

1991 Honda Accord DX

1991-92 AUTOMATIC TRANSMISSIONS APX4 & MPXA Overhaul

1991-92 AUTOMATIC TRANSMISSIONS

APX4 & MPXA Overhaul

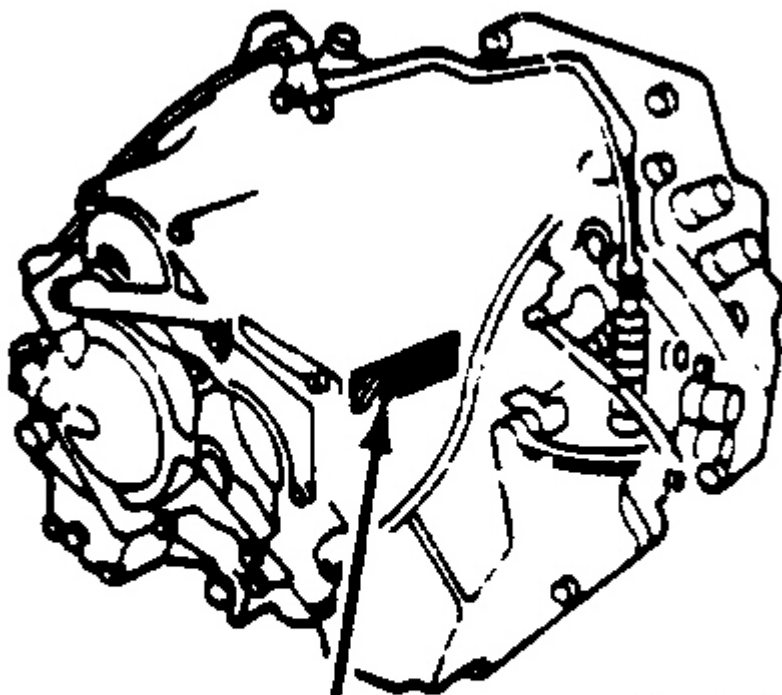
APPLICATION

TRANSAXLE APPLICATION

Application	Transaxle Model
Accord	
1991	(1) MPXA
1992	(1) APX4
(1) The APX4 is manufactured in the United States, and MPXA in Japan.	

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.



Transaxle Model
& Serial Number

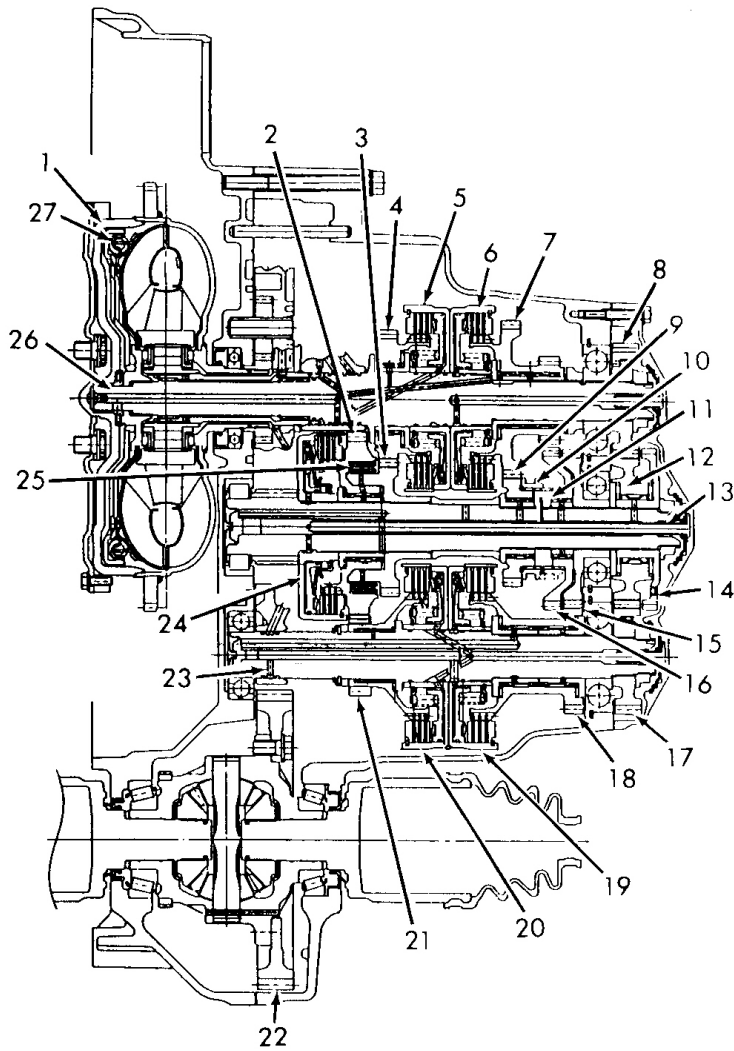
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Fig. 1: Identifying Transaxle Model & Serial Number Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

DESCRIPTION

Automatic transaxle is electronically controlled and has 4 forward speeds and one reverse speed. Transaxle consists of clutches, mainshaft, countershaft, secondary shaft, shift control solenoid valves, lock-up control solenoid valves and lock-up torque converter. See [Fig. 2](#) .

Valve assembly consists of main valve body, secondary valve body, servo valve body, regulator valve body and throttle valve body. Transaxle shifting and torque converter lock-up are controlled by the Automatic Transaxle Control Unit (ATCU) for optimal performance. All 1991 models have an "S" (sport mode) switch mounted on shift lever in vehicle. The "S" switch is used to change shift points under part throttle acceleration.



- | | |
|-------------------------------|--------------------------------|
| 1. Torque Converter | 15. Countershaft 2nd Gear |
| 2. Countershaft 1st Gear | 16. Countershaft Reverse Gear |
| 3. Countershaft 3rd Gear | 17. Secondary Shaft Idler Gear |
| 4. Mainshaft 3rd Gear | 18. Secondary Shaft 2nd Gear |
| 5. 3rd Gear | 19. 2nd Clutch |
| 6. 4th Clutch | 20. 1st Clutch |
| 7. Mainshaft 4th-Reverse Gear | 21. Secondary Shaft 1st Gear |
| 8. Mainshaft Idler Gear | 22. Differential |
| 9. Countershaft 4th Gear | 23. Secondary Shaft |
| 10. Reverse Selector | 24. 1st-Hold Clutch |
| 11. Selector Hub | 25. One-Way Clutch |
| 12. Countershaft Idler Gear | 26. Mainshaft |
| 13. Countershaft | 27. Lock-Up Piston |
| 14. Parking Gear | |

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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. Shift lever also changes position of the shift position console switch, mounted near shift lever. Shift position console switch delivers an input signal to the ATCU to indicate shift lever position. The ATCU uses input signal and operates shift control solenoid valves to control transaxle shifting.

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

"P" (Park)

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

"R" (Reverse)

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

"N" (Neutral)

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

"D4" (Drive/4th)

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

"D" (Drive/3rd)

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

"2" (Second)

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

"1" (First)

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

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

The ATCU contains a self-diagnostic system, which will store fault code if failure or problem exists in transaxle electronic control system. Fault code can be retrieved to determine transaxle problem area. For information on electronic transaxle components, see **APX4 & MPXA 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 more information on shift and key interlock systems, see **APX4 & MPXA ELECTRONIC CONTROLS** article.

LUBRICATION & ADJUSTMENTS

See **SERVICING - ACCORD** article.

ON-VEHICLE SERVICE

AXLE SHAFTS

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

OIL COOLER FLUSHING

1. Attach Oil Cooler Flusher (J38405-A) to oil cooler lines. See **Fig. 3** . Fill oil cooler flusher tank 2/3 full with Flushing Fluid (J35944-20). **DO NOT** use any other flushing fluid.
2. Ensure water and air valves on oil cooler flusher are off. Apply 80-120 psi (5.6-8.4 kg/cm²) air pressure to oil cooler flusher. Turn oil cooler flusher water valve on so water will flow through oil cooler for 10 seconds. Shut water valve off. Replace oil cooler if water will not flow through oil cooler.
3. Depress and hold mixing trigger on oil cooler flusher downward. Turn water valve on, and flush oil cooler for 2 minutes. Turn air valve on for 5 seconds every 15-20 seconds to create a surging action.
4. Turn water valve off. Release mixing trigger. Disconnect oil cooler flusher, and reverse hoses so oil cooler can be flushed in the opposite direction.
5. Repeat steps 2 and 3 . Turn water valve off. Release mixing trigger. Turn water valve on, and rinse oil cooler for at least one minute. Once oil cooler is flushed in both directions, turn water off. Turn air valve on for 2 minutes or until no moisture is visible from drain hose.

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

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

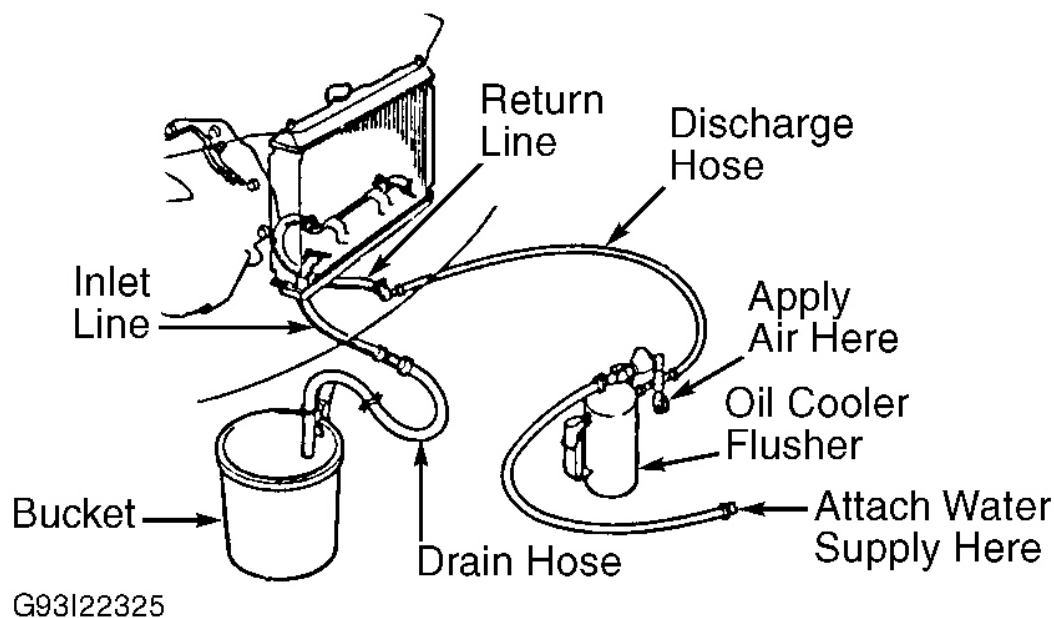


Fig. 3: Installing Oil Cooler Flusher

Courtesy of AMERICAN HONDA MOTOR CO., INC.

TROUBLE SHOOTING

INTRODUCTION

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

SYMPTOM DIAGNOSIS

Excessive Drag In Transaxle

- Defective Torque Converter
- Incorrect Idle RPM

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
- 2nd Orifice Control Valve Stuck

Flares On 3-4 Upshift

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

Gear Whine That Changes With RPM & Shifts

- Damaged Mainshaft Or Countershaft
- Damaged Secondary Shaft Idler Gears
- 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
- 3rd Kickdown Valve Stuck
- 4th Exhaust Valve Stuck

Harsh Shift When Manually Shifting To "1"

- Defective 1st-Hold Clutch Accumulator

Harsh Upshifts & Downshifts

- Check Balls Missing
- Clutch Pressure Control Valve Stuck
- Improper ATF Type
- Incorrect Clutch Clearance
- Throttle Valve "B" Stuck
- Throttle Valve (T. V.) Cable Adjusted Too Short
- 2nd Orifice Control Valve Stuck
- 3rd 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
- 2nd Orifice Control Valve Stuck

Harsh 3-4 Upshift

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

Lock-Up Clutch Does Not Lock-Up Smoothly

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

Lock-Up Clutch Does Not Operate Properly

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

- Defective Differential Gears
- Damaged Reverse 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
- Pressure Regulator 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

- Modulator Valve Stuck
- Throttle Valve (T. V.) Cable Adjusted Too Short
- 3-2 Kickdown Valve Stuck

Slips In All Gears

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

Slips In Low 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
- Pressure Regulator Stuck

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

- One-Way Clutch Installed Upside Down

Will Not Downshift To Low Gear

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

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

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

Will Not Upshift (Stays In Low Gear)

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

TESTING**ROAD TEST**

NOTE: If shift lever cannot be moved from "P" with brake pedal depressed and accelerator at idle position, check shift interlock system. See APX4 & MPXA ELECTRONIC CONTROLS article.

CAUTION: DO NOT shift from "D4" or "D" to "2" at speeds greater than 62.5 MPH, or transaxle may be damaged.

1. Warm engine to normal operating temperature. Apply parking brake and block wheels. Start engine, move shift lever to "D4" while depressing brake pedal. Depress accelerator pedal and release it suddenly. Engine should not stall.
2. Repeat step 1 with speed lever in "D", and ensure engine does not stall. Road test vehicle, and check for abnormal noise and clutch slippage. See CLUTCH APPLICATION table for clutch engagement specification.
3. Ensure shift points are correct. See UPSHIFT SPECIFICATIONS (MPH) and DOWNSHIFT SPECIFICATIONS (MPH) tables.
4. With shift lever in "D4", accelerate to about 35 MPH so transaxle is in 4th gear. Move shift lever to "2" position, and ensure engine braking occurs.
5. Place shift lever in "1". Accelerate from a stop at full throttle. Check for abnormal noise or clutch slippage. Upshifts and downshifts should not occur in this range.
6. Place shift lever in "2". Accelerate from a stop at full throttle. Check for abnormal noise or clutch slippage. Upshifts and downshifts should not occur in this range.
7. Place shift lever in "R". Accelerate from a stop at full throttle. Check for abnormal noise or clutch slippage.

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8. Park vehicle on a slope. Apply parking brake, and place shift lever in "P". Release parking brake, and ensure vehicle does not move. If vehicle moves, check for defective shift cable or parking components.

CLUTCH APPLICATION

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

UPSHIFT SPECIFICATIONS (MPH)

"D3" & "D4" Positions	1st-2nd Gear	2nd-3rd Gear	3rd-4th Gear	Lock-Up Clutch On
With "S" Switch Off ⁽¹⁾				
1/8 Throttle Coasting Downhill From Stop	13-15	26-28	36-40	14-17
1/2 Throttle Accelerating From Stop	17-21	35-39	54-60	60-65
Full Throttle Accelerating From Stop	30-35	63-68	94-100	84-89
With "S" Switch On ⁽¹⁾				
1/8 Throttle Coasting Downhill From Stop	11-13	24-26	38-42	23-26
1/2 Throttle Accelerating From Stop	17-21	41-45	62-68	69-74
Full Throttle Accelerating From Stop	30-35	63-68	96-102	89-94
(1) The "S" switch is the sport mode switch on shift lever and is used on 1991 models only. Specification for 1992 models is the same as 1991 models with "S" switch off.				

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DOWNSHIFT SPECIFICATIONS (MPH)

"D3" & "D4" Positions	Lock-Up Clutch Off	4th-3rd Gear	3rd-2nd Gear	2nd-1st Gear
With "S" Switch Off ⁽¹⁾				
1/8 Throttle Coasting Downhill From Stop	13-16	18-22	(2)	6-10
1/2 Throttle Accelerating From Stop	48-53	(2)	(2)	(2)
Full Throttle Accelerating From Stop	80-85	78-84	53-59	25-30
With "S" Switch On ⁽¹⁾				
1/8 Throttle Coasting Downhill From Stop	22-25	18-22	(2)	6-10
1/2 Throttle Accelerating From Stop	52-57	(2)	(2)	(2)
Full Throttle Accelerating From Stop	80-85	78-84	55-61	25-30
(1) The "S" switch is the sport mode switch on shift lever and is used on 1991 models only. Specification for 1992 models is the same as 1991 models with "S" switch off.				
(2) Specification is not available from manufacturer.				

STALL SPEED TEST

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

1. Apply parking brake, and block front wheels. Connect tachometer and start engine. Warm engine to normal operating temperature. Place shift lever in "2".
2. Fully depress brake pedal. Fully depress accelerator for 6-8 seconds and note engine speed. This is the torque converter stall speed.
3. Allow transaxle to cool for 2 minutes by idling in neutral. Repeat test procedure with shift lever in "D4", "1" and "R". Allow transaxle to cool between each test.
4. Torque converter stall speed should be the same in "D4", "2", "1" and "R". Ensure torque converter stall speed is within specification. See **TORQUE CONVERTER STALL SPEED** table. If torque converter stall speed is not within specification, see **TORQUE CONVERTER STALL SPEED TROUBLE SHOOTING** table for possible causes.

TORQUE CONVERTER STALL SPEED

Application	Engine RPM
Standard	2500
Service Limit	2350-2650

TORQUE CONVERTER STALL SPEED TROUBLE SHOOTING

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

HYDRAULIC PRESSURE TEST**Pressure Test Preparation**

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

Line Pressure Test

1. With engine off, remove plug from line pressure tap on transaxle. See **Fig. 4** . Attach Pressure Gauge Set (07406-0020400) to line pressure tap using NEW aluminum washer. Tighten hose fitting to 13 ft. lbs. (18 N.m).
2. With shift lever in "P", start and operate engine at 2000 RPM. Note line pressure. Place shift lever in "N", and note line pressure.
3. Line pressure should be within specification. See **HYDRAULIC PRESSURE TEST SPECIFICATIONS** table. If line pressure is not within specification, see **HYDRAULIC PRESSURE TEST TROUBLE SHOOTING** table. Shut engine off. Remove pressure gauge set, and install plug.

NOTE: Clutch pressure should be checked at each clutch pressure tap on transaxle. See **Fig. 4** .

Clutch Pressure Test

1. With engine off, remove plug from appropriate clutch pressure tap on transaxle. See **Fig. 4** . Attach Pressure Gauge Set (07406-0020400) to appropriate pressure tap using NEW aluminum washer. Tighten hose fitting to 13 ft. lbs. (18 N.m).

NOTE: Clutch pressure on some applications may vary with position of Throttle Valve (T. V.) lever on the transaxle. The T. V. cable must be disconnected for some tests. Ensure shift lever is in proper position when checking clutch pressures.

2. Start and operate engine at 2000 RPM and note clutch pressure reading with shift lever in proper location. See **HYDRAULIC PRESSURE TEST SPECIFICATIONS** table.
3. Ensure clutch pressure is within specification. If clutch pressure is not within specification, see **HYDRAULIC PRESSURE TEST TROUBLE SHOOTING** table. Shut engine off. Remove pressure gauge set, and install plug.

Low/High Pressure Test

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

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

2. With engine off, remove plug from appropriate clutch pressure tap on transaxle. Attach Pressure Gauge Set (07406-0020400) to appropriate pressure tap using NEW aluminum washer. Tighten hose fitting to 13 ft. lbs. (18 N.m).
3. Start engine and allow to idle. Move shift lever to "D4" position. Slowly increase engine speed until pressure is indicated on pressure gauge. Release throttle, allowing engine to idle, and note low pressure reading.
4. With engine idling, lift transaxle T. V. lever upward about half the distance of lever travel. Increase engine speed, and note highest pressure reading.
5. Repeat procedure on remaining clutches. Ensure low/high pressure is within specification. See **HYDRAULIC PRESSURE TEST SPECIFICATIONS** table. If low/high pressure is not within specification, see **HYDRAULIC PRESSURE TEST TROUBLE SHOOTING** table.
6. Shut engine off. Remove pressure gauge set, and install plug. Reconnect T. V. cable.

Throttle Valve "B" Pressure Test

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

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

2. Attach Pressure Gauge Set (07406-0020400) to throttle valve "B" pressure tap using NEW aluminum washer. Tighten hose fitting to 13 ft. lbs. (18 N.m).
3. Start engine and operate at 1000 RPM. No pressure should exist with transaxle T. V. lever closed (released position). Lift transaxle T. V. lever to fully open position. Note throttle valve "B" pressure reading.
4. Ensure throttle valve "B" pressure is within specification. See **HYDRAULIC PRESSURE TEST SPECIFICATIONS** table. If pressure is not within specification, see **HYDRAULIC PRESSURE TEST TROUBLE SHOOTING** table. Shut engine off. Remove pressure gauge set, and install plug. Reconnect T. V. cable.

