

1992 AUTOMATIC TRANSMISSIONS

M24A Overhaul

APPLICATION

TRANSMISSION APPLICATION

Application	Transmission Model
Honda Civic	M24A

IDENTIFICATION

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

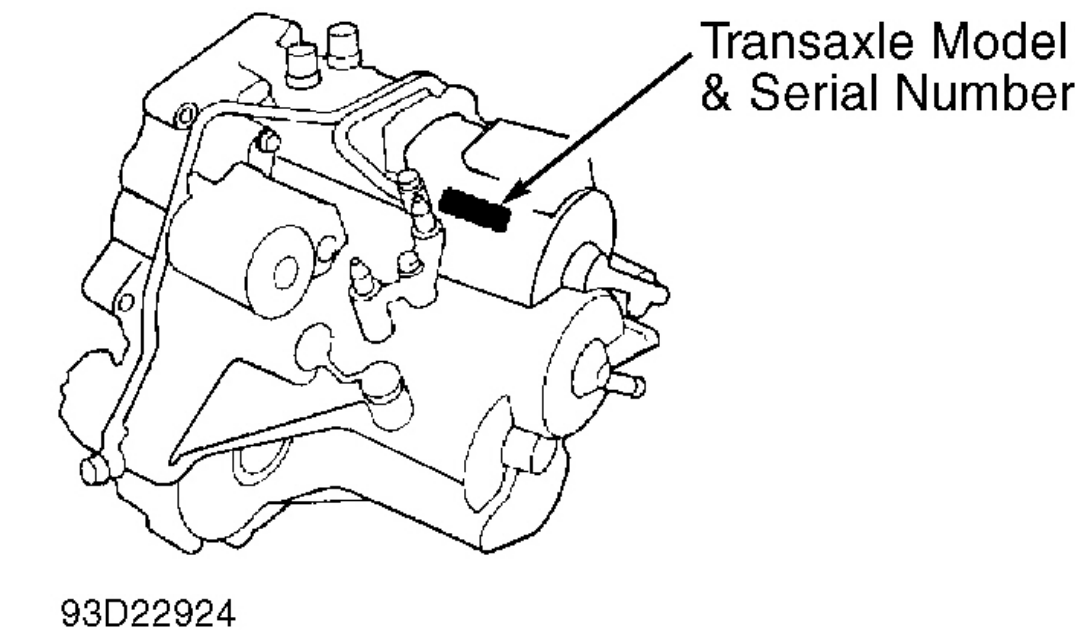
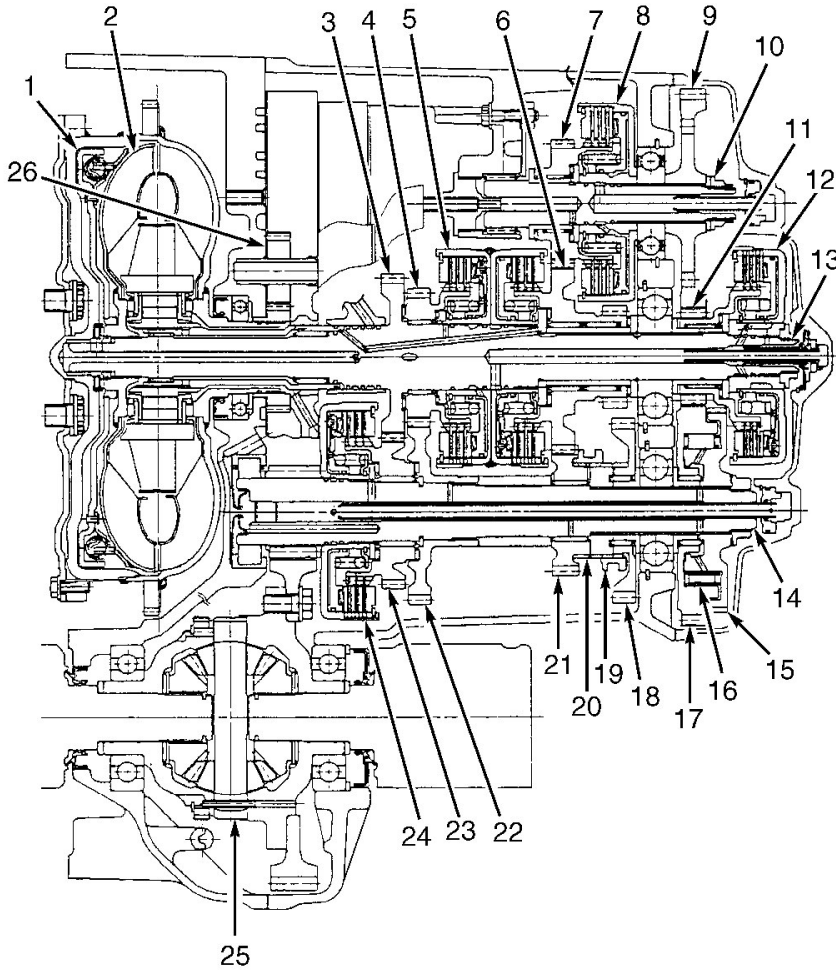


Fig. 1: Identifying Transaxle Model & Serial Number Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

DESCRIPTION

Automatic transaxle provides 4 forward speeds and one reverse. Transaxle consists of clutches, mainshaft, countershaft, sub-shaft, 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, modulator valve body, lock-up

valve body, regulator valve body and governor body. Torque converter lock-up is controlled by the PGM-FI Electronic Control Unit (ECU). This is the ECU used for controlling the fuel injection system.



- | | |
|------------------------------------|-------------------------------|
| 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 safety switch, incorporated in shift position console switch, allows starting in this position.

"R" (Reverse)

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

"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 4th gears. Transaxle will downshift through 3rd, 2nd and 1st gears until vehicle stops. When in this gear, torque converter lock-up will operate through signal delivered from PGM-FI ECU.

"D3" (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 this gear, torque converter lock-up will operate through signal delivered from PGM-FI ECU.

"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 "D3" or "D4" position, in 2nd, 3rd or 4th gear, torque converter lock-up exists and transaxle mainshaft rotates at the same speed as engine crankshaft. Under certain conditions, torque converter lock-up clutch is applied during deceleration when in 2nd, 3rd and 4th gears. Torque converter lock-up is controlled by the PGM-FI ECU. The PGM-FI ECU receives various input signals and operates lock-up control solenoid valves. Operation of lock-up control solenoid valves controls the modulator pressure.

The PGM-FI ECU 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 **M24A 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 **M24A ELECTRONIC CONTROLS** article.

LUBRICATION

See **SERVICING** article.

ON-VEHICLE SERVICE

AXLE SHAFTS

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

OIL COOLER FLUSHING

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

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

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

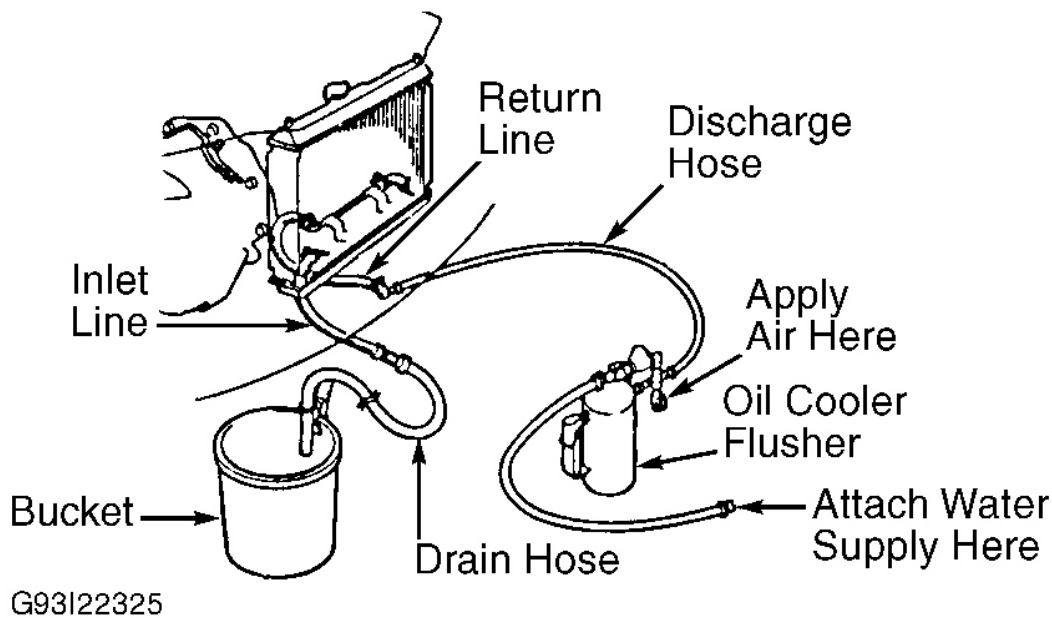


Fig. 3: Installing Oil Cooler Flusher

Courtesy of AMERICAN HONDA MOTOR CO., INC.

TROUBLE SHOOTING

PRELIMINARY INSPECTION

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

SYMPTOM DIAGNOSIS

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
- 2-3 Or 2/3-4 Orifice Control Valve Stuck
- Throttle Valve "B" Stuck
- Throttle Valve T. V. Cable Adjusted Too Long

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

- Check Balls Missing
- 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
- 2/3-4 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 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
- 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
- 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

- 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
- 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 "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 "D3" Or "D4"

- One-Way Clutch Installed Upside Down

Will Not Downshift To Low Gear

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

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

- Defective Or Improperly Adjusted Shift Cable
- 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 **M24A ELECTRONIC CONTROLS** article.

1. Warm engine to normal operating temperature. Apply parking brake, and block wheels. Start engine and 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 shift 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 and torque converter lock-up clutch operation are within specification. See **UPSHIFT SPECIFICATIONS** , **TORQUE CONVERTER LOCK-UP CLUTCH SPECIFICATIONS** and **DOWNSHIFT SPECIFICATIONS** 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" position. 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" position. Accelerate from a stop at full throttle. Check for abnormal noise or clutch

1992 Honda Civic CX**1992 AUTOMATIC TRANSMISSIONS M24A Overhaul**

slippage. Upshifts and downshifts should not occur in this range.

7. Place shift lever in "R" position. Accelerate from a stop at full throttle. Check for abnormal noise or clutch slippage.
8. Park vehicle on a slope. Apply parking brake, and place shift lever in "P" position. Release parking brake, and ensure vehicle does not move. If vehicle moves, check for defective shift cable or parking components.

CLUTCH APPLICATION

Shift Lever Position	Elements In Use
Park & Neutral	No Clutches Are Applied
"R"	4th Clutch
"D4"	
1st Gear	1st Clutch
2nd Gear	(1) 2nd Clutch
3rd Gear	(1) 3rd Clutch
4th Gear	(1) 4th Clutch
"D3"	
1st Gear	1st Clutch
2nd Gear	(1) 2nd Clutch
3rd Gear	(1) 3rd Clutch
"2"	(1) 2nd Clutch
"1"	1st-Hold Cutch & 1st Clutch
(1) The 1st clutch engages, but driving power is not transmitted, as one-way clutch slips.	

UPSHIFT SPECIFICATIONS

"D3" & "D4" Positions	1st-2nd Gear	2nd-3rd Gear	3rd-4th Gear
1.5L			
Fully Closed Throttle Coasting Downhill From Stop	9-12 MPH	22-24 MPH	30-33 MPH
3/16 Throttle Accelerating From Stop	12-15 MPH	28-30 MPH	39-43 MPH
3/8 Throttle Accelerating From Stop	16-21 MPH	35-43 MPH	50-57 MPH
Full Throttle Accelerating From Stop	30-33 MPH	57-62 MPH	91-98 MPH
1.6L			
Fully Closed Throttle Coasting Downhill From Stop	9-12 MPH	22-24 MPH	30-33 MPH
3/16 Throttle Accelerating From Stop	13-16 MPH	30-32 MPH	40-43 MPH
3/8 Throttle Accelerating From Stop	16-21 MPH	39-46 MPH	52-59 MPH
Full Throttle Accelerating From Stop	35-39 MPH	66-70 MPH	96-103 MPH

DOWNSHIFT SPECIFICATIONS

"D3" & "D4" Positions	4th-3rd Gear	3rd-2nd Gear	2nd-1st Gear
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1992 Honda Civic CX**1992 AUTOMATIC TRANSMISSIONS M24A Overhaul****1.5L**

Fully Closed Throttle	(1)	18-21 MPH	6-8 MPH
Fully Open Throttle	77-84 MPH	53-57 MPH	26-29 MPH

1.6L

Fully Closed Throttle	(1)	18-21 MPH	6-8 MPH
Fully Open Throttle	83-90 MPH	58-63 MPH	25-27 MPH

(1) Specification is not available from manufacturer.

TORQUE CONVERTER LOCK-UP CLUTCH SPECIFICATIONS

Application & Shift Lever Position	Lock-Up Clutch On	Lock-Up Clutch Off
1.5L		
D3		
Fully Closed Throttle	60-64 MPH	57-61 MPH
3/8 Throttle	66-70 MPH	57-61 MPH
Full Throttle	82-86 MPH	78-82 MPH
D4		
Fully Closed Throttle	15-17 MPH	14-16 MPH
3/8 Throttle	66-70 MPH	54-58 MPH
Full Throttle	88-91 MPH	85-88 MPH
1.6L		
D3		
Fully Closed Throttle	60-64 MPH	57-61 MPH
3/8 Throttle	66-70 MPH	57-61 MPH
Full Throttle	82-86 MPH	79-83 MPH
D4		
Fully Closed Throttle	15-17 MPH	14-16 MPH
3/8 Throttle	66-70 MPH	54-58 MPH
Full Throttle	94-98 MPH	90-94 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 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 torque converter stall speed.
3. Allow transaxle to cool for 2 minutes. Repeat test procedure with shift lever in "D4", "1" and "R".
4. Torque converter stall speed should be the same in "D4", "2", "1" and "R" and within specification. See

1992 Honda Civic CX

1992 AUTOMATIC TRANSMISSIONS M24A Overhaul

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
Standard	2600
Service Limit	2400-2800

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

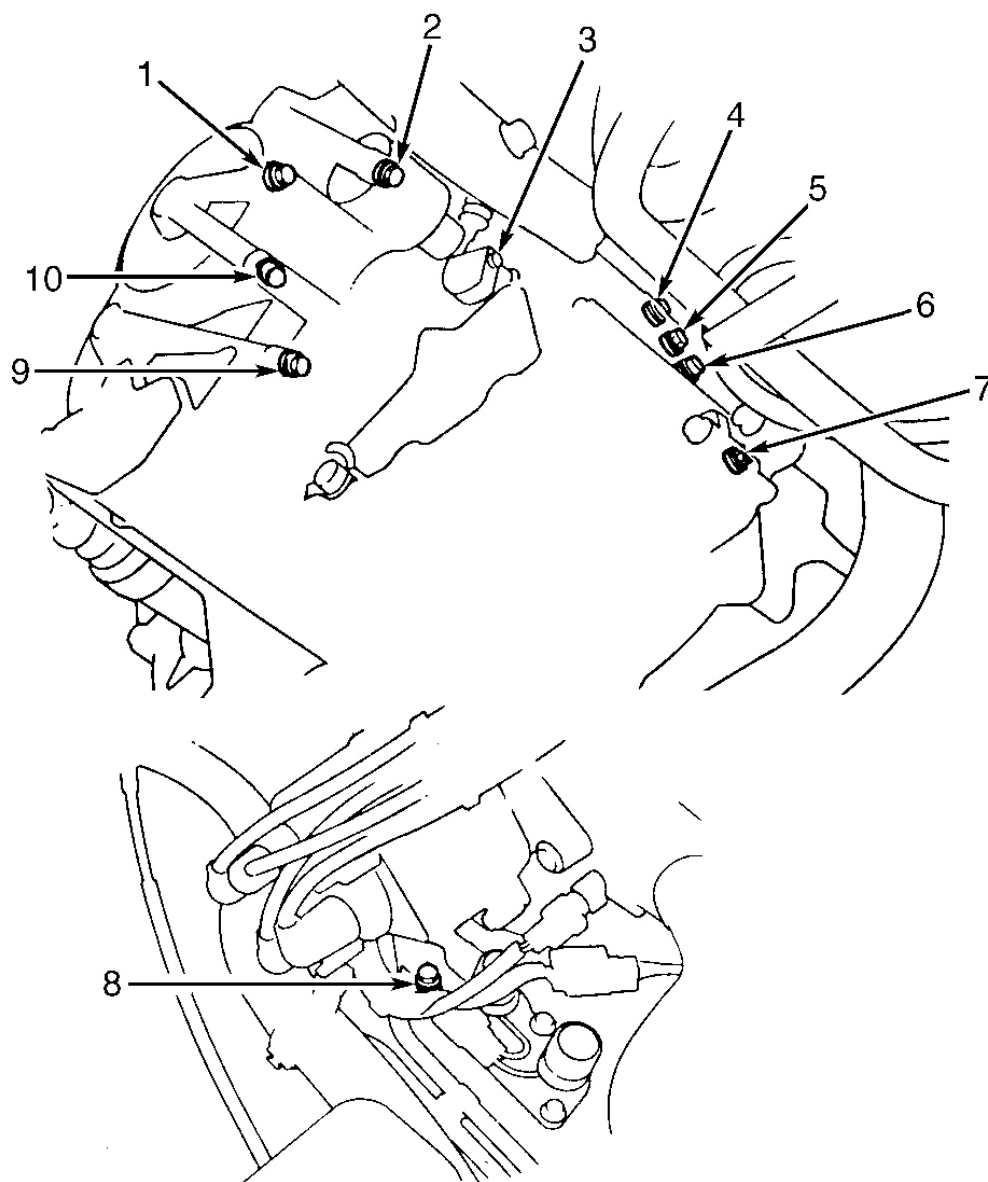
HYDRAULIC PRESSURE TEST

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 rotate.

Line Pressure Test

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



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| 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. 4: Identifying Transaxle Pressure Taps
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

1992 Honda Civic CX

1992 AUTOMATIC TRANSMISSIONS M24A Overhaul

HYDRAULIC PRESSURE TEST SPECIFICATIONS

Application	Shift Lever Position	Pressure - Psi (Kg/Cm²)
Line Pressure		
Engine Speed At 2000 RPM	"P" Or "N"	114-128 (8.0-9.0)
Clutch Pressure		
1st Clutch		
Engine Speed At 2000 RPM	"1" Or "D ₄ "	114-128 (8.0-9.0)
1st Hold Clutch		
Engine Speed At 2000 RPM	"1"	114-128 (8.0-9.0)
2nd Clutch		
Engine Speed At 2000 RPM	"2"	114-128 (8.0-9.0)
Transaxle T. V. Lever Fully Closed ⁽¹⁾	"D ₄ "	50-57 (3.5-4.0)
Transaxle T. V. Lever Open More Than 1/8 ⁽²⁾	"D ₄ "	114-128 (8.0-9.0)
3rd Clutch		
Transaxle T. V. Lever Fully Closed ⁽¹⁾	"D ₄ "	50-57 (3.5-4.0)
Transaxle T. V. Lever Open More Than 1/8 ⁽²⁾	"D ₄ "	114-128 (8.0-9.0)
4th Clutch		
Engine Speed At 2000 RPM	"R"	114-128 (8.0-9.0)
Transaxle Lever Fully Closed ⁽¹⁾	"D ₄ "	50-57 (3.5-4.0)
Transaxle Lever Open More Than 1/8 ⁽²⁾	"D ₄ "	114-128 (8.0-9.0)
Low Pressure		
Transaxle Lever Fully Closed		
2nd, 3rd Or 4th Clutch ⁽¹⁾	"D ₄ "	50-57 (3.5-4.0)
High Pressure		
Transaxle T. V. Lever Lifted Upward 1/2 Distance Of T. V. Lever Travel		
2nd, 3rd Or 4th Clutch	"D ₄ "	114-128 (8.0-9.0)
Throttle Valve Pressure		
Throttle Valve "A"		
Transaxle T. V. Lever Fully Open ⁽³⁾	"D ₃ " Or "D ₄ "	(4)
Throttle Valve "B"		
Transaxle T. V. Lever Fully Open ⁽³⁾	"D ₃ " Or "D ₄ "	114-128 (8.0-9.0)

1992 Honda Civic CX**1992 AUTOMATIC TRANSMISSIONS M24A Overhaul**

Governor Pressure (5)	"D ₃ " Or "D ₄ "	25-27 (1.7-1.9)
(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) Throttle valve "A" pressure should be 71-74 psi (5.0-5.2 kg/cm²) on 1.5L engines and 73-75 psi (5.1-5.2 kg/cm²) on 1.6L engines. (5) Check governor pressure with vehicle speed at 38 MPH.		

