

## 1992 AUTOMATIC TRANSMISSIONS

## MPWA Overhaul

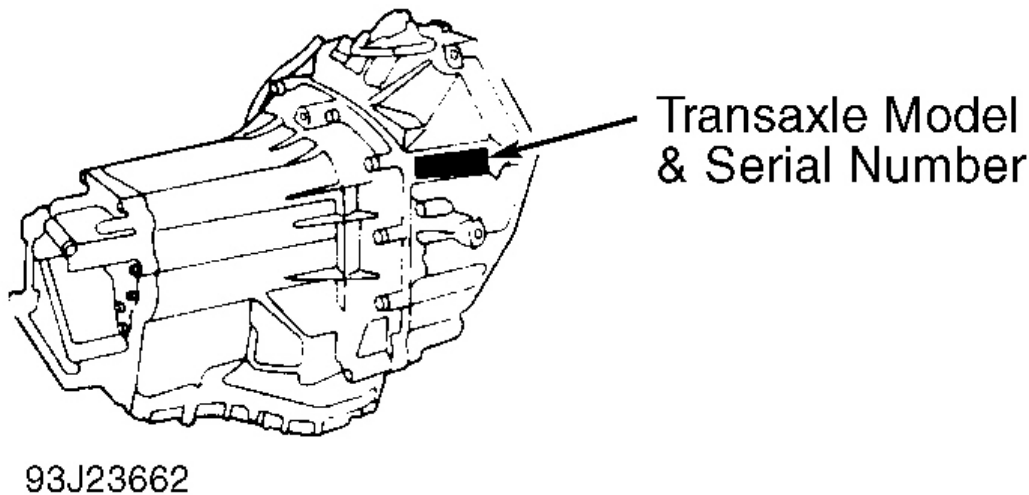
## APPLICATION

## TRANSAXLE APPLICATION

Application	Transaxle Model
Vigor	MPWA

## 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: Locating Transaxle Model & Serial Number**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

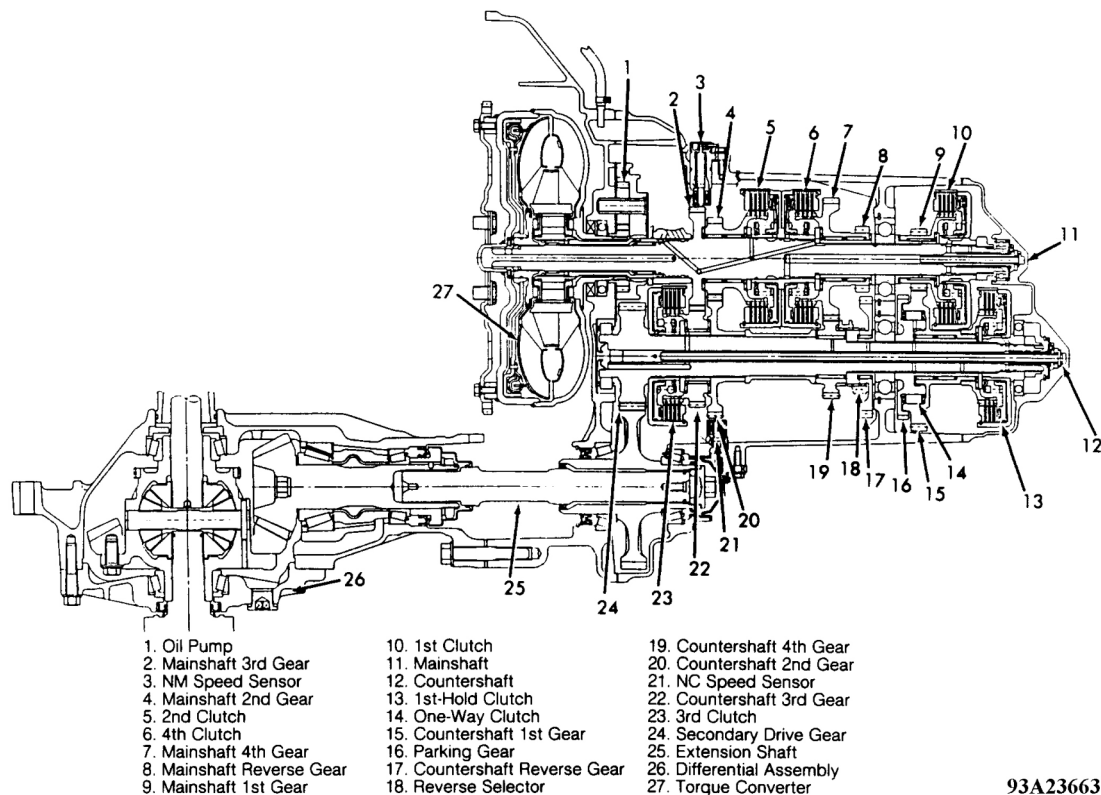
## DESCRIPTION

Automatic transaxle is electronically controlled with 4 forward speeds and one reverse speed. Transaxle consists of clutches, mainshaft, countershaft, shift control solenoid valves, lock-up control solenoid valves, linear solenoid and lock-up torque converter. See **Fig. 2** . Transaxle has a differential assembly bolted to the transaxle. Power is delivered from transaxle to the differential assembly by the extension shaft. See **Fig. 2** .

Lower valve body assembly consists of main valve body, servo body, shift control solenoid valves and oil pass

body. Lower valve body is bolted to transaxle housing. Other valve bodies used are regulator valve body, oil pump body, 2nd accumulator body and throttle valve body. These bodies are bolted to torque converter housing.

Transaxle shifting and torque converter lock-up are controlled by the Automatic Transaxle Control Unit (ATCU). Transaxle shifting is related to engine torque through the linear solenoid used to operate the throttle valve. The ATCU controls the linear solenoid located on the throttle valve body. The ATCU determines appropriate shift point and activates proper shift control solenoid valve for transaxle shifting.



**Fig. 2: Identifying Transaxle Components**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

## OPERATION

### INTRODUCTION

Shift lever has 7 positions. When shift lever is moved, manual valve on main valve body is moved by the shift cable. Shift lever also changes position of the shift position sensor, mounted on the transaxle. Shift position sensor delivers an input signal to the ATCU to indicate shift lever position. The ATCU uses this input signal for controlling shift control solenoid valves. The ATCU determines appropriate shift point and activates proper shift control solenoid valve for transaxle shifting.

When transaxle gear combinations are engaged by clutches, power is transmitted from mainshaft to countershaft to provide different gears. Shift lever positions operate as follows:

## SHIFT LEVER POSITION

### "P" (Park)

Front wheels lock as parking pawl engages with parking gear on countershaft. All clutches are released. Neutral safety switch, incorporated in shift position sensor, allows starting in this position.

### "R" (Reverse)

Reverse selector is engaged with countershaft reverse gear and 4th clutch is applied. Back-up light switch, incorporated in shift position sensor, operates back-up lights.

### "N" (Neutral)

All clutches are released. Neutral safety switch, incorporated in shift position sensor, allows starting in this position.

### "D4" (Drive)

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

### "D" (Drive)

Transaxle starts in 1st gear and upshifts automatically to 2nd gear and then 3rd gear. Transaxle will downshift through all gears on deceleration.

### "2" (Second)

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

### "1" (First)

Transaxle starts off and remains in 1st gear for engine braking. When in "D4" position, 2nd, 3rd and 4th gears, torque converter lock-up exists and transaxle mainshaft rotates at same speed as engine crankshaft. Under certain conditions, torque converter lock-up clutch is applied during deceleration. Torque converter lock-up is controlled by the ATCU. The ATCU receives various input signals and operates lock-up control solenoid valves. Operating of lock-up control solenoid valves controls the modulator pressure.

The ATCU contains a self-diagnostic system, which stores a fault code if a failure or problem exists in transaxle electronic control system. Fault code can be retrieved to determine transaxle problem area. For information on electronic transaxle components, see **MPWA 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 shift and key interlock systems, see **MPWA ELECTRONIC CONTROLS** article.

## **LUBRICATION**

See **SERVICING - ACURA VIGOR** article.

## **ON VEHICLE SERVICE**

### **AXLE SHAFTS**

See **FWD AXLE SHAFTS** article in DRIVELINE/AXLES.

### **DIFFERENTIAL ASSEMBLY**

See **REMOVAL & INSTALLATION** article.

### **LOWER VALVE BODY ASSEMBLY**

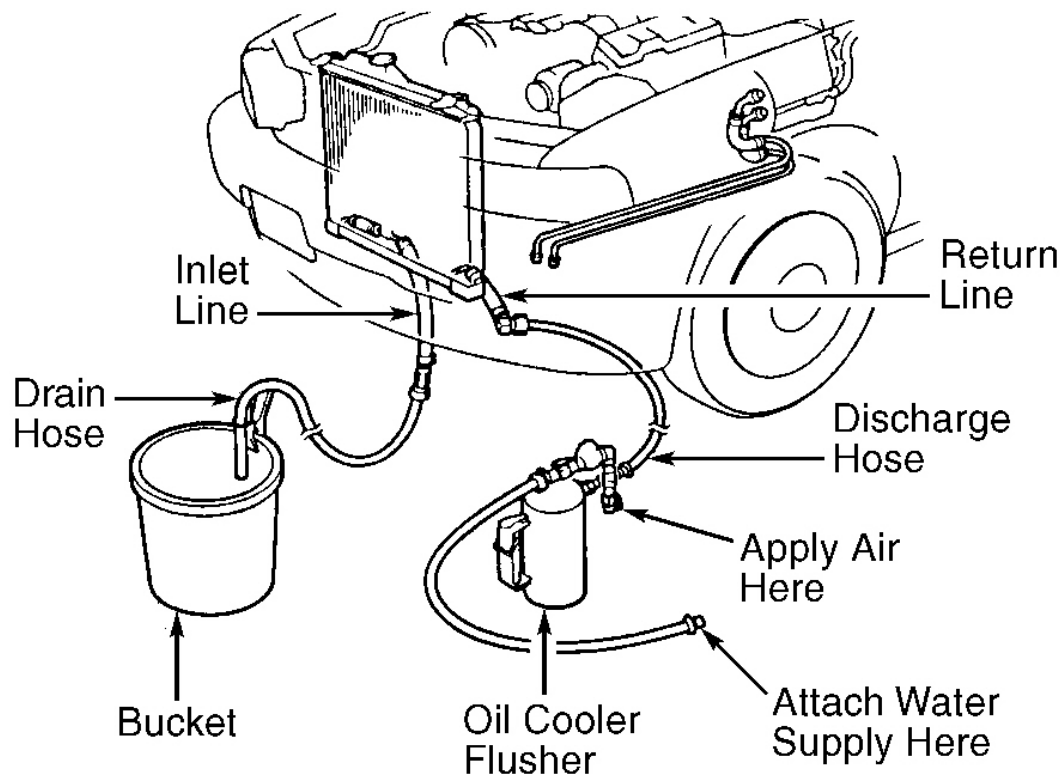
Lower valve body assembly consists of main valve body, servo body, shift control solenoid valves and oil pass body. See **LOWER VALVE BODY ASSEMBLY** .

### **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 turned off. Apply 80-120 psi (5.6-8.4 kg/cm<sup>2</sup> ) 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 approximately 30 seconds or until one quart (.9L) of ATF is discharged from return line. Shut engine off. Remove drain hose. Reinstall return line. Fill transaxle to proper level.



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**Fig. 3: Installing Oil Cooler Flusher**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

## TROUBLE SHOOTING

### INTRODUCTION

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**. Refer to the following symptoms and check the specified components:

### SYMPTOM DIAGNOSIS

#### Excessive Drag In Transaxle

- Binding Oil Pump

#### Excessive Idle Vibration

- Defective Torque Converter Or Oil Pump
- Incorrect Idle RPM
- Lock-Up Clutch Shift Valve Stuck

**Excessive Vibration (RPM Related)**

- Torque Converter Not Fully Seated In Oil Pump

**Flares On 1-2 Upshift**

- Defective Linear Solenoid
- Defective One-Way Clutch
- Defective 2nd Accumulator
- Improper Throttle Valve Adjustment
- Throttle Valve Stuck
- 1-2 Shift Valve Stuck

**Flares On 2-3 Upshift**

- Defective Linear Solenoid
- Defective One-Way Clutch
- Defective 3rd Accumulator
- Feedpipe "O" Ring Damaged
- Improper Throttle Valve Adjustment
- Throttle Valve Stuck
- 2-3 Shift Valve Stuck

**Flares On 3-4 Upshift**

- Defective Linear Solenoid
- Defective 4th Accumulator
- Feedpipe "O" Ring Damaged
- Improper Throttle Valve Adjustment
- Throttle Valve Stuck
- 3-4 Orifice Control Valve Stuck
- 3-4 Shift Valve Stuck

**Gear Whine That Changes With Shifts**

- Defective 1st Clutch
- Defective 3rd Gears

**Gear Whine That Changes With Speed**

- Defective Differential Gears

**Harsh Downshift At Closed Throttle**

- Throttle Valve Stuck

**Harsh Kickdown Shifts**

- Clutch Pressure Control Valve Stuck
- Defective Linear Solenoid
- Improper Throttle Valve Adjustment
- 3rd Or 4th Kickdown Valve Stuck

**Harsh Shift When Manually Shifting To "1"**

- Defective 1st-Hold Accumulator

**Harsh Upshifts & Downshifts**

- Check Balls Missing
- Clutch Pressure Control Valve Stuck
- Defective Linear Solenoid
- Improper Throttle Valve Adjustment
- Improper Type ATF
- Incorrect Clutch Clearance
- Throttle Valve Stuck
- 2-3 Or 3-4 Orifice Control Valve Stuck

**Harsh 1-2 Upshift**

- Defective 2nd Clutch
- Improper Throttle Valve Adjustment

**Harsh 2-1 Kickdown Shift**

- Clutch Pressure Control Valve Stuck
- Defective One-Way Clutch Or 1st Clutch

**Harsh 2-3 Upshift**

- Clutch Pressure Control Valve Stuck
- Defective 3rd Clutch
- Improper Throttle Valve Adjustment
- 2-3 Orifice Control Valve Stuck

**Harsh 3-4 Upshift**

- Clutch Pressure Control Valve Stuck
- Defective 4th Clutch
- Improper Throttle Valve Adjustment
- 3-4 Orifice Control Valve Stuck

**Lock-Up Clutch Does Not Lock Up Smoothly**

- Defective Torque Converter
- Lock-Up Clutch Control Valve Stuck
- Lock-Up Clutch Shift Valve Stuck

**Lock-Up Clutch Does Not Operate Properly**

- Defective Linear Solenoid
- Improper Throttle Valve Adjustment
- Lock-Up Clutch Control Valve Stuck
- Lock-Up Clutch Shift Valve Stuck
- Lock-Up Clutch Timing Valve Stuck
- Throttle Valve Stuck
- Torque Converter Check Valve Stuck

**No Engine Braking In "1"**

- Defective 1st Or 1st-Hold Clutch

**No Engine Braking In "2"**

- Defective 2nd Clutch Or 1st-Hold Clutch
- Defective One-Way Clutch

**Noise From Transaxle In All Gears**

- Defective Oil Pump
- Defective Torque Converter

**Noise From Transaxle With Wheels Rolling**

- Damaged Reverse Gears
- Defective Differential Assembly Or Secondary Gears

**Popping Noise When Taking Off In "R"**

- Damaged Reverse Gears



- Worn Reverse Selector

**Ratcheting Noise When Shifting To "R"**

- Damaged Reverse Gears
- Defective Oil Pump
- Pressure Regulator Stuck
- Worn Reverse Selector

**Ratcheting Noise When Shifting From "R" To "P" Or "N"**

- Damaged Reverse Gears
- Damaged 4th Gears
- Shift Fork Bent
- Worn Reverse Selector

**Shifts Erratically**

- Improperly Installed Springs Or Valves
- Modulator Valve Stuck
- 3rd Kickdown Valve Stuck

**Slips In All Gears**

- Defective Oil Pump
- Fluid Strainer Clogged
- Pressure Regulator Stuck

**Slips In Reverse**

- Defective 4th Clutch
- Worn Reverse Selector Or Reverse Gears

**Slips In 1st Gear**

- Defective One-Way Clutch
- Defective 1st Clutch Or 1st Accumulator
- Feedpipe "O" Ring Damaged

**Slips In 2nd Gear**

- Clutch Pressure Control Valve Stuck
- Defective One-Way Clutch
- Defective Seal Rings Or Guide

- Defective 2nd Clutch Or 2nd Accumulator
- 2-3 Shift Valve Stuck

**Slips In 3rd Gear**

- Clutch Pressure Control Valve Stuck
- Defective 3rd Clutch Or 3rd Accumulator
- Feedpipe "O" Ring Damaged
- 3-4 Shift Valve Stuck

**Slips In 4th Gear**

- Clutch Pressure Control Valve Stuck
- Defective 4th Clutch Or 4th Accumulator

**Upshifts Late**

- Modulator Valve Stuck

**Vehicle Locks In "R"**

- Parking Brake Lever Installed Upside-Down

**Vehicle Moves In All Gears Except "R"**

- Defective Or Improperly Adjusted Shift Cable
- Defective Or Worn Reverse Gears
- Servo Control Valve Stuck
- Worn Reverse Selector

**Vehicle Moves In All Gears Except "2"**

- Defective One-Way Clutch
- Defective Or Improperly Adjusted Shift Cable
- Defective Seal Rings Or Guide
- Defective 2nd Clutch Or 2nd Accumulator

**Vehicle Moves In "N"**

- Defective Or Improperly Adjusted Shift Cable
- Defective 1st, 2nd, 3rd Or 4th Clutch
- Incorrect Gear Or Clutch Clearance

**Vehicle Moves In "2" But Not In "D3" Or "D4"**

- Defective One-Way Clutch
- Defective Or Improperly Adjusted Shift Cable
- Defective 1st Clutch Or 1st Accumulator
- Feedpipe "O" Ring Damaged

**Vehicle Will Not Move**

- Defective Differential Assembly
- Defective Extension Shaft
- Defective Oil Pump
- Defective Or Improperly Adjusted Shift Cable
- Fluid Strainer Clogged
- Pressure Regulator Stuck

**Vehicle Will Not Move In "D3" Or "D4"**

- One-Way Clutch Installed Upside-Down

**Will Not Downshift To Low Gear**

- Defective 1st-Hold Clutch
- 1-2 Shift Valve Stuck

**Will Not Shift Into 4th Gear When In "D4"**

- Defective Or Improperly Adjusted Shift Cable
- Defective 4th Accumulator
- 3-4 Shift Valve Stuck
- 3-4 Orifice Control Valve Stuck

**Will Not Upshift (Stays In Low Gear)**

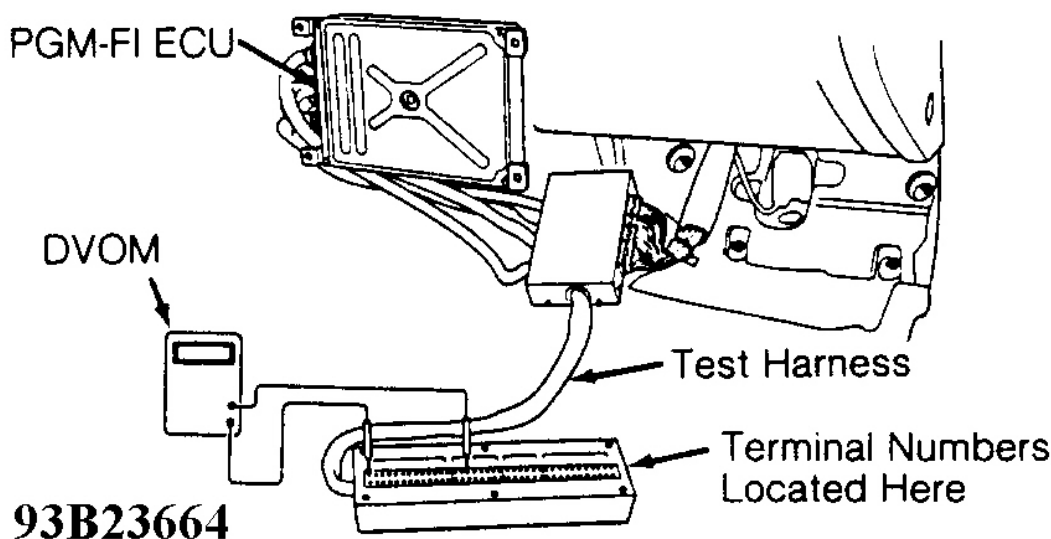
- Clutch Pressure Control Valve Stuck
- Modulator Valve Stuck
- 1-2 Shift Valve Stuck

**TESTING****ROAD TEST**

1. Warm engine to normal operating temperature. Apply parking brake and block wheels. Start engine. Move shift lever to "D4" while depressing brake pedal. Depress accelerator pedal and release it suddenly. Engine should not stall.

2. Repeat step 1 in "D3". Ensure engine does not stall. Ensure ignition is off. Remove door sill molding on passenger's side and remove small cover on right kick panel. Pull carpet back for access to PGM-FI Electronic Control Unit (ECU). This is the ECU for the fuel injection system.
3. Remove bracket from above ECU. Install Test Harness (07LAJ-PT3010A) between PGM-FI ECU and connector. The PGM-FI ECU is located on passenger's side, below carpet. See **Fig. 4**.

**NOTE:** Test harness is installed so throttle angle sensor voltage can be monitored while performing road test.



**Fig. 4: Installing Test Harness At PGM-FI ECU**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Install Digital Volt-Ohmmeter (DVOM) on test harness with positive lead at terminal D11 and negative lead at terminal D22. Terminal numbers are on top of test harness. See **Fig. 4**. Ensure digital volt-ohmmeter is set for measuring voltage.
5. Road test vehicle and check for abnormal noise and clutch slippage. Specified clutch is applied in designated gears. See **CLUTCH APPLICATION** table.
6. Note that shift points are within specification in accordance with throttle angle sensor voltage reading or throttle position with shift lever in "D4" position. See **TRANSAXLE UPSHIFT SPECIFICATIONS (MPH)** and **TRANSAXLE DOWNSHIFT SPECIFICATIONS (MPH)** tables.
7. With shift lever in "D4" position, accelerate to about 35 MPH so transaxle is in 4th gear. Move shift lever to "2" position, and ensure engine braking occurs.

**CAUTION: DO NOT shift from "D4" or "D" to "2" or "1" at speeds over 62.5 MPH or transaxle may be damaged.**

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8. Place shift lever in "1" position. Accelerate from a stop at full throttle. Check for abnormal noise or clutch slippage. Upshifts and downshifts should not occur in this range.
9. Place shift lever in "2" position. Accelerate from a stop at full throttle. Check for abnormal noise or clutch slippage. Upshifts and downshifts should not occur in this range.
10. Place shift lever in "R" position. Accelerate from a stop at full throttle. Check for abnormal noise or clutch slippage.
11. Park vehicle on a slope. Apply parking brake and place shift lever in "P" position. Release parking brake and ensure vehicle does not move. If vehicle moves, check for defective shift cable or parking components.
12. Shut engine off. Remove test harness and reconnect PGM-FI ECU electrical connectors.

**CLUTCH APPLICATION**

<b>Shift Lever Position</b>	<b>Elements In Use</b>
Park & Neutral	No Clutches Are Applied
"R"	4th Clutch
"D4"	
1st Gear	1st Clutch
2nd Gear	(1) 2nd Clutch
3rd Gear	(1) 3rd Clutch
4th Gear	(1) 4th Clutch
"D"	
1st Gear	1st Clutch
2nd Gear	(1) 2nd Clutch
3rd Gear	(1) 3rd Clutch
"2"	(1) 2nd Clutch
"1"	1st-Hold Clutch, 1st Clutch
(1) The 1st clutch engages, but driving power is not transmitted, as one-way clutch slips.	

**TRANSAXLE UPSHIFT SPECIFICATIONS (MPH)**

<b>"D4" Position &amp; Condition</b>	<b>1st-2nd Gear</b>	<b>2nd-3rd Gear</b>	<b>3rd-4th Gear</b>	<b>Lock-Up Clutch On</b>
Throttle Angle Sensor Voltage .70-.82 Volt (1/16 Throttle) & Coasting Downhill From Stop	10-12	17-19	28-32	19-25
Throttle Angle Sensor Voltage 2.4-2.6 Volts (1/2 Throttle) & Accelerating From Stop	22-24	43-47	61-67	70-76
Full Throttle	36-40	63-67	101-105	91-99

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Accelerating From Stop

**TRANSAXLE DOWNSHIFT SPECIFICATIONS (MPH)**

Shift Lever Position	Lock-Up Clutch Off	4th-3rd Gear	3rd-2nd Gear	2nd-1st Gear
Throttle Angle Sensor Voltage .70-.82 Volt (1/16 Throttle) & Coasting Or Braking To A Stop	15-21	19-22	(1)	6-9
Throttle Angle Sensor Voltage 2.4-2.6 Volts (1/2 Throttle) & Vehicle Slowing By Grade Or Load	61-67	(1)	(1)	(1)
Full Throttle Vehicle Slowing By Grade Or Load	89-96	87-91	53-57	26-30

(1) Specification not available from manufacturer.