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HYDRAULIC PRESSURE TEST SPECIFICATIONS

Application	Shift Lever Position	psi (kg/cm ²)
Line Pressure		
With Engine At 2000 RPM	"P" Or "N"	107-121 (7.5-8.5)
Clutch Pressure		
1st Clutch With Engine At 2000 RPM	"1"	107-121 (7.5-8.5)
1st-Hold Clutch With Engine At 2000 RPM	"1"	107-121 (7.5-8.5)
2nd Clutch With Engine At 2000 RPM	"2"	107-121 (7.5-8.5)
With Transaxle T. V. Lever Fully Closed ⁽¹⁾	"2"	64-71 (4.5-5.0)
With Transaxle T. V. Lever Open More Than 1/4 ⁽²⁾	"2"	107-121 (7.5-8.5)
3rd Clutch With Transaxle T. V. Lever Fully Closed ⁽¹⁾	"D"	64-71 (4.5-5.0)
With Transaxle T. V. Lever Open More Than 1/4 ⁽²⁾	"D"	107-121 (7.5-8.5)
4th Clutch With Engine At 2000 RPM	"R"	107-121 (7.5-8.5)
With Transaxle T. V. Lever Fully Closed ⁽¹⁾	"D4"	67-74 (4.7-5.2)
With Transaxle T. V. Lever Open More Than 1/4 ⁽²⁾	"D4"	107-121 (7.5-8.5)
Low Pressure		
With Transaxle T. V. Lever Fully Closed ⁽¹⁾ 2nd Or 3rd Clutch	"D4"	64-71 (4.5-5.0)
4th Clutch	"D4"	67-74 (4.7-5.2)
High Pressure		
With Transaxle T. V. Lever Lifted Upward 1/2 Distance Of T. V. Lever Travel 2nd, 3rd Or 4th Clutch	"D4"	107-121 (7.5-8.5)
Throttle Valve "B" Pressure With Transaxle T. V. Lever Fully Open ⁽³⁾	"D4"	107-121 (7.5-8.5)
(1) Pressure is checked with engine at 2000 RPM. The T. V. cable must be disconnected. Fully closed position is with transaxle T. V. lever in released position and not pulled upward by the T. V. cable. (2) Pressure is checked with engine at 2000 RPM. The T. V. cable must be disconnected. Open position is with transaxle T. V. lever pulled upward 1/4 the distance of lever travel. (3) Pressure is checked with engine at 1000 RPM. Open position is with transaxle T. V. lever pulled fully upward.		

HYDRAULIC PRESSURE TEST TROUBLE SHOOTING

Application	Probable Cause
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Line Pressure

Low Or No Pressure

Defective Torque Converter,
Defective Torque Converter Check
Valve, Defective Oil Pump Pressure
Regulator, Defective Oil Pump**Clutch Pressure**

Low Or No 1st Clutch Pressure

Defective 1st Clutch

Low Or No 1st-Hold Clutch Pressure

Defective 1st-Hold Clutch

Low Or No 2nd Clutch Pressure

Defective 2nd Clutch

Low Or No 3rd Clutch Pressure

Defective 3rd Clutch

Low Or No 4th Clutch Pressure

Defective 4th Clutch, Defective
Servo Valve On 4th Clutch**Low/High Pressure**

Low Or No 2nd Clutch Pressure

Defective 2nd Clutch

Low Or No 3rd Clutch Pressure

Defective 3rd Clutch

Low Or No 4th Clutch Pressure

Defective 4th Clutch

Throttle Valve "B" Pressure

Low Or No Pressure

Defective Throttle Valve "B"

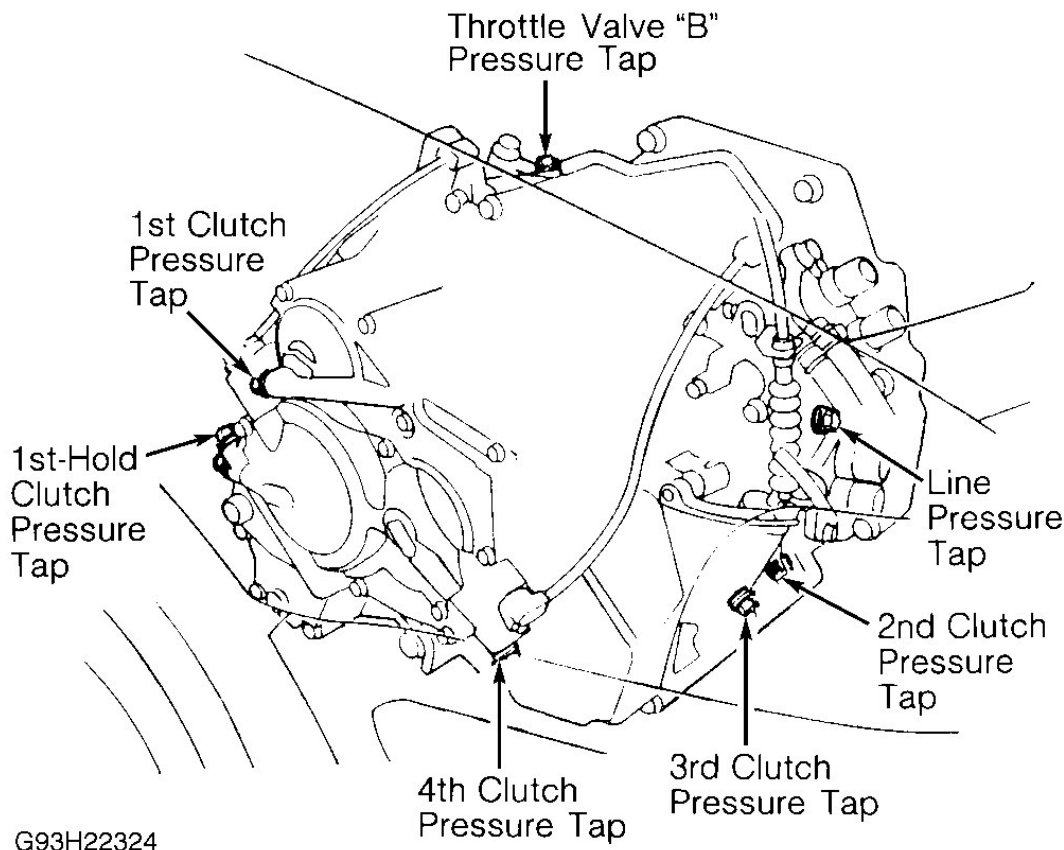


Fig. 4: Identifying Transaxle Pressure Taps

Courtesy of AMERICAN HONDA MOTOR CO., INC.

REMOVAL & INSTALLATION

CAUTION: Vehicle is equipped with a Supplemental Restraint System (SRS). When servicing vehicle, use care to avoid accidental air bag deployment. All SRS electrical connections and wiring harness are covered with Yellow insulation. SRS- related components are located in steering column, center console, instrument panel and lower panel on instrument panel. **DO NOT** use electrical test equipment on these circuits. It may be necessary to deactivate SRS before servicing components. See appropriate **AIR BAG DEACTIVATION PROCEDURES** article in **GENERAL INFORMATION**.

ELECTRICAL COMPONENTS

See APX4 & MPXA ELECTRONIC CONTROLS article.

TRANSAXLE

For transaxle removal procedures, see **REMOVAL & INSTALLATION** article.

TORQUE CONVERTER

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

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

TRANSMISSION DISASSEMBLY

VALVE BODIES & INTERNAL COMPONENTS

1. Remove retaining bolts, right side cover and gasket. See **Fig. 5** . Install Mainshaft Holder (07GAB-PF50100) on mainshaft to secure it. See **Fig. 6** .

CAUTION: DO NOT use impact wrench to remove lock nuts from countershaft, mainshaft and secondary shaft.

2. Engage parking pawl with parking gear. Using hammer and chisel, cut lock tabs on countershaft, mainshaft and secondary shaft lock nuts. Remove lock nuts and spring washers (1992 models). See **Fig. 5** . Mainshaft lock nut has left-hand thread.
3. Remove mainshaft holder once all lock nuts are removed. Using puller, remove parking gear from countershaft. Using puller, remove idler gears from mainshaft and secondary shaft.
4. Remove countershaft idler gear, needle bearing, thrust needle bearing and thrust washer. See **Fig. 5** . Remove parking pawl, parking pawl spring, parking pawl shaft and parking pawl stopper.

CAUTION: Use care when removing reverse idler gear shaft holder from reverse idler gear, as a steel ball and spring are located at bottom of reverse idler gear shaft holder. On 1991 models, steel ball and spring may come out of reverse idler gear shaft holder. On 1992 models, steel ball and spring are held in position by staked area on reverse idler gear shaft holder.

5. Remove throttle control lever and spring from throttle control shaft. See **Fig. 5** . Remove ATF cooler pipe-to-hanger retaining bolt. Remove transaxle housing bolts. Remove bolts and reverse idler gear shaft holder. See **Fig. 5** .
6. Move reverse idler gear to disengage from countershaft reverse gear. See **Fig. 7** . Align spring pin with groove in transaxle housing by rotating shaft. Using Puller (07HAC-PK4010A), remove transaxle housing. See **Fig. 8** .

NOTE: Transaxle housing may not separate from torque converter housing if reverse idler gear shaft holder is not removed and reverse idler gear repositioned.

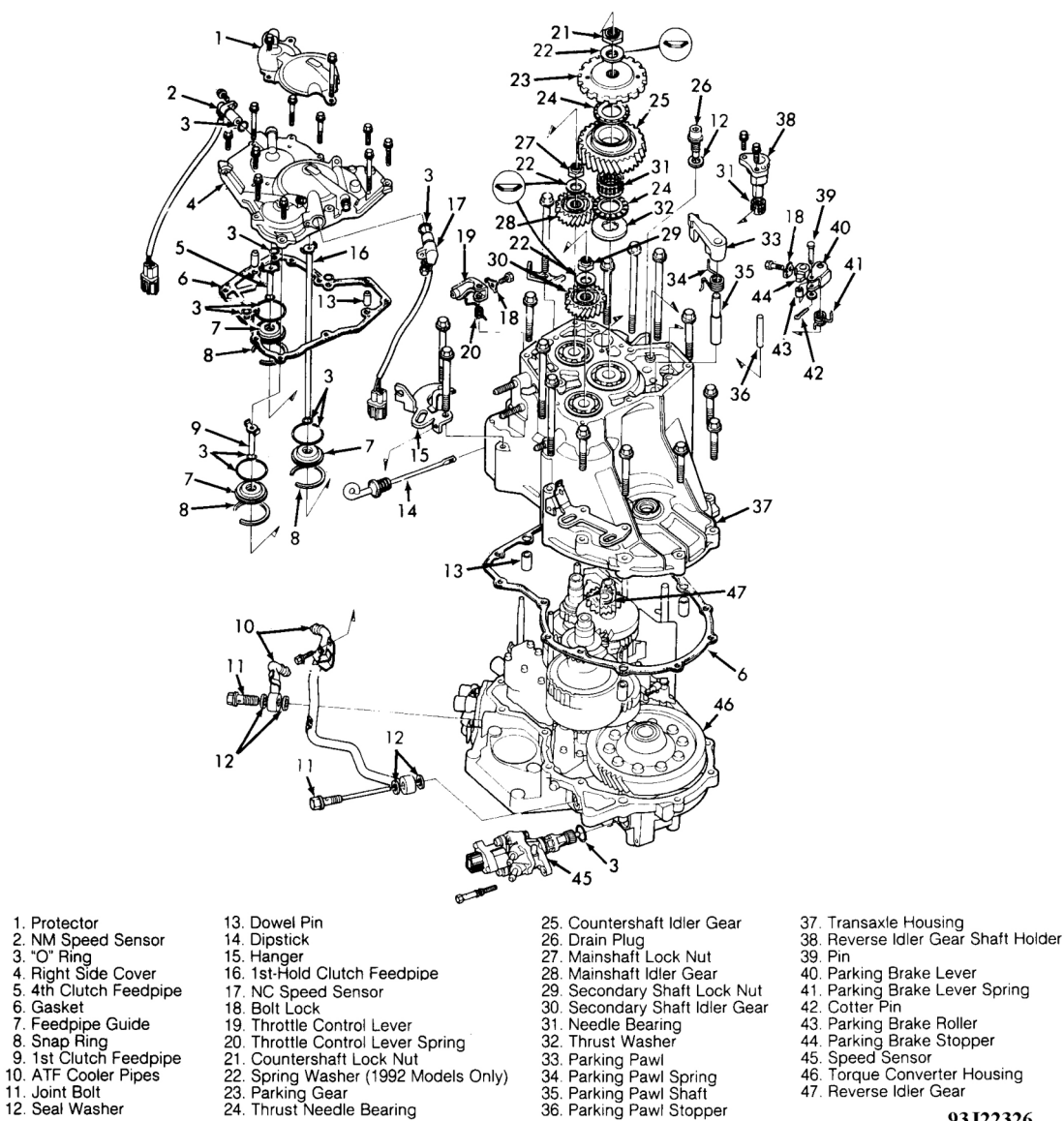


Fig. 5: Exploded View Of Right Side Cover & Components
Courtesy of AMERICAN HONDA MOTOR CO., INC.

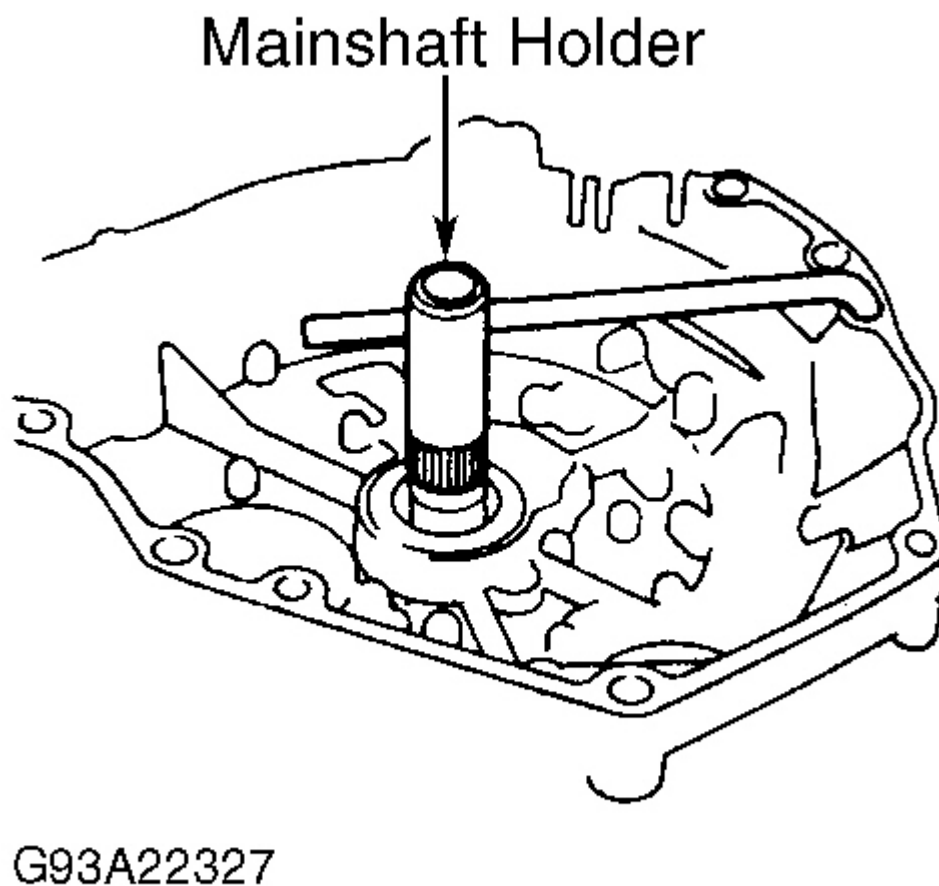


Fig. 6: Installing Mainshaft Holder

Courtesy of AMERICAN HONDA MOTOR CO., INC.

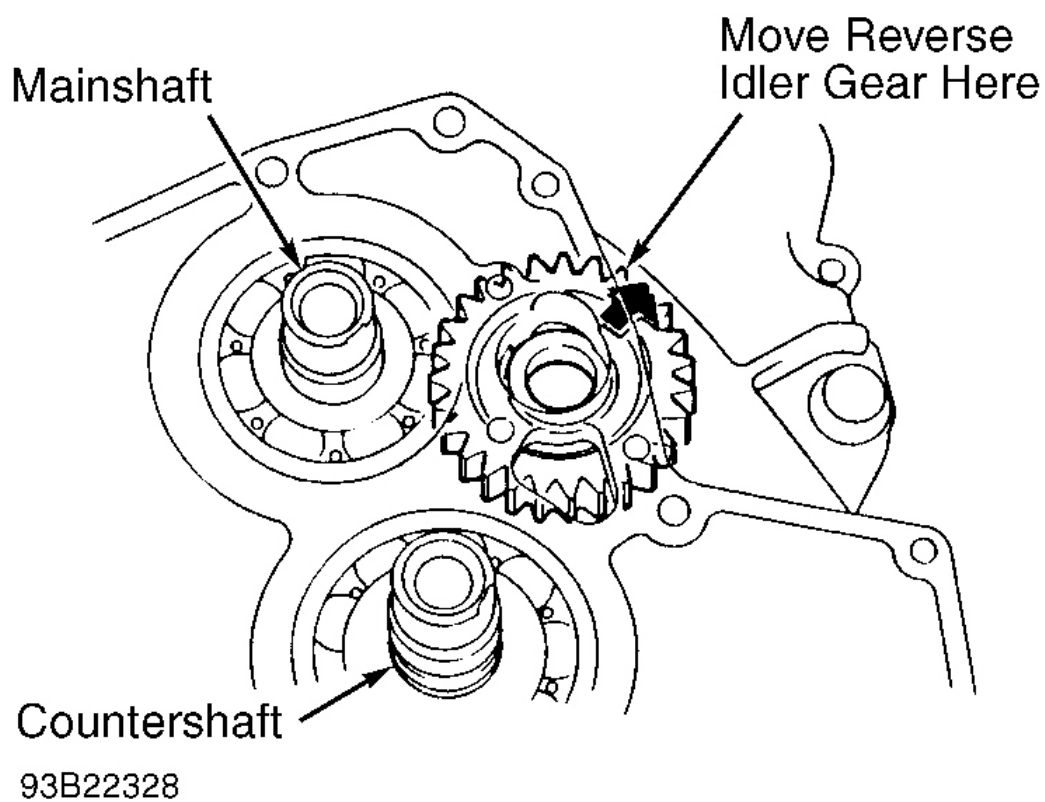


Fig. 7: Positioning Reverse Idler Gear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

