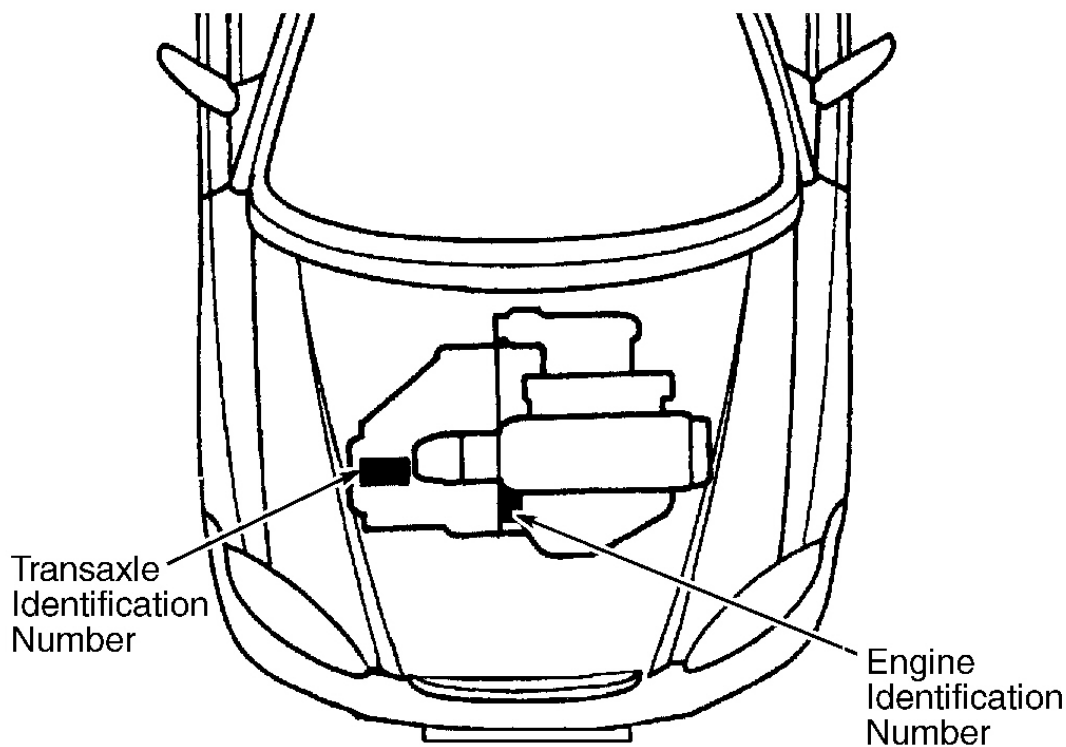


2000 AUTOMATIC TRANSMISSIONS**Honda B4RA & S4RA Overhaul****APPLICATION****AUTOMATIC TRANSAXLE APPLICATIONS**

Application	Transaxle Model
Civic	B4RA & S4RA

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.



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

GEAR RATIOS

TRANSAXLE GEAR RATIOS

Application & Gear Range	Gear Ratio
B4RA & S4RA	
Except VTEC	
Primary	
1st	2.600:1
2nd	1.468:1
3rd	0.926:1
4th	0.638:1
Reverse	1.954:1
Final	4.357:1
VTEC	
Primary	
1st	2.722:1
2nd	1.516:1
3rd	0.975:1
4th	0.638:1
Reverse	1.954:1
Final	4.357:1

DESCRIPTION & OPERATION

Automatic transaxle is electronically controlled with 4 forward speeds and one reverse speed. Transaxle consists of clutches, mainshaft, countershaft, shift control solenoid valves, lock-up control solenoid valves, linear solenoid and a 3-element lock-up torque converter. See **Fig. 2**.

Valve bodies include; main valve body, secondary valve body, regulator valve body, servo body and lock-up valve body.

The linear solenoid and shift control solenoid valve A/B are bolted to transaxle housing. Lock-up control solenoid valve A/B is bolted to torque converter housing.

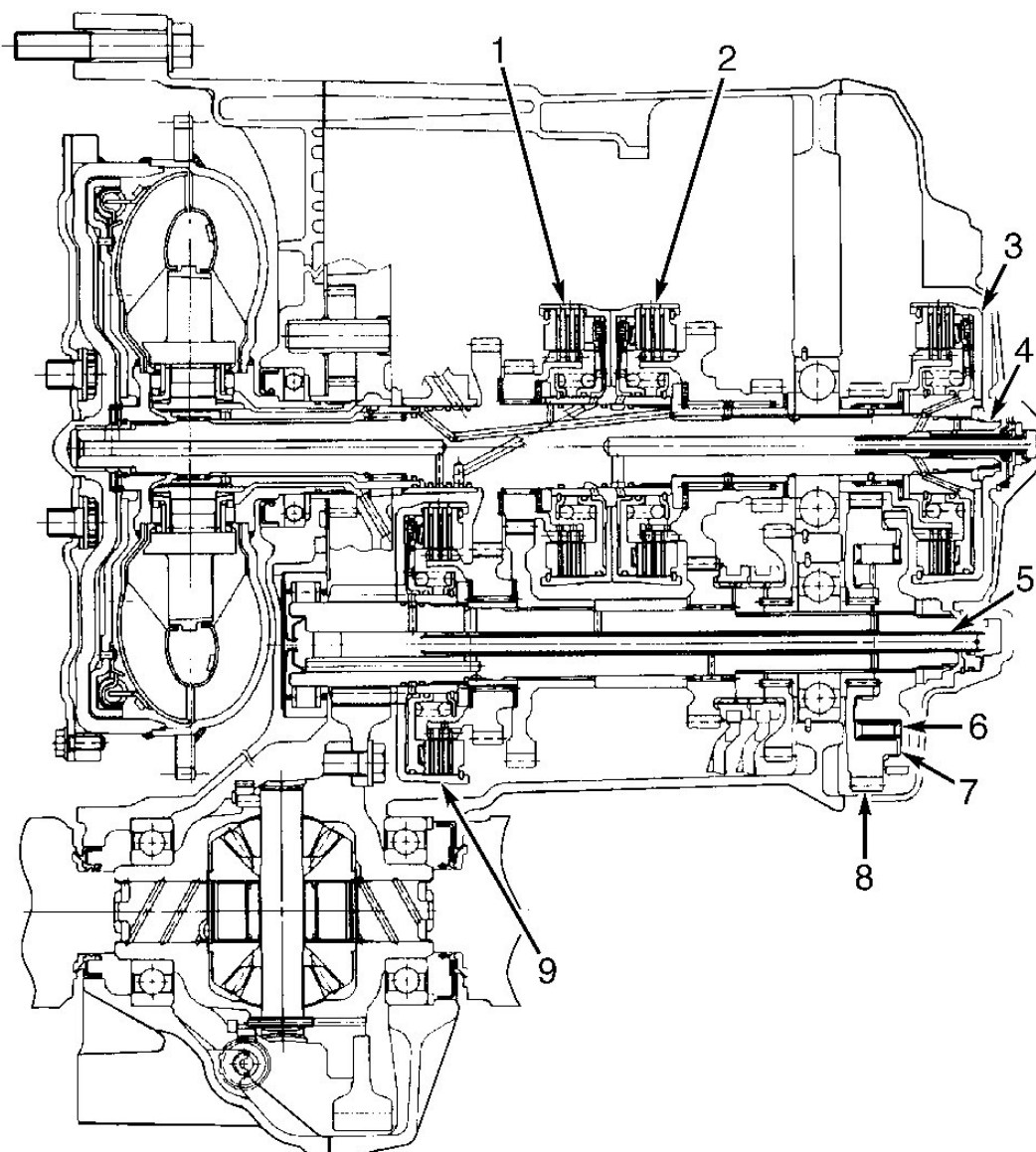
Transaxle shifting and torque converter lock-up are controlled by the Powertrain Control Module (PCM) which receives input signals from various sensors. The PCM determines appropriate shift point and activates appropriate shift control solenoid valve, lock-up control solenoid valves or linear solenoid.

When in "D" position in 3rd gear or "D4" position in 3rd or 4th gear, torque converter lock-up exists and transaxle mainshaft rotates at the same speed as engine crankshaft. Torque converter lock-up is controlled by the PCM.

The PCM contains a grade logic control system which controls transaxle shifting while vehicle is ascending or descending a slope or reducing vehicle speed. For more information on grade logic control system, see appropriate ELECTRONIC CONTROLS article.

The PCM contains a self-diagnostic system, which stores a Diagnostic Trouble Code (DTC) if a failure or problem exists in transaxle electronic control system. DTC can be retrieved to determine transaxle problem area. For information on electronic transaxle components, see appropriate ELECTRONIC CONTROLS article.

Transaxle is equipped with shift and key interlock systems. Shift interlock system prevents selector lever from being moved from "P" position unless brake pedal is depressed and accelerator pedal is in idle position. Key interlock system prevents ignition key from being removed from ignition switch unless selector lever is in "P" position. For additional information on shift and key interlock systems, see ACURA/HONDA SHIFT INTERLOCK SYSTEMS article.



- | | |
|-----------------|--------------------------|
| 1. 2nd Clutch | 6. One-Way Clutch |
| 2. 4th Clutch | 7. Parking Gear |
| 3. 1st Clutch | 8. Countershaft 1st Gear |
| 4. Mainshaft | 9. 3rd Clutch |
| 5. Countershaft | |

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

LUBRICATION

For additional information, see appropriate AUTOMATIC TRANSMISSION SERVICING article in TRANSMISSION SERVICING.

RECOMMENDED FLUID

Use Honda Premium Formula Automatic Transmission Fluid (ATF). Using a non-Honda ATF can affect shift quality.

FLUID CAPACITIES

TRANSAXLE FLUID CAPACITIES ⁽¹⁾

Application	Refill - Qts. (L)	Dry-Fill - Qts. (L)
B4RA & S4RA	2.9 (2.7)	6.2 (5.9)
(1) Approximate quantities listed.		

ON-VEHICLE SERVICE

The following components can be serviced without transaxle removal:

- Axle Shafts
- Countershaft Speed Sensor
- Linear Solenoid Assembly
- Lock-up Control Solenoid Valve A/B Assembly
- Mainshaft Speed Sensor
- Shift Control Solenoid Valve A/B Assembly

For service information on listed components, see appropriate component under **REMOVAL & INSTALLATION** .

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 (560-840 kPa) air pressure to oil cooler flusher. Turn oil cooler flusher water valve on so water will flow through oil cooler for 10 seconds. Replace oil cooler if water will not flow through oil cooler. Turn water valve off.
3. Depress and hold mixing trigger on oil cooler flusher downward. Turn water valve on and flush oil cooler for 2 minutes. Turn air valve on for 5 seconds every 15-20 seconds to create a surging action.
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. Repeat steps 2 and 3 .
5. Turn water valve off and 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 moisture can cause damage to transaxle.

6. Turn air off. Disconnect oil cooler flusher. Reconnect inlet line on oil cooler. Once transaxle is installed, attach drain hose onto return line and place in oil container. Ensure transaxle is in Park. Fill transaxle with ATF. See **RECOMMENDED FLUID** under LUBRICATION.
7. Start engine and operate for about 30 seconds or until one quart (.9L) of ATF is discharged from return line. Turn engine off. Remove drain hose. Reinstall return line. Fill transaxle to proper level.

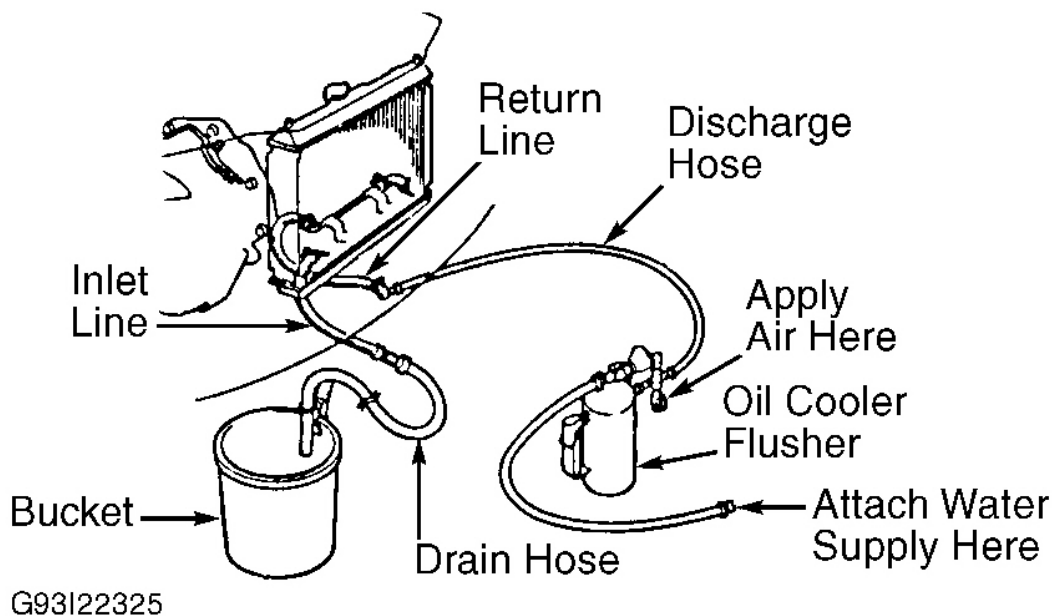


Fig. 3: Installing Oil Cooler Flusher

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, see **PERFORMANCE TESTS**.

SYMPTOM DIAGNOSIS

NOTE: Check all items listed for applicable symptom. If component listed is electrical

or electronically controlled, see appropriate ELECTRONIC CONTROLS article.

Engine Runs, But Vehicle Does Not Move In Any Gear Position

Possible cause: low fluid level, worn or binding oil pump, stuck regulator valve, worn or damaged mainshaft, broken or out of adjustment shift cable, worn or damaged final gears, defective drive plate or clogged ATF strainer.

Vehicle Moves In "2" & "R", But Not In "D3" Or "D4" Position

Possible cause: broken or out of adjustment shift cable, worn or damaged one-way clutch, worn or damaged 1st gears, defective 1st clutch, foreign material in 1st orifice, or foreign material in 2nd exhaust orifice.

Vehicle Moves In "D3", "D4" & "R", But Not In "2" Position

Possible cause: broken or out of adjustment shift cable, worn or damaged 2nd gears, defective 2nd clutch or 2nd accumulator.

Vehicle Moves In "D3", "D4" & "2", But Not In "R" Position

Possible cause: stuck servo valve, broken or out of adjustment shift cable, defective 4th clutch or worn or damaged reverse gears.

Vehicle Moves In "N" Position

Possible cause: defective 1st, 2nd, 3rd or 4th clutch, fluid level too high, foreign material in main orifice, worn or damaged needle bearing, worn or damaged thrust washer, or incorrect clutch clearance.

Excessive Vibration At Idle

Possible cause: low fluid level, worn or binding oil pump, defective linear solenoid assembly, low engine output, defective drive plate, stuck lock-up shift valve, defective lock-up piston or shift control solenoid valve "A".

Poor Acceleration & Flares On Starting Off In "D4" & "D3" Position

Check stall speed. See **TORQUE CONVERTER** under PERFORMANCE TESTS.

No Shift

Possible cause: defective linear solenoid assembly, stuck CPC valve, stuck modulator valve, defective shift control solenoid valve "A" or defective shift control solenoid valve "B".

Fails To Shift From 1st To 3rd In "D3" Or "D4" Position

Possible cause: stuck 2-3 shift valve or defective shift control solenoid "B".

Fails To Shift From 1st To 4th In "D3" Or "D4" Position

Possible cause: stuck 2-3 shift valve, stuck 3-4 shift valve or defective shift control solenoid valve "A".

Erratic 1-2, 2-3 & 3-4 Upshift

Possible cause: defective countershaft speed sensor.

Erratic 1-2 Upshift

Possible cause: stuck 1-2 shift valve or defective shift control solenoid valve "A".

Erratic 2-3 Upshift

Possible cause: stuck 2-3 shift valve or defective shift control solenoid valve "B".

Erratic 3-4 Upshift

Possible cause: stuck 2-3 shift valve or defective shift control solenoid valve "A".

Harsh 1-2 Upshift

Possible cause: defective 2nd clutch, defective linear solenoid assembly, stuck CPC valve, foreign material in main orifice, defective lock-up control solenoid valve "A" or "B", defective mainshaft speed sensor or defective countershaft speed sensor.

Harsh 2-3 Upshift

Possible cause: defective 3rd clutch, defective linear solenoid assembly, stuck CPC valve, defective 2nd accumulator, stuck 2nd orifice control valve, foreign material in main orifice, defective lock-up control solenoid valve "A" or "B", or defective countershaft or mainshaft speed sensor.

Harsh 3-4 Upshift

Possible cause: defective 4th clutch, defective linear solenoid assembly, stuck CPC valve, defective 3rd accumulator, stuck 3-4 orifice control valve, foreign material in main orifice, defective lock-up control solenoid valve "A" or "B", or defective countershaft or mainshaft speed sensor.

Harsh 2-1 Downshift

Possible cause: defective linear solenoid assembly, stuck CPC valve, defective 2nd accumulator, stuck CPB valve, foreign material in 2nd exhaust orifice or defective countershaft or mainshaft speed sensor.

Harsh 3-2 Downshift

Possible cause: defective 2nd clutch, defective linear solenoid assembly, stuck CPC valve, defective 3rd accumulator, stuck CPB valve, foreign material in 3rd exhaust orifice or defective countershaft or mainshaft speed sensor.

Harsh 4-3 Downshift

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2000 AUTOMATIC TRANSMISSIONS Honda B4RA & S4RA Overhaul

Possible cause: defective 3rd clutch, defective linear solenoid assembly, stuck CPC valve, defective 4th accumulator, stuck CPB valve, foreign material in 4th exhaust orifice or defective countershaft or mainshaft speed sensor.

Flare On 2-3 Upshift

Possible cause: defective 3rd clutch, defective linear solenoid assembly, stuck CPC valve, defective 2nd accumulator, stuck 2nd orifice control valve or defective lock-up control solenoid valve "B".

Flare On 3-4 Upshift

Possible cause: defective 4th clutch, defective linear solenoid assembly, stuck CPC valve, defective 3rd accumulator, stuck 2nd orifice control valve, stuck 3-4 orifice control valve or defective lock-up control solenoid valve "B".

Excessive Shock On 2-3 Upshift

Possible cause: defective 3rd clutch, defective linear solenoid assembly, stuck CPC valve, defective 2nd accumulator, stuck 2nd orifice control valve, stuck CPB valve, defective lock-up control solenoid valve "A" or "B", or defective countershaft speed sensor.

Excessive Shock On 3-4 Upshift

Possible cause: defective 4th clutch, defective linear solenoid assembly, stuck CPC valve, defective 3rd accumulator, stuck 3-4 orifice control valve, stuck CPB valve, defective lock-up control solenoid valve "A" or "B", or defective countershaft speed sensor.

Late Shift When Shifting From "N" To "D3" or "D4"

Possible cause: defective 1st clutch or foreign material in 1st orifice.

Late Shift When Shifting From "N" To "R"

Possible cause: stuck servo valve, defective 4th clutch, stuck 1-2 shift valve or defective 1st accumulator.

Noise From Transaxle In All Selector Lever Positions

Possible cause: worn or binding oil pump or worn or damaged torque converter housing or transaxle housing bearings.

Vehicle Does Not Accelerate Greater Than 31 MPH

Possible cause: defective torque converter one-way clutch.

Selector Lever Does Not Operate Smoothly

Possible cause: broken or out of adjustment shift cable.

Fails To Shift, Stuck In 4th Gear

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Possible cause: defective linear solenoid assembly or defective shift control solenoid valve "A" or "B".

Transaxle Will Not Shift Into "P" Position

Possible cause: broken or out of adjustment shift cable or defective park mechanism.

Stall RPM High, All Clutch Pressures Okay

Possible cause: stuck torque converter check valve.

Lock-Up Clutch Does Not Disengage

Possible cause: defective linear solenoid assembly, stuck lock-up timing valve, stuck lock-up shift valve, stuck lock-up control valve, defective lock-up piston, defective lock-up control solenoid valve "A" or "B", or defective countershaft speed sensor.

Lock-Up Clutch Does Not Operate Smoothly

Possible cause: defective linear solenoid assembly, stuck torque converter check valve, stuck lock-up timing valve, stuck lock-up shift valve, stuck lock-up control valve, defective lock-up piston, defective lock-up control solenoid valve "A" or "B", or defective countershaft speed sensor.

Lock-Up Clutch Does Not Engage

Possible cause: defective linear solenoid assembly, stuck torque converter check valve, stuck lock-up timing valve, stuck lock-up shift valve, stuck lock-up control valve, defective lock-up piston, defective lock-up control solenoid valve "A" or "B", or defective countershaft speed sensor or mainshaft speed sensor.