**TORQUE CONVERTER STALL SPEED TEST**

**CAUTION: DO NOT perform torque converter stall speed test for more 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 and start engine. Warm engine to normal operating temperature. Place shift lever in "2".
2. Fully depress brake pedal. Fully depress accelerator for 6-8 seconds and note engine speed. This is the torque converter stall speed.
3. Allow transaxle to cool for 2 minutes. Repeat test procedure in "D4", "1" and "R".
4. Torque converter stall speed should be the same in "D4", "2", "1" and "R". Torque converter stall speed should be 2200-2500 RPM. If torque converter stall speed is not within specification, see **TORQUE CONVERTER STALL SPEED TROUBLE SHOOTING** table for possible causes.

**TORQUE CONVERTER STALL SPEED TROUBLE SHOOTING**

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

## HYDRAULIC PRESSURE TEST

### 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.

### Line Pressure Test

1. With engine off, remove plug from line pressure tap on transaxle. See **Fig. 5** . Attach Pressure Gauge Set (07406-0020003) to line pressure tap using NEW aluminum washer. Tighten hose fitting to 13 ft. lbs. (18 N.m).
2. With shift lever in "P" position, start and operate engine at 2000 RPM. Note line pressure. Place shift lever in "N" position and note line pressure.
3. Line pressure should be within specification. See the **HYDRAULIC PRESSURE TEST SPECIFICATIONS** table. If line pressure is not within specification, see **HYDRAULIC PRESSURE TEST TROUBLE SHOOTING** table. Shut engine off. Remove pressure gauge set and install plug.

**NOTE:** Clutch pressure should be checked at each clutch pressure tap on transaxle. See **Fig. 5** .

### Clutch Pressure Test

1. With engine off, remove plug from appropriate clutch pressure tap on transaxle. See **Fig. 5** . Attach Pressure Gauge Set (07406-0020003) to appropriate pressure tap using NEW aluminum washer. Tighten hose fitting to 13 ft. lbs. (18 N.m).

**NOTE:** Clutch pressure on some applications may vary with position of the throttle. Clutch pressure may need to be checked with throttle closed or with engine at 2000 RPM. Ensure shift lever is in proper position when checking clutch pressures.

2. Start and operate engine. Note clutch pressure in relation to throttle setting or engine RPM with shift lever in proper location to check appropriate clutch. See **HYDRAULIC PRESSURE TEST SPECIFICATIONS** table.
3. Clutch pressure should be within specification. See **HYDRAULIC PRESSURE TEST SPECIFICATIONS** table. If clutch pressure is not within specification, see **HYDRAULIC PRESSURE TEST TROUBLE SHOOTING** table. Shut engine off. Remove pressure gauge set and install plug.

### Low-High Pressure Test

1. The low-high pressure is tested at 2nd, 3rd and 4th clutch pressure taps on transaxle. See **Fig. 5** .
2. With engine off, remove plug from appropriate clutch pressure tap on transaxle. Attach Pressure Gauge Set (07406-0020003) to appropriate pressure tap using NEW aluminum washer. Tighten hose fitting to 13 ft. lbs. (18 N.m).
3. Start engine and allow to idle. Place shift lever in "D4". Slowly increase engine speed until pressure is

- indicated on pressure gauge. Release throttle, allowing engine to idle, and note low pressure reading.
4. With engine idling, gradually increase engine speed and note highest pressure reading. This is high pressure.
  5. Repeat procedure on remaining clutches. Ensure low-high pressure is within specification. See **HYDRAULIC PRESSURE TEST SPECIFICATIONS** table.
  6. If low-high pressure is not within specification, see **HYDRAULIC PRESSURE TEST TROUBLE SHOOTING** table. Shut engine off. Remove pressure gauge set and install plug.

#### Throttle "B" Pressure Test

1. With engine off, remove plug from throttle "B" pressure tap on transaxle. See **Fig. 5**.
2. Attach Pressure Gauge Set (07406-0020003) to throttle "B" pressure tap using NEW aluminum washer. Tighten hose fitting to 13 ft. lbs. (18 N.m).

**NOTE:** Check throttle "B" with transaxle sub-harness connector disconnected and then again with battery voltage applied to linear solenoid.

3. Disconnect transaxle sub-harness connector, located near top of transaxle on driver's side. See **Fig. 6**.
4. Start and operate engine at 1000 RPM. Place shift lever in "D4" position. Note throttle "B" pressure with sub-harness disconnected and no voltage applied.
5. Throttle "B" pressure should measure within specification. See **HYDRAULIC PRESSURE TEST SPECIFICATIONS** table. If throttle "B" pressure does not measure within specification, see **HYDRAULIC PRESSURE TEST TROUBLE SHOOTING** table.
6. Allow engine to idle. Connect positive battery terminal to Red wire and negative battery terminal to White wire of transaxle sub-harness connector. This energizes linear solenoid.
7. Increase engine speed to 1000 RPM with shift lever in "D4" position. Note throttle "B" pressure with sub-harness disconnected and voltage applied. No throttle pressure should exist.
8. If throttle "B" pressure exists with voltage applied, see **HYDRAULIC PRESSURE TEST TROUBLE SHOOTING** table. Shut engine off. Remove pressure gauge set and install plug. Reconnect transaxle sub-harness connector.

#### Modulator Pressure Test

1. Modulator pressure is checked at modulator and modulator "B" pressure taps on transaxle. See **Fig. 5**.
2. With engine off, remove plug from appropriate pressure tap on transaxle. See **Fig. 5**. Attach Pressure Gauge Set (07406-0020003) to pressure tap using NEW aluminum washer. Tighten hose fitting to 13 ft. lbs. (18 N.m).
3. With shift lever in "P" or "N" position, start and operate engine at 2000 RPM. Note modulator pressure. Modulator pressure should be within specification. See **HYDRAULIC PRESSURE TEST SPECIFICATIONS** table.
4. If modulator pressure is not within specification, see **HYDRAULIC PRESSURE TEST TROUBLE SHOOTING** table. Shut engine off. Remove pressure gauge set and install plug.

#### HYDRAULIC PRESSURE TEST SPECIFICATIONS



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Application	Shift Lever Position	psi (kg/cm <sup>2</sup> )
Line Pressure With Engine At 2000 RPM	"P" Or "N"	114-128 (8.0-9.0) Clutch Pressure
1st Clutch		
With Engine At 2000 RPM	"1" Or "D4"	114-128 (8.0-9.0)
1st-Hold Clutch		
With Engine At 2000 RPM	"1"	114-128 (8.0-9.0)
2nd Clutch		
With Engine At 2000 RPM	"2"	114-128 (8.0-9.0)
2nd Clutch		
With Throttle Closed	"D4"	64-71 (4.5-5.0)
With Engine At 2000 RPM	"D4"	114-128 (8.0-9.0)
3rd Clutch		
With Throttle Closed	"D4"	64-71 (4.5-5.0)
With Engine At 2000 RPM	"D4"	114-128 (8.0-9.0)
4th Clutch		
With Throttle Closed	"D4"	64-71 (4.5-5.0)
With Engine At 2000 RPM	"D4"	114-128 (8.0-9.0)
4th Clutch		
With Engine At 2000 RPM	"R"	114-128 (8.0-9.0)
Low Pressure		
2nd, 3rd Or 4th Clutch	"D4"	64-71 (4.5-5.0)
High Pressure		
2nd, 3rd Or 4th Clutch	"D4"	114-128 (8.0-9.0)
Throttle "B" Pressure		
With Transaxle Sub-Harness Disconnected & No Voltage Applied To Harness	"D4"	67-75 (4.7-5.3)
With Transaxle Sub-Harness Disconnected & Voltage Applied To Harness	"D4"	0 (0) Modulator Pressure
Modulator Or Modulator "B" Pressure	"P" Or "N"	58-73 (4.1-5.1)

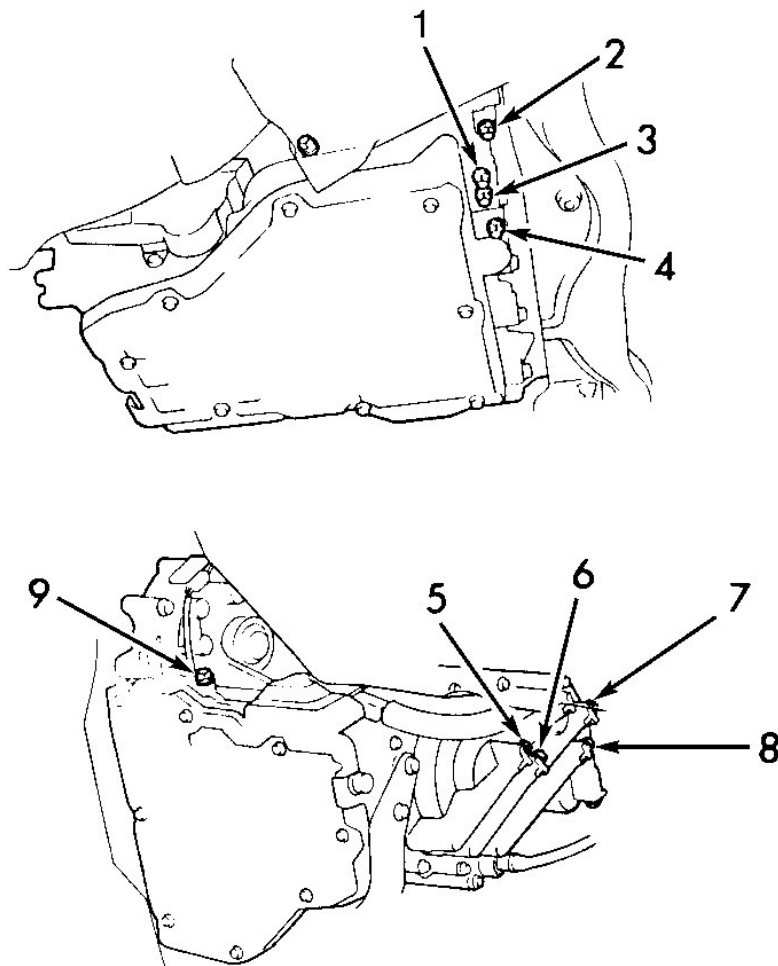
### HYDRAULIC PRESSURE TEST TROUBLE SHOOTING

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

**1992 Acura Vigor GS**

## 1992 AUTOMATIC TRANSMISSIONS MPWA Overhaul

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
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
Throttle "B" Pressure	
Low Or No Throttle "B" Pressure With No Voltage Applied	Defective Throttle Valve Body
High Throttle "B" Pressure With Voltage Applied	Defective Throttle Valve Body
Low Or No Modulator Pressure	Defective Modulator Valve
Low Or No Modulator "B" Pressure	Defective Shift Control Solenoid Valve

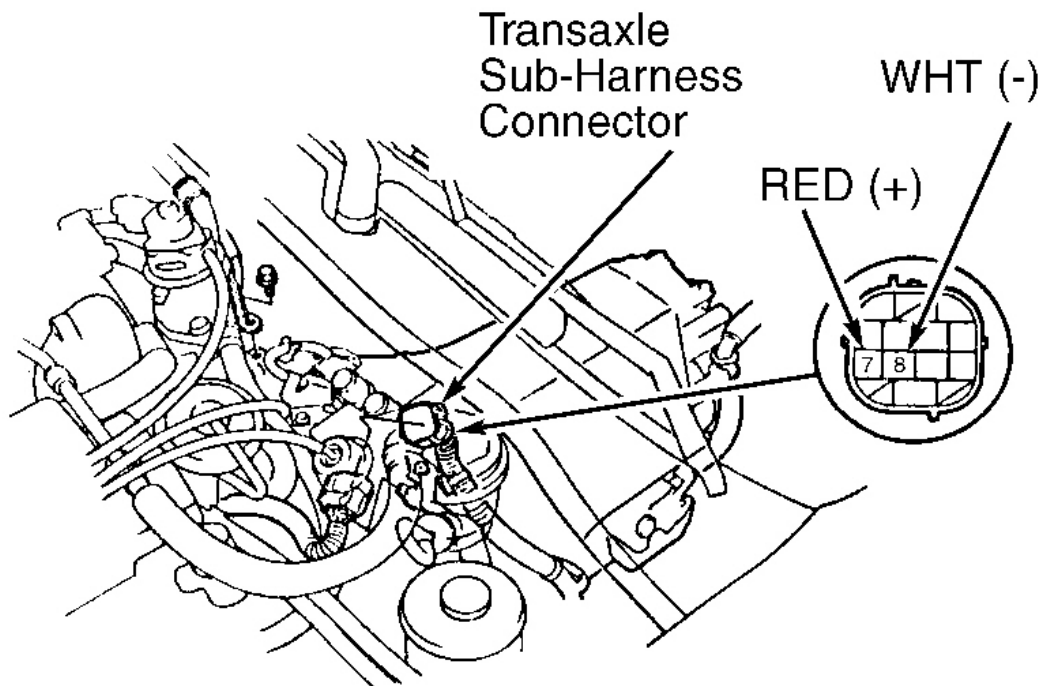


- 1. 2nd Clutch Pressure Tap
- 2. Modulator Pressure Tap
- 3. Throttle "B" Pressure Tap
- 4. Line Pressure Tap
- 5. 1st-Hold Clutch Pressure Tap

- 6. 3rd Clutch Pressure Tap
- 7. 1st Clutch Pressure Tap
- 8. 4th Clutch Pressure Tap
- 9. Modulator "B" Pressure Tap

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**Fig. 5: Identifying Transaxle Pressure Taps & Modulator Valve**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



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**Fig. 6: Identifying Transaxle Sub-Harness Connector**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

## REMOVAL & INSTALLATION

### ELECTRICAL COMPONENTS

See MPWA ELECTRONIC CONTROLS article.

### DIFFERENTIAL ASSEMBLY

See REMOVAL & INSTALLATION article.

### TRANSAXLE

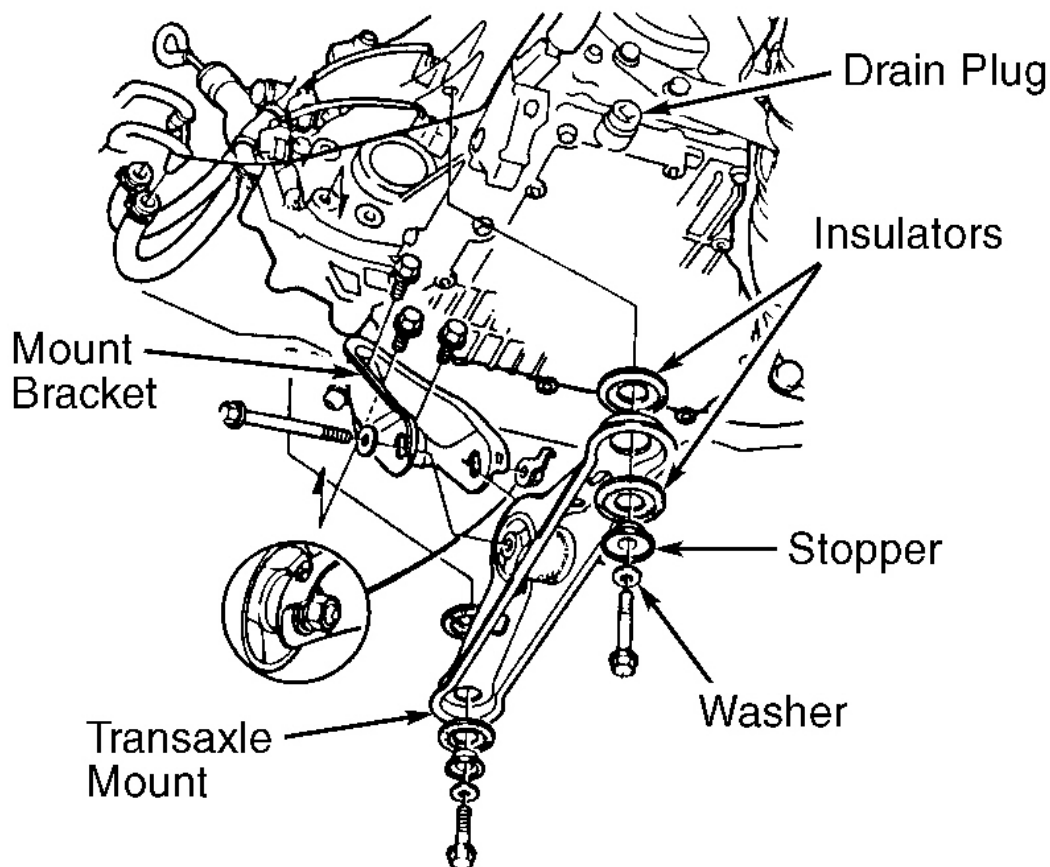
See REMOVAL & INSTALLATION article.

### LOWER VALVE BODY ASSEMBLY

**NOTE:** Lower valve body assembly consists of main valve body, servo body, shift control solenoid valves and oil pass body.

**Removal**

1. Raise and support vehicle. Remove guard located below transaxle. Drain fluid by removing drain plug and seal washer from rear of transaxle. See **Fig. 7** .
2. Support transaxle with floor jack. Remove transaxle mount and mount bracket. See **Fig. 7** . Disconnect shift control solenoid valve harness from transaxle sub-harness. See **Fig. 8** .



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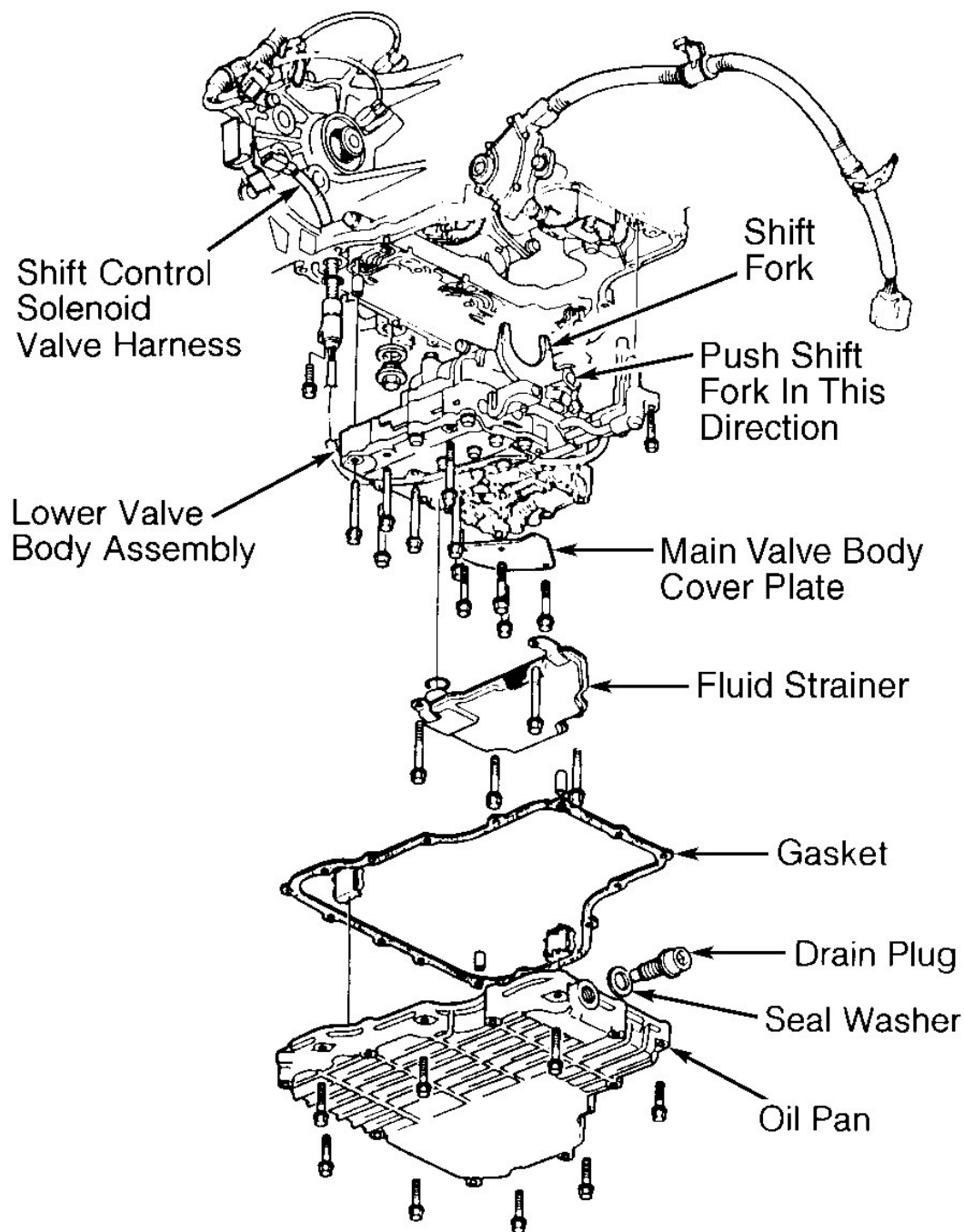
**Fig. 7: Identifying Drain Plug, Mount Bracket & Transaxle Mount**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Remove oil pan, gasket, fluid strainer and main valve body cover. See **Fig. 8** . Ensure shift lever is in Park. Remove proper bolts for lower valve body assembly. See **Fig. 9** . Push shift fork into Drive position. See **Fig. 8** . Remove lower valve body assembly.

**NOTE:** To disassemble lower valve body assembly, refer to **LOWER VALVE BODY ASSEMBLY** .

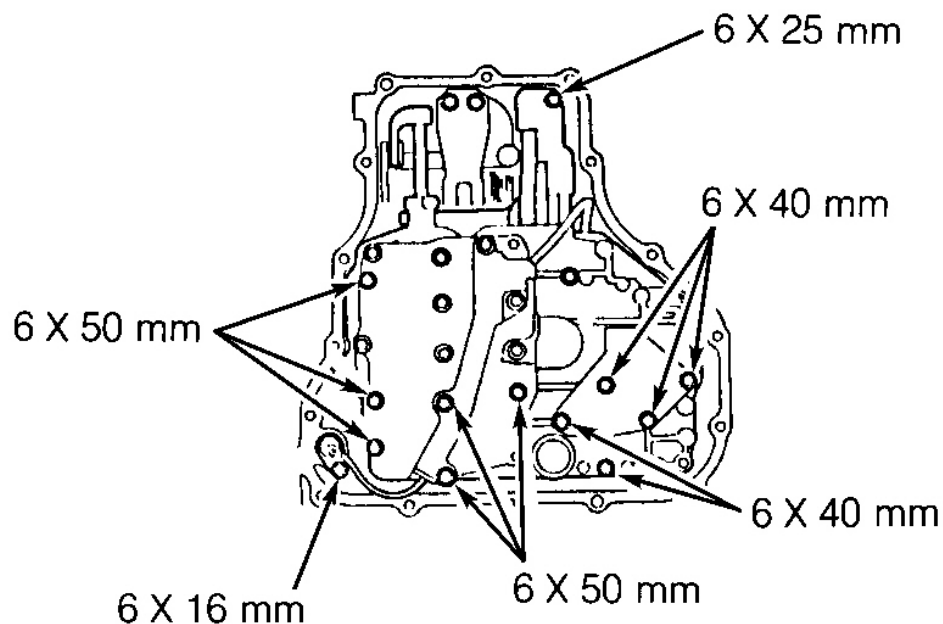
**Installation**

1. Ensure shift lever is in Park. Push shift fork to proper position. See **Fig. 8** . Install lower valve body assembly while engaging manual valve on valve body with detent lever and engaging shift fork with reverse selector.
2. Install main valve body cover plate, fluid strainer and all retaining bolts. Ensure proper length bolts are installed in correct location on lower valve body assembly and fluid strainer. See **Fig. 9** .
3. Tighten all retaining bolts to specification. See **TORQUE SPECIFICATIONS** . Install NEW seal washer on drain plug. Tighten drain plug to specification.

