

1995-96 AUTOMATIC TRANSMISSIONS

A24A & S24A Overhaul

APPLICATION

TRANSAXLE APPLICATION

Vehicle Application	Trans. Model
1995 Civic	A24A
1995 Civic Del Sol	S24A
1996 Civic Del Sol	S24A

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.

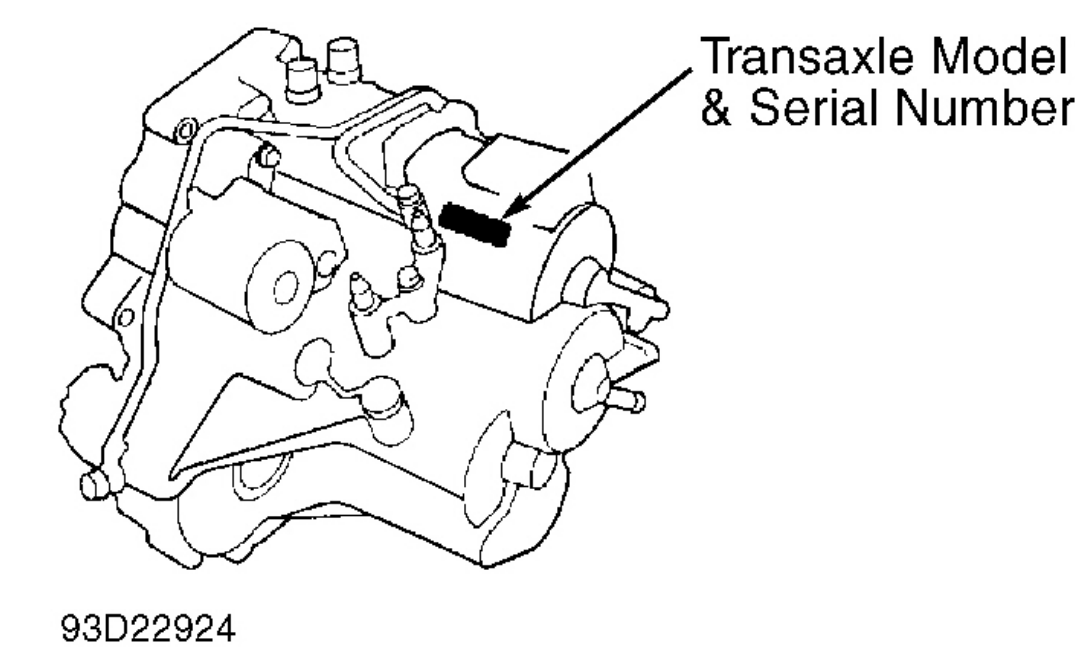


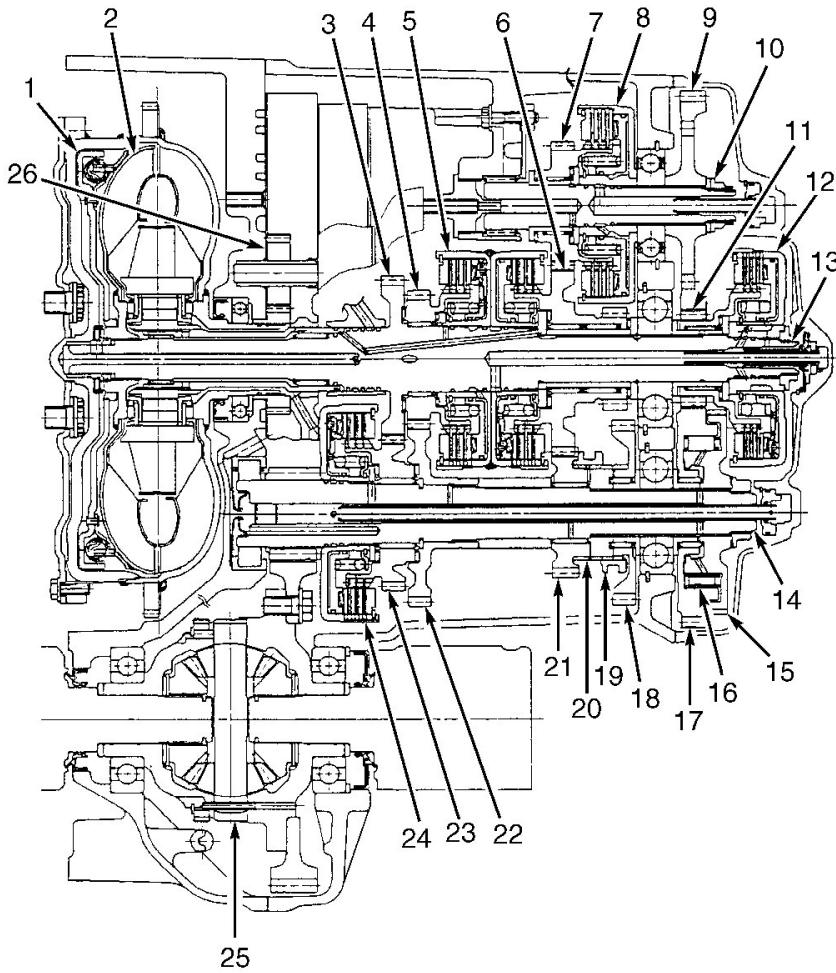
Fig. 1: Identifying Transaxle Model & Serial Number Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

DESCRIPTION

1995 Honda Civic CX

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Transaxle has 4 forward speeds and one reverse. Transaxle consists of hydraulically actuated clutches, mainshaft, countershaft, sub-shaft, lock-up control solenoid valves and lock-up torque converter. See **Fig. 2** . Valve assembly consists of main valve body, secondary valve body, servo body, modulator valve body, lock-up valve body, regulator valve body and governor body. Torque converter lock-up is controlled by the lock-up control solenoid valves. The lock-up control solenoid valves are controlled by the Engine Control Module (ECM).



- | | |
|------------------------------------|-------------------------------|
| 1. Torque Converter Lock-Up Clutch | 14. Countershaft |
| 2. Torque Converter | 15. Parking Gear |
| 3. Mainshaft 3rd Gear | 16. One-Way Clutch |
| 4. Mainshaft 2nd Gear | 17. Countershaft 1st Gear |
| 5. 2nd-4th Clutch | 18. Countershaft Reverse Gear |
| 6. Mainshaft 4th-Reverse Gear | 19. Reverse Selector |
| 7. Sub-Shaft 4th Gear | 20. Reverse Selector Hub |
| 8. 1st-Hold Clutch | 21. Countershaft 4th Gear |
| 9. Sub-Shaft 1st Gear | 22. Countershaft 2nd Gear |
| 10. Sub-Shaft | 23. Countershaft 3rd Gear |
| 11. Mainshaft 1st Gear | 24. 3rd Clutch |
| 12. 1st Clutch | 25. Differential Assembly |
| 13. Mainshaft | 26. Oil Pump |

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

OPERATION

Shift lever has 7 positions. When shift lever is moved, manual valve on main valve body is moved by the shift cable. When certain transaxle gear combinations are engaged by clutches, power is transmitted from the mainshaft to the countershaft through the sub-shaft shaft to provide different gears. Shift lever positions operate as follows:

- "P" (Park) Front wheels locked as parking pawl engages with parking gear on countershaft. All clutches are released. Neutral position switch, incorporated in A/T gear position switch, allows engine starting in this position.
- "R" (Reverse) Reverse selector engages with countershaft reverse gear and 4th clutch is applied. Back-up light switch, incorporated in A/T gear position switch, allows back-up lights to be operated.
- "N" (Neutral) All clutches are released. Neutral position switch, incorporated in A/T gear position switch, allows engine starting in this position.
- "D4" (Drive/4th) Transaxle starts in 1st gear and upshifts automatically to 2nd, 3rd and 4th gears. Transaxle will downshift through 3rd, 2nd and 1st gears until vehicle stops. When in 2nd, 3rd or 4th gear in this range, torque converter lock-up will operate through signal delivered from ECM.
- "D" (Drive/3rd) Transaxle starts off in 1st gear and upshifts automatically to 2nd gear and 3rd gear. On deceleration, transaxle will downshift through 2nd gear to 1st gear. When in 3rd gear in this range, torque converter lock-up will operate through signal delivered from ECM.
- "2" (Second) Transaxle starts off and remains in 2nd gear for engine braking and better traction.
- "1" (First) Transaxle starts off and remains in 1st gear for engine braking.

When in "D4", 2nd, 3rd and 4th gears, or "D" 3rd gear, torque converter lock-up exists and transaxle mainshaft rotates at the same speed as engine crankshaft. Under certain conditions, torque converter lock-up clutch is applied during deceleration when in 2nd, 3rd and 4th gears. Torque converter lock-up is controlled by the ECM. The ECM receives various input signals and operates lock-up control solenoid valves. Operation of lock-up control solenoid valves controls the modulator pressure.

The ECM contains a self-diagnostic system, which will store fault code if failure or problem exists in lock-up control solenoid valve or wiring circuit. Fault code can be retrieved to determine transaxle problem area. For information on lock-up control solenoid valve controls, see appropriate ELECTRONIC CONTROLS article.

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

The A/T gear position indicator on instrument panel contains lights to indicate which position A/T gear position switch on shift lever is in. For information and testing of A/T gear position indicator, see appropriate AUTOMATIC TRANSMISSIONS DIAGNOSIS article.

LUBRICATION

See appropriate SERVICING article.

ON-VEHICLE SERVICE

AXLE SHAFTS

See appropriate AXLE SHAFTS article in DRIVELINE/AXLES.

OIL COOLER FLUSHING

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

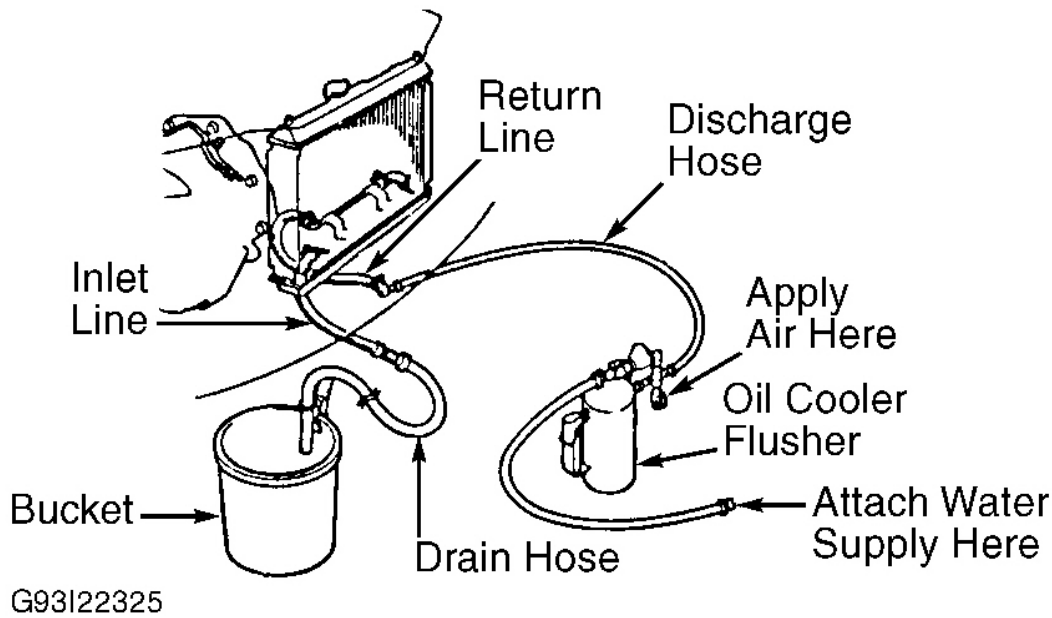


Fig. 3: Installing Oil Cooler Flusher

Courtesy of AMERICAN HONDA MOTOR CO., INC.

TROUBLE SHOOTING

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

Excessive Drag In Transaxle

- Binding Oil Pump

Excessive Idle Vibration

- Defective Torque Converter
- Incorrect Idle RPM

Excessive Vibration (RPM Related)

- Torque Converter Not Fully Seated In Oil Pump

Flares On 1-2 Upshift

- Throttle Valve "B" Stuck
- Throttle Valve (T.V.) Cable Adjusted Too Long

Flares On 2-3 Upshift

- Feedpipe "O" Ring Damaged
- Throttle Valve "B" Stuck
- Throttle Valve (T.V.) Cable Adjusted Too Long
- 2-3 Orifice Control Valve Stuck

Flares On 3-4 Upshift

- Feedpipe "O" Ring Damaged
- Throttle Valve "B" Stuck
- Throttle Valve (T.V.) Cable Adjusted Too Long
- 2/3-4 Orifice Control Valve Stuck

Gear Whine That Changes With RPM & Shifts

- Defective 1st Clutch
- Defective 3rd Gears

Gear Whine That Changes With Speed

- Defective Differential Gears
- Shift Fork Bent

Harsh Downshift At Closed Throttle

- Throttle Valve "B" Stuck

Harsh Kickdown Shifts

- Clutch Pressure Control Valve Stuck
- Throttle Valve (T.V.) Cable Adjusted Too Short
- 4-3 Kickdown Valve Stuck
- 4th Exhaust Valve Stuck

Harsh Shift When Manually Shifting To "1"

- Defective 1st-Hold Accumulator

Harsh Upshifts & Downshifts

- Clutch Pressure Control Valve Stuck
- Improper Type ATF
- Incorrect Clutch Clearance
- Throttle Valve "B" Stuck
- Throttle Valve (T.V.) Cable Adjusted Too Short
- 2-3 Orifice Control Valve Stuck
- 4-3 Kickdown Valve Stuck

Harsh 1-2 Upshift

- Defective 2nd Clutch
- Throttle Valve (T.V.) Cable Adjusted Too Short

Harsh 2-1 Kickdown Shift

- Defective One-Way Clutch

Harsh 2-3 Upshift

- Clutch Pressure Control Valve Stuck
- Defective 3rd Clutch
- Throttle Valve (T.V.) Cable Adjusted Too Short
- 2-3 Orifice Control Valve Stuck

Harsh 3-4 Upshift

- Clutch Pressure Control Valve Stuck
- Defective 4th Clutch
- Throttle Valve (T.V.) Cable Adjusted Too Short
- 2/3-4 Orifice Control Valve Stuck

Lock-Up Clutch Does Not Lock-Up Smoothly

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

Lock-Up Clutch Does Not Operate Properly

- Improperly Adjusted Throttle Valve (T.V.) Cable
- Lock-Up Control Valve Stuck
- Lock-Up Shift Valve Stuck
- Lock-Up Timing Valve Stuck

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- Throttle Valve "B" Stuck
- Torque Converter Check Valve Stuck

No Engine Braking In "1"

- Defective 1st-Hold Clutch

Noise From Transaxle In All Gears

- Defective Oil Pump
- Defective Torque Converter

Noise From Transaxle With Wheels Rolling

- Damaged Reverse Gears
- Defective Differential Gears
- Reverse Hub Installed Upside Down

Popping Noise When Taking Off In "R"

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

Ratcheting Noise When Shifting To "R"

- Damaged Reverse Gears
- Defective Oil Pump
- Regulator Valve Stuck
- Shift Fork Bent
- Worn Reverse Selector

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

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

Shifts Erratically

- Improperly Installed Valves Or Springs
- Modulator Valve Stuck
- Throttle Valve (T.V.) Cable Adjusted Too Short

Slips In All Gears

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

Slips In 1st Gear

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

Slips In Reverse

- Defective 4th Clutch Or 4th Accumulator
- Servo Valve Stuck

Slips In 2nd Gear

- Clutch Pressure Control Valve Stuck
- Defective Seal Rings Or Guide
- Defective 2nd Clutch Or 2nd Accumulator
- 2-3 Shift Valve Stuck

Slips In 3rd Gear

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

Slips In 4th Gear

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

Upshifts Late

- Modulator Valve Stuck

Vehicle Locks In "R"

- Parking Brake Lever Installed Upside Down
- Shift Fork Retaining Bolt Not Installed

Vehicle Moves In All Gears Except "R"

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

Vehicle Moves In All Gears Except "2"

- Defective Seal Rings Or Guide
- Defective 2nd Clutch Or 2nd Accumulator

Vehicle Moves In "N"

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

Vehicle Moves In "R" & "2" Only

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

Vehicle Will Not Move

- Defective Oil Pump
- Defective Or Improperly Adjusted Shift Cable
- Fluid Strainer Clogged
- Regulator Valve Stuck

Vehicle Will Not Move In "D" Or "D4"

- One-Way Clutch Installed Upside Down

Will Not Downshift To 1st Gear

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

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

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

Will Not Upshift (Stays In 1st Gear)

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

TESTING**ROAD TEST**

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

1. Warm engine to normal operating temperature. Apply parking brake and block wheels. Start engine. Move shift lever to "D4" position while depressing brake pedal. Depress accelerator pedal and release it suddenly. Engine should not stall.
2. Repeat step 1) with shift lever in "D" position. Ensure engine does not stall. Manufacturer recommends monitoring of Throttle Position (TP) sensor voltage when performing road test to ensure proper throttle opening for verifying shift points and lock-up of torque converter.
3. Remove door sill molding and lower dash panel on passenger's side and remove small cover on passenger's side kick panel. Pull carpet back for access to the Powertrain Control Module (PCM), located on passenger's side, below carpet. See **Fig. 4** or **Fig. 5**.
4. Remove PCM cover located above PCM. Ensure ignition is off. On 1995 models, install Test Harness (07LAJ-PT3010A) between PCM and PCM electrical connectors. Install Digital Volt-Ohmmeter (DVOM) on test harness with positive lead at terminal D11 and negative lead at terminal D22 to monitor throttle position sensor voltage. Terminal numbers are on top of test harness. See **Fig. 4** or **Fig. 5**.

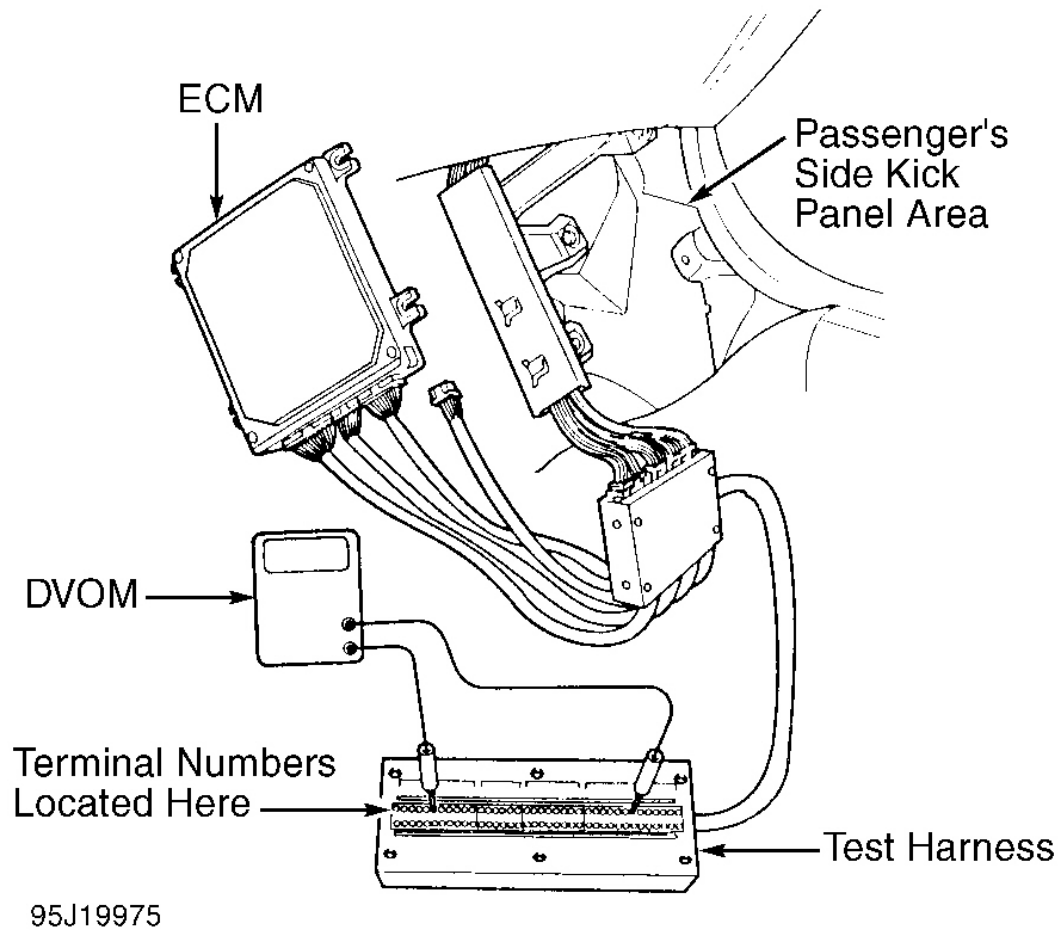
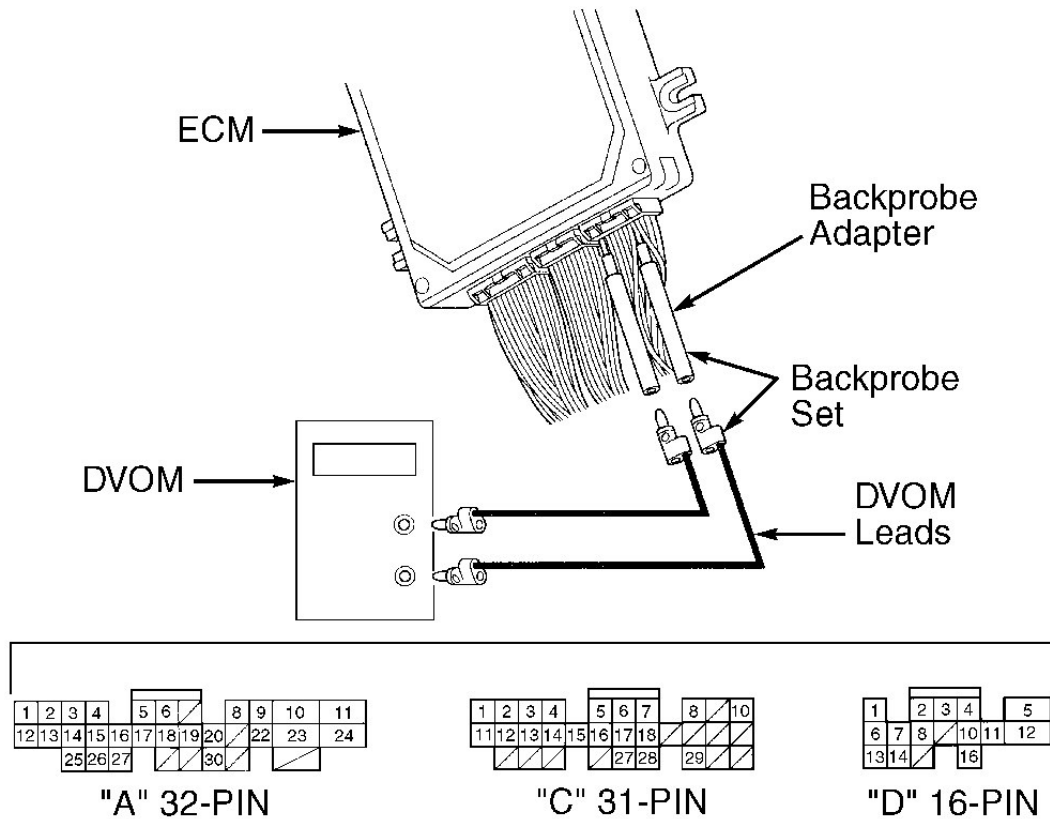


Fig. 4: Measuring TP Sensor Voltage 1995 Models
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 5: Measuring TP Sensor Voltage 1996 Models
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

- On 1996 models, install Backprobe Test Set (07SAZ-001000A) or equivalent between PCM and DVOM leads. See **Fig. 4** or **Fig. 5**. Using DVOM, with positive lead at terminal D1 and negative lead at terminal D11. See **Fig. 4** or **Fig. 5**. Ensure Digital Volt-Ohmmeter (DVOM) is set for measuring voltage.
- On all models, road test vehicle and check for abnormal noise and clutch slippage. See **CLUTCH APPLICATION** table for clutch engagement.
- Ensure upshift and downshift points and torque converter lock-up are correct in relation to throttle position sensor voltage or throttle opening and vehicle speed with shift lever in "D4" position. See appropriate TRANSAXLE UPSHIFT SPECIFICATIONS and TRANSAXLE DOWNSHIFT SPECIFICATIONS tables.
- With shift lever in "D4" position, accelerate to about 35 MPH so transaxle is in 4th gear. Move shift lever to "2" position. Ensure engine braking occurs.

