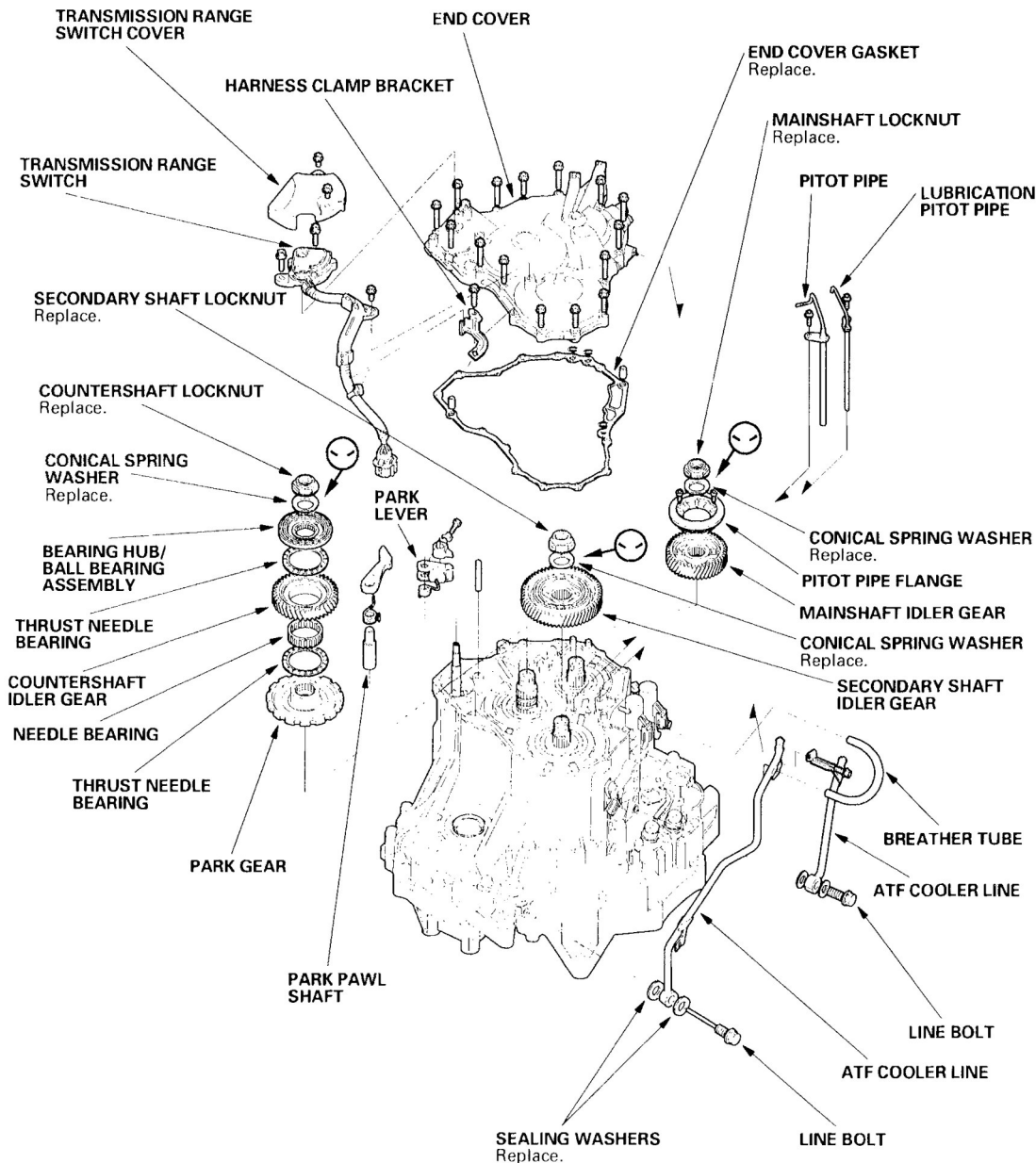


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B7TA, 4- Speed - Overhaul

TRANSMISSION END COVER

END COVER AND IDLER GEAR REMOVAL



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Fig. 1: Exploded View Of End Cover & Idler Gear Components

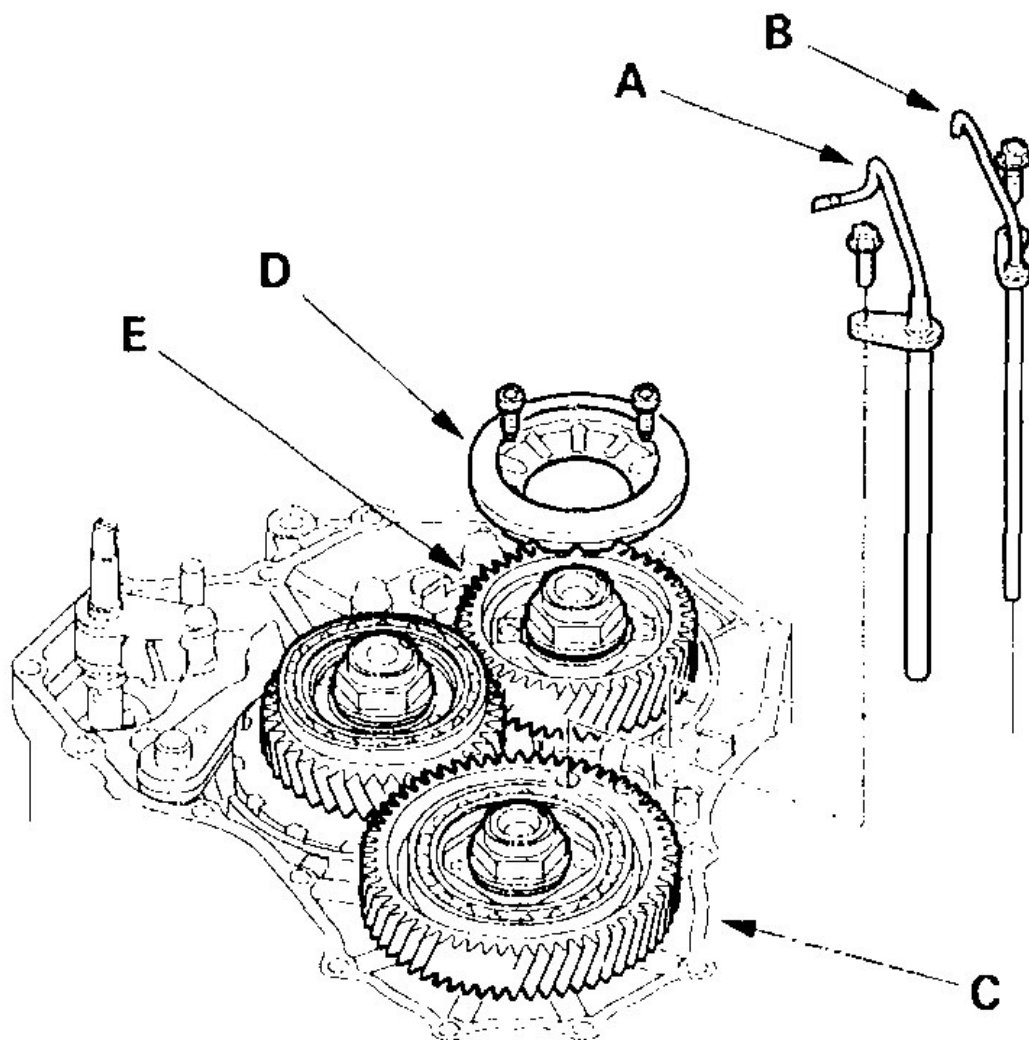
Special Tools Required

Mainshaft holder

07GAB-PF50101 or 07GAB-PF50100

NOTE: **Refer to Fig. 1 as needed during the following procedure.**

1. Remove the transmission range switch cover.
2. Remove the harness clamp bolt and the two transmission range switch bolts, then remove the transmission range switch.
3. Remove the 16 bolts securing the end cover, then remove the end cover.
4. Remove the pitot pipe (A) and the lubrication pitot pipe (B) from the transmission housing (C), then remove the pitot flange (D) from the mainshaft idler gear (E).



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Fig. 2: Removing Pitot Pipe

5. Slip the special tool onto the mainshaft.

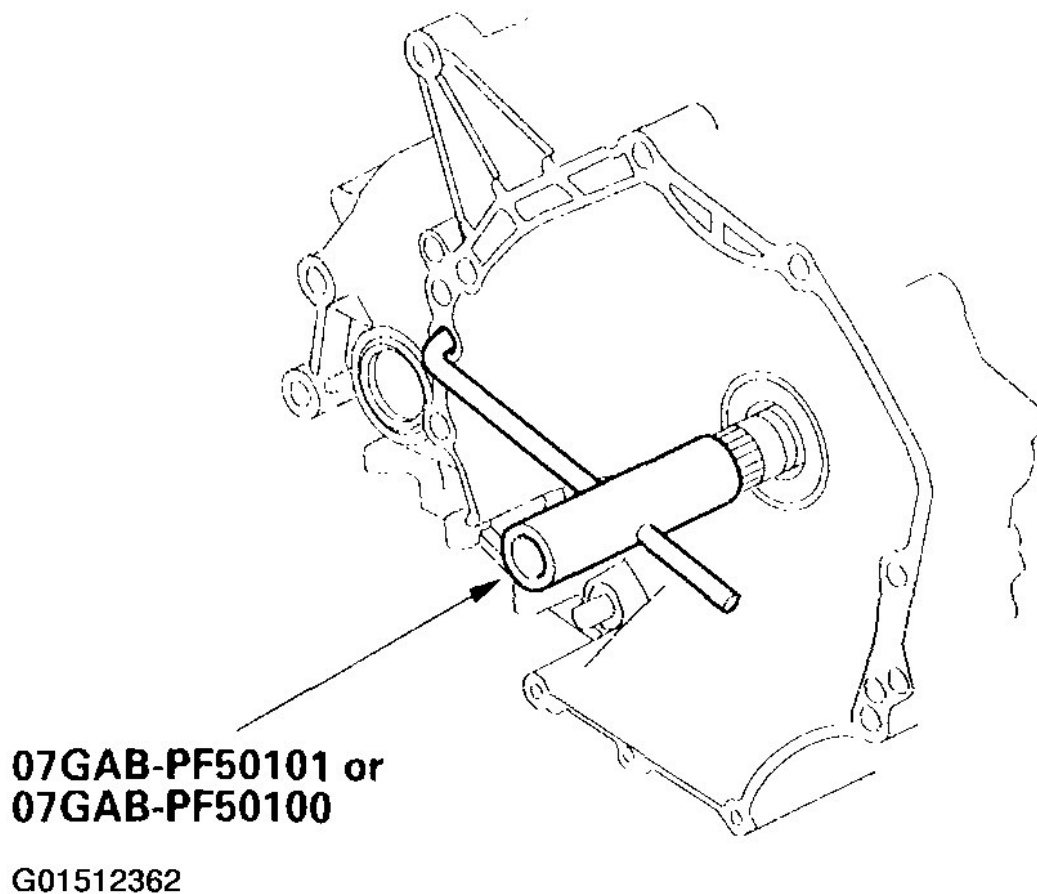


Fig. 3: Slipping Special Tool Onto Mainshaft

6. Engage the park pawl with the park gear.
7. Cut the lock tabs (A) of each shaft locknut (B) using a chisel (C). Then remove the locknuts and conical spring washers from each shaft.

NOTE:

- Countershaft and secondary shaft locknuts have left-hand threads.
- Clean the old locknuts; they are used to install the press fit idler gears on the mainshaft and secondary shaft, and the park gear and bearing hub on the countershaft.
- Keep all of the chiseled particles out of the transmission.

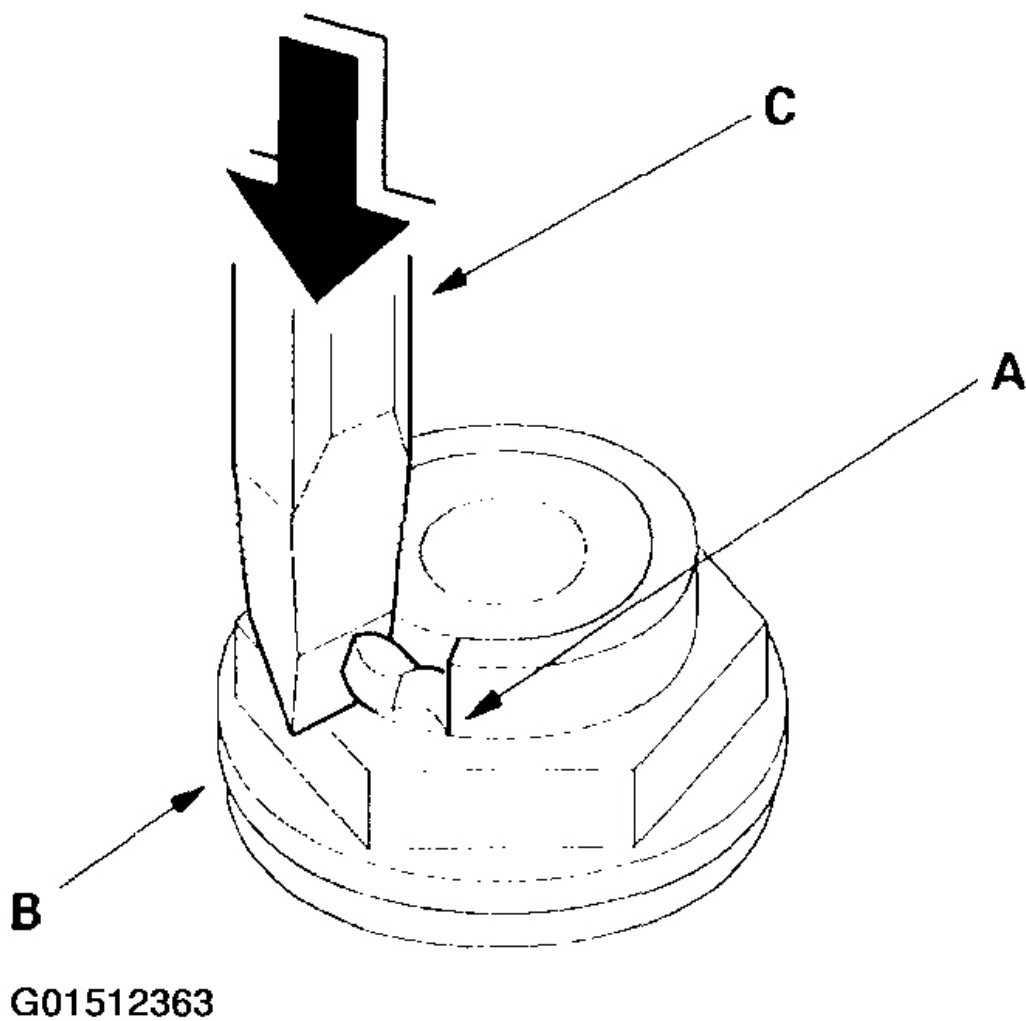
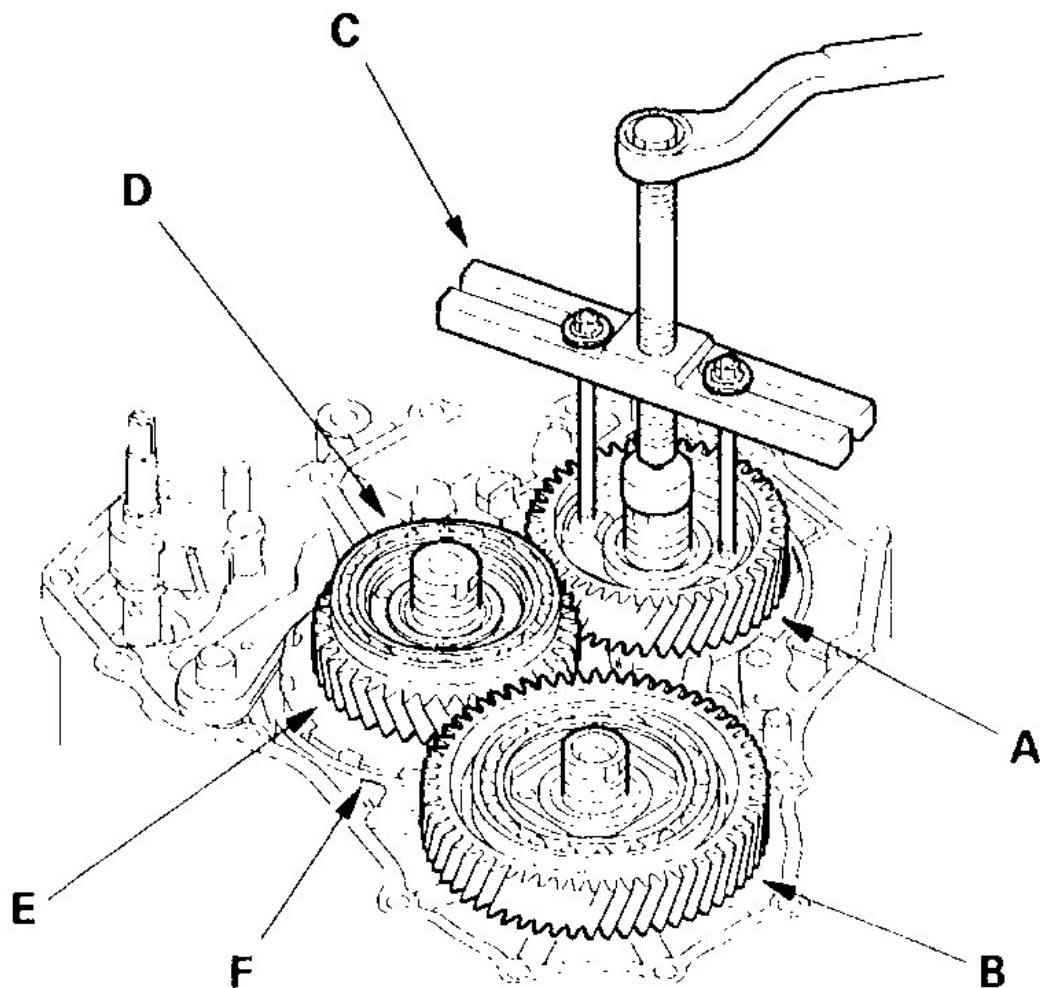


Fig. 4: Cutting Lock Tabs

8. Remove the special tool from the mainshaft.
9. Remove the mainshaft idler gear (A) and the secondary shaft idler gear (B) with a puller (C).



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Fig. 5: Removing Mainshaft Idler Gear

10. Remove the bearing hub (D) with the puller from the countershaft, then remove the countershaft idler gear (E) and bearings.
11. Remove the park gear (F) with the puller.
12. Remove the park pawl, spring, shaft, and shaft stop.
13. Remove the park lever from the control shaft.
14. Remove the line bolts, then remove the ATF cooler lines.

PARK LEVER STOP INSPECTION AND ADJUSTMENT

1. Set the park lever (A) in the P position.

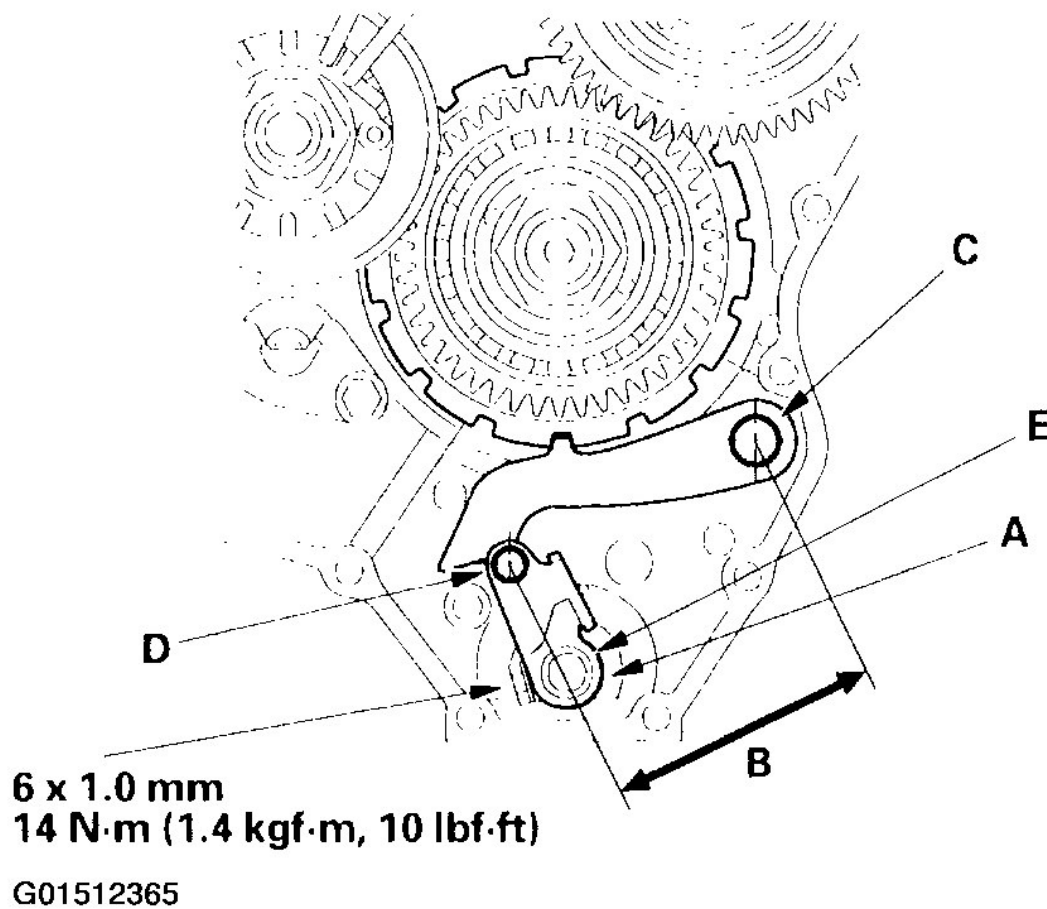


Fig. 6: Setting Parking Lever in P Position With Torque Specifications

2. Measure the distance (B) between the park pawl shaft (C) and the park lever roller pin (D).
Standard: 84.6-85.6 mm (3.33-3.37 in.)
3. If the measurement is out of tolerance, select and install the appropriate park lever stop (E) from the table.

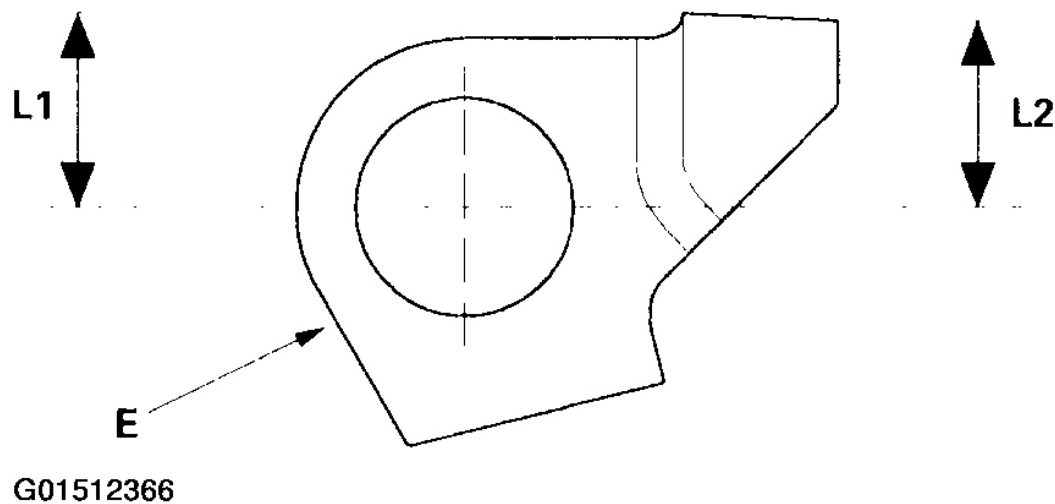


Fig. 7: Installing Appropriate Park Lever Stop

Mark	Part Number	L1	L2
1	24537-PA9-003	11.00 mm (0.433 in.)	11.00 mm (0.433 in.)
2	24538-PA9-003	10.80 mm (0.425 in.)	10.65 mm (0.419 in.)
3	24539-PA9-003	10.60 mm (0.417 in.)	10.30 mm (0.406 in.)

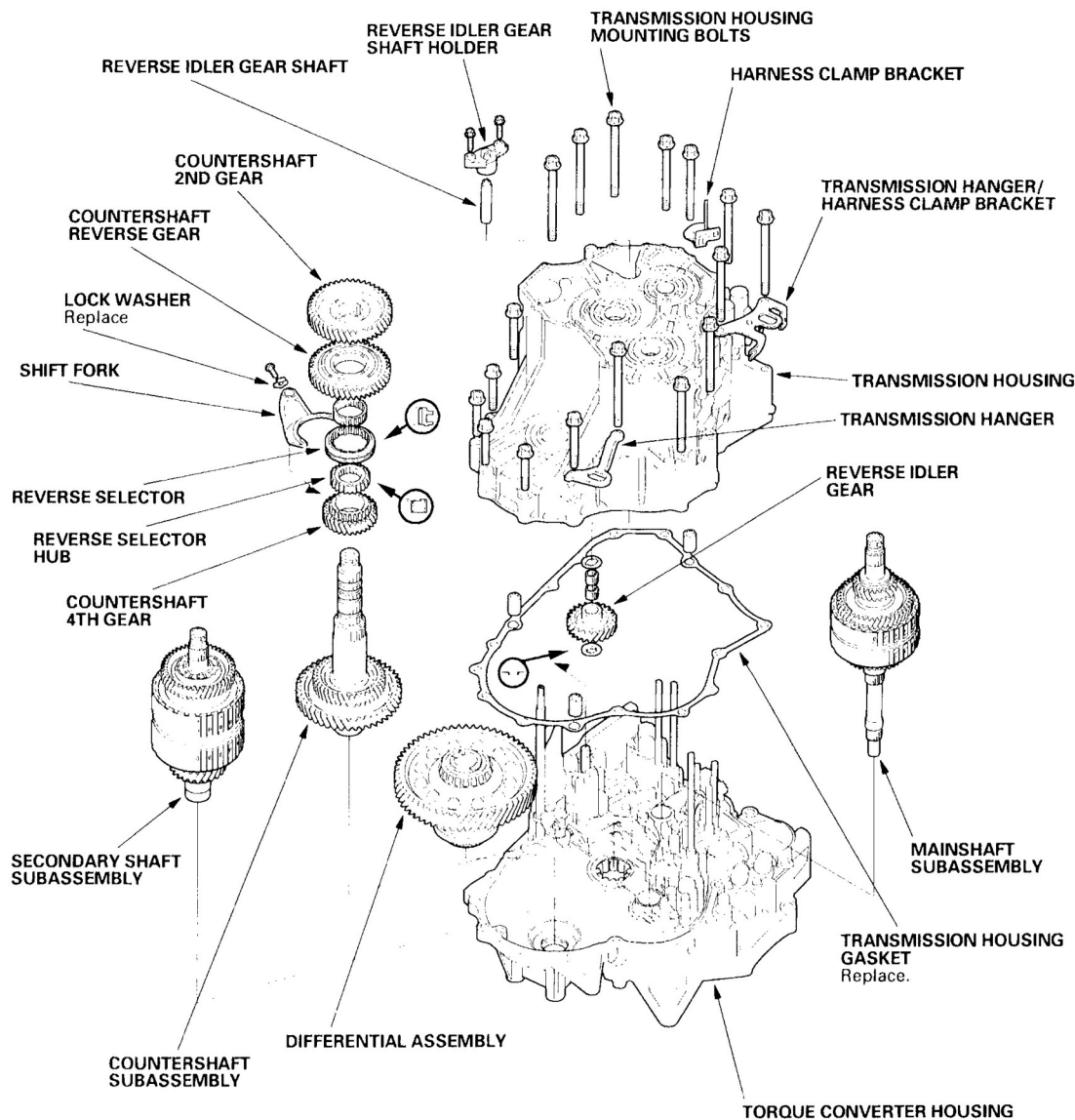
G01512367

Fig. 8: Identifying Park Lever Stop Table

- After replacing the park lever stop, make sure the distance is within tolerance.

TRANSMISSION HOUSING

HOUSING AND SHAFT ASSEMBLY REMOVAL



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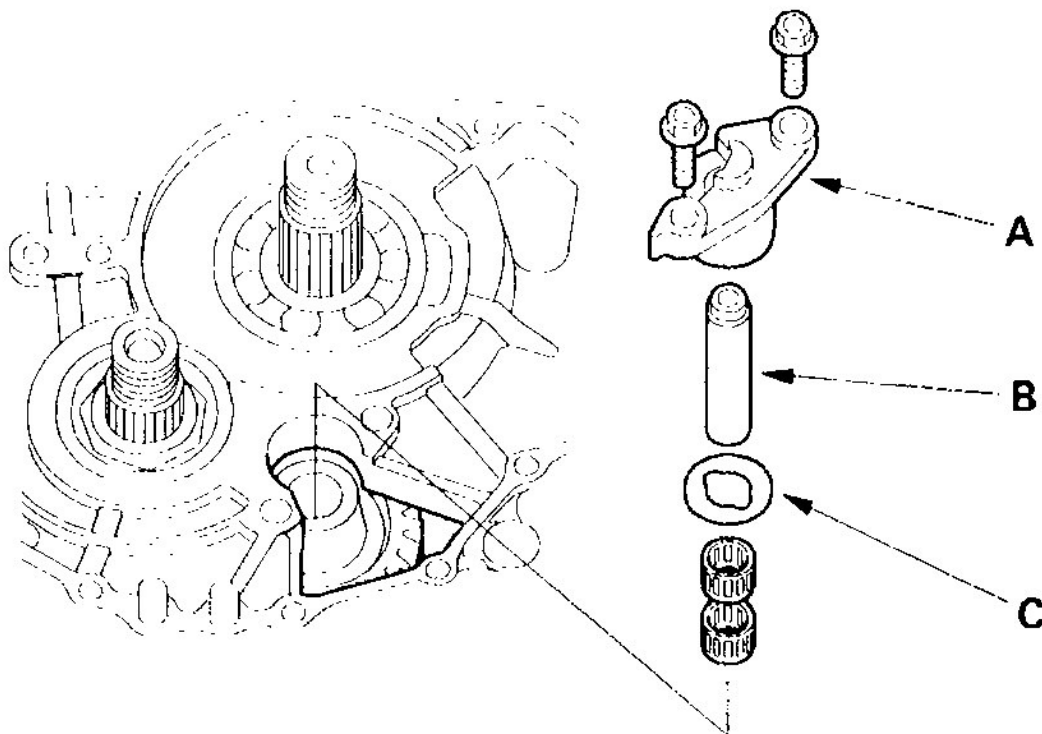
Fig. 9: Exploded View Of Housing & Shaft Components

Special Tools Required

Housing puller 07HAC-PK40102

NOTE: Refer to Fig. 9 as needed during the following procedure.