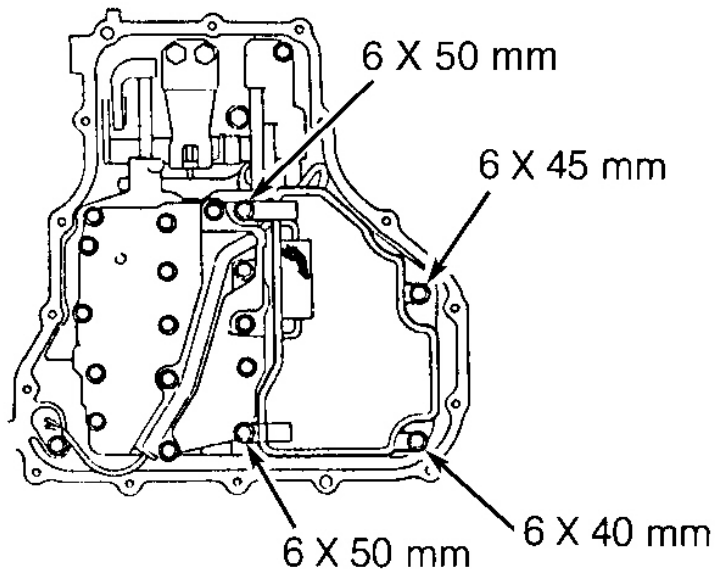


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**Fig. 8: Identifying Lower Valve Body Assembly**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



### IDENTIFYING LOWER VALVE BODY ASSEMBLY BOLTS

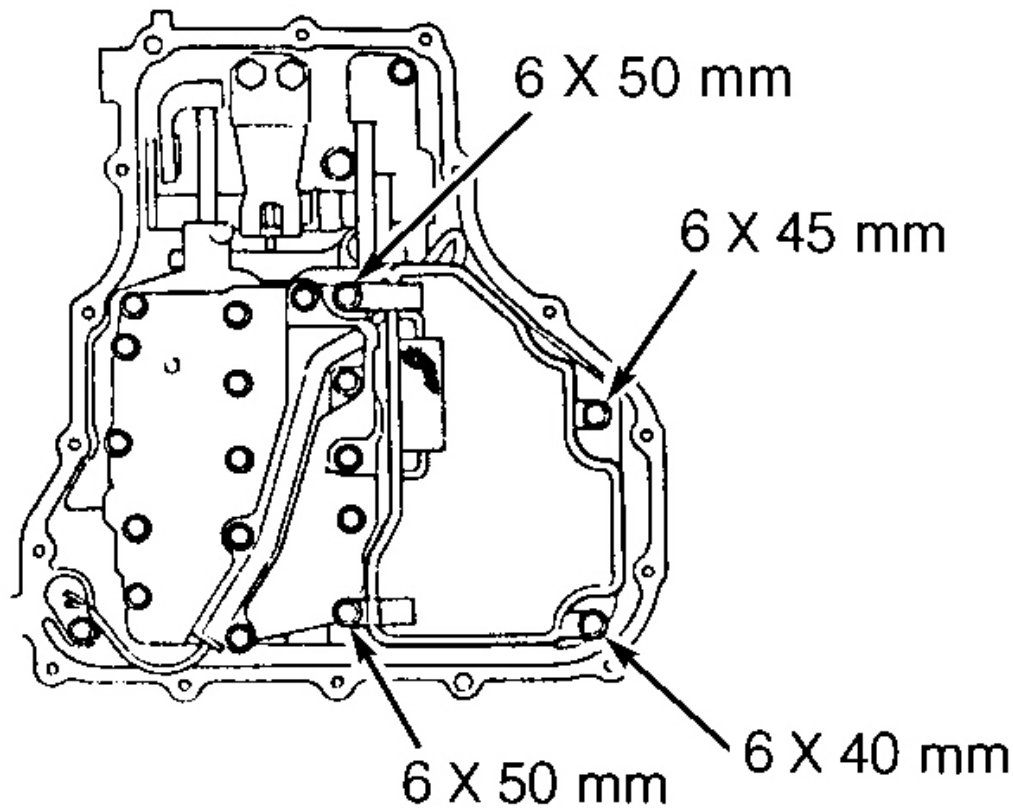


### IDENTIFYING FLUID STRAINER BOLTS

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**Fig. 9: Lower Valve Body Assembly & Fluid Strainer Bolts (1 of 2)**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.





**Fig. 10: Lower Valve Body Assembly & Fluid Strainer Bolts (2 of 2)**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

## TORQUE CONVERTER

**NOTE:** For torque converter stall speed test, see TESTING .

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

## TRANSAXLE DISASSEMBLY

### VALVE BODIES & INTERNAL COMPONENTS

1. Disconnect shift control solenoid valve harness from transaxle sub-harness. See Fig. 8 . Remove oil pan, gasket, fluid strainer and main valve body cover. See Fig. 8 .

2. Ensure shift lever is in Park. Remove lower valve body assembly bolts. Push shift fork shaft into Drive position. See **Fig. 8** . Remove lower valve body assembly.
3. Remove bolts, lock plate, detent spring plate and detent spring. See **Fig. 11** . Remove parking brake roller guide and dowel pins. See **Fig. 11** .
4. Remove bolt and bolt lock from detent lever, parking brake stopper and control shaft collar. See **Fig. 10** . Remove control shaft, control shaft collar, spring, parking brake shift arm and detent lever. See **Fig. 12** .
5. Remove dipstick and bolt from transaxle sub-harness. Remove bolts, rear cover, gasket, dowel pins and all oil pipes. See **Fig. 12** . Install Mainshaft Holder (07GAB-PF50100) onto mainshaft to secure mainshaft. See **Fig. 13** .
6. Using hammer and chisel, cut lock tabs on countershaft and mainshaft lock nuts and pry upward. Remove countershaft and mainshaft lock nuts and disc springs. See **Fig. 13** .

**NOTE:** Mainshaft lock nut has left-hand threads.

7. Remove 1st-hold clutch and bearing, thrust shim, thrust needle bearing and 1st-hold clutch hub. See **Fig. 13** . Remove 1st clutch, thrust shim, thrust needle bearing, needle bearing and mainshaft 1st gear. See **Fig. 11** . Remove thrust shim and mainshaft 1st gear collar from mainshaft.
8. Remove countershaft 1st gear and one-way clutch as an assembly. Remove needle bearings, countershaft 1st gear collar and parking gear. See **Fig. 11** .
9. Remove parking pawl shaft, parking pawl spring, parking pawl and parking pawl stopper. See **Fig. 12** . Remove connector holder and all wiring harness retaining bolts from transaxle housing.
10. Remove NC speed sensor, NM speed sensor, NM speed sensor washer and "O" rings from transaxle housing. See **Fig. 14** . Remove all transaxle housing-to-torque converter housing bolts. See **Fig. 14** .

**NOTE:** There are transaxle housing-to-torque converter housing bolts located on inside of torque converter housing. See **Fig. 14** .

**CAUTION:** Ensure NC and NM speed sensors are removed from transaxle housing before removing transaxle housing from torque converter housing.

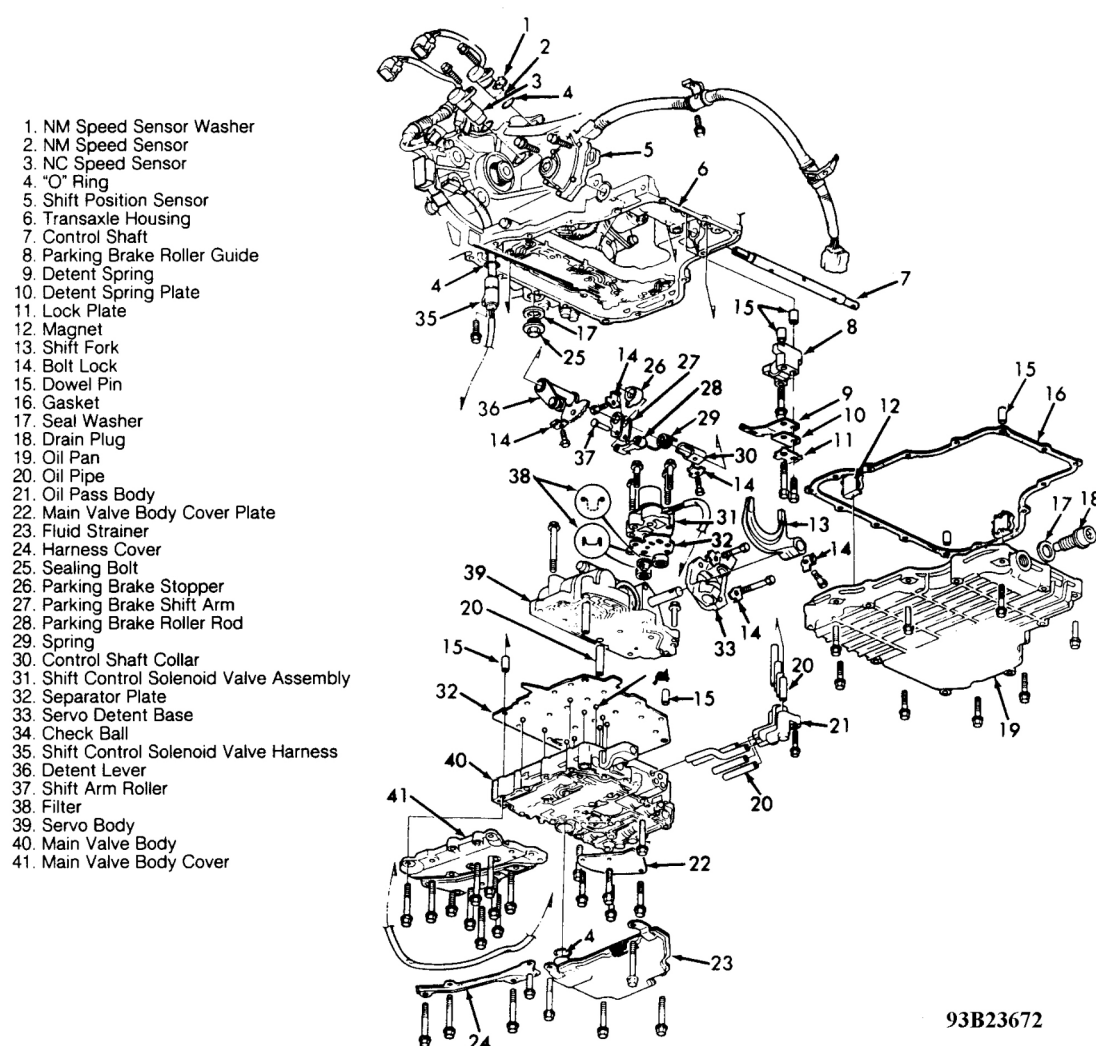
11. Using Puller (07HAC-PK4001A), pull transaxle housing from torque converter housing. See **Fig. 14** . Remove gasket and dowel pins from torque converter housing.
12. Remove countershaft and mainshaft as an assembly from torque converter housing. Remove secondary gear and extension shaft as an assembly from torque converter housing. See **Fig. 13** .
13. Remove bolts and reverse idler gear shaft holder. See **Fig. 13** . Remove reverse idler gear from transaxle housing (if necessary).

**CAUTION:** Use care when removing reverse idler gear shaft holder from reverse idler gear, as a steel ball and spring are located behind needle bearing at bottom of shaft. See **Fig. 13** .

14. Remove oil feedpipes from torque converter housing. Remove flange nuts and disconnect wiring at linear solenoid. See **Fig. 15** .

15. Remove regulator valve body, "O" ring, stator shaft, stopper, separator plate and dowel pins. Remove 2nd accumulator body along with throttle valve body. Remove 2nd accumulator piston and 2nd accumulator spring. See **Fig. 15**.
16. Remove bolts, harness clamp, throttle valve body and separator plate from 2nd accumulator body (if necessary). Remove oil pump body, oil pump drive and driven gears, and oil pump driven gear shaft.
17. Remove torque converter check valve and spring. See **Fig. 15**. Remove dowel pins and separator plate.

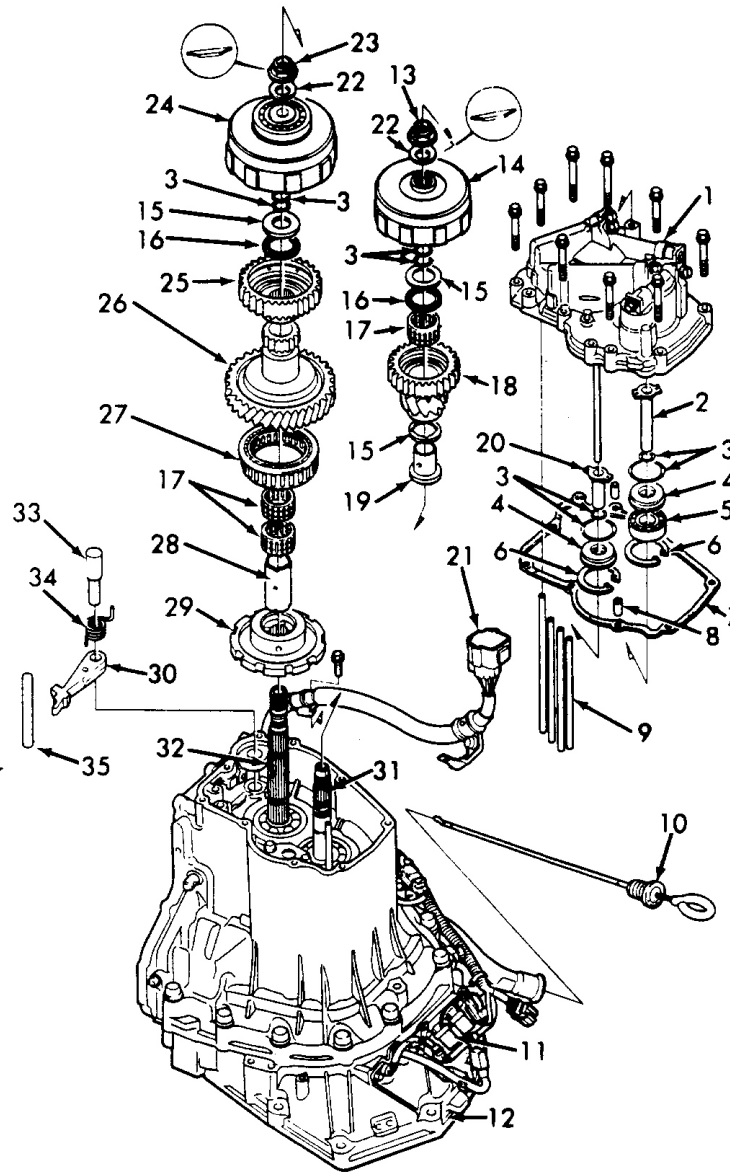
**NOTE:** If necessary to disassemble lower valve body assembly, see **LOWER VALVE BODY ASSEMBLY**.



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**Fig. 11: Exploded View Of Lower Valve Body Assembly**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

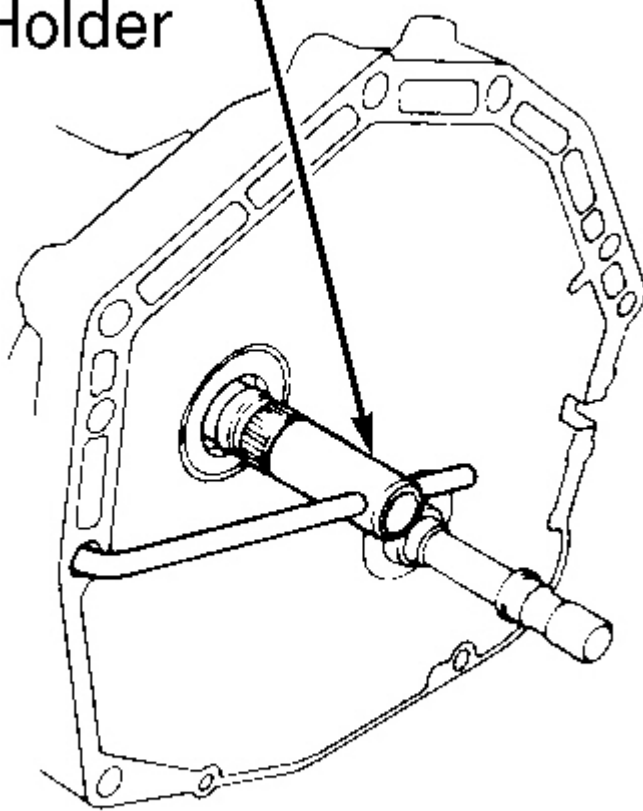
1. Rear Cover
2. 1st Clutch Feedpipe
3. "O" Ring
4. Feedpipe Guide
5. Ball Bearing
6. Snap Ring
7. Gasket
8. Dowel Pin
9. Oil Pipe
10. Dipstick
11. Lock-Up Control Solenoid Valve Assembly
12. Torque Converter Housing
13. Mainshaft Lock Nut
14. 1st Clutch
15. Thrust Shim
16. Thrust Needle Bearing
17. Needle Bearing
18. Mainshaft 1st Gear
19. Mainshaft 1st Gear Collar
20. 1st-Hold Clutch Feedpipe
21. Transaxle Sub-Harness
22. Disc Spring
23. Countershaft Lock Nut
24. 1st-Hold Clutch & Bearing
25. 1st-Hold Clutch Hub
26. Countershaft 1st Gear
27. One-Way Clutch
28. Countershaft 1st Gear Collar
29. Parking Gear
30. Parking Pawl
31. Mainshaft
32. Countershaft
33. Parking Pawl Shaft
34. Parking Pawl Spring
35. Parking Pawl Stopper



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**Fig. 12: Exploded View Of Rear Cover & Components**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

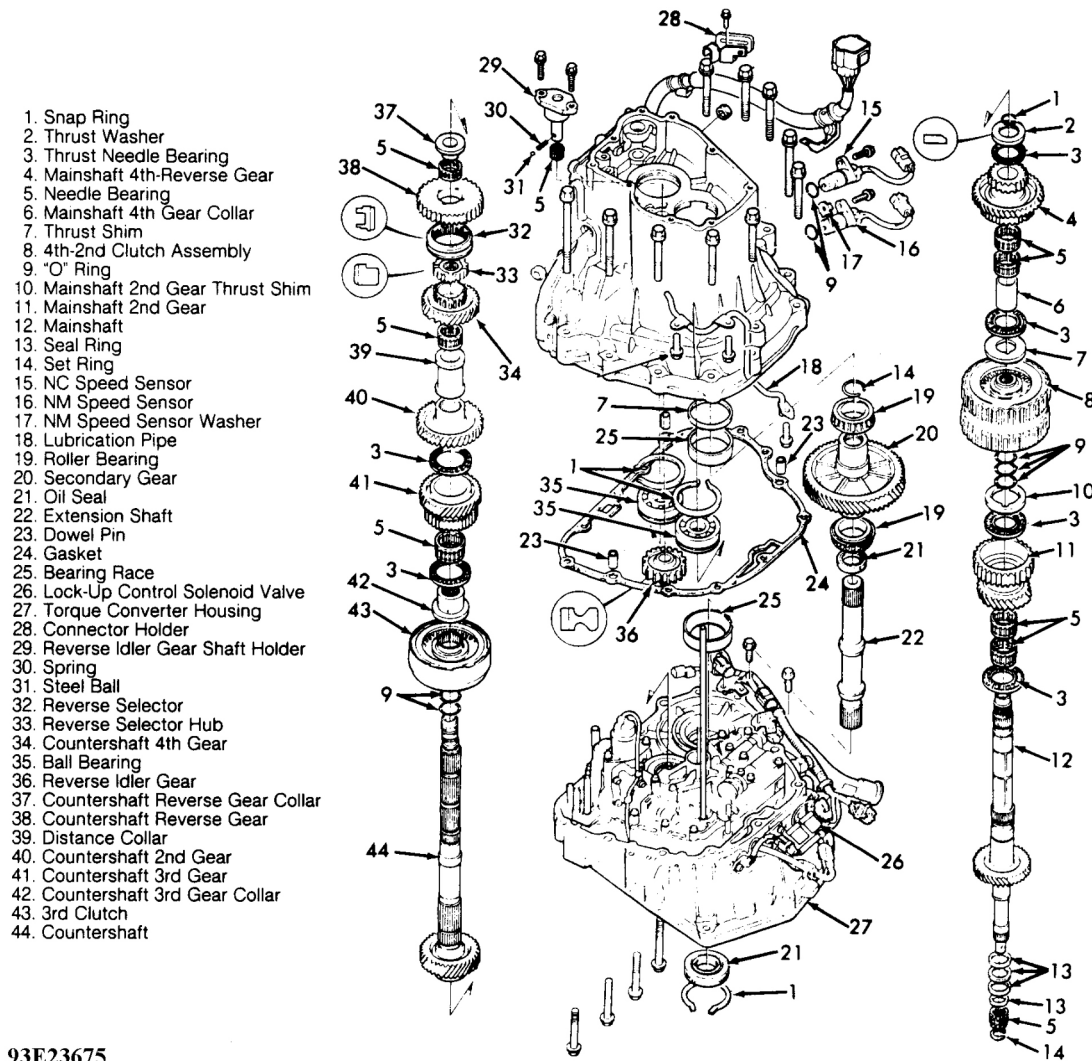
Mainshaft  
Holder



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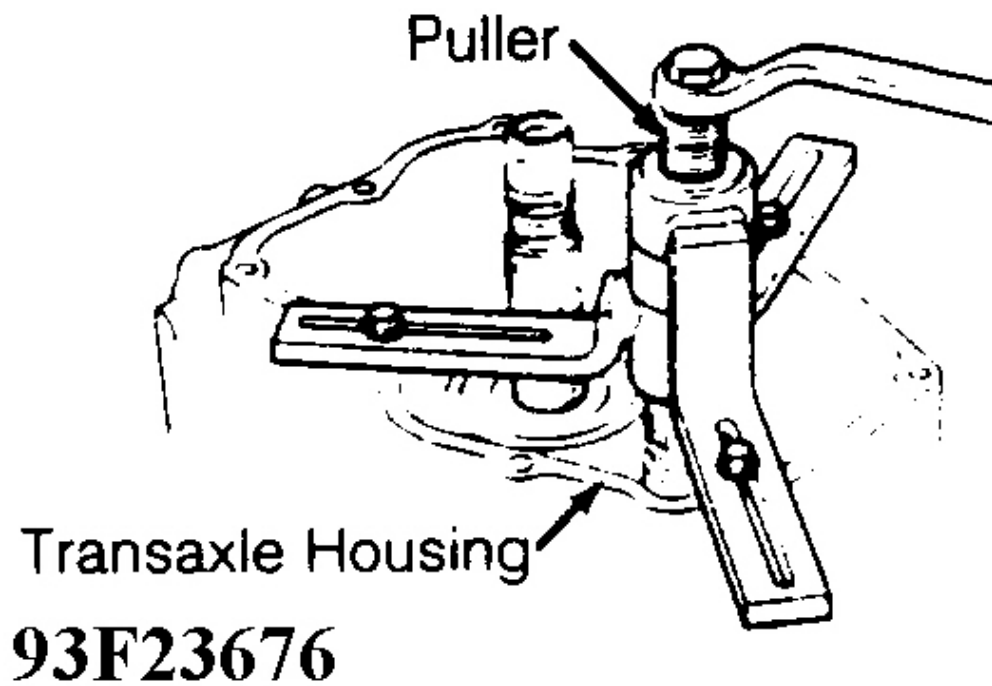
**Fig. 13: Installing Mainshaft Holder**

Courtesy of AMERICAN HONDA MOTOR CO., INC.



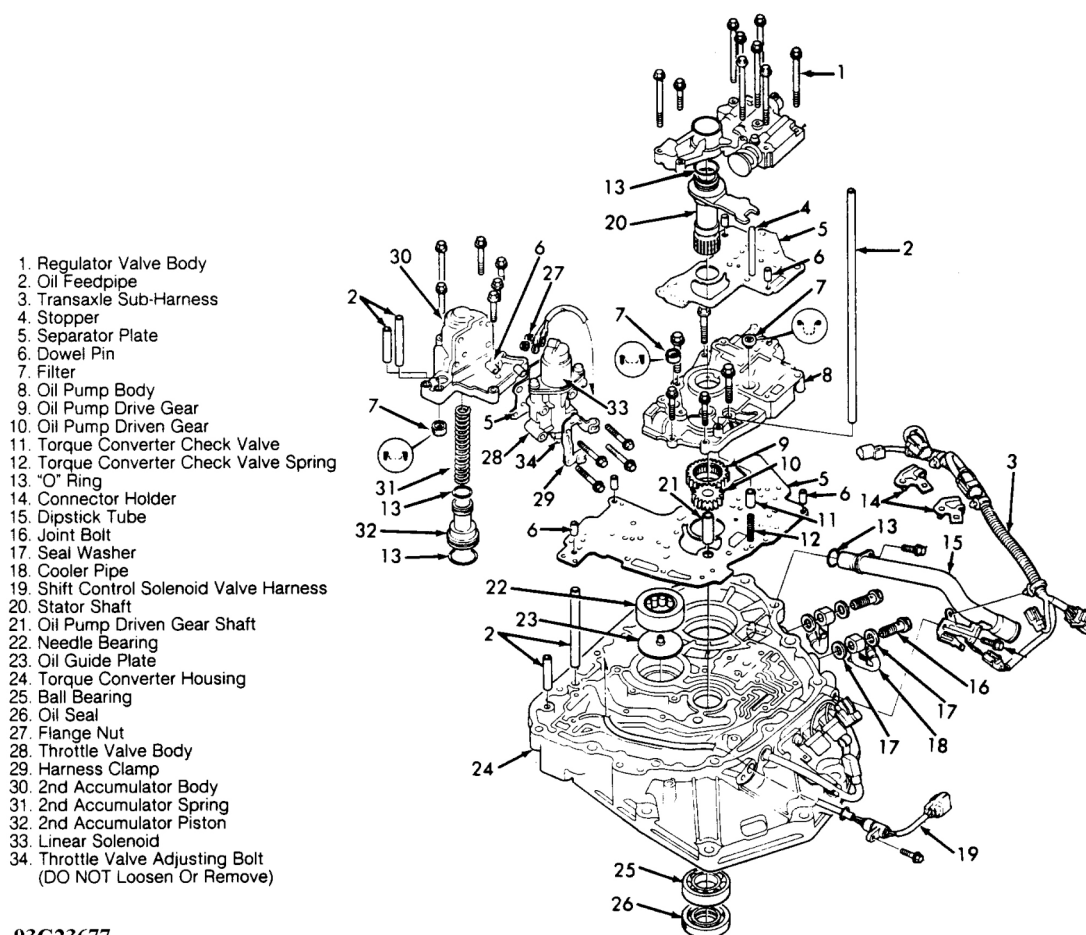
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**Fig. 14: Exploded View Of Transaxle Housing & Components**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



**Fig. 15: Removing Transaxle Housing**

Courtesy of AMERICAN HONDA MOTOR CO., INC.



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**Fig. 16: Exploded View Of Torque Converter Housing**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

## COMPONENT DISASSEMBLY & REASSEMBLY

### LOWER VALVE BODY ASSEMBLY

**CAUTION: DO NOT** use magnet to remove check balls, as check balls may become magnetized.

#### Disassembly

1. Remove harness cover and main valve body cover. See **Fig. 10** . Remove oil pass body and oil pipes from main valve body.
2. Remove shift control solenoid valve assembly and separator plate. Remove bolt, bolt lock and shift fork. Remove servo detent base from servo body. See **Fig. 10** .
3. Remove servo body, separator plate and dowel pins from main valve body. See **Fig. 10** . Use care not to loose check balls from main valve body. Remove check balls from main valve body (if necessary).