CAUTION: DO NOT shift from "D4" to "2" at speeds over 62 MPH or transaxle may be damaged.

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9. Place shift lever in "1" position. Accelerate from a stop at full throttle. Check for abnormal noise or clutch slippage. Upshifts and downshifts should not occur in this shift lever position.
10. Place shift lever in "2" position. Accelerate from a stop at full throttle. Check for abnormal noise or clutch slippage. Upshifts and downshifts should not occur in this shift lever position.
11. Place shift lever in "R" position. Accelerate from a stop at full throttle. Check for abnormal noise or clutch slippage.
12. Park vehicle on a slope. Apply parking brake. Place shift lever in "P" position. Release parking brake. Ensure vehicle does not move. If vehicle moves, check for defective shift cable or parking components.
13. Ensure ignition is off. Remove test harness and reinstall electrical connectors, PCM cover, carpet and door sill molding.

CLUTCH APPLICATION

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

TRANSAXLE UPSHIFT SPECIFICATIONS

"D" & "D4" Positions	1st-2nd Gear	2nd-3rd Gear	3rd-4th Gear
1995 Models			
Except VTEC			
Fully Closed Throttle	9-12 MPH	23-25 MPH	31-33 MPH
TPS Voltage is 1.27 Volt	13-16 MPH	31-33 MPH	41-45 MPH
TPS Voltage is 2.03 Volt	16-21 MPH	38-45 MPH	51-59 MPH
Full Throttle	31-34 MPH	57-61 MPH	89-95 MPH
VTEC Fully Closed Throttle	9-12 MPH	23-25 MPH	31-33 MPH
TPS Voltage is 1.27 Volt	14-16 MPH	32-35 MPH	42-46 MPH
TPS Voltage is 2.03 Volt	17-22 MPH	41-48 MPH	53-61 MPH
Full Throttle	35-37 MPH	65-69 MPH	94-101 MPH

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1996 Models**Except VTEC**

Fully Closed Throttle	9-13 MPH	23-27 MPH	31-35 MPH
TPS Voltage is 1.27 Volt	13-17 MPH	31-35 MPH	41-47 MPH
TPS Voltage is 2.03 Volt	16-24 MPH	38-50 MPH	52-63 MPH
Full Throttle	33-37 MPH	59-67 MPH	92-103 MPH

VTEC

Fully Closed Throttle	9-13 MPH	23-27 MPH	31-35 MPH
TPS Voltage is 1.27 Volt	13-17 MPH	31-35 MPH	41-47 MPH
TPS Voltage is 2.03 Volt	16-24 MPH	38-50 MPH	51-63 MPH
Full Throttle	33-38 MPH	61-68 MPH	94-104 MPH

TRANSAXLE DOWNSHIFT SPECIFICATIONS

"D" & "D4" Positions	4th-3rd Gear	3rd-2nd Gear	2nd-1st Gear
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1995 Models**Except VTEC**

Fully Closed Throttle	(1)	18-20 MPH	6-8 MPH
Fully Open Throttle	75-81 MPH	51-56 MPH	25-28 MPH

VTEC

Fully Closed Throttle	(1)	18-20 MPH	6-8 MPH
Fully Open Throttle	81-87 MPH	58-62 MPH	24-26 MPH

1996 Models**Except VTEC**

Fully Closed Throttle	(1)	18-22 MPH	6-9 MPH
Fully Open Throttle	79-89 MPH	54-62 MPH	24-28 MPH

VTEC

Fully Closed Throttle	(1)	18-22 MPH	5-9 MPH
Fully Open Throttle	81-91 MPH	55-63 MPH	25-29 MPH

(1) Specification is not available from manufacturer at time of publication.

TORQUE CONVERTER LOCK-UP SPECIFICATIONS

Application & Shift Lever Position	Lock-Up Clutch On	Lock-Up Clutch Off
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1995 Models**Except VTEC****"D" Position**

Fully Closed Throttle	60-64 MPH	57-61 MPH
TPS Voltage Is 2.03 Volt	66-70 MPH	57-61 MPH
Full Throttle	82-86 MPH	78-82 MPH

"D4" Position

Fully Closed Throttle	15-17 MPH	14-16 MPH
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TPS Voltage Is 2.03 Volt	66-70 MPH	54-58 MPH
Full Throttle	88-91 MPH	85-88 MPH
VTEC		
"D" Position		
Fully Closed Throttle	60-64 MPH	57-61 MPH
TPS Voltage Is 2.03 Volt	66-70 MPH	57-61 MPH
Full Throttle	82-86 MPH	79-83 MPH
"D4" Position		
Fully Closed Throttle	15-17 MPH	14-16 MPH
TPS Voltage Is 2.03 Volt	66-70 MPH	54-58 MPH
Full Throttle	94-98 MPH	90-94 MPH
1996 Models		
Except VTEC		
"D" Position		
Fully Closed Throttle	61-65 MPH	58-62 MPH
TPS Voltage Is 2.03 Volt	66-70 MPH	58-62 MPH
Full Throttle	85-89 MPH	85-89 MPH
"D4" Position		
Fully Closed Throttle	16-18 MPH	14-16 MPH
TPS Voltage Is 2.03 Volt	66-70 MPH	53-57 MPH
Full Throttle	91-95 MPH	85-89 MPH
VTEC		
"D" Position		
Fully Closed Throttle	61-65 MPH	58-62 MPH
TPS Voltage Is 2.03 Volt	66-70 MPH	58-62 MPH
Full Throttle	85-89 MPH	85-89 MPH
"D4" Position		
Fully Closed Throttle	16-17 MPH	14-16 MPH
TPS Voltage Is 2.03 Volt	66-70 MPH	53-57 MPH
Full Throttle	93-97 MPH	86-90 MPH

TORQUE CONVERTER STALL SPEED TEST

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

1. Apply parking brake. Block all wheels. Connect tachometer and start engine. Ensure A/C is off. Warm engine to normal operating temperature. Place shift lever in "2" position.
2. Fully depress brake pedal. Fully depress accelerator for 6-8 seconds and note engine speed. This is torque converter stall speed.
3. Allow transaxle to cool for 2 minutes. Repeat test procedure with shift lever in "D4", "1" and "R"

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positions.

- Torque converter stall speed should be the same in "D4", "2", "1" and "R" and within specification. See TORQUE CONVERTER STALL SPEED SPECIFICATIONS table. If torque converter stall speed is not within specification, see **TORQUE CONVERTER STALL SPEED TROUBLE SHOOTING** table for possible problem areas.

TORQUE CONVERTER STALL SPEED SPECIFICATIONS

Application	Engine RPM
1995 Models	
Standard	2600
Service Limit	2400-2800
1996 Models	
Standard	2700
Service Limit	2500-2900

TORQUE CONVERTER STALL SPEED TROUBLE SHOOTING

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

HYDRAULIC PRESSURE TEST

Pressure Test Preparation

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

Line Pressure Test

- With engine off, remove pressure tap plug from line pressure tap on transaxle. See **Fig. 6** . Attach pressure gauge to line pressure tap using NEW seal washer. Tighten hose fitting to 13 ft. lbs. (18 N.m).
- With shift lever in "P", start and operate engine at 2000 RPM. Note line pressure. Place shift lever in "N" and note line pressure.
- Ensure line pressure is within specification. See appropriate 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. Using NEW seal washer, install and tighten pressure tap plug to

specification. See **TORQUE SPECIFICATIONS** .

NOTE: Check clutch pressure at each clutch pressure tap on transaxle. See **Fig. 6** .

Clutch Pressure Test

1. With engine off, remove pressure tap plug from appropriate clutch pressure tap on transaxle. See **Fig. 6** . Attach pressure gauge to appropriate pressure tap using NEW seal 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 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. Note clutch pressure with shift lever in appropriate position. See appropriate HYDRAULIC PRESSURE TEST SPECIFICATIONS table.
3. Ensure clutch pressure is within specification. If clutch pressure is not within specification, see **HYDRAULIC PRESSURE TROUBLE SHOOTING** table. Shut engine off.
4. Remove pressure gauge set. Using NEW seal washer, install and tighten pressure tap plug to specification. See **TORQUE SPECIFICATIONS** .

Clutch Low/High Pressure Test

1. Clutch low/high pressure is tested at 2nd, 3rd and 4th clutch pressure taps on transaxle. See **Fig. 6** . 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 pressure tap plug from appropriate clutch pressure tap on transaxle. Attach pressure gauge to appropriate pressure tap using NEW seal washer. Tighten hose fitting to 13 ft. lbs. (18 N.m).
3. Start engine and allow to idle. Move shift lever to "D4" position. Slowly increase engine speed until pressure is indicated on pressure gauge. Release throttle, allowing engine to idle and note clutch low pressure reading.
4. With engine idling, lift transaxle T.V. lever upward approximately half the distance of lever travel. Increase engine speed and note highest pressure reading. This is the clutch high pressure.
5. Repeat procedure on remaining clutches. Ensure clutch low/high pressure is within specification. See appropriate HYDRAULIC PRESSURE TEST SPECIFICATIONS table. If clutch low/high pressure is not within specification, see **HYDRAULIC PRESSURE TROUBLE SHOOTING** table. Shut engine off.
6. Remove pressure gauge set. Using NEW seal washer, install and tighten pressure tap plug to specification. See **TORQUE SPECIFICATIONS** . Reconnect T.V. cable.

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NOTE: Throttle valve pressure must be checked at throttle valve "A" and "B" pressure taps on transaxle.

Throttle Valve Pressure Test

1. Disconnect Throttle Valve (T.V.) cable from transaxle T.V. lever. With engine off, remove pressure tap plug from throttle valve "A" or "B" pressure tap. See **Fig. 6**.

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 to appropriate throttle valve pressure tap using NEW seal washer. Tighten hose fitting to 13 ft. lbs. (18 N.m).
3. Start engine and operate at 1000 RPM with shift lever in "D" or "D4" position. Approximately 0-.7 psi (0-5 kPa) should exist with transaxle T.V. lever closed (released position).
4. Lift transaxle T.V. lever on transaxle to fully open position. Note throttle valve pressure reading.
5. Ensure throttle valve pressure is within specification. See appropriate HYDRAULIC PRESSURE TEST SPECIFICATIONS table. If pressure is not within specification, see **HYDRAULIC PRESSURE TROUBLE SHOOTING** table. Shut engine off.
6. Remove pressure gauge set. Using NEW seal washer, install and tighten pressure tap plug to specification. See **TORQUE SPECIFICATIONS**. Reconnect T.V. cable.

Governor Pressure Test

1. With engine off, remove pressure plug from governor pressure tap on transaxle. See **Fig. 6**. Attach pressure gauge to pressure tap using NEW seal washer. Tighten hose fitting to 13 ft. lbs. (18 N.m).
2. Start engine. Place shift lever in "D" or "D4" position. Accelerate to 38 MPH and note governor pressure.
3. Ensure governor pressure is within specification. See appropriate HYDRAULIC PRESSURE TEST SPECIFICATIONS table. If governor pressure is not within specification, see **HYDRAULIC PRESSURE TROUBLE SHOOTING** table. Shut engine off.
4. Remove pressure gauge set. Using NEW seal washer, install and tighten pressure tap plug to specification. See **TORQUE SPECIFICATIONS**.

HYDRAULIC PRESSURE TEST SPECIFICATIONS (1995 MODELS)

Application & Engine Speed	Shift Lever Position	Pressure psi (kPa)
Line Pressure		
Except VTEC, Engine At 2000 RPM	"P" Or "N"	107-121 (750-850)
VTEC, Engine Speed At 2000 RPM	"P" Or "N"	114-128 (800-900)
Clutch Pressure		
1st Clutch		
Except VTEC, Engine At 2000 RPM	"1" Or "D4"	107-121 (750-850)
VTEC, Engine Speed At 2000 RPM	"1" Or "D4"	114-128 (800-900)
1st-Hold Clutch		
Except VTEC, Engine At 2000 RPM	"1"	107-121 (750-850)

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VTEC, Engine Speed At 2000 RPM	"1"	114-128 (800-900)
2nd Clutch		
Except VTEC		
Engine At 2000 RPM	"2"	107-121 (750-850)
Transaxle T.V. Lever Fully Closed ⁽¹⁾	"D4"	50-57 (350-400)
Transaxle T.V. Lever Open More Than 1/8 ⁽²⁾	"D4"	107-121 (750-850)
VTEC		
Engine Speed At 2000 RPM	"2"	114-128 (800-900)
Transaxle T.V. Lever Fully Closed ⁽¹⁾	"D4"	50-57 (350-400)
Transaxle T.V. Lever Open More Than 1/8 ⁽²⁾	"D4"	114-128 (800-900)
3rd Clutch		
Except VTEC		
Transaxle T.V. Lever Fully Closed ⁽¹⁾	"D4"	50-57 (350-400)
Transaxle T.V. Lever Open More Than 1/8 ⁽²⁾	"D4"	107-121 (750-850)
VTEC		
Transaxle T.V. Lever Fully Closed ⁽¹⁾	"D4"	50-57 (350-400)
Transaxle T.V. Lever Open More Than 1/8 ⁽²⁾	"D4"	114-128 (800-900)
4th Clutch		
Except VTEC		
Engine Speed At 2000 RPM	"R"	107-121(750-850)
Transaxle T.V. Lever Fully Closed ⁽¹⁾	"D4"	50-57 (350-400)
Transaxle T.V. Lever Open More Than 1/8 ⁽²⁾	"D4"	107-121 (750-850)
VTEC		
Engine Speed At 2000 RPM	"R"	114-128 (800-900)
Transaxle T.V. Lever Fully Closed ⁽¹⁾	"D4"	50-57 (350-400)
Transaxle T.V. Lever Open More Than 1/8 ⁽²⁾	"D4"	114-128 (800-900)

1995 Honda Civic CX**1995-96 AUTOMATIC TRANSMISSIONS A24A & S24A Overhaul****Clutch Low Pressure**Transaxle T.V. Lever Fully Closed ⁽¹⁾ 2nd,
3rd Or 4th Clutch**"D4"****50-57 (350-400)****Clutch High Pressure**

Except VTEC

Transaxle T.V. Lever Lifted 1/8
Distance Of T.V. Lever Travel 2nd, 3rd
Or 4th Clutch**"D4"****107-121 (750-850)**

VTEC

Transaxle T.V. Lever Lifted 1/8
Distance Of T.V. Lever Travel 2nd, 3rd
Or 4th Clutch**"D4"****114-128 (800-900)****Throttle Valve Pressure**

Throttle Valve "A",

Transaxle T.V. Lever Fully Open ⁽³⁾**"D" Or "D4"****68-71 (480-500)**

Throttle Valve "B"

Except VTEC, Transaxle T.V. Lever
Fully Open ⁽³⁾**"D" Or "D4"****107-121 (750-850)**VTEC, Transaxle T.V. Lever Fully
Open ⁽³⁾**"D" Or "D4"****114-128 (800-900)****Governor Pressure ⁽⁴⁾****"D" Or "D4"****25-27 (179-192)**

(1) Check pressure with engine speed at 2000 RPM. 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.

(2) Check pressure with engine speed at 2000 RPM. T.V. cable must be disconnected. Open position is with transaxle T.V. lever being pulled upward 1/8 the distance of lever travel.

(3) Check pressure with engine speed at 1000 RPM. Open position is with transaxle T.V. lever being pulled fully upward.

(4) Check governor pressure with vehicle speed at 38 MPH.

HYDRAULIC PRESSURE TEST SPECIFICATIONS (1996 MODELS)

Application & Engine Speed	Shift Lever Position	Pressure psi (kPa)
Line Pressure		
Engine At 2000 RPM	"P" Or "N"	114-128 (800-900)
Clutch Pressure		
1st Clutch		
Engine At 2000 RPM	"1" Or "D4"	114-128 (800-900)
1st-Hold Clutch		
Engine At 2000 RPM	"1"	114-128 (800-900)
2nd Clutch		

1995 Honda Civic CX**1995-96 AUTOMATIC TRANSMISSIONS A24A & S24A Overhaul**

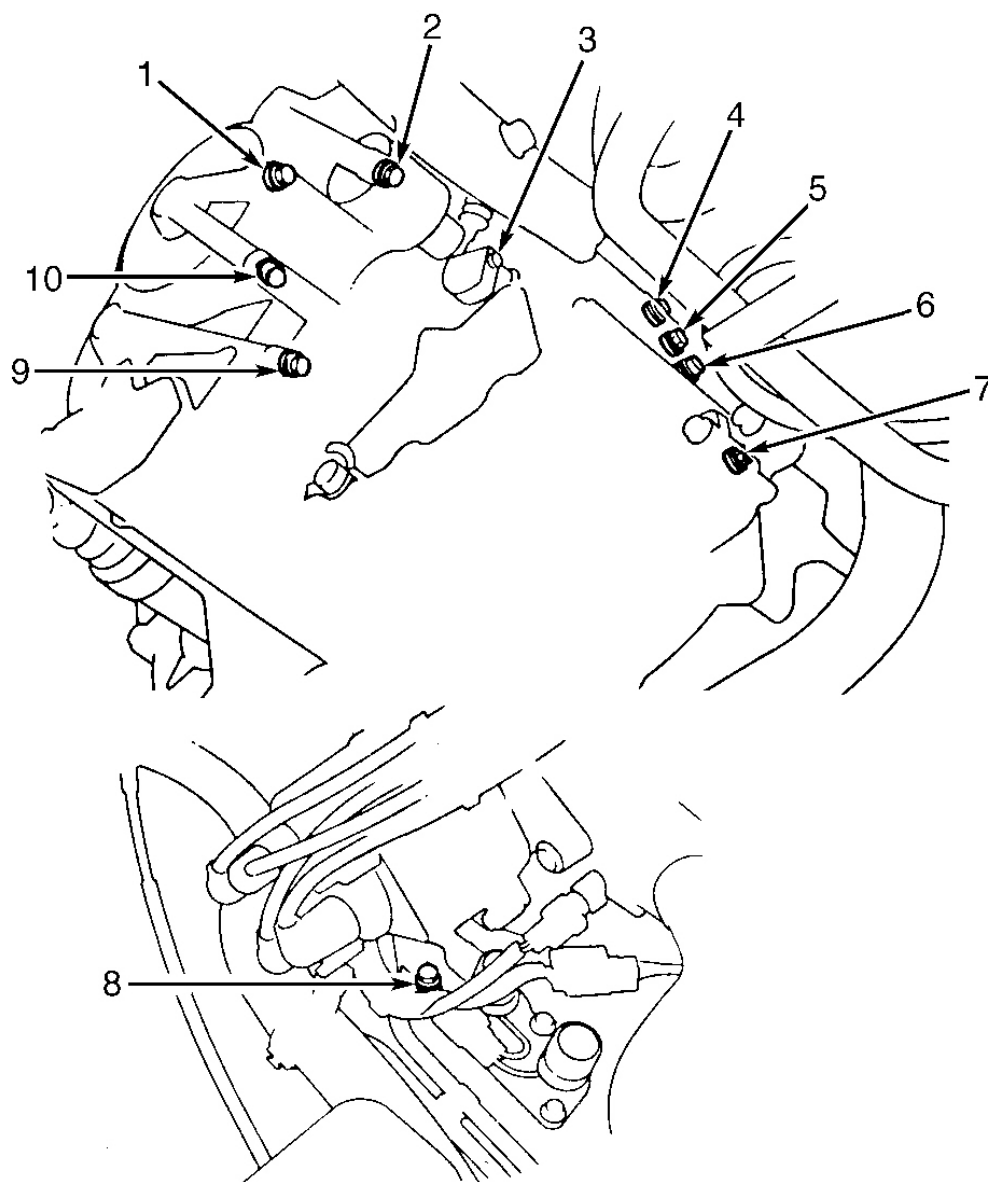
Engine At 2000 RPM	"2"	114-128 (800-900)
Transaxle T.V. Lever Fully Closed ⁽¹⁾	"D4"	50-57 (350-400)
Transaxle T.V. Lever Open More Than 1/8 ⁽²⁾	"D4"	114-128 (800-900)
3rd Clutch		
Transaxle T.V. Lever Fully Closed ⁽¹⁾	"D4"	50-57 (350-400)
Transaxle T.V. Lever Open More Than 1/8 ⁽²⁾	"D4"	114-128 (800-900)
4th Clutch		
Engine At 2000 RPM	"R"	114-128 (800-900)
Transaxle T.V. Lever Fully Closed ⁽¹⁾	"D4"	50-57 (350-400)
Transaxle T.V. Lever Open More Than 1/8 ⁽²⁾	"D4"	114-128 (800-900)
Clutch Low Pressure		
Transaxle T.V. Lever Fully Closed ⁽¹⁾ 2nd, 3rd Or 4th Clutch	"D4"	50-57 (350-400) Clutch High Pressure
Transaxle T.V. Lever Lifted Upward 1/8 Distance Of T.V. Lever Travel 2nd, 3rd Or 4th Clutch	"D4"	114-128 (800-900)
Throttle Valve Pressure		
Throttle Valve "A"		
Except VTEC, Transaxle T.V. Lever Fully Open ⁽³⁾	"D" Or "D4"	73-75 (510-530)
VTEC, Transaxle T.V. Lever Fully Open ⁽³⁾	"D" Or "D4"	75-78 (530-550)
Throttle Valve "B"		
Transaxle T.V. Lever Fully Open ⁽³⁾	"D" Or "D4"	114-128 (800-900)
Governor Pressure ⁽⁴⁾		
Except VTEC	"D" Or "D4"	25-27 (179-192)
VTEC	"D" Or "D4"	25-28 (179-194)
(1) Check pressure with engine speed at 2000 RPM. 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. (2) Check pressure with engine speed at 2000 RPM. T.V. cable must be disconnected. Open position is with transaxle T.V. lever being pulled upward 1/8 the distance of lever travel. (3) Check pressure with engine speed at 1000 RPM. Open position is with transaxle T.V. lever being pulled fully upward. (4) Check governor pressure with vehicle speed at 38 MPH.		