Vibration In All Gear Positions

Possible cause: transaxle incorrectly assembled or defective drive plate.

CLUTCH APPLICATION

CLUTCH APPLICATION

Selector Lever Position	Elements In Use
"P" & "N"	No Clutches Applied
"R"	4th Clutch
"D4"	
1st Gear	1st Clutch, ⁽¹⁾ 1st Gear One-Way Clutch
2nd Gear	⁽²⁾ 1st Clutch, 2nd Clutch
3rd Gear	⁽²⁾ 1st Clutch, 3rd Clutch
4th Gear	⁽²⁾ 1st Clutch, 4th Clutch
"D3"	
1st Gear	

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	1st Clutch, ⁽¹⁾ One-Way Clutch
2nd Gear	⁽²⁾ 1st Clutch, 2nd Clutch
3rd Gear	⁽²⁾ 1st Clutch, 3rd Clutch
"2"	⁽²⁾ 1st Clutch, 2nd Clutch
(1) The 1st gear one-way clutch engages when accelerating, and slips when decelerating.	
(2) The 1st clutch engages, but driving power is not transmitted, as 1st gear one-way clutch slips.	

PERFORMANCE TESTS

ROAD TEST

NOTE: If selector lever cannot be moved from "P" position with brake pedal depressed and accelerator pedal at idle position, check shift interlock system. See **ACURA/HONDA SHIFT INTERLOCK SYSTEMS** article.

1. Warm engine to normal operating temperature. Apply parking brake and block wheels. Start engine. Move selector lever to "D4" position while depressing brake pedal. Depress accelerator pedal and release suddenly. Engine should not stall.
2. Repeat step 1 in "D3" position. Ensure engine does not stall. Manufacturer recommends monitoring of Throttle Position (TP) sensor voltage when performing road test to ensure proper throttle opening for verifying shift points.
3. Ensure ignition is off. Remove passenger side kick panel. Remove PCM. Install Backprobe Test Set (07SAZ-001000A) or equivalent between PCM and DVOM leads. Set DVOM to measure voltage. Connect positive lead at PCM harness connector "C" terminal No. 27 and negative lead at connector "B" terminal No. 20 or 22.
4. Road test vehicle and check for abnormal noise and clutch slippage. Ensure specified clutch is applied in designated gear. See **CLUTCH APPLICATION** under TROUBLE SHOOTING.
5. Ensure shift points and lock-up clutch operation are within specification in accordance with TP sensor voltage. See appropriate table under **UPSHIFT SPECIFICATIONS** and **DOWNSHIFT SPECIFICATIONS**.

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

6. With selector lever in "D4" position, accelerate to about 35 MPH so transaxle is in 4th gear. Move selector lever to "2" position. Ensure engine braking occurs.
7. Place selector lever in "2" position. Accelerate from stop at full throttle. Check for abnormal noise or clutch slippage. Upshifts and downshifts should not occur in this range.
8. Place selector lever in "R" position. Accelerate from stop at full throttle. Check for abnormal noise or clutch slippage.
9. Park vehicle on slope. Apply parking brake and place selector lever in "P" position. Release parking brake. Ensure vehicle does not move. If vehicle moves, check for defective shift cable or parking

components.

10. Ensure ignition is off. Remove test harness and reinstall PCM.

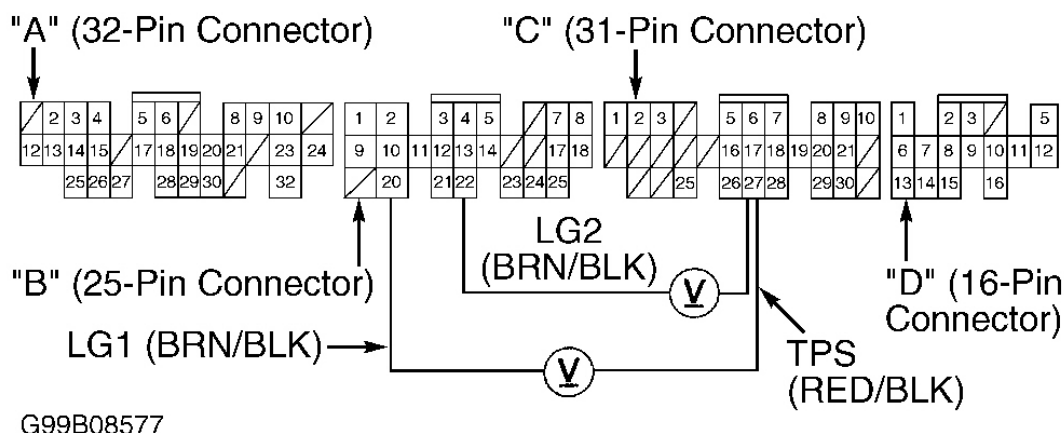


Fig. 4: Measuring TP Sensor Voltage

Courtesy of AMERICAN HONDA MOTOR CO., INC.

UPSHIFT SPECIFICATIONS

UPSHIFT SPECIFICATIONS (EXCEPT VTEC)

Application ("D4" Position)	1st-2nd MPH	2nd-3rd MPH	3rd-4th MPH	Lock-Up Clutch On MPH
TP Sensor Voltage @ .75 Volt	9-12	20-23	28-32	21-24
TP Sensor Voltage @ 2.25 Volts	21-25	40-45	59-65	62-67
Full Throttle	33-38	63-71	101-112	99-109

UPSHIFT SPECIFICATIONS (VTEC)

Application ("D4" Position)	1st-2nd MPH	2nd-3rd MPH	3rd-4th MPH	Lock-Up Clutch On MPH
TP Sensor Voltage @ .75 Volt	9-12	20-23	28-32	21-24
TP Sensor Voltage @ 2.25 Volts	21-25	40-45	59-65	62-67
Full Throttle	32-37	62-70	96-107	95-106

DOWNSHIFT SPECIFICATIONS

DOWNSHIFT SPECIFICATIONS (EXCEPT VTEC)

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2000 Honda Civic EX**2000 AUTOMATIC TRANSMISSIONS Honda B4RA & S4RA Overhaul**

Application ("D4" Position)	Lock-Up Clutch Off MPH	4th-3rd MPH	3rd-2nd MPH	2nd-1st MPH
TP Sensor Voltage @ .50 Volt	19-22	17-20	6-9 ⁽¹⁾	N/A
Full Throttle	95-105	85-95	54-61	25-30
(1) Downshift from 3rd to 1st gear.				

DOWNSHIFT SPECIFICATIONS (VTEC)

Application ("D4" Position)	Lock-Up Clutch Off MPH	4th-3rd MPH	3rd-2nd MPH	2nd-1st MPH
TP Sensor Voltage @ .50 Volt	19-22	17-20	6-9 ⁽¹⁾	N/A
Full Throttle	91-101	85-95	54-61	25-30
(1) Downshift from 3rd to 1st gear.				

TORQUE CONVERTER**Stall Speed Test**

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

1. Apply parking brake and block front wheels. Connect tachometer. Start engine. Ensure A/C is off. Warm engine to normal operating temperature. Place selector lever in "2" position.
2. Fully depress brake pedal. Fully depress accelerator for 6-8 seconds and note engine speed.
3. Allow transaxle to cool for 2 minutes at idle with selector lever in "N" or "P" position. Repeat test procedure in "D4", "2" and "R" positions.
4. Stall speed should be the same in "D4", "2" and "R" positions. Ensure stall speed is within specification. See **STALL SPEED SPECIFICATIONS** table. If stall speed is not within specification, see **STALL SPEED TROUBLE SHOOTING** table.

STALL SPEED SPECIFICATIONS

Application	Engine RPM
Standard	2700
Service Limit	2550-2850

STALL SPEED TROUBLE SHOOTING

Stall Speed Test Results	Probable Cause
Stall Speed RPM High In "D4", "2" & "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

2000 Honda Civic EX**2000 AUTOMATIC TRANSMISSIONS Honda B4RA & S4RA Overhaul**

Stall Speed RPM High In "2"	Slipping 2nd Clutch
Stall Speed RPM High In "D4"	Slipping 1st Clutch Or 1st Gear One-Way Clutch
Stall Speed RPM Low In "D4", "2" & "R"	Engine Output Low, Torque Converter One-Way Clutch Slipping

HYDRAULIC PRESSURE TESTS**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. Attach tachometer.

Pressure Testing

1. With engine off, remove pressure tap plug from appropriate pressure tap on transaxle. See **Fig. 5** . Attach pressure gauge to appropriate pressure tap. Tighten hose fitting to 13 ft. lbs. (18 N.m).

NOTE: **Measure 4th clutch pressure with selector lever in "D4" and "R" positions.**

2. Start and operate engine at 2000 RPM for all pressure readings. With selector lever in appropriate position, measure line pressure, 1st clutch, 2nd clutch, 3rd clutch and 4th clutch pressure in order. Shut engine off.
3. Line and clutch pressure should be within specification. See **HYDRAULIC PRESSURE TEST SPECIFICATIONS** table. If line or clutch pressure is not within specification, see **HYDRAULIC PRESSURE TEST TROUBLE SHOOTING** table.
4. Remove pressure gauge set. Using NEW seal washer, install and tighten pressure tap plug to specification. See **TORQUE SPECIFICATIONS** .

HYDRAULIC PRESSURE TEST SPECIFICATIONS

Application	Selector Lever Position	psi (kPa)
Line Pressure	"P" Or "N"	120-128 (830-880)
Clutch Pressure		
1st Clutch	"D4"	120-128 (830-880)
2nd Clutch	"2"	116-123 (800-850)
3rd Clutch	"D3"	117-125 (810-860)
4th Clutch	"D4" & "R"	117-125 (810-860)

HYDRAULIC PRESSURE TEST TROUBLE SHOOTING

Application	Probable Cause
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Line Pressure

Low Or No Line Pressure

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

Low Or No 1st Clutch Pressure

Defective 1st Clutch

Low Or No 2nd Clutch Pressure

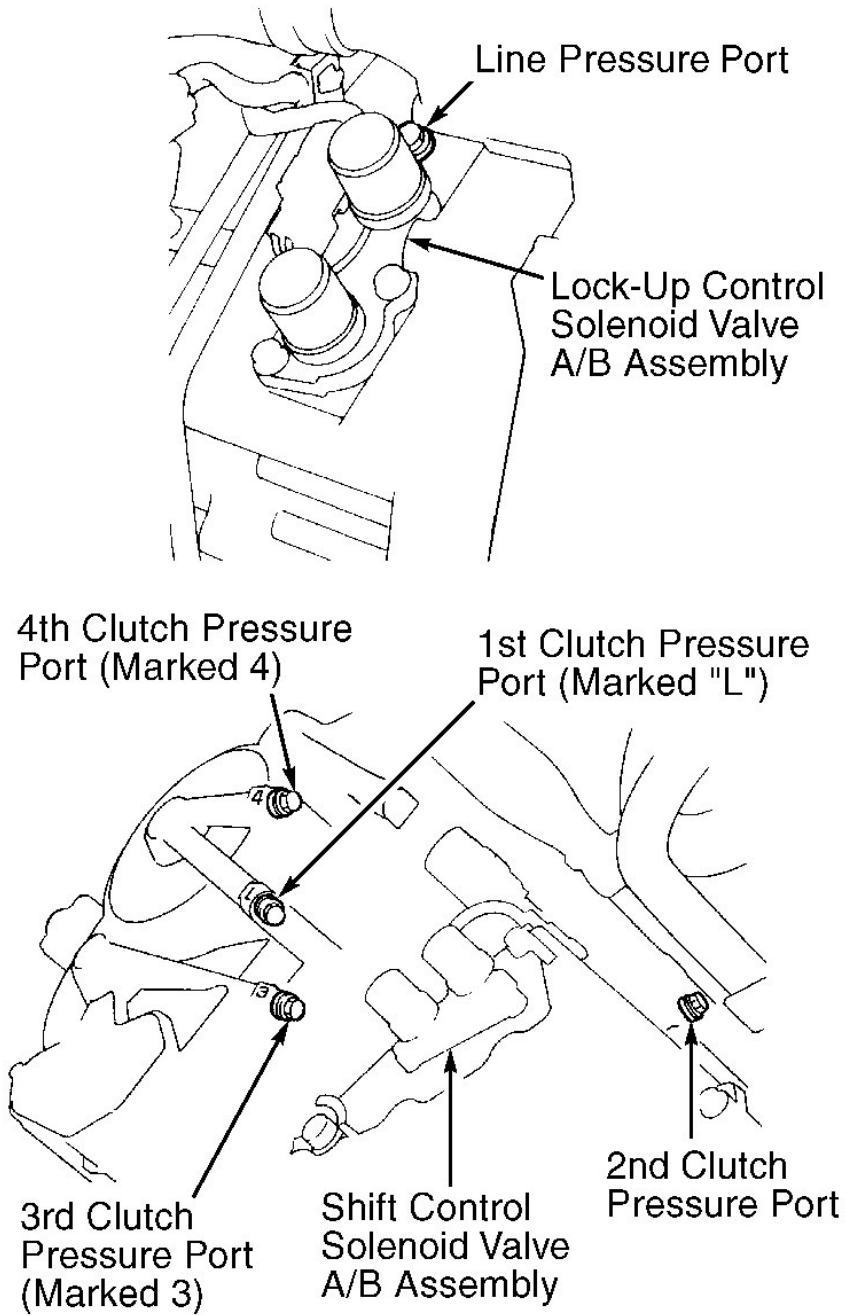
Defective 2nd Clutch

Low Or No 3rd Clutch Pressure

Defective 3rd Clutch

Low Or No 4th Clutch Pressure

Defective 4th Clutch Or Servo
Valve



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

COMPONENT TESTS

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 stall speed test, see **TORQUE CONVERTER** under **PERFORMANCE TESTS**.

REMOVAL & INSTALLATION

AXLE SHAFTS

See appropriate article in **DRIVE AXLES**.

ELECTRICAL COMPONENTS

See appropriate **ELECTRONIC CONTROLS** article.

TRANSAXLE

See appropriate **AUTOMATIC TRANSMISSION REMOVAL** article in **TRANSMISSION SERVICING**.

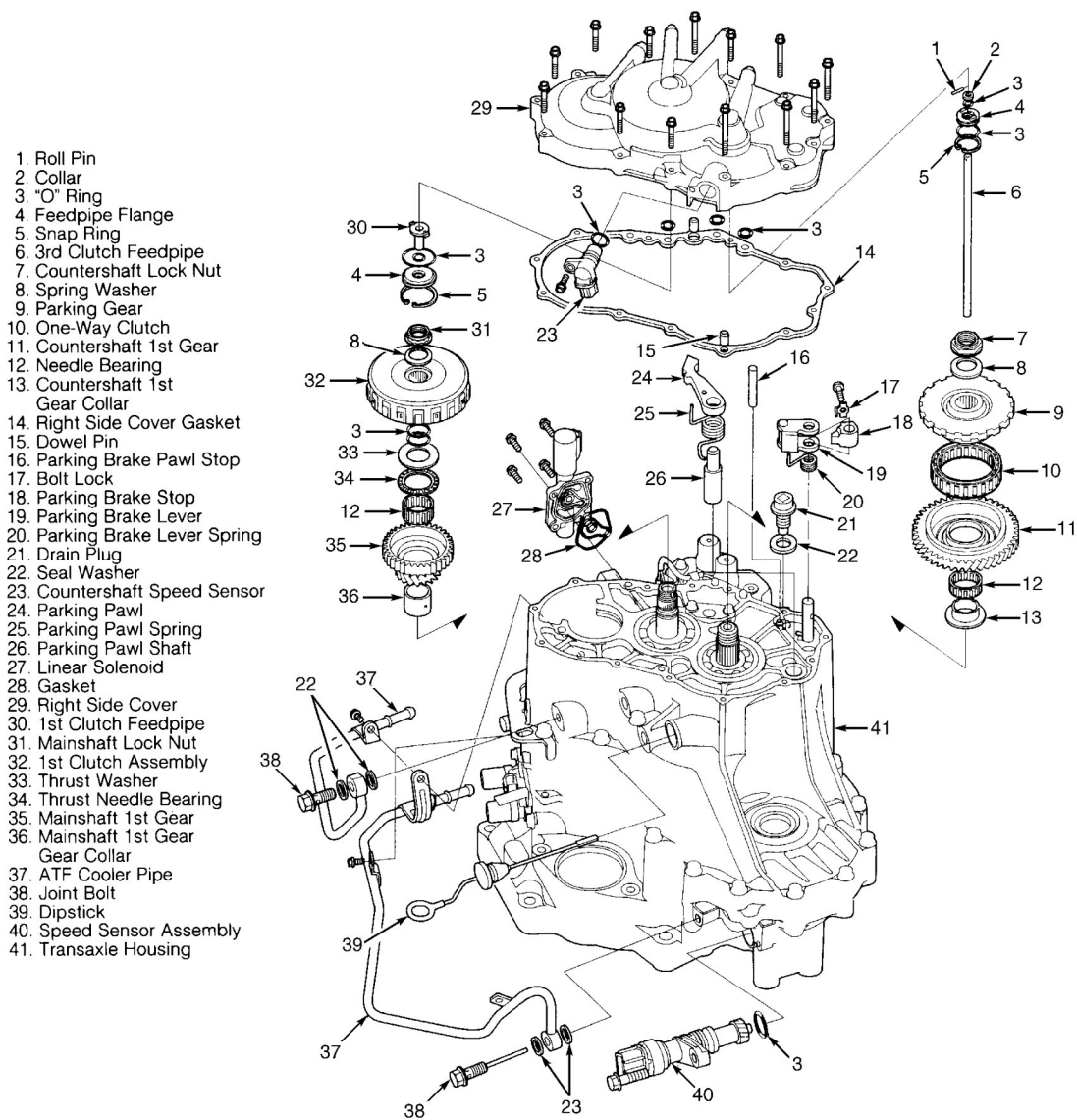
TRANSAXLE DISASSEMBLY

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

CAUTION: DO NOT use impact wrench to remove lock nuts from countershaft or mainshaft.

NOTE: Mainshaft and countershaft lock nut has left-hand thread.

2. Engage parking pawl with parking gear. Using hammer and chisel, cut lock tabs on countershaft and mainshaft lock nuts. Remove lock nuts and spring washers. See **Fig. 6** .
3. Remove mainshaft holder once lock nuts are removed. Remove 1st clutch, mainshaft 1st gear assembly and mainshaft 1st gear collar from mainshaft. Remove parking pawl, parking pawl spring and parking pawl shaft. Remove parking brake lever from control shaft.
4. Using puller, remove parking gear, one-way clutch and countershaft 1st gear from countershaft. Remove needle bearing and countershaft 1st gear collar from countershaft. Remove oil cooler lines and dipstick.
5. Remove mainshaft speed sensor. Remove transaxle housing bolts and hanger. Align spring pin with groove in transaxle housing by rotating control shaft. Using Puller (07HAC-PK4010A), remove transaxle housing. See **Fig. 8** .