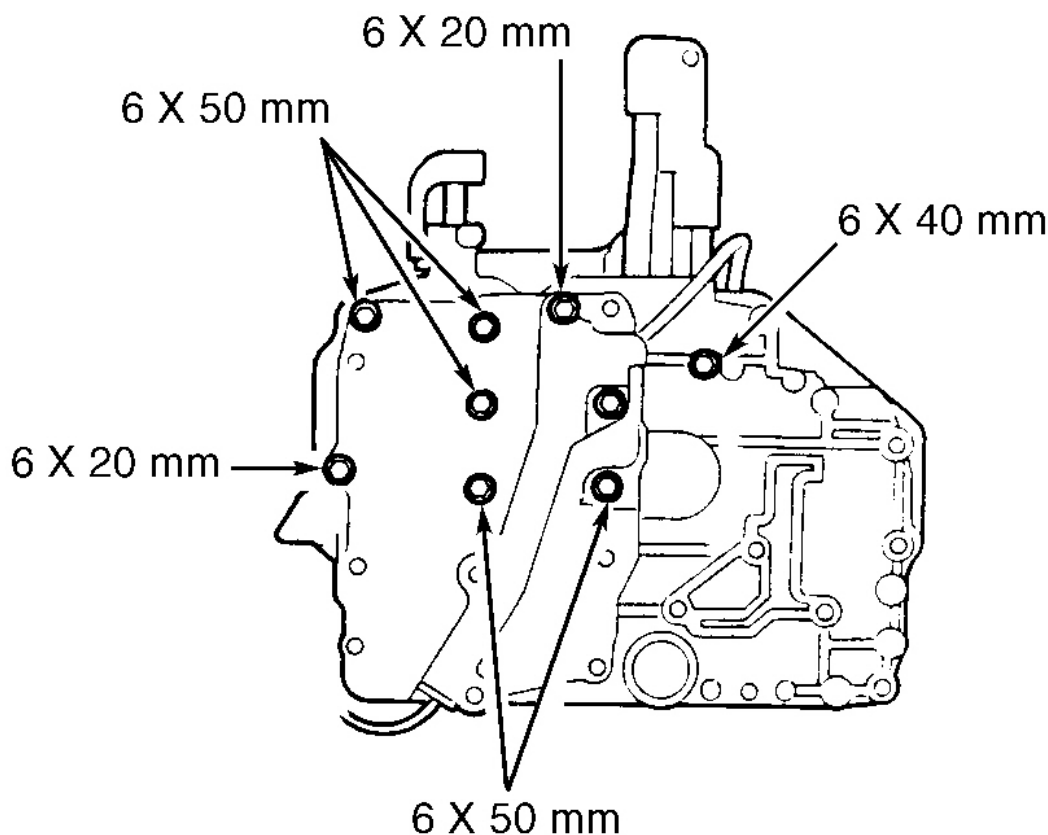


### Cleaning & Inspection

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

### Reassembly

1. Coat all components with ATF. To reassemble, reverse disassembly procedure.
2. Ensure check balls are install in proper areas of main valve body. See **Fig. 17** . Install NEW filters and NEW bolt locks. Ensure all filters are installed in proper direction. See **Fig. 10** .
3. When installing shift fork, rotate shift fork shaft in servo body so large chamfered hole in shaft is aligned with bolt hole in shift fork. Install bolt and tighten to specification. See **TORQUE SPECIFICATIONS** . Bend tabs over on bolt locks.
4. Ensure proper length main valve body cover bolts are installed in specified location. See **Fig. 17** . Tighten all bolts to specification. See **TORQUE SPECIFICATIONS** .



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**Fig. 17: Identifying Main Valve Body Cover Bolts**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

**MAIN VALVE BODY**

**CAUTION:** When disassembling main valve body, place main valve body components in order removed 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.

**Disassembly**

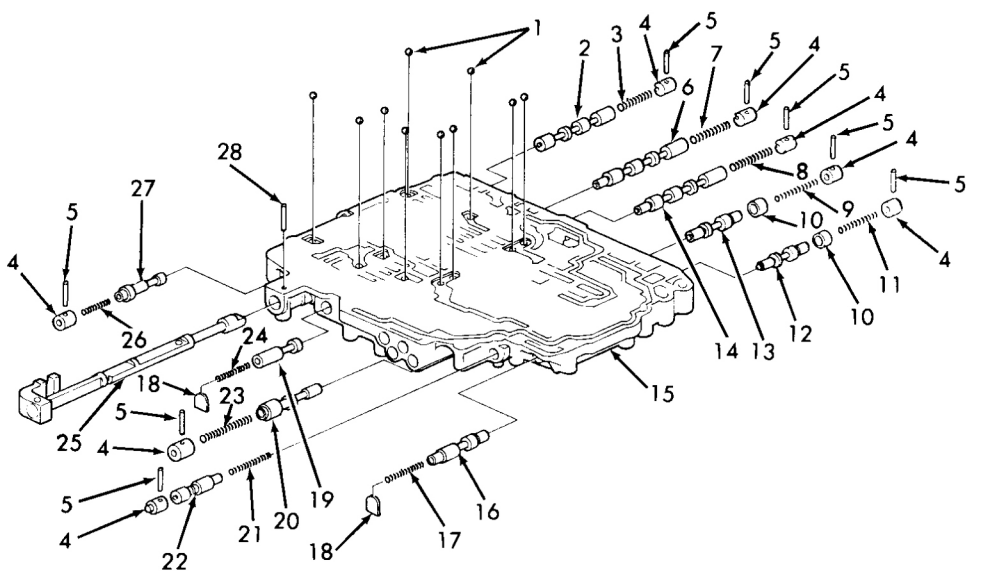
Disassemble main valve body. See **Fig. 18** . Use care when removing valve caps or spring seats, as they are under spring pressure.

**Cleaning & Inspection**

1. Clean components with solvent and dry with compressed air. Replace main valve body if any parts are worn or damaged.
2. Ensure all valves slide freely in 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.

**Reassembly**

Coat all components and bores with ATF. To reassemble, reverse disassembly procedure. Ensure all components are installed in correct location. See **Fig. 18** .



- |                                     |                                      |  |
|-------------------------------------|--------------------------------------|--|
| 1. Check Ball                       | 11. 3-4 Orifice Control Valve Spring | 21. 4th Exhaust Valve Spring             |
| 2. 1-2 Shift Valve                  | 12. 3-4 Orifice Control Valve        | 22. 4th Exhaust Valve                    |
| 3. 1-2 Shift Valve Spring           | 13. 2-3 Orifice Control Valve        | 23. Servo Control Valve Spring           |
| 4. Valve Cap                        | 14. 3-4 Shift Valve                  | 24. 3rd Kickdown Valve Spring            |
| 5. Roller                           | 15. Main Valve Body                  | 25. Manual Valve                         |
| 6. 2-3 Shift Valve                  | 16. 4th Kickdown Valve               | 26. Clutch Pressure Control Valve Spring |
| 7. 2-3 Shift Valve Spring           | 17. 4th Kickdown Valve Spring        | 27. Clutch Pressure Control Valve        |
| 8. 3-4 Shift Valve Spring           | 18. Spring Seat                      | 28. Pin                                  |
| 9. 2-3 Orifice Control Valve Spring | 19. 3rd Kickdown Valve               |  |
| 10. Sleeve                          | 20. Servo Control Valve              |  |

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

### SPRING SPECIFICATIONS

Application	Free Length In. (mm)
<b>Main Valve Body</b>	
Clutch Pressure Control Valve Spring	1.272 (32.30)
Servo Control Valve Spring	2.051 (52.10)
1-2 Shift Valve Spring	1.591 (40.40)
2-3 Orifice Control Valve Spring	1.539 (39.10)
2-3 Shift Valve Spring	1.693 (43.00)
3rd Kickdown Valve Spring	1.520 (38.60)
3-4 Orifice Control Valve Spring	1.370 (34.80)
3-4 Shift Valve Spring	1.693 (43.00)
4th Exhaust Valve Spring	1.933 (49.10)
4th Kickdown Valve Spring	1.898 (48.20)
<b>Oil Pump Body</b>	
Lock-Up Control Valve Spring	(1)
Lock-Up Timing Valve Spring	2.575 (65.40)

**1992 Acura Vigor GS****1992 AUTOMATIC TRANSMISSIONS MPWA Overhaul**

Modulator Valve Spring	1.276 (32.40)
Relief Valve Spring	1.646 (41.80)
Torque Converter Check Valve Spring	1.457 (36.40)
Regulator Valve Body	
Cooler Relief Valve Spring	1.843 (46.80)
Lock-Up Shift Valve Spring	2.902 (73.70)
Regulator Valve Spring "A"	3.488 (88.60)
Regulator Valve Spring "B"	1.732 (44.00)
Stator Reaction Spring	1.193 (30.30)
Servo Body	
3rd Accumulator Spring	3.811 (96.80)
4th Accumulator Spring	2.917 (74.10)
1st & 1st-Hold Accumulator	
1st Accumulator Spring	2.508 (63.70)
1st-Hold Accumulator Spring "A"	2.201 (55.90)
1st-Hold Accumulator Spring "B"	2.102 (53.40)
Ball Spring	.551 (14.00)
(1) Spring free length may be 1.496" (38.00 mm) or 1.567" (39.80 mm).	

**SERVO BODY****Disassembly**

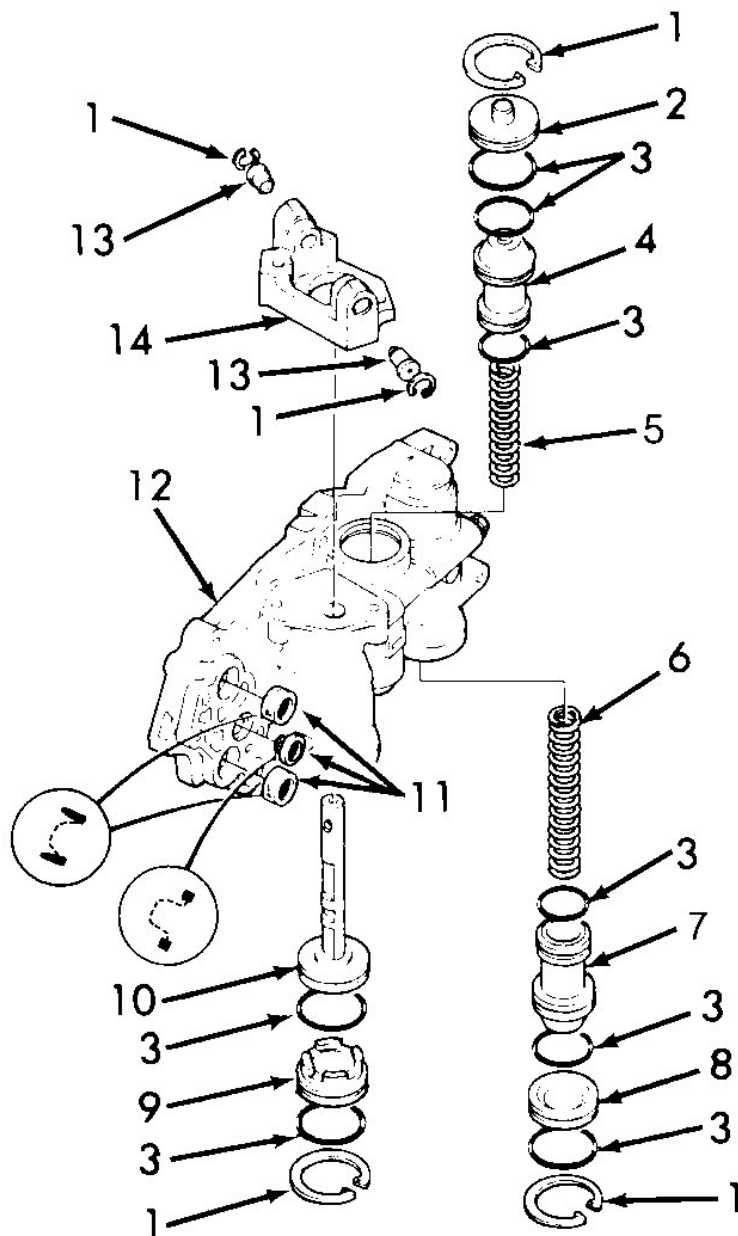
Disassemble servo body. See **Fig. 19** . Use care when removing accumulator covers, as they are under spring pressure.

**Cleaning & Inspection**

Clean components with solvent and dry with compressed air. Replace servo body if any parts are worn or damaged. Ensure spring free length is within specification. See **SPRING SPECIFICATIONS** table. Replace springs if not within specification.

**Reassembly**

Coat all components and bores with ATF. To reassemble, reverse disassembly procedure using NEW filters and "O" rings. Ensure filters are installed in proper direction. See **Fig. 19** .



- |                           |                          |
|---------------------------|--------------------------|
| 1. Snap Ring              | 8. 4th Accumulator Cover |
| 2. 3rd Accumulator Cover  | 9. Servo Valve Cover     |
| 3. "O" Ring               | 10. Shift Fork Shaft     |
| 4. 3rd Accumulator Piston | 11. Filter               |
| 5. 3rd Accumulator Spring | 12. Servo Body           |
| 6. 4th Accumulator Spring | 13. Valve                |
| 7. 4th Accumulator Piston | 14. Servo Detent Base    |

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**Fig. 19: Exploded View Of Servo 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 lock bolt.

**Disassembly**

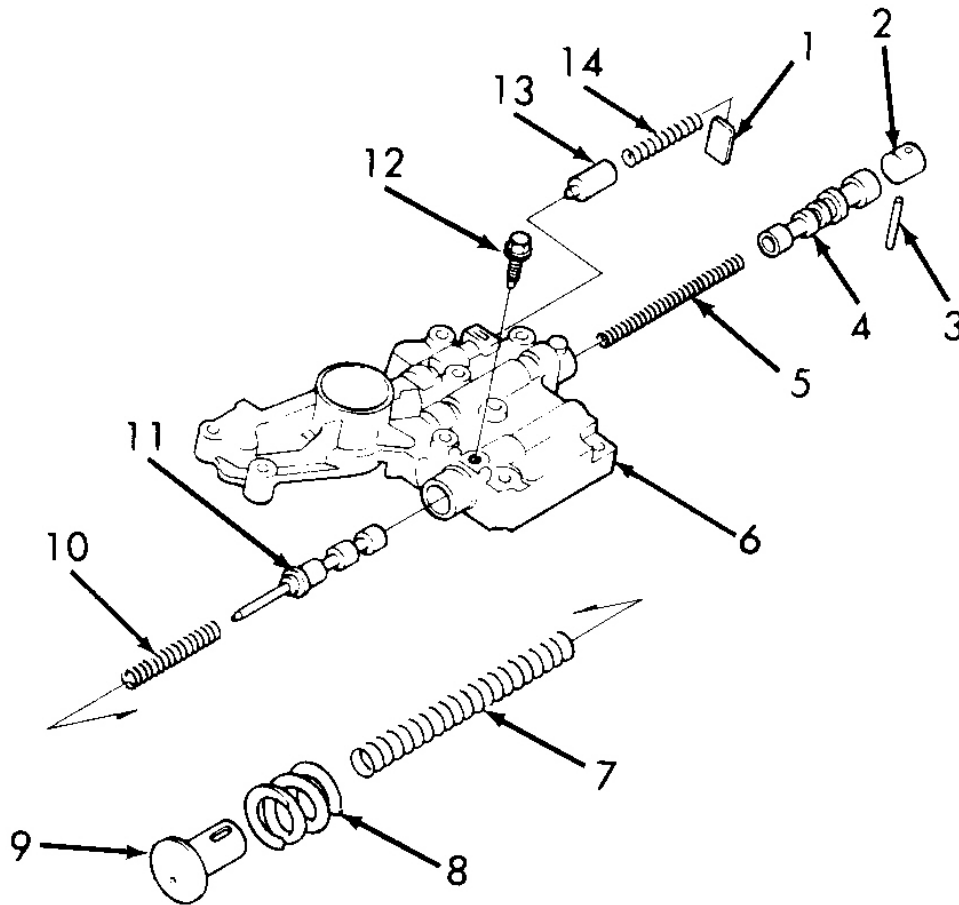
Hold regulator spring cap down and remove lock bolt. Slowly remove regulator spring cap and components from regulator valve body. See **Fig. 20** .

**Cleaning & Inspection**

1. Clean components with solvent and dry with compressed air. Replace regulator valve body if any parts are worn or damaged.
2. Ensure all valves slide freely in 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. Replace springs if not within specification.

**Reassembly**

1. Coat all components and bores with ATF. To reassemble, reverse disassembly procedure. Ensure all components are installed in correct location. See **Fig. 20** .
2. Ensure hole in regulator spring cap aligns with hole for lock bolt in valve body before tightening lock bolt. Tighten lock bolt to specification. See **TORQUE SPECIFICATIONS** .



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

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**Fig. 20: Exploded View Of Regulator Valve Body**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

## OIL PUMP BODY

**CAUTION:** When disassembling oil pump body, place components in order, and mark spring locations for reassembly reference. DO NOT use force to remove

## components.

### Disassembly

Disassemble oil pump body. See **Fig. 21** . 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 oil pump body if any parts are worn or damaged.
2. Ensure all valves slide freely in 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 oil pump body and components if polishing was needed.
3. Ensure spring free length is within specification. See **TORQUE SPECIFICATIONS** . Replace springs if not within specification.
4. Install oil pump gears and oil pump driven gear shaft in oil pump body. Ensure chamfered side of oil pump driven gear is facing upward (toward separator plate side of oil pump body).
5. Using feeler gauge, measure side clearance of both gears between tip of gear teeth and oil pump valve body. See **Fig. 22** and **Fig. 23** . Replace oil pump gears and/or oil pump body if side clearance is not within specification. See **OIL PUMP SPECIFICATIONS** table.
6. Place straightedge across oil pump body surface. Using feeler gauge, measure thrust clearance between oil pump driven gear and straightedge. See **Fig. 22** and **Fig. 23** . Replace the oil pump gears and/or oil pump body if thrust clearance is not within specification. See **OIL PUMP SPECIFICATIONS** table.

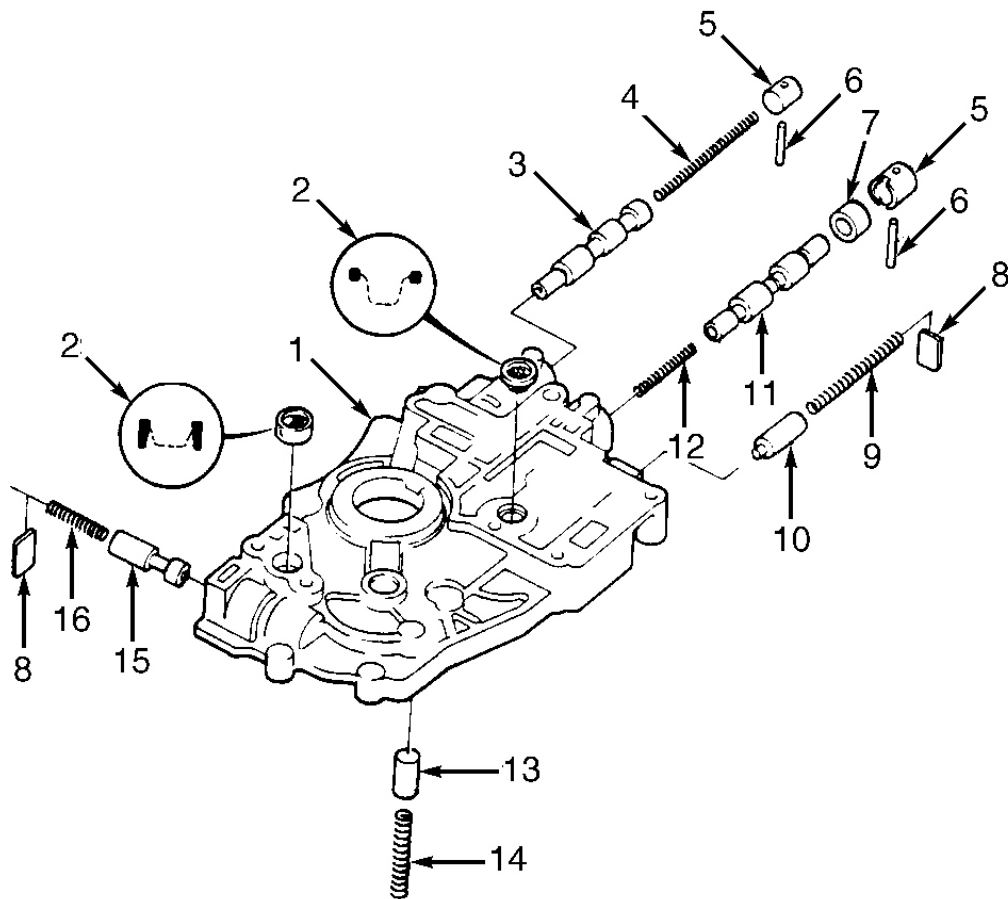
### OIL PUMP SPECIFICATIONS

Application	In. (mm)
Side Clearance	
Oil Pump Drive Gear	.0083-.0104 (.210-.265)
Oil Pump Driven Gear	.0028-.0049 (.070-.125)
Thrust Clearance	
Standard	.001-.002 (.03-.05)
Wear Limit	.0028 (.070)

### Reassembly

Coat components with ATF. To reassemble, reverse disassembly procedure using NEW filters. Ensure chamfered side of oil pump driven gear faces upward (toward separator plate side of oil pump body). Ensure filters are installed in proper direction. See **Fig. 21** .