HYDRAULIC PRESSURE TROUBLE SHOOTING

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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 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 Pressure	
High, Low Or No Throttle Valve "A" Pressure	Defective Throttle Valve "A", Defective Modulator Valve
High, Low Or No Throttle Valve "B" Pressure	Defective Throttle Valve "B"
Governor Pressure Low Or No Pressure	Defective Governor Valve



- | | |
|--|------------------------------------|
| 1. 4th Clutch Pressure Tap | 6. Governor Pressure Tap |
| 2. 1st-Hold Clutch Pressure Tap | 7. Throttle Valve "B" Pressure Tap |
| 3. Transaxle Throttle Valve (T.V.) Lever | 8. Line Pressure Tap |
| 4. Throttle Valve "A" Pressure Tap | 9. 3rd Clutch Pressure Tap |
| 5. 2nd Clutch Pressure Tap | 10. 1st Clutch Pressure Tap |

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

REMOVAL & INSTALLATION

ELECTRICAL COMPONENTS

See appropriate ELECTRONIC CONTROLS article.

TRANSAXLE

See appropriate REMOVAL & INSTALLATION article.

TORQUE CONVERTER

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

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

TRANSAXLE DISASSEMBLY

VALVE BODIES & INTERNAL COMPONENTS

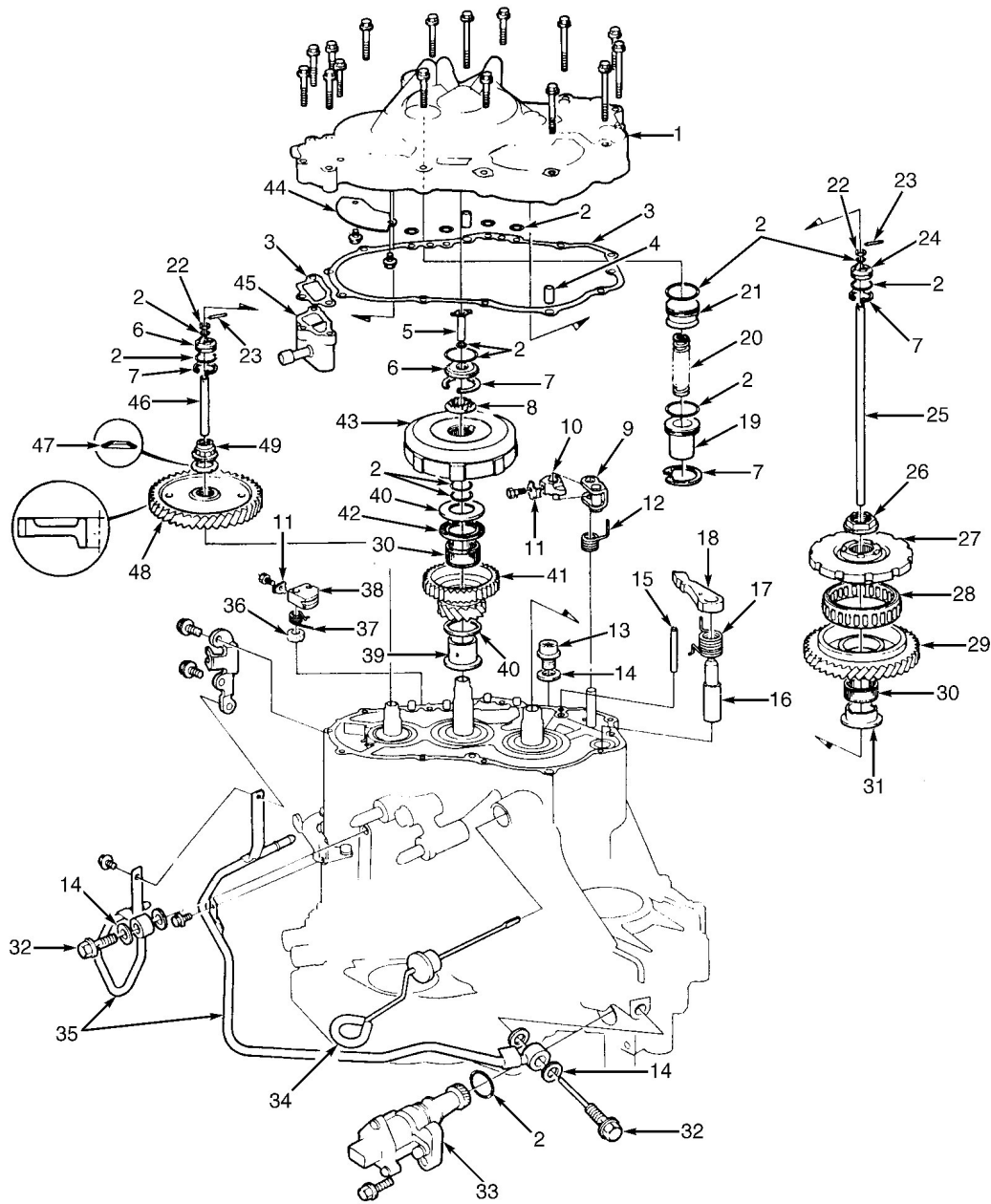
1. Remove bolts, right side cover and gasket. See Fig. 7 . Install Mainshaft Holder (07GAB-PF50101) on mainshaft to secure mainshaft from rotating. See Fig. 8 .
2. Engage parking pawl with parking gear. Align hole in sub-shaft 1st gear with hole in transaxle housing. Install pin in sub-shaft 1st gear and transaxle housing to prevent sub-shaft 1st gear from rotating. See Fig. 9 .
3. Using hammer and chisel, cut lock tabs on sub-shaft lock nut. Pry lock tabs on mainshaft and countershaft lock nuts upward. Remove all lock nuts and spring washer from sub-shaft.

NOTE: On 1995 models, mainshaft lock nut has left-hand threads. On 1996 models mainshaft and countershaft lock nuts have left-hand threads.

4. Remove mainshaft holder once all lock nuts are removed. Remove pin securing sub-shaft 1st gear. Remove 1st clutch assembly, mainshaft 1st gear and components from mainshaft.
5. Remove sub-shaft 1st gear. Remove parking pawl. Using puller, remove parking gear and countershaft 1st gear from countershaft. Remove needle bearing and countershaft 1st gear collar from countershaft.
6. Remove parking brake lever and throttle valve lever. Remove dipstick, speed sensor, joint bolts and cooler pipes.
7. Remove mount bracket from transaxle housing. See Fig. 11 . Remove transaxle housing bolts. Align spring pin with groove in transaxle housing by rotating control shaft. Using puller, remove transaxle housing. See Fig. 10 .

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1. Right Side Cover
2. "O" Ring
3. Gasket
4. Dowel Pin
5. 1st Clutch Feedpipe
6. Feedpipe Guide
7. Circlip
8. Mainshaft Lock Nut
9. Parking Brake Lever
10. Parking Brake Stopper
11. Bolt Lock
12. Parking Brake Lever Spring
13. Drain Plug
14. Seal Washer
15. Parking Pawl Stopper
16. Parking Pawl Shaft

17. Parking Pawl Spring
18. Parking Pawl
19. 1st-Hold Accumulator Cover
20. Accumulator Spring
21. 1st-Hold Accumulator Piston
22. Collar
23. Roller
24. Feedpipe Flange
25. 3rd Clutch Feedpipe
26. Countershaft Lock Nut
27. Parking Gear
28. One-Way Clutch
29. Countershaft 1st Gear
30. Needle Bearing
31. Countershaft 1st Gear Collar
32. Joint Bolt

33. Speed Sensor
34. Dipstick
35. Cooler Pipes
36. Oil Seal
37. Throttle Valve Lever Spring
38. Throttle Valve Lever
39. Mainshaft 1st Gear Collar
40. Thrust Washer (1995)
41. Mainshaft 1st Gear
42. Thrust Needle Bearing
43. 1st Clutch Assembly
44. Breather Cover (1995)
45. Breather Chamber (1995)
46. 1st-Hold Clutch Feedpipe
47. Spring Washer
48. Sub-Shaft 1st Gear
49. Sub-Shaft Lock Nut

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Fig. 7: Exploded View Of Right Side Cover & Components
Courtesy of AMERICAN HONDA MOTOR CO., INC.

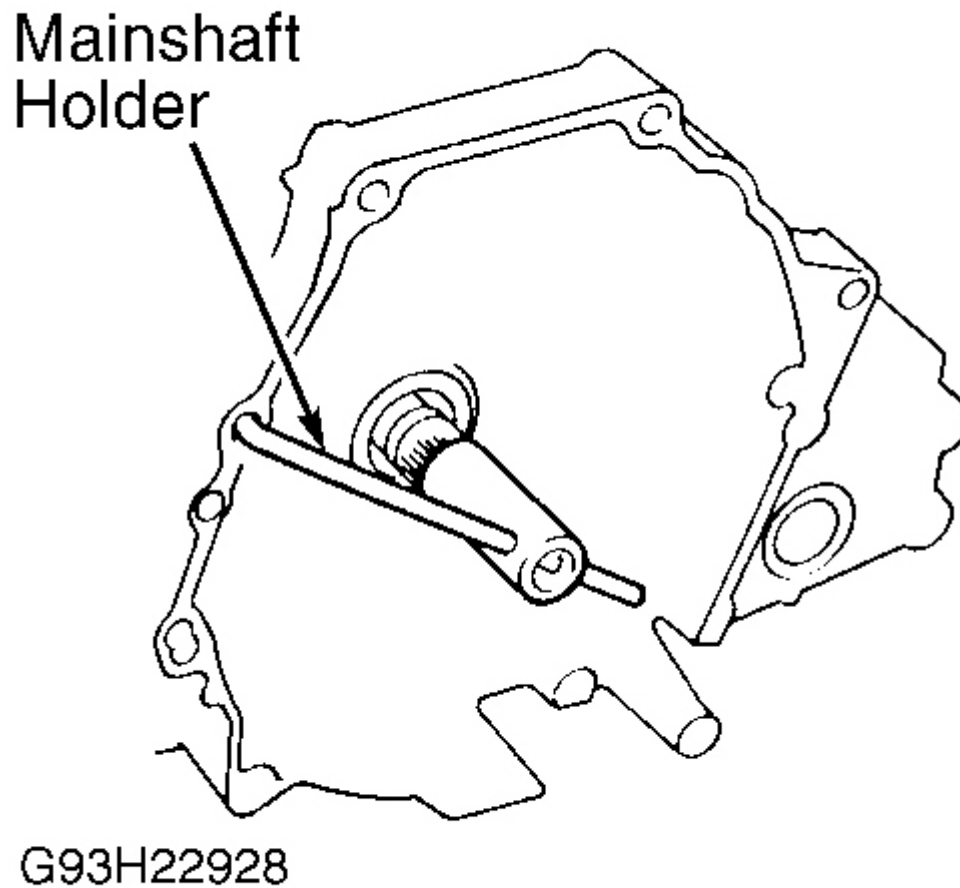
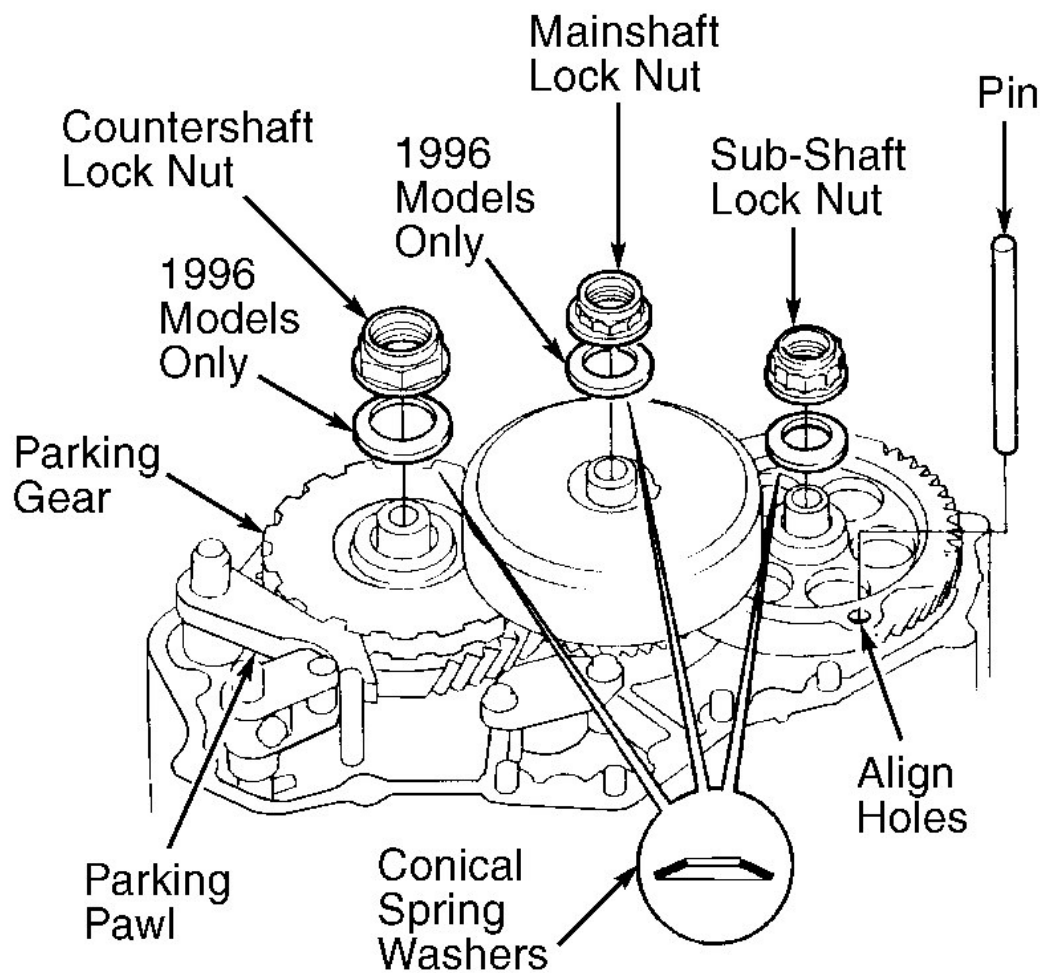


Fig. 8: Installing Mainshaft Holder
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 9: Securing Sub-Shaft 1st Gear

Courtesy of AMERICAN HONDA MOTOR CO., INC.

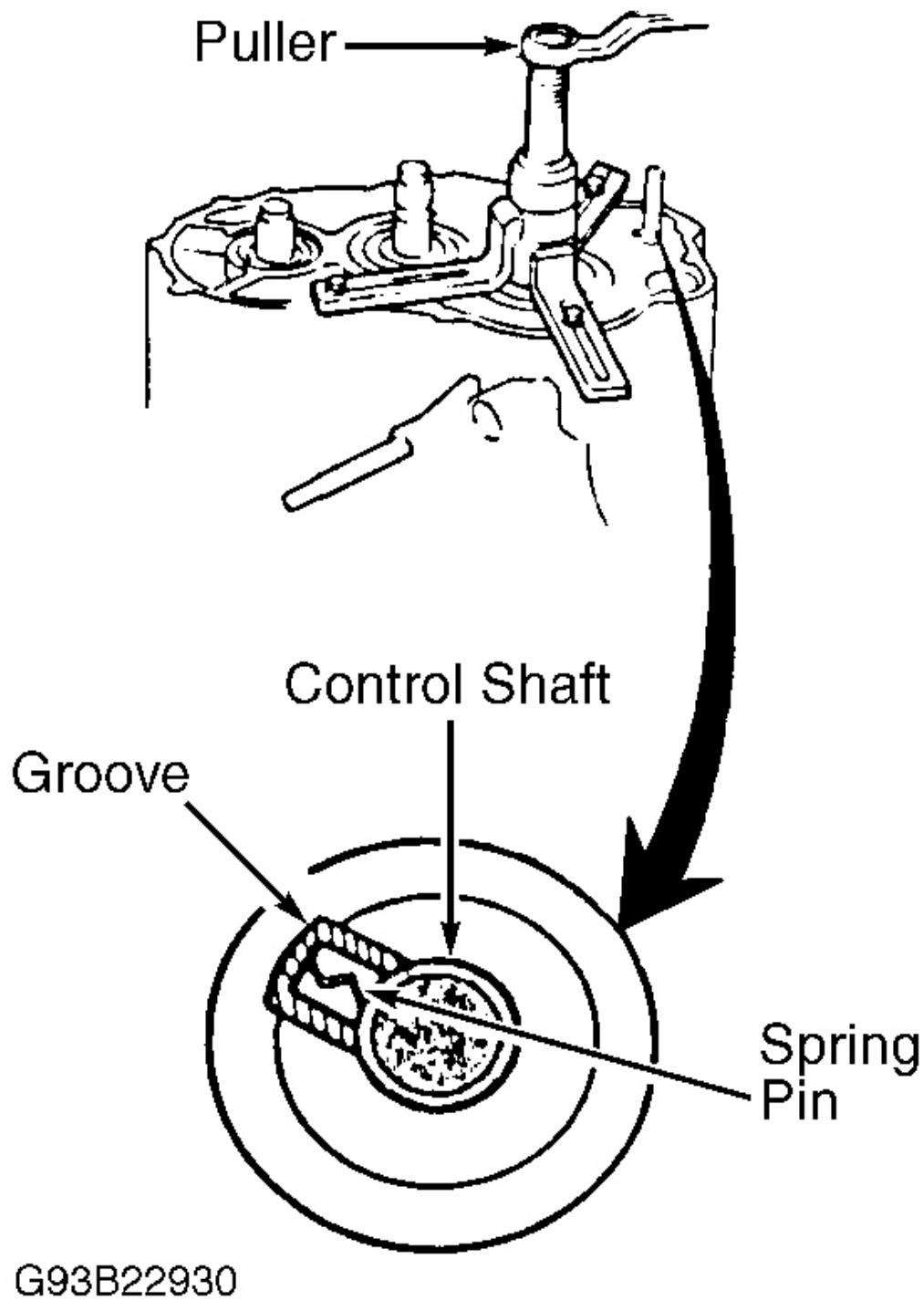


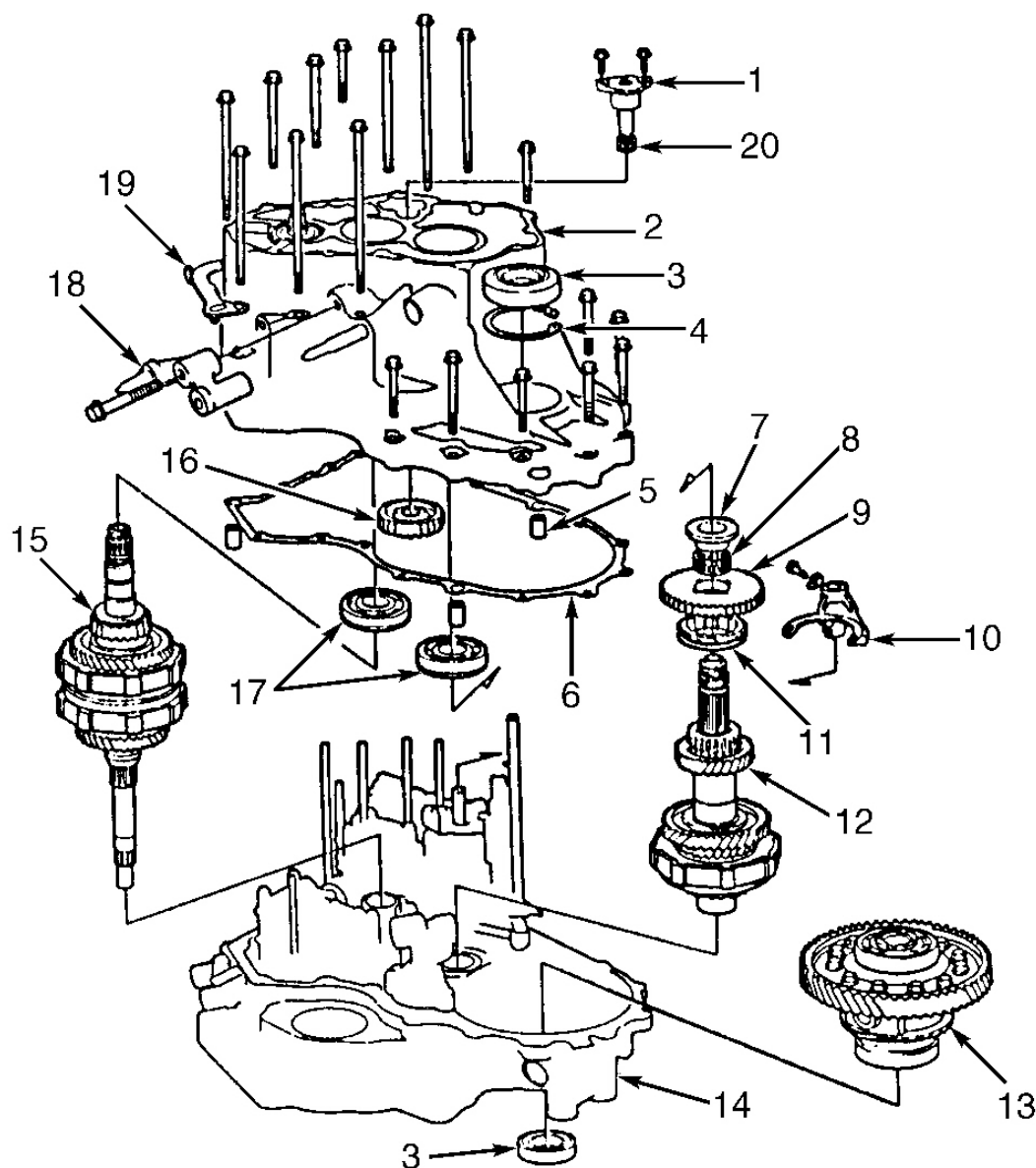
Fig. 10: Aligning Spring Pin & Removing Transaxle Housing

Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

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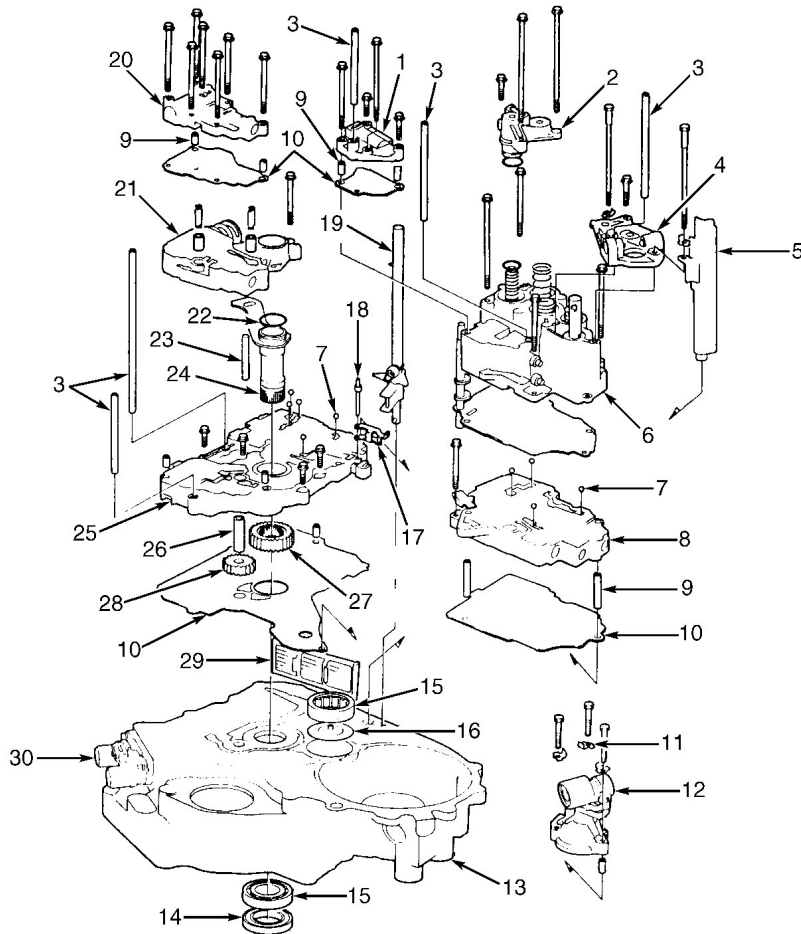


- | | |
|------------------------------|------------------------------|
| 1. Reverse Idler Gear Holder | 11. Reverse Selector |
| 2. Transaxle Housing | 12. Countershaft |
| 3. Oil Seal | 13. Differential Assembly |
| 4. Snap Ring | 14. Torque Converter Housing |
| 5. Dowel Pin | 15. Mainshaft |
| 6. Gasket | 16. Reverse Idler Gear |
| 7. Collar | 17. Bearing |
| 8. Needle Bearing | 18. Mount Bracket |
| 9. Countershaft Reverse Gear | 19. Hanger |
| 10. Shift Fork | 20. Needle Bearing |

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Fig. 11: Exploded View Of Transaxle Housing & Components

Courtesy of AMERICAN HONDA MOTOR CO., INC.



