

1991 AUTOMATIC TRANSMISSIONS

MPSA Overhaul

APPLICATION

TRANSAXLE APPLICATION

Application	Transaxle Model
Civic 4WD Wagon	MPSA

IDENTIFICATION

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

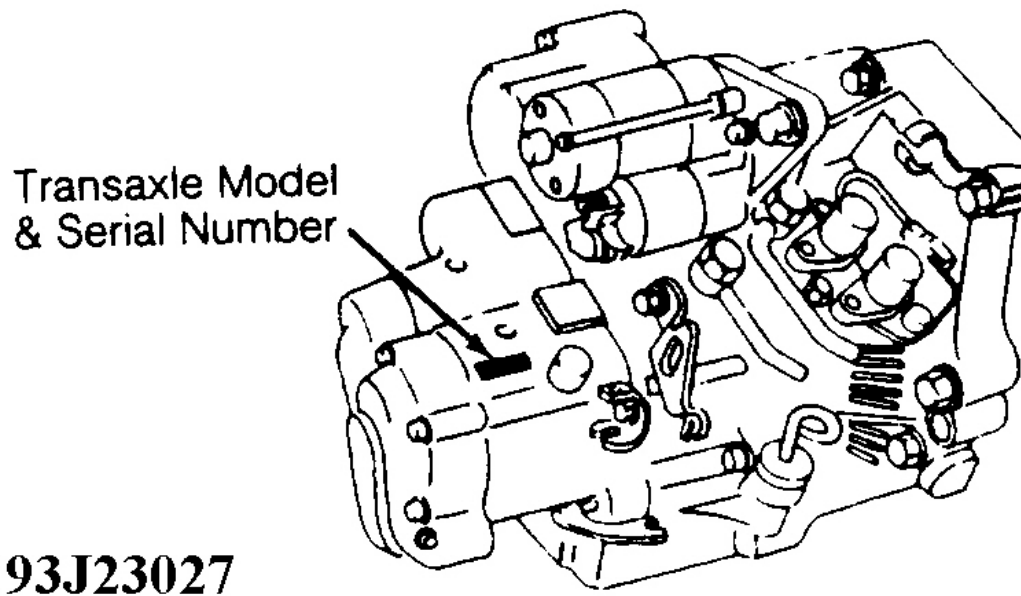


Fig. 1: Identifying Transaxle Model & Serial Number Location

Courtesy of AMERICAN HONDA MOTOR CO., INC.

DESCRIPTION

Automatic transaxle is electronically controlled and provides 4 forward speeds and one reverse speed. Transaxle consists of clutches, mainshaft, countershaft, sub-shaft, shift control solenoid valves, lock-up control solenoid valves and lock-up torque converter. See **Fig. 2** . Transaxle contains a transfer unit which provides power to rear wheels when in 4WD.

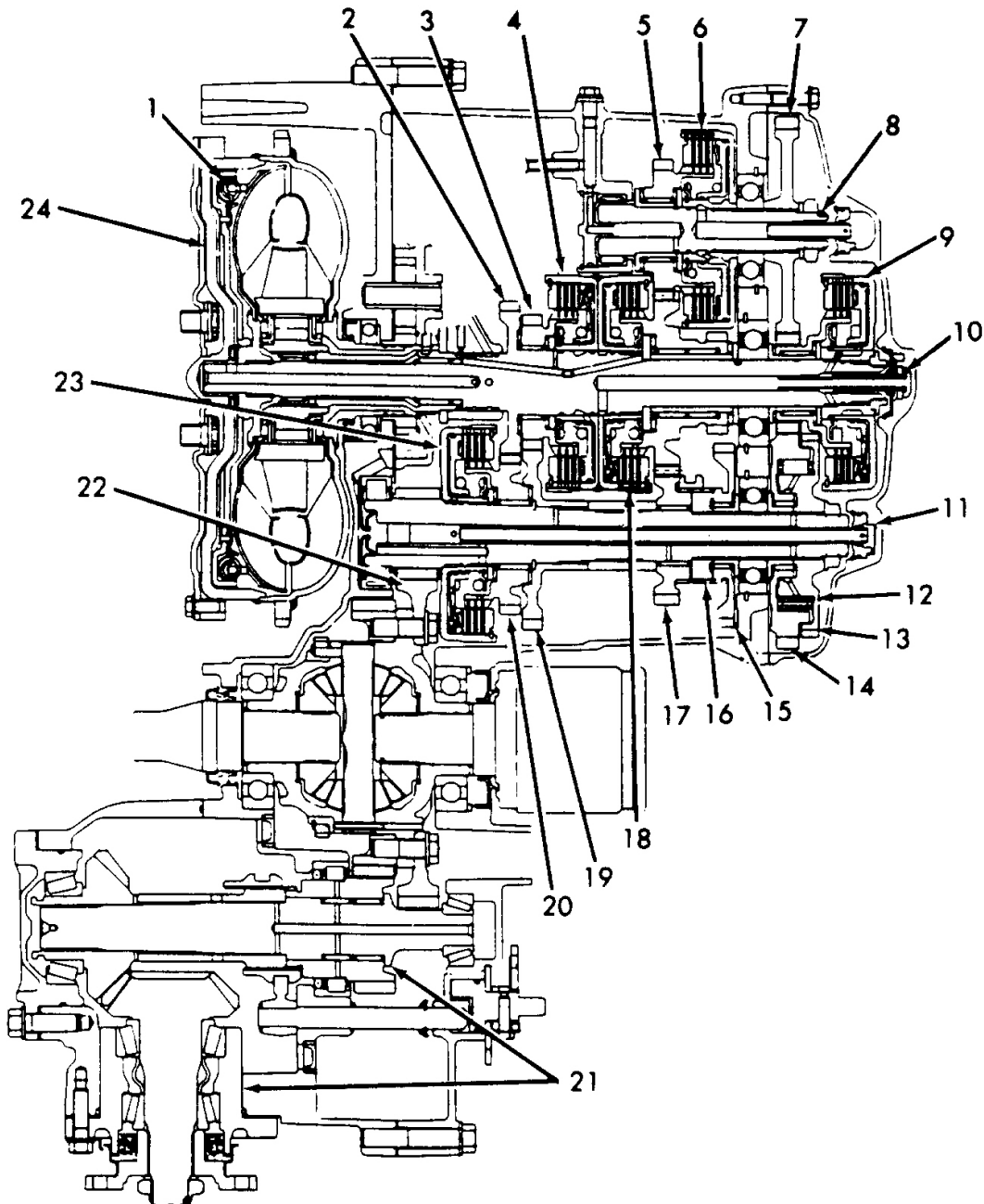
Valve assembly consists of main valve body, secondary valve body, servo valve body, regulator valve body and lock-up valve body. Transaxle shifting and torque converter lock-up are controlled by the Automatic Transaxle Control Unit (ATCU) for optimal performance.

An "S4" switch is mounted on the shift lever. When "S4" switch is depressed (ON position), transaxle will shift into 4th gear when shift lever is in the "S" position, and "S4" light on the instrument panel will come on. When "S4" switch is released (OFF position), transaxle will shift into 3rd gear, "S4" light will go off, and "S" light on instrument panel will come on.

A LOW switch is mounted in front of the shift lever in the vehicle. When shift lever is in "2" position and LOW switch is depressed (ON position), transaxle will remain in 1st gear for more power or engine braking, provided vehicle speed is less than 31. To release the LOW switch, move shift lever to any other gear position.

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- | | | |
|-----------------------|-------------------------------|---------------------------|
| 1. Lock-Up Clutch | 9. 1st Clutch | 17. Countershaft 4th Gear |
| 2. Mainshaft 3rd Gear | 10. Mainshaft | 18. 4th Clutch |
| 3. Mainshaft 2nd Gear | 11. Countershaft | 19. Countershaft 2nd Gear |
| 4. 2nd Clutch | 12. One-Way Clutch | 20. Countershaft 3rd Gear |
| 5. Sub-Shaft 4th Gear | 13. Parking Gear | 21. Transfer Unit |
| 6. Low-Hold Clutch | 14. Countershaft 1st Gear | 22. Differential Assembly |
| 7. Sub-Shaft 1st Gear | 15. Countershaft Reverse Gear | 23. 3rd Clutch |
| 8. Sub-Shaft | 16. Reverse Selector | 24. Torque Converter |

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Fig. 2: Identifying Transaxle Components

Courtesy of AMERICAN HONDA MOTOR CO., INC.

OPERATION

Shift lever has 6 positions. When shift lever is moved, manual valve on main valve body is moved by the shift cable. Shift lever also changes position of shift position console switch, mounted near shift lever. Shift position console switch delivers an input signal to the ATCU to indicate shift lever position. The ATCU uses input signal to operate shift control solenoid valves and control transaxle shifting.

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

- **"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 console switch, allows starting in this position.

- **"R" (Reverse)**

Reverse selector engages with countershaft reverse gear, and 4th gear clutch is applied. Back-up light switch, incorporated in shift position console switch, allows back-up lights to operate.

- **"N" (Neutral)**

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

- **"D" (Drive 1st-4th Gears)**

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

- **"S" (1st-3rd Gears)**

Transaxle starts off in 1st gear and upshifts automatically to 2nd gear and then 3rd gear with "S4" switch on shift lever released (OFF position). When "S4" switch is depressed (ON position), transaxle will shift into 4th gear with shift lever in the "S" position, and "S4" light on the instrument panel will come on. When "S4" switch is released, transaxle will shift into 3rd gear, "S4" light will go off, and "S" light on instrument panel will come on. Transaxle will downshift through 2nd to 1st gear on deceleration.

- **"2" (Second)**

Transaxle starts off in 1st gear and upshifts to 2nd gear if LOW switch, mounted in front of shift lever, is released (OFF position). When shift lever is in "2" position and LOW switch is depressed (ON position), transaxle will remain in 1st gear for more power or engine braking, provided vehicle speed is less than 31 MPH. To release the LOW switch, move shift lever to any other gear position. With shift lever in "D" or

"S" position, in 2nd, 3rd and 4th gears, torque converter lock-up exists, and transaxle mainshaft rotates at the same speed as engine crankshaft. Under certain conditions, torque converter lock-up clutch is applied during deceleration. Torque converter lock-up is controlled by the ATCU. The ATCU receives various input signals and operates lock-up control solenoid valves. Operation of lock-up control solenoid valves controls modulator pressure. The ATCU has a self-diagnostic system, which will store fault code if failure or problem exists in the transaxle electronic control system. Fault code can be retrieved to determine transaxle problem area. For information on electronic transaxle components, see **MPSA ELECTRONIC CONTROLS (4WD)** 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 is in idle position. In case of a malfunction, shift lever can be released by placing ignition key in release slot near shift lever. Key interlock system prevents ignition key from being removed from ignition switch unless shift lever is in "P" position. For additional information on interlock systems, see **MPSA ELECTRONIC CONTROLS (4WD)** article.

LUBRICATION & ADJUSTMENTS

See **SERVICING** article.

ON-VEHICLE SERVICE

AXLE SHAFTS

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

OIL COOLER FLUSHING

1. Attach Oil Cooler Flusher (J38405-A) to oil cooler lines. See **Fig. 3** . Fill oil cooler flusher tank 2/3 full with Flushing Fluid (J35944-20). **DO NOT** use any other flushing fluid.
2. Ensure water and air valves on oil cooler flusher are off. Apply 80-120 psi (5.6-8.4 kg/cm²) 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. Turn water valve off. Release mixing trigger.
4. Disconnect oil cooler flusher, and reverse hoses so oil cooler can be flushed in the opposite direction. Repeat steps 2) and 3).
5. 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 moisture 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.

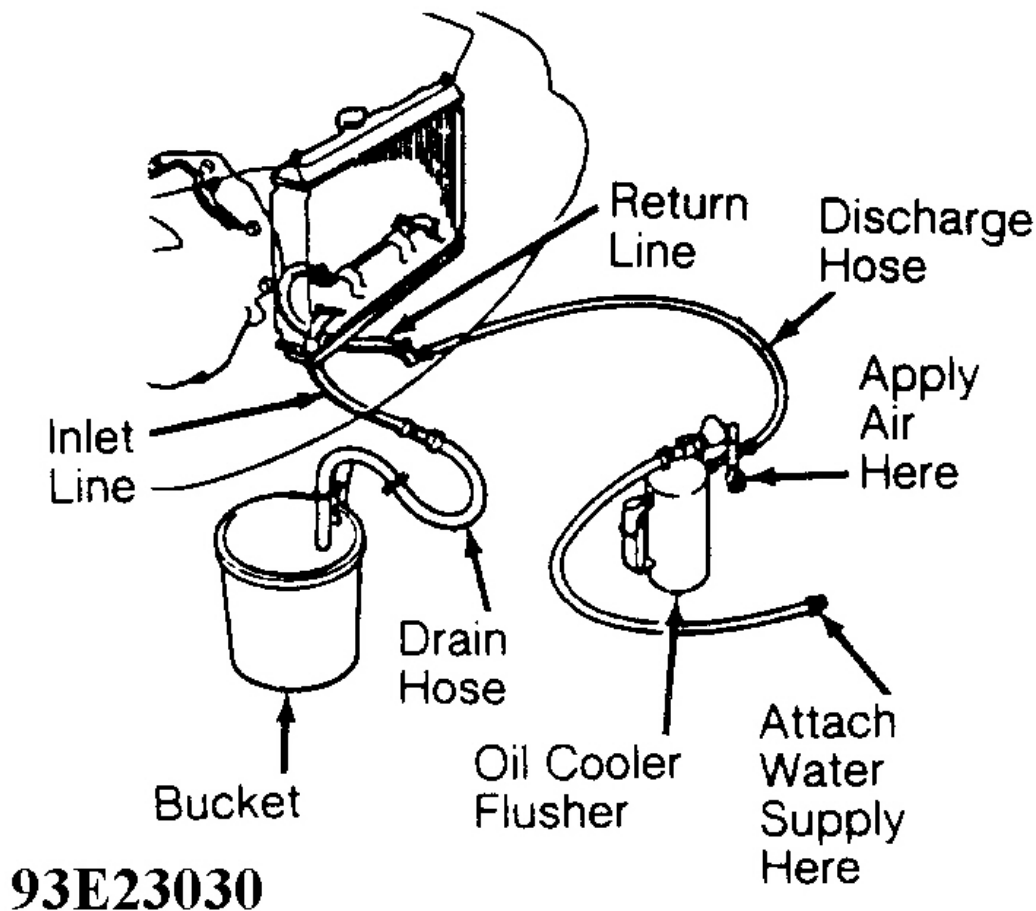


Fig. 3: Installing Oil Cooler Flusher

Courtesy of AMERICAN HONDA MOTOR CO., INC.

TROUBLE SHOOTING

PRELIMINARY INSPECTION

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

SYMPTOM DIAGNOSIS

Early Or Late Upshifts In All Gears

- Defective ATCU Or Electronic Components

Early Or Late 1-2 Upshift

- Defective ATCU Or Electronic Components
- Defective Shift Control Solenoid Valve "A"
- Defective 2nd Accumulator

Early Or Late 2-3 Upshift

- Defective ATCU Or Electronic Components
- Defective Shift Control Solenoid Valve "B"
- Defective 3rd Accumulator

Early Or Late 3-4 Upshift

- Defective ATCU Or Electronic Components
- Defective Shift Control Solenoid Valve "A"
- Defective 4th Accumulator

Engine RPM Flares On 2-3 Upshift (Shift Points Okay)

- Defective 2nd Or 3rd Accumulator
- Defective 2nd Orifice Control Valve
- Defective 2-3 Shift Valve
- Defective 3rd Clutch
- Foreign Material In Main Or 3rd Orifice
- Throttle Valve "B" Stuck

Engine RPM Flares On 3-4 Upshift (Shift Points Okay)

- Defective 3rd Orifice Control Valve
- Defective 3rd Or 4th Accumulator
- Defective 3-4 Shift Valve
- Defective 4th Clutch
- Foreign Material In Main Or 4th Orifice
- Throttle Valve "B" Stuck

Excessive Drag In Transaxle

- Binding Oil Pump

Excessive Idle Vibration

- Defective Oil Pump
- Defective Torque Converter Or Drive Plate
- Incorrect Idle RPM

Excessive Shock On 2-3 Shift (Shift Points Okay)

- Defective 2nd Or 3rd Accumulator
- Foreign Material In 2nd Or Separator Orifice
- Throttle Valve "B" Stuck
- 3rd Check Ball Stuck

Excessive Shock On 3-4 Shift (Shift Points Okay)

- Defective 3rd Or 4th Accumulator
- Defective 3rd Orifice Control Valve
- Foreign Material In 3rd Or Separator Orifice
- Throttle Valve "B" Stuck
- 4th Check Ball Stuck

Excessive Vibration (RPM Related)

- Torque Converter Not Fully Seated In Oil Pump

Excessive Time Lag From "N" To "D" Or "S" Positions

- Defective 1st Clutch
- Foreign Material In 1st Orifice
- Improperly Adjusted Shift Cable

Excessive Time Lag From "N" To "R" Position

- Defective Servo Control Valve
- Defective 4th Clutch
- Improperly Adjusted Shift Cable
- Servo Shaft Stuck

Harsh 2-1 Downshift

- Defective 1-2 Shift Valve
- Defective 2nd Accumulator
- Defective 2nd Orifice Control Valve
- Defective 2-1 Orifice Control Valve

- Foreign Material In 2nd Orifice
- Throttle Valve "B" Stuck
- 2nd Check Ball Stuck

Harsh 3-2 Downshift

- Defective 2nd Or 3rd Accumulator
- Defective 2-3 Shift Valve
- Defective 3-2 Kickdown Valve
- Foreign Material In 3rd Orifice
- Throttle Valve "B" Stuck
- 3rd Check Ball Stuck

Harsh 4-3 Downshift

- Defective 3rd Or 4th Accumulator
- Defective 3-4 Shift Valve
- Defective 4th Exhaust Valve
- Defective 4-3 Kickdown Valve
- Foreign Material In 4th Orifice
- Throttle Valve "B" Stuck
- 4th Check Ball Stuck

Harsh 1-2 Upshift

- Defective 1-2 Shift Valve
- Defective 2nd Accumulator
- Defective 2nd Clutch
- Foreign Material In 2nd Orifice
- Throttle Valve "B" Stuck

Harsh 2-3 Upshift

- Defective 2nd Or 3rd Accumulator
- Defective 2nd Or 3rd Orifice Control Valve
- Defective 2-3 Shift Valve
- Defective 3rd Clutch
- Foreign Material In 2nd Orifice
- Throttle Valve "B" Stuck

Harsh 3-4 Upshift

- Defective 3rd Or 4th Accumulator
- Defective 3rd Orifice Control Valve
- Defective 3-4 Shift Valve
- Defective 4th Clutch
- Foreign Material In 3rd Or 4th Orifice
- Throttle Valve "B" Stuck

Lock-Up Clutch Cycles On & Off, Causing Unsteady Engine RPM With Steady Throttle, Or Vehicle Surges

- Defective ATCU Or Electronic Components
- Defective Lock-Up Control Solenoid Valve
- Defective Throttle Valve "B"
- Defective Torque Converter Lock-Up Piston

Lock-Up Clutch Disengages Improperly, Causing Engine Stalling, Excessive Shock During Shifts Or Low Power & Vibration At Low Speeds

- Defective ATCU Or Electronic Components
- Defective Lock-Up Control Solenoid Valve
- Defective Lock-Up Control Valve
- Defective Lock-Up Shift Valve
- Defective Lock-Up Timing Valve "B"
- Defective Throttle Valve "B"
- Defective Torque Converter Lock-Up Piston

Lock-Up Clutch Fails To Operate

- Defective ATCU Or Electronic Components
- Defective Lock-Up Control Solenoid Valve "A"
- Defective Lock-Up Shift Valve
- Defective Lock-Up Timing Valve "B"
- Defective Throttle Valve "B"
- Defective Torque Converter Check Valve
- Defective Torque Converter Lock-Up Piston

Noise From Transaxle With Wheels Rolling

- Defective Differential Gears
- Reverse Hub Installed Upside Down

Noise In "P", "N" Or All Gears

- Defective Oil Pump
- Defective Or Worn 3rd Gears
- Defective Countershaft Or Mainshaft Bearings

Transaxle Shifts From 1st To 3rd Gear When In "S" Position

- Defective ATCU Or Electronic Components

Transaxle Shifts From 1st To 4th Gear When In "D" Position

- Defective ATCU Or Electronic Components
- Defective Shift Control Solenoid Valve "B"

Transaxle Will Not Upshift

- Defective ATCU Or Electronic Components
- Defective Modulator Valve

Vehicle Accelerates Only To 31 MPH

- Defective Torque Converter One-Way Clutch

Vehicle Has 4th Gear Only

- Defective ATCU Or Electronic Components

Vehicle Locks In "R"

- Parking Brake Lever Installed Upside Down

Vehicle Moves In All Gears Except "R"

- Defective Needle Bearings
- Defective Or Improperly Adjusted Shift Cable
- Defective Or Worn Reverse Gears
- Defective 2nd Accumulator
- Servo Control Valve Stuck
- Servo Valve Stuck

Vehicle Moves In "S" & "R" Positions But Not In "2"

- Defective Or Improperly Adjusted Shift Cable
- Defective Or Worn 2nd Gears
- Defective 2nd Clutch

Vehicle Will Not Move In Any Gear

- Clogged Oil Screen Or Filter
- Defective Differential Gears
- Defective Mainshaft
- Defective Oil Pump
- Defective Or Improperly Adjusted Shift Cable
- Defective Or Stuck Regulator Valve
- Defective Torque Converter Drive Plate
- Low ATF Level

Vehicle Moves In "N" Position

- Defective Needle Bearings Or Thrust Washers
- Defective 1st, 2nd, 3rd Or 4th Clutch
- Incorrect Clutch Or Gear Clearance

TESTING**ROAD TEST**

NOTE: If shift lever cannot be moved from "P" with brake pedal depressed and accelerator at idle position, check shift interlock system. See the **MPSA ELECTRONIC CONTROLS (4WD)** article in this section.

CAUTION: DO NOT shift from "D" or "S" to "2" at speeds greater than 62.5 MPH with LOW switch released (OFF position) or 55 MPH with LOW switch depressed (ON position), or transaxle may be damaged.

1. Warm engine to normal operating temperature. Apply parking brake and block wheels. Start engine, move shift lever to "D" while depressing brake pedal. Depress accelerator pedal and release it suddenly. Engine should not stall.
2. Repeat step 1) with shift lever in "S", and ensure engine does not stall. Road test vehicle, and check for abnormal noise and clutch slippage. See **CLUTCH APPLICATION** table.
3. Ensure shift points are within specification. See **SHIFT SPEED SPECIFICATIONS** .
4. Place shift lever in "2". Accelerate from a stop at full throttle. Check for abnormal noise or clutch slippage. Upshifts and downshifts should not occur in this range.
5. Place shift lever in "R". Accelerate from a stop at full throttle. Check for abnormal noise or clutch slippage.
6. Park vehicle on a slope. Apply parking brake, and place shift lever in "P". Release parking brake, and ensure vehicle does not move. If vehicle moves, check for defective shift cable or parking components.

CLUTCH APPLICATION

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Shift Lever Position	Elements In Use
Park & Neutral	No Clutches Are Applied
"R"	4th Clutch
"D"	
1st Gear	1st Clutch, One-Way Clutch
2nd Gear	(1) 2nd Clutch
3rd Gear	(1) 3rd Clutch
4th Gear	(1) 4th Clutch
"S"	
1st Gear	1st Clutch, One-Way Clutch
2nd Gear	(1) 2nd Clutch
3rd Gear	(1) 3rd Clutch
4th Gear (2)	(1) 4th Clutch
"2"	
1st Gear During Acceleration	Low-Hold Clutch, 1st Clutch, One-Way Clutch
1st Gear During Deceleration	(1) Low-Hold Clutch
2nd Gear	(1) 2nd Clutch
(1) The 1st clutch engages, but driving power is not transmitted, as one-way clutch slips.	
(2) The "S4" switch on shift lever must be depressed (ON position) before transaxle will shift into 4th gear.	

SHIFT SPEED SPECIFICATIONS**UPSHIFT SPECIFICATIONS (MPH)**

Shift Lever Position	1st-2nd Gear	2nd-3rd Gear	3rd-4th Gear	Lock-Up Clutch On
"D" Position				
1/12 Throttle				
Coasting Downhill From Stop	9-11	17-21	28-33	13-16
1/2 Throttle				
Accelerating From Stop	21-24	39-44	59-65	67-70
Full Throttle				
Accelerating From Stop	34-39	63-68	94-100	89-91
"S" Position With "S4" Switch ON (1)				
1/12 Throttle				

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Coasting Downhill From Stop	12-15	20-24	30-34	24-26
7/16 Throttle				
Accelerating From Stop	21-24	40-45	59-65	70-72
Full Throttle				
Accelerating From Stop	34-39	63-68	94-100	89-91
"2" Position With LOW Switch OFF ⁽²⁾				
1/12 Throttle				
Coasting Downhill From Stop	8-11			
7/16 Throttle				
Accelerating From Stop	15-19			
Full Throttle				
Accelerating From Stop	31-36			
(1) The "S4" switch is mounted on the shift lever. The ON position is with switch depressed.				
(2) The LOW switch is mounted in front of the shift lever. The OFF position is with switch released. Transaxle will only upshift from 1st to 2nd gear with shift lever in "2" position.				

DOWNSHIFT SPECIFICATIONS (MPH)

Shift Lever Position	Lock-Up Clutch Off	4th-3rd Gear	3rd-2nd Gear	2nd-1st Gear
"D" Position				
1/12 Throttle				
Coasting Or Braking To A Stop	11-13	17-21	(1)	6-9
7/16 Throttle				
Vehicle Slowing By Increased Load	50-53	(1)	(1)	(1)
Full Throttle				
Vehicle Slowing	86-88	81-87	53-59	26-31

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By Increased Load				
"S" Position With "S4" Switch ON ⁽²⁾				
1/12 Throttle				
Coasting Or Braking To A Stop	23-26	17-21	(1)	6-9
7/16 Throttle				
Vehicle Slowing By Increased Load	57-60	(1)	(1)	(1)
Full Throttle				
Vehicle Slowing By Increased Load	86-88	81-87	53-59	29-34
"2" Position With LOW Switch OFF ⁽³⁾				
1/12 Throttle				
Coasting Or Braking To A Stop				4-8
Full Throttle				
Vehicle Slowing By Increased Load				27-34
(1) Specification is not available from manufacturer.				
(2) The "S4" switch is mounted on the shift lever. The ON position is with switch depressed.				
(3) The LOW switch is mounted in front of the shift lever. The OFF position is with switch released. Transaxle will only downshift from 2nd to 1st gear with shift lever in "2" position.				