HYDRAULIC PRESSURE TROUBLE SHOOTING

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

Clutch Pressure Test

NOTE: Clutch pressure should be checked at each clutch pressure tap on transaxle.

See Fig. 4 .

1. With engine off, remove plug from appropriate clutch pressure tap on transaxle. See **Fig. 4** . Attach Pressure Gauge Set (07406-0020003) to appropriate pressure tap using NEW aluminum washer. Tighten hose fitting to 13 ft. lbs. (18 N.m).

NOTE: Clutch pressure on some applications may vary with position of Throttle Valve T. V. lever on 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. Clutch pressure should be within specification. If clutch pressure is not within specification, see **HYDRAULIC PRESSURE TROUBLE SHOOTING** table. Shut engine off. Remove pressure gauge set, and install plug.

Low/High Pressure Test

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

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.
2. With engine off, remove plug from appropriate clutch pressure tap on transaxle. Attach Pressure Gauge. Set (07406-0020003) to appropriate pressure tap using NEW aluminum washer. Tighten hose fitting to 13 ft. lbs. (18 N.m).
3. Start engine and allow to idle. Move shift lever to "D4" position. Slowly increase engine speed until pressure is indicated on pressure gauge. Release throttle, allow engine to idle, and note low pressure reading.
4. With engine idling, lift transaxle T. V. lever upward approximately 1/2 the distance of lever travel. Increase engine speed, and note highest pressure reading.
5. Repeat procedure on remaining clutches. The low/high pressure should be within specification. See **HYDRAULIC PRESSURE TEST SPECIFICATIONS** table. If low/high pressure is not within specification, see **HYDRAULIC PRESSURE TROUBLE SHOOTING** table.
6. Shut engine off. Remove pressure gauge set, and install plug. Reconnect T. V. cable.

Throttle Valve Pressure Test

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

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

1. Disconnect Throttle Valve T. V. cable from transaxle T. V. lever. With engine off, remove plug from throttle valve "A" or "B" pressure tap. See **Fig. 4** .
2. Attach Pressure Gauge Set (07406-0020003) to appropriate throttle valve pressure tap using NEW aluminum washer. Tighten hose fitting to 13 ft. lbs. (18 N. m).
3. Start engine and operate at 1000 RPM with shift lever in "D3" or "D4" position. No pressure should exist with transaxle T. V. lever closed (released position). Lift transaxle T. V. lever on transaxle to fully open position. Note throttle valve pressure reading.
4. Throttle valve pressure should be within specification. See **HYDRAULIC PRESSURE TEST SPECIFICATIONS** table. If pressure is not within specification, see **HYDRAULIC PRESSURE TROUBLE SHOOTING** table. Shut engine off. Remove pressure gauge set, and install plug. Reconnect T. V. cable.

Governor Pressure Test

1. With engine off, remove plug from governor pressure tap on transaxle. See **Fig. 4** . Attach Pressure Gauge Set (07406-0020003) to pressure tap using NEW aluminum washer. Tighten hose fitting to 13 ft. lbs. (18 N.m).
2. Start engine. Place shift lever in "D3" or "D4" position. Accelerate to 38 MPH, and note governor pressure. Governor pressure should be within specification. See **HYDRAULIC PRESSURE TEST SPECIFICATIONS** table. If governor pressure is not within specification, see **HYDRAULIC PRESSURE TROUBLE SHOOTING** table. Shut engine off. Remove pressure gauge set, and install plug.

REMOVAL & INSTALLATION

WARNING: Vehicle is equipped with Supplemental Inflatable Restraint (SIR) system. When servicing vehicle, use care to avoid accidental air bag deployment. SIR system-related components are located in various locations throughout interior and exterior of vehicle, depending on application. DO NOT use electrical test equipment on or near these circuits. If necessary, deactivate SIR system before servicing components. See **AIR BAG DEACTIVATION PROCEDURES** in GENERAL INFORMATION.

CAUTION: Flush oil cooler and oil cooler lines prior to transmission installation. Oil cooling system contamination may cause premature transmission failure. For additional information, see **SERVICING** article.

ELECTRICAL COMPONENTS

See **M24A ELECTRONIC CONTROLS** article.

TRANSAXLE

See **REMOVAL & INSTALLATION** article.

TORQUE CONVERTER

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

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

TRANSAXLE DISASSEMBLY

VALVE BODIES & INTERNAL COMPONENTS

1. Remove retaining bolts, right side cover and gasket. See **Fig. 5**. Install Mainshaft Holder (07GAB-PF50101) on mainshaft to secure mainshaft. See **Fig. 6**.
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. 7**.
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. See **Fig. 5**.

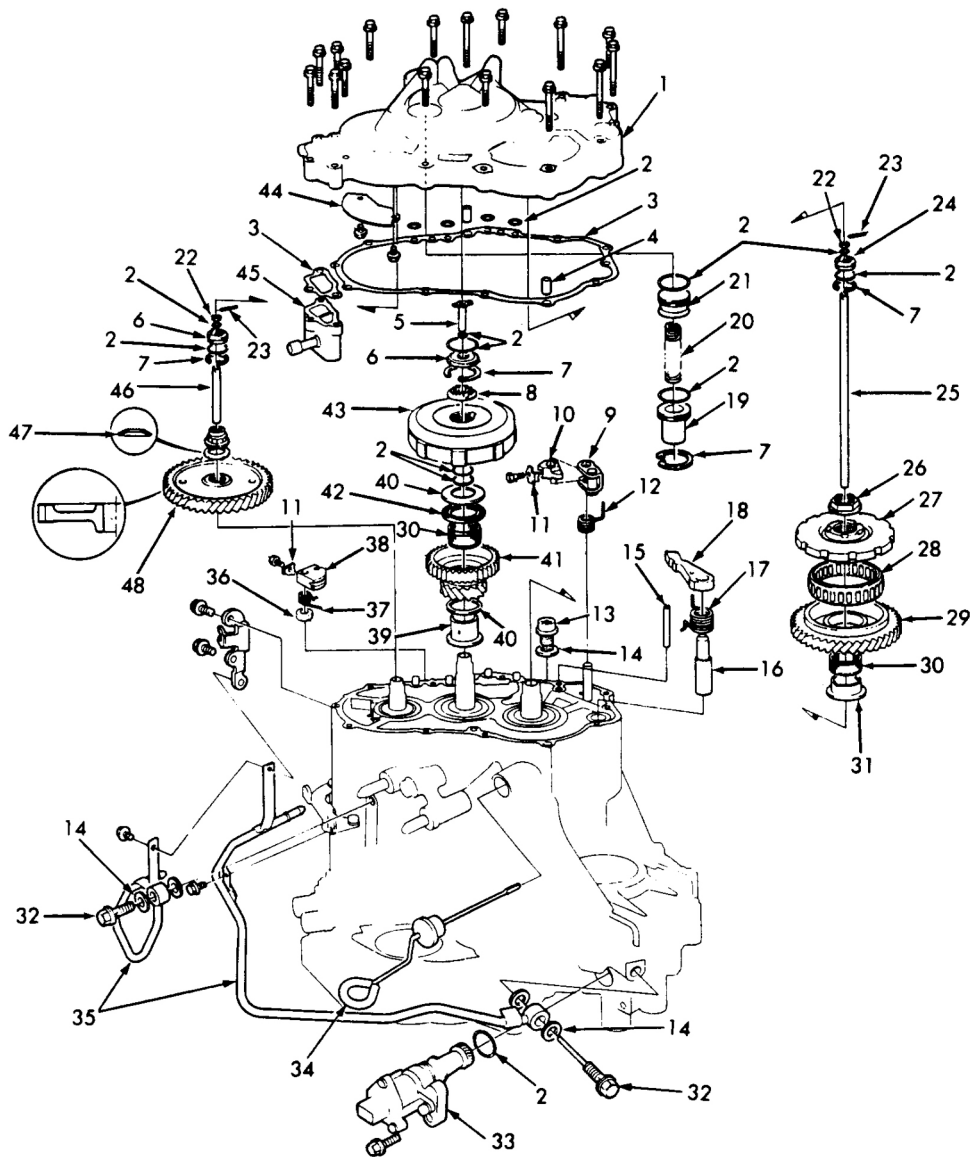
NOTE: Mainshaft lock nut has left-hand threads.

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. See **Fig. 5**.
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. See **Fig. 5**.
6. Remove parking brake lever and throttle valve lever. **Fig. 5**. Remove dipstick, speed sensor, joint bolts and cooler pipes.
7. Remove mount bracket from transaxle housing. See **Fig. 8**. Remove transaxle housing bolts. Align spring pin with groove in transaxle housing by rotating control shaft. Using puller (07HAC-PK4010A), remove transaxle housing. See **Fig. 9**.
8. Remove collar, needle bearing and reverse gear from countershaft. See **Fig. 8**. Remove bolt and bolt lock from reverse shift fork. Remove reverse 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).

CAUTION: When removing reverse idler gear holder from reverse idler, **DO NOT** allow needle bearing to come off reverse idler gear holder end. A steel ball and spring are located below needle bearing, on reverse idler gear holder. See **Fig. 9**.

10. Remove oil feedpipes from servo valve body, modulator valve body and main valve body. See **Fig. 10**. Remove bolts and accumulator cover. Remove bolts, servo detent base and baffle plate.

11. Remove bolts, modulator valve body, servo valve body and separator plates. See **Fig. 10** . 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 regulator valve body. Remove stopper shaft and stator shaft. 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. 10** .
14. Remove oil pump driven gear shaft and oil pump gears. See **Fig. 10** . Remove bolts and governor body. Remove main valve body separator plate and dowel pins. Remove fluid strainer. Remove lock-up control solenoid valve assembly (if necessary).



- | | | |
|--------------------------------|----------------------------------|---------------------------------|
| 1. Right Side Cover | 17. Parking Pawl Spring | 33. Speed Sensor |
| 2. "O" Ring | 18. Parking Pawl | 34. Dipstick |
| 3. Gasket | 19. 1st-Hold Accumulator Cover | 35. Cooler Pipes |
| 4. Dowel Pin | 20. Accumulator Spring | 36. Oil Seal |
| 5. 1st Clutch Feedpipe | 21. 1st-Hold Accumulator Piston | 37. Throttle Valve Lever Spring |
| 6. Feedpipe Guide | 22. Collar | 38. Throttle Valve Lever |
| 7. Circlip | 23. Roller | 39. Mainshaft 1st Gear Collar |
| 8. Mainshaft Lock Nut | 24. Feedpipe Flange | 40. Thrust Washer |
| 9. Parking Brake Lever | 25. 3rd Clutch Feedpipe | 41. Mainshaft 1st Gear |
| 10. Parking Brake Stopper | 26. Countershaft Lock Nut | 42. Thrust Needle Bearing |
| 11. Bolt Lock | 27. Parking Gear | 43. 1st Clutch Assembly |
| 12. Parking Brake Lever Spring | 28. One-Way Clutch | 44. Breather Cover |
| 13. Drain Plug | 29. Countershaft 1st Gear | 45. Breather Chamber |
| 14. Seal Washer | 30. Needle Bearing | 46. 1st-Hold Clutch Feedpipe |
| 15. Parking Pawl Stopper | 31. Countershaft 1st Gear Collar | 47. Spring Washer |
| 16. Parking Pawl Shaft | 32. Joint Bolt | 48. Sub-Shaft 1st Gear |

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Fig. 5: Exploded View Of Right Side Cover & Components

Courtesy of AMERICAN HONDA MOTOR CO., INC.

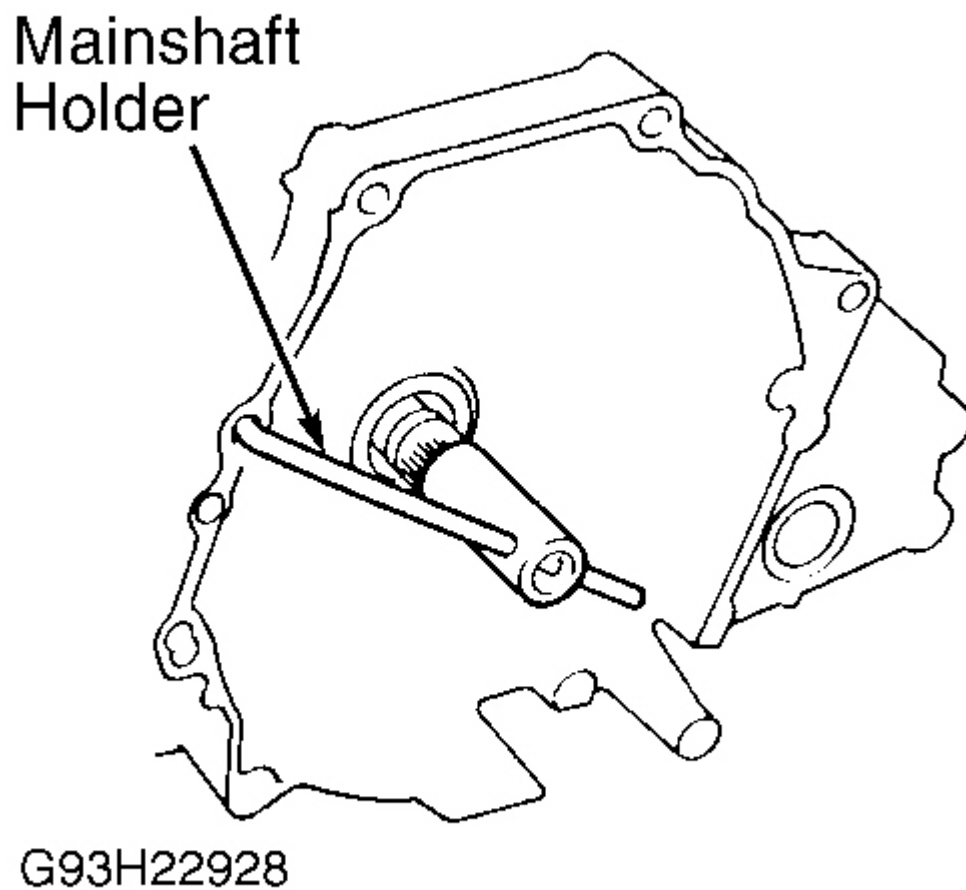
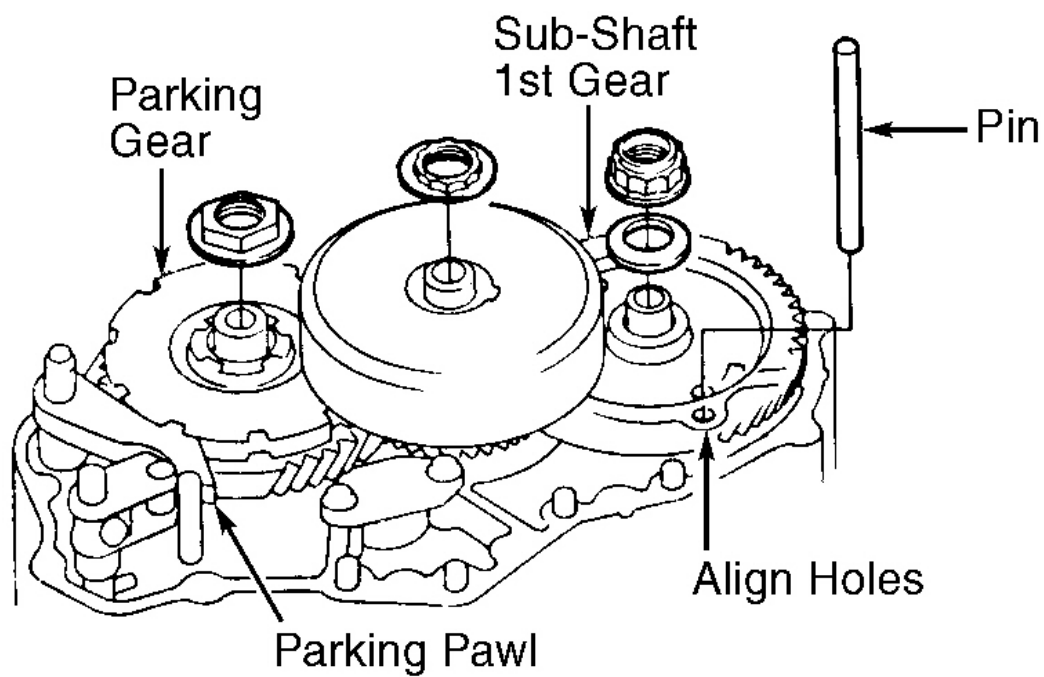


Fig. 6: Installing Mainshaft Holder

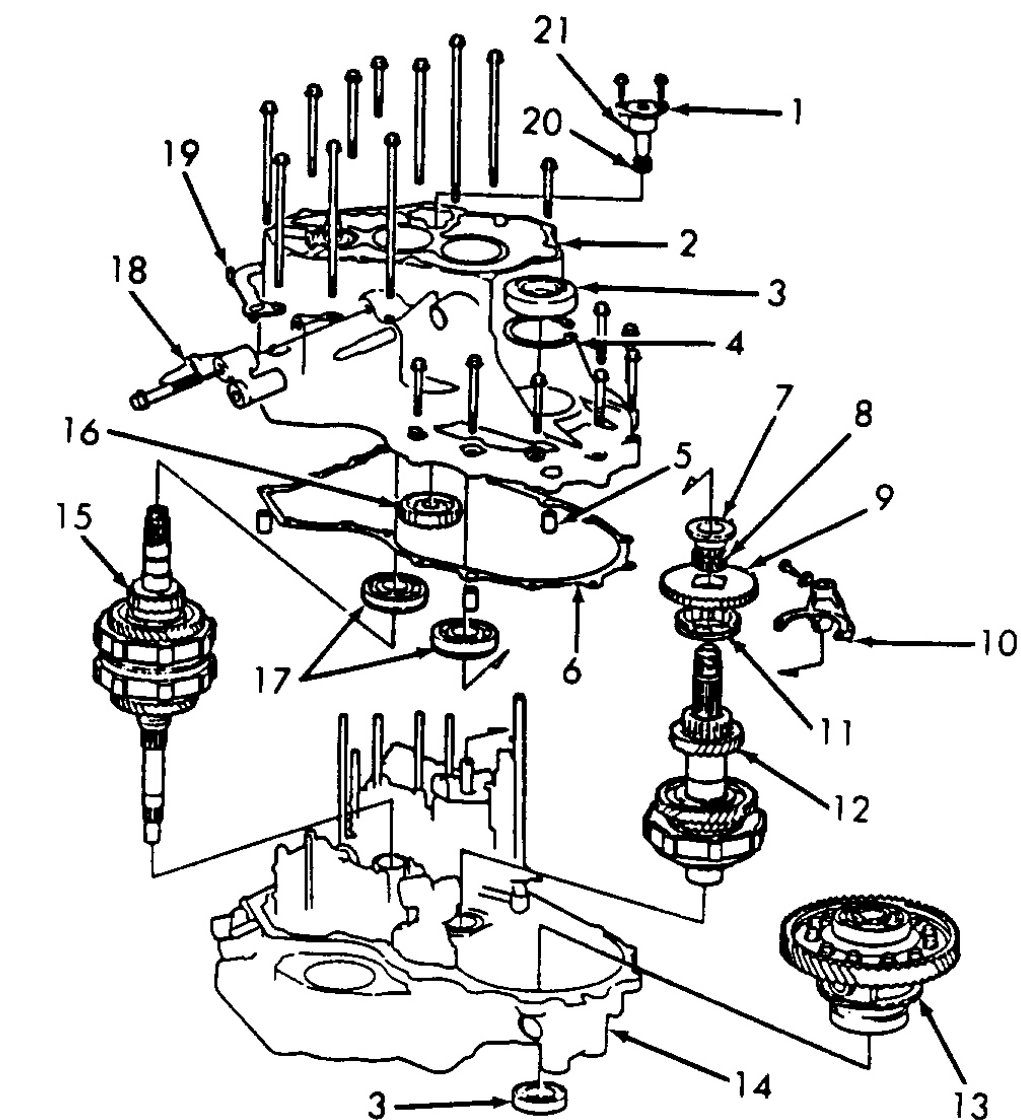
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 7: Securing Sub-Shaft 1st Gear

Courtesy of AMERICAN HONDA MOTOR CO., INC.



