

1990 Honda Civic EX

1988-90 AUTOMATIC TRANSMISSIONS L4 Diagnosis & Overhaul

1988-90 AUTOMATIC TRANSMISSIONS

L4 Diagnosis & Overhaul

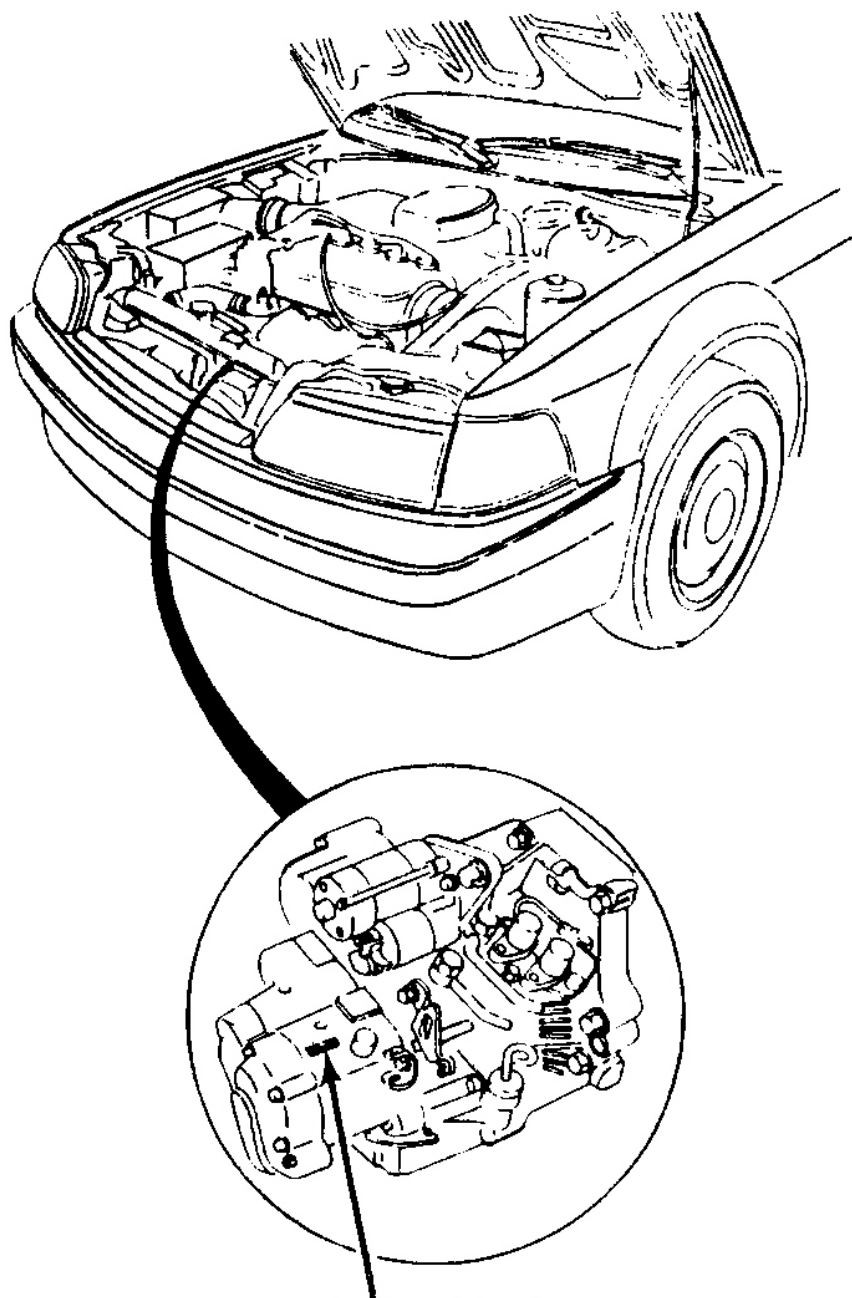
APPLICATION

TRANSAXLE APPLICATION

Application	Transaxle Model
Civic	L4
Civic Wagon	L4
Civic CRX	L4

IDENTIFICATION

NOTE: Transaxle identification is stamped on a metal pad on top of transaxle. See Fig. 1.

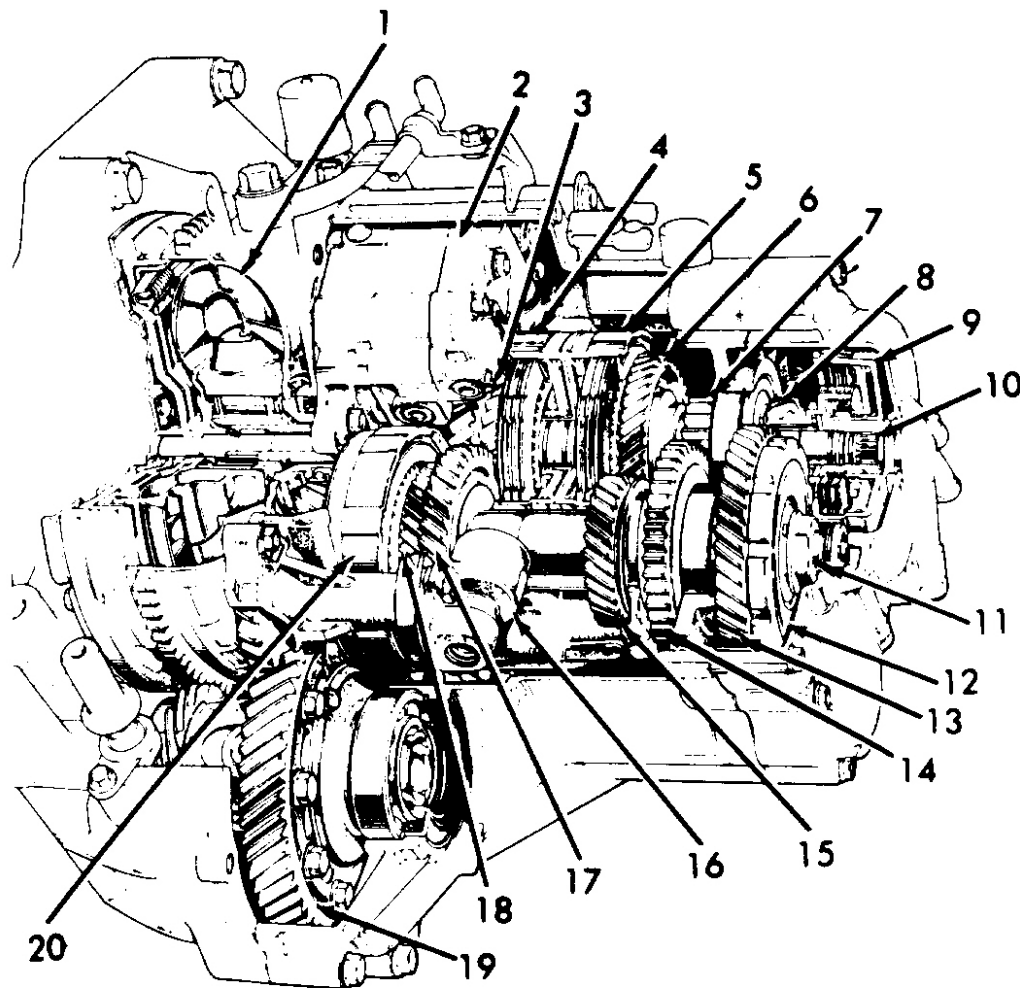


Transmission Number **96E26264**

Fig. 1: Transaxle Identification Number
Courtesy of AMERICAN HONDA MOTOR CO., INC.

DESCRIPTION & OPERATION

The Automatic Transaxle consists of a 3-element torque converter and dual shaft transaxle which provides 4 forward speeds and one reverse speed. Transaxle is positioned in line with the engine. The torque converter consists of a pump, turbine and stator assembled in a single unit. See **Fig. 2** . The main valve assembly includes secondary, servo, modulator, regulator and lock-up shift valve bodies. An Electronic Control Unit (ECU) controls timing of lock-up mechanism to provide best performance. The ECU receives input from oxygen content sensor, manifold absolute pressure sensor, coolant temperature sensor, throttle angle sensor, TDC crank angle sensor, ignition output signal, fuel injector, vehicle speed sensor, lock-up control solenoid valve and Programmed Fuel Injection Electronic Control Unit (ECU). Input from various sensors located throughout vehicle determine when lock-up clutch mechanism should be applied.



1. Torque Converter
2. Valve Assembly
3. Mainshaft 2nd Gear
4. 2nd Clutch
5. 4th Clutch
6. Mainshaft 4th Gear
7. Mainshaft Reverse Gear
8. Mainshaft 1st Gear
9. 1st Clutch

10. Mainshaft
11. Countershaft
12. Parking Gear
13. Countershaft 1st Gear
14. Countershaft Reverse Gear
15. Countershaft 4th Gear
16. Governor Valve
17. Countershaft 2nd Gear
18. Countershaft 3rd Gear
19. Differential Assembly
20. 3rd Clutch

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Fig. 2: Identifying Transaxle Components

Courtesy of AMERICAN HONDA MOTOR CO., INC.

CONVERTER LOCK-UP CLUTCH

In gear selector "D4", pressurized fluid from torque converter is directed to lock-up piston which locks transaxle

mainshaft to engine crankshaft. Lock-up is controlled by engine speed, hydraulic pressure and ECU signal. Lock-up occurs in "D4" or "D3" range when car is at cruising speed. Lock-up improves driveability and fuel economy. Main components of lock-up control consist of a lock-up cut-off valve, lock-up control solenoid valve, lock-up control valve, lock-up shift valve and lock-up timing valve B. Lock-up mechanism engages and disengages lock-up clutch.

GEAR SHIFT SELECTOR

The selector lever has 6 positions and is not mechanically linked to transaxle. It controls electrical switches which are connected to the ECU. The ECU controls operation within selected range.

"P" - Park

The front road wheels are locked, the parking pawl is engaged in the park gear on the countershaft. All clutches are released. A slide-type starter inhibitor switch enables the engine to be started in this position.

"R" - Reverse

The reverse selector engages the countershaft and locks the 4th gear clutch.

"N" - Neutral

All clutches are released. A slide-type starter inhibitor switch enables the engine to be started in this position.

"D4" - Drive

Vehicle starts in 1st, shifts automatically to 2nd, 3rd and 4th. Automatically downshifts through 3rd, 2nd and 1st. Lock-up mechanism occurs in "D4".

"D3" - Drive

For rapid acceleration at highway speeds and general driving. Starts in 1st, shifts automatically to 2nd and 3rd. Downshifts through 2nd to 1st on deceleration.

"2" - Second

For engine braking or better traction starting off on slippery surfaces. Stays in 2nd gear, does not shift up or down.

ECU BACK-UP FUNCTION

Fail-Safe Function

When an abnormality occurs in a signal from a sensor, ECU ignores that signal and assumes a pre-programmed value that allows the engine to continue to run.

Back-Up Function

When an abnormality occurs in the ECU, the injectors are controlled by a back-up circuit independent of system in order to permit minimal diving.

Self-Diagnosis Function (CHECK ENGINE Warning Light, LED Indicator)

When an abnormality occurs in a signal from a sensor, the ECU lights CHECK ENGINE warning light, stores failure code in erasable memory and indicates code with LED on the ECU anytime ignition is on. When ignition is initially turned on, ECU supplies ground for CHECK ENGINE warning light for two seconds.

ECU INPUT SENSORS**Oxygen (O2) Sensor**

Monitors O2 content in exhaust gas and inputs ECU. ECU receives input and varies duration during which fuel is injected. O2 sensor is installed on exhaust manifold.

Manifold Absolute Pressure (MAP) Sensor

MAP sensor converts manifold absolute pressure to electrical signal and inputs ECU.

Crank Angle Sensor

Determines timing for fuel injection of each cylinder and detects RPM.

Top Dead Center (TDC) Sensor

TDC sensor determines ignition timing during starting and when crank angle signal is abnormal.

Coolant Temperature (TW) Sensor

W sensor is temperature dependent resistor (thermistor). Sensor resistance decreases as coolant temperature increases.

Throttle Angle Sensor

Throttle angle sensor is a potentiometer connected to throttle valve shaft. As throttle angle changes, sensor varies voltage signal to ECU.

Cylinder (CYL) Sensor

CYL sensor detects position of No. 1 cylinder for sequential fuel injection to each cylinder.

Air Temperature (TA) Sensor

TA sensor is a temperature dependent resistor (thermistor). Sensor resistance decreases as intake air temperature increases.

Atmospheric Pressure (PA) Sensor

PA sensor converts atmospheric pressure into electrical signal and inputs ECU.

Vehicle Speed (VSS) Sensor

VSS generates a signal which produces 4 pulses (switch closure to ground) for each rotation of speedometer cable.

LUBRICATION & ADJUSTMENTS

See appropriate SERVICING article.

ON-VEHICLE SERVICE

DRIVE AXLE SHAFTS

See appropriate FWD AXLE SHAFTS article in DRIVELINE/AXLES.

TROUBLE SHOOTING

SYMPTOM DIAGNOSIS

NOTE: When attempting to diagnose possible transaxle malfunction, always verify that electronic operation is properly functioning before checking hydraulic operation.

SYMPTOM DIAGNOSIS

Problem or Symptom	⁽¹⁾ Possible Cause Of Symptom Reference No.
Engine runs, but car does not move in any gear	1, 6, 7, 16
Car moves in "R" and "2", but not in "D3" or "D4"	8, 29, 45, 49
Car moves in "D3", "D4" and "R", but not in "2"	9, 30, 50
Car moves in "D3", "D4" and "2", but not in "R"	1, 11, 12, 22, 39, 40, 41
Car moves in "N"	1, 8, 9, 10, 11, 47, 48
Excessive idle vibration	5, 17
Slips in all gears	6, 7, 16
Slips in low gear	8, 29, 45, 46, 49
Slips in 2nd gear	9, 20, 23, 30, 46, 50
Slips in 3rd gear	10, 21, 23, 31, 45, 46
Slips in 4th gear	11, 23, 32, 46
Slips in reverse gear	11, 32
Slips on 2-3 upshift	3, 15, 24
Slips on 3-4 upshift	3, 15, 25
No upshift, stays in low gear	12, 13, 14, 19, 23

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No downshift to low gear	12, 19
Late upshift	2, 12, 13, 14
Early upshift	3, 13, 14
Erratic shifting	2, 14, 26
Harsh shift (upshift and downshift)	2, 4, 15, 23, 24, 25, 27, 48
Harsh shift (1-2)	2, 9
Harsh shift (2-3)	2, 10, 23, 24
Harsh shift (3-4)	2, 11, 23, 25
Harsh kickdown shifts	2, 23, 27
Harsh kickdown shift (2-1)	48
Harsh downshift (3-2) at closed throttle	15
Axle(s) slips out of transaxle on turns	44, 51
Axle(s) stuck in transaxle	44
Ratcheting noise when shifting into "R"	6, 7, 39, 40, 41
Loud popping noise when taking off in "R"	39, 40, 41
Ratcheting noise when shifting from "R" to "P" or from "R" to "N"	39, 40, 41, 52
Noise from transaxle in all selector lever positions	6, 17
Noise from transaxle only when wheels rolling	40, 43
Gear whine, RPM related (pitch changes with shifts)	6, 42
Gear whine, speed related (pitch changes with speed)	40, 43
Trans will not shift into 4th gear in "D4"	1, 21, 28
Engine stalls on emergency stops (shift lever in "D4" only)	2, 33
Lockup clutch does not lock up smoothly	17, 35, 37
Lockup clutch does not operate properly	2, 3, 12, 15, 18, 33, 34, 35, 36, 37, 38
Transaxle has multitude of problems shifting. At disassembly, large deposits of metal found on magnet	44

(1) Possible cause of symptom reference No. corresponds with reference No. in **TROUBLE SHOOTING FAULTS** table.

TROUBLE SHOOTING FAULTS

Reference No.	Possible 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

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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	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 clutch accumulator defective
33	Lock-up clutch cut-off valve stuck
34	Lock-up clutch timing valve "A" stuck
35	Lock-up clutch timing valve "B" stuck
36	Lock-up clutch shift valve stuck
37	Lock-up clutch control valve stuck
38	Lock-up control solenoid valve broken
39	Shift fork bent
40	Reverse gears worn/damaged (3 gears)
41	Reverse selector worn
42	3rd gears worn/damaged (2 gears)
43	Final gears worn/damaged (2 gears)
44	Differential pinion shaft worn
45	Feed pipe "O" ring broken
46	Servo valve check valve loose
47	Gear clearance incorrect
48	Clutch clearance incorrect
49	Sprag clutch defective
50	Sealing rings guide worn
51	

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	Axle-inboard joint clip missing
52	4th gears worn/damaged (2 gears)

NOTE: For additional information, see SELF-DIAGNOSTIC SYSTEM .

PERFORMANCE TESTS

ROAD TEST

CAUTION: DO NOT shift from "D4" or "D9" to "2" at speeds over 62.5 MPH. Damage may occur to transaxle.

"D3" & "D4" Range

1. Warm engine to operating temperature. Apply parking brake and block wheels. Shift transaxle selector to "D4" while depressing brake pedal.
2. Depress accelerator and release suddenly. Engine should not stall. Ensure shift points occur at proper speeds. See TRANSAXLE UPSHIFT SPECIFICATIONS (MPH) and TRANSAXLE DOWNSHIFT SPECIFICATIONS (MPH) tables. Check for abnormal noise and clutch slippage.
3. Accelerate to about 35 MPH until transaxle is in 4th gear. Shift from "D4" to "2". Car should decelerate immediately.

"2" (2nd Gear) Range

Accelerate from stop at full throttle. Ensure no abnormal noise or clutch slippage occurs. Upshifts and downshifts should not occur with gear selector in this range.

"R" (Reverse) Range

Accelerate from stop at full throttle. Ensure no abnormal noise or clutch slippage occurs.

"P" (Park) Range

Park vehicle on incline (about 16 degrees). Apply parking brake and shift selector into "P". Release brake and check for vehicle movement. Movement should not occur.

TRANSAXLE UPSHIFT SPECIFICATIONS (MPH)

Shift Lever Position & Condition	1st-2nd Gear	2nd-3rd Gear	3rd-4th Gear	Lock-Up Clutch On
"D3" Or "D4" Range				
1/8 Throttle Coasting Downhill From Stop	12-14	22-24	31-35	28-38
1/2 Throttle Accelerating From Stop	19-22	38-44	53-59	(1)
Full Throttle Accelerating From Stop	31-35	58-64	90-96	89-97

(1) Specification not available from manufacturer.

