

1997-99 AUTOMATIC TRANSMISSIONS**Honda MDMA, MDLA, M4TA & SDMA Overhaul****APPLICATION****TRANSAXLE APPLICATION**

Vehicle Model	Transaxle Model
1997 CR-V	MDMA & SDMA
1998-99 CR-V	MDLA & M4TA

IDENTIFICATION

Transaxle model and serial number are stamped on the transaxle. See **Fig. 1** . Model and serial number may be required when ordering replacement components.

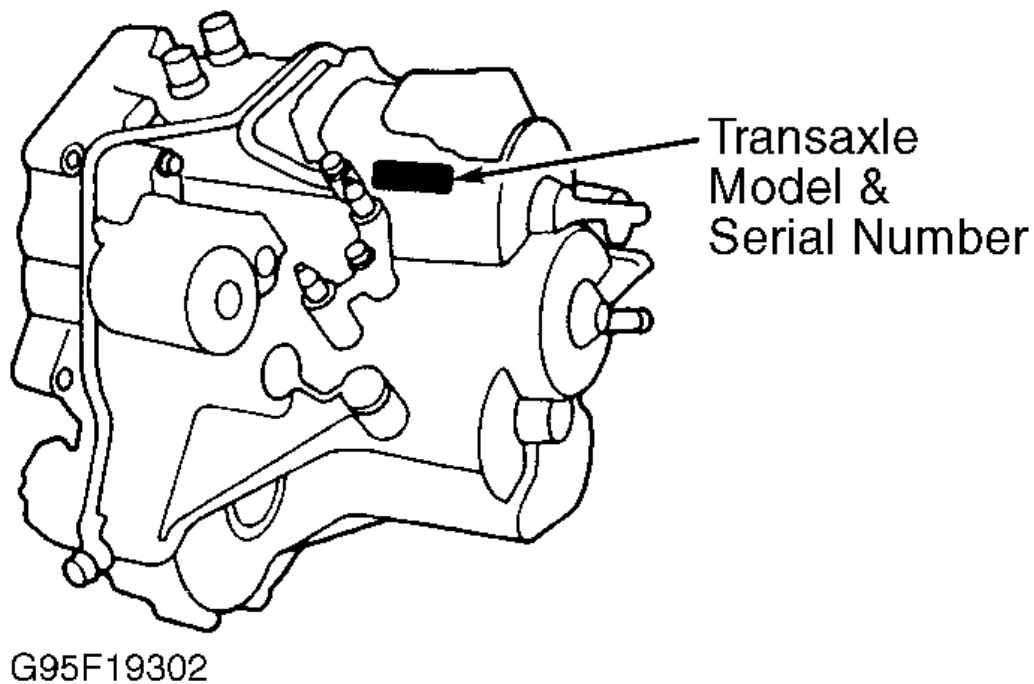


Fig. 1: Identifying Transaxle Model & Serial Number Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

DESCRIPTION

Automatic transaxle provides 4 forward speeds and one reverse. Transaxle consists of clutches, mainshaft, countershaft, sub-shaft, transfer assembly, shift control solenoid valves, lock-up control solenoid valves, a linear solenoid and lock-up torque converter. See **Fig. 2**.

Valve bodies consists of main valve body, secondary valve body, servo body, lock-up valve body and regulator valve body. Valve bodies are attached to torque converter housing. Transaxle shifting and torque converter lock-up are controlled by the Powertrain Control Module (PCM).

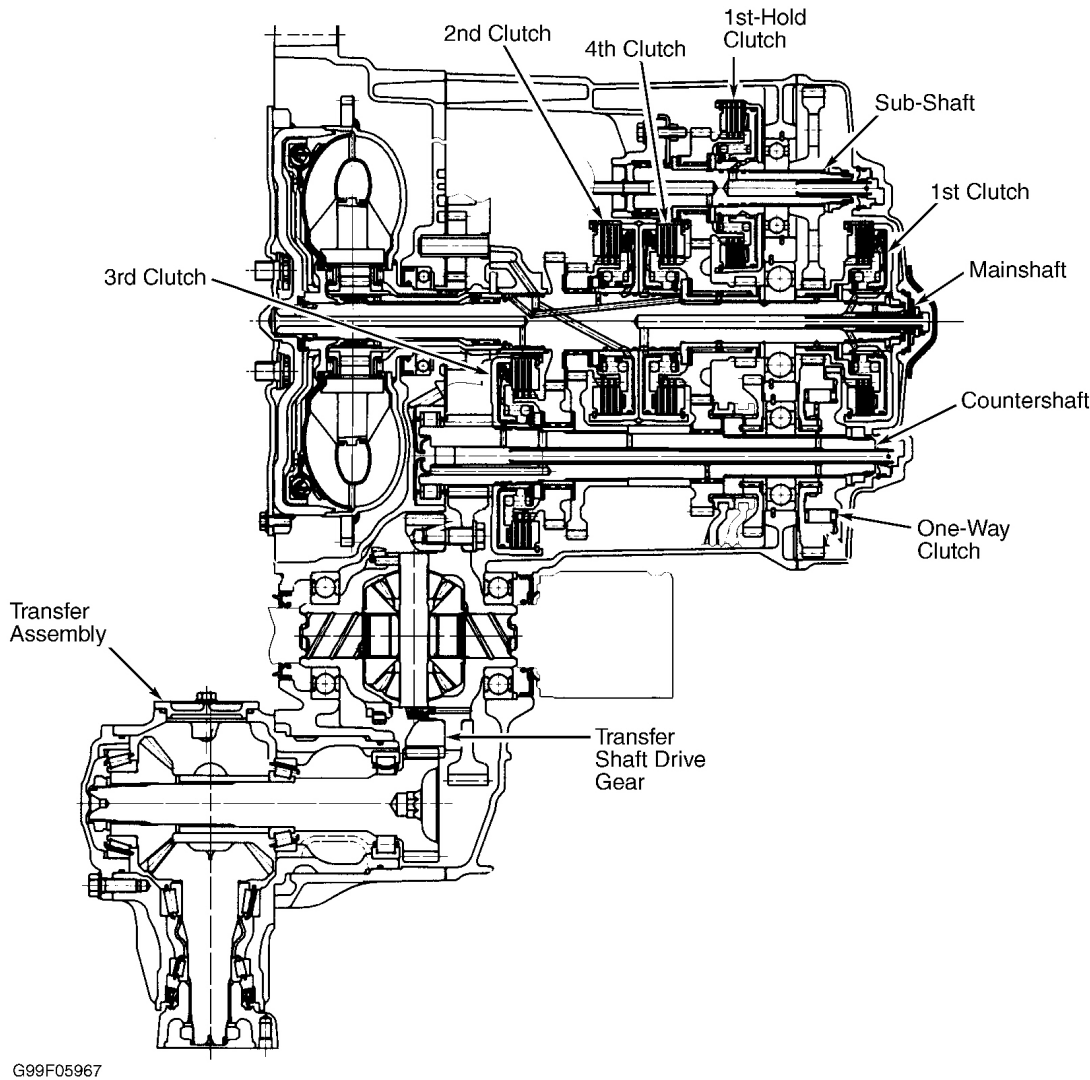


Fig. 2: Identifying Transaxle Component Locations
Courtesy of AMERICAN HONDA MOTOR CO., INC.

OPERATION

When in "D3" position in 3rd gear or "D" and D4" position in 2nd, 3rd or 4th gear, torque converter lock-up exists and transaxle mainshaft rotates at the same speed as engine crankshaft. Under certain conditions, torque

converter lock-up clutch is applied during deceleration when in 3rd and 4th gears. Torque converter lock-up is controlled by the PCM. The PCM receives various input signals and operates lock-up control solenoid valves. Operation of lock-up control solenoid valves controls the modulator pressure.

The PCM contains a grade logic control system which controls transaxle shifting while vehicle is ascending or descending on a slope or reducing vehicle speed. For more information on grade logic control system, see HONDA MDMA, MDLA, M4TA & SDMA ELECTRONIC CONTROLS article.

The PCM contains self-diagnostic system, which stores Diagnostic Trouble Code (DTC) if failure or problem exists in transaxle electronic control system. The DTC code can be retrieved to determine transaxle problem area. For information on electronic transaxle components, see HONDA MDMA, MDLA, M4TA & SDMA ELECTRONIC CONTROLS article.

Transaxle is equipped with shift and key interlock systems. Shift interlock system prevents shift lever from being moved from "P" position unless brake pedal is depressed and accelerator pedal is in idle position. In case of a malfunction, shift lever can be released by placing ignition key in release slot near shift lever. Key interlock system prevents ignition key from being removed from ignition switch unless shift lever is in "P" position. For additional information on interlock systems, see appropriate SHIFT INTERLOCK SYSTEMS article.

The A/T gear position indicator contains lights to indicate which position A/T gear position switch on shift lever is in. For information and testing of A/T gear position indicator, see HONDA MDMA, MDLA, M4TA & SDMA ELECTRONIC CONTROLS article.

1997-98 models have 7 shift lever positions. 1999 models have 6 shift lever positions. On all models, when shift lever is moved, manual valve on main valve body is moved by the shift cable. When certain transaxle gear combinations are engaged by clutches, power is transmitted from the mainshaft to the countershaft through the sub-shaft to provide different gears. Shift lever positions operate as follows.

SHIFT LEVER POSITIONS

"P" (Park)

Front wheels lock as parking pawl engages with parking gear on countershaft. All clutches are released. Neutral position switch, incorporated in A/T gear position switch, allows engine starting in this position.

"R" (Reverse)

Reverse selector engages with countershaft reverse gear and 4th gear clutch is applied. Backup light switch, incorporated in A/T gear position switch, allows back-up lights to operate.

"N" (Neutral)

All clutches are released. Neutral position switch, incorporated in A/T gear position switch, allows engine starting in this position.

"D" (1st Through 4th Gear) 1999 Models

Transaxle starts in 1st gear and upshifts automatically to 2nd, 3rd and 4th gears. Transaxle will downshift

through 3rd, 2nd and 1st gears until vehicle stops. When in 2nd, 3rd or 4th gear in "D" position, PCM sends signal to operate torque converter lock-up.

"D4" (Drive/4th Gear)

Transaxle starts in 1st gear and upshifts automatically to 2nd, 3rd and 4th gears. Transaxle will downshift through 3rd, 2nd and 1st gears until vehicle stops. When in 2nd, 3rd or 4th gear in "D4" position, PCM sends signal to operate torque converter lock-up.

"D" With OD Switch Off (1st Through 3rd) 1999 Models

Transaxle starts off in 1st gear and upshifts automatically to 2nd gear and 3rd gear. On deceleration, transaxle will downshift through 2nd gear to 1st gear. When in 3rd gear in "D" position, PCM sends signal to operate torque converter lock-up.

"D3" (Drive/3rd Gear)

Transaxle starts off in 1st gear and upshifts automatically to 2nd gear and 3rd gear. On deceleration, transaxle will downshift through 2nd gear to 1st gear. When in 3rd gear in "D" position, PCM sends signal to operate torque converter lock-up.

"2" (Second Gear)

Transaxle starts off and remains in 2nd gear for engine braking and better traction.

"1" (First Gear)

Transaxle starts off and remains in 1st gear for engine braking.

LUBRICATION & ADJUSTMENTS

See appropriate SERVICING article.

ON-VEHICLE SERVICE

AXLE SHAFTS

See appropriate AXLE SHAFTS article in DRIVELINE/AXLES.

OIL COOLER FLUSHING

1. Attach Oil Cooler Flusher (J38405-A) to oil cooler lines. See **Fig. 3** . Fill oil cooler flusher tank 2/3 full with Flushing Fluid (J35944-20). DO NOT use any other flushing fluid.
2. Ensure water and air valves on oil cooler flusher are off. Apply 80-120 psi (550-829 kPa) air pressure to oil cooler flusher. Turn oil cooler flusher water valve on so water will flow through oil cooler for 10 seconds. Shut water valve off. Replace oil cooler if water will not flow through oil cooler.
3. Depress and hold mixing trigger on oil cooler flusher downward. Turn water valve on and flush oil cooler

for 2 minutes. Turn air valve on for 5 seconds every 15-20 seconds to create a surging action.

4. Turn water valve off. Release mixing trigger. Disconnect oil cooler flusher and reverse hoses so oil cooler can be flushed in the opposite direction.
5. Repeat steps 2 and 3 . Turn water valve off. Release mixing trigger. Turn water valve on and rinse oil cooler for at least one minute. Once oil cooler is flushed in both directions, turn water off. Turn air valve on for 2 minutes or until no moisture is visible from drain hose.

CAUTION: Ensure no moisture exists in oil cooler, as it can damage transaxle.

6. Turn air off. Disconnect oil cooler flusher. Reconnect inlet line on oil cooler. Once transaxle is installed, attach drain hose on return line and place in oil container. Ensure transaxle is in "P" position. Fill transaxle with ATF.
7. Start engine and operate for about 30 seconds or until one quart (.9L) of ATF is discharged from return line. Turn engine off. Remove drain hose. Reinstall return line. Fill transaxle to proper level.

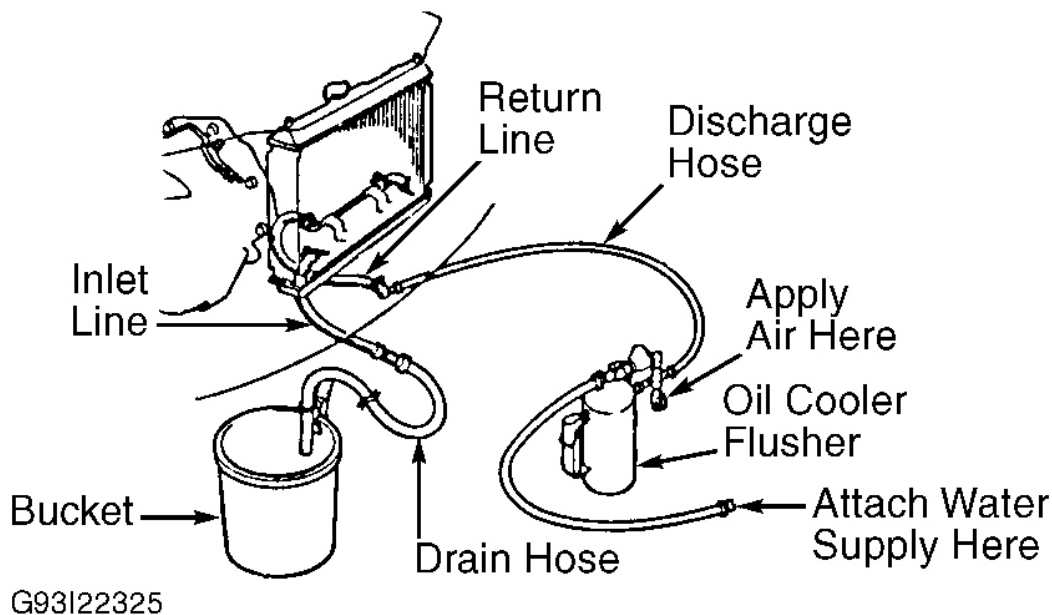


Fig. 3: Installing Oil Cooler Flusher

Courtesy of AMERICAN HONDA MOTOR CO., INC.

TROUBLE SHOOTING

Transaxle malfunctions may be caused by poor engine performance, improper adjustments, or failure of hydraulic, mechanical or electronic components. Always begin by checking fluid level, fluid condition and cable adjustments. Perform road test to determine if problem has been corrected. If problem still exists, several

tests must be performed on transaxle. See **TESTING**.

SYMPTOM DIAGNOSIS

Engine Runs, But Vehicle Does Not Move In Any Gear Position

- Low ATF
- Shift Cable Broken/Out Of Adjustment
- Oil Pump Worn Or Binding
- Regulator Valve Stuck Or Spring Worn
- Oil Filter Clogged
- Mainshaft Worn/Damaged
- Final Gears Worn/Damaged
- Drive Plate Defective

Vehicle Moves In "R" & "2" Only

- Shift Cable Broken/Out Of Adjustment
- 1st Gears Worn Or Damaged
- Defective One-Way Clutch
- Defective 1st Clutch
- Foreign Material In 1st Orifice
- 1st Accumulator Defective

Vehicle Moves In All Gears Except "2"

- Shift Cable Broken/Out Of Adjustment
- 2nd Gear Worn Or Damaged
- Defective 2nd Clutch Or 2nd Accumulator

Vehicle Moves In All Gears Except "R"

- Servo Valve Stuck
- Defective Or Improperly Adjusted Shift Cable
- Defective 4th Clutch
- Defective Or Worn Reverse Gears

Vehicle Moves In "N"

- Defective 1st, 2nd, 3rd Or 4th Clutch
- Excessive ATF
- Foreign Material In Main Orifice
- Needle Bearing/Thrust Washer Worn Or Damaged

- Incorrect Gear Or Clutch Clearance

Excessive Idle Vibration

- Low ATF
- Binding Oil Pump
- Linear Solenoid Defective
- Engine Output Low
- Drive Plate Defective
- Lock-Up Shift Valve Stuck
- Lock-Up Clutch Piston Defective
- Shift Control Solenoid Valve "A" Defective

Poor Acceleration & Flares On Starting Off In "D", "D3" & "D4" Position

See **TORQUE CONVERTER STALL SPEED TEST** under TESTING.

No Shift

- Linear Solenoid Defective
- CPC Valve Stuck
- Modulator Valve Defective
- Shift Control Solenoid Valve "A" Defective
- Shift Control Solenoid Valve "B" Defective

No 1-3 Shift In "D", "D3" Or "D4" Position

- 2-3 Shift Valve Stuck
- Shift Control Solenoid Valve "B" Defective

No 1-4 Shift In "D", "D3" Or "D4" Position

- 2-3 Shift Valve Stuck
- 3-4 Shift Valve Stuck
- Shift Control Solenoid Valve "A" Defective

Erratic Upshifts

- Defective Countershaft Speed Sensor

Erratic 1-2 Upshift

- 1-2 Shift Valve Stuck
- Shift Control Solenoid Valve "A" Defective

Erratic 2-3 Upshift

- 2-3 Shift Valve Stuck
- Shift Control Solenoid Valve "B" Defective

Erratic 3-4 Upshift

- 3-4 Shift Valve Stuck
- Shift Control Solenoid Valve "A" Defective

Harsh 1-2 Upshift

- Defective 2nd Clutch
- Linear Solenoid Defective
- Clutch Pressure Control (CPC) Valve Stuck
- Foreign Material In Main Orifice
- Lock-Up Control Solenoid Valve "A" Defective
- Lock-Up Control Solenoid Valve "B" Defective
- Defective Mainshaft Speed Sensor
- Defective Countershaft Speed Sensor

Harsh 2-3 Upshift

- Defective 3rd Clutch
- Linear Solenoid Defective
- Clutch Pressure Control (CPC) Valve Stuck
- 2nd Accumulator Defective
- 2nd Orifice Control Valve Stuck
- Foreign Material In Main Orifice
- Lock-Up Control Solenoid Valve "A" Defective
- Lock-Up Control Solenoid Valve "B" Defective
- Defective Mainshaft Speed Sensor
- Defective Countershaft Speed Sensor

Harsh 3-4 Upshift

- Defective 4th Clutch
- Linear Solenoid Defective
- Clutch Pressure Control (CPC) Valve Stuck
- 3rd Accumulator Defective
- 3-4 Orifice Control Valve Stuck
- Foreign Material In Main Orifice

- Lock-Up Control Solenoid Valve "A" Defective
- Lock-Up Control Solenoid Valve "B" Defective
- Defective Mainshaft Speed Sensor
- Defective Countershaft Speed Sensor

Harsh 2-1 Downshift

- Linear Solenoid Defective
- Clutch Pressure Control (CPC) Valve Stuck
- 2nd Accumulator Defective
- Clutch Pressure Back-Up (CPB) Valve Stuck
- Foreign Material In 2nd Exhaust Orifice
- Defective Mainshaft Speed Sensor
- Defective Countershaft Speed Sensor

Harsh 3-2 Downshift

- 2nd Clutch Defective
- Linear Solenoid Defective
- Clutch Pressure Control (CPC) Valve Stuck
- 3rd Accumulator Defective
- Foreign Material In Separator Plate
- Clutch Pressure Back-Up (CPB) Valve Stuck
- Foreign Material In 3rd Exhaust Orifice
- Defective Mainshaft Speed Sensor
- Defective Countershaft Speed Sensor
- 3rd Sub-Accumulator Defective

Harsh 4-3 Downshift

- Defective 3rd Clutch
- Linear Solenoid Defective
- Clutch Pressure Control (CPC) Valve Stuck
- 4th Accumulator Defective
- Foreign Material In Separator Plate
- Clutch Pressure Back-Up (CPB) Valve Stuck
- Foreign Material In 4th Exhaust Orifice
- Defective Mainshaft Speed Sensor
- Defective Countershaft Speed Sensor

Flares On 2-3 Upshift

- Defective 3rd Clutch
- Linear Solenoid Defective
- Clutch Pressure Control (CPC) Valve Stuck
- 2nd Accumulator Defective
- 2nd Orifice Control Valve Stuck
- Lock-Up Control Solenoid Valve "B" Defective

Flares On 3-4 Upshift

- Defective 4th Clutch
- Linear Solenoid Defective
- Clutch Pressure Control (CPC) Valve Stuck
- 3rd Accumulator Defective
- 3-4 Orifice Control Valve Stuck
- Clutch Pressure Control (CPC) Valve Stuck
- Lock-Up Control Solenoid Valve "B" Defective

Excessive Shock During 2-3 Shift

- Defective 3rd Clutch
- Linear Solenoid Defective
- Clutch Pressure Control (CPC) Valve Stuck
- 2nd Accumulator Defective
- 2nd Orifice Control Valve Stuck
- Clutch Pressure Back-Up (CPB) Valve Stuck
- Lock-Up Control Solenoid Valve "A" Defective
- Lock-Up Control Solenoid Valve "B" Defective
- Defective Countershaft Speed Sensor

Excessive Shock During 3-4 Shift

- Defective 4th Clutch
- Linear Solenoid Defective
- Clutch Pressure Control (CPC) Valve Stuck
- 3rd Accumulator Defective
- 3-4 Orifice Control Valve Stuck
- Clutch Pressure Back-Up (CPB) Valve Stuck
- Lock-Up Control Solenoid Valve "A" Defective
- Lock-Up Control Solenoid Valve "B" Defective
- Defective Countershaft Speed Sensor

Late Shift From "N" To "D", "D3" Or "D4"

- 1st Clutch Defective
- Foreign Material In 1st Orifice

Late Shift From "N" To "R"

- Servo Valve Stuck
- 4th Clutch Defective
- 1-2 Shift Valve Stuck
- Servo Control Valve Stuck

Noise From Transaxle In All Gears

- Defective Oil Pump
- Defective Or Worn Torque Converter Housing Or Transaxle Housing Bearing

Vehicle Does Not Accelerate Greater Than 31 MPH

- Torque Converter One-Way Clutch Defective

Stuck In 4th Gear

- Linear Solenoid Defective
- Shift Control Solenoid Valve "A" Defective
- Shift Control Solenoid Valve "B" Defective

Shift Lever Does Not Shift Into "P"

- Shift Cable Broken/Out Of Adjustment
- Joint In Shift Cable & Transaxle Or Body Worn
- Parking Gear Mechanism Defective

Stall RPM High; All Clutch Pressures Okay

- Torque Converter Check Valve Stuck

Lock-Up Clutch Does Not Disengage

- Linear Solenoid Defective
- Lock-Up Timing Valve Stuck
- Lock-Up Shift Valve Stuck
- Lock-Up Control Valve Stuck
- Lock-Up Clutch Piston Defective
- Lock-Up Control Solenoid Valve "A" Defective

- Lock-Up Control Solenoid Valve "B" Defective
- Defective Countershaft Speed Sensor

Lock-Up Clutch Does Not Lock-Up Smoothly

- Linear Solenoid Defective
- Torque Converter Check Valve Stuck
- Lock-Up Timing Valve Stuck
- Lock-Up Shift Valve Stuck
- Lock-Up Control Valve Stuck
- Lock-Up Clutch Piston Defective
- Lock-Up Control Solenoid Valve "A" Defective
- Lock-Up Control Solenoid Valve "B" Defective
- Defective Countershaft Speed Sensor

Lock-Up Clutch Does Not Engage

- Linear Solenoid Defective
- Torque Converter Check Valve Stuck
- Lock-Up Timing Valve Stuck
- Lock-Up Shift Valve Stuck
- Lock-Up Control Valve Stuck
- Lock-Up Clutch Piston Defective
- Lock-Up Control Solenoid Valve "A" Defective
- Lock-Up Control Solenoid Valve "B" Defective
- Defective Mainshaft Speed Sensor
- Defective Countershaft Speed Sensor

Excessive Vibration (RPM Related)

- Torque Converter Not Fully Seated In Oil Pump
- Drive Plate Defective

No Engine Braking In "1"

- Defective 1st-Hold Clutch

A/T Gear Position Indicator Does Not Show Any Position

- Shift Cable Broken/Out Of Adjustment
- Joint In Shift Cable & Transaxle Or Body Worn
- A/T Gear Position Switch Defective Or Out Of Adjustment

TESTING

CAUTION: Vehicle is equipped with an air bag system (Supplemental Restraint System (SRS). All wires have Yellow insulation and are located underdash or in instrument panel area. To avoid injury from accidental deployment, see **AIR BAG DEACTIVATION PROCEDURES** in **GENERAL INFORMATION**.