1. Remove the two bolts securing the reverse idler gear shaft holder, then remove the reverse idler gear shaft holder (A), shaft (B), and washer (C).

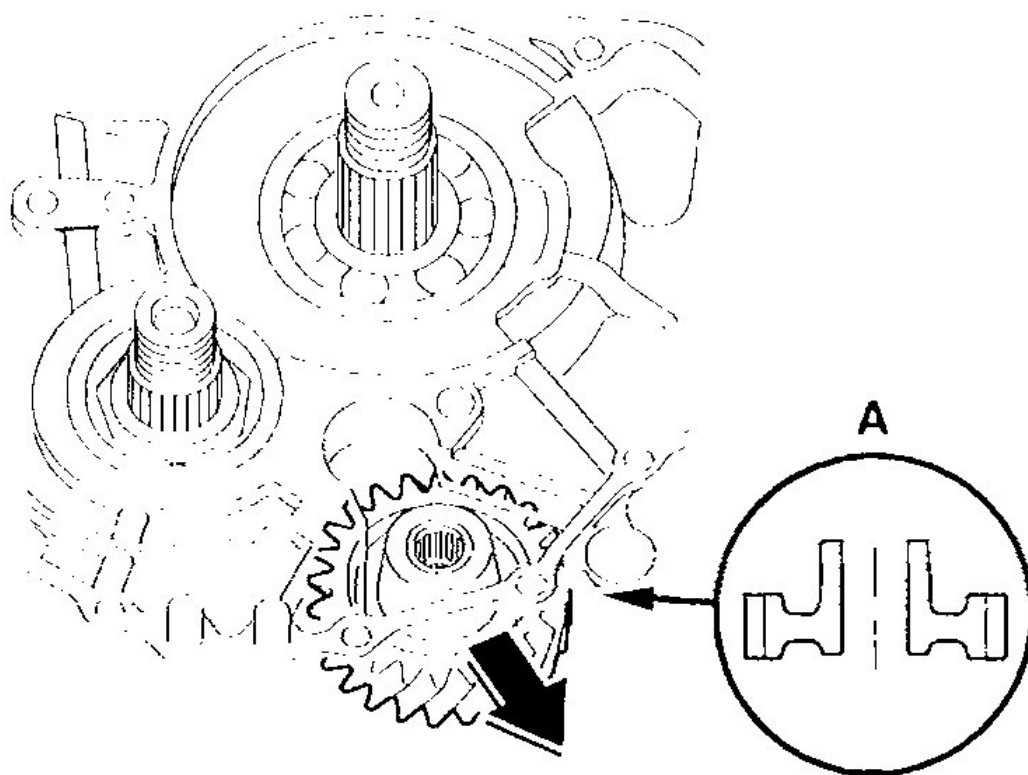


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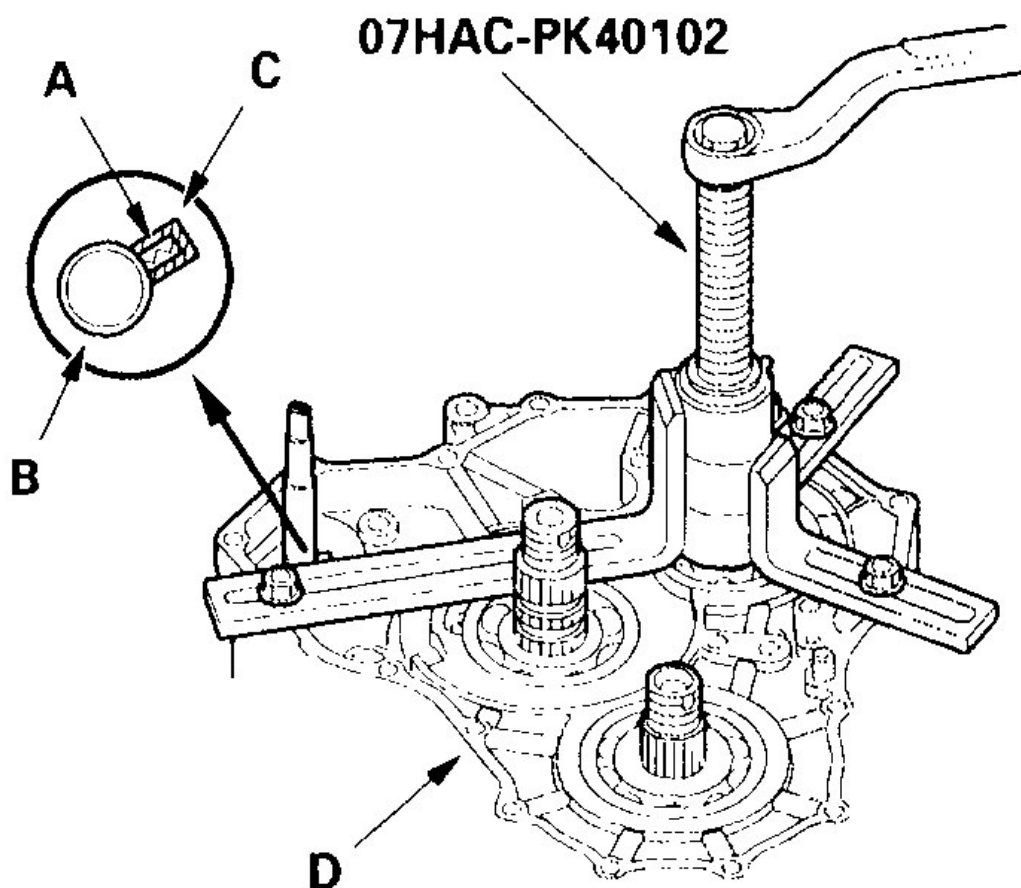
Fig. 10: Removing Reverse Idler Gear Shaft Holder

2. Remove the transmission housing mounting bolts, transmission hangers, and harness clamp bracket.
3. Move the reverse idler gear (A) to disengage it from the mainshaft and countershaft reverse gears.

NOTE: The transmission housing will not separate from the torque converter housing if the reverse idler gear is not moved.

**G01512370****Fig. 11: Moving Reverse Idler Gear**

4. Align the spring pin (A) on the control shaft (B) with the transmission housing groove (C) by turning the control shaft.



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Fig. 12: Aligning Spring Pin

5. Install the special tool over the mainshaft, then remove the transmission housing (D).

NOTE: If the top arm of your housing puller is too short, replace it with Housing Puller Arm, 205 mm O7SAC-P0Z0101.

6. Remove the reverse idler gear, needle bearings, and thrust washer from the transmission housing.
7. Remove the countershaft 2nd gear, then remove the countershaft reverse gear and the needle bearing.
8. Remove the lock bolt securing the shift fork, then remove the shift fork with the reverse selector, reverse selector hub, and countershaft 4th gear. If the reverse selector hub is press-fitted, leave it and 4th gear on the countershaft.
9. Remove the secondary shaft subassembly.

If the reverse selector hub is press-fitted, remove the secondary shaft subassembly, countershaft subassembly and mainshaft subassembly together.

10. Remove the countershaft subassembly.
11. Remove the mainshaft subassembly.
12. Remove the differential assembly.

BEARING REMOVAL AND INSTALLATION

Special Tools Required

- Driver 07749-0010000
- Seal driver attachment

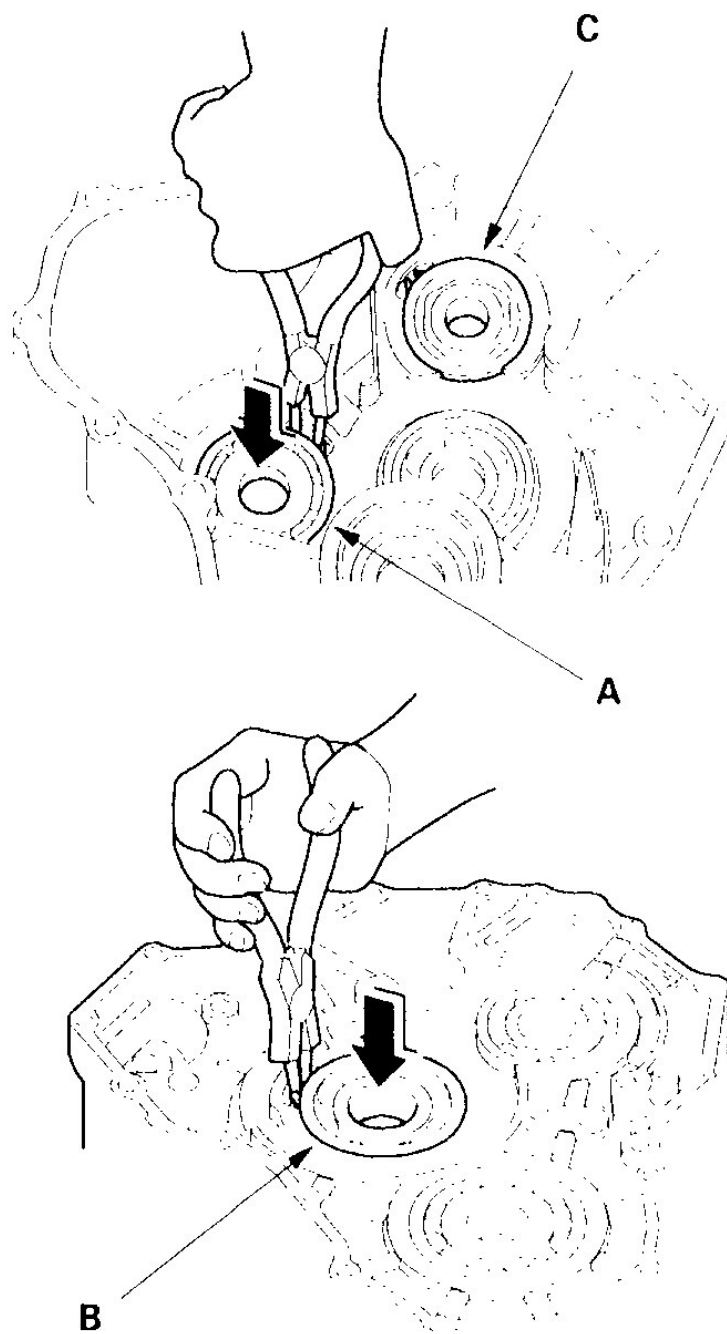
07GAD-PG40101 or 07GAD-PG40100

- Attachment, 62 x 68 mm 07746-0010500
- Attachment, 72 x 75 mm 07746-0010600

NOTE: Coat all parts with ATF before assembly

1. To remove the mainshaft bearing (A), countershaft bearing (B), and secondary shaft bearing (C) from the transmission housing, expand each snap ring with the snap ring pliers, then push the bearing out

NOTE: Do not remove the snap rings unless it's necessary to clean the grooves in the housing.



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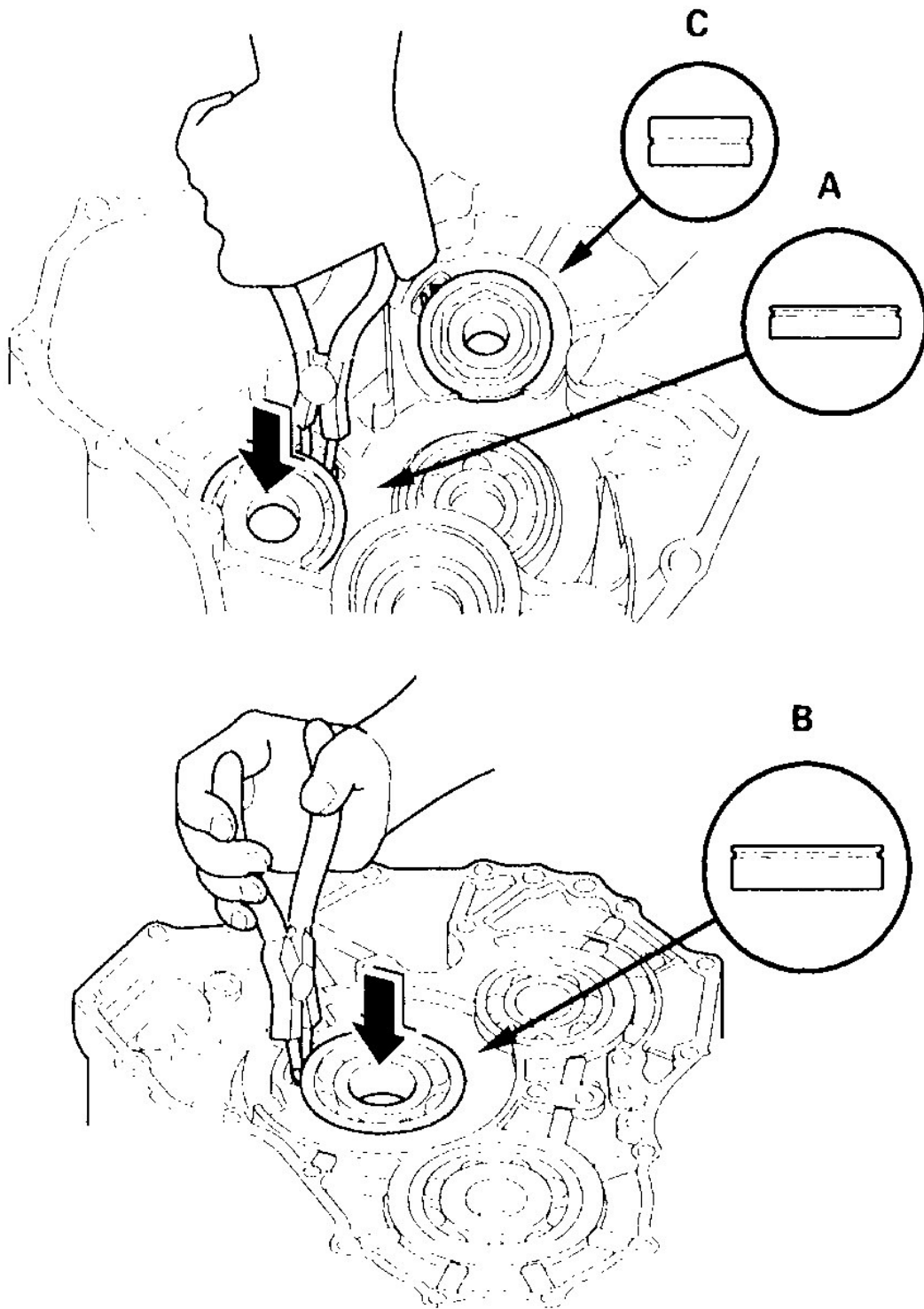
Fig. 13: Removing Mainshaft Bearing

2. Install the bearings in the direction shown.
3. Expand each snap ring with the snap ring pliers, and insert the bearing part-way into the housing.

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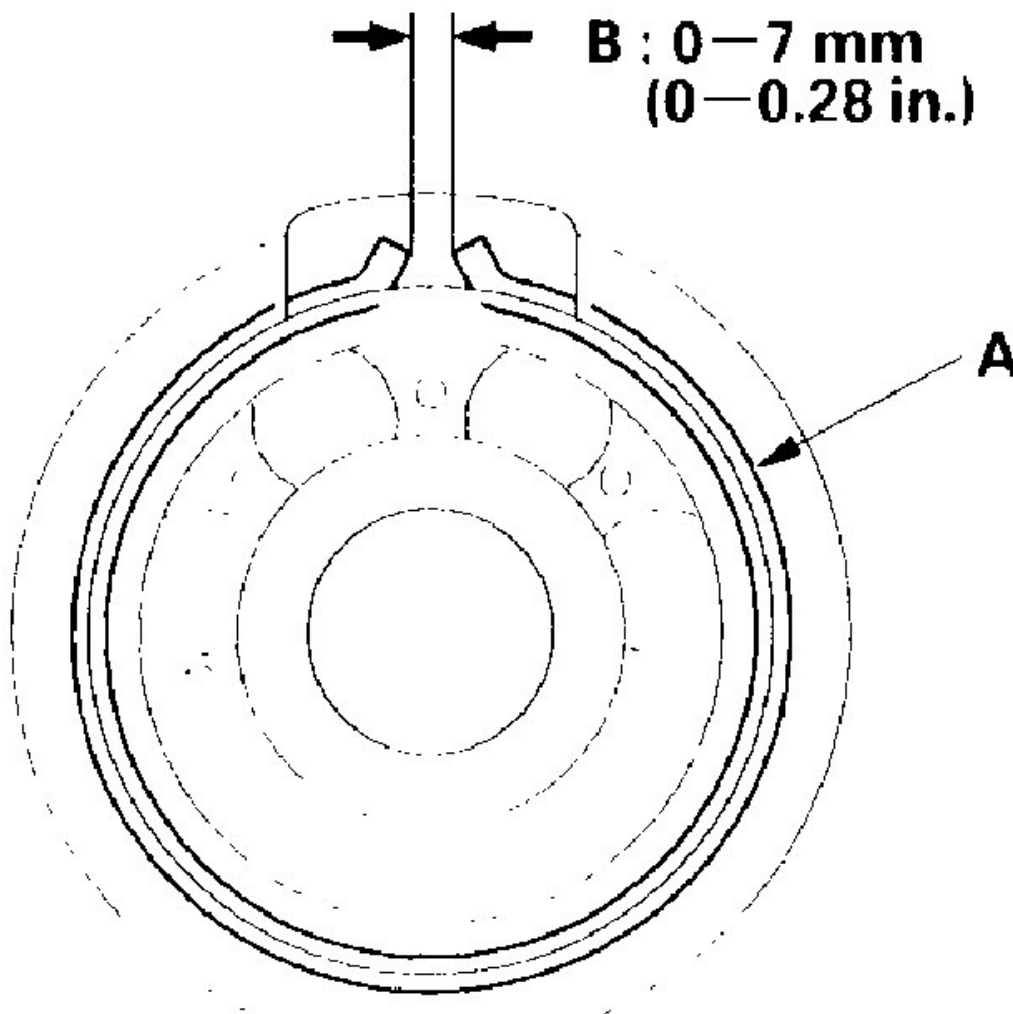
4. Release the pliers, then push the bearing down into the housing until the snap ring snaps in place around it.



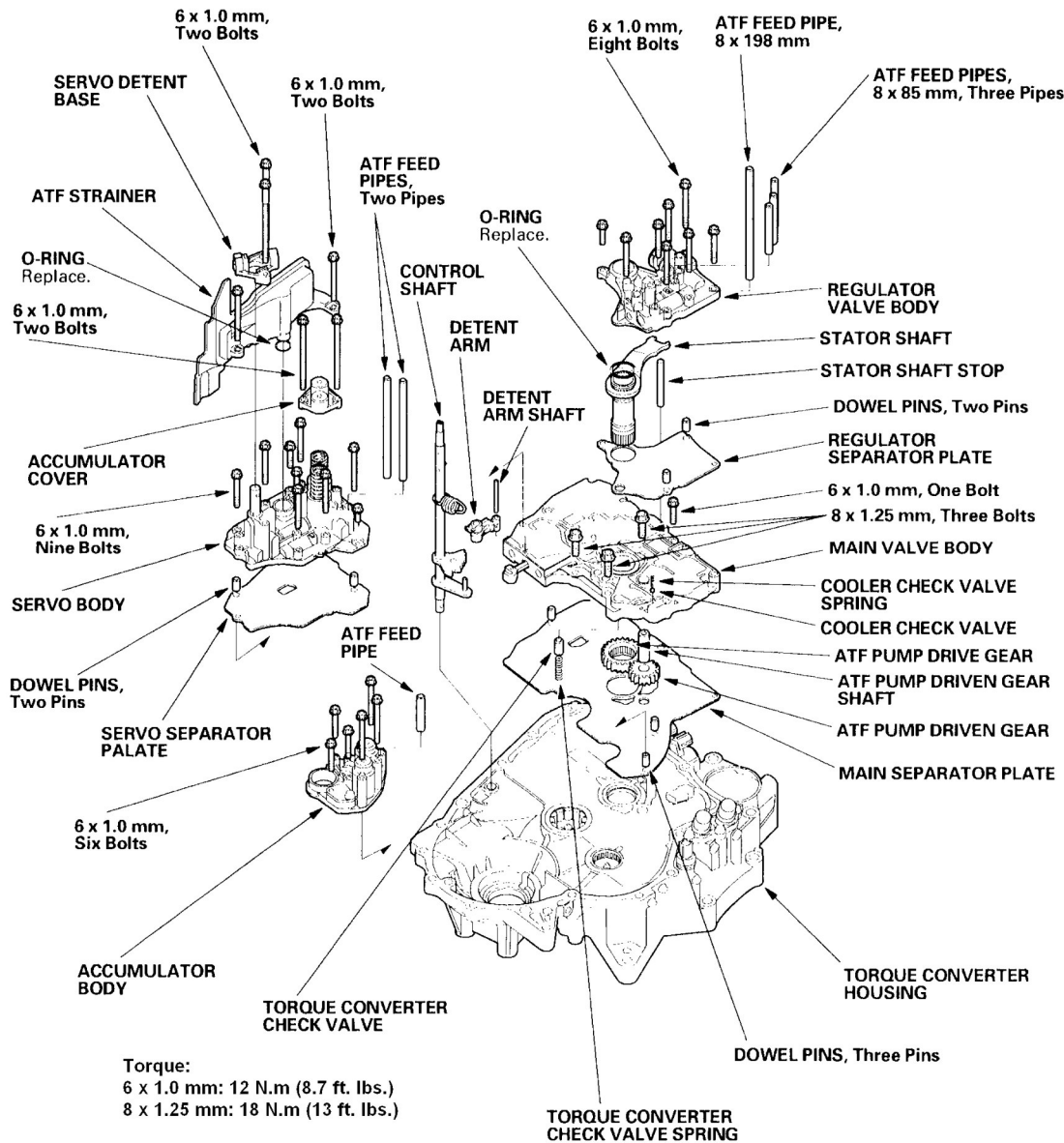
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Fig. 14: Releasing Pliers

5. After installing the bearings verify the following:
- The snap rings (A) are seated in the bearing and housing grooves.
 - The ring end gaps (B) are correct.

**G01512374****Fig. 15: Aligning Bearing Snap Ring Ends****VALVE BODY**

VALVE BODY AND ATF STRAINER REMOVAL



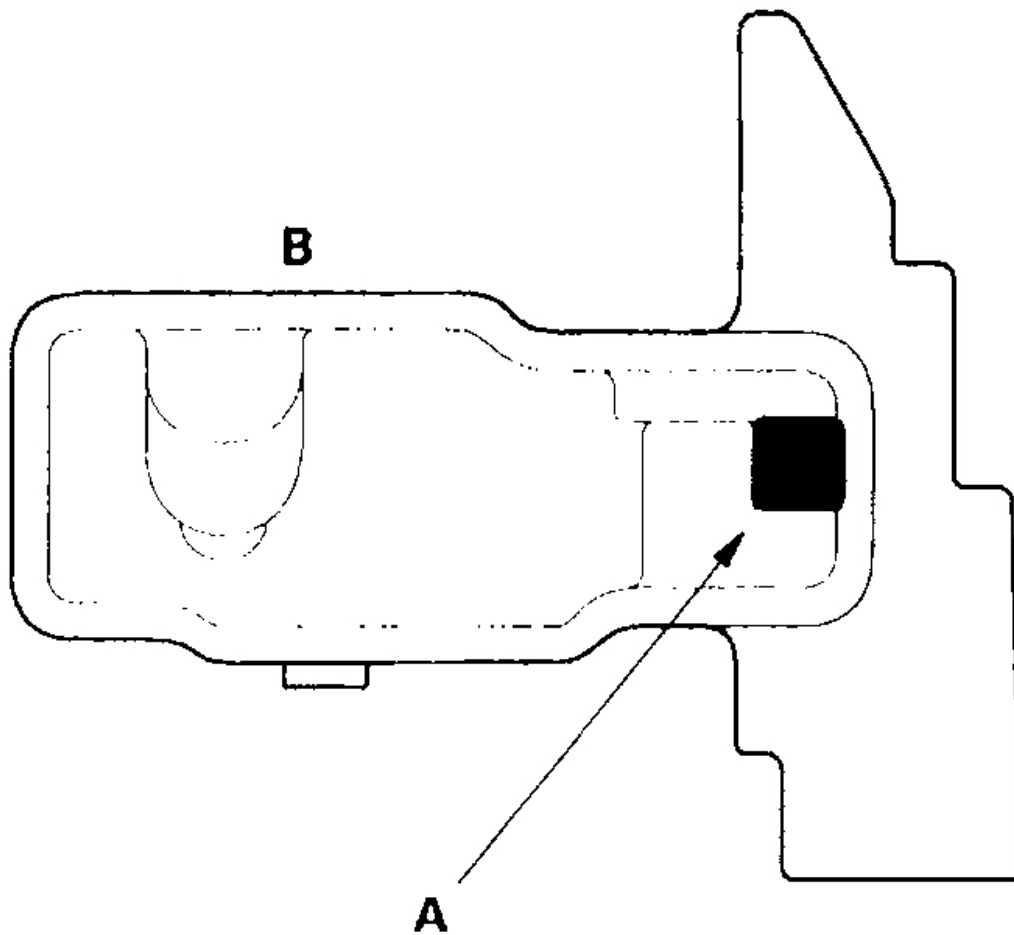
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Fig. 16: Exploded View Of Valve Body & ATF Strainer Components With Torque Specifications

NOTE: Refer to the Exploded View as needed during the following procedure:

1. Remove the ATF feed pipes from the regulator valve body, servo body and accumulator body.
2. Remove the servo detent base (two bolts).
3. Remove the ATF strainer (two bolts).
4. Remove the accumulator cover (two bolts).

5. Remove the bolts securing the servo body (nine bolts), then remove the servo body, servo separator plate, and dowel pins (two).
6. Remove the accumulator body (six bolts).
7. Remove the regulator valve body (eight bolts).
8. Remove the stator shaft and stator shaft stop.
9. Remove the regulator separator plate and dowel pins (two).
10. Unhook the detent spring from the detent arm, then remove the detent arm shaft, detent arm, and control shaft.
11. Remove the cooler check valve spring and cooler check valve (steel ball).
12. Remove the main valve body (four bolts).
13. Remove the torque converter check valve and spring.
14. Remove the ATF pump driven gear shaft, then remove the ATF pump gears.
15. Remove the main separator plate and dowel pins (three).
16. Clean the inlet opening (A) of the ATF strainer (B) thoroughly with compressed air, then check that it is in good condition, and the inlet opening is not clogged.



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Fig. 17: Cleaning Inlet Opening

17. Test the ATF strainer by pouring clean ATF through the inlet opening, and replace it if it is clogged or damaged.

VALVE BODY REPAIR

NOTE: This repair is only necessary if one or more of the valves in a valve body do not slide smoothly in their bores. Use this procedure to free the valves.

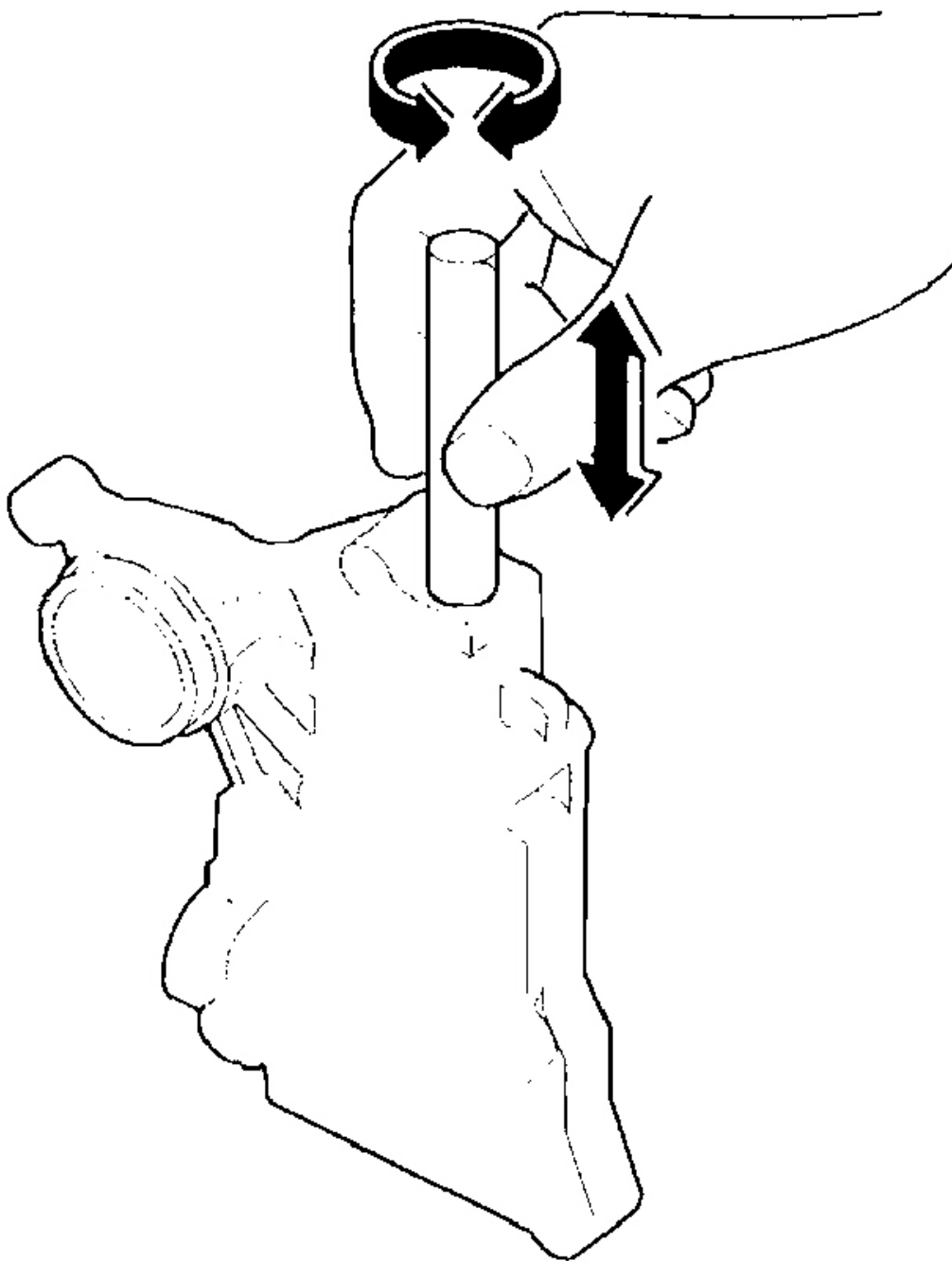
1. Soak a sheet of # 600 abrasive paper in ATF for about 30 minutes.
2. Carefully tap the valve body so the sticking valve drops out of its bore. It may be necessary to use a small screwdriver to pry the valve free. Be careful not to scratch the bore with the screwdriver.

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3. Inspect the valve for any scuff marks. Use the ATF soaked # 600 paper to polish off any burrs that are on the valve, then wash the valve in solvent and dry it with compressed air.
4. Roll up half a sheet of ATF-soaked # 600 paper and insert it in the valve bore of the sticking valve. Twist the paper slightly, so that it unrolls and fits the bore tightly, then polish the bore by twisting the paper as you push it in and out.