TRANSAXLE DOWNSHIFT SPECIFICATIONS (MPH)

Shift Lever Position & Condition	Lock-Up Clutch Off	4th-2nd Gear	3rd-2nd Gear	2nd-1st Gear
"D3" Or "D4" Range				
1/8 Throttle Coasting Or Braking To A Stop	(1)	18-20	(1)	7-9
Full Throttle Vehicle Slowing By Grade Or Load	73-80	(1)	55-59	23-25
(1) This gear downshift does not occur.				

PRESSURE TESTING

CAUTION: Prior to testing, ensure that transaxle fluid level is correct. Also, before installing pressure gauge test equipment, ensure correct inspection hole is used with corresponding pressure measurement. Incorrect diagnosis could result if not performed properly. See Fig. 3 .

NOTE: With engine off, attach hoses from pressure testing Gauge Set (07406-00200003) or equivalent to transaxle. Torque hose fittings to 13 ft. lbs. (18 N.m). DO NOT reuse aluminum washers.

1. Make line pressure measurement after setting parking brake securely. Raise front of vehicle and support safely. Run engine at 2,000 RPM. See appropriate procedure under PRESSURE TEST SPECIFICATIONS .
2. Make clutch pressure measurement after setting parking brake securely and blocking rear wheels. Raise front of vehicle and support safely. Run engine at 2000 RPM. See appropriate procedure under PRESSURE TEST SPECIFICATIONS .
3. Make low/high clutch pressure test after raising car and supporting with safety stands. Attach gauge set to appropriate pressure test port. Unhook cable end of throttle control cable. See appropriate procedure under PRESSURE TEST SPECIFICATIONS .
4. Warm engine to normal operating temperature (cooling fan comes on). With engine idling move selector lever to "D3" or "D4". Slowly move throttle linkage to increase engine RPM until pressure is indicated on appropriate gauge. Release throttle linkage, allow engine to return to idle. Record pressure reading. See Fig. 3 .
5. Repeat step 4 for each clutch pressure being inspected. With engine idling lift throttle control lever up approximately 1/2 of its possible travel and increase engine RPM until pressure is indicated on appropriate gauge. Record highest pressure reading. See appropriate procedure under PRESSURE TEST SPECIFICATIONS .
6. Repeat step 5 for each clutch pressure being measured. Make throttle pressure measurement after setting parking brake securely and blocking wheels. Run engine at 2000 RPM. Disconnect throttle control cable from throttle lever. See appropriate procedure under PRESSURE TEST SPECIFICATIONS .

7. Make governor pressure measurement after setting parking brake and blocking rear wheels. Raise front of vehicle and support safely. Run vehicle at 38 MPH. See appropriate procedure under **PRESSURE TEST SPECIFICATIONS**.

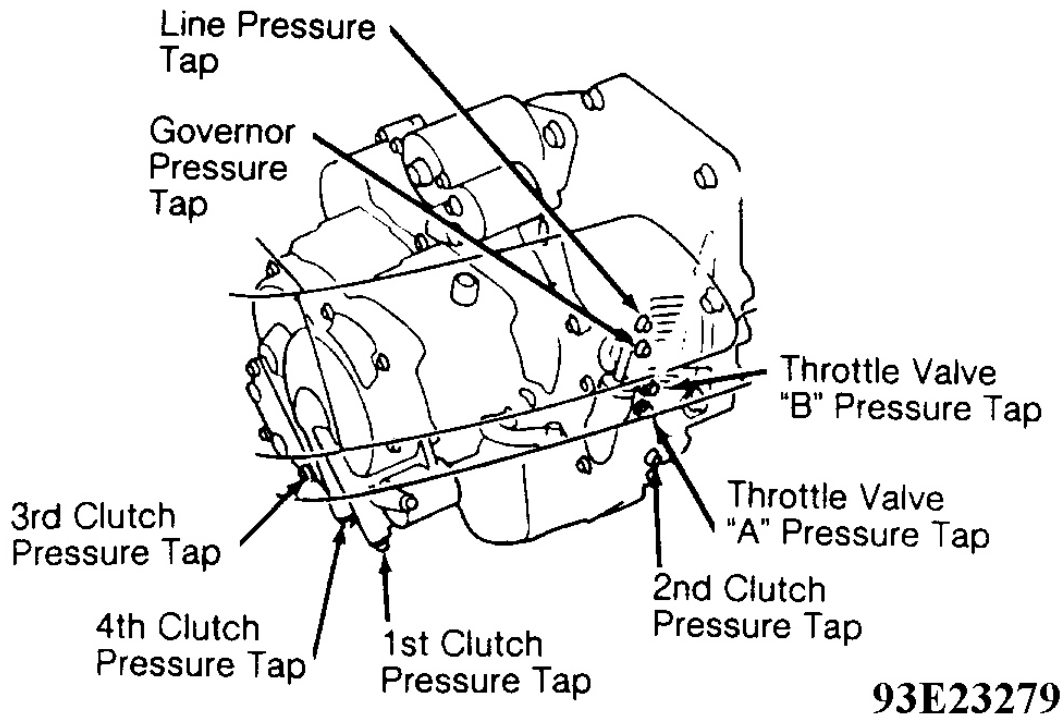


Fig. 3: Identifying Pressure Tap Locations
Courtesy of AMERICAN HONDA MOTOR CO., INC.

PRESSURE TEST SPECIFICATIONS

Clutch Pressure Test

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CLUTCH PRESSURE TEST

Pressure	Selector Position	Symptom	Probable Cause	Fluid Pressure, psi (kPa)	
				Standard	Service Limit
1st Clutch	"D ₃ " or "D ₄ "	No or low 1st pressure	1st Clutch	114-121 (785-834)	107 (736)
2nd Clutch (2nd hold)	"2"	No or low 2nd pressure	2nd Clutch	114-121 (785-834)	107 (736)
2nd Clutch	"D ₃ " or "D ₄ "	No or low 2nd pressure	2nd Clutch	60 (412) (throttle control lever fully closed) 114-121 (785-834) (throttle open more than 1/4)	53 (363) (throttle control lever fully closed) 107 (736) (throttle open more than 1/4)
3rd Clutch	"D ₃ "	No or low 3rd pressure	3rd Clutch		
4th Clutch	"D ₄ "	No or low 4th pressure	4th Clutch		
	"R"		Servo valve or 4th Clutch	114-121 (785-834)	107 (736)

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Fig. 4: Clutch Pressure Test

Courtesy of AMERICAN HONDA MOTOR CO., INC.

Governor Pressure Test

GOVERNOR PRESSURE TEST

Pressure	Selector Position	Symptom	Probable Cause	Fluid Pressure, psi (kPa)	
				Standard	Service Limit
Governor	"D ₃ " or "D ₄ "	No or low governor pressure	Governor valve	30-31 (206-216)	29 (201)

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Fig. 5: Governor Pressure Test

Courtesy of AMERICAN HONDA MOTOR CO., INC.

Line Pressure Test

LINE PRESSURE TEST

Pressure	Selector Position	Symptom	Probable Cause	Fluid Pressure, psi (kPa)	
				Standard	Service Limit
Line	"N" or "P"	No or low line pressure	Torque converter, oil pump pressure regulator, torque converter check valve, oil pump	114-121 (785-834)	107 (736)

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Fig. 6: Line Pressure Test

Courtesy of AMERICAN HONDA MOTOR CO., INC.

Low/High Pressure Test

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LOW/HIGH PRESSURE TEST

Pressure	Selector Position	Symptom	Probable Cause	Fluid Pressure, psi (kPa)	
				Standard	Service Limit
2nd Clutch	"D ₃ " or "D ₄ "	No or low 2nd pressure	2nd Clutch	60-121 (412-834) varies with throttle opening	53 (363) with lever released 107 (736) with lever in full throttle position
3rd Clutch	"D ₃ " or "D ₄ "	No or low 3rd pressure	3rd Clutch		
4th Clutch	"D ₄ "	No or low 4th pressure	4th Clutch		

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Fig. 7: Low/High Pressure Test
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Throttle Pressure Test

THROTTLE PRESSURE TEST

Pressure	Selector Position	Symptom	Probable Cause	Fluid Pressure, psi (kPa)	
				Standard	Service Limit
Throttle A	"D ₃ " or "D ₄ "	No or low throttle pressure	Throttle valve A Throttle modulator valve	0-.7 (0-.49) with lever released 73.2-75.4 (505-520) with lever in full throttle position	72.5 (500) with lever in full throttle position
Throttle B	"D ₃ " or "D ₄ "	No or low throttle pressure	Throttle valve B	0 (0) with lever released 114-121 (785-834) with lever in full throttle position	107 (736) with lever in full throttle position

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Fig. 8: Throttle Pressure Test
Courtesy of AMERICAN HONDA MOTOR CO., INC.

STALL SPEED

CAUTION: To prevent transaxle damage, **DO NOT** test stall speed for more than 10 seconds at a time. **DO NOT** shift the lever while raising engine speed. Be sure to remove pressure gauge before testing stall speed.

NOTE: Stall speed in "D3", "D4", "2" and "R" must be the same and within the following speed range. See STALL SPEED SPECIFICATIONS table.

Engage parking brake and block front wheels. Connect tachometer and start engine. See **Fig. 9**. After the engine has warmed up to normal operating temperature, shift into "D3": Fully depress brake pedal and accelerator for 6-8 seconds and note engine speed. Allow 2 minutes for cooling, repeat same test in "D4", "2" and "R". If stall speeds are not within specification, see STALL SPEED TROUBLE SHOOTING table.

STALL SPEED SPECIFICATIONS

Application	Engine RPM
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Standard	2750
Service Limit	2300-2900

STALL SPEED TROUBLE SHOOTING

Torque Converter Stall Speed Test Results	Probable Cause
Stall Speed RPM High In "D4", "D", "2" & "R"	Low Fluid Level, Low Oil Pump Output, Clogged Fluid Strainer, Pressure Regulator Valve Stuck Closed, Slipping Clutch
Stall Speed RPM High In "D4" & "D3"	Slipping 1st Clutch
Stall Speed RPM Low In "D4", "D3", "2" & "R"	Engine Output Low, Throttle Cable Misadjusted, Oil Pump Seized, Torque Converter One-Way Clutch Slipping

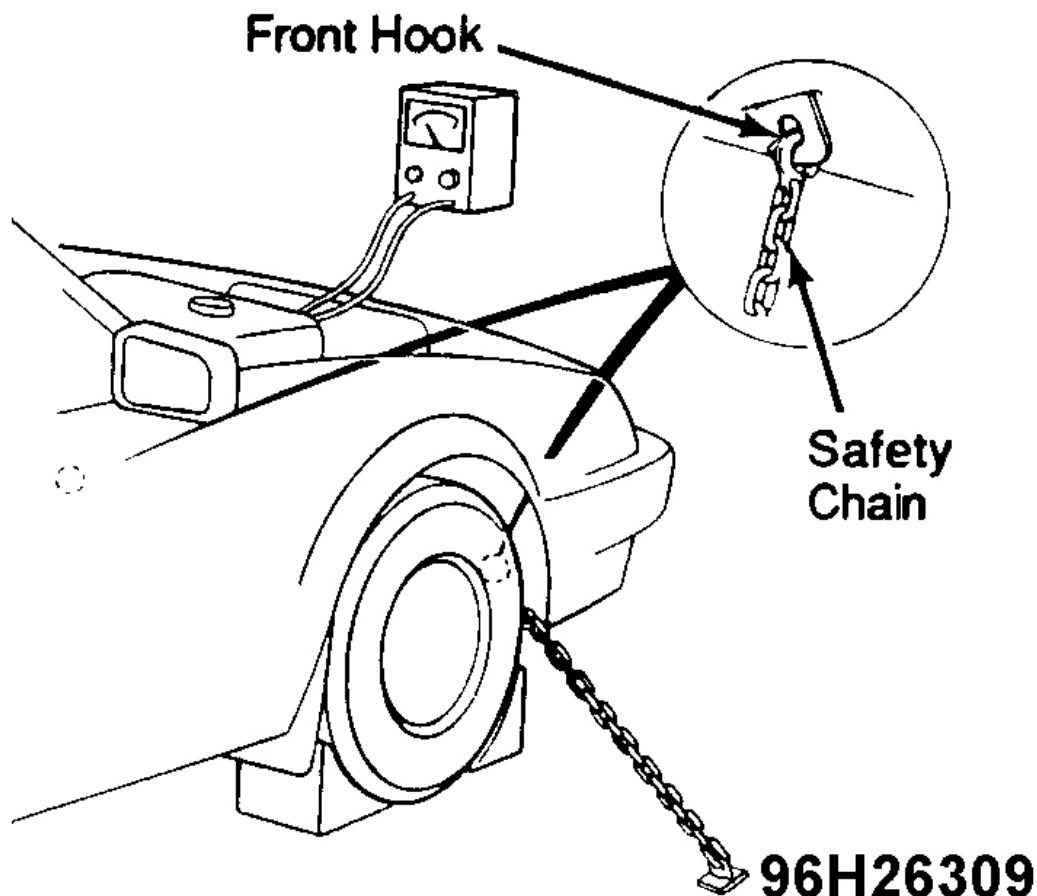


Fig. 9: Securing Vehicle For Stall Test
Courtesy of AMERICAN HONDA MOTOR CO., INC.

SELF-DIAGNOSTIC SYSTEM

ELECTRONIC SELF-DIAGNOSIS

CAUTION: Puncturing wiring insulation can cause poor or intermittent electrical connections. To test connectors other than PGM-F1 test harness bring test probe into contact with terminal from connector side of wire harness connector in the engine compartment. For female connectors, touch lightly with test probe. DO NOT Insert probe, as damage to connector will occur. See Fig. 10 .

NOTE: Prior to starting any testing or diagnostic procedure on transaxle, ensure basic electrical connections are in good condition and transaxle fluid level is correct. See WIRING DIAGRAMS .

The automatic transaxle has an Electronic Control Unit (ECU) which controls lock-up operations and also provides self-diagnosis capabilities. If a problem is present within system, CHECK ENGINE light will flash and LED on ECU will blink. See Fig. 10 . Counting number of blinks will give fault codes. Turn ignition ON, if CHECK ENGINE warning light is on, pull down passengers side carpet from under the dashboard and observe LED on top of ECU.

The LED indicates a system failure code by blinking frequency. See SYSTEM FAILURE CODES table. The ECU LED can indicate a number of simultaneous component faults by blinking separate codes one after another. To clear stored codes remove HAZARD fuse in main fuse box for 10 seconds.

- If codes other than those listed in table are indicated, count the number of blinks again. If indicator is blinking these codes, substitute a known-good ECU and recheck. If indication goes away, replace original ECU.
- The CHECK ENGINE warning light and ECU LED may come on, indicating a system problem, when, in fact, there is a poor or intermittent electrical connection. First, check the electrical connections, clean or repair connections if necessary.
- If CHECK ENGINE warning light is on and LED stays on, replace

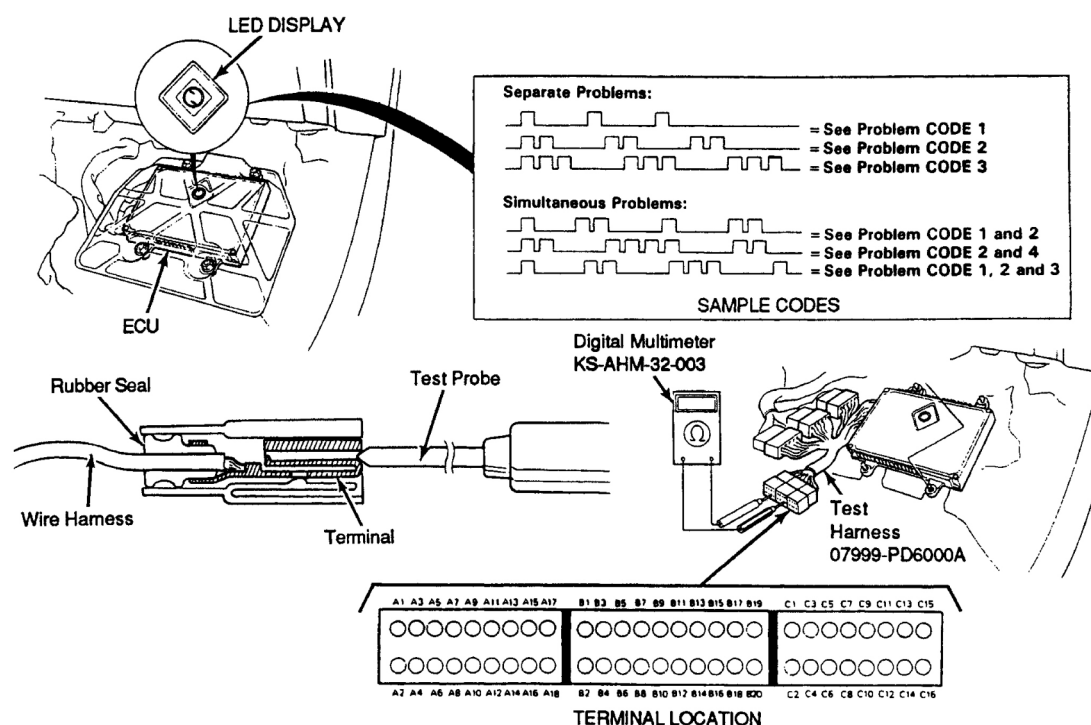
SYSTEM FAILURE CODES

Self-Diagnostic LED System Indicated	Indicator Blinks
0	ECU
1	Oxygen Content
3 & 5	Manifold Absolute Pressure
4	Crank Angle
6	Coolant Temperature
7	Throttle Angle
8	TDC Position
9	No. 1 Cylinder Position (HF & SI)

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10	Intake Air Temperature
12	EGR System (HF & Std. CAL: AT
13	Atmospheric Pressure
14	Electronic Air Control
15	Ignition Output Signal
16	Fuel Injector
17	Vehicle Speed Sensor
19	Lock-Up Control Solenoid Valve
20	Electric Load



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Fig. 10: Identifying Diagnostic Equipment & Terminals
Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT TESTS

LOCK-UP CONTROL SOLENOID VALVE

Disconnect lock-up control solenoid valve connector. Connect terminal of lock-up control solenoid valve to battery (+) terminal and the battery negative (-) terminal to body ground. A clicking sound should be heard. If not, check for continuity between harness and body ground. Replace lockup control solenoid valve if there is continuity between the harness and body ground. Replace valve if all passages are plugged with dirt.