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. Ensure front and rear wheels are blocked.

1. Apply parking brake, and block front and rear 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 with shift lever in "D", "S" and "R".

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4. Torque converter stall speed should be the same in "D", "S", "2" and "R" and within specification. See **TORQUE CONVERTER STALL SPEED SPECIFICATIONS** table. If torque converter stall speed does not fall within within specification, see **TORQUE CONVERTER STALL SPEED TROUBLE SHOOTING** table for possible problem areas.

TORQUE CONVERTER STALL SPEED SPECIFICATIONS

Application	Engine RPM
Standard	2750
Service Limit	2300-2900

TORQUE CONVERTER STALL SPEED TROUBLE SHOOTING

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

HYDRAULIC PRESSURE TEST

Pressure Test Preparation

Ensure transaxle fluid level is correct. Warm engine to normal operating temperature. Raise and support vehicle so front and rear wheels can rotate.

CAUTION: Ensure vehicle is supported so front and rear wheels can rotate. On 4WD unit, rear wheels will also rotate when the front wheels are rotating.

Line Pressure Test

1. With engine off, remove plug from line pressure tap on transaxle. See **Fig. 4** . 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", start and operate engine at 2000 RPM. Note line pressure. Place shift lever in "N", and note line pressure.
3. Line pressure should be within specification. See **HYDRAULIC PRESSURE TEST**

SPECIFICATIONS table. If line pressure is not within specification, see **HYDRAULIC PRESSURE TROUBLE SHOOTING** table. Shut engine off. Remove pressure gauge set. Install plug using NEW seal washer.

NOTE: Check clutch pressure at each clutch pressure tap on transaxle. See **Fig. 4**.

Clutch Pressure Test

1. With engine off, remove plug from appropriate clutch pressure tap on transaxle. See **Fig. 4**. 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 Throttle Valve (T.V.) lever on the transaxle. The T.V. cable must be disconnected for some tests. Ensure shift lever is in proper position when checking clutch pressures.

2. Start and operate engine at 2000 RPM, and note clutch pressure reading with shift lever in appropriate position. See **HYDRAULIC PRESSURE TEST SPECIFICATIONS** table.

NOTE: When checking certain clutches the "S4" or LOW switch may be required to be turned on and off. The "S4" switch is mounted on the shift lever. The LOW switch is mounted in front of the shift lever.

3. Clutch pressure should be within specification. If clutch pressure is not within specification, see **HYDRAULIC PRESSURE TROUBLE SHOOTING** table. Shut engine off. Remove pressure gauge set. Install plug and NEW seal washer.

Low/High Pressure Test

1. The low/high pressure is tested at 2nd, 3rd and 4th clutch pressure taps on transaxle. See **Fig. 4**. Disconnect Throttle Valve (T.V.) cable from transaxle T.V. lever.

NOTE: When disconnecting T.V. cable, unhook cable from transaxle T.V. lever. DO NOT loosen lock nuts used for cable adjustment.

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. Move shift lever to "S" position. 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, lift transaxle T.V. lever upward approximately 1/2 the distance of lever travel. Increase engine speed, and note highest pressure reading.
5. Repeat procedure on remaining clutches. The low/high pressure should be within specification. See **HYDRAULIC PRESSURE TEST SPECIFICATIONS** table. If low/high pressure is not within

specification, see **HYDRAULIC PRESSURE TROUBLE SHOOTING** table.

6. Shut engine off. Remove pressure gauge set. Install plug and NEW seal washer. Reconnect T.V. cable.

Throttle Valve "B" Pressure Test

1. Disconnect Throttle Valve (T.V.) cable from transaxle T.V. lever. With engine off, remove plug from throttle valve "B" pressure tap. See **Fig. 4**.

NOTE: When disconnecting T.V. cable, unhook cable from transaxle T.V. lever. **DO NOT** loosen lock nuts used for cable adjustment.

2. Attach Pressure Gauge Set (07406-0020003) to throttle valve "B" pressure tap using NEW aluminum washer. Tighten hose fitting to 13 ft. lbs. (18 N.m).
3. Start engine and operate at 1000 RPM. No pressure should exist with transaxle T.V. lever closed (released position). Lift transaxle T.V. lever on transaxle to fully open position. Note throttle valve "B" pressure reading.
4. Throttle valve "B" pressure should be within specification. See **HYDRAULIC PRESSURE TEST SPECIFICATIONS** table. If pressure is not within specification, see **HYDRAULIC PRESSURE TROUBLE SHOOTING** table. Shut engine off. Remove pressure gauge set. Install plug and NEW seal washer. Reconnect T.V. cable.

HYDRAULIC PRESSURE TEST SPECIFICATIONS

Application	Shift Lever Position	Pressure psi (kg/cm ²)
Line Pressure		
With Engine At 2000 RPM	"P" Or "N"	107-121 (7.5-8.5)
Clutch Pressure		
1st Clutch		
With Engine At 2000 RPM	"S" Or "D"	107-121 (7.5-8.5)
1st-Hold Clutch		
With Engine At 2000 RPM	"2" (1)	107-121 (7.5-8.5)
2nd Clutch		
With Engine At 2000 RPM	"2" (2)	107-121 (7.5-8.5)
With Transaxle T.V. Lever Fully Closed ⁽³⁾	"S" Or "D"	64-71 (4.5-5.0)
With Transaxle T.V. Lever Open More Than 3/8 ⁽⁴⁾	"S" Or "D"	107-121 (7.5-8.5)
3rd Clutch		
With Transaxle T.V. Lever Fully Closed ⁽³⁾	"S" (5)	64-71 (4.5-5.0)

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With Transaxle T.V. Lever Open More Than 3/8 ⁽⁴⁾	"S" ⁽⁵⁾	107-121 (7.5-8.5)
4th Clutch		
With Engine At 2000 RPM	"R"	107-121 (7.5-8.5)
With Transaxle T.V. Lever Fully Closed ⁽³⁾	"S" ⁽⁶⁾	64-71 (4.5-5.0)
With Transaxle T.V. Lever Open More Than 3/8 ⁽⁴⁾	"S" ⁽⁶⁾	107-121 (7.5-8.5)
Low Pressure		
2nd Clutch		
With Transaxle T.V. Lever Fully Closed ⁽³⁾	"S" Or "D"	64-71 (4.5-5.0)
3rd Clutch		
With Transaxle T.V. Lever Fully Closed ⁽³⁾	"S" ⁽⁵⁾	64-71 (4.5-5.0)
4th Clutch		
With Transaxle T.V. Lever Fully Closed ⁽³⁾	"S" ⁽⁶⁾	64-71 (4.5-5.0)
High Pressure		
2nd Clutch		
With Transaxle T.V. Lever Lifted Upward 1/2 Distance Of T.V. Lever Travel	"S" Or "D"	107-121 (7.5-8.5)
3rd Clutch		
With Transaxle T.V. Lever Lifted Upward 1/2 Distance Of T.V. Lever Travel	"S" ⁽⁵⁾	107-121 (7.5-8.5)
4th Clutch		
With Transaxle T.V. Lever Lifted Upward 1/2 Distance Of T.V. Lever Trave	"S" ⁽⁶⁾	107-121 (7.5-8.5)
Throttle Valve "B" Pressure		
With Transaxle T.V. Lever Fully Open ⁽⁷⁾	"S" Or "D"	107-121 (7.5-8.5)
(1) Check pressure with LOW switch depressed (ON position). The LOW switch is mounted in front of the shift lever. (2) Check pressure with LOW switch released (OFF position) The LOW switch is mounted in front of the shift lever. (3) Check pressure with engine at 2000 RPM. The T.V. cable must be disconnected. Fully closed position is with transaxle T.V. lever in released position and not being pulled upward by T.V. cable. (4) Check pressure with engine at 2000 RPM. The T.V. cable must be disconnected. Open position is with transaxle T.V. lever being pulled upward 3/8 the distance of lever travel. (5) Check pressure with "S4" switch released (OFF position). The "S4" switch is mounted on the shift lever.		

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- (6) Check pressure with "S4" switch depressed (ON position). The "S4" switch is mounted on the shift lever.
- (7) Check pressure with engine at 1000 RPM. Open position is with transaxle T.V. lever being pulled fully upward.

HYDRAULIC PRESSURE TROUBLE SHOOTING

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

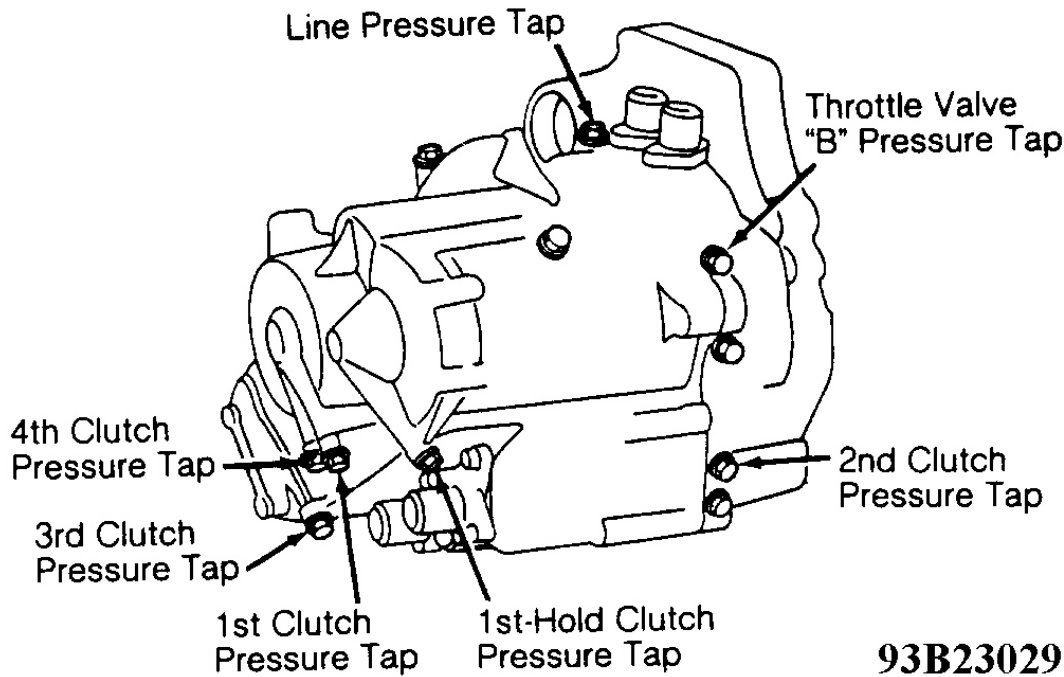


Fig. 4: Identifying Transaxle Pressure Taps

Courtesy of AMERICAN HONDA MOTOR CO., INC.

REMOVAL & INSTALLATION

ELECTRICAL COMPONENTS

See MPSA ELECTRONIC CONTROLS (4WD) article.

TRANSAXLE

See REMOVAL & INSTALLATION article.

TORQUE CONVERTER

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

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

TRANSAXLE DISASSEMBLY

NOTE: For disassembly of transfer unit, see TRANSFER UNIT .

VALVE BODIES & INTERNAL COMPONENTS

1. Remove retaining bolts, right side cover and gasket. See Fig. 5 . Remove joint bolts, seal washers, cooler pipes and dipstick.
2. Install Mainshaft Holder (07923-6890202) on mainshaft to secure mainshaft. See Fig. 6 . Engage parking pawl with parking gear. Remove mainshaft lock nut. See Fig. 5 .

NOTE: Mainshaft lock nut has left-hand threads.

3. Remove 1st clutch, thrust washer, thrust needle bearing, needle bearing and mainshaft 1st gear. See Fig. 5 . Remove countershaft lock nut. Using puller, remove parking gear and countershaft 1st gear as an assembly from countershaft.
4. Remove needle bearing and collar from countershaft. See Fig. 5 . Remove parking pawl, parking pawl spring, parking pawl shaft and stop pin.

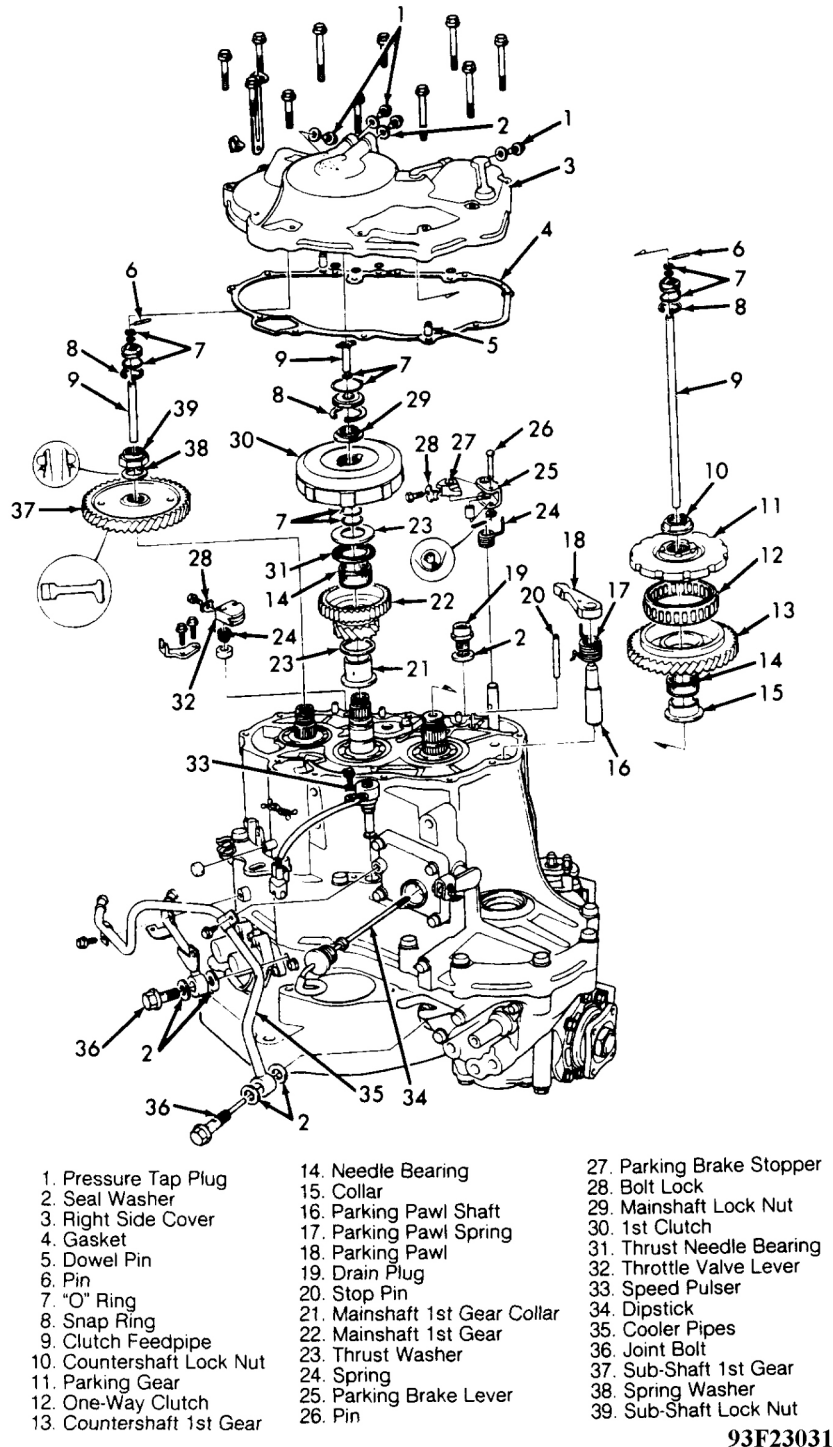


Fig. 5: Exploded View Of Right Side Cover & Components
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

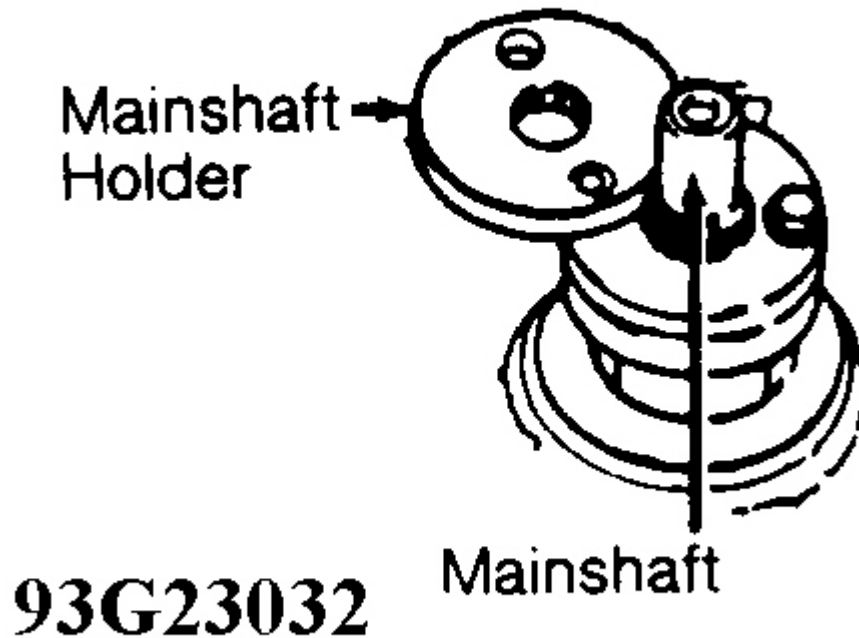


Fig. 6: Installing Mainshaft Holder

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Rotate sub-shaft 1st gear, and position hole in gear so pin can be installed through gear, into transaxle housing to secure sub-shaft. See **Fig. 7** . Install pin. Remove sub-shaft lock nut and spring washer.
6. Using puller, pull sub-shaft 1st gear from sub-shaft. Remove bolt, bolt lock and throttle valve lever. See **Fig. 5** . Remove bolt, bolt lock and parking brake stopper.
7. Remove parking brake lever and spring. Remove thrust washer and mainshaft 1st gear collar from mainshaft. Remove bolts, change cover, gasket and dowel pins. See **Fig. 8** . Remove bolt and bolt lock from end of linkage on control shaft.
8. Remove change lever from transaxle housing. See **Fig. 8** . Remove transaxle housing retaining bolts. Align spring pin on control shaft with groove in transaxle housing by rotating control shaft. Using Puller (07HAC-PK4010A), remove transaxle housing. See **Fig. 9** .
9. Remove transaxle housing gasket from torque converter housing. Remove bolts, reverse idler gear holder and reverse idler gear from transaxle housing (if necessary).

CAUTION: Use care when removing reverse idler gear holder from reverse idler to prevent needle bearing from coming off reverse idler gear holder end. A steel ball and spring are located below needle bearing, on reverse idler gear holder. See **Fig. 8** .

10. Remove countershaft reverse gear collar, needle bearing and countershaft reverse gear from countershaft. See **Fig. 8** . Remove bolt, bolt lock, reverse shift fork, reverse selector and reverse selector hub. Remove countershaft 4th gear, needle bearing and distance collar. Remove mainshaft and countershaft as an assembly.
11. Remove bolts, bolt locks and speed pulser rotor assembly. See **Fig. 10** . Remove all clutch feedpipes.

CAUTION: Ensure servo cover is held downward when removing bolts to prevent bolt damage. Use care when removing bolts and servo cover, as servo cover is under spring tension.

12. Hold servo cover down, and loosen retaining bolt in a crisscross pattern. Remove servo cover. Remove baffle plate.
13. Remove retaining clip and throttle control shaft. See **Fig. 10** . Remove servo valve body and separator plate. Remove secondary valve body, separator plate and dowel pins. Use care not to lose check balls in secondary valve body.
14. Remove 2nd accumulator body. Remove lock-up valve body and separator plate. Remove regulator valve body, pin, stator shaft and "O" ring. Remove control shaft and linkage.
15. Remove bolts and main valve body, using care not to lose check balls in main valve body. Remove oil pump driven gear shaft, oil pump driven and drive gears, main valve body separator plate and dowel pins.
16. Remove screen filter. Using puller, remove bearing from end of transfer shaft. Remove differential assembly. Remove lock-up control solenoid valve assembly (if necessary). Remove speed sensor.

NOTE: If transfer unit components are to be removed from torque converter housing, see TRANSFER UNIT .

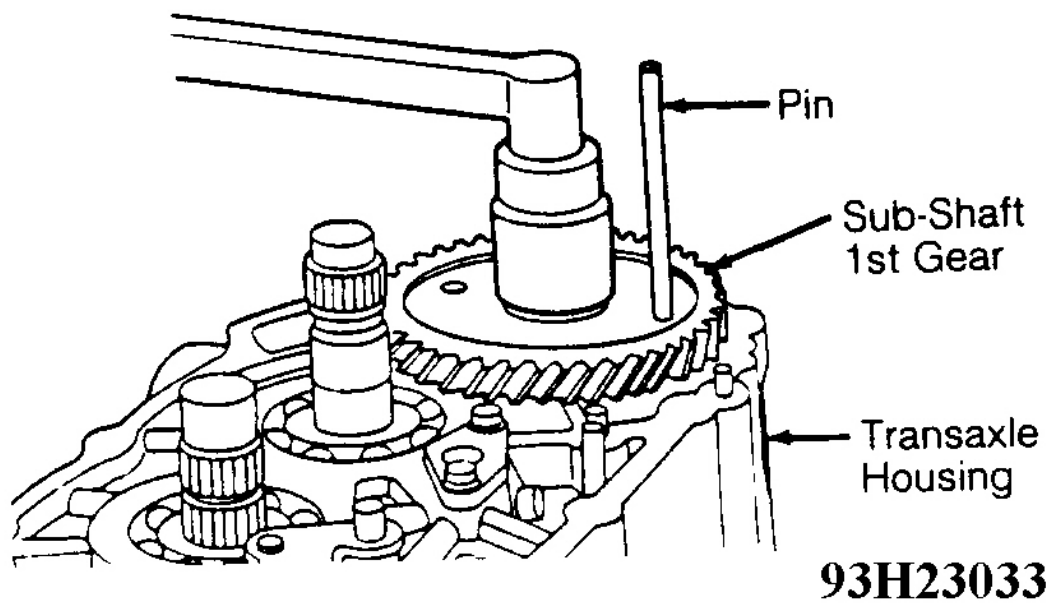


Fig. 7: Securing Sub-Shaft

Courtesy of AMERICAN HONDA MOTOR CO., INC.