- | | |
|------------------------------|------------------------------|
| 1. Reverse Idler Gear Holder | 12. Countershaft |
| 2. Transaxle Housing | 13. Differential Assembly |
| 3. Oil Seal | 14. Torque Converter Housing |
| 4. Snap Ring | 15. Mainshaft |
| 5. Dowel Pin | 16. Reverse Idler Gear |
| 6. Gasket | 17. Bearing |
| 7. Collar | 18. Mount Bracket |
| 8. Needle Bearing | 19. Hanger |
| 9. Reverse Gear | 20. Needle Bearing |
| 10. Reverse Shift Fork | 21. Steel Ball & Spring |
| 11. Reverse Selector | |

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Fig. 8: Exploded View Of Transaxle Housing & Components

1992 Honda Civic CX

1992 AUTOMATIC TRANSMISSIONS M24A Overhaul

Courtesy of AMERICAN HONDA MOTOR CO., INC.

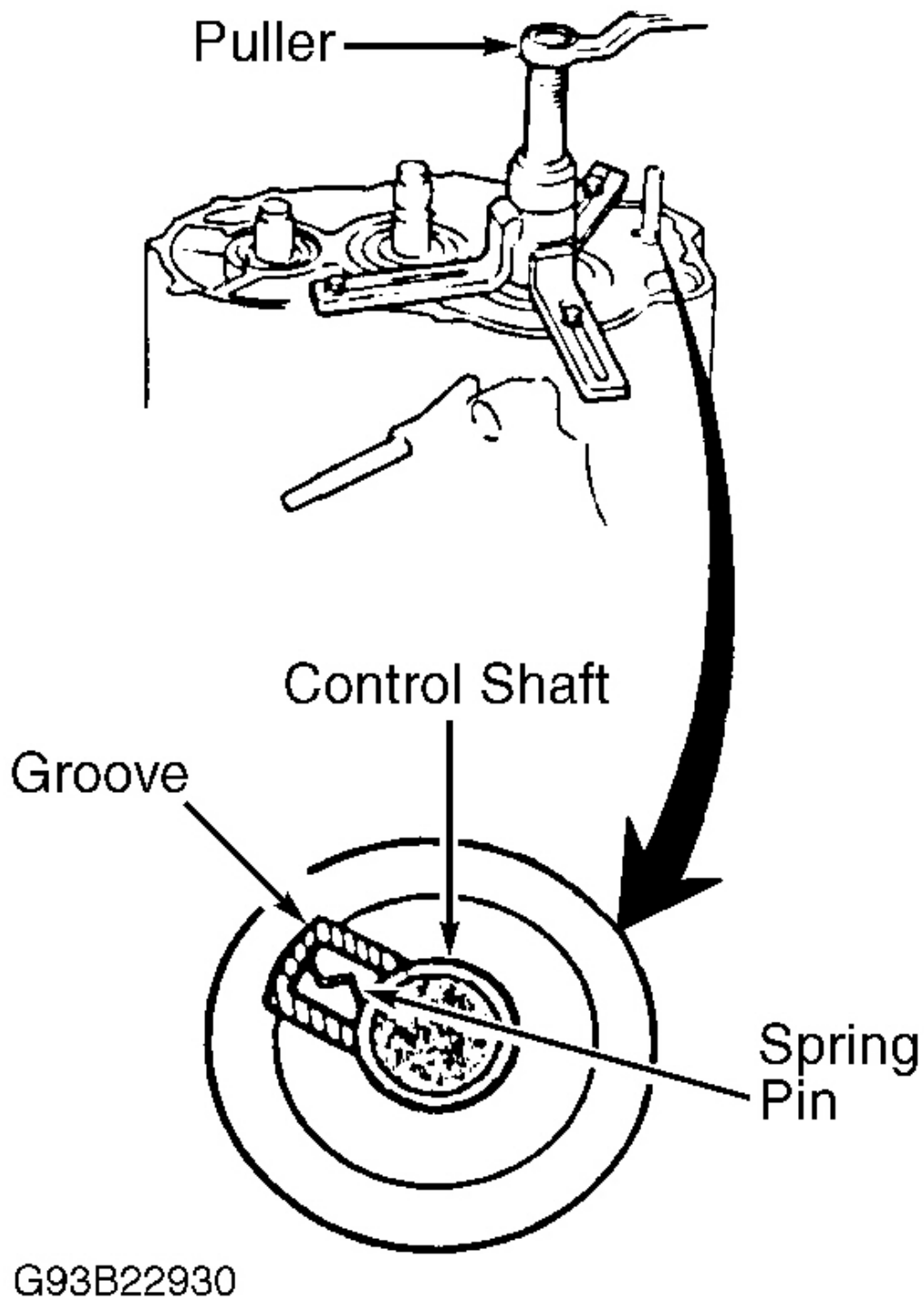


Fig. 9: Aligning Spring Pin & Removing Transaxle Housing

Courtesy of AMERICAN HONDA MOTOR CO., INC.

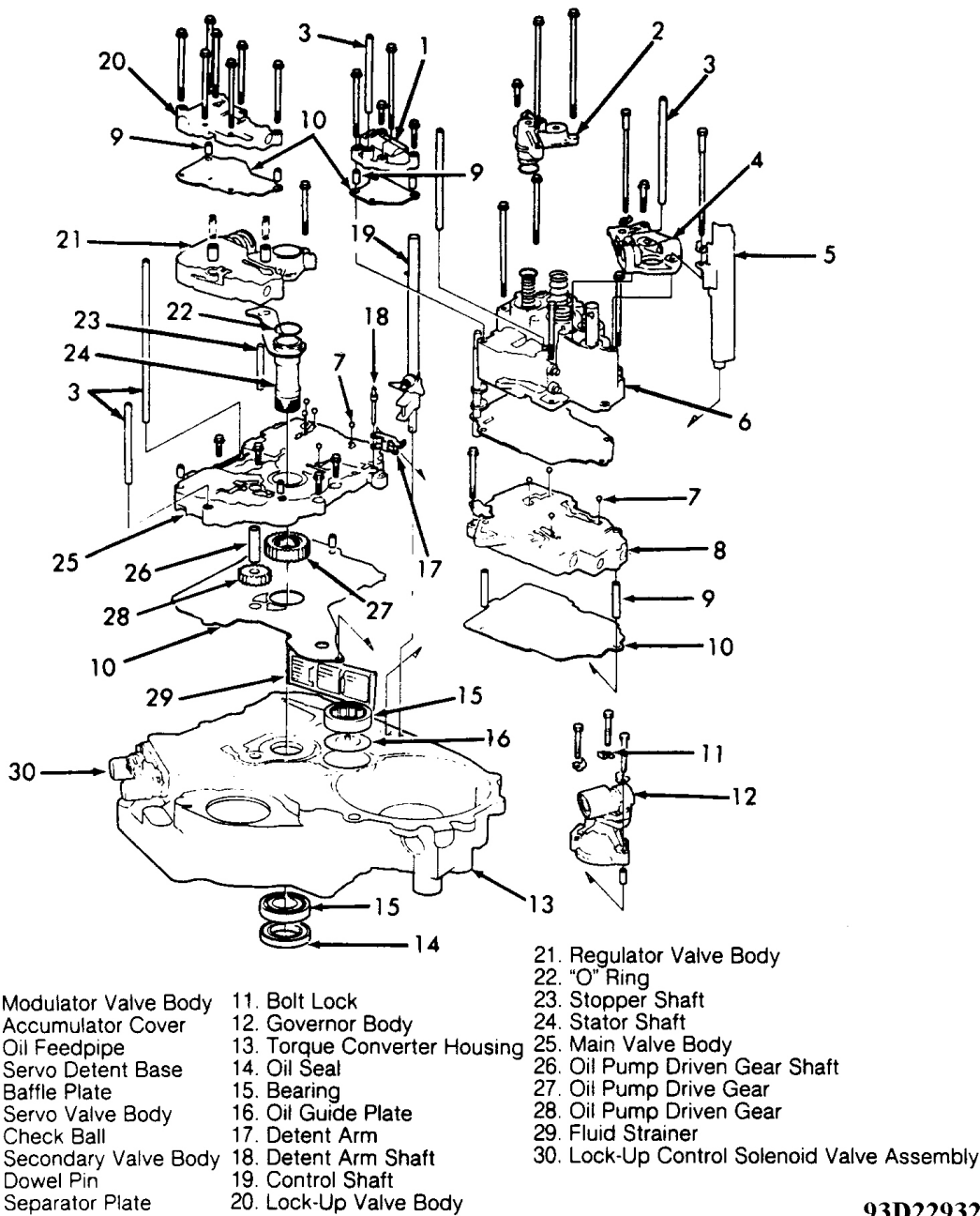


Fig. 10: Exploded View Of Torque Converter Housing & Components
Courtesy of AMERICAN HONDA MOTOR CO., INC.

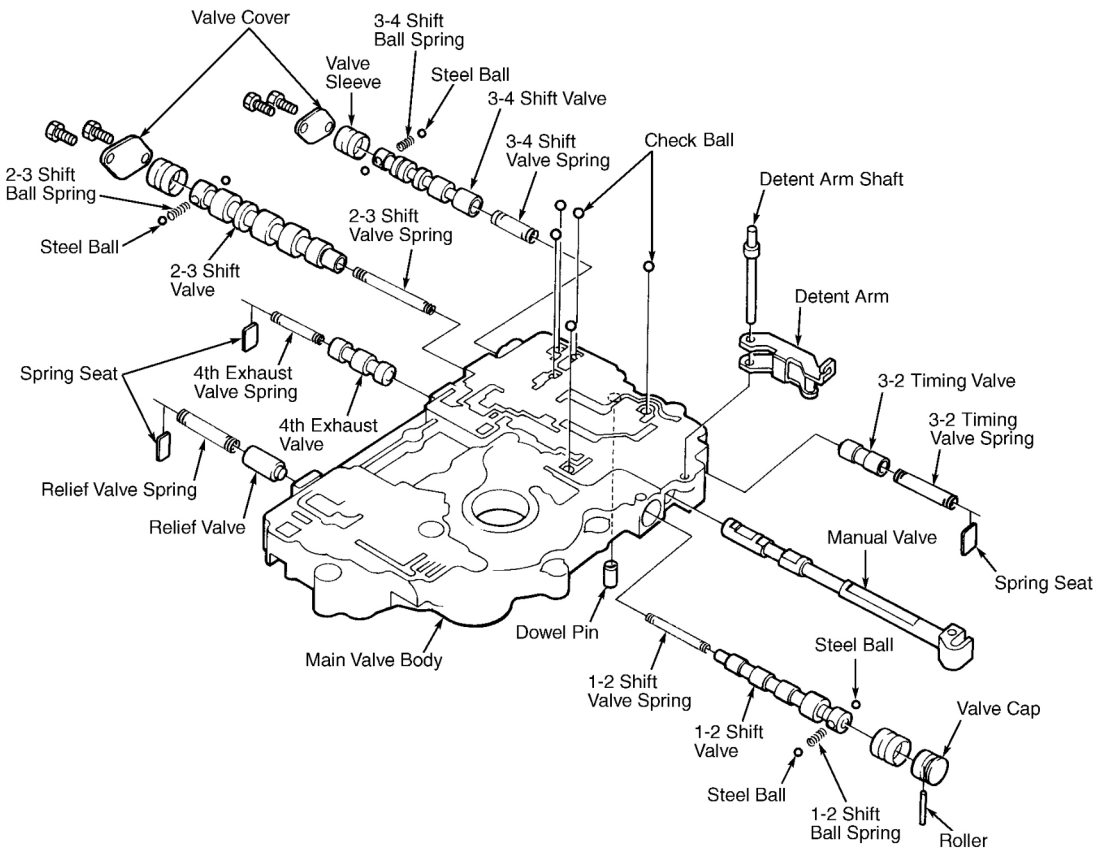
COMPONENT DISASSEMBLY & REASSEMBLY

MAIN VALVE BODY

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

Disassembly

Disassemble main valve body. See **Fig. 11** . Use care when removing valve caps or spring seats, as they are under spring pressure.



93E22933

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

Cleaning & Inspection

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

1992 Honda Civic CX**1992 AUTOMATIC TRANSMISSIONS M24A Overhaul**

springs if not within specification.

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

Reassembly

Coat all components, and bores with ATF. To reassemble, reverse disassembly procedure. Ensure all components are installed in correct location. See **Fig. 11** . 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 Ball Spring	.421 (10.70)
1-2 Shift Valve Spring	2.079 (52.80)
2-3 Shift Ball Spring	.579 (14.70)
2-3 Shift Valve Spring	2.547 (64.70)
3-2 Timing Valve Spring	1.847 (46.90)
3-4 Shift Ball Spring	.455 (11.30)
3-4 Shift Valve Spring	1.280 (32.50)
4th Exhaust Valve Spring	1.705 (43.30)
Regulator Valve Body	
Cooler Check Valve Spring	1.331 (33.80)
Lock-Up Control Valve Spring	1.992 (50.60)
Regulator Valve Spring "A"	3.488 (88.60)
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	1.004 (25.50)
Governor Cut Valve Spring	1.752 (44.50)
Reverse Control Valve Spring	1.575 (40.00)
Servo Control Valve Spring	1.343 (34.10)
2-1 Timing Valve Spring	1.299 (33.00)
2-3 Orifice Control Valve Spring	1.177 (29.90)
3-2 Kickdown Valve Spring	1.795 (45.60)
4-3 Kickdown Valve Spring	1.177 (29.90)
Servo Valve Body	
Throttle Valve "A" Adjusting Spring	1.063 (27.00)
Throttle Valve "A" Spring	.878 (22.30)
Throttle Valve "B" Adjusting Spring	1.181 (30.00)

1992 Honda Civic CX**1992 AUTOMATIC TRANSMISSIONS M24A Overhaul**

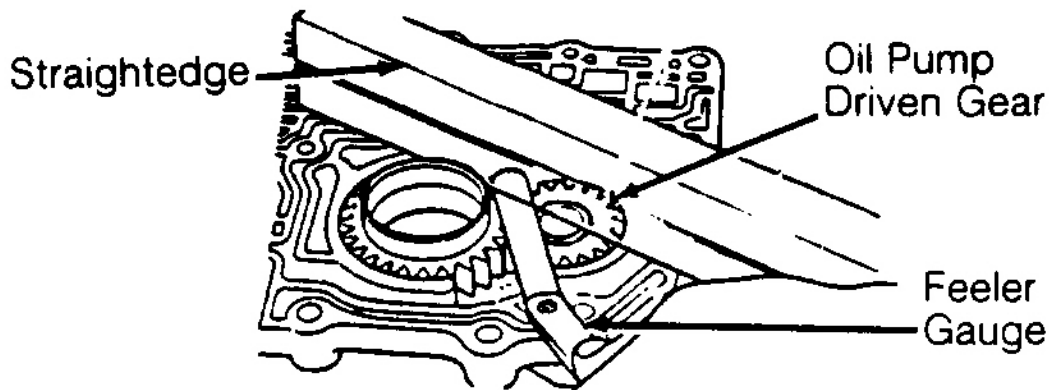
Throttle Valve "B" Spring	.634 (41.50)
1st Accumulator Spring	3.142 (79.80)
2nd Accumulator Spring	2.968 (75.40)
2/3-4 Orifice Control Valve Spring	2.055 (52.20)
3rd Accumulator Spring	3.209 (81.50)
4th Accumulator Spring	3.346 (85.00)
Modulator Valve Body	
Modulator Valve Spring	1.071 (27.20)
Lock-Up Valve Body	
Lock-Up Shift Valve Spring	2.902 (73.70)
Lock-Up Timing Valve Spring	2.421 (61.50)
Governor Body	
Governor Spring "A"	1.295 (32.90)
Governor Spring "B"	(1)
(1) Spring free length may be 1.094-1.146" (27.80-29.10 mm).	

OIL PUMP**Disassembly**

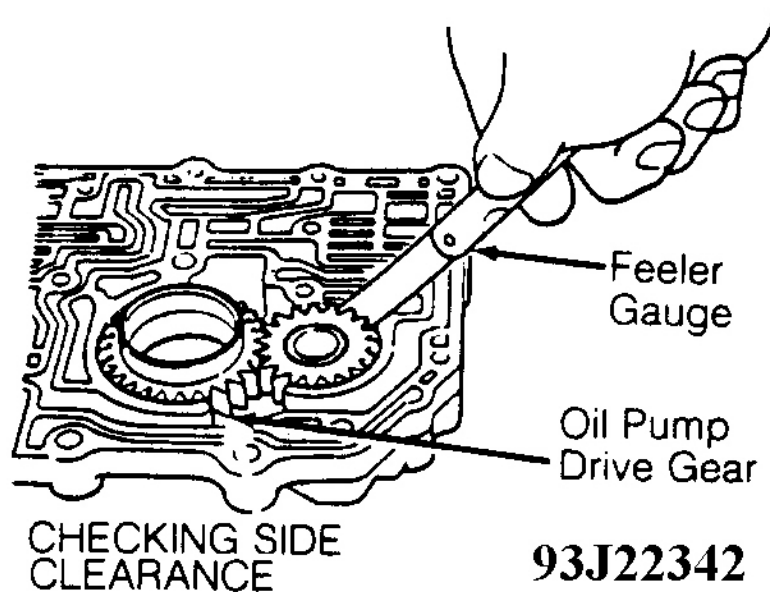
Note direction of oil pump gear installation in main valve body. Remove oil pump driven gear shaft and oil pump gears from main valve body (if not previously removed).