REMOVAL & INSTALLATION

For transaxle removal procedure, see appropriate REMOVAL & INSTALLATION article.

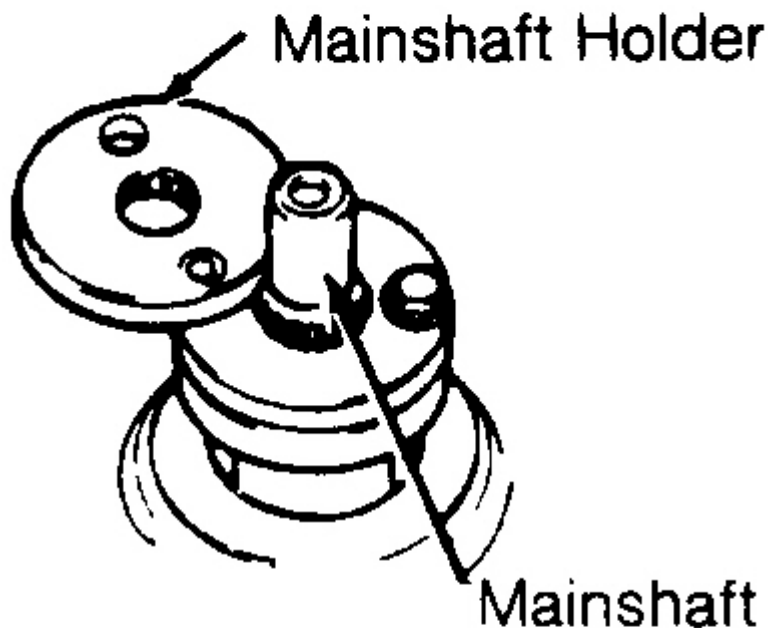
TORQUE CONVERTER

Torque converter is a non-serviceable component. If defective, it must be replaced as a unit.

TRANSAXLE DISASSEMBLY

NOTE: Mainshaft lock nut has LEFT HAND threads.

1. Remove 9 end cover bolts. Remove end cover. Use Mainshaft Holder (07923-6890202) to lock mainshaft. See **Fig. 11** .
2. Remove end cover gasket, dowel pins and pry staked edge of lock nut out of notch in 1st clutch. See **Fig. 12** .
3. Align control shaft spring pin with cutout in transaxle housing. See **Fig. 12** and **Fig. 13** . Install transaxle housing puller over countershaft with 3 bolts and tighten securely. See **Fig. 14** . Screw in puller bolt against end of countershaft until transaxle housing comes loose. See **COMPONENT DISASSEMBLY & REASSEMBLY** for further information.

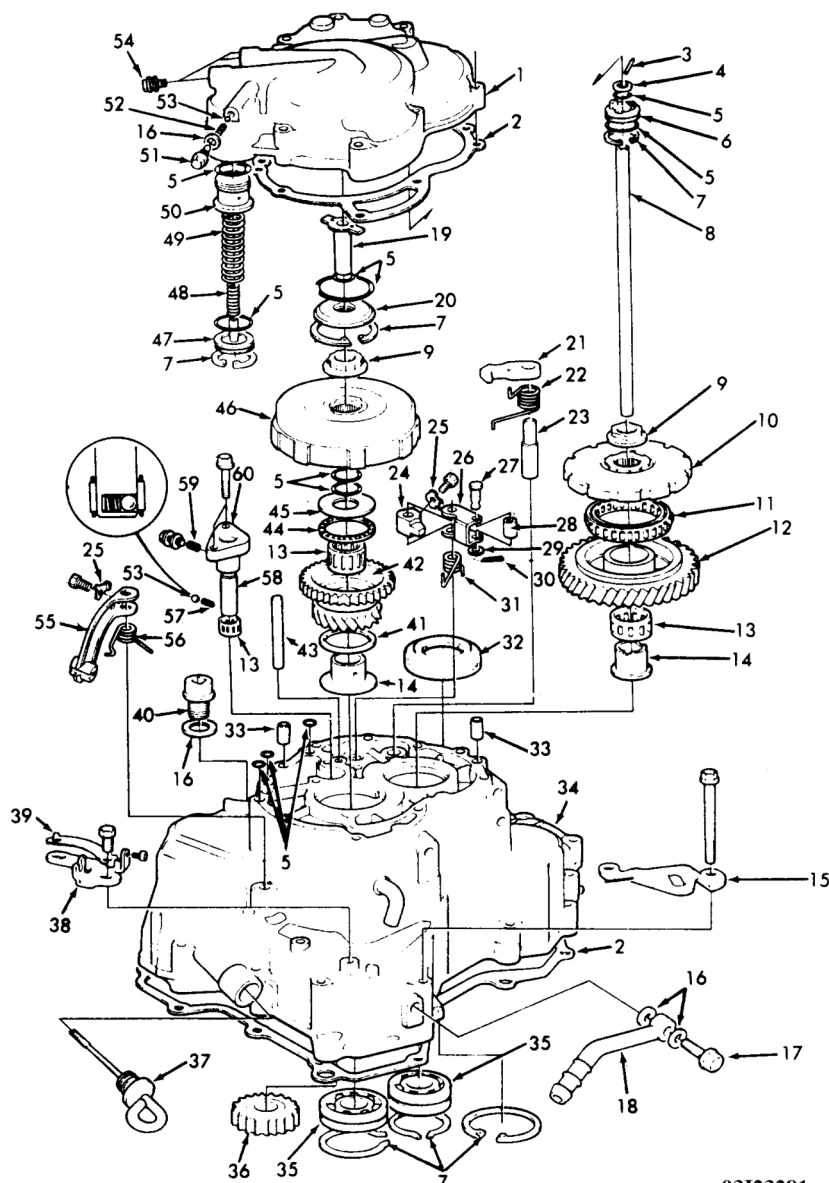


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Fig. 11: Installing Mainshaft Holder

Courtesy of AMERICAN HONDA MOTOR CO., INC.

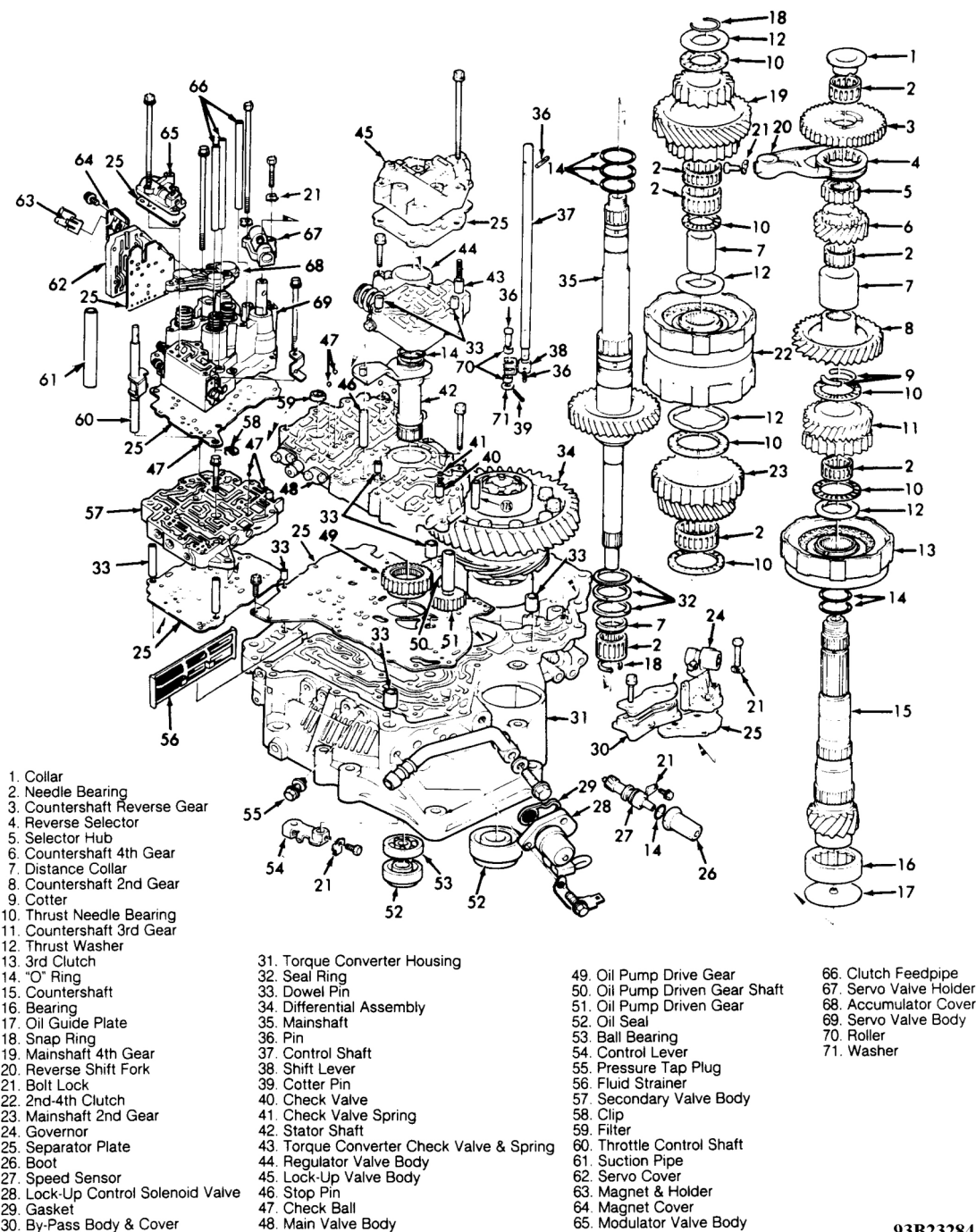
1. Right Side Cover
2. Gasket
3. Pin
4. Washer
5. "O" Ring
6. Feedpipe Flange
7. Snap Ring
8. 3rd Clutch Feedpipe
9. Lock Nut
10. Parking Gear
11. One-Way Clutch
12. Countershaft 1st Gear
13. Needle Bearing
14. Collar
15. Hanger
16. Seal Washer
17. Joint Bolt
18. Cooler Pipe
19. 1st Clutch Feedpipe
20. Feedpipe Guide
21. Parking Pawl
22. Parking Pawl Spring
23. Parking Pawl Shaft
24. Parking Brake Stopper
25. Bolt Lock
26. Parking Shift Arm
27. Roller Pin
28. Roller
29. Washer
30. Cotter Pin
31. Parking Brake Spring
32. Oil Seal
33. Dowel Pin
34. Transaxle Housing
35. Ball Bearing
36. Reverse Idler Gear
37. Dipstick
38. Cable Bracket
39. Bolt Lock Plate
40. Drain Plug
41. Thrust Washer
42. Mainshaft 1st Gear
43. Stop Pin
44. Thrust Needle Bearing
45. Thrust Washer
46. 1st Clutch
47. 1st Accumulator Cover
48. Inner Spring
49. Outer Spring
50. 1st Accumulator Piston
51. Sealing Bolt
52. Ball Spring
53. Steel Ball
54. Pressure Tap Plug
55. Throttle Control Lever
56. Throttle Control Lever Spring
57. Spring
58. Shaft
59. Shaft Spring
60. Reverse Idle Gear Holder



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Fig. 12: Right Side Cover & Transaxle Housing Components

Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 13: Exploded View Of Transaxle & Components
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

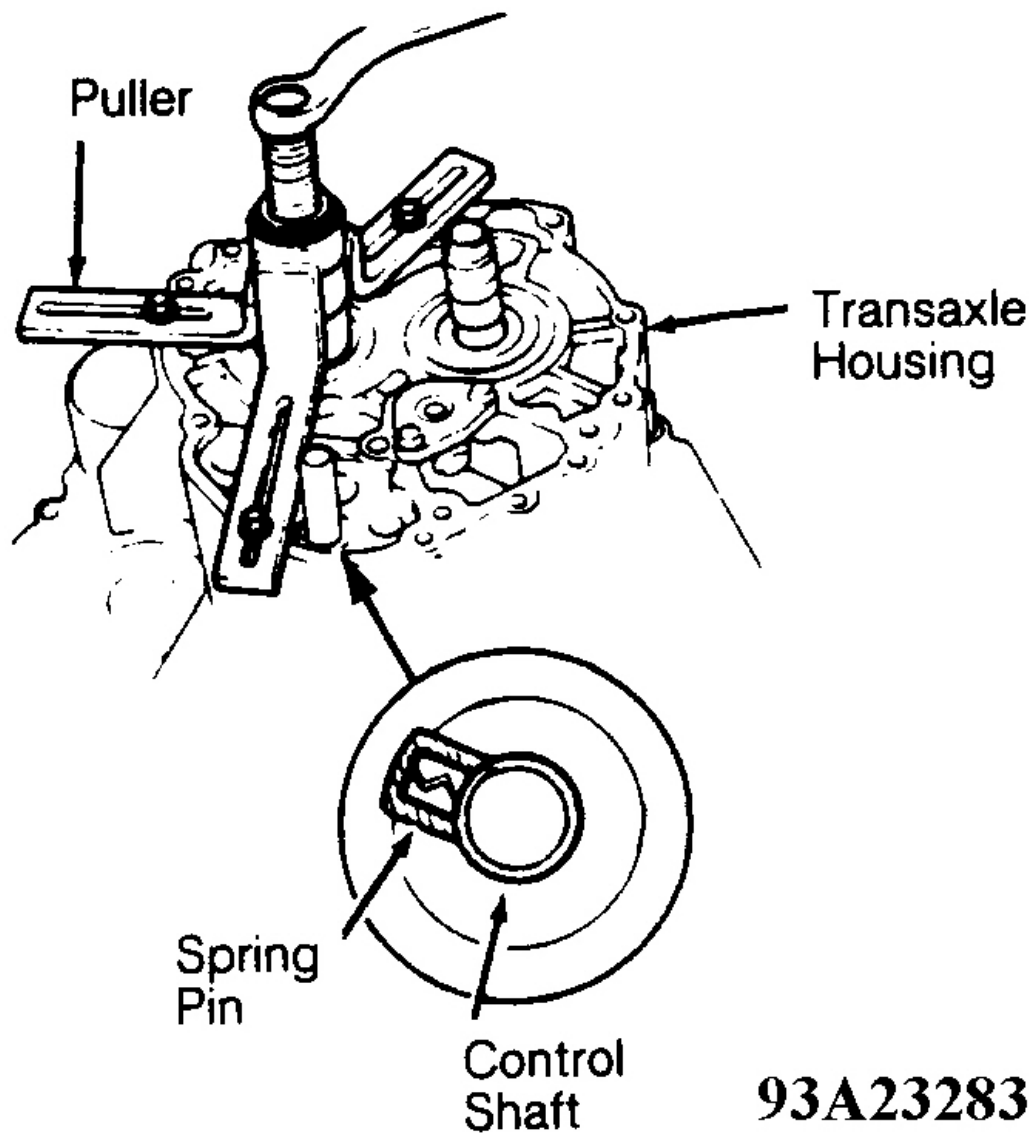


Fig. 14: Aligning Spring Pin & Removing Transaxle Housing
Courtesy of AMERICAN HONDA MOTOR CO., INC.

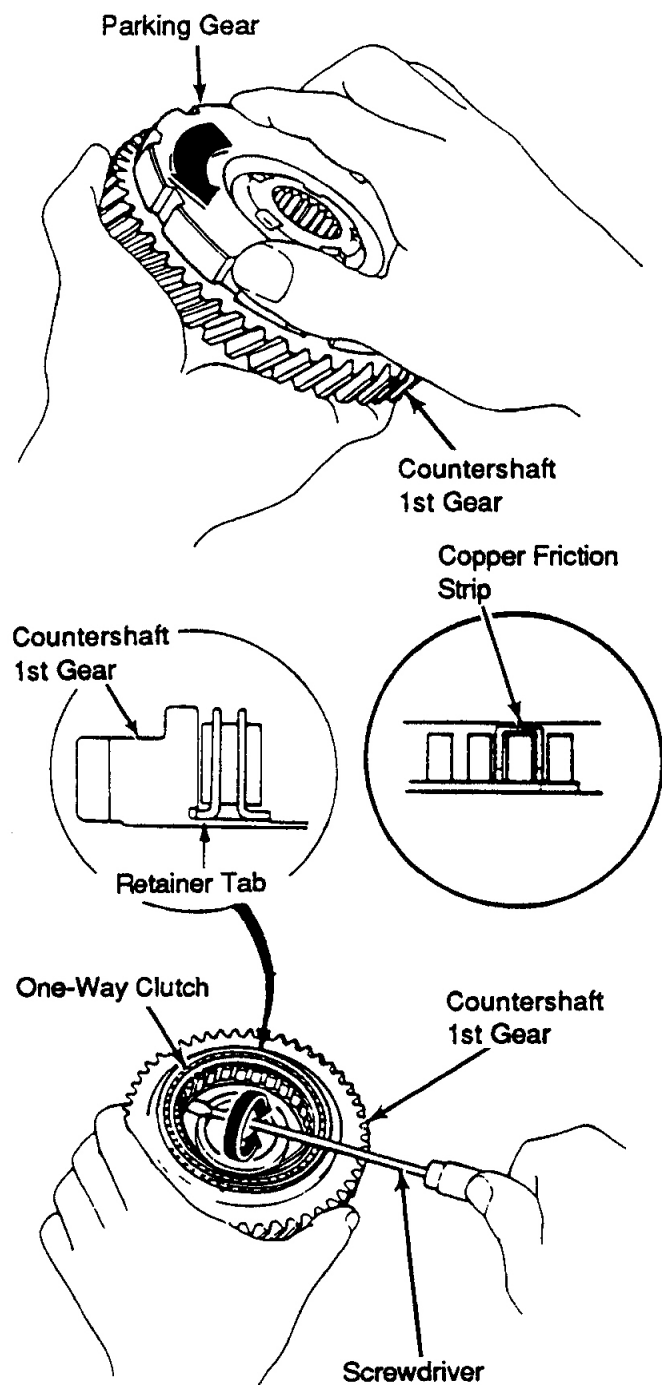
COMPONENT DISASSEMBLY & REASSEMBLY

ONE-WAY CLUTCH/PARKING GEAR

Disassembly

NOTE: DO NOT pry on 3 copper friction strips. If strip is broken or damaged, clutch will not operate properly.

Separate countershaft 1st gear from parking gear by turning parking gear in counterclockwise direction:
Remove one-way clutch by prying up using screwdriver. See **Fig. 15** .



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Fig. 15: Checking Operation Of One-Way Clutch & Parking Gear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Cleaning & Inspection

Inspect parking gear and countershaft 1st gear for wear or scoring. Inspect one-way clutch for damage or faulty movement.