ROAD TEST

NOTE: If shift lever cannot be moved from "P" position with brake pedal depressed and accelerator at idle position, check shift interlock system. See appropriate **SHIFT INTERLOCK SYSTEMS** article.

1. Warm engine to normal operating temperature. Apply parking brake, and block wheels. Start engine. Move shift lever to "D" or "D4" position while depressing brake pedal. Depress accelerator pedal and release it suddenly. Engine should not stall.
2. Repeat step 1 with shift lever in "D3" position. Ensure engine does not stall. Manufacturer recommends monitoring of throttle position sensor voltage when performing road test to ensure proper throttle opening for verifying shift points and lock-up of torque converter.
3. Using Backprobe Adapter Set (07SAZ-001000A), connect backprobe adapter to PCM harness connector terminals B9 or B22 and D1 on 1997 models and PCM harness connector terminals B20 or B22 and C27. Connect DVOM to backprobe adapter. See **Fig. 4**.
4. Road test vehicle on a flat road surface with transaxle in "D" or "D4" position. Check that shift points occur at approximate speeds. Check for abnormal noise and clutch slippage. See **CLUTCH APPLICATION** table for clutch engagement. Ensure upshift and downshift points, and lock-up of torque converter are correct in relation to TP sensor voltage or throttle opening and vehicle speed. See **Fig. 5**.

CAUTION: DO NOT downshift from "D4", "D3" or "D" to "2" or "1" position at speeds greater than 100 MPH. Transaxle damage will occur.

5. Place transaxle in "D" or "D4" position. Accelerate to about 35 MPH so transaxle is in 4th gear, then shift from "D" or "D4" to "2" position. Vehicle should immediately begin slowing down from engine braking.
6. Place transaxle in "1" position. Accelerate from a full stop at full throttle. Check for abnormal noise or clutch slippage. Upshifts should not occur with shift lever in this position.
7. Place transaxle in "2" position. Accelerate from a full stop at full throttle. Check for abnormal noise or clutch slippage. Upshift or downshifts should not occur with shift lever in this position.
8. Place transaxle in "R" position. Accelerate from full stop at full throttle. Check for abnormal noise or clutch slippage.
9. Position vehicle on a slope. Apply parking brakes. Place transaxle in Park. Release parking brake. Vehicle should not move. If vehicle moves, check for defective shift cable or parking components.

CLUTCH APPLICATION

Shift Lever Position	Elements In Use
"P" Or "N"	No Clutches Are Applied

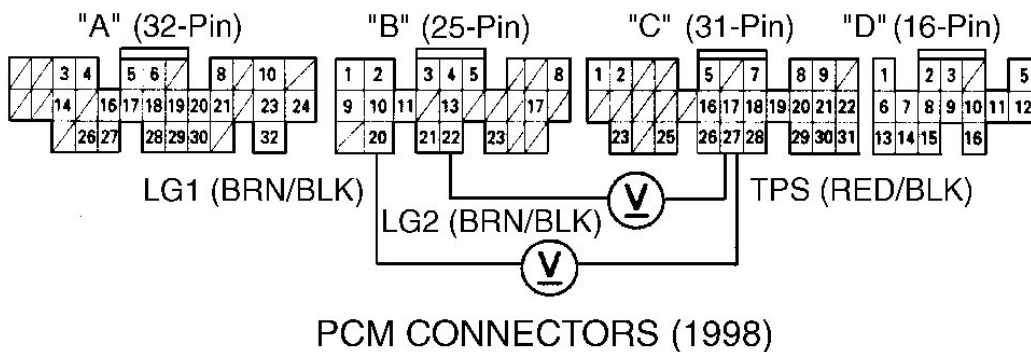
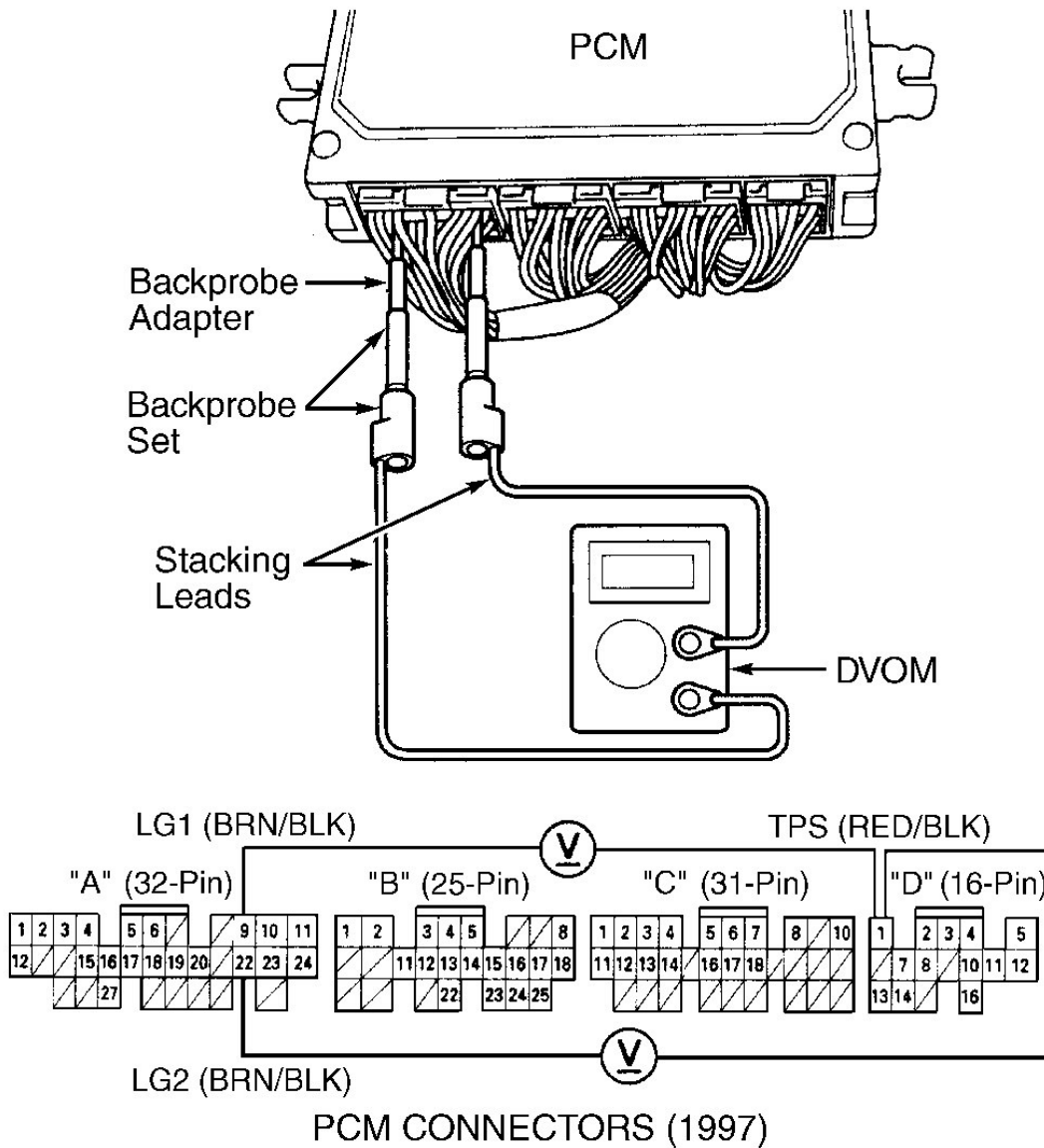
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1997-99 AUTOMATIC TRANSMISSIONS Honda MDMA, MDLA, M4TA & SDMA Overhaul

"R"	4th Clutch
"D" Or "D4"	
1st Gear	(1) 1st Clutch
2nd Gear	(2) 2nd Clutch
3rd Gear	(2) 3rd Clutch
4th Gear	(2) 4th Clutch
"D" (3) Or "D3"	
1st Gear	1st Clutch
2nd Gear	(2) 2nd Clutch
3rd Gear	(2) 3rd Clutch
"2"	(2) 2nd Clutch
"1"	1st-Hold Clutch & 1st Clutch
(1) One-way clutch engages on acceleration and slips on deceleration, no engine braking.	
(2) The 1st clutch engages, but driving power is not transmitted, as one-way clutch slips.	
(3) 1999 models with OD switch off.	

1999 Honda CR-V EX

1997-99 AUTOMATIC TRANSMISSIONS Honda MDMA, MDLA, M4TA & SDMA Overhaul



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Fig. 4: Installing Backprobe Set At PCM (1999 Is Same As 1998)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

UPSHIFT

Throttle Opening	Unit of speed	1st → 2nd	2nd → 3rd	3rd → 4th	Lock-up ON
Throttle position sensor voltage: 0.75 V	mph	9 – 12	20 – 23	28 – 33	21 – 25
	km/h	15 – 19	32 – 37	45 – 53	34 – 40
Throttle position sensor voltage: 2.25 V	mph	22 – 26	43 – 49	62 – 68	68 – 74
	km/h	35 – 41	69 – 79	99 – 108	109 – 118
Fully-opened throttle, Throttle position sensor voltage: 4.5 V	mph	34 – 40	66 – 74	95 – 105	88 – 99
	km/h	55 – 63	105 – 118	152 – 169	141 – 158

DOWNSHIFT

Throttle Opening	Unit of speed	Lock-up OFF	4th → 3rd	3rd → 2nd	2nd → 1st
Fully-closed throttle, Throttle position sensor voltage: 0.5 V	mph	19 – 23	18 – 22	6 – 10 (3rd → 1st)	
	km/h	31 – 36	29 – 34	10 – 15 (3rd → 1st)	
Fully-opened throttle, Throttle position sensor voltage: 4.5 V	mph	86 – 96	83 – 94	54 – 61	26 – 32
	km/h	137 – 153	133 – 149	87 – 98	42 – 50

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Fig. 5: Upshift & Downshift Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TORQUE CONVERTER STALL SPEED TEST

CAUTION: DO NOT perform torque converter stall speed test for longer than 10 seconds or transaxle may be damaged. DO NOT move shift lever while increasing engine speed.

1. Apply parking brake and block all wheels. Connect tachometer. Start engine. Ensure A/C is off. Warm engine to normal operating temperature. Place shift lever in "2" position.
2. Fully depress brake pedal. Fully depress accelerator for 6-8 seconds and note engine speed. This is torque converter stall speed.
3. Allow transaxle to cool for 2 minutes. Repeat test procedure with shift lever in "D4", "D", "1" and "R" positions.
4. Torque converter stall speed should be the same in "D4", "D", "2", "1" and "R" positions and within specification. See **TORQUE CONVERTER STALL SPEED SPECIFICATIONS** table. If torque converter stall speed does not fall within specification, for possible causes, see **TORQUE CONVERTER STALL SPEED TROUBLE SHOOTING** table.

TORQUE CONVERTER STALL SPEED SPECIFICATIONS

Application	RPM
Standard Specification	2550
Service Limit	2400-2700

TORQUE CONVERTER STALL SPEED TROUBLE SHOOTING

Stall Speed Test Results	Probable Cause
RPM High In "D4", "D", "2", "1" & "R"	Low Fluid Level, Low Oil Pump Output, Clogged Fluid Strainer, Pressure Regulator Valve Stuck Closed, Slipping Clutch
RPM High In "R"	Slipping 4th Clutch
RPM High In "D4" Or "D"	Slipping 1st Clutch, Defective One-Way Clutch
RPM High In "2"	Slipping 2nd Clutch
RPM High In "1"	Slipping 1st-Hold Or 1st Clutch, Defective One-Way Clutch
RPM Low In "D4", "D", "2", "1" & "R"	Engine Output Low, Torque Converter One-Way Clutch Slipping

HYDRAULIC PRESSURE TEST**Pressure Test Preparation**

Ensure transaxle fluid level is correct. Warm engine to normal operating temperature. Apply parking brake, and block rear wheels. Raise and support vehicle so front wheels can rotate on 2WD, or so all 4 wheels can rotate on 4WD.

Pressure Test (Line & Clutch)

1. With engine off, remove pressure tap plug from appropriate pressure tap on transaxle. See **Fig. 6** . Attach Pressure Gauge Set (07406-0020400) to appropriate pressure tap using NEW seal washer. Tighten hose fitting to 13 ft. lbs. (18 N.m).

NOTE: On some applications pressure may vary with position of throttle control lever on transaxle. Linear solenoid connector will need to be disconnected for 2nd, 3rd and 4th clutch pressure tests. Ensure shift lever is in proper position when checking clutch pressures.

2. With shift lever in "P" or "N" position, start and operate engine at 2000 RPM. Note line pressure. Line pressure should be within specification. See **HYDRAULIC PRESSURE TEST SPECIFICATIONS** table.
3. If line pressure is not within specification, see **HYDRAULIC PRESSURE TROUBLE SHOOTING** table.
4. For 2nd, 3rd or 4th clutch measurement, disconnect linear solenoid connector. See **Fig. 7** . Apply battery voltage to linear solenoid connector terminals. With shift lever in appropriate position, measure each line pressure at 2000 RPM. Line pressure should be within specification. See **HYDRAULIC PRESSURE TEST SPECIFICATIONS** table. If line pressure is not within specification, see **HYDRAULIC PRESSURE TROUBLE SHOOTING** table. Shut engine off.
5. Using NEW seal washer, install and tighten pressure tap plug to specification. See **TORQUE SPECIFICATIONS** .

HYDRAULIC PRESSURE TEST SPECIFICATIONS

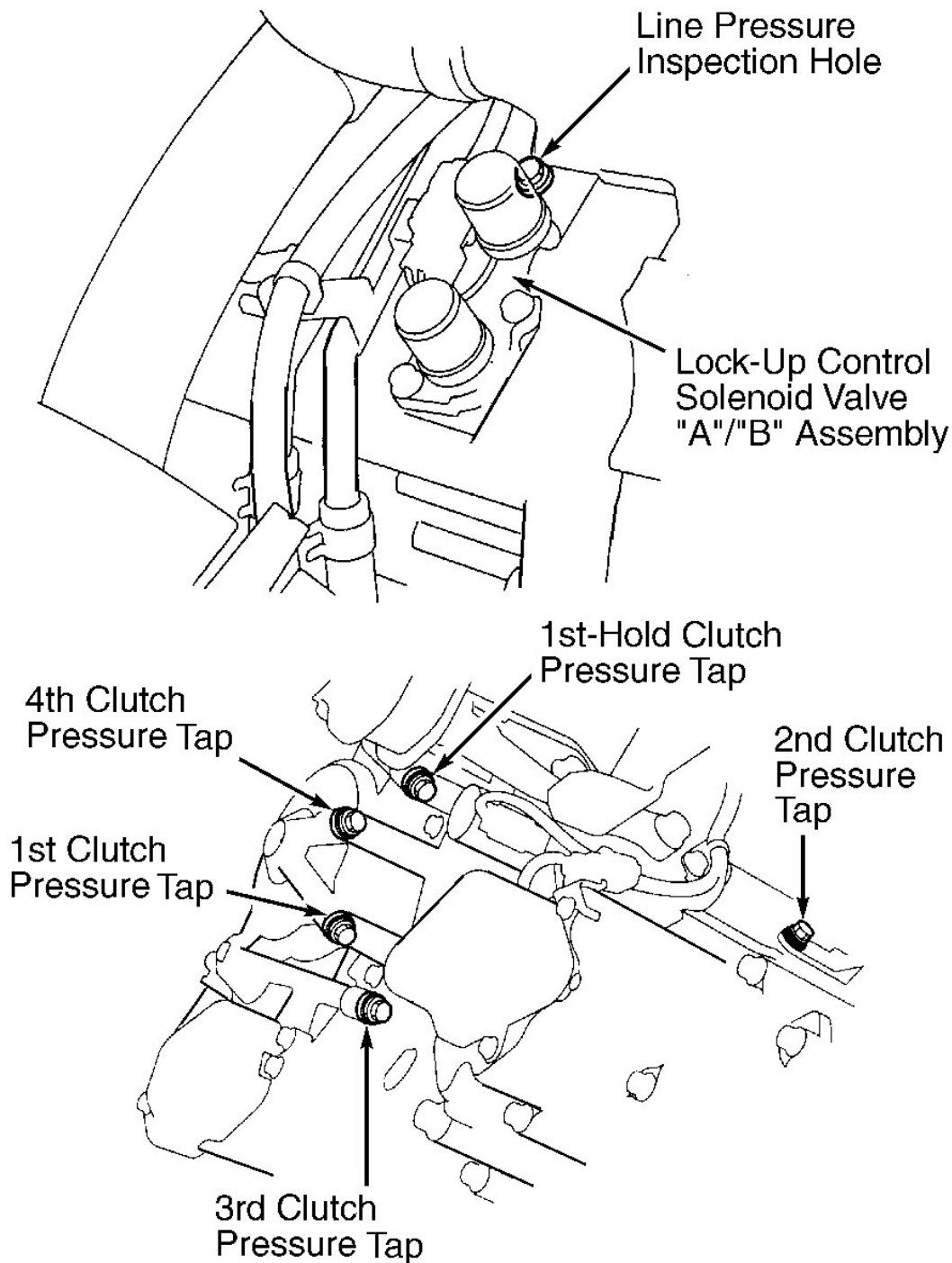
1999 Honda CR-V EX

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Application	Shift Lever Position	psi. (kPa)
Line Pressure	"P" Or "N"	120-128 (830-880)
1st & 1st-Hold Clutch Pressure	"P" Or "N"	120-128 (830-880)
2nd, 3rd & 4th Clutch Pressure		
No Voltage At Linear Solenoid		
2nd & 3rd Clutch	"D4"	116-123 (800-850)
4th Clutch	"D4", "D", & "R"	116-123 (800-850)
With Voltage Applied To Linear Solenoid		
2nd, 3rd & 4th Clutch	"D4", "D", & "R"	0-21 (0-150)

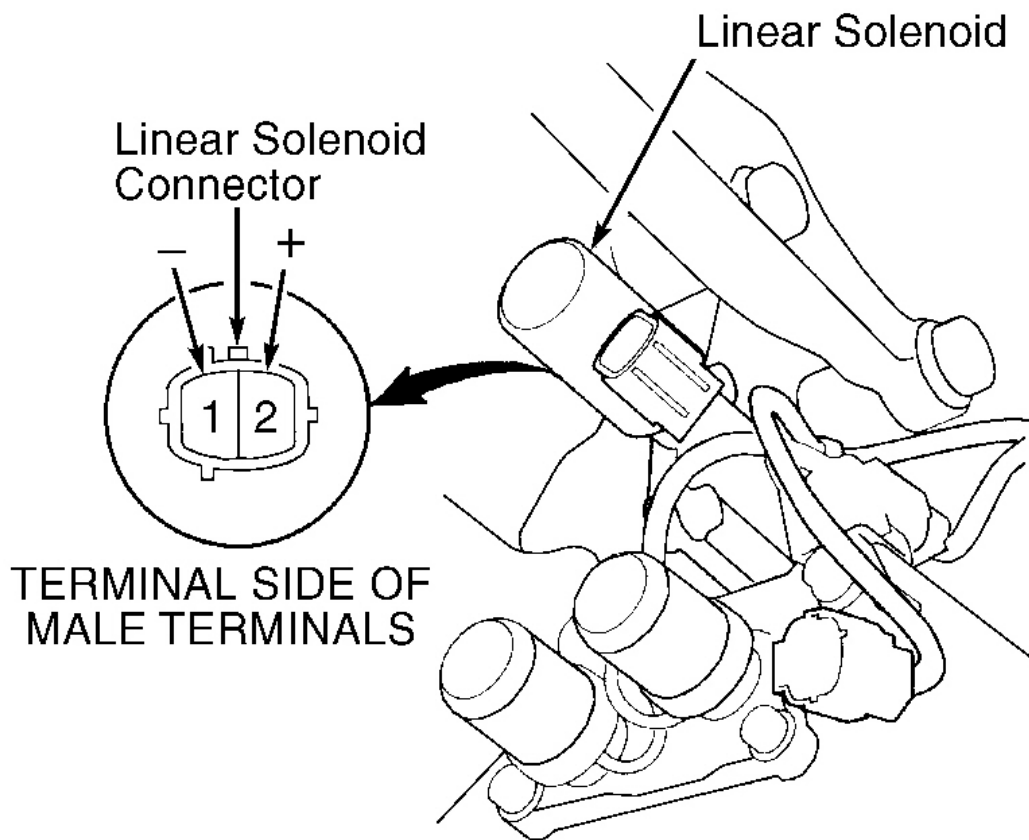
HYDRAULIC PRESSURE TROUBLE SHOOTING

Application	Probable Cause
Line Pressure	
Low Or No Line Pressure	Defective Torque Converter, Defective Torque Converter Check Valve, Defective Oil Pump Pressure Regulator, Defective Oil Pump
Clutch Pressure	
Low Or No 1st Clutch Pressure	Defective 1st Clutch
Low Or No 1st-Hold Clutch Pressure	Defective 1st-Hold Clutch
Low Or No 2nd Clutch Pressure	Defective 2nd Clutch
Low Or No 3rd Clutch Pressure	Defective 3rd Clutch
Low Or No 4th Clutch Pressure	Defective 4th Clutch, Defective Servo Valve On 4th Clutch
Clutch Low/High Pressure	
Low Or No 2nd Clutch Pressure	Defective 2nd Clutch
Low Or No 3rd Clutch Pressure	Defective 3rd Clutch
Low Or No 4th Clutch Pressure	Defective 4th Clutch



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Fig. 6: Identifying Transaxle Pressure Taps
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 7: Identifying Linear Solenoid 2-Pin Connector
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REMOVAL & INSTALLATION

ELECTRICAL COMPONENTS

See HONDA MDMA, MDLA, M4TA & SDMA ELECTRONIC CONTROLS article.

TRANSAXLE

See appropriate REMOVAL & iNSTALLATION article.

TORQUE CONVERTER

Torque converter consists of pump, turbine and stator assembled as a unit. Torque converter cannot be serviced and must be replaced if defective.

NOTE: For torque converter stall speed test, see TORQUE CONVERTER STALL SPEED TEST under TESTING.

TRANSAXLE DISASSEMBLY

VALVE BODIES & INTERNAL COMPONENTS

1. Remove A/T gear position switch cover and switch from right side cover. Remove bolts, right side cover and gasket. See Fig. 8 . Install Mainshaft Holder (07GAB-PF50101) on mainshaft to secure mainshaft. See Fig. 9 .
2. Engage parking pawl with parking gear. Using hammer and chisel, cut lock tabs on shaft and sub-shaft lock nuts. See Fig. 10 .

NOTE: Mainshaft and countershaft lock nuts contain left-hand threads.