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Fig. 6: Exploded View Of Right Side Cover & Components
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

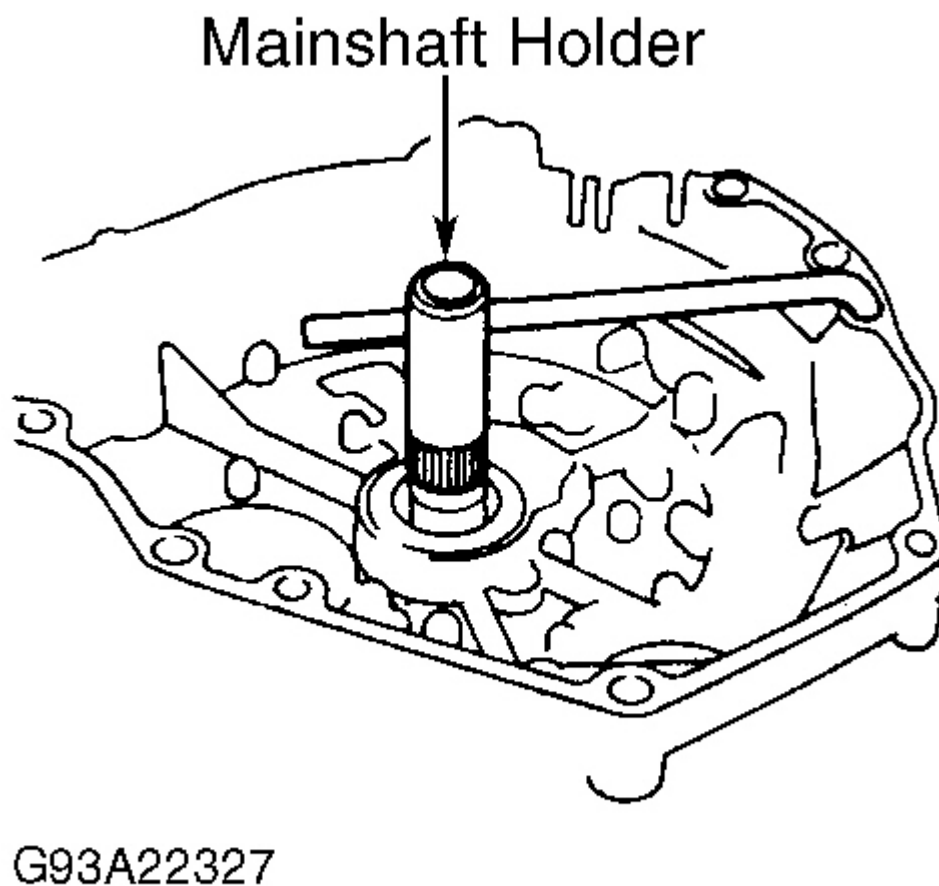
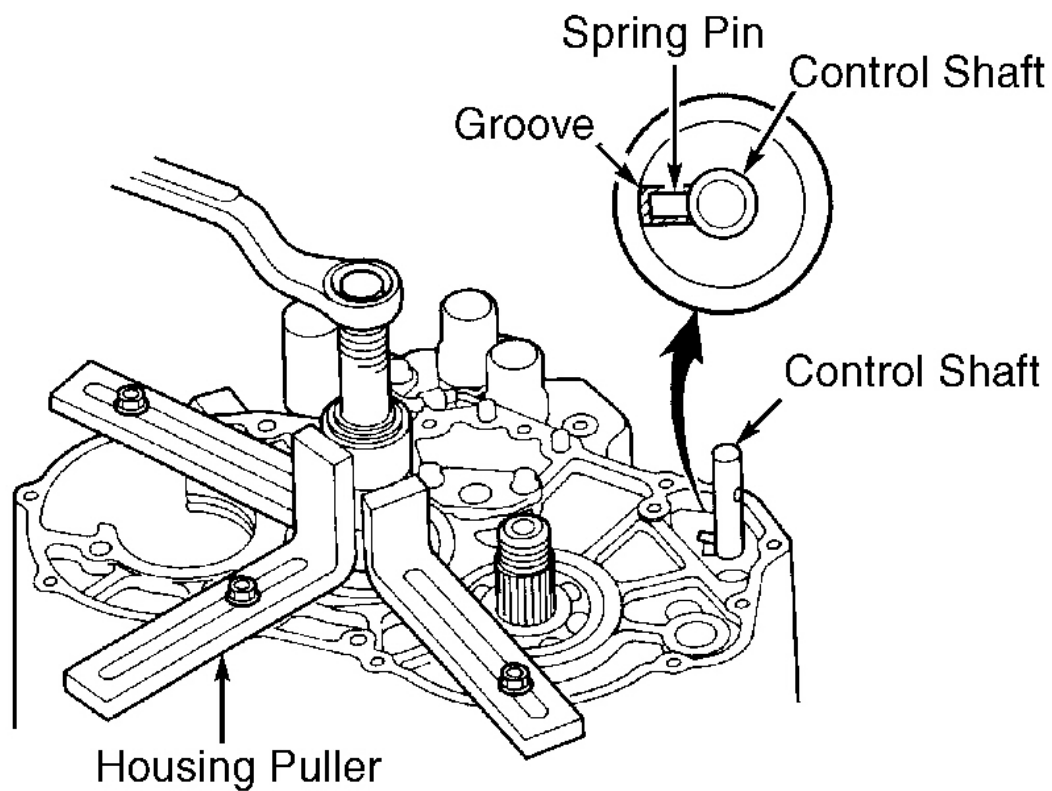


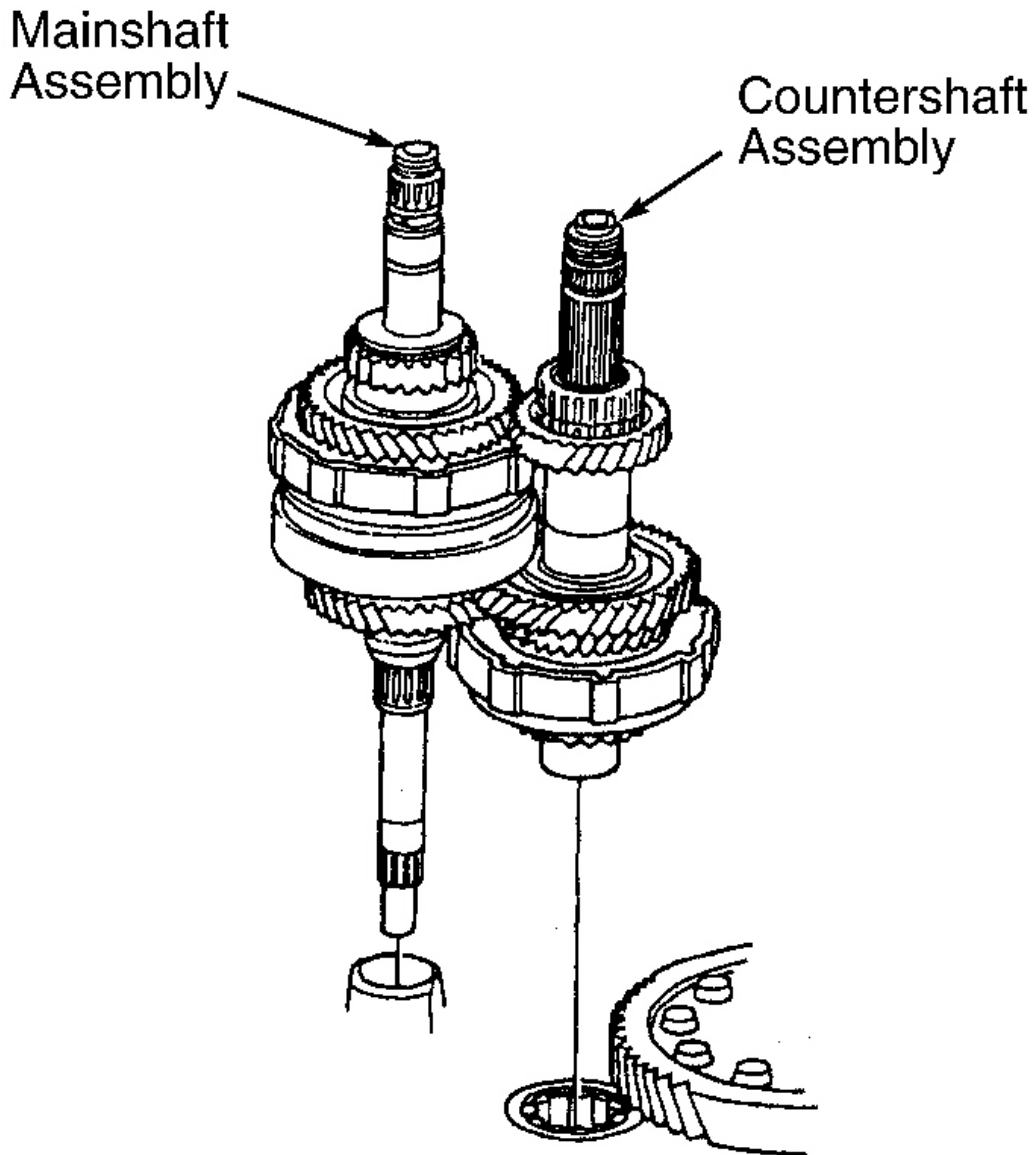
Fig. 7: Installing Mainshaft Holder

Courtesy of AMERICAN HONDA MOTOR CO., INC.



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



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Fig. 9: Removing/Installing Mainshaft & Countershaft Assemblies
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove countershaft reverse gear, collar and needle bearing. See **Fig. 10** . Remove shift fork bolt and lock washer, then remove shift fork and reverse selector.
7. Remove mainshaft and countershaft assemblies together. See **Fig. 9** . Remove differential assembly from torque converter housing.
8. Remove oil feed pipes from servo body, secondary valve body and main valve body. Remove bolts and

fluid strainer. Remove bolts, servo body and servo separator plate. See **Fig. 11** .

9. Remove secondary valve body, stop shaft and secondary separator plate. Remove bolts, lock-up valve body and separator plate.
10. Remove bolt and regulator valve body. Remove stop shaft, "O" ring and stator shaft. Disconnect detent spring from detent arm. Remove control shaft from torque converter housing. Remove detent arm shaft and detent arm from main valve body.
11. Remove bolts and main valve body. Use care not to lose 8 check balls in main valve body. Remove oil pump driven gear shaft, oil pump driven gear and oil pump drive gear. Remove main separator plate and dowel pins.

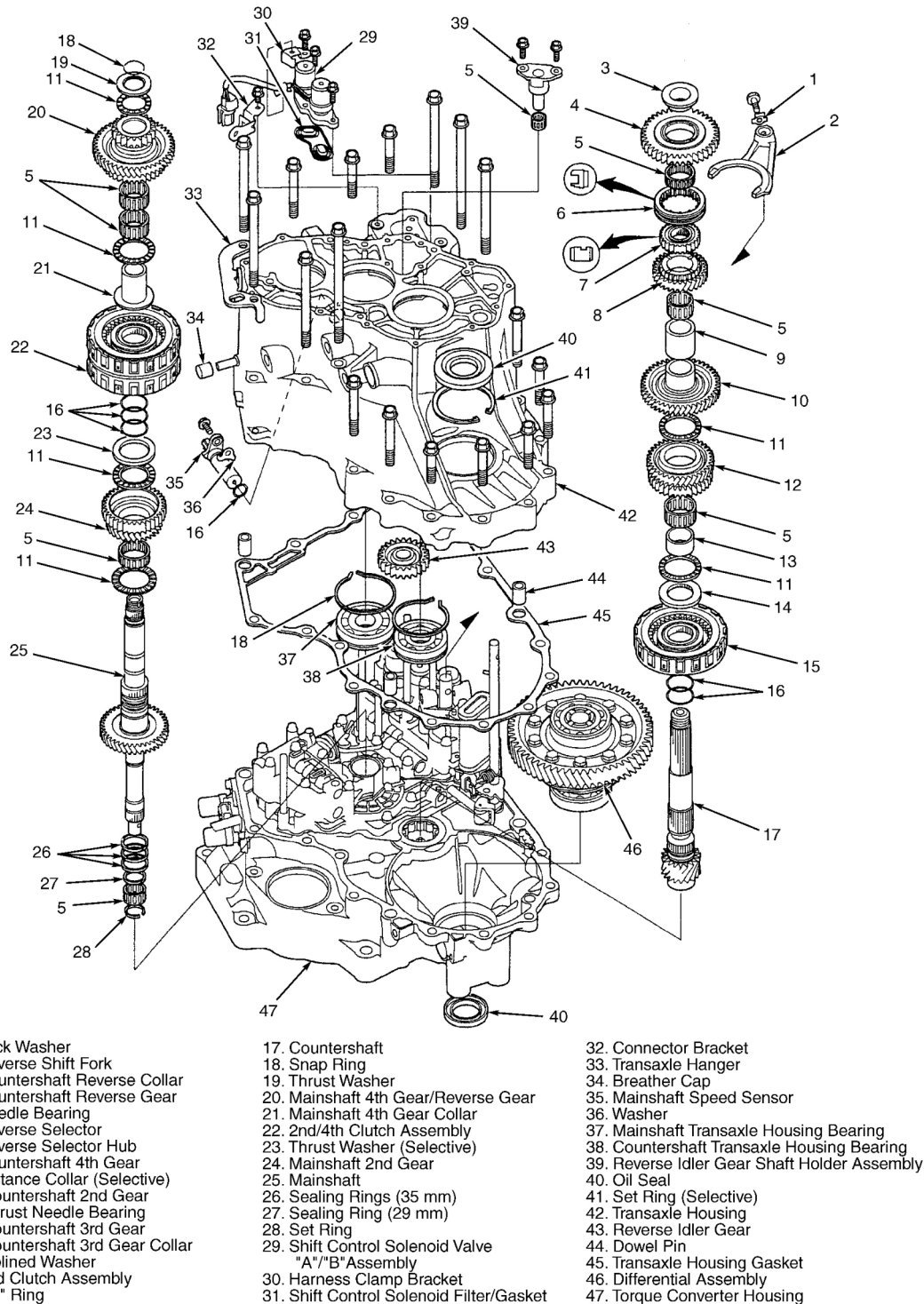
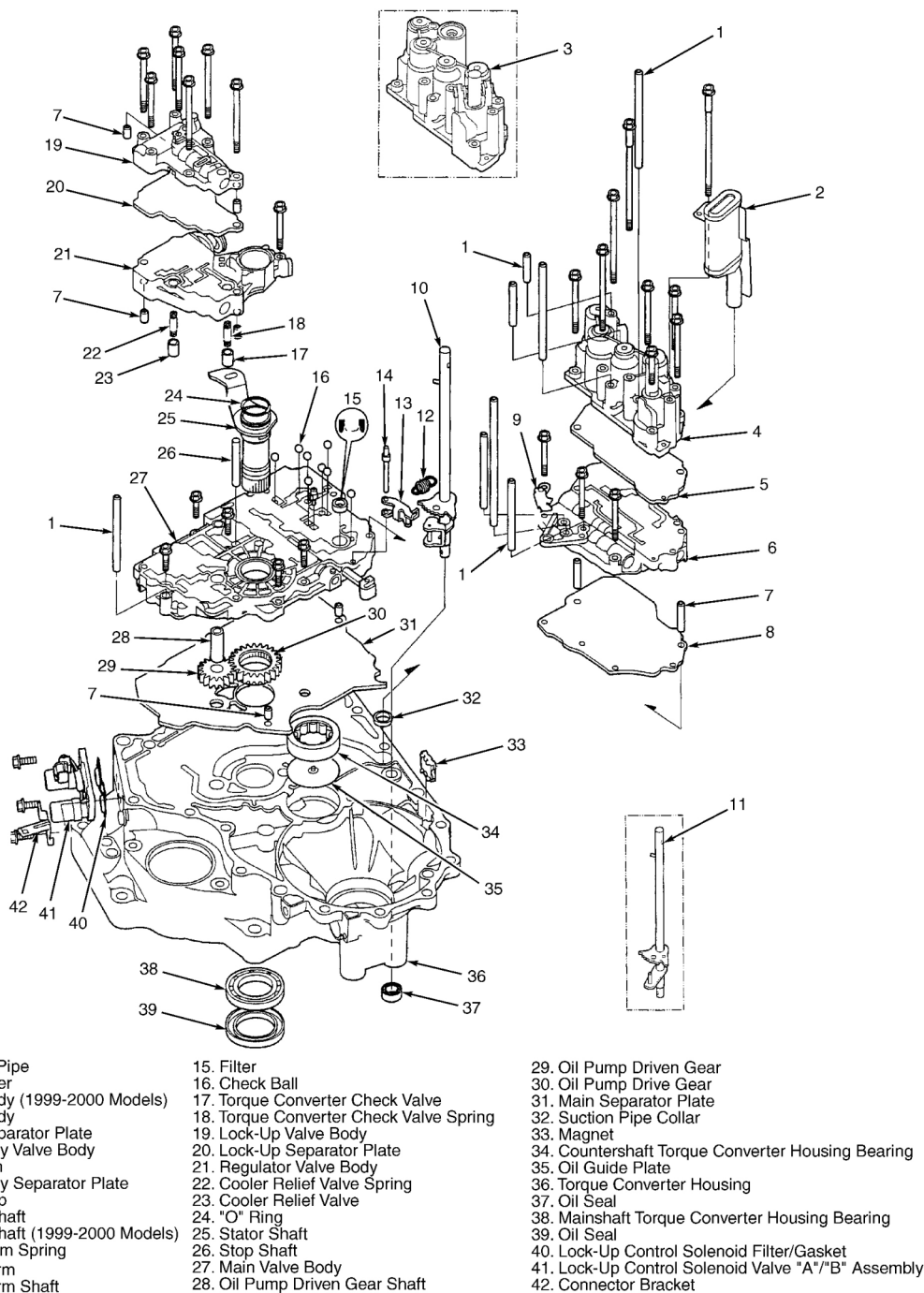


Fig. 10: Exploded View Of Transaxle Housing & Components
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 11: Exploded View Of Torque Converter Housing & Components
Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT DISASSEMBLY & REASSEMBLY

MAIN VALVE BODY

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

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

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

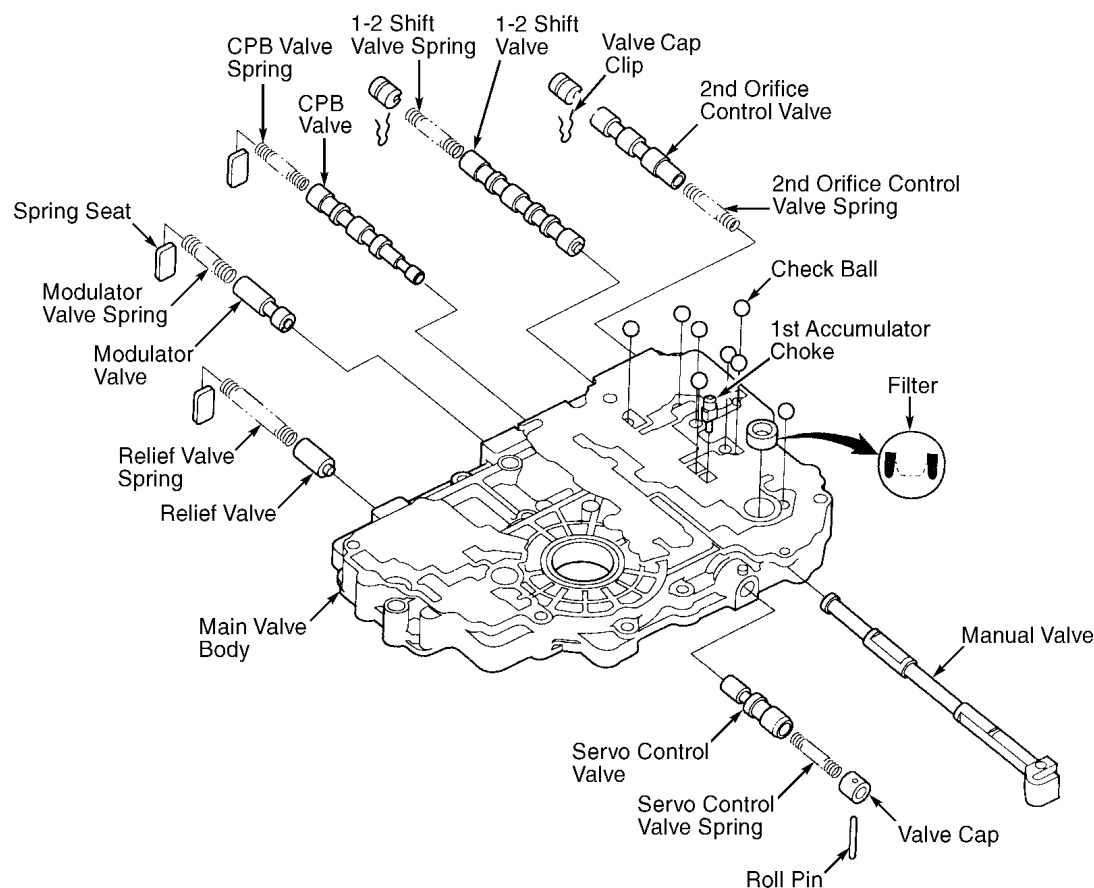
1. Clean components with solvent and dry with compressed air. Replace main valve body if any parts are worn or damaged.
2. Ensure all valves slide freely in their bores. If valves do not slide freely, polish burrs or rough areas using No. 600 sandpaper soaked for 30 minutes in ATF. Thoroughly clean main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

MAIN VALVE BODY SPRING SPECIFICATIONS

Application	Free Length - In. (mm)
Clutch Pressure Back-Up Valve Spring	1.858 (47.20)
Modulator Valve Spring	1.378 (35.00)
Relief Valve Spring	1.461 (37.10)
Servo Control Valve Spring	2.051 (52.10)
1-2 Shift Valve Spring	1.626 (41.30)
2nd Orifice Control Valve Spring	1.370 (34.80)

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** .