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. 12** . Replace oil pump gears and/or main valve body if thrust clearance is not within specification. See **OIL PUMP SPECIFICATIONS** table.
4. Using feeler gauge, measure side clearance between tip of gear teeth and main valve body on both gears. See **Fig. 12** . Replace oil pump gears and/or main valve body if side clearance is not within specification. See **OIL PUMP SPECIFICATIONS** table.



CHECKING THRUST CLEARANCE

CHECKING SIDE
CLEARANCE**93J22342****Fig. 12: Measuring Oil Pump Clearances**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

Reassembly

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

OIL PUMP SPECIFICATIONS

Application	In. (mm)
Side Clearance	
Oil Pump Drive Gear	.0083-.0104 (.210-.265)

1992 Honda Civic CX

1992 AUTOMATIC TRANSMISSIONS M24A Overhaul

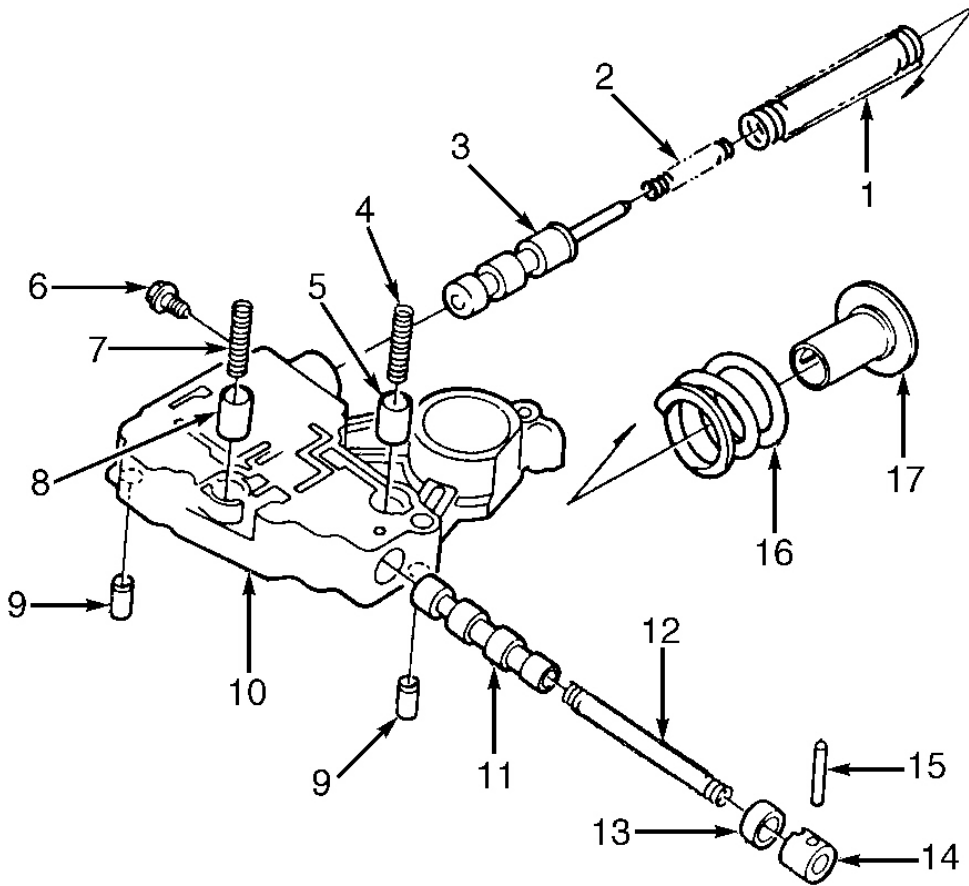
Oil Pump Driven Gear	.0028-.0049 (.070-.125)
Thrust Clearance	
Standard	.001-.002 (.03-.05)
Wear Limit	.0028 (.070)

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. 13** .



- | | |
|--|----------------------------------|
| 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 | |

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

Cleaning & Inspection

1. Clean components with solvent and dry with compressed air. Replace regulator valve body assembly if

any parts are worn or damaged.

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

Reassembly

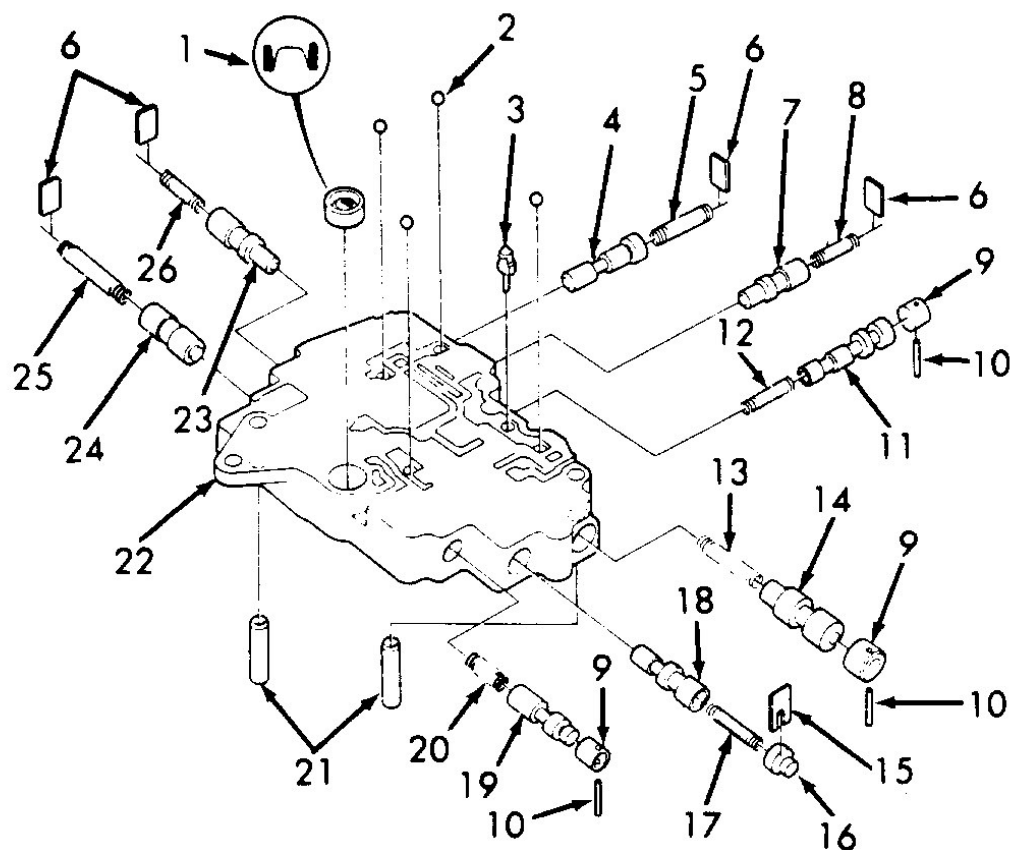
Coat all components and bores with ATF. To reassemble, reverse disassembly procedure. Ensure all components are installed in correct location. See **Fig. 13** . Tighten stopper bolt to specification. See **TORQUE SPECIFICATIONS** .

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.

Disassembly

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



- | | |
|-------------------------------------|--|
| 1. Filter | 14. Reverse Control Valve |
| 2. Check Ball | 15. Stopper Seat |
| 3. 1st Accumulator Choke | 16. Stopper |
| 4. Governor Cut Valve | 17. Servo Control Valve Spring |
| 5. Governor Cut Valve Spring | 18. Servo Control Valve |
| 6. Spring Seat | 19. Clutch Pressure Control Valve |
| 7. 2-3 Orifice Control Valve | 20. Clutch Pressure Control Valve Spring |
| 8. 2-3 Orifice Control Valve Spring | 21. Dowel Pin |
| 9. Valve Cap | 22. Secondary Valve Body |
| 10. Roller | 23. 4-3 Kickdown Valve |
| 11. 2-1 Timing Valve | 24. 3-2 Kickdown Valve |
| 12. 2-1 Timing Valve Spring | 25. 3-2 Kickdown Valve Spring |
| 13. Reverse Control Valve Spring | 26. 4-3 Kickdown Valve Spring |

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

Cleaning & Inspection

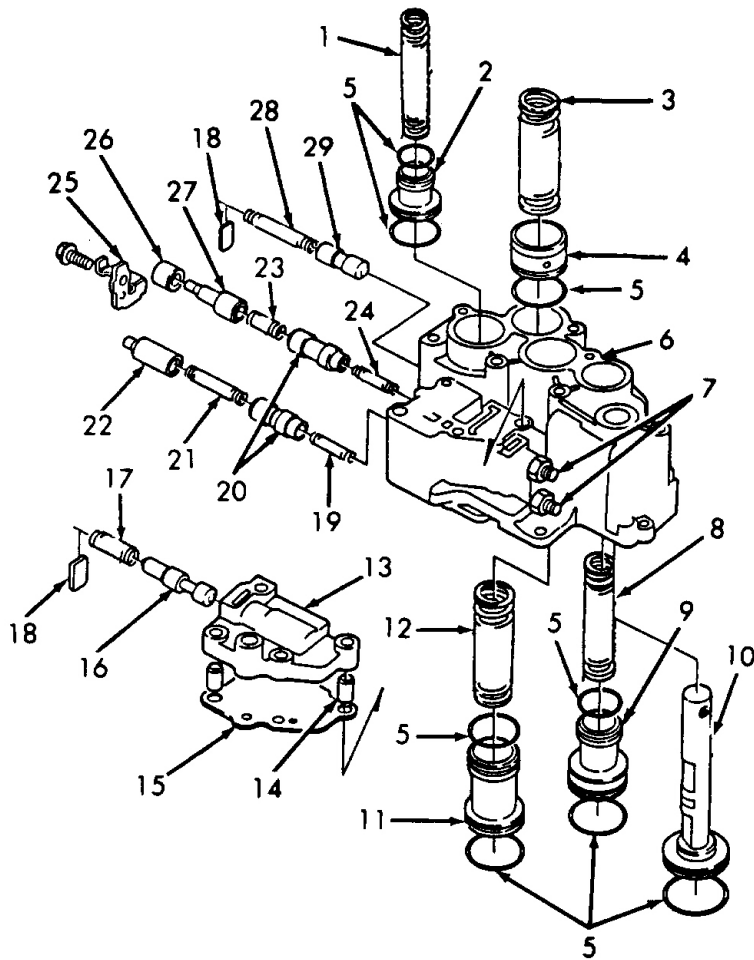
1. Clean components with solvent and dry with compressed air. Replace secondary valve body assembly if any parts are worn or damaged.
2. Ensure all valves slide freely in their bores. If valves do not slice freely, polish burrs or rough areas using No. 600 sandpaper soaked in ATF for at least 30 minutes. 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. Install NEW filter. Ensure all components are installed in correct location. See **Fig. 14** .

SERVO & MODULATOR VALVE BODIES**Disassembly**

Disassemble servo and modulator valve bodies. See **Fig. 15** . Use care when removing spring seats, as they are under spring pressure.



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

93H22936

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

Cleaning & Inspection

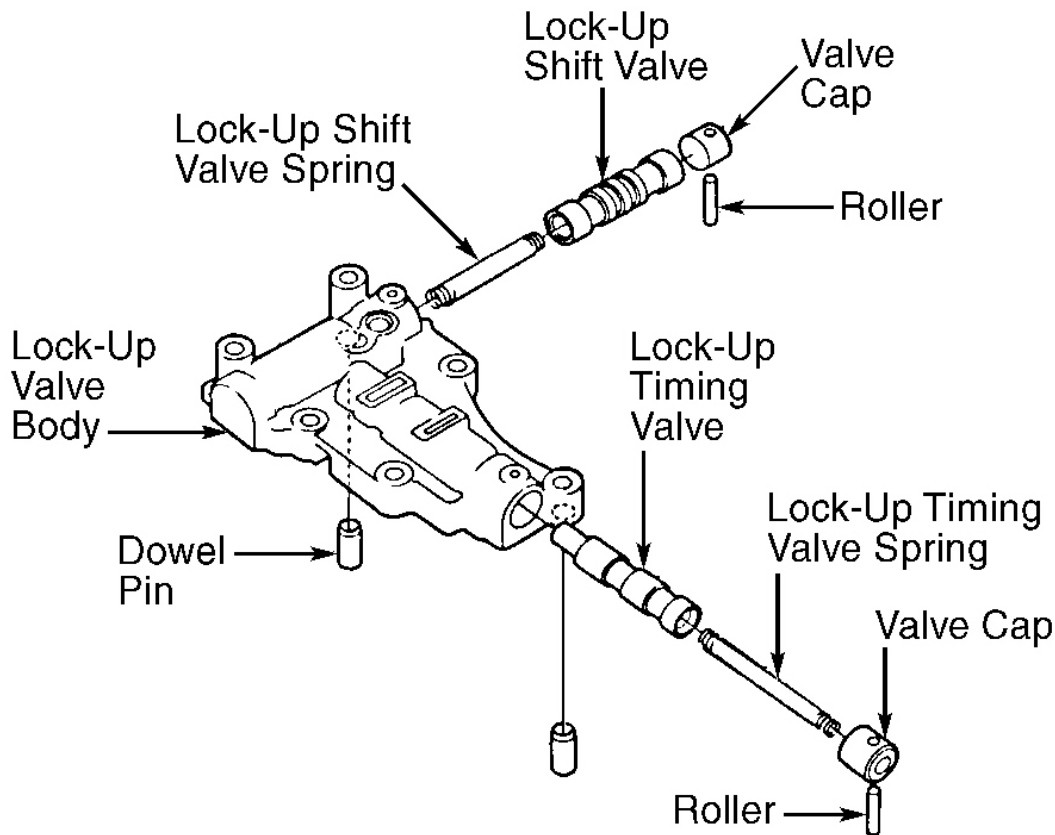
1. Clean components with solvent and dry with compressed air. Replace valve body assembly if any parts are worn or damaged.
2. Ensure all valves slide freely in their bores. If valves do not slide freely, polish burrs or rough areas using No. 600 sandpaper soaked in ATF for at least 30 minutes. Thoroughly clean 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 using NEW "O" rings. Tighten throttle cam stopper bolt to specification. See **TORQUE SPECIFICATIONS** .

LOCK-UP VALVE BODY**Disassembly**

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



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

Cleaning & Inspection

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

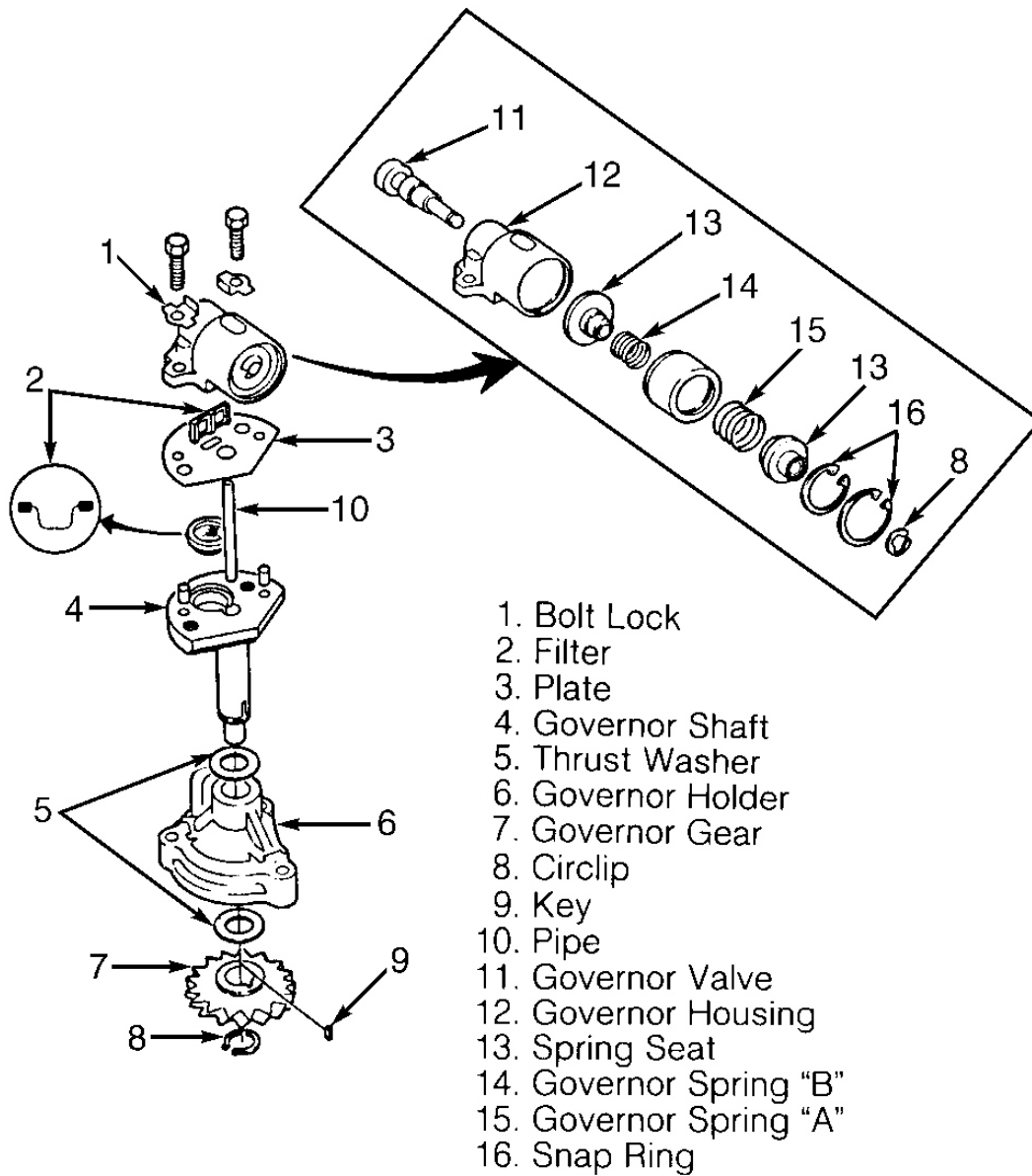
Reassembly

Coat all components and bores with ATF. To reassemble, reverse disassembly procedure. See **Fig. 16** .

GOVERNOR BODY

Disassembly

To disassemble, refer to illustration for exploded view of governor body. See **Fig. 17**.



93J22938

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

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. 17** . Tighten governor housing-to-governor shaft bolts to specification. See **TORQUE SPECIFICATIONS** .

1ST-HOLD ACCUMULATOR

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

Disassembly

Remove circlip and 1st-hold accumulator cover with "O" ring. See **Fig. 5** . Remove accumulator spring and 1st-hold accumulator piston.