3. Align hole in sub-shaft 1st gear with hole in transaxle housing. Install pin in sub-shaft 1st gear and transaxle housing to prevent sub-shaft 1st gear from rotating. See Fig. 10 . Remove all lock nuts and spring washers from countershaft, mainshaft and sub-shaft.
4. Remove mainshaft holder once all lock nuts are removed. Remove pin securing sub-shaft 1st gear. Remove 1st clutch assembly, mainshaft 1st gear, thrust washer and mainshaft 1st gear collar from mainshaft. See Fig. 8 .
5. Remove sub-shaft 1st gear. Remove parking pawl. Using puller, remove parking gear, one-way clutch and countershaft 1st gear from countershaft. Remove needle bearing and countershaft 1st gear collar from countershaft. See Fig. 8 .
6. Remove parking brake lever and parking brake lever spring from control shaft. Remove throttle control lever and throttle control lever spring from throttle control shaft. See Fig. 8 .
7. Remove dipstick, vehicle speed sensor, joint bolts and cooler lines. Remove mount bracket from transaxle housing. See Fig. 12 . Remove transaxle housing bolts and transaxle hanger.
8. Align spring pin on control shaft with groove in transaxle housing by rotating control shaft. Using Puller (07HAC-PK4010A), remove transaxle housing. See Fig. 11 . Remove gasket for transaxle housing.

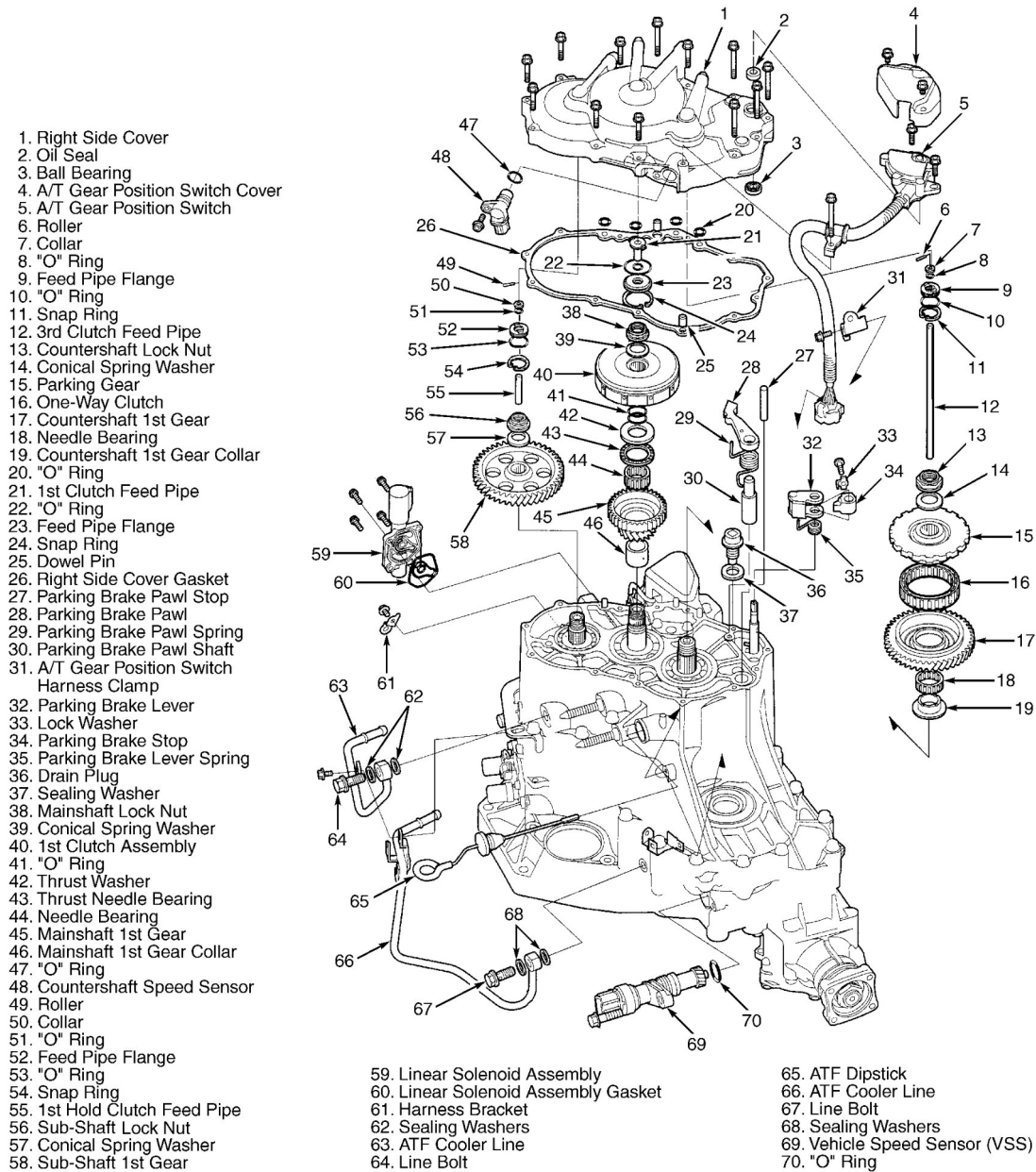


Fig. 8: Exploded View Of Right Side Cover & Components (4WD Is Shown; 2WD Is Similar)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

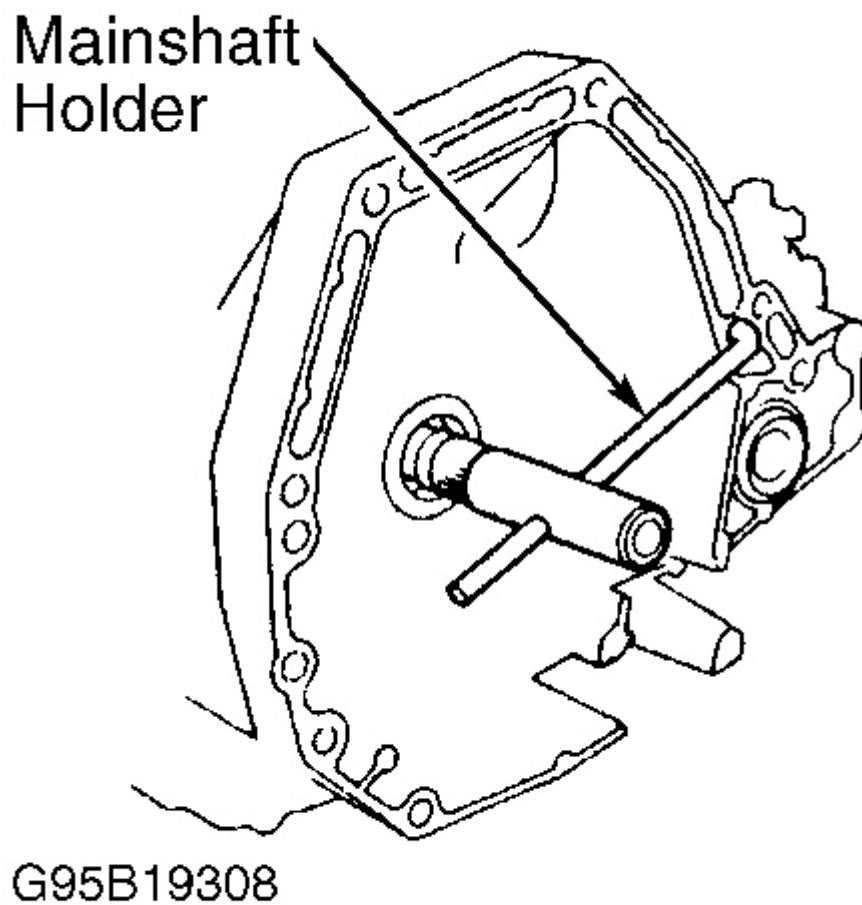
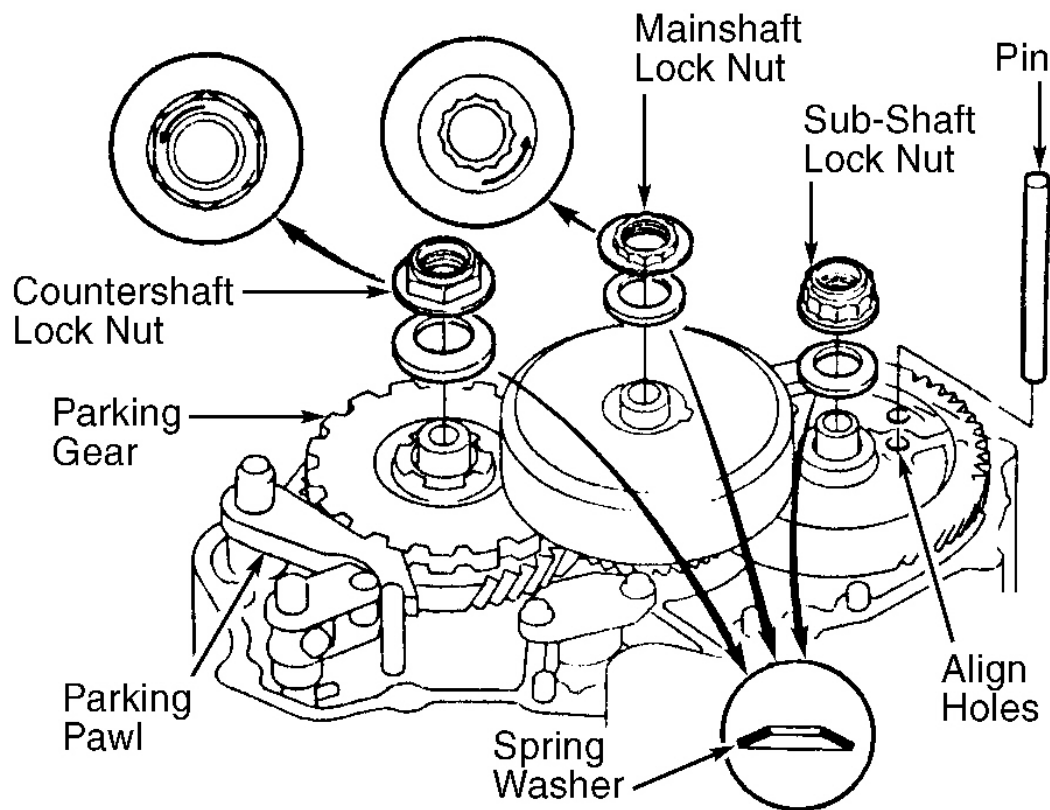


Fig. 9: Installing Mainshaft Holder
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 10: Securing Sub-Shaft 1st Gear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

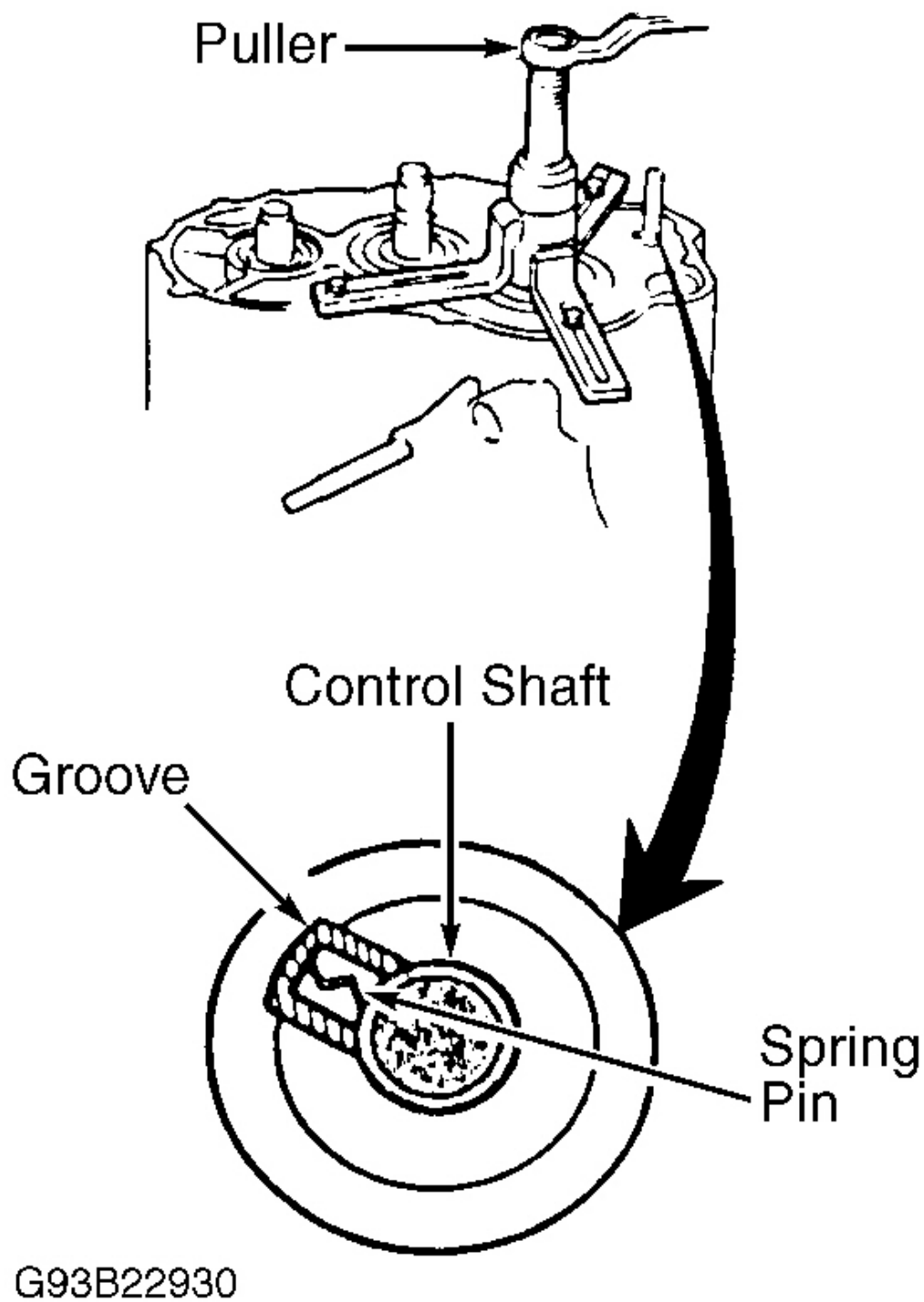


Fig. 11: Aligning Spring Pin & Removing Transaxle Housing

Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Remove countershaft reverse gear collar, needle bearing and countershaft reverse gear from countershaft. See **Fig. 12** . Remove bolt and bolt lock from reverse shift fork. Remove reverse shift fork with reverse selector from countershaft.
10. Remove countershaft and mainshaft together from torque converter housing. Remove differential assembly. Remove bolts, reverse idler gear shaft holder, reverse idler gear and needle bearing from transaxle housing (if necessary).
11. Remove oil feed pipes from servo body, servo detent base, accumulator cover, lock-up valve body and main valve body. See **Fig. 13** . Remove bolts and accumulator cover. Remove bolts, fluid strainer and servo detent base.
12. Remove bolts, servo body and separator plate. See **Fig. 13** . Remove bolt, secondary valve body and separator plate. DO NOT lose check balls in secondary valve body.
13. Remove bolts, lubrication plate, lock-up valve body and separator plate. Remove regulator valve body. Remove stopper shaft and stator shaft. Remove detent spring from detent arm. Remove control shaft from torque converter housing.
14. Remove detent arm shaft and detent arm from main valve body. Remove bolts and main valve body. DO NOT lose check balls in main valve body. See **Fig. 13** .
15. Remove oil pump driven gear shaft and oil pump gears. See **Fig. 13** . Remove separator plate for main valve body and dowel pins. Remove magnet. Remove lock-up control solenoid valve assembly (if necessary).

1999 Honda CR-V EX

1997-99 AUTOMATIC TRANSMISSIONS Honda MDMA, MDLA, M4TA & SDMA Overhaul

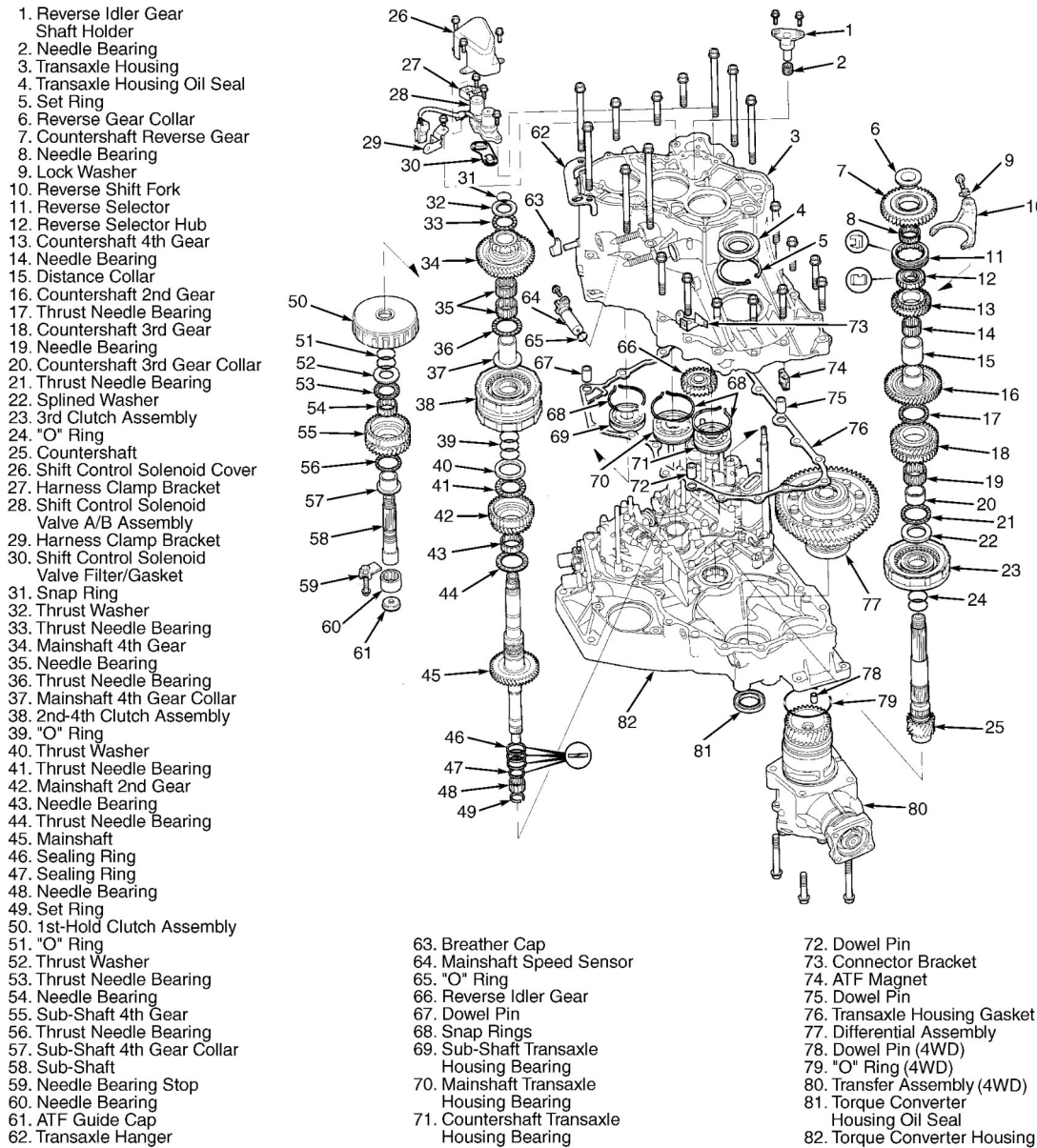
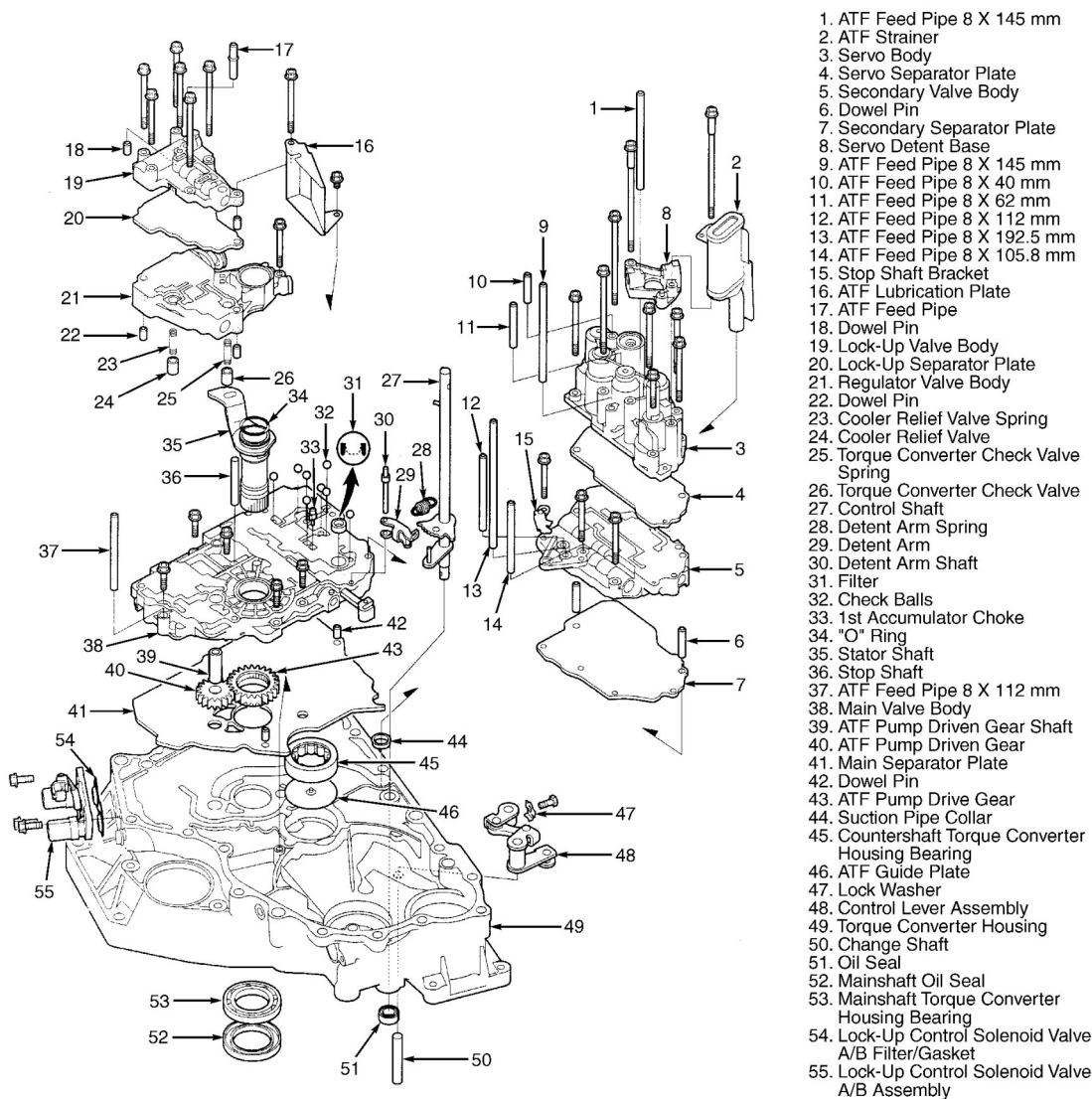


Fig. 12: Exploded View Of Transaxle Housing & Components (4WD Shown; 2WD Is Similar)
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 13: Exploded View Of Torque Converter Housing & Components (4WD Shown; 2WD Is Similar)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT DISASSEMBLY & REASSEMBLY

MAIN VALVE BODY

CAUTION: When disassembling main valve body, place main valve body components in order and mark spring locations for reassembly reference. **DO NOT** use force to remove components. **DO NOT** use magnet to remove check balls, as check balls may become magnetized. Note direction of valve cap installation before removing from main valve body.

Disassembly

Disassemble main valve body. See **Fig. 14** . Use care when removing valve caps or spring seat, as they are under spring pressure.

