing accumulator spring		1.1 (0.04)	11.7 (0.46)	28.2 (1.11)	6.6
	2—1 timing spring		1.1 (0.04)	6.6 (0.26)	52.4 (2.06)	26.5
	Servo return spring		2.6 (0.10)	28.8 (1.13)	40.3 (1.59)	3.3
	Servo control spring		0.8 (0.03)	6.6 (0.26)	55.3 (2.18)	22

*: Fuel-Injected Engine

VALVE BODY INTERCHANGE

ACCORD MAIN VALVE BODIES

CASTING NO.	MODEL	FROM SERIAL NO. TO SERIAL NO.		PART NUMBER
PF4	1986 ALL		6039079	27000-PF4-643
PF4	1986 ALL		6039080	27000-PF4-612
PF4	1987 ALL		6325619	27000-PF4-612
PF4	1987 ALL	6325620	6464359	27000-PF4-613
PF4	1987 ALL	6464360		27000-PF4-614
PF4Y	1988 FI			27000-PF4-700
PF4Y	1988 CARB			27000-PF4-740
PF4X	1989 CARB			27000-PF4-C00
PF4X	1989 FI			27000-PF4-L00

NO DIFFERENCE FOUND IN 27000-PF4-643 and 27000-PF4-612

PRELUDE MAIN VALVE BODIES

CASTING NO.	MODEL	FROM SERIAL NO. TO SERIAL NO.		PART NUMBER
PF4	1985			27000-PF4-643
PF4	1986		6038419	27000-PF4-643
	1986	6038420	6082518	27000-PF4-610*
	1986	6038420		27000-PF4-611*
	1987		6318002	27000-PF4-611*
PF4	1986	6038420		27000-PF4-612
PF4	1987		6325619	27000-PF4-612
PF4	1987	6325620		27000-PF4-613

* SUPERCEDED BY 27000-PF4-612

The pinion shaft must be gold in color, if not, replace it with a titanium coated differential pinion shaft Part Number.

41321-PL3-T00

This should be used in all F4 transaxles to prevent serious case damage and sticking valves.