Cleaning & Inspection

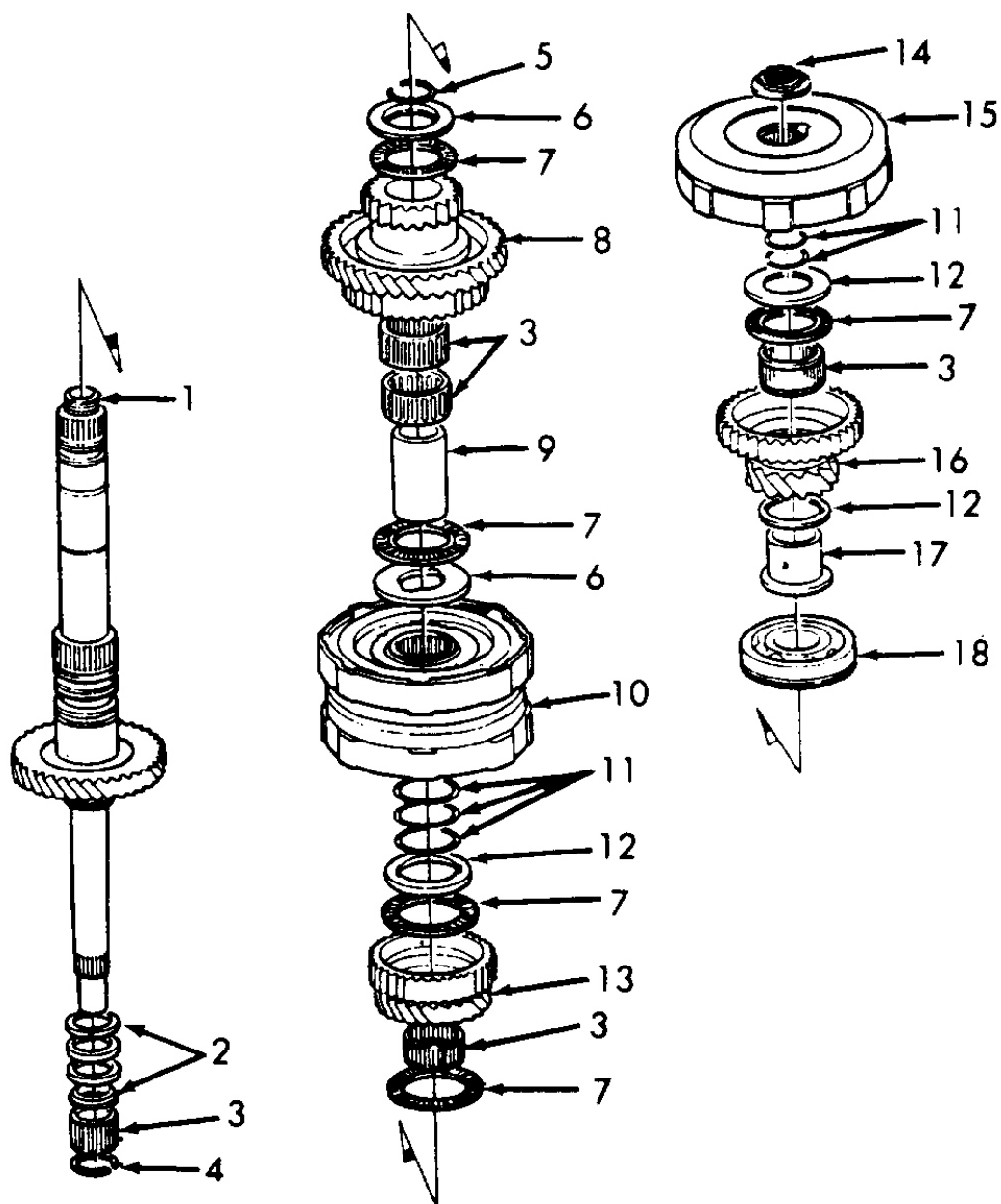
Clean components with solvent and dry with compressed air. Replace components if worn or damaged. Ensure accumulator spring free length is 2.823" (71.70 mm). Replace spring if not as specified.

Reassembly

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

MAINSHAFT**Disassembly**

Note location of mainshaft components. See **Fig. 18** . Remove mainshaft components.



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

93A22939

Fig. 18: Exploded View Of Mainshaft & Components
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

Reassembly

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

1. To check mainshaft 2nd gear-to-3rd gear clearance, install proper components, except "O" rings, on mainshaft. See **Fig. 19** .

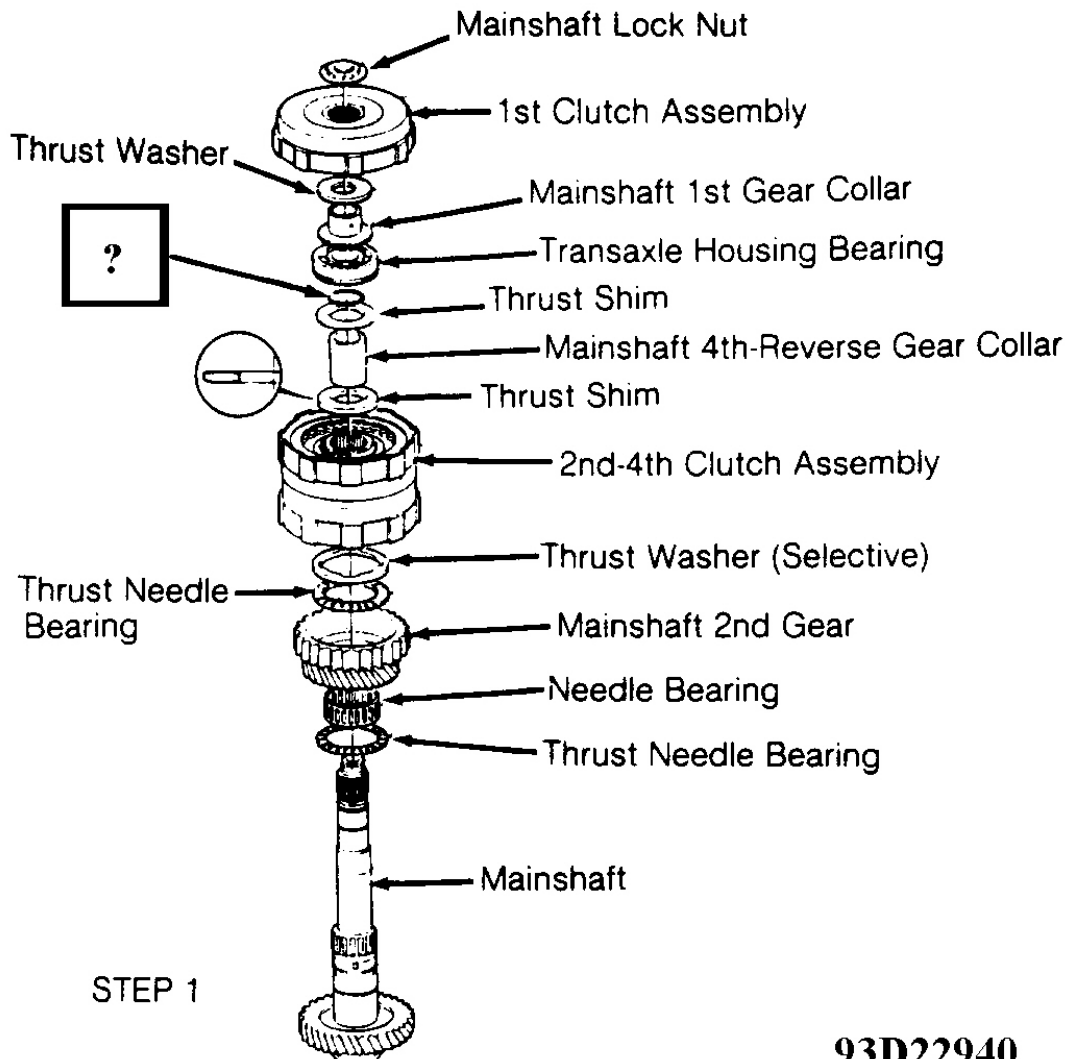


Fig. 19: Checking Mainshaft 2nd Gear-To-3rd Gear Clearances
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Install used mainshaft lock nut on mainshaft. Tighten mainshaft lock nut to 22 ft. lbs. (30 N.m). Hold mainshaft 2nd gear against 2nd clutch.
3. Using feeler gauge, measure clearance between mainshaft 2nd gear and mainshaft 3rd gear. See **Fig. 19**. Replace 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 **THRUST WASHER SPECIFICATIONS** table. Replace thrust washer, and recheck 2nd gear-to-3rd gear clearance.
4. Once correct thickness thrust washer is obtained, lubricate all components with ATF. Reassemble mainshaft.

1992 Honda Civic CX

1992 AUTOMATIC TRANSMISSIONS M24A Overhaul

5. 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.

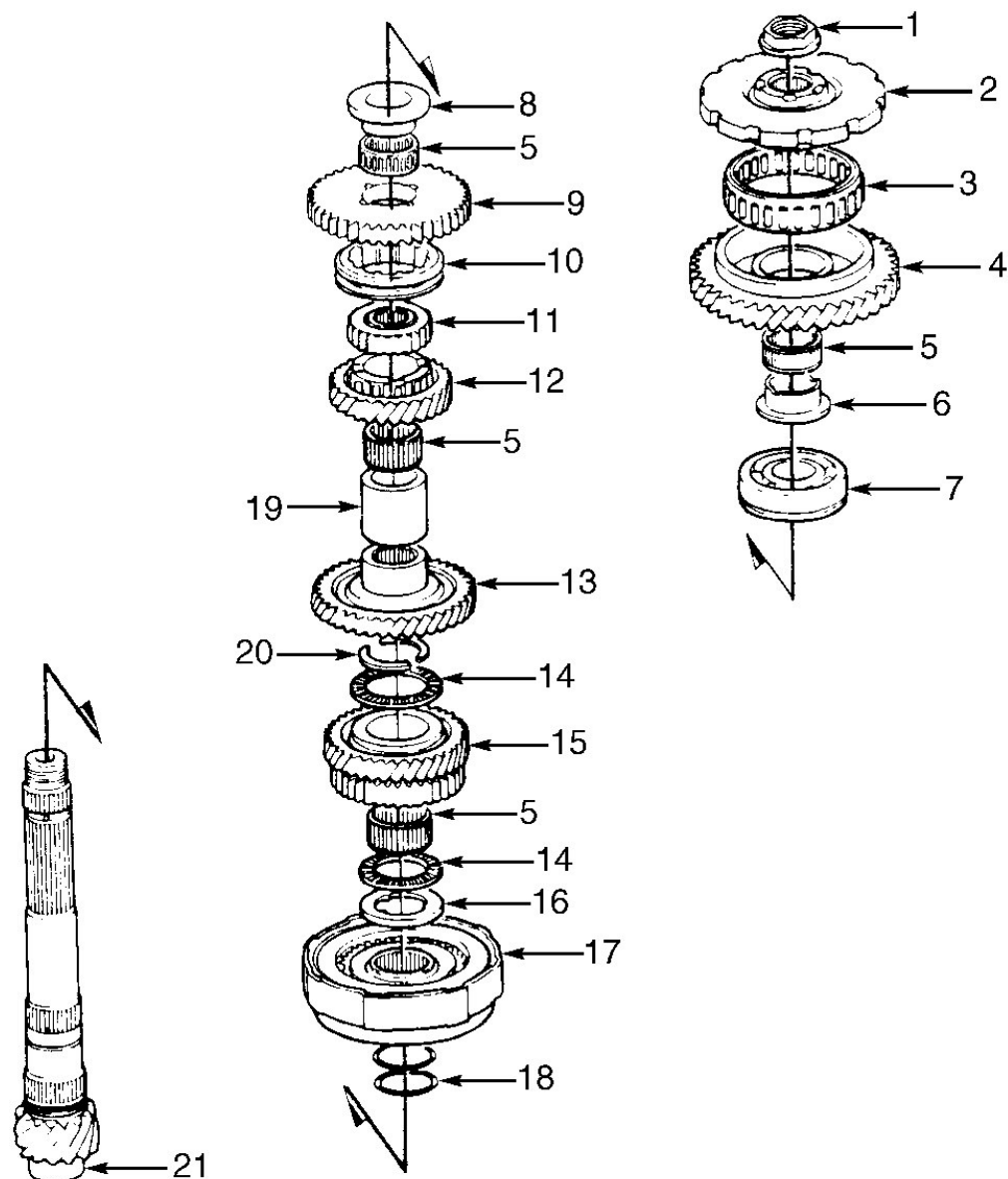
THRUST WASHER SPECIFICATIONS

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)

COUNTERSHAFT

Disassembly

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



- | | |
|-------------------------------------|---------------------------------|
| 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 (Selective) |
| 6. Countershaft 1st Gear Collar | 17. 3rd Clutch |
| 7. Transaxle Housing Bearing | 18. "O" Ring |
| 8. Countershaft Reverse Gear Collar | 19. Distance Collar (Selective) |
| 9. Countershaft Reverse Gear | 20. Cotter Pins |
| 10. Reverse Selector | 21. Countershaft |
| 11. Reverse Selector Hub | |

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

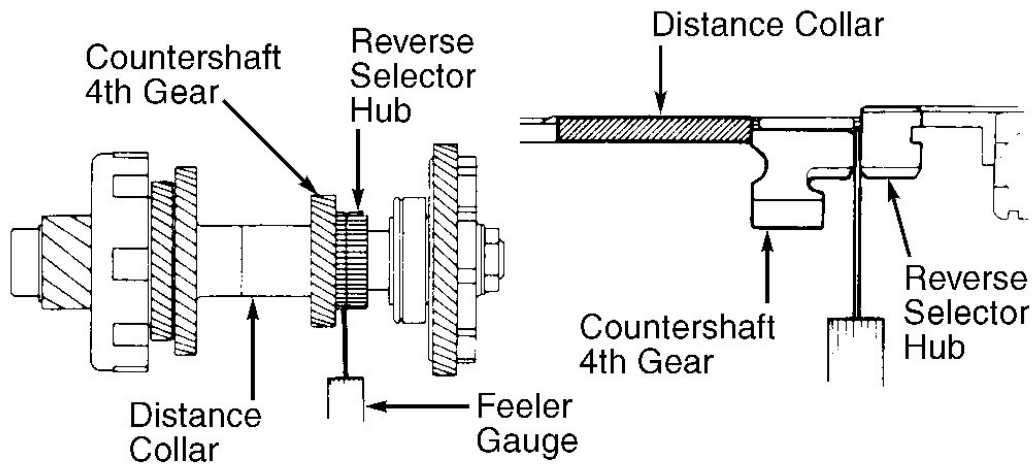
Cleaning & Inspection

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.

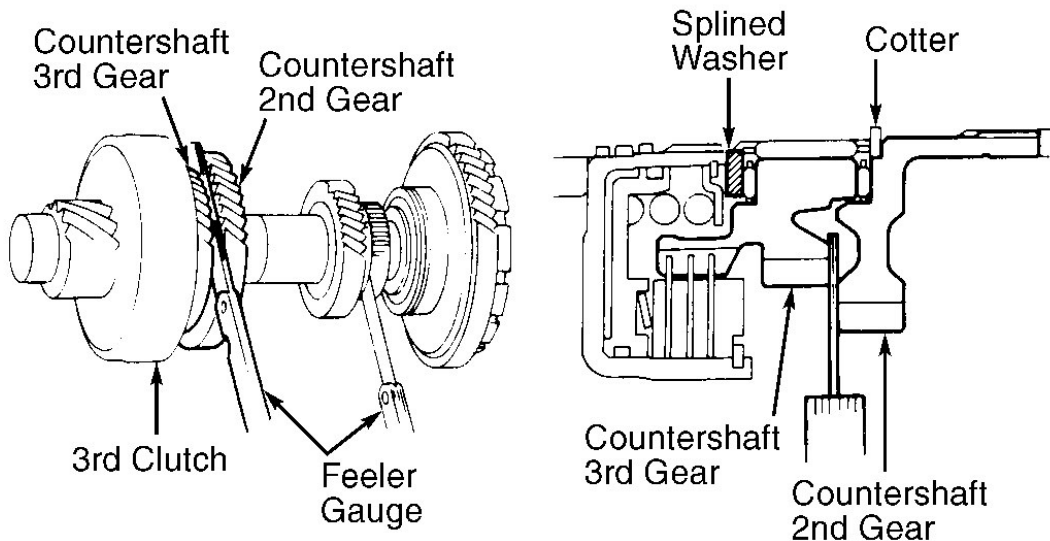
Reassembly

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

1. To check countershaft gear clearances, install components, except "O" rings, on countershaft. See **Fig. 20**.
2. Install transaxle housing bearing, countershaft 1st gear and components on countershaft. Install used countershaft lock nut on countershaft. Tighten countershaft lock nut to 22 ft. lbs. (30 N.m).
3. Using feeler gauge, measure countershaft 4th gear clearance between shoulder on reverse selector hub and shoulder on countershaft 4th gear. See **Fig. 21**.
4. 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 3rd gear. See **Fig. 21**.
5. Slide countershaft 3rd gear fully inward (toward countershaft 2nd gear), and measure clearance between countershaft 2nd gear and 3rd gear. Calculate difference between 2 measurements to determine countershaft 2nd gear-to-3rd gear clearance. Remove feeler gauges.
6. 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. Recheck countershaft 4th gear clearance.
7. 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. Recheck countershaft 2nd-3rd gear clearance.
8. Once correct gear clearances are obtained, lubricate all components with ATF. Reassemble countershaft. Ensure thrust needle bearings are installed with unrolled edge of bearing retainer facing washer.
9. Use NEW "O" rings on countershaft. Before installing "O" rings on countershaft, wrap splines with tape and then install "O" rings.



CHECKING COUNTERSHAFT 4TH GEAR CLEARANCE



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

93H22944

Fig. 21: Assembling & Checking Countershaft 2nd-To-3rd Gear & 4th Gear Clearances
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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)

1992 Honda Civic CX**1992 AUTOMATIC TRANSMISSIONS M24A Overhaul**

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)

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

Lubricate all components with ATF. Install one-way clutch with large flange area toward countershaft 1st gear. See **Fig. 22** and **Fig. 23** . Install parking gear. Hold countershaft 1st gear, and ensure parking gear rotates counterclockwise.