Cleaning & Inspection

1. Clean components with solvent and dry with compressed air. Replace main valve body if any parts are worn or damaged.
2. Ensure all valves slide freely in their bores. If valves do not slide freely, polish burrs or rough areas using No. 600 sandpaper soaked in ATF for at least 30 minutes. Thoroughly clean main valve body and components if polishing was needed.
3. Ensure spring free length is within specification. See **SPRING SPECIFICATIONS** table. Replace springs if not within specification.

NOTE: Oil pump clearance must be checked in main valve body. See **OIL PUMP** .

Reassembly

Coat all components and bores with ATF. To reassemble, reverse disassembly procedure. Ensure all components are installed in correct location. See **Fig. 14** .

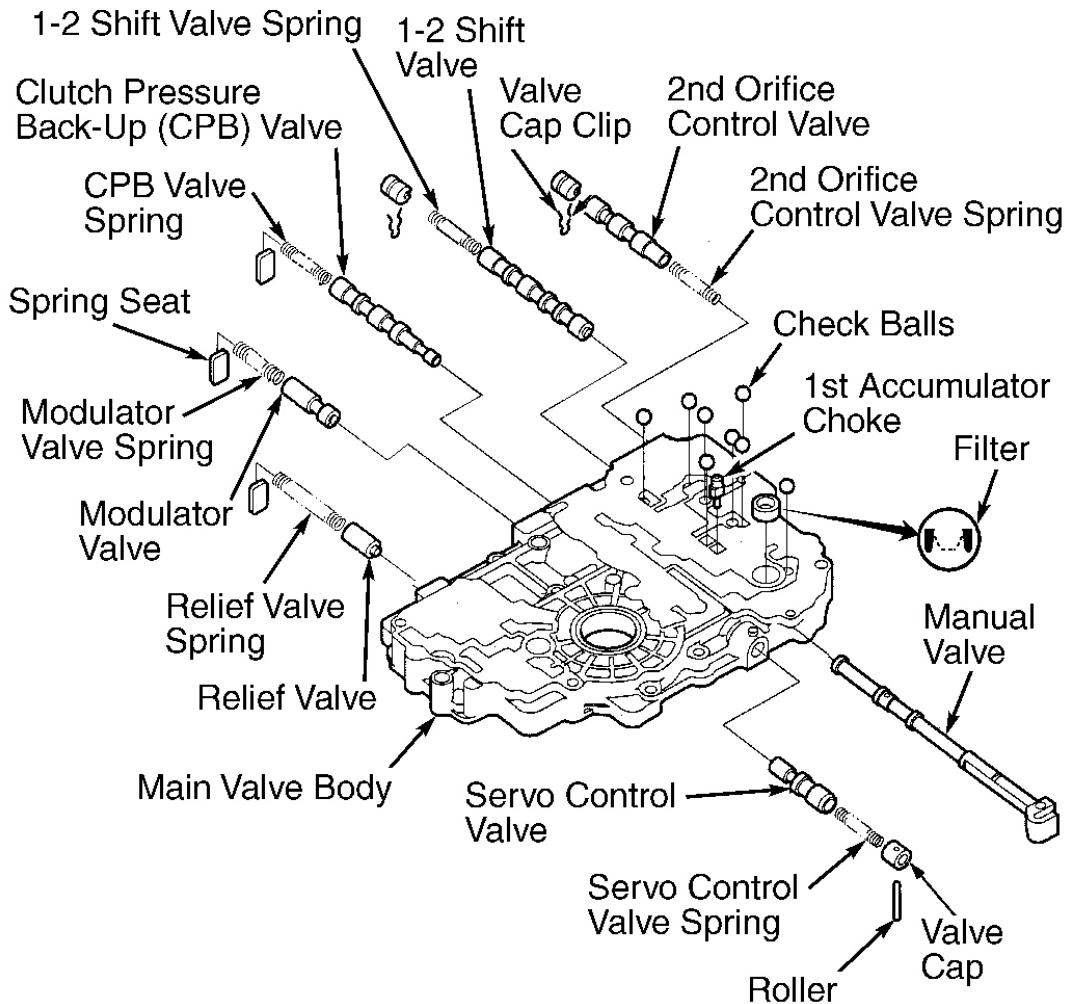
SPRING SPECIFICATIONS

Application	Free Length In. (mm)
Lock-Up Valve Body	
Lock-Up Shift Valve Spring	2.902 (73.70)
Lock-Up Timing Valve Spring	3.205 (81.40)
Main Valve Body	
Clutch Pressure Back-Up (CPB) Valve	1.858 (47.20)
Relief Valve Spring	1.461 (37.10)
Modulator Valve Spring	1.378 (35.00)
1-2 Shift Valve Spring	1.626 (41.30)
2nd Orifice Control Valve Spring	1.370 (34.80)
Servo Control Valve Spring	2.051 (52.10)
Regulator Valve Body	
Regulator Valve Spring "A"	3.457 (87.80)
Regulator Valve Spring "B"	1.732 (44.00)
Stator Reaction Spring	1.193 (30.30)
Torque Converter Check Valve Spring (1997)	1.433 (36.40)
Torque Converter Check Valve Spring (1998-99)	1.276 (32.40)
Cooler Relief Valve Spring	1.331 (33.80)
Lock-Up Control Valve Spring	1.496 (38.00)
Secondary Valve Body	
3-4 Shift Valve Spring	2.244 (57.00)
2-3 Shift Valve Spring	2.244 (57.00)

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4th Exhaust Valve Spring	1.433 (36.40)
3-4 Orifice Control Valve Spring	1.492 (37.90)
Servo Body	
1st Accumulator Spring	3.508 (89.10)
2nd Accumulator Spring "A"	1.535 (39.00)
2nd Accumulator Spring "B"	.815 (20.70)
2nd Accumulator Spring "C"	2.677 (68.00)
3rd Accumulator Spring "A"	3.713 (94.30)
3rd Accumulator Spring "B"	1.504 (38.20)
3rd Sub-Accumulator Spring	1.535 (39.00)
4th Accumulator Spring "A"	3.480 (88.40)
4th Accumulator Spring "B"	2.031 (51.60)



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Fig. 14: Exploded View Of Main Valve Body

Courtesy of AMERICAN HONDA MOTOR CO., INC.

OIL PUMP**Disassembly**

Note direction of oil pump gear installation in main valve body. Remove oil pump driven gear shaft and oil pump gears from main valve body (if not previously removed).

Cleaning & Inspection

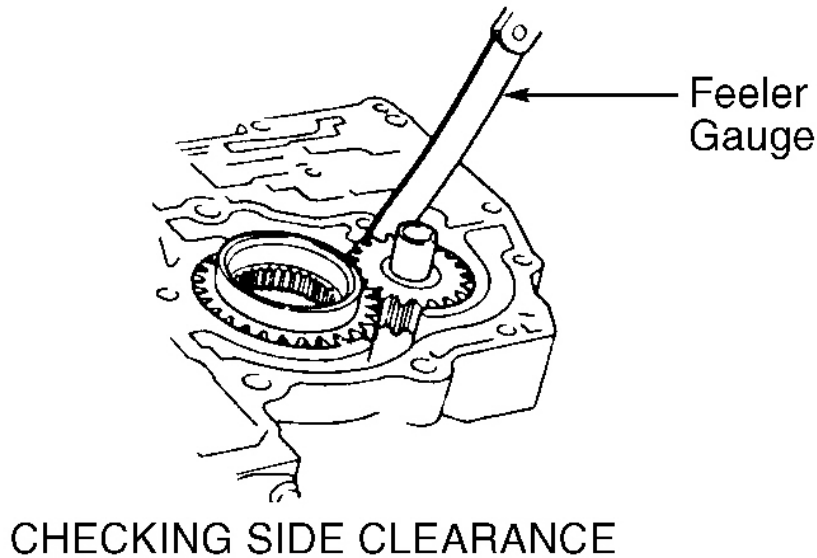
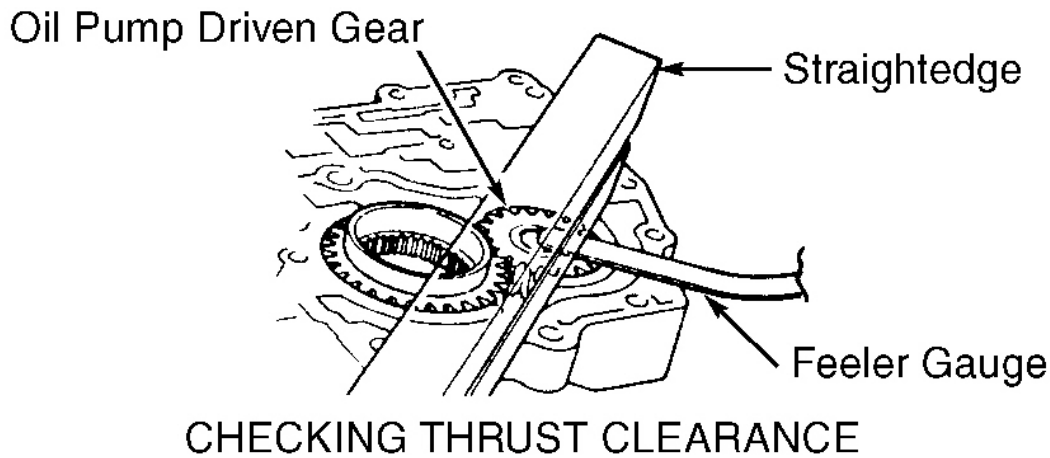
1. Clean components with solvent and dry with compressed air. Inspect components and replace if damaged.
2. Install oil pump gears in main valve body. Ensure chamfered and grooved side of oil pump driven gear is facing upward (toward separator plate side of main valve body).
3. Place straightedge across main valve body surface. Using feeler gauge, measure thrust clearance between oil pump driven gear and straightedge. See **Fig. 15** . Replace oil pump gears and/or main valve body if thrust clearance is not within specification. See **OIL PUMP SPECIFICATIONS** table.
4. Install oil pump driven gear shaft in oil pump driven gear. Using feeler gauge, measure side clearance of both gears between tip of gear teeth and main valve body. See **Fig. 15** . Replace oil pump gears and/or main valve body if side clearance is not within specification. See **OIL PUMP SPECIFICATIONS** table.

OIL PUMP SPECIFICATIONS

Application	In. (mm)
Side Clearance	
Oil Pump Drive Gear	.0041-.0052 (.105-.133)
Oil Pump Driven Gear	.0014-.0025 (.035-.063)
Thrust Clearance	
Standard	.0010-.0020 (.030-.050)
Wear Limit	.0028 (.070)

Reassembly

Coat components with ATF. To reassemble, reverse disassembly procedure. Ensure chamfered and grooved side of oil pump driven gear faces upward (toward separator plate side of main valve body).



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Fig. 15: Checking Oil Pump Clearances

Courtesy of AMERICAN HONDA MOTOR CO., INC.

SECONDARY VALVE BODY

CAUTION: When disassembling secondary valve body, place secondary valve body components in order and mark spring locations for reassembly reference. **DO NOT** use force to remove components. **DO NOT** use magnet to remove check balls, as check balls may become magnetized. Note direction of valve cap installation before removing from secondary valve body.

Disassembly

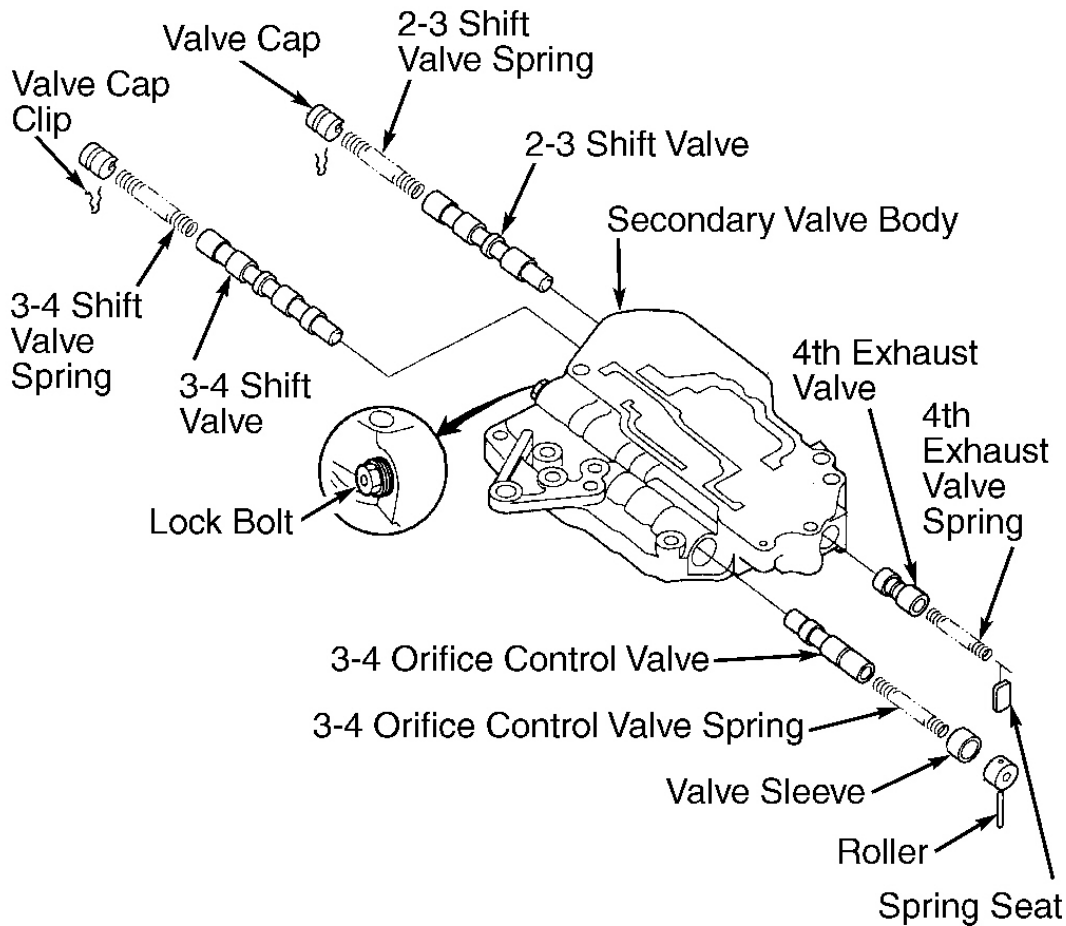
Disassemble secondary valve body. See **Fig. 16** . Use care when removing valve caps or spring seats, as they are under spring pressure.

Cleaning & Inspection

1. Clean components with solvent and dry with compressed air. Replace secondary valve body assembly if any parts are worn or damaged.
2. Ensure all valves slide freely in their bores. If valves do not slide freely, polish burrs or rough areas using No. 600 sandpaper soaked for 30 minutes in ATF. Thoroughly clean secondary valve body and components if polishing was needed.
3. Ensure spring free length is within specification. See **SPRING SPECIFICATIONS** table under MAIN VALVE BODY. Replace springs if not within specification.

Reassembly

Coat all components and bores with ATF. To reassemble, reverse disassembly procedure. Install NEW filter. Ensure all components are installed in correct location. See **Fig. 16** .



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Fig. 16: Exploded View Of Secondary Valve Body
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REGULATOR VALVE BODY

CAUTION: Regulator spring cap is under spring pressure. Ensure regulator spring cap is held down when removing stopper bolt. Use care when removing valve cap, as valve cap is under spring pressure.

Disassembly

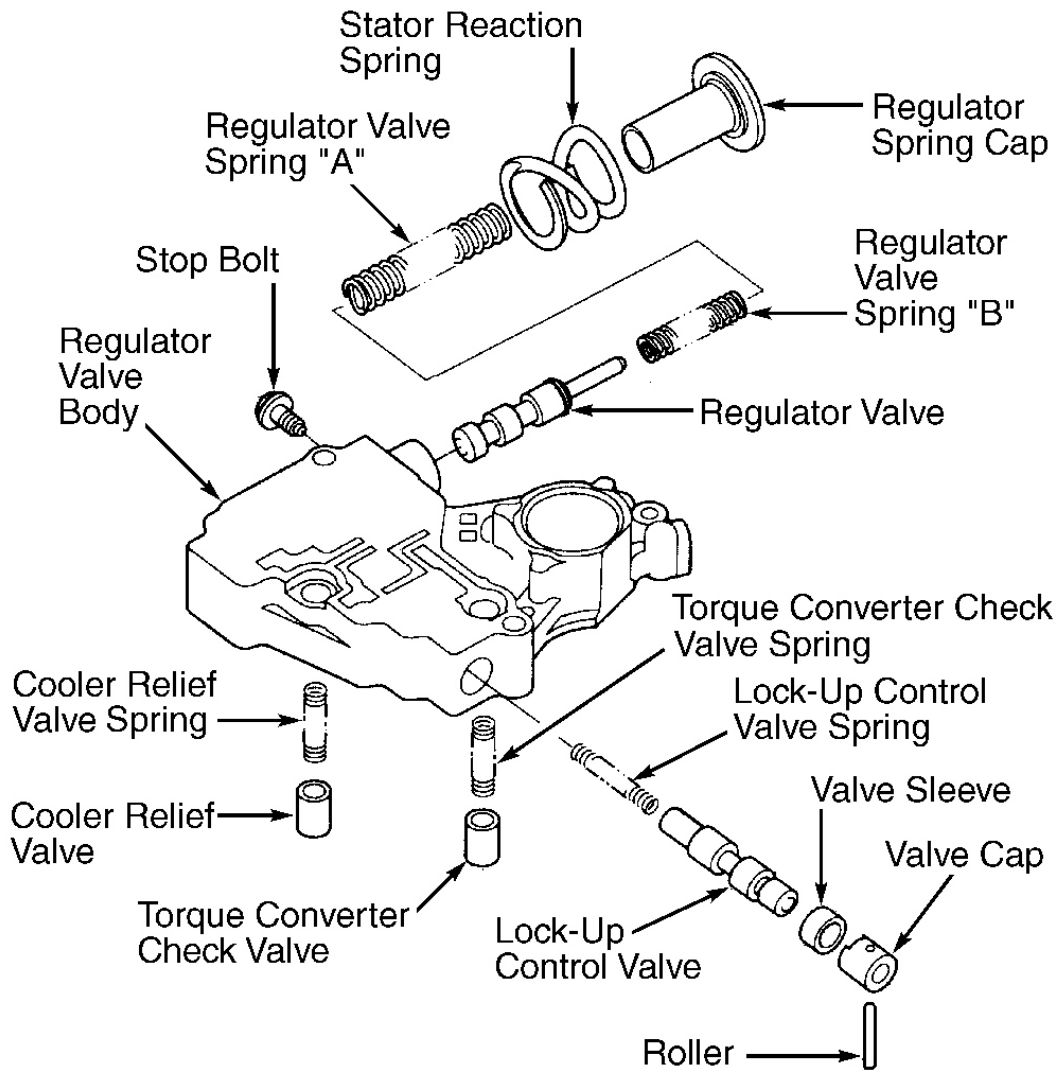
Note direction of valve cap installation before removing from regulator valve body. Hold regulator spring cap down, and remove stopper bolt. Slowly remove regulator spring cap and components from regulator valve body. See [Fig. 17](#).

Cleaning & Inspection

1. Clean components with solvent and dry with compressed air. Replace regulator valve body assembly if any parts are worn or damaged.
2. Ensure all valves slide freely in their bores. If valves do not slide freely, polish burrs or rough areas using No. 600 sandpaper soaked in ATF for at least 30 minutes. Thoroughly clean regulator valve body and components if polishing was needed.
3. Ensure spring free length is within specification. See **SPRING SPECIFICATIONS** table under MAIN VALVE BODY. Replace springs if not within specification.

Reassembly

Coat all components and bores with ATF. To reassemble, reverse disassembly procedure. Ensure all components are installed in correct location. See **Fig. 17** . Tighten stopper bolt to specification. See **TORQUE SPECIFICATIONS** .



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Fig. 17: Exploded View Of Regulator Valve Body
Courtesy of AMERICAN HONDA MOTOR CO., INC.

SERVO BODY

Disassembly

Disassemble servo body. See **Fig. 18** . DO NOT loosen or remove throttle adjusting bolt.

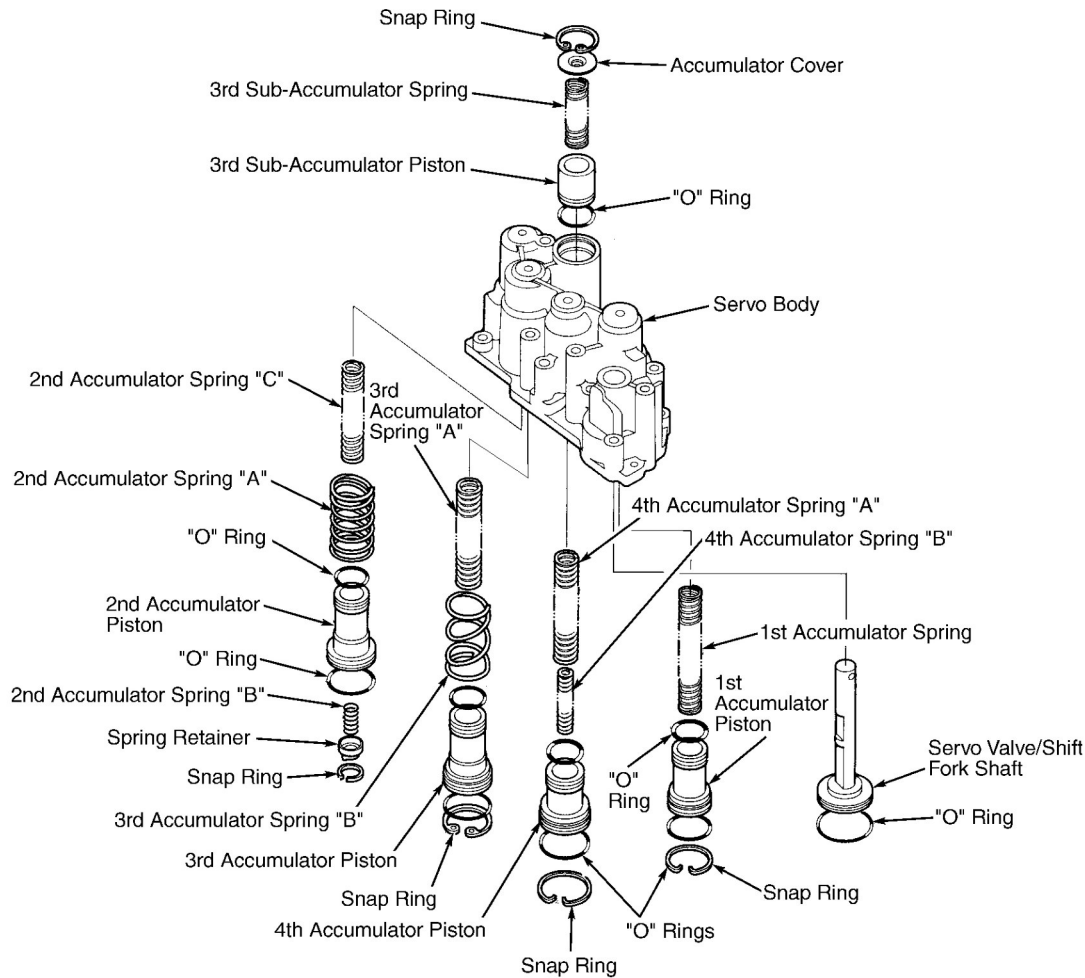
Cleaning & Inspection

1. Clean components with solvent and dry with compressed air. Replace servo body assembly if any parts are worn or damaged. Ensure all valves slide freely in their bores.

2. Ensure spring free length is within specification. See **SPRING SPECIFICATIONS** table under MAIN VALVE BODY. Replace springs if not within specification.

Reassembly

Coat all components and bores with ATF. To reassemble, reverse disassembly procedure using NEW "O" rings. Tighten throttle cam stopper bolt to specification. See **TORQUE SPECIFICATIONS**.



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Fig. 18: Exploded View Of Servo Body
Courtesy of AMERICAN HONDA MOTOR CO., INC.