NOTE: **The valve body is aluminum and doesn't require much polishing to remove any burrs.**



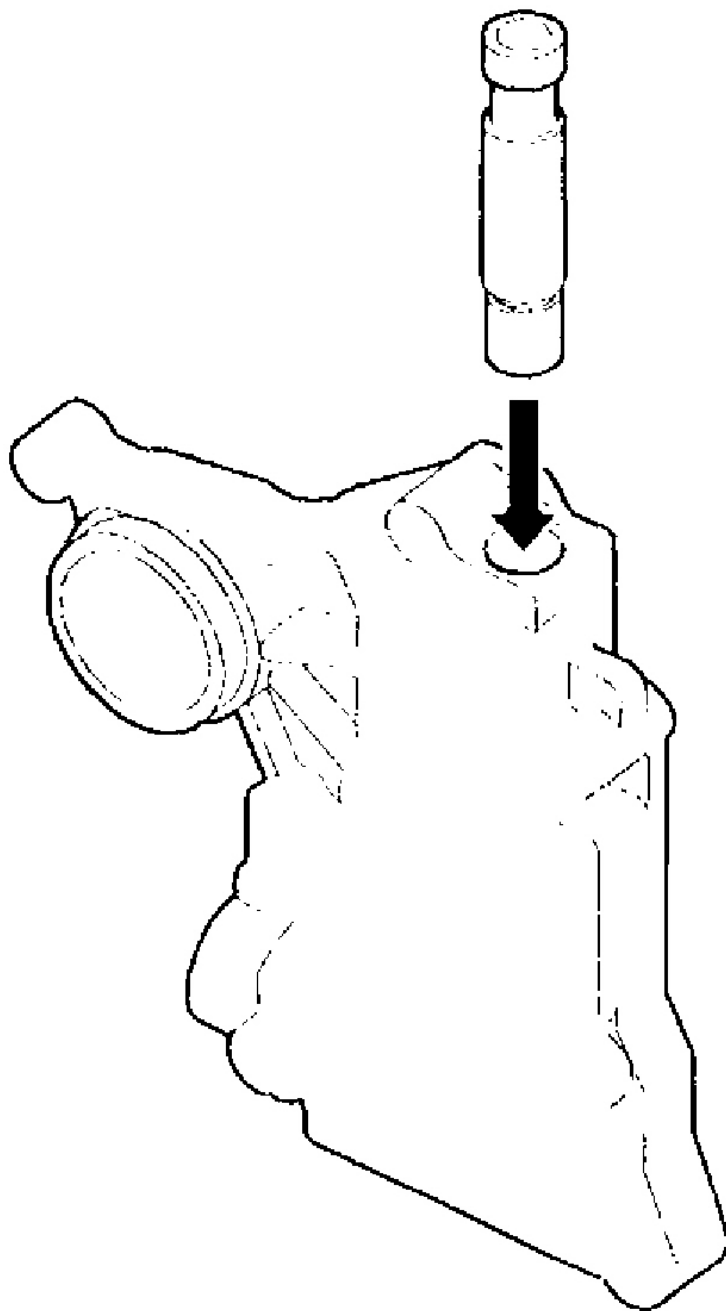
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Fig. 18: Polishing Bore By Twisting # 600 Paper

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5. Remove the # 600 paper. Thoroughly wash the entire valve body in solvent, then dry it with compressed air.
6. Coat the valve with ATF, then drop it into its bore. It should drop to the bottom of the bore under its own weight. If not, repeat steps 4 and 5 , then retest. If the valve still sticks, replace the valve body.



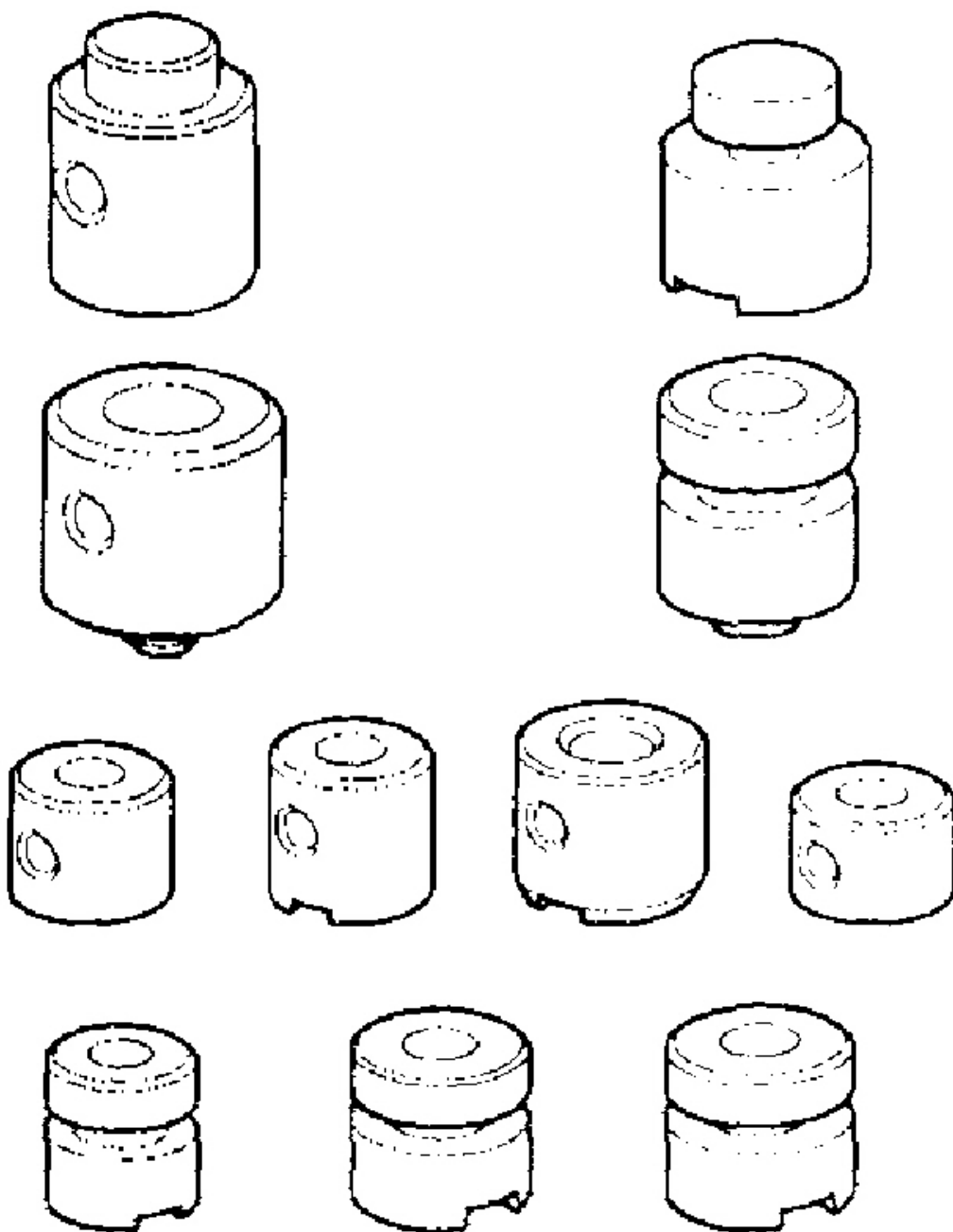
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Fig. 19: Coating Valve With ATF

7. Remove the valve, and thoroughly clean it and the valve body with solvent. Dry all parts with compressed air, then reassemble using ATF as a lubricant.

VALVE BODY VALVE REASSEMBLY

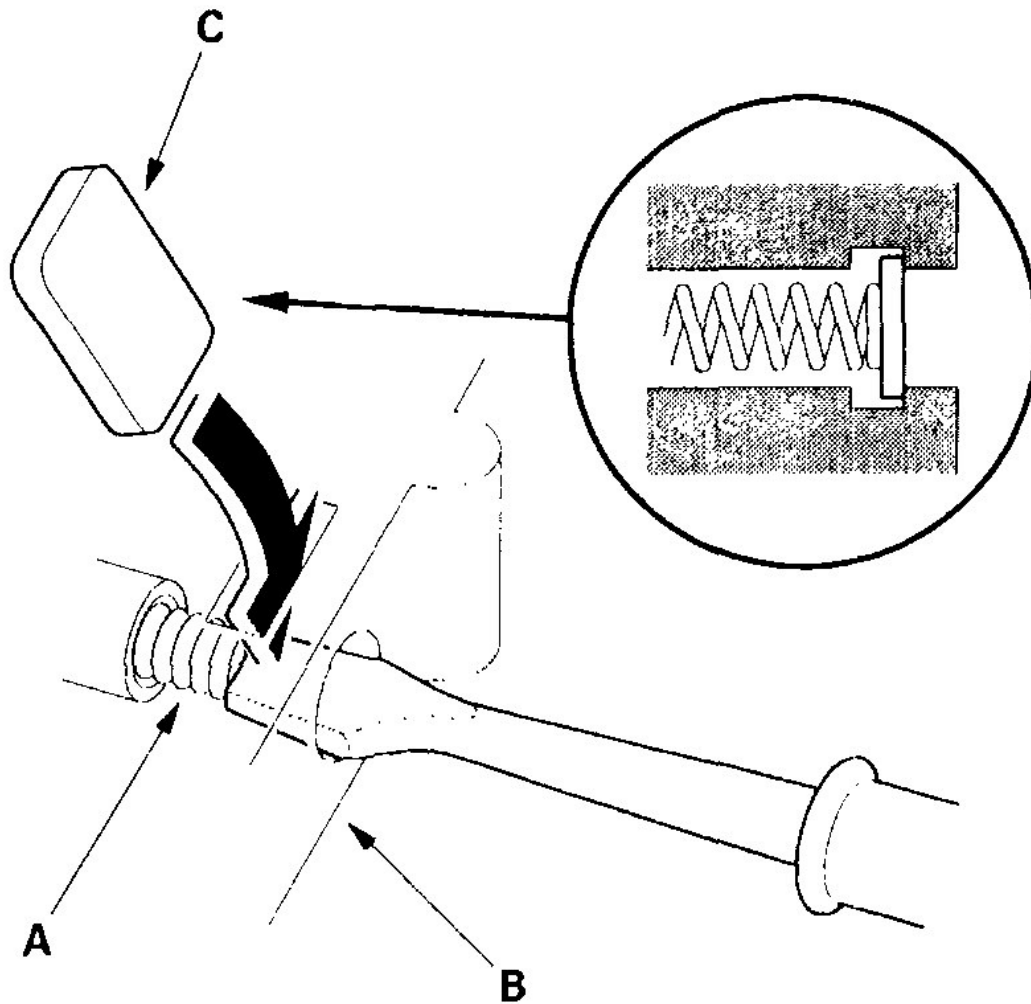
1. Coat all parts with ATF before assembly.
2. Install the valves and springs in the sequence shown for the main valve body (see **Main Valve Body Disassembly, Inspection, and Reassembly**), regulator valve body (see **Regulator Valve Body Disassembly, Inspection, and Reassembly**), and servo body (see **Servo Body Disassembly, Inspection, and Reassembly**). Refer to **Fig. 20**, and install each valve cap so the end shown facing up will be facing the outside of the valve body.



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Fig. 20: Installing Valves & Springs In Sequence

3. Install all the springs and seats. Insert the spring (A) in the valve, then install the valve in the valve body (B). Push the spring in with a screwdriver, then install the spring seat (C).

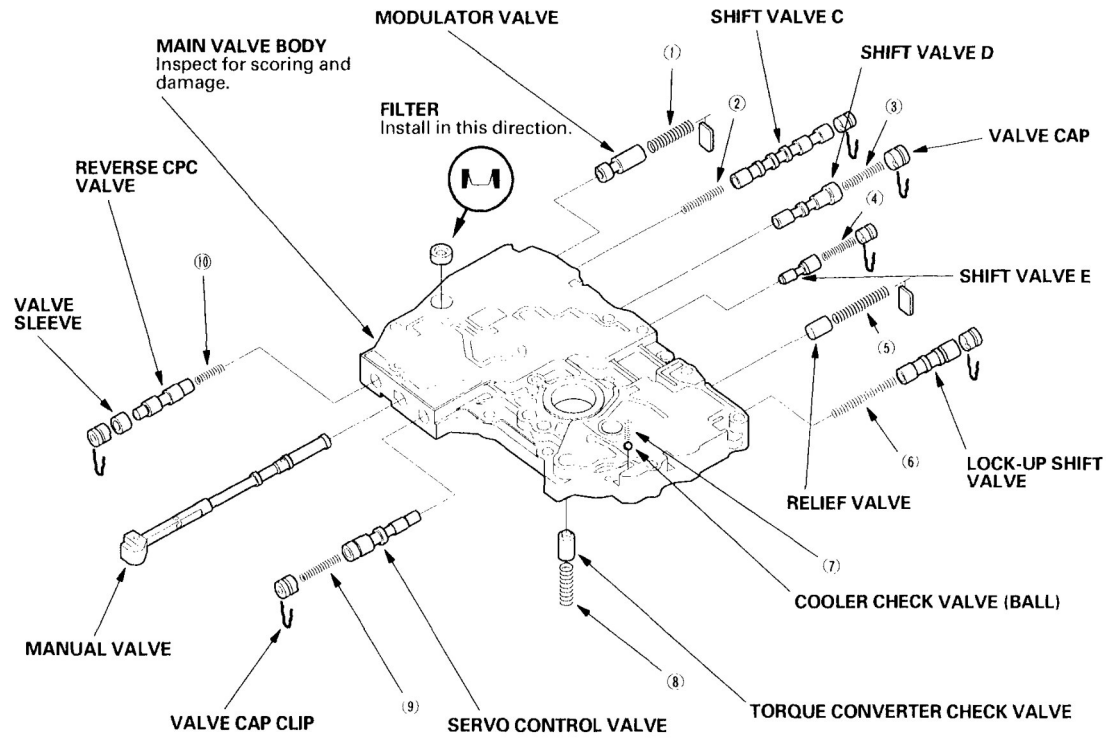


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Fig. 21: Inserting Spring In Valve**MAIN VALVE BODY DISASSEMBLY, INSPECTION, AND REASSEMBLY**

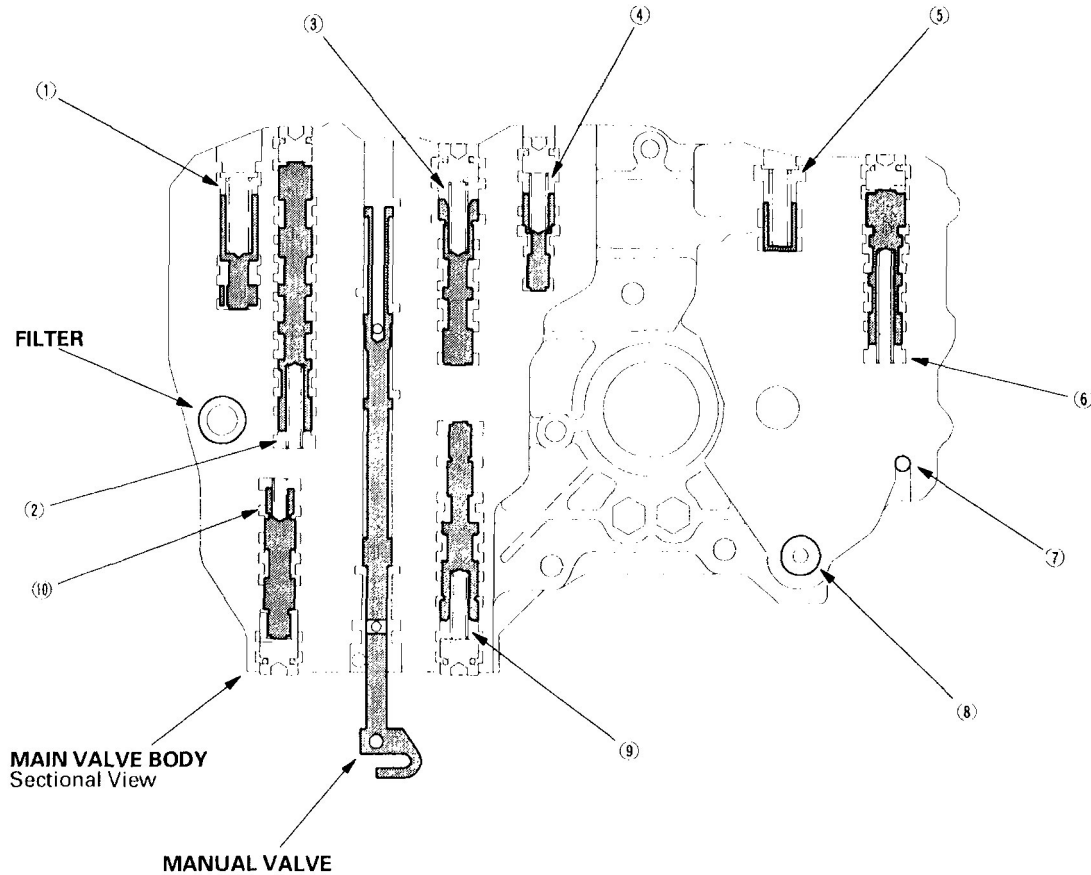
1. Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air. Blow out all passages.
2. Do not use a magnet to remove the check valve ball; it may magnetize the ball.
3. Check all valves for free movement. If any fail to slide freely, refer to **Valve Body Repair**.
4. Replace the valve body as an assembly if any parts are worn or damaged.

5. Coat all parts with ATF during assembly.
6. Install the filter in the direction shown.



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Fig. 22: Installing Filter In Correct Direction



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Fig. 23: Locating Main Valve Body Springs

NOTE: To identify springs, see [Fig. 24](#).

No.	Spring	Standard (New)-Unit: mm (in.)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Modulator valve spring	1.6 (0.063)	10.4 (0.409)	33.5 (1.319)	9.8
②	Shift valve C spring	0.8 (0.031)	6.6 (0.260)	49.1 (1.933)	21.7
③	Shift valve D spring	0.7 (0.028)	6.6 (0.260)	35.7 (1.406)	17.2
④	Shift valve E spring	0.7 (0.028)	6.1 (0.240)	17.8 (0.701)	7.9
⑤	Relief valve spring	1.1 (0.043)	8.6 (0.339)	30.1 (1.185)	10.7
⑥	Lock-up shift valve spring	0.9 (0.035)	7.6 (0.299)	63.0 (2.480)	22.4
⑦	Cooler check valve spring	0.6 (0.024)	5.8 (0.228)	14.5 (0.571)	6.8
⑧	Torque converter check valve	1.2 (0.047)	8.6 (0.339)	34.4 (1.354)	11.7
⑨	Servo control valve spring	0.7 (0.028)	6.6 (0.260)	35.7 (1.406)	17.2
⑩	Reverse CPC valve spring	0.7 (0.028)	6.1 (0.240)	17.8 (0.701)	7.9

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Fig. 24: Main Valve Body Spring Specifications Table

ATF PUMP INSPECTION

1. Install the ATF pump drive gear (A), driven gear (B), and ATF pump driven gear shaft (C) in the main valve body (D). Lubricate all parts with ATF, and install the ATF pump driven gear with its grooved and chamfered side facing up.

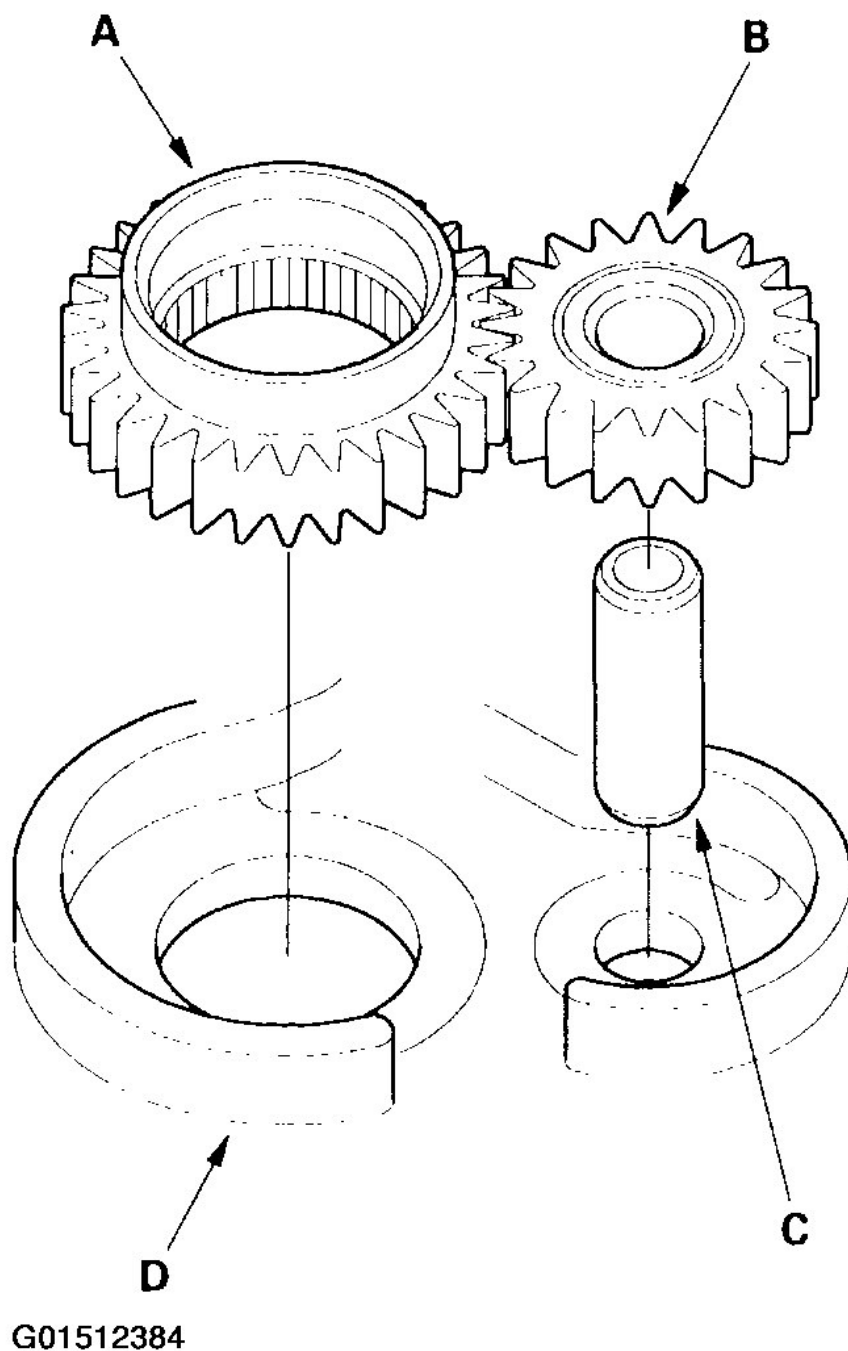


Fig. 25: Installing ATF Pump Drive Gear

2. Measure the side clearance of the ATF pump drive gear (A) and driven gear (B).

ATF Pump Gears Side (Radial) Clearance:**Standard (New):**

ATF Pump Drive Gear: 0.210-0.265 mm (0.0083-0.00104 in.)

ATF Pump Driven Gear: 0.070-0.125 mm (0.0028-0.0050 in.)

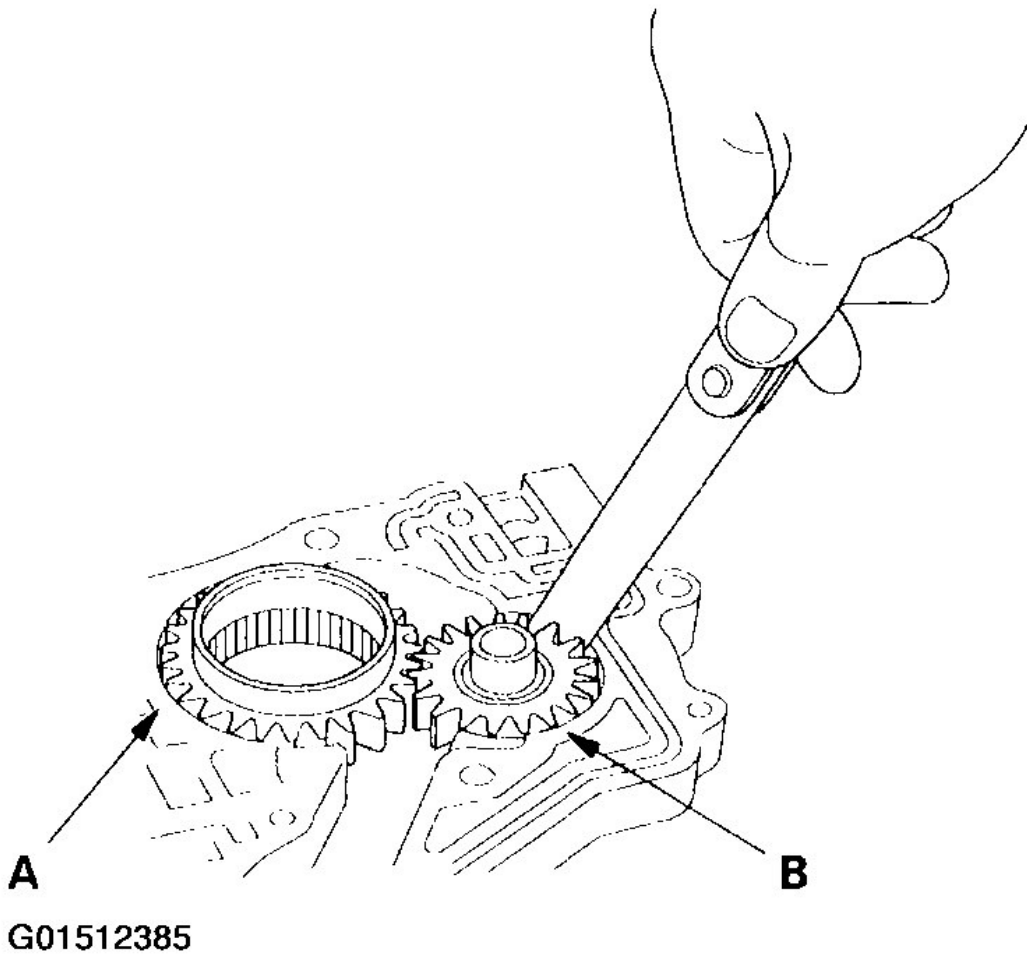


Fig. 26: Measuring Side Clearance Of ATF Pump Drive Gear

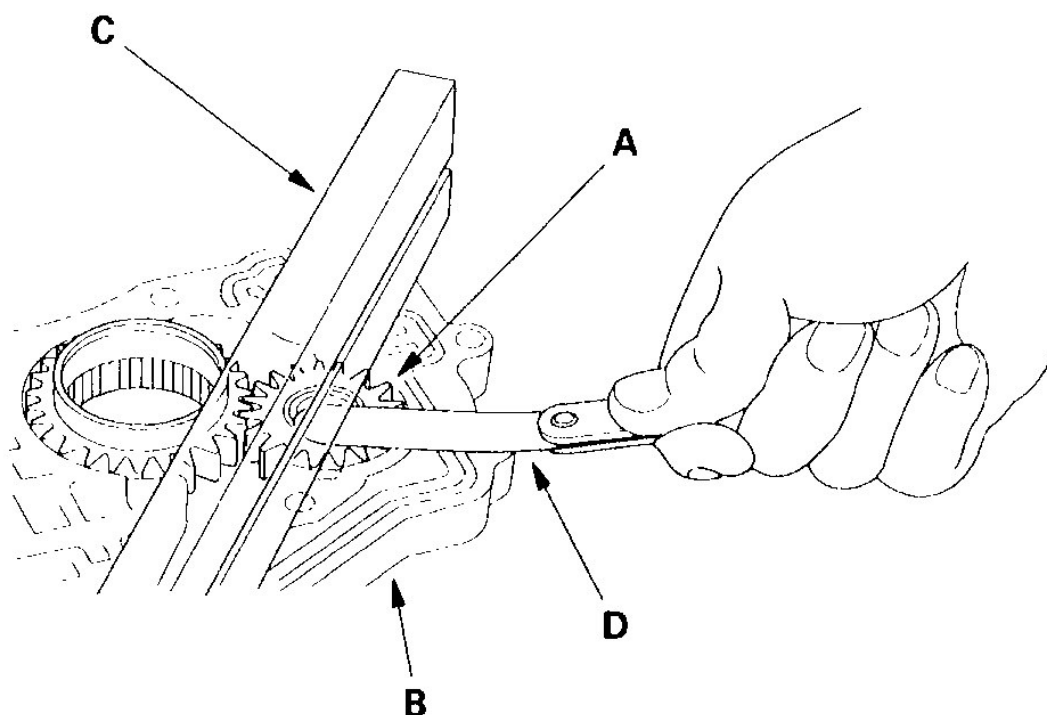
3. Remove the ATF pump driven gear shaft. Measure the thrust clearance between the ATF pump driven gear (A) and the valve body (B) with a straight edge (C) and a feeler gauge (D).

ATF Pump Drive/Driven Gear Thrust (Axial)

Clearance:

Standard (New): 0.030-0.05 mm (0.001-0.002 in.)

Service Limit: 0.07 mm (0.003 in.)

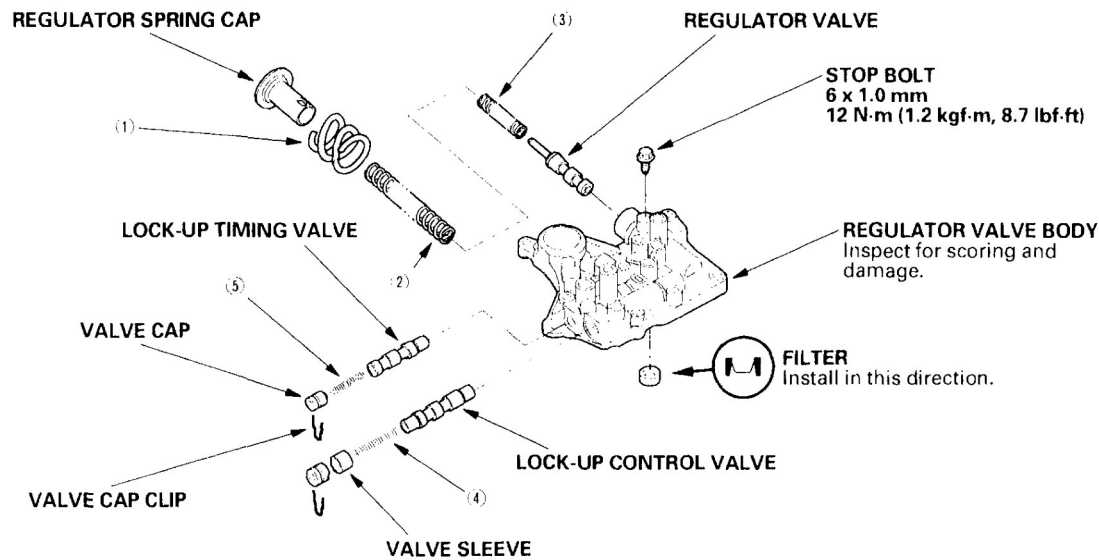


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Fig. 27: Measuring Thrust Clearance Between ATF Pump Driven Gear

REGULATOR VALVE BODY DISASSEMBLY, INSPECTION, AND REASSEMBLY

1. Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air. Blow out all passages.
2. Check all valves for free movement. If any fail to slide freely, refer to Valve Body Repair (see **Valve Body Repair**).
3. Replace the valve body as an assembly if any parts are worn or damaged.
4. Hold the regulator spring cap in place while removing the stop bolt. The regulator spring cap is spring loaded. Once the stop bolt is removed, release the spring cap slowly so it does not pop out.
5. Reassembly is the reverse of disassembly. Install the filter in the direction shown.
6. Coat all parts with ATF during reassembly.
7. Align the hole in the regulator spring cap with the hole in the valve body, then press the spring cap into the valve body, and tighten the stop bolt.