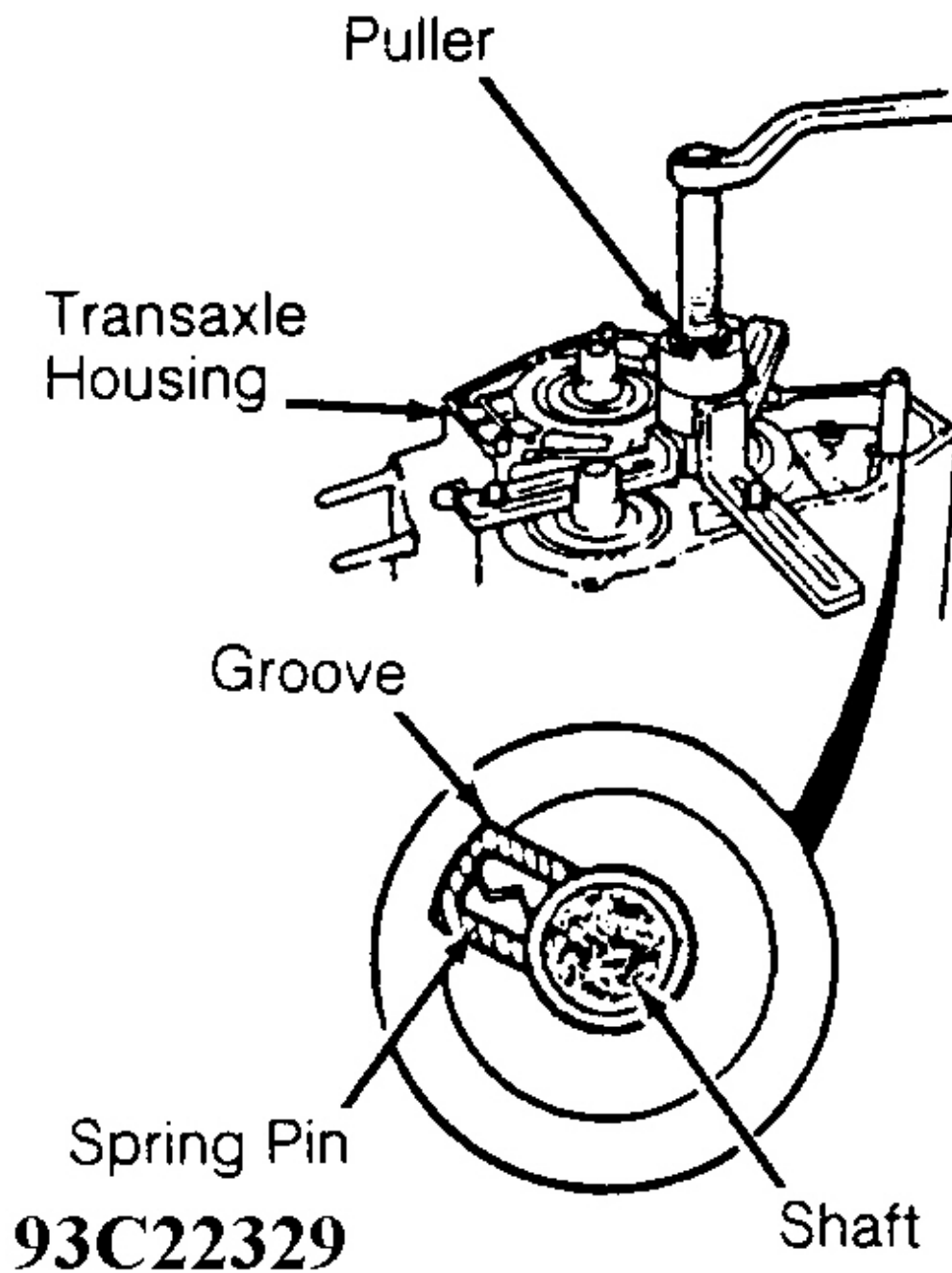
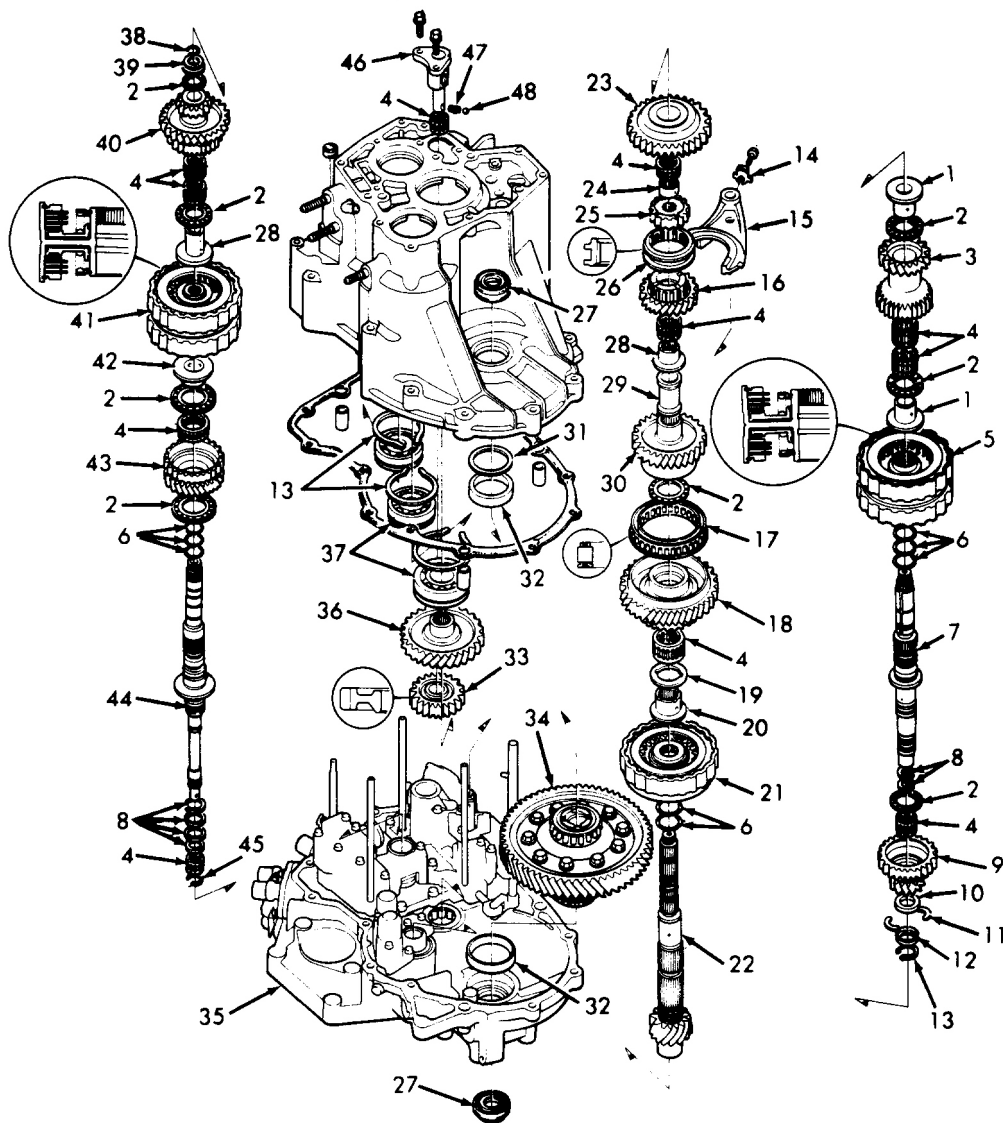


Fig. 8: Aligning Spring Pin & Removing Transaxle Housing
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. On 1991 models, remove countershaft reverse gear, 2nd gear collar, thrust needle bearing and secondary shaft 2nd gear. See **Fig. 9** . Remove needle bearing and countershaft reverse gear collar.
8. Remove bolt, bolt lock, reverse shift fork, reverse selector hub, reverse selector, countershaft 4th gear, needle bearing and 4th gear collar. See **Fig. 9** . Remove secondary shaft, mainshaft and countershaft assemblies. Remove reverse idler gear. Using press, press countershaft 2nd gear from transaxle case. Remove differential assembly.
9. On 1992 models, remove reverse idler gear from transaxle housing. Remove countershaft 2nd gear and countershaft reverse gear from countershaft. Remove thrust washer, thrust needle bearing and secondary shaft 2nd gear from secondary shaft. See **Fig. 10** .
10. Remove bolt, bolt lock, reverse shift fork, reverse selector hub and reverse selector. See **Fig. 10** . Remove needle bearings, thrust needle bearing and splined washer from secondary shaft.
11. Remove secondary shaft, mainshaft and countershaft assemblies. Remove differential assembly.
12. On all models, remove cable control lever from end of control shaft. Remove bolt, bolt locks and servo detent base. See **Fig. 11** . Remove bolts and fluid strainer.

CAUTION: To prevent bolt damage, ensure accumulator cover is held downward when removing bolts. Use care when removing bolts and accumulator cover, as accumulator cover is under spring tension.

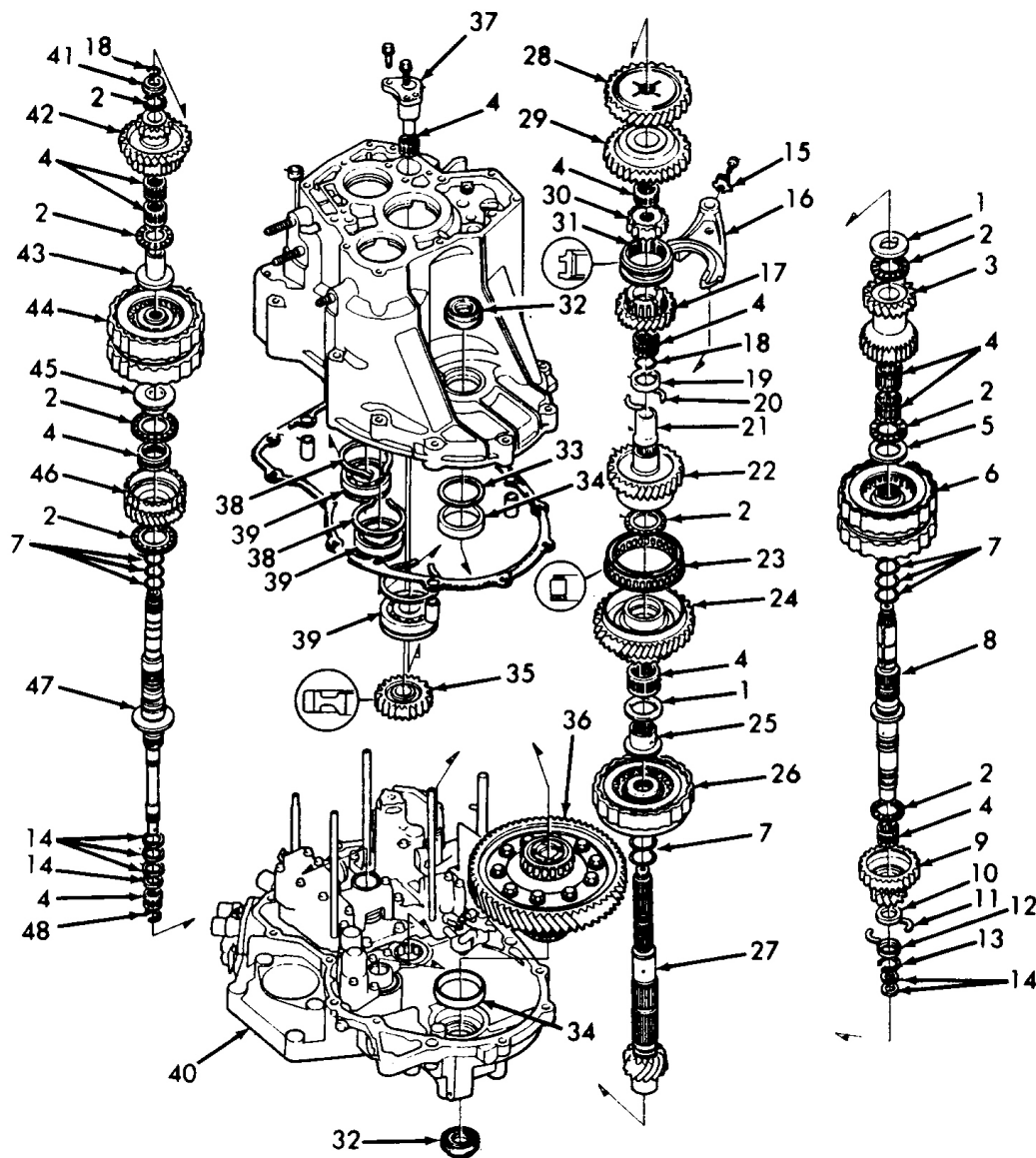
13. Remove clutch feedpipe from servo valve body. Remove bolts and accumulator cover. See **Fig. 11** . Remove oil feedpipe from servo valve body. Remove bolts, servo valve body and servo separator plate.
14. Remove secondary valve body and secondary separator plate. Use care not to lose check balls in secondary valve body. See **Fig. 11** . Remove bolts, throttle valve body and throttle valve separator plate.
15. Remove "E" clip and throttle control shaft from throttle valve body. Remove bolt and regulator valve body. Remove stopper pin, "O" ring and stator shaft.
16. On 1992 models, remove detent arm shaft, detent arm and detent spring. See **Fig. 11** . On all models, remove clutch feedpipes from main valve body. Remove control shaft from torque converter housing.
17. Remove bolts and main valve body, using care not to loose check balls in main valve body. Remove bolts and 1st-2nd accumulator body.
18. Remove oil pump driven gear shaft, oil pump driven and drive gears, main separator plate and dowel pins. Remove lock-up solenoid and shift solenoid assembly (if necessary).



- | | | |
|-----------------------------|--------------------------------------|-------------------------------------|
| 1. 2nd Gear Collar | 17. One-Way Clutch | 33. Reverse Idler Gear |
| 2. Thrust Needle Bearing | 18. Countershaft 1st Gear | 34. Differential Assembly |
| 3. Secondary Shaft 2nd Gear | 19. Thrust Washer | 35. Torque Converter Housing |
| 4. Needle Bearing | 20. 1st Gear Collar | 36. Countershaft 2nd Gear |
| 5. 1st-2nd Clutch Assembly | 21. 1st-Hold Clutch Assembly | 37. Transaxle Housing Bearing |
| 6. "O" Ring | 22. Countershaft | 38. Snap Ring |
| 7. Secondary Shaft | 23. Countershaft Reverse Gear | 39. Collar |
| 8. Seal Ring | 24. Countershaft Reverse Gear Collar | 40. Mainshaft 4th-Reverse Gear |
| 9. Secondary Shaft 1st Gear | 25. Reverse Selector Hub | 41. 3rd-4th Clutch Assembly |
| 10. Distance Collar | 26. Reverse Selector | 42. 3rd Gear Collar |
| 11. Cotter | 27. Differential Oil Seal | 43. Mainshaft 3rd Gear |
| 12. Cotter Retainer | 28. 4th Gear Collar | 44. Mainshaft |
| 13. Circlip | 29. Distance Collar | 45. Set Ring |
| 14. Bolt Lock | 30. Countershaft 3rd Gear | 46. Reverse Idler Gear Shaft Holder |
| 15. Reverse Shift Fork | 31. Thrust Shim | 47. Spring |
| 16. Countershaft 4th Gear | 32. Bearing Outer Race | 48. Steel Ball |

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Fig. 9: Exploded View Of Transaxle Housing & Components (1991 Models)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



- | | | |
|-----------------------------|----------------------------------|-------------------------------------|
| 1. Thrust Washer | 17. Countershaft 4th Gear | 33. Thrust Shim |
| 2. Thrust Needle Bearing | 18. Snap Ring | 34. Bearing Outer Race |
| 3. Secondary Shaft 2nd Gear | 19. Collar | 35. Reverse Idler Gear |
| 4. Needle Bearing | 20. Cotter | 36. Differential Assembly |
| 5. Splined Washer | 21. Distance Collar | 37. Reverse Idler Gear Shaft Holder |
| 6. 1st-2nd Clutch Assembly | 22. Countershaft 3rd Gear | 38. Circlip |
| 7. "O" Ring | 23. One-Way Clutch | 39. Transaxle Housing Bearing |
| 8. Secondary Shaft | 24. Countershaft 1st Gear | 40. Torque Converter Housing |
| 9. Secondary Shaft 1st Gear | 25. Countershaft 1st Gear Collar | 41. Collar |
| 10. Distance Collar | 26. 1st-Hold Clutch Assembly | 42. Mainshaft 4th-Reverse Gear |
| 11. Cotter | 27. Countershaft | 43. 4th Gear Collar |
| 12. Cotter Retainer | 28. Countershaft 2nd Gear | 44. 3rd-4th Clutch Assembly |
| 13. Circlip | 29. Countershaft Reverse Gear | 45. 3rd Gear Collar |
| 14. Seal Ring | 30. Reverse Selector Hub | 46. Mainshaft 3rd Gear |
| 15. Bolt Lock | 31. Reverse Selector | 47. Mainshaft |
| 16. Reverse Shift Fork | 32. Differential Oil Seal | 48. Set Ring |

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Fig. 10: View Of Transaxle Housing & Components (1992 Models)

Courtesy of AMERICAN HONDA MOTOR CO., INC.

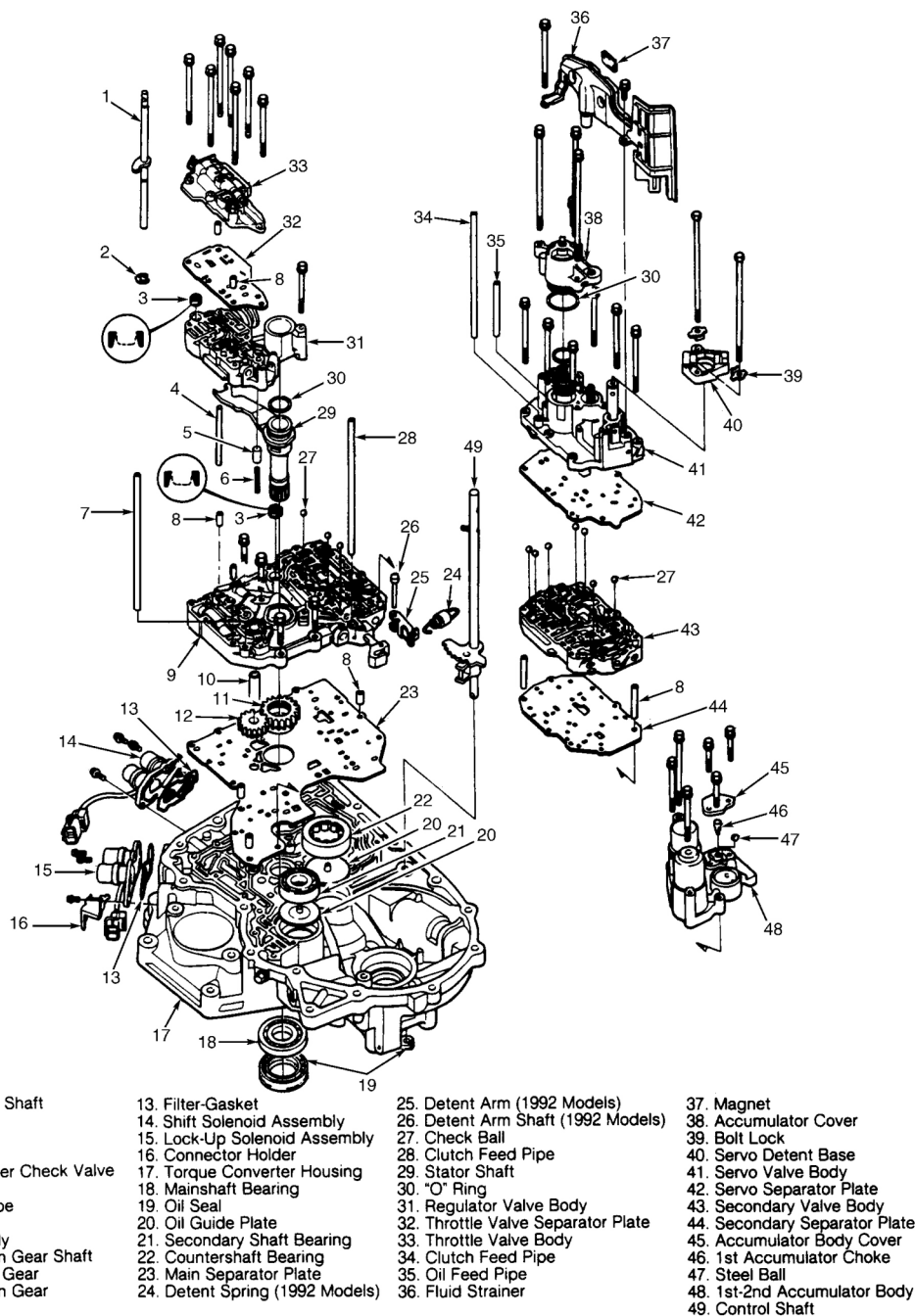


Fig. 11: Exploded View Of Torque Converter Housing & Components

Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT DISASSEMBLY & ASSEMBLY

MAIN VALVE BODY

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

Disassembly

Disassemble main valve body. See **Fig. 12** . Use care when removing valve caps or spring seats, as they are under spring pressure.

Cleaning & Inspection

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

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

Reassembly

Coat all components and bores with ATF. To reassemble, reverse disassembly procedure. Install NEW filter. Ensure all components are installed in correct location. See **Fig. 12** .