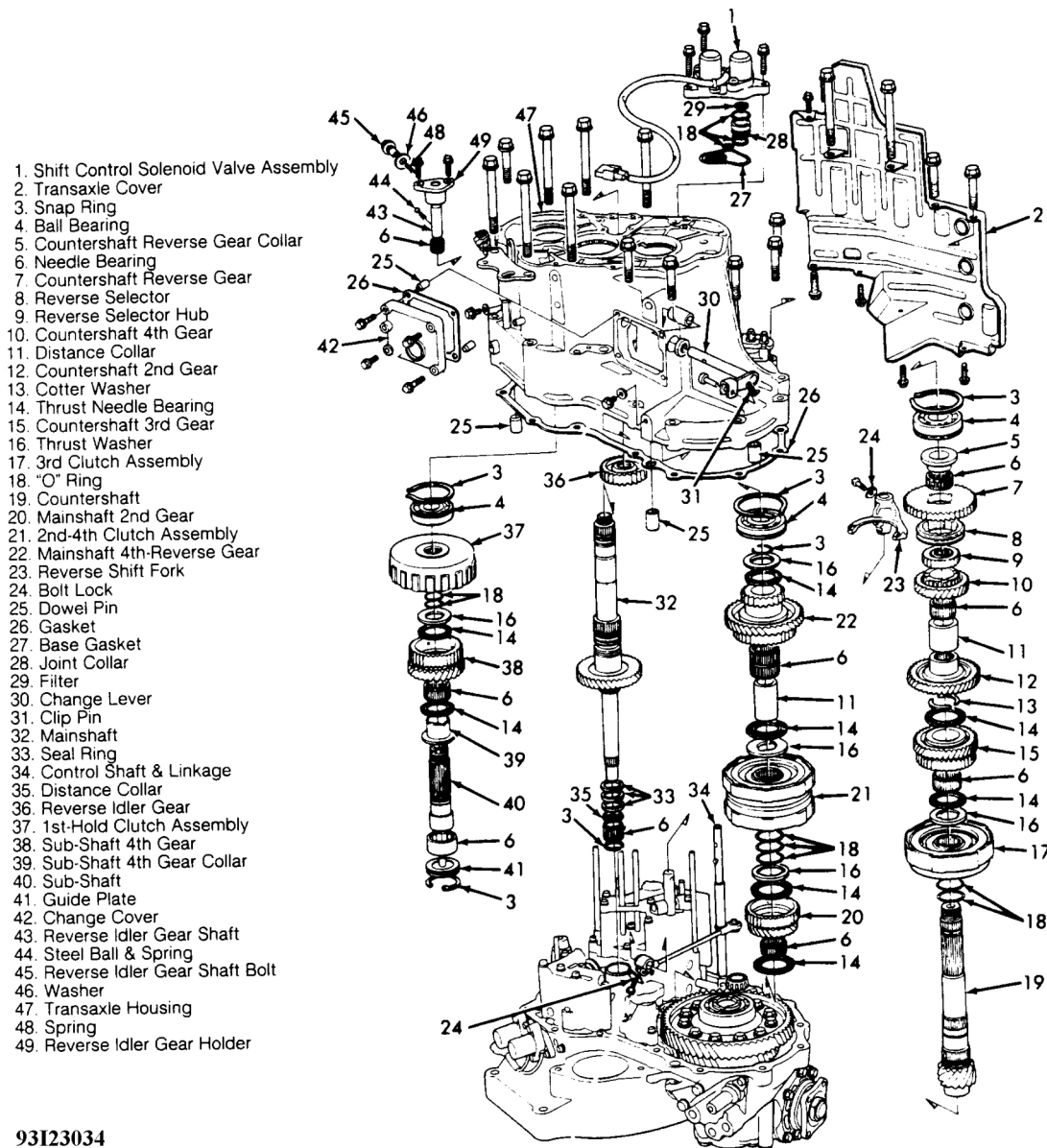
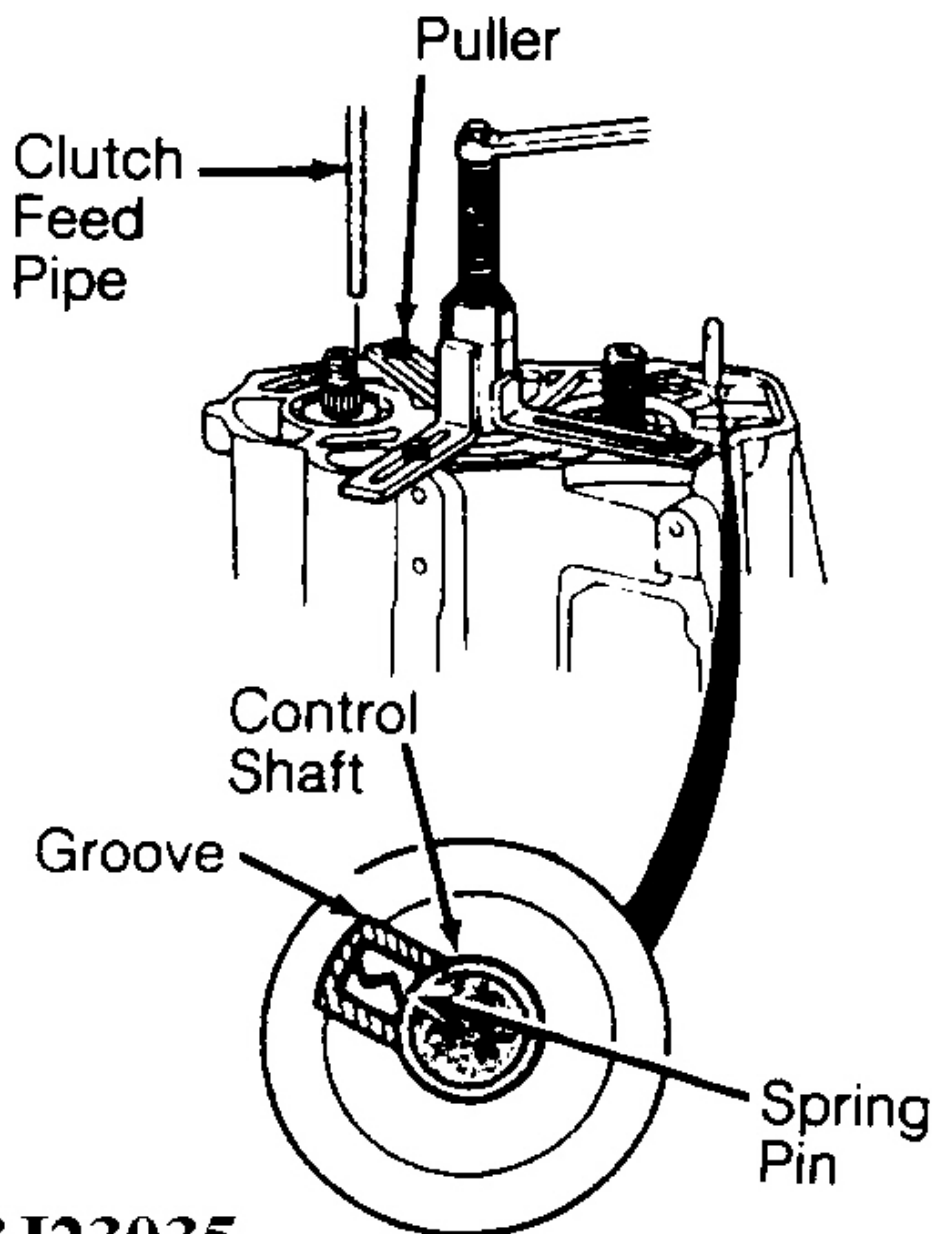
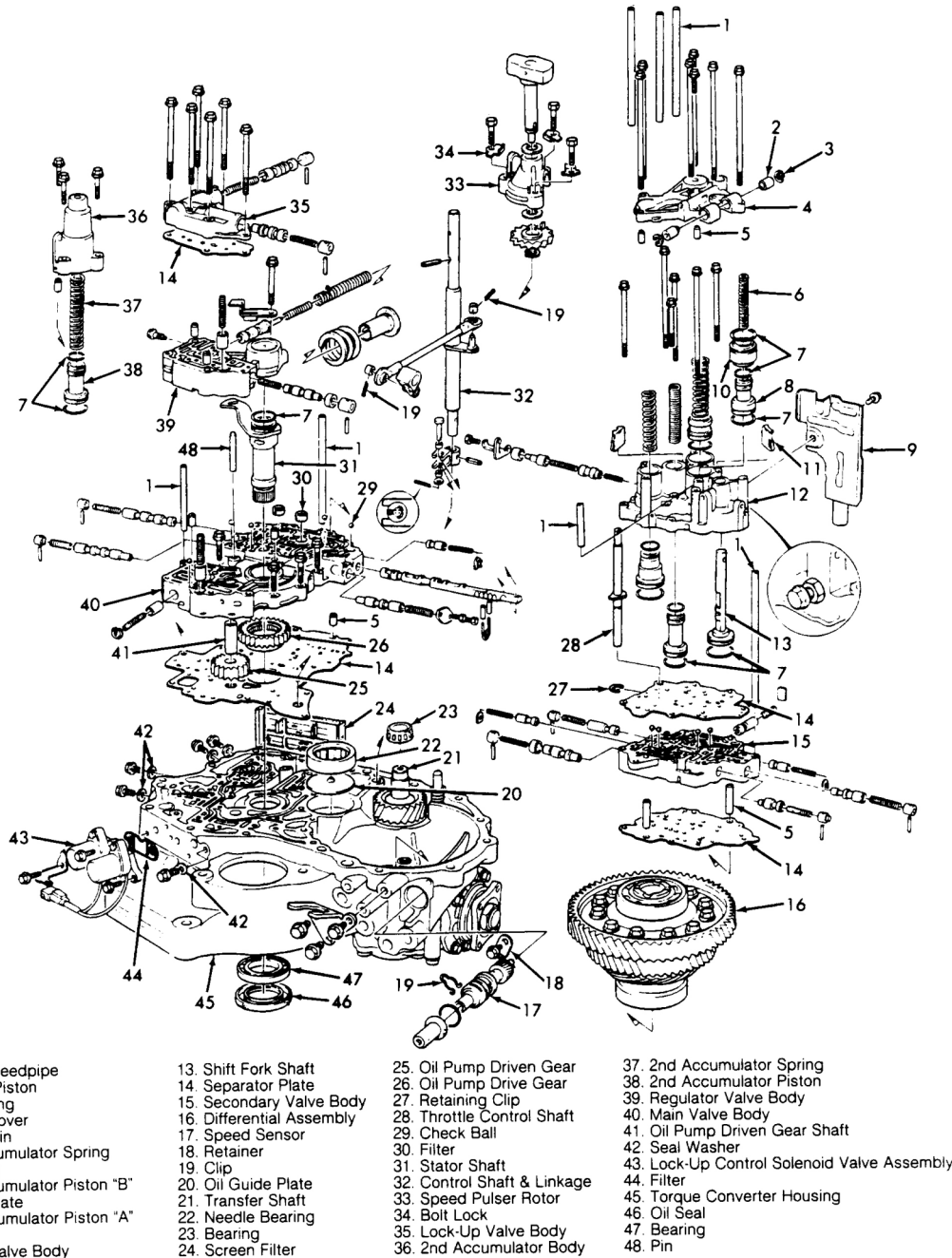


Fig. 8: Exploded View Of Transaxle Housing & Components
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 9: Aligning Spring Pin & Removing Transaxle Housing
Courtesy of AMERICAN HONDA MOTOR CO., INC.



93A23036

Fig. 10: Exploded View Of Torque Converter Housing & Components
Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT DISASSEMBLY & REASSEMBLY

MAIN VALVE BODY

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

Disassembly

Disassemble main valve body. See **Fig. 11** . 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 as an assembly if any parts are worn or damaged.
2. Ensure all valves slide freely in their bores. If valves **DO NOT** slide freely, polish burrs or rough areas using No. 600 sandpaper soaked in ATF for at least 30 minutes. Thoroughly clean main valve body and components if polishing was needed.
3. Ensure spring free length is within specification. See **SPRING SPECIFICATIONS** table. Replace springs if not within specification.

NOTE: Oil pump clearance must be checked in main valve body. See **OIL PUMP** under **COMPONENT DISASSEMBLY & REASSEMBLY**.

Reassembly

Lubricate all components and bores with ATF. To reassemble, reverse disassembly procedure. Install NEW filters. Ensure all components are installed in correct location. See **Fig. 11** . Tighten valve cover bolts to specification. See **TORQUE SPECIFICATIONS** .

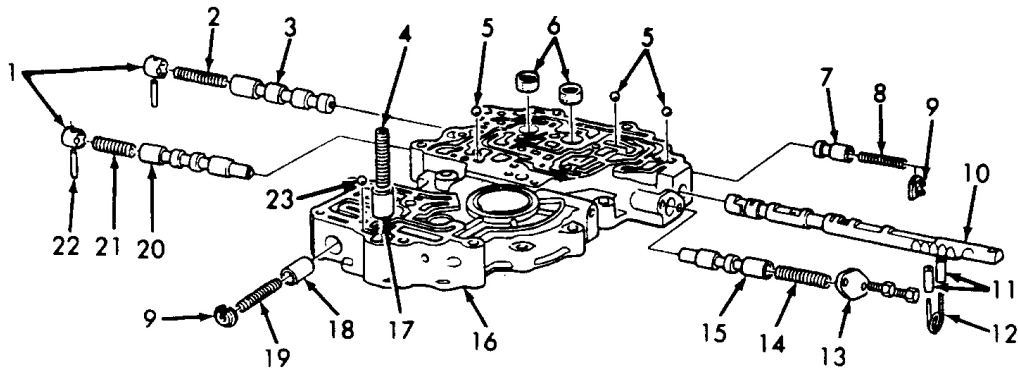
SPRING SPECIFICATIONS

Application	Free Length In. (mm)
Lock-Up Valve Body	
Lock-Up Shift Valve Spring	2.008 (51.00)
Lock-Up Timing Valve "B" Spring	1.717 (43.60)
Main Valve Body	
Cooler Relief Valve Spring	1.433 (36.40)
Orifice Control Valve Spring	1.413 (35.90)
Relief Valve Spring	2.047 (52.00)
1-2 Shift Valve Spring	1.591 (40.40)
2-3 Shift Valve Spring	1.409 (35.80)
3-4 Shift Valve Spring	2.350 (59.70)
Regulator Valve Body	
Lock-Up Control Valve Spring	1.693 (43.00)
Regulator Valve Spring "A"	3.406 (86.50)

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Regulator Valve Spring "B"	1.732 (44.00)
Stator Reaction Spring	1.193 (30.30)
Torque Converter Check Valve Spring	1.433 (36.40)
Secondary Valve Body	
Clutch Pressure Control Valve Spring	1.244 (31.60)
Modulator Valve Spring	1.299 (33.00)
Servo Control Valve Spring	1.654 (42.00)
2nd Orifice Control Valve Spring	1.516 (38.50)
4th Exhaust Valve Spring	1.457 (37.00)
4-2 Kickdown Valve Spring	1.681 (42.70)
4-3 Kickdown Valve Spring	1.681 (42.70)
Servo Valve Body	
Throttle Valve "B" Adjusting Spring	1.181 (30.00)
Throttle Valve "B" Spring	1.626 (41.30)
1st Accumulator Spring	2.807 (71.30)
1st-Hold Accumulator Spring	2.343 (59.50)
3rd Accumulator Spring	3.083 (78.30)
4th Accumulator Spring	3.083 (78.30)



- | | | |
|---------------------------------|----------------------------|----------------------------|
| 1. Valve Cap | 9. Spring Seat | 17. Cooler Relief Valve |
| 2. 1-2 Shift Valve Spring | 10. Manual Valve | 18. Relief Valve |
| 3. 1-2 Shift Valve | 11. Spring Roller | 19. Relief Valve Spring |
| 4. Cooler Relief Valve Spring | 12. Spring | 20. 2-3 Shift Valve |
| 5. Check Ball | 13. Valve Cover | 21. 2-3 Shift Valve Spring |
| 6. Filter | 14. 3-4 Shift Valve Spring | 22. Roller |
| 7. Orifice Control Valve | 15. 3-4 Shift Valve | 23. Steel Ball |
| 8. Orifice Control Valve Spring | 16. Main Valve Body | |

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

OIL PUMP

Disassembly

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

Cleaning & Inspection

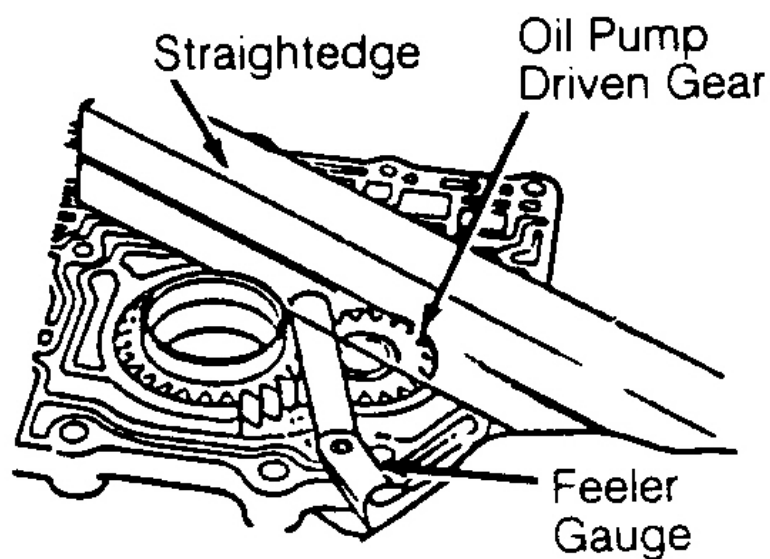
1. Clean components with solvent and dry with compressed air. Inspect components and replace if damaged.
2. Install oil pump gears and oil pump driven gear shaft in main valve body. Ensure chamfered side of oil pump driven gear is facing upward (toward separator plate side of main valve body). Place straightedge across main valve body surface.
3. Using feeler gauge, measure thrust clearance of oil pump driven gear between oil pump driven gear and straightedge. See **Fig. 12** . Replace oil pump gears and/or main valve body if thrust clearance is not within specification. See **OIL PUMP SPECIFICATIONS** table.
4. Using feeler gauge, measure side clearance between tip of gear teeth and main valve body on both gears. See **Fig. 12** . Replace oil pump gears and/or main valve body if side clearance is not within specification. See **OIL PUMP SPECIFICATIONS** table.

Reassembly

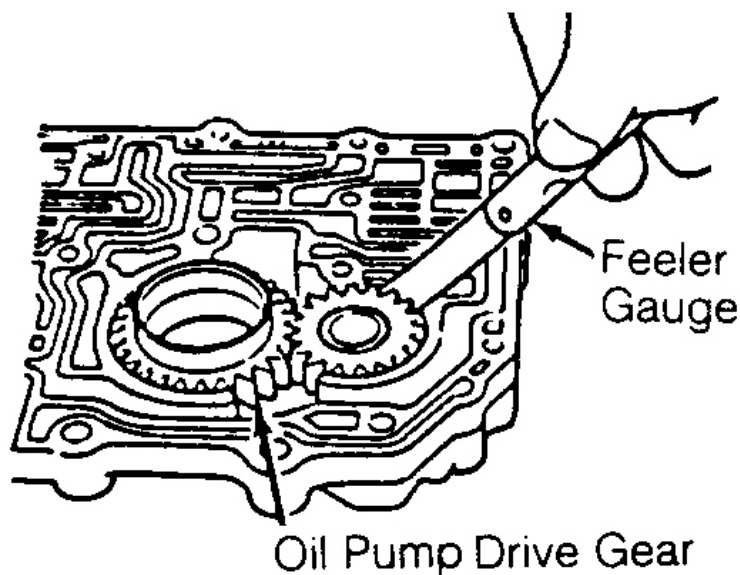
Lubricate components with ATF. To reassemble, reverse disassembly procedure. Ensure chamfered side of oil pump driven gear is facing upward (toward separator plate side of main valve body).

OIL PUMP SPECIFICATIONS

Application	In. (mm)
Side Clearance	
Oil Pump Drive Gear	.0094-.0105 (.240-.266)
Oil Pump Driven Gear	.0025-.0035 (.063-.088)
Thrust Clearance	
Standard	.001-.002 (.03-.05)
Wear Limit	.0028 (.070)



CHECKING THRUST CLEARANCE

CHECKING SIDE
CLEARANCE**93D23039****Fig. 12: Measuring Oil Pump Clearances**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

SECONDARY VALVE BODY

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

Disassembly

Disassemble secondary valve body. See **Fig. 13** . Use care when removing valve caps or spring seats, as they are under spring pressure.

Cleaning & Inspection

1. Clean components with solvent and dry with compressed air. Replace secondary valve body as an assembly if any parts are worn or damaged.
2. Ensure all valves slide freely in their bores. If valves do not slide freely, polish burrs or rough areas using No. 600 sandpaper soaked in ATF for at least 30 minutes. Thoroughly clean secondary 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

Lubricate all components and bores with ATF. To reassemble, reverse disassembly procedure. Ensure all components are installed in correct location. See **Fig. 13** .

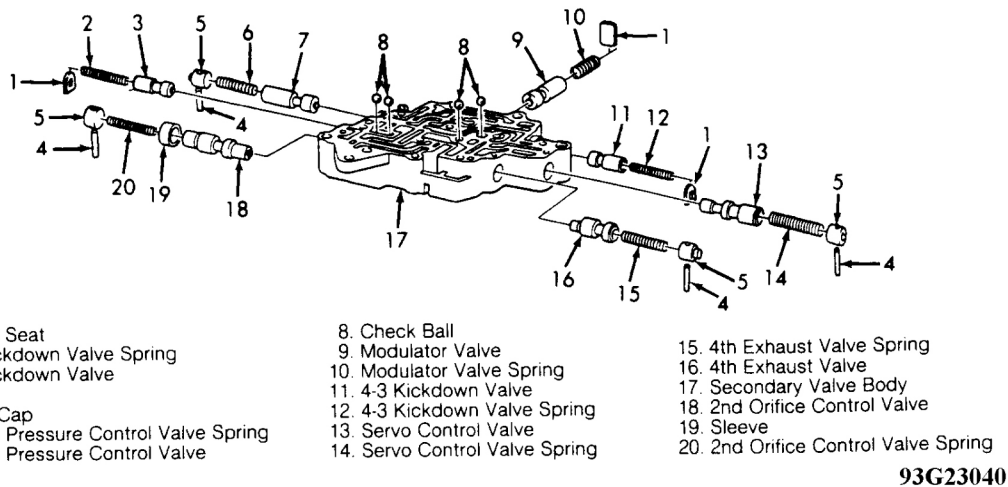


Fig. 13: Exploded View Of Secondary Valve Body
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

SERVO VALVE BODY

CAUTION: Stopper is under spring pressure. Ensure stopper is held downward when

removing servo valve body stopper bolt.**Disassembly**

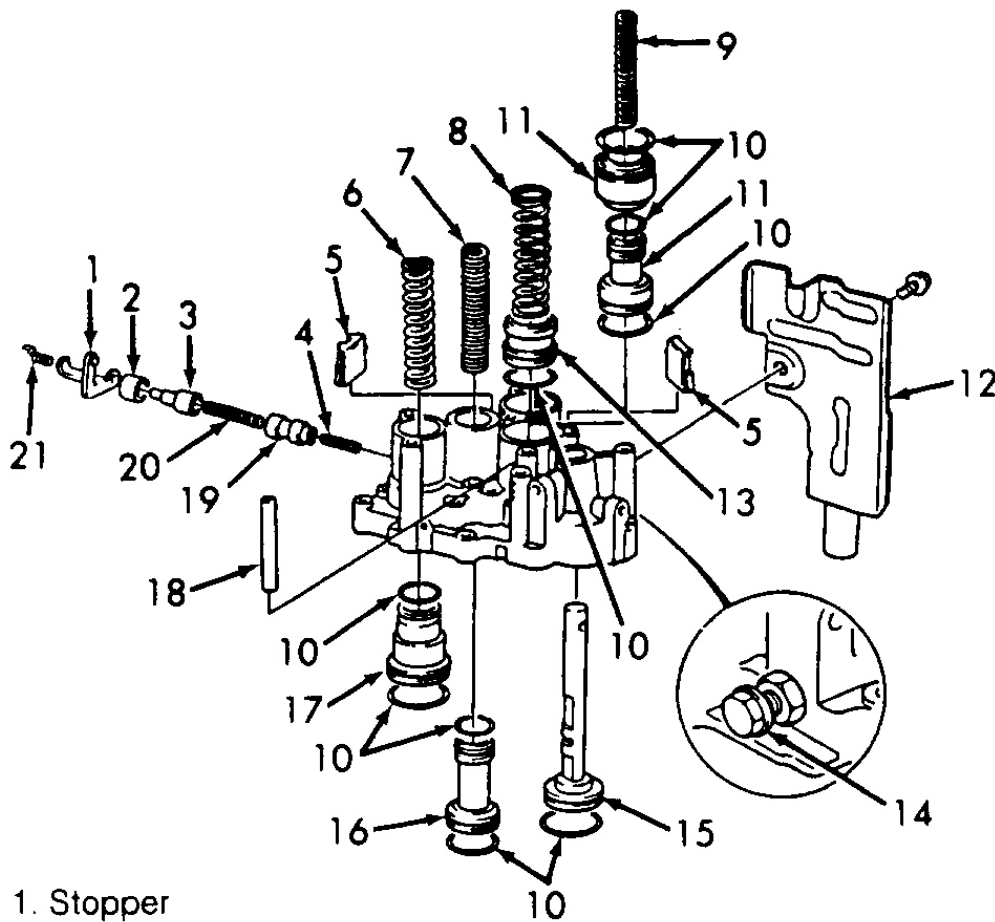
Disassemble servo valve body. See **Fig. 14** . **DO NOT** loosen or remove throttle pressure adjustment bolt.

Cleaning & Inspection

1. Clean components with solvent and dry with compressed air. Replace components if worn or damaged. Ensure shift fork shaft is not bent or damaged.
2. Ensure all valves slide freely in their bores. If valves do not slide freely, polish burrs or rough areas using No. 600 sandpaper soaked in ATF for at least 30 minutes. Thoroughly clean servo 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

Lubricate all components and bores with ATF. To reassemble, reverse disassembly procedure using NEW "O" rings. Tighten servo valve body stopper bolt to specification. See **TORQUE SPECIFICATIONS** .



- | | |
|---|--|
| 1. Stopper | 12. Baffle Plate |
| 2. Sleeve | 13. 1st-Hold Accumulator Piston |
| 3. Throttle Valve "B" (Short) | 14. Throttle Pressure Adjust Bolt
(DO NOT Loosen Or Remove) |
| 4. Throttle Valve "B"
Adjusting Spring | 15. Shift Fork Shaft |
| 5. Magnet | 16. 3rd Accumulator Piston |
| 6. 4th Accumulator Spring | 17. 4th Accumulator Piston |
| 7. 3rd Accumulator Spring | 18. Clutch Feedpipe |
| 8. 1st-Hold
Accumulator Spring | 19. Throttle Valve "B" (Long) |
| 9. 1st Accumulator Spring | 20. Throttle Valve "B" Spring |
| 10. "O" Ring | 21. Servo Valve Body Stopper Bolt |
| 11. 1st Accumulator Piston | |

93H23041

Fig. 14: Exploded View Of Servo Valve Body
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

REGULATOR VALVE BODY

CAUTION: Retainer cap is under spring pressure. Ensure retainer cap is held down when removing regulator valve body stopper bolt.

Disassembly

Hold retainer cap down, and remove regulator valve body stopper bolt. Slowly remove retainer cap and components from regulator valve body. See **Fig. 15** .

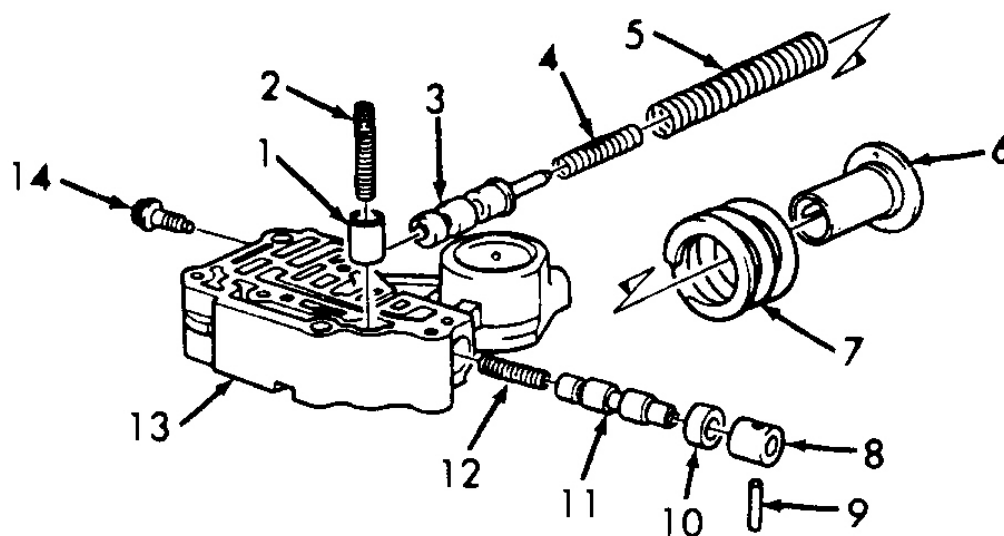
Cleaning & Inspection

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

Reassembly

Lubricate all components and bores with ATF. To reassemble, reverse disassembly procedure. Ensure all components are installed in correct location. See **Fig. 15** . Align hole in retainer cap with hole in regulator valve body. Install and tighten regulator valve body stopper bolt to specification. See **TORQUE SPECIFICATIONS** .