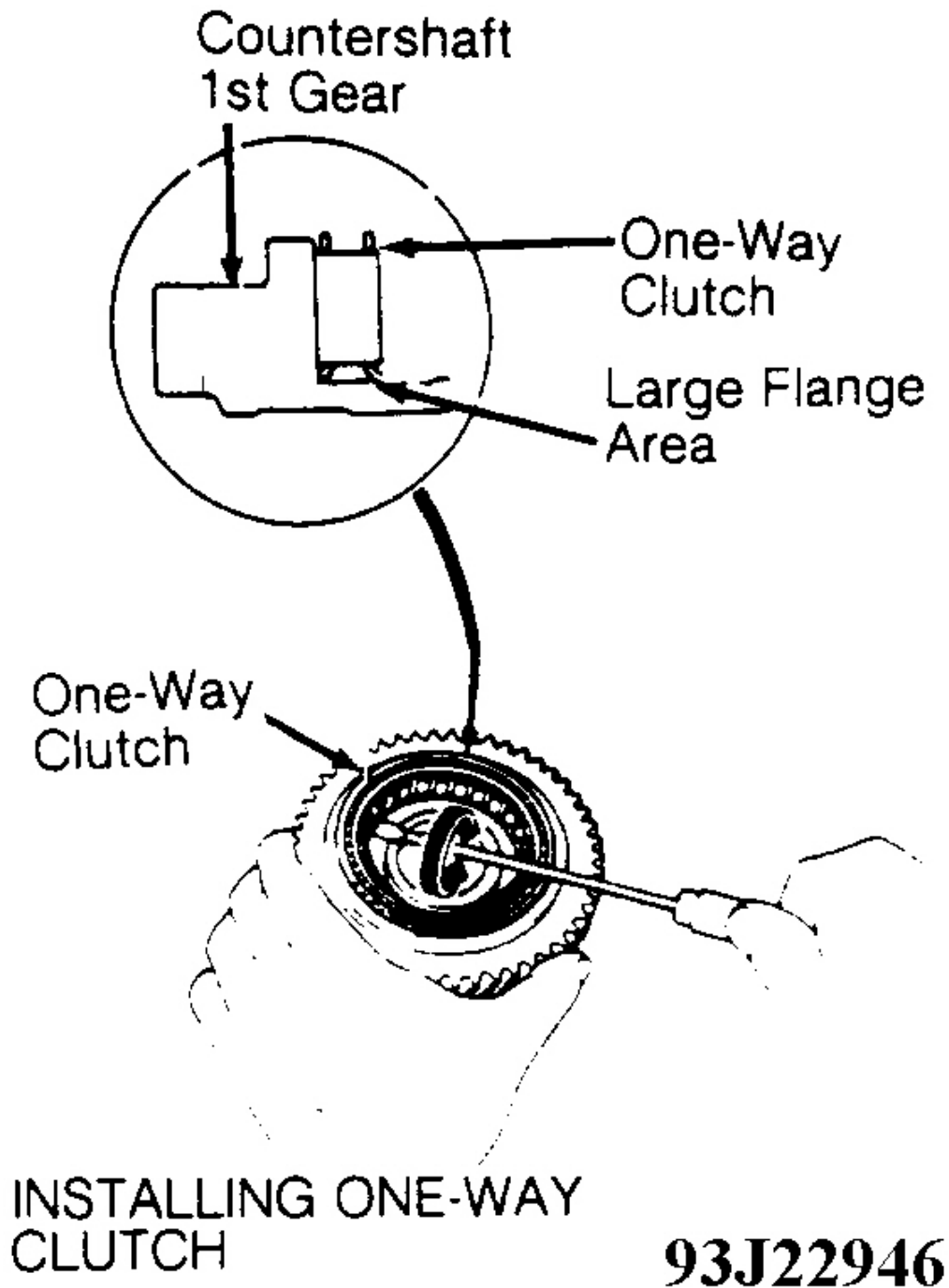
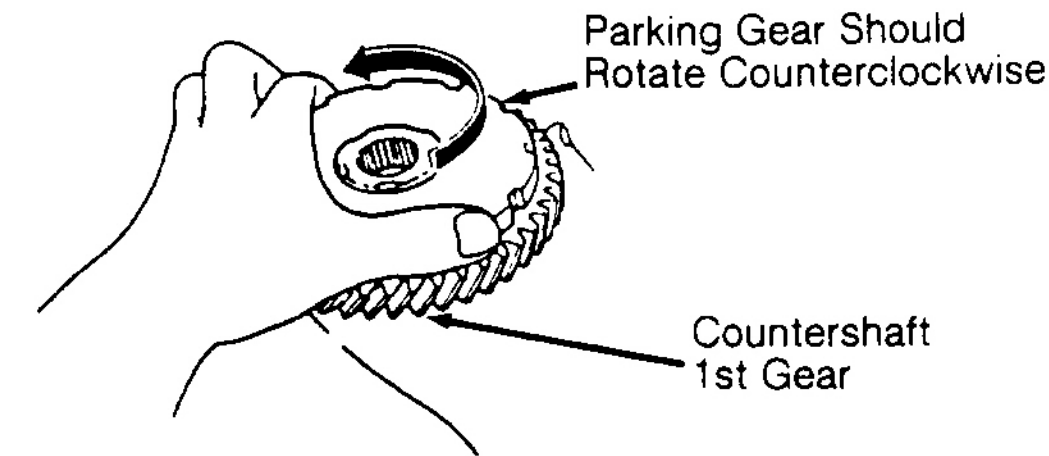


Fig. 22: Installing One-Way Clutch Operation
Courtesy of AMERICAN HONDA MOTOR CO., INC.



CHECKING ONE-WAY
CLUTCH OPERATION

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Fig. 23: Checking One-Way Clutch Operation
Courtesy of AMERICAN HONDA MOTOR CO., INC.

SUB-SHAFT & COMPONENTS

Disassembly

1. Remove sub-shaft oil guide cap. See **Fig. 24** . Remove sub-shaft, 1st-hold clutch, sub-shaft 4th gear and components.
2. If removing needle bearing from transaxle housing, remove needle stopper bolt and needle stopper. Using hammer and drift, tap needle bearing from transaxle housing.
3. If removing transaxle housing bearing, expand snap ring. Using press, Handle (07749-0010000) and Adapter (07746-0010500), press bearing from transaxle housing. Remove snap ring (if necessary).

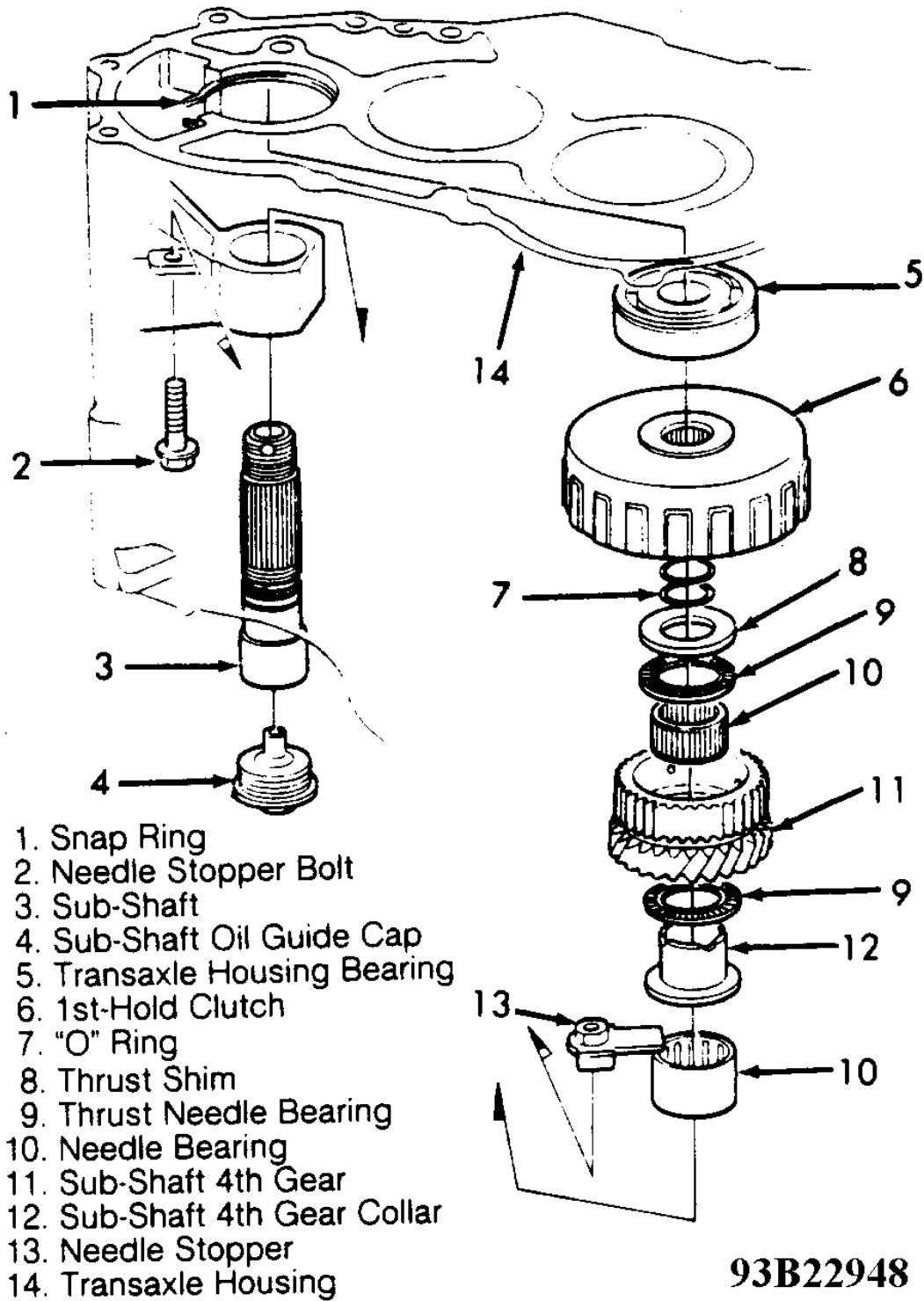


Fig. 24: Exploded View Of Sub-Shaft & Components
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

Cleaning & Inspection

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

Reassembly

1. Lubricate all components with ATF. If installing needle bearing in transaxle housing, use press, Handle (07749-0010000) and Adapter (07746-0010100) to press needle bearing into transaxle housing.
2. If installing transaxle housing bearing in transaxle housing, expand snap ring. Using press, handle and Adapter (07746-0010500), press bearing part way into transaxle housing.

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

3. Release snap ring. Continue pressing bearing into transaxle housing until snap ring engages in bearing. Ensure snap ring is fully seated.
4. Reassemble sub-shaft. Ensure thrust needle bearings are installed with unrolled edge of bearing retainer facing washer.
5. Use NEW "O" rings on sub-shaft. Before installing "O" rings on sub-shaft, wrap splines with tape. Ensure sub-shaft oil guide cap and needle stopper bolt are tightened to specification. See **TORQUE SPECIFICATIONS** .

CLUTCH ASSEMBLIES**Disassembly**

1. Remove snap ring, clutch end plate, clutch discs and clutch plates. See **Fig. 25 -Fig. 28** . 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 (07HAE-PL50100), Adapter (07LAE-PX40100) and Bolt (07GAE-PG40200) to compress return spring. See **Fig. 29** .
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.

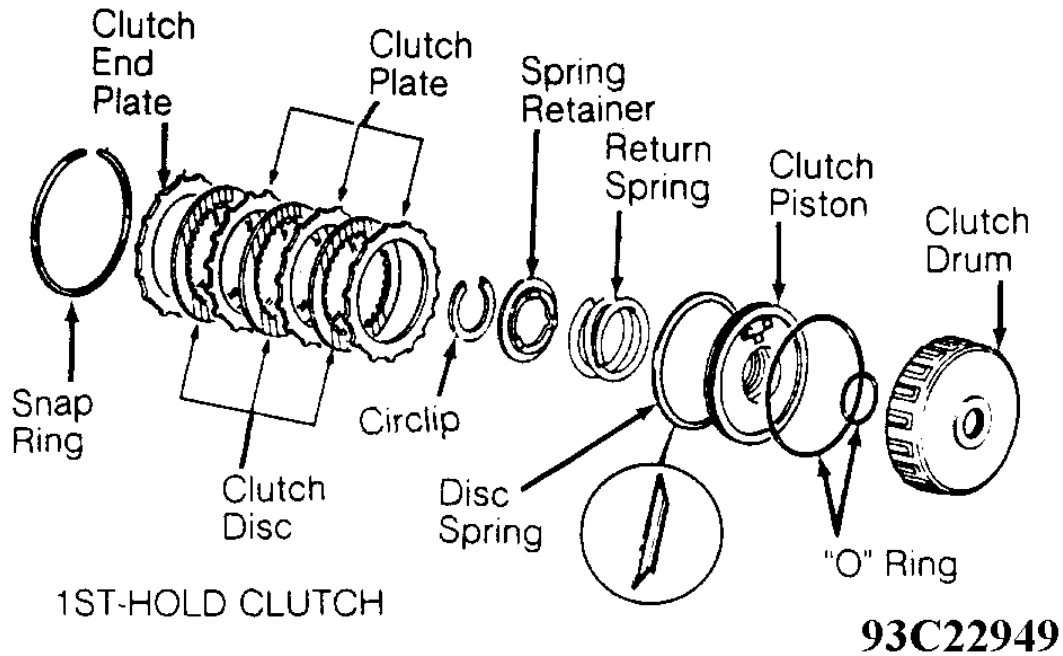


Fig. 25: Exploded View Of Clutch Assemblies (1 of 4)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

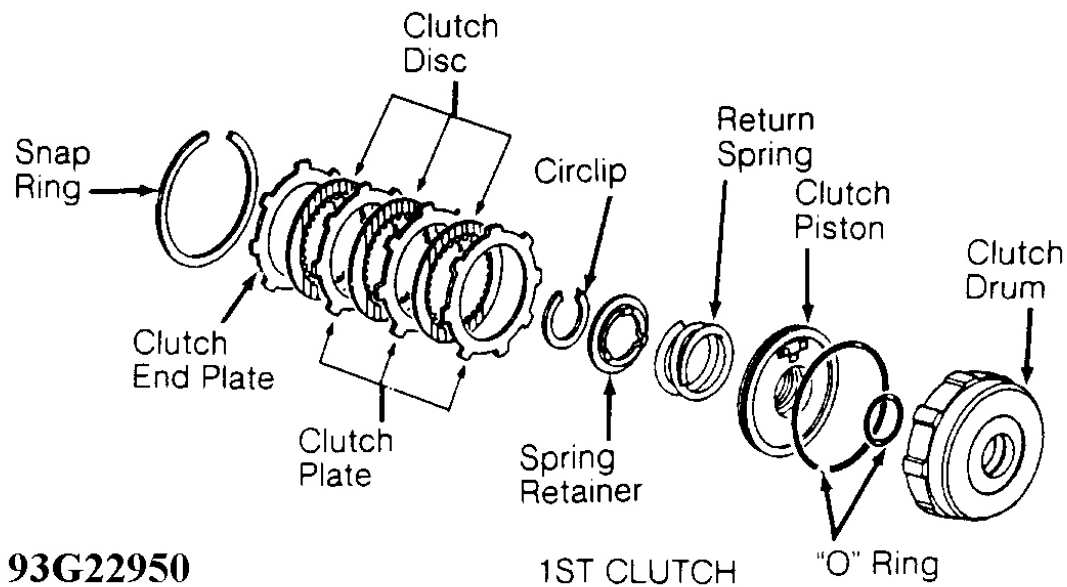


Fig. 26: Exploded View Of Clutch Assemblies (2 of 4)

Courtesy of AMERICAN HONDA MOTOR CO., INC.

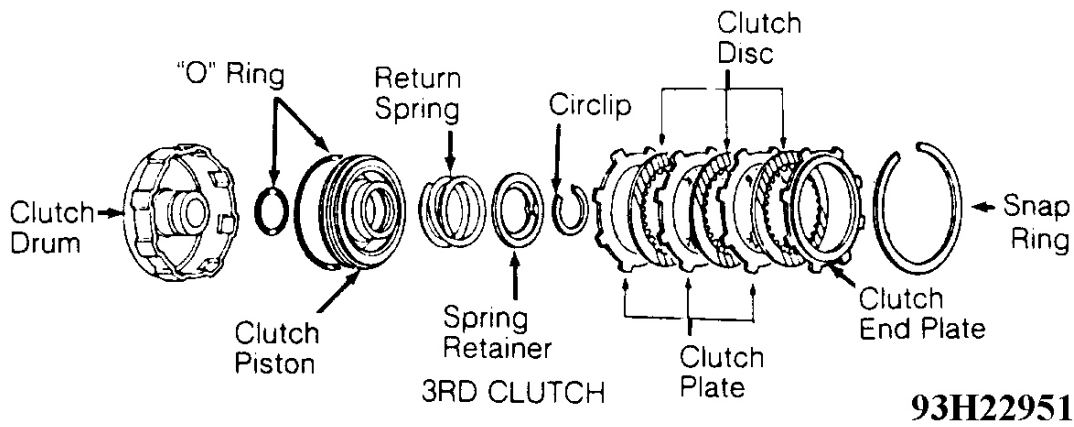


Fig. 27: Exploded View Of Clutch Assemblies (3 of 4)

Courtesy of AMERICAN HONDA MOTOR CO., INC.

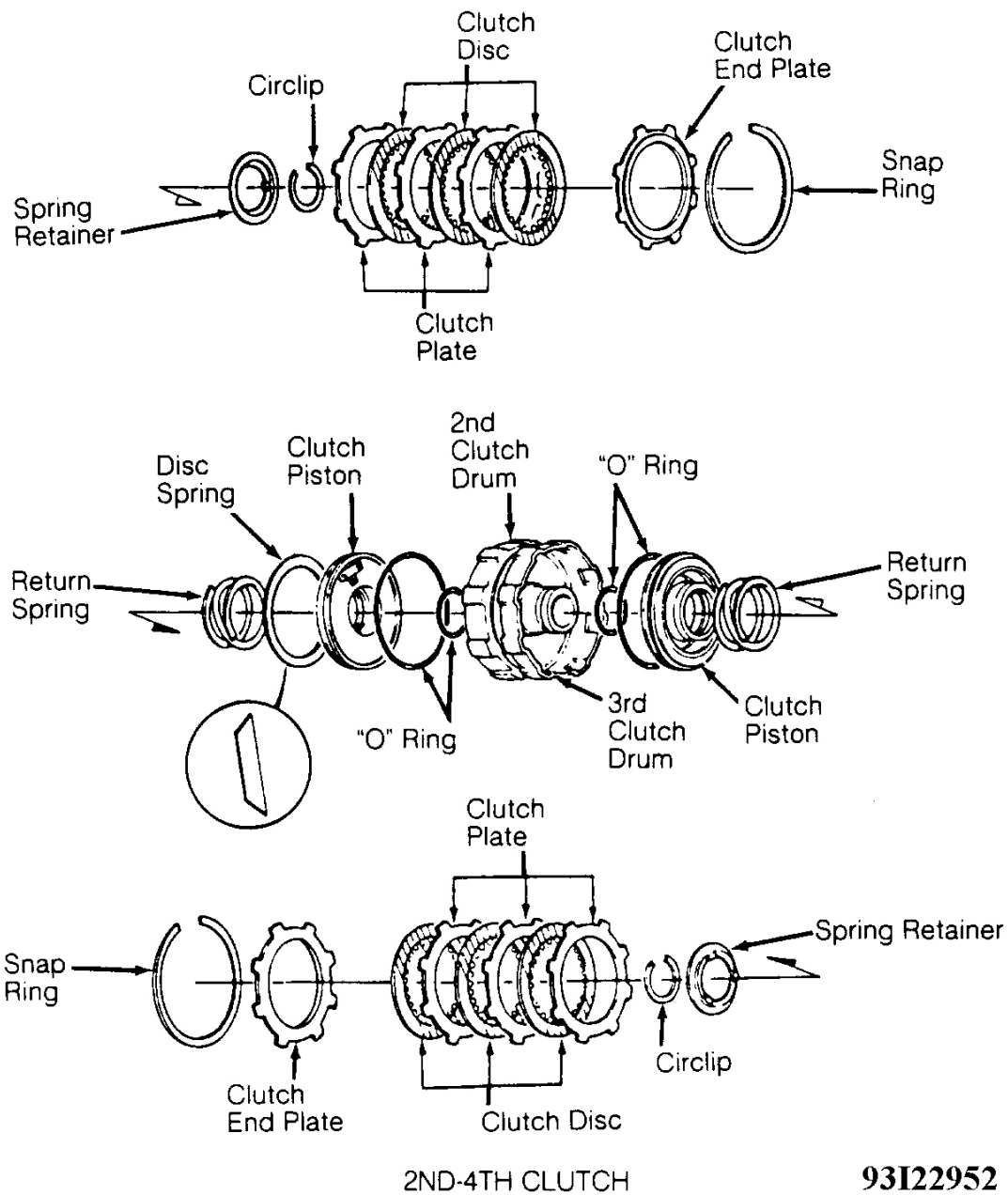


Fig. 28: Exploded View Of Clutch Assemblies (4 of 4)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