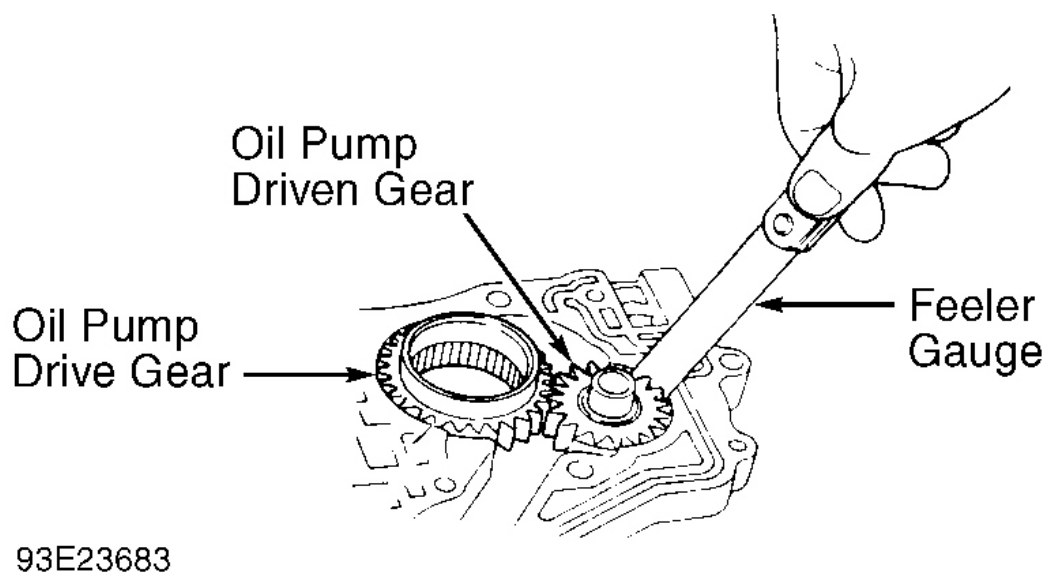




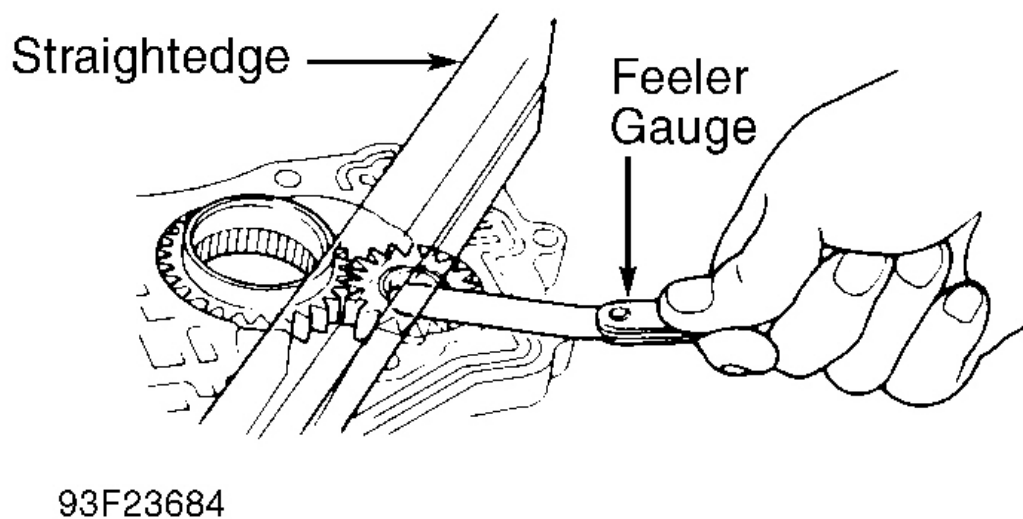
- |                                |   |
|--------------------------------|---|
| 1. Oil Pump Body               | 9. Relief Valve Spring                  |
| 2. Filter                      | 10. Relief Valve                        |
| 3. Lock-Up Timing Valve        | 11. Lock-Up Control Valve               |
| 4. Lock-Up Timing Valve Spring | 12. Lock-Up Control Valve Spring        |
| 5. Valve Cap                   | 13. Torque Converter Check Valve        |
| 6. Roller                      | 14. Torque Converter Check Valve Spring |
| 7. Sleeve                      | 15. Modulator Valve                     |
| 8. Spring Seat                 | 16. Modulator Valve Spring              |

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**Fig. 21: Exploded View Of Oil Pump Body**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



**Fig. 22: Measuring Oil Pump Clearances (1 of 2)**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.



**Fig. 23: Measuring Oil Pump Clearances (2 of 2)**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

## 2ND ACCUMULATOR BODY & THROTTLE VALVE BODY

### Disassembly

**CAUTION: DO NOT loosen or remove throttle valve adjusting bolt on bottom of throttle valve body. See Fig. 16 . DO NOT remove linear solenoid from throttle valve body.**

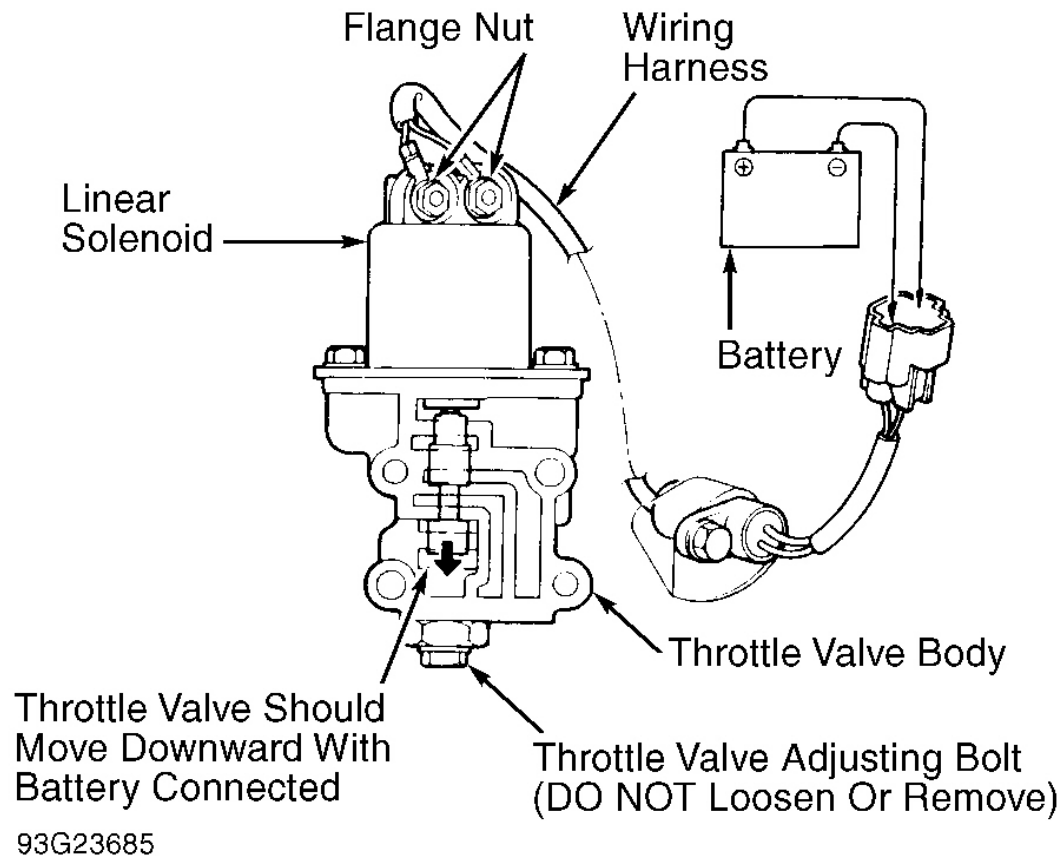
Remove 2nd accumulator piston, 2nd accumulator spring and filter from 2nd accumulator body. See Fig. 16 . Remove bolts, harness clamp, throttle valve body and separator plate from 2nd accumulator body.

### Cleaning & Inspection

1. Clean components with solvent and dry with compressed air. Replace components if worn or damaged.
2. Ensure 2nd accumulator spring free length is 3.468" (88.10 mm). Replace spring if free length is not within specification.
3. To check linear solenoid operation, connect wiring harness to linear solenoid. Tighten flange nuts to specification. See TORQUE SPECIFICATIONS .
4. Connect battery positive terminal to Red wire and negative terminal to White wire of wiring harness. See Fig. 24 . Ensure throttle valve moves downward in throttle valve body by looking through passage on throttle valve body. See Fig. 24 . If throttle valve moves downward with battery connected, linear solenoid is operating.
5. If throttle valve does not move, disconnect wiring harness at linear solenoid. Connect battery directly to linear solenoid. If throttle valve now moves, replace wiring harness for linear solenoid. If linear solenoid still does not operate, replace linear solenoid and throttle valve body as an assembly.

### Reassembly

1. Coat components with ATF. To reassemble, reverse disassembly procedure using NEW filter and NEW "O" rings. Ensure filter is installed in proper direction. See Fig. 24 .
2. Tighten throttle valve body bolts to specification. See TORQUE SPECIFICATIONS .

**Fig. 24: Checking Linear Solenoid Operation**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

**1ST & 1ST-HOLD ACCUMULATOR****NOTE:** The 1st and 1st-hold accumulators are located in rear cover.**Disassembly**

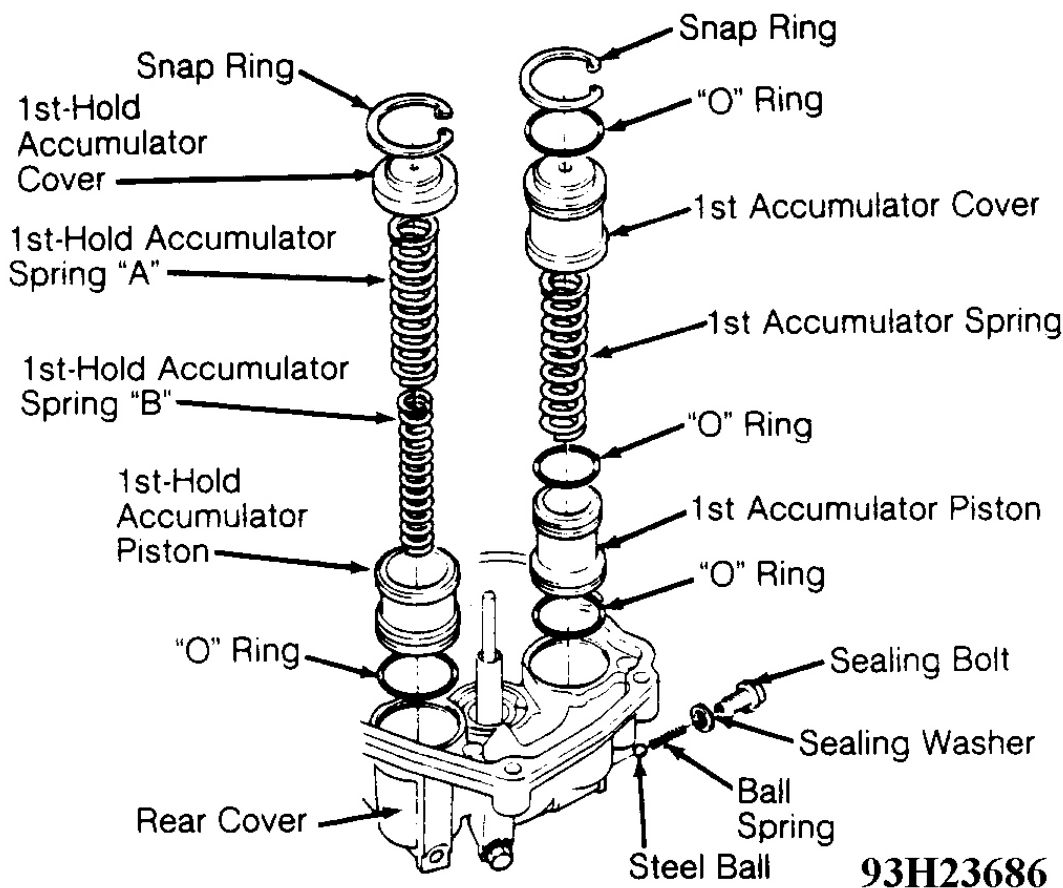
Disassemble 1st and 1st-hold accumulators. See **Fig. 25** . Use care when removing accumulator covers, as they are under spring pressure.

**Cleaning & Inspection**

Clean components with solvent and dry with compressed air. Replace components if worn or damaged. Ensure spring free length is within specification. See **SPRING SPECIFICATIONS** table. Replace springs if not within specification.

**Reassembly**

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



**Fig. 25: Exploded View Of 1st & 1st-Hold Accumulators**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

## MAINSHAFT

### Disassembly

Note location of mainshaft components. See **Fig. 14**. Remove components from mainshaft.

### 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:** Mainshaft 2nd gear clearance must be checked during reassembly.

**Reassembly**

1. Install all components on mainshaft without installing "O" rings on mainshaft. See **Fig. 13** . Remove ball bearing for mainshaft from transaxle housing. Install ball bearing on mainshaft.
2. Install mainshaft 1st gear collar, thrust shims and 1st clutch on mainshaft. DO NOT install mainshaft 1st gear and needle bearings at this time. See **Fig. 11** .
3. Install disc spring and used lock nut on mainshaft. Ensure disc spring is installed with largest side against lock nut. See **Fig. 11** . Tighten lock nut to 22 ft. lbs. (30 N.m).

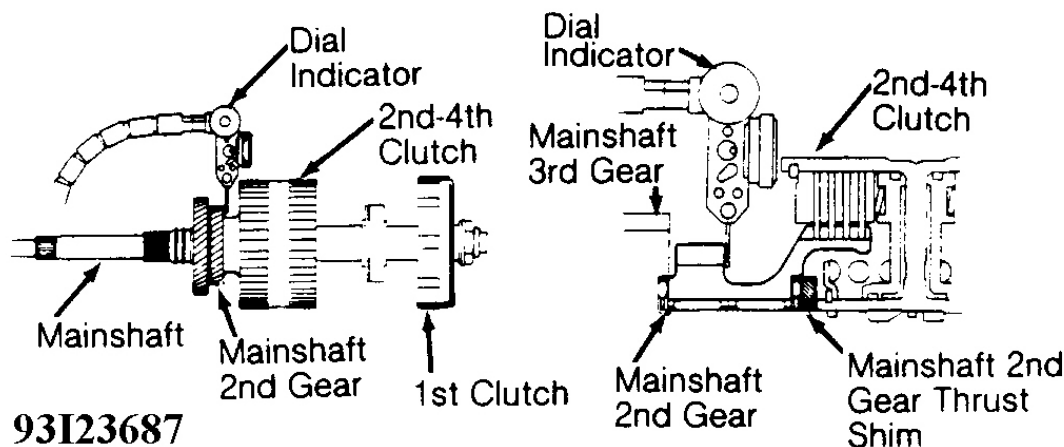
**NOTE: Mainshaft has left-hand threads.**

4. Install dial indicator on mainshaft so stem of dial indicator is resting against mainshaft 2nd gear. See **Fig. 24** . Move 2nd-4th clutch toward 1st clutch and note reading on dial indicator. This is the mainshaft 2nd gear clearance.
5. Measure mainshaft 2nd gear clearance in 3 different places. Use average reading as mainshaft 2nd gear clearance. Mainshaft 2nd gear clearance should be .003-.006" (.07-.15 mm).
6. Install different thickness mainshaft 2nd gear thrust shim and recheck clearance if mainshaft 2nd gear clearance is not within specification. See **MAINSHAFT 2ND GEAR THRUST SHIM SPECIFICATIONS** table.
7. Once correct mainshaft 2nd gear thrust shim is obtained, disassemble mainshaft. Lubricate all components with ATF. Wrap splines of mainshaft with tape. Install NEW "O" rings on mainshaft. Reassemble mainshaft.

**MAINSHAFT 2ND GEAR THRUST SHIM SPECIFICATIONS**

Thrust Shim Number	Part Number	Thickness In. (mm)
1	90441-PW4-000	.157 (4.00)
2	90442-PW4-000	.159 (4.05)
3	90443-PW4-000	.161 (4.10)
4	90444-PW4-000	.163 (4.15)
5	90445-PW4-000	.165 (4.20)
6	90446-PW4-000	.167 (4.25)
7	90447-PW4-000	.169 (4.30)
8	90448-PW4-000	.171 (4.35)
9	90449-PW4-000	.173 (4.40)
10	90450-PW4-000	.175 (4.45)
11	90451-PW4-000	.177 (4.50)

**NOTE: Ensure thrust needle bearings are installed with unrolled edge of bearing retainer facing washer.**



**Fig. 26: Checking Mainshaft 2nd Gear Clearance**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

## COUNTERSHAFT

### Disassembly

Note location of countershaft components. See **Fig. 13** . Remove components from countershaft.

### 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 4th gear clearance must be checked during reassembly.

### Reassembly

1. Install components on countershaft without installing "O" rings on countershaft. See **Fig. 13** . Remove ball bearing for countershaft from transaxle housing. Install ball bearing on countershaft.
2. Install parking gear, countershaft 1st gear collar, thrust shim and 1st-hold clutch on countershaft. See **Fig. 11** .

**NOTE:** DO NOT install needle bearings, one-way clutch, countershaft 1st gear, 1st-hold clutch hub and thrust needle bearing at this time. See **Fig. 11** .

3. Install disc spring and used lock nut on countershaft. Ensure disc spring is installed with largest side against lock nut. See **Fig. 11** .
4. Tighten lock nut to 22 ft. lbs. (30 N.m). Hold countershaft 4th gear against distance collar. Using feeler gauge, measure countershaft 4th gear clearance between countershaft 4th gear and reverse selector hub.

See **Fig. 25** .

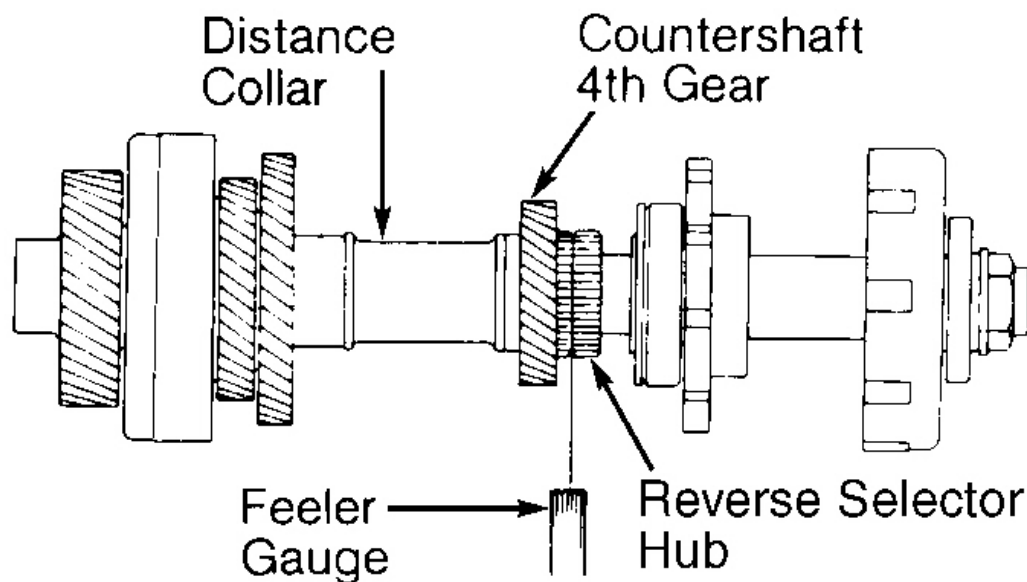
5. Measure countershaft 4th gear clearance in 3 different places. Use average reading as countershaft 4th gear clearance. Countershaft 4th gear clearance should be .003-.006" (.07-.15 mm).
6. Install different length distance collar and recheck clearance if countershaft 4th gear clearance is not within specification. See **DISTANCE COLLAR SPECIFICATIONS** table.
7. Once correct distance collar is obtained, disassemble countershaft. Lubricate all components with ATF. Wrap splines of countershaft with tape. Install NEW "O" rings on countershaft. Reassemble countershaft.

#### **DISTANCE COLLAR SPECIFICATIONS**

<b>Collar Number</b>	<b>Part Number</b>	<b>Length In. (mm)</b>
1	90501-PW7-000	2.585 (65.65)
2	90502-PW7-000	2.587 (65.70)
3	90503-PW7-000	2.589 (65.75)
4	90504-PW7-000	2.591 (65.80)
5	90505-PW7-000	2.593 (65.85)
6	90506-PW7-000	2.594 (65.90)
7	90507-PW7-000	2.596 (65.95)
8	90508-PW7-000	2.598 (66.00)
9	90509-PW7-000	2.600 (66.05)
10	90510-PW7-000	2.602 (66.10)

**NOTE:** Ensure thrust needle bearings are installed with unrolled edge of bearing retainer facing washer.





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**Fig. 27: Checking Countershaft 4th Gear Clearance**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

## PARKING GEAR & ONE-WAY CLUTCH

### Disassembly

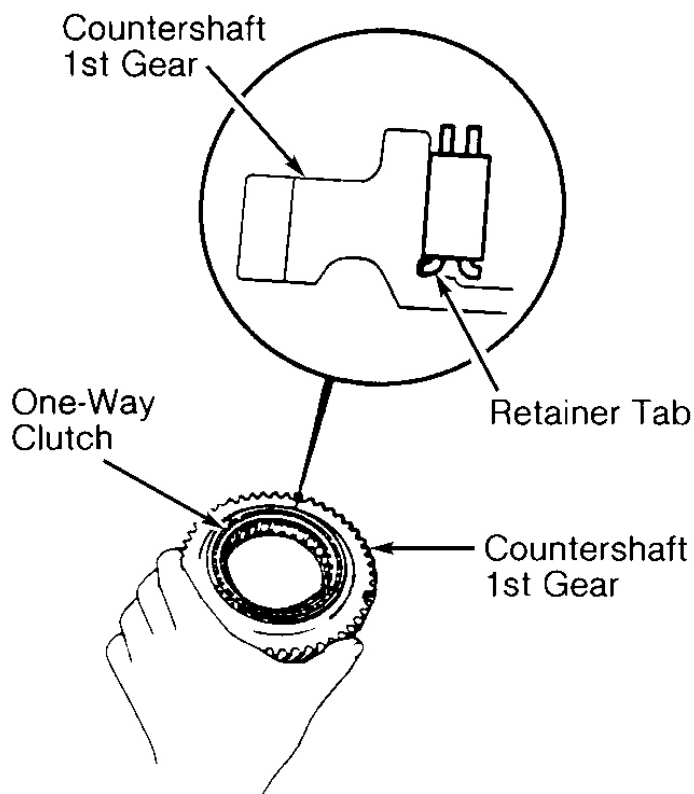
1. To separate parking gear from countershaft 1st gear, hold countershaft 1st gear and rotate parking gear clockwise. Remove parking gear.
2. Note direction of one-way clutch installation in countershaft 1st gear. Using screwdriver, gently pry one-way clutch from countershaft 1st gear.

### Cleaning & Inspection

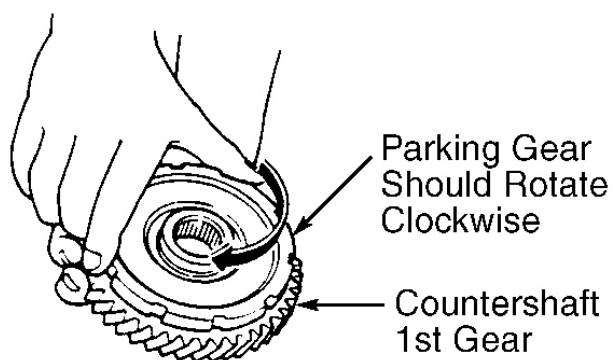
Clean components with solvent and dry with compressed air. Inspect components for damage.

### Reassembly

Lubricate all components with ATF. Install one-way clutch with retainer tab toward countershaft 1st gear. See **Fig. 28** . Install parking gear. Ensure parking gear rotates clockwise when holding countershaft 1st gear. See **Fig. 29** .



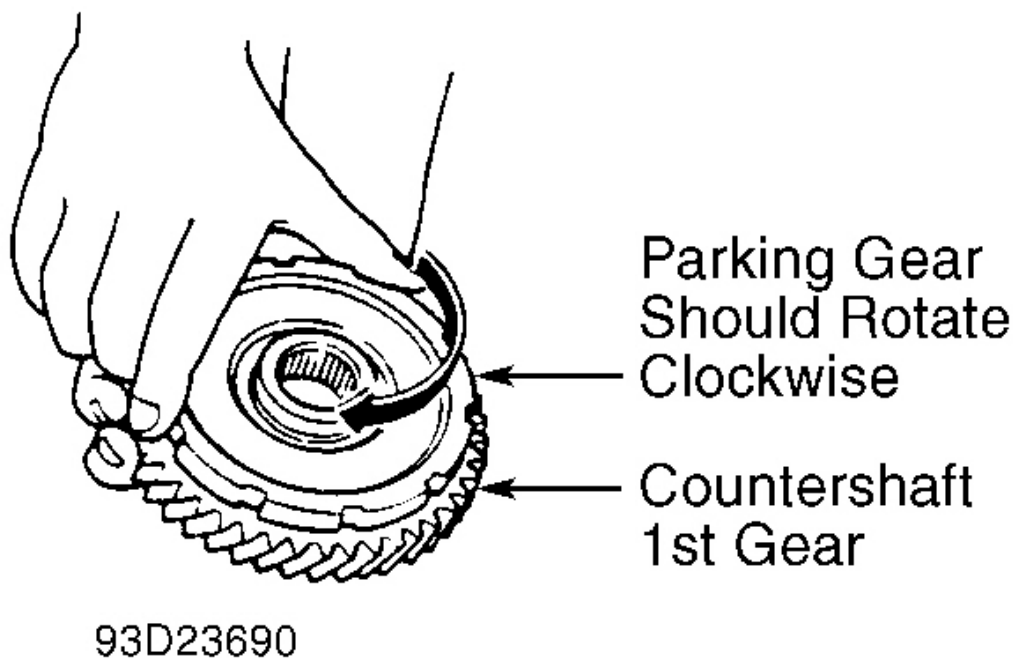
### INSTALLING ONE-WAY CLUTCH



### CHECKING ONE-WAY CLUTCH OPERATION

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**Fig. 28: Installing One-Way Clutch Operation**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.



**Fig. 29: Checking One-Way Clutch Operation**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

## CLUTCH ASSEMBLIES

### Disassembly

1. Remove snap ring, clutch end plate, clutch discs and clutch plates. See **Fig. 28** . On 1st-hold, 2nd and 4th clutches, note direction of disc spring installation. Remove disc spring.

**CAUTION: Ensure adapter is centered over area of spring retainer supported by return spring. Spring retainer may be damaged if not supported by return spring.**

2. On all clutches, use Spring Compressor (07LAE-PX40100), Adapter (07HAE-PL50100) and Bolt (07GAE-PG40200) to compress return spring. See **Fig. 31** .
3. Remove circlip. Release and remove spring compressor components. Remove spring retainer and return spring.
4. 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**

1. Clean metal components with solvent and dry with compressed air. Ensure check valve on rear of clutch piston is thoroughly cleaned.
2. Inspect components for damage and replace if necessary. Ensure no rough edges exist on "O" ring sealing areas. On 1st and 3rd clutches, ensure disc spring is securely staked to clutch piston. Inspect for loose check valve on rear of clutch piston.

**Reassembly**

1. 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 force on clutch piston, or "O" rings will be damaged.**

2. Install return spring and spring retainer in clutch drum. Place circlip on spring retainer. Using spring compressor, compress return spring. Install circlip and remove spring compressor.
3. Install disc spring on 1st-hold, 2nd and 4th clutches. Ensure disc spring is installed in proper direction. See **Fig. 33**.