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Fig. 28: Aligning Hole In Regulator Spring Cap With Torque Specifications

No.	Spring	Standard (New)-Unit: mm (in.)			
		Wire Dia.	O.D.	Free Length	No. of Coils
(1)	Stator reaction spring	5.5 (0.217)	37.4 (1.472)	30.3 (1.193)	2.12
(2)	Regulator valve spring A	1.9 (0.075)	14.7 (0.579)	77.4 (3.047)	15.2
(3)	Regulator valve spring B	1.6 (0.063)	9.2 (0.362)	44.0 (1.732)	12.5
(4)	Lock-up control valve spring	0.8 (0.031)	6.6 (0.260)	44.3 (1.744)	25.5
(5)	Lock-up timing valve spring	0.65 (0.026)	6.6 (0.260)	34.8 (1.370)	15.6

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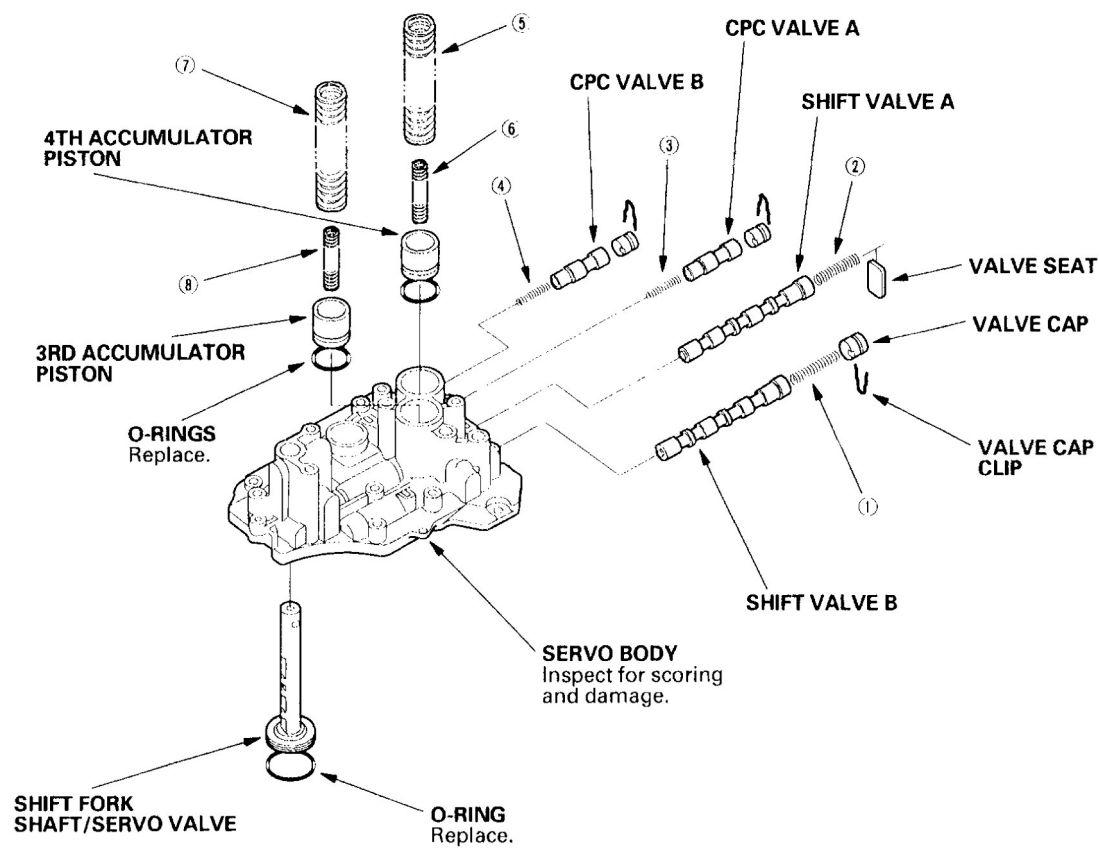
Fig. 29: Regulator Valve Body Spring Specifications Table

SERVO BODY DISASSEMBLY, INSPECTION, AND REASSEMBLY

1. Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air. Blow out all passages.
2. Check all valves for free movement. If any fail to slide freely, refer to Valve Body Repair (see **Valve Body Repair**).
3. Replace the valve body as an assembly if any parts are worn or damaged.
4. Coat all parts with ATF during reassembly.

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Fig. 30: Exploded View Of Servo Body Components

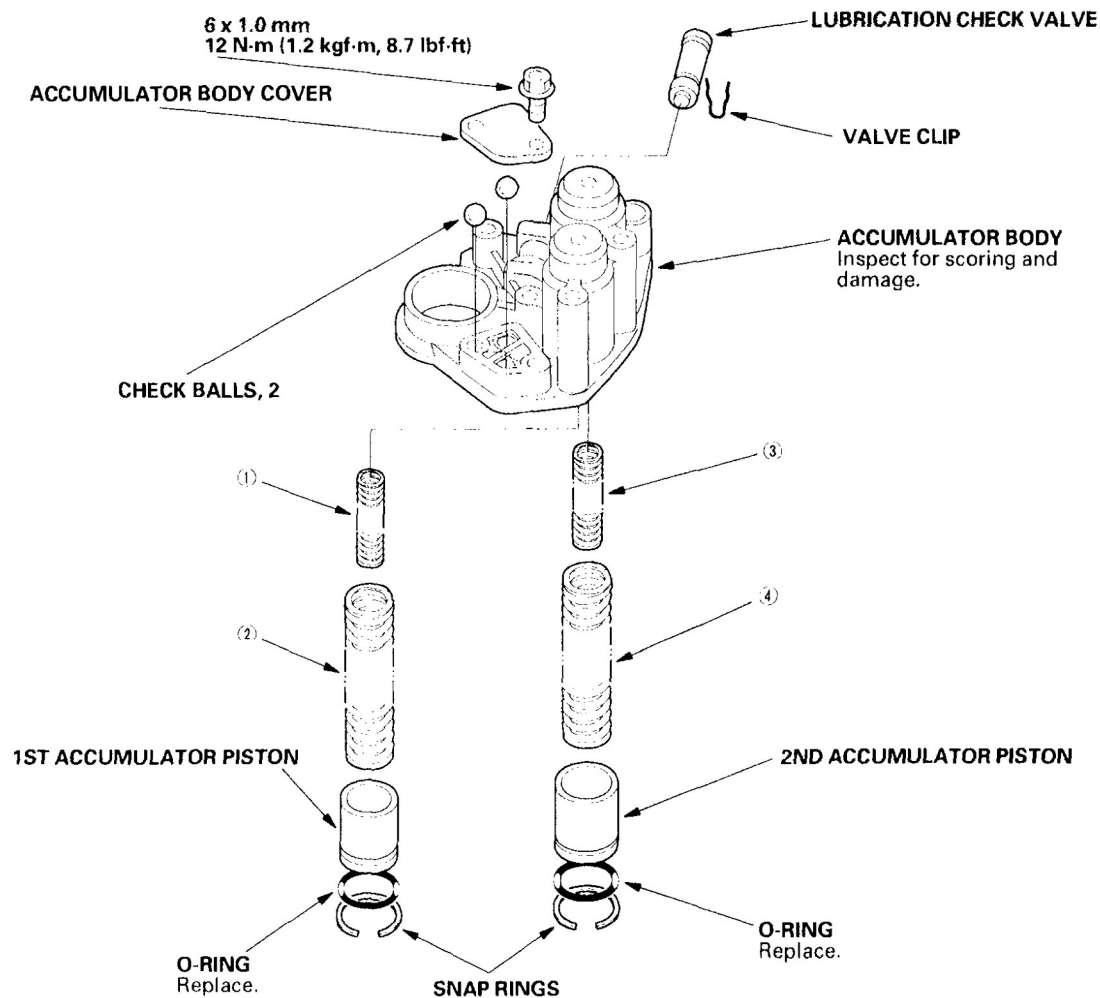
No.	Spring	Standard (New)-Unit: mm (in.)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Shift valve B spring	0.8 (0.031)	7.1 (0.280)	40.4 (1.591)	16.9
②	Shift valve A spring	0.8 (0.031)	7.1 (0.280)	40.4 (1.591)	16.9
③	CPC valve A spring	0.7 (0.028)	6.1 (0.240)	17.8 (0.701)	7.9
④	CPC valve B spring	0.7 (0.028)	6.1 (0.240)	17.8 (0.701)	7.9
⑤	4th accumulator spring A	2.6 (0.102)	19.6 (0.772)	66.4 (2.614)	9.7
⑥	4th accumulator spring B	2.4 (0.094)	12.8 (0.504)	51.5 (2.028)	11.5
⑦	3rd accumulator spring A	2.6 (0.102)	19.6 (0.772)	66.4 (2.614)	9.7
⑧	3rd accumulator spring B	2.4 (0.094)	12.8 (0.504)	51.5 (2.028)	11.5

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Fig. 31: Servo Body Spring Specifications Table

ACCUMULATOR BODY DISASSEMBLY, INSPECTION, AND REASSEMBLY

1. Do not use a magnet to remove the check balls; it may magnetize the balls.
2. Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air. Blow out all passages.
3. Coat all parts with ATF during reassembly.



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Fig. 32: Exploded View Of Accumulator Body With Torque Specifications

No.	Springs	Standard (New)-Unit: mm (in.)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	1st accumulator spring B	2.7 (0.106)	14.8 (0.583)	52.5 (2.067)	11.3
②	1st accumulator spring A	2.6 (0.102)	21.6 (0.850)	80.5 (3.169)	11.2
③	2nd accumulator spring B	2.4 (0.094)	12.6 (0.496)	53.5 (2.106)	12.9
④	2nd accumulator spring A	2.7 (0.106)	19.6 (0.772)	66.3 (2.610)	9.9

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Fig. 33: Accumulator Body Spring Specifications Chart

TORQUE CONVERTER HOUSING

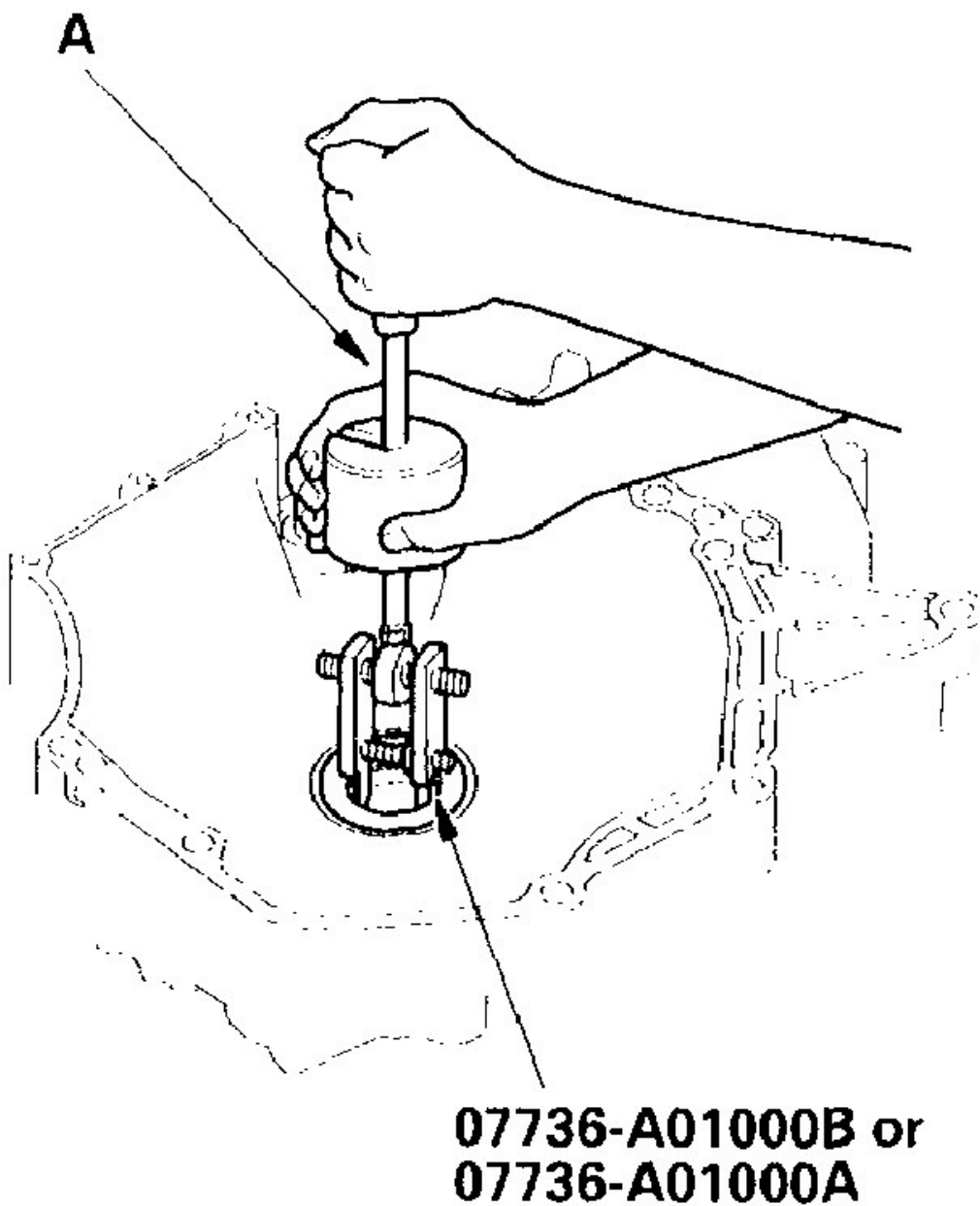
MAINSHAFT BEARING AND OIL SEAL REPLACEMENT

Special Tools Required

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- Adjustable bearing puller, 25-40 mm 07736-A01000B or 07736-A01000A
 - Driver 07749-0010000
 - Attachment, 62 x 68 mm 07746-0010500
 - Attachment, 72 x 75 mm 07746-0010600
1. Remove the mainshaft bearing and oil seal with the special tool and a commercially available 3/8"-16 slide hammer (A).



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Fig. 34: Removing Mainshaft Bearing & Oil Seal

2. Install the new mainshaft bearing until it bottoms in the housing with the special tools.

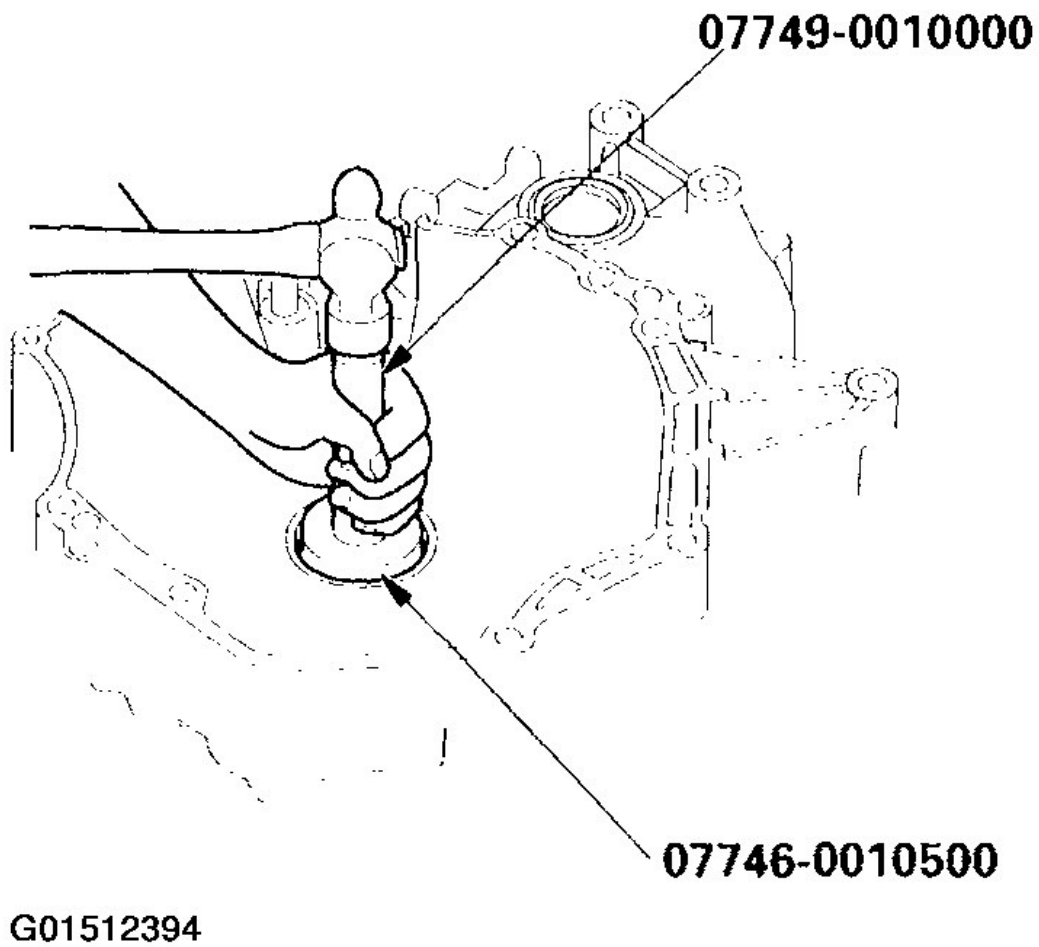


Fig. 35: Installing New Mainshaft Bearing

3. Install the new oil seal flush with the housing with the special tools.

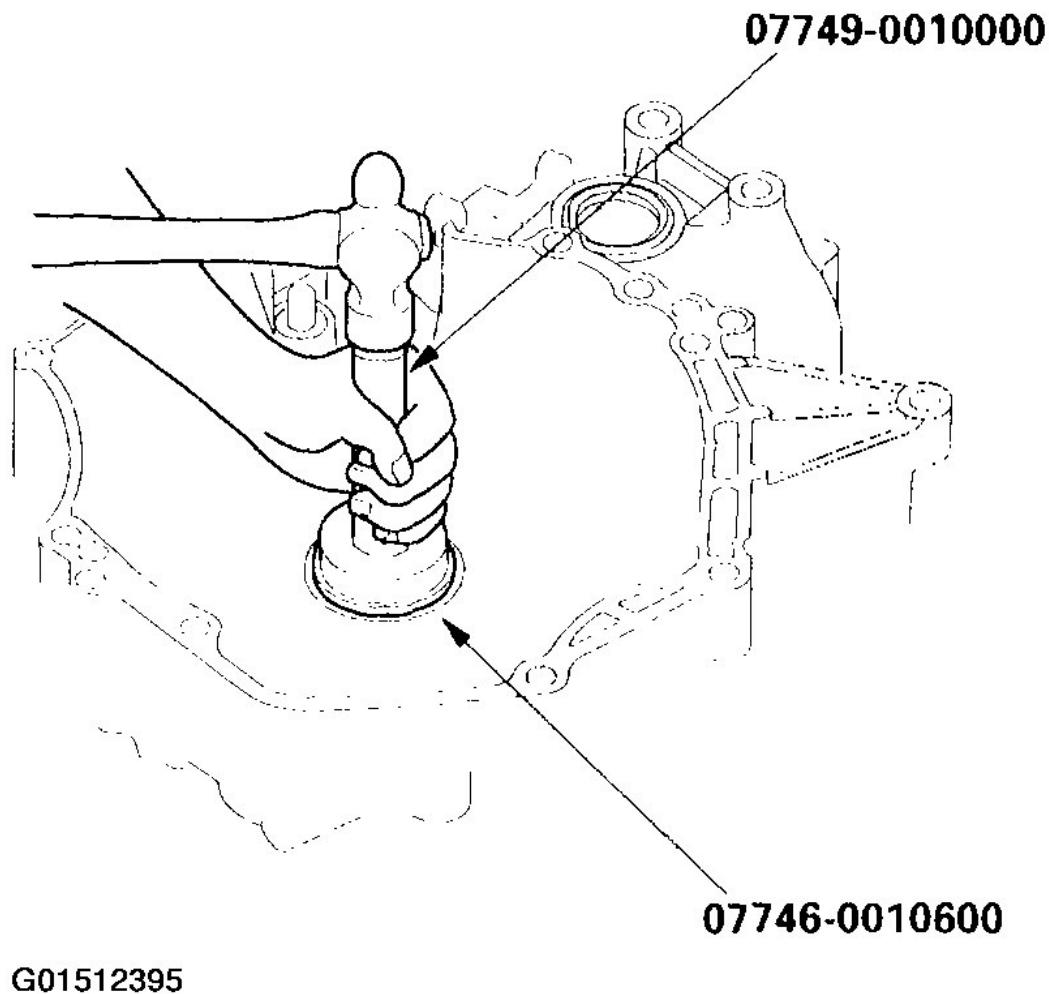


Fig. 36: Installing New Oil Seal Flush With Housing

COUNTERSHAFT BEARING REPLACEMENT

Special Tools Required

- Adjustable bearing puller, 25-40 mm 07736-A01000B or 07736-A01000A
- Driver 07749-0010000
- Attachment, 62 x 68 mm 07746-0010500

1. Remove the countershaft bearing (A) with the special tool and a commercially available 3/8"-16 slide hammer (B).

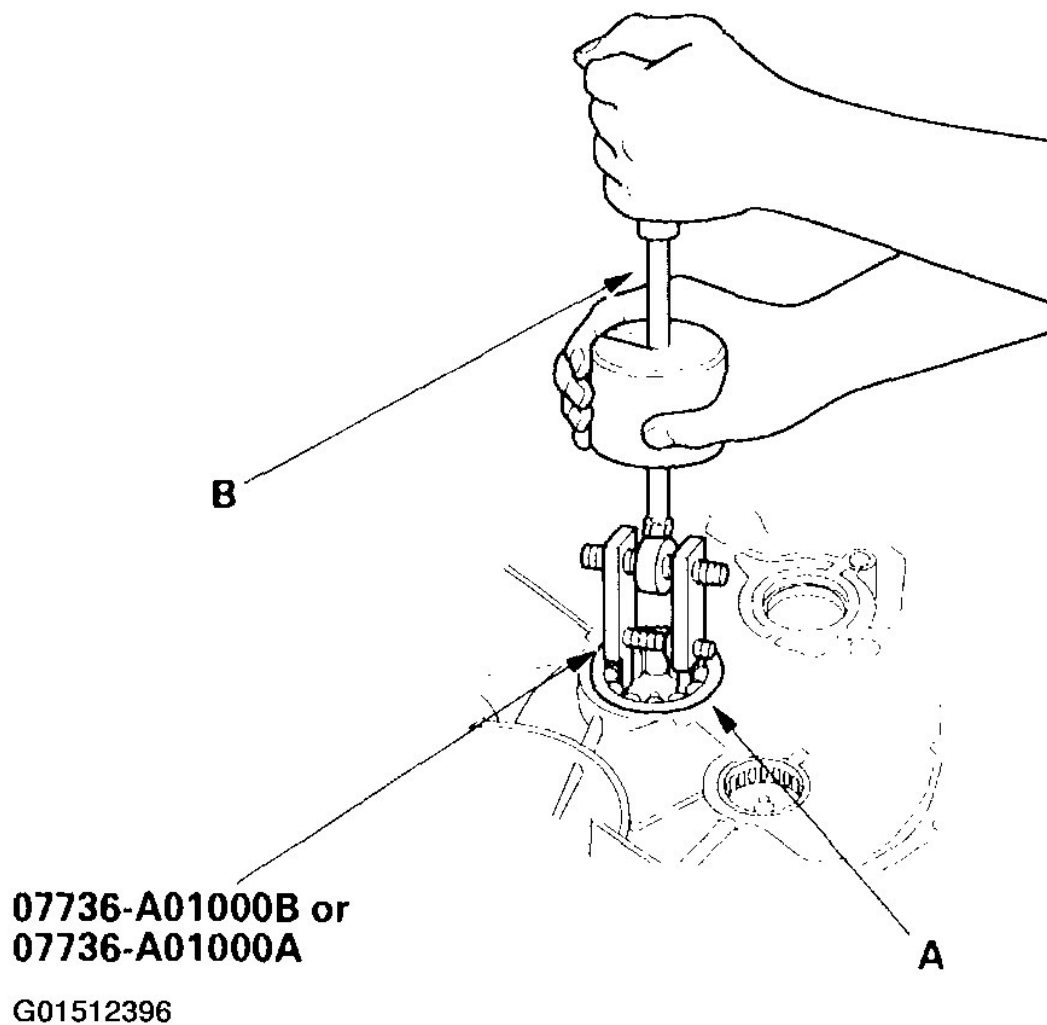


Fig. 37: Removing Countershaft Bearing

2. Install the ATF guide plate (A).

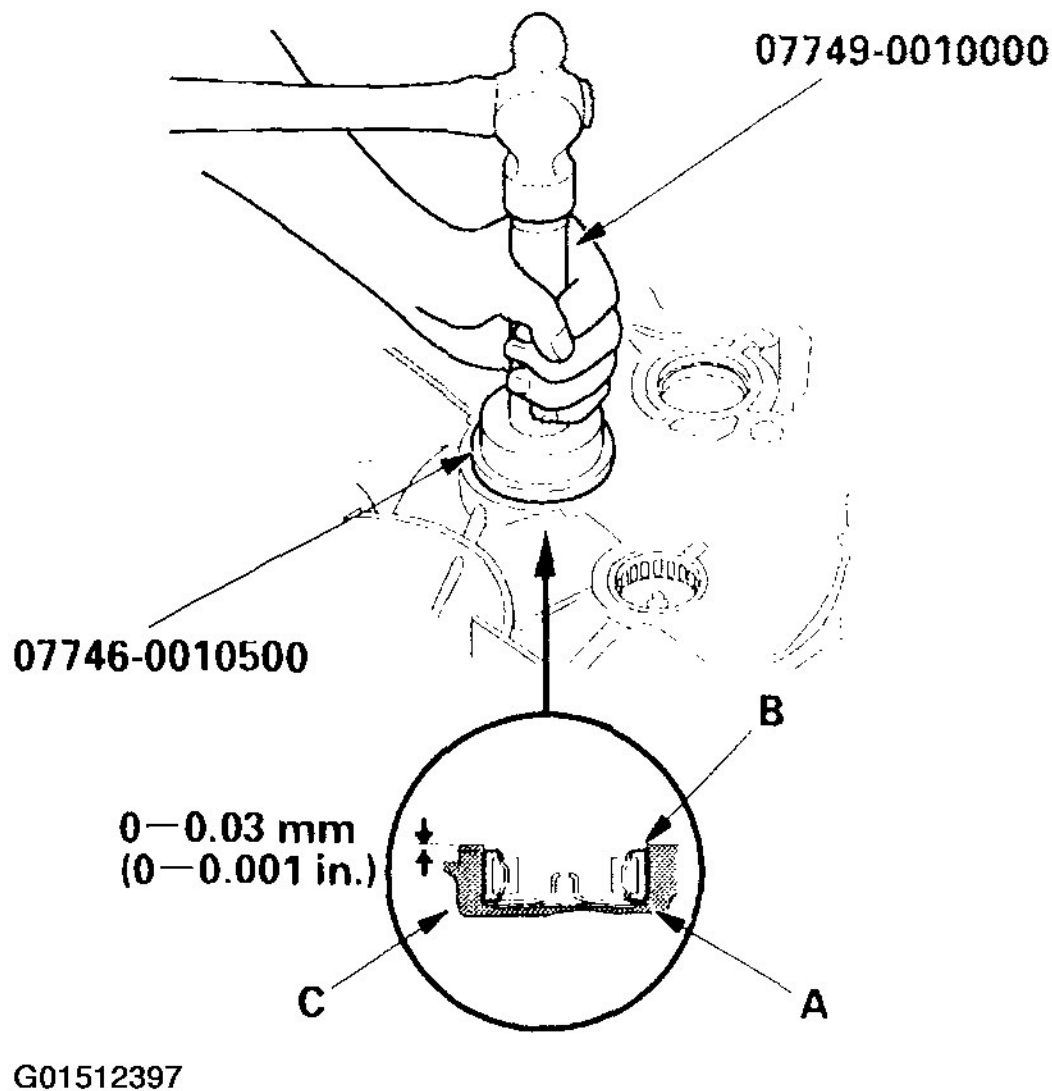


Fig. 38: Installing ATF Guide Plate

3. Install the new bearing (B) into the housing (C) with the special tools.

SECONDARY SHAFT BEARING REPLACEMENT

Special Tools Required

- Adjustable bearing puller, 25-40 mm 07736-A01000B or 07736-A01000A
- Driver 07749-0010000
- Driver attachment 07947-6340500