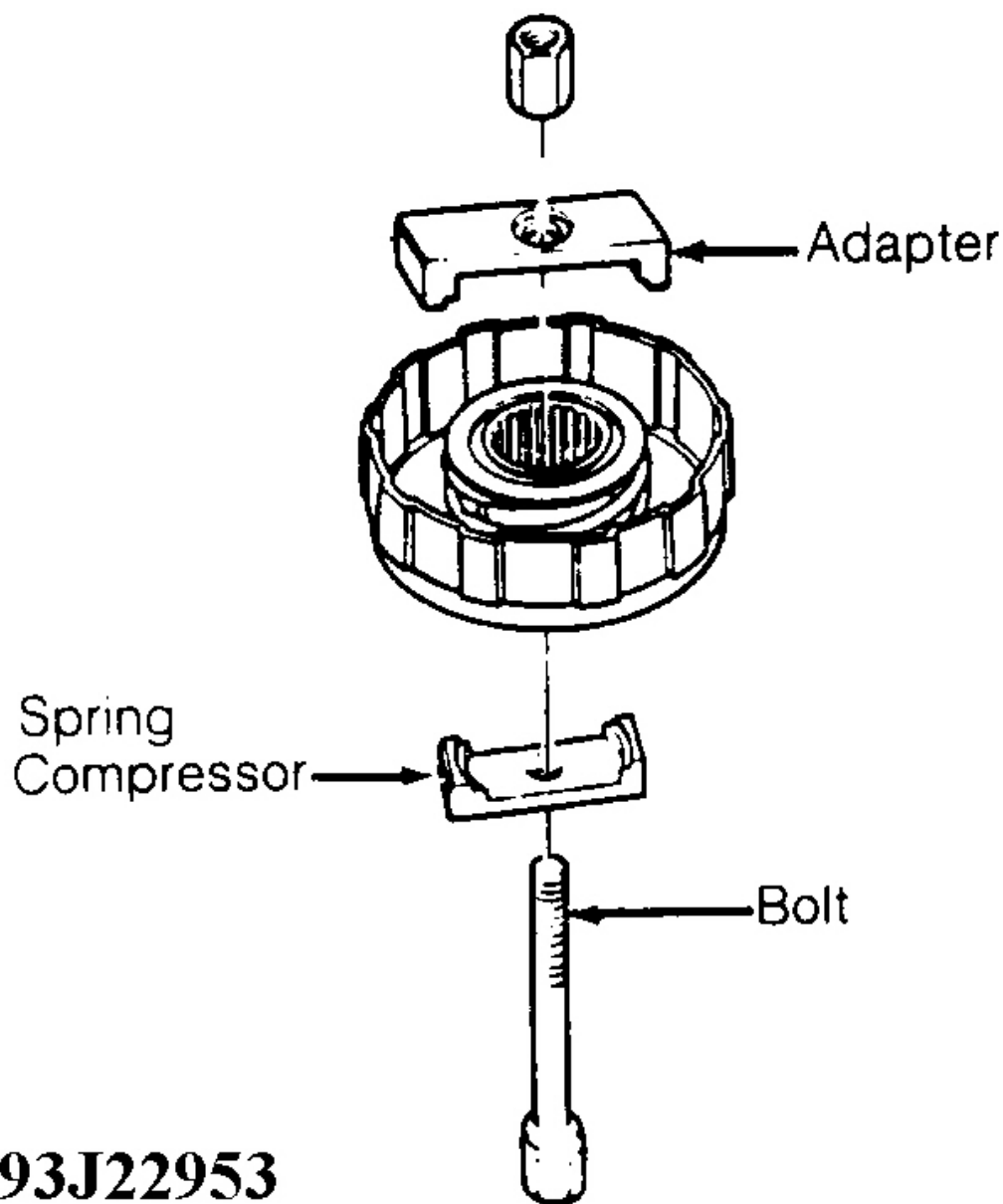


Fig. 29: Compressing Return Spring (1st-Hold Clutch Shown; Others Are similar)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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. Replace as 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

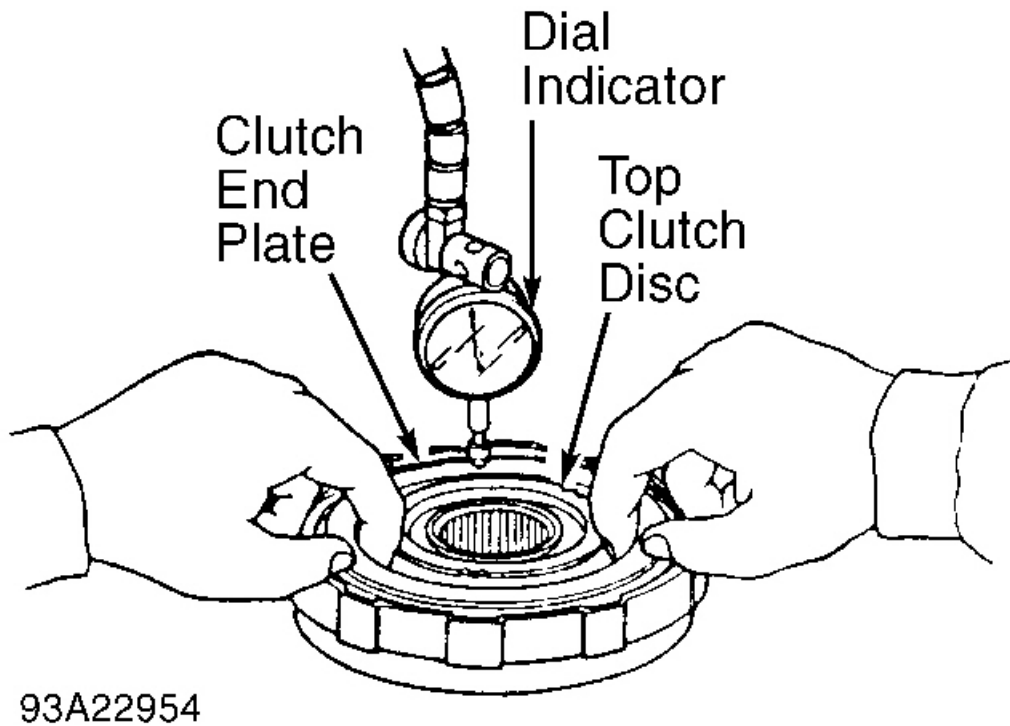
1. Lubricate all components with ATF. Install NEW "O" rings. Install clutch piston in clutch drum. Slightly rotate clutch piston back and forth during installation to prevent damaging "O" rings.

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. 25 -Fig. 28** .

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. 30** . 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 END PLATE SPECIFICATIONS** table.

**Fig. 30: Measuring Clutch Clearance**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 No.	Part No.	Thickness In. (mm)
1st-Hold Clutch		
1	22551-PS5-030	.082 (2.10)
2	22552-PS5-030	.086 (2.20)
3	22553-PS5-030	.090 (2.30)
4	22554-PS5-030	.094 (2.40)

1992 Honda Civic CX**1992 AUTOMATIC TRANSMISSIONS M24A Overhaul**

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

TORQUE CONVERTER HOUSING**Disassembly**

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

Cleaning & Inspection

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

Reassembly

1. Coat components with ATF. To install mainshaft bearing, use hammer, Driver (07749-0010000) and Adapter (07746-0010500). Drive bearing in until bearing bottoms in torque converter housing.
2. Using hammer, driver and Adapter (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 with tab in center facing upward (away from torque converter housing surface). See **Fig. 10** .
4. Using hammer, driver and Adapter (07746-0010500), drive 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 .

5. Once correct differential bearing side clearance is obtained, install differential oil seal. Using driver, Adapter (07JAD-PH80101) and Pilot (07JAD-PH80200), drive oil seal into torque converter housing until oil seal is fully seated.

TRANSAXLE HOUSING

Disassembly

1. To remove mainshaft, countershaft and sub-shaft bearings, use press, Driver (07749-0010000) and Adapter (07746-0010600 - mainshaft; 07746-0010500 - countershaft and sub-shaft).
2. Expand snap ring retaining bearing in transaxle housing. Press bearings from transaxle housing. DO NOT remove snap ring from transaxle housing unless necessary to clean groove in transaxle housing. Using hammer and drift, tap differential oil seal from transaxle housing.

Cleaning & Inspection

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

Reassembly

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

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

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

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

3. Once correct differential bearing side clearance is obtained, install differential oil seal. Use driver, Adapter (07947-6110500) and Pilot (07JAD-PH80200), drive oil seal into transaxle housing until oil seal is fully seated.

DIFFERENTIAL ASSEMBLY

Disassembly

1. Before disassembling differential assembly, check side gear backlash. Place differential assembly on "V" blocks with both axle shafts installed.
2. Install dial indicator with stem resting against pinion gear. See **Fig. 31** . Check side gear backlash. Side gear backlash should be .002- .006" (.05-.15 mm). Replace differential assembly if side 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. 32** .

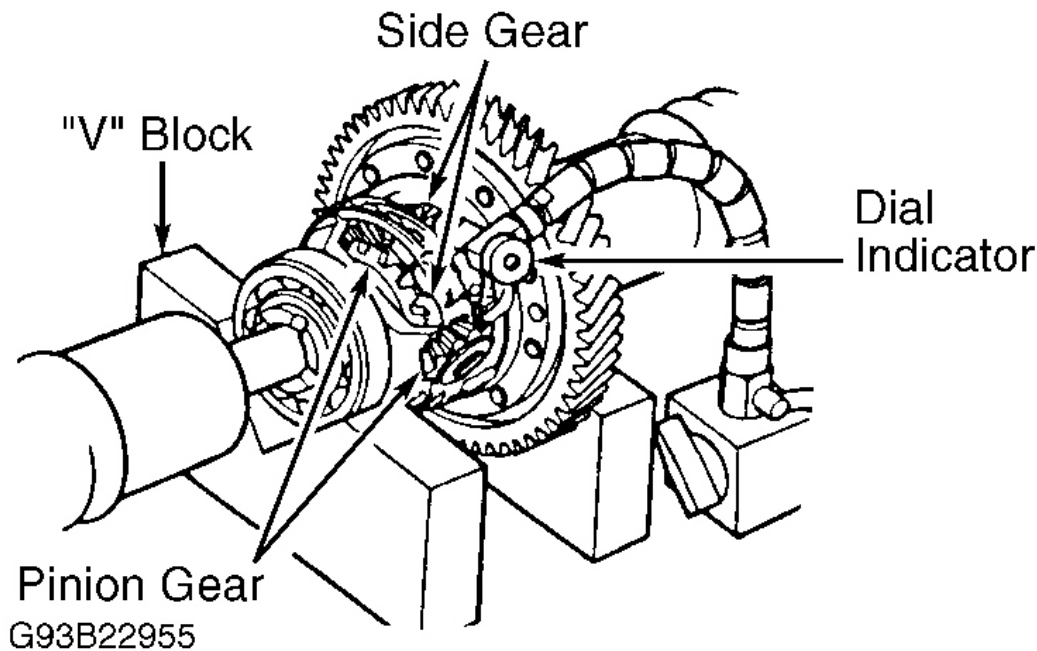


Fig. 31: Checking Side Gear Backlash

Courtesy of AMERICAN HONDA MOTOR CO., INC.

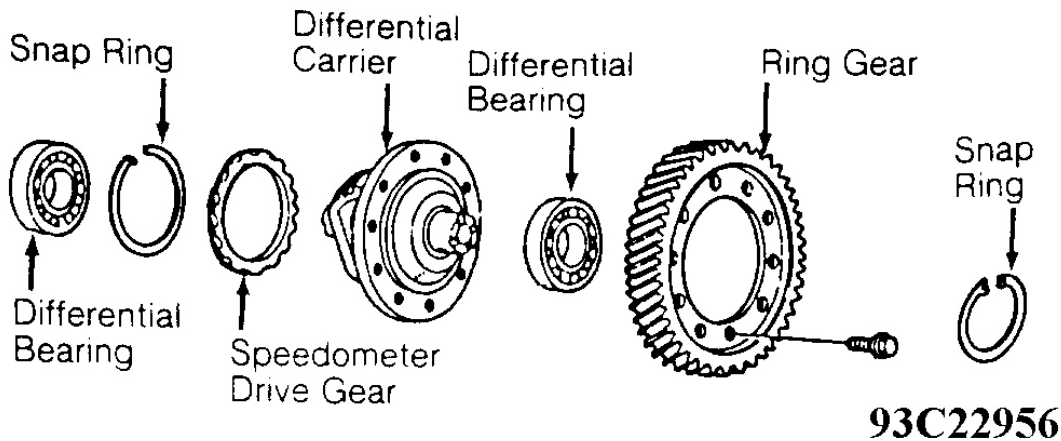


Fig. 32: Exploded View Of Differential Assembly
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

Cleaning & Inspection

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

Reassembly

1. Install dowel pin for speedometer drive gear. Install speedometer drive gear with chamfered side on inside of gear toward differential carrier. Install snap ring so snap ring end gap is properly positioned in relation to differential carrier. See **Fig. 33**.

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

2. Install ring gear on differential carrier with chamfered side on inside of ring gear toward differential carrier. Install ring gear bolts and tighten to specification. See **TORQUE SPECIFICATIONS**. Using Driver (07746-0030100), install differential bearings on differential carrier (if removed).

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

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**.

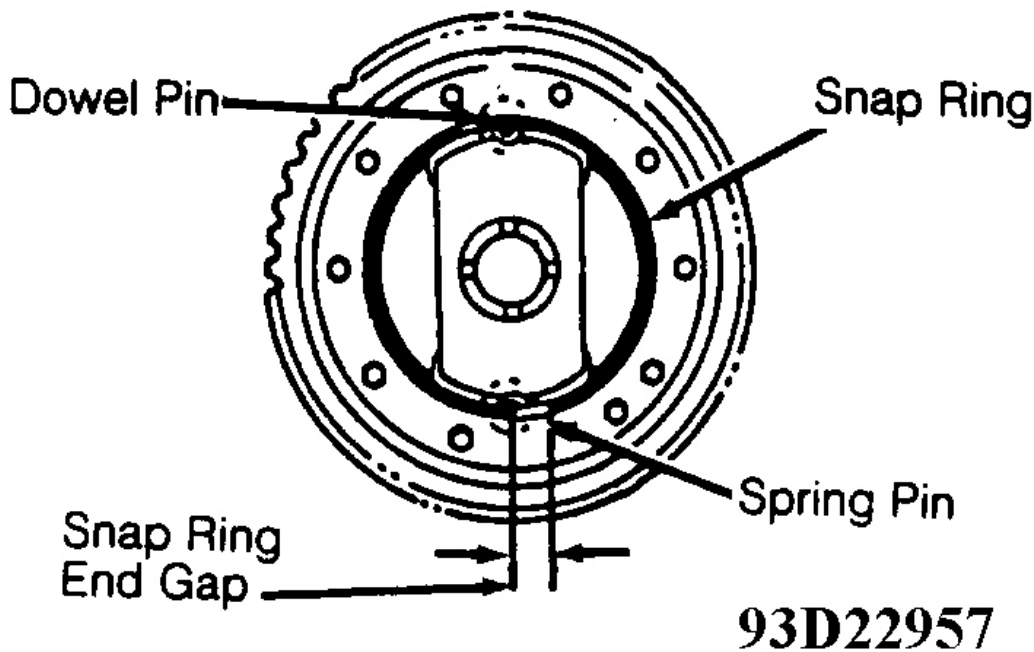


Fig. 33: Installing Speedometer Drive Gear Retaining Snap Ring
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

TRANSAXLE REASSEMBLY

DIFFERENTIAL BEARING SIDE CLEARANCE

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

1. Install .098" (2.50 mm) thick snap ring in transaxle housing. This is the snap ring that differential bearing seats against. Ensure snap ring is fully seated.
2. Tap differential assembly into torque converter housing using Driver (07746-0030100). Perform step 1 in figure. See **Fig. 34** . Ensure bearing on differential carrier is fully seated on torque converter housing.
3. Install gasket and transaxle housing on torque converter housing. Install and tighten transaxle housing bolts to 25 ft. lbs. (34 N.m) in 2 steps using proper sequence. See **Fig. 35** .
4. Using Driver (07746-0030100), tap on transaxle housing side of differential assembly to fully seat bearings. Perform step 2 in figure. See **Fig. 34** . Ensure bearings are fully seated in both housing.
5. Using feeler gauge, measure differential bearing side clearance between snap ring and bearing on transaxle housing. See **Fig. 36** . Replace snap ring if differential bearing side clearance exceeds .006" (.15 mm). 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)
90419-689-000	.118 (3.00)