CAUTION: Ensure regulator valve body stopper bolt properly engages with hole in retainer cap.



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

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Fig. 15: Exploded View Of Regulator Valve Body
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

LOCK-UP VALVE BODY

Disassembly

Disassemble lock-up valve body. See **Fig. 16** . Use care when removing valve caps, as they are under spring pressure.

Cleaning & Inspection

1. Clean components with solvent and dry with compressed air. Replace lock-up valve body as an assembly if any parts are worn or damaged.
2. Ensure all valves slide freely in their bores. If valves do not slide freely, polish burrs or rough areas using No. 600 sandpaper soaked in ATF for at least 30 minutes. Thoroughly clean lock-up 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

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

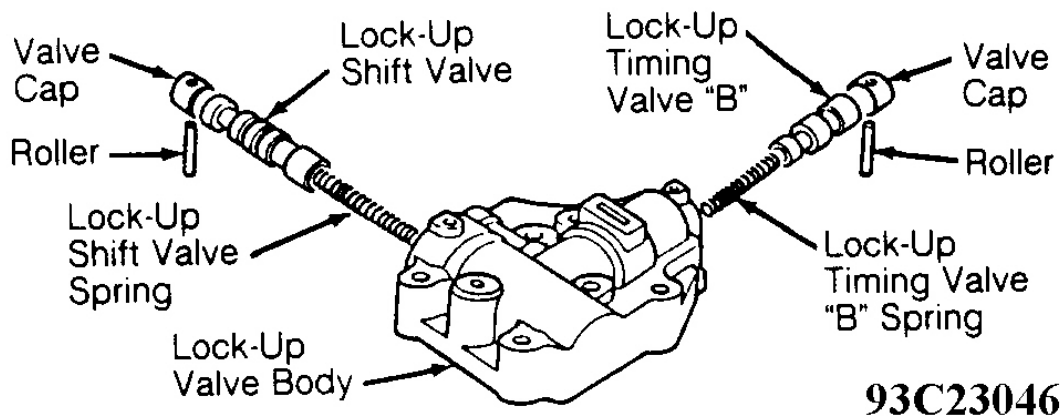


Fig. 16: Exploded View Of Lock-Up Valve Body
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2ND ACCUMULATOR BODY

Disassembly

Remove 2nd accumulator piston, "O" rings and 2nd accumulator spring from accumulator body. See **Fig. 10** .

Cleaning & Inspection

Clean components with solvent and dry with compressed air. Inspect components and replace if damaged. Ensure 2nd accumulator spring free length is 3.48" (88.4 mm). Replace spring if not within specification.

Reassembly

Lubricate all components and bores with ATF. To reassemble, reverse disassembly procedure using NEW "O" rings.

SPEED PULSER ROTOR

Disassembly

Disassemble speed pulser rotor. See **Fig. 17** .

Cleaning & Inspection

Clean components with solvent and dry with compressed air. Inspect components and replace if damaged.

Reassembly

To reassemble, reverse disassembly procedure. Ensure key is installed in magnet before installing drive gear.

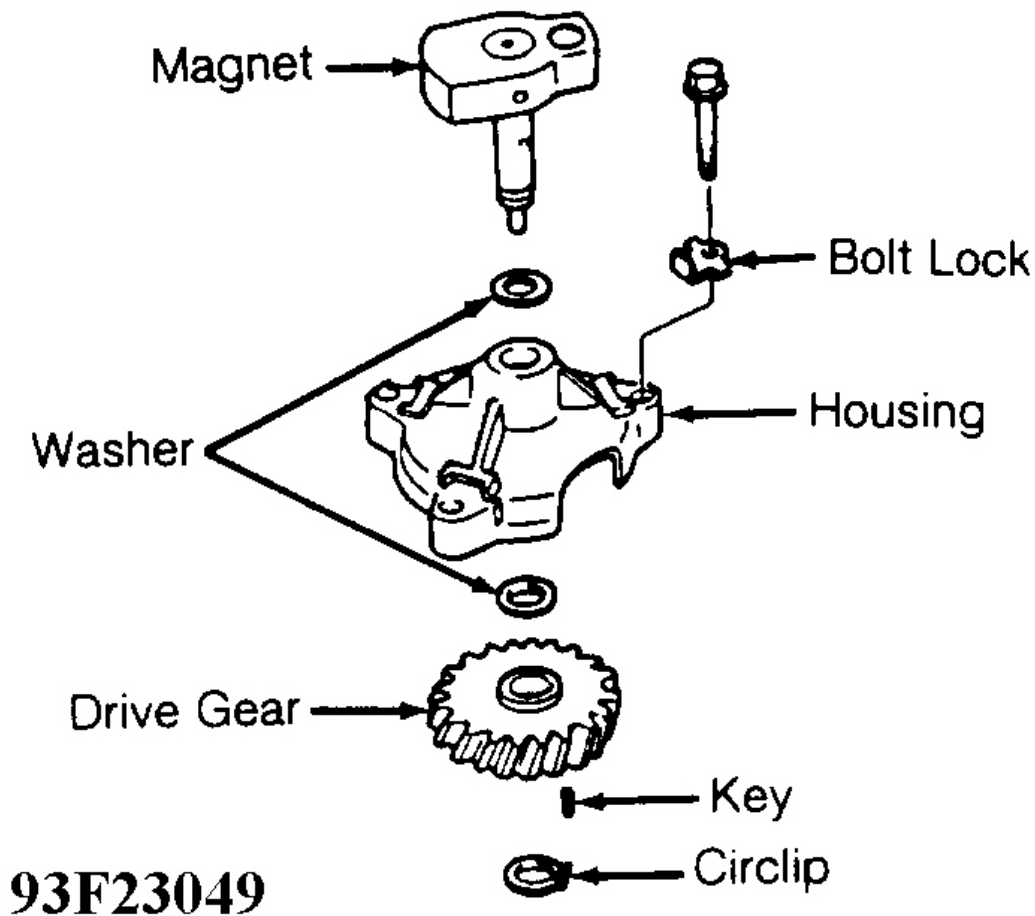


Fig. 17: Exploded View Of Speed Pulser Rotor
Courtesy of AMERICAN HONDA MOTOR CO., INC.

SUB-SHAFT & COMPONENTS**Disassembly**

1. Remove snap ring and guide plate from transaxle housing. See **Fig. 8** . Remove sub-shaft, 1st-hold clutch,

sub-shaft 4th gear and components.

2. If removing needle bearing from transaxle housing, use slide hammer and Puller (07736-A01000A). Pull needle bearing from transaxle housing.
3. If removing sub-shaft ball bearing from transaxle housing, expand snap ring. Press ball bearing from transaxle housing. Remove snap ring (if necessary).

Cleaning & Inspection

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

Reassembly

1. Lubricate all components with ATF. If installing needle bearing in transaxle housing, use hammer, Driver (07749-0010000) and Adapter (07746-0010200). Drive needle bearing into transaxle housing until bearing bottoms in transaxle housing.
2. If installing sub-shaft ball bearing in transaxle housing, expand snap ring. Install ball bearing part way into transaxle housing so reference mark is properly positioned. See **Fig. 18**.

CAUTION: Ensure sub-shaft ball bearing is installed with groove facing snap ring in transaxle housing, so snap ring will engage with ball bearing. Ensure ball bearing is installed with reference mark properly positioned. See Fig. 18.

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

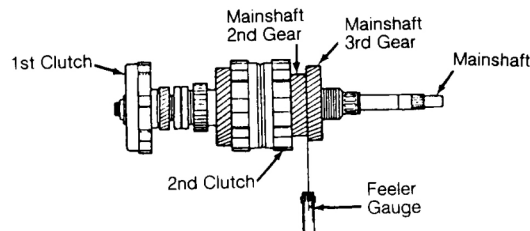
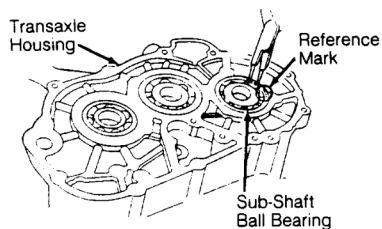


Fig. 18: Aligning Sub-Shaft Ball Bearing Reference Marks
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

MAINSHAFT

Disassembly

Note location of mainshaft components. See **Fig. 8** . Remove mainshaft components.

Cleaning & Inspection

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

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

Reassembly

1. To check mainshaft 2nd gear-to-3rd gear clearance, install all components except "O" rings on mainshaft. See **Fig. 8** .
2. Remove mainshaft ball bearing from transaxle housing and install on mainshaft. Install mainshaft 1st gear collar, thrust washer and mainshaft 1st gear on mainshaft. See **Fig. 5** .
3. Install needle bearing, thrust needle bearing, thrust washer and 1st clutch on mainshaft. See **Fig. 5** . Install used mainshaft lock nut on mainshaft. Tighten mainshaft lock nut to 22 ft. lbs. (30 N.m). Hold mainshaft 2nd gear against 2nd clutch.
4. Using feeler gauge, measure clearance between mainshaft 2nd gear and mainshaft 3rd gear. See **Fig. 19** . Replace thrust washer, located between mainshaft 2nd gear and 2nd clutch, if clearance is not .003-.006" (.07-.15 mm). Different thickness thrust washers are available. See **MAINSHAFT THRUST WASHER SPECIFICATIONS** table. Replace thrust washer and recheck 2nd gear-to-3rd gear clearance.
5. Once correct thickness thrust washer is obtained, lubricate all components with ATF. Reassemble mainshaft. Before installing NEW "O" rings on mainshaft, wrap splines with tape.

MAINSHAFT THRUST WASHER SPECIFICATIONS

Washer I.D. Letter	Part Number	Thickness In. (mm)
"A"	90441-PC9-010	.137-.138 (3.47-3.50)
"B"	90442-PC9-010	.139-.140 (3.52-3.55)
"C"	90443-PC9-010	.141-.142 (3.57-3.60)
"D"	90444-PC9-010	.143-.144 (3.62-3.65)
"E"	90445-PC9-010	.145-.146 (3.67-3.70)
"F"	90446-PC9-010	.147-.148 (3.72-3.75)
"G"	90447-PC9-010	.149-.150 (3.77-3.80)
"H"	90448-PC9-010	.151-.152 (3.82-3.85)
"I"	90449-PC9-010	.153-.154 (3.87-3.90)

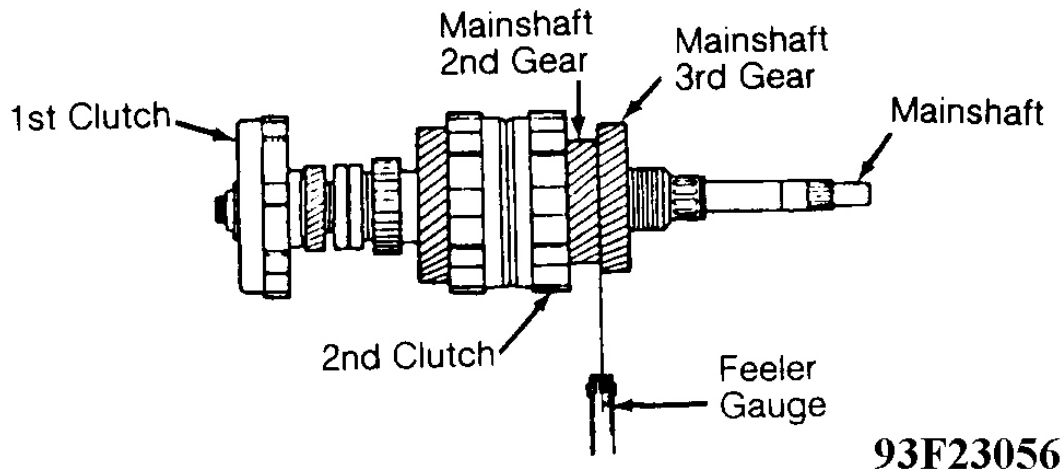


Fig. 19: Checking Mainshaft 2nd Gear-To-3rd Gear Clearance
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

COUNTERSHAFT

Disassembly

Note location of countershaft components. See **Fig. 8** . Remove countershaft components.

Cleaning & Inspection

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

NOTE: **Countershaft 2nd gear-to-3rd gear and 4th gear clearances must be checked during reassembly.**

Reassembly

1. To check countershaft gear clearances, install all components except "O" rings on countershaft. See **Fig. 8** .
2. Remove countershaft ball bearing from transaxle housing and install on countershaft. Install collar, needle bearing, countershaft 1st gear, one-way clutch and parking gear on countershaft. See **Fig. 5** .
3. Install used countershaft lock nut on countershaft. Tighten countershaft lock nut to 22 ft. lbs. (30 N.m).
4. Using feeler gauge, measure countershaft 4th gear clearance between shoulder on reverse selector hub and shoulder on countershaft 4th gear. See **Fig. 20** .
5. To check countershaft 2nd gear-to-3rd gear clearance, leave feeler gauge installed between shoulder on reverse selector hub and shoulder on countershaft 4th gear. Slide countershaft 3rd gear fully outward (away from countershaft 2nd gear).

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6. Using a second feeler gauge, measure clearance between countershaft 2nd and 3rd gears. See **Fig. 21** . Slide countershaft 3rd gear fully inward (toward countershaft 2nd gear). Measure clearance between countershaft 2nd and 3rd gears. Calculate the difference between 2 measurements to determine countershaft 2nd gear-to-3rd gear clearance. Remove feeler gauges.
7. Replace distance collar if countershaft 4th gear clearance is not .003-.006" (.07-.15 mm). Different length distance collars are available. See **DISTANCE COLLAR SPECIFICATIONS** table. Recheck countershaft 4th gear clearance.
8. Replace thrust washer between 3rd clutch and countershaft 3rd gear if countershaft 2nd gear-to-3rd gear clearance is not .003-.006" (.07-.15 mm). Different thickness thrust washers are available. See **COUNTERSHAFT THRUST WASHER SPECIFICATIONS** table. Recheck countershaft 2nd gear-to-3rd gear clearance.
9. Once correct gear clearances are obtained, lubricate all components with ATF. Reassemble countershaft. Use NEW "O" rings on countershaft. Before installing "O" rings on countershaft, wrap splines with tape.

DISTANCE COLLAR SPECIFICATIONS

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

COUNTERSHAFT THRUST WASHER SPECIFICATIONS

Washer Part Number	Thickness In. (mm)
90411-PA9-010	.117-.118 (2.97-3.00)
90412-PA9-010	.119-.120 (3.02-3.05)
90413-PA9-010	.121-.122 (3.07-3.10)
90414-PA9-010	.123-.124 (3.12-3.15)
90415-PA9-010	.125-.126 (3.17-3.20)
90418-PA9-010	.127-.128 (3.22-3.25)
90419-PA9-010	.129-.130 (3.27-3.30)
90420-PA9-010	.131-.132 (3.32-3.35)
90421-PA9-010	.133-.134 (3.37-3.40)
90423-PA9-010	.113-.114 (2.87-2.90)
90424-PA9-010	.115-.116 (2.92-2.95)

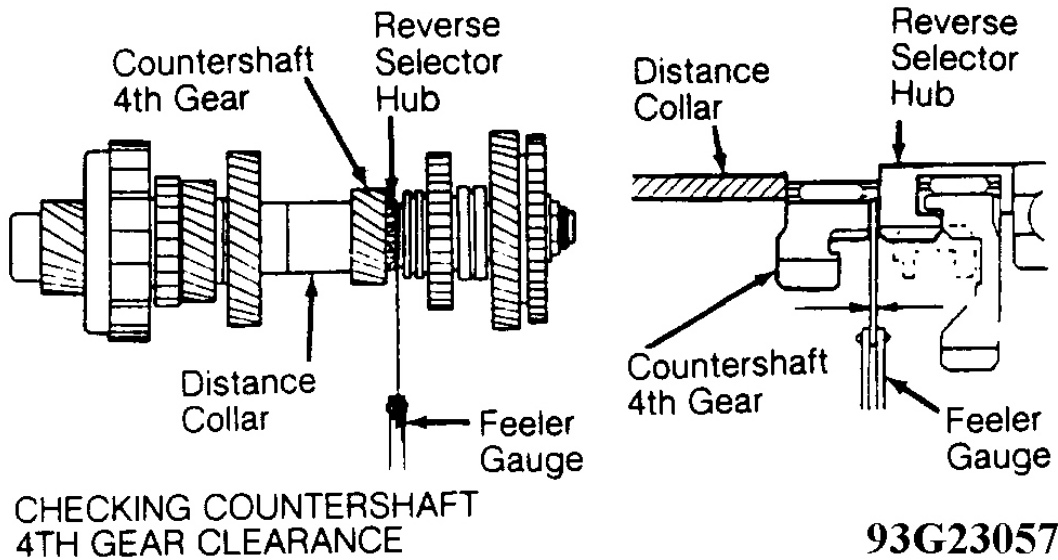


Fig. 20: Countershaft 4th Gear Clearances
Courtesy of AMERICAN HONDA MOTOR CO., INC.

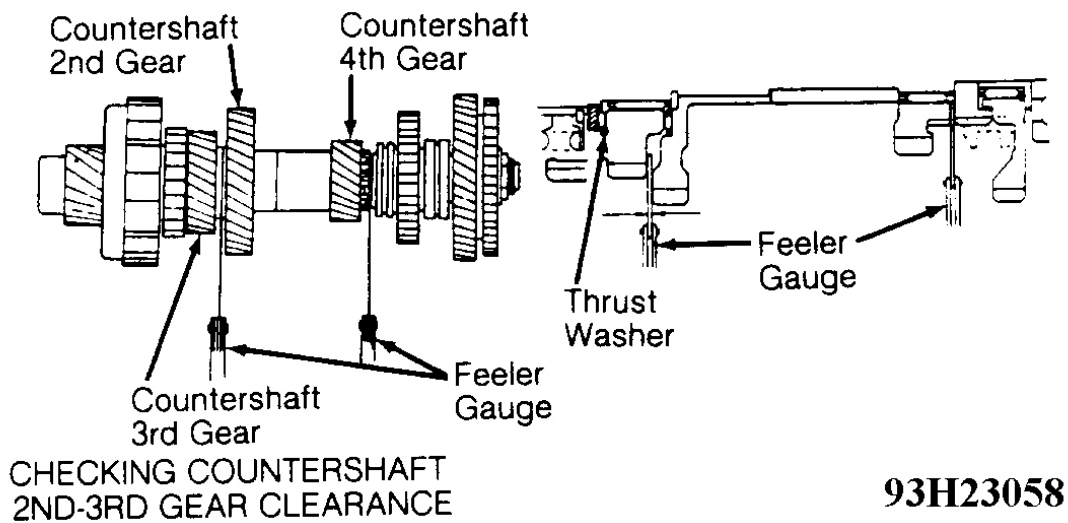


Fig. 21: Countershaft 2nd Gear-To-3rd Gear Clearances
Courtesy of AMERICAN HONDA MOTOR CO., INC.

PARKING GEAR & ONE-WAY CLUTCH

Disassembly

1. To separate parking gear from countershaft 1st gear, hold countershaft 1st gear and rotate parking gear counterclockwise. 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.

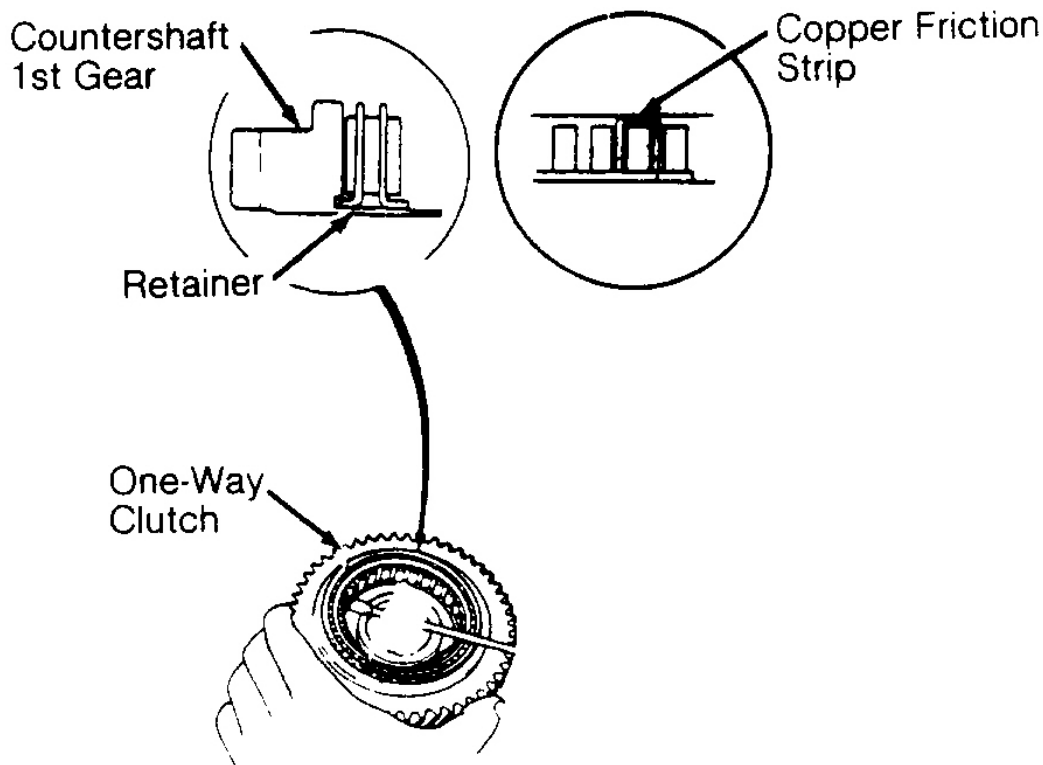
CAUTION: DO NOT pry on copper friction strips on one-way clutch during removal or one-way clutch will be damaged.

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 toward countershaft 1st gear. See **Fig. 22**. Install parking gear. Hold countershaft 1st gear, and ensure parking gear rotates counterclockwise.



INSTALLING ONE-WAY CLUTCH

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Fig. 22: Installing One-Way Clutch Operation

Courtesy of AMERICAN HONDA MOTOR CO., INC.

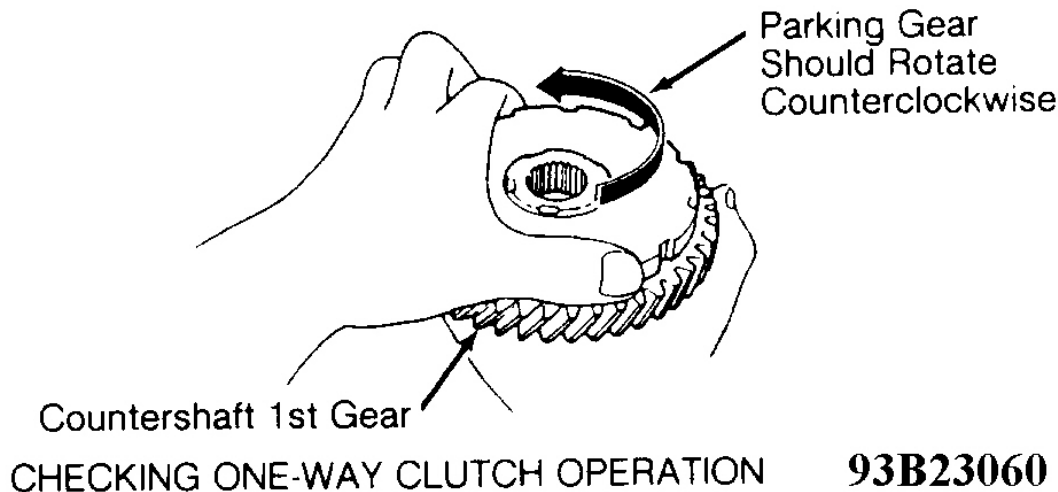


Fig. 23: Checking One-Way Clutch Operation

Courtesy of AMERICAN HONDA MOTOR CO., INC.

CLUTCH ASSEMBLIES

Disassembly

1. Remove snap ring, clutch end plate, clutch discs and clutch plates. See **Fig. 24** . On 2nd clutch, 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 (07HAE-PL50100), Adapter (07960-6120100) and Bolt (07GAE-PG40200) to compress return spring. See **Fig. 28** .
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, 1st-hold, 3rd and 4th clutches, ensure disc spring is securely staked to 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 2nd clutch. Ensure disc spring is installed in proper direction. See **Fig. 29**.