- | | | |
|-------------------------|------------------------------|---|
| 1. Modulator Valve Body | 11. Bolt Lock | 21. Regulator Valve Body |
| 2. Accumulator Cover | 12. Governor Body | 22. "O" Ring |
| 3. Oil Feedpipe | 13. Torque Converter Housing | 23. Stopper Shaft |
| 4. Servo Detent Base | 14. Oil Seal | 24. Stator Shaft |
| 5. Baffle Plate | 15. Bearing | 25. Main Valve Body |
| 6. Servo Body | 16. Oil Guide Plate | 26. Oil Pump Drive Gear Shaft |
| 7. Check Ball | 17. Detent Arm | 27. Oil Pump Drive Gear |
| 8. Secondary Valve Body | 18. Detent Arm Shaft | 28. Oil Pump Drive Gear |
| 9. Dowel Pin | 19. Control Shaft | 29. Fluid Strainer |
| 10. Separator Plate | 20. Lock-Up Valve Body | 30. Lock-Up Control Solenoid Valve Assembly |

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Fig. 12: Exploded View Of Torque Converter Housing & Components

Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT DISASSEMBLY & REASSEMBLY

VALVE BODY CLEANING & INSPECTION

NOTE: The following procedure should be used when servicing valves and valve bodies after disassembly.

1. Clean components with solvent and dry with compressed air. Replace 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. Sandpaper can be rolled into a tube shape for deburring valve bores. 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.

MAIN VALVE BODY

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

Disassembly

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

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

Reassembly

Coat all components and bores with ATF. To reassemble, reverse disassembly procedure. Ensure all components are installed in correct location. See **Fig. 13** . Tighten valve cover bolts to specification. See **TORQUE SPECIFICATIONS** .

SPRING SPECIFICATIONS

Application	Free Length In. (mm)
Main Valve Body	
Relief Valve Spring	1.461 (37.10)
1-2 Shift Valve Ball Spring	.421 (10.70)
1-2 Shift Valve Spring	2.079 (52.80)
2-3 Shift Valve Ball Spring	.524 (13.30)
2-3 Shift Valve Spring	2.571 (65.30)
3-2 Timing Valve Spring	1.795 (45.60)
3-4 Shift Valve Ball Spring	.445 (11.30)
3-4 Shift Valve Spring	1.280 (32.50)

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4th Exhaust Valve Spring	1.705 (43.30)
Regulator Valve Body	
Cooler Check Valve Spring	1.331 (33.80)
Lock-Up Control Valve Spring	1.512 (38.40)
Regulator Valve Spring "A"	
1995 Models	
Except VTEC	3.362 (85.40)
VTEC	3.457 (87.80)
1996 Models	
Regulator Valve Spring "B"	1.732 (44.00)
Stator Reaction Spring	1.193 (30.30)
Torque Converter Check Valve Spring	1.331 (33.80)
Secondary Valve Body	
Clutch Pressure Control Valve Spring	.980 (24.90)
Governor Cut Valve Spring	1.752 (44.50)
Reverse Control Valve Spring	1.575 (40.00)
Servo Control Valve Spring	1.343 (34.10)
2nd-On Orifice Control Valve Spring	.949 (24.10)
2-1 Timing Valve Spring	1.299 (33.00)
2-3 Orifice Control Valve Spring	1.307 (33.20)
4-3 Kickdown Valve Spring	1.177 (29.90)
Servo Body	
Throttle Valve "A" Adjusting Spring	1.063 (27.00)
Throttle Valve "A" Spring	(1)
Throttle Valve "B" Adjusting Spring	1.181 (30.00)
Throttle Valve "B" Spring	(2)
1st Accumulator Spring "A"	4.012 (101.90)
1st Accumulator Spring "B"	1.929 (49.00)
2nd Accumulator Spring	3.031 (77.00)
2/3-4 Orifice Control Valve Spring	2.043 (51.90)
3rd Accumulator Spring	3.614 (91.80)
4th Accumulator Spring	3.547 (90.10)
Modulator Valve Body	
Modulator Valve Spring	
1995 Models	(3)
1996 Models	(4)
Lock-Up Valve Body	
Lock-Up Shift Valve Spring	2.902 (73.70)
Lock-Up Timing Valve Spring	2.421 (61.50)
Governor Body	

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Governor Spring "A"

1.295 (32.90)

Governor Spring "B"

(5)

- (1) Spring free length may be .870" (22.10 mm), .874" (22.20 mm) or .878" (22.30 mm).
- (2) Spring free length may be 1.634" (41.50 mm) or 1.638" (41.60 mm).
- (3) Spring free length may be 1.071" (27.20 mm) or 1.035" (26.30 mm).
- (4) Spring free length may be 1.071" (27.20 mm) or 1.087" (27.60 mm).
- (5) Spring free length may be 1.094" (27.80 mm) or 1.146" (29.10 mm).

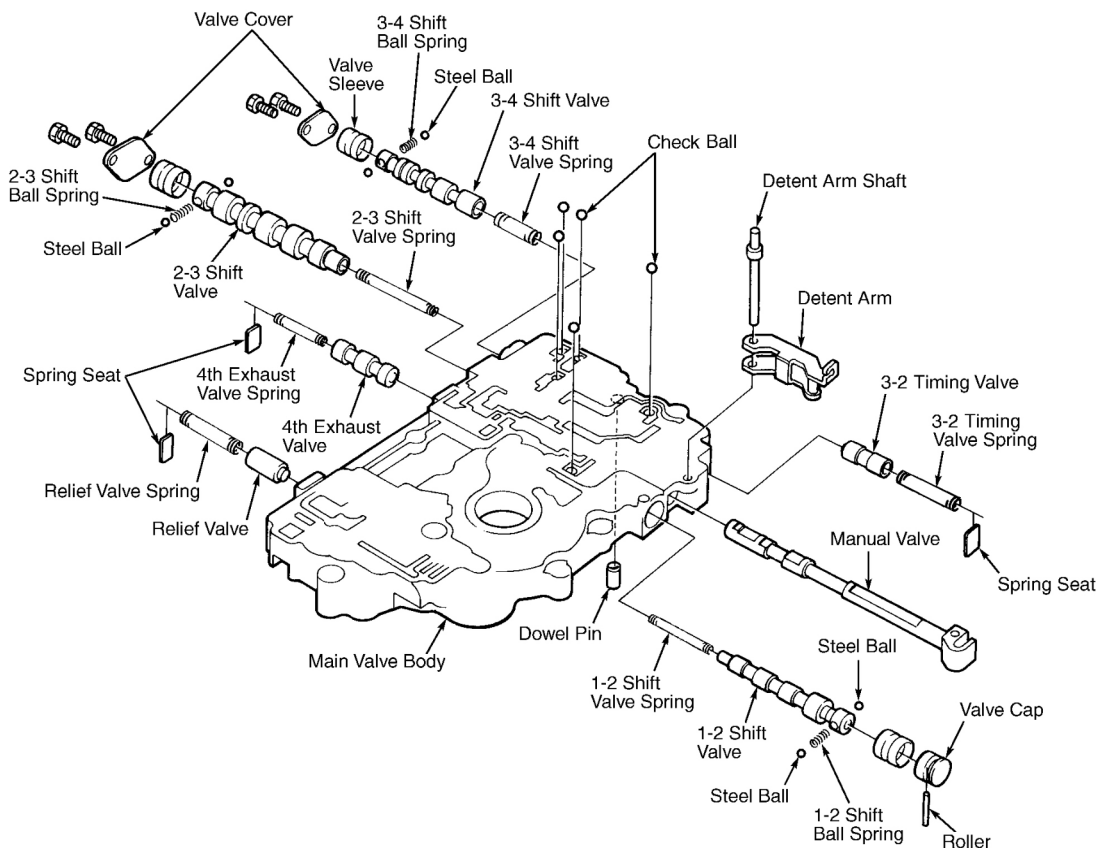


Fig. 13: Exploded View Of Main Valve Body
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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).

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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 and grooved side of oil pump driven gear is facing upward (toward separator plate side of main valve body).
3. Using feeler gauge, measure side clearance of both gears between tip of gear teeth and main valve body. See **Fig. 14** . Replace oil pump gears and/or main valve body if side clearance is not within specification. See OIL PUMP SPECIFICATIONS table.
4. Remove oil pump driven gear shaft. Place straightedge across main valve body surface. Using feeler gauge, measure thrust clearance between oil pump gears and straightedge. Replace oil pump gears and/or main valve body if thrust clearance is not within specification. See OIL PUMP SPECIFICATIONS table.

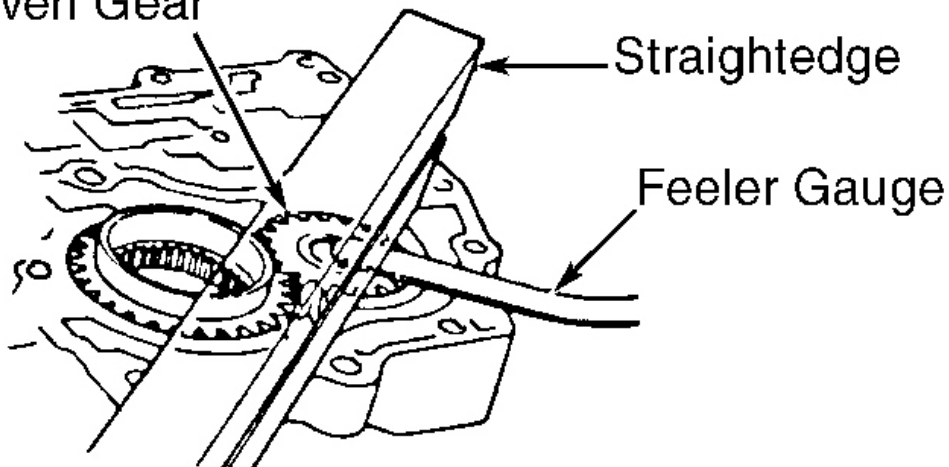
OIL PUMP SPECIFICATIONS

Application	In. (mm)
Side Clearance	
Oil Pump Drive Gear	.0083-.0104 (.210-.265)
Oil Pump Driven Gear	
1995	.0028-.0049 (.070-.125)
1996	.0014-.0025 (.035-.065)
Thrust Clearance	
Standard	.0016-.0024 (.034-.056)
Wear Limit	.0028 (.070)

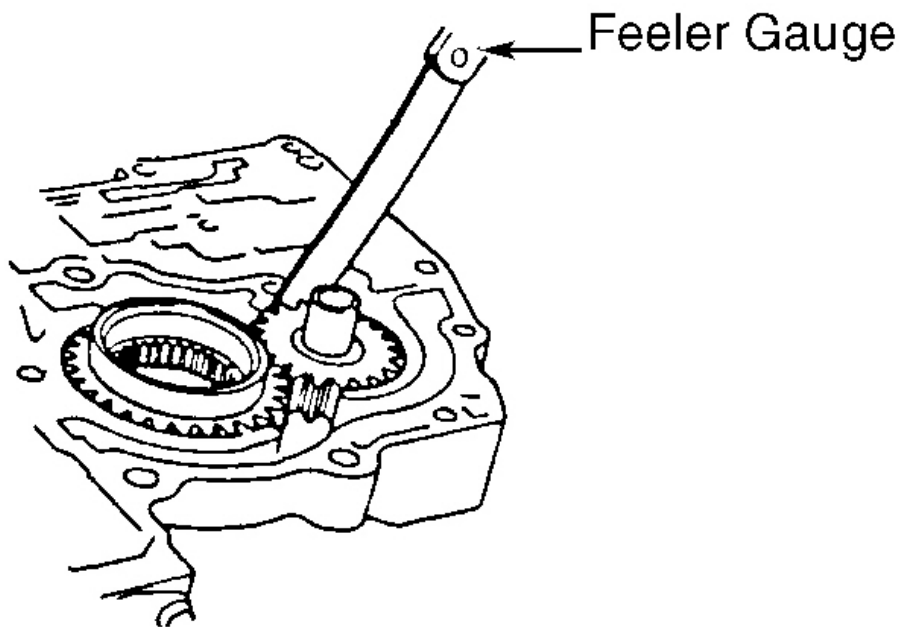
Reassembly

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

Oil Pump
Driven Gear



CHECKING THRUST CLEARANCE



CHECKING SIDE CLEARANCE

G95C19754

Fig. 14: Measuring Oil Pump Clearances
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REGULATOR VALVE BODY

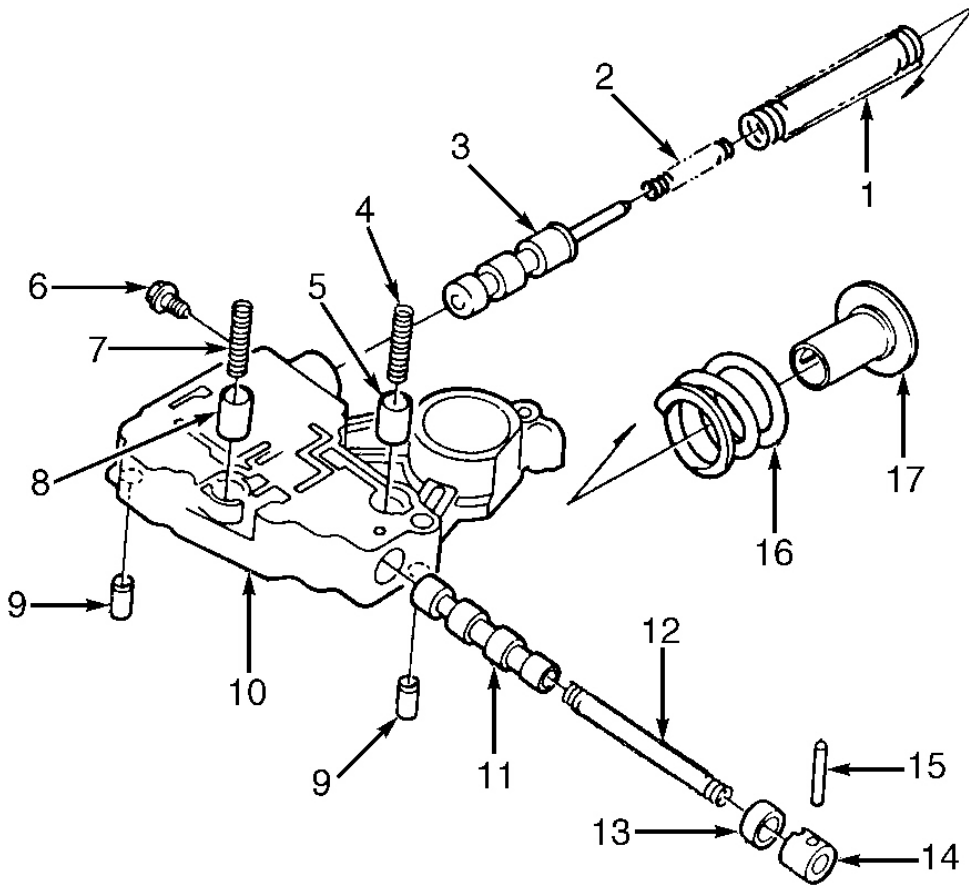
CAUTION: Regulator spring cap is under spring pressure. Ensure regulator spring cap is held downward when removing stopper bolt.

Disassembly

Hold regulator spring cap downward. Remove stopper bolt. Slowly remove regulator spring cap and components from regulator valve body. See **Fig. 15** .

Reassembly

Coat all components and bores with ATF. To reassemble, reverse disassembly procedure. Ensure all components are installed in correct location. See **Fig. 15** . Tighten stopper bolt to specification. See **TORQUE SPECIFICATIONS** .



- | | |
|--|----------------------------------|
| 1. Regulator Valve Spring "A" | 10. Regulator Valve Body |
| 2. Regulator Valve Spring "B" | 11. Lock-Up Control Valve |
| 3. Regulator Valve | 12. Lock-Up Control Valve Spring |
| 4. Torque Converter Check Valve Spring | 13. Sleeve |
| 5. Torque Converter Check Valve | 14. Valve Cap |
| 6. Stopper Bolt | 15. Roller |
| 7. Cooler Check Valve Spring | 16. Stator Reaction Spring |
| 8. Cooler Check Valve | 17. Regulator Spring Cap |
| 9. Dowel Pin | |

G93F22934

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

SECONDARY VALVE BODY

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

Disassembly

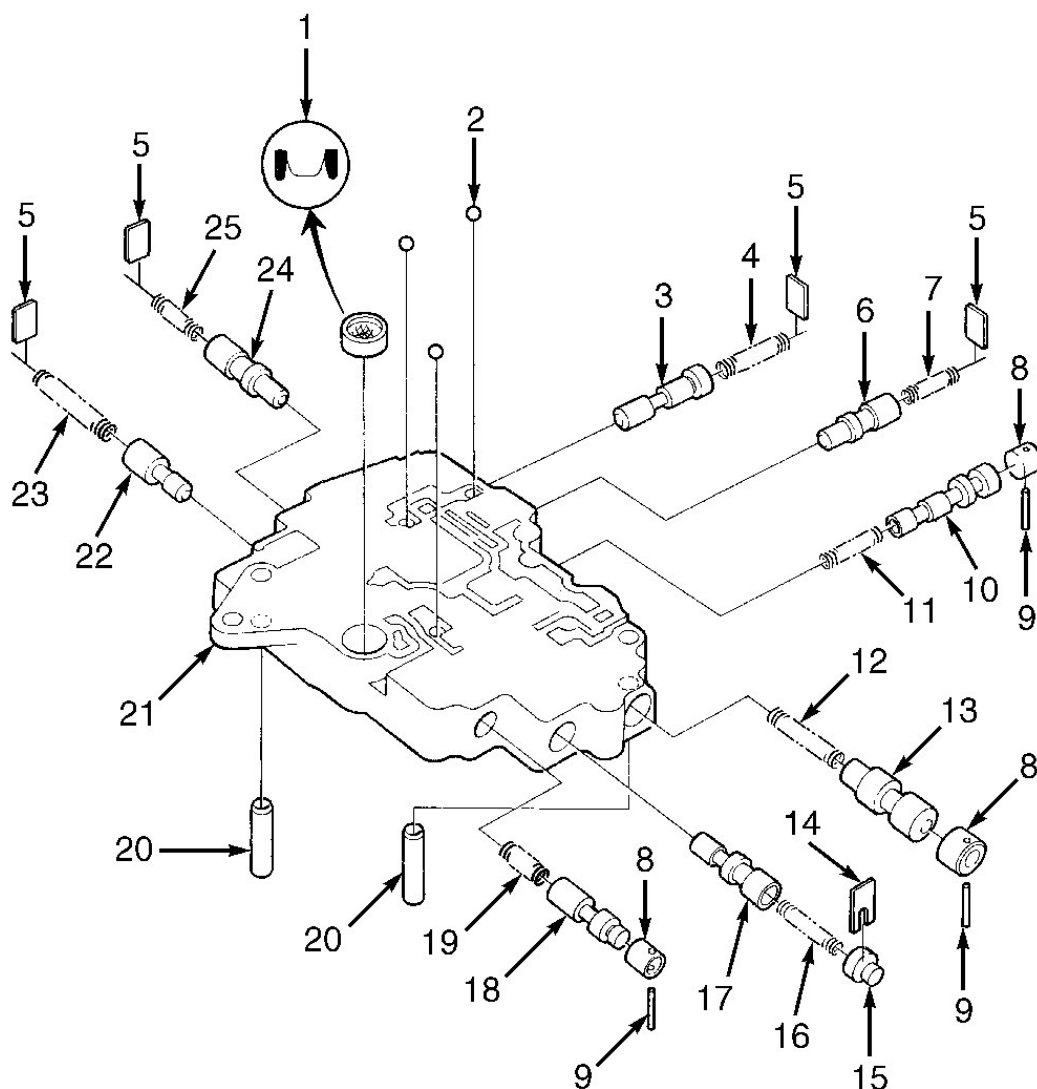
Disassemble secondary valve body. See **Fig. 16** . Use care when removing valve caps or spring seats, as they are under spring pressure.

Reassembly

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

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- | | |
|-------------------------------------|--|
| 1. Filter | 14. Stopper Seat |
| 2. Check Ball | 15. Stopper |
| 3. Governor Cut Valve | 16. Servo Control Valve Spring |
| 4. Governor Cut Valve Spring | 17. Servo Control Valve |
| 5. Spring Seat | 18. Clutch Pressure Control Valve |
| 6. 2-3 Orifice Control Valve | 19. Clutch Pressure Control Valve Spring |
| 7. 2-3 Orifice Control Valve Spring | 20. Dowel Pin |
| 8. Valve Cap | 21. Secondary Valve Body |
| 9. Roll Pin | 22. 2nd-On Orifice Control Valve |
| 10. 2-1 Timing Valve | 23. 2nd-On Orifice Control Valve Spring |
| 11. 2-1 Timing Valve Spring | 24. 4-3 Kickdown Valve |
| 12. Reverse Control Valve Spring | 25. 4-3 Kickdown Valve Spring |
| 13. Reverse Control Valve | |

96B30966

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

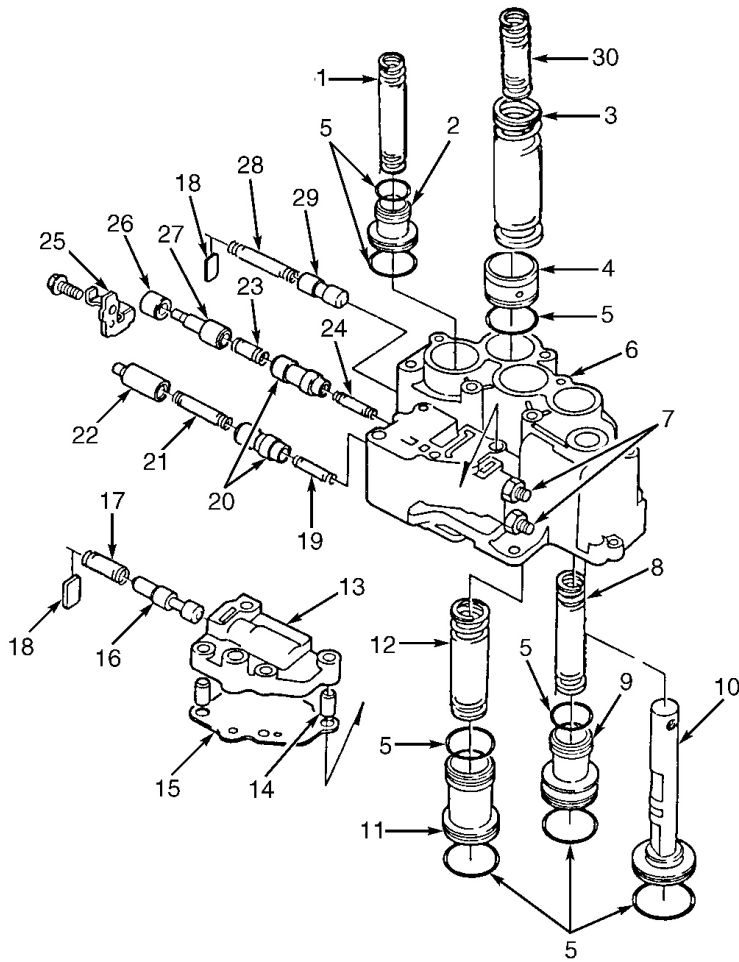
SERVO BODY & MODULATOR VALVE BODY

Disassembly

Disassemble servo body and modulator valve body. See **Fig. 17** . Use care when removing spring seats, as they are under spring pressure.