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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 and grooved side of oil pump driven gear is facing upward (toward separator plate side of main valve body).
3. Using feeler gauge, measure side clearance of both gears between tip of gear teeth and main valve body. See **Fig. 13**. Replace oil pump gears and/or main valve body if side clearance is not within specification. See **OIL PUMP SPECIFICATIONS** table.
4. Remove oil pump driven gear shaft. Place straightedge across main valve body surface. Using feeler

2000 Honda Civic EX

2000 AUTOMATIC TRANSMISSIONS Honda B4RA & S4RA Overhaul

gauge, measure thrust clearance between oil pump gears and straightedge. Replace oil pump gears and/or main valve body if thrust clearance is not within specification. See **OIL PUMP SPECIFICATIONS** table.

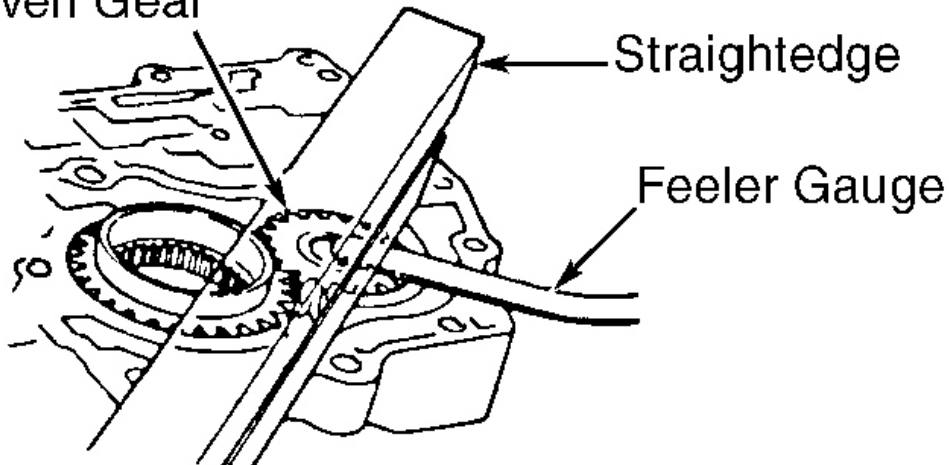
OIL PUMP SPECIFICATIONS

Application	In. (mm)
Side Clearance	
Oil Pump Drive Gear	.0041-.0052 (.105-.133)
Oil Pump Driven Gear	.0014-.0025 (.035-.063)
Thrust Clearance	
Standard	.001-.002 (.03-.05)
Wear Limit	.003 (.07)

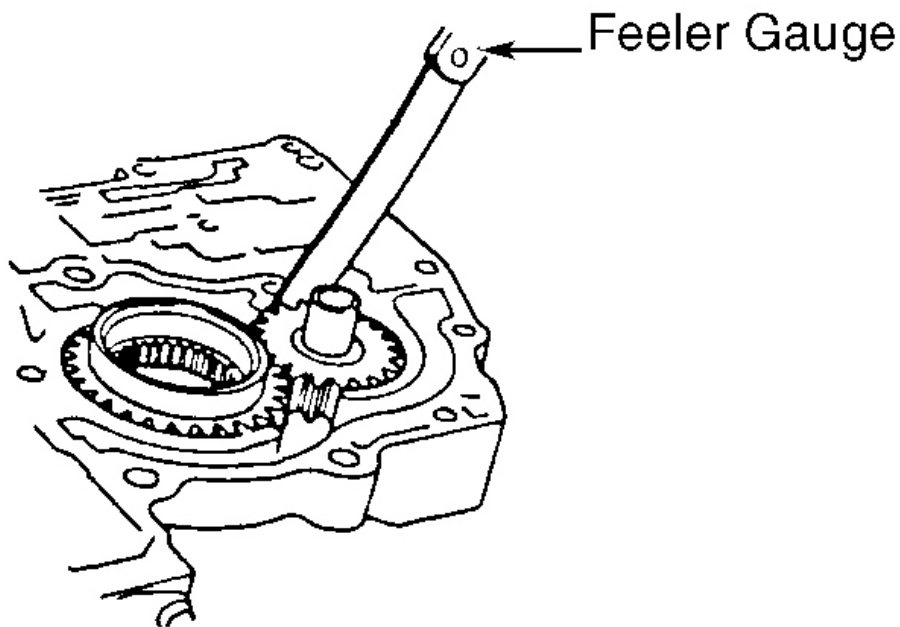
Reassembly

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

Oil Pump
Driven Gear



CHECKING THRUST CLEARANCE



CHECKING SIDE CLEARANCE

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Fig. 13: Measuring Oil Pump Clearances
Courtesy of AMERICAN HONDA MOTOR CO., INC.

SECONDARY VALVE BODY

CAUTION: Clutch Pressure Control (CPC) valve is installed in secondary valve body, behind lock bolt. See **Fig. 14** . DO NOT remove lock bolt. If CPC valve becomes frozen, replace secondary valve body assembly.

Disassembly

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

Cleaning & Inspection

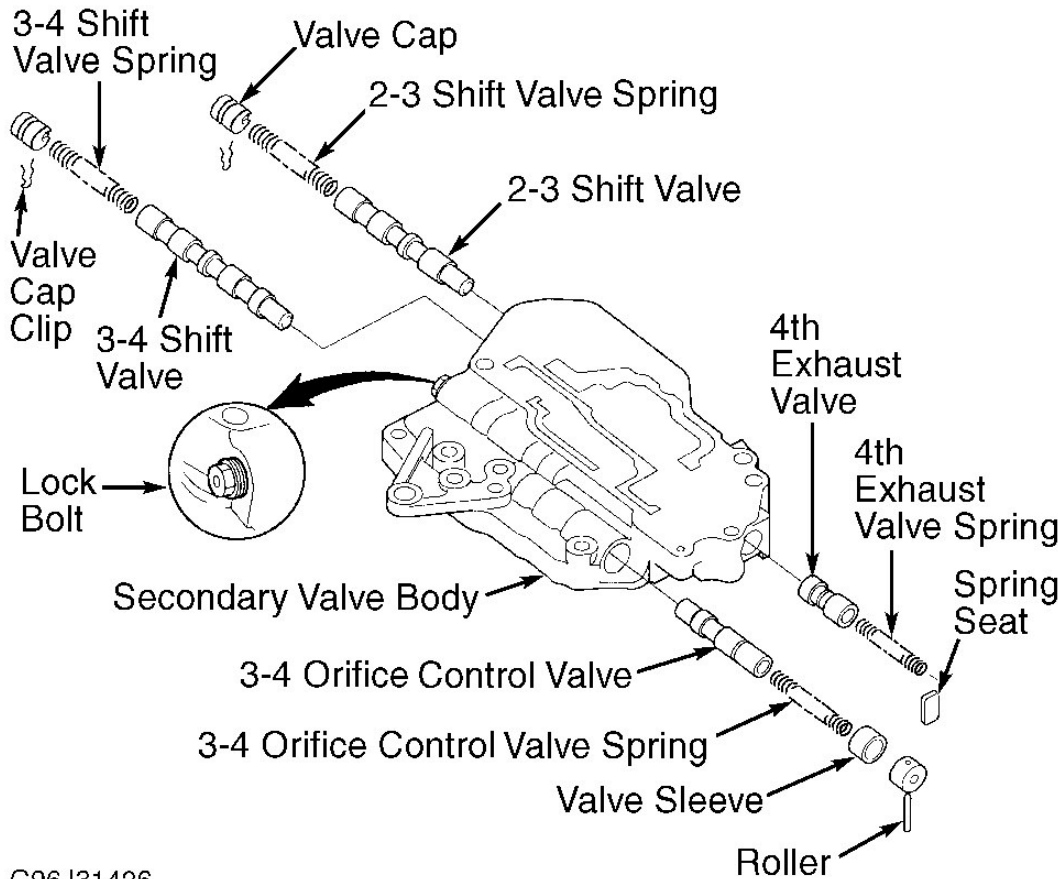
1. Clean components with solvent and dry with compressed air. Replace secondary valve body if any parts are worn or damaged.
2. Ensure all valves slide freely in their bores. If valves do not slide freely, polish burrs or rough areas using No. 600 sandpaper soaked for 30 minutes in ATF. Sandpaper can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

SECONDARY VALVE BODY SPRING SPECIFICATIONS

Application	Free Length - In. (mm)
2-3 Shift Valve Spring	2.244 (57.00)
3-4 Orifice Control Valve Spring	1.476 (37.50)
3-4 Shift Valve Spring	2.244 (57.00)
4th Exhaust Valve Spring	1.433 (36.40)

Reassembly

Coat all components and bores with ATF. To reassemble, reverse disassembly procedure. Ensure all components are installed in correct location. See **Fig. 14** .



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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 downward when removing stop bolt.

Disassembly

Hold regulator spring cap downward. Remove stop 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.

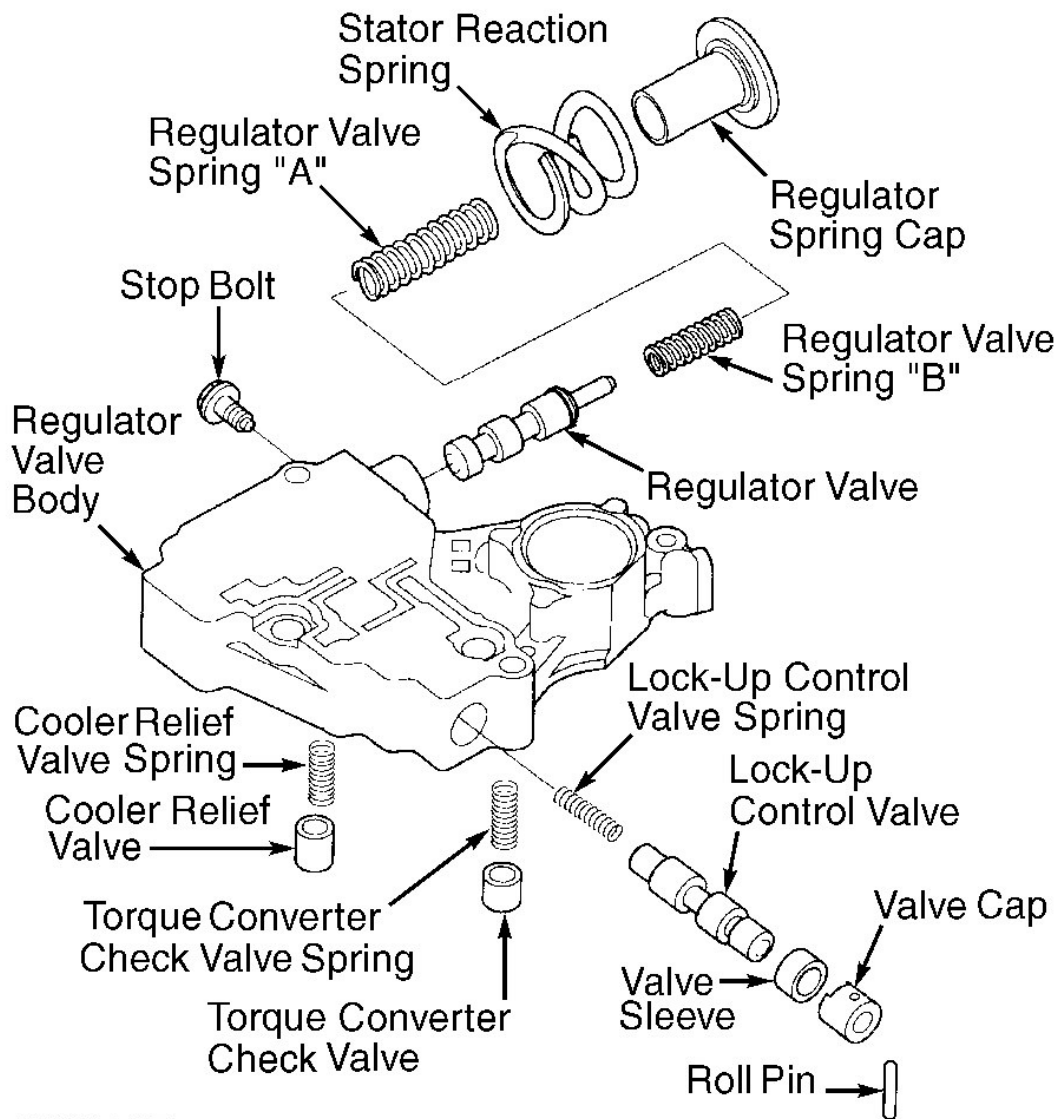
2. Ensure all valves slide freely in their bores. If valves do not slide freely, polish burrs or rough areas using No. 600 sandpaper soaked for 30 minutes in ATF. Sandpaper can be rolled into a tube shape for deburring valve bores. Thoroughly clean regulator valve body and components if polishing was needed.
3. Ensure spring free length is within specification. See **REGULATOR VALVE BODY SPRING SPECIFICATIONS** table. Replace springs if not within specification.

REGULATOR VALVE BODY SPRING SPECIFICATIONS

Application	Free Length - In. (mm)
Cooler Relief Valve Spring	1.331 (33.80)
Lock-Up Control Valve Spring	1.496 (38.00)
Regulator Valve Spring "A"	3.457 (87.80)
Regulator Valve Spring "B"	1.732 (44.00)
Stator Reaction Spring	1.193 (30.30)
Torque Converter Check Valve Spring	1.331 (33.80)

Reassembly

Coat all components and bores with ATF. To reassemble, reverse disassembly procedure. Align hole in regulator spring cap with hole in valve body, then press spring cap into valve body. Tighten stop bolt to specification. See **TORQUE SPECIFICATIONS** . Ensure all components are installed in correct location. See **Fig. 15** .



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

SERVO BODY

Disassembly

Disassemble servo body. See **Fig. 16** . Use care when removing accumulator piston snap rings, as they are under spring pressure.

Cleaning & Inspection

2000 Honda Civic EX

2000 AUTOMATIC TRANSMISSIONS Honda B4RA & S4RA Overhaul

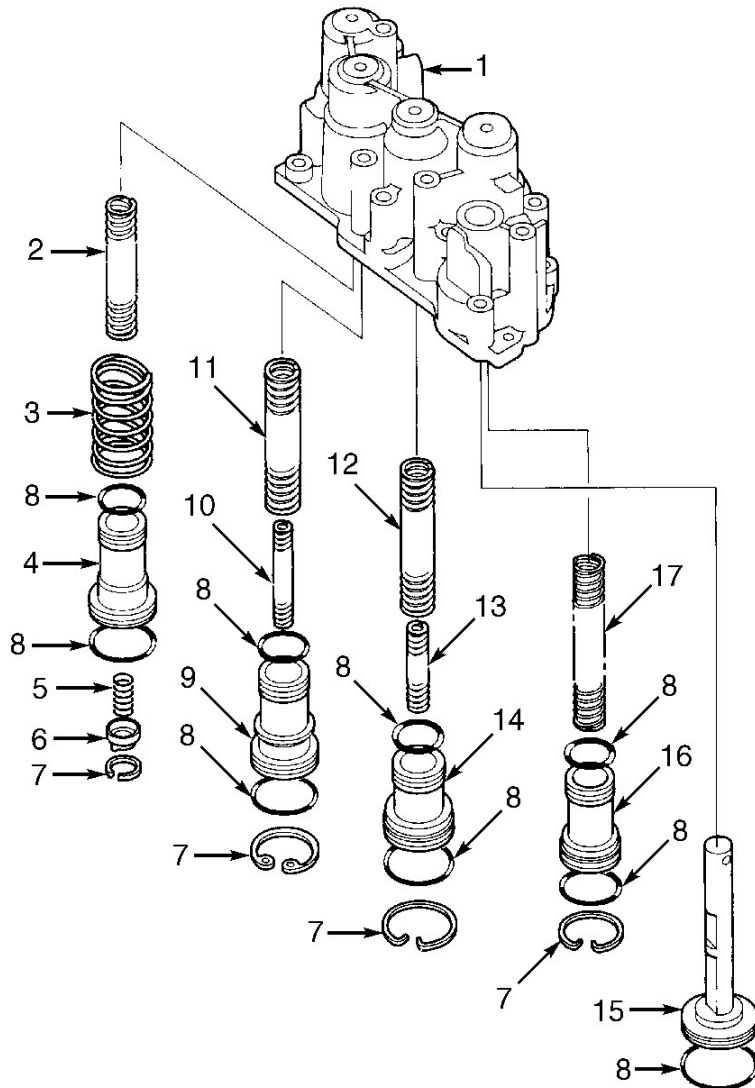
1. Clean components with solvent and dry with compressed air. Inspect for wear, scratches or scoring. Replace components if worn or damaged.
2. Ensure spring free length is within specification. See **SERVO BODY SPRING SPECIFICATIONS** table. Replace springs if not within specification.

SERVO BODY SPRING SPECIFICATIONS

Application	Free Length - In. (mm)
1st Accumulator Spring	3.508 (89.10)
2nd Accumulator Spring "A"	1.535 (39.00)
2nd Accumulator Spring "B"	.815 (20.70)
2nd Accumulator Spring "C"	2.677 (68.00)
3rd Accumulator Spring "A"	3.516 (89.30)
3rd Accumulator Spring "B"	1.382 (35.10)
4th Accumulator Spring "A"	3.425 (87.00)
4th Accumulator Spring "B"	2.031 (51.60)

Reassembly

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



- | | |
|-------------------------------|----------------------------------|
| 1. Servo Body | 10. 3rd Accumulator Spring "B" |
| 2. 2nd Accumulator Spring "C" | 11. 3rd Accumulator Spring "A" |
| 3. 2nd Accumulator Spring "A" | 12. 4th Accumulator Spring "A" |
| 4. 2nd Accumulator Piston | 13. 4th Accumulator Spring "B" |
| 5. 2nd Accumulator Spring "B" | 14. 4th Accumulator Piston |
| 6. Spring Retainer | 15. Servo Valve Shift Fork Shaft |
| 7. Snap Ring | 16. 1st Accumulator Piston |
| 8. "O" Ring | 17. 1st Accumulator Spring |
| 9. 3rd Accumulator Piston | |

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Fig. 16: Exploded View Of Servo Body

Courtesy of AMERICAN HONDA MOTOR CO., INC.

LOCK-UP VALVE BODY

Disassembly

Disassemble lock-up valve body. See **Fig. 17** .

Cleaning & Inspection

1. Clean components with solvent and dry with compressed air. Replace lock-up 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 for 30 minutes in ATF. Sandpaper can be rolled into a tube shape for deburring valve bores. Thoroughly clean lock-up valve body and components if polishing was needed.
3. Ensure spring free length is within specification. See **LOCK-UP VALVE BODY SPRING SPECIFICATIONS** table. Replace springs if not within specification.

LOCK-UP VALVE BODY SPRING SPECIFICATIONS

Application	Free Length - In. (mm)
Lock-Up Shift Valve Spring	2.902 (73.70)
Lock-Up Timing Valve Spring	3.177 (80.70)

Reassembly

Coat all components and bores with ATF. To reassemble, reverse disassembly procedure. Ensure all components are installed in correct location. See **Fig. 17** .