**CAUTION: Ensure clutch discs are soaked in ATF for at least 30 minutes before installing.**

4. Alternately install clutch plates and clutch discs starting with clutch plate. Install clutch end plate with flat side toward clutch disc. Install snap ring. Momentarily apply air to oil passage on clutch drum and note that the clutch piston moves and clutch engages.
5. Using dial indicator, measure clutch clearance between clutch end plate and top clutch disc. See **Fig. 34**. Zero dial indicator with clutch end plate lowered, and then lift clutch end plate upward against snap ring. Distance measured is clutch clearance.
6. Measure clutch clearance at 3 different locations. Ensure clutch clearance is within specification. See **CLUTCH CLEARANCE SPECIFICATIONS** table.
7. 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**

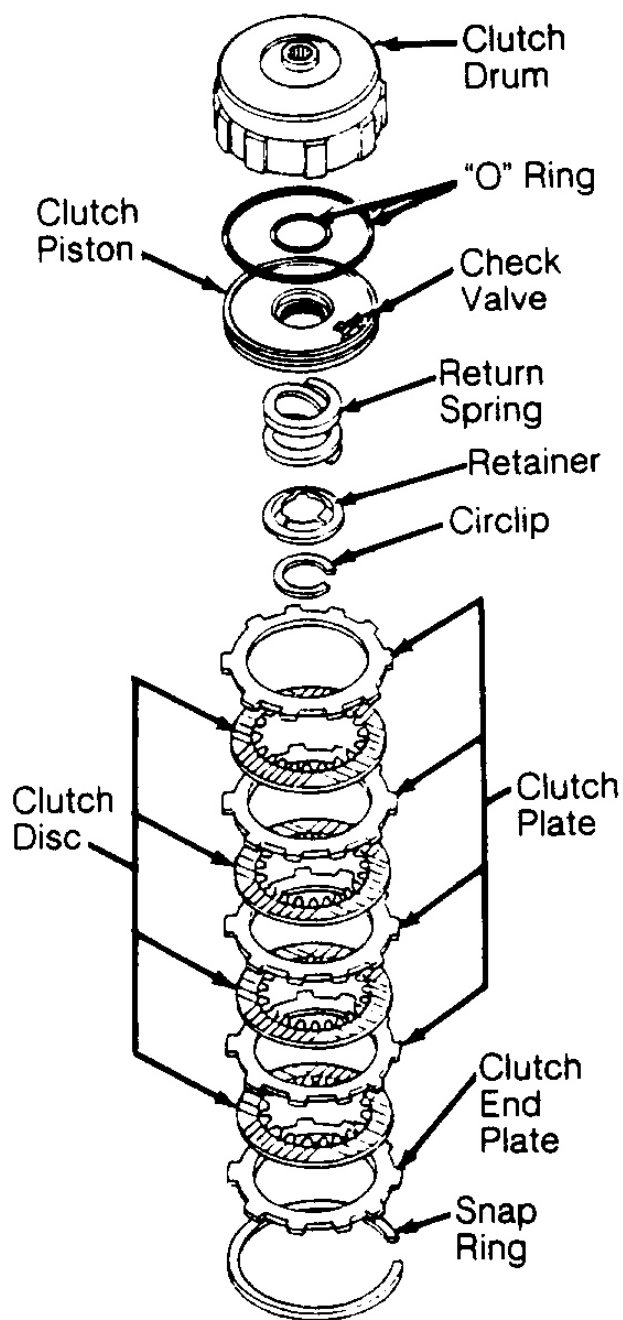
Application	In. (mm)
1st Clutch	.026-.033 (.65-.85)
1st-Hold Clutch	.031-.039 (.80-1.00)
2nd, 3rd & 4th Clutches	.022-.030 (.55-.75)

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**CLUTCH END PLATE SPECIFICATIONS**

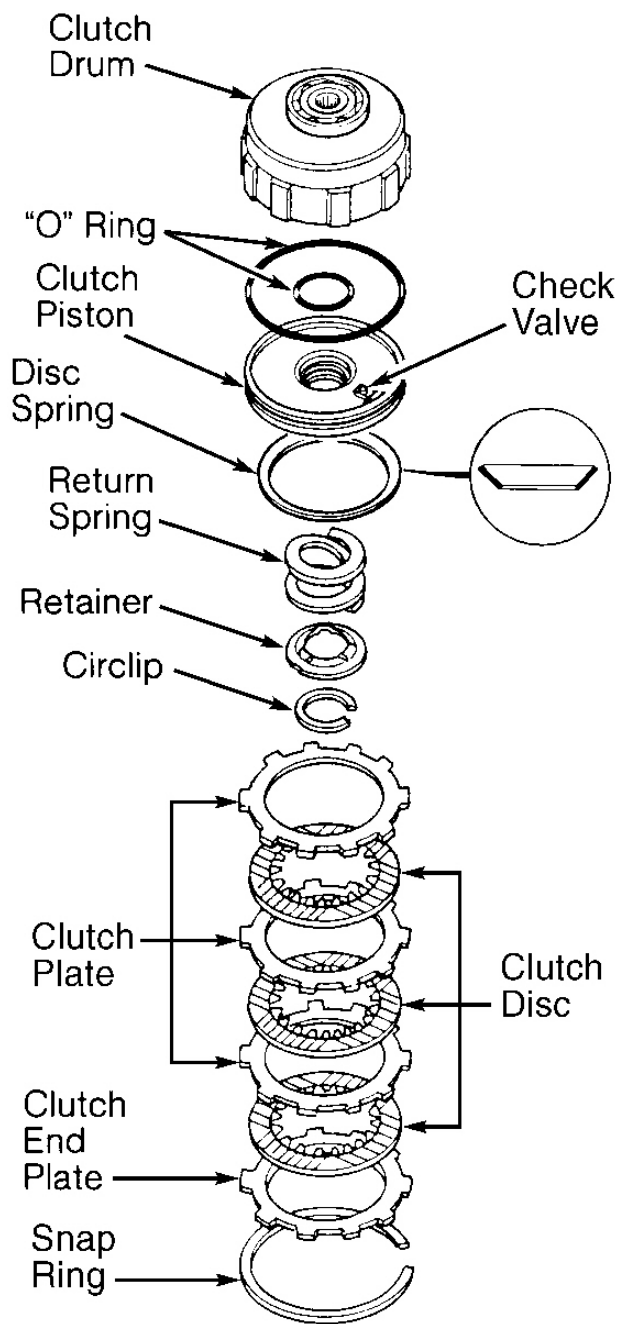
<b>Plate Number</b>	<b>Part Number</b>	<b>Thickness In. (mm)</b>
<b>1st &amp; 1st-Hold Clutch</b>		
1	22551-PF4-000	.083 (2.10)
2	22552-PF4-000	.087 (2.20)
3	22553-PF4-000	.091 (2.30)
4	22554-PF4-000	.094 (2.40)
5	22555-PF4-000	.098 (2.50)
6	22556-PF4-000	.102 (2.60)
7	22557-PF4-000	.106 (2.70)
8	22558-PF4-000	.110 (2.80)
9	22559-PF4-000	.114 (2.90)
10	22560-PF4-000	.118 (3.00)
11	22561-PF4-000	.122 (3.10)
12	22562-PF4-000	.126 (3.20)
13	22563-PF4-000	.130 (3.30)
14	22564-PF4-000	.134 (3.40)
<b>2nd &amp; 4th Clutches</b>		
1	22631-PR9-000	.083 (2.10)
2	22632-PR9-000	.087 (2.20)
3	22633-PR9-000	.091 (2.30)
4	22634-PR9-000	.094 (2.40)
5	22635-PR9-000	.098 (2.50)
6	22636-PR9-000	.102 (2.60)
7	22637-PR9-000	.106 (2.70)
8	22638-PR9-000	.110 (2.80)
9	22639-PR9-000	.114 (2.90)
<b>3rd Clutch</b>		
1	22551-PF4-000	.083 (2.10)
2	22552-PF4-000	.087 (2.20)
3	22553-PF4-000	.091 (2.30)
4	22554-PF4-000	.094 (2.40)
5	22555-PF4-000	.098 (2.50)
6	22556-PF4-000	.102 (2.60)
7	22557-PF4-000	.106 (2.70)
8	22558-PF4-000	.110 (2.80)
9	22559-PF4-000	.114 (2.90)
10	22560-PF4-000	.118 (3.00)



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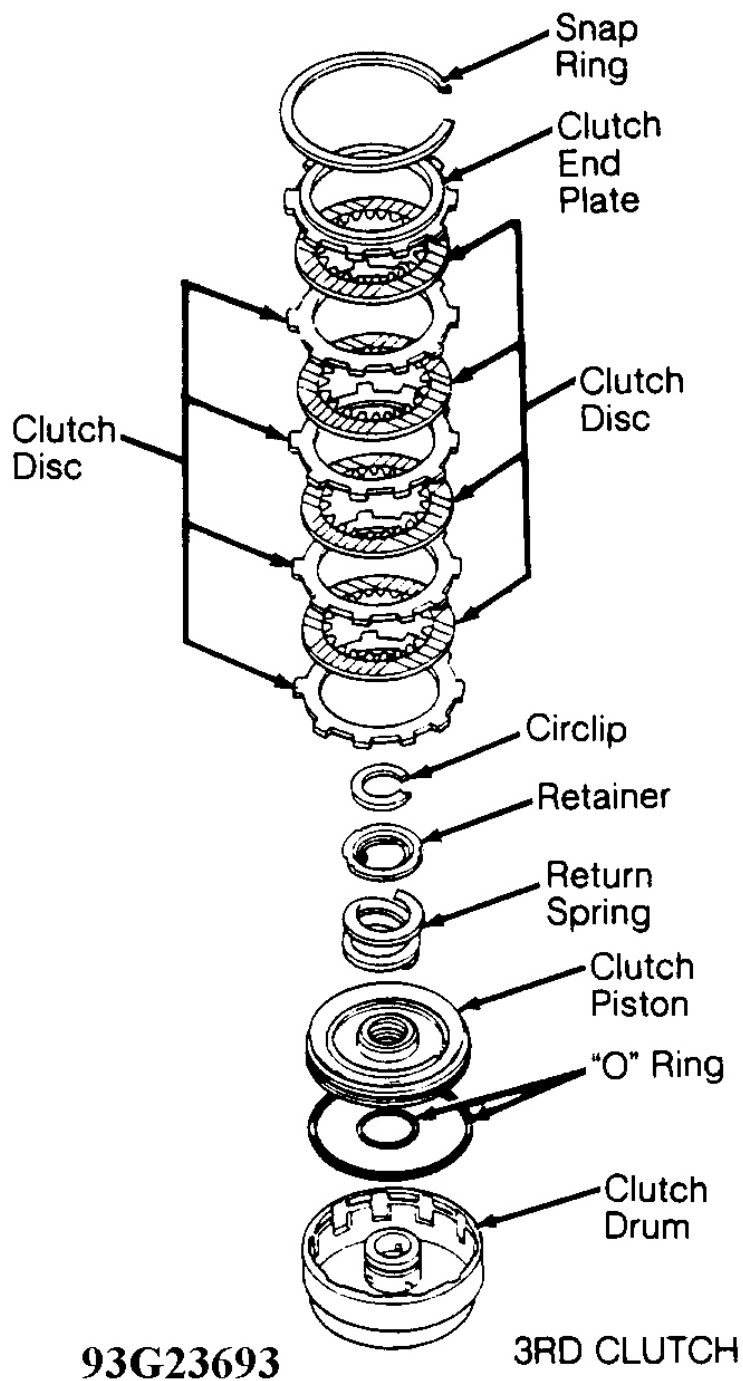
1ST CLUTCH

**Fig. 30: Exploded View Of 1st Clutch Assembly**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.



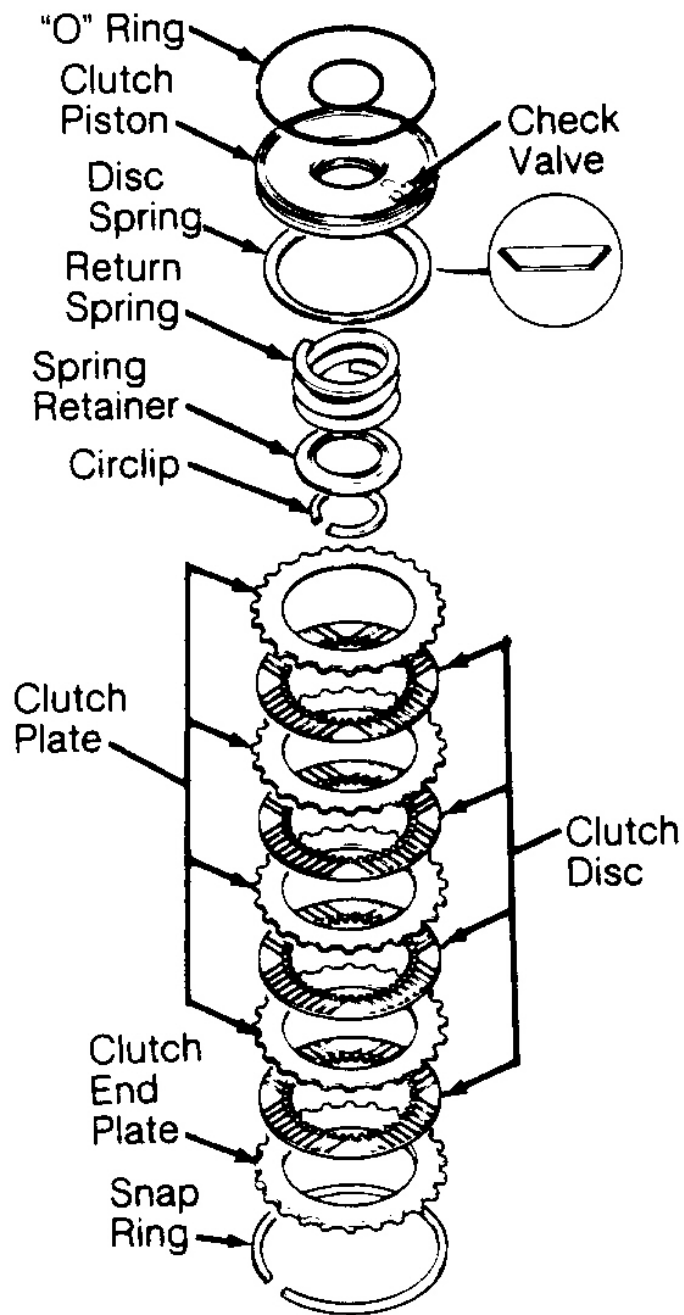
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**Fig. 31: Exploded View Of 1st-Hold Clutch Assembly**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.



**Fig. 32: Exploded View Of 3rd Clutch Assembly**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

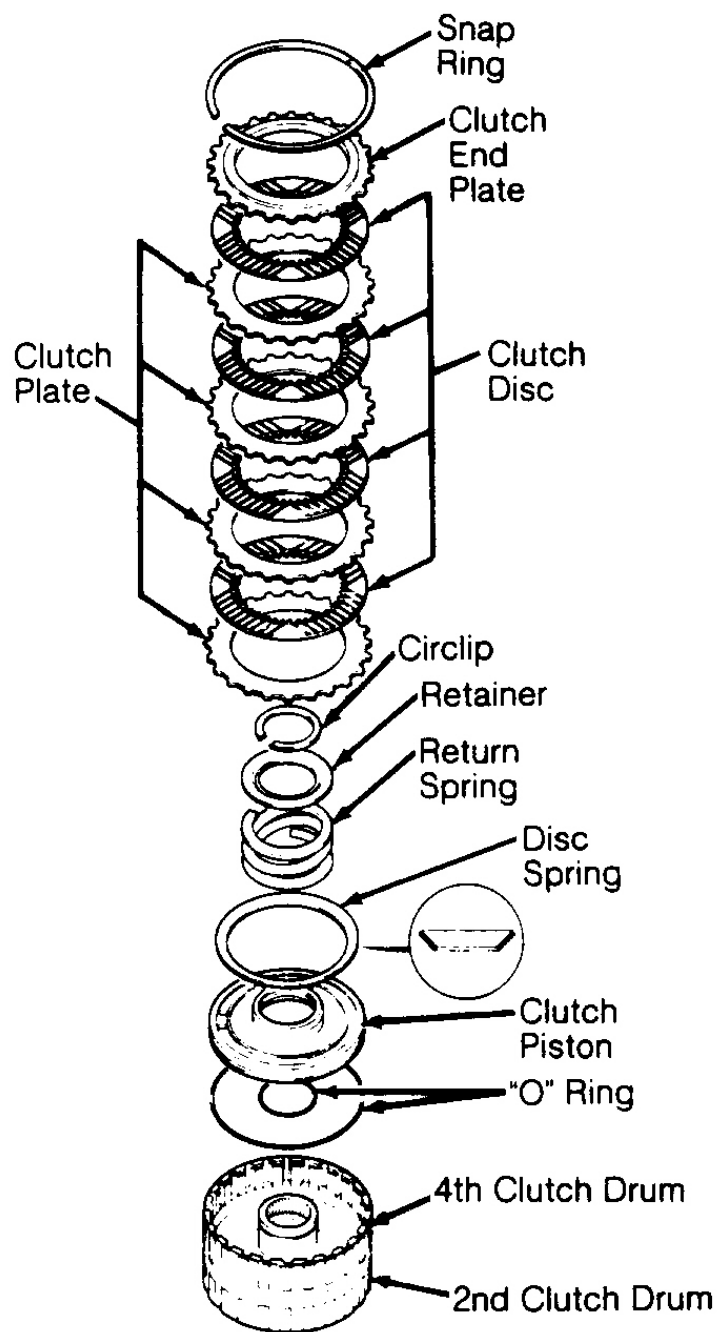




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2ND CLUTCH

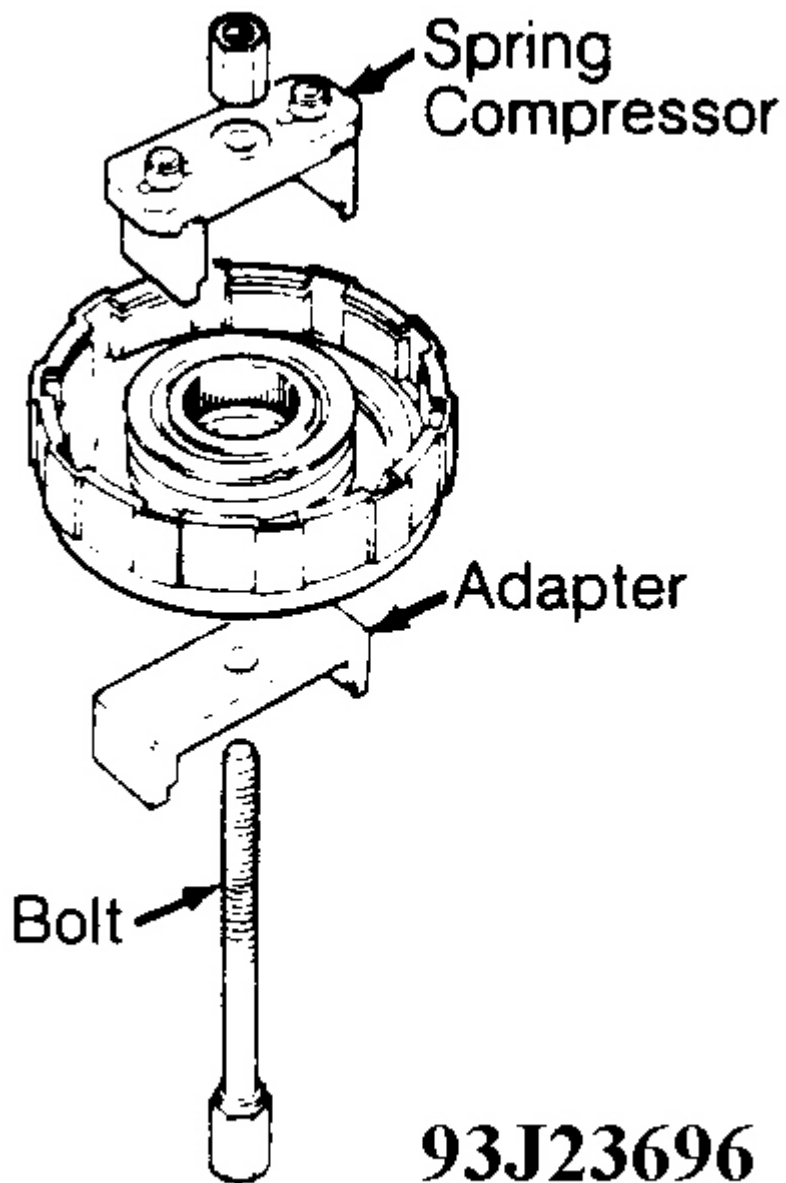
**Fig. 33: Exploded View Of 2nd-4th Clutch Assembly (1 of 2)**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



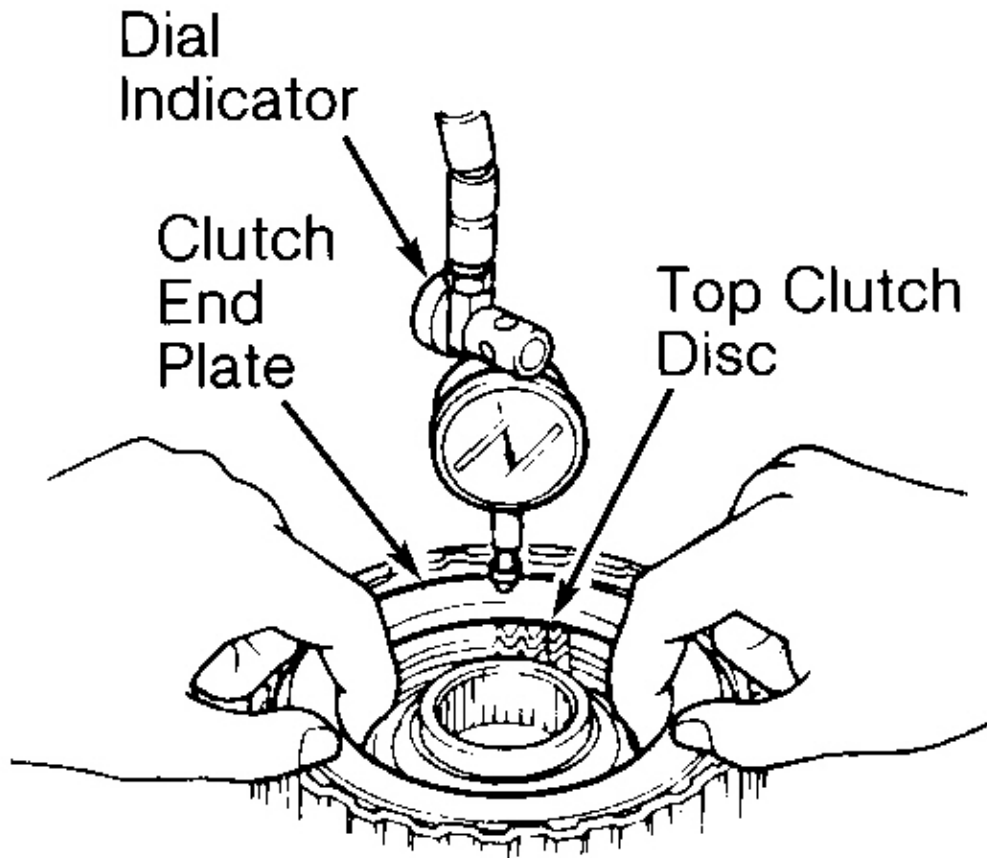
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4TH CLUTCH

**Fig. 34: Exploded View Of 2nd-4th Clutch Assembly (2 of 2)**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



**Fig. 35: Compressing Return Spring (1st Clutch Shown; Others Are Similar)**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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**Fig. 36: Measuring Clutch Clearance**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

**1ST-HOLD CLUTCH BEARING****NOTE:** Bearing is located on rear of 1st-hold clutch. See [Fig. 11](#) .**Removal & Installation**

Using puller, remove bearing from rear of 1st-hold clutch. To install, use hammer and Driver (07746-0030100). Drive bearing on 1st-hold clutch until bearing bottoms.

**TORQUE CONVERTER HOUSING**

**Disassembly**

1. Remove countershaft needle bearing from torque converter housing, using Bearing Remover (07736-A01000A) and slide hammer (if necessary). Remove oil guide plate. See **Fig. 15**.
2. Remove mainshaft bearing and oil seal. Remove snap ring retaining extension shaft oil seal in torque converter housing. Using hammer and drift, tap secondary gear 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. Using hammer, Driver (07749-0010000) and Adapter (07746-0010500), drive in mainshaft bearing until bearing bottoms in torque converter housing.
2. Using hammer, driver and Adapter (07746-0010600), install mainshaft oil seal in torque converter housing. Oil seal should be even with torque converter housing surface.
3. To install countershaft needle bearing, install NEW oil guide plate in countershaft bearing bore of torque converter housing. Ensure oil guide plate is installed so tab in center faces upward (away from torque converter housing surface). See **Fig. 14**. Using hammer, driver and Adapter (07746-0010500), drive countershaft needle bearing into torque converter housing.

**NOTE:** If secondary gear, roller bearings, bearing races, thrust shim, transaxle housing or torque converter housing are replaced, secondary gear bearing preload must be checked before installing secondary gear oil seal. See **SECONDARY GEAR BEARING PRELOAD**.

4. Using hammer, driver and Pinion Cover Driver (07LAD-PW50500), install secondary gear oil seal in torque converter housing. Install snap ring in torque converter housing.

**TRANSAXLE HOUSING****Disassembly**

Expand snap ring and press mainshaft and countershaft ball bearings from transaxle housing. Using hammer and drift, tap secondary gear 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. Expand snap ring and install ball bearing part way into transaxle housing. Release snap ring. Press ball bearing into transaxle housing until snap ring engages with groove in ball bearing.

**CAUTION:** Ensure ball bearings are installed with groove of ball bearing facing inside of transaxle housing so snap ring engages in ball bearing when ball bearing is fully installed. Ensure snap ring fully engages in ball bearing.

**NOTE:** If secondary gear, roller bearings, bearing races, thrust shim, transaxle housing or torque converter housing are replaced, secondary gear bearing preload must be checked before installing secondary gear oil seal. See SECONDARY GEAR BEARING PRELOAD .

2. Using hammer, steel plate and Adapter (07LAD-PW50601), install secondary gear oil seal into transaxle housing.

## SECONDARY GEAR & EXTENSION SHAFT

**NOTE:** If secondary gear, roller bearings, bearing races, thrust shim, transaxle housing or torque converter housing are replaced, secondary gear bearing preload must be checked before installing secondary gear oil seal. See SECONDARY GEAR BEARING PRELOAD .