LOCK-UP VALVE BODY

Disassembly

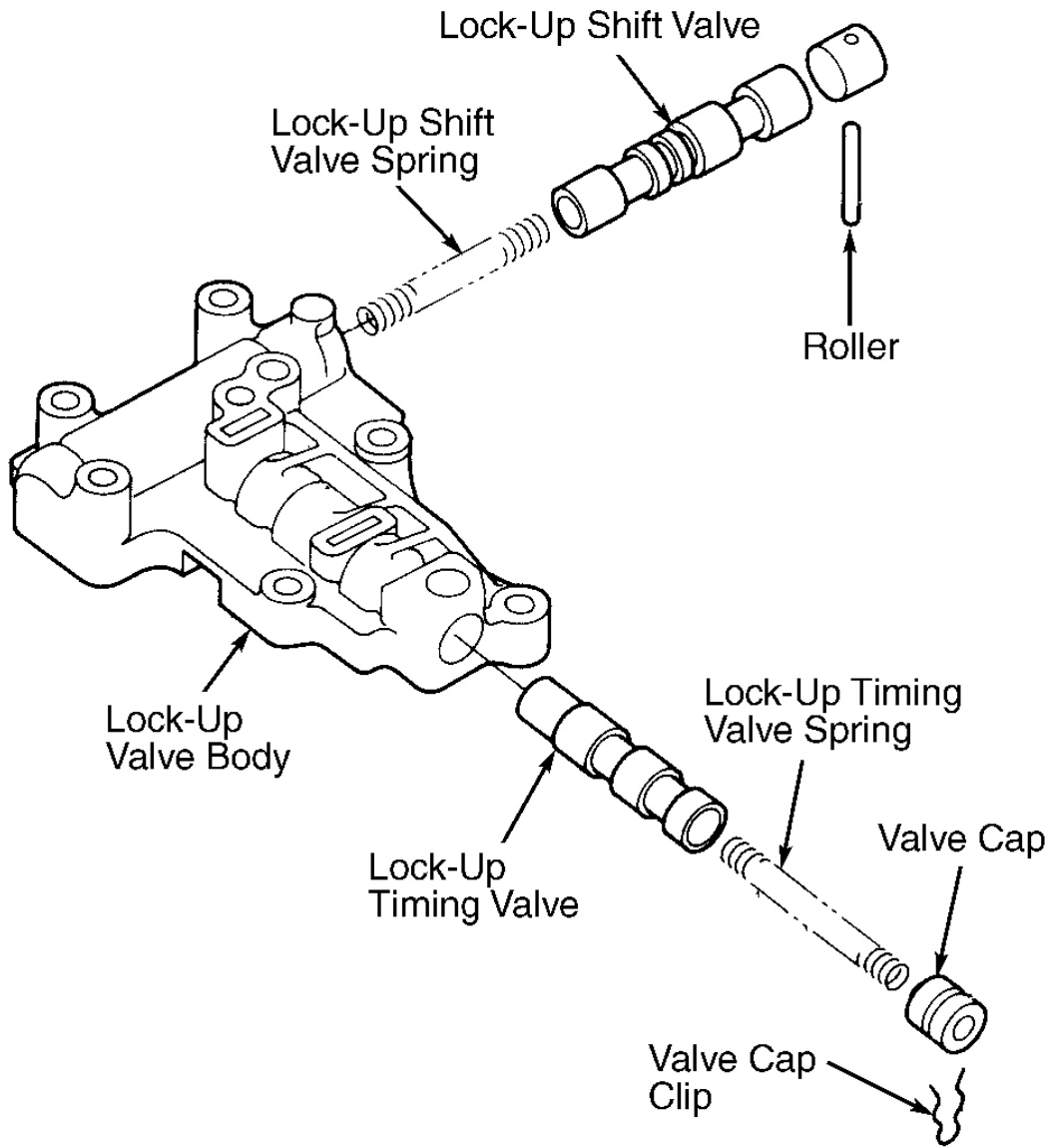
Note direction of valve cap installation before removing from lock-up valve body. Disassemble lock-up valve body. See **Fig. 19**. Use care when removing valve caps, as they are under spring pressure.

Cleaning & Inspection

1. Clean components with solvent and dry with compressed air. Replace lock-up valve body assembly if any parts are worn or damaged.
2. Ensure all valves slide freely in their bores. If valves do not slide freely, polish burrs or rough areas using No. 600 sandpaper soaked for 30 minutes in ATF. Thoroughly clean lock-up valve body and components if polishing was needed.
3. Ensure spring free length is within specification. See **SPRING SPECIFICATIONS** table under MAIN VALVE BODY. Replace springs if not within specification.

Reassembly

Coat all components and bores with ATF. To reassemble, reverse disassembly procedure. See **Fig. 19** .



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Fig. 19: Exploded View Of Lock-Up Valve Body
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

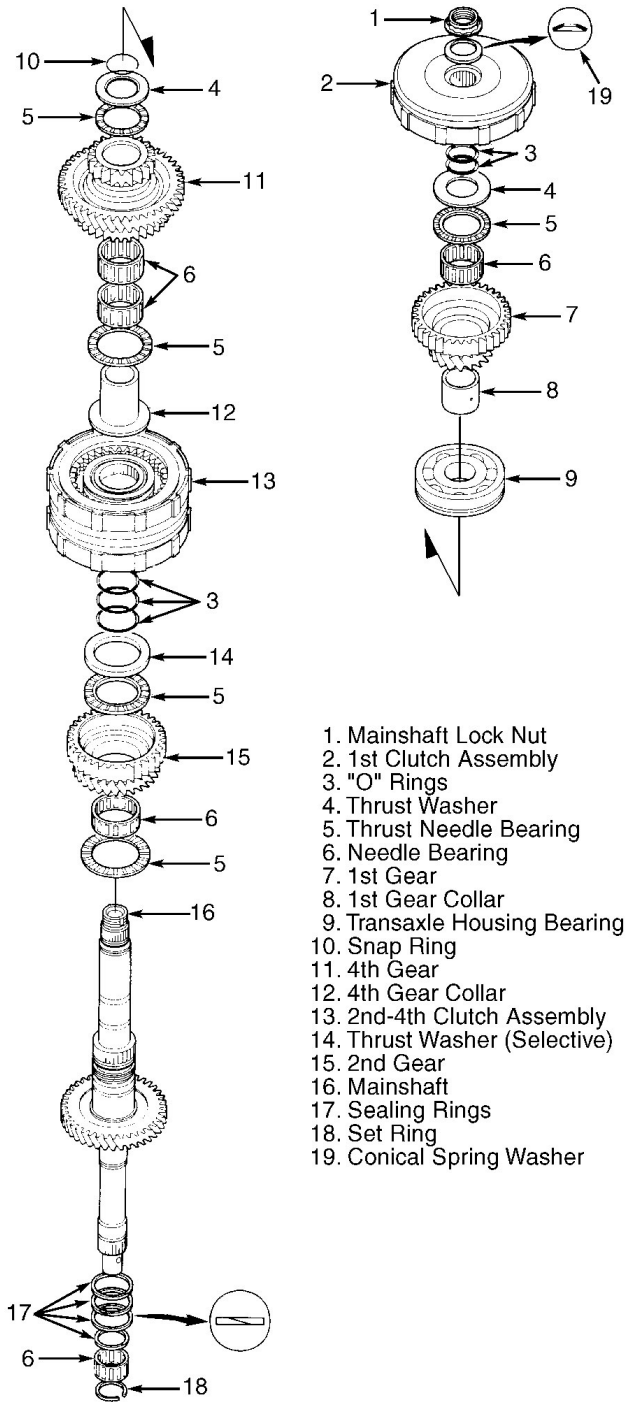
MAINSHAFT

Disassembly

Note location of mainshaft components. See **Fig. 20** . Remove mainshaft components.

Cleaning & Inspection

Clean components with solvent and dry with compressed air. Inspect splines for excessive wear and bearing surfaces for scoring or wear. Inspect all bearings for galling and rough movement.



1. Mainshaft Lock Nut
2. 1st Clutch Assembly
3. "O" Rings
4. Thrust Washer
5. Thrust Needle Bearing
6. Needle Bearing
7. 1st Gear
8. 1st Gear Collar
9. Transaxle Housing Bearing
10. Snap Ring
11. 4th Gear
12. 4th Gear Collar
13. 2nd-4th Clutch Assembly
14. Thrust Washer (Selective)
15. 2nd Gear
16. Mainshaft
17. Sealing Rings
18. Set Ring
19. Conical Spring Washer

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Fig. 20: Exploded View Of Mainshaft Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

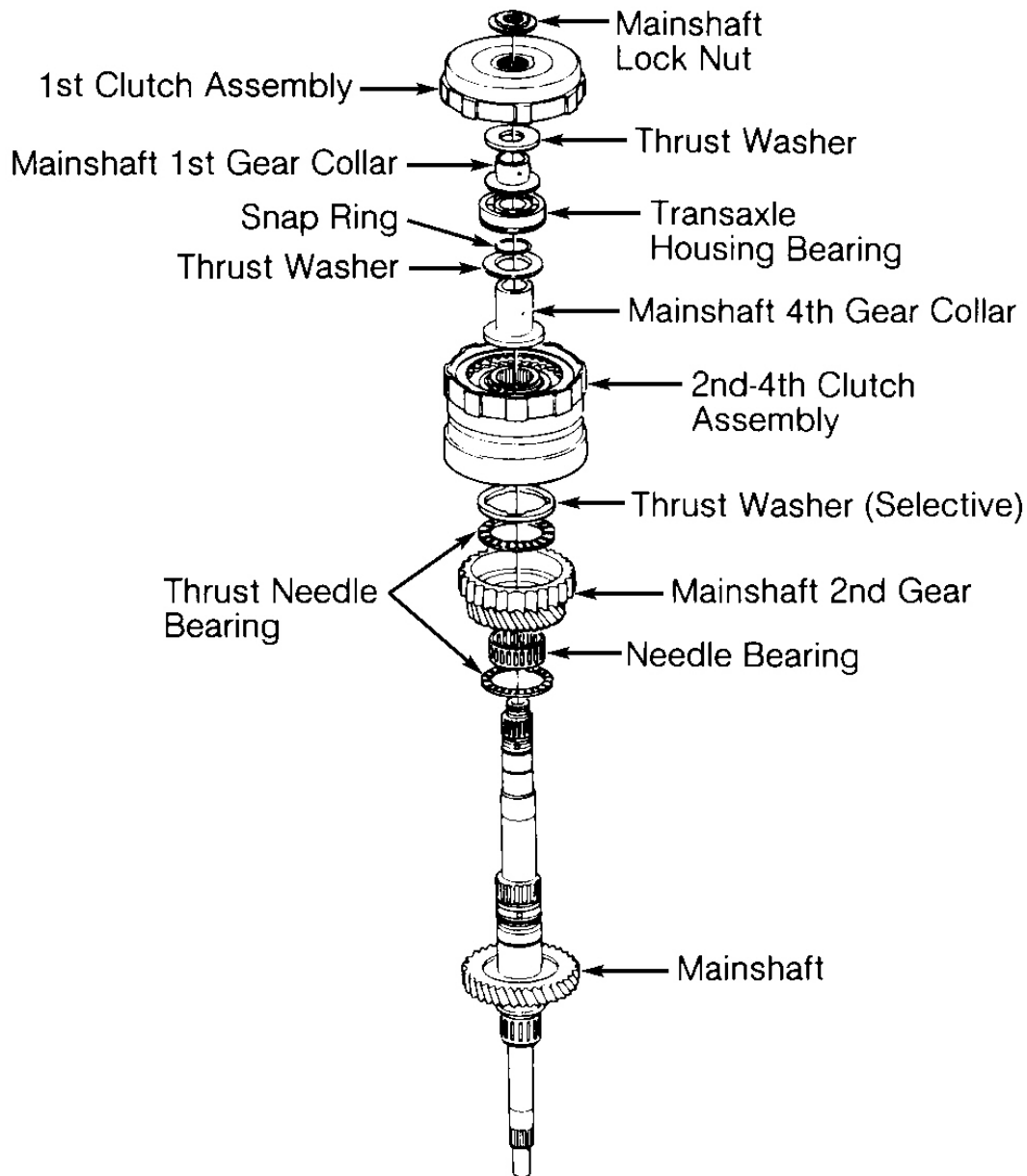
NOTE: Mainshaft 2nd gear-to-3rd gear clearance must be checked during reassembly.

Reassembly

1. To check mainshaft 2nd gear-to-3rd gear clearance, install proper components, except "O" rings and mainshaft 4th gear on mainshaft. See **Fig. 21**.
2. Install used mainshaft lock nut on mainshaft. Tighten mainshaft lock nut to 22 ft. lbs. (30 N.m). Hold mainshaft 2nd gear against 2nd clutch.
3. Using feeler gauge, measure clearance between mainshaft 2nd gear and mainshaft 3rd gear. See **Fig. 22**. If mainshaft 2nd gear-to-3rd gear clearance is not .002-.005" (.05-.13 mm), replace thrust washer, located between mainshaft 2nd gear and 2nd clutch. Different thickness thrust washers are available. See **THRUST WASHER SPECIFICATIONS** table. Replace thrust washer and recheck mainshaft 2nd gear-to-3rd gear clearance.
4. Once correct thickness thrust washer is obtained, lubricate all components with ATF. Reassemble mainshaft.
5. Ensure thrust needle bearings are installed with unrolled edge of bearing retainer facing washer. See **Fig. 20**. Before installing NEW "O" rings on mainshaft, wrap splines with tape.

THRUST WASHER SPECIFICATIONS

Washer No.	Part Number	Thickness In. (mm)
1	90441-PG4-010	.157 (4.00)
2	90442-PG4-010	.159 (4.05)
3	90443-PG4-010	.161 (4.10)
4	90444-PG4-010	.163 (4.15)
5	90445-PG4-010	.165 (4.20)
6	90446-PG4-010	.167 (4.25)
7	90447-PG4-010	.169 (4.30)
8	90448-PG4-010	.171 (4.35)
9	90449-PG4-010	.173 (4.40)
10	90450-PG4-000	.175 (4.45)



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Fig. 21: Assembling Mainshaft To Measure 2nd Gear-To-3rd Gear Clearance
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

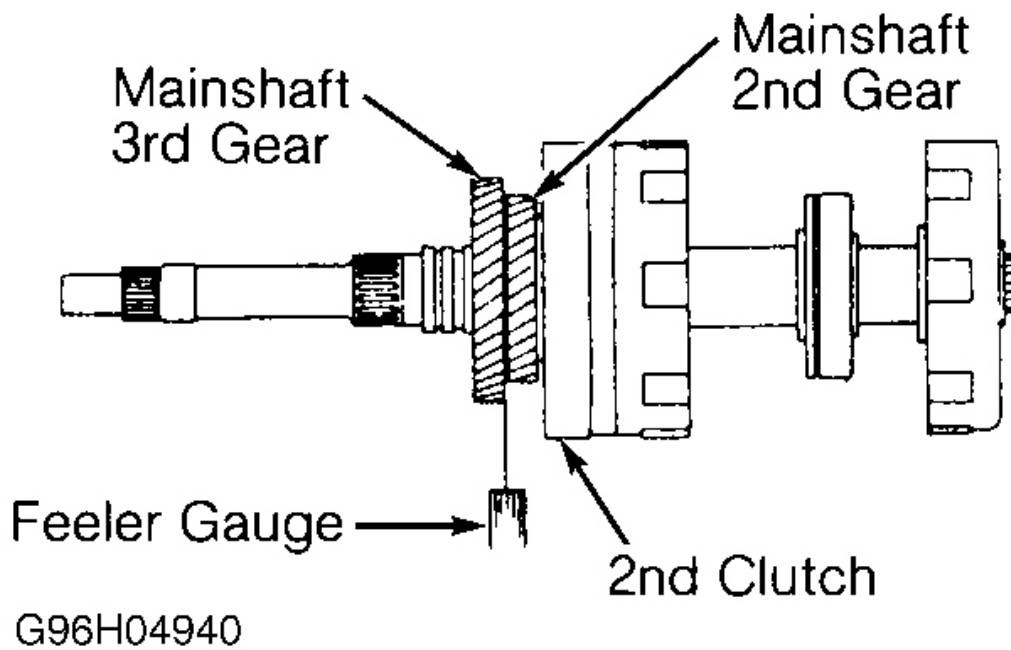


Fig. 22: Measuring Mainshaft 2nd Gear-To-3rd Gear Clearance
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

COUNTERSHAFT

NOTE: Reverse selector hub is press-fit on countershaft. Countershaft must be pressed from reverse selector hub.

Disassembly

1. Note location of countershaft components. See **Fig. 12** . Remove all components from countershaft down to the reverse selector hub.
2. Place countershaft in hydraulic press while supporting countershaft 4th gear. Threaded end of countershaft must be facing upward (toward ram of press). Place a protective cap between hydraulic press and countershaft to prevent damage to countershaft.
3. Press countershaft from reverse selector hub and countershaft 4th gear. Separate remaining components from countershaft. See **Fig. 12** .

Cleaning & Inspection

Clean components with solvent and dry with compressed air. Inspect splines for excessive wear. Check bearing surfaces for scoring or wear. Inspect all needle bearings for galling and rough movement.

NOTE: Countershaft 2nd gear clearance must be checked during reassembly.

Reassembly

1. To check countershaft 2nd gear clearance, install all components on countershaft up to the reverse selector hub. See **Fig. 12** . DO NOT install "O" rings on countershaft at this time.
2. Install reverse selector hub on countershaft in proper direction. Support countershaft in press. Press reverse selector hub onto countershaft.
3. Install countershaft reverse gear collar on countershaft. See **Fig. 12** . DO NOT install reverse selector, countershaft reverse gear and needle bearing on countershaft at this time.
4. Install transaxle housing bearing on countershaft. Install countershaft 1st gear collar, needle bearing and countershaft 1st gear with one-way clutch and parking gear on countershaft. See **Fig. 8** .
5. Install spring washer and used countershaft lock nut on countershaft. Tighten countershaft lock nut to 22 ft. lbs. (30 N.m).
6. Using feeler gauge, measure countershaft 2nd gear clearance between distance collar and countershaft 2nd gear. See **Fig. 23** . Measure countershaft 2nd gear clearance in 3 areas. Determine the average of the measurements. Countershaft 2nd gear clearance should be .002-.005" (.05-.13 mm).
7. If countershaft 2nd gear clearance is not within specification, install different length distance collar between countershaft 2nd gear and countershaft 4th gear and recheck clearance. See **DISTANCE COLLAR SPECIFICATIONS** table.
8. If shortest distance collar is installed and clearance still exceeds specification, check components for wear. During final reassembly, lubricate all components with ATF.
9. Before installing NEW "O" rings on countershaft, wrap splines with tape. Ensure NEW "O" rings are installed on countershaft.
10. Ensure reverse selector hub is installed on countershaft in proper direction. See **Fig. 12** . Ensure thrust needle bearings and needle bearings are installed with unrolled edge of bearing retainer facing washer surface.

DISTANCE COLLAR SPECIFICATIONS

Collar No.	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)
8	90511-PC9-000	1.531 (38.90)
9	90512-PC9-000	1.533 (38.95)

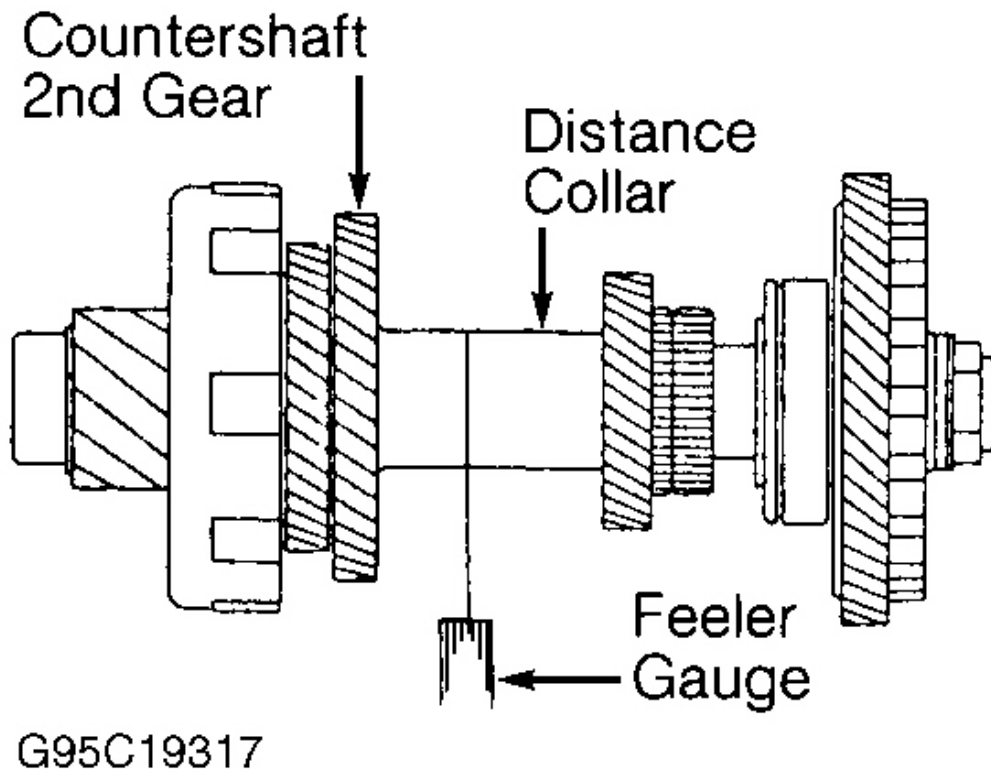


Fig. 23: Checking Countershaft 2nd Gear Clearance
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

PARKING GEAR & ONE-WAY CLUTCH

Disassembly

1. To separate parking gear from countershaft 1st gear, hold countershaft 1st gear with parking gear facing upward. Rotate parking gear counterclockwise and remove from countershaft 1st gear.
2. Note direction of one-way clutch installation in countershaft 1st gear. To remove one-way clutch from countershaft 1st gear, using screwdriver, gently pry between one-way clutch and countershaft 1st gear.

Cleaning & Inspection

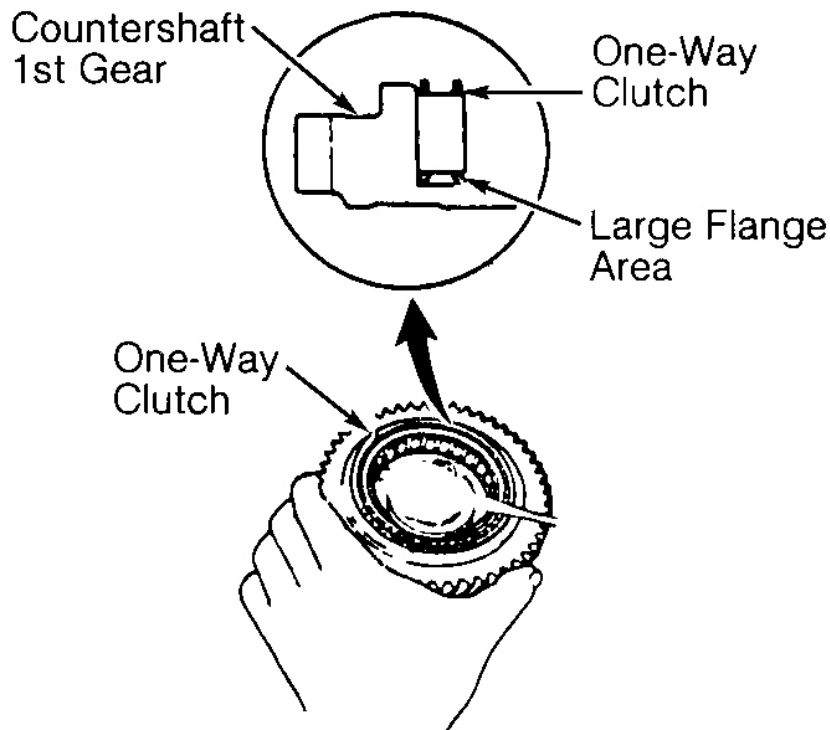
Clean components with solvent and dry with compressed air. Inspect components for damage.