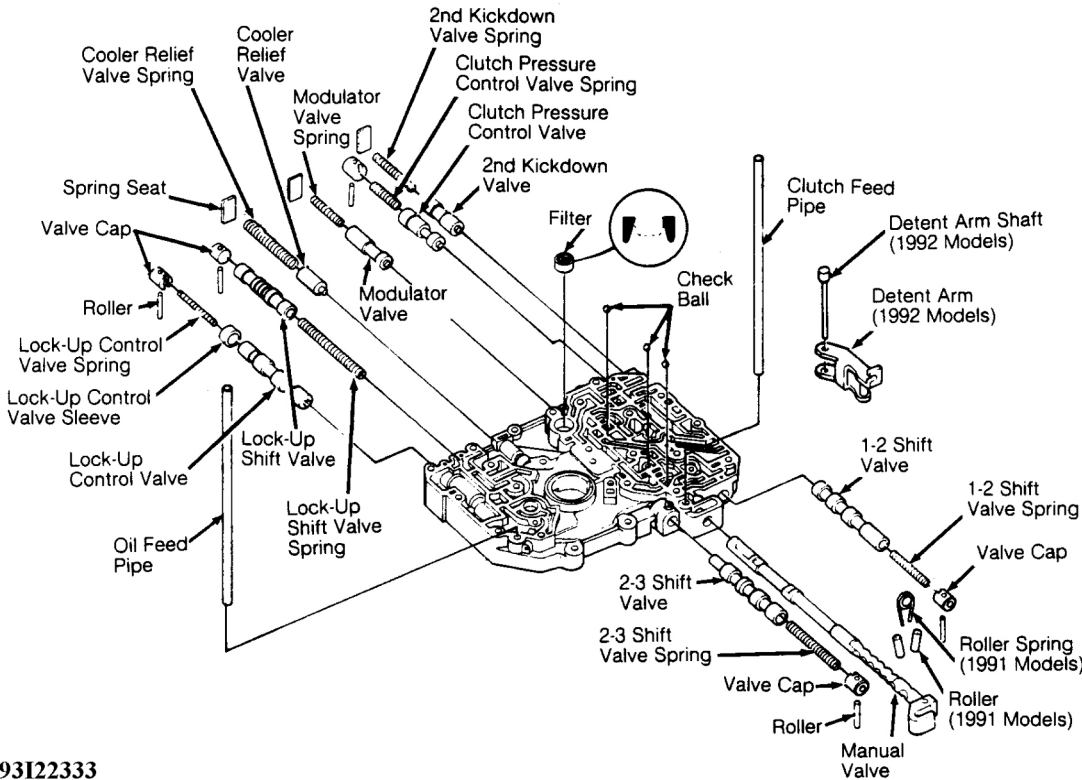
SPRING SPECIFICATIONS

Application	Free Length In. (mm)
Main Valve Body	
Clutch Pressure Control Valve Spring	1.299 (33.00)
Cooler Relief Valve Spring	1.843 (46.81)
Lock-Up Control Valve Spring (1991 Models)	1.614 (41.00)
Lock-Up Control Valve Spring (1992 Models)	1.496 (38.00)
Lock-Up Shift Valve Spring	2.902 (73.70)
Modulator Valve Spring	1.299 (33.00)
1-2 Shift Valve Spring	1.626 (41.30)
2nd Kickdown Valve Spring	1.846 (46.90)
2-3 Shift Valve Spring	2.244 (57.00)
Regulator Valve Body	
Lock-Up Timing Valve Spring (1991 Models)	2.520 (64.00)
Lock-Up Timing Valve Spring (1992 Models)	2.012 (51.10)

1991 Honda Accord DX

1991-92 AUTOMATIC TRANSMISSIONS APX4 & MPXA Overhaul

Regulator Valve Spring "A"	3.406 (86.50)
Regulator Valve Spring "B"	1.732 (44.00)
Stator Reaction Spring	1.193 (30.30)
Torque Converter Check Valve Spring (1991 Models)	1.331 (33.80)
Torque Converter Check Valve Spring (1992 Models)	1.433 (36.40)
Secondary Valve Body	
Servo Control Valve Spring	2.071 (52.60)
Servo Orifice Control Valve Spring	2.067 (52.50)
2nd Orifice Control Valve Spring (1991 Models)	2.055 (52.20)
2nd Orifice Control Valve Spring (1992 Models)	2.197 (55.80)
3rd Kickdown Valve Spring	1.902 (48.30)
3-4 Shift Valve Spring	2.244 (57.00)
4th Exhaust Valve Spring	2.394 (60.80)
Servo Valve Body	
1st-Hold Accumulator Spring	2.547 (64.70)
3rd Accumulator Spring	3.709 (94.20)
4th Accumulator Spring	3.547 (90.10)
Throttle Valve Body	
Relief Valve Spring	1.539 (39.10)
Throttle Valve "B" Spring	1.634 (41.50)
Throttle Valve "B" Adjusting Spring	1.181 (30.00)
1st-2nd Accumulator Body	
1st Accumulator Spring (1991 Models)	3.780 (96.00)
1st Accumulator Spring (1992 Models)	4.543 (115.40)
2nd Accumulator Spring (1991 Models)	3.177 (80.70)
2nd Accumulator Spring (1992 Models)	3.035 (77.10)



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Fig. 12: Exploded View Of Main Valve Body
Courtesy of AMERICAN HONDA MOTOR CO., INC.

OIL PUMP

Disassembly

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

Cleaning & Inspection

1. Clean components with solvent and dry with compressed air. Inspect components and replace if damaged.
2. Install oil pump gears and oil pump driven gear shaft in main valve body. Ensure chamfered side of oil pump driven gear is facing upward (toward separator plate side of main valve body). Place straightedge across main valve body surface.
3. Using feeler gauge, measure thrust clearance between oil pump driven gear and straightedge. See **Fig. 13**. Replace oil pump gears and/or main valve body if thrust clearance is not within specification. See **OIL PUMP SPECIFICATIONS** table.
4. Using feeler gauge, measure side clearance of both gears between tip of gear teeth and main valve body. See **Fig. 13**. Replace oil pump gears and/or main valve body if side clearance is not within specification. See **OIL PUMP SPECIFICATIONS** table.

1991 Honda Accord DX

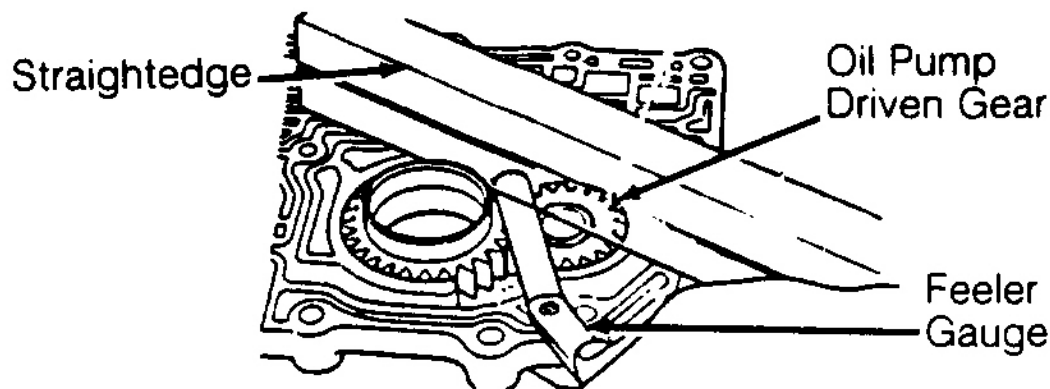
1991-92 AUTOMATIC TRANSMISSIONS APX4 & MPXA Overhaul

OIL PUMP SPECIFICATIONS

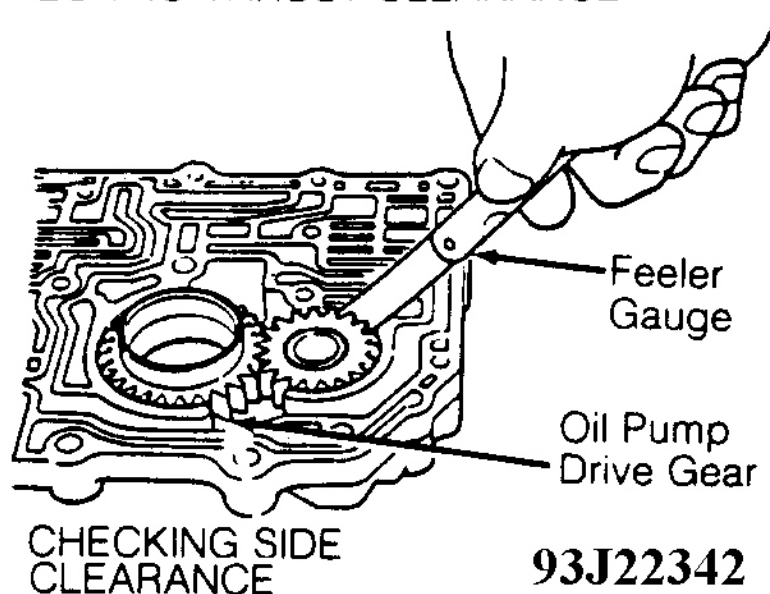
Application	In. (mm)
Side Clearance	
Oil Pump Drive Gear	.0083-.0104 (.210-.265)
Oil Pump Driven Gear	.0014-.0025 (.035-.063)
Thrust Clearance	
Standard	.001-.002 (.03-.05)
Wear Limit	.0028 (.070)

Reassembly

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



CHECKING THRUST CLEARANCE

**Fig. 13: Measuring Oil Pump Clearances**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

SECONDARY VALVE BODY

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

Disassembly

Disassemble secondary valve body. See **Fig. 14** . Use care when removing valve caps or spring seats, as they

are under spring pressure.

Cleaning & Inspection

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

Reassembly

Coat all components and bores with ATF. To reassemble, reverse disassembly procedure. Ensure all components are installed in correct location. See **Fig. 14** . Tighten throttle cam stopper bolt to specification. See **TORQUE SPECIFICATIONS** .

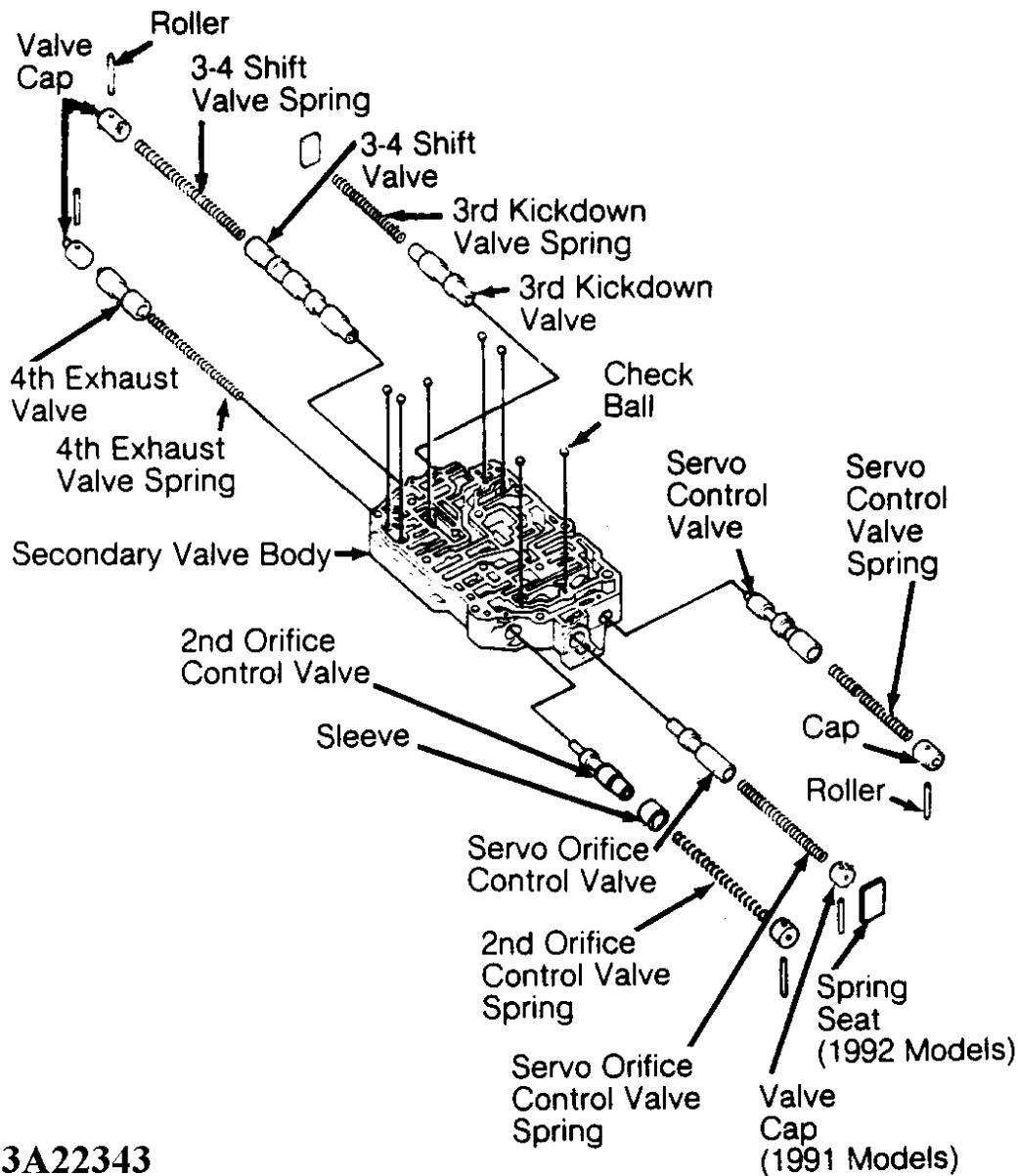


Fig. 14: Exploded View Of Secondary Valve Body
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

REGULATOR VALVE BODY

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

Disassembly

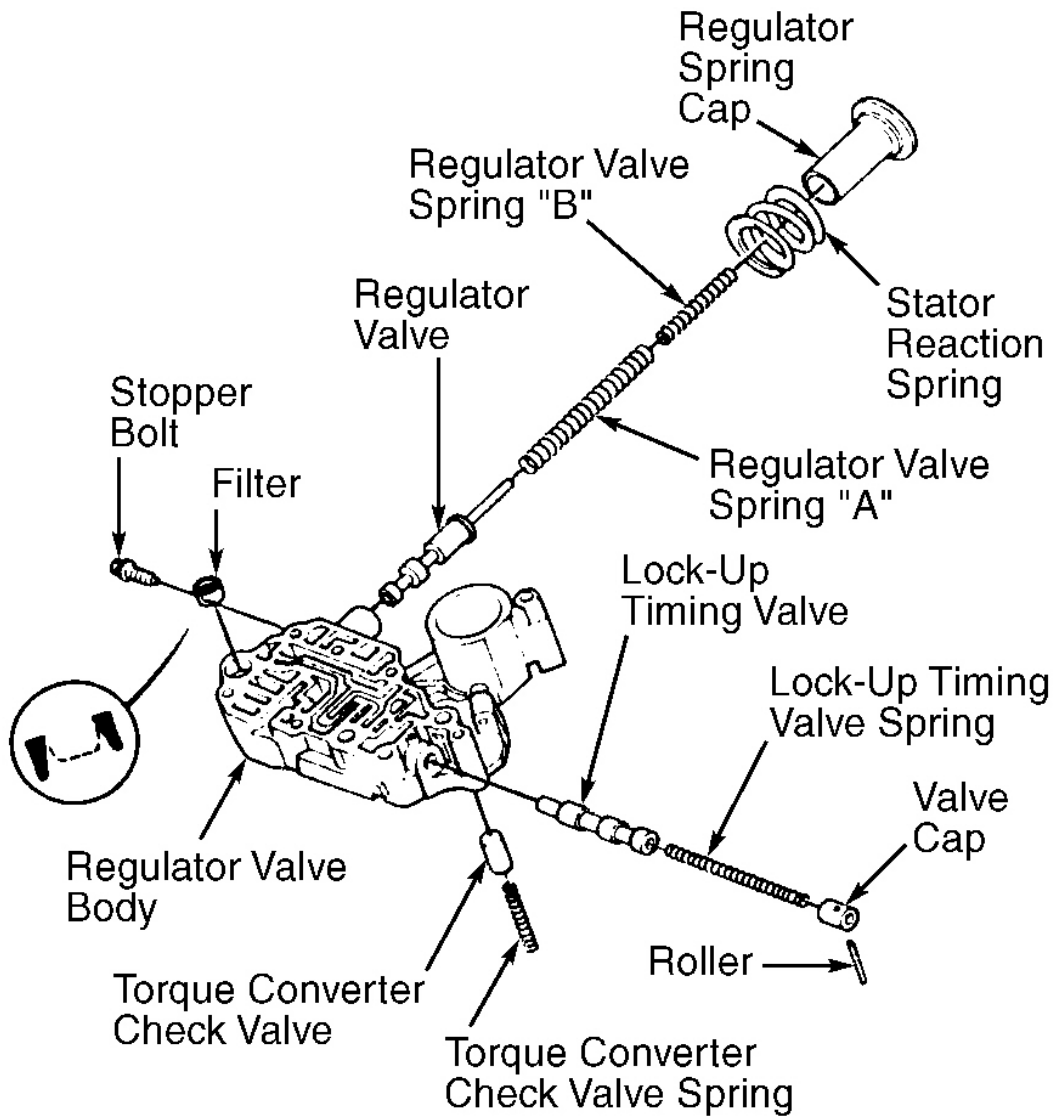
Hold regulator spring cap down, and remove stopper bolt. Slowly remove regulator spring cap and components from regulator valve body. See **Fig. 15** .

Cleaning & Inspection

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

Reassembly

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. 15** . Tighten stopper bolt to specification. See **TORQUE SPECIFICATIONS** .



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

THROTTLE VALVE BODY

NOTE: DO NOT loosen or remove throttle adjusting bolt.

Disassembly

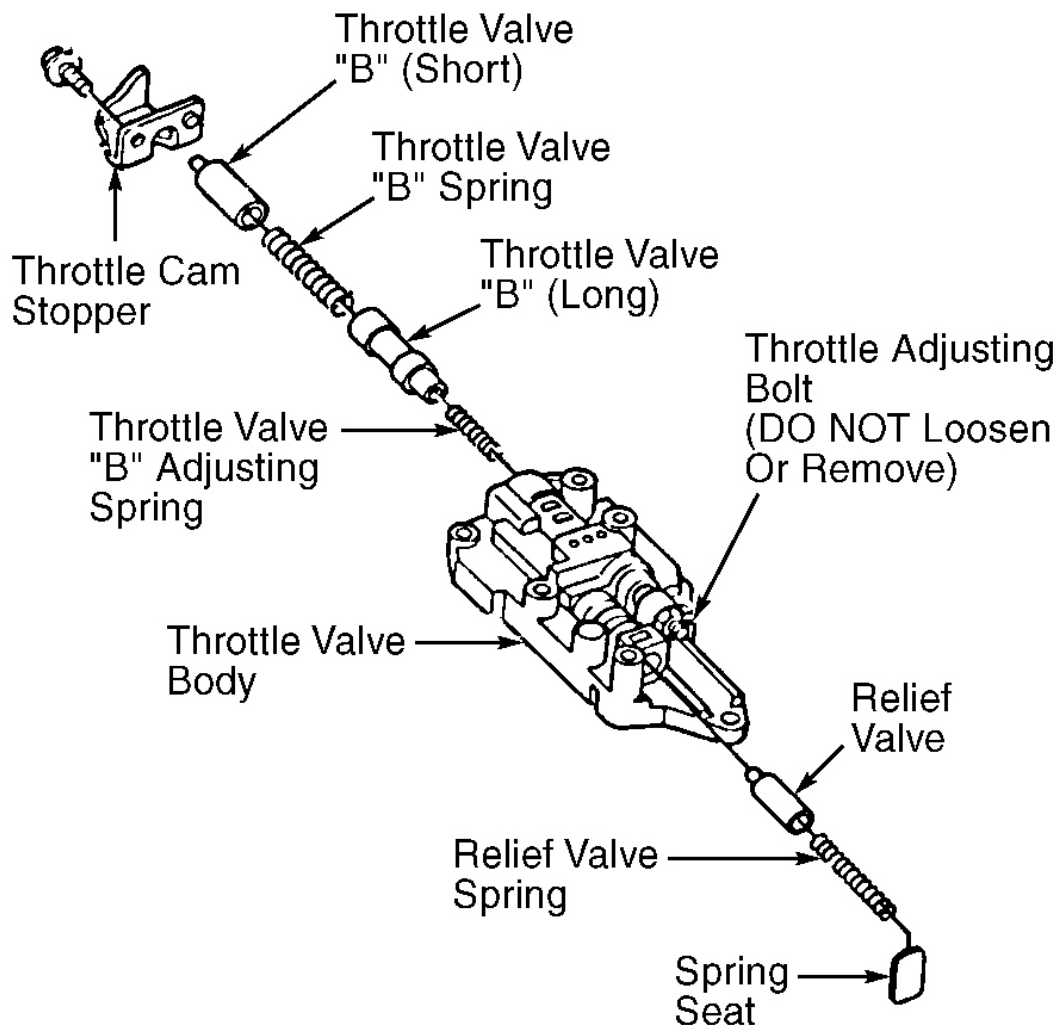
Disassemble throttle valve body. See **Fig. 16** . Use care when removing throttle cam stopper and spring seat, as they are under spring pressure.