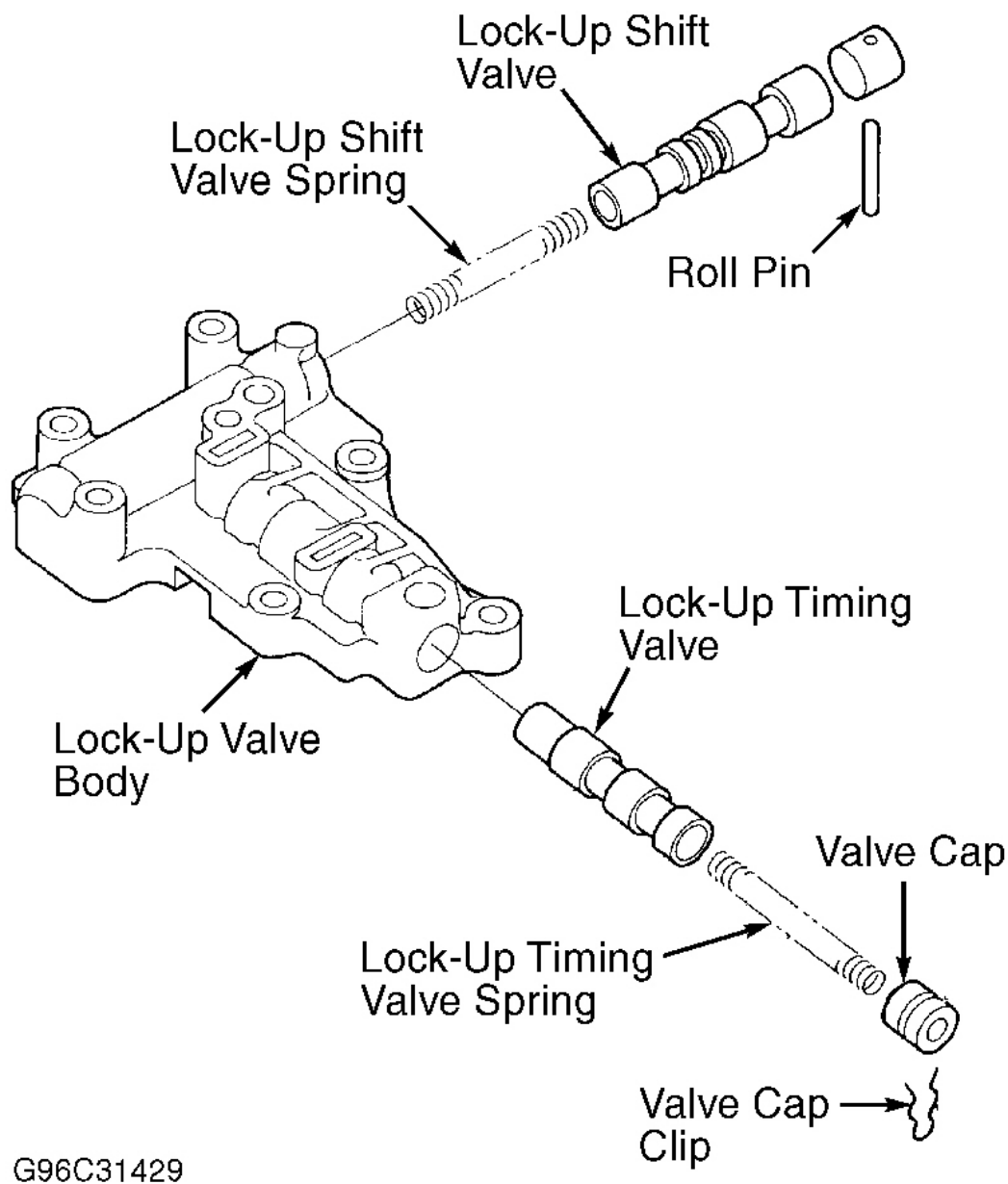


Fig. 17: Exploded View Of Lock-Up Valve Body
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

MAINSHAFT

NOTE: Mainshaft lock nut has left hand threads.

Disassembly

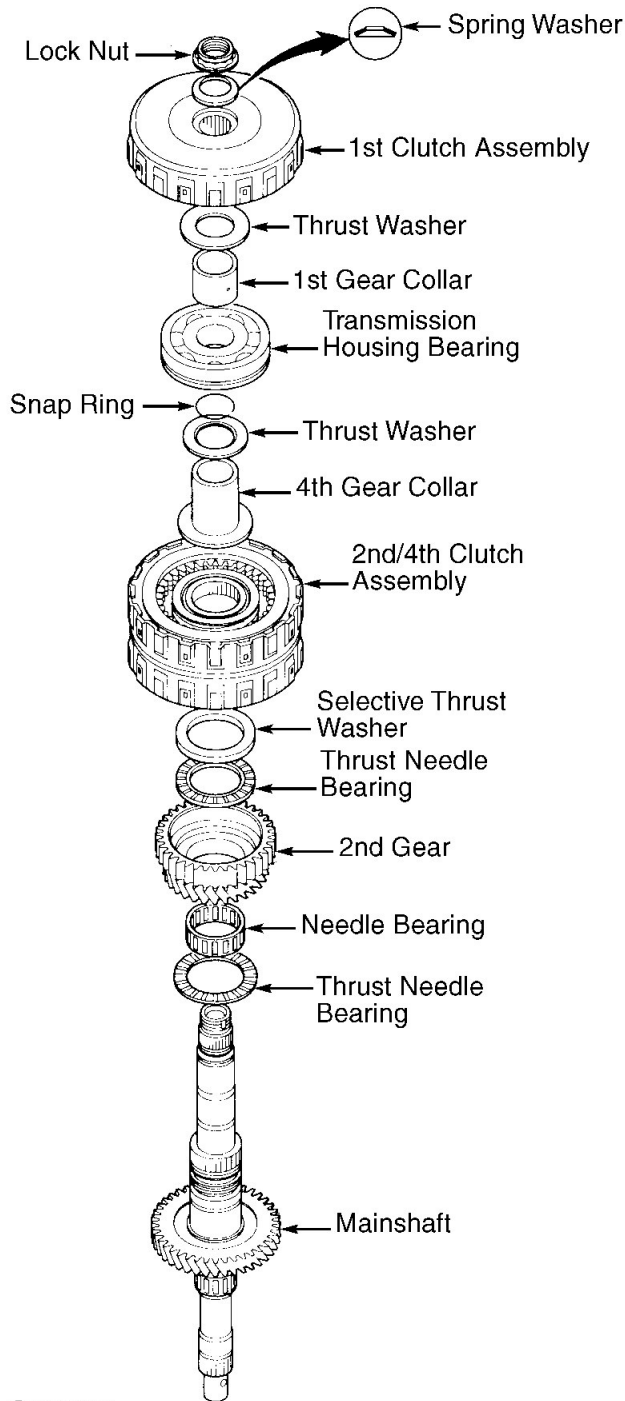
Note location of mainshaft components. See **Fig. 10** . Remove mainshaft components.

Cleaning & Inspection

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

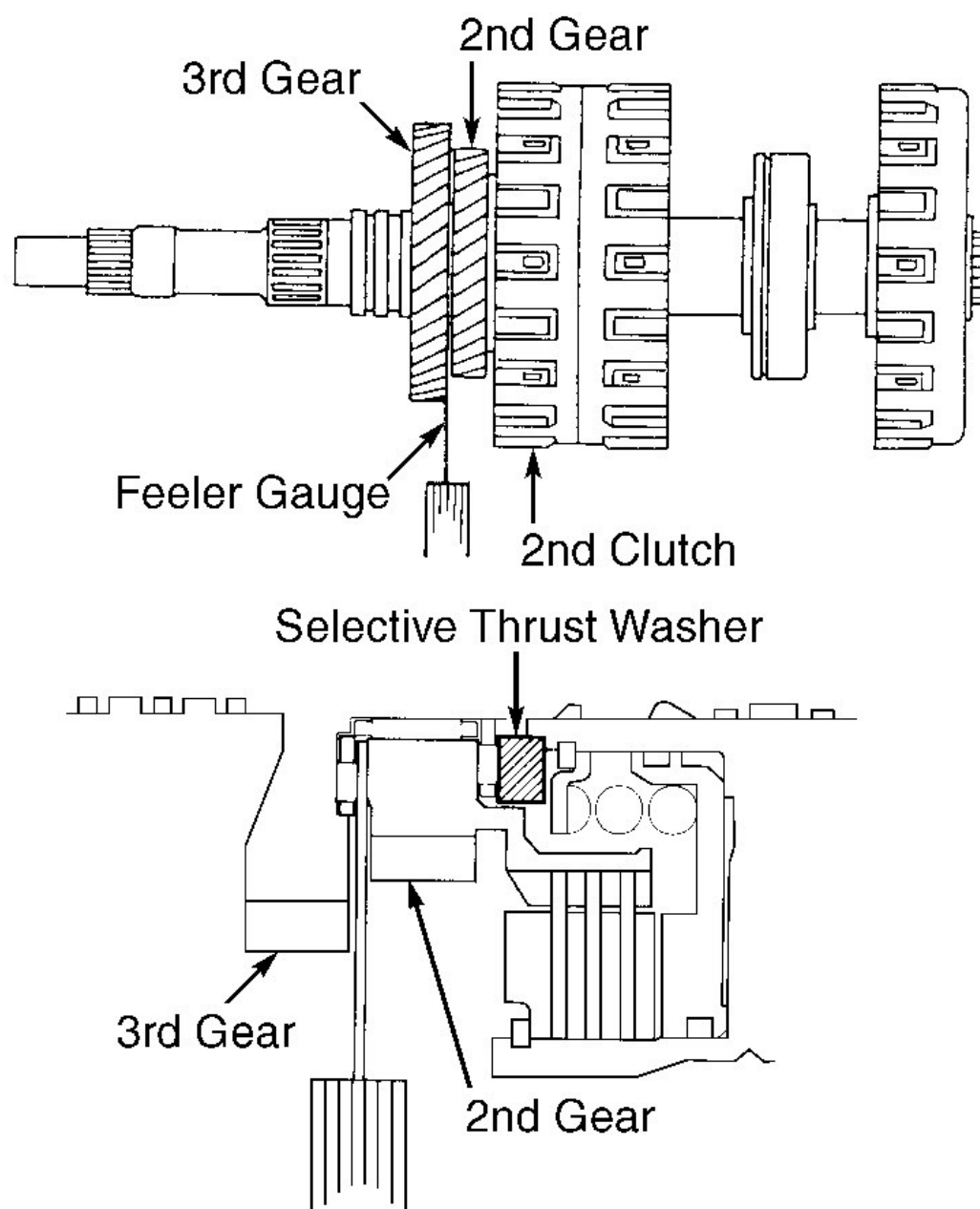
Reassembly

1. Remove mainshaft bearing from transaxle housing. Lubricate all components with ATF. Reassemble mainshaft components in illustration without "O" rings. Install mainshaft bearing removed from transaxle housing on mainshaft. See **Fig. 18** . Tighten mainshaft lock nut to 22 ft. lbs. (30 N.m).
2. Push 2nd gear towards 2nd clutch. Using a feeler gauge, measure clearance between 2nd and 3rd gear. See **Fig. 19** . Check mainshaft clearance at 3 places. Average the 3 readings to obtain mainshaft clearance.
3. Replace thrust shim if clearance is not .002-.005" (.05-.13 mm). Thrust shims range in thickness from .157" (4.00 mm) to .175" (4.45 mm) in .002" (.05 mm) increments. Install different thickness thrust shim (if necessary) and recheck clearance.
4. Lubricate all components with ATF. Reassemble mainshaft. See **Fig. 10** . Before installing NEW "O" rings on mainshaft, wrap splines on mainshaft with tape to prevent damage to "O" rings.



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Fig. 18: Identifying Mainshaft Components For Clearance Measurement
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 19: Checking Mainshaft Clearance

Courtesy of AMERICAN HONDA MOTOR CO., INC.

COUNTERSHAFT

NOTE: Countershaft lock nut has left hand threads.

Disassembly

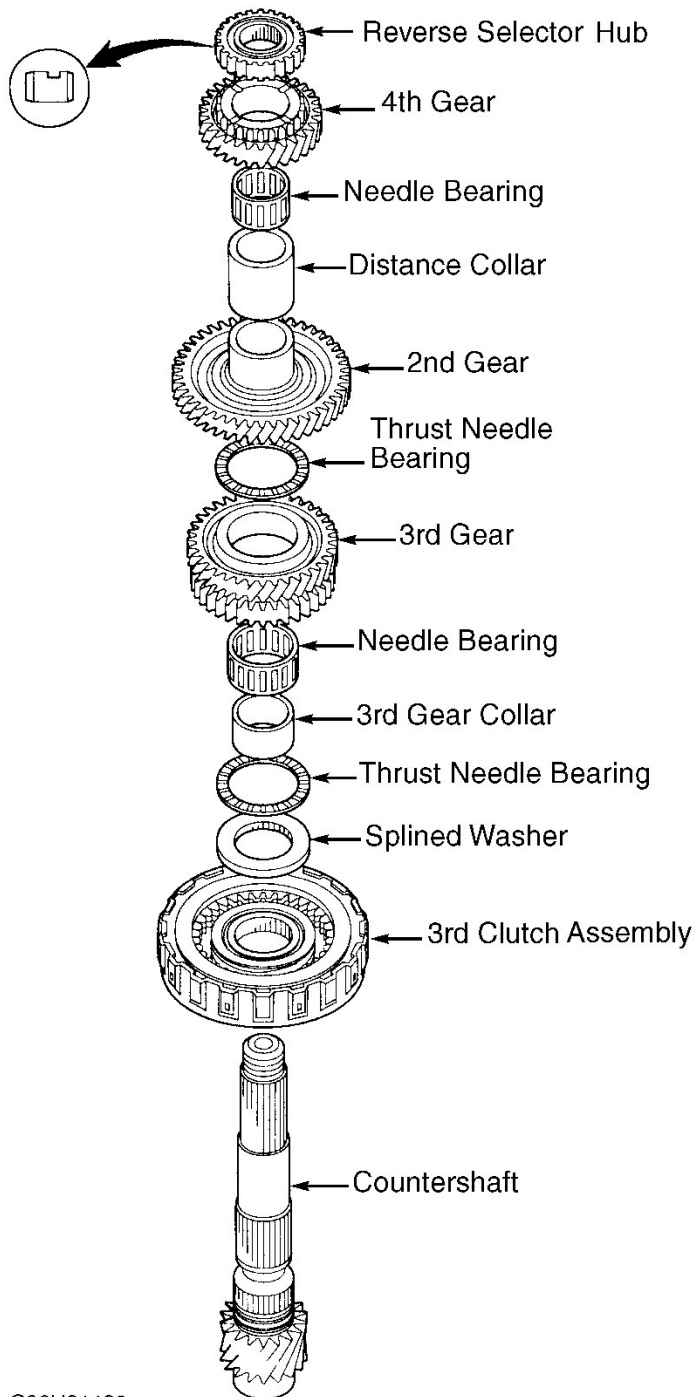
1. Note location of countershaft components. See **Fig. 20** and **Fig. 21** . Remove countershaft components down to reverse selector hub.
2. Place countershaft in hydraulic press while supporting 4th gear. Press countershaft from countershaft 4th gear. Disassemble remainder of countershaft assembly.

Cleaning & Inspection

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

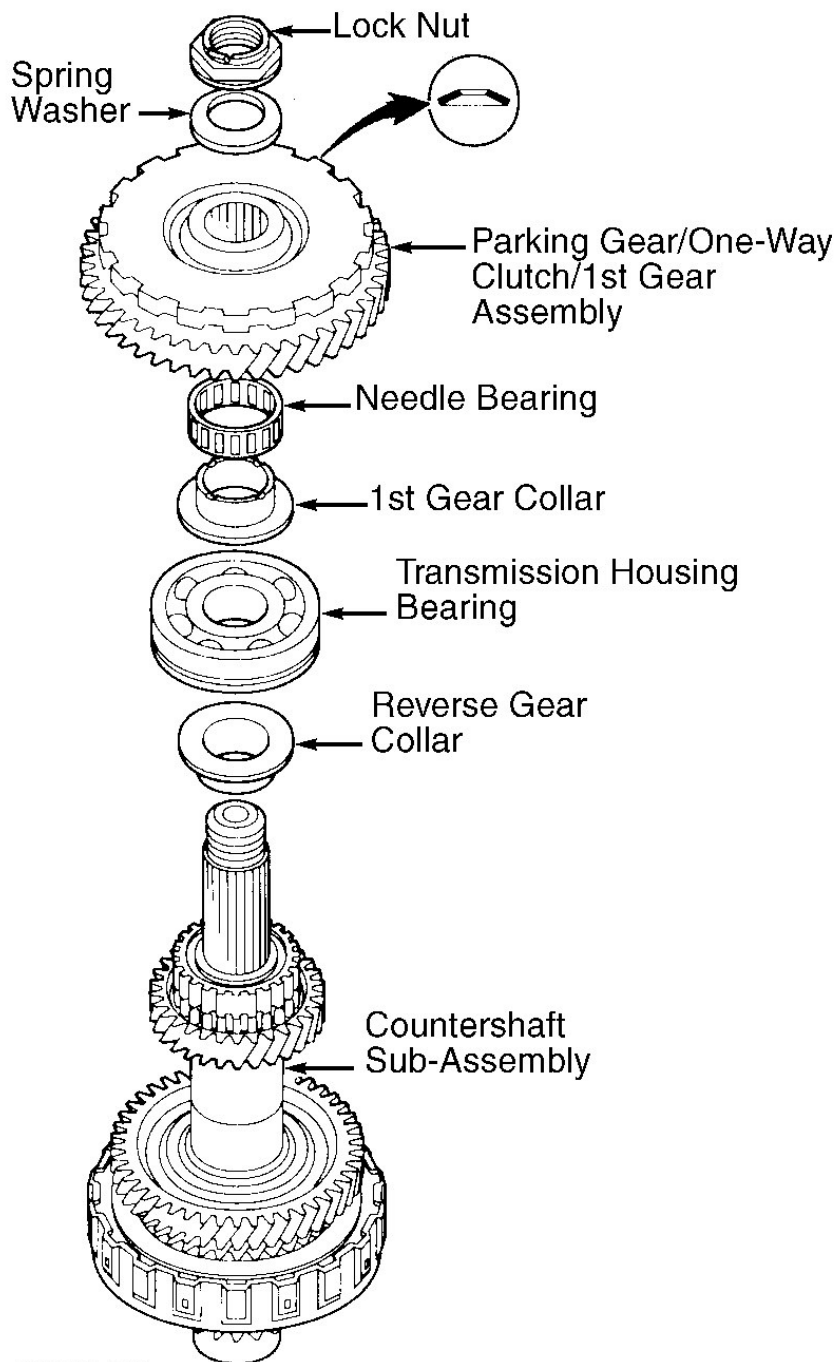
Reassembly

1. Lubricate all components with ATF. Reassemble countershaft components in illustration without "O" rings. See **Fig. 20** . Using hydraulic press, install reverse selector hub.
2. Remove countershaft bearing from transaxle housing. Install countershaft bearing removed from transaxle housing on countershaft with remaining components. See **Fig. 21** . Tighten countershaft lock nut to 22 ft. lbs. (30 N.m).
3. Using a feeler gauge, measure clearance between 2nd gear and distance collar. See **Fig. 22** . Check countershaft clearance at 3 places. Average the 3 readings to obtain countershaft clearance.
4. Ensure countershaft clearance is .004-.007" (.10-.18 mm). If clearance is not as specified, replace distance collar with appropriate collar. Distance collars range in thickness from 1.535" (39.00 mm) to 1.533" (38.95 mm) in .004" (.10 mm) increments. Install different thickness distance collar (if necessary) and recheck clearance.
5. Lubricate all components with ATF. Install all components from 3rd clutch assembly through reverse selector hub. See **Fig. 20** .
6. Before installing NEW "O" rings on mainshaft, wrap splines on countershaft with tape to prevent damage to "O" rings. Using hydraulic press, install reverse selector hub.



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Fig. 20: Countershaft Components For Clearance Measurement (1 Of 2)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 21: Countershaft Components For Clearance Measurement (2 Of 2)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

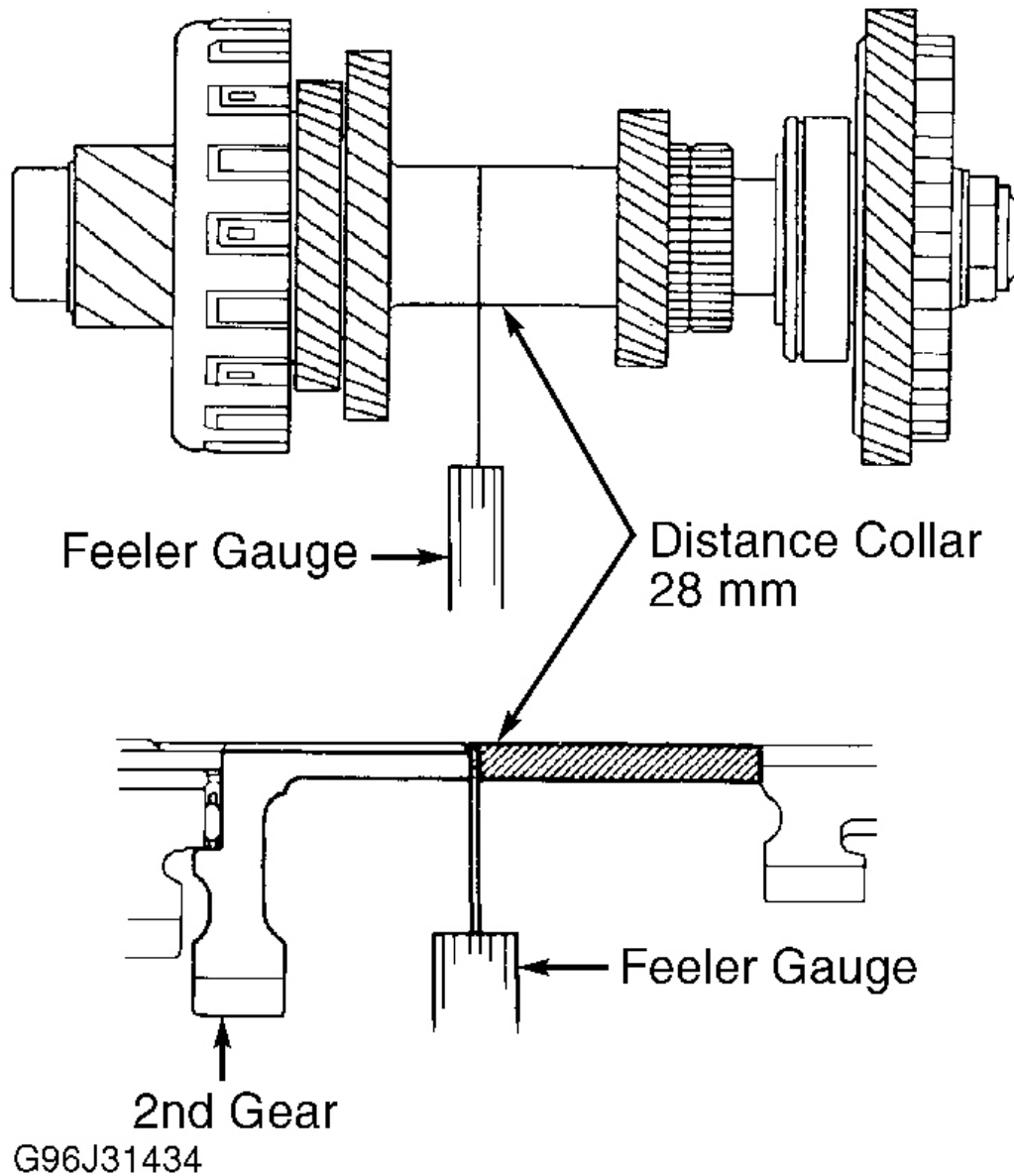


Fig. 22: Checking Countershaft Clearance

Courtesy of AMERICAN HONDA MOTOR CO., INC.