Reassembly

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



- | | |
|--|---|
| 1. 4th Accumulator Spring | 17. Modulator Valve Spring |
| 2. 4th Accumulator Piston | 18. Spring Seat |
| 3. 1st Accumulator Spring "A" | 19. Throttle Valve "B" Adjusting Spring |
| 4. 1st Accumulator Piston | 20. Throttle Long Valve |
| 5. "O" Ring | 21. Throttle Valve "B" Spring |
| 6. Servo Body | 22. Throttle Valve "B" |
| 7. Adjusting Bolt
(DO NOT Loosen Or Remove) | 23. Throttle Valve "A" Spring |
| 8. 3rd Accumulator Spring | 24. Throttle Valve "A" Adjusting Spring |
| 9. 3rd Accumulator Piston | 25. Throttle Cam Stopper |
| 10. Shift Fork Shaft | 26. Valve Sleeve |
| 11. 2nd Accumulator Piston | 27. Throttle Valve "A" |
| 12. 2nd Accumulator Spring | 28. 2/3-4 Orifice Control Valve Spring |
| 13. Modulator Valve Body | 29. 2/3-4 Orifice Control Valve |
| 14. Dowel Pin | 30. 1st Accumulator Spring "B" |
| 15. Separator Plate | |
| 16. Modulator Valve | |

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

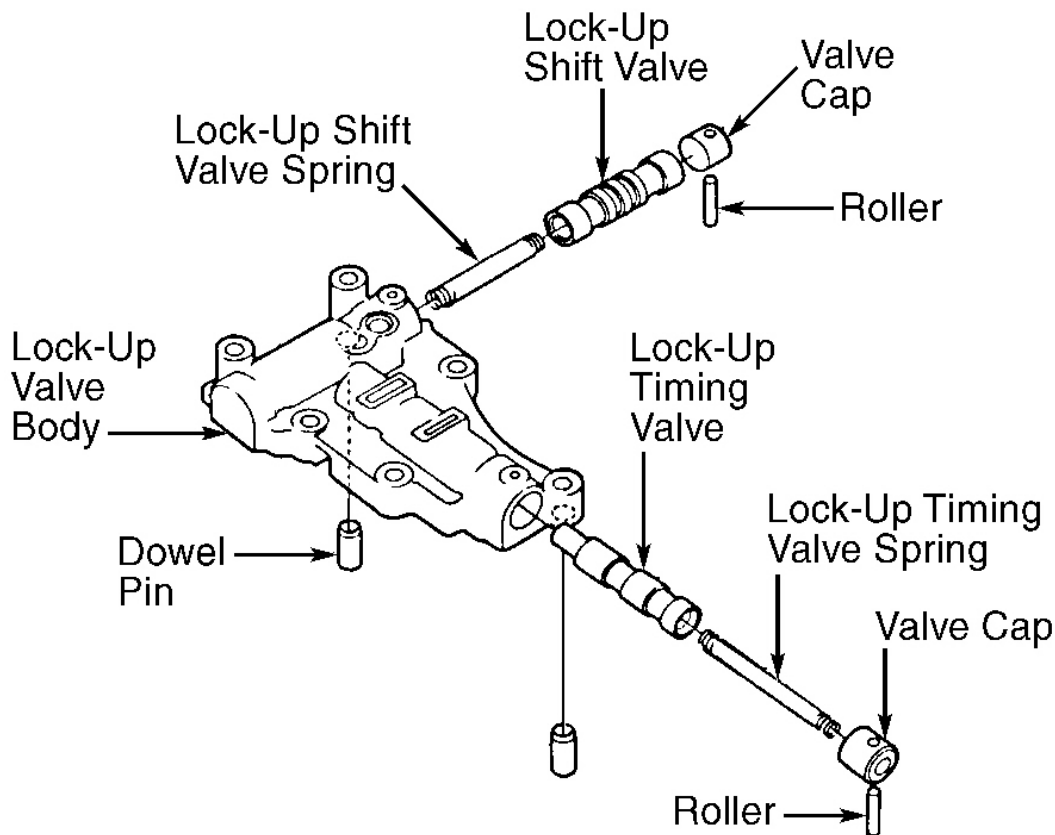
LOCK-UP VALVE BODY

Disassembly

Note direction of valve cap installation before removing from lock-up valve body. Disassemble lock-up valve body. See **Fig. 18** . Use care when removing valve caps, as they are under spring pressure.

Reassembly

Coat all components and bores with ATF. To reassemble, reverse disassembly procedure. See **Fig. 18** .



93I22937

Fig. 18: Exploded View Of Lock-Up Valve Body
Courtesy of AMERICAN HONDA MOTOR CO., INC.

GOVERNOR BODY

Disassembly

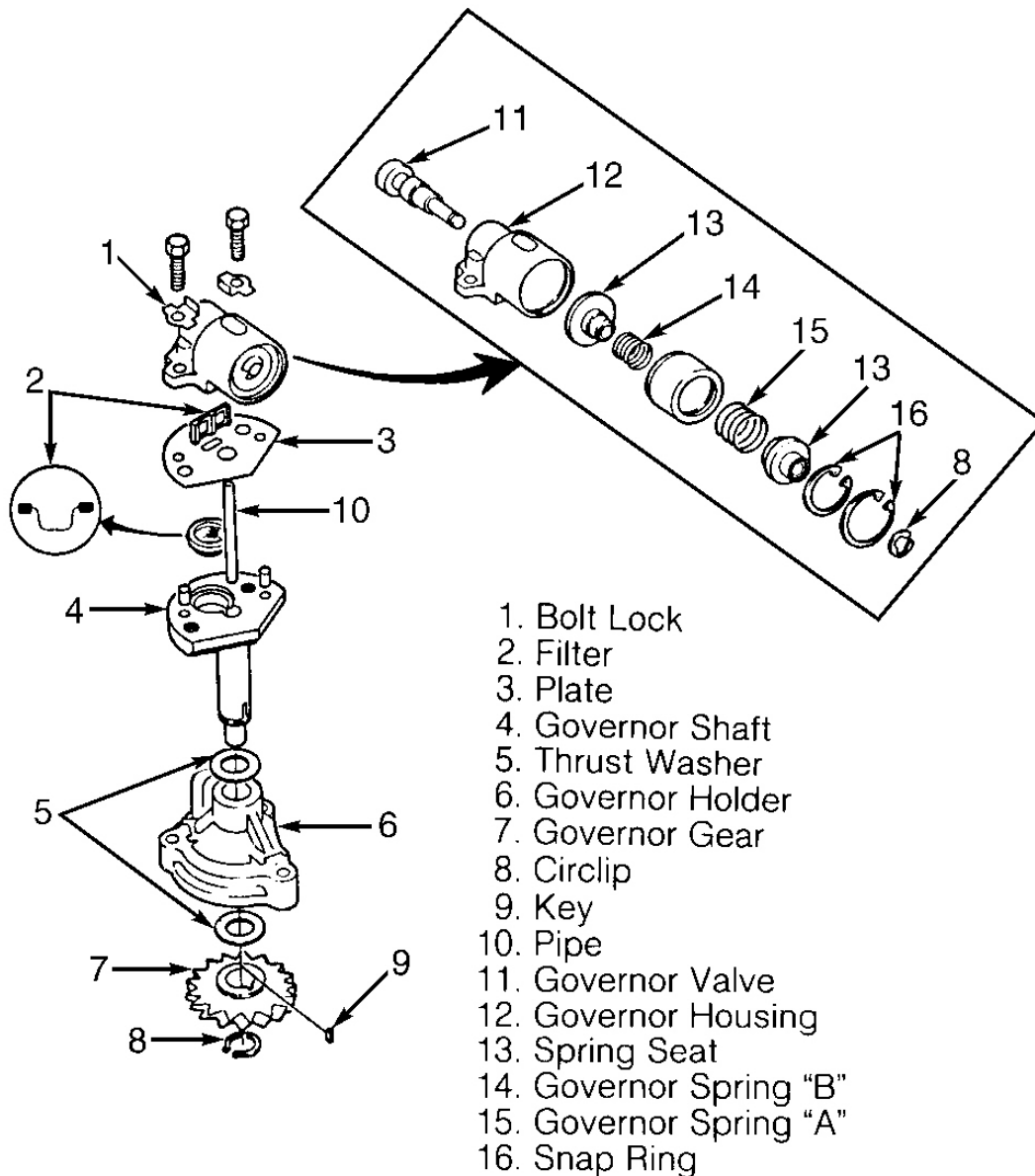
To disassemble, refer to illustration for exploded view of governor body. See **Fig. 19** .

Cleaning & Inspection

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

Reassembly

Coat all components and bores with ATF. To reassemble, reverse disassembly procedure using NEW bolt locks and NEW filters. See **Fig. 19** . Tighten governor housing-to-governor shaft bolts to specification. See **TORQUE SPECIFICATIONS** .



93J22938

Fig. 19: Exploded View Of Governor Body
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

1ST-HOLD ACCUMULATOR

NOTE: The 1st-hold accumulator is located in right side cover.

Disassembly

Remove circlip and 1st-hold accumulator cover with "O" ring. See [Fig. 7](#) . Remove accumulator spring and 1st-hold accumulator piston.

Cleaning & Inspection

Clean components with solvent and dry with compressed air. Replace components if worn or damaged. Ensure accumulator spring free length is 2.823" (71.70 mm). Replace spring if not as specified.

Reassembly

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

MAINSHAFT

NOTE: **Mainshaft lock nut has left hand threads. On 1996 models, mainshaft has beveled spring washer below lock nut.**

Disassembly

Note location of mainshaft components. See [Fig. 20](#) . Remove mainshaft components.

Cleaning & Inspection

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

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

Reassembly

1. To check mainshaft 2nd gear-to-3rd gear clearance, install proper components, except "O" rings, on mainshaft. See [Fig. 21](#) .
2. Install beveled spring washer, if equipped. Install used mainshaft lock nut on mainshaft. Tighten mainshaft lock nut to 22 ft. lbs. (30 N.m). Hold mainshaft 2nd gear against 2nd clutch.
3. Using feeler gauge, measure clearance between mainshaft 2nd gear and mainshaft 3rd gear. Check mainshaft clearance at 3 places on mainshaft. Average the 3 measurements to obtain mainshaft 2nd gear-to-3rd gear clearance. See [Fig. 22](#) .
4. Replace selective thrust washer, located between mainshaft 2nd gear and 2nd clutch if mainshaft 2nd gear-to-3rd gear clearance is not .002-.005" (.05-.13 mm). Different thickness thrust washers are available. See appropriate THRUST WASHER SPECIFICATIONS table. Replace thrust washer if necessary and recheck mainshaft 2nd gear-to-3rd gear clearance.
5. Once correct thickness thrust washer is obtained, lubricate all components with ATF. Reassemble mainshaft using NEW "O" rings.
6. Ensure thrust needle bearings are installed with unrolled edge of bearing retainer facing washer. Before installing NEW "O" rings on mainshaft, wrap splines on mainshaft with tape to prevent damage to "O" rings.

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THRUST WASHER SPECIFICATIONS (1995)

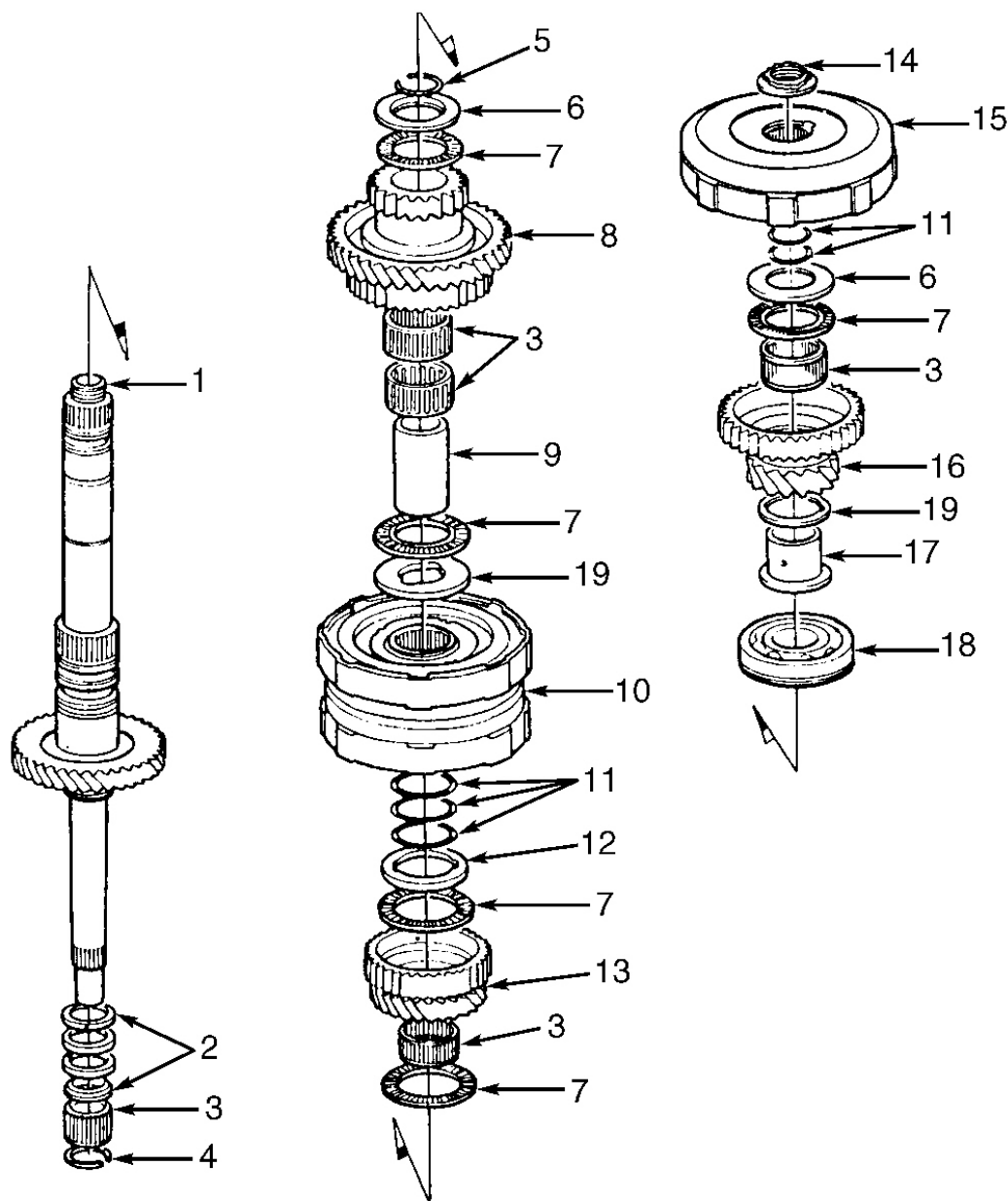
Washer Number	Part Number	Thickness In. (mm)
1	90441-PC9-010	.138 (3.50)
2	90442-PC9-010	.140 (3.55)
3	90443-PC9-010	.142 (3.60)
4	90444-PC9-010	.144 (3.65)
5	90445-PC9-010	.146 (3.70)
6	90446-PC9-010	.148 (3.75)
7	90447-PC9-010	.150 (3.80)
8	90448-PC9-010	.152 (3.85)
9	90449-PC9-010	.154 (3.90)

THRUST WASHER SPECIFICATIONS (1996)

Washer Number	Part Number	Thickness In. (mm)
1	90441-P4P-000	.157 (4.00)
2	90442-P4P-000	.159 (4.05)
3	90443-P4P-000	.161 (4.10)
4	90444-P4P-000	.163 (4.15)
5	90445-P4P-000	.165 (4.20)
6	90446-P4P-000	.167 (4.25)
7	90447-P4P-000	.169 (4.30)
8	90448-P4P-000	.171 (4.35)
9	90449-P4P-000	.173 (4.40)
10	90450-P4P-000	.175 (4.45)

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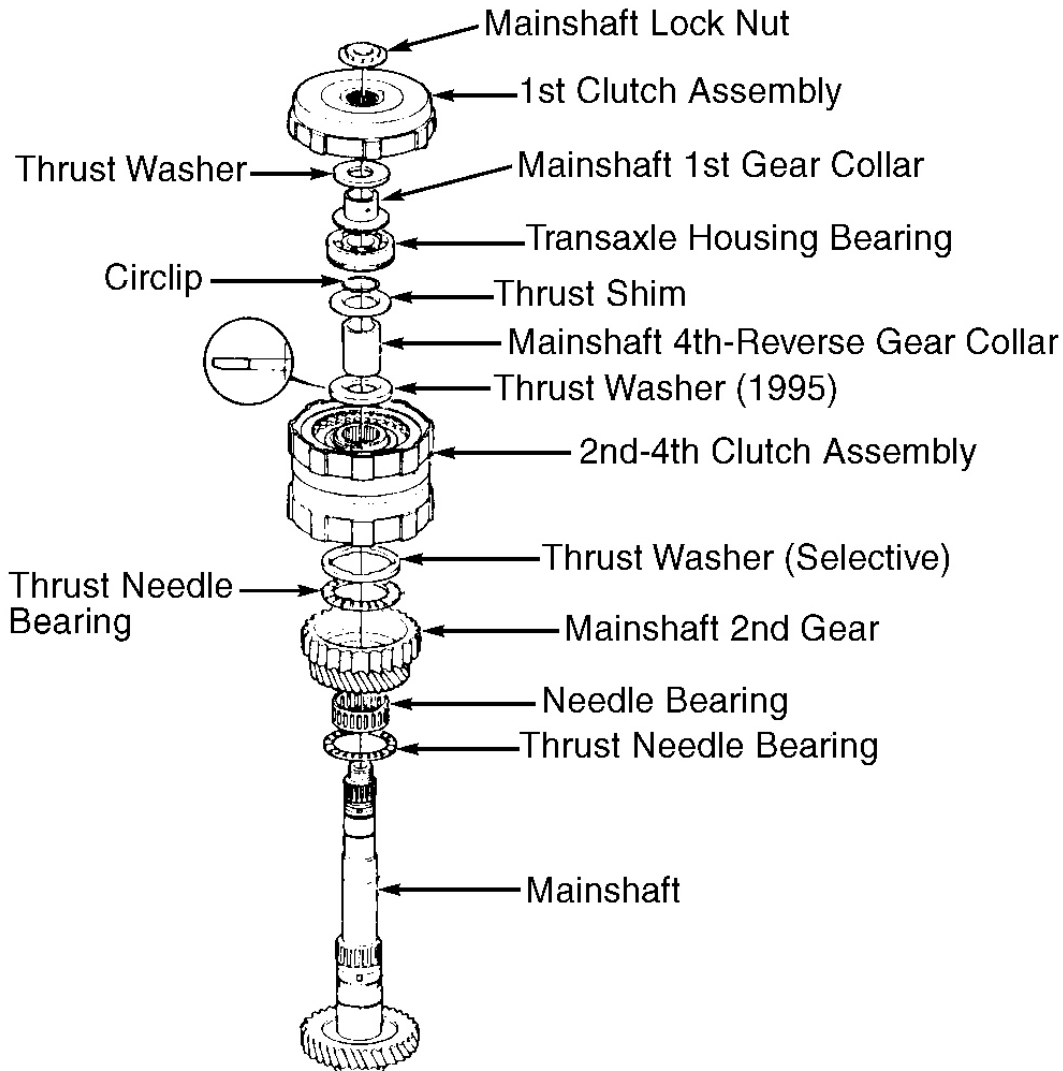
1995-96 AUTOMATIC TRANSMISSIONS A24A & S24A Overhaul



- | | |
|--------------------------------------|-------------------------------|
| 1. Mainshaft | 11. "O" Ring |
| 2. Seal Ring | 12. Thrust Washer (Selective) |
| 3. Needle Bearing | 13. Mainshaft 2nd Gear |
| 4. Set Ring | 14. Mainshaft Lock Nut |
| 5. Circlip | 15. 1st Clutch Assembly |
| 6. Thrust Washer | 16. Mainshaft 1st Gear |
| 7. Thrust Needle Bearing | 17. Mainshaft 1st Gear Collar |
| 8. Mainshaft 4th-Reverse Gear | 18. Transaxle Housing Bearing |
| 9. Mainshaft 4th-Reverse Gear Collar | 19. Thrust Washer (1995) |
| 10. 2nd-4th Clutch Assembly | |

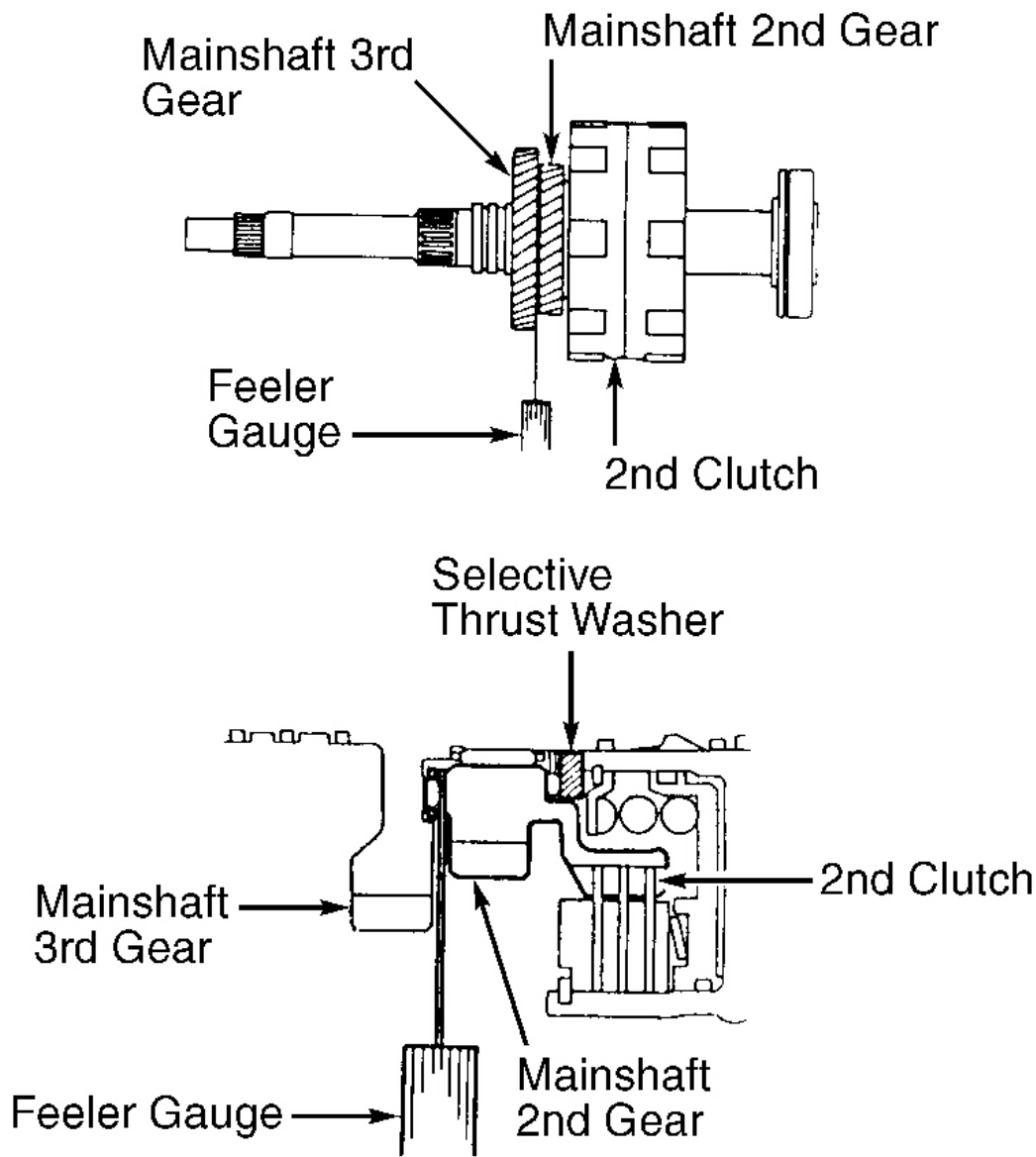
96C30967

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



96D30968

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



95J19983

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

COUNTERSHAFT

NOTE: On 1996 models, countershaft lock nut has left hand threads and beveled spring washer below lock nut. On 1995 models, separating countershaft 2nd gear and countershaft 3rd gear are cotters and a needle thrust bearing, 1996 models do

not have the cotters.