Cleaning & Inspection

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

Reassembly

Coat all components and bores with ATF. To reassemble, reverse disassembly procedure. Ensure all components are installed in correct location. See **Fig. 16** . Tighten throttle cam stopper bolt to specification. See **TORQUE SPECIFICATIONS** .



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

SERVO VALVE BODY

Disassembly

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

Cleaning & Inspection

Clean components with solvent and dry with compressed air. Replace components if worn or damaged. Replace fluid strainer if clogged. 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 "O" rings.

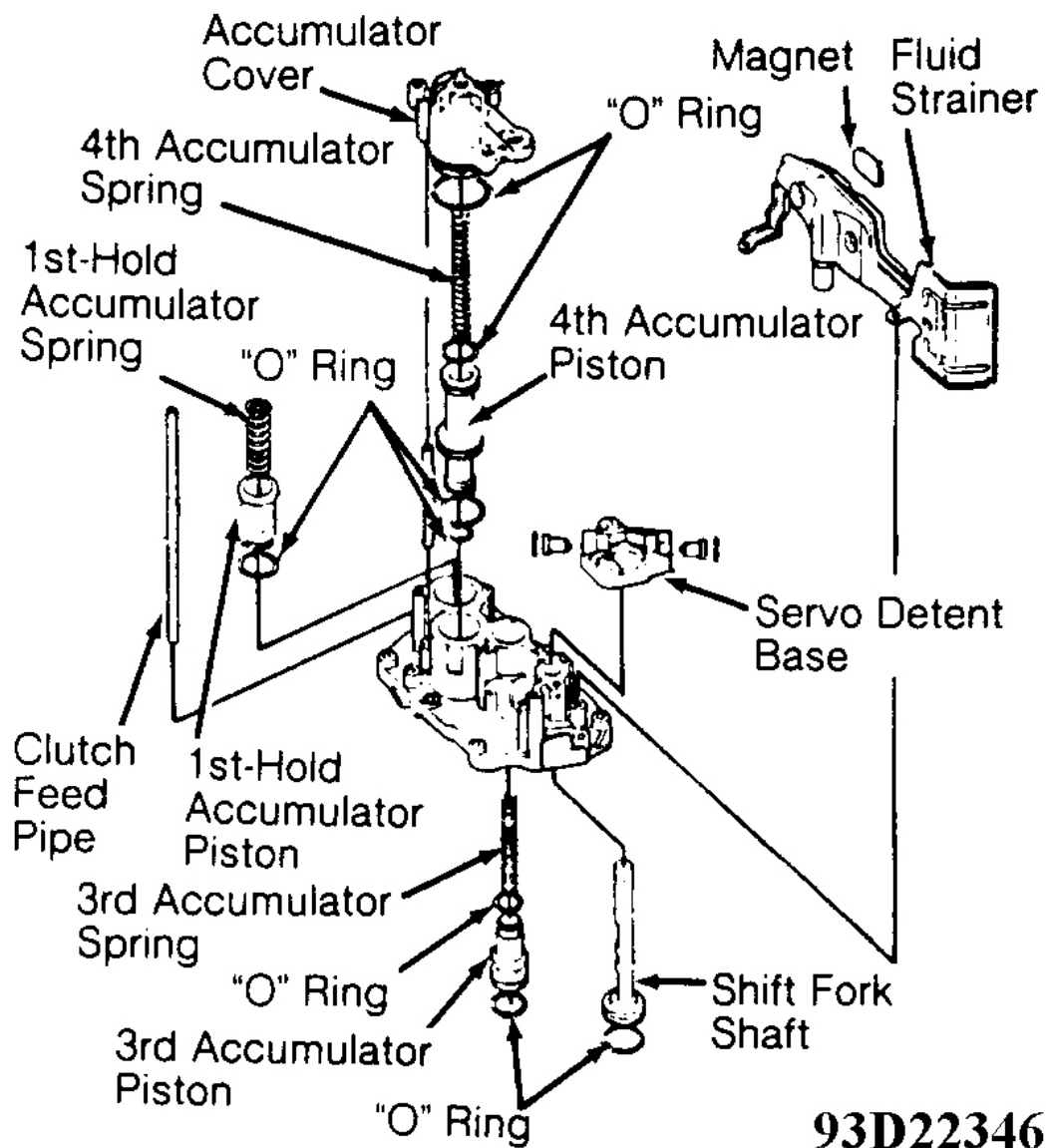


Fig. 17: Exploded View Of Servo Valve Body
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

1ST-2ND ACCUMULATOR BODY**Disassembly**

Disassemble 1st-2nd accumulator body. See **Fig. 18** . Use care when removing circlips, as they are under spring pressure. **DO NOT** use magnet to remove check ball, as check ball may become magnetized.

Cleaning & Inspection

1. Clean components with solvent and dry with compressed air. Replace components if worn or damaged.
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 "O" rings.

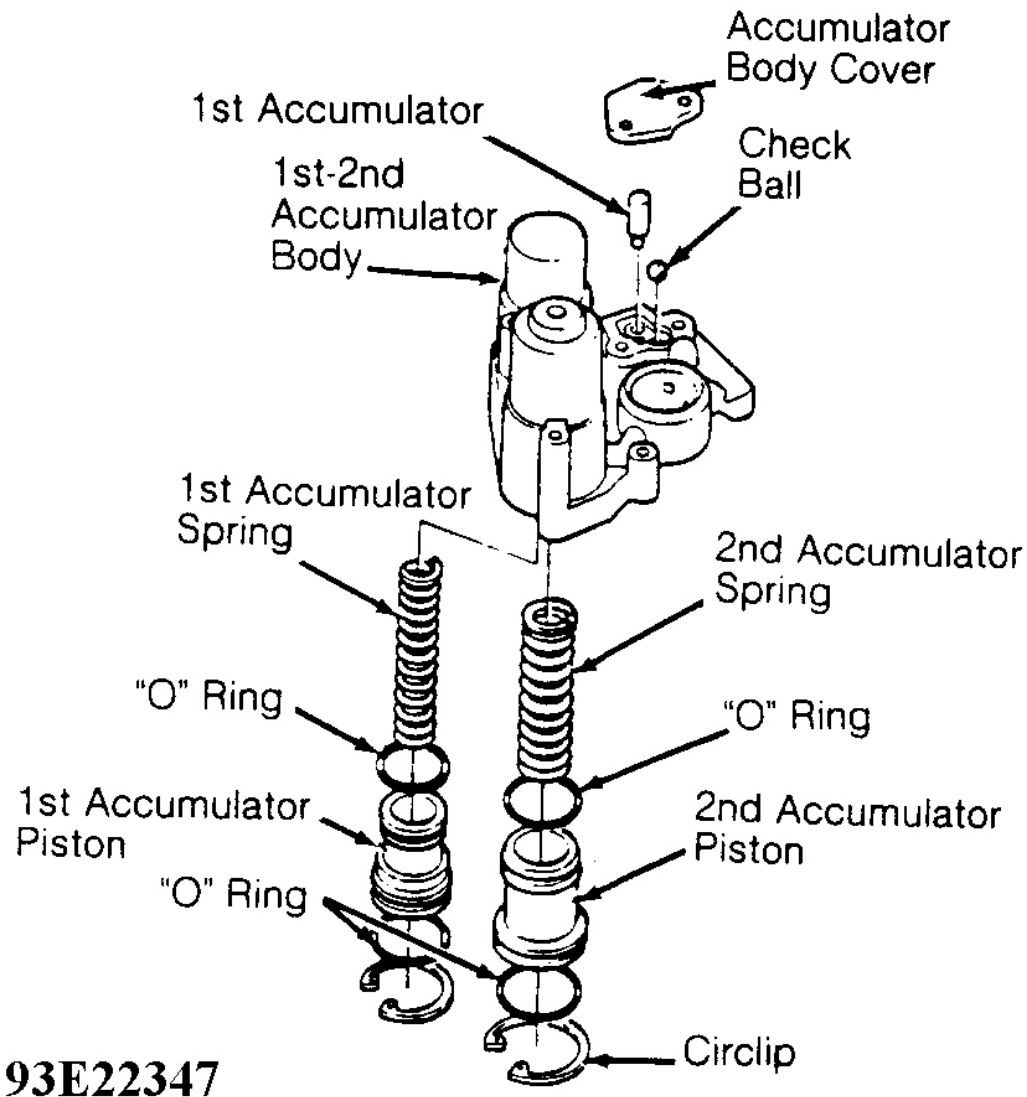


Fig. 18: Exploded View Of 1st-2nd Accumulator Body
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

COUNTERSHAFT & ONE WAY CLUTCH

CAUTION: On some 1991 models, an updated countershaft lock nut must be used. Ensure proper lock nut is installed. See TECHNICAL SERVICE BULLETINS .

Disassembly

1. Note location of countershaft components. See **Fig. 9** and **Fig. 10** . Remove countershaft components down to 1st-hold clutch assembly.
2. Place countershaft in hydraulic press while supporting 1st-hold clutch drum. Place a protective cap between hydraulic press and countershaft to prevent damage to shaft. Press countershaft from 1st-hold clutch drum.
3. To separate countershaft 3rd gear from countershaft 1st gear, hold countershaft 1st gear and rotate countershaft 3rd gear counterclockwise. Remove countershaft 3rd gear.
4. Note direction of one-way clutch installation in countershaft 3rd gear. Gently pry one-way clutch from countershaft 3rd gear.

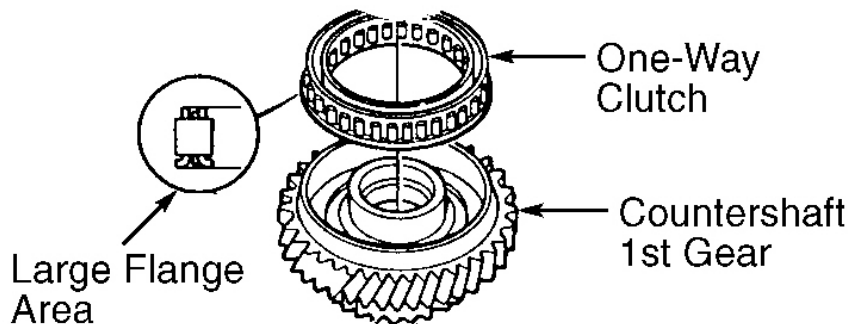
CAUTION: DO NOT pry on the 3 copper strips on one-way clutch.

Cleaning & Inspection

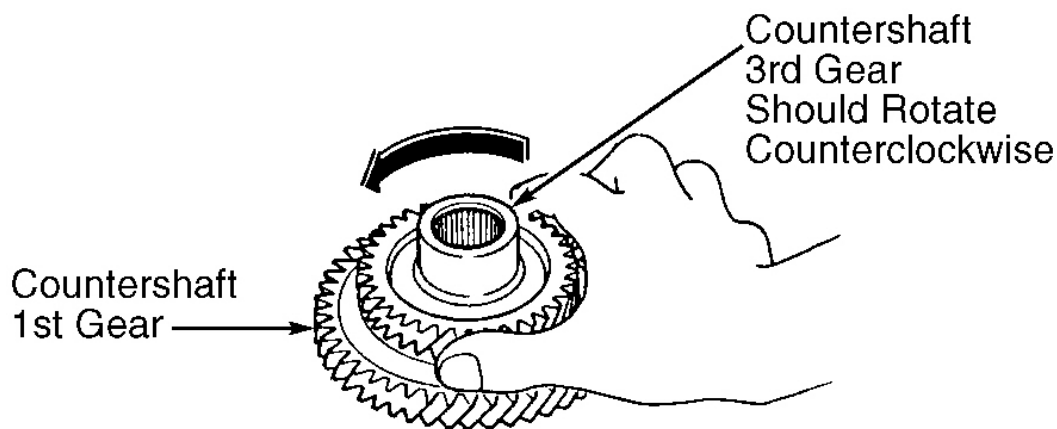
1. Clean components with solvent and dry with compressed air. Inspect splines for excessive wear. Check bearing surfaces for scoring or wear.
2. Inspect all needle bearings for galling and rough movement. Inspect one-way clutch for damage.

Reassembly

1. Lubricate all components with ATF. Install one-way clutch with large flange area toward countershaft 1st gear. See **Fig. 19** . Install countershaft 3rd gear. Hold countershaft 1st gear, ensure countershaft 3rd gear rotates counterclockwise. See **Fig. 19** .
2. Reassemble countershaft. Ensure thrust needle bearings are installed with unrolled edge of bearing retainer facing washer. Before installing NEW "O" rings on countershaft, wrap splines with tape.



INSTALLING ONE-WAY CLUTCH



CHECKING ONE-WAY CLUTCH OPERATION

93F22348

Fig. 19: Installing & Checking One-Way Clutch Operation
Courtesy of AMERICAN HONDA MOTOR CO., INC.

MAINSHAFT

CAUTION: On some 1991 models, an updated mainshaft lock nut must be used. Ensure proper lock nut is installed. See **TECHNICAL SERVICE BULLETINS** .

Disassembly

Note location of mainshaft components. See **Fig. 9** and **Fig. 10** . Remove mainshaft components.

Cleaning & Inspection

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

Reassembly

Lubricate all components with ATF. Reassemble mainshaft. Ensure thrust needle bearings are installed with unrolled edge of bearing retainer facing washer. Before installing NEW "O" rings on mainshaft, wrap splines with tape.

SECONDARY SHAFT

CAUTION: On some 1991 models, an updated secondary shaft lock nut must be used. Ensure proper lock nut is installed. See TECHNICAL SERVICE BULLETINS .

Disassembly

Note location of secondary shaft components. See Fig. 9 and Fig. 10 . Remove secondary shaft components.

Cleaning & Inspection

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

Reassembly (1991 Models)

Lubricate all components with ATF. Reassemble secondary shaft. Ensure thrust needle bearings are installed with unrolled edge of bearing retainer facing washer. Before installing NEW "O" rings on secondary shaft, wrap splines with tape.

Reassembly (1992 Models)

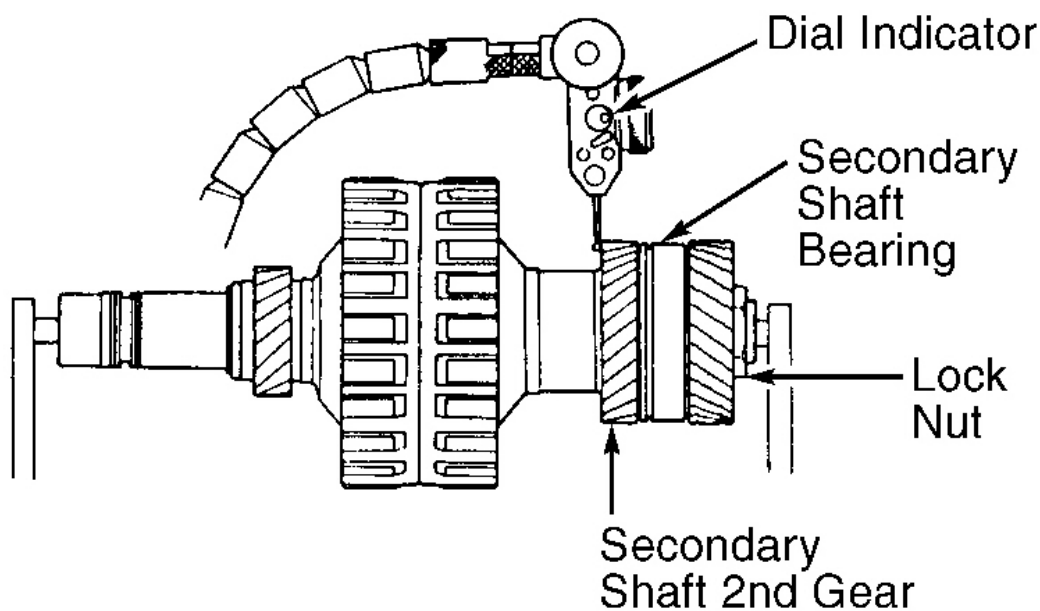
1. Lubricate all components with ATF. Reassemble secondary shaft without "O" rings. Ensure thrust needle bearings are installed with unrolled edge of bearing retainer facing washer.
2. Remove secondary shaft bearing from transaxle housing. Install secondary shaft bearing, secondary shaft idler gear, spring washer and used lock nut on secondary shaft. See Fig. 20 .
3. Tighten lock nut to 22 ft. lbs. (30 N.m). Attach dial indicator on secondary shaft, with stem against secondary shaft 2nd gear. See Fig. 20 . Push secondary shaft 2nd gear inward (toward 1st-2nd clutch), and zero dial indicator.
4. Pull secondary shaft 2nd gear outward, and note axial clearance. Check axial clearance at 3 places on secondary shaft 2nd gear. Average the 3 axial clearance measurements.
5. Replace splined washer if average axial clearance is not .003-.006" (.08-.15 mm). Different thickness splined washers are available. See SPLINED WASHER SPECIFICATIONS table. Recheck axial clearance.

SPLINED WASHER SPECIFICATIONS

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Washer Number	Part Number	Thickness In. (mm)
1	90406-PX4-700	.159 (4.05)
2	90407-PX4-700	.161 (4.10)
3	90408-PX4-700	.163 (4.15)
4	90409-PX4-700	.165 (4.20)
5	90410-PX4-700	.167 (4.25)
6	90411-PX4-700	.169 (4.30)
7	90412-PX4-700	.171 (4.35)
8	90413-PX4-700	.173 (4.40)
9	90414-PX4-700	.175 (4.45)

6. Remove lock nut, spring washer, secondary shaft idler gear and secondary shaft bearing. Lubricate all components with ATF.
7. Reassemble secondary shaft. Ensure thrust needle bearings are installed with unrolled edge of bearing retainer facing washer. Before installing NEW "O" rings on secondary shaft, wrap splines with tape.



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Fig. 20: Checking Secondary Shaft 2nd Gear Axial Clearance
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

CLUTCH ASSEMBLIES

Disassembly

1. Remove snap ring, clutch end plate, clutch discs and clutch plates. See **Fig. 21** and **Fig. 22** . On 1st-hold and 2nd clutches, note direction of disc spring installation. Remove disc spring.

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

2. On all clutches, use Spring Compressor (07LAE-PX40100), Adapter (07HAE-PL50100) and Bolt (07GAE-PG40200) to compress return spring. See **Fig. 23** .
3. Remove circlip. Release and remove spring compressor components. Remove spring retainer and return spring.
4. Wrap shop towel around clutch drum. Apply light air pressure to oil passage on clutch drum to remove clutch piston. Remove "O" rings.

Cleaning & Inspection

1. Clean metal components with solvent and dry with compressed air. Ensure check valve on rear of clutch piston is thoroughly cleaned.
2. Inspect components for damage and replace if necessary. Ensure no rough edges exist on "O" ring sealing areas. On 1st, 3rd and 4th clutches, ensure disc spring is securely staked to clutch piston.

Reassembly

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

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

2. Install return spring and spring retainer in clutch drum. Place circlip on spring retainer. Using spring compressor, compress return spring. Install circlip, and remove spring compressor.
3. Install disc spring on 1st-hold and 2nd clutches. Ensure disc spring is installed in proper direction. See **Fig. 21** and **Fig. 22** .

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

4. Alternately install clutch plates and clutch discs starting with clutch plate. Install clutch end plate with flat side toward clutch disc. Install snap ring.
5. Using dial indicator, measure clutch clearance between clutch end plate and top clutch disc. See **Fig. 24** . Zero dial indicator with clutch end plate lowered, and then lift clutch end plate upward against snap ring. Distance measured is clutch clearance.

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6. Measure clutch clearance at 3 different locations. Ensure clutch clearance is within specification. See **CLUTCH CLEARANCE SPECIFICATIONS** table.
7. If clutch clearance is not within specification, install different thickness clutch end plate. See **CLUTCH END PLATE SPECIFICATIONS** table.