Reassembly

After parts are assembled, hold countershaft 1st gear and turn parking gear in counterclockwise direction to ensure that it rotates freely. See **Fig. 15** .

COUNTERSHAFT & MAINSHAFT**Disassembly**

Disassemble countershaft and mainshaft. See **Fig. 16** and **Fig. 17** .

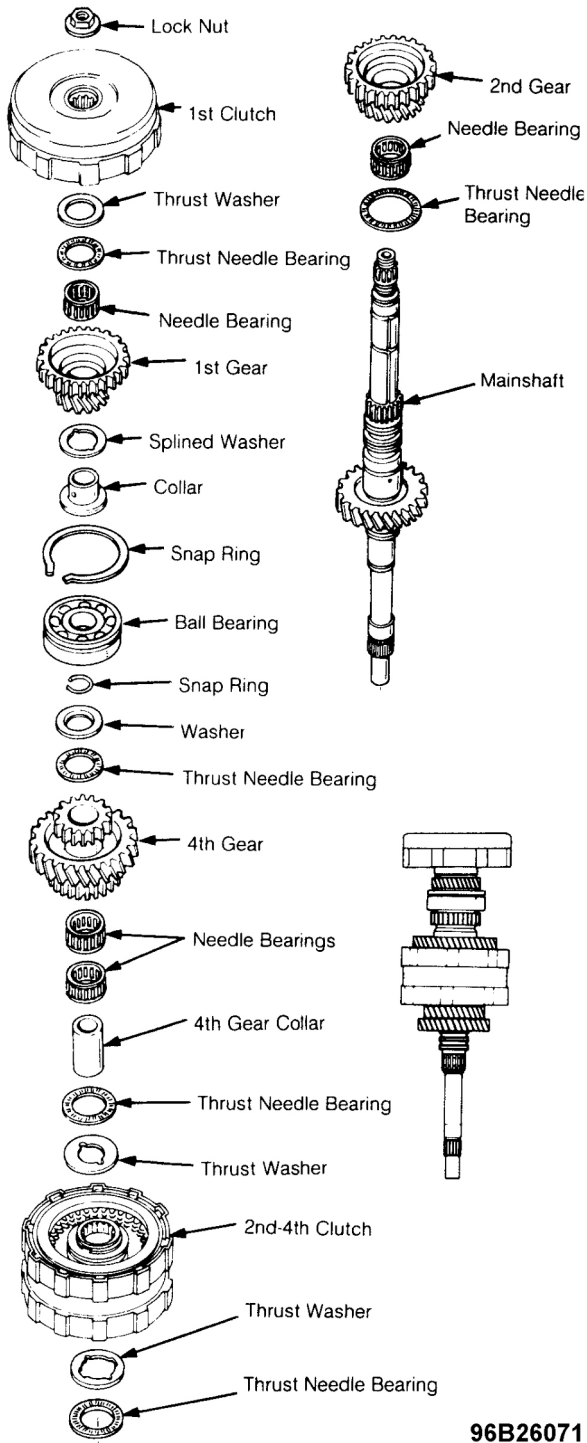


Fig. 16: Exploded View Of Mainshaft Assembly
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

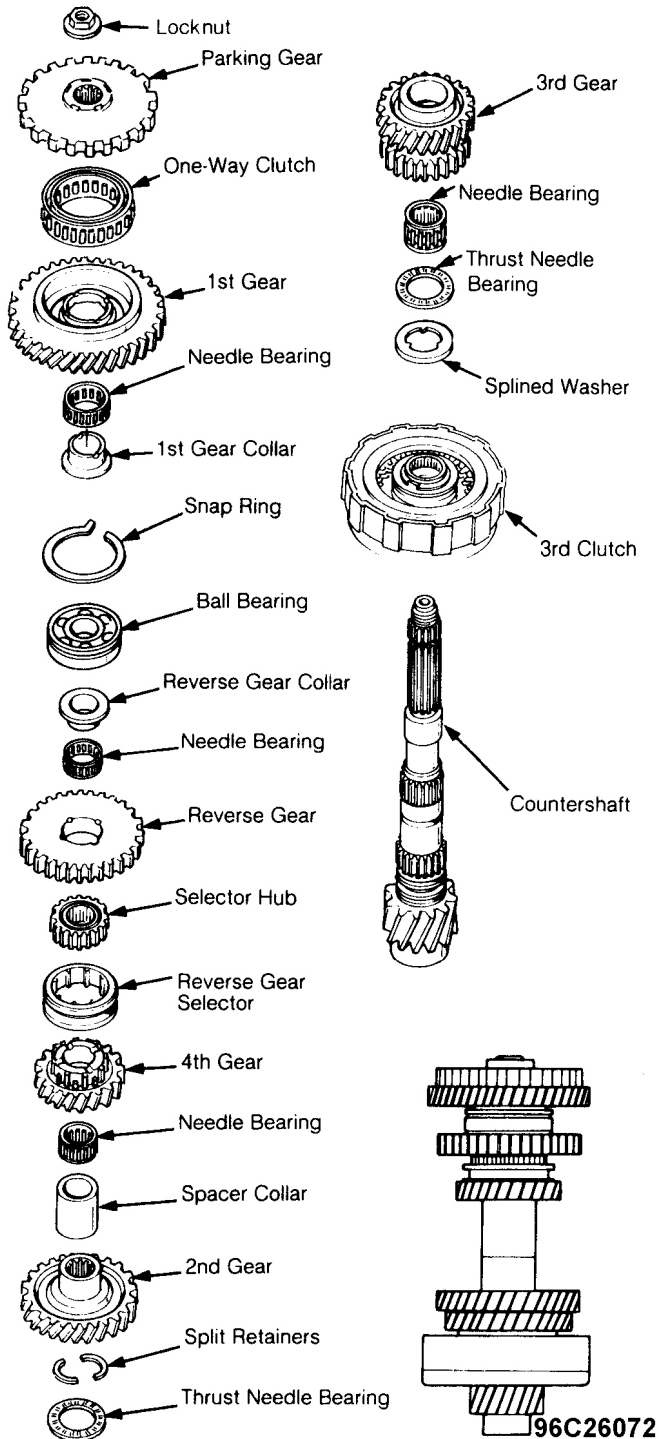


Fig. 17: Exploded View Of Countershaft Assembly
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

Cleaning & Inspection

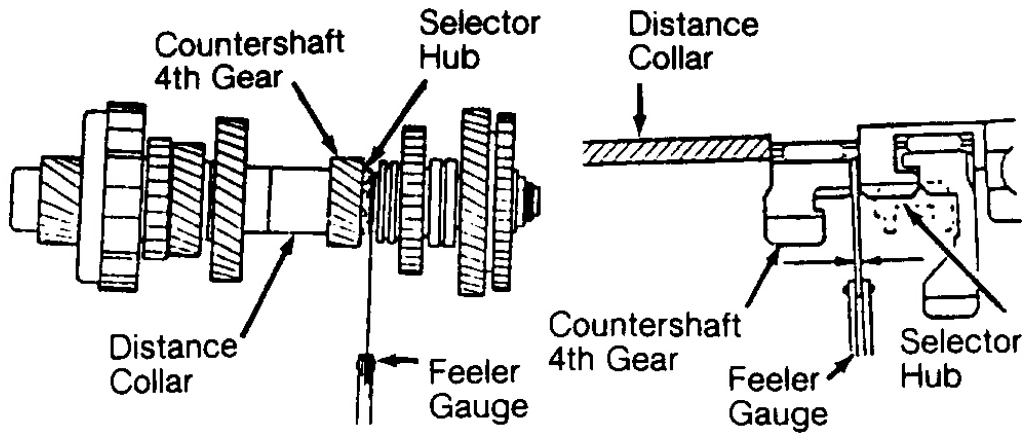
1. Check all splines for excessive wear or damage. Also check bearing surfaces for scaring, scratches or excessive wear. Replace metal seal rings.
2. Check needle bearings for galling and rough movement. Replace all "O" rings.

Reassembly

1. Lubricate all parts with ATF prior to reassembly. Install thrust needle bearings with unrolled edge of bearing retainer facing washer.
2. Install mainshaft and countershaft assemblies into torque converter housing. See Fig. 10. Install mainshaft holder to prevent shafts from turning.
3. Torque mainshaft lock nut which has LEFT-HAND threads to 22 ft. lbs. (30 N.m). Torque countershaft lock nut to 22 ft. lbs. (30 N.m). Slide 3rd gear out fully, measure and record clearance between 2nd and 3rd gear with a feeler gauge. Leave feeler gauge in place (4th gear), while measuring 3rd gear clearance. Standard clearance is .003-.006" (.07-.15 mm). See **Fig. 18** and **Fig. 19**.

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

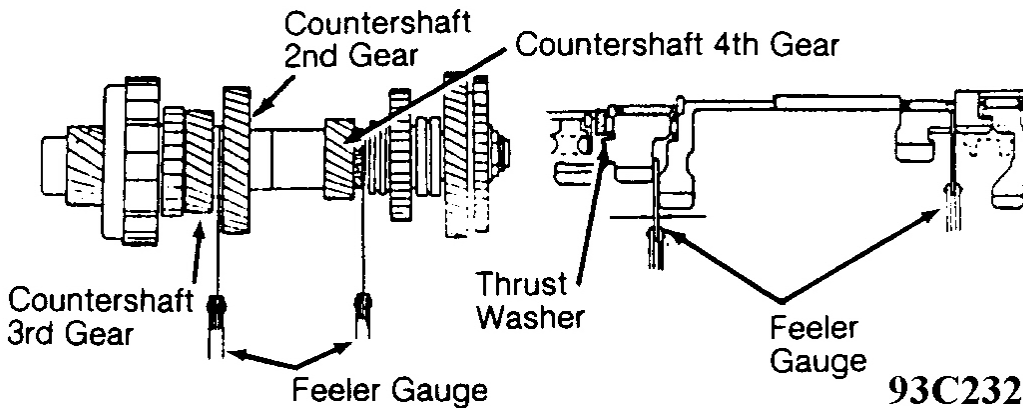
4. Slide 3rd gear in fully, measure clearance between 2nd and 3rd gear with another feeler gauge. Calculate difference between 2 readings to determine actual clearance between 2 gears. If readings exceed service limit, measure thickness of countershaft splined thrust washer 1.38" (35.0 mm) I.D. See **Fig. 18** and **Fig. 19**. Select one which gives proper clearance. See **COUNTERSHAFT SPLINED THRUST WASHER SPECIFICATIONS** table.
5. On mainshaft, measure the clearance between shoulder of 2nd gear and main 3rd gear in same manner as step 3. See **Fig. 20**. Standard clearance should be .003-.006" (.07-.15 mm). If clearance exceeds standard limits, measure thickness of 2nd clutch thrust washer (.142" (3.60 mm) maximum ID) and replace with correct clearance washer. See **2ND CLUTCH THRUST WASHER - .142" (3.60 MM) MAXIMUM ID** table.



CHECKING COUNTERSHAFT 4TH GEAR CLEARANCE

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Fig. 18: Checking Countershaft 4th Gear Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.



CHECKING COUNTERSHAFT 2ND-3RD GEAR CLEARANCE

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Fig. 19: Checking Countershaft 2nd-3rd Gear Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

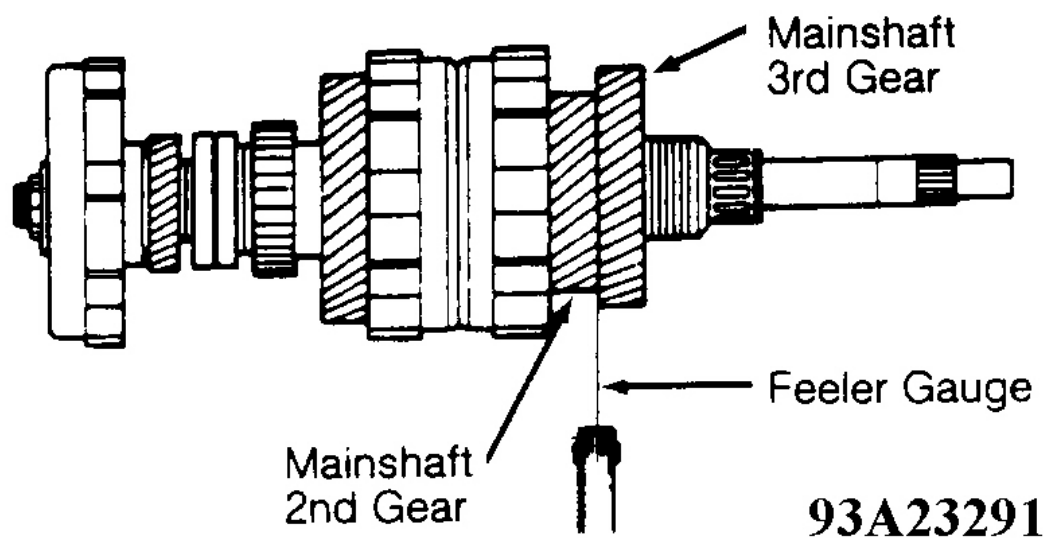


Fig. 20: Checking Mainshaft 2nd-3rd Gear Clearance
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

Clearance Measurements

Measure countershaft clearance between shoulder on selector hub and shoulder on 4th gear. Standard should be .003-.006" (0.07-0.15 mm). If clearance exceeds service limit, measure thickness of distance collar and select one which gives correct clearance. See **DISTANCE COLLAR SPECIFICATIONS** table. See **Fig. 20**.

COUNTERSHAFT SPLINED THRUST WASHER SPECIFICATIONS

Washer Part Number	Thickness In. (mm)
90411-PA9-010	.117-.118 (2.97-3.00)
90412-PA9-010	.119-.120 (3.02-3.05)
90413-PA9-010	.121-.122 (3.07-3.10)
90414-PA9-010	.123-.124 (3.12-3.15)
90415-PA9-010	.125-.126 (3.17-3.20)
90418-PA9-010	.127-.128 (3.22-3.25)
90419-PA9-010	.129-.130 (3.27-3.30)
90420-PA9-010	.131-.132 (3.32-3.35)
90421-PA9-010	.133-.134 (3.37-3.40)

2ND CLUTCH THRUST WASHER - .142" (3.60 MM) MAXIMUM ID

Washer I.D. Letter	Part Number	Thickness In. (mm)
"A"	90441-PC9-010	.137-.138 (3.47-3.50)
"B"	90442-PC9-010	.139-.140 (3.52-3.55)

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"C"	90443-PC9-010	.141-.142 (3.57-3.60)
"D"	90444-PC9-010	.143-.144 (3.62-3.65)
"E"	90445-PC9-010	.145-.146 (3.67-3.70)
"F"	90446-PC9-010	.147-.148 (3.72-3.75)
"G"	90447-PC9-010	.149-.150 (3.77-3.80)
"H"	90448-PC9-010	.151-.152 (3.82-3.85)
"I"	90449-PC9-010	.153-.154 (3.87-3.90)

DISTANCE COLLAR SPECIFICATIONS

Collar Number	Part Number	Thickness In. (mm)
1	90503-PC9-000	1.535 (39.00)
2	90504-PC9-000	1.539 (39.10)
3	90505-PC9-000	1.543 (39.20)
4	90507-PC9-000	1.547 (39.30)
5	90508-PC9-000	1.537 (39.05)
6	90509-PC9-000	1.541 (39.15)
7	90510-PC9-000	1.545 (39.25)

VALVE BODIES**Disassembly**

Accumulator cover is spring loaded. To prevent possibility of stripping threads from converter housing, press down on accumulator cover while removing bolts in a crisscross pattern. Follow this procedure for installation as well. DO NOT use a magnet to remove steel balls. Balls may become magnetized and result in improper transaxle operation. Note installed position of all valves and springs for reassembly reference. See **Fig. 21** and **Fig. 22** .