1. Remove the secondary shaft bearing (A) with the special tool and a commercially available 3/8"-16 slide hammer (B).

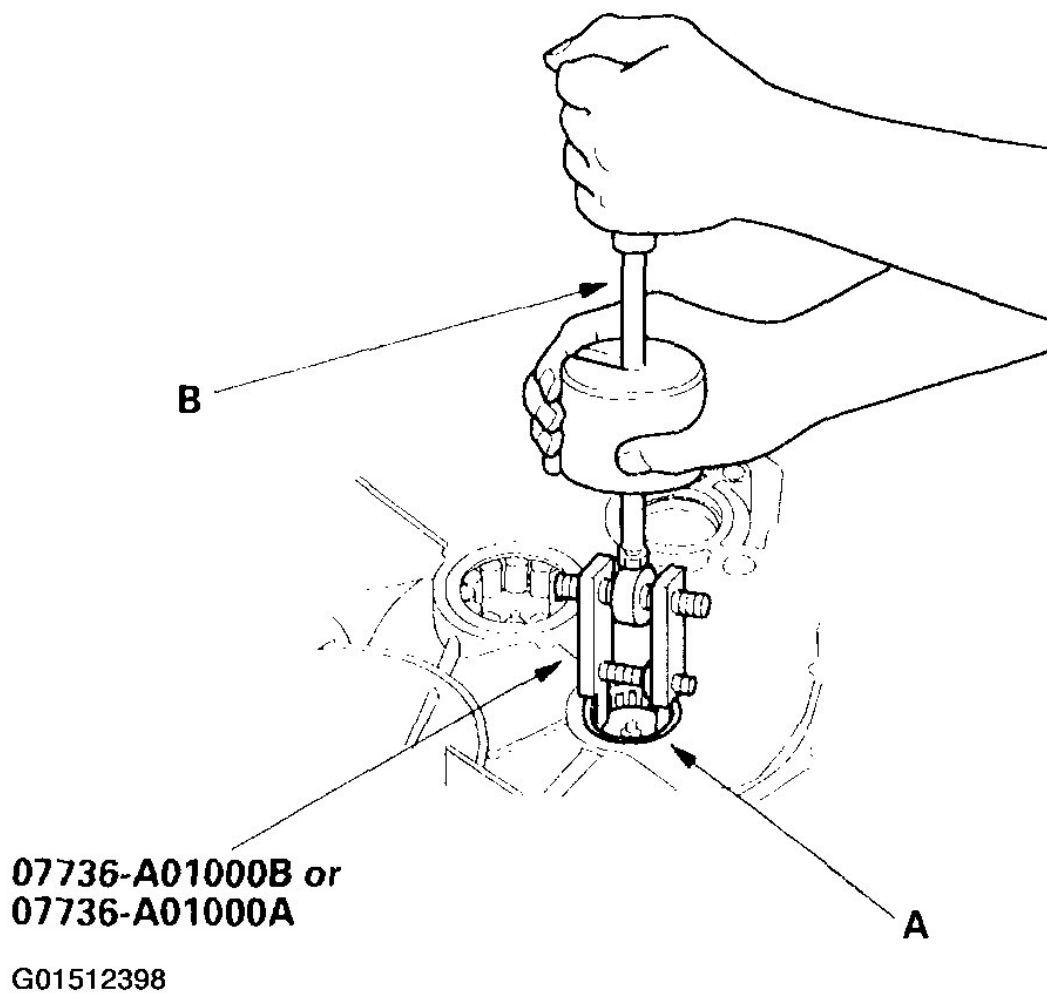


Fig. 39: Removing Secondary Shaft Bearing

2. Install the ATF guide plate (A).

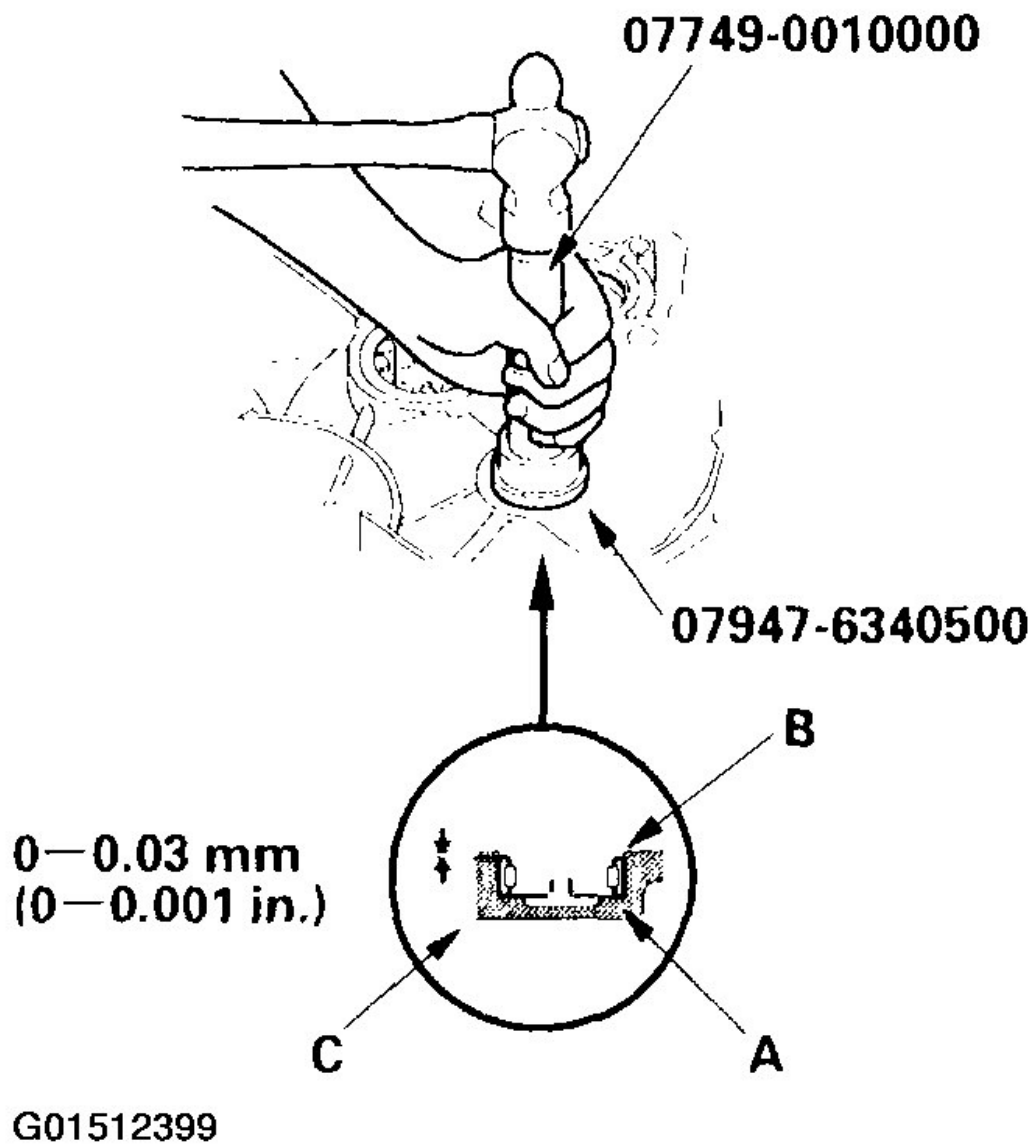


Fig. 40: Installing ATF Guide Plate

3. Install the new bearing (B) into the housing (C) with the special tools.

SHAFTS AND CLUTCHES

MAINSHAFT DISASSEMBLY, INSPECTION, AND REASSEMBLY

1. Lubricate all parts with ATF during reassembly.

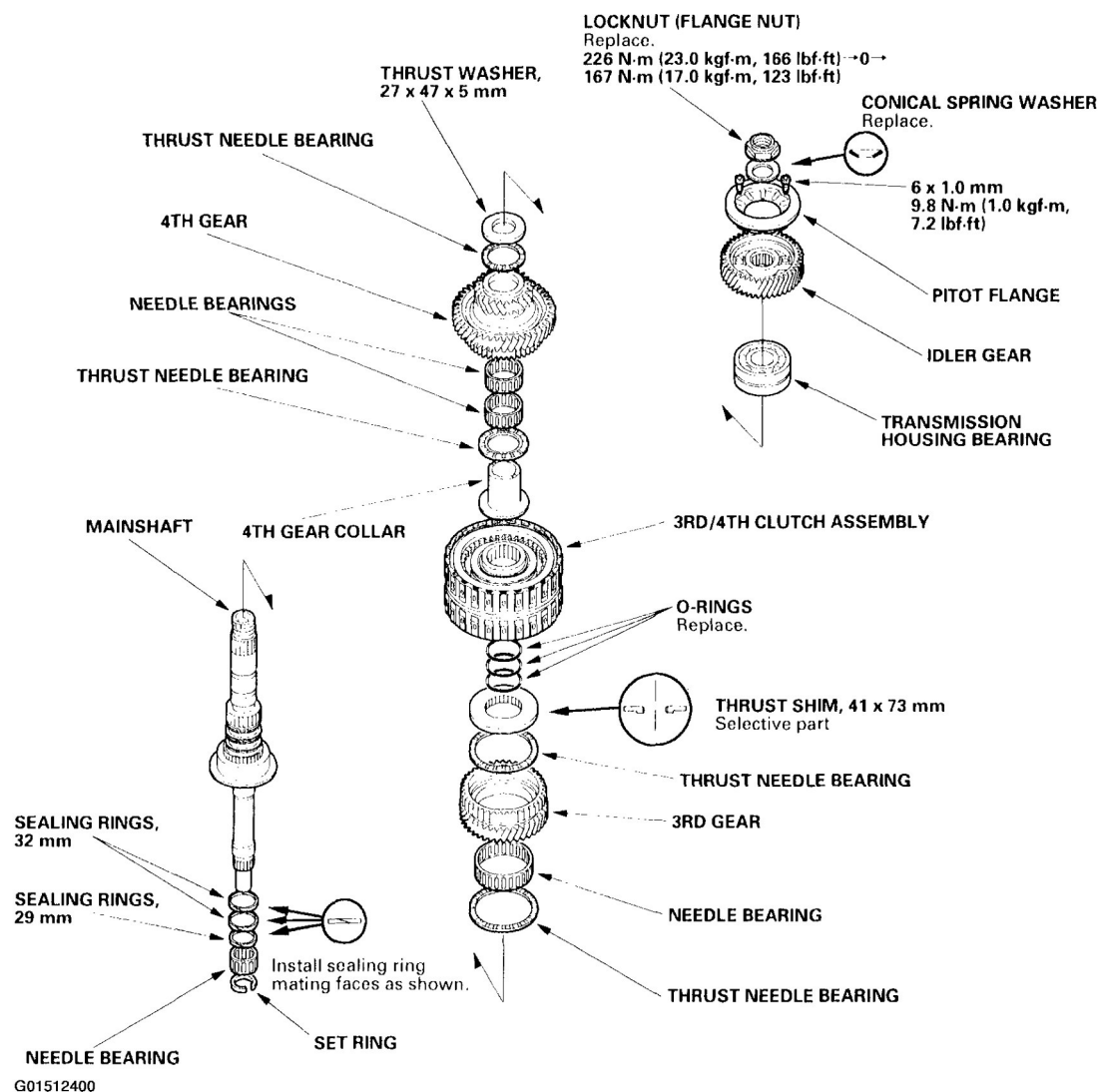
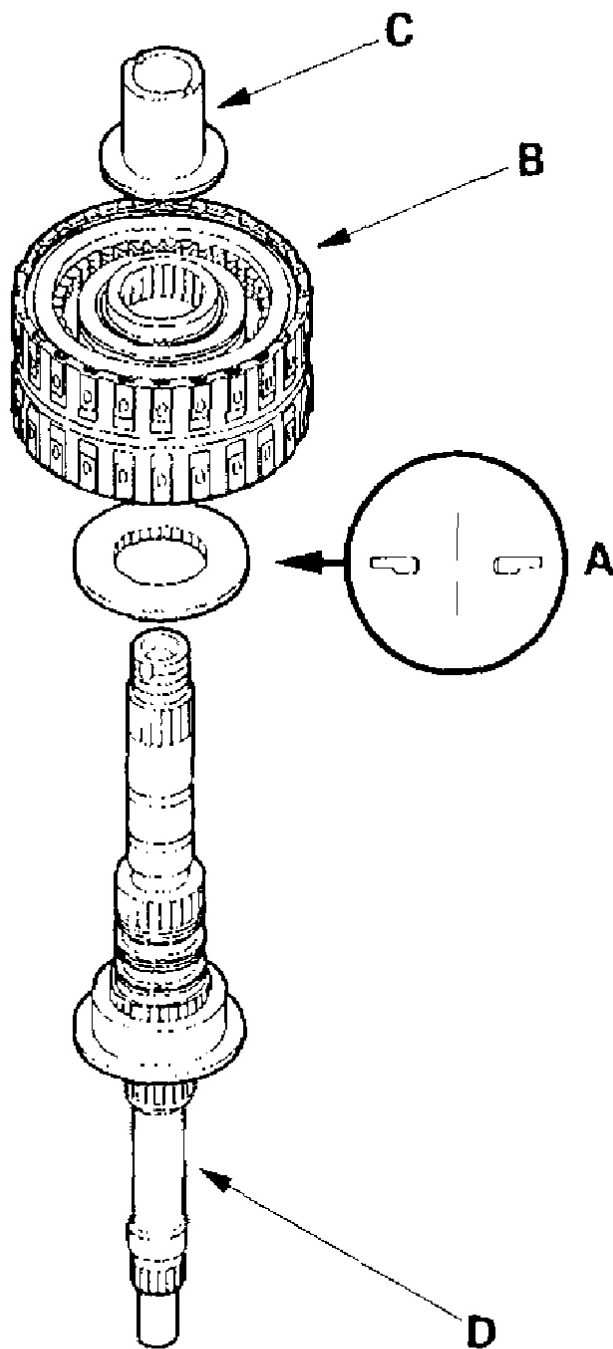


Fig. 41: Lubricating All Parts With ATF With Torque Specifications

2. Check the clearance of the 3rd/4th clutch assembly (see **3rd/4th Clutch Clearance Inspection**).
3. Inspect the thrust needle bearing and the needle bearing for galling and rough movement.
4. Inspect the splines for excessive wear and damage.
5. Check shaft bearing surfaces for scoring, scratches, and excessive wear.
6. Before installing the O-rings, wrap the shaft splines with tape to prevent damage to the O-rings.
7. Install the conical spring washer and 41 x 73 mm thrust shim in the direction shown.
8. Inspect condition of the sealing rings. If the sealing rings are worn, distorted, or damaged, replace them (see **Mainshaft Sealing Ring Replacement**).

3RD/4TH CLUTCH CLEARANCE INSPECTION

1. Remove the O-rings from the mainshaft.
2. Assemble the 41 x 73 mm thrust shim (A), 3rd/4th clutch assembly (B), and 4th gear collar (C) on the mainshaft (D).



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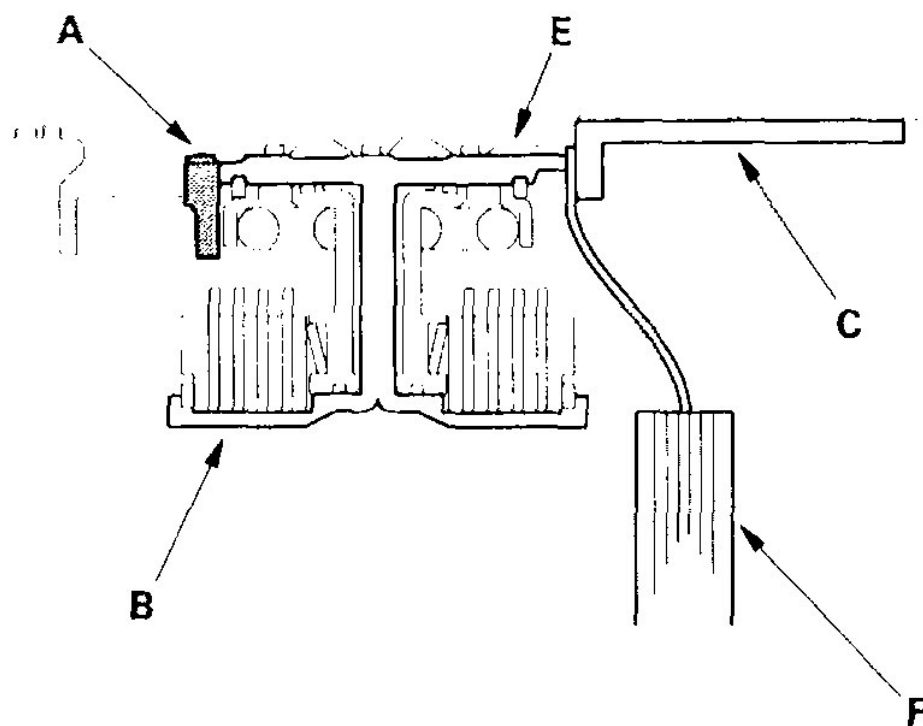
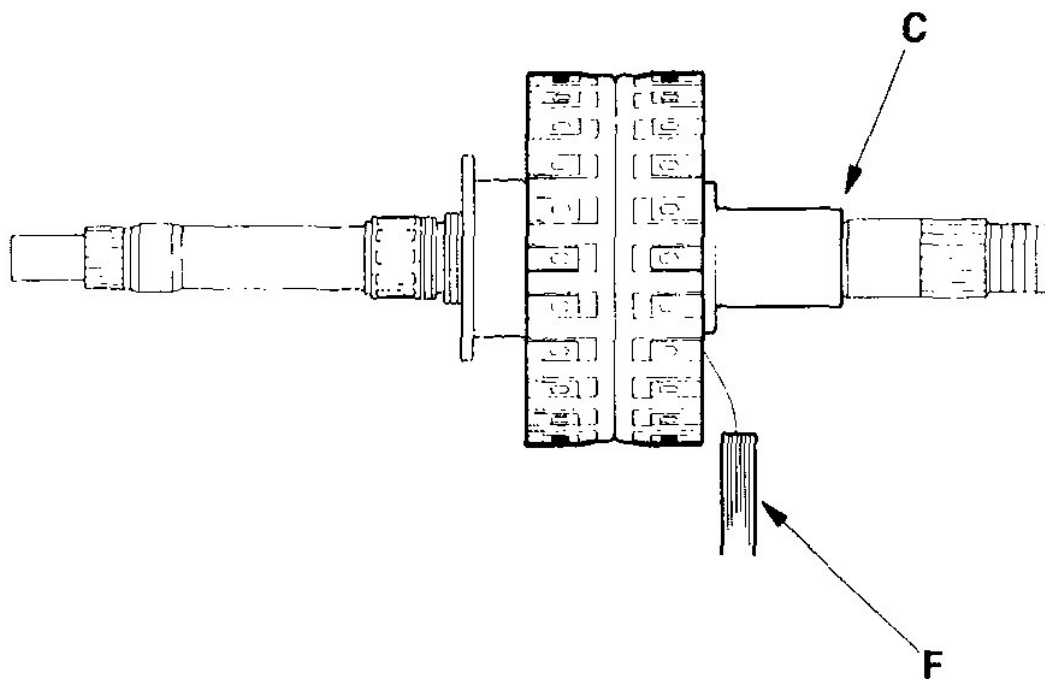
Fig. 42: Assembling Thrust Shim

3. Hold the 4th gear collar (C) against the clutch assembly (B), then measure the clearance between the clutch guide (E) and the 4th gear collar with a feeler gauge (F) in at least three places. Use the average as the actual clearance.

Standard: 0.03-0.11 mm (0.001-0.004 in.)

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G01512402

Fig. 43: Measuring Clearance Between Clutch Guide & 4th Gear Collar

4. If the clearance is out of standard, remove the thrust shim and measure its thickness.
5. Select and install a new shim, then recheck.

No.	Part Number	Thickness
1	90414-P7T-000	7.85 mm (0.309 in.)
2	90415-P7T-000	7.90 mm (0.311 in.)
3	90416-P7T-000	7.95 mm (0.313 in.)
4	90417-P7T-000	8.00 mm (0.315 in.)
5	90418-P7T-000	8.05 mm (0.317 in.)
6	90419-P7T-000	8.10 mm (0.319 in.)

G01512403

Fig. 44: 3rd/4th Clutch Thrust Shim Selection Chart

6. After replacing the thrust shim, make sure the clearance is within standard.

MAINSHAFT SEALING RING REPLACEMENT

The sealing rings are synthetic resin with chamfered ends. Check the condition of the sealing rings, and replace them only if they are worn, distorted, or damaged.

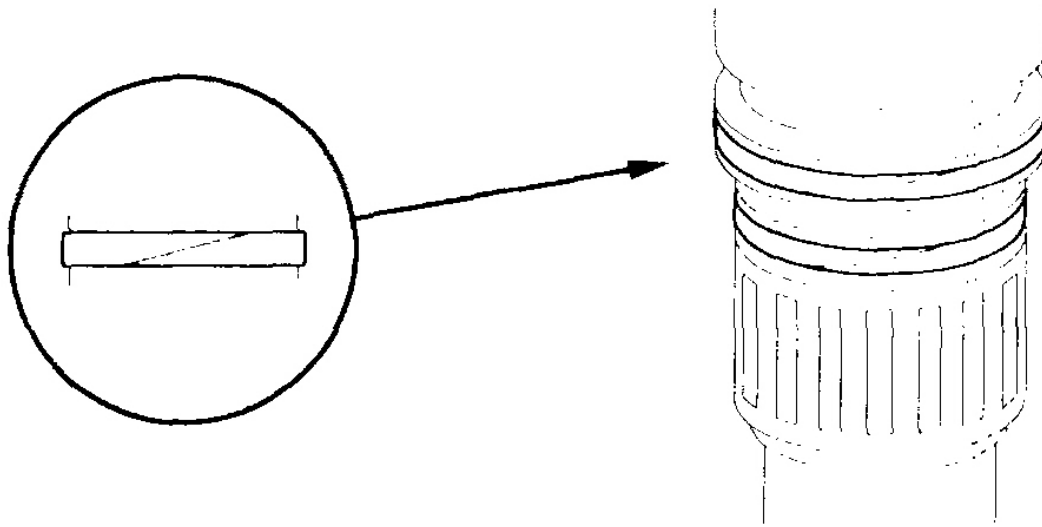
1. For a better fit, squeeze sealing rings together slightly before installing them.



G01512404

Fig. 45: Squeezing Mainshaft Sealing Rings Together Slightly

2. Apply ATF to the new sealing rings then install them on the mainshaft.



G01512405

Fig. 46: Applying ATF To New Mainshaft Sealing Rings

3. After installing the sealing rings, verify the following:

- The rings are fully seated in the groove.
- The rings are not twisted.
- The chamfered ends of the rings are properly joined.

COUNTERSHAFT DISASSEMBLY, INSPECTION, AND REASSEMBLY

1. Remove the locknut, and take off components down to the reverse selector hub.

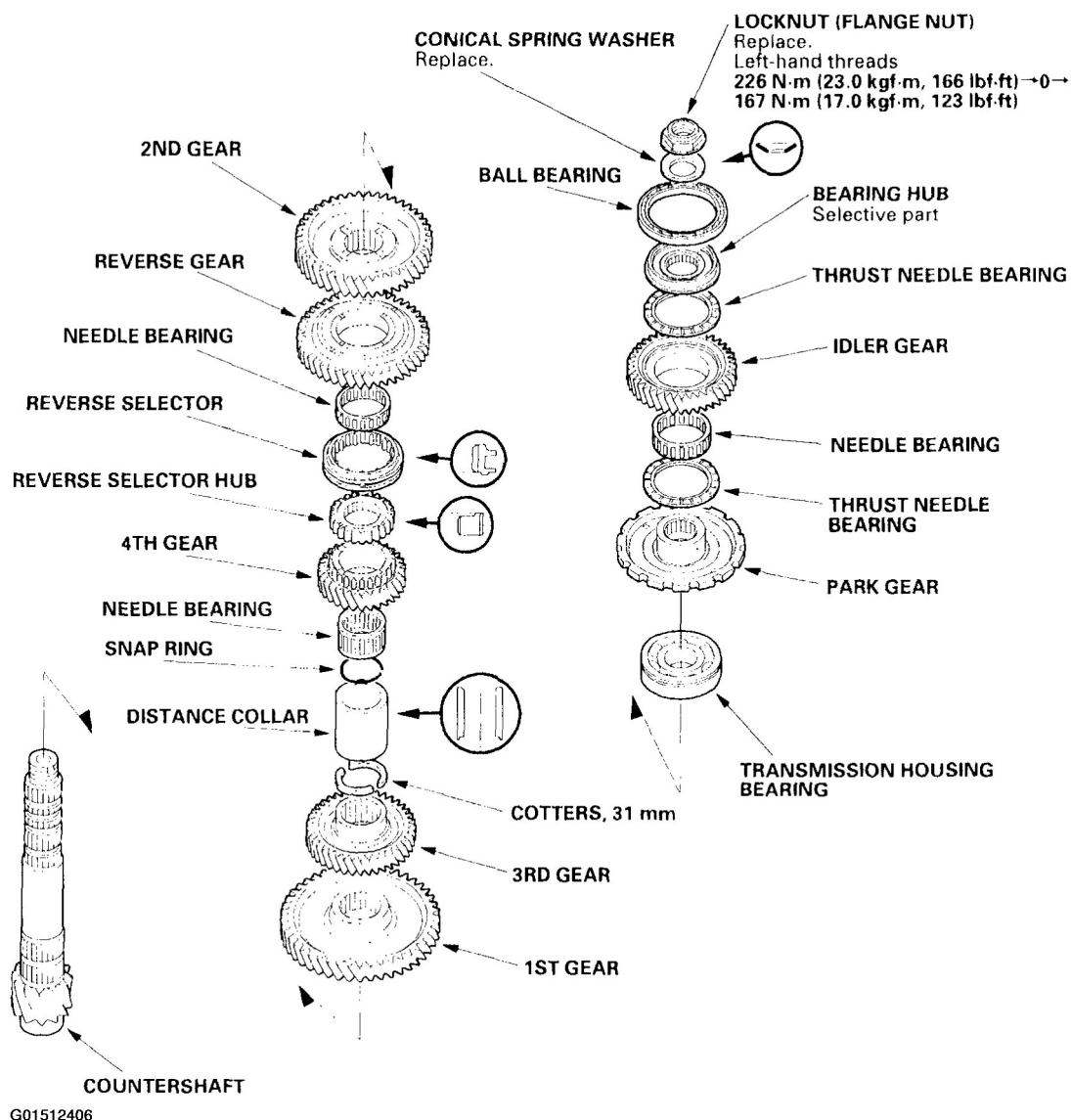


Fig. 47: Exploded View Of Countershaft Assembly With Torque Specifications

2. Remove the reverse selector hub, 3rd gear, and 1st gear (see **Countershaft Reverse Selector Hub, 3rd Gear, and 1st Gear Removal**).
3. Check the bearing in the bearing hub for wear and rough movement. If the bearing is worn or damaged, replace it (see **Countershaft Bearing Hub/Bearing Replacement**).
4. Inspect the thrust needle bearing and the needle bearing for galling and rough movement.
5. Check the splines for excessive wear and damage.
6. Check the shaft bearing surfaces for scoring, scratches, and excessive wear.
7. Lubricate all parts with ATF, and reassemble the shafts and gears.
8. Install the conical spring washer, reverse selector, reverse selector hub, and distance collar in the direction shown.

COUNTERSHAFT REVERSE SELECTOR HUB, 3RD GEAR, AND 1ST GEAR REMOVAL

1. Remove the reverse selector hub (A) and the 4th gear (B) from the countershaft with a press. Place a shaft protector (C) between the countershaft and press to prevent damaging the countershaft.

NOTE: Some reverse selector hubs are not press-fitted, and can be removed without using a puller.

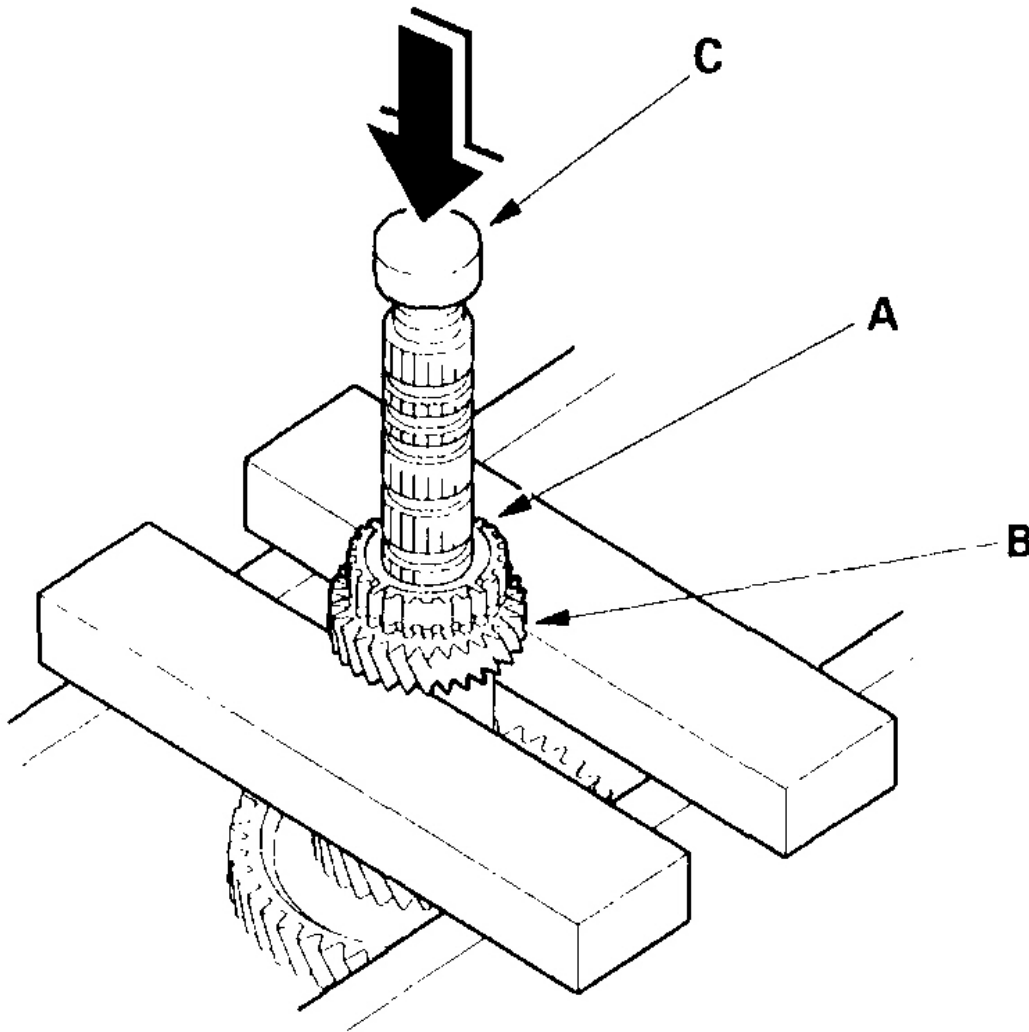
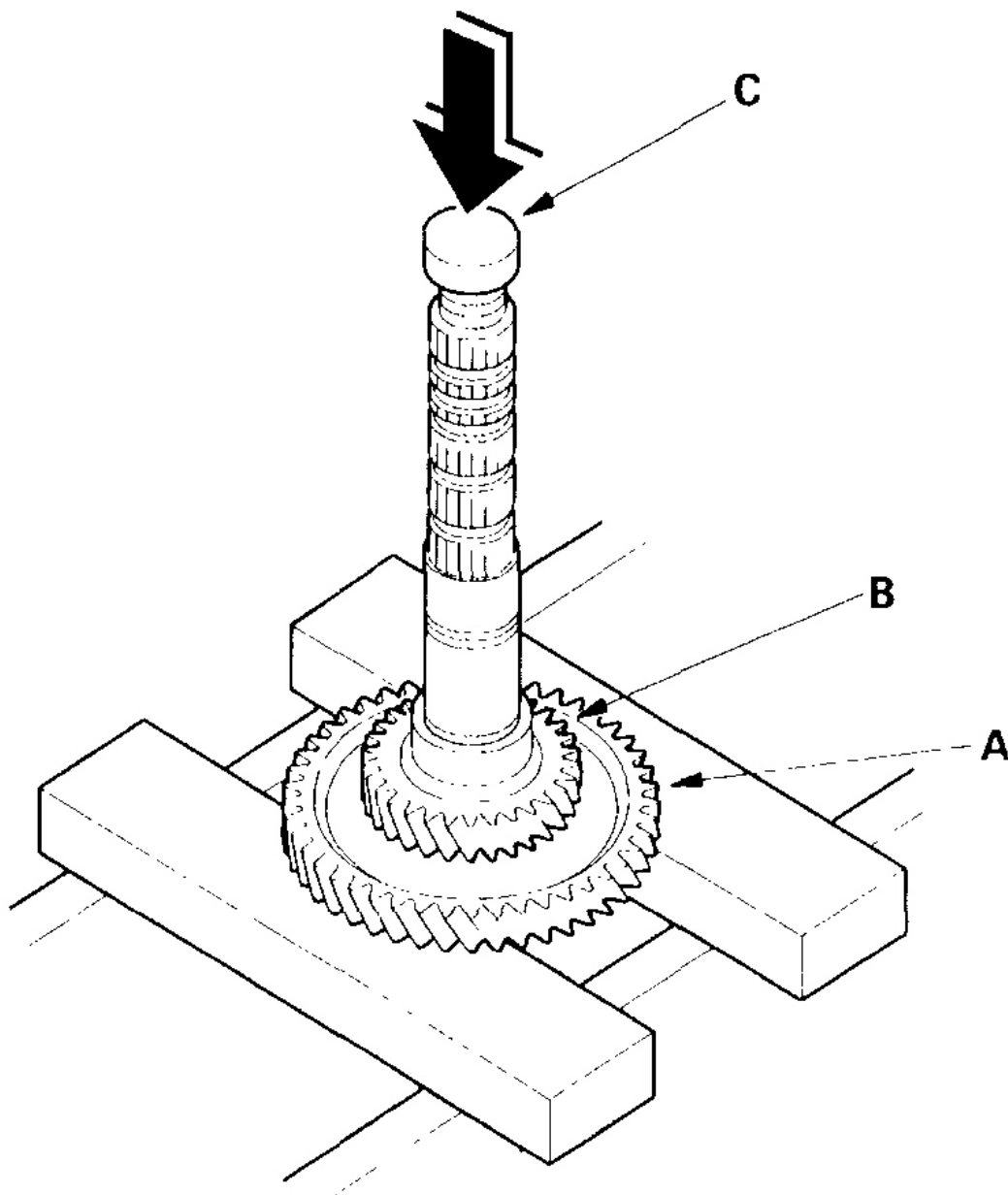
**G01512407**

Fig. 48: Removing Reverse Selector Hub

2. Remove the needle bearing, snap ring, distance collar, and 31 mm cotters from the countershaft.

3. Remove the 1st gear (A) and 3rd gear (B) together from the countershaft with a press. Place a shaft protector (C) between the countershaft and press to prevent damaging the countershaft.