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

CLUTCH CLEARANCE SPECIFICATIONS

Application	In. (mm)
1st & 2nd Clutches	.026-.033 (.65-.85)
1st-Hold Clutch	.031-.039 (.80-1.00)
3rd & 4th Clutches	.016-.024 (.40-.60)

CLUTCH END PLATE SPECIFICATIONS

Plate Number	Part Number	Thickness In. (mm)
1	22551-PX4-003	.082 (2.10)
2	22552-PX4-003	.086 (2.20)
3	22553-PX4-003	.090 (2.30)
4	22554-PX4-003	.094 (2.40)
5	22555-PX4-003	.098 (2.50)
6	22556-PX4-003	.102 (2.60)
7	22557-PX4-003	.106 (2.70)
8	22558-PX4-003	.110 (2.80)
9	22559-PX4-003	.114 (2.90)

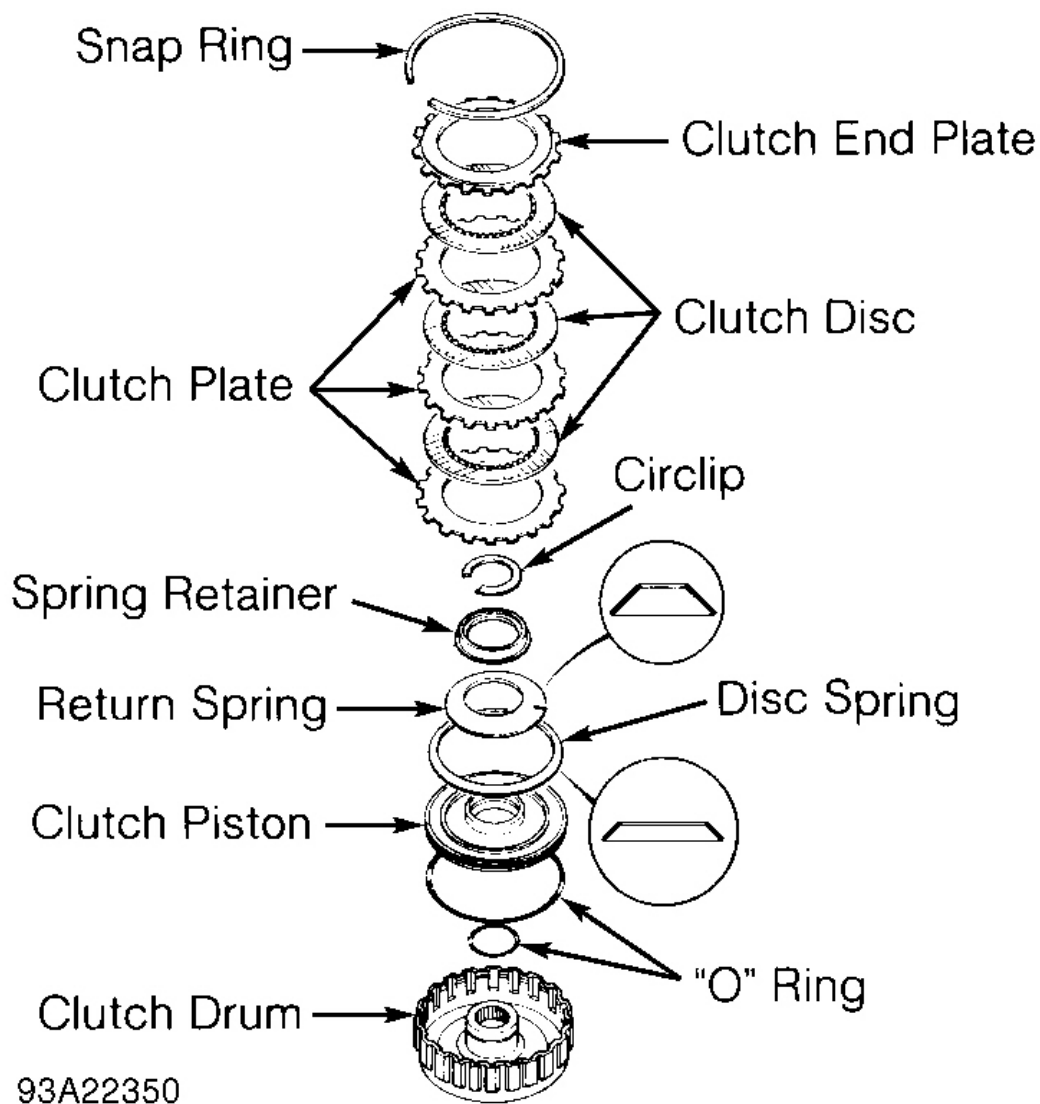
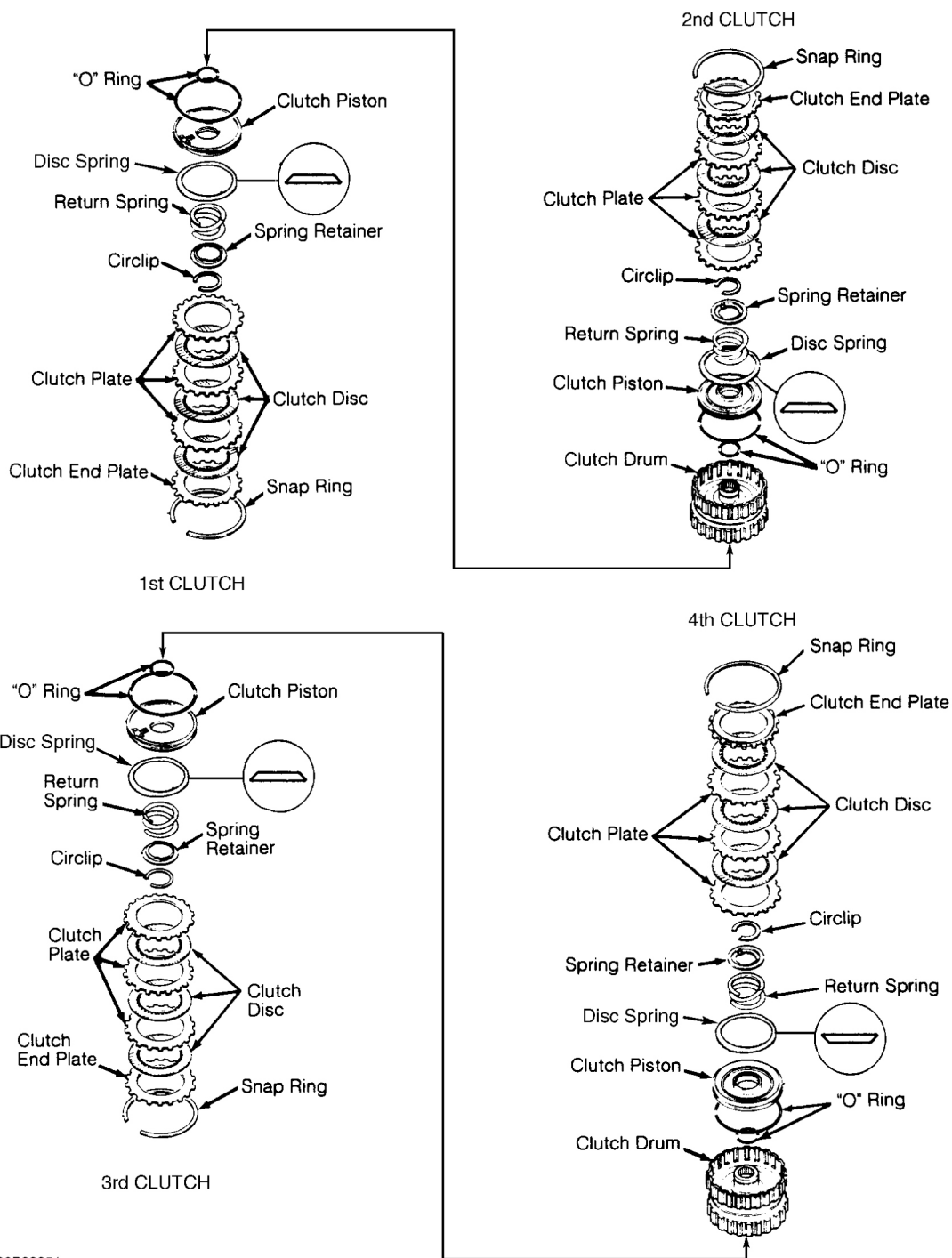


Fig. 21: Exploded View Of 1st-Hold Clutch
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 22: Exploded View Of 1st-2nd & 3rd-4th Clutches
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

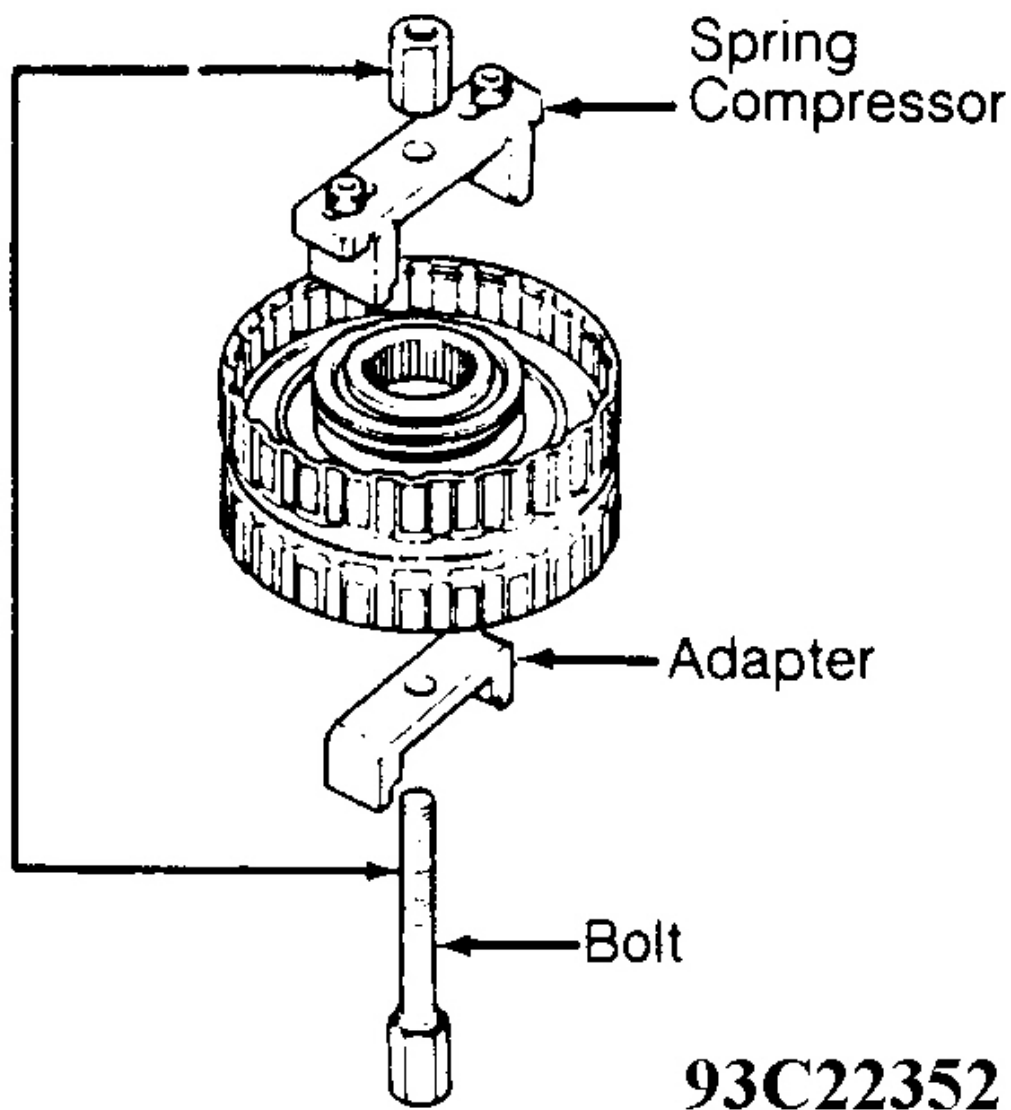
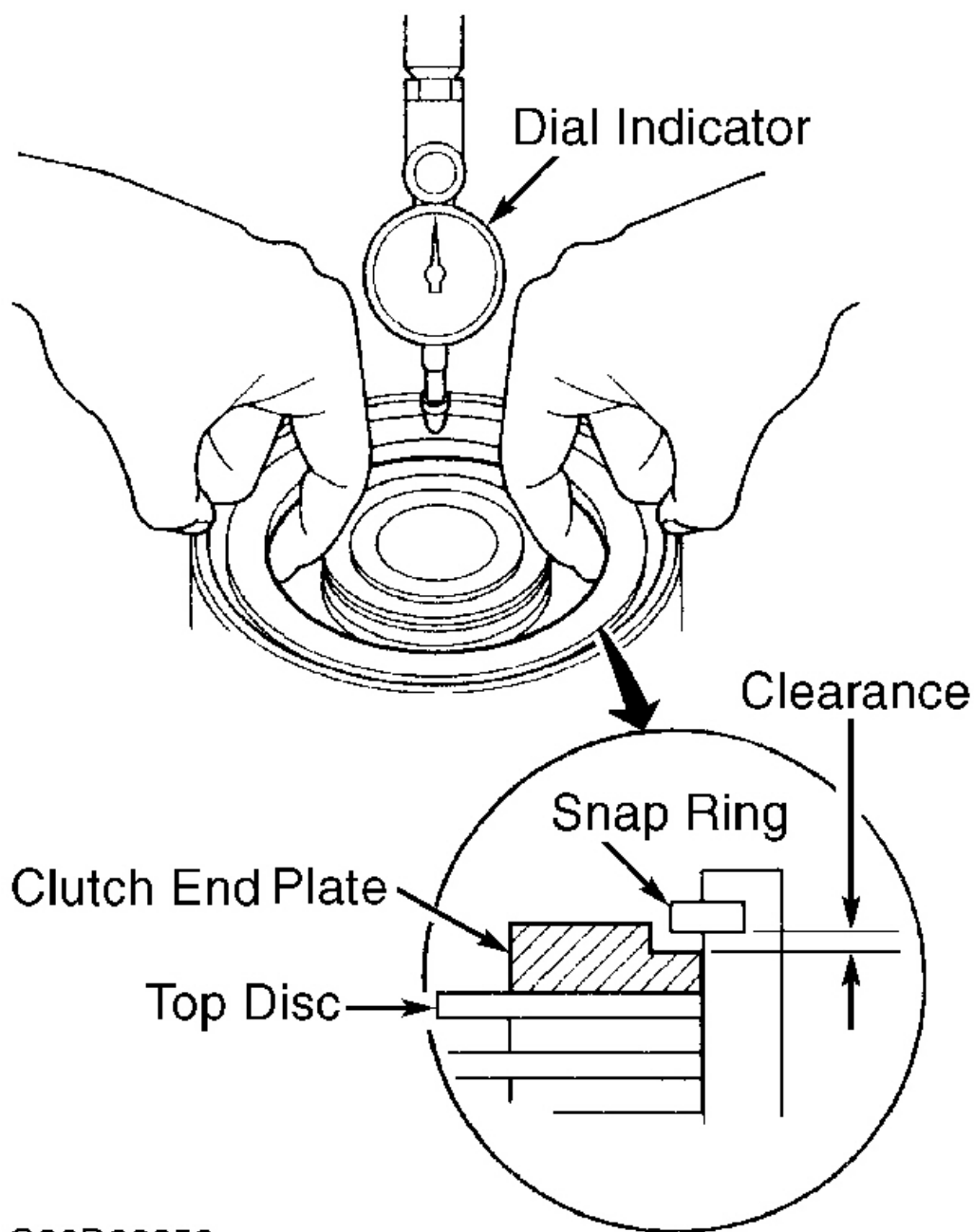


Fig. 23: Compressing Return Spring (1st-2nd Clutch Shown)
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 24: Measuring Clutch Clearance

Courtesy of AMERICAN HONDA MOTOR CO., INC.

TORQUE CONVERTER HOUSING

Disassembly

1. Removing countershaft bearing from torque converter housing, using Bearing Remover (07736-A01000A) and slide hammer (if necessary). Remove oil guide plate. See **Fig. 11**.

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

2. If removing secondary shaft bearing, use heat gun to heat torque converter housing, around secondary shaft bearing to 212°F (100°C). Tap secondary shaft bearing from torque converter housing. Remove oil guide plate from torque converter housing. See **Fig. 11**.
3. Remove mainshaft bearing and oil seal using hammer, Driver (07749-0010000) and Adapter (07947-6340500). Pry differential bearing outer race 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. To install mainshaft bearing, use hammer, Driver (07749-0010000) and Adapter (07746-0010500). Drive bearing in until bearing bottoms in torque converter housing.
2. Using hammer, driver and Adapter (07746-0010600), install mainshaft oil seal in torque converter housing. Oil seal should be even with torque converter housing surface.
3. To install countershaft bearing, install NEW oil guide plate in countershaft bearing bore of torque converter housing. Ensure oil guide plate is installed so tab in center faces upward (away from torque converter housing surface). See **Fig. 11**.
4. Using hammer, driver and Adapter (07746-0010500), drive countershaft bearing into torque converter housing.
5. To install secondary shaft bearing, install NEW oil guide plate in secondary shaft 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. 11**.
6. Using hammer, driver and Adapter (07746-0010400), drive secondary shaft bearing into torque converter housing.
7. To install differential bearing outer race, use driver and Adapter (07GAD-SD40101). Install differential bearing outer race until race is even with torque converter housing surface.

CAUTION: DO NOT install thrust shim in torque converter housing below differential bearing outer race. Thrust shim must be installed in transaxle housing.

8. To install differential oil seal, use driver, Adapter (07JAD-PH80101) and Pilot Driver (07JAD-PH80400). Drive oil seal in torque converter housing until oil seal is fully seated.

TRANSAXLE HOUSING

Disassembly

1. Expand snap ring, and press mainshaft, countershaft and secondary shaft bearings from transaxle housing. Using hammer and drift, tap differential oil seal from transaxle housing.

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

2. If removing differential bearing outer race, use heat gun to heat transaxle housing, around differential bearing outer race, to 212°F (100°C).
3. Pry differential bearing outer race from transaxle housing. Remove thrust shim (located below differential bearing outer race) 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.

NOTE: Ensure original thickness thrust shim is installed. If any components have been changed, differential assembly bearing preload must be checked. See **DIFFERENTIAL ASSEMBLY BEARING PRELOAD** .

Reassembly

Install thrust shim. Using Driver (07749-010000) and Adapter (07HAD-SF10100), install differential bearing outer race. To reassemble remaining components, reverse disassembly procedure. Ensure bearings are installed with groove away from transaxle housing so snap ring will engage in bearing.

RIGHT SIDE COVER

Disassembly

Remove snap rings retaining clutch feedpipes in right side cover. Remove 4th clutch feedpipe, 1st-hold clutch feedpipe, 1st clutch feedpipe and "O" rings from right side cover. See **Fig. 5** .

Cleaning & Inspection

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

Reassembly

To reassemble, reverse disassembly procedure using NEW "O" rings.

DIFFERENTIAL ASSEMBLY

Disassembly

1. Before disassembling differential assembly, check side gear backlash. Place differential assembly on "V" blocks with both axle shafts installed.
2. Install dial indicator with stem resting against pinion gear. See **Fig. 25** . Check side gear backlash. Side gear backlash should be .003-.006" (.08-.15 mm).
3. If side gear backlash is not within specification, install different thickness pinion gear thrust washer during reassembly. See **PINION GEAR THRUST WASHER SPECIFICATIONS** table.

PINION GEAR THRUST WASHER SPECIFICATIONS

Part Number	Thickness In. (mm)
41351-PG1-000	.028 (.70)
41352-PG1-000	.029 (.75)
41353-PG1-000	.031 (.80)
41354-PG1-000	.033 (.85)
41355-PG1-000	.035 (.90)
41356-PG1-000	.037 (.95)
41357-PG1-000	.039 (1.00)
41358-PG1-000	.041 (1.05)

4. If replacing bearings, use bearing puller to remove bearings from differential carrier. Remove bolts and ring gear.

NOTE: Ring gear bolts have left-hand threads.

5. Drive pin from differential carrier. See **Fig. 26** . Remove pinion shaft, pinion gears, side gears and thrust washers.