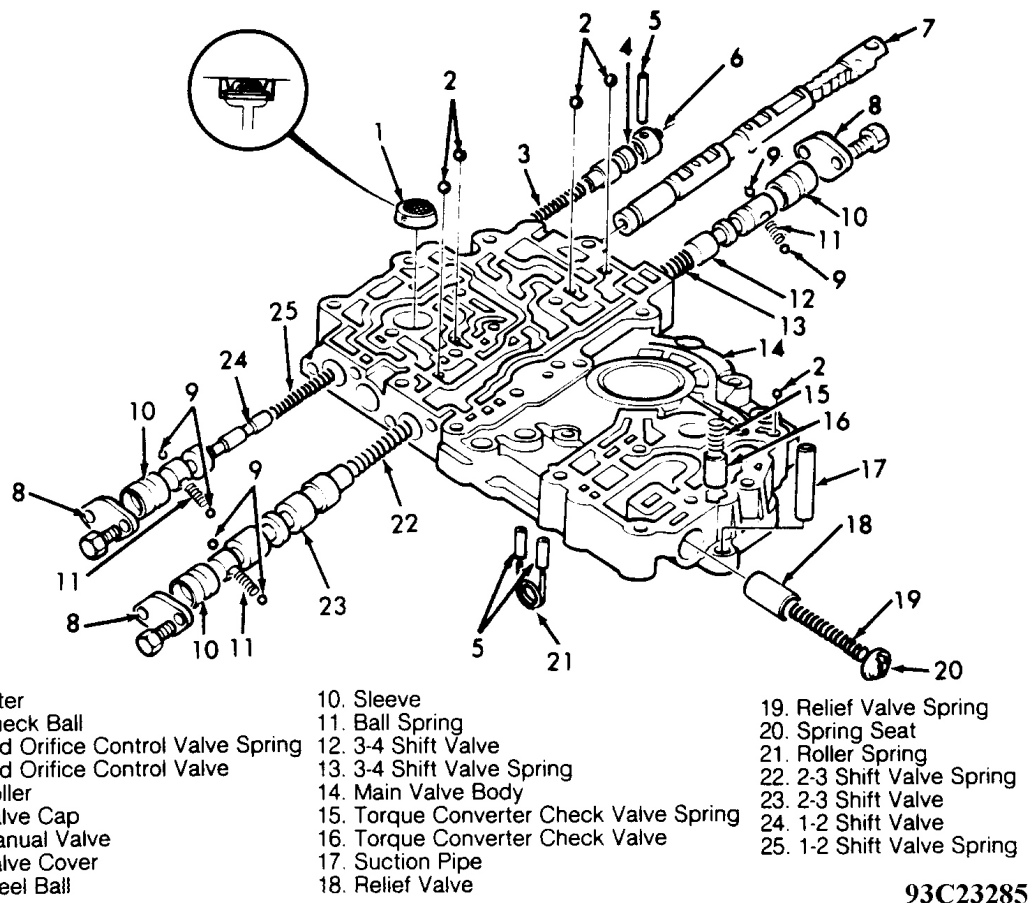


Fig. 21: Exploded View Of Main Valve Body
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

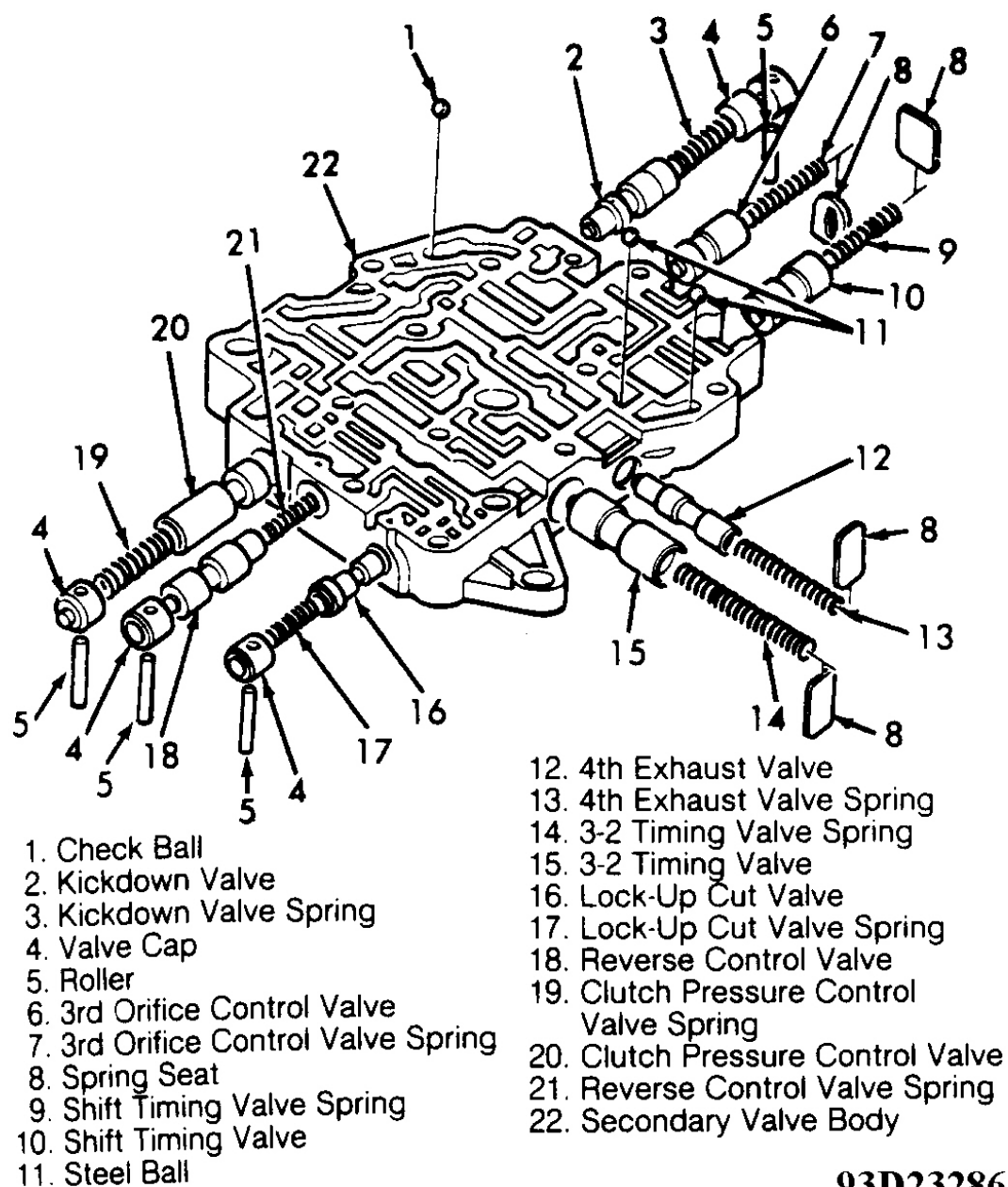


Fig. 22: Exploded View Of Secondary Valve Body
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

Cleaning & Inspection

NOTE: Before using No. 600 abrasive paper, ensure that it has been soaked in ATF for about 30 minutes.

1. Thoroughly clean all parts in solvent or carburetor cleaner. Dry using compressed air and blow out all passages. Replace valve body as an assembly if any parts are worn or damaged.
2. Check that all valves move freely. If valves do not move freely, polish off burrs or rough areas using ATF soaked No. 600 abrasive paper. Rewash entire valve body and parts thoroughly if polishing was needed.
3. Ensure that all springs meet specifications. See **SPRING FREE LENGTH** table. Coat all parts in ATF before reassembly.

Reassembly (Main & Secondary Valve Bodies)

1. Slide spring into hole in big end of shift valve. While holding steel balls with fingertips, put sleeve over the shift valve.
2. Place shift spring in shift valve, slip it into valve body and install valve cover. Set relief spring in relief valve and install in main valve body.
3. Install spring with a screwdriver, install check valve cap with cutout aligned with screwdriver. Install manual valve, detent rollers and spring. See **Fig. 23** .

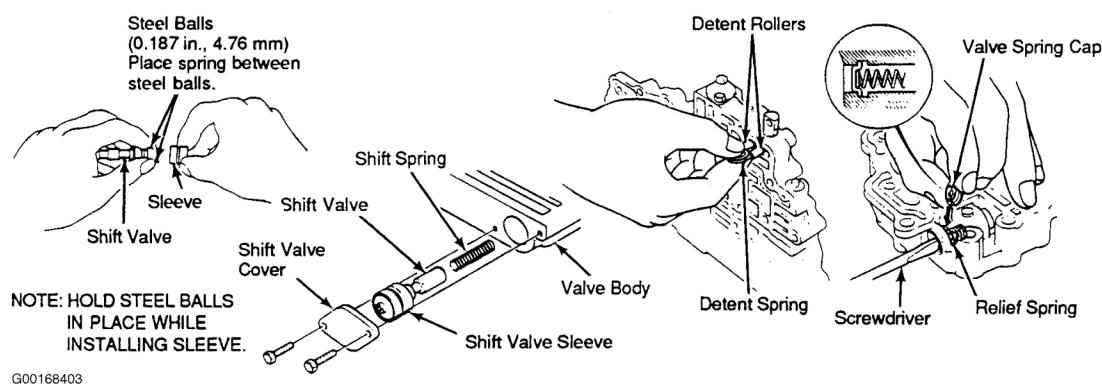
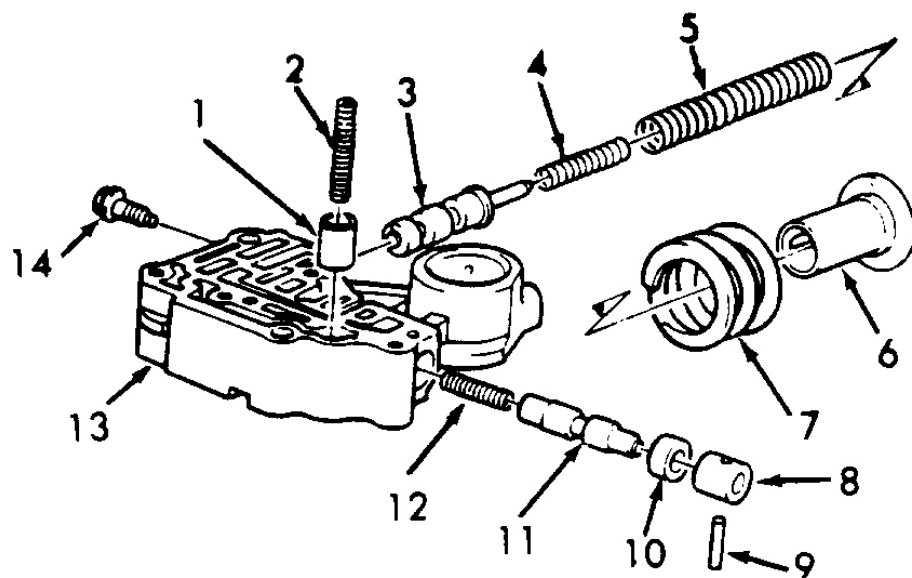


Fig. 23: Installing Shift Valve In Main Valve Body
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Reassembly (Regulator Valve Body)

Align hole in retainer with hole in valve body and torque lock bolt to 106 INCH lbs. (12 N.m). See **Fig. 24** .



- | | |
|-------------------------------|----------------------------------|
| 1. Cooler Relief Valve | 8. Valve Cap |
| 2. Cooler Relief Valve Spring | 9. Roller |
| 3. Regulator Valve | 10. Sleeve |
| 4. Regulator Valve Spring "B" | 11. Lock-Up Control Valve |
| 5. Regulator Valve Spring "A" | 12. Lock-Up Control Valve Spring |
| 6. Regulator Spring Cap | 13. Regulator Valve Body |
| 7. Stator Reaction Spring | 14. Stopper Bolt |

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Fig. 24: Exploded View Of Regulator Valve Body
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

Reassembly (Lock-Up Shift Valve Body)

Reassemble lock-up shift valve body. See **Fig. 25** .

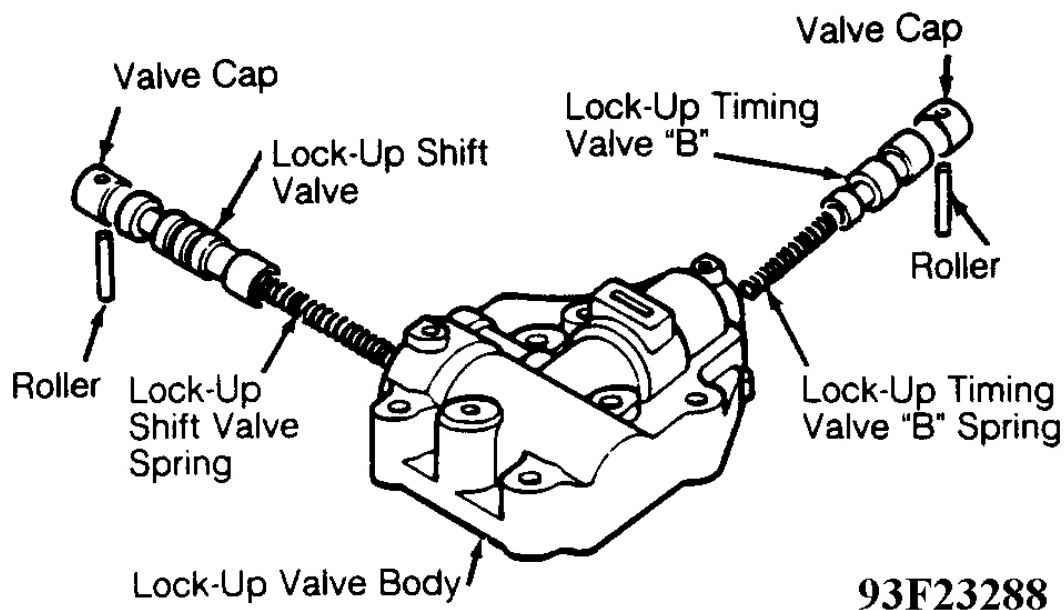
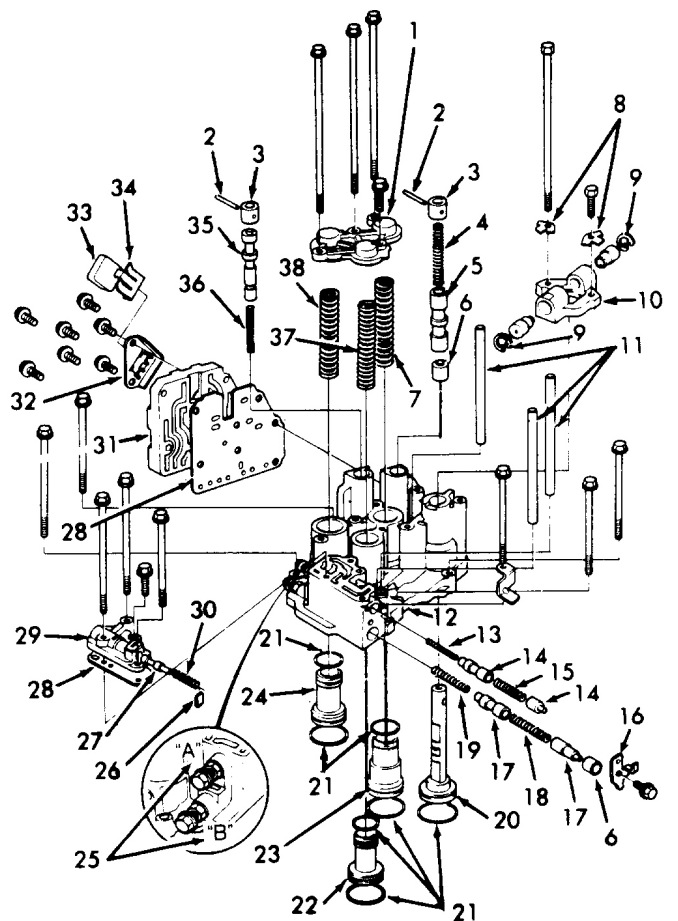


Fig. 25: Exploded View Of Lock-Up Valve Body
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Reassembly (Servo Valve Body)

Reassemble servo valve body. See **Fig. 26** .



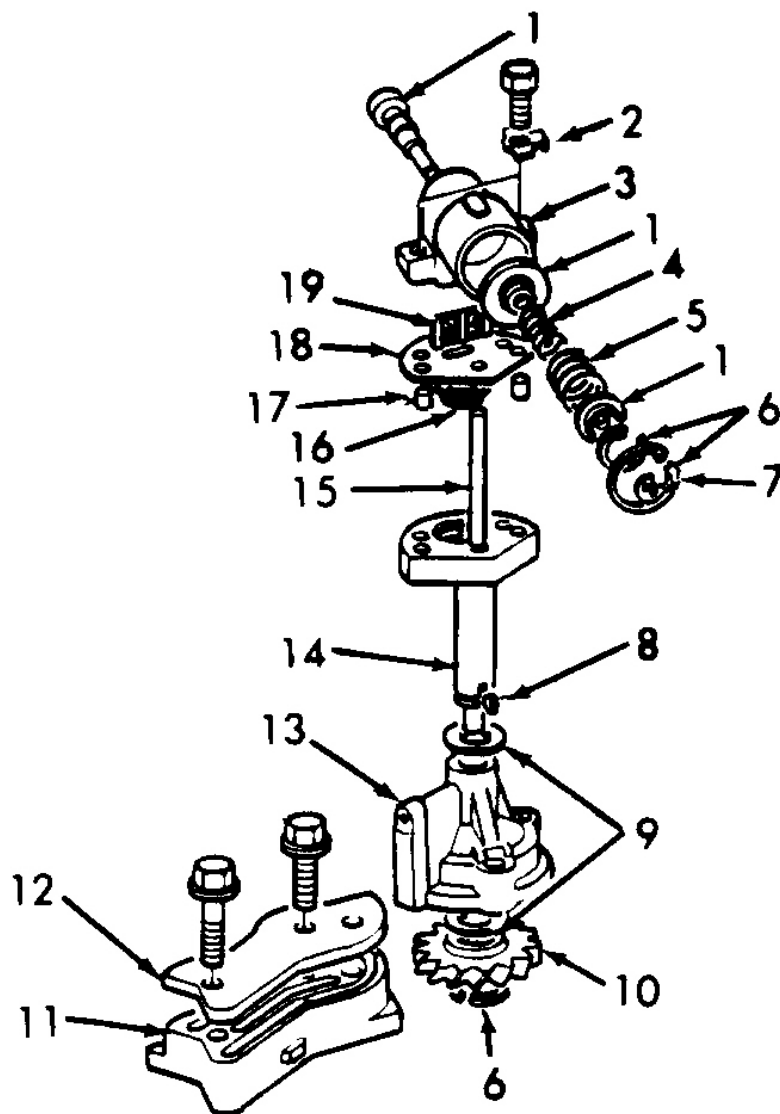
- | | |
|---|--|
| 1. Accumulator Cover | 20. Shift Fork Shaft |
| 2. Pin | 21. "O" Ring |
| 3. Valve Cap | 22. 3rd Accumulator Piston |
| 4. Servo Control Valve Spring | 23. 4th Accumulator Piston |
| 5. Servo Control Valve | 24. 2nd Accumulator Piston |
| 6. Sleeve | 25. Throttle Pressure Adjusting Bolts
(DO NOT Loosen Or Remove) |
| 7. 4th Accumulator Spring | 26. Spring Seat |
| 8. Bolt Lock | 27. Modulator Valve |
| 9. Retaining Clip | 28. Separator Plate |
| 10. Servo Valve Holder | 29. Modulator Valve Body |
| 11. Clutch Feedpipe | 30. Modulator Valve Spring |
| 12. Servo Valve Body | 31. Servo Cover |
| 13. Throttle Valve "A" Adjusting Spring | 32. Magnet Cover |
| 14. Throttle Valve "A" | 33. Magnet |
| 15. Throttle Valve "A" Spring | 34. Magnet Holder |
| 16. Valve Retainer | 35. Reverse Timing Valve |
| 17. Throttle Valve "B" | 36. Reverse Timing Valve Spring |
| 18. Throttle Valve "B" Spring | 37. 3rd Accumulator Spring |
| 19. Throttle Valve "B" Adjusting Spring | 38. 2nd Accumulator Spring |

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Fig. 26: Exploded View Of Servo Valve Body & Modulator Valve Body
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

Reassembly (Governor Valve Body)

Reassemble governor valve body. See **Fig. 27** .