ONE-WAY CLUTCH

Disassembly

Separate countershaft 1st gear from parking gear by rotating parking gear counterclockwise while holding countershaft 1st gear. See **Fig. 23** . Remove one-way clutch by prying up with end of screwdriver. See **Fig. 24** .

Inspection

Check parking gear and 1st gear for wear and scoring. Check one-way clutch for damage and movement in wrong direction. One-way clutch should only turn in direction shown. See **Fig. 23**.

Reassembly

To reassemble, reverse disassembly procedure. Ensure one-way clutch is installed correctly. See **Fig. 24**. Check one-way clutch rotation. One-way clutch is defective if parking gear will rotate clockwise. See **Fig. 23**.

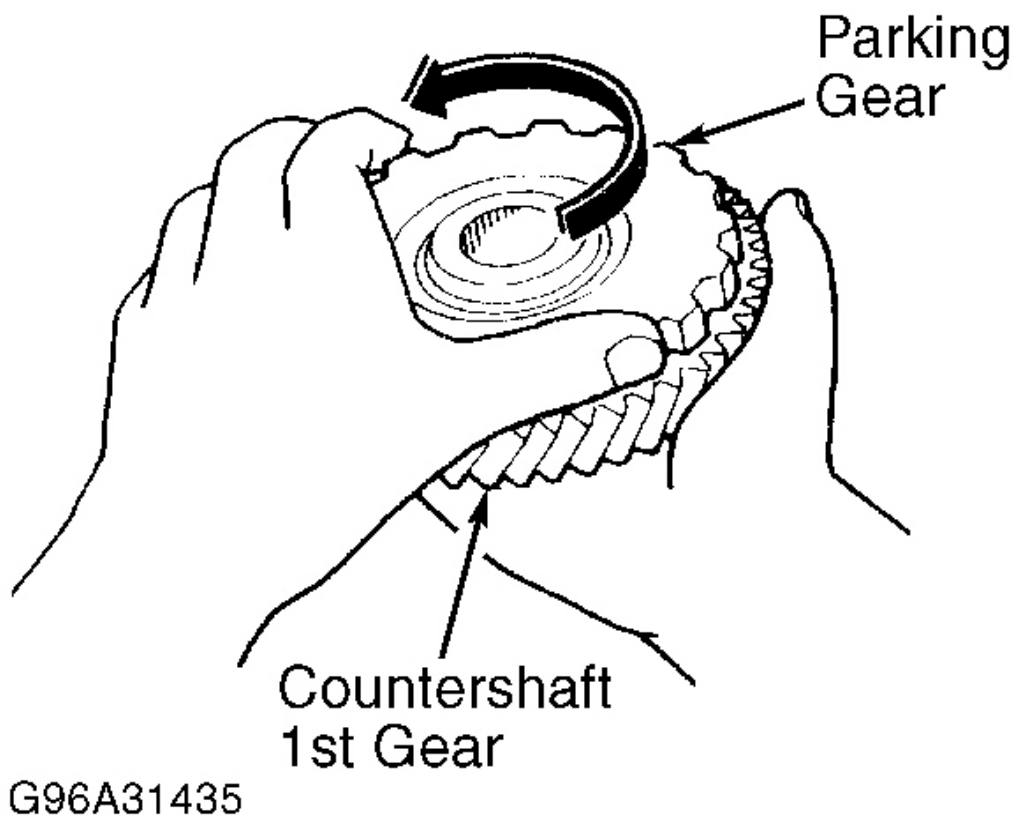
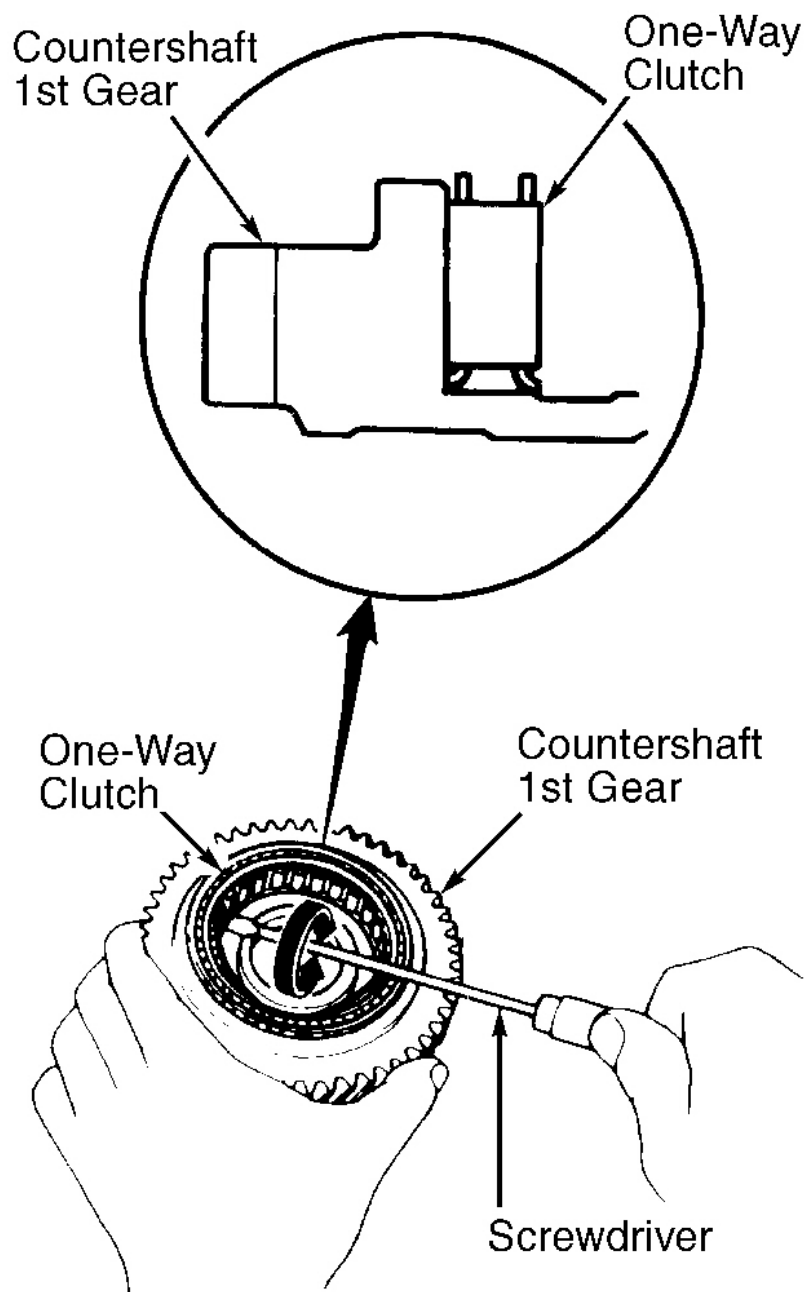


Fig. 23: Removing Parking Gear & Checking One-Way Clutch Operation
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 24: Removing & Installing One-Way Clutch
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CLUTCH ASSEMBLIES

Disassembly

1. Remove snap ring, clutch end plate, clutch discs and clutch plates. Note direction of disc spring installation. On all clutches except 2nd clutch, remove disc spring. The 2nd clutch is not equipped with a disc spring. See [Fig. 26](#) and [Fig. 27](#).

CAUTION: Ensure spring compressor fully contacts spring retainer. Spring compressor must be positioned as shown or damage will occur. See [Fig. 25](#).

2. Using spring compressor, compress return spring. Remove snap ring. Release and remove spring compressor. Remove spring retainer and return spring.
3. 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

Clean metal components with solvent and dry with compressed air. Ensure check valve on rear of clutch piston is thoroughly cleaned and securely fastened on clutch piston. Inspect components for damage and replace if necessary. Ensure no rough edges exist on "O" ring sealing areas.

Reassembly

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

1. Lubricate all components with ATF. Install NEW "O" rings. Install clutch piston in clutch drum. Slightly rotate clutch piston during installation to prevent damaging "O" rings.
2. Install return spring. Install spring retainer in clutch drum. Place snap ring on spring retainer. Using spring compressor, compress return spring. Install snap ring. Release and remove spring compressor.
3. Install disc spring (except 2nd clutch). Ensure disc spring is installed in proper direction. See [Fig. 26](#) and [Fig. 27](#).

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

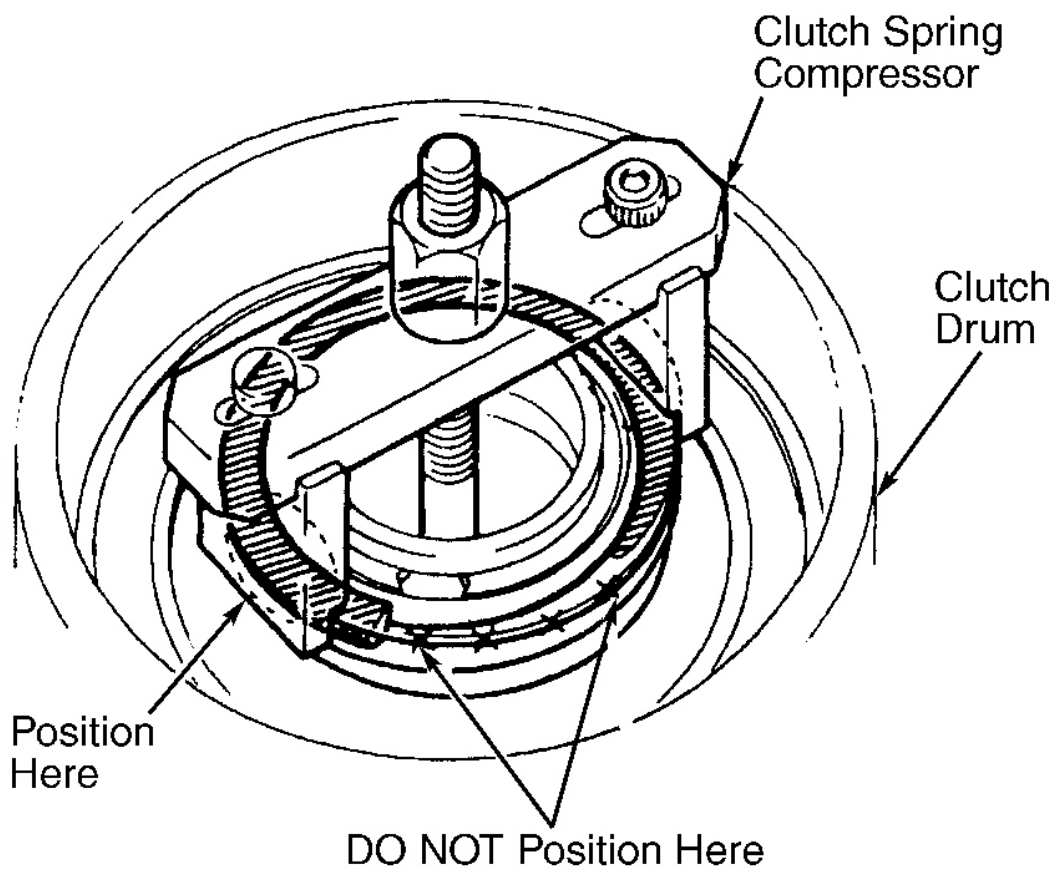
4. Alternately install clutch plates and clutch discs starting with clutch plate. Install clutch end plate with flat side toward clutch disc. Install snap ring.
5. Using dial indicator, measure clutch clearance between clutch end plate and top clutch disc. See [Fig. 28](#). Zero dial indicator with clutch end plate lowered, and then lift clutch end plate upward against snap ring. Measure clutch clearance at 3 different locations.

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

6. Ensure clutch clearance is within specification. See **CLUTCH CLEARANCE SPECIFICATIONS** table. If clutch clearance is not within specification, install different thickness clutch end plate. End plates range in thickness from .083" (2.10 mm) to .114" (2.90 mm) in .004" (.10 mm) increments.

CLUTCH CLEARANCE SPECIFICATIONS

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



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Fig. 25: Identifying Clutch Spring Compressor Placement
Courtesy of AMERICAN HONDA MOTOR CO., INC.

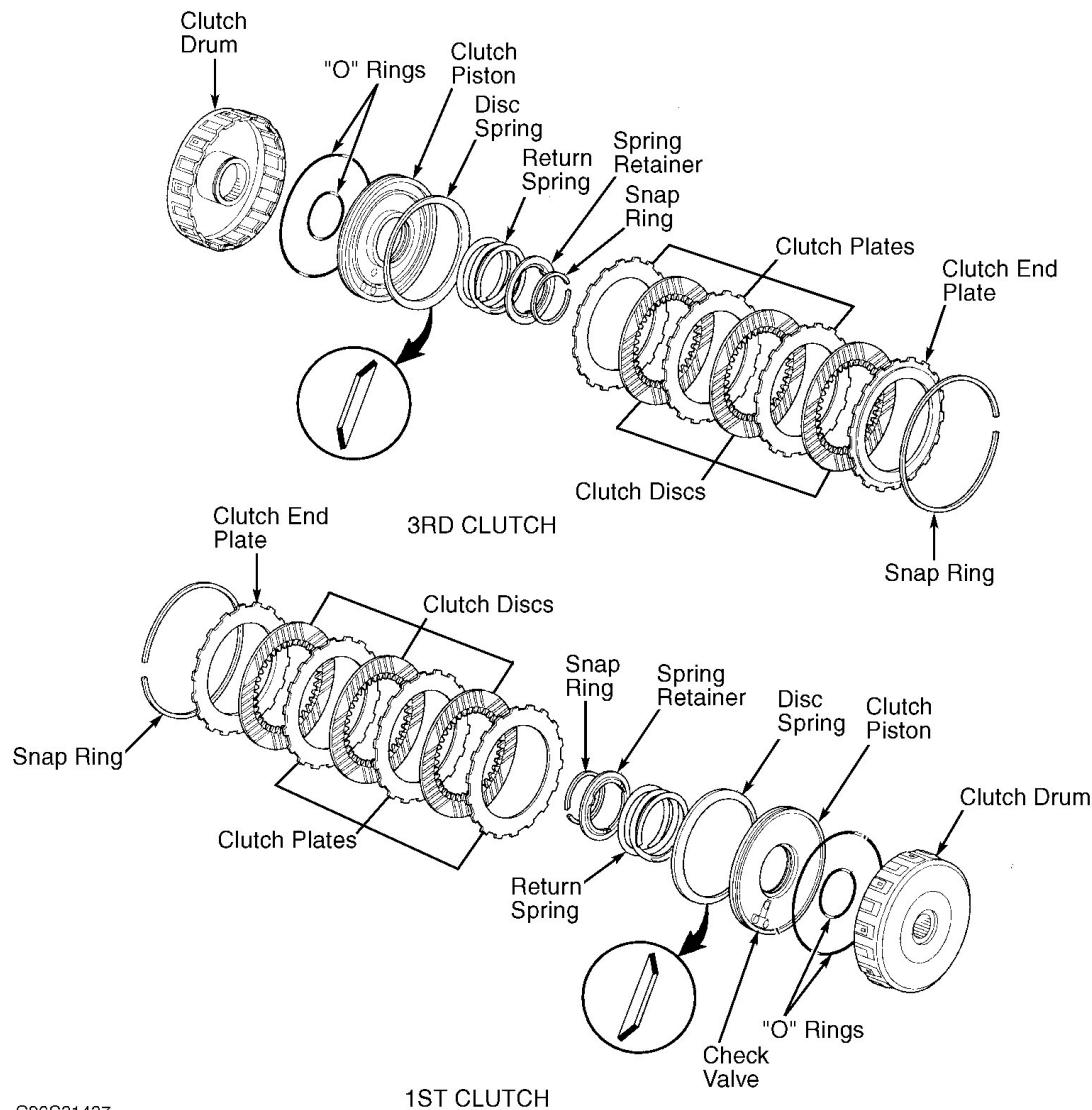
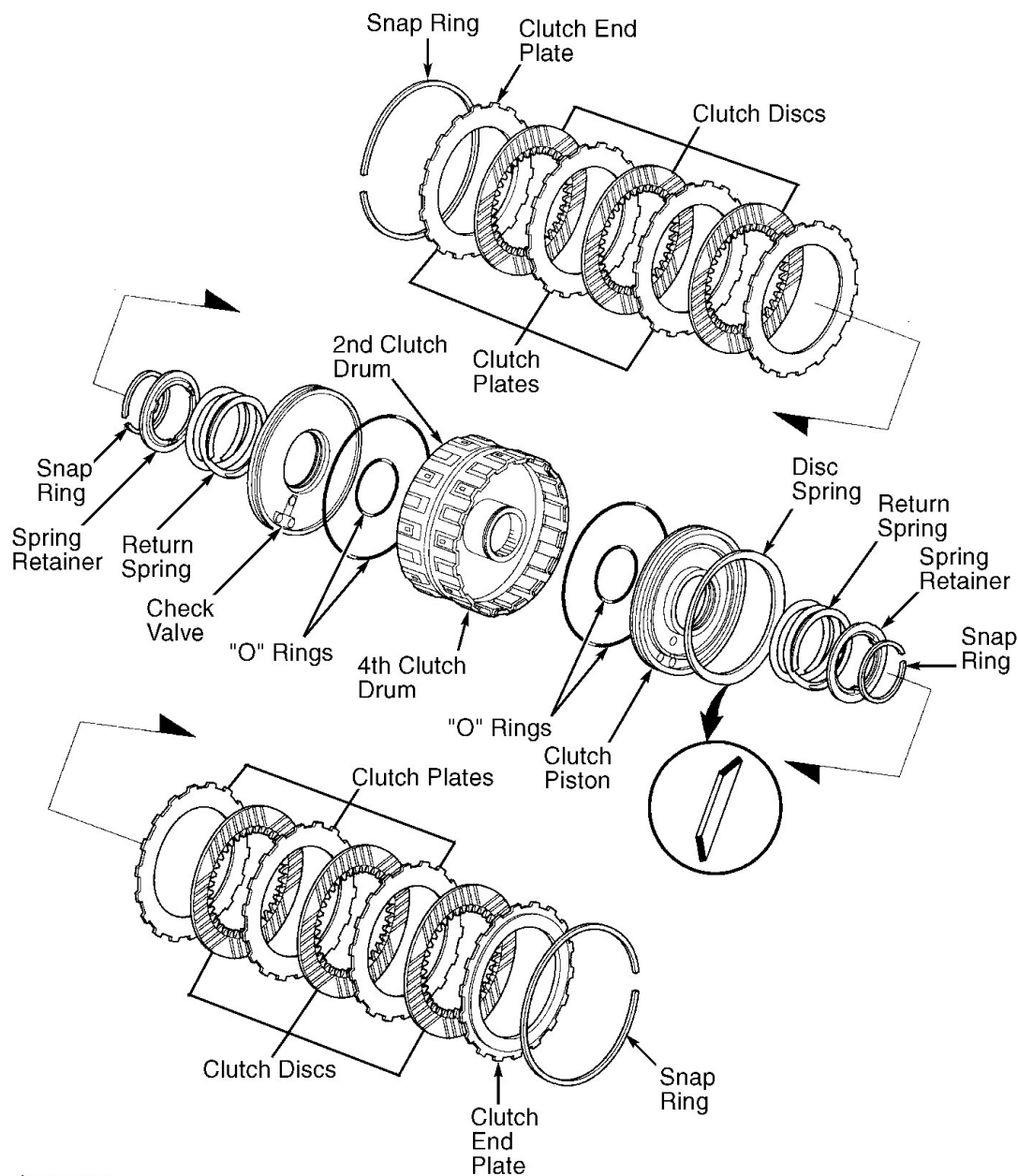
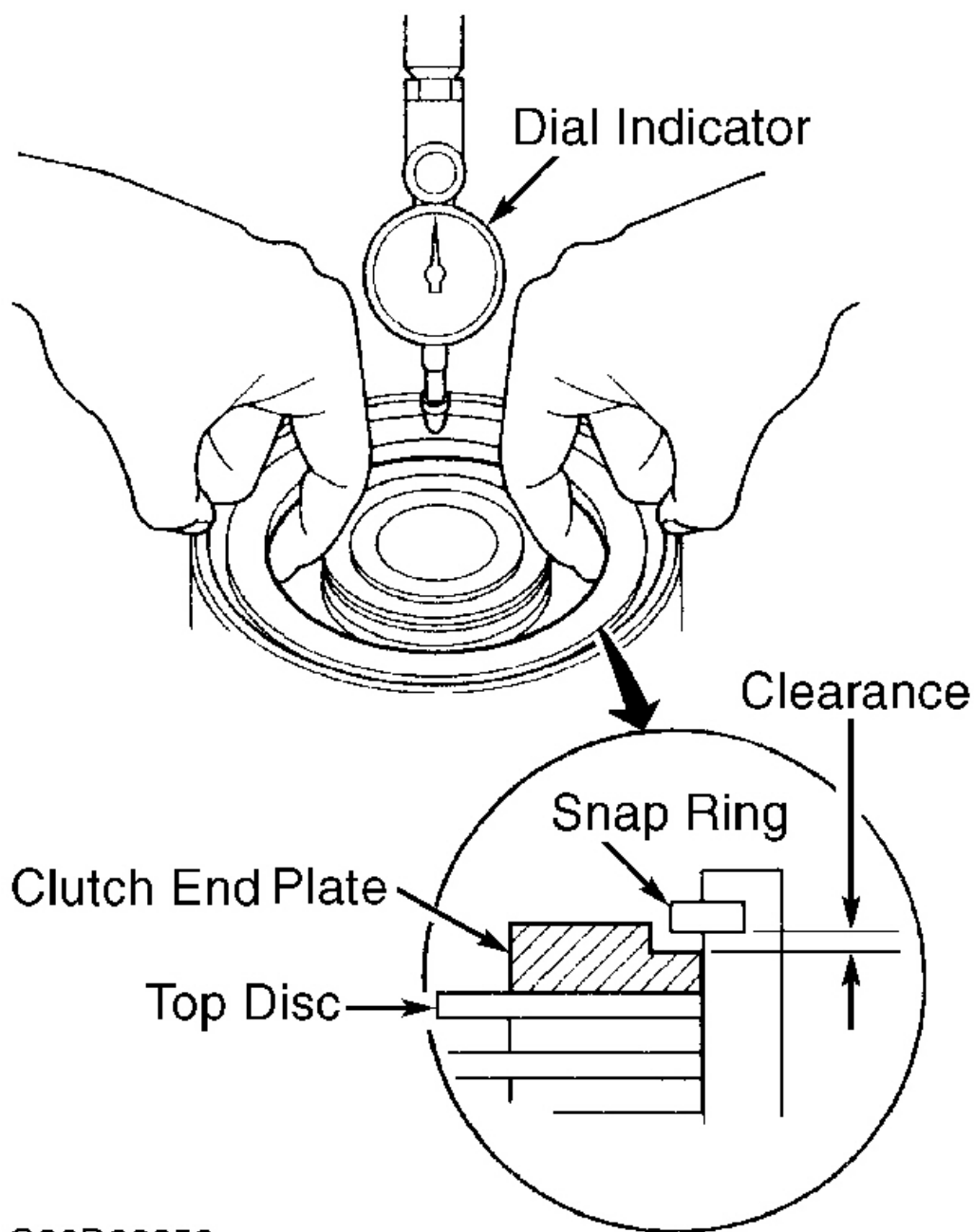