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.
5. Momentarily apply air to oil passage on clutch drum, and ensure clutch piston moves and clutch engages. Using dial indicator, measure clutch clearance between clutch end plate and top clutch disc. See **Fig. 30**.
6. Zero dial indicator with clutch end plate lowered, and lift clutch end plate upward against snap ring. Distance measured is clutch clearance.
7. Measure clutch clearance at 3 different locations. Clutch clearance should be within specification. See **CLUTCH CLEARANCE SPECIFICATIONS** table.
8. 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	Clutch Clearance In. (mm)
1st & 2nd Clutches	.026-.033 (.65-.85)
1st-Hold Clutch	.020-.031 (.50-.80)
3rd & 4th Clutches	.016-.024 (.40-.60)

CLUTCH END PLATE SPECIFICATIONS

Plate Number	Part Number	Thickness In. (mm)
1st-Hold Clutch		
1	22551-PS5-030	.082 (2.10)
2	22552-PS5-030	.086 (2.20)
3	22553-PS5-030	.090 (2.30)

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4	22554-PS5-030	.094 (2.40)
5	22555-PS5-030	.098 (2.50)
6	22556-PS5-030	.102 (2.60)
7	22557-PS5-030	.106 (2.70)
1st, 2nd, 3rd & 4th Clutches		
1	22551-PC9-000	.094 (2.40)
2	22552-PC9-000	.098 (2.50)
3	22553-PC9-000	.102 (2.60)
4	22554-PC9-000	.106 (2.70)
5	22555-PC9-000	.110 (2.80)
6	22556-PC9-000	.114 (2.90)
7	22557-PC9-000	.118 (3.00)
8	22558-PC9-000	.122 (3.10)
9	22559-PC9-000	.126 (3.20)
10	22560-PC9-000	.130 (3.30)
11	22561-PC9-000	.082 (2.10)
12	22562-PC9-000	.086 (2.20)
13	22563-PC9-000	.090 (2.30)

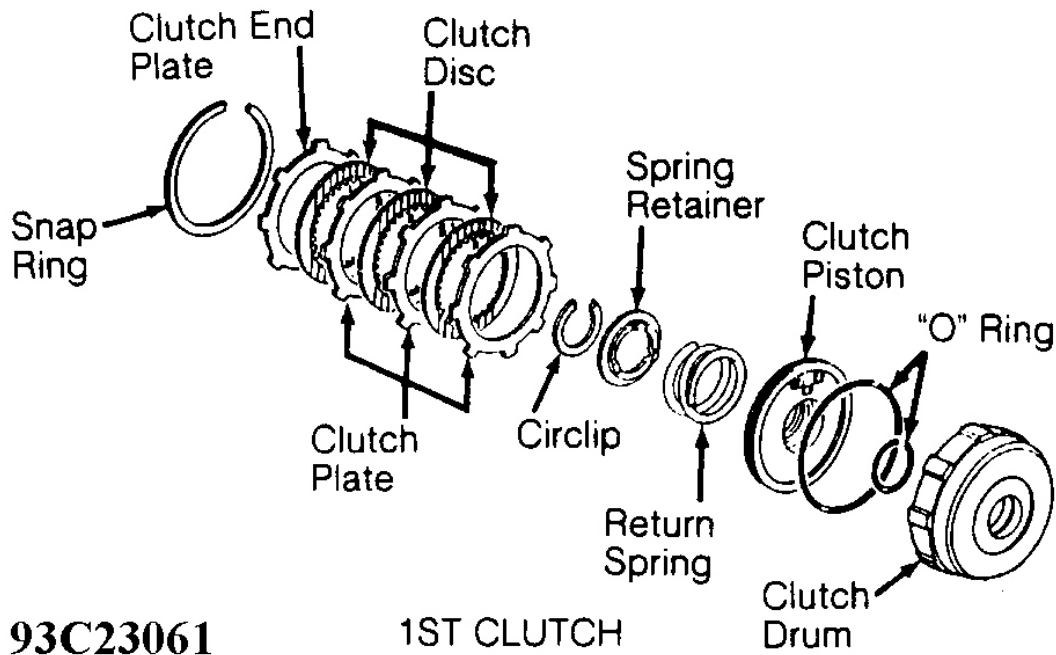


Fig. 24: Exploded View Of Clutch Assemblies (1 of 4)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

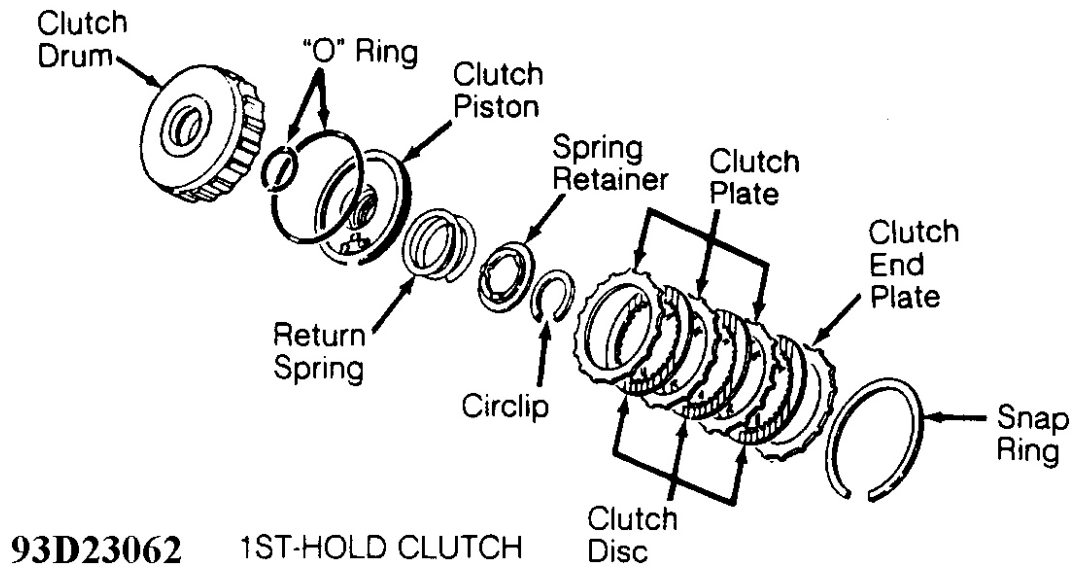


Fig. 25: Exploded View Of Clutch Assemblies (2 of 4)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

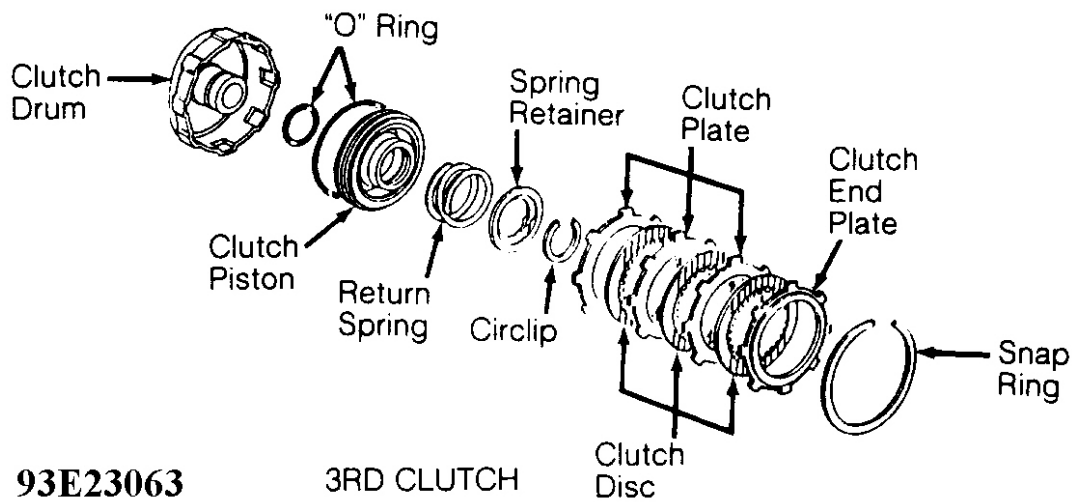


Fig. 26: Exploded View Of Clutch Assemblies (3 of 4)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

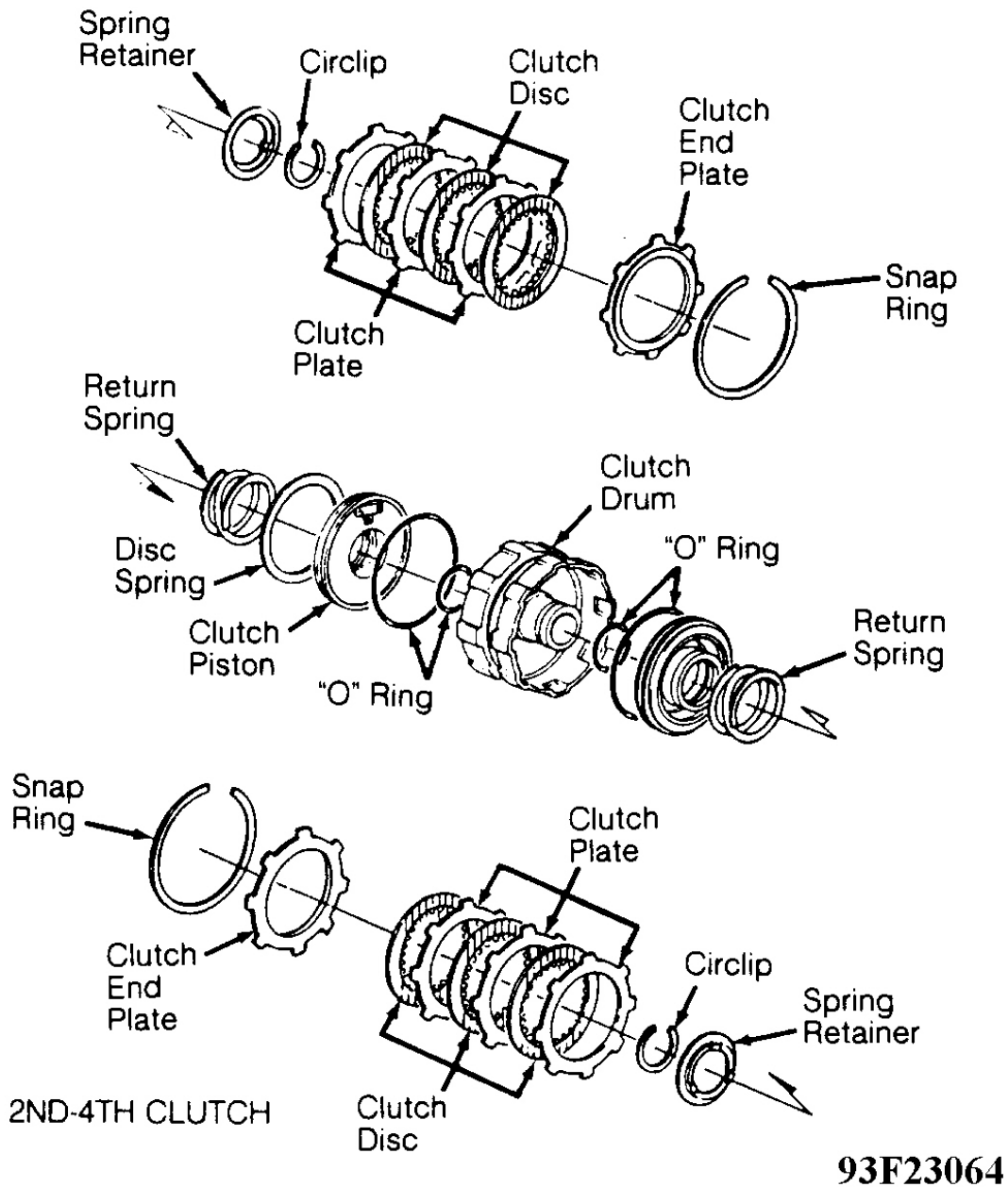


Fig. 27: Exploded View Of Clutch Assemblies (4 of 4)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

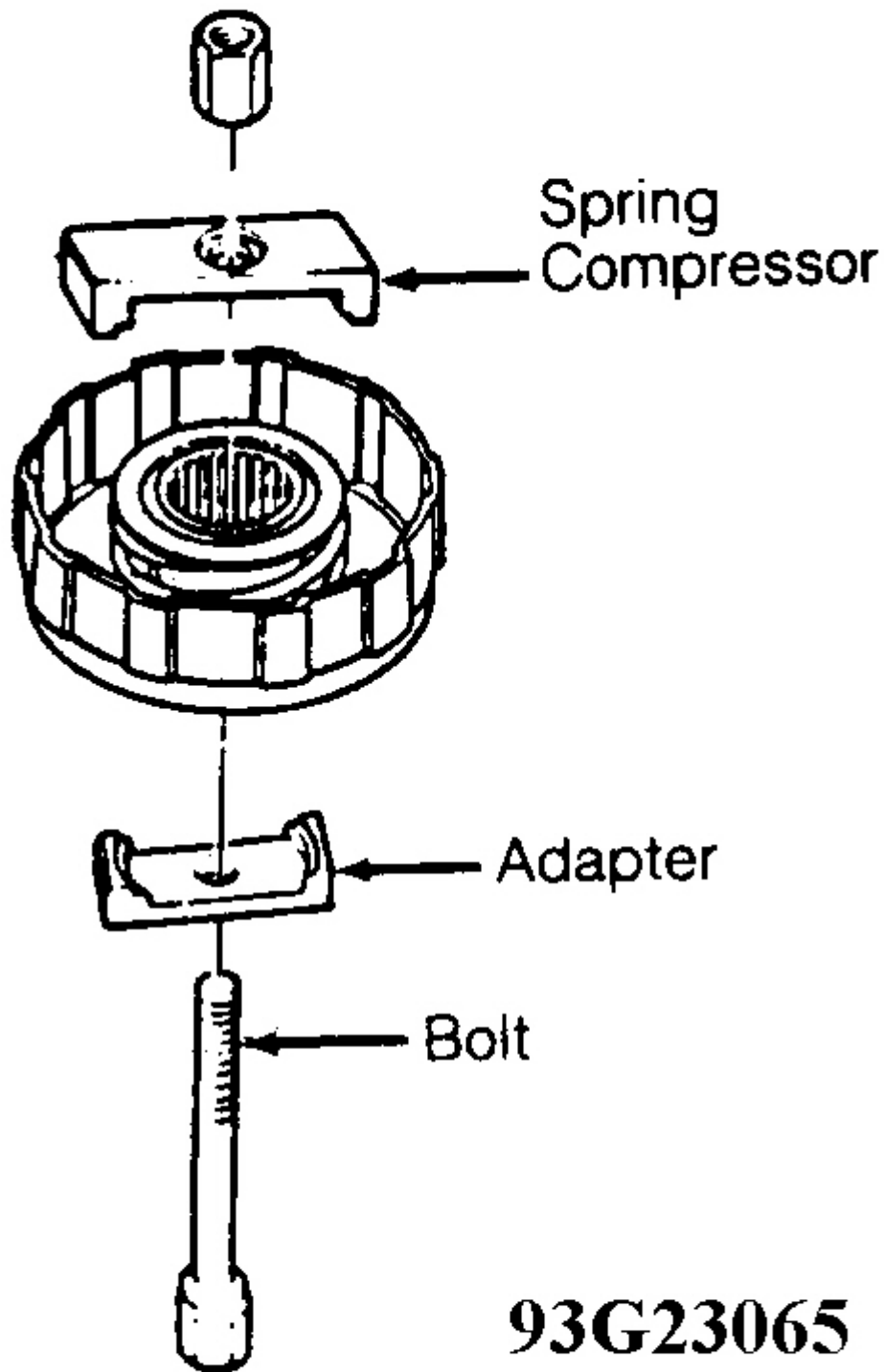


Fig. 28: Return Spring (1st-Hold Clutch Shown; Others Similar)

Courtesy of AMERICAN HONDA MOTOR CO., INC.

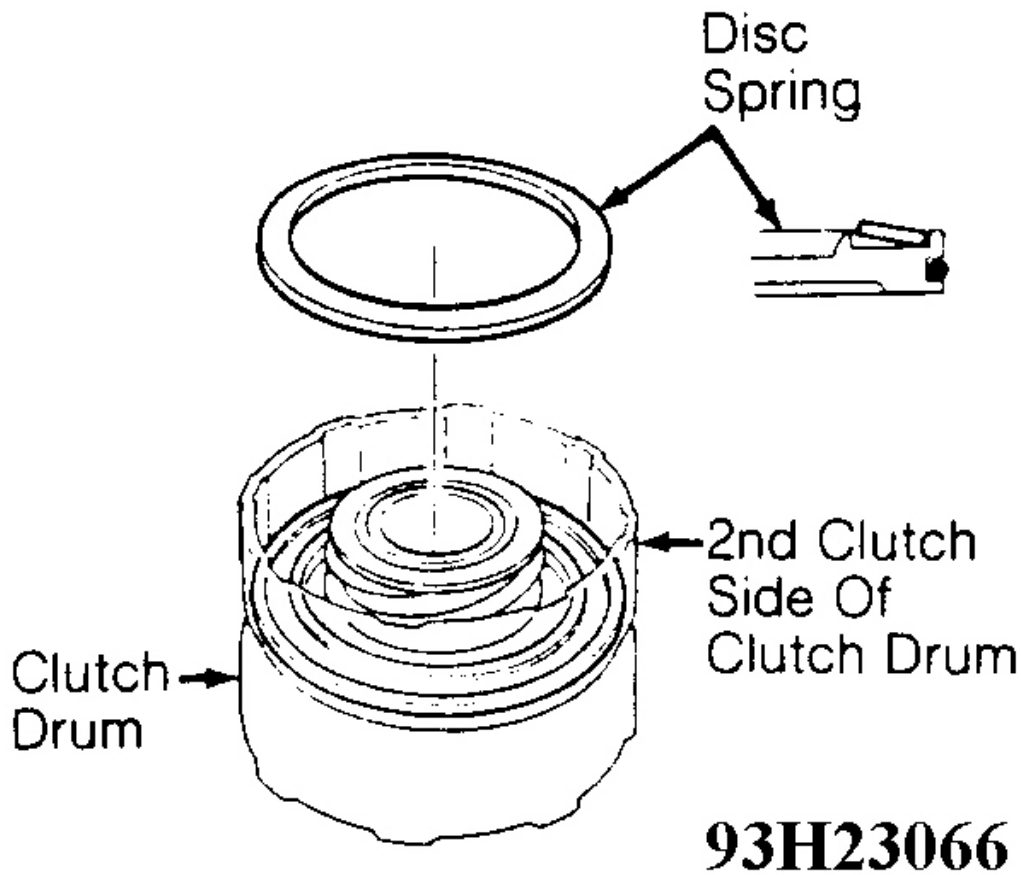


Fig. 29: Installing Disc Spring On 2nd Clutch

Courtesy of AMERICAN HONDA MOTOR CO., INC.

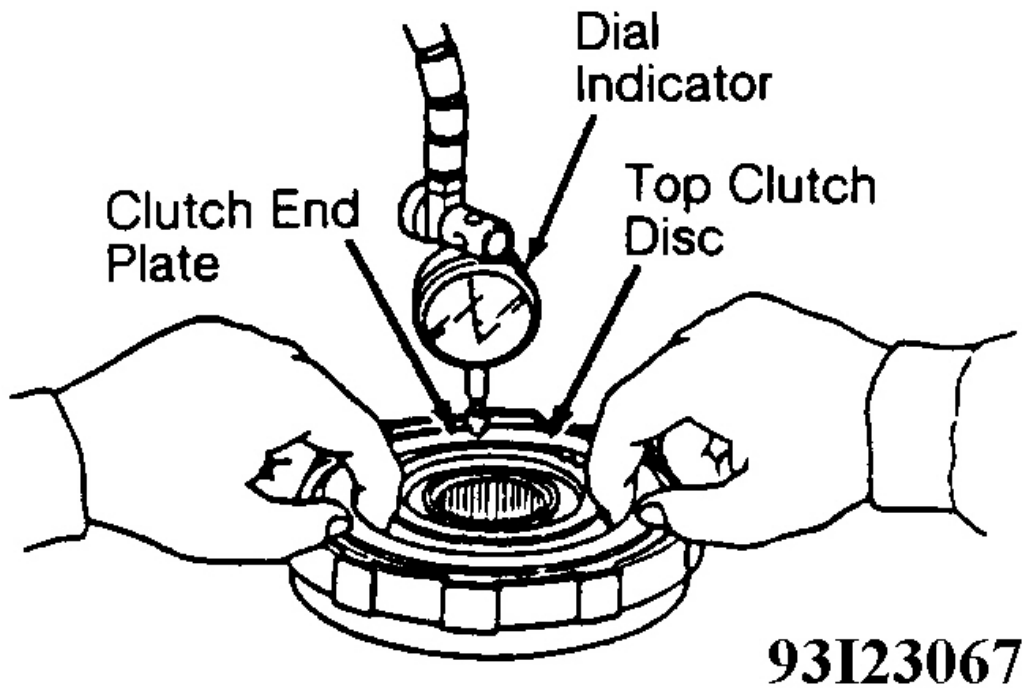


Fig. 30: Measuring Clutch Clearance

Courtesy of AMERICAN HONDA MOTOR CO., INC.

TORQUE CONVERTER HOUSING

Disassembly

1. Remove countershaft and transfer shaft bearings from torque converter housing using Bearing Remover (07736-A01000A) and slide hammer (if necessary). Remove oil guide plate from countershaft bearing bore in torque converter housing. See **Fig. 10** .
2. Remove mainshaft bearing and oil seal using hammer, Driver (07749-0010000) and Adapter (07749-6340500). Using hammer and drift, tap differential oil seal from torque converter housing.

Cleaning & Inspection

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

Reassembly

1. Lubricate components with ATF. To install mainshaft bearing, use hammer, Driver (07749-0010000) and Adapter (07746-0010500). Drive bearing in until bearing bottoms in torque converter housing.

2. Using hammer, driver and Adapter (07947-6340201), install mainshaft oil seal in torque converter housing. Oil seal should be even with torque converter housing surface.
3. To install countershaft bearing, install NEW oil guide plate in countershaft bearing bore of torque converter housing. Ensure oil guide plate is installed with tab in center facing upward (away from torque converter housing surface). See **Fig. 10** . Using hammer, driver and Adapter (07746-0010500), drive countershaft bearing into torque converter housing.
4. To install transfer shaft bearing, use hammer, driver and Adapter (07746-0010600). Drive bearing into torque converter housing.

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

5. Once correct differential bearing side clearance is obtained, install differential oil seal. Using driver, Adapter (07HAD-SF10100) and Pilot (07JAD-PH80400), drive oil seal into torque converter housing until oil seal is fully seated.

TRANSAXLE HOUSING

Disassembly

1. To remove mainshaft, countershaft and sub-shaft ball bearings, expand snap ring retaining bearing in transaxle housing. Press bearings from transaxle housing. **DO NOT** remove snap ring from transaxle housing unless necessary to clean groove in transaxle housing.
2. To remove sub-shaft needle bearing from transaxle housing, use slide hammer and Puller (07736-A01000A). Pull needle bearing from transaxle housing.
3. To remove transfer shaft bearing race from transaxle housing, use slide hammer and Puller (07736-A01000A). Pull bearing race from transaxle housing. Using hammer and drift, tap differential oil seal from transaxle housing.

Cleaning & Inspection

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

Reassembly

1. Lubricate all components with ATF. If installing sub-shaft needle bearing in transaxle housing, use hammer, Driver (07749-0010000) and Adapter (07746-0010200) to drive needle bearing into transaxle housing until it bottoms in transaxle housing.
2. If installing mainshaft, countershaft or sub-shaft ball bearings in transaxle housing, expand snap ring. Install ball bearing part way into transaxle housing so reference mark is properly positioned. See **Fig. 31** .

CAUTION: Ensure ball bearing is installed with groove facing snap ring in transaxle housing, so snap ring will engage ball bearing. Ensure ball

bearing is installed with reference mark properly positioned. See Fig. 31 .

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

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

4. Once correct differential bearing side clearance is obtained, install differential oil seal. Using driver, Adapter (07947-6110500) and Pilot (07JAD-PH80400), drive oil seal into transaxle housing until oil seal is fully seated.
5. If installing transfer shaft bearing race, use hammer, Driver (07749-0010000) and Adapter (07746-0010200) to drive bearing race into transaxle housing until it bottoms in transaxle housing.

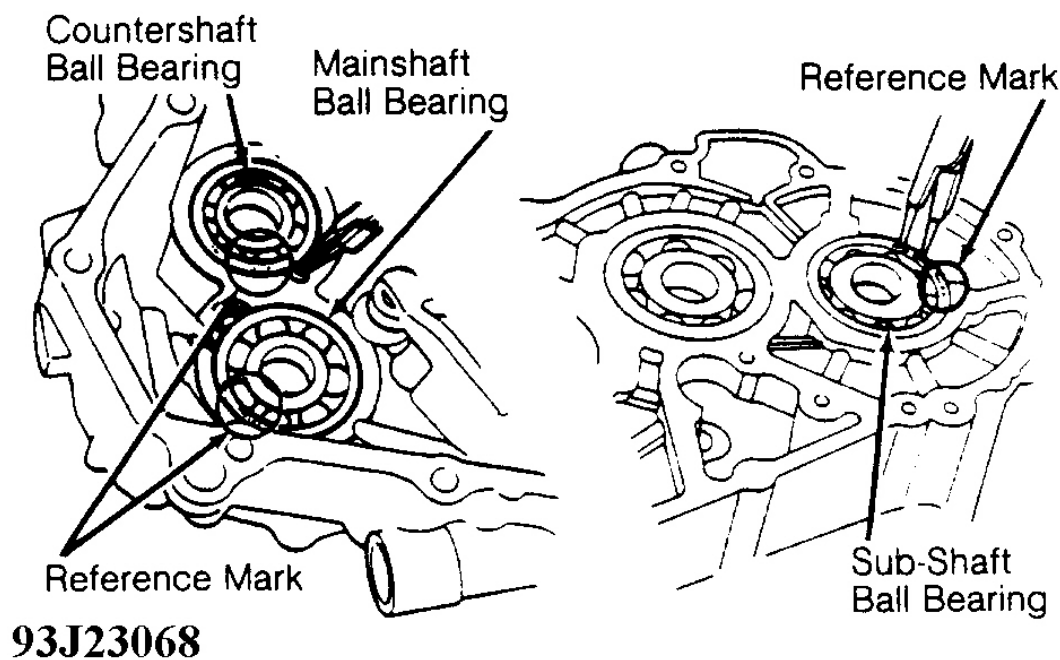


Fig. 31: Countershaft, Mainshaft Ball Bearing Reference Marks
Courtesy of AMERICAN HONDA MOTOR CO., INC.