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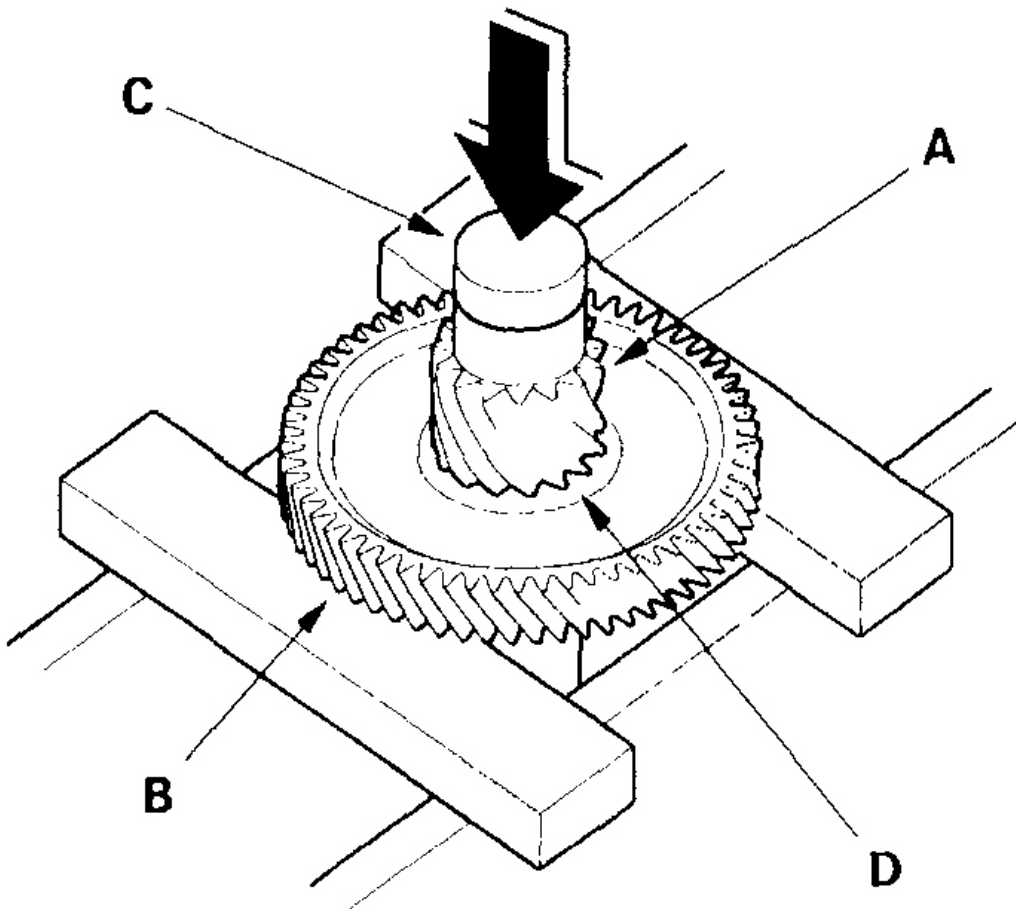
Fig. 49: Removing 1st Gear & 3rd Gear Together

COUNTERSHAFT REVERSE SELECTOR HUB, 3RD GEAR, AND 1ST GEAR INSTALLATION

Special Tools Required

Driver, 40 mm I.D. 07746-0030100

1. Apply ATF to the parts.
2. Align the shaft splines with those on 1st gear, then press the countershaft (A) into the 1st gear (B) with a press.
 - Place an attachment (C) between the press and countershaft to prevent damaging the countershaft.
 - Stop pressing the countershaft when the 1st gear contacts the final drive gear (D).



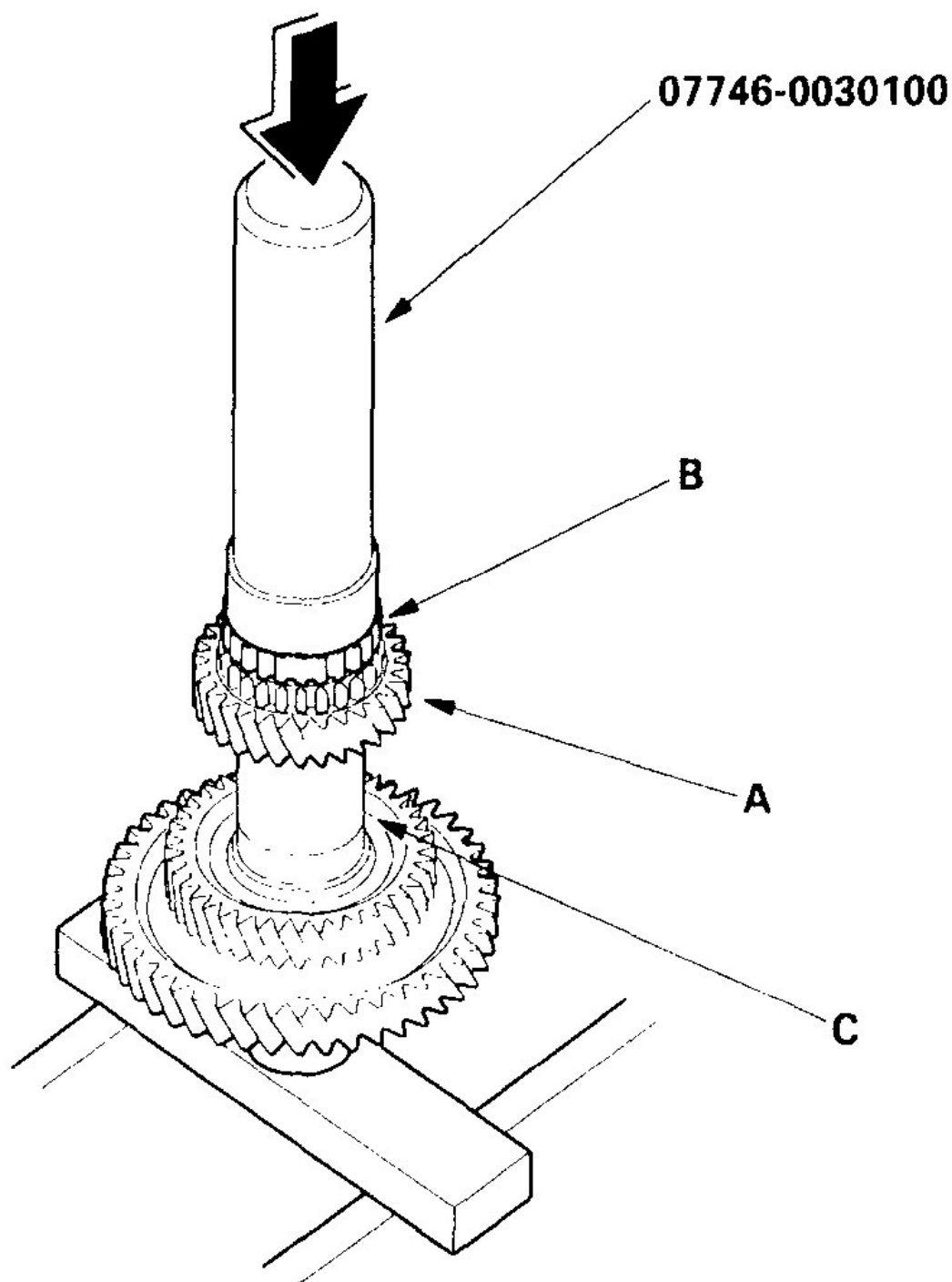
G01512409

Fig. 50: Pressing Countershaft Into 1st Gear

3. Align the shaft splines with those on 3rd gear, then press the countershaft into the 3rd gear with a press.

- Place an attachment between the press and countershaft to prevent damaging the countershaft.
 - Stop pressing the countershaft when the 3rd gear contacts the 1st gear.
4. Install the 31 mm cotters, distance collar, snap ring, needle bearing, and 4th gear (A) on the countershaft.
 5. Slide the reverse selector hub (B) over the countershaft (C), and then press it into place with the special tool and a press.

NOTE: **Some reverse selector hubs are not press-fitted and can be installed without using the special tool and a press.**



G01512410

Fig. 51: Installing 4th Gear (A) & Reverse Selector Hub (B) On Countershaft

COUNTERSHAFT BEARING HUB/BEARING REPLACEMENT**Special Tools Required**

- Driver 07749-0010000
 - Attachment, 42 x 47 mm 07746-0010300
 - Attachment, 62 x 68 mm 07746-0010500
1. Check the bearing for wear, damage, and rough movement. If the bearing is worn or damaged, replace it.
 2. Remove the bearing (A) from the bearing hub with the special tools, a bearing separator (B) and a press.

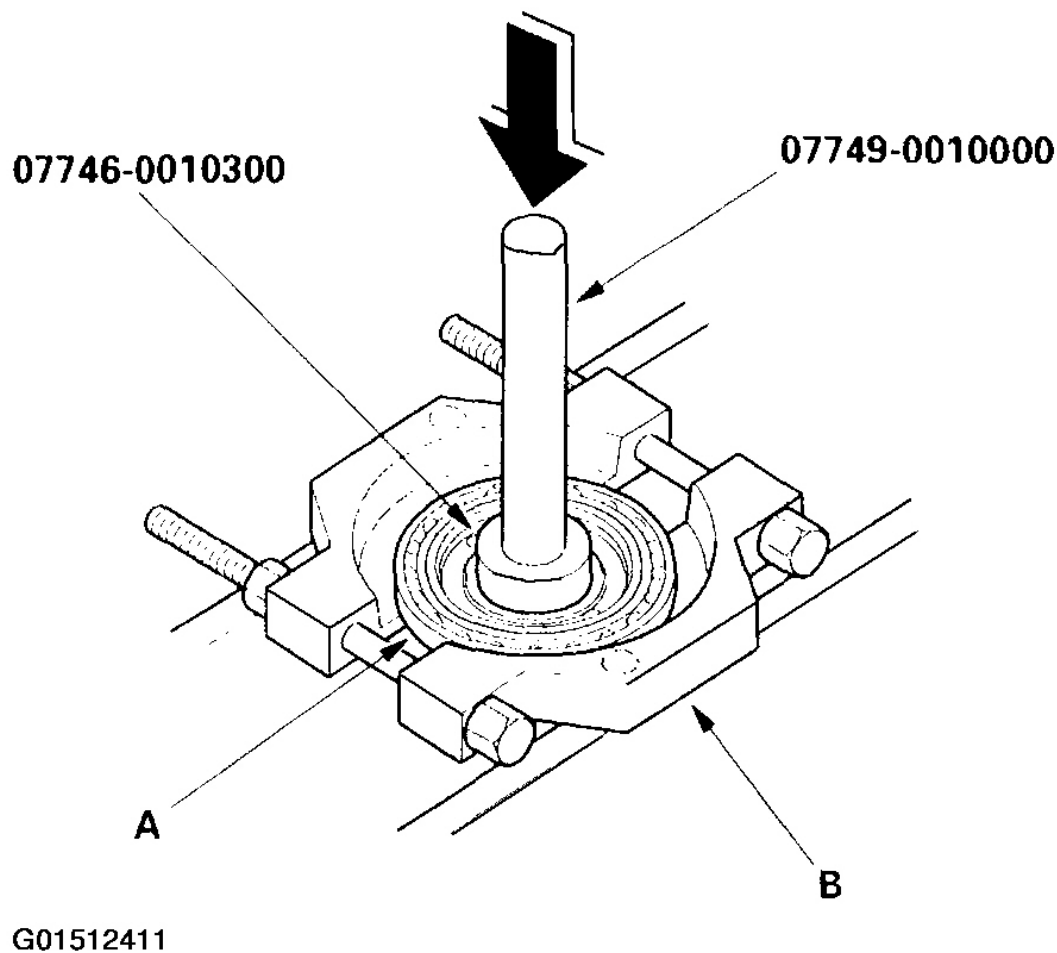
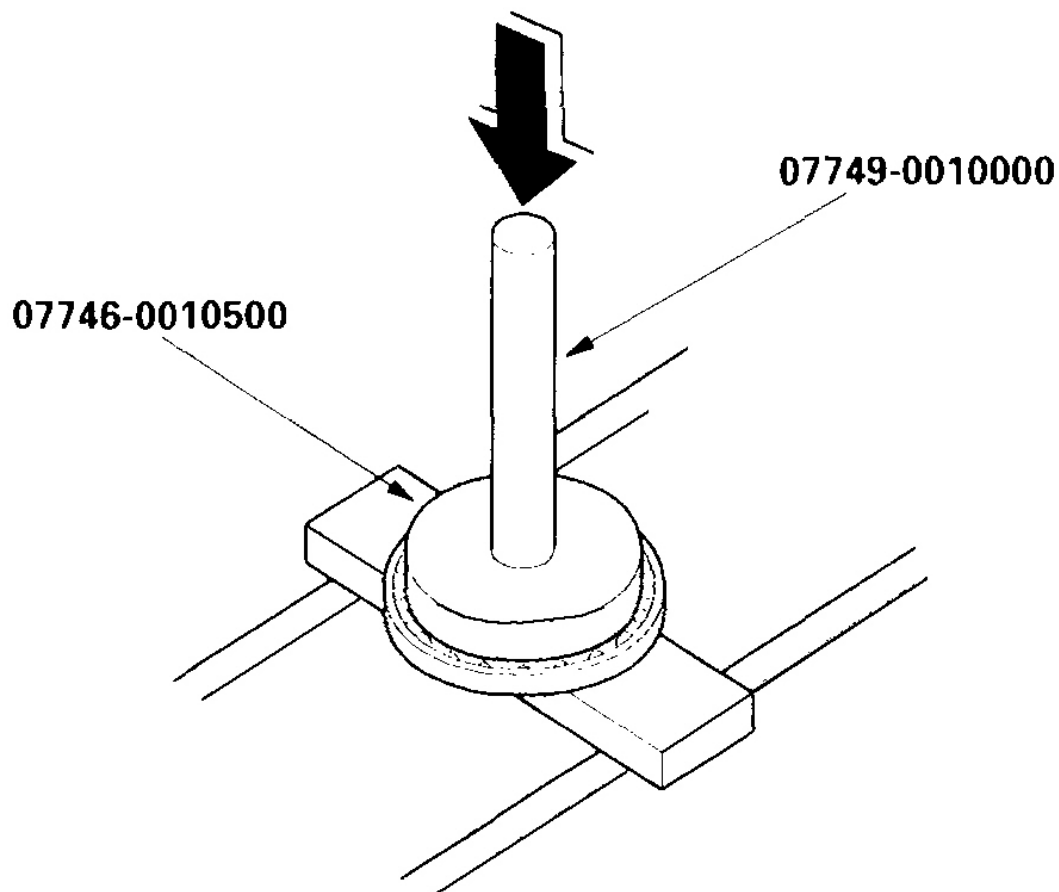


Fig. 52: Removing Bearing From Bearing Hub

3. Install the new bearing on the bearing hub with the special tools and a press.

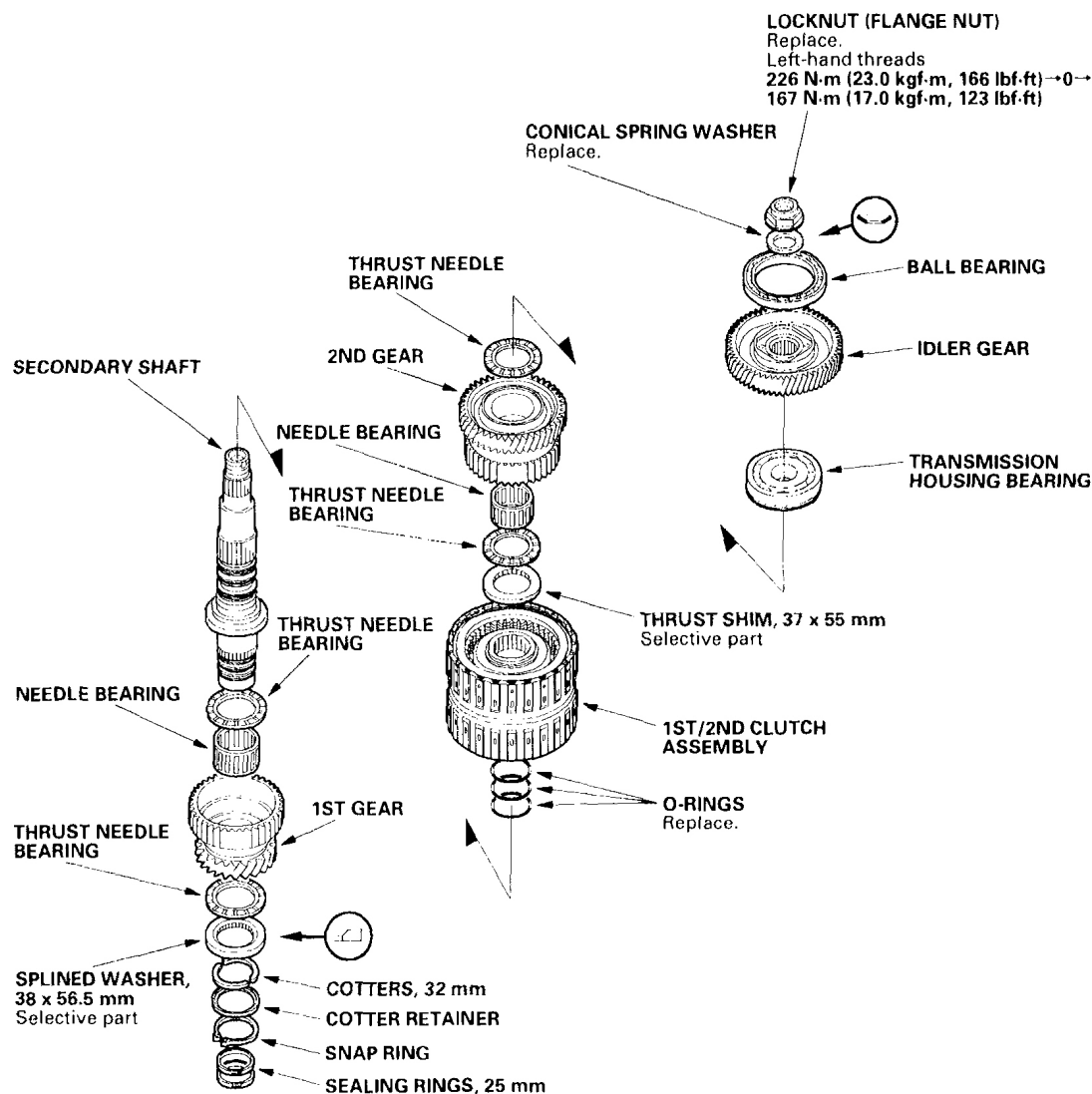


G01512412

Fig. 53: Installing New Bearing On Bearing Hub

SECONDARY SHAFT DISASSEMBLY, INSPECTION, AND REASSEMBLY

1. Remove the locknut, and disassemble the shaft and gears.



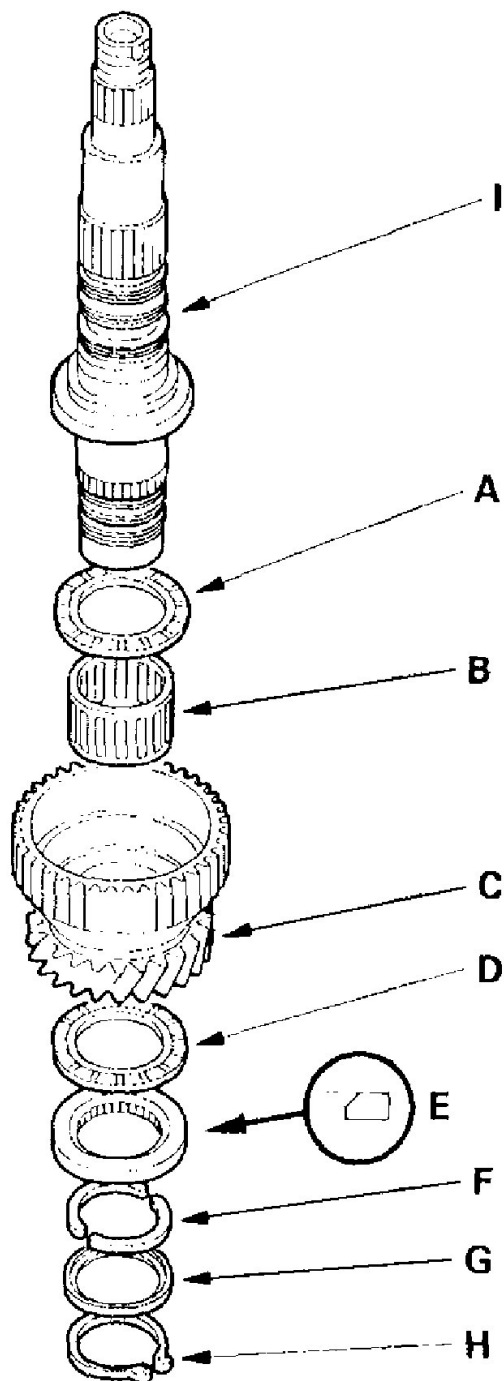
G01512413

Fig. 54: Exploded View Of Secondary Shaft Assembly With Torque Specifications

- Inspect the thrust needle bearing and the needle bearing for galling and rough movement.
- Check clearance of the secondary shaft assembly (see **Secondary Shaft Clearance Inspection**).
- Check the splines for excessive wear and damage.
- Check the shaft bearing surfaces for scoring, scratches, and excessive wear.
- Check the idler gear bearing for wear and rough movement. If the bearing is worn or damaged, replace it (see **Secondary Shaft Idler Gear Bearing Replacement**).
- Before installing the O-rings, wrap the shaft splines with tape to prevent damage to the O-rings.
- Lubricate all parts with ATF during reassembly.
- Install the conical spring washer and 38 x 56.5 splined washer in the direction shown in **Fig. 54**.

SECONDARY SHAFT CLEARANCE INSPECTION

1. Remove the O-rings from the shaft.
2. Assemble the thrust needle bearing (A), needle bearing (B), 1st gear (C), thrust needle bearing (D), 38 x 56.5 mm splined washer (E), 32 mm cotters (F), cotter retainer (G), and snap ring (H) on the secondary shaft (I).

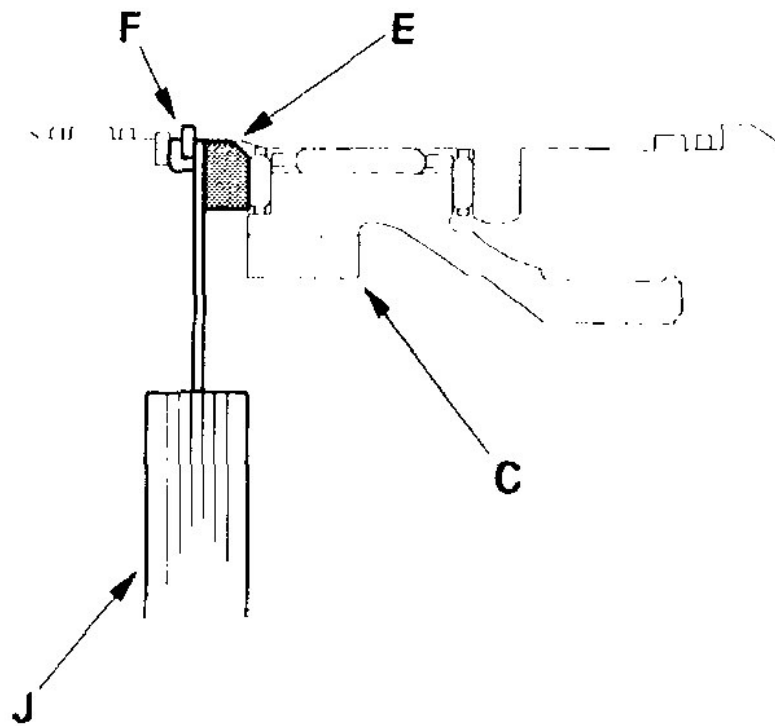
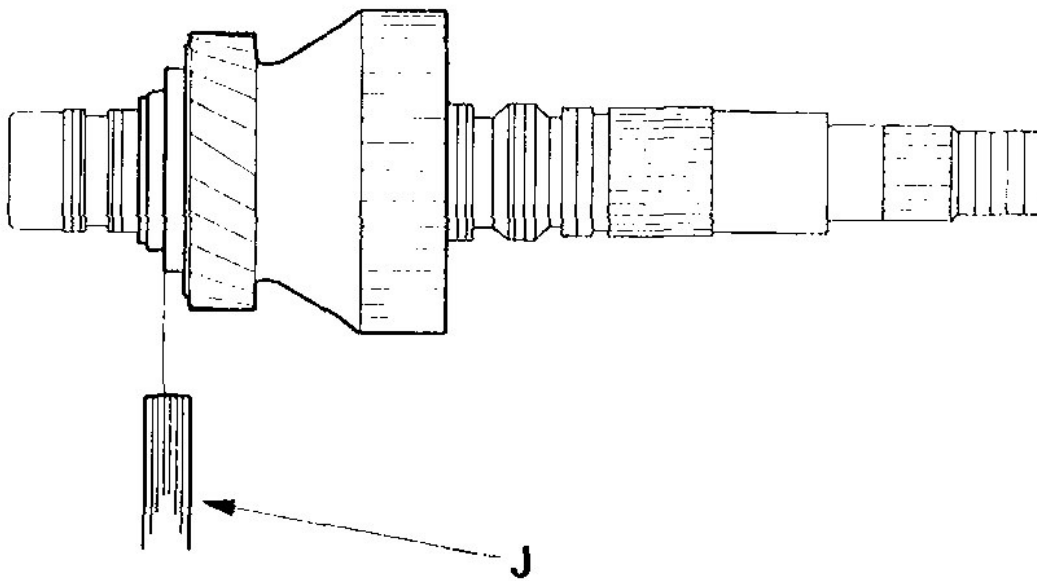


G01512414

Fig. 55: Assembling Secondary Shaft Thrust Needle Bearing

3. Measure the clearance between the 38 x 56.5 mm splined washer (E) and cotters (F) with a feeler gauge (J) in at least three places. Use the average as the actual clearance.

Standard: 0.07-0.15 mm (0.003-0.006 in.)



G01512415

Fig. 56: Measuring Clearance Between Secondary Shaft Splined Washer & Cotters

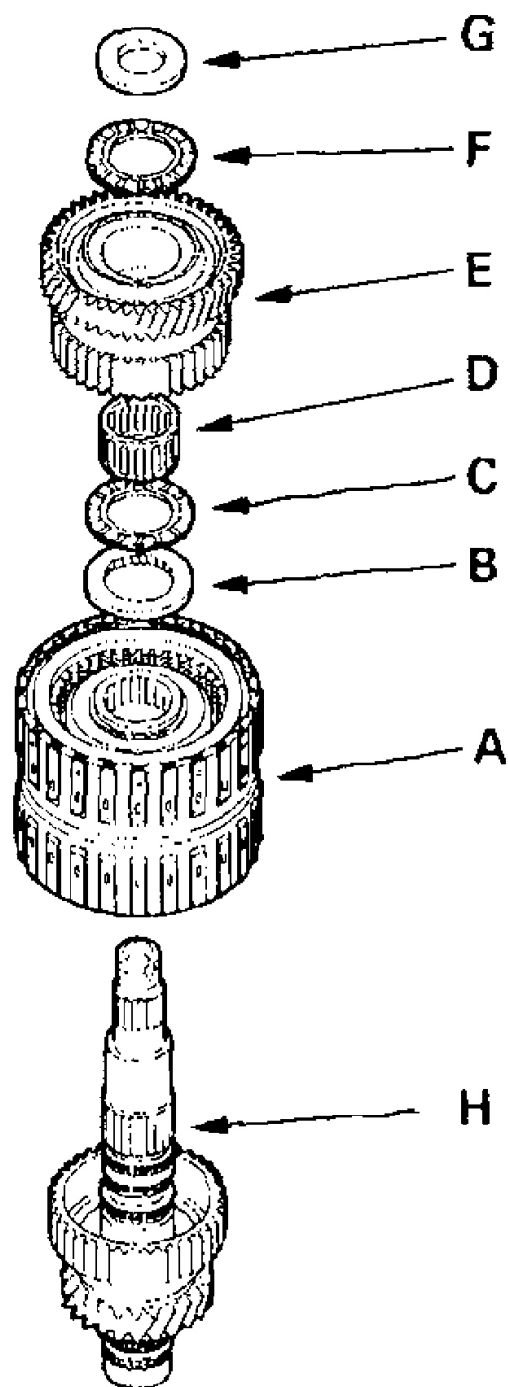
4. If the clearance is out of standard, remove the splined washer, and measure its thickness.
5. Select and install a new splined washer, then recheck.