Fig. 26: Exploded View Of 1st Clutch & 3rd Clutch
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 27: Exploded View Of 2nd/4th Clutch Assemblies
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 28: Measuring Clutch Clearance

Courtesy of AMERICAN HONDA MOTOR CO., INC.

TORQUE CONVERTER HOUSING

Disassembly

If removing countershaft bearing from torque converter housing, use slide hammer to remove countershaft bearing. Remove oil guide plate from bore in torque converter housing. See **Fig. 12** . Remove mainshaft bearing and oil seal using slide hammer.

Cleaning & Inspection

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

Reassembly

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

TRANSAXLE HOUSING

NOTE: **DO NOT remove snap rings from transaxle housing unless necessary for cleaning snap ring groove. Expand snap ring enough to push bearing out.**

Disassembly

1. Expand snap ring. Press mainshaft and countershaft bearings from transaxle housing. Using hammer and drift, tap differential oil seal from transaxle housing.
2. Remove reverse idler gear shaft assembly. Slide reverse idler gear from transaxle housing. See **Fig. 29** .

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

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

1. To install mainshaft and countershaft bearings, expand snap ring and install bearing part of the way into

transaxle housing. Release snap ring.

2. Press bearing into transaxle housing until snap ring engages with groove on bearing. Ensure snap ring end gap is 0-.28" (0-7 mm). If snap ring end gap is not within specification, re-seat or replace snap ring.
3. To install reverse idle gear, slide reverse idle gear into transaxle housing until it aligns with shaft hole. Install reverse idle gear shaft assembly and needle bearing. See **Fig. 29** . Tighten bolts to specification. See **TORQUE SPECIFICATIONS** .

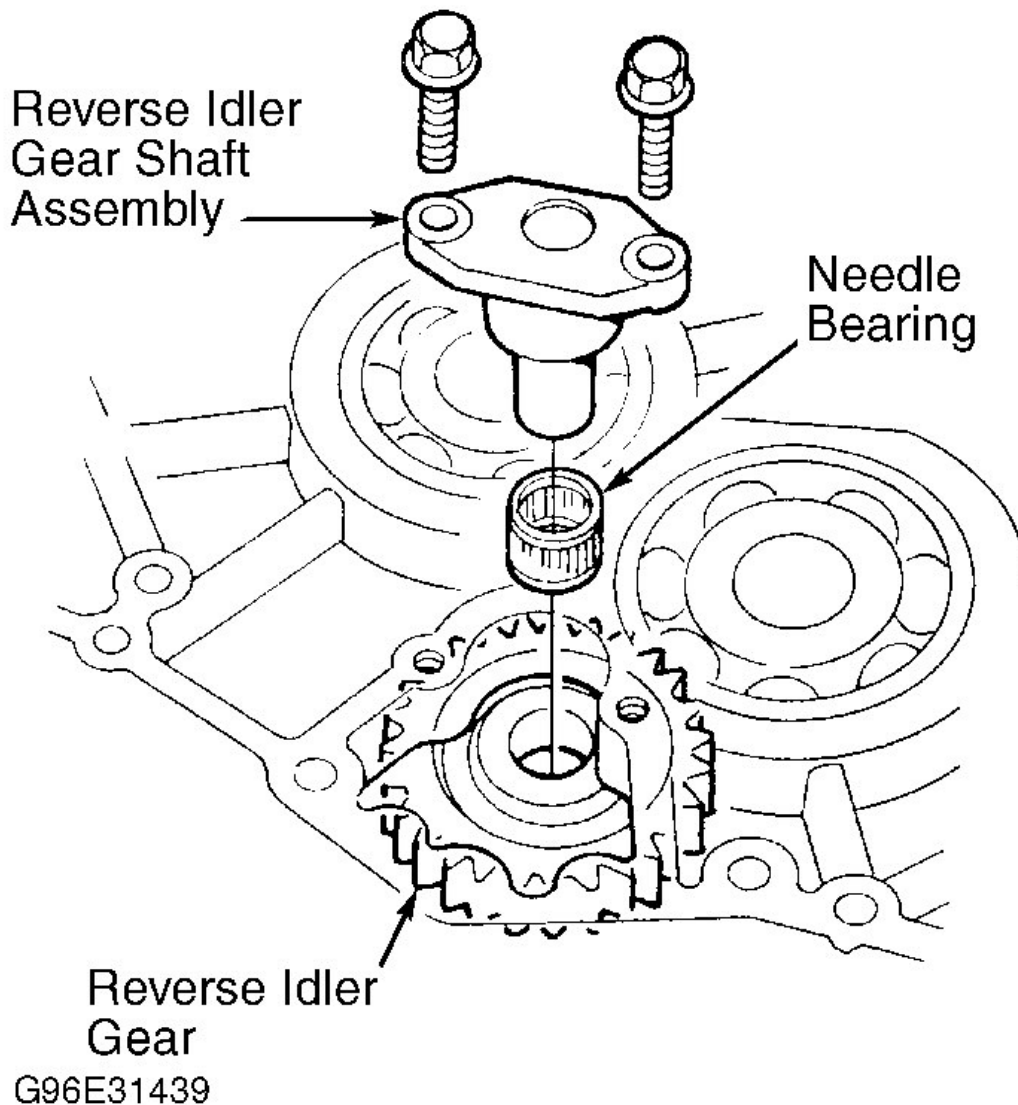


Fig. 29: Removing & Installing Idler Gear Shaft Assembly & Components
Courtesy of AMERICAN HONDA MOTOR CO., INC.

DIFFERENTIAL ASSEMBLY

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** .

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. 30** . Check side gear backlash. Side gear backlash should be .002-.006" (.05-.15 mm). If side gear backlash is not within specification, replace differential carrier assembly.

NOTE: **Ring gear bolts have left-hand threads.**

3. If replacing bearings, use bearing puller to remove bearings from differential carrier. To replace differential carrier assembly, remove bolts and ring gear. Pry speedometer drive gear snap ring off differential carrier. Pull speedometer drive gear and roll pin from carrier assembly. See **Fig. 31** .
4. Drive out differential seals from transaxle and converter housings from inside to outside. Remove set ring from transaxle housing. See **Fig. 10** .

Cleaning & Inspection

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

Reassembly

1. Install speedometer drive gear roll pin. Install speedometer drive gear with chamfered side facing carrier. Align cutout in speedometer drive gear with roll pin.
2. Align speedometer drive gear snap ring hooked end with pinion shaft. See **Fig. 32** . Install snap ring in differential carrier groove.

CAUTION: Ring gear must be installed with chamfered edge on inside of ring gear toward differential carrier.

3. Install ring gear on differential carrier. See **Fig. 31** . Install and tighten ring gear bolts in crisscross pattern to specification. See **TORQUE SPECIFICATIONS** .
4. Press NEW bearings onto differential carrier (if removed). Install set ring in transaxle housing. See **Fig. 10** . Do not install oil seal until differential side bearing clearance has been checked. See **DIFFERENTIAL BEARING SIDE CLEARANCE** .

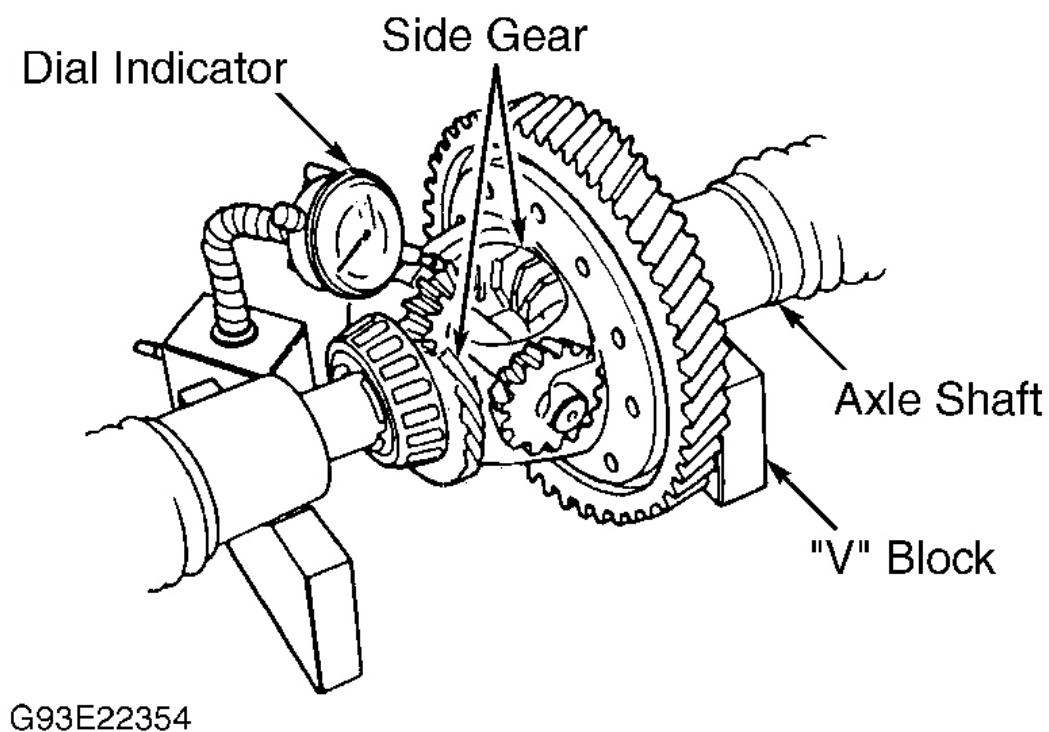
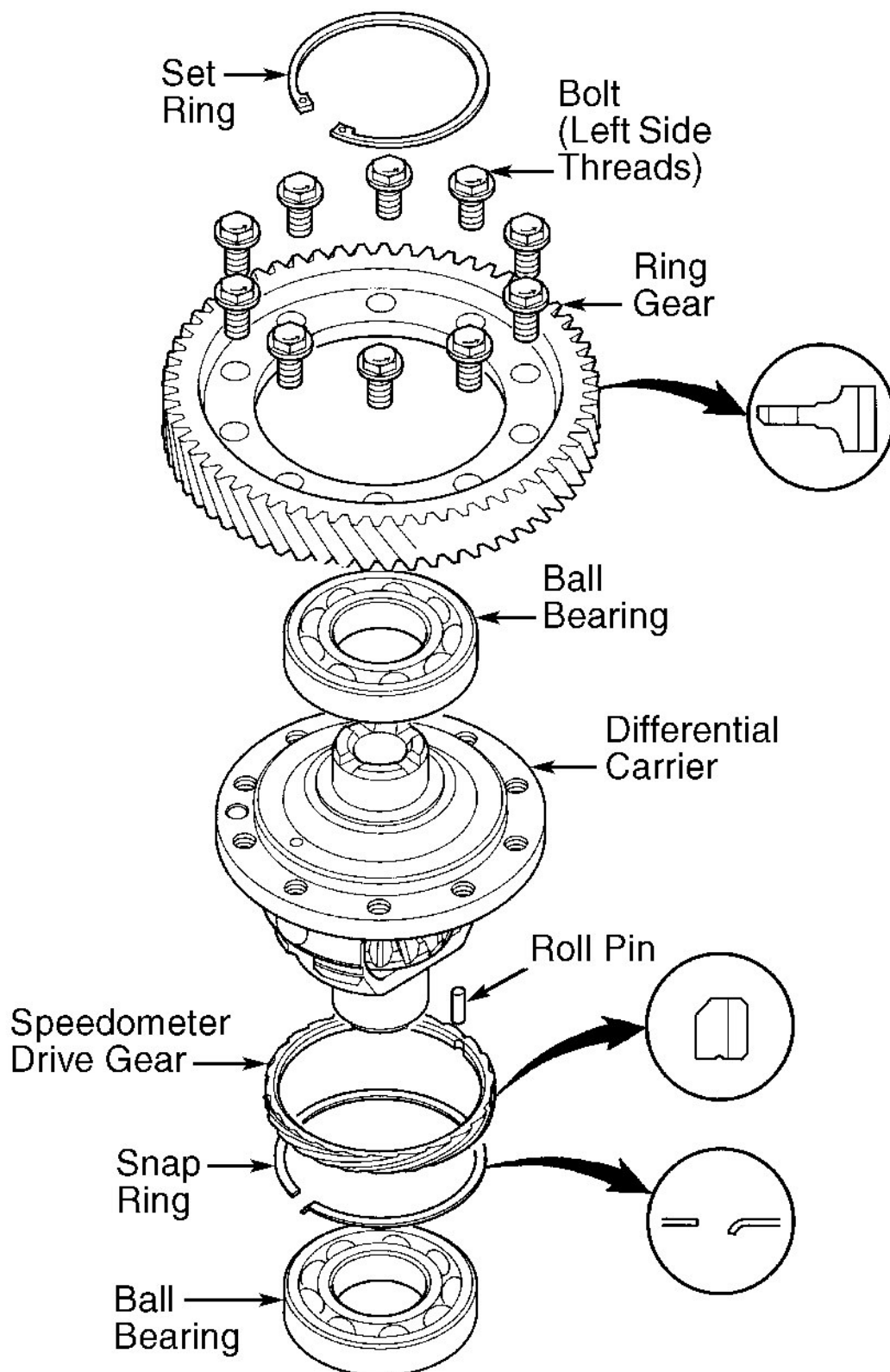


Fig. 30: Checking Side Gear Backlash

Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 31: Exploded View Of Differential Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

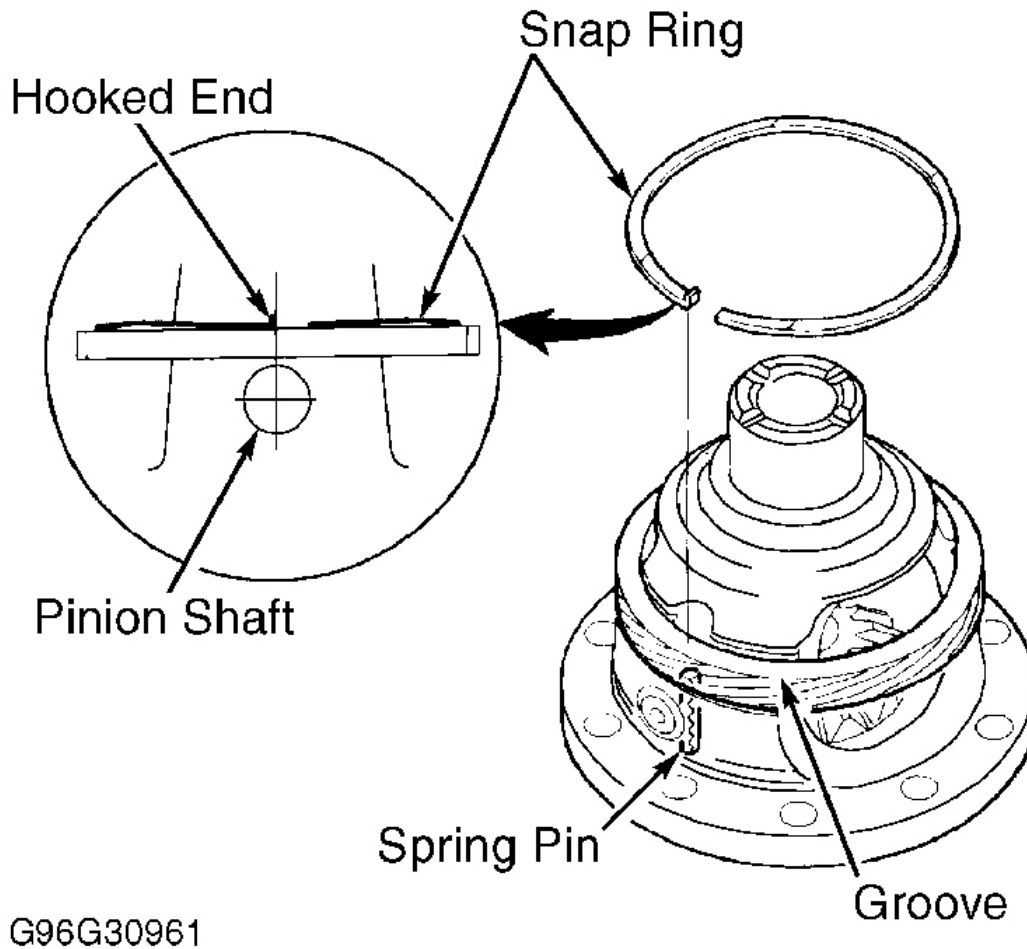


Fig. 32: Installing Speedometer Drive Gear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 set ring into transaxle housing. See **Fig. 10** . Ensure set ring is fully seated.
2. Tap differential assembly into torque converter housing using Driver (07746-0030100). See **Fig. 33** . Ensure differential bearing is fully seated in torque converter housing.