Disassembly

1. Note location of countershaft components. See **Fig. 23** . Remove countershaft components down to the reverse selector hub.
2. Place countershaft in hydraulic press while supporting countershaft 4th gear. Place a protective cap between hydraulic press and countershaft to prevent damage to countershaft.
3. Press countershaft from reverse selector hub. Remove remaining components from countershaft.

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: **On 1995 models, countershaft 2nd gear-to-3rd gear clearance and countershaft 4th gear clearance must be checked during reassembly.**

Reassembly (1995 Models)

1. To check countershaft gear clearances, install all components on countershaft up to the countershaft 4th gear, except "O" rings. Using press, press reverse selector hub on countershaft.
2. **DO NOT** install reverse selector, countershaft reverse gear and needle bearing at this time. Install countershaft reverse gear collar, transaxle housing bearing, countershaft 1st gear collar, needle bearing and parking gear with countershaft 1st gear on countershaft.
3. Install used countershaft lock nut on countershaft. Tighten countershaft lock nut to 22 ft. lbs. (30 N.m).
4. Using feeler gauge, check countershaft 4th gear clearance between shoulder on reverse selector hub and shoulder on countershaft 4th gear. See **Fig. 24** .
5. Check countershaft 4th gear clearance at 3 places on countershaft. Average the 3 measurements to obtain countershaft 4th gear clearance.
6. 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). Using a second feeler gauge, measure clearance between countershaft 2nd gear and countershaft 3rd gear. See **Fig. 24** .
7. Slide countershaft 3rd gear fully inward (toward countershaft 2nd gear). Using feeler gauge, measure clearance between countershaft 2nd gear and countershaft 3rd gear. Calculate difference between 2 measurements to determine countershaft 2nd gear-to-3rd gear clearance.
8. Check countershaft 2nd gear-to-3rd gear clearance at 3 places on countershaft. Average the 3 measurements to obtain countershaft 2nd gear-to-3rd gear clearance. Remove feeler gauges.
9. Replace distance collar if countershaft 4th gear clearance is not .002-.005" (.05-.13 mm). Different length distance collars are available. See **DISTANCE COLLAR SPECIFICATIONS** table. Install different distance collar if necessary and recheck countershaft 4th gear clearance.
10. Replace splined washer if countershaft 2nd gear-to-3rd gear clearance is not .002-.005" (.05-.13 mm). Different thickness splined washers are available. See **SPLINED WASHER SPECIFICATIONS** table.

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Install different thickness splined washer if necessary and recheck countershaft 2nd-3rd gear clearance.

11. Once correct gear clearances are obtained, lubricate all components with ATF. Reassemble countershaft using NEW "O" rings.
12. Ensure thrust needle bearings are installed with unrolled edge of bearing retainer facing washer. Before installing NEW "O" rings on countershaft, wrap splines on countershaft with tape to prevent damage to "O" rings.

DISTANCE COLLAR SPECIFICATIONS

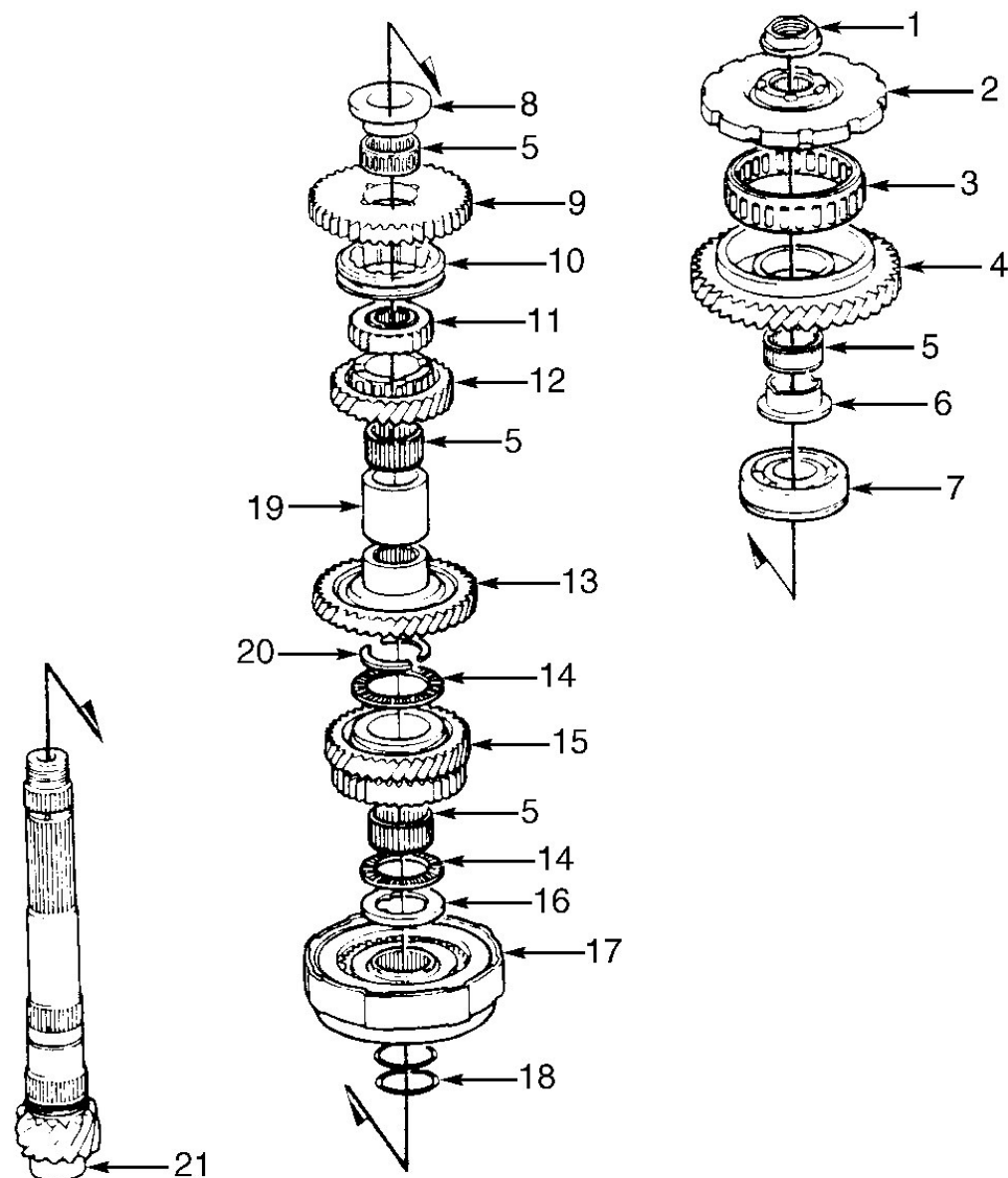
Collar Number	Part Number	Thickness In. (mm)
1	90503-PC9-000	1.535 (39.00)
2	90504-PC9-000	1.539 (39.10)
3	90505-PC9-000	1.543 (39.20)
4	90507-PC9-000	1.547 (39.30)
5	90508-PC9-000	1.537 (39.05)
6	90509-PC9-000	1.541 (39.15)
7	90510-PC9-000	1.545 (39.25)
8	90511-PC9-000	1.531 (38.90)
9	90512-PC9-000	1.533 (38.95)

SPLINED WASHER SPECIFICATIONS

Washer Number	Part Number	Thickness In. (mm)
1	90411-PF4-000	.118 (3.00)
2	90412-PF4-000	.120 (3.05)
3	90413-PF4-000	.122 (3.10)
4	90414-PF4-000	.124 (3.15)
5	90415-PF4-000	.126 (3.20)
6	90416-PF4-000	.128 (3.25)
7	90417-PF4-000	.130 (3.30)
8	90418-PF4-000	.132 (3.35)
9	90419-PF4-000	.134 (3.40)
10	90411-P24-J00	.136 (3.45)
11	90412-P24-J00	.138 (3.50)
12	90413-P24-J00	.140 (3.55)
13	90414-P24-J00	.142 (3.60)

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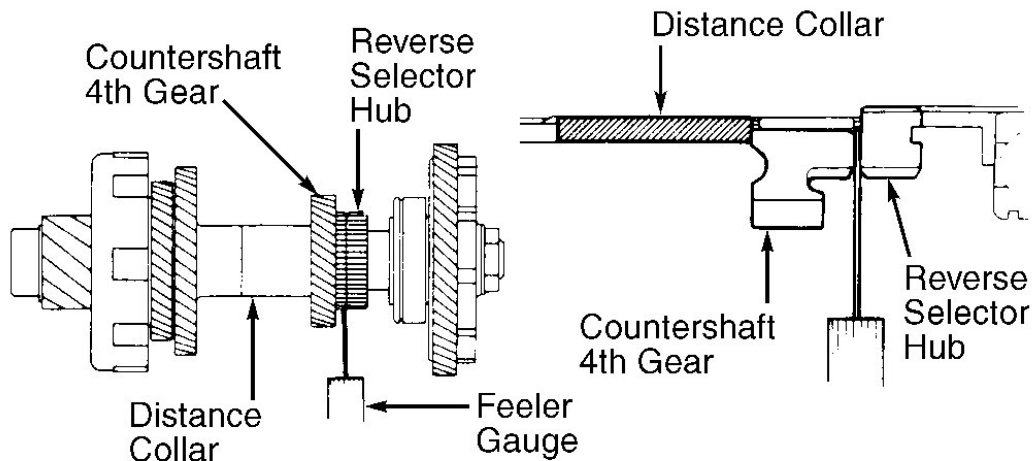


- | | |
|-------------------------------------|---------------------------------|
| 1. Countershaft Lock Nut | 12. Countershaft 4th Gear |
| 2. Parking Gear | 13. Countershaft 2nd Gear |
| 3. One-Way Clutch | 14. Thrust Needle Bearing |
| 4. Countershaft 1st Gear | 15. Countershaft 3rd Gear |
| 5. Needle Bearing | 16. Splined Washer |
| 6. Countershaft 1st Gear Collar | (Selective On 1995) |
| 7. Transaxle Housing Bearing | 17. 3rd Clutch |
| 8. Countershaft Reverse Gear Collar | 18. "O" Ring |
| 9. Countershaft Reverse Gear | 19. Distance Collar (Selective) |
| 10. Reverse Selector | 20. Cotteners (1995) |
| 11. Reverse Selector Hub | 21. Countershaft |

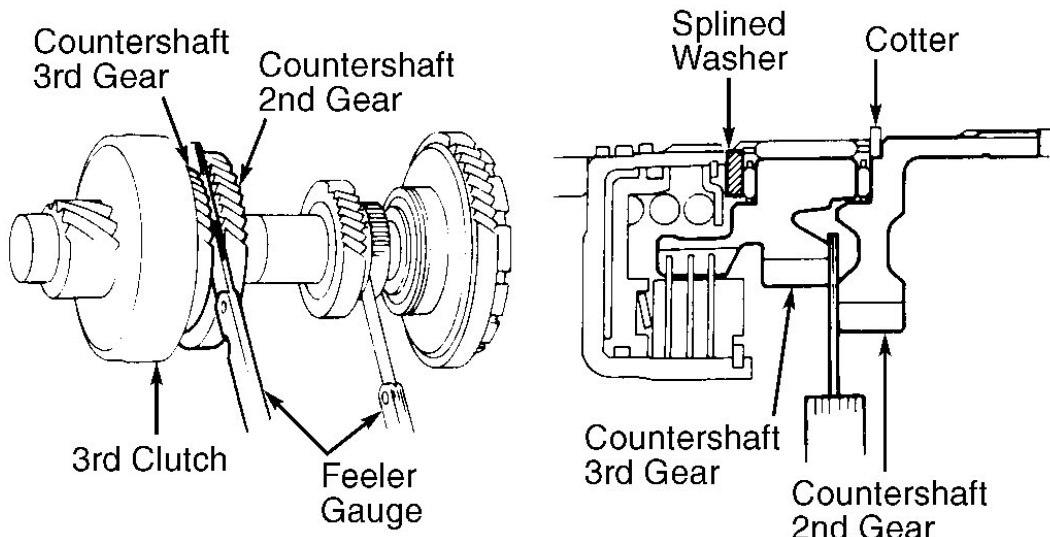
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Fig. 23: Exploded View Of Countershaft & Components

Courtesy of AMERICAN HONDA MOTOR CO., INC.



CHECKING COUNTERSHAFT 4TH GEAR CLEARANCE



**CHECKING COUNTERSHAFT
2ND GEAR-TO-3RD GEAR CLEARANCE**

93H22944

Fig. 24: Checking Countershaft 2nd Gear-To-3rd Gear & 4th Gear Clearances

Courtesy of AMERICAN HONDA MOTOR CO., INC.

NOTE: On 1996 models, countershaft 4th gear clearance must be checked during reassembly.

Reassembly (1996 Models)

1. To check countershaft gear clearances, install all components on countershaft up to the countershaft 4th gear, except "O" rings. Using press, press reverse selector hub on countershaft.
2. **DO NOT** install reverse selector, countershaft reverse gear and needle bearing at this time. Install countershaft reverse gear collar, transaxle housing bearing, countershaft 1st gear collar, needle bearing and parking gear with countershaft 1st gear on countershaft.
3. Install beveled spring washer and used countershaft lock nut on countershaft. Tighten countershaft lock nut to 22 ft. lbs. (30 N.m).
4. Using feeler gauge, check countershaft 4th gear clearance between shoulder on reverse selector hub and shoulder on countershaft 4th gear. See **Fig. 24** .
5. Check countershaft 4th gear clearance at 3 places on countershaft. Average the 3 measurements to obtain countershaft 4th gear clearance.
6. Replace distance collar if countershaft 4th gear clearance is not .004-.007" (.10-.18 mm). Different length distance collars are available. See **DISTANCE COLLAR SPECIFICATIONS** table. Install different distance collar if necessary and recheck countershaft 4th gear clearance.
7. Once correct gear clearances are obtained, lubricate all components with ATF. Reassemble countershaft using NEW "O" rings.
8. Ensure thrust needle bearings are installed with unrolled edge of bearing retainer facing washer. Before installing NEW "O" rings on countershaft, wrap splines on countershaft with tape to prevent damage to "O" rings.

PARKING GEAR & ONE-WAY CLUTCH

Disassembly

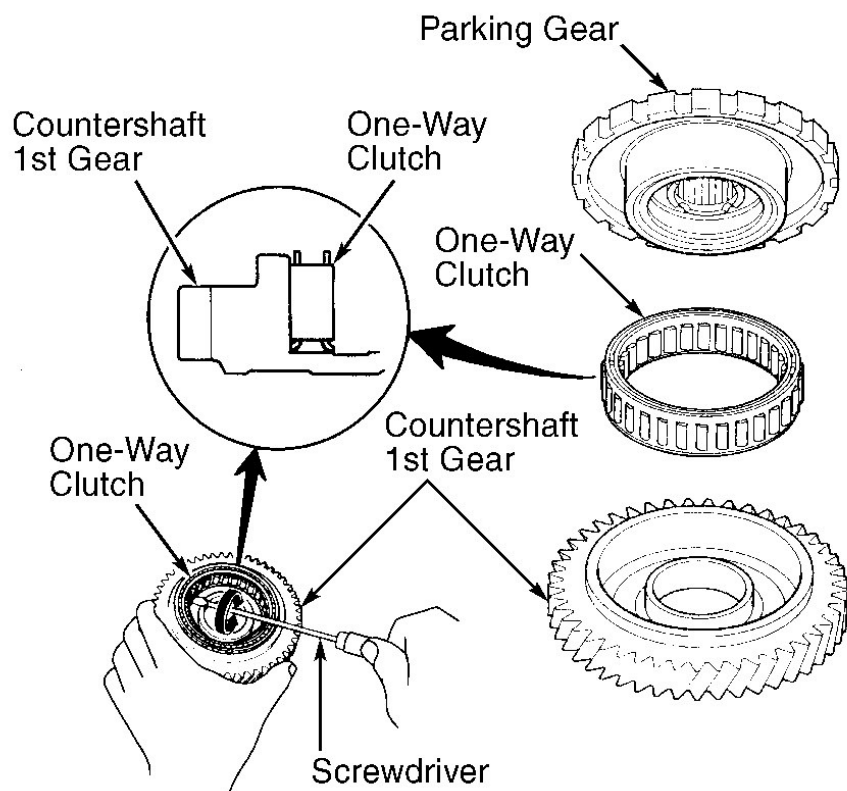
1. To separate parking gear from countershaft 1st gear, hold countershaft 1st gear and rotate parking gear counterclockwise. Remove parking gear.
2. Note direction of one-way clutch installation in countershaft 1st gear. Using screwdriver, gently pry one-way clutch from countershaft 1st gear.

Cleaning & Inspection

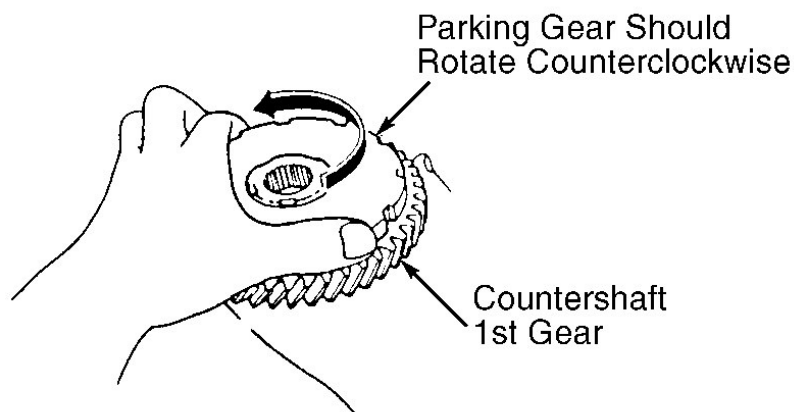
Clean components with solvent and dry with compressed air. Inspect components for damage.

Reassembly

1. Lubricate all components with ATF. Install one-way clutch with large flange area toward countershaft 1st gear. See **Fig. 25** .
2. Install parking gear. To check one-way clutch operation, hold countershaft 1st gear. Ensure parking gear rotates counterclockwise.



REMOVING & INSTALLING ONE-WAY CLUTCH



CHECKING ONE-WAY CLUTCH OPERATION

95A19984

Fig. 25: Installing & Checking One-Way Clutch Operation
Courtesy of AMERICAN HONDA MOTOR CO., INC.

SUB-SHAFT & COMPONENTS

Disassembly

1. Tap on sub-shaft to remove oil guide cap from transaxle housing. See **Fig. 26** .
2. On all models, remove sub-shaft, 1st-hold clutch, sub-shaft 4th gear and components from transaxle housing.
3. If removing transaxle housing bearing, expand snap ring. Using press, press transaxle housing bearing from transaxle housing. Remove snap ring (if necessary).
4. If removing needle bearing from transaxle housing, remove needle bearing stopper bolt and needle bearing stopper. Using hammer and drift, tap needle bearing from transaxle housing.

Cleaning & Inspection

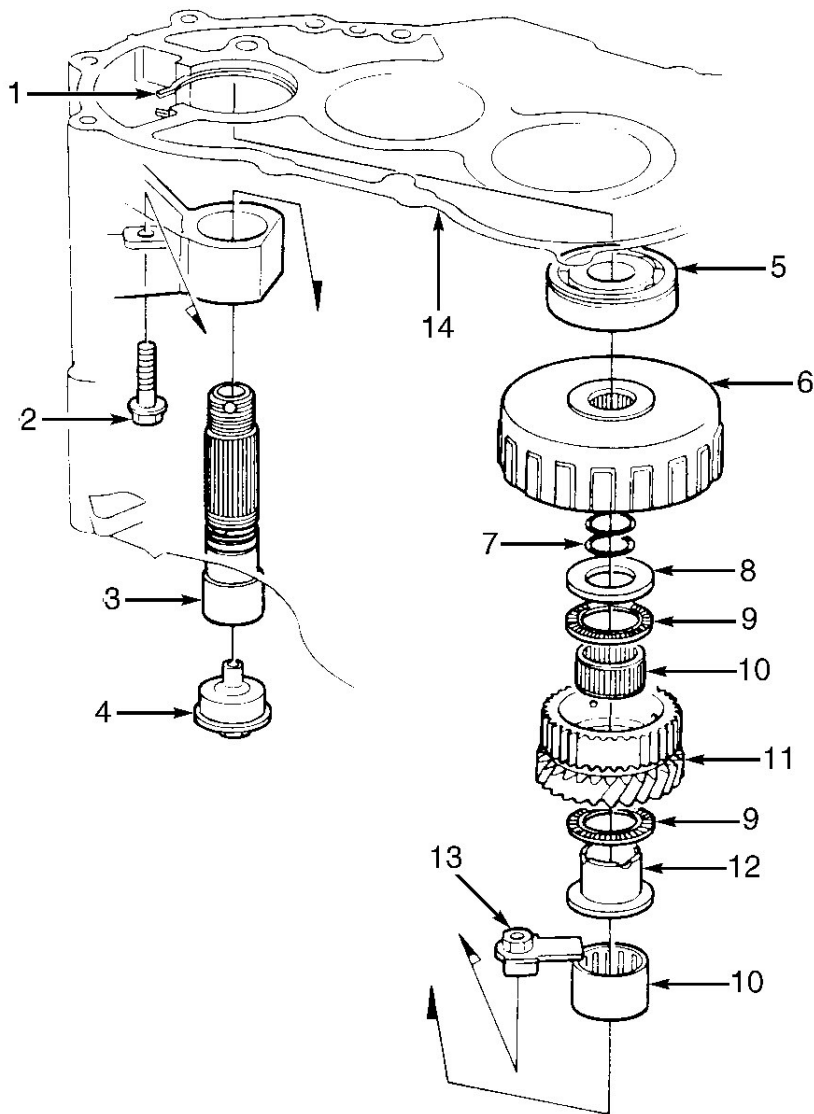
1. Clean components with solvent and dry with compressed air. Inspect splines for excessive wear and bearing surfaces for scoring or wear.
2. Inspect all needle bearings for galling and rough movement. Inspect sub-shaft 4th gear for damage.