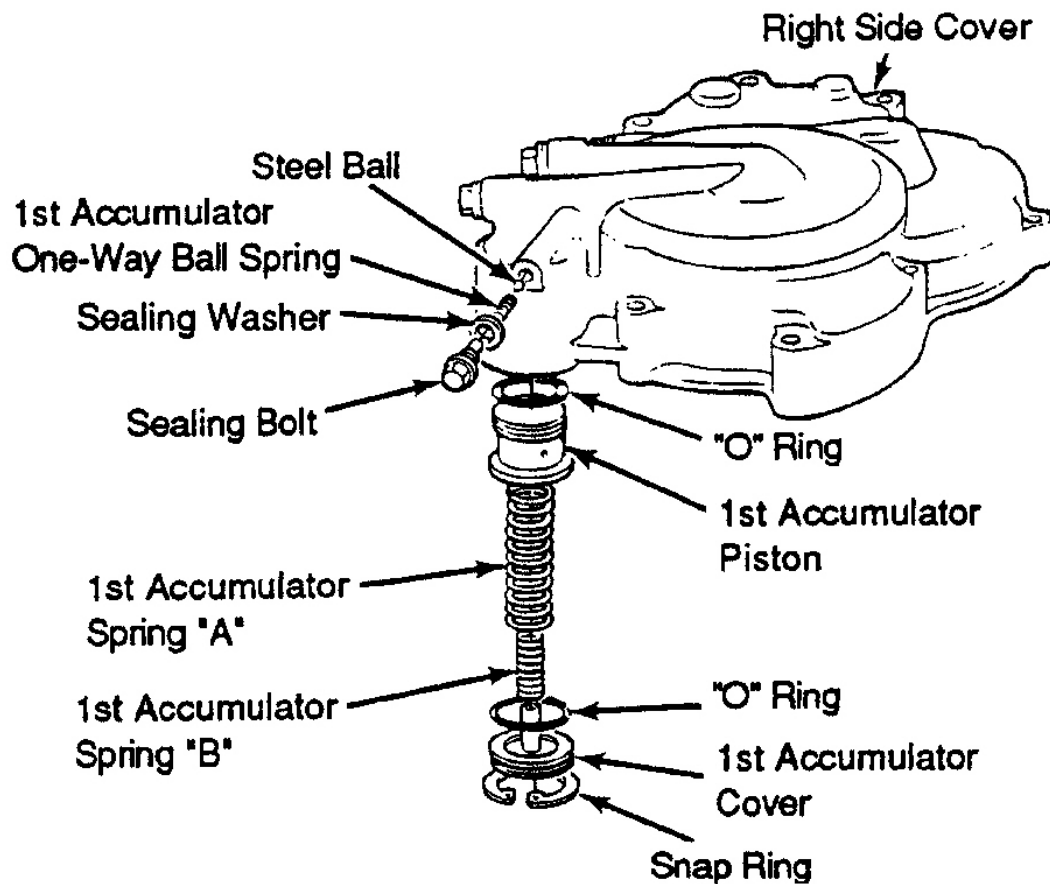


- | | |
|------------------------------|------------------------|
| 1. Governor Valve Assembly | 11. By-Pass Body |
| 2. Bolt Lock | 12. By-Pass Body Cover |
| 3. Governor Housing | 13. Body |
| 4. Governor Valve Spring "B" | 14. Shaft |
| 5. Governor Valve Spring "A" | 15. Pipe |
| 6. Retaining Ring | 16. Filter |
| 7. Clip | 17. Dowel Pin |
| 8. Key | 18. Plate |
| 9. Thrust Washer | 19. Filter |
| 10. Gear | |

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Fig. 27: Exploded View Of Governor

Courtesy of AMERICAN HONDA MOTOR CO., INC.

Reassembly (1st Accumulator)Reassembly 1st accumulator. See **Fig. 28** .

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Fig. 28: Exploded View Of 1st Accumulator

Courtesy of AMERICAN HONDA MOTOR CO., INC.

SPRING FREE LENGTH

Application	Free Length In. (mm)
Regulator Valve Spring "A"	3.41 (86.5)
Regulator Valve Spring "B"	1.73 (44.0)
Stator Reaction Spring	1.19 (30.3)
Throttle Modulator Spring	1.07 (27.2)

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Torque Converter Check Valve Spring	1.43 (36.4)
Cooler Relief Valve Spring	1.43 (36.4)
Relief Valve Spring	2.05 (52.0)
Governor Spring "A" - 2 Pieces	1.50 (38.1)
Governor Spring "B"	1.09 (27.8)
2nd Orifice Control Spring	1.72 (43.8)
Servo Orifice Control Spring	1.41 (35.9)
Throttle Spring "A"	0.87 (22.2)
Throttle Adjust Spring "A" (Throttle "B" Pressure)	1.18 (30.0)
Throttle Adjust Spring "A"	1.06 (27.0)
Throttle Spring "B"	1.63 (41.3)
1-2 Shift Spring - 2 Pieces	1.86 (47.2)
1-2 Shift Ball Spring - Main	0.50 (12.7)
1-2 Shift Ball Spring - Secondary	0.50 (12.7)
2-3 Shift Spring	1.76 (44.6)
2-3 Shift Ball Spring - 2 Pieces	0.57 (14.4)
3-4 Shift Ball Spring - 2 Pieces	1.28 (32.5)
Low Accumulator Spring "A"	2.63 (66.7)
Low Accumulator Spring "B"	1.57 (40.0)
Top Accumulator Spring	3.08 (78.3)
2nd Accumulator Spring	3.02 (76.7)
3rd Accumulator Spring	3.15 (80.0)
Lock-Up Clutch Shift Spring	2.04 (51.8)
Lock-Up Clutch Timing "B" Spring	2.19 (55.6)
Lock-Up Clutch Control Spring - 3 Pieces	1.39 (35.5)
Clutch Pressure Control Valve Spring - 2 Pieces	1.24 (31.6)
Shift Timing Valve Spring	1.69 (42.9)
Kickdown Valve Spring	1.61 (40.8)
Reverse Control Spring	1.46 (37.2)
Lock-Up Clutch Cut Spring	1.14 (29.0)
3-2 Timing Valve Spring	1.78 (45.1)
Low One-Way Ball Spring	0.55 (14.0)
4th Exhaust Spring	1.72 (43.7)
Servo Control Valve Spring	1.73 (44.0)
Reverse Timing Spring	1.72 (43.8)

OIL PUMP**Cleaning & Inspection**

1. Install pump gears and shaft in main valve body. Install oil pump shaft and measure side clearance of drive and driven gears.

2. Standard pump side (radial) drive gear clearance should be .0094-.0105" (.240-.266 mm). Driven gear (radius) clearance should be .0025-.0035" (.063-.089 mm). Inspect teeth for wear or damage.
3. Measure thrust clearance of driven gear-to-valve body. Standard clearance should be .001-.002" (.03-.05 mm). Service limit is .0028" (0.070 mm). See **Fig. 29** and **Fig. 30**.

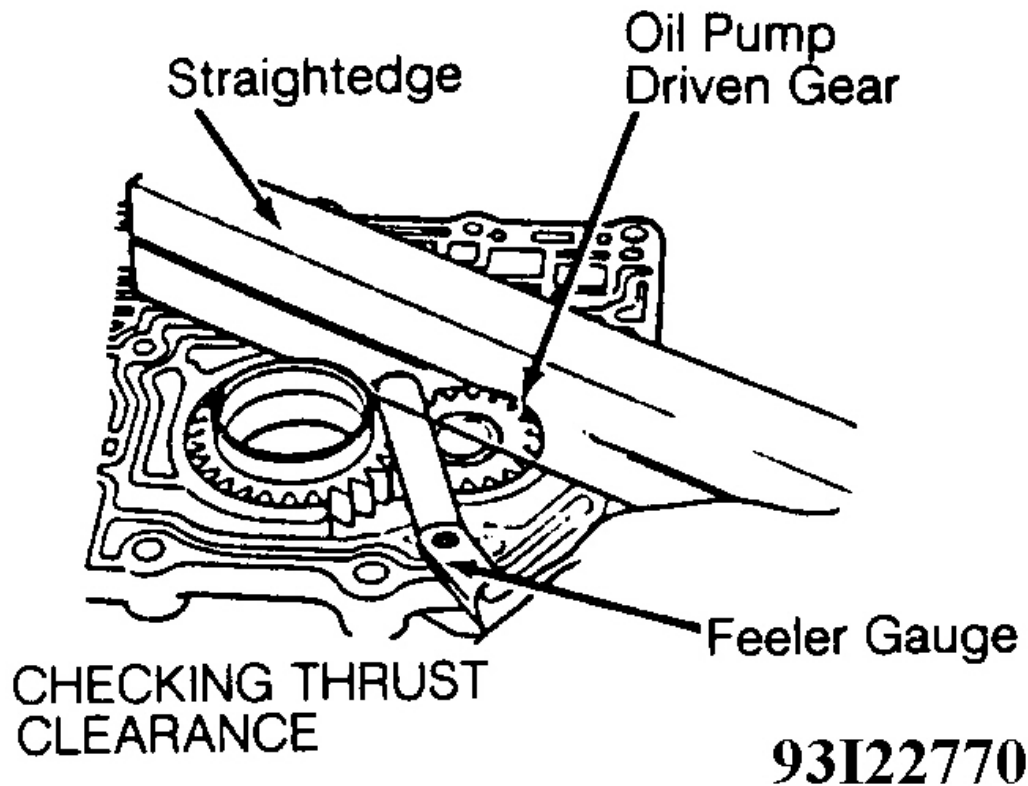


Fig. 29: Measuring Oil Pump Gear Thrust Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

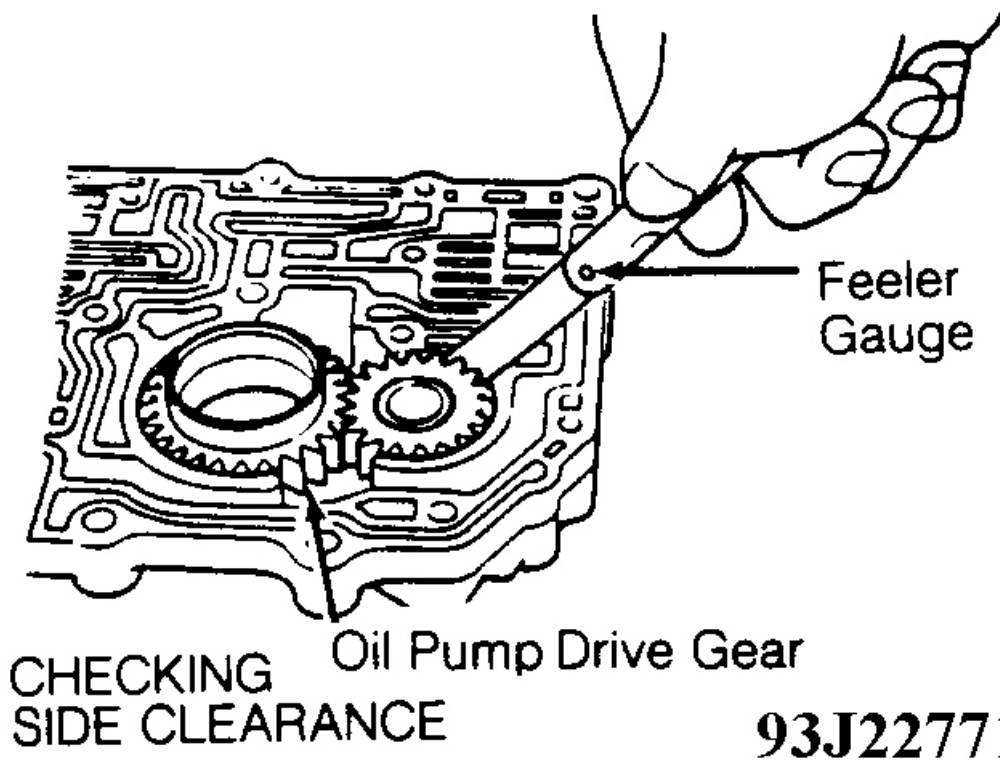


Fig. 30: Measuring Oil Pump Gear Side Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CLUTCH

Disassembly

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

1. On 1st/3rd and 2nd/4th clutch, remove snap ring, plate, clutch discs and plates. Remove clutch piston plate. Using Spring Compressor (07HAE-PL50100), compress clutch return spring. See **Fig. 31 -Fig. 34**.
2. On 1st/3rd clutch, assemble spring compressor on clutch drum and compress clutch return spring. Follow same procedure for 2nd/4th clutch.
3. Remove snap ring, spring compressor, spring retainer and spring. With clutch drum wrapped in shop towel, apply compressed air to oil passage to remove piston. Place finger tip on other end of oil passage while applying air pressure.

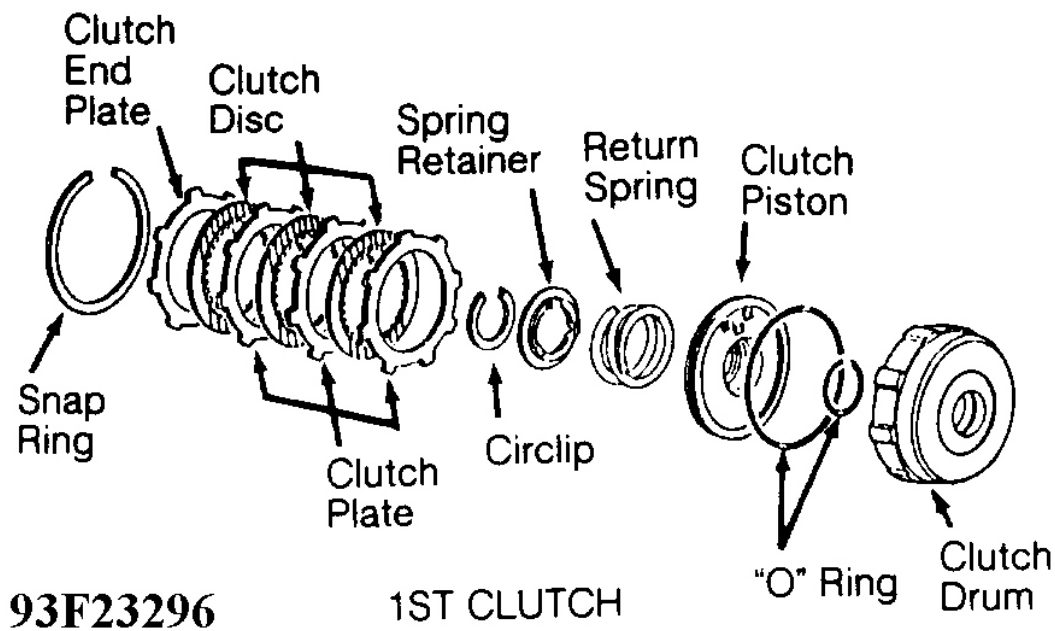


Fig. 31: Exploded View Of 1st Clutch Assembly
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

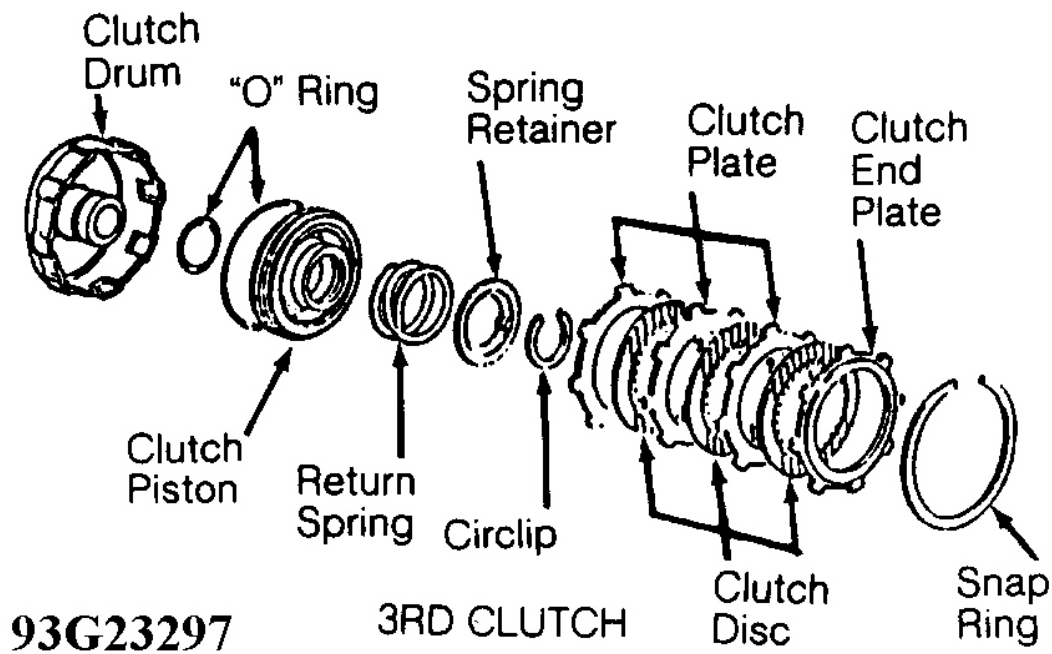


Fig. 32: Exploded View Of 3rd Clutch Assembly

Courtesy of AMERICAN HONDA MOTOR CO., INC.