No.	Part Number	Thickness
1	90502-P0Z-000	6.85 mm (0.270 in.)
2	90503-P0Z-000	6.90 mm (0.272 in.)
3	90504-P0Z-000	6.95 mm (0.274 in.)
4	90505-P0Z-000	7.00 mm (0.276 in.)
5	90506-P0Z-000	7.05 mm (0.278 in.)
6	90507-P0Z-000	7.10 mm (0.280 in.)

G01512416

Fig. 57: Secondary Shaft Splined Washer Selection Chart

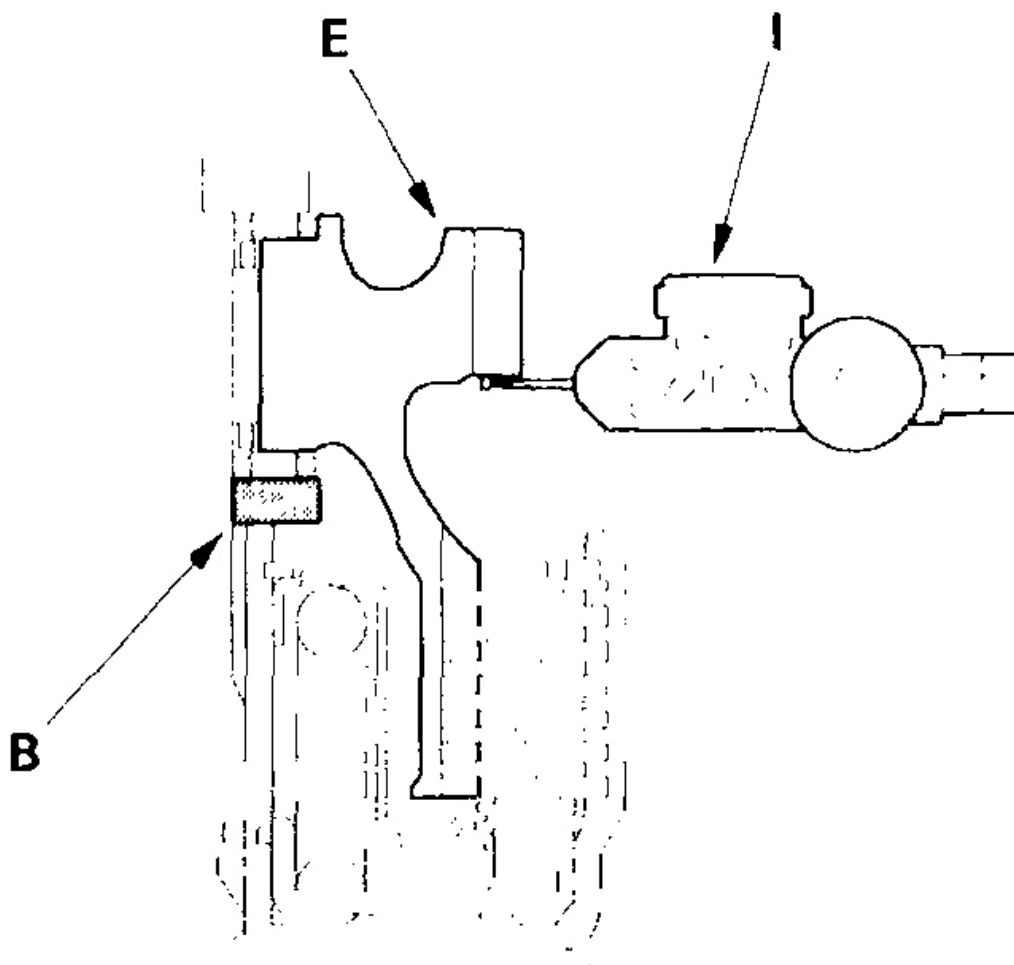
6. Remove the 27 x 47 x 5 mm thrust washer from the mainshaft.
7. Assemble the 1st/2nd clutch assembly (A), 37 x 55 mm thrust shim (B), thrust needle bearing (C), needle bearing (D), 2nd gear (E), thrust needle bearing (F), and 27 x 47 x 5 mm thrust washer (removed from mainshaft) (G) on the secondary shaft (H).



G01512417

Fig. 58: Assembling 1st/2nd Clutch Assembly

8. Set the dial indicator (I) on 2nd gear (E).

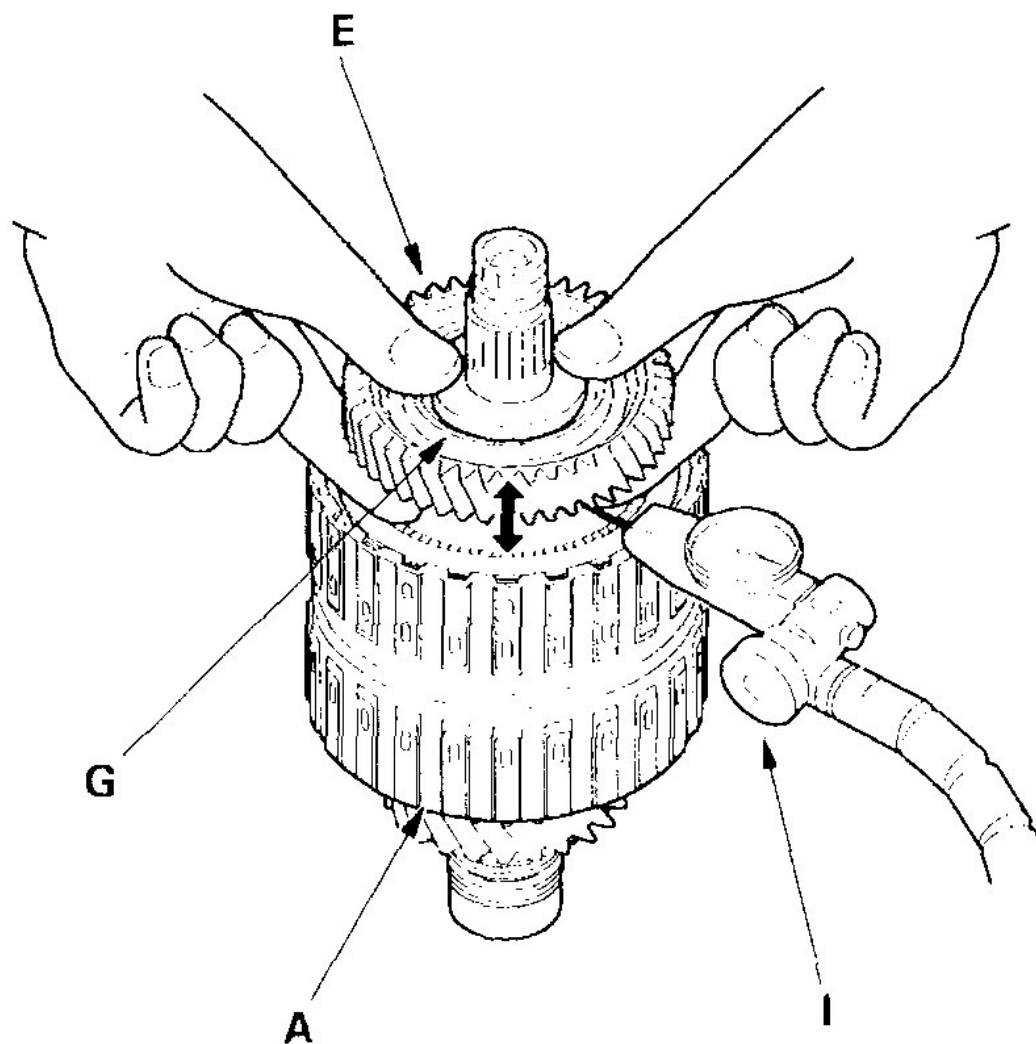


G01512418

Fig. 59: Setting Dial Indicator On 2nd Gear

9. Hold the 27 x 47 x 5 mm thrust washer (G) against the clutch assembly (A), and measure the 2nd gear axial clearance in at least three places while moving the 2nd gear (E). Use the average as the actual clearance.

Standard: 0.04-0.12 mm (0.002-0.005 in.)



G01512419

Fig. 60: Measuring 2nd Gear Axial Clearance

10. If the clearance is out of standard, remove the 37 x 55 mm thrust shim and measure its thickness.
11. Select and install a new thrust shim, then recheck.

No.	Part Number	Thickness
1	90406-P0Z-000	4.90 mm (0.193 in.)
2	90407-P0Z-000	4.95 mm (0.195 in.)
3	90408-P0Z-000	5.00 mm (0.197 in.)
4	90409-P0Z-000	5.05 mm (0.199 in.)
5	90410-P0Z-000	5.10 mm (0.201 in.)
6	90411-P0Z-000	5.15 mm (0.203 in.)
7	90412-P0Z-000	5.20 mm (0.205 in.)

G01512420

Fig. 61: 2nd Gear Axial Clearance Thrust Washer Selection Chart

12. Disassemble the shaft and gears.
13. Reinstall the 27 x 47 x 5 mm thrust washer on the mainshaft.

SECONDARY SHAFT IDLER GEAR BEARING REPLACEMENT**Special Tools Required**

- Driver 07749-0010000
 - Attachment, 62 x 68 mm 07746-0010500
1. Check the bearing for wear, damage, and rough movement. If the bearing is worn or damaged, go to step 2.
 2. Place the secondary shaft idler gear in a vise with soft jaws.
 3. Remove the bearing (A) from the secondary shaft idler gear (B) with a commercially available, 3-jaw slide hammer (C).

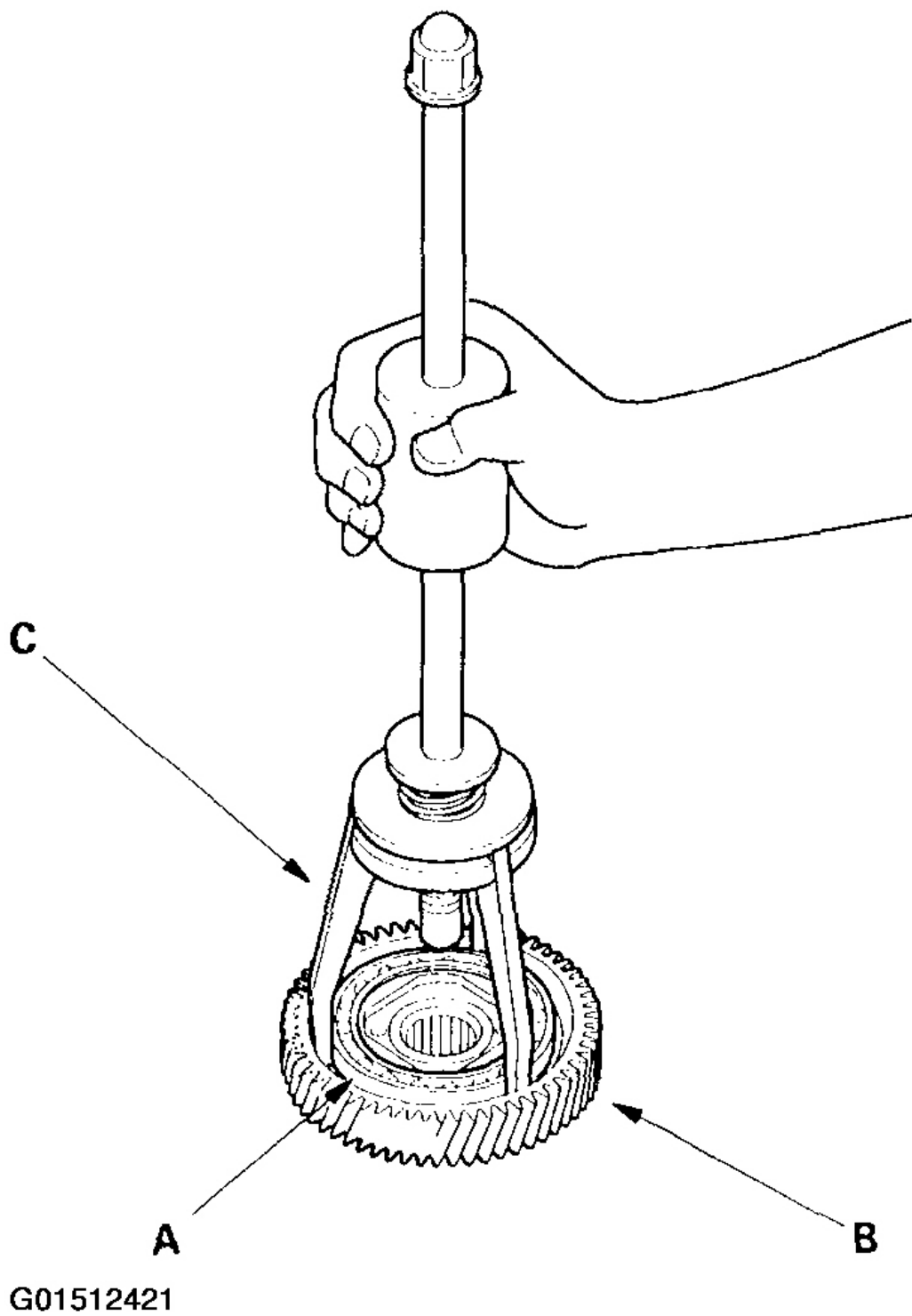


Fig. 62: Removing Bearing From Secondary Shaft Idler Gear

4. Install the bearing on the secondary shaft idler gear with the special tools and a press.

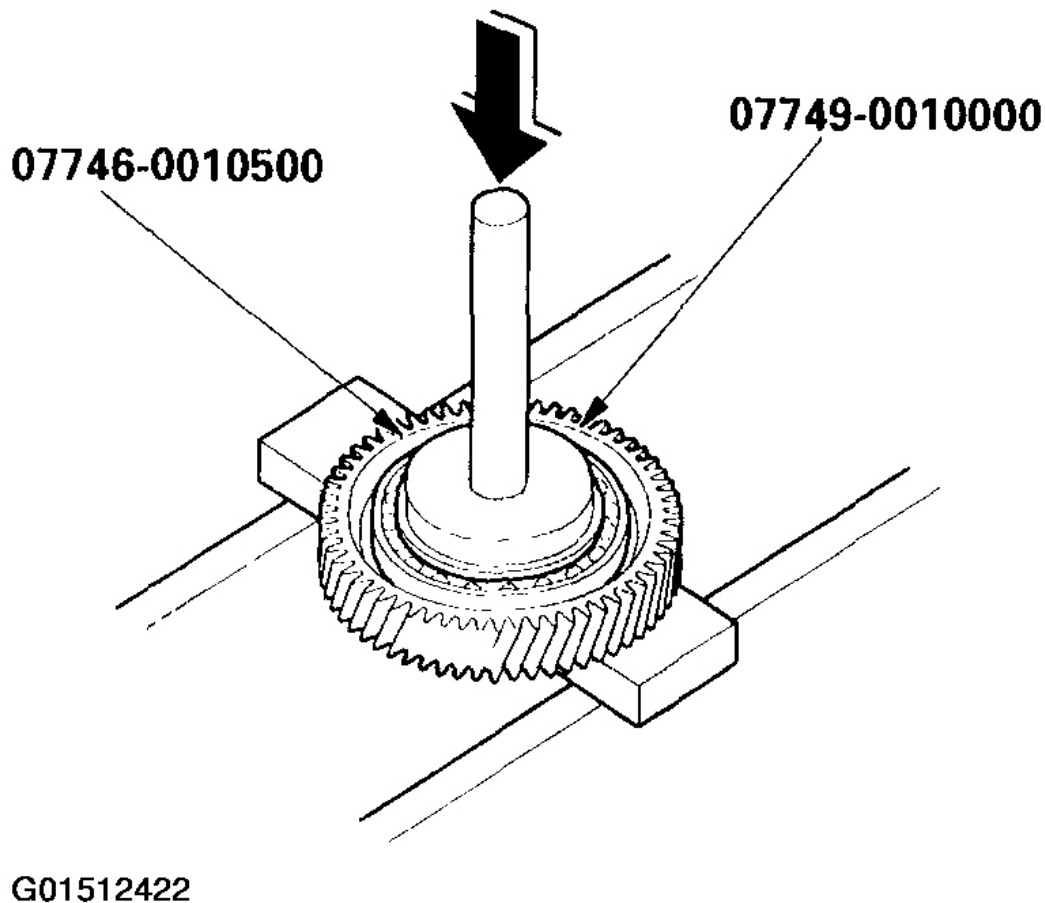
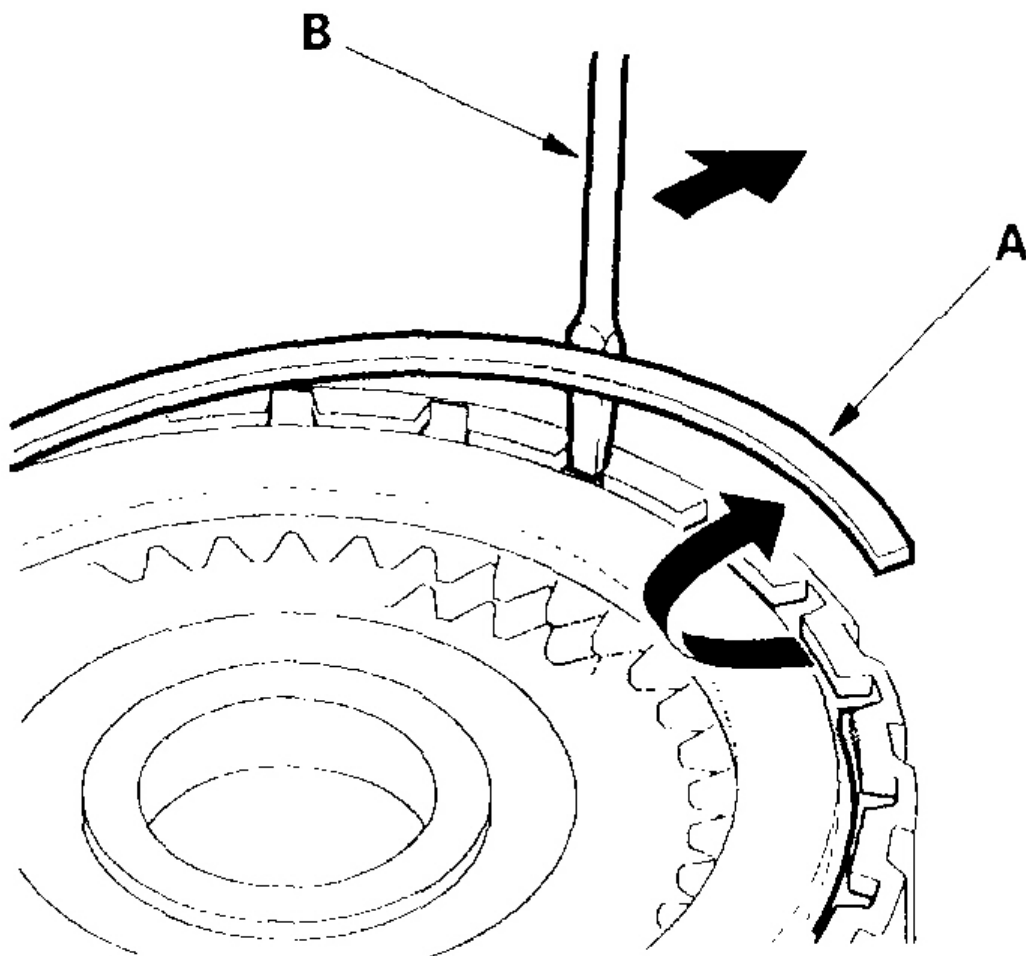


Fig. 63: Installing Bearing On Secondary Shaft Idler Gear

CLUTCH DISASSEMBLY

Special Tools Required

- Clutch spring compressor attachment 07LAE-PX40100
 - Clutch spring compressor attachment 07HAE-PL50101
 - Clutch spring compressor bolt assembly 07GAE-PG40200 or 07GAE-PG4020A
1. Remove the snap ring (A), then remove the clutch end plate, the clutch discs, and the plates with a screwdriver (B).

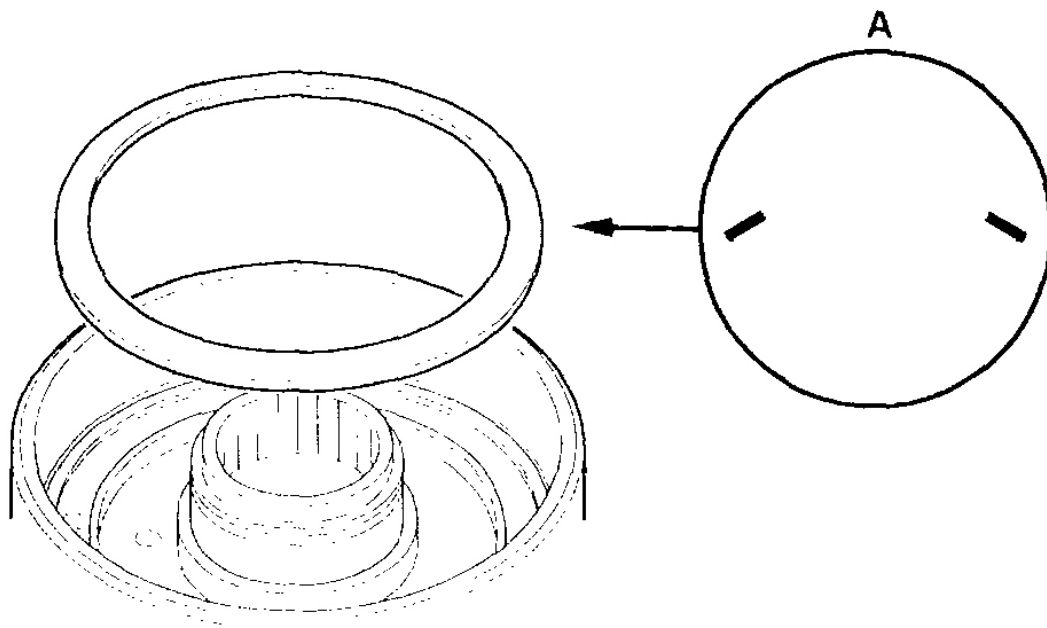


G01512423

Fig. 64: Removing Clutch End Plate Snap Ring

2. Remove the disc spring (A) from the 1st, 3rd, and 4th clutches.

NOTE: The 2nd clutch does not have a disc spring.



G01512424

Fig. 65: Removing Disc Spring From The 1st, 3rd, And 4th Clutches

3. Install the special tools on the clutch assembly.

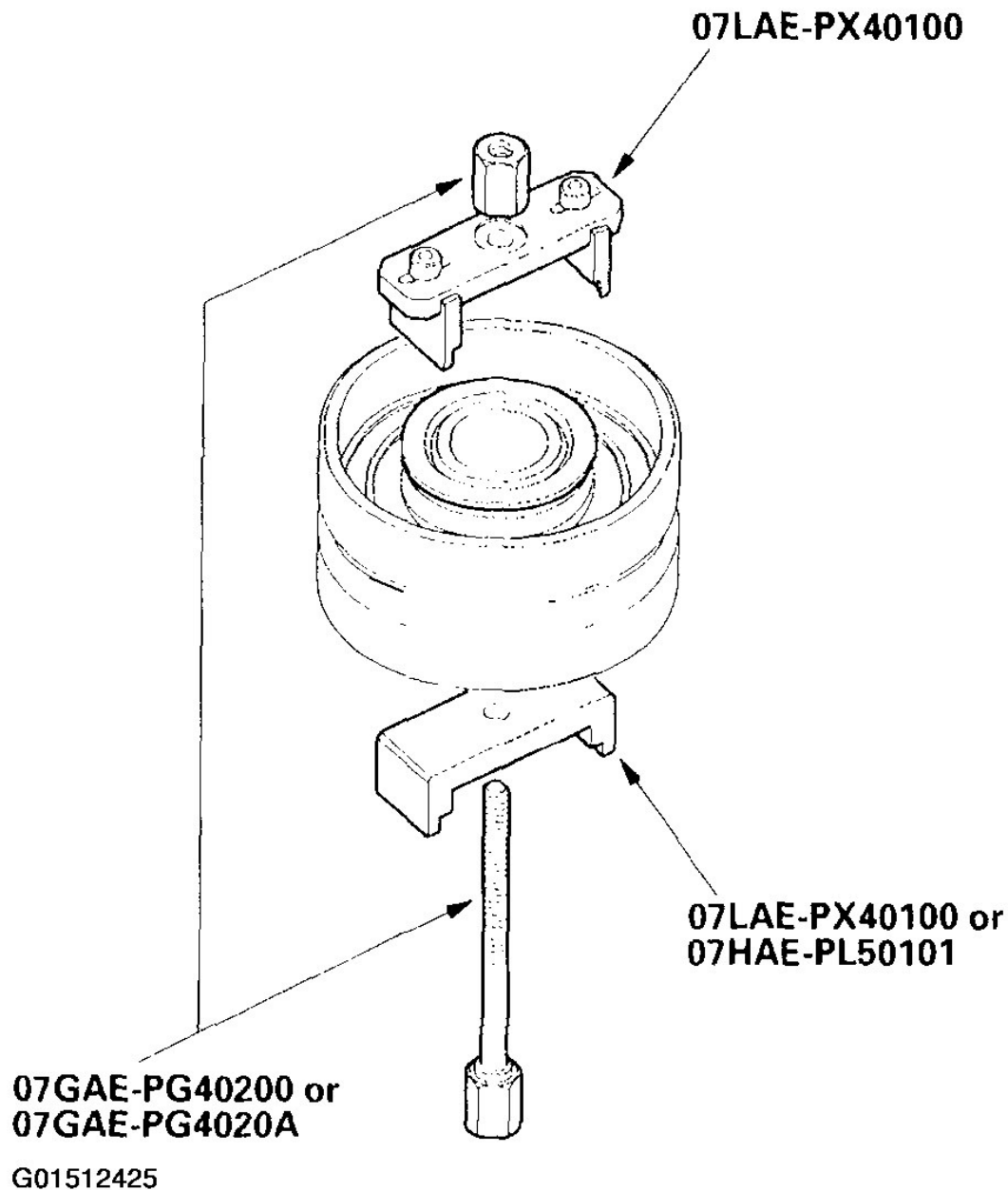
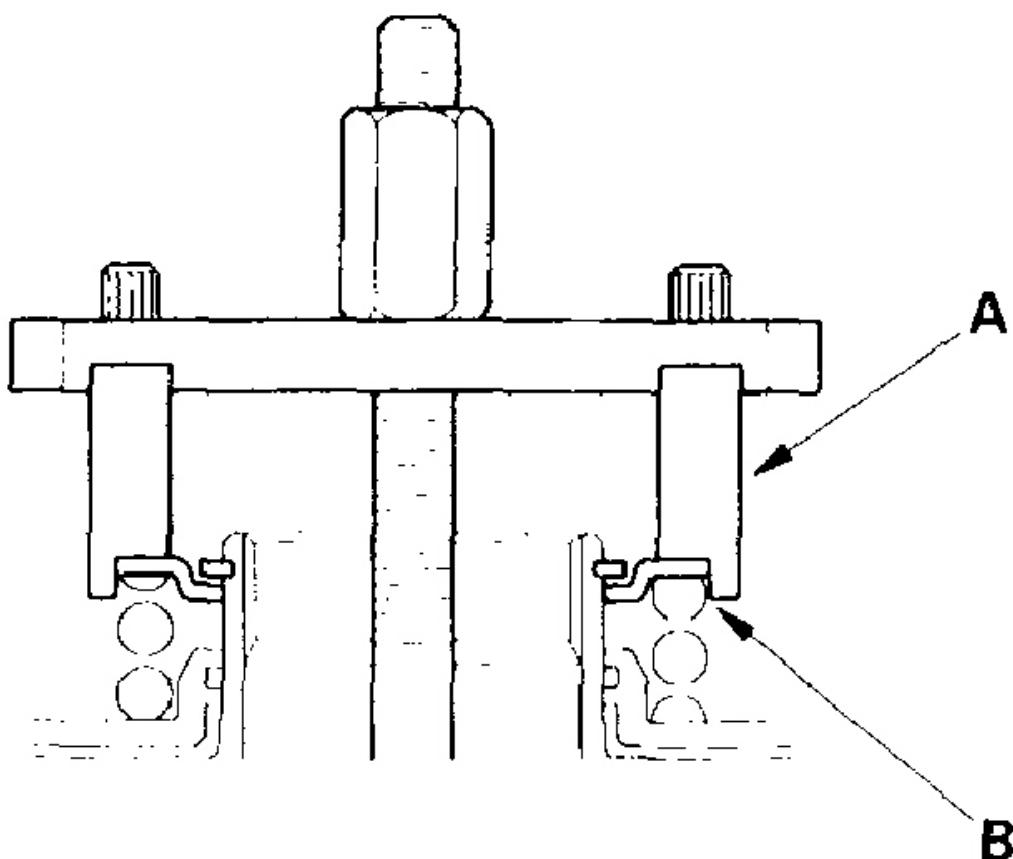
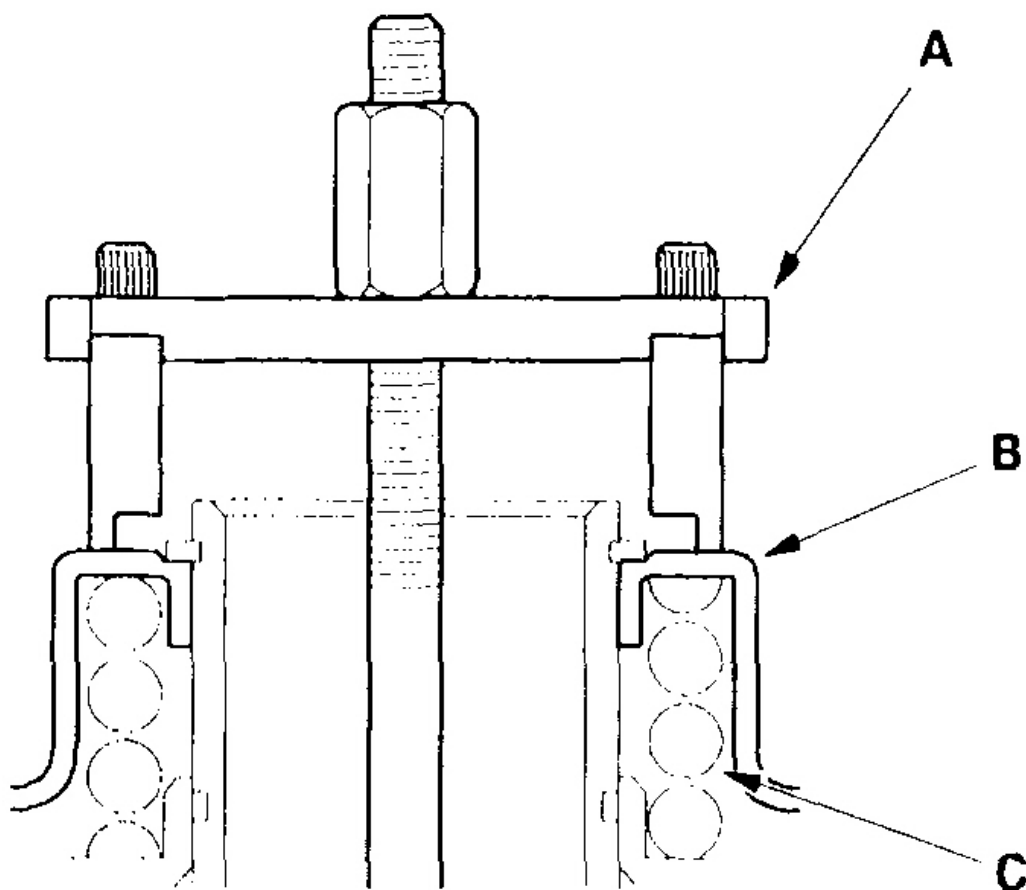


Fig. 66: Installing Special Tools On Clutch Assembly

4. Be sure the special tool (A) is adjusted to have full contact with the spring retainer (B) on the 3rd and 4th clutches.