### Disassembly

1. Remove set ring and extension shaft from secondary gear. See Fig. 13 . Using screwdriver, pry oil seal for extension shaft from secondary gear.
2. If removing roller bearing from secondary gear, support secondary gear in press using bearing remover. Using press, press secondary gear from roller bearing.

**CAUTION:** DO NOT heat torque converter housing or transaxle housing to more than 212°F (100°C) or housing may be damaged.

3. If removing bearing races for secondary gear from torque converter or transaxle housing, use heat gun to heat area around bearing race to 212°F (100°C). Tap bearing race from housing.

### Cleaning & Inspection

Clean components with solvent and dry with compressed air. Inspect splines for excessive wear. Check bearing surfaces for scoring or wear. Inspect secondary gear for damage.

### Reassembly

1. To reassemble extension shaft, use hammer, Driver (07749-0010000) and Adapter (07746-0010300) to install oil seal in secondary gear. Using press, steel plate and Adapter (07LAD-PW50601), press roller bearings onto secondary gear. Ensure roller bearing fully bottoms on secondary gear.

**NOTE:** Adapter contains 2 different sizes for roller bearing installation. Ensure 40-

**mm side of adapter is used for bearing on transaxle housing side and 50-mm side is used on torque converter housing side.**

2. Install extension shaft in secondary gear. Install NEW set ring on end of extension shaft.
3. If installing bearing race for secondary gear in transaxle housing, install thrust shim in transaxle housing. Using hammer, Driver (07749-0010000) and Adapter (07746-0010600), tap bearing race into transaxle housing.
4. If installing bearing race for secondary gear in torque converter housing, use hammer, Driver (07749-0010000) and Adapter (07GAD-SD40101). Tap bearing race into transaxle housing.

**NOTE:** If secondary gear, roller bearings, bearing races, thrust shim, transaxle housing or torque converter housing are replaced, secondary gear bearing preload must be checked before installing secondary gear oil seal. See SECONDARY GEAR BEARING PRELOAD .

## TRANSAXLE REASSEMBLY

### SECONDARY GEAR BEARING PRELOAD

1. Oil seals must be removed from torque converter housing and transaxle housing before checking secondary gear bearing preload. Remove snap ring retaining extension shaft oil seal in torque converter housing.
2. Using hammer and drift, tap extension shaft oil seal from torque converter housing and transaxle housing. Remove set ring and extension shaft from secondary gear. See Fig. 13 .
3. Install sealing bolt in secondary gear. See Fig. 30 . Tighten sealing bolt to 15 ft. lbs. (20 N.m). Install secondary gear in torque converter housing. DO NOT install mainshaft and countershaft in torque converter housing.
4. Install dowel pins and gasket on the torque converter housing. Install transaxle housing on torque converter housing. Install and tighten transaxle housing bolts to specification. See TORQUE SPECIFICATIONS .

**CAUTION:** Ensure transaxle housing bolts are also installed on inside of torque converter housing. See Fig. 13 .

5. Rotate secondary gear in both directions to fully seat roller bearings on secondary gear. Secondary gear bearing preload is determined by measuring starting torque required to rotate secondary gear in both directions.
6. Using INCH-lb. torque wrench, measure starting torque required to rotate secondary gear in both directions. See Fig. 30 . The starting torque should be 20-29 INCH lbs. (2.3-3.3 N.m).
7. If starting torque is not within specification, install a different thickness thrust shim below the bearing race in the transaxle housing. See THRUST SHIM SPECIFICATIONS table. Also, see Fig. 13 .
8. If changing thrust shim, remove transaxle housing from torque converter housing. Using heat gun, heat area around bearing race in transaxle housing to 212°F (100°C). Tap bearing race from transaxle housing. Remove thrust shim.

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**CAUTION: DO NOT heat transaxle housing to more than 212°F (100°C) or housing may be damaged.**

9. Install thrust shim in transaxle housing. Using hammer, Driver (07749-0010000) and Adapter (07746-0010600), tap bearing race into transaxle housing. Recheck secondary gear bearing preload.
10. Once correct secondary gear bearing preload is obtained, remove transaxle housing and secondary gear from torque converter housing. Using hammer, Driver (07749-0010000) and Pinion Cover Driver (07LAD-PW50500), install secondary gear oil seal in torque converter housing. Install snap ring in torque converter housing.
11. Using hammer, steel plate and Adapter (07LAD-PW50601), install secondary gear oil seal into transaxle housing. Install extension shaft in secondary gear. Install NEW set ring on end of extension shaft.

**THRUST SHIM SPECIFICATIONS**

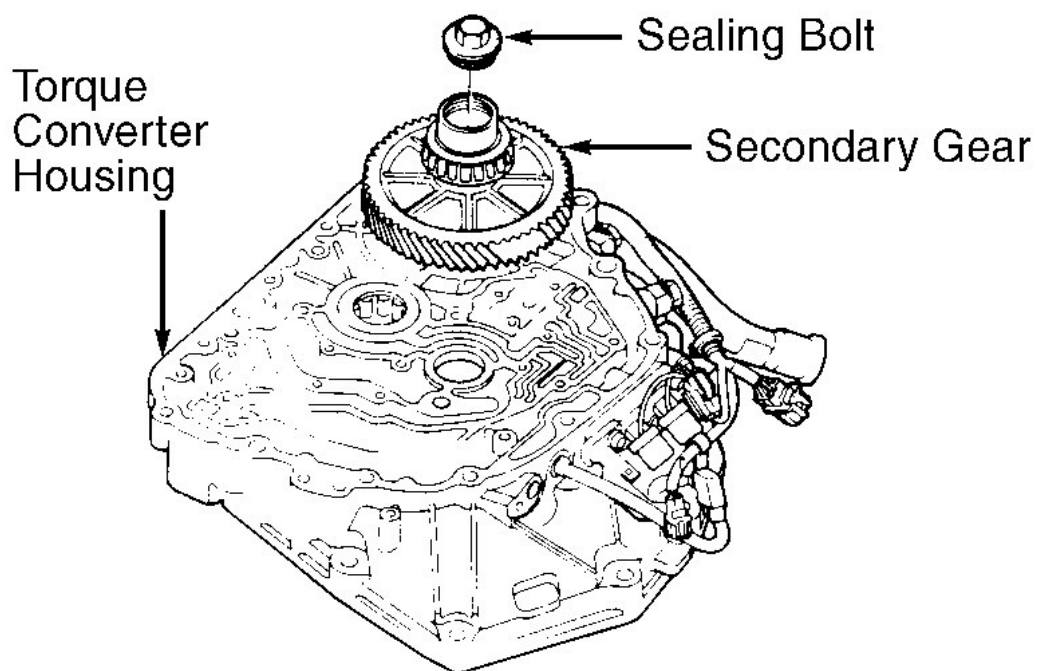
Thrust Shim I.D. Letter	Part Number	Thickness In. (mm)
"A"	23941-PW5-000	.061 (1.56)
"B"	23942-PW5-000	.063 (1.59)
"C"	23943-PW5-000	.064 (1.62)
"D"	23944-PW5-000	.065 (1.65)
"E"	23945-PW5-000	.066 (1.68)
"F"	23946-PW5-000	.067 (1.71)
"G"	23947-PW5-000	.069 (1.74)
"H"	23948-PW5-000	.070 (1.77)
"I"	23949-PW5-000	.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)
BB	23968-PW5-000	.093 (2.37)



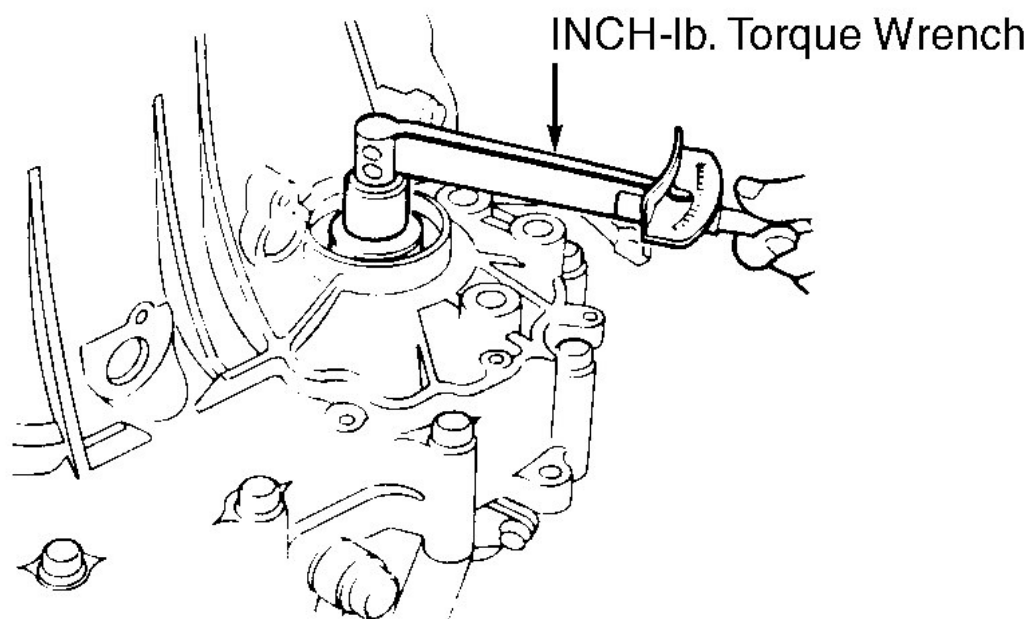
**1992 Acura Vigor GS**

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CC	23969-PW5-000	.094 (2.40)
DD	23970-PW5-000	.096 (2.43)



### INSTALLING SEALING BOLT

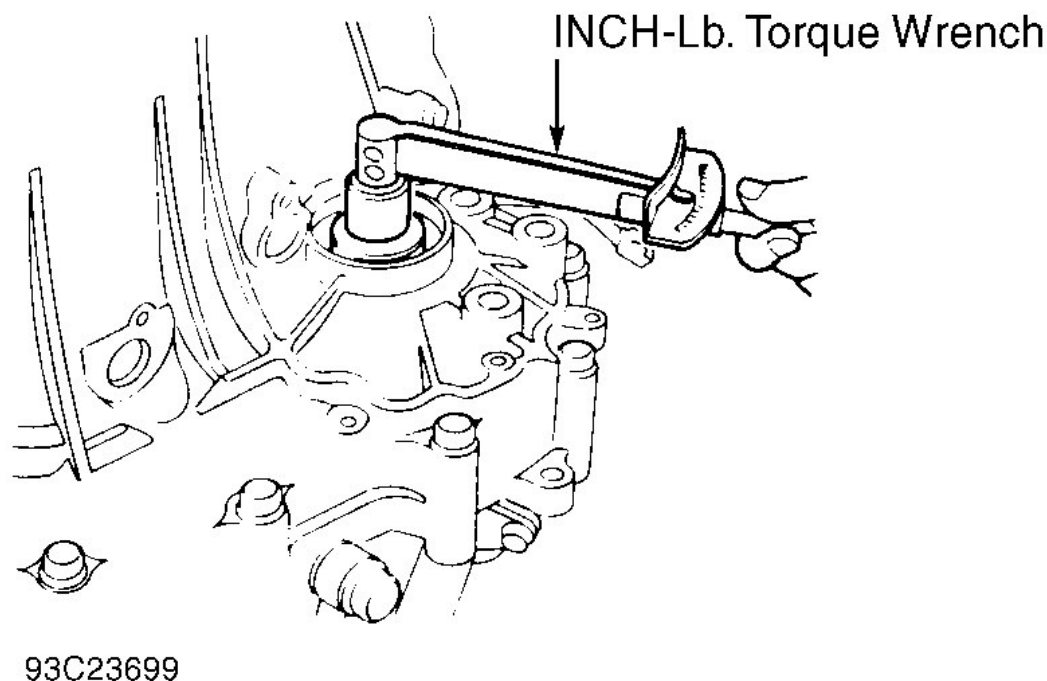


### CHECKING STARTING TORQUE

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**Fig. 37: Installing Sealing Bolt**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

**Fig. 38: Checking Starting Torque**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

**VALVE BODIES & INTERNAL COMPONENTS**

**NOTE:** If secondary gear, roller bearings, bearing races, thrust shim, transaxle housing or torque converter housing are replaced, secondary gear bearing preload must be checked before installing secondary gear oil seal. See **SECONDARY GEAR BEARING PRELOAD** .

1. Install spring and steel ball in reverse idler gear shaft holder. Install needle bearing on end of reverse idler gear shaft holder. Ensure needle bearing retains steel ball and spring in reverse idler gear shaft holder.
2. Install reverse idler gear in transaxle housing with largest chamfered side of gear away from transaxle housing (toward torque converter housing). See **Fig. 39** .
3. Install reverse idler gear shaft holder on transaxle housing. Install and tighten reverse idler gear shaft holder bolts to specification. See **TORQUE SPECIFICATIONS** .
4. Install shift control solenoid valve harness in torque converter housing. See **Fig. 14** . Install harness retaining bolt and tighten to specification. Install dowel pins and separator plate on torque converter housing.

**CAUTION: Ensure oil pump driven gear is installed with groove and chamfered side facing downward (toward main valve body separator plate).**

5. Install oil pump drive gear, oil pump driven gear and oil pump driven gear shaft. Install torque converter check valve and spring. See **Fig. 14**.
6. Install oil pump body. Install and tighten oil pump body bolts to specification.

**CAUTION: Ensure oil pump gears rotate smoothly and oil pump driven gear shaft moves freely once oil pump body is installed. If components do not operate correctly, loosen retaining 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.**

7. Install NEW filters in oil pump body. Ensure filters are installed in proper direction. See **Fig. 14**.
8. Install dowel pins, separator plate, throttle valve body and harness clamp on 2nd accumulator body. Install and tighten throttle valve body bolts to specification.
9. Install NEW "O" rings on 2nd accumulator piston. Install 2nd accumulator spring and 2nd accumulator piston in 2nd accumulator body. Install NEW filter in 2nd accumulator body. Ensure filter is installed in proper direction. See **Fig. 14**.
10. Install 2nd accumulator body. Install and tighten 2nd accumulator body bolts to specification. Install oil feedpipes in 2nd accumulator body. Install dowel pin and separator plate for regulator valve body.
11. Install stator shaft, NEW "O" ring and stopper. See **Fig. 14**. Install regulator valve body. Install and tighten regulator valve body bolts to specification.
12. Install oil feedpipes in oil pump body and torque converter housing. See **Fig. 14**. Install NEW "O" ring and dipstick tube. Install and tighten retaining bolt to specification.
13. Install NEW seal washers, cooler pipes and joint bolts. Tighten joint bolts to specification. Install extension shaft and secondary gear in torque converter housing.
14. Install countershaft and mainshaft as an assembly in torque converter housing. Install dowel pins and gasket on torque converter housing.

**CAUTION: Ensure NC and NM speed sensors ARE NOT installed in transaxle housing when installing transaxle housing on torque converter housing.**

15. Install transaxle housing on torque converter housing. Install and tighten torque converter housing bolt to specification in 2 steps using crisscross pattern.

**CAUTION: Ensure transaxle housing-to-torque converter housing bolts are installed on inside of torque converter housing. See Fig. 13.**

16. Install NEW "O" rings on NC and NM speed sensors. Install NC speed sensor. Install NM speed sensor washer and NM speed sensor. See **Fig. 13**. Install and tighten speed sensor bolts to specification.

**CAUTION: Ensure NM speed sensor washer is installed when installing NM speed sensor. NC speed sensor does not use a washer.**

17. Install connector holder on transaxle housing. Install parking pawl, parking pawl spring, parking pawl shaft and parking pawl stopper. See **Fig. 11** .
18. Install mainshaft 1st gear collar and thrust shim on mainshaft. Install parking gear, countershaft 1st gear collar and needle bearings on countershaft. See **Fig. 11** . Install one-way clutch and countershaft 1st gear as an assembly on countershaft.
19. Wrap splines of countershaft and mainshaft with tape. Install NEW "O" rings on countershaft and mainshaft. Remove tape from countershaft and mainshaft.
20. Install mainshaft 1st gear, needle bearing, thrust needle bearing, thrust shim and 1st clutch on mainshaft. See **Fig. 11** . Install 1st-hold clutch hub, thrust needle bearing, thrust shim and 1st-hold clutch on countershaft.
21. Coat disc springs and lock nuts with ATF. Install disc spring on mainshaft and countershaft. Ensure disc spring is installed with largest side against lock nut. See **Fig. 11** .
22. Install mainshaft and countershaft lock nuts. Install Mainshaft Holder (07GAB-PF50100) on mainshaft to secure mainshaft. See **Fig. 12** .
23. Engage parking pawl with parking gear. Tighten mainshaft and countershaft lock nuts to specification. Remove mainshaft holder. Stake lock nuts against the shaft.

**CAUTION: Ensure mainshaft and countershaft lock nuts are securely staked.**

24. Install control shaft, control shaft collar, spring, parking brake stopper, parking brake shift arm and detent lever in transaxle housing. See **Fig. 10** .
25. Install NEW bolt locks and bolts in control shaft collar, parking brake stopper and detent lever. Tighten bolts to specification. See **TORQUE SPECIFICATIONS** . Bend tabs over on bolt locks. Install shift arm roller and parking brake roller rod on parking brake shift arm.

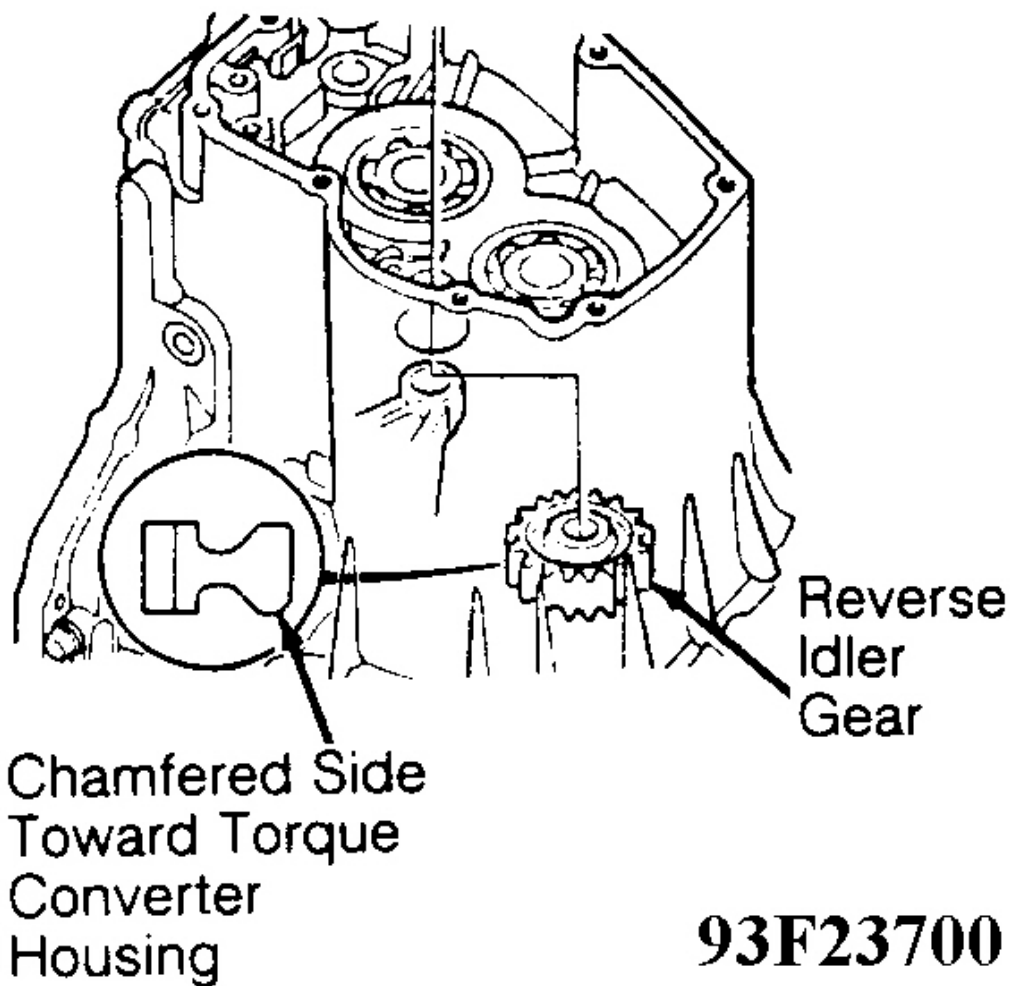
**CAUTION: Ensure shift arm roller is installed with head of roller toward detent lever. See Fig. 10 . Ensure parking brake roller rod is installed with rivets in rod facing toward detent lever.**

26. Shift detent lever to any position except Park. Install dowel pins and parking brake roller guide. See **Fig. 10** .
27. Install detent spring, detent spring plate, lock plate and retaining bolts. Tighten parking brake roller guide bolts to specification. Install shift control solenoid valve harness.
28. Ensure shift lever is in Park. Push shift fork to proper position. See **Fig. 8** . Install lower valve body assembly while engaging manual valve on valve body with detent lever and engaging shift fork with reverse selector.
29. Install main valve body cover plate, fluid strainer and all retaining bolts. Ensure proper length bolts are installed in correct location on lower valve body assembly and fluid strainer. See **Fig. 9** .
30. Tighten all bolts to specification. See **TORQUE SPECIFICATIONS** . Install dowel pins, gasket and oil

pan. Tighten oil pan bolts to specification. Install NEW seal washer on drain plug. Tighten drain plug to specification.

31. Install oil pipes, dowel pins, gasket and rear cover. Install and tighten rear cover bolts to specification. Reconnect shift control solenoid valve harness to transaxle sub-harness.

**CAUTION:** If transaxle failure existed, flush oil cooler. See OIL COOLER FLUSHING .



**Fig. 39: Installing Reverse Idler Gear**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

## DIFFERENTIAL ASSEMBLY

### OVERHAUL

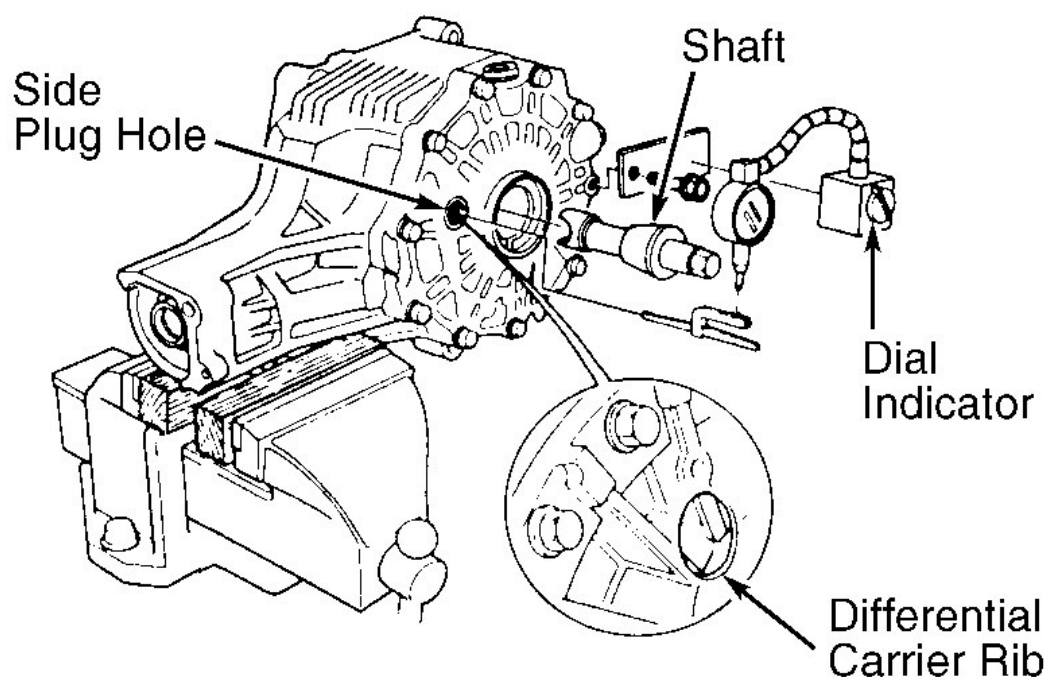
**NOTE:** Pre-disassembly inspection should be performed before disassembly of differential assembly. This will indicate if proper thrust shims and thrust washers are used.

#### Pre-Disassembly Inspection

1. Check ring gear backlash, total bearing preload and gear tooth contact pattern before disassembling differential assembly. Record measurements for use during reassembly.
2. To check ring gear backlash, mount differential assembly in soft-jawed vice. Remove side plug from differential case cover. Remove oil seal from differential case. Align differential carrier rib with side plug hole.
3. Install Shaft (07HAJ-PK40201) in differential assembly and mount dial indicator on differential case. See **Fig. 38**.
4. Measure ring gear backlash in 3 different locations on differential carrier. Gear backlash should be .002-.004" (.04-.10 mm). Difference between measurements in different areas should not exceed .0015" (.040 mm).
5. If ring gear backlash is within specification, proper thickness thrust shims are installed behind bearing races for differential carrier bearings provided no components are changed. If ring gear backlash is not within specification, different thickness thrust shim must be installed during reassembly.
6. To measure total bearing preload, install a dial-type INCH-lb. torque wrench on end of drive pinion. Rotate drive pinion and note total bearing preload. Total bearing preload should be 13.80-19.50 INCH lbs. (1.6-2.2 N.m) with used bearings.