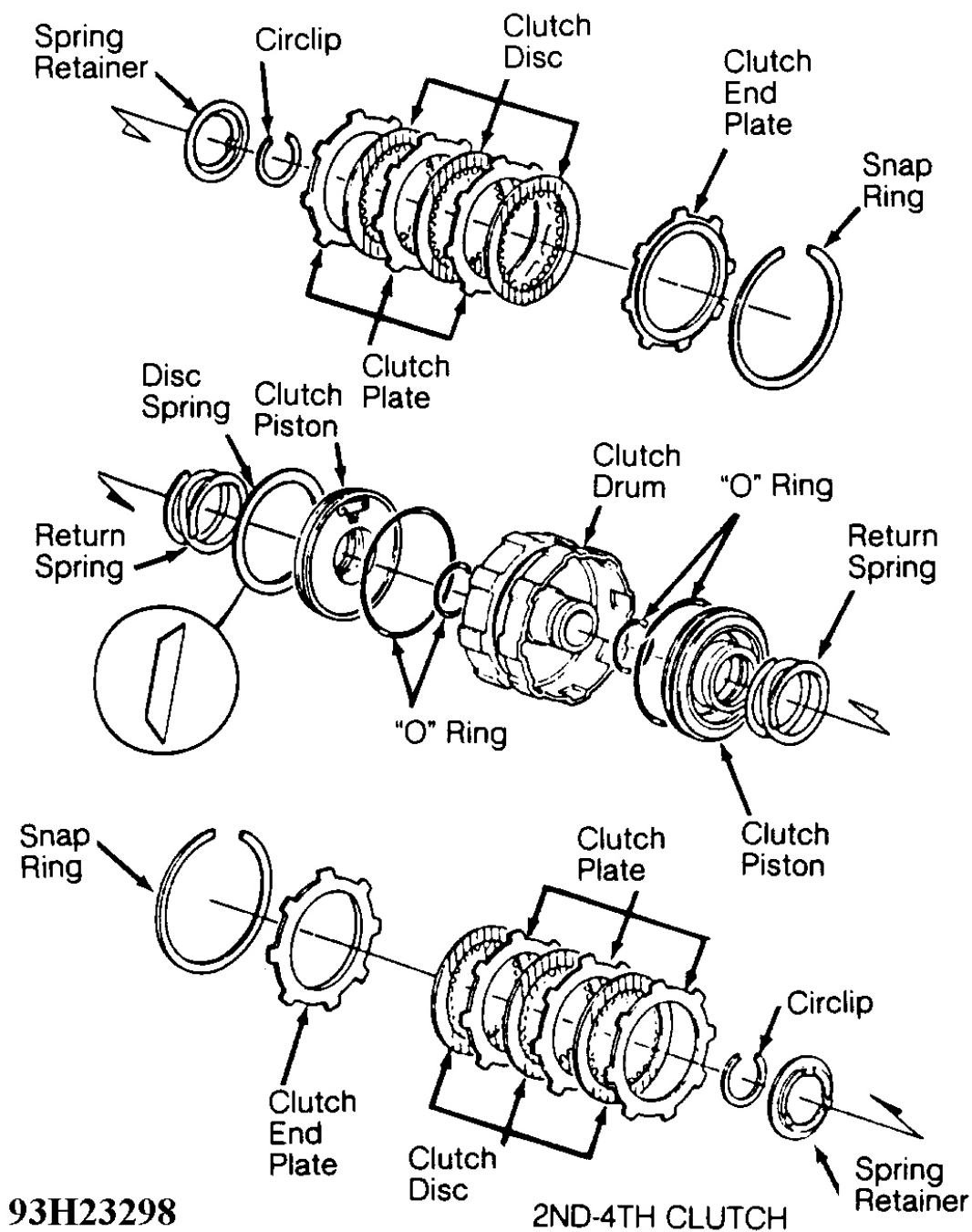


Fig. 33: Exploded View Of 2nd-4th Clutch Assembly
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

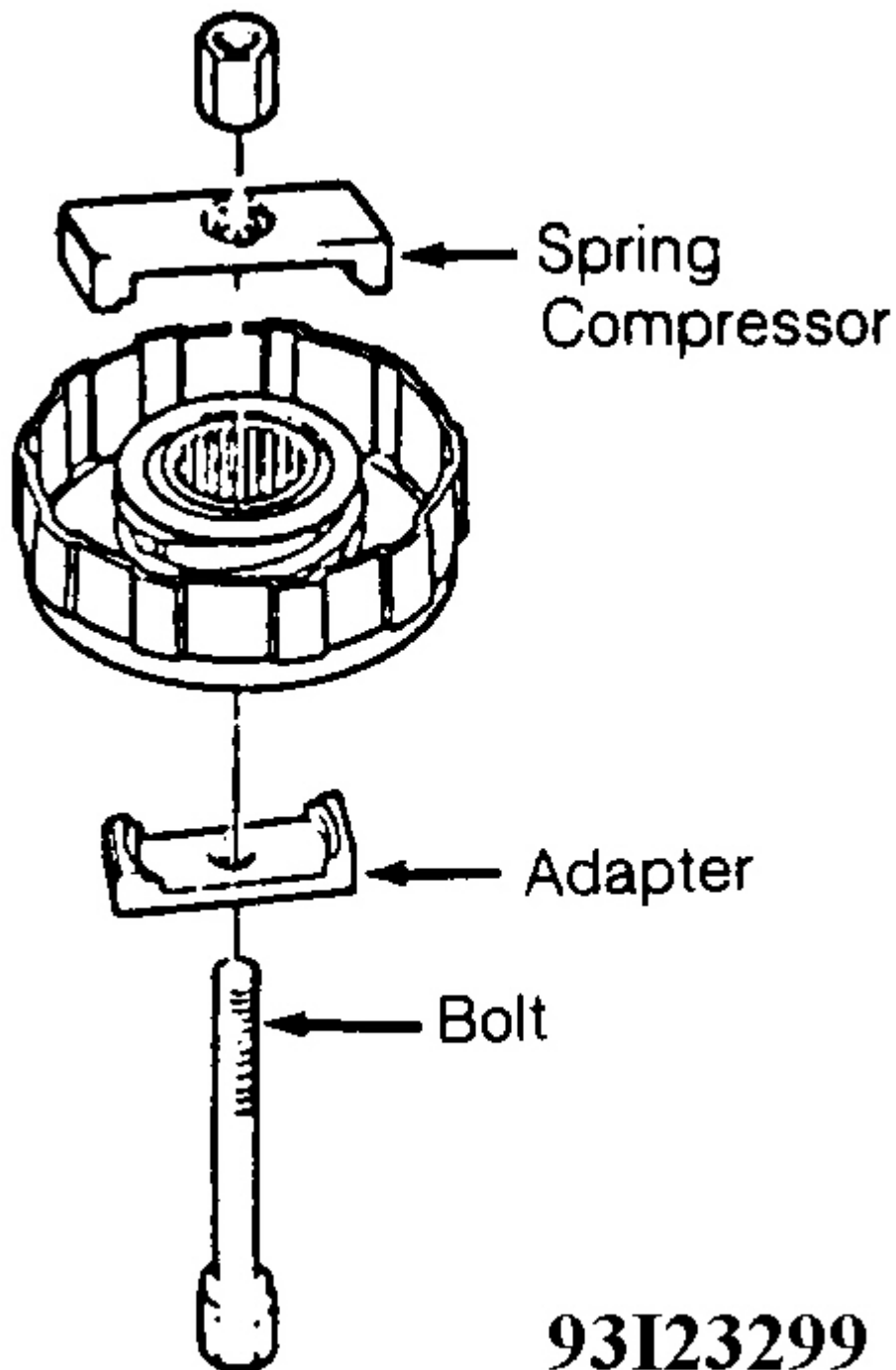


Fig. 34: Compressing Return Spring

Courtesy of AMERICAN HONDA MOTOR CO., INC.

Cleaning & Inspection

NOTE: Before installing plates and discs, ensure that inside of clutch drum is free of dirt or other foreign matter. DO NOT pinch "D" ring by forcing piston installation.

Clean all parts thoroughly using solvent and dry using compressed air. Ensure that all passages are blown out. Lubricate all parts with ATF before reassembly. Use new "O" rings on clutch pistons.

Reassembly

1. Ensure clutch discs thoroughly soak in ATF for a minimum of 30 minutes before installation. During reassembly ensure piston plate and spring washer are installed correctly.
2. Reverse disassembly to continue with reassembly: Starting with clutch plate alternately install clutch plates and discs.
3. Install clutch end plate with flat side toward disc. Install 125 mm snap ring. Check engagement by blowing air into oil passage in clutch drum hub. Remove air pressure and ensure that clutch releases.
4. Measure the clearance between the clutch end plate and top disc with a dial indicator. Zero dial indicator with clutch end plate lowered and lift it up to the snap ring. The distance that the clutch end plate moves is the clearance between the clutch end plate and top disc. Measure at 3 locations. See **END PLATE-TO-TOP DISC CLEARANCE** table.
5. If clearance is not within service limits, select new clutch end plate. Clutch end plates are available in sizes from .082" in increments of .004".
6. If clearance is not within service limits, select a new clutch end plate from following table. If the thickest clutch end plate is installed but the clearance is still over standard, replace clutch discs and clutch plates. See **CLUTCH END PLATE SPECIFICATIONS** table.

END PLATE-TO-TOP DISC CLEARANCE

Application	Clutch Clearance - In. (mm)
1st & 2nd Clutches	.026-.033 (.65-.85)
3rd & 4th Clutches	.016-.024 (.40-.60)

CLUTCH END PLATE SPECIFICATIONS

Plate Number	Part Number	Thickness In. (mm)
1	22551-PC9-000	.094 (2.4)
2	22552-PC9-000	.098 (2.5)
3	22553-PC9-000	.102 (2.6)
4	22554-PC9-000	.106 (2.7)
5	22555-PC9-000	.110 (2.8)
6	22556-PC9-000	.114 (2.9)
7	22557-PC9-000	.118 (3.0)
8	22558-PC9-000	.122 (3.1)

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9	22559-PC9-000	.126 (3.2)
10	22560-PC9-000	.130 (3.3)
11	22561-PC9-000	.082 (2.1)
12	22562-PC9-000	.086 (2.2)
13	22563-PC9-000	.090 (2.3)

TORQUE CONVERTER HOUSING

Disassembly

Remove differential assembly countershaft bearing and oil guide plate.

Cleaning & Inspection

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

Reassembly

Replace countershaft bearings and oil guide plate.

TRANSAXLE HOUSING

Disassembly

Remove mainshaft and countershaft bearings.

Cleaning & Inspection

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

TRANSAXLE REASSEMBLY

1. Install new filter screen on torque converter housing. Ensure that filter screen support is facing in.
2. Install differential assembly and ensure that it rotates freely. Assemble manual valve lever on control shaft and install torque converter housing. Install control lever and new lock plate on other end of shaft. Torque bolt to 10 ft. lbs. (14 N.m) and bend tab against bolt head.
3. Install main valve separator plate and dowel pins on torque converter housing. Torque main valve body separator plate bolt to 106 INCH lbs. (12 N.m).
4. Install oil pump drive gear and driven gear. Ensure driven gear chamfered side is facing down. Install driven gear shaft.
5. Install main valve body on torque converter housing and install bolts in sequence to finger-tight. Torque all bolts in sequence to 106 INCH lbs. (12 N.m). See **Fig. 35**.

CAUTION: If pump gears and pump shaft do not move freely, loosen valve body bolts, realign shaft and re-torque to specification. Failure to align pump shaft correctly will result in seized pump gear or pump shaft.

6. Ensure pump driven gear rotates smoothly in normal operating direction and pump shaft moves smoothly in axial, and normal operating directions.
7. Install 5 steel balls in main valve body oil passages. Install new filter in main valve body. Install stator shaft arm, stop pin and dowel pins. Install torque converter check valve and spring.
8. Install 4 pressure inspection port bolts, torque to 13 ft. lbs. (17 N.m). Install lock-up control solenoid valve, torque bolts to 106 INCH lbs. (12 N.m).
9. Install regulator valve body assembly on main valve body assembly, torque bolts to 106 INCH lbs. (12 N.m). Install lock-up valve separator plate and lock-up valve body. Torque bolts to 106 INCH lbs. (12 N.m).
10. Install secondary separator plate and secondary valve body assembly on main valve body. Install secondary filter and 3 steel balls in secondary valve assembly. DO NOT move assembly during or after installing steel balls. Torque secondary valve body bolt to 106 INCH lbs. (12 N.m).
11. Install servo separator plate and throttle control shaft, Install servo valve body, servo valve holder, modulator separator plate and modulator valve. Install accumulator springs and cover. Tighten accumulator cover bolts to 106 INCH lbs. (12 N.m). Bend lock washer tab against bolt heads.

NOTE: To prevent stripping the threads, press down accumulator cover while installing bolts.

12. Install suction pipe, servo cover separator, servo cover and holder with magnet. Torque servo cover bolt to 106 INCH lbs. (12 N.m).
13. Install separator plate governor and torque bolt to 106 INCH lbs. (12 N.m), bend lock tab against bolt head. Install by-pass body and body cover. Torque by-pass body cover bolt to 106 INCH lbs. (12 N.m).
14. Set countershaft and mainshaft in place as an assembly. DO NOT tap shaft with hammer to drive in place.
15. Install, distance collar, needle, bearing, countershaft 4th gear and selector hub on countershaft.

NOTE: Install reverse gear selector with flat face up. Install reverse gear selector hub with groove facing up. Turn valve stem so chamfered hole faces fork bolt hole.

16. Install reverse shift fork over servo valve stem. Align hole in stem with hole in fork and install bolt. Torque bolt to 10 ft. lbs. (14 N.m), bend lock plate tab against bolt head. See **Fig. 36** .
17. Install countershaft reverse gear, needle bearing and reverse gear collar on countershaft and suction pipe in countershaft. Install new gasket and 3 dowel pins in torque converter housing. See **Fig. 37** .

NOTE: Dowel pins are different lengths. Be sure to install properly. Install reverse roller gear so large chamfer on shaft bore faces torque converter housing.

NOTE: When tightening transaxle housing bolts, DO NOT distort or damage throttle control bracket, distortion or damage to bracket will change

transaxle shift points.

18. Assemble and install reverse idler gear in transaxle housing. Place transaxle housing on torque converter housing. Ensure main valve control shaft lines up with hole in housing and that reverse idler gear meshes with mainshaft and countershaft or housing will not go on.
19. Install transaxle hook on bolt No. 12 and lock plate and throttle cable bracket on housing. Assemble and install throttle control lever. Torque mounting bolts to 71 INCH lbs. (8 N.m).
20. Torque transaxle housing bolts to 25 ft. lbs. (34 N.m) in two steps to prevent distortion. See **Fig. 35** and **Fig. 37**.
21. Install parking brake roller, roller pin and washer on parking shift arm and secure using new cotter pin. Install parking spring, parking shift arm and parking lever on shift shaft. Torque bolt to 10 ft. lbs. (14 N.m), bend lock tab against bolt head.
22. Install collar and needle bearing on countershaft. Install collar on mainshaft. Install countershaft 1st gear one-way clutch and parking gear on countershaft.
23. Install parking pawl shaft, parking pawl spring and parking pawl. Ensure that hook end of spring is placed in hole of transaxle housing and not in parking pawl.
24. Ensure release spring places clockwise tension on parking pawl forcing it away from parking gear. Shift into park and install mainshaft holder.
25. Install and torque new countershaft lock nut to 103 ft. lbs. (140 N.m). Lock nut has LEFT-HAND threads. Using a .14" (3.5 mm) punch, stake lock nut, flange at two places in gear grooves. See **Fig. 38**.
26. Install stop pin in transaxle housing. Install "O" ring, thrust washer, mainshaft 1st gear, needle bearing, thrust needle bearing, thrust washer and 1st clutch assembly on mainshaft.
27. Attach mainshaft holder to underside of torque converter case. Torque new mainshaft lock nut to 70 ft. lbs. (95 N.m). Stake lock nut flange into groove in 1st clutch. See **Fig. 38**.
28. Install 3 "O" rings in transaxle housing. Install 2 dowel pins in transaxle housing. Install end cover with 1st accumulator piston and 1st clutch feed pipe assembly on transaxle housing. Torque end cover bolts in a crisscross pattern to 106 INCH lbs. (12 N.m).
29. Install transaxle oil cooler pipes on transaxle housing using new sealing washers. Torque bolt to 21 ft. lbs. (29 N.m). Install speed sensor and torque bolt to 106 INCH lbs. (12 N.m).
30. Install torque converter with new "O" ring. When disassembling or reassembling torque converter, ensure all bolts are tightened (or loosened) in crisscross pattern. Inspect drive plate for cracks and replace "O" ring.

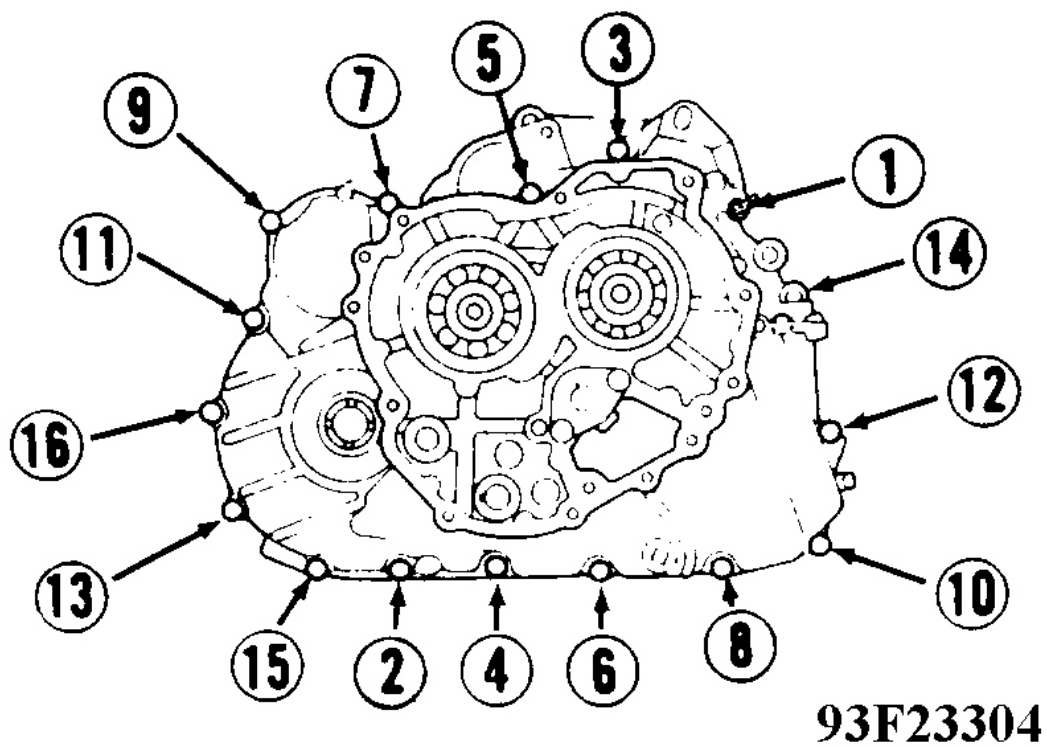
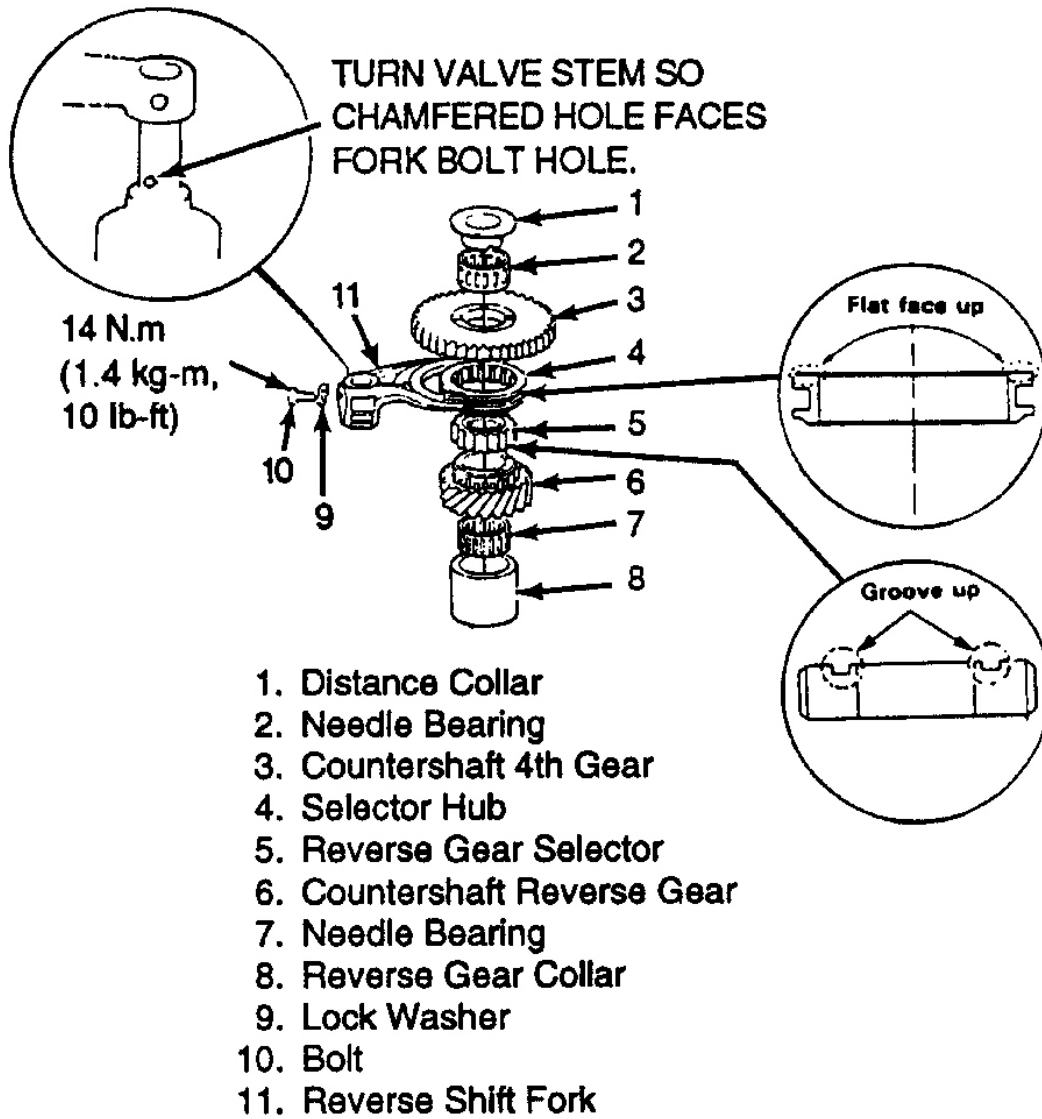