DIFFERENTIAL ASSEMBLY

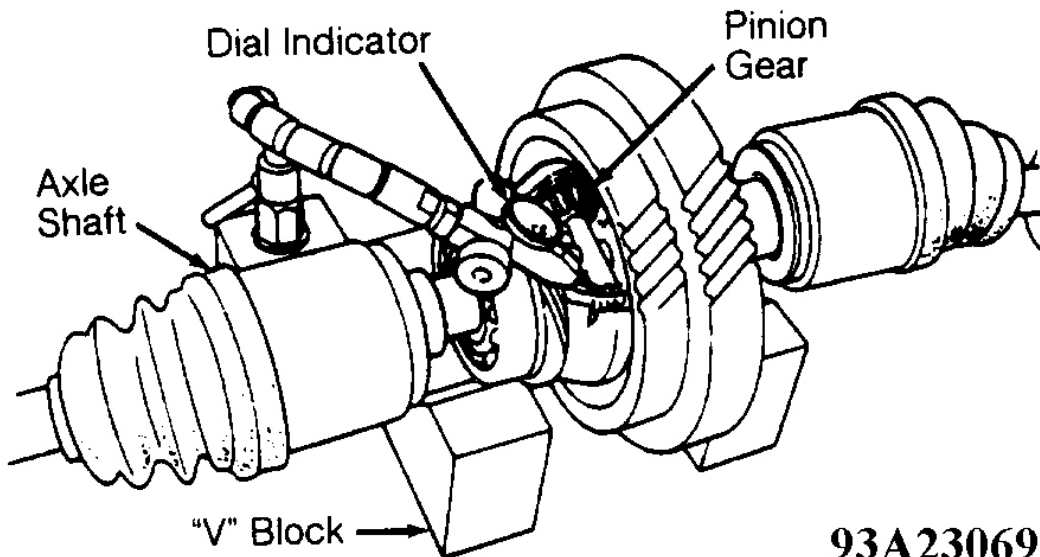
Disassembly

1. Before disassembling differential assembly, check pinion gear backlash. Place differential assembly on "V" blocks with both axle shafts installed.
2. Install dial indicator with stem resting against pinion gear. See **Fig. 32** . Check pinion gear backlash. Pinion gear backlash should be .002-.006" (.05-.15 mm).
3. If pinion gear backlash is not within specification, install different thickness pinion gear thrust washer during reassembly. See **PINION GEAR THRUST WASHER SPECIFICATIONS** table.

PINION GEAR THRUST WASHER SPECIFICATIONS

Part Number	Thickness In. (mm)
41351-689-000	.028 (.70)
41352-689-000	.031 (.80)
41353-689-000	.035 (.90)
41354-689-000	.039 (1.00)
41355-PC8-000	.030 (.75)
41356-PC8-000	.033 (.85)
41357-PC8-000	.037 (.95)

4. If replacing bearings, use bearing puller to remove bearings from differential carrier. Remove ring gear-to-transfer drive gear bolts. Remove ring gear and transfer drive gear. See **Fig. 33** .
5. Remove snap ring. Pry speedometer drive gear from differential carrier. See **Fig. 33** . Remove dowel pin for speedometer drive gear from differential carrier.
6. Drive pin for pinion shaft from differential carrier. See **Fig. 33** . Remove pinion shaft, pinion gears, side gears and thrust washers.



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Fig. 32: 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 wear and damage. Replace components as necessary.

Reassembly

1. Coat both sides of pinion gears and side gears with grease. Install side gears and side gear thrust washers in differential carrier.
2. Install pinion gears and pinion gear thrust washers in differential carrier so they are exactly opposite each other. Rotate pinion gears until they align with pinion shaft hole in differential carrier. Install pinion shaft and pin.
3. Recheck pinion gear backlash. If pinion gear backlash is not .002-.006" (.05-.15 mm), select different thickness pinion gear thrust washer. If pinion gear backlash still is not within specification, replace side and pinion gears.
4. Recheck pinion gear backlash. If pinion gear backlash is not within specification, replace differential carrier.

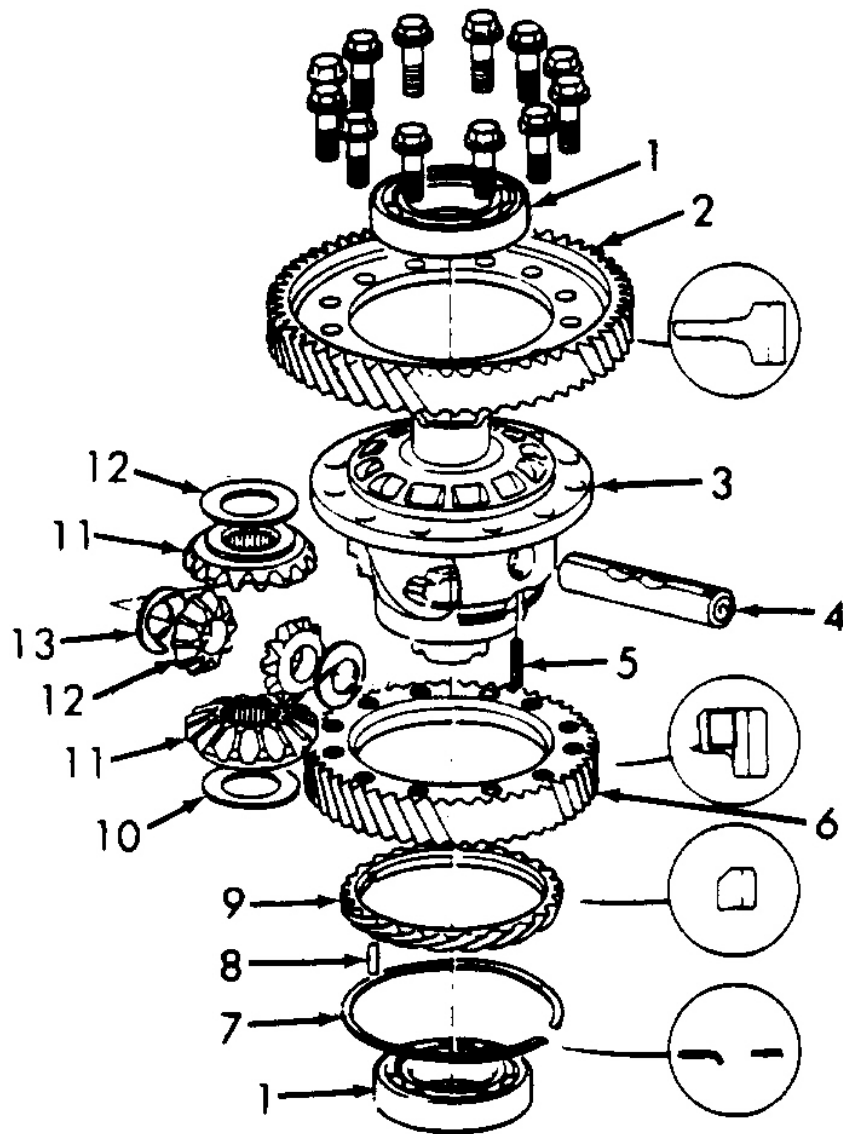
CAUTION: Ring gear and transfer drive gear must be installed with chamfered side of gear toward differential carrier. See Fig. 33 .

5. Install ring gear and transfer drive gears on differential carrier. Ensure chamfered side of gear is toward differential carrier. Install and tighten ring gear-to-transfer drive gear bolts to specification. See **TORQUE SPECIFICATIONS** .

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

6. Install dowel pin for speedometer drive gear. Install speedometer drive gear with chamfered side on inside of gear toward differential carrier.
7. Install snap ring so raised end of snap ring is away from differential carrier. See **Fig. 33** . Ensure snap ring end gap is properly positioned in relation to differential carrier. See **Fig. 34** . Using Driver (07746-0030100), install bearings on differential carrier (if removed).

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



- | | |
|-------------------------|-------------------------------|
| 1. Bearing | 8. Dowel Pin |
| 2. Ring Gear | 9. Speedometer Drive Gear |
| 3. Differential Carrier | 10. Side Gear Thrust Washer |
| 4. Pinion Shaft | 11. Side Gear |
| 5. Pin | 12. Pinion Gear |
| 6. Transfer Drive Gear | 13. Pinion Gear Thrust Washer |
| 7. Snap Ring | |

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Fig. 33: Exploded View Of Differential Assembly
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

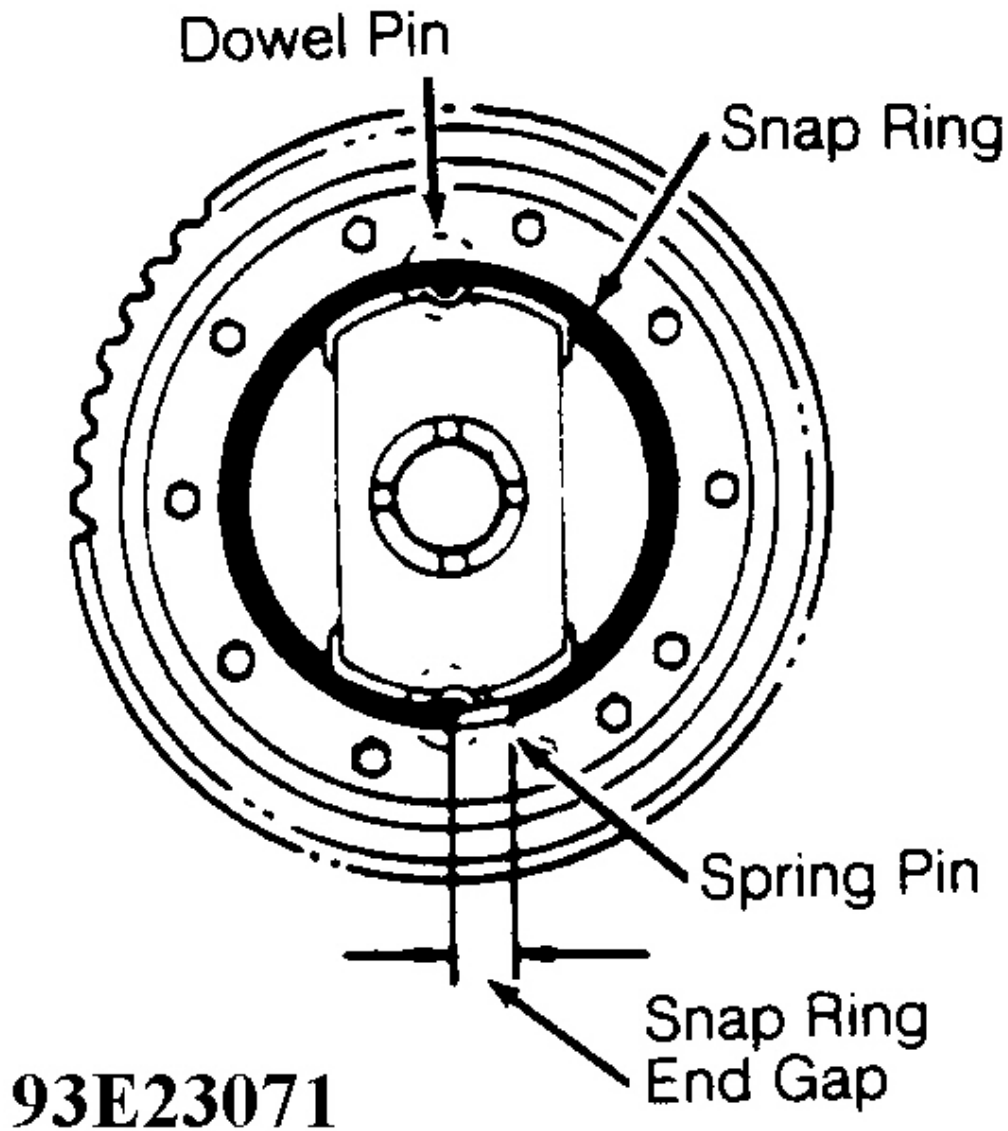


Fig. 34: Installing Speedometer Drive Gear Retaining Snap Ring
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TRANSAXLE REASSEMBLY

DIFFERENTIAL BEARING SIDE CLEARANCE

CAUTION: If differential carrier, differential bearings, transaxle housing, torque

converter housing or snap rings are replaced, differential bearing side clearance must be checked.

1. Install .098" (2.50 mm) thick snap ring in transaxle housing. This is the snap ring that bearing on differential carrier seats against. Ensure snap ring is fully seated.
2. Install differential assembly in torque converter housing. Using Driver (07746-0030100), tap differential assembly into torque converter housing. Perform STEP 1. See **Fig. 35** . Ensure bearing on differential carrier is fully seated on torque converter housing.
3. Install gasket and transaxle housing on torque converter housing. Install and tighten transaxle housing bolts in sequence to 40 ft. lbs. (54 N.m). See **Fig. 36** .
4. Using Driver (07749-0010000) and Adapter (07947-6340500), tap on transaxle housing side of differential assembly to fully seat the bearings. Perform STEP 2. See **Fig. 35** . Ensure bearings are fully seated in both housings.
5. Using feeler gauge, measure differential bearing side clearance between snap ring and bearing on transaxle housing. See **Fig. 37** . Replace snap ring if differential bearing side clearance exceeds .006" (.15 mm). Different thickness snap rings are available. See the **SNAP RING SPECIFICATIONS** table. Recheck differential bearing side clearance. Remove transaxle housing and differential assembly.

SNAP RING SPECIFICATIONS

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

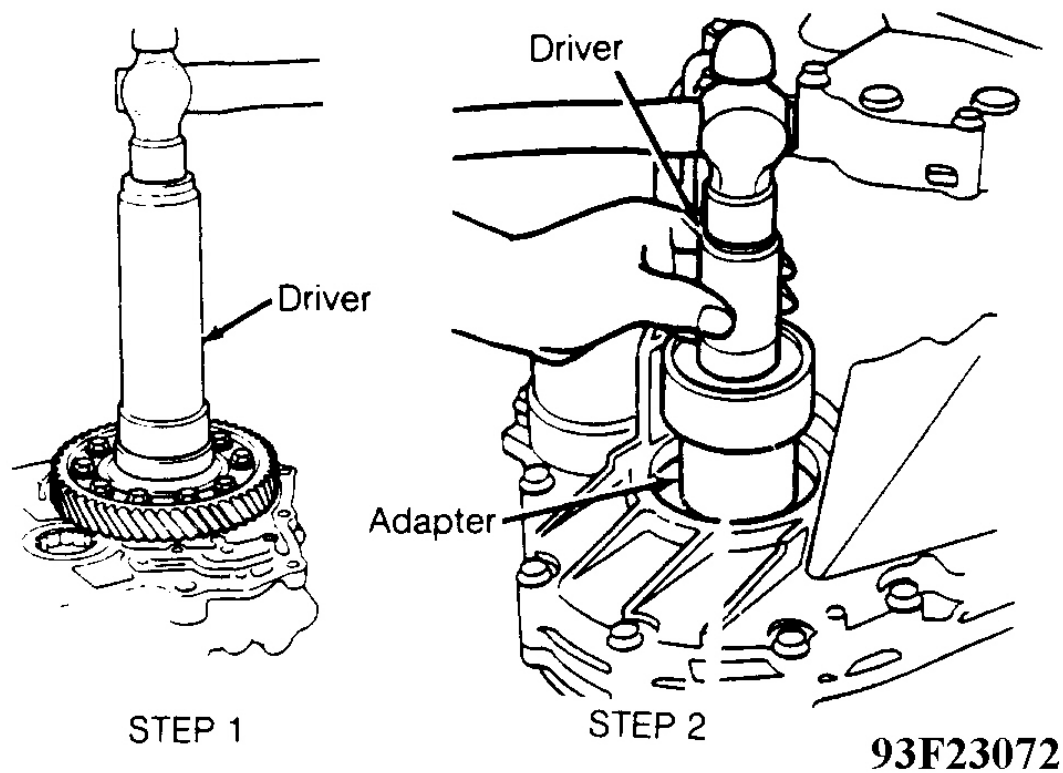


Fig. 35: Installing Differential Assembly
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

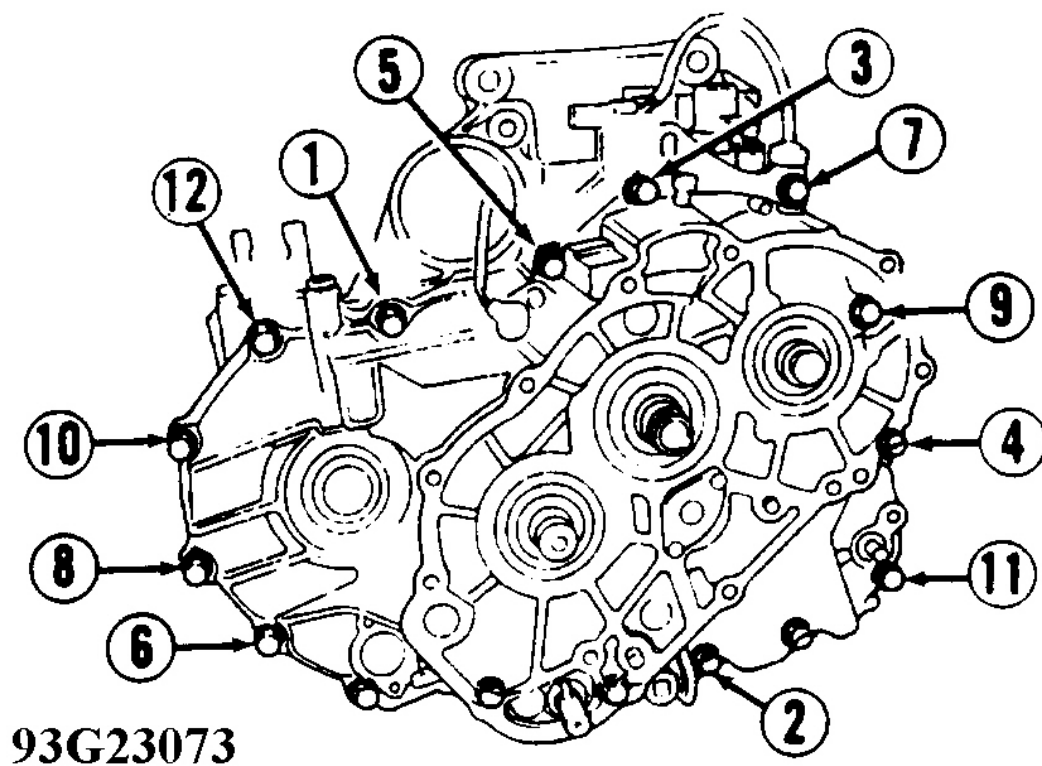


Fig. 36: Transaxle Housing Bolt Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

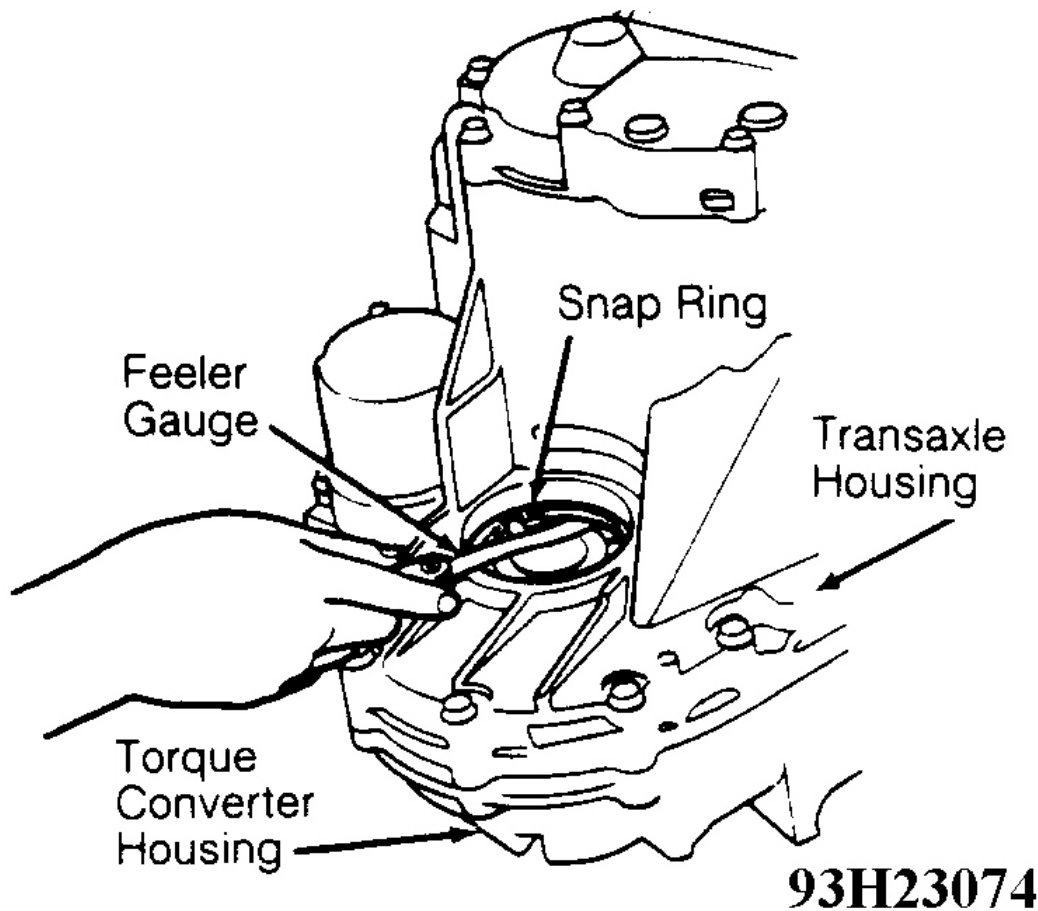


Fig. 37: Checking Differential Bearing Side Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

VALVE BODIES & INTERNAL COMPONENTS

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

NOTE: Coat all components with ATF before reassembly.

1. Install shaft in reverse idler gear holder. Align hole in shaft with reverse idler gear shaft bolt. Install spring, washer and reverse idler gear shaft bolt. Tighten bolt to specification. See TORQUE SPECIFICATIONS.
2. Install spring and steel ball in reverse idler gear holder. Install needle bearing on end of reverse idler gear

holder. Ensure needle bearing retains steel ball and spring in reverse idler gear holder.

3. Install reverse idler gear in transaxle housing with largest chamfered side of gear away from transaxle housing (toward torque converter housing). See **Fig. 38**.

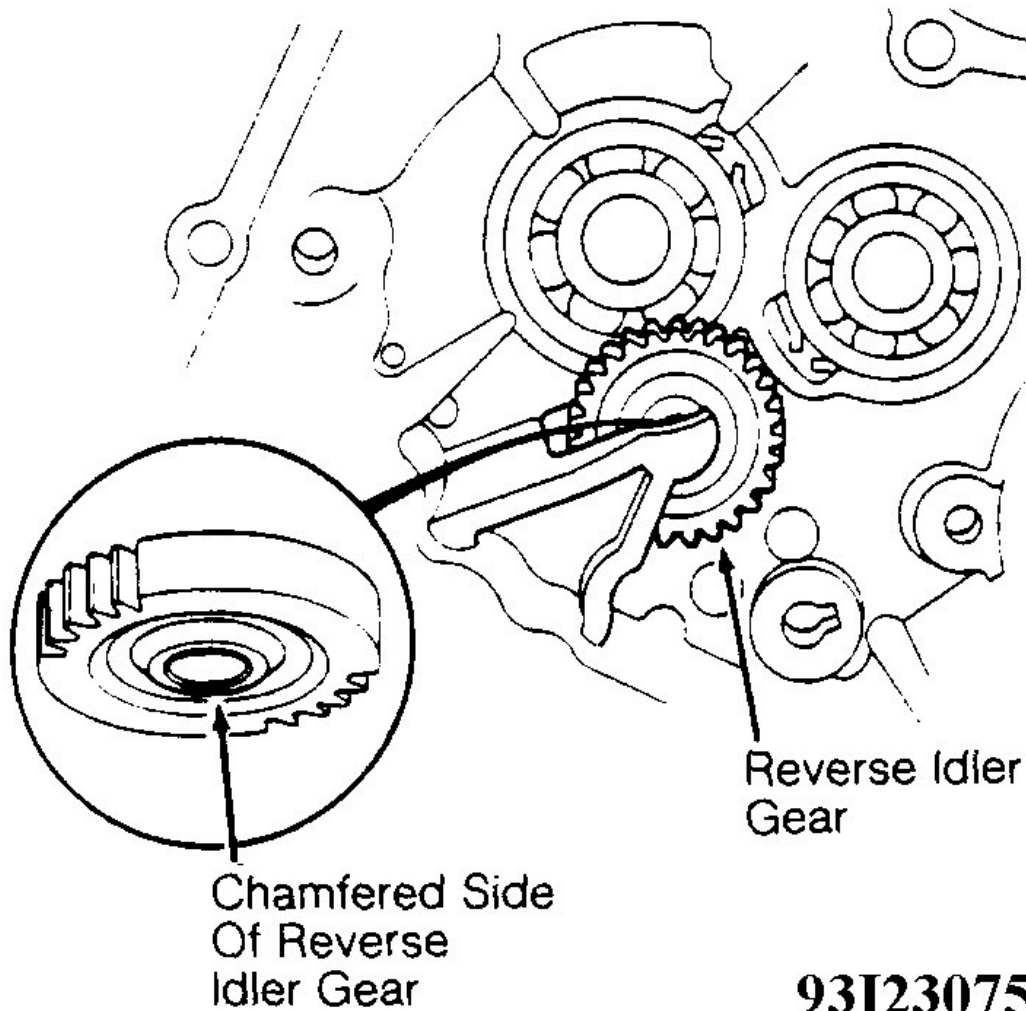


Fig. 38: Installing Reverse Idler Gear

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Install reverse idler gear holder on transaxle housing. Install and tighten reverse idler gear bolts to specification.
5. Install differential assembly in torque converter housing. Using Driver (07746-0030100), tap differential assembly into torque converter housing. Perform STEP 1. See **Fig. 35**. Ensure bearing on differential carrier is fully seated on torque converter housing.
6. Install bearing on end of transfer shaft. Install screen filter on torque converter housing. Install dowel pins

and separator plate for main valve body 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).

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

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

8. Ensure filters, steel ball and check balls are installed in main valve body. See **Fig. 11** . Install "O" ring, stator shaft and pin. See **Fig. 10** . Install control shaft and linkage.
9. Install dowel pins and 2nd accumulator body. Install and tighten 2nd accumulator body bolts to specification.
10. Install speed pulser rotor, NEW bolt locks and bolts. Tighten bolts to specification and bend tabs over on bolt locks. Install dowel pins, separator plate and secondary valve body. See **Fig. 10** .
11. Ensure check balls are installed in secondary valve body. See **Fig. 13** . Install separator plate on top of secondary valve body. Install throttle control shaft using NEW retaining clip. Install servo valve body. Install and tighten servo valve body bolts to specification.
12. Install and hold servo cover downward. Install and tighten servo cover bolts to specification. Install regulator valve body, separator plate and lock-up valve body. Tighten bolts to specification.
13. Install baffle plate. Install and tighten baffle plate bolt to specification. Install all clutch feedpipes. See **Fig. 10** . Install mainshaft and countershaft as an assembly in torque converter housing.