Reassembly

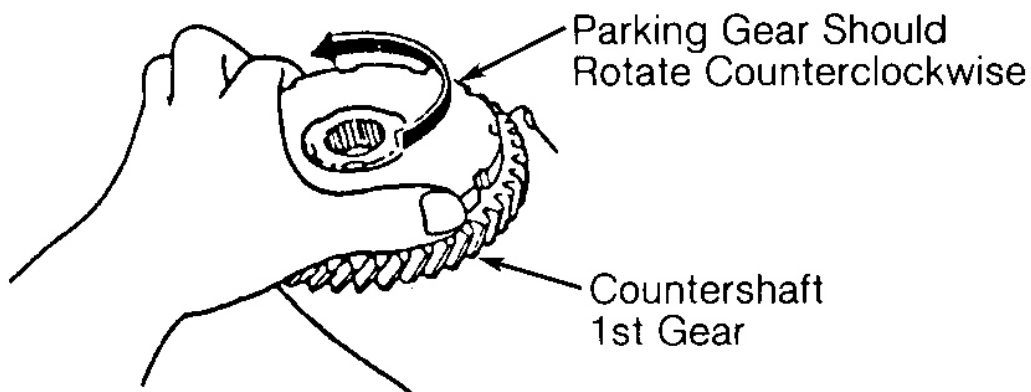
1. Lubricate all components with ATF. Install one-way clutch in countershaft 1st gear with large flange area

on one-way clutch toward countershaft 1st gear. See **Fig. 24** .

2. Install parking gear. To check one-way clutch operation, hold countershaft 1st gear with parking gear facing upward. Ensure parking gear rotates freely counterclockwise.



INSTALLING ONE-WAY CLUTCH



CHECKING ONE-WAY CLUTCH OPERATION

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Fig. 24: Installing & Checking One-Way Clutch Operation

Courtesy of AMERICAN HONDA MOTOR CO., INC.

SUB-SHAFT & COMPONENTS

Disassembly

1. Note sub-shaft and component locations. See **Fig. 12** . Remove oil guide cap from transaxle housing by using hammer and driver and tapping on end of sub-shaft. Remove sub-shaft, sub-shaft 4th gear, 1st-hold clutch and components.
2. If removing needle bearing from transaxle housing, remove needle bearing stopper bolt and needle bearing stopper. Using hammer and drift, tap needle bearing from transaxle housing.
3. If removing transaxle housing bearing, expand snap ring. Using press, press bearing from transaxle housing. Remove snap ring (if necessary).

Cleaning & Inspection

1. Clean components with solvent and dry with compressed air. Inspect splines on sub-shaft for excessive wear and bearing surfaces for scoring or wear.
2. Inspect all needle bearings for galling and rough movement. Inspect sub-shaft 4th gear for damage.

Reassembly

1. Lubricate all components with ATF. If installing needle bearing in transaxle housing, using press, press needle bearing into transaxle housing.
2. Install needle bearing stopper. Tighten needle bearing stopper bolt to specification. See **TORQUE SPECIFICATIONS** .
3. If installing transaxle housing bearing in transaxle housing, expand snap ring. Using press, press bearing part way into transaxle housing.

CAUTION: Ensure transaxle housing bearing is installed with groove facing toward outside of transaxle housing so snap ring will engage with bearing.

4. Release snap ring. Continue pressing bearing into transaxle housing until snap ring engages in bearing. Ensure snap ring is fully seated.
5. Before installing "O" rings on sub-shaft, wrap splines with tape. Use NEW "O" rings on sub-shaft. Reassemble sub-shaft.
6. Ensure thrust needle bearings are installed with unrolled edge of bearing retainer facing washer. Install NEW oil guide cap.

CLUTCH ASSEMBLIES

Disassembly

1. Remove snap ring, clutch end plate, clutch discs and clutch plates. See **Fig. 25** . Note direction of disc spring installation. Remove disc spring.

- Using spring compressor, compress return spring. Remove snap ring. Release and remove spring compressor. Remove spring retainer and return spring.
- Wrap shop towel around clutch drum. Apply light air pressure to oil passage on clutch drum to remove clutch piston. Remove "O" rings.

Cleaning & Inspection

- Clean metal components with solvent and dry with compressed air. Ensure check valve on rear of clutch piston (except 1st-hold clutch) is thoroughly cleaned and secured tightly on clutch piston.
- Inspect components for damage. Replace as necessary. Ensure no rough edges exist on "O" ring sealing areas.

Reassembly

- Lubricate all components with ATF. Install NEW "O" rings. Install clutch piston in clutch drum. Slightly rotate clutch piston back and forth during installation to prevent damaging "O" rings.

CAUTION: DO NOT apply excessive force on clutch piston, or "O" rings will be damaged.

- Install return spring and spring retainer in clutch drum. Place snap ring on spring retainer. Using spring compressor, compress return spring. Install snap ring. Remove spring compressor.

CAUTION: Disc spring on 3rd clutch installs in opposite direction of all other clutch assemblies. See Fig. 25 . Ensure clutch discs are soaked in ATF for at least 30 minutes before installing.

- Install disc spring. Ensure disc spring is installed in proper direction. See Fig. 25 .
- Alternately install clutch plates and clutch discs starting with clutch plate. Install clutch end plate with flat side toward clutch disc. Install snap ring.
- Using dial indicator, measure clutch clearance between clutch end plate and top clutch disc. See Fig. 26 . Zero dial indicator with clutch end plate lowered. Lift clutch end plate upward against snap ring. Distance measured is clutch clearance.
- Measure clutch clearance at 3 different locations. Clutch clearance should be within specification. See CLUTCH CLEARANCE SPECIFICATIONS table.
- If clutch clearance is not within specification, install different thickness clutch end plate. See CLUTCH END PLATE SPECIFICATIONS table.

NOTE: If thickest clutch end plate is installed and clutch clearance still exceeds specification, replace clutch discs and clutch plates.

CLUTCH CLEARANCE SPECIFICATIONS

Application	Clearance In. (mm)
1st Clutch	.026-.033 (.65-.85)

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1st-Hold Clutch	.020-.031 (.50-.80)
2nd, 3rd & 4th Clutches	.016-.024 (.40-.60)

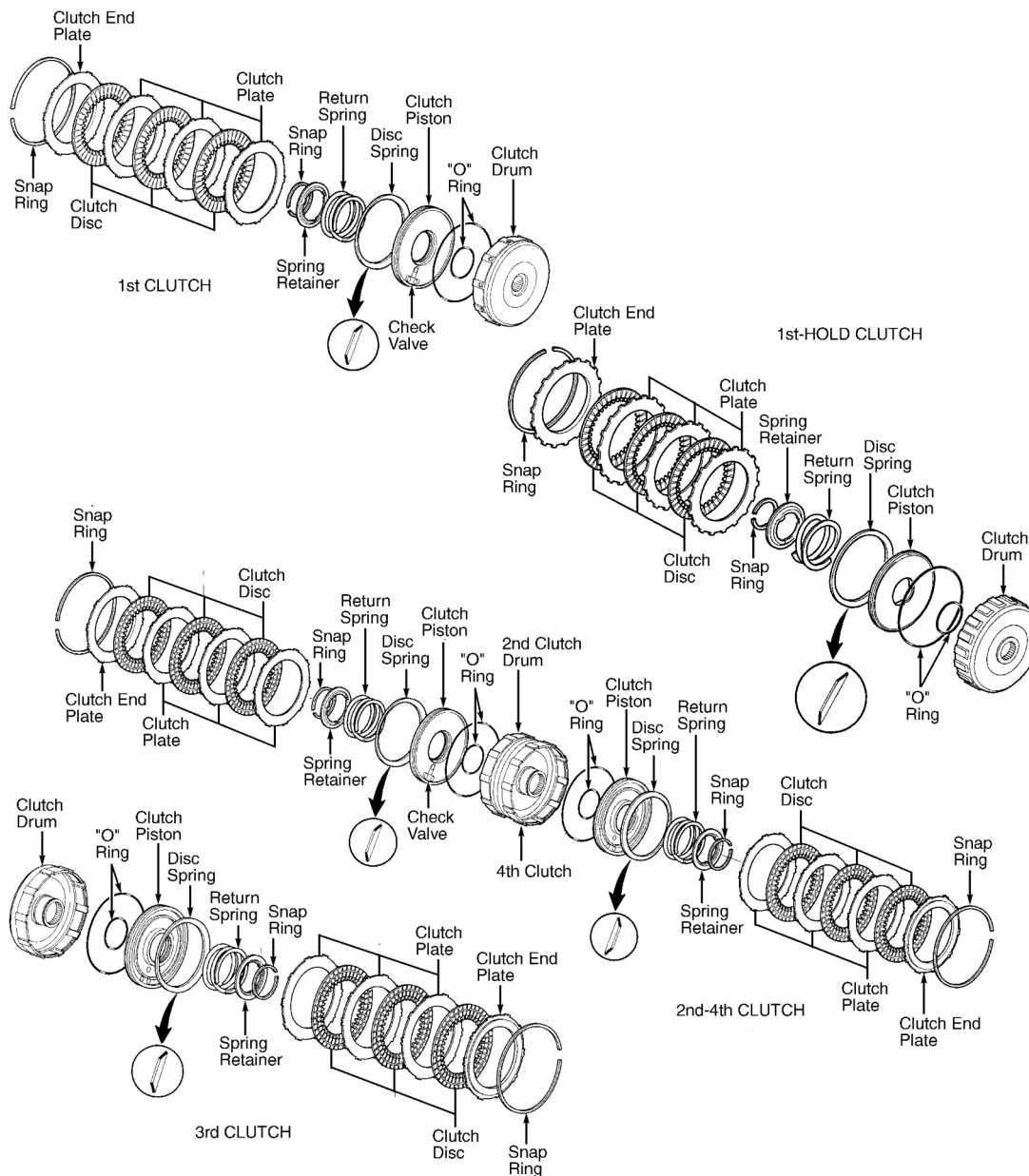
CLUTCH END PLATE SPECIFICATIONS

Plate No.	Part Number	Thickness In. (mm)
1st-Hold Clutch		
1	22551-PS5-003	.083 (2.10)
2	22552-PS5-003	.087 (2.20)
3	22553-PS5-003	.091 (2.30)
4	22554-PS5-003	.094 (2.40)
5 (No Mark)	22555-PS5-003	.098 (2.50)
6	22556-PS5-003	.102 (2.60)
7	22557-PS5-003	.106 (2.70)
1st Clutch		
1	22551-P56-N00	.083 (2.10)
2	22552-P56-N00	.087 (2.20)
3	22553-P56-N00	.091 (2.30)
4	22554-P56-N00	.094 (2.40)
5	22555-P56-N00	.098 (2.50)
6	22556-P56-N00	.102 (2.60)
7	22557-P56-N00	.106 (2.70)
8	22558-P56-N00	.110 (2.80)
9	22559-P56-N00	.114 (2.90)
10	22560-P56-N00	.118 (3.00)
2nd & 4th Clutches		
6	22556-P56-N00	.102 (2.60)
7	22557-P56-N00	.106 (2.70)
8	22558-P56-N00	.110 (2.80)
9	22559-P56-N00	.114 (2.90)
10	22560-P56-N00	.118 (3.00)
11	22561-PDM-000	.122 (3.10)
12	22562-PDM-000	.126 (3.20)
13	22563-PDM-000	.130 (3.30)
14	22564-PDM-000	.134 (3.40)
15	22565-PDM-000	.138 (3.50)
16	22566-PDM-000	.142 (3.60)
17	22567-PDM-000	.146 (3.70)
3rd Clutch		
8	22558-P56-N00	.110 (2.80)
9	22559-P56-N00	.114 (2.90)
10	22560-P56-N00	.118 (3.00)

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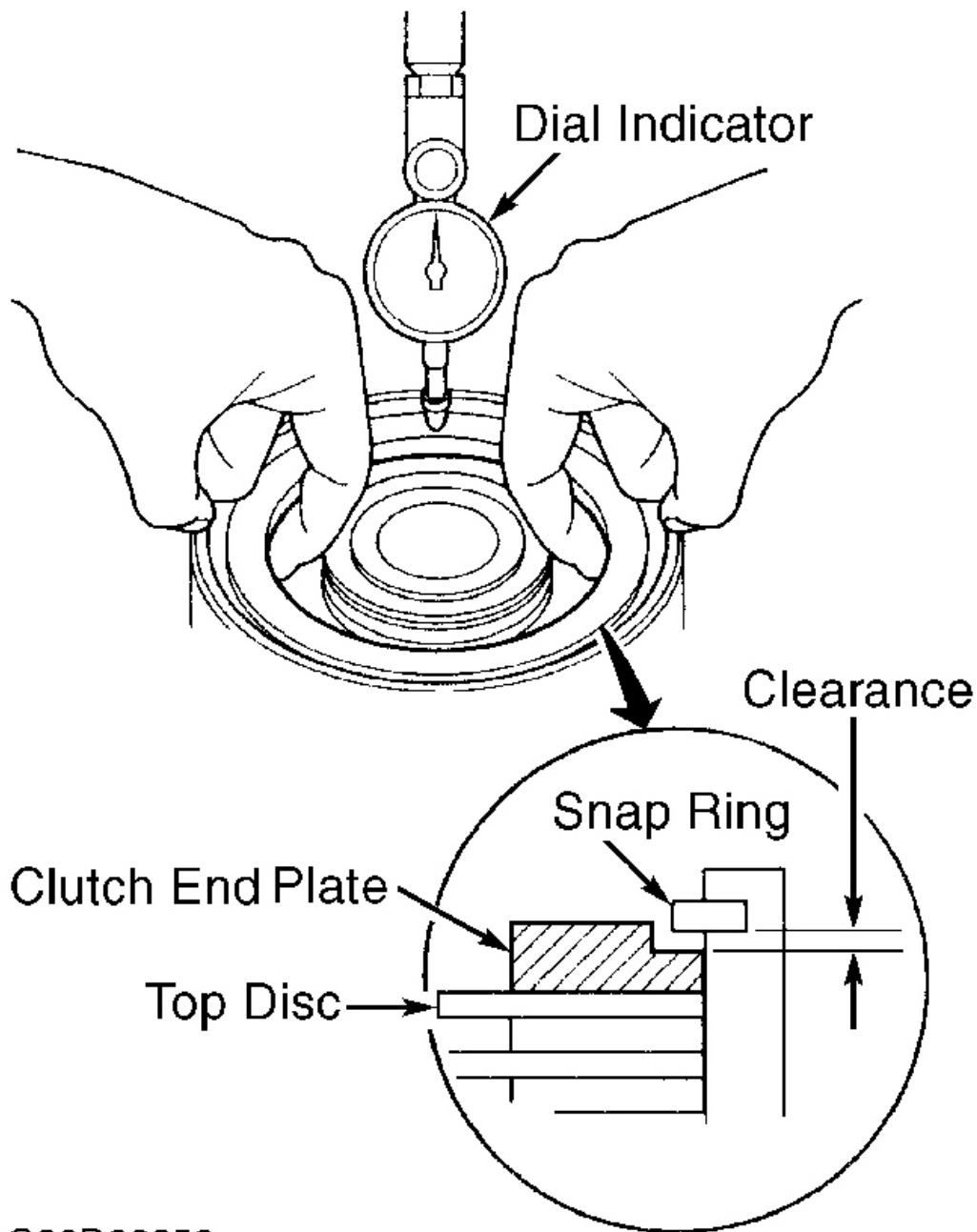
11	22561-PDM-000	.122 (3.10)
12	22562-PDM-000	.126 (3.20)
13	22563-PDM-000	.130 (3.30)
14	22564-PDM-000	.134 (3.40)
15	22565-PDM-000	.138 (3.50)
16	22566-PDM-000	.142 (3.60)
17	22567-PDM-000	.146 (3.70)



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Fig. 25: Exploded View Of Clutch Assemblies

Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 26: Measuring Clutch Clearance

Courtesy of AMERICAN HONDA MOTOR CO., INC.

TORQUE CONVERTER HOUSING

Disassembly

1. Remove countershaft bearing from torque converter housing using slide hammer (if necessary). Remove oil guide plate from torque converter housing. See **Fig. 13**.
2. Remove mainshaft bearing and oil seal using hammer and driver. Using hammer and drift, tap differential oil seal from torque converter housing.

Cleaning & Inspection

Clean components with solvent and dry with compressed air. Inspect torque converter housing for cracks and damage in bearing areas. Replace torque converter housing if damaged.

Reassembly

1. Coat components with ATF. To install mainshaft bearing, using hammer and driver, drive mainshaft bearing in torque converter housing until bearing bottoms in torque converter housing.
2. Using hammer and oil seal installer, install mainshaft oil seal in torque converter housing. Oil seal should be flush with surface of torque converter housing.
3. To install countershaft bearing, install NEW oil guide plate in countershaft bearing bore of torque converter housing. Ensure oil guide plate is installed with tab in center facing upward (away from torque converter housing surface). See **Fig. 13**.
4. Using hammer and driver, drive countershaft bearing into torque converter housing. Ensure surface of countershaft bearing is flush with surface of torque converter housing.

CAUTION: If any differential components, transaxle housing, torque converter housing, snap rings or differential bearings are replaced, differential bearing side clearance must be checked. See DIFFERENTIAL BEARING SIDE CLEARANCE under TRANSAXLE REASSEMBLY.

5. Once correct differential bearing side clearance is obtained, install differential oil seal. Using hammer and oil seal installer, drive oil seal into torque converter housing until oil seal is fully seated.

TRANSAXLE HOUSING

Disassembly

1. To remove countershaft, mainshaft and sub-shaft bearings, expand snap ring retaining bearing in transaxle housing. Press bearings from transaxle housing.
2. DO NOT remove snap ring from transaxle housing unless necessary to clean groove in transaxle housing. Using hammer and drift, tap differential oil seal from transaxle housing.

Cleaning & Inspection

Clean components with solvent and dry with compressed air. Inspect transaxle housing for cracks and damage

in bearing areas. Replace transaxle housing if damaged.

Reassembly

1. Coat components with ATF. To install bearings, expand snap ring. Using press and driver, press bearing part way into transaxle housing.

CAUTION: Ensure bearing is installed with groove facing toward outside of transaxle housing so snap ring will engage with bearing.

2. Release snap ring. Continue pressing bearing into transaxle housing until snap ring engages in bearing. Ensure snap ring is fully seated.

CAUTION: If differential carrier, differential bearings, transaxle housing, torque converter housing or snap rings are replaced, differential bearing side clearance must be checked. See DIFFERENTIAL BEARING SIDE CLEARANCE under TRANSAXLE REASSEMBLY.

3. Once correct differential bearing side clearance is obtained, install differential oil seal using hammer and oil seal installer until oil seal is fully seated.

DIFFERENTIAL ASSEMBLY

Disassembly

1. Before disassembling differential assembly, check side gear backlash. Place differential assembly on "V" blocks with both axle shafts installed.
2. Install dial indicator with stem resting against pinion gear. See **Fig. 27** . Check side gear backlash. Side gear backlash should be .002-.006" (.05-.15 mm). If side gear backlash is not within specification, replace differential carrier.
3. If replacing differential bearings, use bearing puller to remove differential bearings from differential carrier. Remove bolts and ring gear.

NOTE: 2WD ring gear bolts have left-hand threads.

4. If removing speedometer drive gear, remove snap ring, speedometer drive gear and roller. See **Fig. 28** and **Fig. 29** .

Cleaning & Inspection

Clean components with solvent and dry with compressed air. Inspect components for wear and damage. Replace components as necessary.

Reassembly

1. Install roller for speedometer drive gear in differential carrier. Install speedometer drive gear with

chamfered side on inside of gear toward differential carrier. See **Fig. 28** and **Fig. 29** . Ensure cutout area on speedometer drive gear is aligned with roller.

CAUTION: Ensure speedometer drive gear is installed with chamfered side on inside of gear toward differential carrier.

2. Align hooked end of snap ring with pinion shaft on differential carrier and install snap ring. See **Fig. 30** . Ensure snap ring is installed so hooked end of snap ring is facing in proper direction. See **Fig. 30** .

CAUTION: Ensure ring gear is installed with chamfered side on inside of ring gear toward differential carrier.

3. Install ring gear on differential carrier with chamfered side on inside of ring gear toward differential carrier. See **Fig. 28** and **Fig. 29** . Install and tighten ring gear bolts to specification. See **TORQUE SPECIFICATIONS** . Using press, install NEW differential bearings on differential carrier (if removed).

CAUTION: If differential carrier, differential bearings, transaxle housing, torque converter housing or snap rings are replaced, differential bearing side clearance must be checked. See **DIFFERENTIAL BEARING SIDE CLEARANCE** under TRANSAXLE REASSEMBLY.