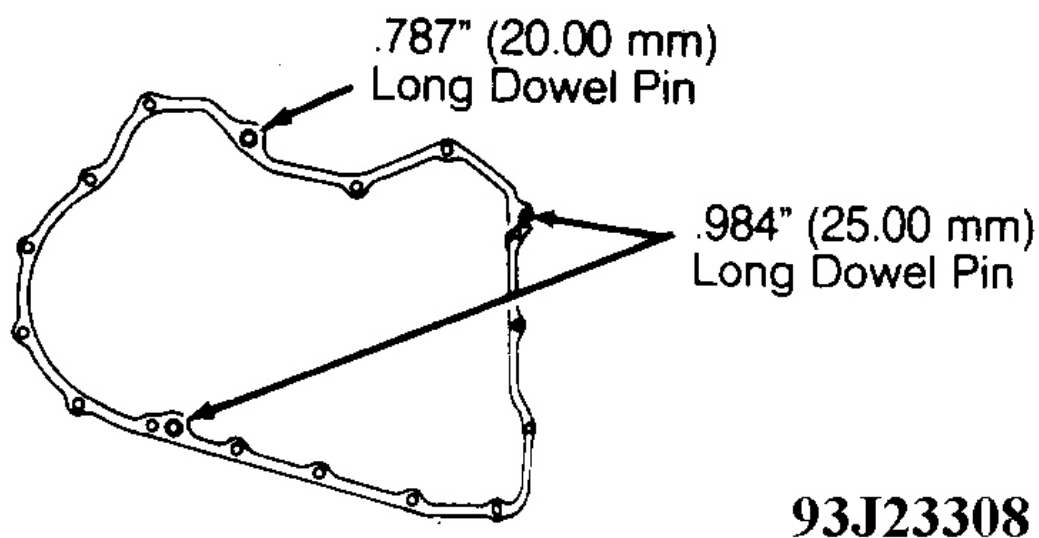
Fig. 35: Transaxle Housing Bolt Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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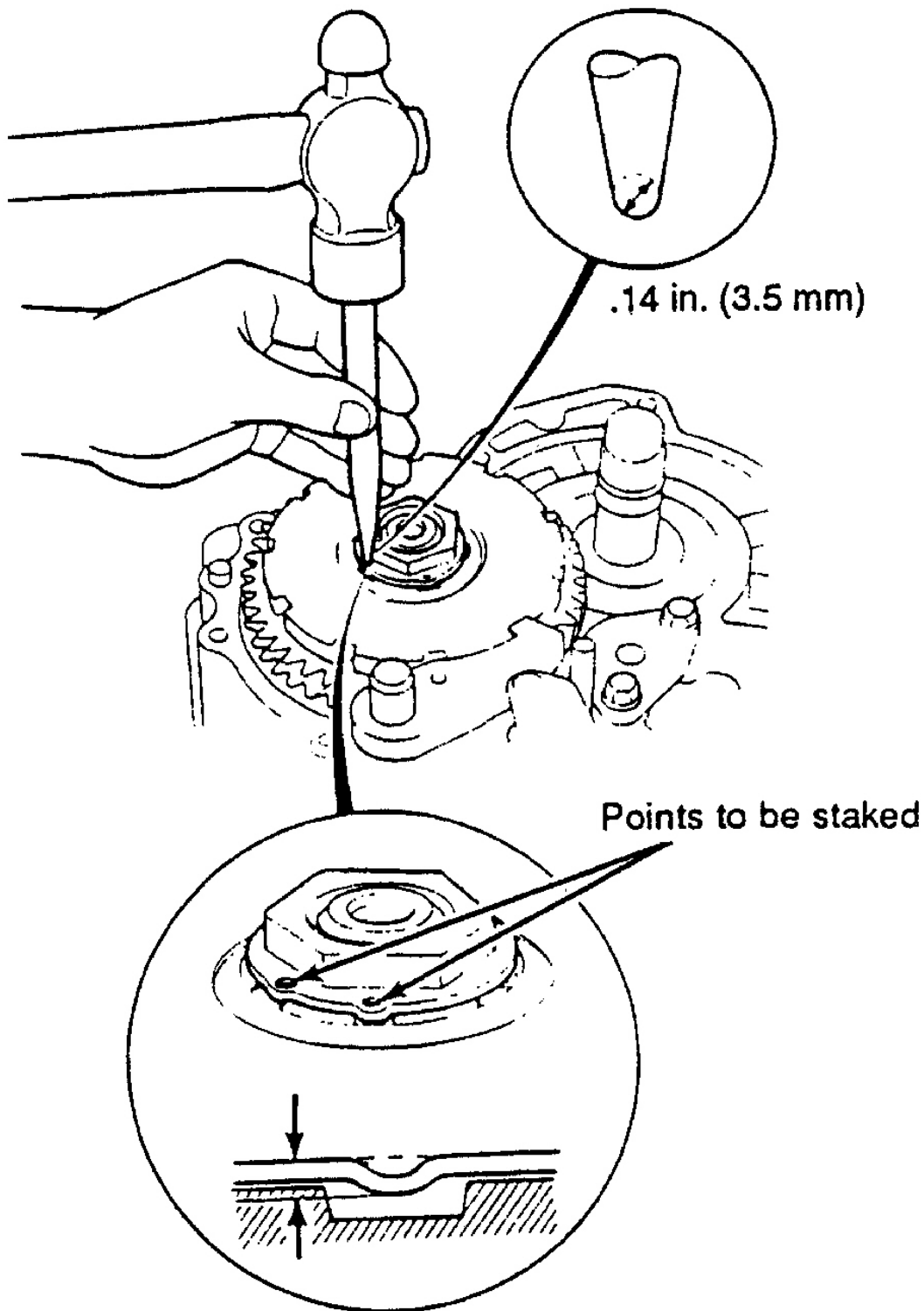
Fig. 36: Exploded View Of Fork & Stem

Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 37: Installing Dowel Pins On Torque Converter Housing
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 38: Staking Lock Nut Flange

Courtesy of AMERICAN HONDA MOTOR CO., INC.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Control Lever Bolt	10 (14)
Cooler Pipe Bolt	21 (28)
Countershaft Lock Nut	103 (140)
Drain Plug	29 (40)
Idler Shaft Retainer Bolt	20 (27)
Joint Bolt	21 (29)
Mainshaft Lock Nut	70 (95)
Parking Brake Stopper Bolt	11 (15)
Pressure Port Bolt	13 (17.5)
Reverse Shift Fork Bolt	10 (14)
Transaxle Housing-To-Torque Converter Housing Bolt	25 (34)
1st Accumulator Sealing Bolt	13 (17.5)
	INCH Lbs. (N.m)
Accumulator Cover Bolt	106 (12)
End Cover Bolt	106 (12)
Governor Bolt	106 (12)
Idler Shaft Holder Bolt	106 (12)
Lock-Up Control Solenoid Valve Bolt	106 (12)
Lock-Up Valve Body Bolt	106 (12)
Main Valve Body Bolt	106 (12)
Main Valve Body Separator Plate Bolt	106 (12)
Main Valve Body Shift Valve Cover Bolt	72 (8)
Magnet Cover Bolt	106 (12)
Modulator Valve Body Bolt	106 (12)
Regulator Valve Body Bolt	106 (12)
Regulator Valve Retainer Bolt	106 (12)
Secondary Valve Body Bolt	106 (12)
Servo Valve Body Bolt	106 (12)
Servo Valve Throttle Valve "B" Bolt	72 (8)
Speed Sensor Assembly Bolt	106 (12)
Throttle Control Lever Bolt	106 (12)

WIRING DIAGRAMS

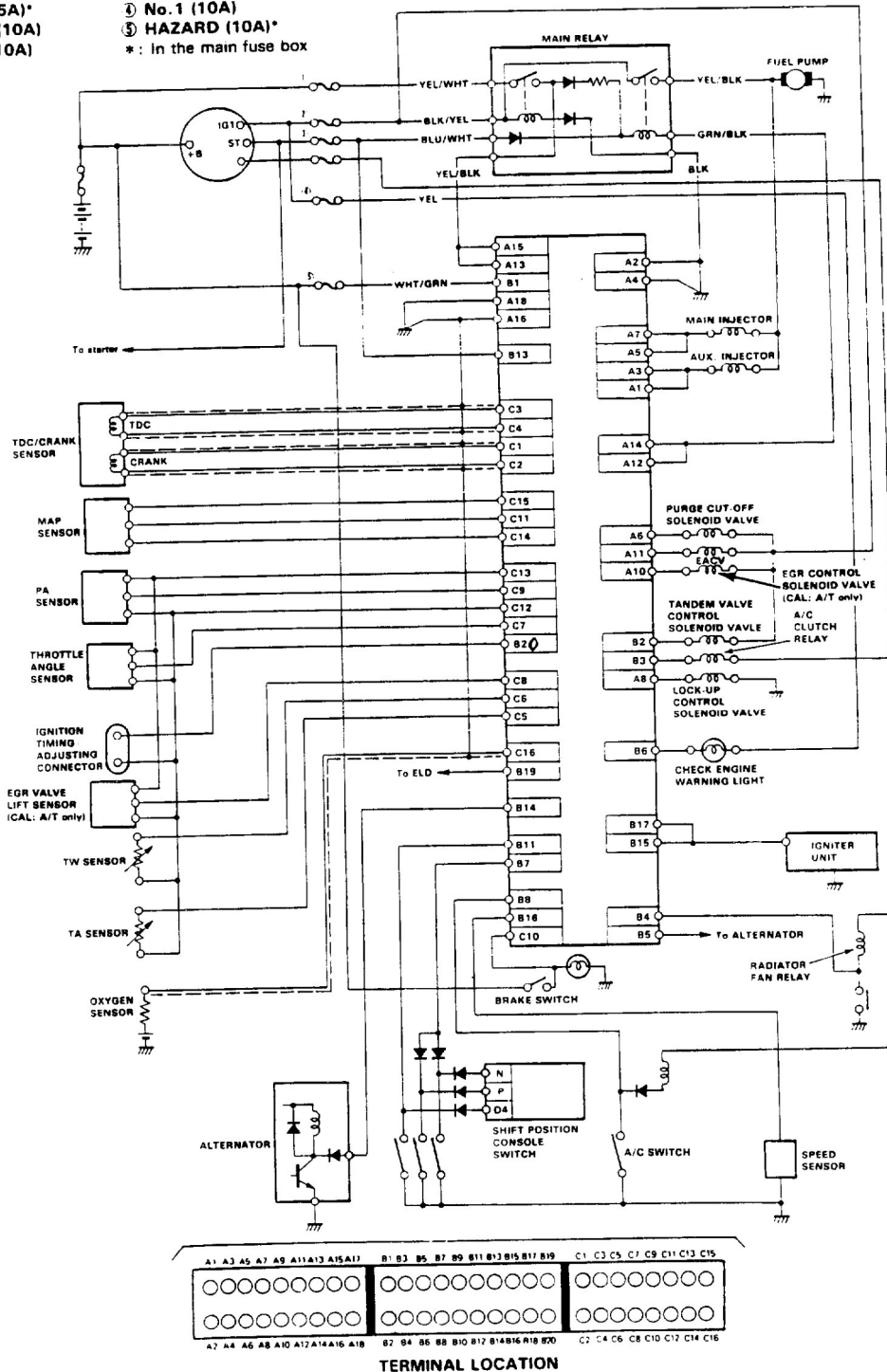
1990 Honda Civic EX

1988-90 AUTOMATIC TRANSMISSIONS L4 Diagnosis & Overhaul

FUSES

- ① ECU (15A)*
- ② No.14 (10A)
- ③ No.2 (10A)

- ④ No.1 (10A)
- ⑤ HAZARD (10A)*
- *: In the main fuse box



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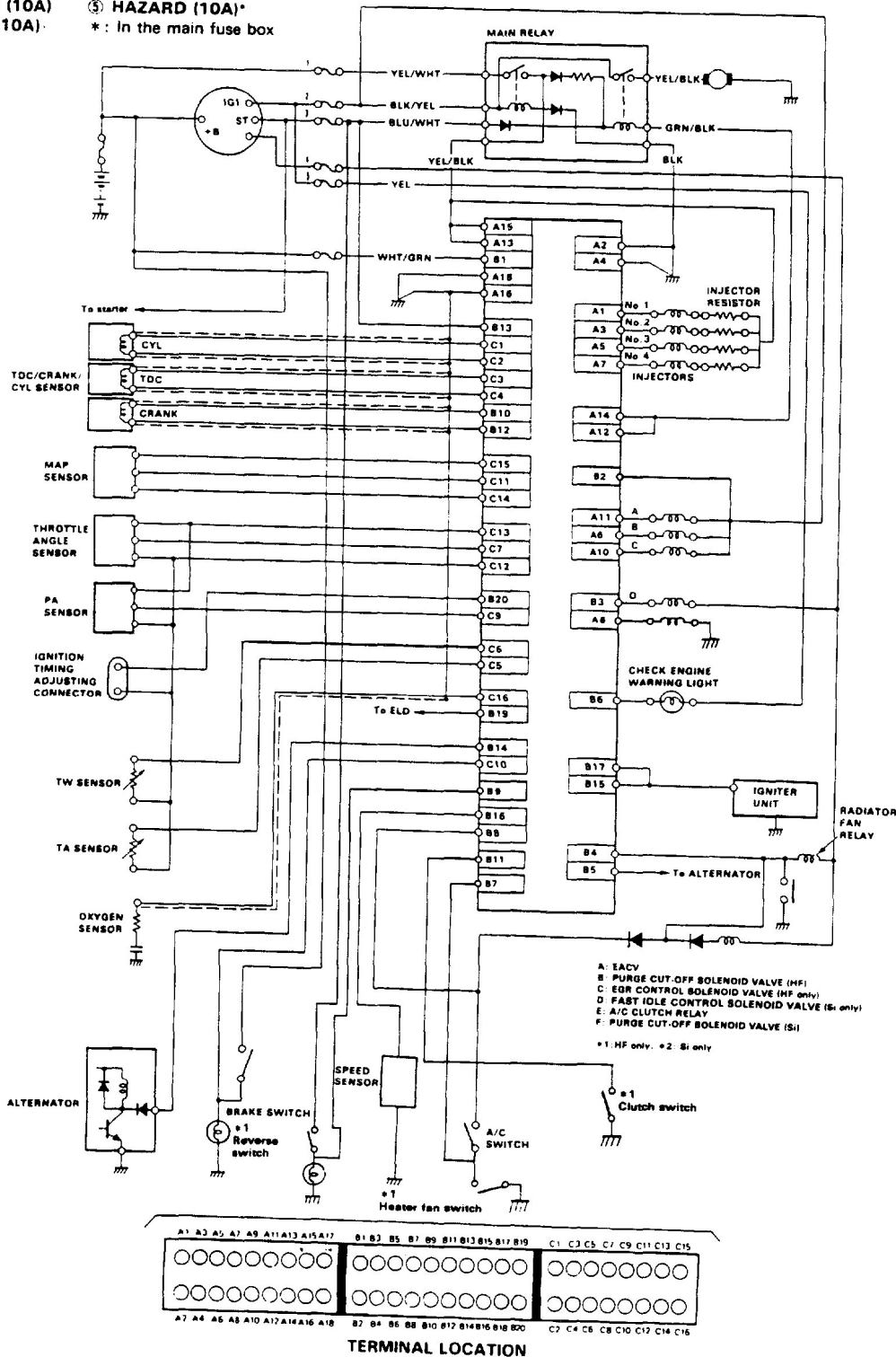
Fig. 39: Transaxle Wiring Diagram (1988-90 Civic - 1.5L Carbureted)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

1990 Honda Civic EX

1988-90 AUTOMATIC TRANSMISSIONS L4 Diagnosis & Overhaul

FUSES

- ① ECU (15A)*
- ② No. 14 (10A)
- ③ No. 2 (10A)
- ④ No. 1 (10A)
- ⑤ HAZARD (10A)*
- *: In the main fuse box



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Fig. 40: Transaxle Wiring Diagram (1988-90 Civic - 1.6L Fuel Injected)
Courtesy of AMERICAN HONDA MOTOR CO., INC.