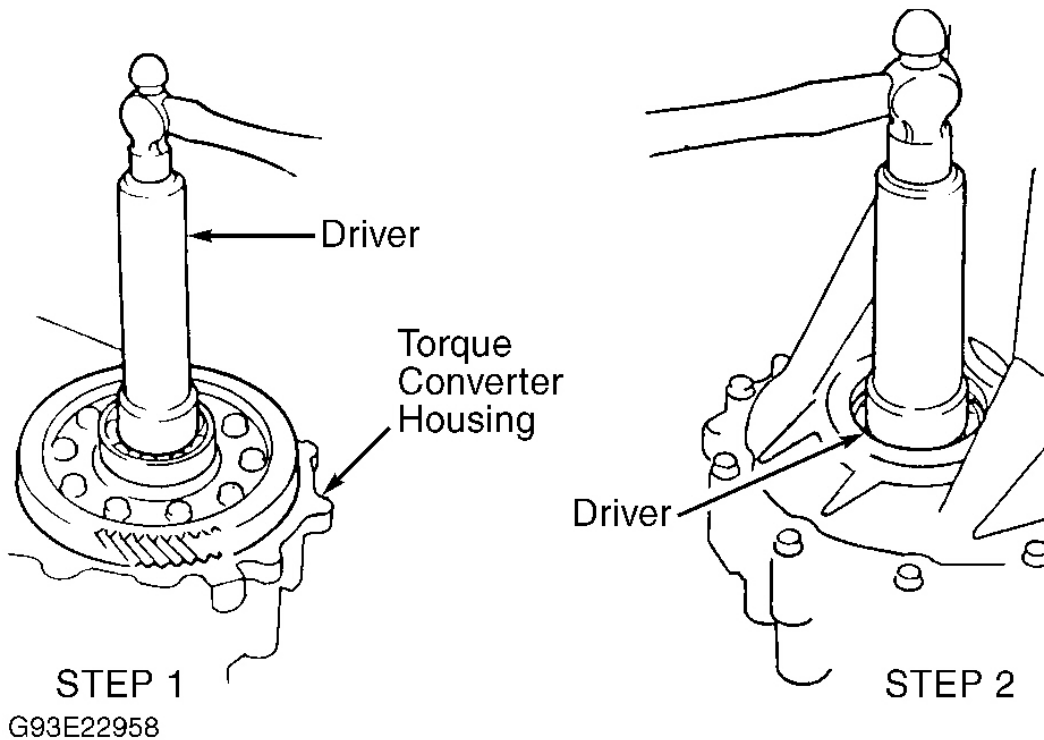
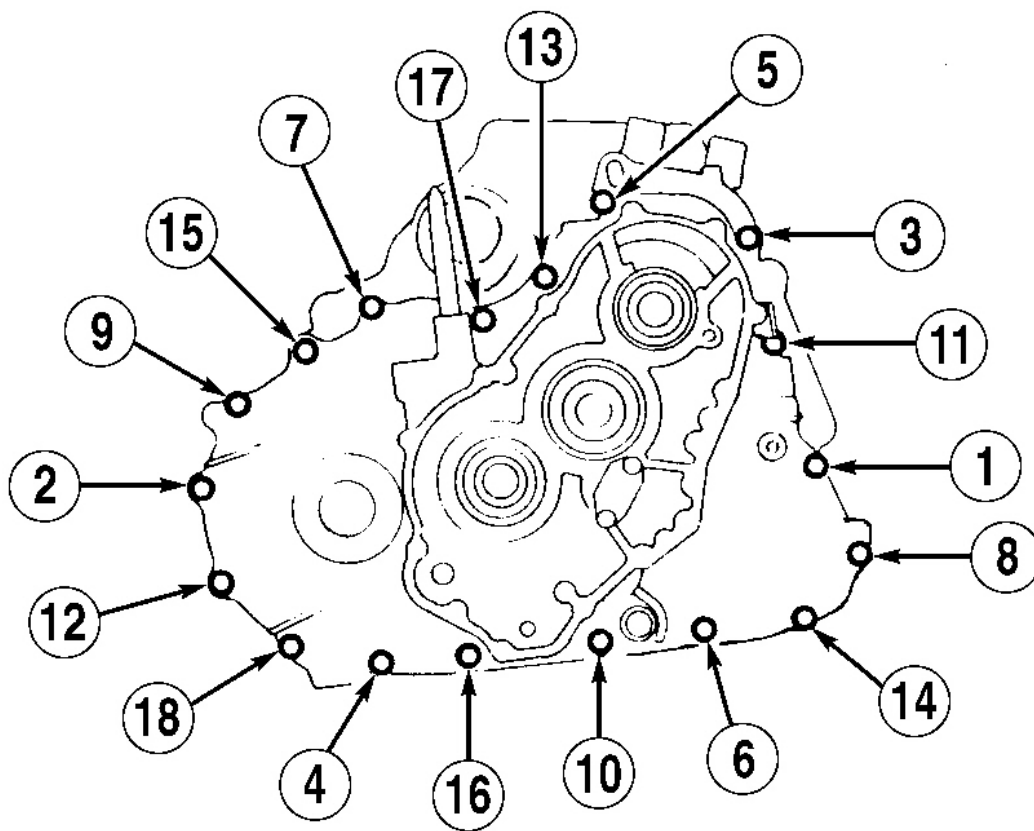


Fig. 34: Installing Differential Assembly
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 35: Transaxle Housing Bolt Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

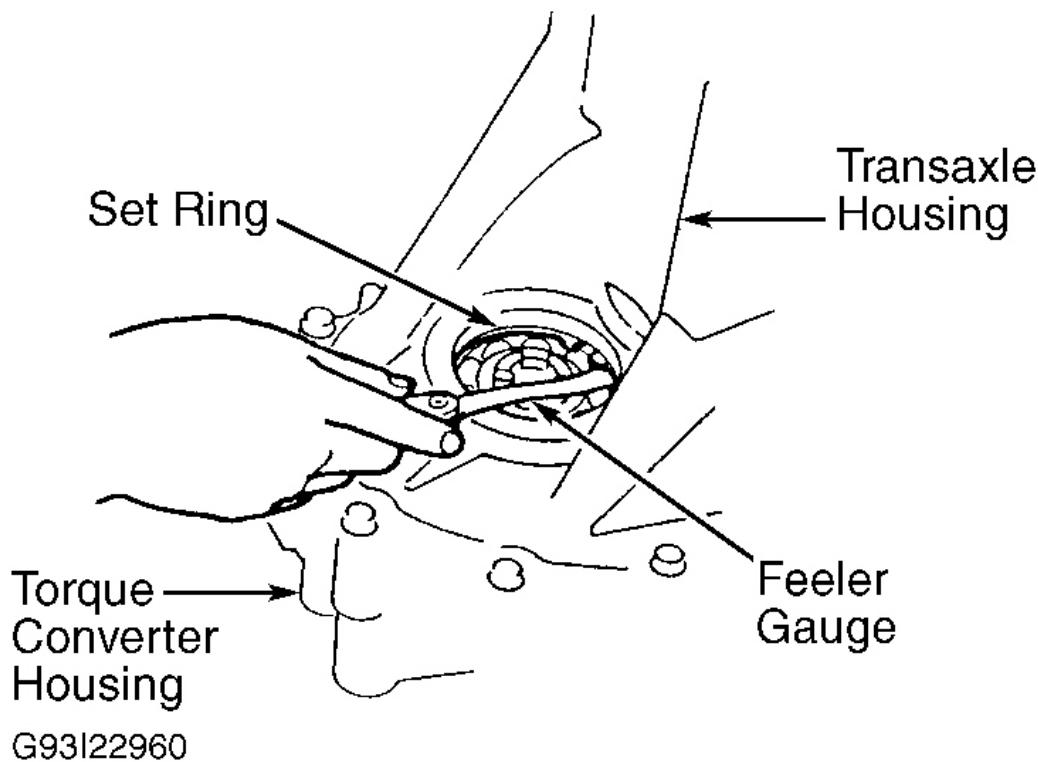


Fig. 36: Checking Differential Bearing Side Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 spring and steel ball in reverse idler gear holder. Install needle bearing on end of reverse idler gear holder. Ensure needle bearing retains steel ball and spring in reverse idler gear holder.
2. Install reverse idler gear in transaxle housing with chamfered side of gear away from transaxle housing (toward torque converter housing). See **Fig. 37** .
3. Install reverse idler gear holder on transaxle housing. Install and tighten reverse idler gear bolts to specification. See **TORQUE SPECIFICATIONS** .
4. Install fluid strainer on torque converter housing. Install dowel pins and separator plate for main valve on

torque converter housing.

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

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

CAUTION: Ensure oil pump gears rotate smoothly and oil pump driven gear shaft troves 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.

6. Ensure check balls are installed in main valve body. See **Fig. 11** . Install stator shaft and stopper shaft. Install regulator valve body with one retaining bolt.
7. Install dowel pins, separator plate and lock-up valve body. See **Fig. 10** . Tighten regulator valve body and lock-up valve body bolts to specification.
8. Install separator plate, dowel pins, secondary valve body and retaining bolt. Install control shaft on torque converter housing. Ensure control shaft engages with manual valve on main valve body.
9. Install detent arm and detent arm shaft on main valve body. Hook detent spring on detent arm and control shaft.
10. Ensure check balls and filter are installed on secondary valve body. See **Fig. 14** . Install separator plate and servo valve body. Tighten secondary valve body and servo valve boor bolts to specification.
11. Install dowel pins, separator plate and modulator valve body. Tighten bolts to specification. Install accumulator cover. Tighten bolts to specification.
12. Install baffle plate and servo detent base. Install bolts and NEW bolt locks on servo detent base. Tighten bolts to specification. Bend tabs on bolt locks over.
13. Install dowel pin and governor body. Install bolts and NEW bolt locks on governor body. Tighten bolts to specification. Bend tabs on bolt locks over. Install all oil feedpipes. See **Fig. 10** .
14. Install differential assembly in torque converter housing. Using Driver (07746-0030100), tap differential assembly into torque converter housing. Perform STEP 1 in figure. See **Fig. 34** . 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 valve body so large chamfered hole aligns with hole in reverse shift fork.
16. Install reverse shift fork and reverse selector. See **Fig. 9** . Install reverse shift fork bolt and NEW bolt lock. Tighten bolt to specification. See **TORQUE SPECIFICATIONS** . Bend tabs on bolt lock over.
17. Install reverse gear and collar on countershaft. See **Fig. 9** . Align spring pin on control shaft with groove on transaxle housing by rotating control shaft. See **Fig. 8** . Install dowel pins and new gasket onto 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. 35** .
19. Install mount bracket on transaxle housing. See **Fig. 9** . Install and tighten mount bracket bolts to

specification.

20. Install mainshaft holder on mainshaft. See **Fig. 6** . Install parking brake lever and parking brake lever spring on control shaft. See **Fig. 5** .
21. Install countershaft 1st gear collar, needle bearing and countershaft 1st gear with one-way clutch and parking gear on countershaft. See **Fig. 5** .
22. Install parking brake stopper, bolt and NEW bolt lock. Tighten bolt to specification. Bend tabs on bolt lock over. Install parking pawl stopper, parking pawl shaft, parking pawl spring and parking pawl.
23. Engage parking pawl with parking gear. Install old lock nut on countershaft. Tighten nut to 101 ft. lbs. (137 N.m) to seat parking gear and countershaft 1st gear on countershaft. Remove old lock nut from countershaft.
24. Install mainshaft 1st gear collar, thrust washer and mainshaft 1st gear on mainshaft. See **Fig. 5** . Install needle bearing, thrust needle bearing, thrust washer and 1st clutch assembly on mainshaft.
25. Install sub-shaft 1st gear on sub-shaft. 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. 1** . Install spring washer on sub-shaft.

CAUTION: Ensure spring washer is installed on sub-shaft with largest area against sub-gear. See Fig. 5 .

NOTE: Mainshaft has left-hand threads.

26. Install NEW lock nuts on countershaft, mainshaft and sub-shaft. Tighten lock nuts to specification. See **TORQUE SPECIFICATIONS** . Remove pin from sub-shaft 1st gear. Remove mainshaft holder.
27. 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.

28. Place parking brake lever in "P" position and ensure parking pawl engages parking gear. Measure parking brake stopper distance between parking pawl shaft and pin on parking brake lever. See **Fig. 38** .
29. Parking brake stopper distance should be 2.65-2.69" (67.5-68.2 mm). If parking brake stopper distance is not within specification, install different size parking brake stopper, and recheck parking brake stopper distance.
30. Parking brake stopper is available in different sizes. See **Fig. 38** . See **PARKING BRAKE STOPPER SPECIFICATIONS** table.
31. Install NEW gasket and right side cover. Tighten bolts to specification. 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 .

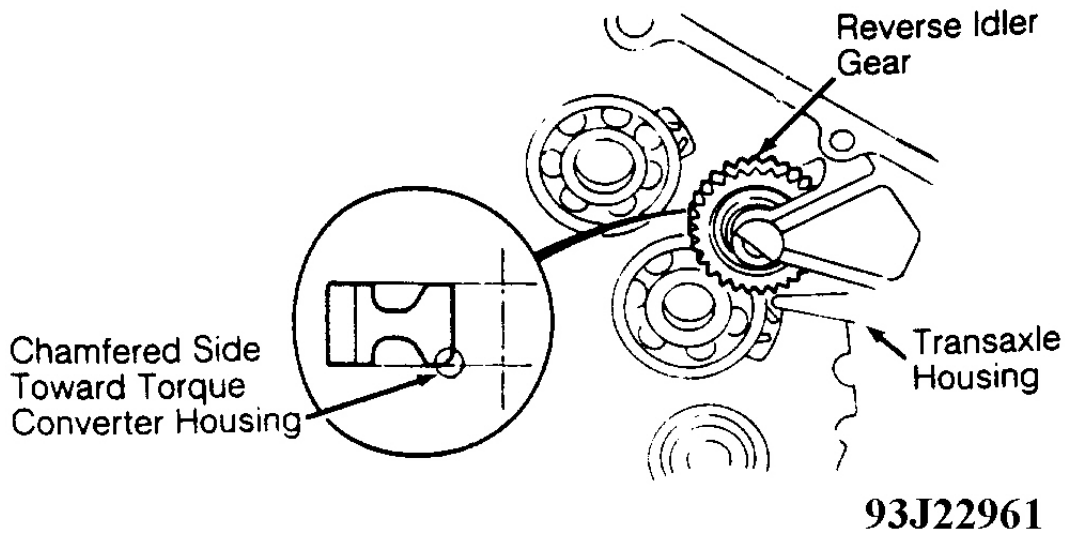


Fig. 37: Installing Reverse Idler Gear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

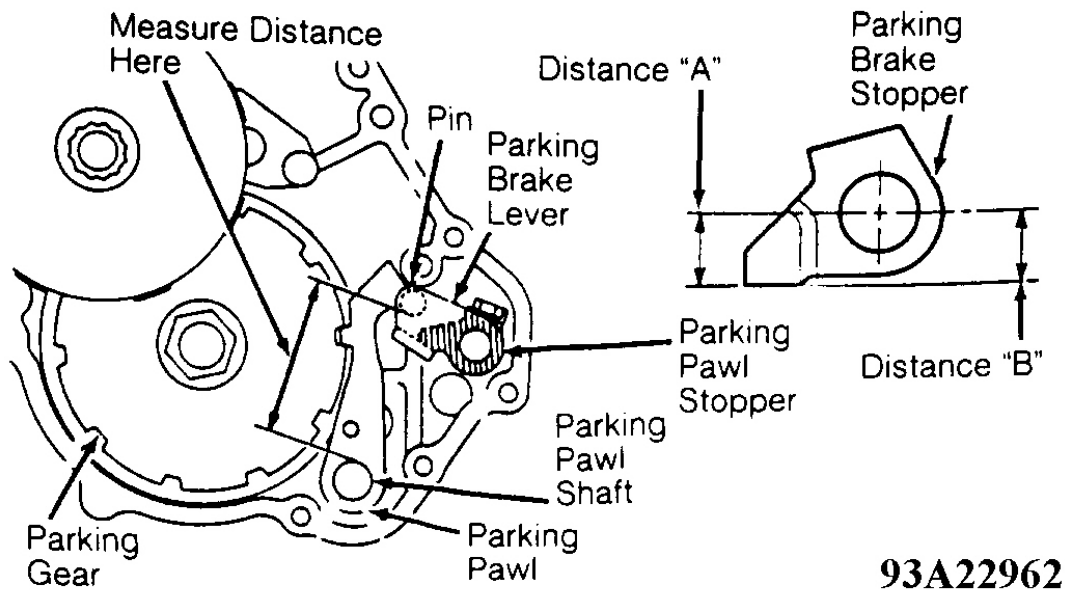


Fig. 38: Parking Brake Stopper Distance & Parking Brake
Courtesy of AMERICAN HONDA MOTOR CO., INC.

PARKING BRAKE STOPPER SPECIFICATIONS

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1992 Honda Civic CX

1992 AUTOMATIC TRANSMISSIONS M24A Overhaul

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. 39** .

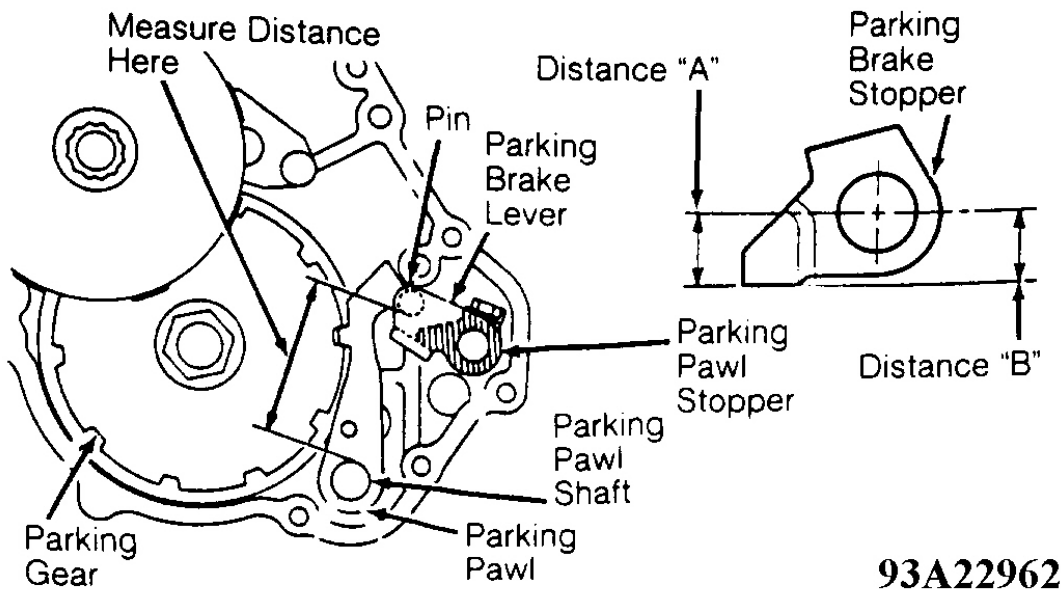


Fig. 39: Measuring Parking Brake Stopper Distance & Parking Brake Stopper
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Countershaft Lock Nut	103 (140)
Drain Plug	29 (39)
Joint Bolt	21 (29)
Mainshaft Lock Nut	70 (95)
Mount Bracket Bolt	36 (49)
Ring Gear Bolt	74 (100)
Speed Sensor Bolt	16 (22)
Sub-Shaft Lock Nut	70 (95)
Sub-Shaft Oil Guide Cap	29 (39)

1992 Honda Civic CX**1992 AUTOMATIC TRANSMISSIONS M24A Overhaul**

Transaxle Housing Bolt ⁽¹⁾	25 (34)
INCH Lbs. (N.m)	
Accumulator Cover Bolt	108 (12)
Breather Cover Bolt	96 (11)
Governor Body Bolt	108 (12)
Governor Housing-To-Governor Shaft Bolt	108 (12)
Lock-Up Valve Body Bolt	108 (12)
Main Valve Body Bolt	108 (12)
Modulator Valve Body Bolt	108 (12)
Needle Stopper Bolt	108 (12)
Parking Brake Stopper Bolt	120 (14)
Regulator Valve Body Bolt	108 (12)
Reverse Idler Gear Holder Bolt	108 (12)
Reverse Shift Fork Bolt	120 (14)
Right Side Cover Bolt	108 (12)
Secondary Valve Body Bolt	108 (12)
Servo Detent Base Bolt	108 (12)
Servo Valve Body Bolt	108 (12)
Stopper Bolt	108 (12)
Throttle Cam Stopper Bolt	108 (12)
Throttle Control Lever Bolt	72 (8)
Valve Cover Bolt	72 (8)

(1) Tighten bolts to specification in sequence. See **Fig. 35**.

TRANSAXLE SPECIFICATIONS**TRANSAXLE SPECIFICATIONS**

Application	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 Side Gear Backlash	.002-.006 (.05-.15)
Countershaft Gear Clearance	
2nd Gear-To-3rd Gear Clearance	.002-.005 (.05-.13)
4th Gear Clearance	.002-.005 (.05-.13)
Mainshaft Gear Clearance (2nd-To-3rd)	.002-.005 (.05-.13)
Oil Pump Side Clearances	
Oil Pump Drive Gear	.0083-.0104 (.210-.265)

1992 Honda Civic CX

1992 AUTOMATIC TRANSMISSIONS M24A Overhaul

Oil Pump Driven Gear	.0028-.0049 (.070-.125)
Oil Pump Thrust Clearance	
Standard	.001-.002 (.03-.05)
Wear Limit	.0028 (.070)
Parking Brake Stopper Distance	2.65-2.69 (67.5-68.2)
(1) Maximum clearance. Replace snap ring with different thickness snap ring if clearance exceeds specification.	