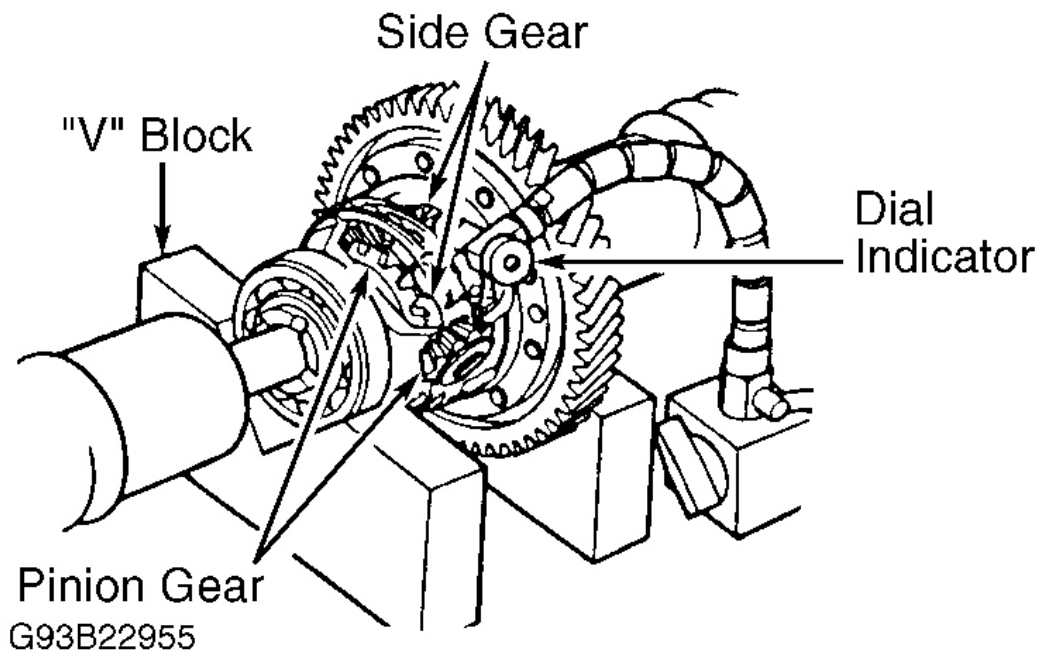
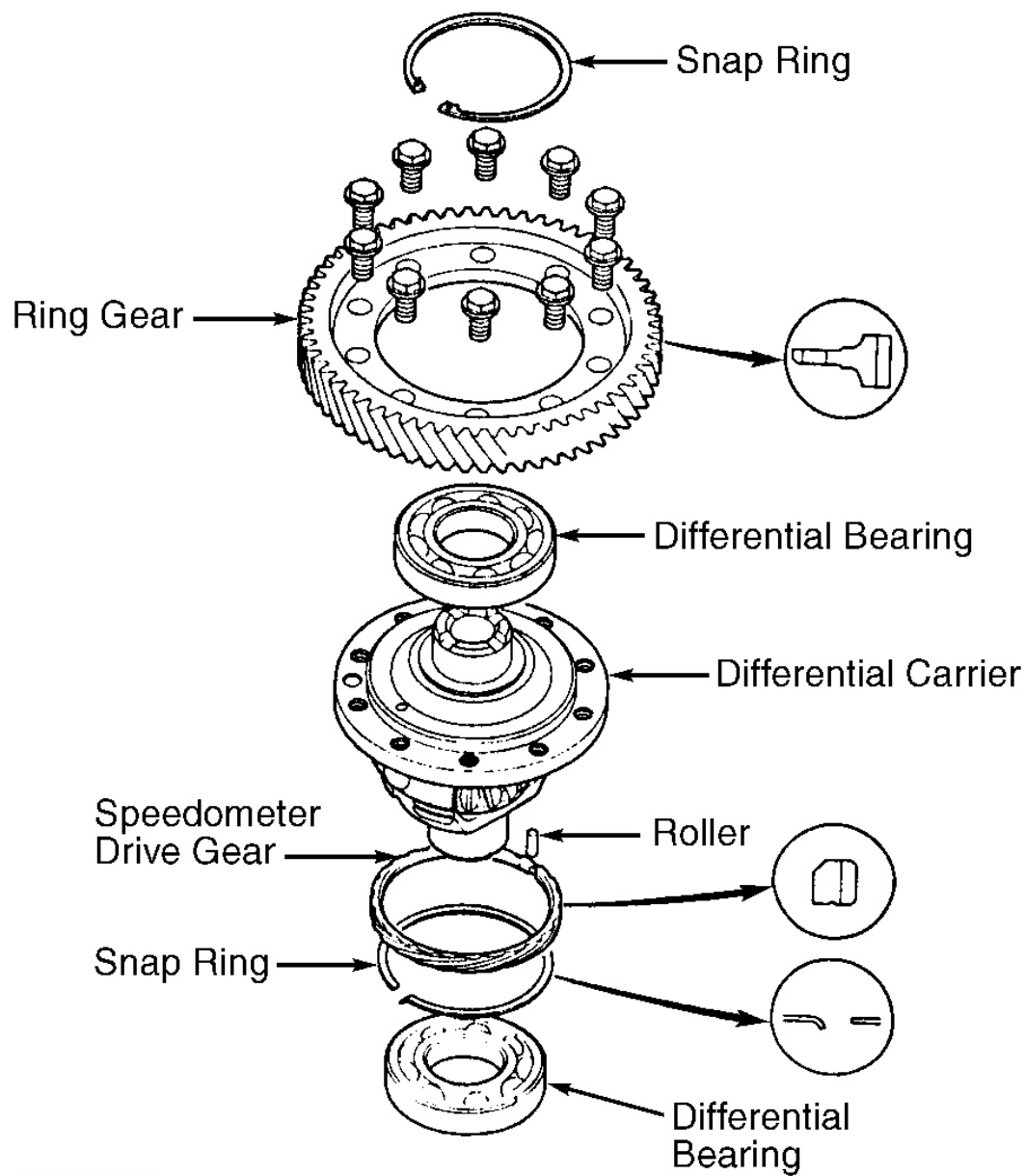


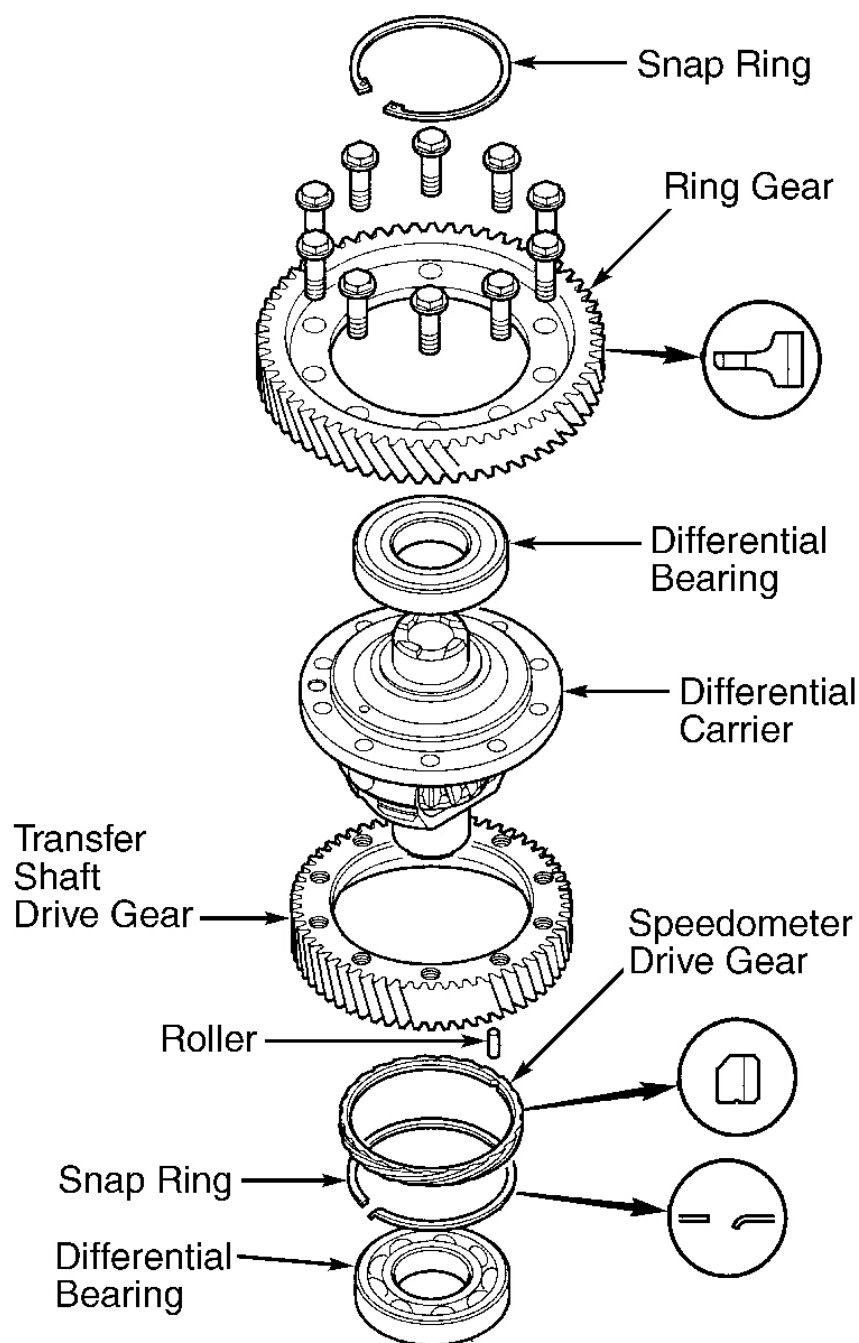
Fig. 27: Checking Side Gear Backlash

Courtesy of AMERICAN HONDA MOTOR CO., INC.



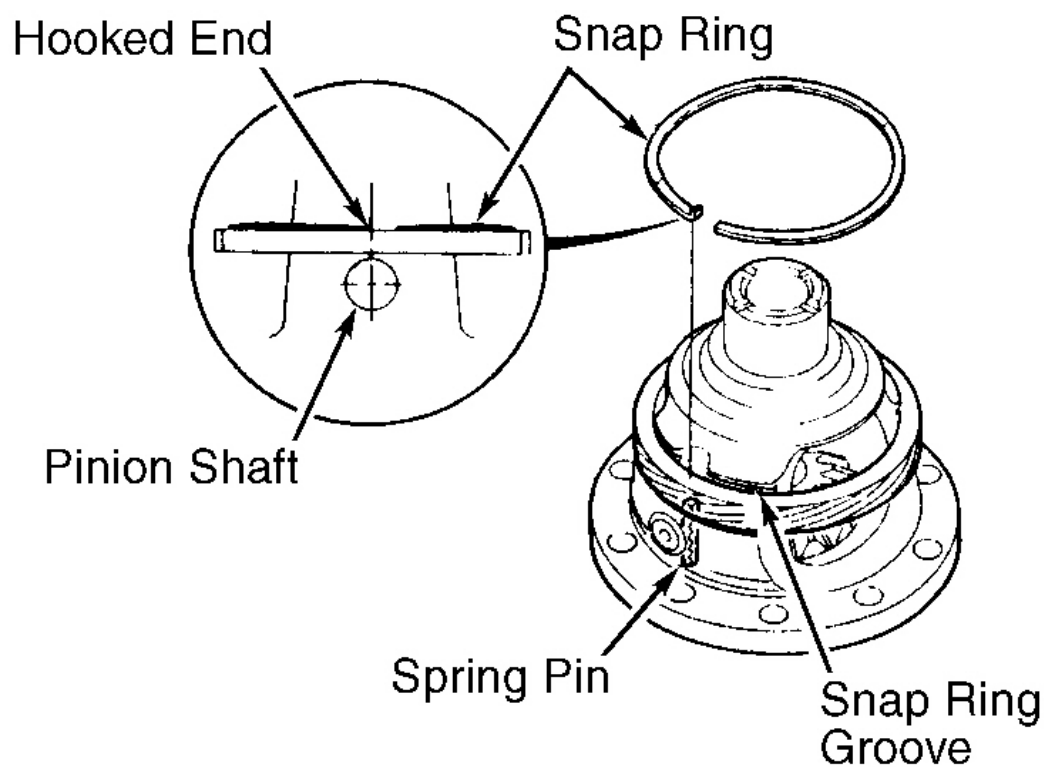
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Fig. 28: Exploded View Of Differential Assembly (2WD)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 29: Exploded View Of Differential Assembly (4WD)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



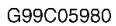
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Fig. 30: Installing Speedometer Drive Gear Retaining Snap Ring
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

TRANSFER GEAR ASSEMBLY

Disassembly

NOTE: Shaft lock nut has left-hand threads.



1. Before disassembling transfer gear assembly, check gear backlash. Place transfer gear assembly in soft-jawed vise. Attach dial indicator to companion flange. Measure transfer gear backlash. Transfer gear

backlash should be .002-.006" (.06-.16 mm). If transfer gear backlash is not within specification, adjust during reassembly procedure. See **REASSEMBLY** .

2. Remove covers. Cut lock nut tabs with chisel. Place Allen wrench in gear side of transfer shaft. Mount Allen wrench in bench vise. Remove shaft lock nut and conical spring washer.
3. Remove transfer shaft, drive gear, thrust shim, shaft collar and tapered roller bearing from transfer housing. See **Fig. 31** . Mount transfer assembly in soft-jawed vise. Using Companion Flange Holder (07AJB-TB401A), remove driven gear shaft lock nut and conical spring washer.
4. Remove back-up spring, "O" ring and companion flange. Remove driven gear shaft. Remove spacer from driven gear shaft. Remove oil seal and tapered roller bearing from transfer housing.
5. To remove tapered roller bearings from drive gear and driven gear shaft, use a bearing separator and a press. Using a hammer and drift, remove roller bearing from transfer housing. See **Fig. 32** .
6. To remove race from transfer cover "A", heat cover to 212°F (100°F) using a heat gun. Remove all transfer housing bearing races using hammer and drift. See **Fig. 33** .

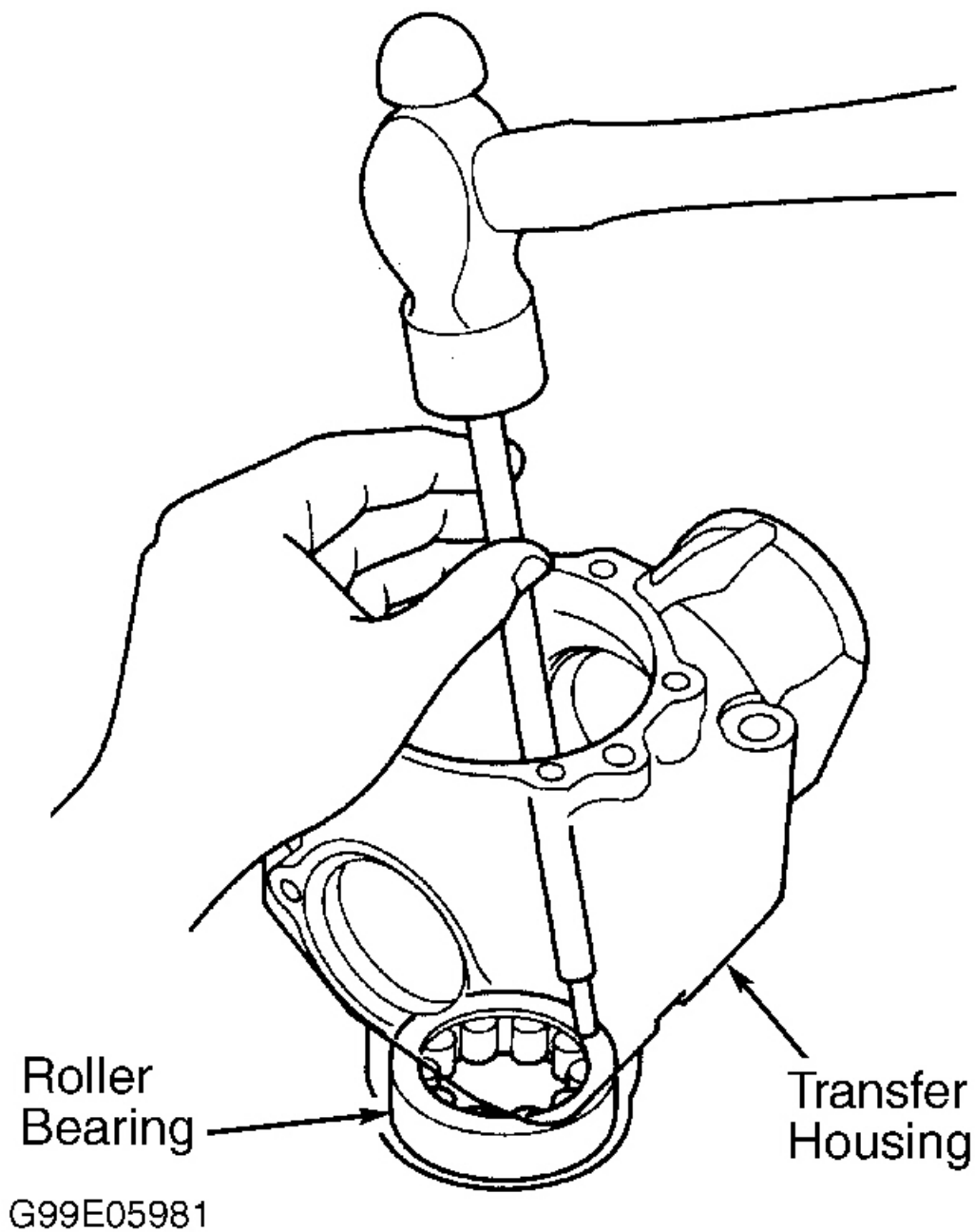
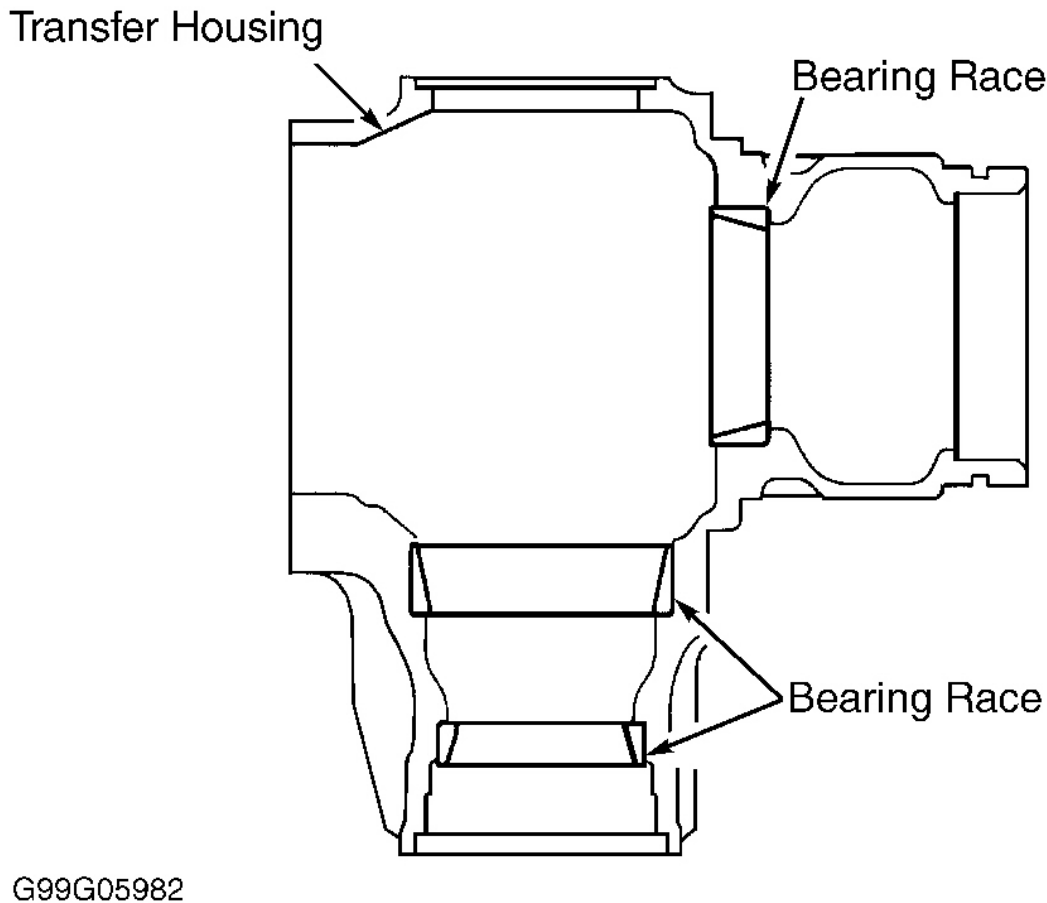


Fig. 32: Removing Roller Bearing From Transfer Housing
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 33: Removing Bearing Races From Transfer Housing
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Cleaning & Inspection

Clean components with solvent and dry with compressed air. Inspect components for wear and damage. Replace components as necessary.

Reassembly

1. Using press and appropriate driver, install transfer housing and transfer cover "A" bearing races. See **Fig. 33** . Press roller bearing into transfer housing. See **Fig. 32** . Install thrust shim on driven gear shaft. Press tapered roller bearing onto driven gear shaft.
2. Place tapered roller bearing on race of companion flange. Install NEW oil seal on transfer housing. Install driven gear shaft in transfer housing. DO NOT install spacer at this time. Install companion flange, conical spring washer and lock nut. DO NOT install "O" ring or back-up spring at this time.
3. Mount transfer assembly in soft-jawed vise. Using Companion Flange Holder (07AJB-TB401A), tighten

lock nut while measuring starting torque. Tighten lock nut to a starting (turning) torque of 8.68-12.30 INCH lbs. (.98-1.39 N.m).

4. Install transfer shaft in transfer housing. Install tapered roller bearing, shaft collar, thrust shim, drive gear, conical spring washer and lock nut on transfer shaft. Place Allen wrench in transfer gear. Mount Allen wrench in bench vise. Tighten lock nut to 87 ft. lbs. (118 N.m). Install transfer cover "A" without "O" ring.
5. Rotate companion flange several times. Set dial indicator on companion flange and measure backlash. Ensure backlash is .002-.006" (.06-.16 mm). If backlash is not within specification, remove lock nut and replace transfer shaft thrust shim. See **SMALL TRANSFER SHAFT THRUST SHIM SPECIFICATIONS** table. Recheck backlash.
6. Apply Prussian Blue to transfer gear teeth. Rotate transfer gear one full turn in each direction. Tooth contact should be in center of gear tooth. For diagnosis of tooth contact pattern, see **Fig. 34** . To adjust gear contact pattern under the following conditions:

- **Toe Contact**

Use thicker driven gear shaft thrust shim. This will change backlash. Increase thickness of small transfer shaft thrust shim and decrease thickness of large transfer shaft thrust shim by same amount to correct backlash.

- **Heel Contact**

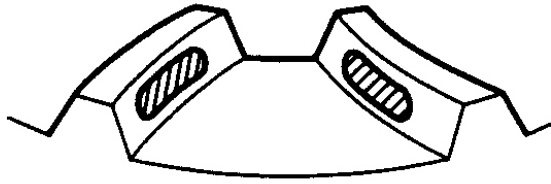
Use thinner driven gear shaft thrust shim. This will change backlash. Decrease thickness of small transfer shaft thrust shim and increase thickness of large transfer shaft thrust shim by same amount to correct backlash.

- **Flank Contact**

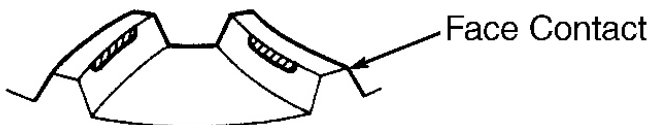
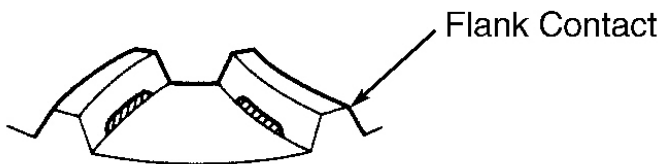
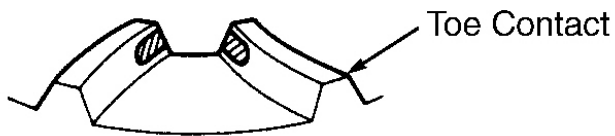
Use thinner small transfer shaft thrust shim. This adjustment may be made within backlash tolerance. If backlash exceeds tolerance, decrease thickness of small transfer shaft thrust shim and increase thickness of large transfer shaft thrust shim by same amount to correct backlash.

- **Face Contact**

Use thicker small transfer shaft thrust shim. This adjustment may be made within backlash tolerance. Increase thickness of small transfer shaft thrust shim and decrease thickness of large transfer shaft thrust shim by same amount to correct backlash.



CORRECT TOOTH CONTACT PATTERN



INCORRECT TOOTH CONTACT PATTERN

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Fig. 34: Diagnosing Gear Contact Pattern

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove transfer shaft from housing. Mount transfer assembly in soft-jawed vise. Using Companion Flange Holder (07AJB-TB401A), remove driven gear shaft lock nut and conical spring washer.

8. Remove driven gear shaft and companion flange. Install NEW spacer on driven gear shaft. See **Fig. 31** . Reinstall driven gear shaft. Install companion flange, "O" ring, back-up spring, conical spring washer and lock nut.
9. Using Companion Flange Holder (07AJB-TB401A), tighten lock nut while measuring starting torque. Tighten lock nut to 97-159 ft. lbs. (132-216 N.m) and a starting (turning) torque of 8.68-12.30 INCH lbs. (.98-1.39 N.m). Rotate companion flange several times to seat bearings.
10. If starting torque exceeds specification with minimum tightening torque or if tightening torque exceeds specification with starting torque below specification, replace transfer spacer. Document starting torque for later computations of total starting torque. Stake driven gear shaft lock nut.
11. Install transfer shaft. Install tapered roller bearing, collar, thrust shim, drive gear, conical spring washer and lock nut. Place Allen wrench in transfer gear. Mount Allen wrench in bench vise. Tighten lock nut to 87 ft. lbs. (118 N.m). Stake lock nut. Install transfer cover "A" without "O" ring.
12. Mount transfer assembly in soft-jawed vise. Rotate companion flange several times to seat bearings. Measure total starting torque. Ensure total starting torque is 15.0-18.4 INCH lbs. (1.70-2.08 N.m) plus amount noted in step 10 . If total starting torque is not within specification, go to next step. If total starting torque is within specification, go to step 15 .
13. Remove transfer cover "A". Using heat gun, remove large transfer shaft shim from behind bearing race. Change thrust shim thickness to adjust total starting torque. See **LARGE TRANSFER SHAFT THRUST SHIM SPECIFICATIONS** table.
14. Press bearing race over NEW large transfer shaft thrust shim. Recheck total starting torque. If total starting torque is within specification, go to next step. If total starting torque is not within specification, repeat step 13 .
15. Install NEW "O" rings on transfer covers "A" and "B". Install transfer covers "A" and "B" and tighten bolts to specification.