**NOTE:** If total bearing preload is not within specification, different thickness shim must be installed behind bearing race for differential carrier bearings.

7. To check gear tooth contact pattern, remove differential case cover. See **Fig. 33**. Clean and paint both sides of ring gear teeth with Prussian Blue.
8. Install differential case cover. Tighten bolts in a crisscross pattern to 35 ft. lbs. (47 N.m). Install Shaft (07HAJ-PK40201) in differential assembly.
9. Rotate ring gear both directions while applying resistance to pinion shaft. Remove differential cover and inspect ring gear tooth contact pattern. Correct gear tooth contact should be centered on the ring gear. See **GEAR TOOTH CONTACT PATTERNS** in GENERAL INFORMATION.



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**Fig. 40: Checking Differential Backlash**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

**Disassembly**

1. Remove differential case cover. Remove oil collector plate and breather chamber plate from differential case cover (if necessary). See **Fig. 39**.
2. Remove differential carrier assembly. Remove oil cooler and "O" ring. Punch 2 small holes in pinion cover oil seal 180 degrees apart from each other.
3. Place wooden block on differential case to protect case when prying pinion cover oil seal from differential case. Place screwdriver in small holes and pry pinion cover oil seal from differential case.
4. Using hammer and chisel, cut lock nut tab and pry away from drive pinion. Insert 17-mm Allen wrench into gear end of drive pinion.

**NOTE:** Lock nut on drive pinion has left-hand threads.

5. Secure long end of Allen wrench in vise. Remove lock nut, spring washer and pinion collar.
6. Remove oil seal and pinion bearing. Remove pin from end of drive pinion. Remove drive pinion, pinion spacer and thrust washers. See **Fig. 39**.
7. Inspect pinion bearings. If replacing pinion bearing on drive pinion, use press and bearing remover to press bearing from drive pinion. Remove thrust shim from drive pinion.



**NOTE:** If pinion bearings are replaced, bearing races must also be replaced.

8. To remove pinion bearing races from differential case, tap out bearing race using hammer and drift. Remove thrust washer, located below bearing race, from differential case. See **Fig. 39**.
9. Inspect differential carrier bearings. If replacing differential carrier bearings, use press and bearing remover to press bearing from differential carrier.

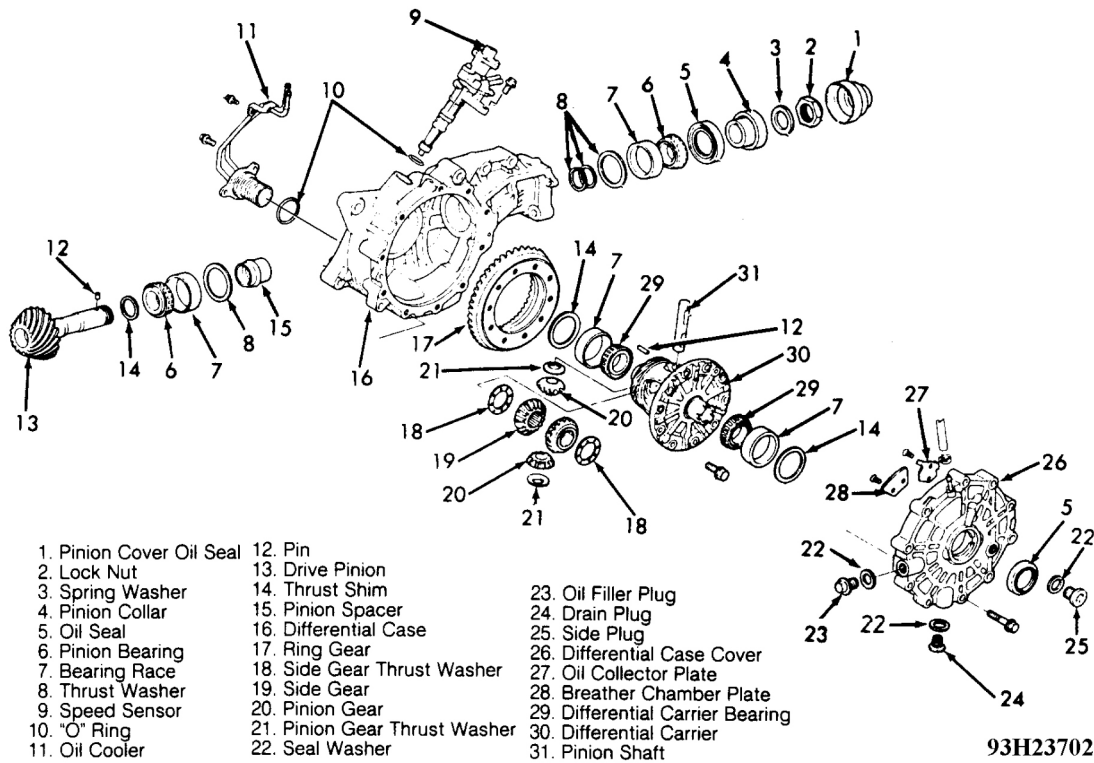
**NOTE:** If differential carrier bearings are replaced, bearing races must also be replaced.

10. To remove differential carrier bearing races, tap out bearing race from differential case and differential case cover using hammer and drift. Remove thrust shim, located below bearing race, from differential case or differential case cover. See **Fig. 39**.

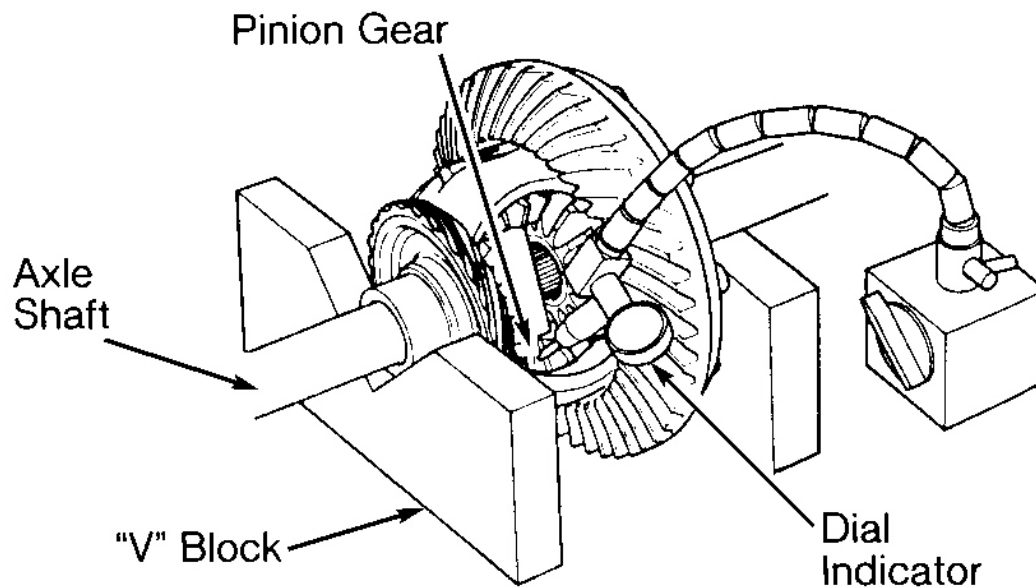
**NOTE:** Thrust shim must be replaced if bearing race was removed from differential case or differential case cover.

**NOTE:** Pinion gear backlash must be checked before disassembling differential carrier. Differential carrier bearings must be removed from differential carrier to measure pinion gear backlash.

11. Mount differential carrier in "V" blocks with axle shafts inserted into side gears. See **Fig. 41**. Using dial indicator, check pinion gear backlash. Pinion gear backlash should be .002-.006" (.05-.15 mm).
12. If pinion gear backlash is not within specification, different thickness pinion gear thrust washer must be installed during reassembly. Remove ring gear.
13. Drive pin for pinion shaft from differential carrier. Remove pinion shaft, side gears, pinion gears and thrust washers. See **Fig. 41**.



**Fig. 41: Exploded View Of Differential Assembly**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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**Fig. 42: Checking Pinion Gear Backlash**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

#### Cleaning & Inspection

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

#### Reassembly

1. Coat all side gears, pinion gears and thrust washers with grease. Install side gears and side gear thrust washers in differential carrier.
2. Install pinion gears in place exactly opposite each other in mesh with side gears. Install pinion gear thrust washers behind pinion gears.
3. Rotate side gears until pinion gears are aligned with pinion shaft hole in differential carrier. Install pinion shaft and NEW pin.
4. Mount differential carrier in "V" blocks with axle shafts inserted into side gears. See **Fig. 41** . Using dial indicator, check pinion gear backlash.
5. Pinion gear backlash should be .002-.006" (.05-.15 mm). If pinion gear backlash is not within specification, install different thickness pinion gear thrust washer. See **PINION GEAR THRUST WASHER SPECIFICATIONS** table.

**CAUTION: Ensure pinion gear thrust washers are the same thickness.**

6. Install ring gear. Install and tighten ring gear bolts to specification in a crisscross pattern. See **TORQUE SPECIFICATIONS** . Using press and Adapter (07MAD-PR90100), install differential carrier bearings on differential carrier (if removed).
7. If installing bearing races for drive pinion in differential case, install thrust washer, located behind bearing race, in differential case. Use Shaft (07MAF-SPOO13A) and Bearing Race Installers (07MAF-SPOO11A) and (07MAF-SPOO12A) to install bearing races. Install drive pinion bearing races in differential case, starting with outer bearing race (lock nut side) and then the inner bearing race.

**CAUTION: Heating differential case to 212°F (100°C) will assist in bearing race installation. DO NOT exceed 212°F (100°C) or differential case may be damaged.**

8. If installing bearing races for differential carrier bearings, install NEW thrust shim in differential case or differential case cover. Ensure thrust shim is the same thickness as thrust shim that was removed. Using hammer, Driver (07749-0010000) and Adapter (07746-0010600), drive bearing race into differential case and differential case cover.
9. If original drive pinion and ring gear are being installed, install original thickness thrust shim on drive pinion (if removed). If NEW drive pinion and ring gear are being installed, proper thickness thrust shim must be determined to obtain correct drive pinion height. See **DRIVE PINION HEIGHT** .
10. If installing pinion bearing on drive pinion, use press, old pinion spacer and Driver (07746-003100). Press pinion bearing onto drive pinion. Lubricate all pinion bearings with oil.
11. Install drive pinion in differential case. DO NOT install pinion spacer and thrust washers at this time. Install pinion bearing on drive pinion.
12. Using hammer and Driver (07746-003100), drive outer pinion bearing onto drive pinion while supporting drive pinion. Install pin in drive pinion. Install pinion collar. Ensure groove in pinion collar aligns with pin in drive pinion.
13. Install spring washer and lock nut on drive pinion. Tighten lock nut to 15 ft. lbs. (20 N.m). Clean drive pinion and ring teeth and coat with Prussian Blue.
14. Lubricate differential carrier bearings with oil. Install differential carrier into differential case. Install differential case cover. Tighten differential case cover bolts in a crisscross pattern to 35 ft. lbs. (47 N.m).
15. Install Shaft (07HAJ-PK40201) in differential assembly. Rotate ring gear one full revolution in both directions while applying resistance to pinion shaft.
16. Remove differential cover and inspect ring gear tooth contact pattern. Correct gear tooth contact should be centered on the ring gear. See **GEAR TOOTH CONTACT PATTERNS** in GENERAL INFORMATION.
17. If gear tooth contact pattern is incorrect, drive pinion height must be changed to correct gear tooth contact pattern. Change thrust shim located below bearing on drive pinion to adjust drive pinion height.
18. If gear tooth contact pattern is correct, remove components from drive pinion for installation of pinion spacer. Install NEW pinion spacer and thrust washers on drive pinion.
19. Install outer pinion bearing on drive pinion. Using hammer and driver, drive outer pinion bearing onto drive pinion while supporting drive pinion. Using Driver (07749-0010000) and Pinion Cover Driver (07LAD-PW50500), install oil seal on drive pinion.

20. Install pin in drive pinion and pinion collar. Install NEW spring washer and NEW lock nut. Check pinion bearing preload. See **PINION BEARING PRELOAD**.
21. Once correct pinion bearing preload is obtained, stake lock nut against drive pinion. Clean drive pinion and ring teeth and coat with Prussian Blue. Lubricate differential carrier bearings with oil.
22. Install differential carrier into differential case. Install differential case cover. Tighten differential case cover bolts in a crisscross pattern to 35 ft. lbs. (47 N.m).
23. Check total bearing preload. See **TOTAL BEARING PRELOAD**. Once correct total bearing preload is correct, check ring gear backlash. See **RING GEAR BACKLASH**.
24. Once correct ring gear backlash is obtained, remove differential case cover and check gear tooth contact pattern. Correct gear tooth contact should be centered on the ring gear. See **GEAR TOOTH CONTACT PATTERNS** in GENERAL INFORMATION.
25. Install oil collector plate and breather chamber plate on differential case cover (if removed). Install breather chamber bolts and tighten to specification. Stake heads of bolts against differential case cover.
26. Apply Liquid Gasket (08718-0001) to differential case cover. Install cover. Install and tighten bolts to specification in a crisscross pattern.
27. Using hammer, Driver (07749-0010000) and Adapter (07947-6110500), install oil seal in differential case. Install oil cooler and NEW "O" ring. Install and tighten bolts to specification. Using hammer, Driver (07947-0010000) and Seal Driver (07LAD-PW50500), install pinion cover oil seal.

#### PINION GEAR THRUST WASHER SPECIFICATIONS

Thrust Washer I.D. Letter	Part Number	Thickness In. (mm)
"A"	41351-PL5-ZOO	.0276 (.700)
"B"	41352-PL5-ZOO	.0295 (.750)
"C"	41353-PL5-ZOO	.0315 (.800)
"D"	41354-PL5-ZOO	.0335 (.850)
"E"	41355-PL5-ZOO	.0354 (.900)
"F"	41356-PL5-ZOO	.0374 (.950)
"G"	41357-PL5-ZOO	.0394 (1.000)
"H"	41358-PL5-ZOO	.0413 (1.050)

## ADJUSTMENTS

### DRIVE PINION HEIGHT

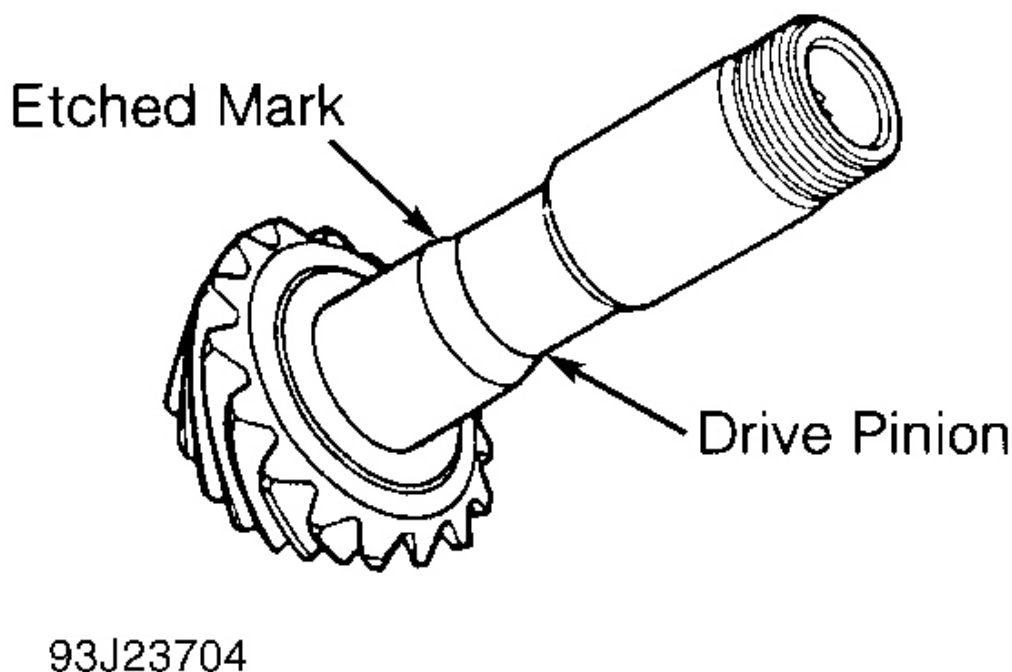
**NOTE:** If drive pinion and ring gear are replaced, drive pinion height must be set. Drive pinion height may also need to be set if incorrect gear tooth contact pattern exists.

1. Drive pinion height is controlled by thickness of thrust shim located between pinion bearing and drive pinion shaft. When installing used drive pinion and ring gear and gear tooth contact pattern is incorrect, see **GEAR TOOTH CONTACT PATTERNS** in GENERAL INFORMATION to determine if thrust shim should be thicker or thinner.

2. When installing NEW drive pinion and ring gear, calculate thrust shim thickness by noting etched mark located on side of drive pinion. See **Fig. 35**.
3. Etched mark indicate with a (+) positive or (-) negative mark along with a numerical digit to indicate drive pinion size. Etched mark is positive or negative in thousandths of a millimeter.

**NOTE:** Etched mark is indicated in thousandths of a millimeter. If etched mark is -20, this would be a negative .02 mm.

4. If etched mark on old drive pinion is positive, add it to the old thrust shim thickness. If etched mark on old drive pinion is negative, subtract it from the old thrust shim thickness.
5. If etched mark on NEW drive pinion is positive, subtract it from thrust shim thickness obtained in step 4. If etched mark on NEW drive pinion is negative, add it to thrust shim thickness obtained in step 4.
6. For example; if old thrust shim thickness is 1.30 mm and old drive pinion etched mark is +20 (.02 mm) and NEW drive pinion etched mark is -20 (.02 mm), replacement thrust shim thickness should be 1.34 mm.
7. Select thrust shim that is closest to but not more than the determined thrust shim thickness. Thrust shims are available in thickness from .047-.064" (1.19-1.63 mm) in .001" (.03 mm) increments. Part numbers are 41381-PW5-000 to 41396-PW5-000.



**Fig. 43: Identifying Drive Pinion Etched Mark Location**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

## PINION BEARING PRELOAD

1. Tighten drive pinion lock nut to 188 ft. lbs. (255 N.m). Install a dial-type INCH-lb. torque wrench on end of drive pinion. Rotate drive pinion and pinion bearing preload. Pinion bearing preload should be within specification. See **PINION BEARING PRELOAD SPECIFICATIONS** table.
2. If pinion bearing preload exceeds specification, replace pinion spacer. If pinion bearing preload is less than specified, slightly tighten lock nut until correct pinion bearing preload is obtained.

## PINION BEARING PRELOAD SPECIFICATIONS

Application	INCH Lbs. (N.m)
New Bearings	11.30-14.80 (1.3-1.7)
Used Bearings	5.70-9.20 (.65-1.05)

**CAUTION: DO NOT tighten lock nut to more than 239 ft. lbs. (325 N.m). If pinion bearing preload is still less than specified with lock nut tightened to 239 ft. lbs. (325 N.m), replace pinion spacer.**

## TOTAL BEARING PRELOAD

1. With differential fully assembled, install Shaft (07HAJ-PK40201) in differential assembly. Rotate ring gear one full revolution in both directions while applying resistance to pinion shaft. Remove shaft from differential assembly.
2. Install a dial-type INCH-lb. torque wrench on the end of the drive pinion. Rotate drive pinion and note total bearing preload. The total bearing preload should be within specification. See **TOTAL BEARING PRELOAD SPECIFICATIONS** table.
3. If total bearing preload is not within specification, increase preload by increasing thickness of thrust shim located below bearing races in differential case and differential case cover.

## TOTAL BEARING PRELOAD SPECIFICATIONS

Application	INCH Lbs. (N.m)
New Bearings	
All New Bearings	22.80-29.20 (2.58-3.30)
Differential Carrier Bearings Only Outer Bearing (Ring Gear Side) Only	17.00-23.50 (1.93-2.65)
Inner Bearing (Drive Pinion Side) Only	19.60-25.22 (2.21-2.85)
Used Bearings	13.80-19.50 (1.56-2.20)

**CAUTION: Ensure thrust shim thickness is increased the same amount on both thrust shims.**

## RING GEAR BACKLASH

1. Mount differential assembly in soft-jawed vice. Remove side plug from differential case cover. Remove oil seal from differential case. Align differential carrier rib with side plug hole.
2. Install Shaft (07HAJ-PK40201) in differential assembly. See **Fig. 38** . Mount dial indicator on differential case.
3. Measure ring gear backlash in 3 different locations on differential carrier. Ring gear backlash should be .002-.004" (.04- .10 mm). Difference between measurements in different areas should not exceed .0015" (.040 mm).
4. If ring gear backlash is within specification, proper thickness thrust shims are installed behind bearing races for differential carrier bearings provided no components are changed.
5. If ring gear backlash exceeds specification, decrease thrust shim thickness on thrust shim located behind bearing race in differential case. Increase thickness of thrust shim in differential case cover the same amount.
6. If ring gear backlash is less than specified, increase thrust shim thickness on thrust shim located behind bearing race in differential case. Decrease thickness of thrust shim in differential case cover the same amount.
7. Thrust shims are available in thickness from .0657-.0941" (1.668-2.390 mm) in .001" (.03 mm) increments. Part numbers are 41402-PW8-010 to 41426-PW8-010. One shim is available at .0260" (.660 mm), part number is 41401-PW8-010.

## TORQUE SPECIFICATIONS

### TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Countershaft Lock Nut	123 (167)
Differential Case Cover Bolt	35 (47)
Drain Plug	36 (49)
Drive Pinion Lock Nut <sup>(1)</sup>	188-239 (255-325)
Joint Bolt	21 (29)
Mainshaft Lock Nut	123 (167)
Mount Bracket Bolt	40 (54)
Oil Cooler Bolt	
6-mm Bolt	(2)
8-mm Bolt	21 (29)
Oil Pump Body Bolt	
6-mm Bolt	(2)
8-mm Bolt	13 (18)
Parking Brake Roller Guide Bolt	22 (30)
Rear Cover Sealing Bolt	13 (18)
Ring Gear Bolt	114 (155)
Side Plug	35 (47)
Transaxle Housing Bolt	
8-mm Bolt	25 (34)



**1992 Acura Vigor GS****1992 AUTOMATIC TRANSMISSIONS MPWA Overhaul**

10-mm Bolt	33 (45)
Transaxle Housing Sealing Bolt	36 (49)
Transaxle Mount Bolt	47 (64)
<b>INCH Lbs. (N.m)</b>	
Breather Chamber Bolt	108 (12)
Control Shaft Collar Bolt	120 (14)
Detent Lever Bolt	120 (14)
Dipstick Tube Bolt	108 (12)
Flange Nut	72 (8)
Fluid Strainer Bolt	108 (12)
Harness Cover Bolt	108 (12)
Lower Valve Body Assembly Bolt	108 (12)
Lubrication Pipe Bolt	108 (12)
Magnet Retaining Bolt	108 (12)
Main Valve Body Cover Bolt	108 (12)
Main Valve Body Cover Plate Bolt	108 (12)
NC & NM Speed Sensor Bolt	108 (12)
Oil Pan Bolt	108 (12)
Oil Pass Body Bolt	108 (12)
Parking Brake Stopper Bolt	120 (14)
Rear Cover Bolt	108 (12)
Regulator Valve Body Bolt	108 (12)
Regulator Valve Body Lock Bolt	108 (12)
Reverse Idler Gear Shaft Holder Bolt	108 (12)
Servo Body Bolt	108 (12)
Servo Detent Base Bolt	108 (12)
Shift Control Solenoid Valve Assembly Bolt	108 (12)
Shift Control Solenoid Valve Harness Bolt	108 (12)
Shift Fork Bolt	120 (14)
Shift Position Sensor Bolt	108 (12)
Throttle Valve Body Bolt	108 (12)
Transaxle Sub-Harness Bolt	108 (12)
2nd Accumulator Body Bolt	108 (12)

(1) Pinion bearing preload is adjusted when tightening the lock nut. See **PINION BEARING PRELOAD** under ADJUSTMENTS for adjusting procedure.

(2) Tighten 6-mm bolts to 108 INCH lbs. (12 N.m).

## TRANSAXLE SPECIFICATIONS

### TRANSAXLE SPECIFICATIONS

<b>Application</b>	<b>Specification</b>
--------------------	----------------------

**1992 Acura Vigor GS****1992 AUTOMATIC TRANSMISSIONS MPWA Overhaul****Clutch Clearance**

1st Clutch	.026-.033" (.65-.85 mm)
1st-Hold Clutch	.031-.039" (.80-1.00 mm)
2nd, 3rd & 4th Clutches	.022-.030" (.55-.75 mm)
Differential Gear Backlash	.002-.004" (.04-.10 mm)

**Gear Clearances**

Countershaft 4th Gear Clearance	.003-.006" (.07-.15 mm)
Mainshaft 2nd Gear Clearance	.003-.006" (.07-.15 mm)

**Oil Pump Clearances**

<b>Side Clearance</b>	
Oil Pump Drive Gear	.0083-.0104" (.210-.265 mm)
Oil Pump Driven Gear	.0028-.0049" (.070-.125 mm)

<b>Thrust Clearance</b>	
Standard	.001-.002" (.03-.05 mm)
Wear Limit	.0028" (.070 mm)

Pinion Gear Backlash	.002-.006" (.05-.15 mm)
Secondary Gear Bearing Preload <sup>(1)</sup>	20-29 INCH lbs. (2.3-3.3 N.m)

(1) This is the starting torque required to rotate secondary gear in both directions.