Cleaning & Inspection

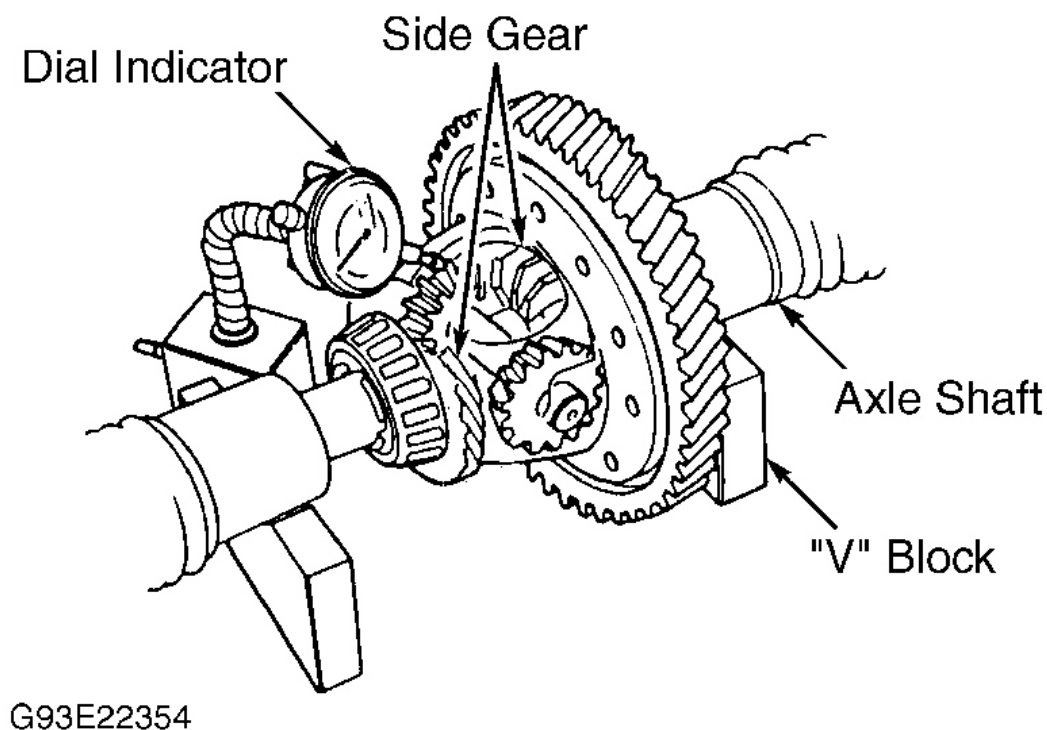
Clean components with solvent and dry with compressed air. Inspect components for wear and damage. Replace components if necessary.

Reassembly

1. Coat both side of pinion gears and side gears with grease. Install side gears and side gear thrust washers in differential carrier.
2. Install pinion gears and pinion gear thrust washers in differential carrier so they are exactly opposite each other. Rotate pinion gears until they align with pinion shaft hole in differential carrier. Install pinion shaft and pin.
3. Recheck side gear backlash. If side gear backlash is not .003-.006" (.08-.15 mm), select different thickness pinion gear thrust washer. If side gear backlash cannot be properly adjusted with different size thrust washer, replace side and pinion gears.
4. Recheck side gear backlash. If backlash is still not within specification, replace differential carrier.

CAUTION: Ring gear must be installed with chamfered side of ring gear toward differential carrier.

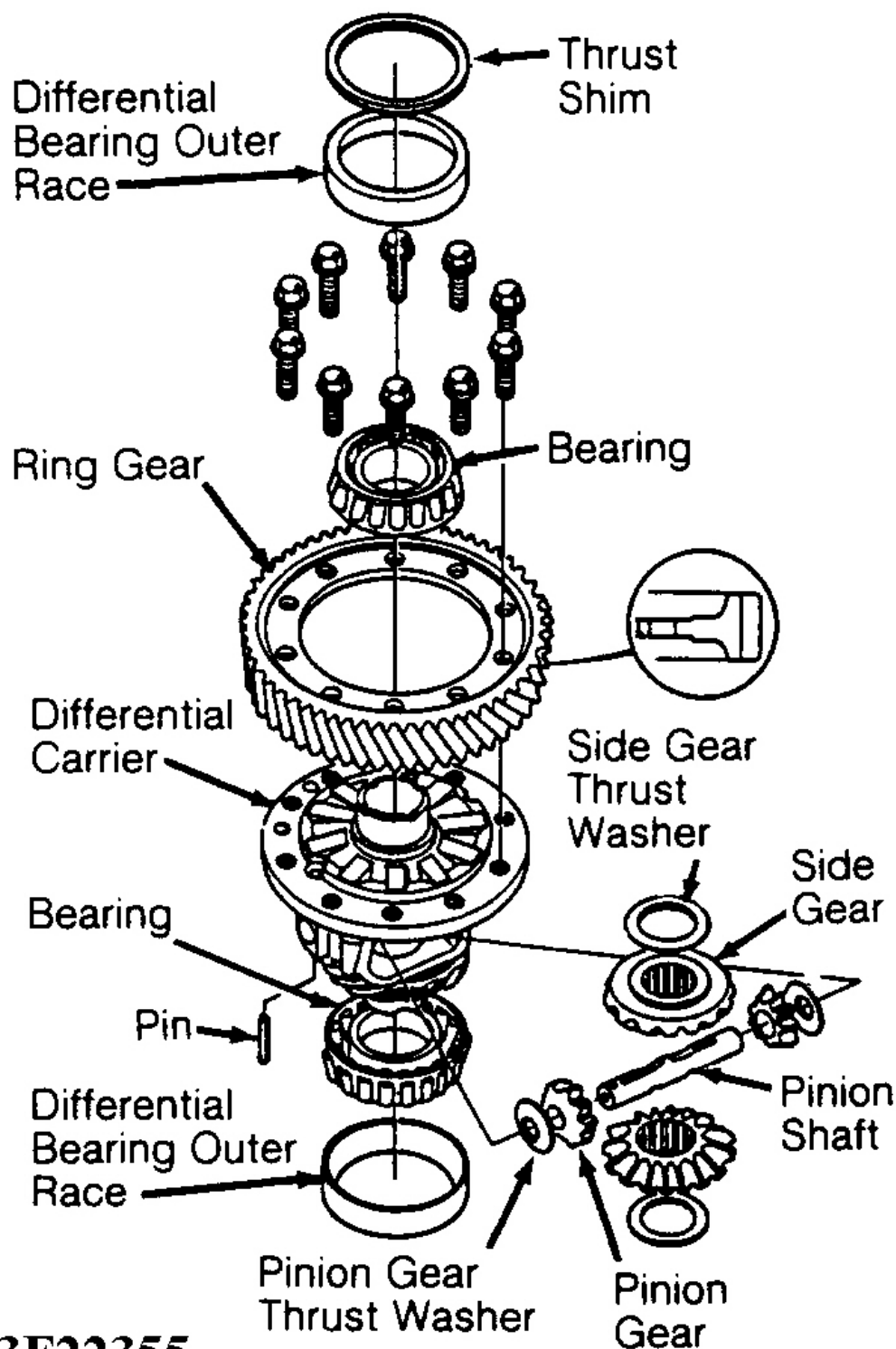
5. Install ring gear. Install and tighten ring gear bolts to specification. See **TORQUE SPECIFICATIONS**.



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Fig. 25: Checking Side Gear Backlash

Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 26: Exploded View Of Differential Assembly
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

TRANSMISSION ASSEMBLY

DIFFERENTIAL ASSEMBLY BEARING PRELOAD

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

NOTE: If transaxle housing, torque converter housing, differential carrier, bearings, thrust shim or differential bearing outer races are replaced, differential assembly bearing preload must be checked.

1. Using heat gun, heat transaxle housing, around differential bearing outer race, to 212°F (100°C). Pry differential bearing outer race from transaxle housing. Remove thrust shim (located below differential bearing outer race) from transaxle housing.
2. Allow transaxle housing to cool to room temperature. Select thrust shim so total thickness of thrust shim is .102" (2.60 mm). See **THRUST SHIM SPECIFICATIONS** table.

CAUTION: DO NOT use more than 2 thrust shims when adjusting differential assembly bearing preload.

THRUST SHIM SPECIFICATIONS

Thrust Shim I.D. Letter	Part Number	Thickness In. (mm)
"A"	41441-PK4-000	.087 (2.20)
"B"	41442-PK4-000	.089 (2.25)
"C"	41443-PK4-000	.091 (2.30)
"D"	41444-PK4-000	.093 (2.35)
"E"	41445-PK4-000	.094 (2.40)
"F"	41446-PK4-000	.096 (2.45)
"G"	41447-PK4-000	.098 (2.50)
"H"	41448-PK4-000	.100 (2.55)
"I" (1)	41449-PK4-000	.102 (2.60)
"J"	41450-PK4-000	.104 (2.65)
"K"	41451-PK4-000	.106 (2.70)
"L"	41452-PK4-000	.108 (2.75)
"M"	41453-PK4-000	.110 (2.80)
"N"	41454-PK4-000	.112 (2.85)
"O"	41455-PK4-000	.114 (2.90)
"P"	41456-PK4-000	.116 (2.95)

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"O"	41457-PK4-000	.118 (3.00)
"R"	41458-PK4-000	.120 (3.05)
(1) This is the standard thrust shim.		

3. Install thrust shim in transaxle housing. Using Driver (07749-0010000) and Adapter (07HAD-SF10100), install differential bearing outer race in transaxle housing. Ensure differential bearing outer race is fully seated in transaxle housing.
4. Install gasket on torque converter housing. Install differential assembly in torque converter housing. Install transaxle housing on torque converter housing without mainshaft, countershaft and secondary shaft installed.

CAUTION: Ensure gasket is installed when checking differential assembly bearing preload.

5. Install and tighten transaxle housing-to-torque converter housing bolts to 40 ft. lbs. (54 N.m). Rotate differential assembly several revolutions to seat bearings.
6. Install Preload Adapter (07HAJ-PK40201) into differential assembly. See **Fig. 27** . Install INCH-lb. torque wrench on preload adapter. Measure differential assembly bearing preload by checking starting torque required to rotate differential assembly in both directions.
7. Ensure differential assembly bearing preload is within specification. See **DIFFERENTIAL ASSEMBLY BEARING PRELOAD SPECIFICATIONS** table.

DIFFERENTIAL ASSEMBLY BEARING PRELOAD SPECIFICATIONS

Application	(1) INCH Lbs. (N.m)
New Bearings	24-35 (2.8-4.0)
Used Bearings	22-32 (2.5-3.7)
(1) This is the starting torque required to rotate differential assembly.	

8. If differential assembly bearing preload is not within specification, select proper thickness thrust shim to obtain correct reading. See **THRUST SHIM SPECIFICATIONS** table.
9. Changing thrust shim by one size will increase or decrease differential assembly bearing preload about 2.60-3.47 INCH lbs. (.29-.39 N.m). Increasing thrust shim thickness increases differential assembly bearing preload, and decreasing thrust shim thickness decreases preload.

CAUTION: DO NOT use more than 2 thrust shims when adjusting differential assembly bearing preload.

10. If adjusting differential assembly bearing preload, remove differential bearing outer race from transaxle housing. Install correct thrust shim. Using driver and adapter, install differential bearing outer race in transaxle housing.
11. Recheck differential assembly bearing preload. Once correct differential assembly bearing preload is

obtained, remove transaxle housing, gasket and differential assembly from torque converter housing.

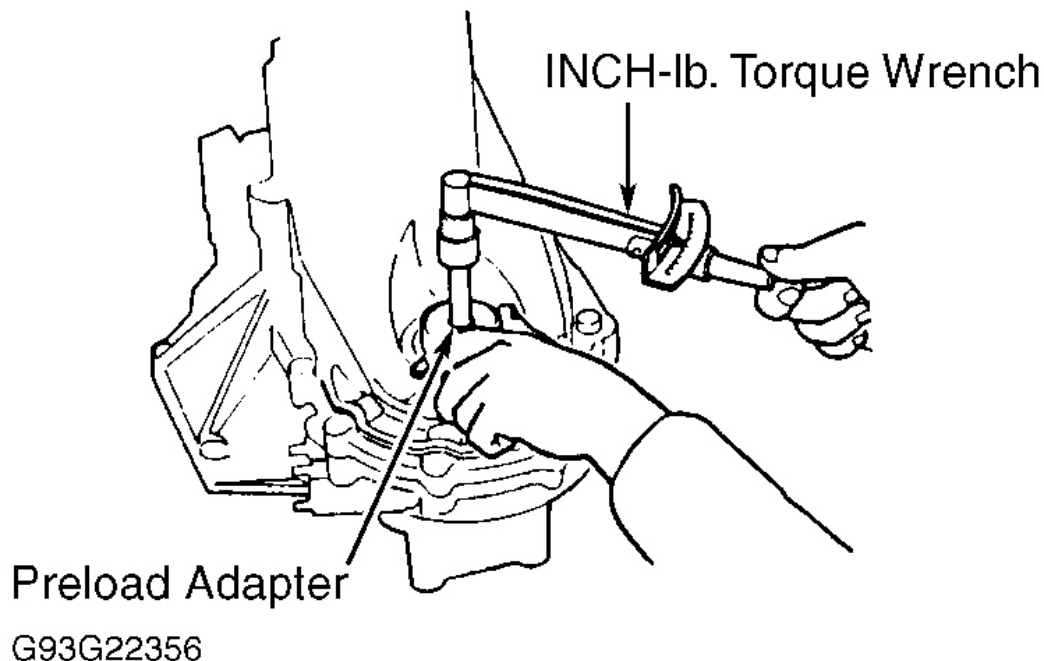


Fig. 27: Checking Differential Bearing Preload
Courtesy of AMERICAN HONDA MOTOR CO., INC.

VALVE BODIES & INTERNAL COMPONENTS

NOTE: If transaxle housing, torque converter housing, differential carrier, bearings, thrust shim or differential bearing outer races are replaced, differential assembly bearing preload must be checked. See DIFFERENTIAL ASSEMBLY BEARING PRELOAD .

NOTE: Coat all components with ATF before reassembly.

1. On 1991 models, use press and Driver (07746-003100) to press countershaft 2nd gear into transaxle housing. On all models, install main separator plate and 3 dowel pins on torque converter housing.

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

2. Install oil pump drive gear, oil pump driven gear and oil pump driven gear shaft. Install main valve body. Loosely install all main valve body bolts. Once all bolts are installed, tighten main valve body bolts to

specification. See **TORQUE SPECIFICATIONS** .

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

3. Ensure filter and check balls are installed in main valve body. See **Fig. 11** . Install stator shaft and stopper pin. Install dowel pins, spring and torque converter check valve in main valve body.
4. Install regulator valve body and retaining bolt on main valve body. Ensure filter is installed on regulator valve body. See **Fig. 11** . Install dowel pins and throttle valve separator plate.
5. Install throttle control shaft on throttle valve body using NEW "E" clip. Install throttle valve body. Install and tighten throttle valve body bolts to specification. See **TORQUE SPECIFICATIONS** .
6. Install secondary separator plate and dowel pins on main valve body. See **Fig. 11** . Install control shaft on torque converter housing. Ensure control shaft engages with manual valve on main valve body.
7. On 1992 models, install detent arm and detent arm shaft on main valve body. See **Fig. 11** . Install detent spring and hook on detent arm and control shaft.
8. On all models, install cable control lever on end of control shaft. Install secondary valve body on secondary separator plate. Ensure check balls are installed in secondary valve body. See **Fig. 11** .
9. Install servo separator plate and servo valve body on secondary valve body. Install and tighten servo valve body bolts to specification.
10. Install oil feedpipe and accumulator cover on servo valve body. Install and tighten accumulator cover bolts to specification.
11. Install fluid strainer. Install and tighten fluid strainer bolts to specification.
12. Install servo detent base. Install NEW bolt locks on servo detent base bolts. Install and tighten bolts to specification. Bend tabs on bolt locks over.
13. Install 1st-2nd accumulator body. Install and tighten bolts to specification. Ensure steel ball is located in 1st-2nd accumulator body. See **Fig. 11** . Install accumulator body cover. Install and tighten bolts to specification.
14. Install clutch feedpipes in main valve body. Install oil feedpipe in servo body. Install differential assembly, mainshaft, secondary shaft and countershaft in torque converter housing.
15. On 1991 models, install 4th gear collar, needle bearing and countershaft 4th gear on countershaft. See **Fig. 9** . On 1992 models, install needle bearing and countershaft 4th gear on the countershaft. See **Fig. 10** .
16. On all models, install reverse selector on countershaft. Ensure flanged side of reverse selector is facing upward (away from torque converter housing). See **Fig. 9** and **Fig. 10** . Install reverse shift fork and reverse selector hub.
17. Rotate shift fork shaft on servo valve body so large chamfered hole aligns with hole in reverse shift fork. Install reverse shift fork bolt and NEW bolt lock. Tighten bolt to specification. See **TORQUE SPECIFICATIONS** . Bend tabs on bolt lock over.
18. On 1991 models, install secondary shaft 2nd gear, thrust needle bearing, and 2nd gear collar on secondary shaft. See **Fig. 9** . Install countershaft reverse gear collar, needle bearing and countershaft reverse gear on countershaft.

19. On 1992 models, install secondary shaft 2nd gear, thrust needle bearing and thrust washer on secondary shaft. See **Fig. 10** . Install needle bearing and countershaft reverse gear on countershaft.
20. On all models, install reverse idler gear in transaxle case, with largest chamfered area facing upward (away from transaxle housing). See **Fig. 28** . Install NEW gasket on torque converter housing. Align spring pin with groove in transaxle housing by rotating shaft. See **Fig. 8** .

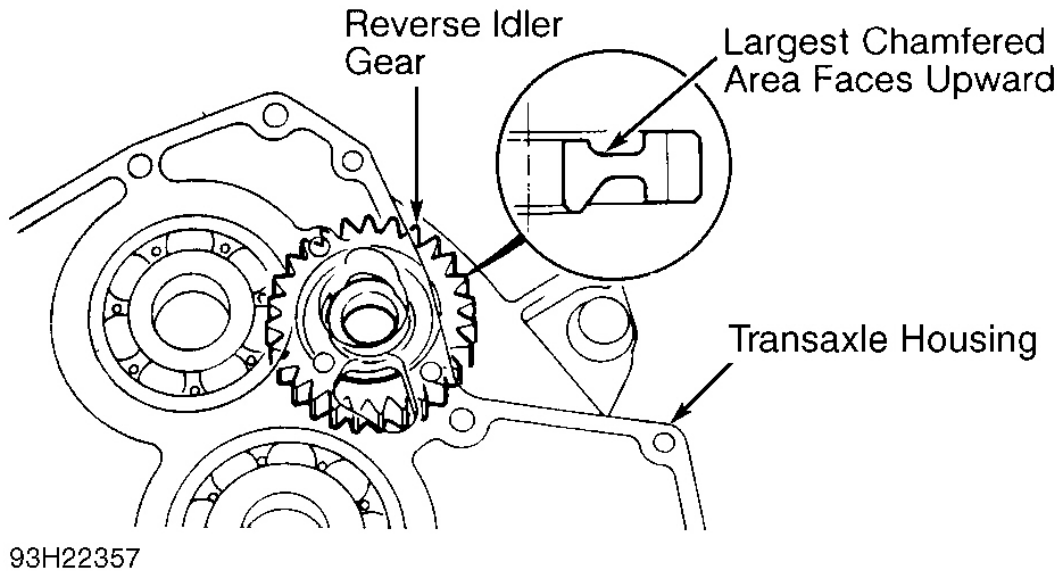


Fig. 28: Installing Reverse Idler Gear

Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Install transaxle housing on torque converter housing. Install and tighten bolts to specification in sequence using several steps. See **Fig. 29** . See **TORQUE SPECIFICATIONS** .
22. Engage reverse idler gear with countershaft reverse gear. Install reverse idler gear shaft holder. Install and tighten bolts to specification.

NOTE: Ensure steel ball and spring are installed on reverse idler gear shaft holder. On 1991 models, steel ball and spring may come out of reverse idler gear shaft holder. On 1992 models, steel ball and spring are held in position by staked area on reverse idler gear shaft holder.