SMALL TRANSFER SHAFT THRUST SHIM SPECIFICATIONS

Shim No.	Part Number	Thickness In. (mm)
1	29411-P1C-000	.067 (1.70)
2	29412-P1C-000	.068 (1.73)
3	29413-P1C-000	.069 (1.76)
4	29414-P1C-000	.070 (1.79)
5	29415-P1C-000	.072 (1.82)
6	29416-P1C-000	.073 (1.85)
7	29417-P1C-000	.074 (1.88)
8	29418-P1C-000	.075 (1.91)
9	29419-P1C-000	.076 (1.94)
10	29420-P1C-000	.078 (1.97)
11	29421-P1C-000	.079 (2.00)
12	29422-P1C-000	.080 (2.03)
13	29423-P1C-000	.081 (2.06)
14	29424-P1C-000	.082 (2.09)
15	29425-P1C-000	.083 (2.12)
16	29426-P1C-000	.085 (2.15)

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17	29427-P1C-000	.086 (2.18)
18	29428-P1C-000	.087 (2.21)
19	29429-P1C-000	.088 (2.24)

LARGE TRANSFER SHAFT THRUST SHIM SPECIFICATIONS

Shim No.	Part Number	Thickness In. (mm)
ZV	23974-P1C-020	.056 (1.41)
ZW	23975-P1C-020	.057 (1.44)
ZX	23976-P1C-020	.058 (1.47)
ZY	23977-P1C-020	.059 (1.50)
ZZ	23978-P1C-020	.060 (1.53)
A	23941-PW5-000	.061 (1.56)
B	23942-PW5-000	.063 (1.59)
C	23943-PW5-000	.064 (1.62)
D	23944-PW5-000	.065 (1.65)
E	23945-PW5-000	.066 (1.68)
F	23946-PW5-000	.067 (1.71)
G	23947-PW5-000	.069 (1.74)
H	23948-PW5-000	.070 (1.77)
I	23949-PW5-000	.071 (1.80)
J	23950-PW5-000	.072 (1.83)
K	23951-PW5-000	.073 (1.86)
L	23952-PW5-000	.074 (1.89)
M	23953-PW5-000	.076 (1.92)
N	23954-PW5-000	.077 (1.95)
O	23955-PW5-000	.078 (1.98)
P	23956-PW5-000	.079 (2.01)
Q	23957-PW5-000	.080 (2.04)
R	23958-PW5-000	.081 (2.07)
S	23959-PW5-000	.083 (2.10)
T	23960-PW5-000	.084 (2.13)
U	23961-PW5-000	.085 (2.16)
V	23962-PW5-000	.086 (2.19)
W	23963-PW5-000	.087 (2.22)
X	23964-PW5-000	.089 (2.25)
Y	23965-PW5-000	.090 (2.28)
Z	23966-PW5-000	.091 (2.31)
AA	23967-PW5-000	.092 (2.34)
AB	23968-PW5-000	.093 (2.37)
AC	23969-PW5-000	.094 (2.40)
AD	23970-P1C-000	.096 (2.43)

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AZ	23941-PW8-000	.097 (2.46)
BZ	23942-PW8-000	.098 (2.49)
CZ	23943-PW8-000	.099 (2.52)
DZ	23944-PW8-000	.100 (2.55)
EZ	23945-PW8-000	.102 (2.58)

TRANSAXLE REASSEMBLY**DIFFERENTIAL BEARING SIDE CLEARANCE**

CAUTION: If differential carrier, differential bearings, transaxle housing, torque converter housing or snap rings are replaced, differential bearing side clearance must be checked.

1. Install .098" (2.50 mm) thick snap ring in transaxle housing. This is the snap ring that differential bearing seats against. Ensure snap ring is fully seated.
2. Tap differential assembly into torque converter housing using Driver (07746-0030100). Perform STEP 1. See **Fig. 35** . Ensure differential bearing on differential carrier is fully seated on torque converter housing.
3. Install gasket and transaxle housing on torque converter housing. Install and tighten transaxle housing bolts to 33 ft. lbs. (45 N.m) in 2 steps using proper sequence. See **Fig. 36** .
4. Using driver, tap on transaxle housing side of differential assembly to fully seat differential bearings. Perform STEP 2. See **Fig. 35** . Ensure differential bearings are fully seated in both housing.
5. Using feeler gauge, measure differential bearing side clearance between snap ring and bearing on the transaxle housing. See **Fig. 37** . Replace snap ring if differential bearing side clearance exceeds .006" (.15 mm). Different thickness snap rings are available. See the **SNAP RING SPECIFICATIONS** table. Recheck differential bearing side clearance. Remove transaxle housing and differential assembly.

SNAP RING SPECIFICATIONS

Part Number	Thickness In. (mm)
90414-689-000	.098 (2.50)
90415-689-000	.102 (2.60)
90416-689-000	.106 (2.70)
90417-689-000	.110 (2.80)
90418-689-000	.114 (2.90)
90419-PH8-000	.118 (3.00)

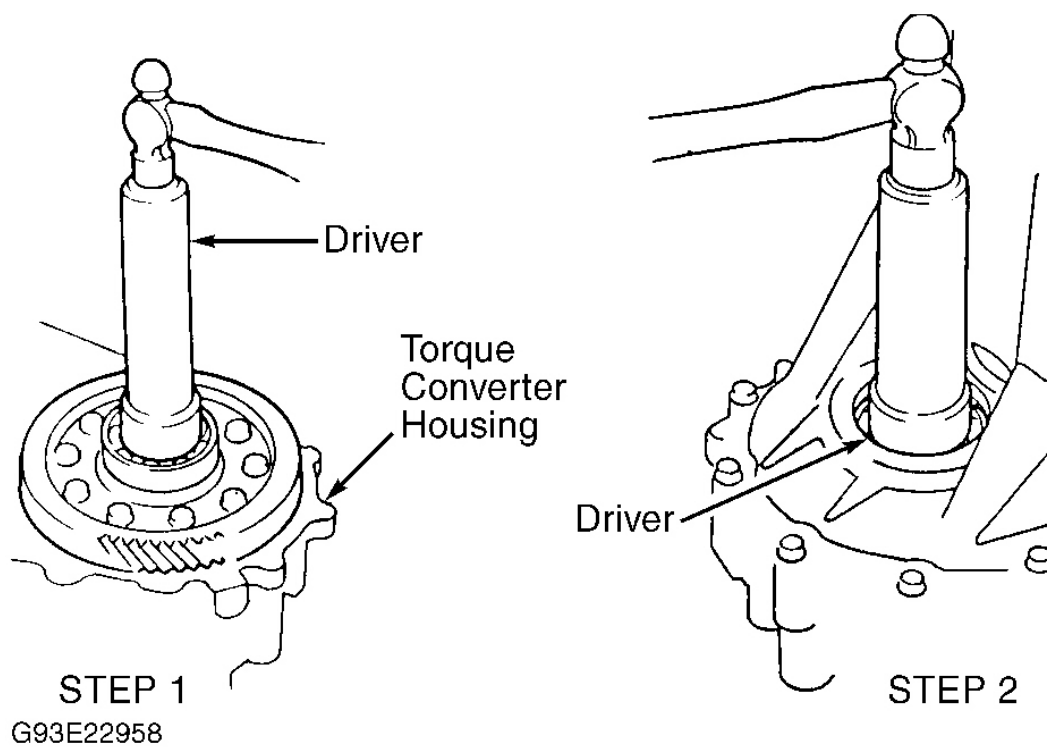
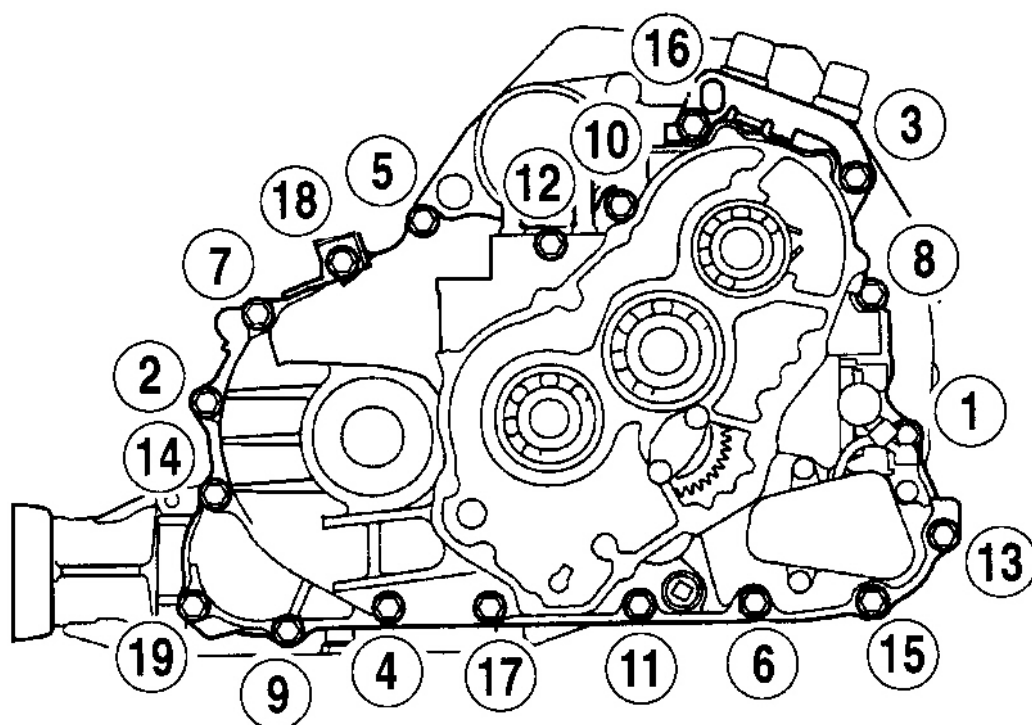


Fig. 35: Installing Differential Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 36: Transaxle Housing Bolt Tightening Sequence
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

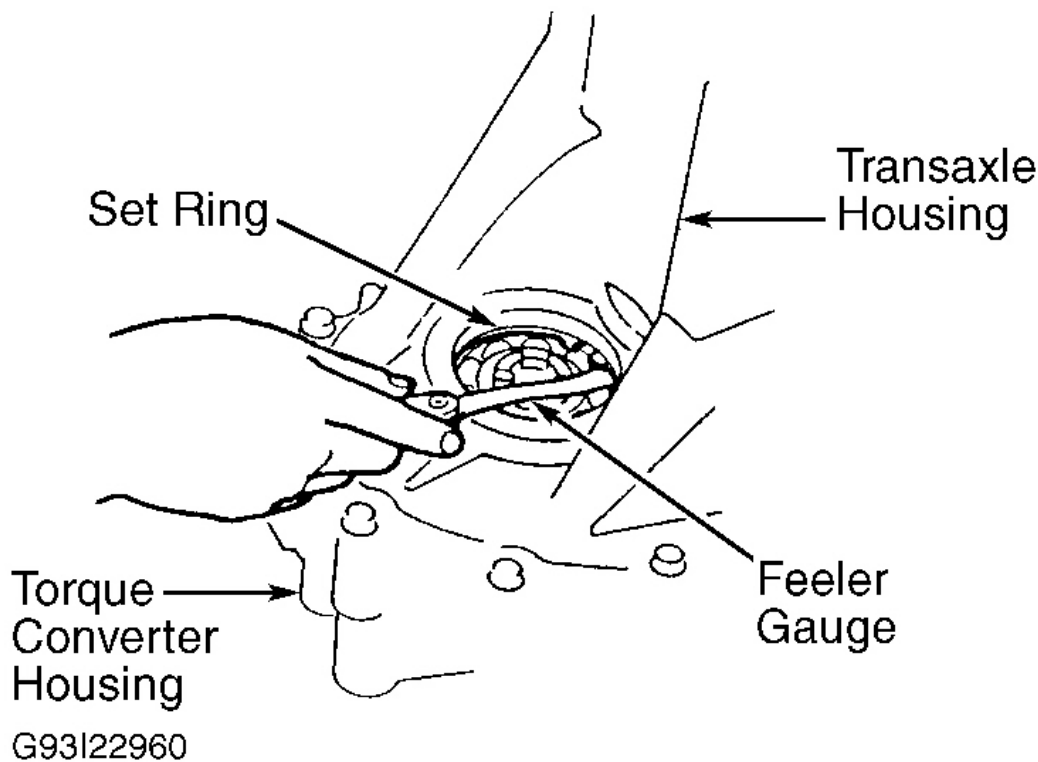


Fig. 37: Checking Differential Bearing Side Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

VALVE BODIES & INTERNAL COMPONENTS

CAUTION: If differential carrier, differential bearings, transaxle housing, torque converter housing or snap rings are replaced, differential bearing side clearance must be checked. See **DIFFERENTIAL BEARING SIDE CLEARANCE** .

NOTE: Coat all components with ATF before reassembly.

1. Install needle bearing on end of reverse idler gear shaft holder. Install reverse idler gear in transaxle housing (if removed). Install reverse idler gear shaft holder on transaxle housing. Install and tighten reverse idler gear shaft holder bolts to specification. See **TORQUE SPECIFICATIONS** .
2. Install magnet and suction pipe collar on torque converter housing. See **Fig. 13** . Install dowel pins and separator plate for main valve on torque converter housing.

CAUTION: Ensure oil pump driven gear is installed with groove and chamfered

side facing upward (toward main separator plate).

3. Install oil pump drive gear, oil pump driven gear and oil pump driven gear shaft. Install main valve body. Install and tighten main valve body bolts to specification.

CAUTION: Ensure oil pump gears rotate smoothly and oil pump driven gear shaft moves freely once main valve body is installed. If components do not operate correctly, loosen bolts, and realign oil pump gears and oil pump driven gear shaft. Failure to align oil pump driven gear shaft may result in seized oil pump gears or shaft.

4. Ensure check balls are installed in main valve body. See **Fig. 14** . Install separator plate, dowel pins and secondary valve body on main valve body. Install and tighten bolts to specification. Ensure check balls and 1st accumulator choke are installed in secondary valve body. See **Fig. 16** .
5. Install control shaft on torque converter housing so control shaft engages manual valve on main valve body. Install detent arm and detent arm shaft on main valve body. Hook detent spring on detent arm.
6. Install separator plate and servo body. Install and tighten bolts to specification. Using NEW "O" ring, install accumulator cover. Install and tighten bolts to specification.
7. Install servo detent base and fluid strainer. Install NEW bolt locks on servo detent base bolts. Install and tighten bolts to specification. Bend over tabs on bolt locks.
8. Install stator shaft, NEW "O" ring and stopper shaft. Install stopper shaft support on secondary valve body. Install regulator valve body. Install and tighten bolts to specification.
9. Install cooler check valve and torque converter check valve and springs on regulator valve body. See **Fig. 17** . Install separator plate, dowel pins, lock-up valve body and lubrication plate on regulator valve body. Install and tighten bolts to specification.
10. Install oil feed pipes in accumulator cover, servo detent base, servo body, lock-up valve body and main valve body. See **Fig. 13** .
11. Install sub-shaft and components in transaxle housing (if removed). See **SUB-SHAFT & COMPONENTS** under COMPONENT DISASSEMBLY & REASSEMBLY.
12. Install differential assembly in torque converter housing. Using Driver (07746-0030100), tap differential assembly into torque converter housing. Perform STEP 1. See **Fig. 35** . Ensure differential bearing on differential carrier is fully seated on torque converter housing.
13. Install mainshaft and countershaft as an assembly on torque converter housing. Rotate shift fork shaft on servo body so large chamfered hole aligns with hole in reverse shift fork.
14. Install reverse shift fork and reverse selector. See **Fig. 12** . Install reverse shift fork bolt and NEW bolt lock. Tighten bolt to specification. Bend over tabs on bolt lock.
15. Install countershaft reverse gear, needle bearing and countershaft reverse gear collar on countershaft. See **Fig. 12** . Install dowel pins and NEW gasket on torque converter housing.
16. Align spring pin on control shaft with groove on transaxle housing by rotating control shaft. See **Fig. 11** .
17. Install transaxle housing on torque converter housing. Install and tighten transaxle housing bolts to specification in 2 steps using proper sequence. See **Fig. 36** .
18. Install mount bracket on transaxle housing. See **Fig. 12** . Install and tighten mount bracket bolts to specification.

19. Install mainshaft holder on mainshaft. See **Fig. 9** . Install parking brake lever with parking brake stopper and parking brake lever spring on control shaft. See **Fig. 8** .
20. Install mainshaft 1st gear collar and thrust washer on mainshaft. Install countershaft 1st gear collar, needle bearing and countershaft 1st gear with one-way clutch and parking gear on countershaft.
21. Install parking pawl stopper, parking pawl shaft, parking pawl spring and parking pawl on transaxle housing.
22. Engage parking pawl with parking gear. Install old spring washer and lock nut on countershaft. Tighten nut to 76 ft. lbs. (103 N.m) to seat parking gear and countershaft 1st gear on countershaft. Remove old lock nut and spring washer from countershaft.
23. Install sub-shaft 1st gear on sub-shaft. Wrap splines on mainshaft with tape. Install NEW "O" rings on mainshaft. Install mainshaft 1st gear on mainshaft. See **Fig. 8** . Install needle bearing, thrust needle bearing, thrust washer and 1st clutch assembly on mainshaft.
24. Align hole in sub-shaft 1st gear with hole in transaxle housing. Install pin in sub-shaft 1st gear and transaxle housing to prevent sub-shaft 1st gear from rotating. See **Fig. 10** .

CAUTION: Ensure spring washers are installed in correct direction. See Fig. 10 .

25. Install NEW spring washers and NEW lock nuts on mainshaft, countershaft and sub-shaft. Ensure spring washers are installed with large area against the gear. See **Fig. 10** .

NOTE: Mainshaft and countershaft contain left-hand threads.

26. Tighten lock nuts on mainshaft, countershaft and sub-shaft to specification. Remove pin from sub-shaft 1st gear. Remove mainshaft holder.
27. Stake flange area of mainshaft lock nut against 1st clutch assembly. Stake threaded area of countershaft lock nut against threads on countershaft. Stake threaded area of sub-shaft lock nut against threads of sub-shaft.

CAUTION: Ensure all lock nuts are securely staked.

28. Place parking brake lever in "P" position. Ensure parking pawl engages parking gear. Measure parking brake stopper distance between parking pawl shaft and pin on the parking brake lever. See **Fig. 38** .
29. Parking brake stopper distance should be 2.87-2.91" (72.9-73.9 mm). If parking brake stopper distance is not within specification install different size parking brake stopper, and recheck parking brake stopper distance. Parking brake stopper is available in 3 different sizes. Consult parts department for parking brake stopper sizes.
30. Once correct parking brake stopper distance is obtained, install NEW bolt lock on bolt for parking brake stopper. Tighten parking brake stopper bolt to specification. Bend over tabs on bolt lock.
31. Using NEW gasket, install right side cover and right side cover protector. Install and tighten bolts to specification. Install throttle control lever with spring on throttle control shaft. Install and tighten bolt to specification.

32. To install remaining components, reverse removal procedure. Use NEW seal washers when installing joint bolts for cooler lines. Use NEW "O" ring when installing mainshaft or countershaft speed sensors. Tighten all fasteners to specification.

CAUTION: If transaxle failure existed, flush oil cooler. See OIL COOLER FLUSHING under ON-VEHICLE SERVICE.

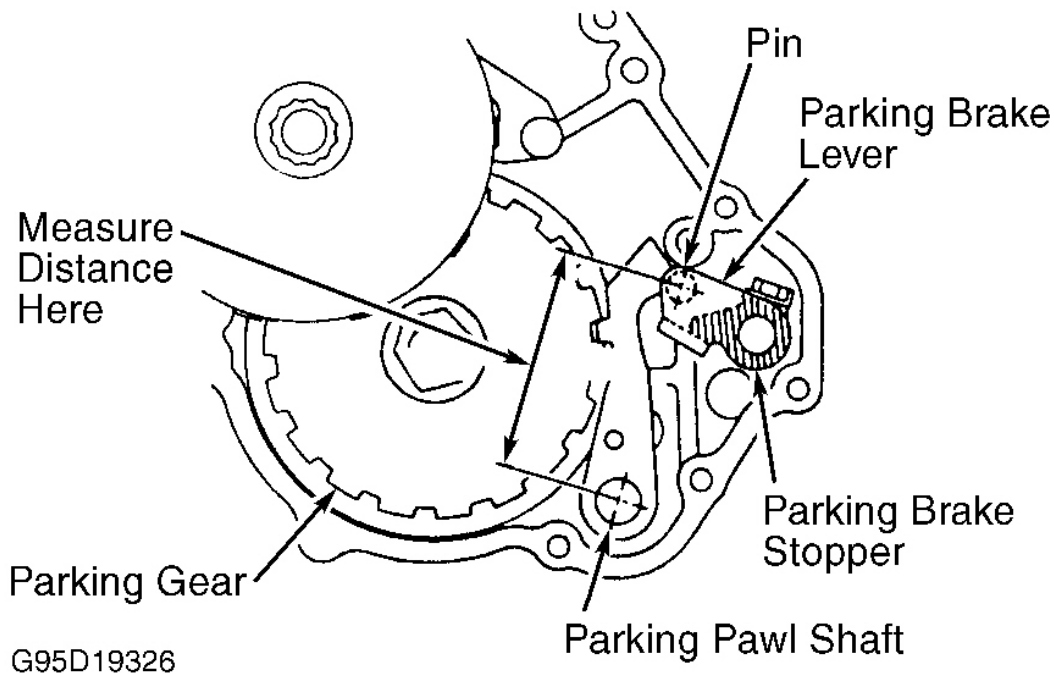


Fig. 38: Measuring Parking Brake Stopper Distance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Countershaft Lock Nut	76 (103)
Drain Plug	36 (49)
Joint Bolt	21 (29)
Mainshaft Lock Nut	58 (78)
Mount Bracket Bolt	47 (64)
Parking Brake Stopper Bolt	10 (14)
Pressure Tap Plug	13 (18)

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Reverse Shift Fork Bolt	10 (14)
Ring Gear Bolt	74 (100)
Sub-Shaft Lock Nut	69 (94)
Transaxle Housing Bolt ⁽¹⁾	33 (45)
Transfer Covers "A" & "B"	17 (24)
Vehicle Speed Sensor Bolt	16 (22)
INCH Lbs. (N.m)	
Accumulator Cover Bolt	106 (12.0)
Countershaft Speed Sensor Bolt	106 (12.0)
Lock-Up Control Solenoid Valve Assembly Bolt	106 (12.0)
Lock-Up Valve Body Bolt	106 (12.0)
Mainshaft Speed Sensor Bolt	106 (12.0)
Main Valve Body Bolt	106 (12.0)
Needle Bearing Stopper Bolt	106 (12.0)
Regulator Valve Body Bolt	106 (12.0)
Reverse Idler Gear Shaft Holder Bolt	106 (12.0)
Right Side Cover Bolt	106 (12.0)
Secondary Valve Body Bolt	106 (12.0)
Servo Body Bolt	106 (12.0)
Servo Detent Base Bolt	106 (12.0)
Shift Control Solenoid Valve Assembly Bolt	106 (12.0)
Stopper Bolt	106 (12.0)
Throttle Cam Stopper Bolt	106 (12.0)
Throttle Control Lever Bolt	69 (7.8)

(1) Tighten bolts to specification in sequence. See **Fig. 36**.**TRANSAXLE SPECIFICATIONS****TRANSAXLE SPECIFICATIONS**

Application	Specification In. (mm)
Clutch Clearance	
1st Clutch	.026-.033 (.65-.85)
1st-Hold Clutch	.020-.031 (.50-.80)
2nd, 3rd & 4th Clutches	.016-.024 (.40-.60)
Differential Bearing Side Clearance	⁽¹⁾ .006 (.15)
Differential Side Gear Backlash	.002-.006 (.05-.15)
Gear Clearances	
Countershaft 2nd Gear	.002-.005 (.05-.13)
Mainshaft 2nd Gear-To-3rd Gear	.002-.005 (.05-.13)
Oil Pump Side Clearances	

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Oil Pump Drive Gear	.004-.005 (.105-.133)
Oil Pump Driven Gear	.0014-.0025 (.035-.063)
Oil Pump Thrust Clearance	
Standard	.0010-.0020 (.030-.050)
Wear Limit	.0028 (.070)
Parking Brake Stopper Distance	2.87-2.91 (72.9-73.9)
(1) This is the maximum clearance. Replace snap ring with different thickness snap ring if clearance exceeds specification.	