Reassembly

1. Lubricate all components with ATF. If installing NEW needle bearing in transaxle housing, using press, press needle bearing into transaxle housing.

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

2. If installing transaxle housing bearing in transaxle housing, install snap ring (if removed). Expand snap ring. Using press, press transaxle housing bearing part way into transaxle housing.
3. Release snap ring. Continue pressing transaxle housing bearing into transaxle housing until snap ring engages in bearing. Ensure snap ring is fully seated. Snap ring end gap clearance should be 0-.280" (0-7 mm). If snap ring end gap is too large, reseal or replace snap ring.
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 on sub-shaft with tape to prevent damage to "O" rings. Install sub-shaft and components in transaxle housing.
6. Install and tighten needle bearing stopper bolt to specification. See **TORQUE SPECIFICATIONS** . Tap NEW oil guide cap into transaxle housing. Ensure oil guide cap is fully seated in transaxle housing.



- | | |
|--------------------------------|-------------------------------|
| 1. Snap Ring | 8. Thrust Shim |
| 2. Needle Bearing Stopper Bolt | 9. Thrust Needle Bearing |
| 3. Sub-Shaft | 10. Needle Bearing |
| 4. Oil Guide Cap | 11. Sub-Shaft 4th Gear |
| 5. Transaxle Housing Bearing | 12. Sub-Shaft 4th Gear Collar |
| 6. 1st-Hold Clutch | 13. Needle Bearing Stopper |
| 7. "O" Ring | 14. Transaxle Housing |

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Fig. 26: Exploded View Of Typical Sub-Shaft & Components
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

CLUTCH ASSEMBLIES

NOTE: The 2nd/4th and 1st-Hold clutch assemblies are equipped with 2 different styles of clutch pistons, if replacement is necessary, ensure same design as original type clutch is used. See **Fig. 27** . Ensure spring compressor is making full contact with spring retainer or damage will occur.

Disassembly

1. Remove snap ring, clutch end plate, clutch discs and clutch plates. See **Fig. 27** .
2. Note direction of disc spring installation on all clutches. Remove disc springs.
3. Using spring compress, compress return spring. Remove snap ring. Release and remove spring compressor. 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 (if equipped) is thoroughly cleaned and securely fastened on clutch piston.
2. Inspect components for damage. Replace if necessary. Ensure no rough edges exist on "O" ring sealing areas.

Reassembly

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

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

2. Install return spring and spring retainer in clutch drum. Place snap ring on spring retainer. Using spring compressor, compress return spring. Install snap ring. Remove spring compressor.
3. Install disc spring on all clutches. Ensure disc spring is installed in proper direction. See **Fig. 27** .

CAUTION: Soak clutch discs 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. Using dial indicator, measure clutch clearance between clutch end plate and top clutch disc. See **Fig. 28** . Zero dial indicator with clutch end plate lowered, and then lift clutch end plate upward against snap ring. Distance measured is clutch clearance.
6. Measure clutch clearance at 3 different locations. Clutch clearance should be within specification. See **CLUTCH CLEARANCE SPECIFICATIONS** table.
7. If clutch clearance is not within specification, install different thickness clutch end plate. See **CLUTCH**

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END PLATE SPECIFICATIONS table.

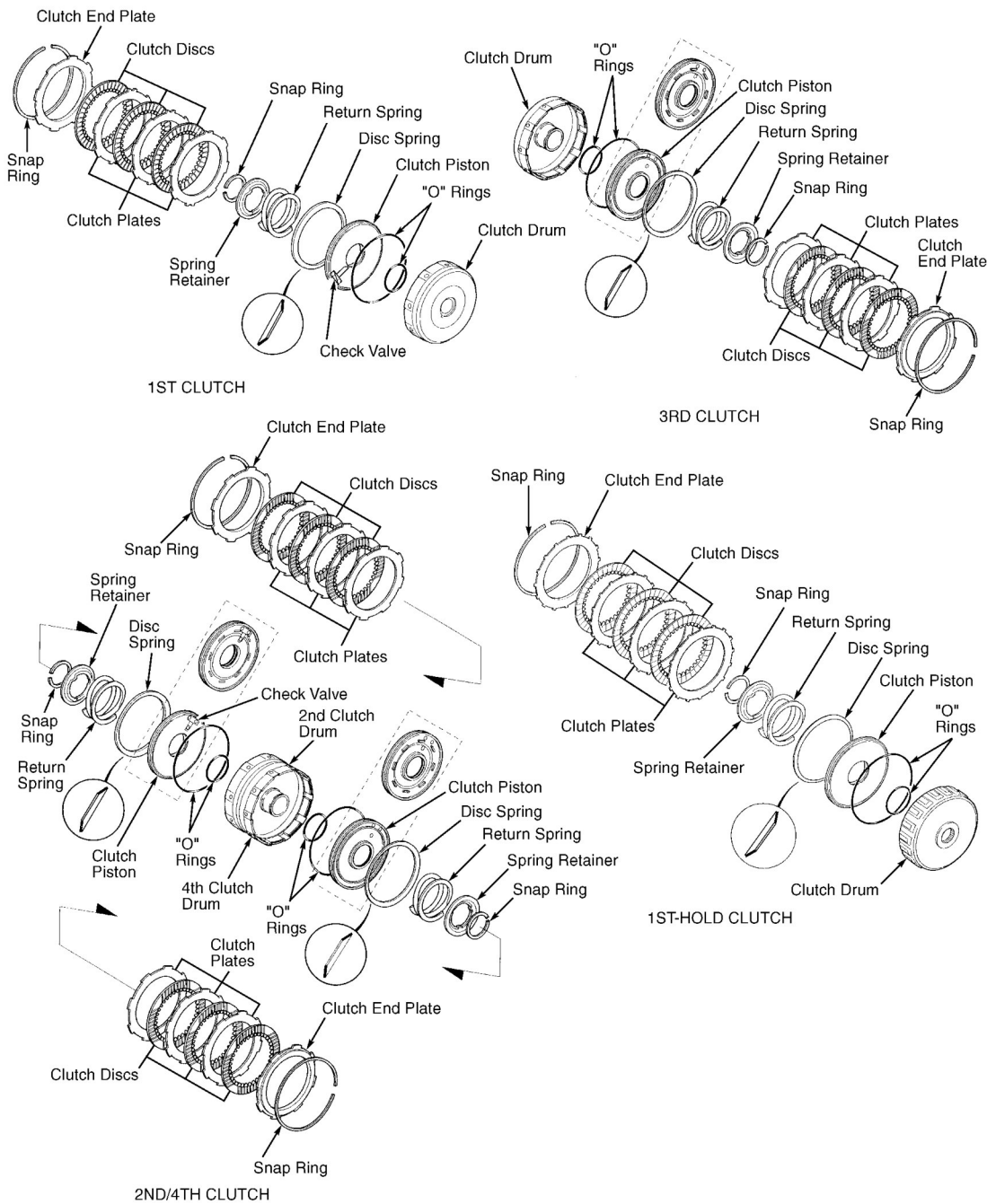
NOTE: If thickest clutch end plate is installed and clutch clearance still exceeds specification, replace clutch discs and clutch plates.

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)

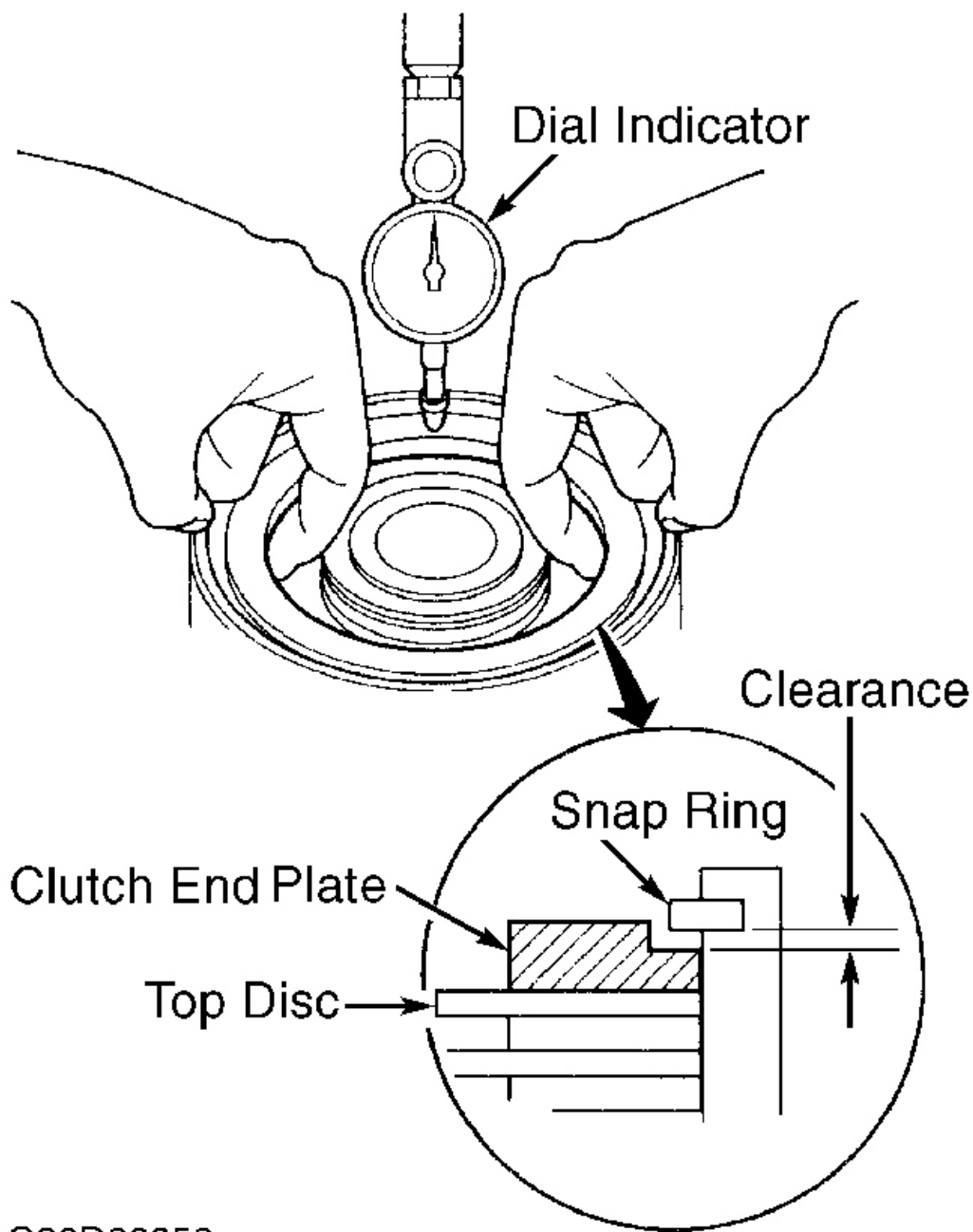
CLUTCH END PLATE SPECIFICATIONS

Plate Number	Part Number	Thickness In. (mm)
1st-Hold Clutch		
1	22551-PS5-003	.083 (2.10)
2	22552-PS5-003	.087 (2.20)
3	22553-PS5-003	.091 (2.30)
4	22554-PS5-003	.094 (2.40)
5	22555-PS5-003	.098 (2.50)
6	22556-PS5-003	.102 (2.60)
7	22557-PS5-003	.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	.083 (2.10)
12	22562-PC9-000	.087 (2.20)
13	22563-PC9-000	.091 (2.30)



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



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Fig. 28: Measuring Clutch Clearance

Courtesy of AMERICAN HONDA MOTOR CO., INC.

TORQUE CONVERTER HOUSING

Disassembly

1. Remove countershaft bearing from torque converter housing using slide hammer (if necessary). Remove oil guide plate from torque converter housing. See **Fig. 12** .
2. Using hammer and bearing remover/installer, remove mainshaft bearing and oil seal from torque converter housing. Using hammer and drift, tap differential oil seal from torque converter housing.

Cleaning & Inspection

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

Reassembly

1. Coat all components with ATF. To install mainshaft bearing, use hammer and bearing remover/installer, install bearing in until bearing bottoms in torque converter housing.
2. Using hammer and oil seal installer, install NEW mainshaft oil seal in torque converter housing. Oil seal should be flush with torque converter housing surface.
3. To install countershaft bearing, install oil guide plate in countershaft bearing bore of torque converter housing. Ensure oil guide plate is installed so tab in center faces upward (away from torque converter housing surface). See **Fig. 12** . Ensure oil guide is installed to a depth of 0-.001" (0-.03 mm), zero being flush and .001" is past flush (inset). Using hammer and bearing installer, install countershaft 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.

4. Once correct differential bearing side clearance is obtained, using hammer and oil seal installer, install NEW differential oil seal in torque converter housing. Ensure oil seal is fully seated in torque converter housing.

TRANSAXLE HOUSING**Disassembly**

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

Cleaning & Inspection

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

Reassembly

1. Coat all components with ATF. To install mainshaft, countershaft and sub-shaft bearings, expand snap ring and install bearing part way into transaxle housing.

CAUTION: Ensure bearings are installed with groove of bearing facing inside of transaxle housing so snap ring engages in bearing when bearing is fully installed. Ensure snap ring fully engages in bearing. Snap ring end gap clearance should be 0-.280" (0-7 mm). If snap ring end gap is too large, reseal or replace snap ring.

2. Release snap ring. Press bearing into transaxle housing until snap ring engages with groove on bearing.

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

3. Once correct differential bearing side clearance is obtained, using hammer and oil seal installer, install NEW differential oil seal in transaxle housing. Ensure oil seal is fully seated in transaxle housing.

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. 29 . Check pinion gear backlash. Pinion gear backlash should be .003-.006" (.08-.15 mm). Replace differential assembly if pinion gear backlash is not within specification.
3. If replacing differential bearings, use bearing puller to remove differential bearings from differential carrier. Remove bolts and ring gear.

NOTE: Ring gear bolts have left-hand threads.

4. If removing speedometer drive gear, remove snap ring, speedometer drive gear and dowel pin. See Fig. 30 .

Cleaning & Inspection

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

Reassembly

1. Install dowel pin for speedometer drive gear in differential carrier. Install speedometer drive gear on

differential carrier.

CAUTION: Ensure chamfered side on inside of speedometer drive gear is toward differential carrier. See [Fig. 30](#) . Ensure cutout area on speedometer drive gear aligns with dowel pin.

2. Install snap ring so hooked end is facing upward and snap ring end gap is properly positioned in relation to pinion shaft in differential carrier. See [Fig. 31](#) . Ensure snap ring seats in groove on differential carrier.

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

3. Install ring gear on differential carrier with chamfered side on inside of ring gear toward differential carrier. See [Fig. 30](#) .
4. Install and tighten ring gear bolts to specification. See [TORQUE SPECIFICATIONS](#) . Using driver, install NEW differential bearings on differential carrier (if removed).

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

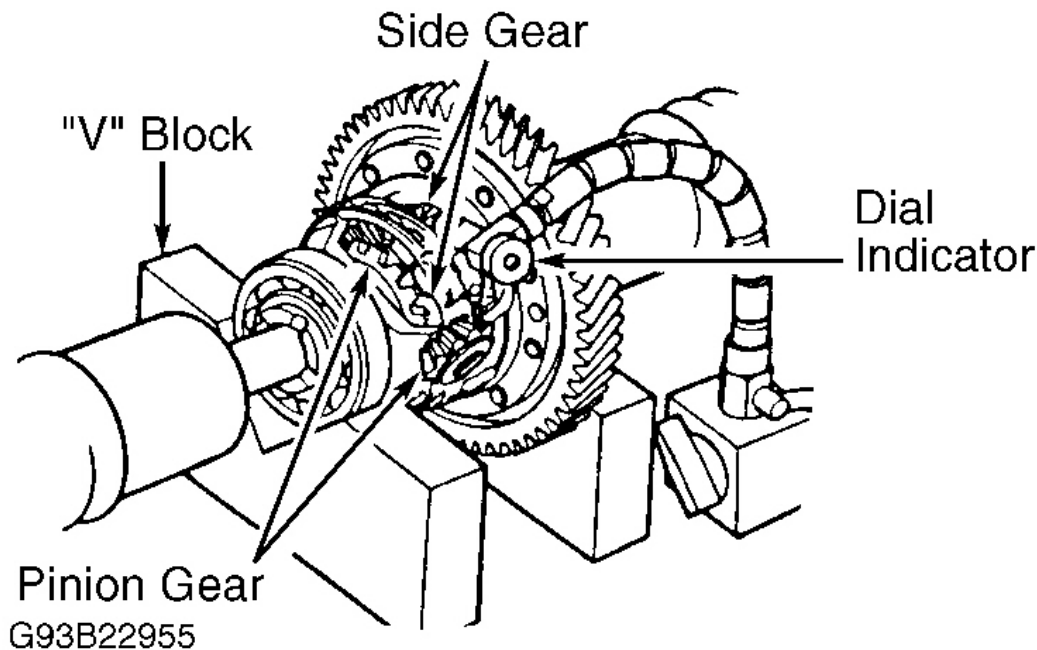
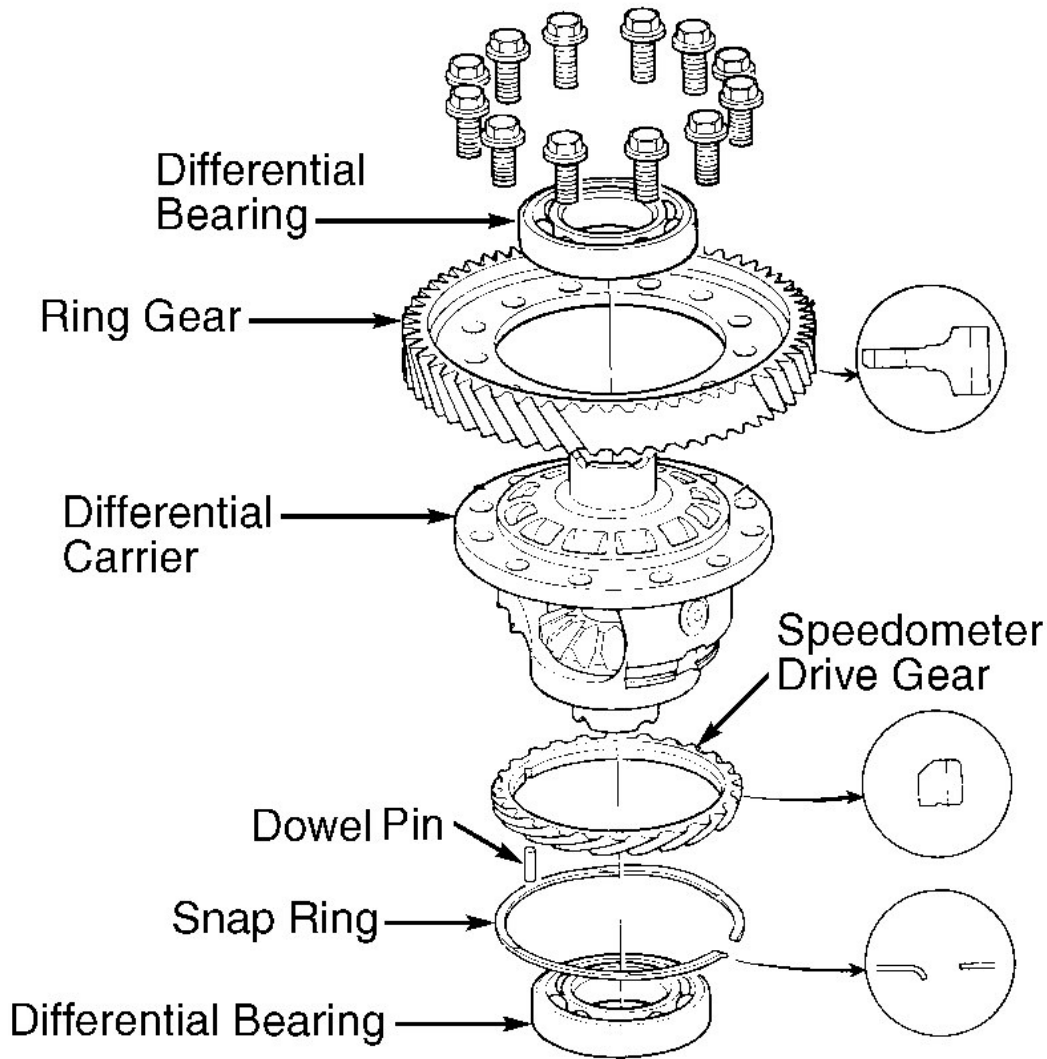


Fig. 29: Checking Pinion Gear Backlash

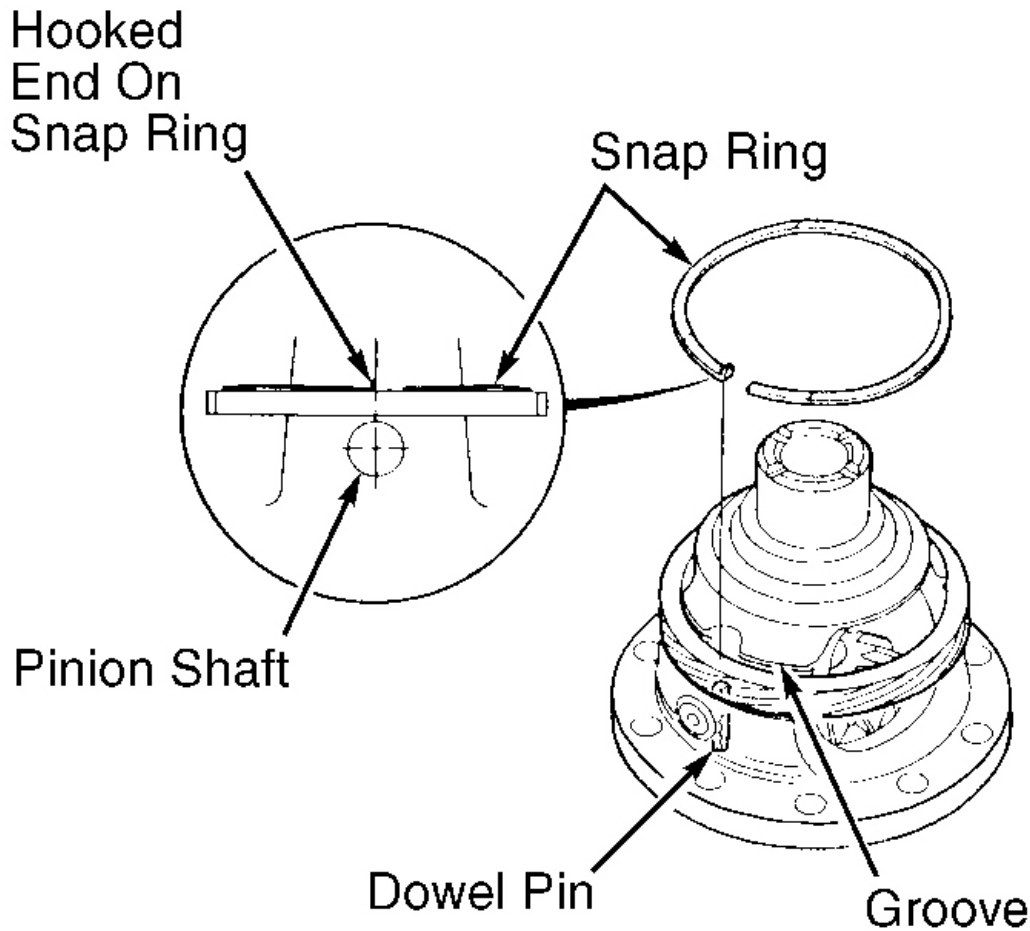
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 30: Exploded View Of Differential Assembly

Courtesy of AMERICAN HONDA MOTOR CO., INC.