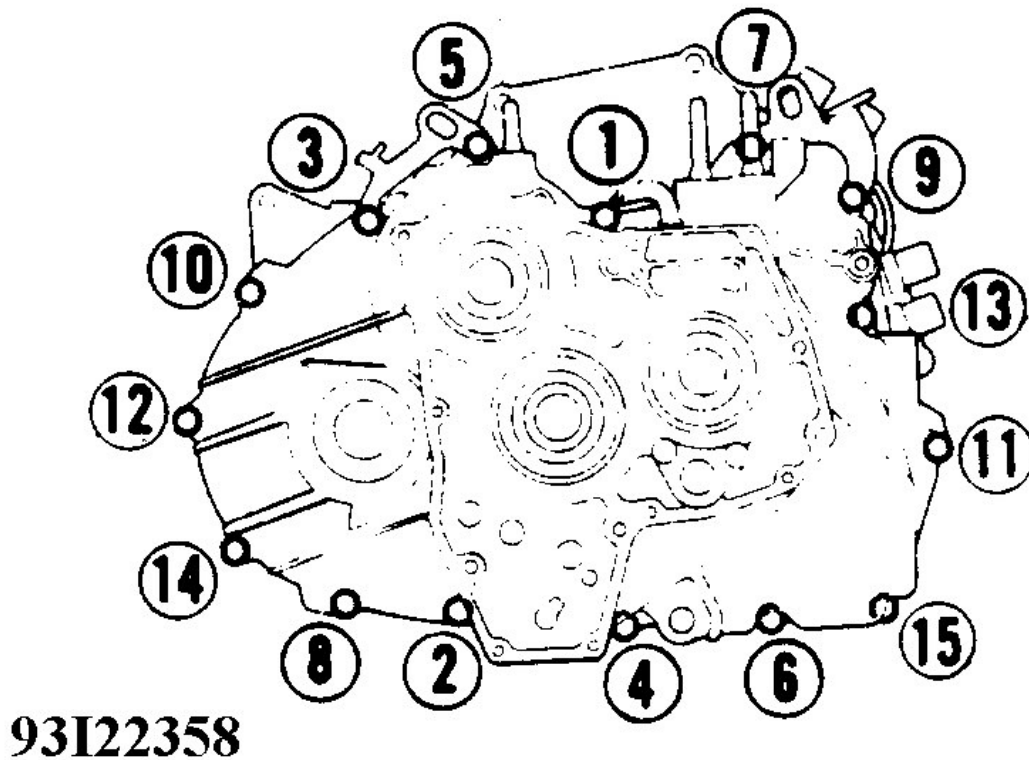


Fig. 29: Transaxle Housing Bolt Tightening Sequence
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

23. Install parking pawl shaft, parking brake lever spring and parking brake lever. See **Fig. 5** . Install NEW bolt and bolt lock on parking brake lever. Tighten bolt to specification. See **TORQUE SPECIFICATIONS** . Bend lock tabs on bolt lock over.
24. Install secondary shaft idler gear on secondary shaft. Install mainshaft idler gear on mainshaft. Install thrust washer, thrust needle bearing, needle bearing, countershaft idler gear and parking gear on countershaft. See **Fig. 5** .
25. Install Mainshaft Holder (07GAB-PF50100) on mainshaft to secure it. See **Fig. 6** . Install parking pawl stopper, parking pawl spring and parking pawl. See **Fig. 5** . Engage parking pawl with parking gear.

CAUTION: On some 1991 models, a updated lock nut must be installed on mainshaft, countershaft and secondary shaft. Ensure proper lock nut is used. See **TECHNICAL SERVICE BULLETINS** .

26. Install old lock nuts and spring washers (if equipped) on mainshaft, countershaft and secondary shaft. Ensure spring washer (1992 models) is installed with concave side toward lock nut. See **Fig. 5** . Tighten lock nuts to specification to press gears on shafts. See **TORQUE SPECIFICATIONS** .

NOTE: Mainshaft lock nut has left-hand threads.

27. Remove lock nuts from mainshaft, countershaft and secondary shaft. Install NEW spring washers (if equipped) and NEW lock nuts. Tighten lock nuts to specification. Stake lock nuts against shaft. Remove mainshaft holder.

CAUTION: DO NOT use impact wrench to tighten lock nuts on countershaft, mainshaft and secondary shaft. Ensure all lock nuts are securely staked against shaft.

28. Place parking brake lever in "P" position and ensure parking pawl engages parking gear. Measure parking brake stopper distance between pin on parking brake stopper and parking pawl shaft. See **Fig. 30** .
29. Parking brake stopper distance should be 2.54-2.58" (64.5-65.6 mm). If parking brake stopper distance is not as specified, install different size parking brake stopper. Parking brake stopper is available in various sizes. See **PARKING BRAKE STOPPER SPECIFICATIONS** table.
30. Install NEW gasket and right side cover. Tighten bolts to specification. See **TORQUE SPECIFICATIONS** . To install remaining components, reverse removal procedure. Use NEW seal washers when installing joint bolts for ATF cooler pipes. Tighten all fasteners to specification.

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

PARKING BRAKE STOPPER SPECIFICATIONS

I.D. Mark	Part Number	⁽¹⁾ Distance "A" In. (mm)	⁽¹⁾ Distance "B" In. (mm)
1	24537-PA9-003	.433 (11.00)	.433 (11.00)
2	24538-PA9-003	.425 (10.80)	.419 (10.65)
3	24539-PA9-003	.417 (10.60)	.406 (10.30)
(1) Measured from center of parking brake stopper. See Fig. 30 .			

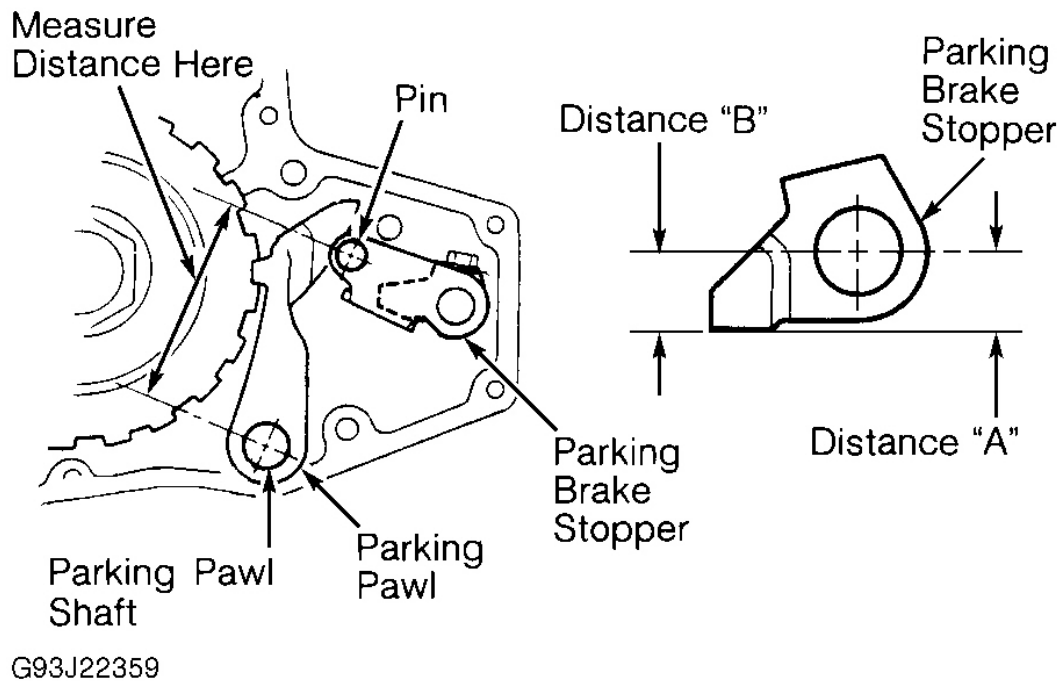


Fig. 30: Parking Brake Stopper Distance & Parking Brake Stopper
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Specification
Clutch Clearance	
1st & 2nd Clutches	.026-.033" (.65-.85 mm)
1st-Hold Clutch	.031-.039" (.80-1.00 mm)
3rd & 4th Clutches	.016-.024" (.40-.60 mm)
Differential Bearing Preload ⁽¹⁾	
New Bearings	24-35 INCH lbs. (2.8-4.0 N.m)
Used Bearings	22-32 INCH lbs. (2.5-3.7 N.m)
Oil Pump Clearances	
Side Clearance	
Oil Pump Drive Gear	.0083-.0104" (.210-.265 mm)
Oil Pump Driven Gear	.0014-.0025" (.035-.063 mm)
Thrust Clearance	
Standard	.001-.002" (.03-.05 mm)
Wear Limit	.0028" (.070 mm)

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Secondary Shaft 2nd Gear Axial Clearance (1992 Models)	.003-.006" (.08-.15 mm)
Side Gear Backlash	.003-.006" (.08-.15 mm)
Parking Brake Stopper Distance	2.54-2.58" (64.5-65.6 mm)

(1) This is the starting torque required to rotate differential assembly.

TRANSAXLE SPECIFICATIONS**TRANSAXLE SPECIFICATIONS**

Application	Ft. Lbs. (N.m)
Ball Joint Nut	40 (54)
Countershaft Lock Nut	
1991 Models	(1) 148 (201)
1992 Models	123 (167)
Damper Fork-To-Lower Control Arm Bolt	47 (64)
Damper Fork-To-Strut Bolt	32 (43)
Front Beam Bolt	47 (64)
Joint Bolt	21 (29)
Mainshaft Lock Nut	
1991 Models	(1) 118 (160)
1992 Models	123 (167)
Main Valve Body Bolt	
6-mm Bolt	(2)
8-mm Bolt	13 (18)
Radius Rod Nut	32 (43)
Radius Rod-To-Lower Control Arm Bolt	76 (103)
Ring Gear Bolt	76 (103)
Secondary Shaft Lock Nut	
1991 Models	(1) 118 (160)
1992 Models	123 (167)
Transaxle Housing Bolt (3)	40 (54)
Transaxle Side Mount Nut	28 (38)
Wheel Lug Nut	80 (109)
	INCH Lbs. (N.m)
Accumulator Body Cover Bolt	108 (12)
Accumulator Cover Bolt	108 (12)
Fluid Strainer Bolt	108 (12)
Parking Brake Lever Bolt	120 (14)
Regulator Valve Body Bolt	108 (12)
Regulator Valve Stopper Bolt	108 (12)
Reverse Idler Gear Shaft Holder Bolt	108 (12)

1991 Honda Accord DX

1991-92 AUTOMATIC TRANSMISSIONS APX4 & MPXA Overhaul

Reverse Shift Fork Bolt	120 (14)
Right Side Cover Bolt	108 (12)
Servo Detent Base Bolt	108 (12)
Servo Valve Body Bolt	108 (12)
Speed Sensor Bolt	108 (12)
Stopper Bolt	108 (12)
Throttle Cam Stopper Bolt	72 (8)
Throttle Valve Body Bolt	108 (12)
1st-2nd Accumulator Body Bolt	108 (12)

(1) On some 1991 models, lock nut may have been updated. Ensure proper lock nut is used. See **TECHNICAL SERVICE BULLETINS** at the end of this article.

(2) Tighten bolt to 108 INCH lbs. (12 N.m).

(3) Tighten bolts to specification in sequence. See **Fig. 29** .

TECHNICAL SERVICE BULLETINS

A/T SHAFT LOCK NUTS

Technical Service Bulletin 91-028 (October 25, 1991)

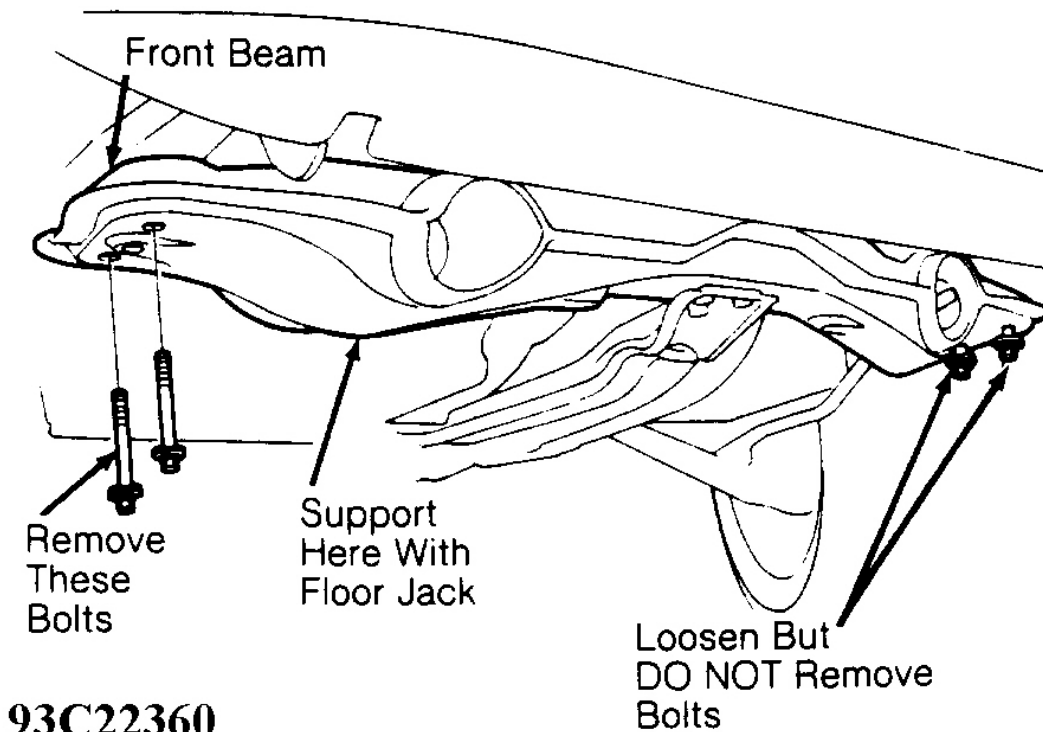
On 1990-91 Accords, an updated lock nut and spring washer must be installed on countershaft, mainshaft and secondary shaft. Previous type lock nuts may come loose, causing a loud whine when accelerating in 1st and 2nd gears. Loud whine may also exist in "P" and "N". This procedure applies to all 1990-91 Accords with following Vehicle Identification Numbers (VIN):

- JHMCB76 Through MC093388 (Japan Built 4-Door Models)
- 1HGCB72 Through MA056143 (Ohio Built 2-Door Models)
- 1HGCB76 Through MA153884 (Ohio Built 4-Door Models)
- 1HGCB98 Through MA019542 (Wagon Models)

If VIN is in this range, check for a center punch mark above letter "C" in VIN, stamped on passenger's side of engine compartment firewall. If center punch mark exists, lock nuts should have already been replaced. If there is no center punch mark, replace lock nuts using Update Kit (06210-PX4-305) and following procedure:

1. Ensure shift lever is in "P". Place ignition switch in ACC position so steering column is unlocked.
2. Remove battery, battery tray and air cleaner case. Raise and support vehicle. Disconnect NC speed sensor electrical connector. See **Fig. 5** . Remove NC speed sensor from mounting bracket.
3. Clean area around right side cover on transaxle. Remove transaxle side mount nuts. Remove right front wheel. Remove lower engine splash shield. Remove cotter pin and nut from ball joint at right lower control arm.
4. Using puller, separate ball joint from lower control arm. Remove damper fork-to-strut and lower control arm bolts. Remove damper fork.

5. Lift steering knuckle upward and place behind lower control arm. **DO NOT** allow axle shaft to disengage from transaxle. Remove bolts and radius arm located between lower control arm and body.
6. Drain transaxle fluid. Support transaxle with transmission jack. Loosen both bolts on left side of front beam about 10 turns. See **Fig. 31** . **DO NOT** remove bolts. Support front beam with floor jack.



93C22360

Fig. 31: Identifying Front Beam

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove both bolts from right side of front beam. Lower transaxle until right side cover is clear of inner fender panel. Remove NM speed sensor. See **Fig. 5** . Remove bolts and right side cover. If necessary, rotate right side cover so it will clear inner fender panel.

CAUTION: DO NOT cock right side cover during removal, or oil feedpipe will be damaged. Right side cover must be pulled straight from transaxle to prevent bending oil feedpipe.

8. Inspect countershaft, mainshaft and secondary shaft lock nuts to ensure lock nuts are still securely staked in place. Ensure no signs of cracking exist.

NOTE: If any lock nut has started to come loose or signs of cracking exists, contact authorized Honda dealer.

CAUTION: DO NOT use impact wrench to remove or install lock nuts.

9. Using hammer and chisel, cut lock tabs on countershaft, mainshaft and secondary shaft lock nuts. Remove lock nut from countershaft.
10. Coat NEW spring washer and NEW lock nut with ATF. Install spring washer with concave side toward lock nut. See **Fig. 5** . Install lock nut and tighten to 123 ft. lbs. (167 N.m). Stake lock nut against countershaft.
11. Using 2 bolts, install gear holder on mainshaft idler gear. See **Fig. 32** . Ensure shoulders on rear of gear holder engage with recess area on front of mainshaft idler gear. Remove lock nut from secondary shaft. Remove gear holder.
12. Coat NEW spring washer and NEW lock nut with ATF. Install spring washer with concave side toward the lock nut. See **Fig. 5** . Install lock nut and tighten to 123 ft. lbs. (167 N.m). Stake lock nut against secondary shaft.
13. Using 2 bolts, install gear holder on secondary shaft idler gear. Ensure shoulders on rear of gear holder engage with recess area on front of secondary shaft idler gear. Remove lock nut from mainshaft.

NOTE: Mainshaft has left-hand threads.

14. Coat NEW spring washer and NEW lock nut with ATF. Install spring washer with concave side toward lock nut. See **Fig. 5** . Install lock nut and tighten to 123 ft. lbs. (167 N.m). Stake lock nut against mainshaft. Remove gear holder.
15. Install NEW gasket and right side cover. Tighten bolts to specification. See **TORQUE SPECIFICATIONS** . Install NM speed sensor using NEW "O" ring.
16. To install remaining components, reverse removal procedure. Install NEW bolts on both sides of front beam. Install NEW bolts and lock nut on radius rod and damper fork. Tighten all fasteners to specification. See **TORQUE SPECIFICATIONS** .
17. Refill transaxle with ATF. Place center punch mark above letter "C" in VIN, stamped on passenger's side of firewall, to indicate update was completed.

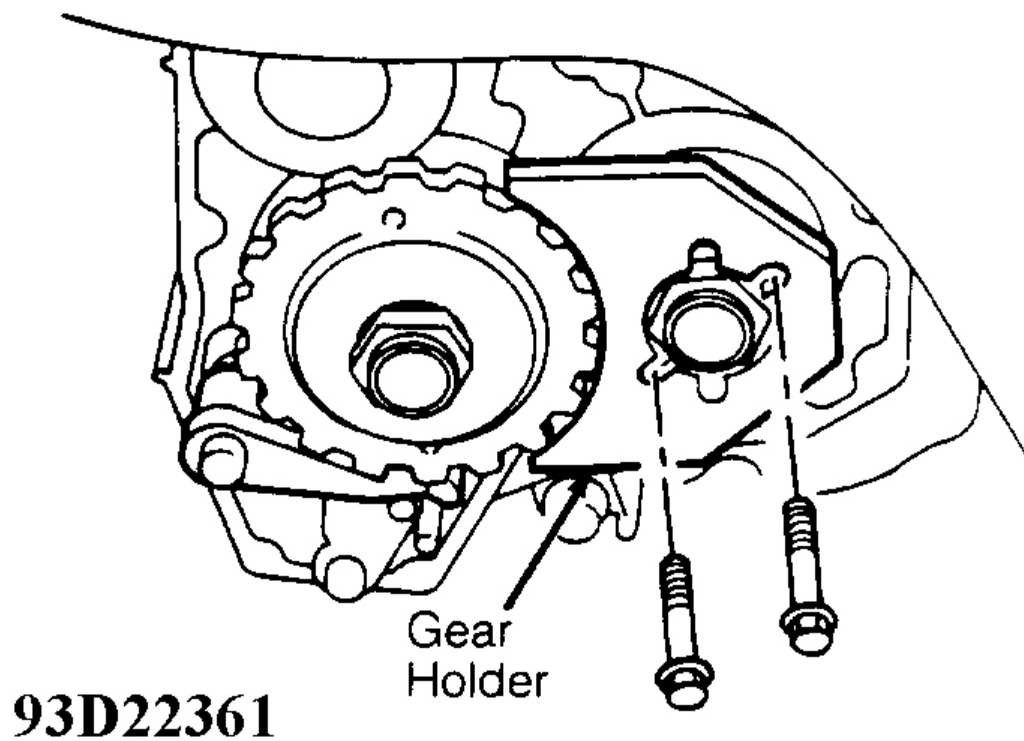


Fig. 32: Installing Gear Holder

Courtesy of AMERICAN HONDA MOTOR CO., INC.