CAUTION: DO NOT tap on mainshaft or countershaft with a hammer to seat shaft assembly in torque converter housing.

14. Install needle bearing, countershaft 4th gear and reverse selector hub on countershaft. See **Fig. 8** . Install reverse selector with flat side facing upward (toward threaded end of countershaft).
15. Rotate shift fork shaft on servo valve body so large chamfered hole aligns with hole in reverse shift fork. Install reverse shift fork so it engages with reverse selector. See **Fig. 8** . Install reverse shift fork bolt and NEW bolt lock. Tighten bolt to specification. See **TORQUE SPECIFICATIONS** . Bend bolt lock tabs over.
16. Install countershaft reverse gear, needle bearing and countershaft reverse gear collar on countershaft. See **Fig. 8** .
17. Align spring pin on control shaft with groove on transaxle housing by rotating control shaft. See **Fig. 9** . Install dowel pins and NEW gasket on torque converter housing.
18. Install transaxle housing on torque converter housing. Install and tighten transaxle housing bolts to specification in sequence. See **Fig. 31** . Install mainshaft 1st gear collar and thrust washer on mainshaft. See **Fig. 5** .

19. Install spring and parking brake lever on control shaft. See **Fig. 5** . Install parking brake stopper, bolt and NEW bolt lock. Tighten bolt to specification. Bend bolt lock tabs over.
20. Install collar, needle bearing, countershaft 1st gear with one-way clutch and parking gear on countershaft. Install NEW lock nut on countershaft. Install parking pawl shaft, parking pawl spring, parking pawl and stop pin. See **Fig. 5** .

CAUTION: Ensure parking pawl spring fits in hole on parking pawl and hole on transaxle housing. Spring force should hold parking pawl away from parking gear.

21. Install sub-shaft 1st gear on sub-shaft so offset of gear is in proper direction. See **Fig. 5** . Using suitable diameter socket, drive sub-shaft 1st gear onto sub-shaft.
22. Install spring washer and NEW lock nut on sub-shaft. Install mainshaft 1st gear, needle bearing, thrust needle bearing and thrust washer on mainshaft. See **Fig. 5** . Install 1st clutch and NEW lock nut on mainshaft.

NOTE: Mainshaft has left-hand threads.

23. Rotate sub-shaft 1st gear, and position hole in gear so pin can be installed through gear, into transaxle housing to secure sub-shaft. See **Fig. 7** . Install pin.
24. Tighten sub-shaft lock nut to specification to fully seat all components. Loosen sub-shaft lock and then retighten to specification. Remove pin from sub-shaft 1st gear. Stake lock nut against sub-shaft.

CAUTION: Ensure lock nut on sub-shaft is securely staked against sub-shaft.

25. Install Mainshaft Holder (07923-6890202) on mainshaft to secure mainshaft. See **Fig. 6** . Engage parking pawl with parking gear. Tighten mainshaft and countershaft lock nuts to specification to fully seat all components. Loosen lock nut and then retighten to specification. Remove mainshaft holder.
26. Stake countershaft lock nut flange against grooves of parking gear in 2 places. Stake mainshaft lock nut flange against groove in 1st clutch assembly.

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

27. Install spring and throttle valve lever. See **Fig. 5** . Install bolt and NEW bolt lock on throttle valve lever. Tighten bolt to specification. Bend bolt lock tabs over.
28. Place parking brake lever in "P" position and ensure parking pawl engages parking gear. Measure parking brake stopper distance between parking pawl shaft and pin on parking brake lever. See **Fig. 39** .
29. Parking brake stopper distance should be 2.25-2.29" (57.2-58.2 mm). If parking brake stopper distance is not within specification, install different size parking brake stopper. Parking brake stopper is available in 3 different sizes. Consult parts department for braking brake stopper sizes.

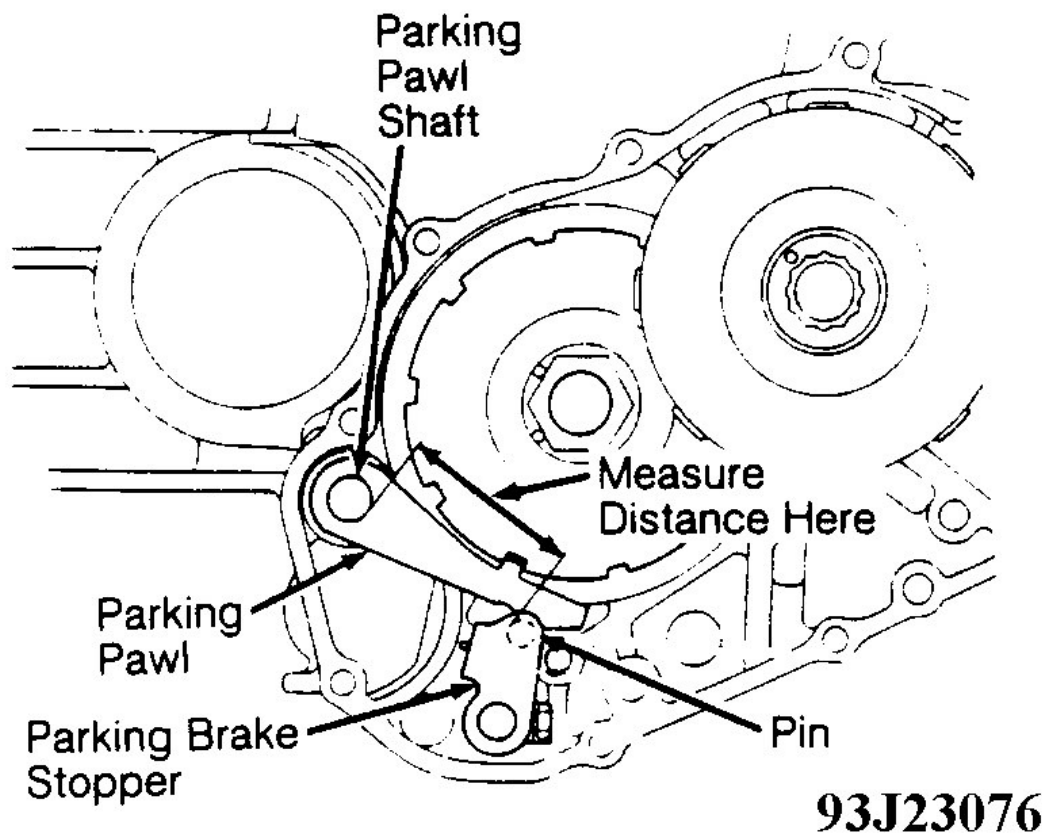


Fig. 39: Measuring Parking Brake Stopper Distance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

30. Ensure all clutch feedpipes are installed in right side cover using NEW "O" rings. See **Fig. 5** . Install NEW gasket and right side cover. Tighten bolts to specification.
31. Install change lever in transaxle housing. Tighten change lever bolt to specification. Install dowel pins, gasket and change cover. See **Fig. 8** . Tighten change cover bolts to specification.
32. To install remaining components, reverse removal procedure. Ensure NEW seal washers are used when installing joint bolts for cooler pipes. Tighten all fasteners to specification. See **TORQUE SPECIFICATIONS** .

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

TRANSFER UNIT

TRANSFER UNIT DISASSEMBLY

NOTE: Check gear backlash and gear tooth contact pattern during disassembly. If gear backlash and tooth contact are correct, proper shims are installed, unless any components are changed. If gear backlash and tooth contact are not correct, different thickness shims must be installed during reassembly.

1. Disengage transfer unit by rotating disengagement lever counterclockwise and placing lever in 2WD position. See **Fig. 40**.
2. Using dial indicator, check gear backlash while slightly moving companion flange back and forth. Rotate companion flange 180 degrees, and recheck gear backlash. See **Fig. 41**.
3. Gear backlash should be .004-.006" (.09-.14 mm). If gear backlash is not within specification, different thickness driven gear thrust shim must be used.

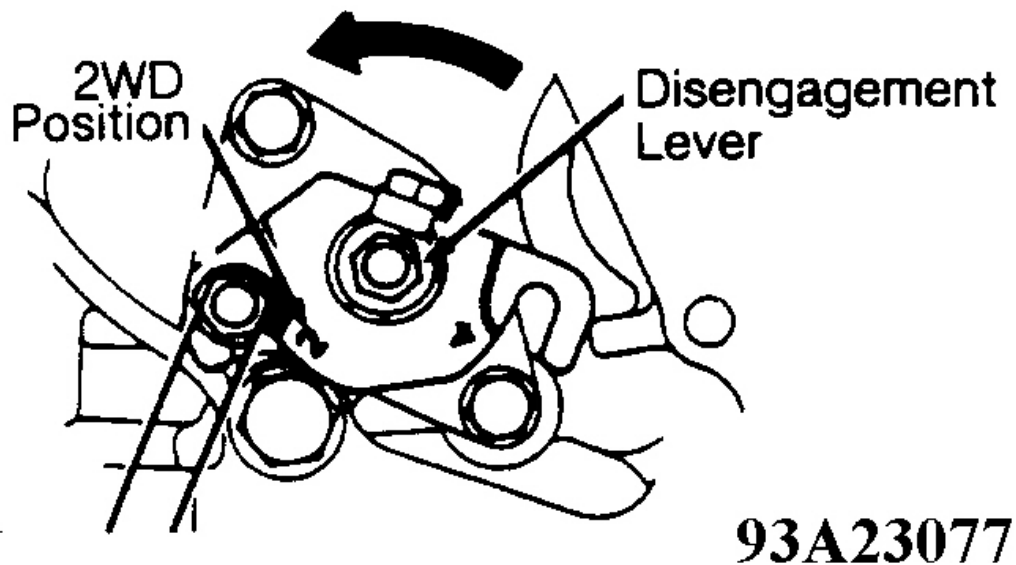


Fig. 40: Disengaging Transfer Unit

Courtesy of AMERICAN HONDA MOTOR CO., INC.

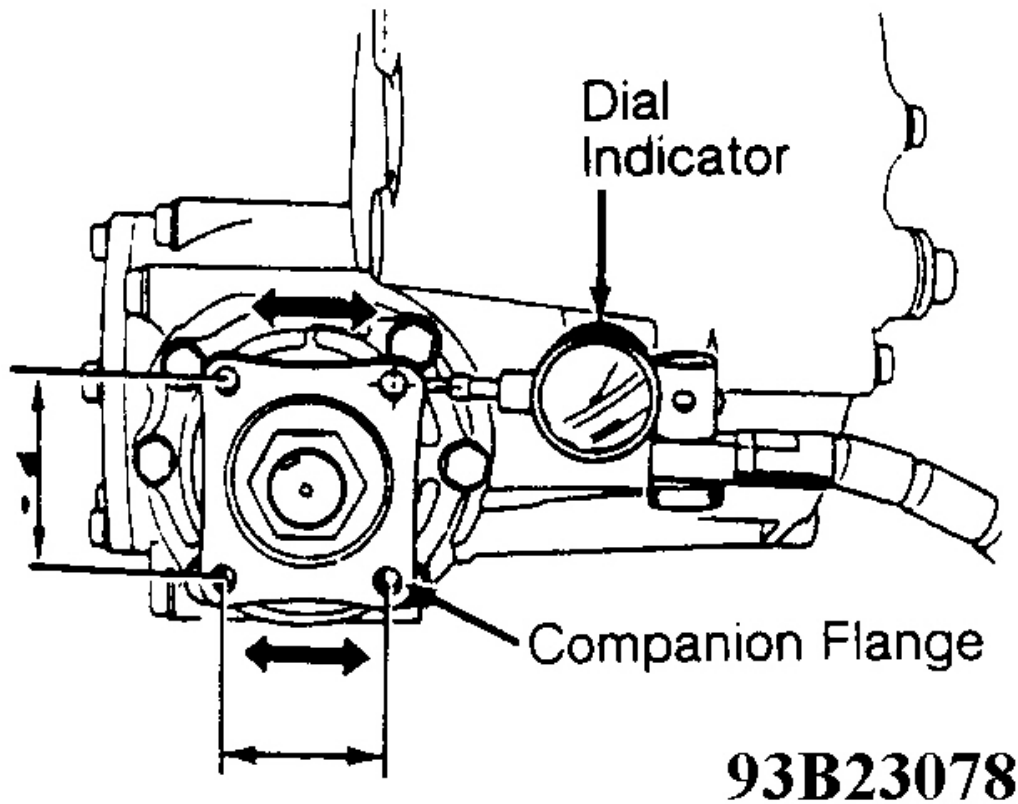
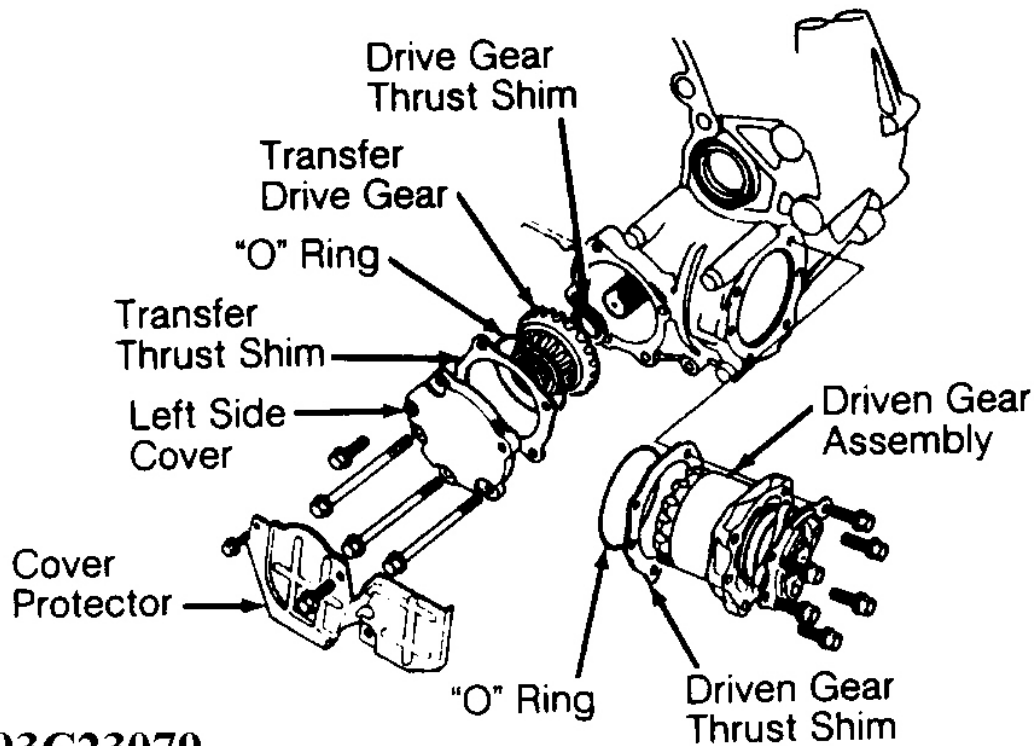


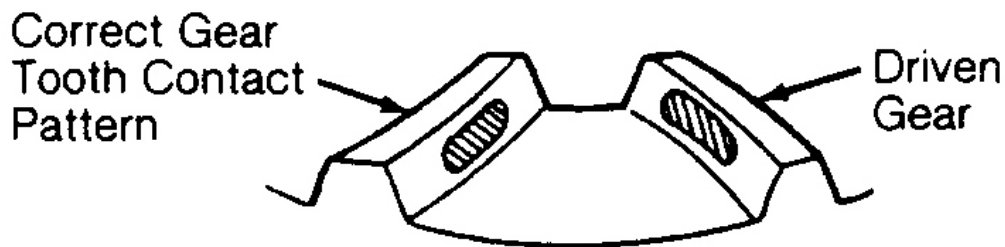
Fig. 41: Checking Transfer Unit Gear Backlash
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. To check gear tooth contact pattern, remove bolts, cover protector, left side cover, transfer thrust shim, "O" ring and transfer drive gear. Remove bolts from rear cover, driven gear assembly, driven gear thrust shim and "O" ring. See **Fig. 42** .
5. Apply Prussian Blue to driven gear teeth. Reinstall driven gear assembly, drive gear and all components. Tighten bolts to specification. See **TORQUE SPECIFICATIONS** .
6. Rotate companion flange on driven gear assembly back and forth several times. Remove driven gear assembly, transfer drive gear and components. Note gear tooth contact pattern on driven gear.
7. Gear tooth contact pattern on driven gear should be centered on gear teeth. See **Fig. 43** . If tooth contact pattern is not centered, different thrust shims must be used.



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Fig. 42: Exploded View Of Transfer Unit & Components
Courtesy of AMERICAN HONDA MOTOR CO., INC.



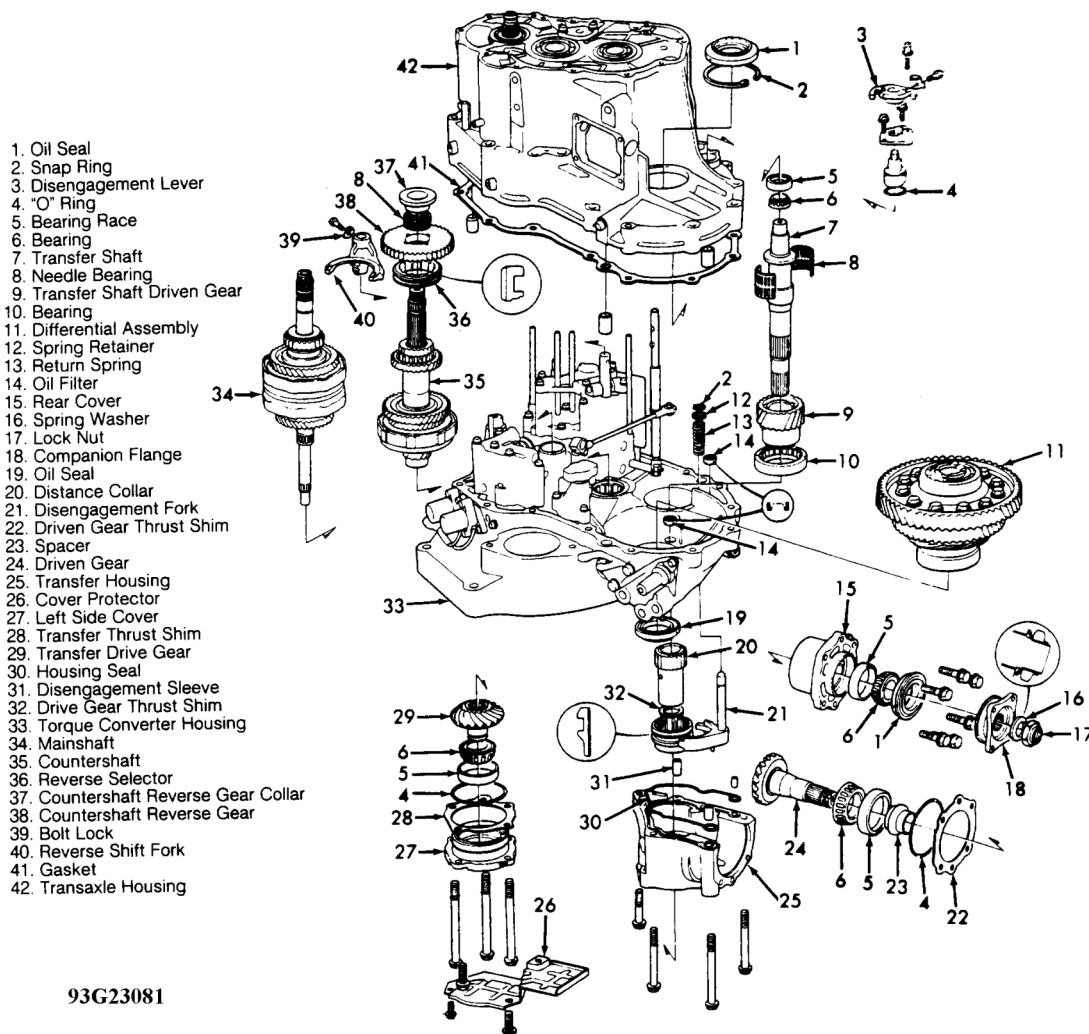
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Fig. 43: Identifying Driven Gear Tooth Contact Pattern
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. If driven gear assembly must be disassembled, reinstall driven gear assembly in transfer housing on

torque converter housing. Install and slightly tighten retaining bolts.

9. Install Flange Holder (07926-SD90000) on companion flange. Raise tab on companion flange lock nut from shaft. Hold flange holder and loosen companion flange retaining lock nut. Remove flange holder.
10. Remove bolts and driven gear assembly. Remove lock nut, spring washer and companion flange from driven gear. Using soft-faced hammer, tap driven gear from rear cover. Remove spacer from driven gear. See **Fig. 44** . Pry oil seal from rear cover.
11. Remove bolts, left side cover, transfer thrust shim, "O" ring and transfer drive gear. If removing bearing race from left side cover, use puller to remove bearing race. Using puller, remove bearing from transfer drive gear.
12. If removing bearing races from rear cover, use hammer and drift to remove bearing races. Use puller and remove inner bearing from driven gear.
13. Remove retaining bolts, housing seal, dowel pins and transfer housing from the torque converter housing (if necessary). See **Fig. 44** . Disassemble the transaxle if the transfer shaft and it's related components must be removed. Refer to **TRANSAXLE DISASSEMBLY** . See **Fig. 44** .



93G23081

Fig. 44: Torque Converter Housing, Transfer Unit & Components
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TRANSFER UNIT REASSEMBLY & ADJUSTMENT

1. If installing transfer housing on torque converter housing, apply Sealant (08718-0001) on transfer housing-to-torque converter housing sealing surfaces.

NOTE: **Ensure sealant is also applied on inner threads of bolt holes on transfer housing.**

2. Install dowel pins, NEW housing seal and transfer housing on torque converter housing. Install and tighten bolts to specification. See **TORQUE SPECIFICATIONS** .
3. If installing bearing race in left side cover, use hammer, Driver (07749-0010000) and Adapter (07746-0010500) to drive bearing race into left side cover.
4. If installing bearing races in rear cover, use press, driver and Adapter (07746-0010500 for inner bearing race, or 07746-0010400 for outer bearing race). Inner bearing race is race closest to driven gear. Outer bearing race is race closest to companion flange area. Press bearing races into rear cover.
5. Coat bearing races in rear cover with oil. Install Driven Gear Shaft (07JAJ-PH8020A), Threaded Shaft (07973-SD9090A), bearings and Collar (07973-SD9060A) in rear cover. See **Fig. 45** .

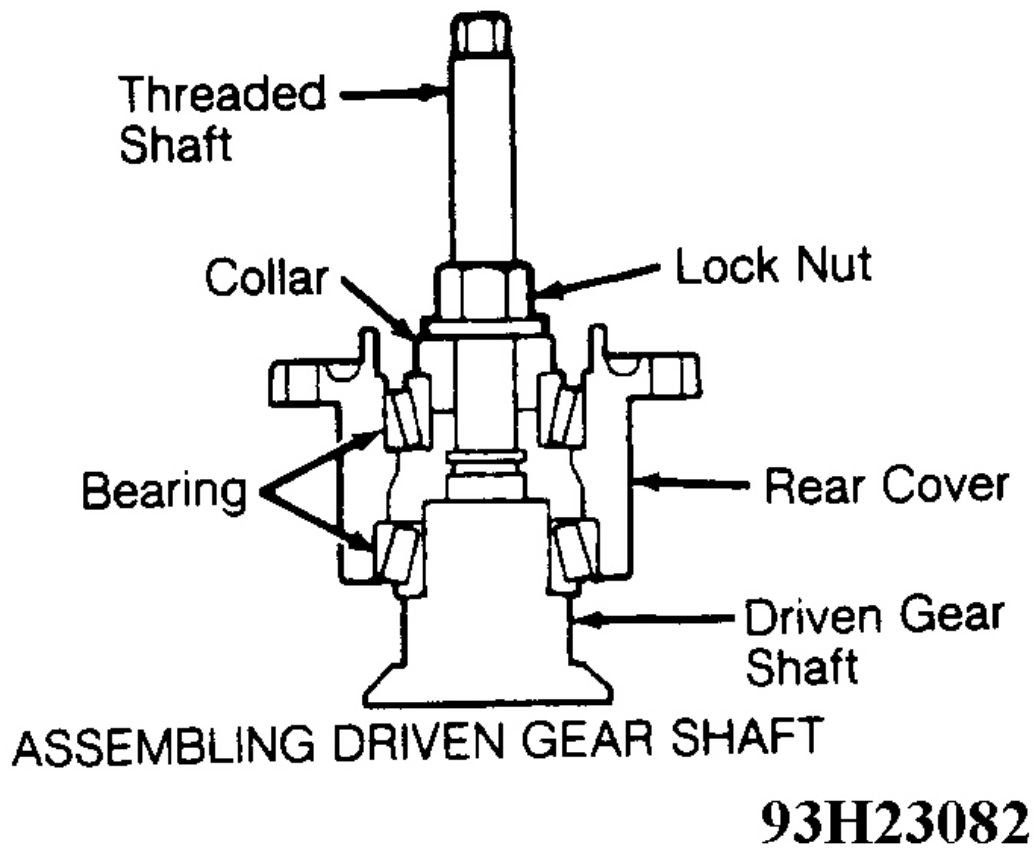


Fig. 45: Assembling Driven Gear Shaft

Courtesy of AMERICAN HONDA MOTOR CO., INC.