95J19991

Fig. 31: 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. Ensure differential oil seal is not installed in transaxle housing. Install .098" (2.50 mm) thick snap ring in transaxle housing. This is the snap ring that differential bearing seats against. Ensure snap ring is fully

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seated.

2. Install differential assembly on torque converter housing. Using driver, tap differential assembly into torque converter housing. Perform STEP 1. See **Fig. 32** . Ensure bearing on differential carrier is fully seated on torque converter housing.
3. Install gasket and transaxle housing on torque converter housing. **DO NOT** apply sealer at this time. Install and tighten transaxle housing bolts to 25 ft. lbs. (34 N.m) in 2 steps using proper sequence. See **Fig. 33** .
4. Using driver, tap on transaxle housing side of differential assembly to fully seat bearings. Perform STEP 2. See **Fig. 32** . 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. 34** . Replace snap ring if differential bearing side clearance exceeds .006" (.15 mm).
6. Different thickness snap rings are available. See **SNAP RING SPECIFICATIONS** table. Recheck differential bearing side clearance. Remove transaxle housing and differential assembly.

SNAP RING SPECIFICATIONS

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

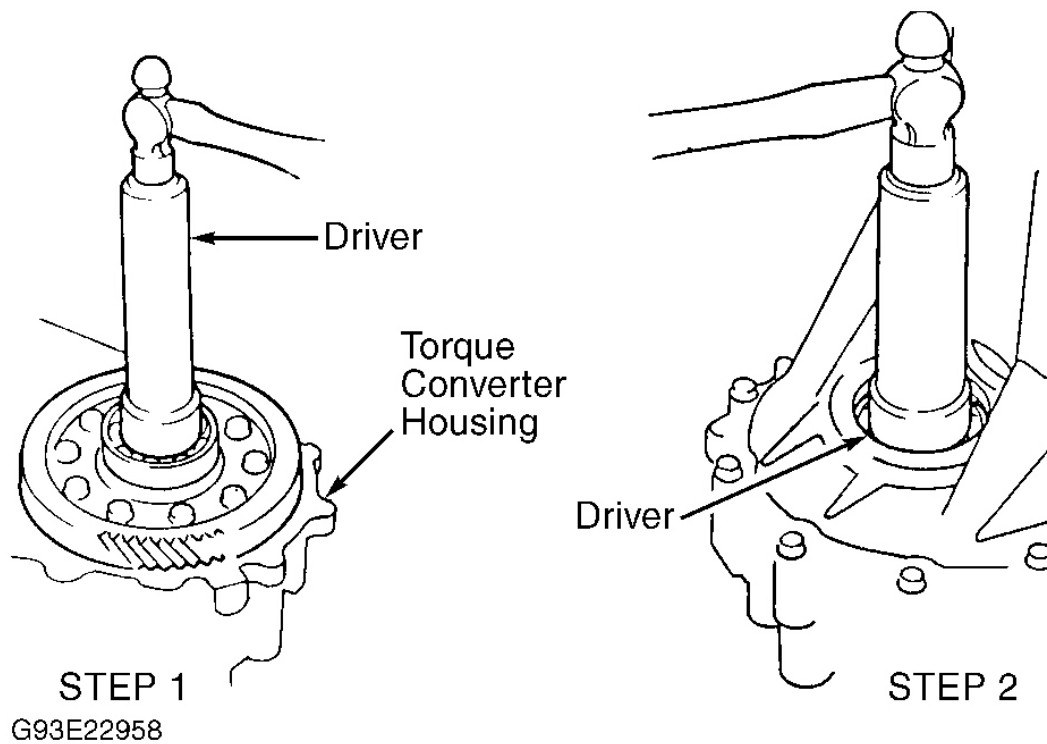
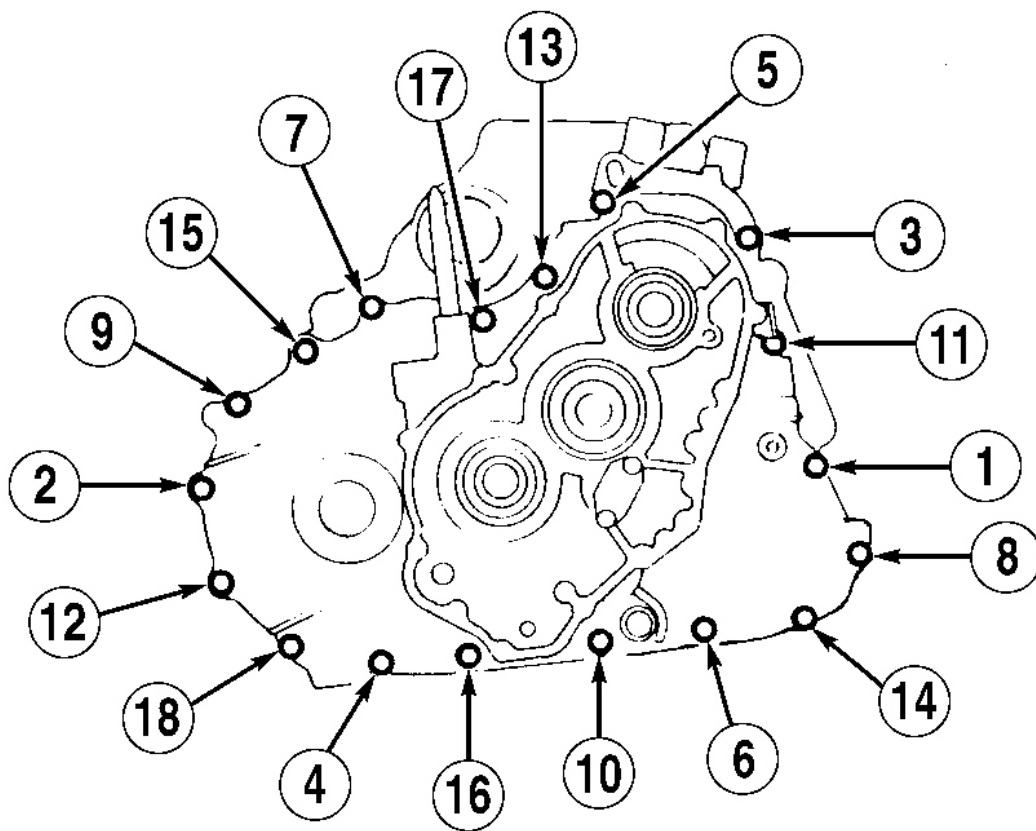


Fig. 32: Installing Differential Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 33: Transaxle Housing Bolt Tightening Sequence
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

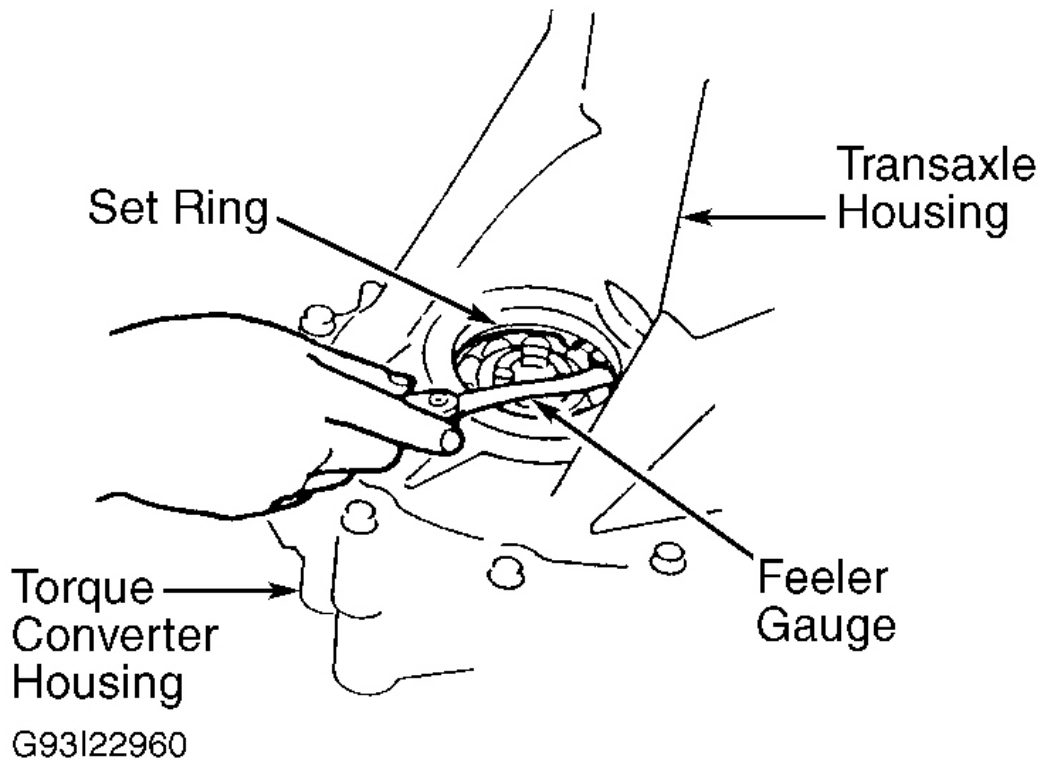


Fig. 34: Checking Differential Bearing Side Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

VALVE BODIES & INTERNAL COMPONENTS

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

NOTE: Coat all components with ATF before reassembly.

1. Install needle bearing on end of reverse idler gear holder. Install reverse idler gear in transaxle housing. Install reverse idler gear holder on transaxle housing. Install and tighten reverse idler gear holder bolts to specification. See **TORQUE SPECIFICATIONS** .
2. Install fluid strainer 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 separator plate).

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

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 main valve body bolts, and realign oil pump gears and oil pump driven gear shaft. Failure to align oil pump driven gear shaft may result in seized oil pump gears or shaft.

4. Ensure check balls are installed in main valve body. See **Fig. 13** . Install separator plate, dowel pins, secondary valve body and retaining bolt.
5. Install control shaft on torque converter housing. Ensure control shaft engages with manual valve on main valve body.
6. Install detent arm and detent arm shaft on main valve body. Hook detent spring on detent arm and control shaft.
7. Ensure check balls and filter are installed on secondary valve body. See **Fig. 16** . Install separator plate and servo body. Install and tighten secondary valve body and servo body bolts to specification.
8. Install dowel pins, separator plate and modulator valve body. Install and tighten bolts to specification. Install accumulator cover. Install and tighten bolts to specification.
9. Install baffle plate and servo detent base. Install bolts and NEW bolt locks on servo detent base. Tighten bolts to specification. Bend over tabs on bolt locks.
10. Install dowel pin and governor body. Install bolts and NEW bolt locks on governor body. Tighten bolts to specification. Bend over tabs on bolt locks.
11. Tighten main valve body bolts to specification. 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 main valve body 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.
12. Install stator shaft, NEW "O" ring and stopper shaft. Install regulator valve body with one retaining bolt.
13. Install dowel pins, separator plate and lock-up valve body. Install and tighten regulator valve body and lock-up valve body bolts to specification. Install all oil feedpipes. See **Fig. 12** .
14. Install sub-shaft assembly. See **SUB-SHAFT & COMPONENTS** under COMPONENT DISASSEMBLY & REASSEMBLY. Install differential assembly in torque converter housing. Using driver, tap differential assembly into torque converter housing. Perform STEP 1. See **Fig. 32** . Ensure bearing on differential carrier is fully seated on torque converter housing.
15. Install mainshaft and countershaft as an assembly on torque converter housing. Rotate shift fork shaft on servo body so large chamfered hole aligns with hole in reverse shift fork.
16. Install shift fork and reverse selector. See **Fig. 11** . Install shift fork bolt and NEW bolt lock. Tighten bolt to specification. Bend over tabs on bolt lock.
17. Install countershaft reverse gear, needle bearing and collar on countershaft. Align spring pin on control shaft with groove on transaxle housing by rotating control shaft. See **Fig. 10** . 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 2 steps using proper sequence. See **Fig. 33**.
19. Install mount bracket on transaxle housing. Install and tighten mount bracket bolts to specification.
20. Install mainshaft holder on mainshaft to secure mainshaft from rotating. See **Fig. 8**. Install parking brake lever and parking brake lever spring on control shaft. See **Fig. 7**.
21. Install countershaft 1st gear collar, needle bearing and countershaft 1st gear with one-way clutch and parking gear on countershaft.
22. Install parking brake stopper, bolt and NEW bolt lock. **DO NOT** tighten bolt at this time. Install parking pawl stopper, parking pawl shaft, parking pawl spring and parking pawl.

NOTE: On 1996 models, countershaft lock nut has left hand threads. **DO NOT** use impact wrench to tighten lock nut.

23. Engage parking pawl with parking gear. Install old beveled spring washer (1996) and old countershaft lock nut on countershaft. Tighten countershaft lock nut to 77 ft. lbs. (105 N.m) to seat parking gear and countershaft 1st gear on countershaft. Remove old countershaft lock nut from countershaft.
24. Install sub-shaft 1st gear on sub-shaft. Install mainshaft 1st gear collar on mainshaft. Apply tape to mainshaft splines to prevent damage to "O" rings. Install NEW "O" rings on mainshaft.
25. Install needle bearing, thrust needle bearing, thrust washer and mainshaft 1st gear in 1st clutch assembly and install on mainshaft. See **Fig. 7**.
26. Ensure sub-shaft 1st gear is installed in proper direction. Align hole in sub-shaft 1st gear with hole in transaxle housing.
27. Install pin in sub-shaft 1st gear and transaxle housing to prevent sub-shaft 1st gear from rotating while tightening lock nut. See **Fig. 9**. Install NEW beveled spring washer on sub-shaft, countershaft (1996) and mainshaft (1996).

CAUTION: Ensure beveled spring washers are installed with largest area away from lock nut. See **Fig. 7**.

NOTE: Mainshaft has left-hand threads. Countershaft in 1996 has left hand-threads. **DO NOT** use impact wrench to tighten lock nuts.

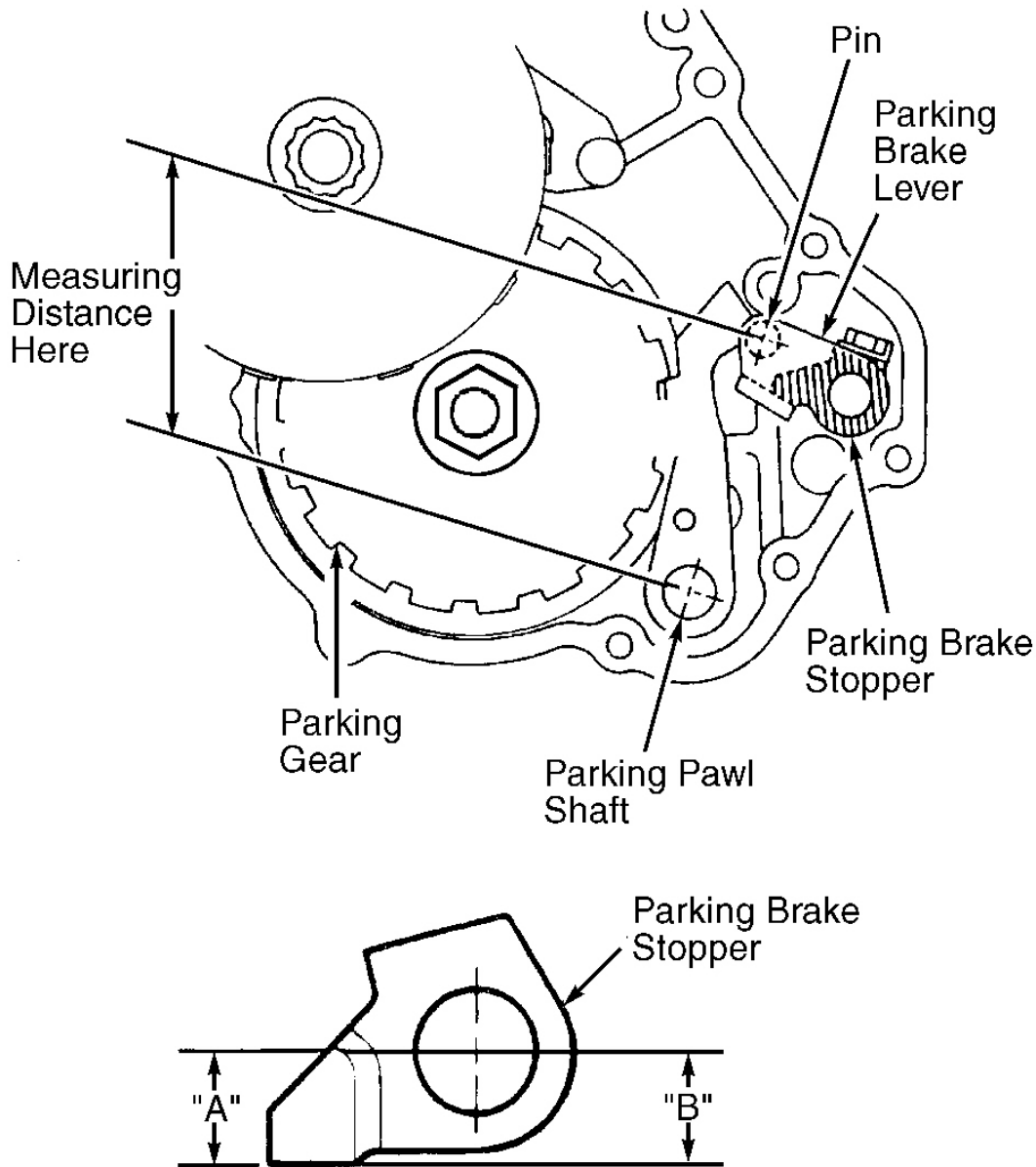
28. Install NEW lock nuts on countershaft, mainshaft and sub-shaft. Tighten lock nuts to specification. Remove pin from sub-shaft 1st gear. Remove mainshaft holder.
29. Stake flange area of mainshaft lock nut against 1st clutch assembly. Stake flange area of countershaft lock nut against parking gear. Stake thread area of sub-shaft lock nut against threads of sub-shaft.

CAUTION: Ensure all lock nuts are securely staked.

30. Place parking brake lever in "P" position. Ensure parking pawl fully engages parking gear.
31. If parking pawl does not fully engage, measure parking brake stopper distance between parking pawl shaft and pin on parking brake lever. See **Fig. 35**.

32. Parking brake stopper distance should be 3.100-3.140" (78.75-79.75 mm). If parking brake stopper distance is not within specification, install different size parking brake stopper, and recheck parking brake stopper distance.
33. Parking brake stopper is available in different sizes. See **PARKING BRAKE STOPPER SPECIFICATIONS** table.
34. Tighten parking brake stopper bolt to specification. Bend over tabs on bolt lock. Using NEW gasket, install right side cover. Install and tighten bolts to specification.
35. 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.

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



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Fig. 35: Measuring Parking Brake Stopper Distance & Parking Brake stopper
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

PARKING BRAKE STOPPER SPECIFICATIONS

I.D. Mark	Part Number	Distance "A" ⁽¹⁾ In. (mm)	Distance "B" ⁽¹⁾ In. (mm)
1	24537-PA9-003	.433 (11.00)	.433 (11.00)
2	24538-PA9-003	.425 (10.80)	.419 (10.65)

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3	24539-PA9-003	.417 (10.60)	.406 (10.30)
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(1) Measured from center of parking brake stopper. See **Fig. 35**.**TORQUE SPECIFICATIONS****TORQUE SPECIFICATIONS**

Application	Ft. Lbs. (N.m)
Cooler Pipes	21 (29)
Countershaft Lock Nut	77 (105)
Drain Plug	36 (49)
Joint Bolt	21 (29)
Mainshaft Lock Nut	58 (80)
Mount Bracket Bolt	36 (49)
Pressure Tap Plug	13 (18)
Ring Gear Bolt	76 (103)
Speed Sensor Bolt	16 (22)
Sub-Shaft Lock Nut	70 (95)
Transaxle Housing Bolt ⁽¹⁾	33 (45)
INCH Lbs. (N.m)	
Accumulator Cover Bolt	106 (12.0)
Breather Cover Bolt	97 (11.0)
Governor Body Bolt	106 (12.0)
Governor Housing-To-Governor Shaft Bolt	106 (12.0)
Lock-Up Control Solenoid Valve Assembly Bolt	106 (12.0)
Lock-Up Valve Body Bolt	106 (12.0)
Main Valve Body Bolt	106 (12.0)
Modulator Valve Body Bolt	106 (12.0)
Needle Bearing Stopper Bolt	106 (12.0)
Parking Brake Stopper Bolt	124 (14.0)
Regulator Valve Body Bolt	106 (12.0)
Reverse Idler Gear Holder Bolt	106 (12.0)
Right Side Cover Bolt	108 (12.0)
Secondary Valve Body Bolt	106 (12.0)
Servo Body Bolt	106 (12.0)
Servo Detent Base Bolt	106 (12.0)
Shift Fork Bolt	124 (14.0)
Stopper Bolt	106 (12.0)
Throttle Cam Stopper Bolt	106 (12.0)
Valve Cover Bolt	71 (8.0)

(1) Tighten bolts to specification in sequence. See **Fig. 33**.

TRANSAXLE SPECIFICATIONS

TRANSAXLE SPECIFICATIONS

Application	Specification: In. (mm)
Clutch Clearance	
1st & 2nd Clutches	.026-.033 (.65-.85)
1st-Hold Clutch	.020-.031 (.50-.80)
3rd & 4th Clutches	.016-.024 (.40-.60)
Differential Bearing Side Clearance	⁽¹⁾ .006 (.15)
Differential Pinion Gear Backlash	.003-.006 (.08-.15)
Gear Clearances	
Countershaft	
1995	
2nd Gear-To-3rd Gear	.002-.005 (.05-.13)
4th Gear	.002-.005 (.05-.13)
1996	
4th Gear	.004-.007 (.10-.18)
Mainshaft	
2nd Gear-To-3rd Gear	.002-.005 (.05-.13)
Oil Pump Clearances	
Side Clearance	
Oil Pump Drive Gear	.0083-.0104 (.210-.265)
Oil Pump Driven Gear	
1995	.0028-.0049 (.070-.125)
1996	.0014-.0025 (.035-.065)
Thrust Clearance	
Standard	.0016-.0024 (.034-.056)
Wear Limit	.0028 (.070)
Parking Brake Stopper Distance	3.100-3.140 (78.75-79.75)
(1) This is the maximum clearance. Replace snap ring with different thickness snap ring if clearance exceeds specification.	