3. Install gasket and transaxle housing onto torque converter housing. Install and tighten transaxle housing bolts to 33 ft. lbs. (45 N.m) in 2 steps using proper sequence. See **Fig. 34**.
4. Using driver, tap on transaxle housing side of differential assembly to fully seat differential. See **Fig. 33**.
5. Using feeler gauge, measure differential bearing side clearance between set ring and bearing on transaxle housing. See **Fig. 35**. Replace set ring if differential bearing side clearance exceeds .006" (.15 mm). Set rings range in thickness from .098" (2.50 mm) to .118" (3.0 mm) in .004" (.10 mm) increments. Recheck differential bearing side clearance. Remove transaxle housing and differential assembly.

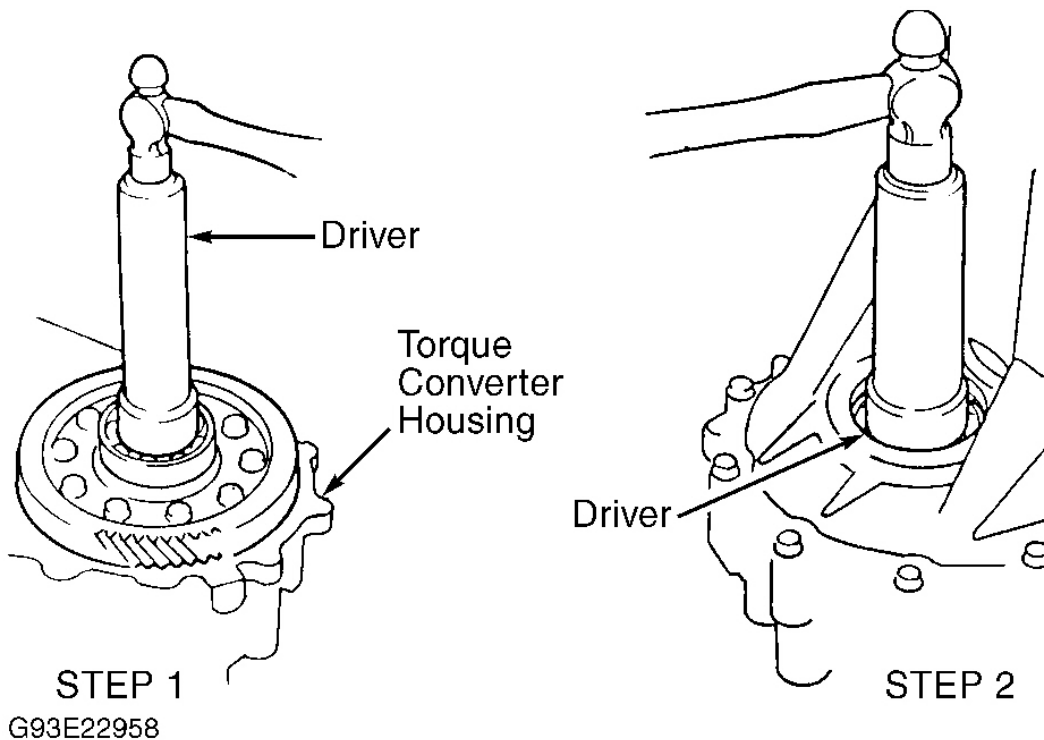
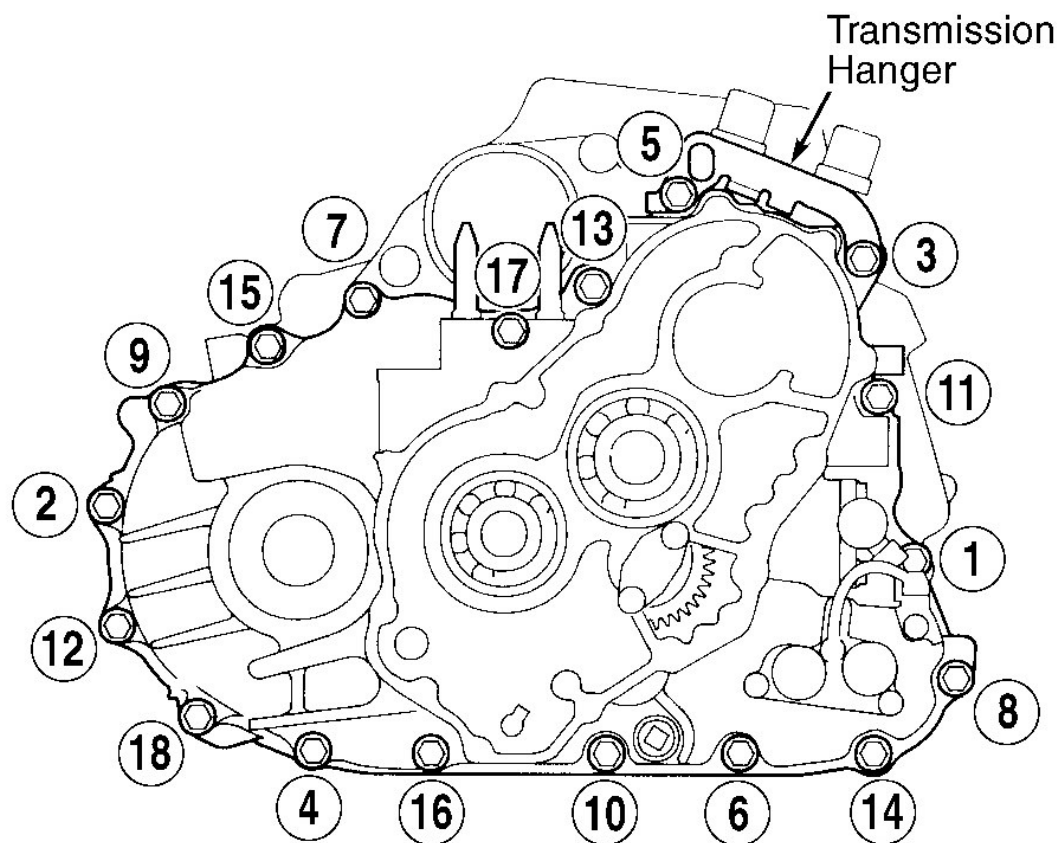
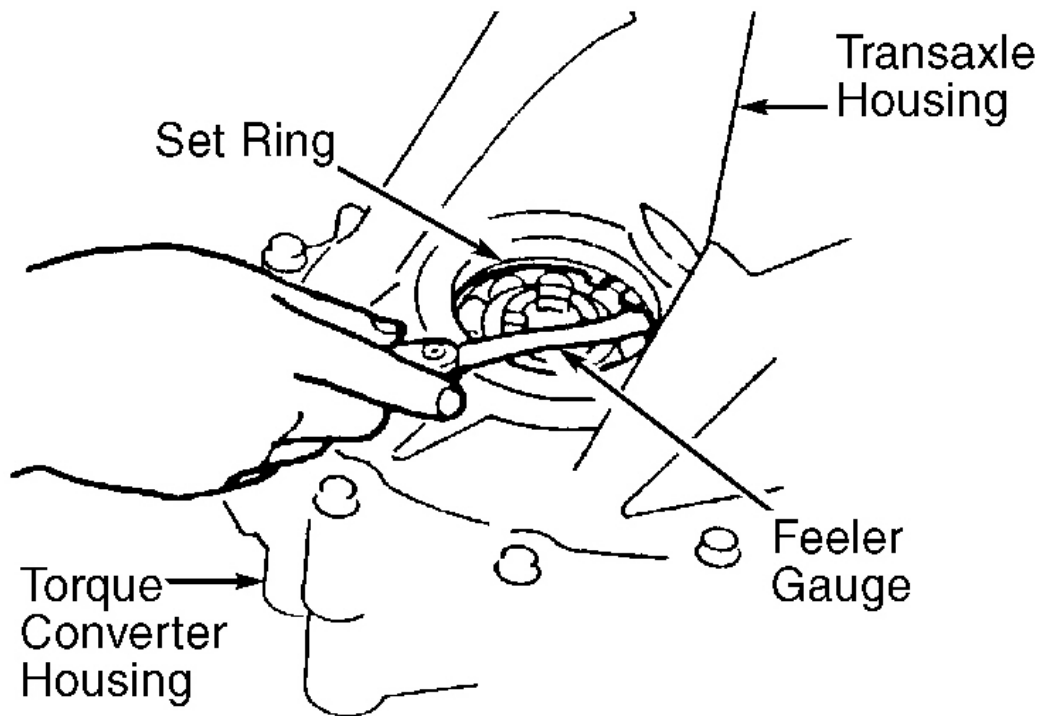


Fig. 33: Installing Differential Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 34: Transaxle Housing Bolt Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 35: Checking Differential Bearing Side Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TRANSAXLE REASSEMBLY

CAUTION: If transaxle housing, torque converter housing, differential carrier or differential carrier bearings are replaced, differential assembly bearing side clearance must be checked. See **DIFFERENTIAL ASSEMBLY** under **COMPONENT DISASSEMBLY & REASSEMBLY**.

NOTE: Coat all components with ATF before reassembly.

1. Install needle bearing on end of reverse idler gear shaft holder. Install reverse idler gear into transaxle housing (if removed). Install reverse idler gear shaft holder onto transaxle housing. Install and tighten reverse idler gear shaft holder bolts to specification. See **TORQUE SPECIFICATIONS**.
2. Install magnet and suction pipe collar into torque converter housing. See **Fig. 11**. Install dowel pins and separator plate for main valve body onto torque converter housing.

NOTE: Ensure oil pump driven gear is installed with groove and chamfered side

facing downward (toward main separator plate).

3. Install oil pump drive gear, oil pump driven gear and oil pump driven gear shaft. Install main valve body. Install and loosely tighten 5 main valve body bolts.
4. Ensure check balls are installed in main valve body. See **Fig. 12** . Install separator plate, dowel pins and secondary valve body onto main valve body. DO NOT install bolts.
5. Install control shaft into torque converter housing with control shaft and manual valve together. Install detent arm and detent arm shaft onto main valve body. Hook detent spring onto detent arm.

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 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. Install separator plate and servo body. Install and tighten bolts to specification. See **TORQUE SPECIFICATIONS** . Install fluid strainer. Tighten main valve body bolts to specification. Ensure oil pump gears rotate smoothly and oil pump driven gear shaft moves freely.
7. Install stator shaft, NEW "O" ring and stop shaft. Install stop shaft and bolts on secondary valve body. Tighten secondary valve body bolts to specification.
8. Install torque converter check valve, cooler relief valve and springs into regulator valve body. Install regulator valve body onto main valve body. Install and tighten bolt to specification.
9. Install lock-up valve body onto regulator valve body. Install and tighten bolts to specification. **TORQUE SPECIFICATIONS** . Install oil feed pipes into main valve body, secondary valve body and servo body. See **Fig. 11** .
10. Install differential assembly into torque converter housing. Using Driver (07746-0030100), tap differential assembly into torque converter housing. See **Fig. 33** . Ensure differential carrier bearing is fully seated in torque converter housing.
11. Install mainshaft and countershaft assemblies into torque converter housing. See **Fig. 9** . Rotate shift fork shaft so large chamfered hole aligns with hole in reverse shift fork.
12. Install reverse shift fork and reverse selector. See **Fig. 10** . Install reverse shift fork bolt and NEW bolt lock. Tighten bolt to specification. Bend tabs over on bolt lock.
13. Install needle bearing, countershaft reverse gear and countershaft reverse gear collar onto countershaft. See **Fig. 10** . Align spring pin on control shaft with groove on transaxle housing by rotating control shaft. See **Fig. 8** .

CAUTION: Ensure mainshaft speed sensor is not installed in transaxle housing before installing transaxle housing onto torque converter housing.

14. Install dowel pins, NEW gasket, transaxle housing and transaxle hanger onto torque converter housing. Install and tighten transaxle housing bolts to specification in 2 steps in correct sequence. See **Fig. 34** . See **TORQUE SPECIFICATIONS** .
15. Install mainshaft holder onto mainshaft. See **Fig. 7** . Install parking brake lever with parking brake stop and parking brake lever spring onto control shaft. See **Fig. 8** .

16. Assemble countershaft 1st gear, parking gear and one-way clutch. See **Fig. 24** . Install countershaft 1st gear collar, needle bearing and countershaft 1st gear with one-way clutch and parking gear onto countershaft.
17. Install parking pawl stop, parking pawl shaft, parking pawl spring and parking pawl onto transaxle housing.
18. Engage parking pawl with parking gear. Install mainshaft 1st gear collar onto mainshaft. Wrap splines on mainshaft with tape. Install NEW "O" rings onto mainshaft.
19. Install thrust washer, thrust needle bearing, needle bearing and mainshaft 1st gear in 1st clutch assembly. Install assembly onto mainshaft.

NOTE: Ensure spring washers are installed in correct direction. See **Fig. 18** and **Fig. 21** .

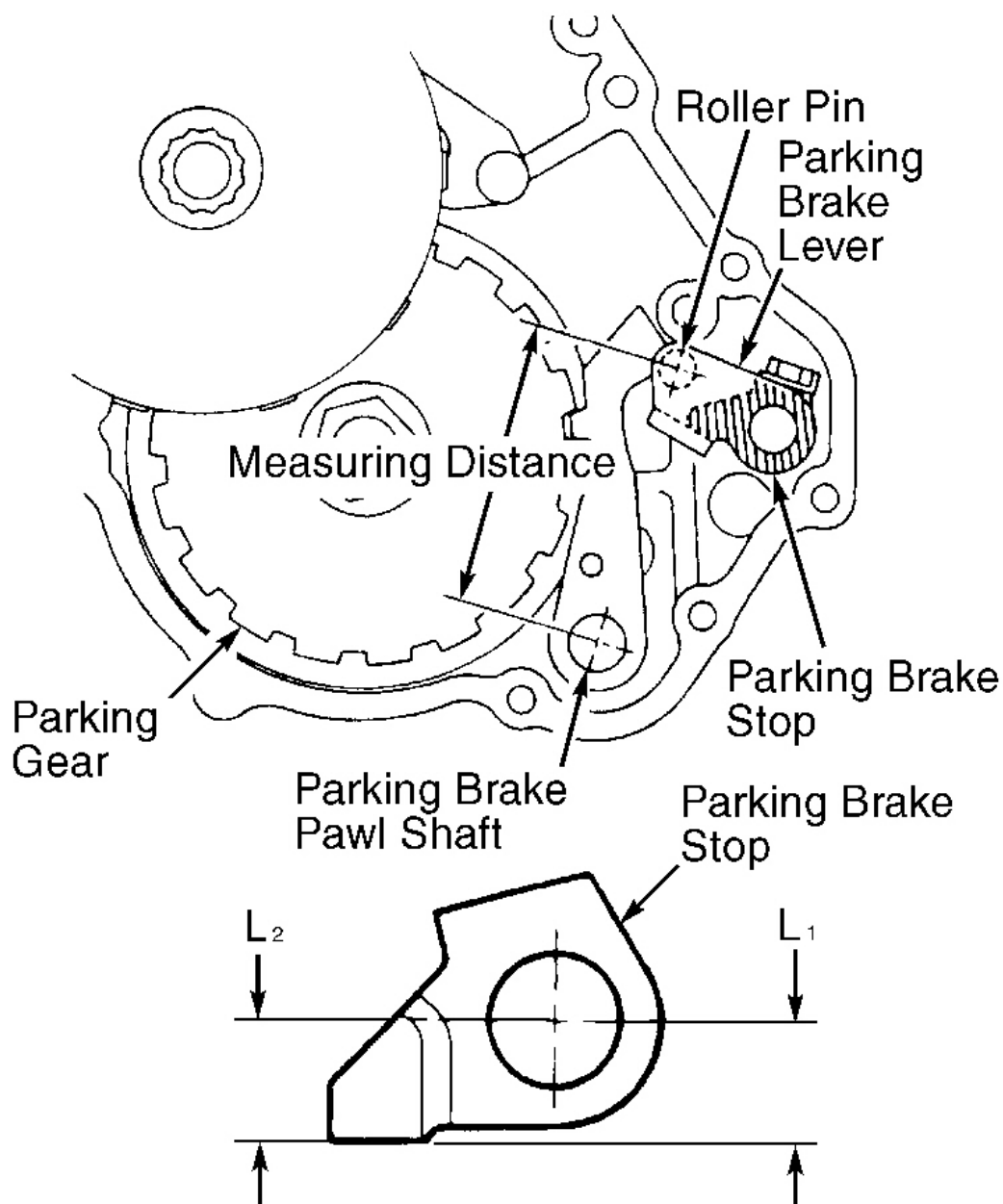
20. Install NEW spring washers and lock nuts on countershaft and mainshaft. Tighten lock nuts to specifications. See **TORQUE SPECIFICATIONS** . Remove mainshaft holder. Using hammer and punch, stake lock nuts at groove in mainshaft and countershaft to depth of .003-.005" (.7-1.2 mm).
21. Place parking brake lever in "P" position. Ensure parking pawl engages parking gear. Measure parking brake stop distance between parking pawl shaft and pin on parking brake lever. See **Fig. 36** .
22. Parking brake stop distance should be 2.87-2.91" (72.9-73.9 mm). If parking brake stop distance is not within specification install different size parking brake stop, and recheck parking brake stop distance. Parking brake stop is available in 3 different sizes. See **PARKING BRAKE STOP SPECIFICATIONS** table.

PARKING BRAKE STOP SPECIFICATIONS

ID Mark	Part Number	Distance "L1" - In. (mm) ⁽¹⁾	⁽¹⁾ Distance "L2" - 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 stop. See Fig. 36 .			

23. Once correct parking brake stop distance is obtained, tighten parking brake stop bolt to specification. Bend tabs over on bolt lock. Install NEW gasket, install right side cover. Install and tighten bolts to specification. See **TORQUE SPECIFICATIONS** .
24. To install remaining components, reverse removal procedure. Use NEW seal washers when installing joint bolts for cooler pipes. Use NEW "O" ring when installing mainshaft or countershaft speed sensors. Tighten all fasteners to specification.

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



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Fig. 36: Measuring Parking Brake Stop Distance
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

2000 Honda Civic EX**2000 AUTOMATIC TRANSMISSIONS Honda B4RA & S4RA Overhaul**

Application	Ft. Lbs. (N.m)
Countershaft Lock Nut	76 (103)
Drain Plug	36 (49)
Joint Bolt	21 (28)
Mainshaft Lock Nut	58 (78)
Pressure Tap Plug	13 (18)
Ring Gear Bolt	75 (101)
Transaxle Housing Bolt ⁽¹⁾	33 (45)
Vehicle Speed Sensor Bolt	16 (22)
INCH Lbs. (N.m)	
Countershaft Speed Sensor Bolt	106 (12.0)
Lock-Up Valve Body Bolt	106 (12.0)
Mainshaft Speed Sensor Bolt	106 (12.0)
Main Valve Body Bolt	106 (12.0)
Parking Brake Stop Bolt	120 (14.0)
Regulator Valve Body Bolt	106 (12.0)
Regulator Valve Body Stop Bolt	106 (12.0)
Reverse Idler Gear Shaft Holder Bolt	106 (12.0)
Reverse Shift Fork Bolt	120 (14.0)
Right Side Cover Bolt	106 (12.0)
Secondary Valve Body Bolt	106 (12.0)
Servo Body Bolt	106 (12.0)
(1) Tighten bolts to specification in sequence. See Fig. 34 .	

TRANSAXLE SPECIFICATIONS**TRANSAXLE SPECIFICATIONS**

Application	Specification In. (mm)
Clutch Clearance	
1st & 2nd Clutches	.026-.033 (.65-.85)
3rd & 4th Clutches	.016-.024 (.40-.60)
Countershaft 2nd Gear Clearance	.004-.007 (.10-.18)
Differential Bearing Side Clearance	⁽¹⁾ .006 (.15)
Differential Side Gear Backlash	.002-.006 (.05-.15)
Mainshaft Clearance	.002-.005 (.05-.13)
Oil Pump Clearances	
Side Clearance	
Oil Pump Drive Gear	.0041-.0052 (.105-.133)
Oil Pump Driven Gear	.0014-.0025 (.035-.063)
Thrust Clearance	

2000 Honda Civic EX

2000 AUTOMATIC TRANSMISSIONS Honda B4RA & S4RA Overhaul

Standard	.001-.002 (.03-.05)
Wear Limit	.003 (.07)
Parking Brake Stop Distance	2.87-2.91 (72.9-73.9)
(1) Maximum clearance. Replace set ring with different thickness set ring if clearance exceeds specification.	