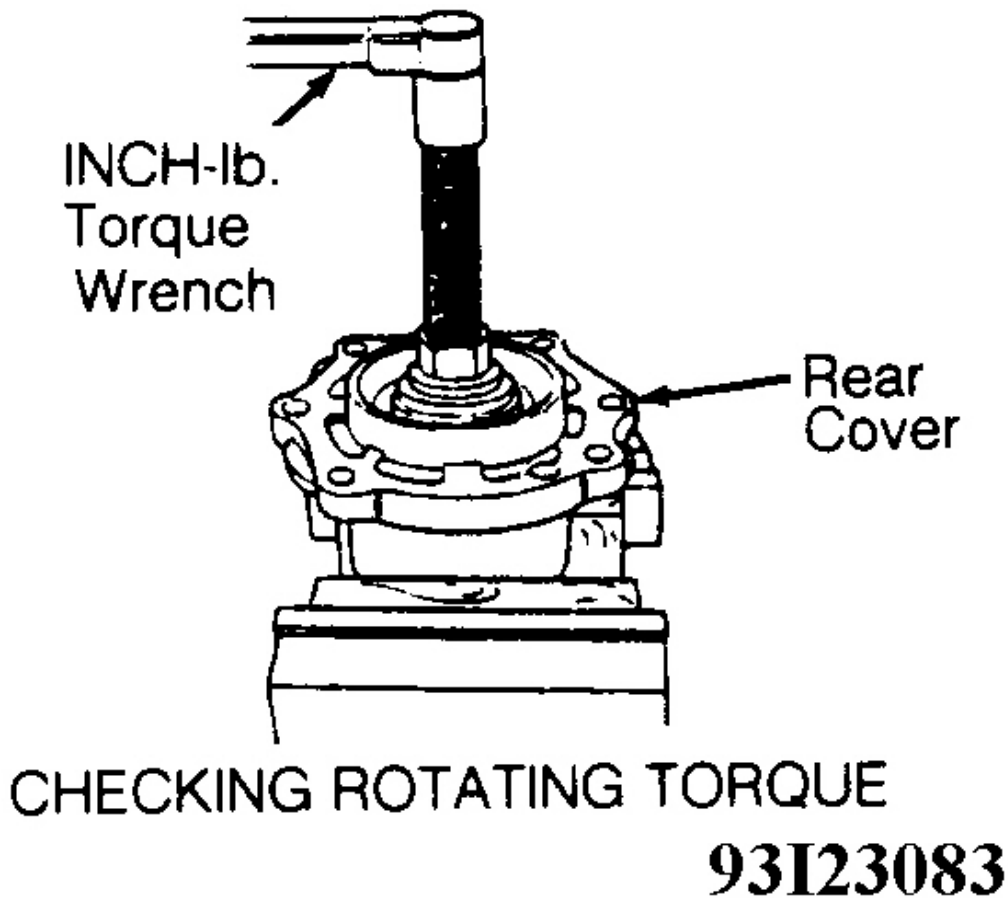


Fig. 46: Checking Driven Gear Preload

Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Hold threaded shaft and tighten lock nut to 84 INCH lbs. (10 N.m). Rotate threaded shaft several times to seat bearings. Using INCH-lb. torque wrench, measure torque required to rotate threaded shaft. This is the rotating torque.
7. Rotating torque should be 4.8-7.2 INCH lbs. (.5-.8 N.m). If rotating torque is not within specification, adjust lock nut until proper rotating torque is obtained.
8. Install rear cover and threaded shaft assembly in transfer housing. See **Fig. 47** . Using puller, remove bearing from transfer drive gear (if not previously removed). Lubricate transfer drive gear bearing with oil.
9. Ensure drive gear thrust shim is not installed on transfer shaft. See **Fig. 42** . Install transfer drive gear bearing and Drive Gear Gauge (07973-SD90500) in transfer housing. See **Fig. 47** . If necessary, pull rear cover and threaded shaft assembly outward slightly to allow drive gear gauge to fully seat.

CAUTION: Ensure drive gear thrust shim is not installed on transfer shaft before installing drive gear gauge.

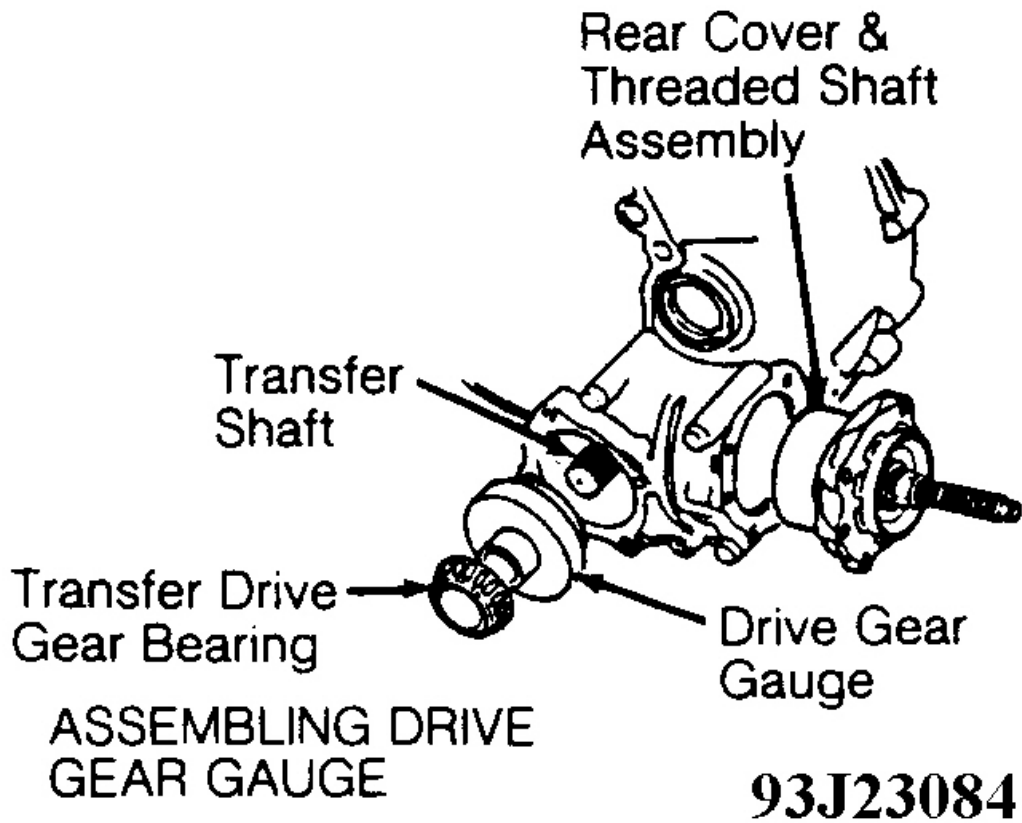


Fig. 47: Assembling Drive Gear Gauge
Courtesy of AMERICAN HONDA MOTOR CO., INC.

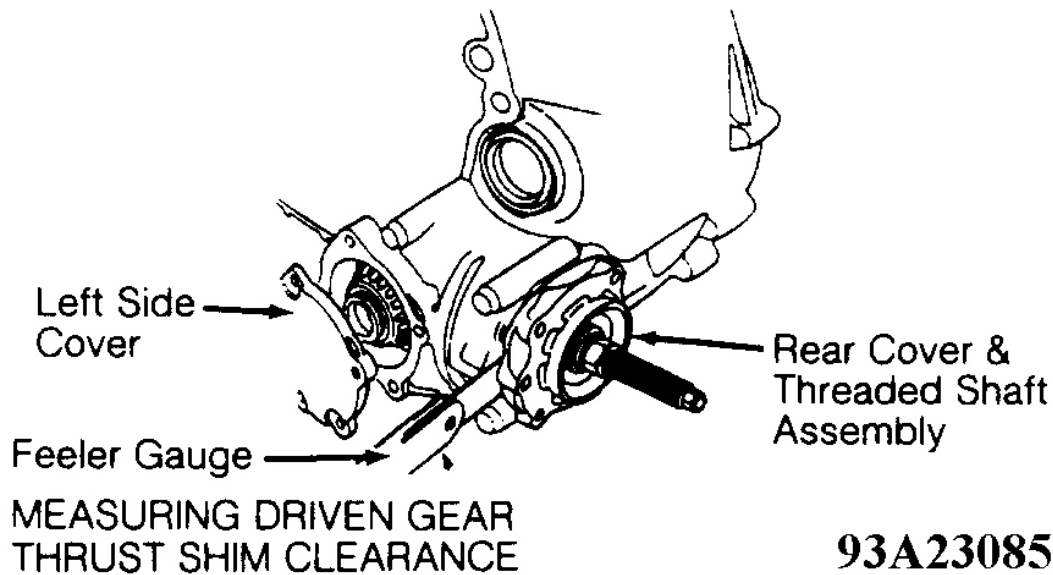


Fig. 48: Measuring Driven Gear Thrust Shim Clearances
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

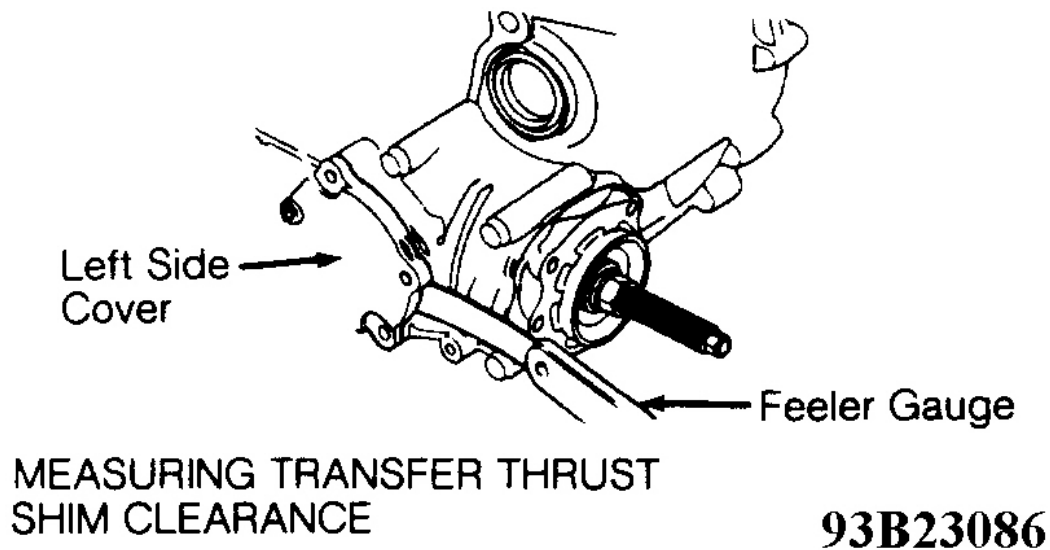


Fig. 49: Measuring Transfer Thrust Shim Clearances
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Install left side cover without bolts. To determine driven gear thrust shim thickness, use feeler gauge measuring in millimeters. Measure clearance between rear cover and transfer housing while pushing inward on threaded shaft. See **Fig. 47** . Record clearance.
11. Using recorded clearance, add or subtract value etched on top of driven gear to determine proper thickness driven gear thrust shim. See **Fig. 50** .

NOTE: Etched mark on top of driven gear represents hundredths of a millimeter. If a "+" exists in front of etched mark, add this amount to recorded clearance. If a "-" exists in front of etched mark, subtract this amount from recorded clearance.

12. For example, if recorded clearance is 1.08 mm and etched mark is "+2", then correct driven thrust shim thickness is 1.10 mm. If recorded clearance is 1.08 mm and etched mark is "-3", then correct driven thrust shim thickness is 1.05 mm.
13. Different thickness driven gear thrust shims are available. See **DRIVEN GEAR THRUST SHIM SPECIFICATIONS** table.

DRIVEN GEAR THRUST SHIM SPECIFICATIONS

Part Number	Thickness In. (mm)
29481-PH8-000	.020 (.50)
29482-PH8-000	.033 (.85)
29483-PH8-000	.035 (.90)
29484-PH8-000	.037 (.95)
29485-PH8-000	.039 (1.00)
29486-PH8-000	.041 (1.05)
29487-PH8-000	.043 (1.10)
29488-PH8-000	.045 (1.15)
29489-PH8-000	.047 (1.20)
29491-PH8-000	.049 (1.25)
29492-PH8-000	.051 (1.30)

14. To determine transfer thrust shim thickness, use feeler gauge measuring in millimeters. Measure clearance between left side cover and transfer housing while pushing inward on left side cover. See **Fig. 47** . Record clearance.
15. Using recorded clearance, add or subtract value etched on rear side of transfer drive gear to determine proper thickness transfer thrust shim. See **Fig. 50** .

NOTE: Etched mark on rear side of transfer drive gear represents hundredths of a millimeter. If a "+" exists in front of etched mark, add this amount to recorded clearance. If a "-" exists in front of etched mark, subtract this amount from recorded clearance.

16. For example, if recorded clearance is 1.04 mm and etched mark is "+2", then correct transfer thrust shim thickness is 1.06 mm. If recorded clearance is 1.04 mm and etched mark is "-1", then correct transfer

thrust shim thickness is 1.03 mm.

17. Different thickness transfer thrust shims are available. See **TRANSFER THRUST SHIM SPECIFICATIONS** table.

TRANSFER THRUST SHIM SPECIFICATIONS

Part Number	Thickness In. (mm)
29461-PS5-000	.012 (.30)
29462-PS5-000	.039 (1.00)
29463-PS5-000	.041 (1.03)
29464-PS5-000	.042 (1.06)
29465-PS5-000	.043 (1.09)
29466-PS5-000	.044 (1.12)
29467-PS5-000	.045 (1.15)
29468-PS5-000	.046 (1.18)
29469-PS5-000	.048 (1.21)
29471-PS5-000	.049 (1.24)
29472-PS5-000	.050 (1.27)
29473-PS5-000	.051 (1.30)
29474-PS5-000	.052 (1.33)

18. Remove left side cover, transfer drive gear bearing and drive gear gauge. Using press, Driver (07746-0030100) and Adapter (07746-0030400), press bearing onto transfer drive gear.
19. To determine drive gear thrust shim, install two .069" (1.75 mm) thick Dummy Shims (Part. No. 29415-PH8-000) on transfer shaft. Install transfer drive gear on transfer shaft.
20. Install correct thickness transfer thrust shim and left side cover. **DO NOT** install bolts in left side cover. Using feeler gauge measuring in millimeters, measure clearance between left side cover and transfer housing while pushing inward on left side cover. Record clearance.
21. Subtract recorded clearance from total thickness of the 2 dummy shims, which is .138" (3.5 mm). For example, if recorded clearance is 1.57 mm, subtract this amount from 3.5 mm. Correct drive gear thrust shim thickness would be 1.93 mm. Different thickness drive gear thrust shims are available. See **DRIVE GEAR THRUST SHIM SPECIFICATIONS** table.

DRIVE GEAR THRUST SHIM SPECIFICATIONS

Part Number	Thickness In. (mm)
29411-PH8-000	.019 (0.48)
29412-PH8-000	.062 (1.57)
29413-PH8-000	.064 (1.63)
29414-PH8-000	.067 (1.69)
29415-PH8-000	.069 (1.75)
29416-PH8-000	.071 (1.81)
29417-PH8-000	.074 (1.87)
29418-PH8-000	.076 (1.93)
29419-PH8-000	.078 (1.99)

22. Remove left side cover, transfer thrust shim, transfer drive gear and dummy shims. Remove rear cover and threaded shaft assembly. Remove threaded shaft and components from rear cover.
23. Install outer bearing in rear cover. Using Driver (07749-0010000) and Adapter (07948-SC20200), install oil seal in rear cover. Coat lips of oil seal with grease.
24. Using press, Driver (07746-0030100) and Adapter (07746-0030400), press bearing onto driven gear. Install NEW spacer on driven gear. See **Fig. 45** . Install driven gear in rear cover. Install companion flange, spring washer and NEW lock nut.

CAUTION: Ensure spring washer is installed with dished side against companion flange.

25. Install driven gear assembly in transfer housing on torque converter housing. Install and slightly tighten retaining bolts. Install flange holder on companion flange. Tighten lock nut on companion flange to 88 ft. lbs. (119 N.m).
26. Remove driven gear assembly from transfer housing. Place driven gear assembly in soft-faced vise. Rotate companion flange several times to seat bearings. Using INCH-lb. torque wrench, measure torque required to rotate companion flange and driven gear. This is the driven gear preload.
27. Driven gear preload should be 7.2-9.6 INCH lbs. (.8-1.1 N.m). If driven gear preload exceeds specification, replace spacer on driven gear and recheck preload.

CAUTION: DO NOT loosen lock nut if driven gear preload exceeds specification. Replace spacer on driven gear and recheck preload.

28. If driven gear preload is less than specification, continue to tighten lock nut. Tighten lock nut a little at a time until correct preload is obtained. **DO NOT** exceed 169 ft. lbs. (230 N.m).

CAUTION: If lock nut is tightened to 169 ft. lbs. (230 N.m) and drive gear preload is still not within specification, replace spacer on driven gear. See Fig. 44 .

29. Install drive gear thrust shim, transfer drive gear, "O" ring, transfer thrust shim and left side cover on transfer housing. Tighten left side cover retaining bolts to specification. See **TORQUE SPECIFICATIONS** .
30. Install "O" ring, driven gear thrust shim and driven gear assembly on transfer housing. Tighten rear cover bolts to specification.
31. Using INCH-lb. torque wrench, measure torque required to rotate companion flange and driven gear assembly. This is the total bearing preload.
32. Total bearing preload should be 6.0-8.4 INCH lbs. (.8-1.0 N.m) greater than driven gear preload measured in step 27). For example, if driven gear preload is 8.4 INCH lbs. (1.0 N.m), total bearing preload should be 14.4-16.8 INCH lbs. (1.6-1.9 N.m).
33. If total bearing preload is not within specification, adjust total bearing preload by changing thickness of transfer thrust shim. If total bearing preload is less than specification, install thinner transfer thrust shim. If total bearing preload exceeds specification, install thicker transfer thrust shim.

34. Once correct total bearing preload is obtained, ensure transfer unit is disengaged. To disengage transfer unit, rotate disengagement lever counterclockwise, and place lever in 2WD position. See **Fig. 40** .
35. Using dial indicator, check gear backlash while slightly moving companion flange back and forth. Rotate companion flange 180 degrees and recheck gear backlash. See **Fig. 41** .
36. Gear backlash should be .004-.006" (.09-.14 mm). If gear backlash is not within specification, install different thickness driven gear thrust shim. Recheck gear backlash.
37. Once gear backlash is correct, remove driven gear assembly. Apply Prussian Blue to driven gear teeth. Reinstall driven gear assembly. Tighten rear cover bolts to specification. See **TORQUE SPECIFICATIONS** .
38. Rotate companion flange on driven gear assembly one full turn in both directions. Remove driven gear assembly. Note gear tooth contact pattern on driven gear.
39. Gear tooth contact pattern on driven gear should be centered on gear teeth. See **Fig. 49** . Different types of gear tooth contact patterns may exist.
40. If toe contact pattern exists, install thicker drive gear thrust shim. See **Fig. 50** . Also increase transfer thrust shim thickness by the same thickness increase in drive gear thrust shim was increased.
41. If heel contact pattern exists, this indicates excessive backlash. Install thinner drive gear thrust shim. Transfer thrust shim thickness must also be decreased by the same thickness decrease in drive gear thrust shim.

NOTE: Changing drive gear thrust shim thickness changes gear backlash.

42. If face contact is too high on the teeth, install a thicker driven gear thrust shim. Ensure gear backlash is still .004-.006" (.09-.14 mm). If gear backlash does not remain within specification, repeat step 41) to correct gear tooth contact.
43. If flank contact pattern exists, move driven gear in toward transfer drive gear by using thinner driven gear thrust shim. Ensure gear backlash remains within specification. If gear backlash does not remain within specification, repeat step 40) to correct gear tooth contact.
44. Once gear tooth contact pattern is correct, stake lock nut on companion flange against driven gear. Install NEW "O" ring on driven gear assembly. Coat "O" ring with engine oil.
45. Install driven gear thrust shim and driven gear assembly on transfer housing. Tighten rear cover bolts to specification.
46. Install drive gear thrust shim and transfer drive gear. Coat NEW "O" ring with engine oil. Install "O" ring, transfer thrust shim and left side cover on transfer housing. Tighten left side cover bolts to specification.
47. Using INCH-lb. torque wrench, recheck total bearing preload. Total bearing preload should be the same as measured in steps 31 and 32 .

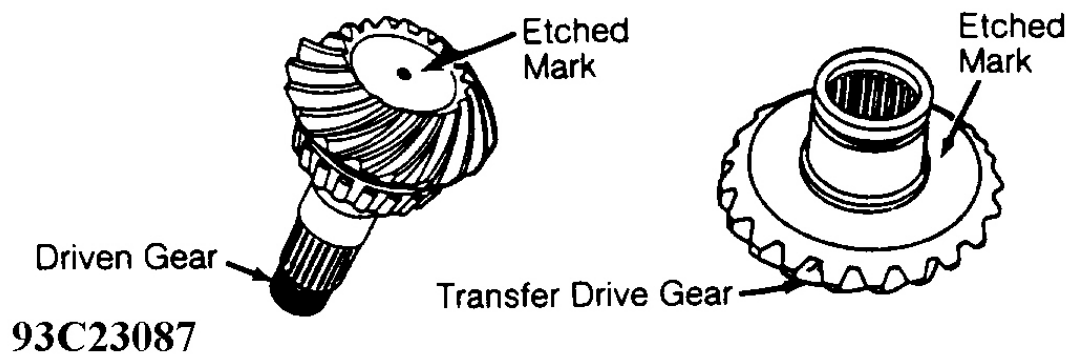
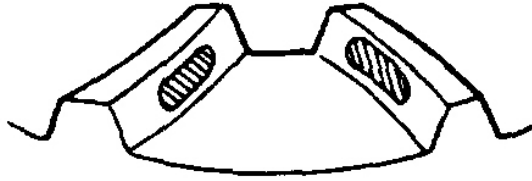


Fig. 50: Driven Gear & Transfer Drive Gear Etched Markings
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CORRECT TOOTH CONTACT



IMPROPER TOOTH CONTACT

TOE CONTACT



Adjust Transfer Drive
Gear & Driven
Gear



FLANK CONTACT



Adjust Driven
Gear Only



HEEL CONTACT



Adjust Transfer Drive
Gear & Driven
Gear



FACE CONTACT



Adjust Driven
Gear Only



93D23088

Fig. 51: Gear Tooth Contact Patterns & Correcting Procedure
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TORQUE SPECIFICATIONS

1991 Honda Civic

1991 AUTOMATIC TRANSMISSIONS MPSA Overhaul

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Countershaft Lock Nut	
Step 1	103 (140)
Step 2	Loosen Lock Nut
Step 3	103 (140)
Drain Plug	29 (39)
Joint Bolt	21 (29)
Left Side Cover Bolt	33 (45)
Mainshaft Lock Nut	
Step 1	70 (95)
Step 2	Loosen Lock Nut
Step 3	70 (95)
Pressure Tap Plug	13 (18)
Rear Cover Bolt	19 (26)
Reverse Idler Gear Shaft Bolt	20 (27)
Ring Gear-To-Transfer Drive Gear Bolt	74 (100)
Sub-Shaft Lock Nut	
Step 1	70 (95)
Step 2	Loosen Lock Nut
Step 3	70 (95)
Transaxle Housing Bolt ⁽¹⁾	40 (54)
Transfer Companion Flange Lock Nut	(2)
Transfer Housing Bolt	33 (45)
INCH Lbs. (N.m)	
Baffle Plate Bolt	106 (12)
Change Cover Bolt	106 (12)
Change Lever Bolt	124 (14)
Control Shaft Linkage Bolt	124 (14)
Disengagement Lever Bolt	106 (12)
Lock-Up Control Solenoid Valve Bolt	106 (12)
Lock-Up Valve Body Bolt	106 (12)
Main Valve Body Bolt	106 (12)
Parking Brake Stopper Bolt	124 (14)
Regulator Valve Body Bolt	106 (12)
Regulator Valve Body Stopper Bolt	106 (12)
Reverse Idler Gear Holder Bolt	106 (12)
Reverse Shift Fork Bolt	124 (14)
Right Side Cover Bolt	106 (12)
Servo Cover Bolt	106 (12)
Servo Valve Body Bolt	106 (12)

Servo Valve Body Stopper Bolt	71
Shift Control Solenoid Valve Bolt	106 (12)
Speed Pulser Bolt	106 (12)
Speed Pulser Rotor Bolt	106 (12)
Speed Sensor Bolt	106 (12)
Throttle Valve Lever Bolt	71
Valve Cover Bolt	71
2nd Accumulator Body Bolt	106 (12)

(1) Tighten bolts to specification in sequence. See **Fig. 31** .

(2) Lock nut is used to set driven gear preload. See **TRANSFER UNIT REASSEMBLY & ADJUSTMENT** under TRANSFER UNIT for tightening procedure.

TRANSAXLE SPECIFICATIONS

TRANSAXLE SPECIFICATIONS

Application	Specification
Clutch Clearance	
1st & 2nd Clutches	.026-.033" (.65-.85 mm)
1st-Hold Clutch	.020-.031" (.50-.80 mm)
3rd & 4th Clutches	.016-.024" (.40-.60 mm)
Differential Bearing Side Clearance	⁽¹⁾ .006" (.15 mm)
Differential Pinion Gear Backlash	.002-.006" (.05-.15 mm)
Gear Clearances	
Mainshaft 2nd Gear-To-3rd Gear	.003-.006" (.07-.15 mm)
Countershaft 2nd Gear-To-3rd Gear	.003-.006" (.07-.15 mm)
Countershaft 4th Gear	.003-.006" (.07-.15 mm)
Oil Pump Clearances	
Side Clearance	
Oil Pump Drive Gear	.0094-.0105" (.240-.266 mm)
Oil Pump Driven Gear	.0025-.0035" (.063-.088 mm)
Thrust Clearance	
Standard	.001-.002" (.03-.05 mm)
Wear Limit	.0028" (.070 mm)
Parking Brake Stopper Distance	2.25-2.29" (57.2-58.2 mm)
Transfer Unit	
Gear Backlash	.004-.006" (.09-.14 mm)
Total Bearing Preload	⁽²⁾ 6.0-8.4 INCH lbs. (.8-1.0 N.m)
Transfer Driven Gear Preload ⁽³⁾	7.2-9.6 INCH lbs. (.8-1.1

N.m)

- (1) This is the maximum clearance. Replace snap ring with different thickness snap ring if clearance exceeds specification.
- (2) Add this amount to driven gear preload to obtain total bearing preload. See **TRANSFER UNIT REASSEMBLY & ADJUSTMENT** under TRANSFER UNIT in this article.
- (3) Transfer driven gear preload is checked with bearings and oil seal installed. See **TRANSFER UNIT REASSEMBLY & ADJUSTMENT** under TRANSFER UNIT in this article.