**G01512426****Fig. 67: Special Tool Installed**

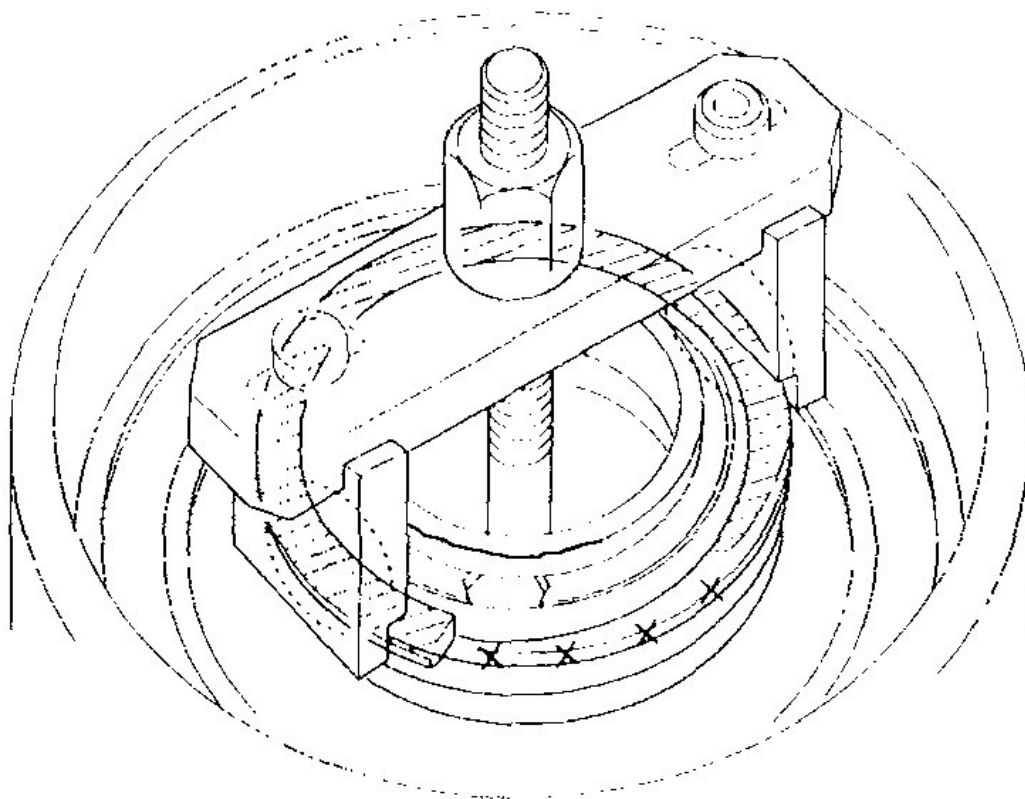
5. Set the special tool (A) on the spring retainer (B) of the 1st and 2nd clutches so the special tool contacts the clutch return spring (C).



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Fig. 68: Setting Special Tool On Spring Retainer

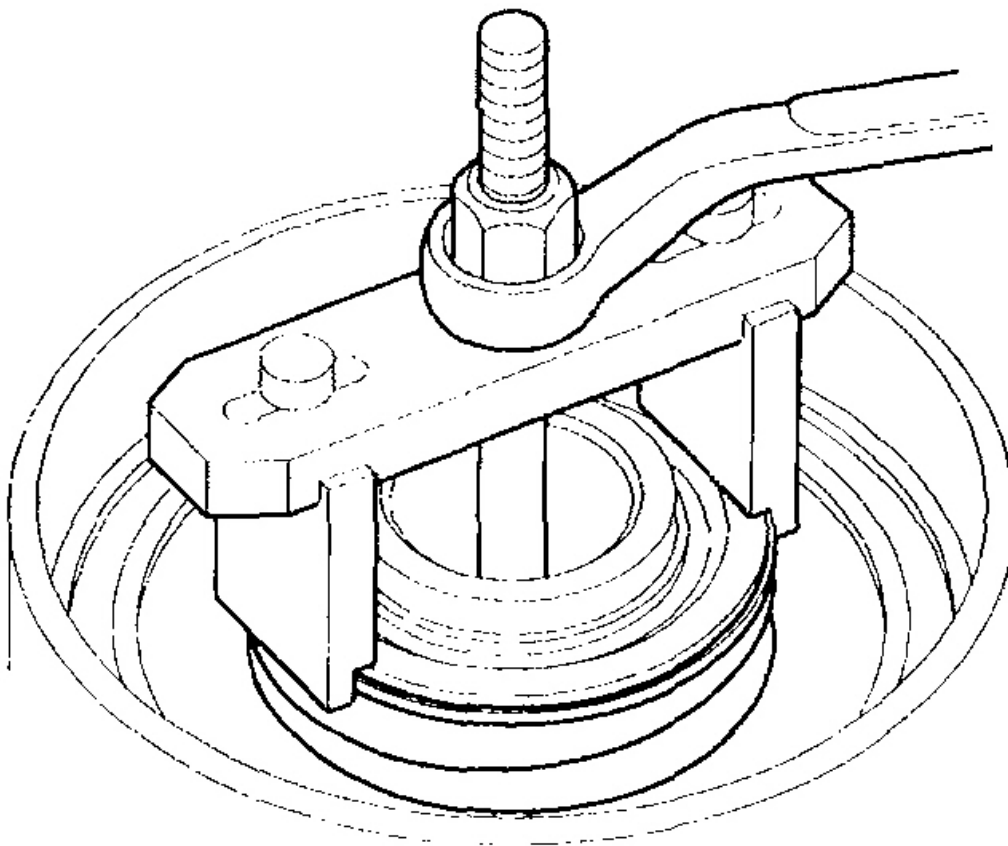
6. If either end of the special tool is set over an area of the spring retainer which is unsupported by the return spring, the retainer may be damaged.



G01512428

Fig. 69: Correctly Positioning Special Tool On Spring Retainer

7. Compress the spring until the snap ring can be removed.



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Fig. 70: Compressing Clutch Spring

8. Remove the snap ring (A). Then remove the special tool (B), spring retainer (C) and return spring.

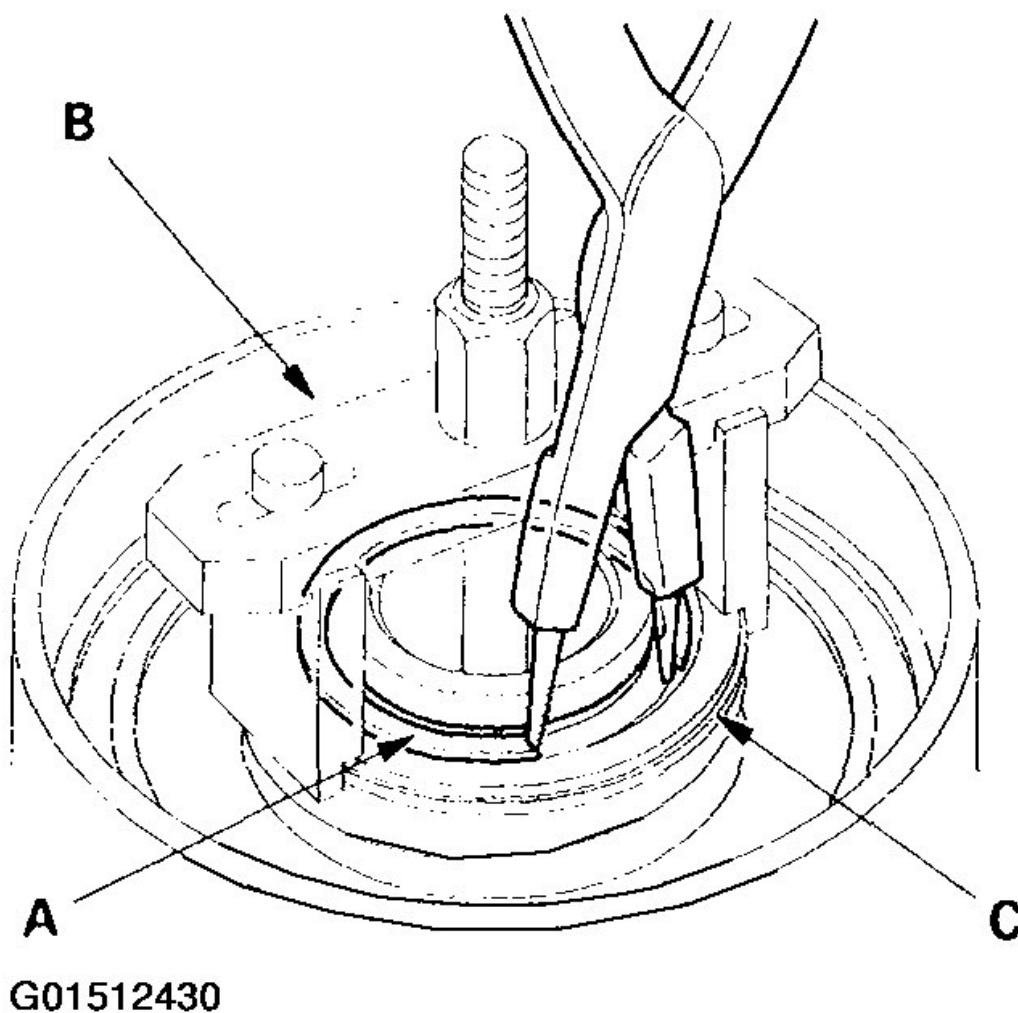
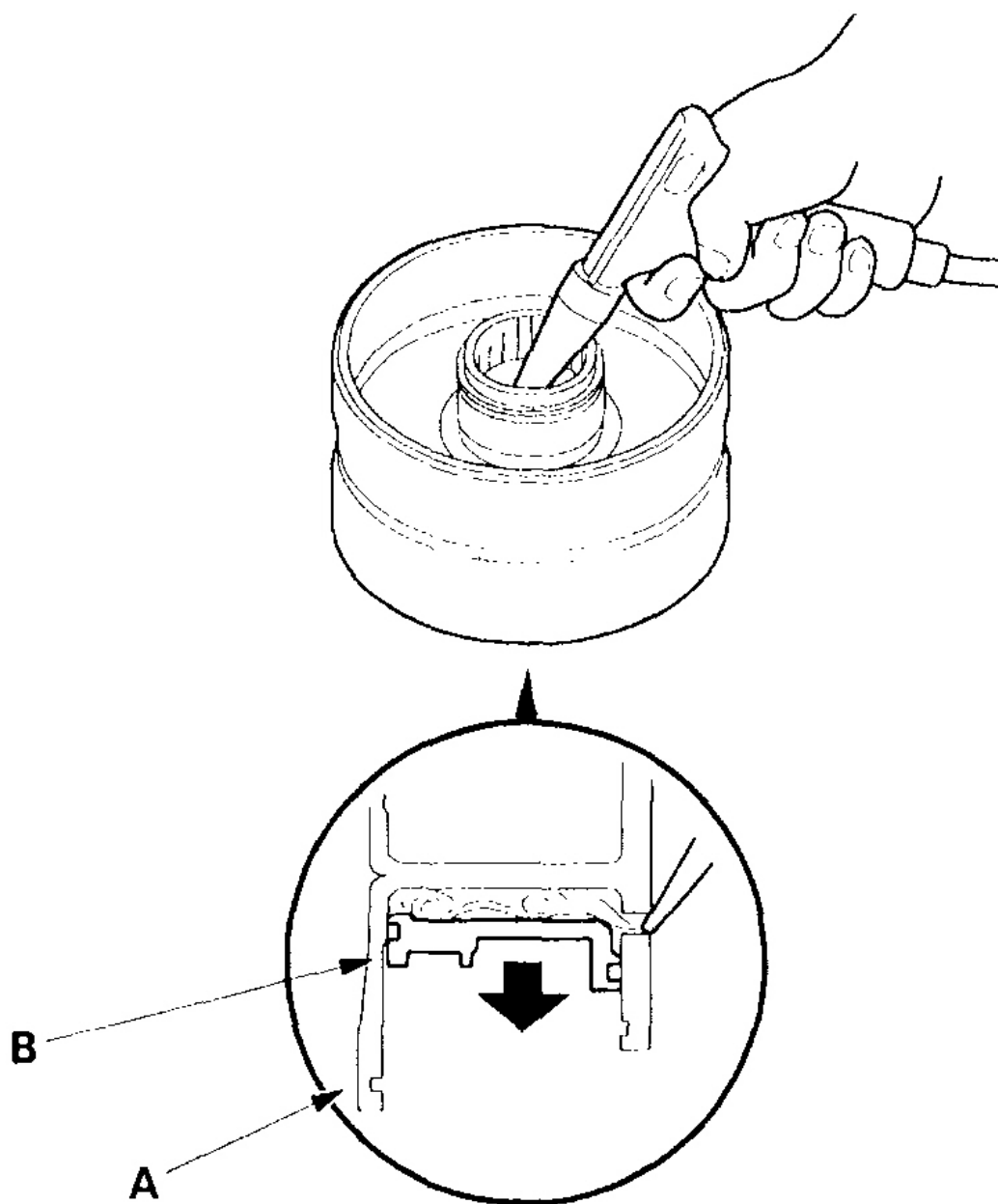


Fig. 71: Removing Clutch Snap Ring

9. For 3rd and 4th clutch: Wrap a shop rag around the clutch drum (A), and apply air pressure to the fluid passage to remove the piston (B). Place a finger tip on the other end while applying air pressure.



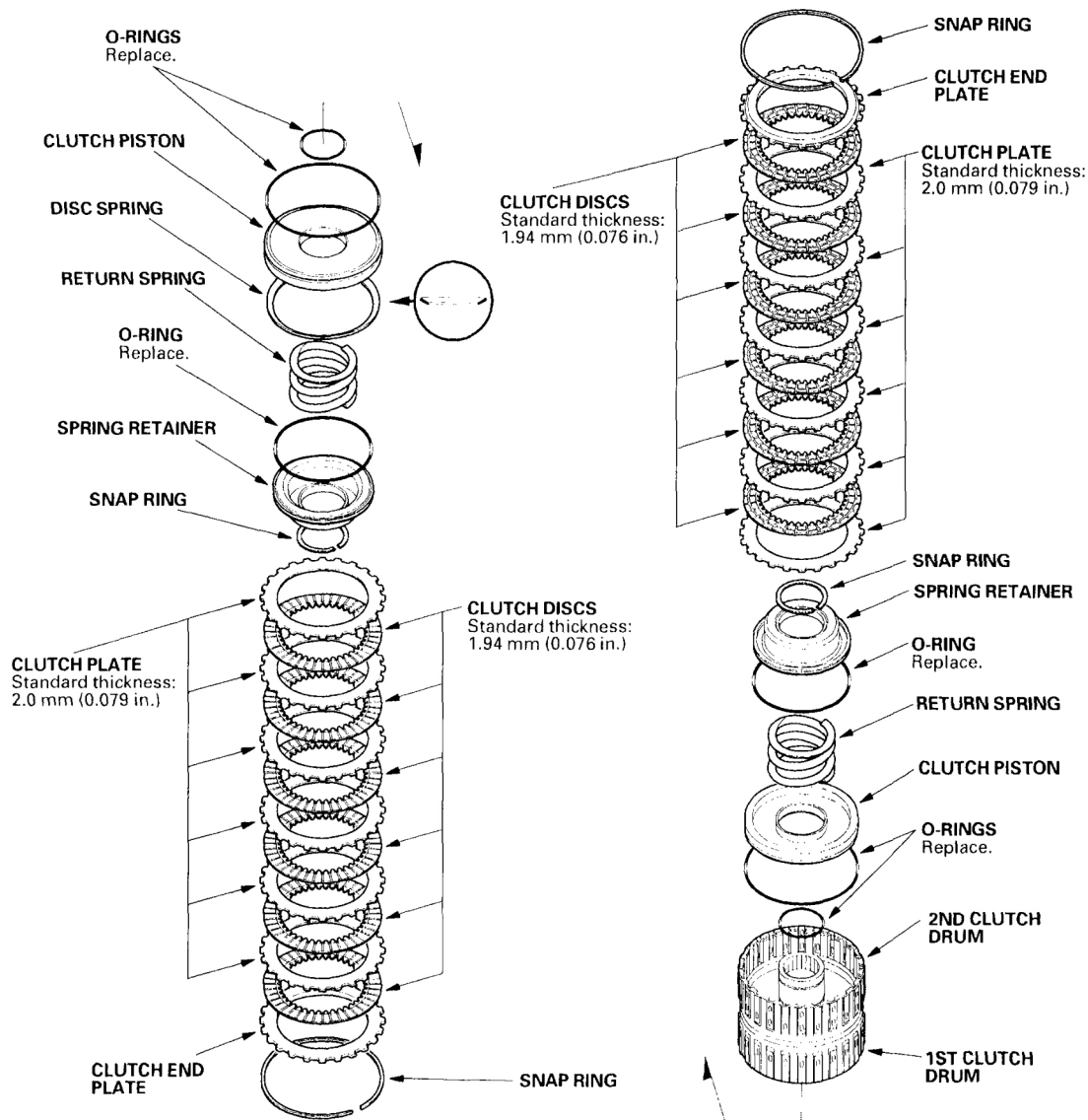
G01512431

Fig. 72: Wrapping Shop Rag Around Clutch Drum

CLUTCH INSPECTION

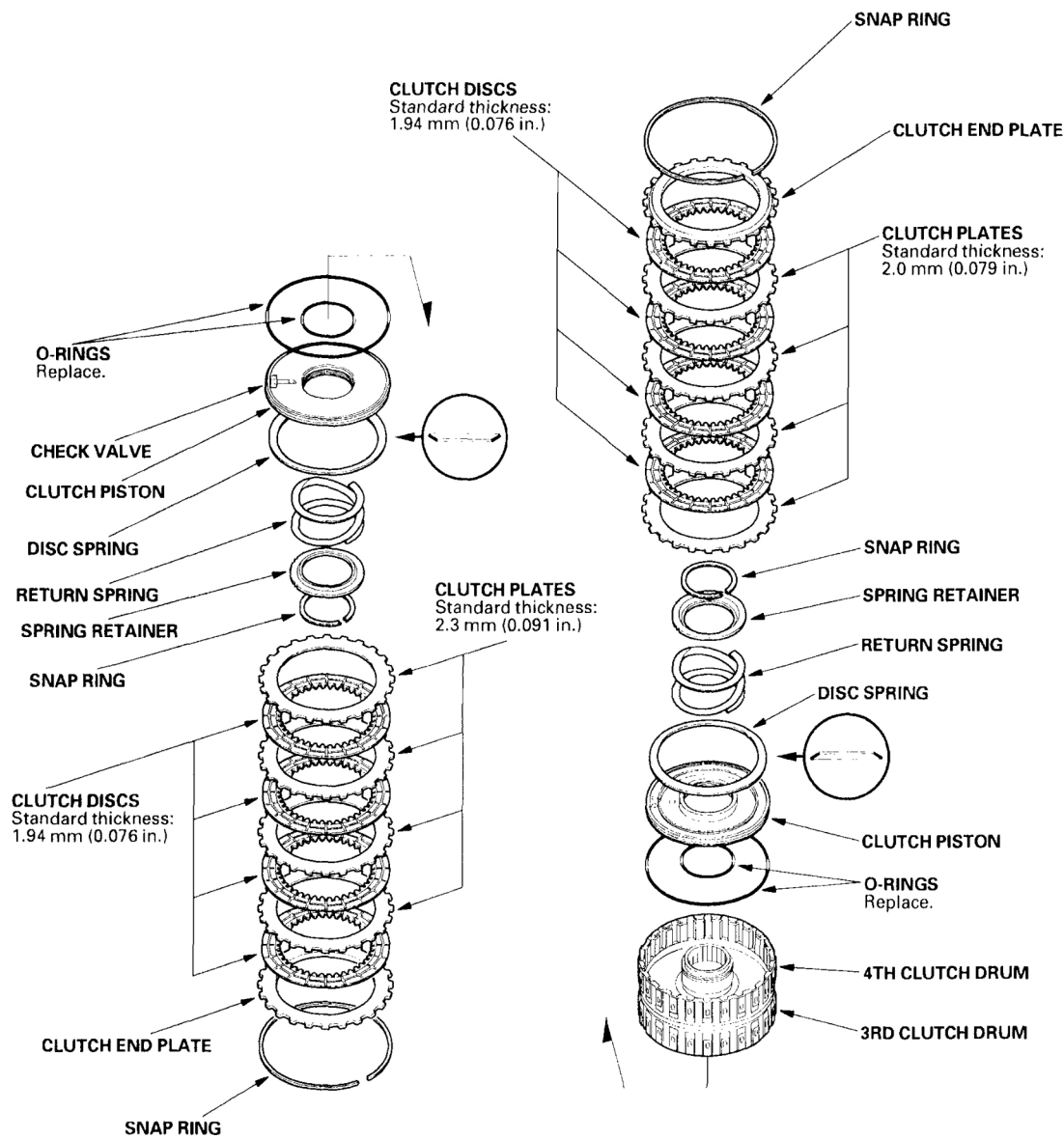
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G01512432

Fig. 73: Exploded View Of Clutch (1st/2nd Clutch)



G01512433

Fig. 74: Exploded View Of Clutch (3rd/4th Clutch)

CLUTCH REASSEMBLY

Special Tools Required

- Clutch spring compressor attachment 07LAE-PX40100
- Clutch spring compressor attachment 07HAE-PL50101
- Clutch spring compressor bolt assembly 07GAE-PG40200 or 07GAE-PG4020A
- Clutch compressor attachment 07ZAE-PRP0100

Note these items during reassembly:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air.
 - Blow out all passages.
 - Apply ATF to all parts before assembly.
1. Soak the clutch discs thoroughly in ATF for a minimum of 30 minutes.
 2. Inspect the check valve (A) on the clutch pistons (B); if it's loose or stuck, replace the piston.

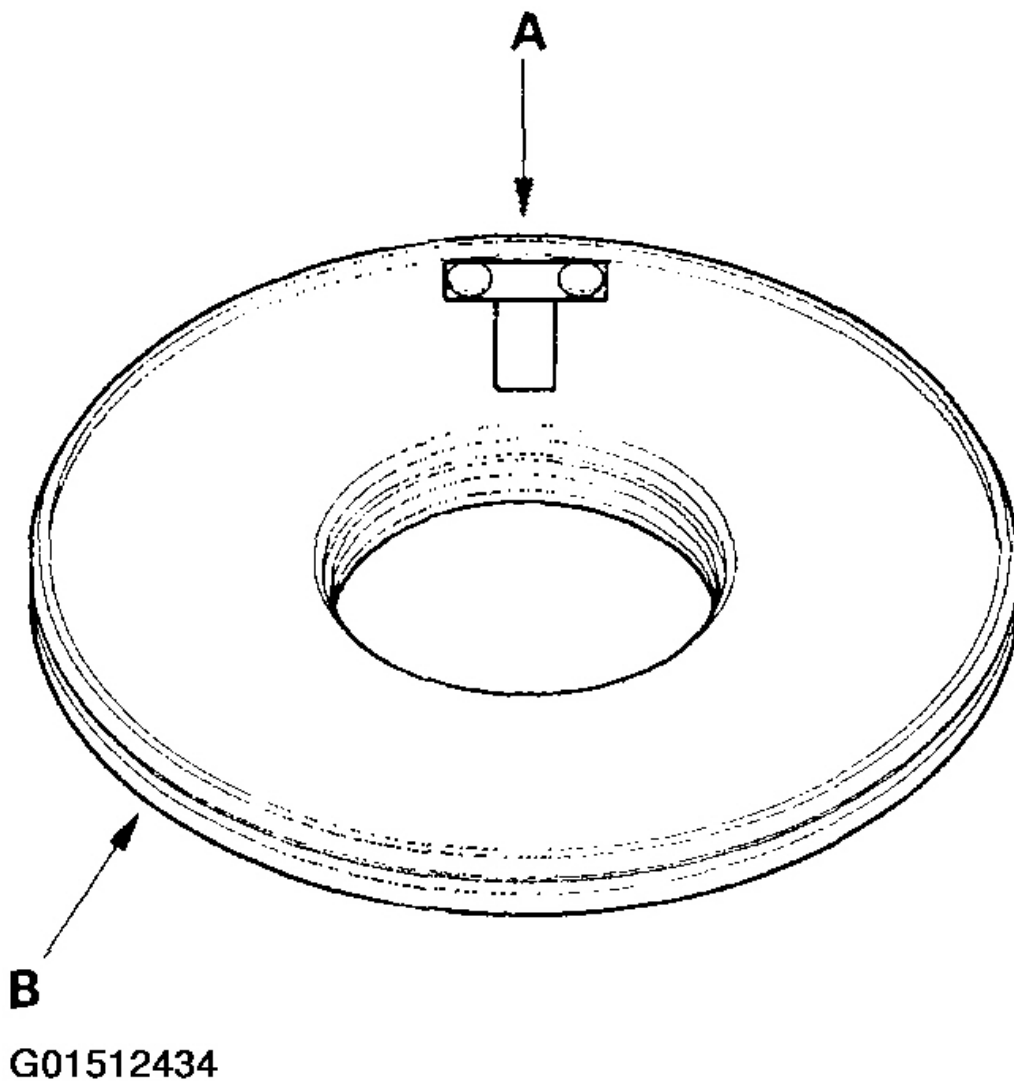
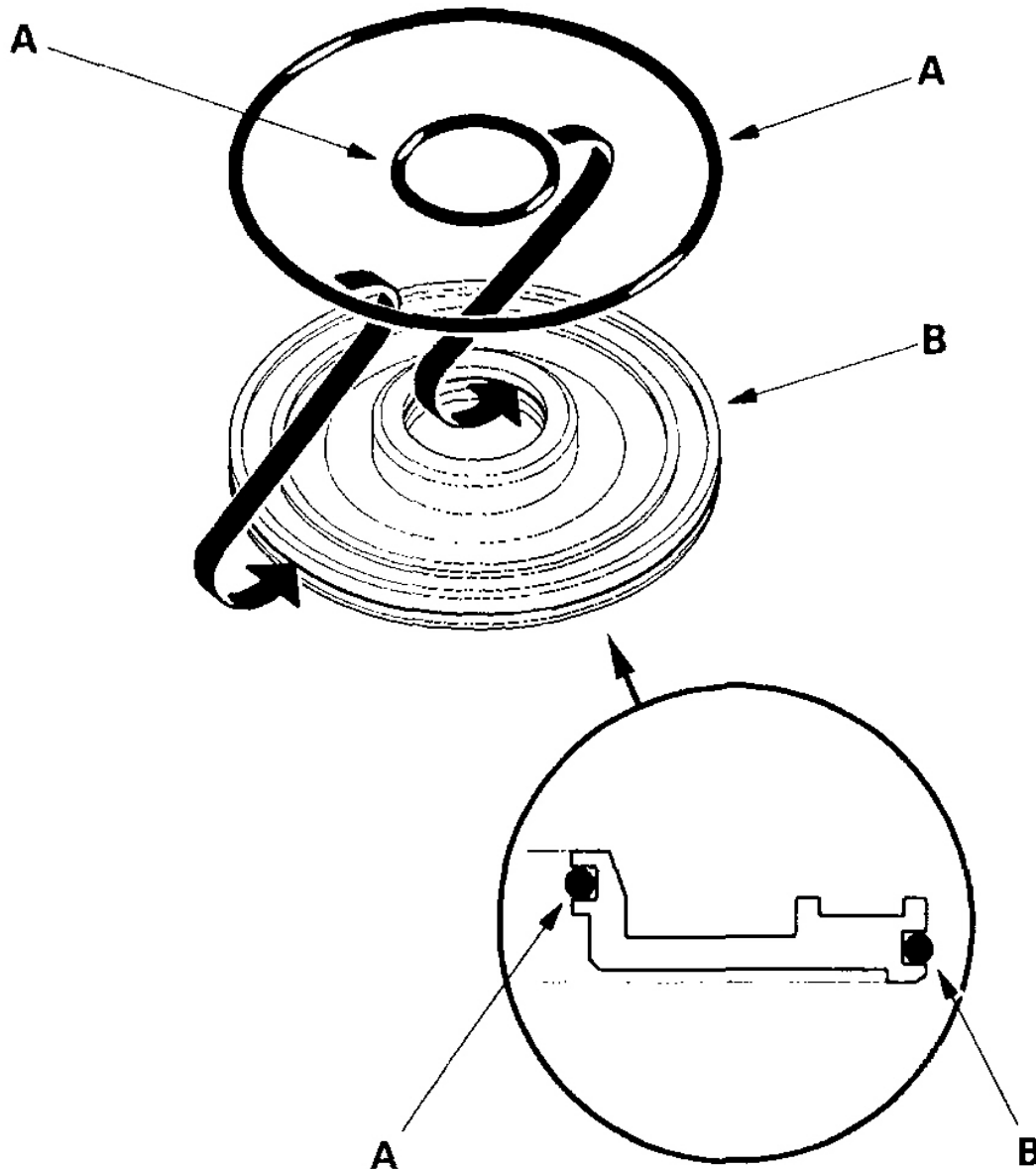


Fig. 75: Inspecting Check Valve

3. Install new O-rings (A) on the piston (B)



G01512435

Fig. 76: Installing New O-Rings On Piston

4. Install the piston (A) in the clutch drum (B). Apply pressure and rotate to ensure proper seating. Lubricate the piston O-ring with ATF before installing. Do not pinch the O-ring by installing the piston with too much force.

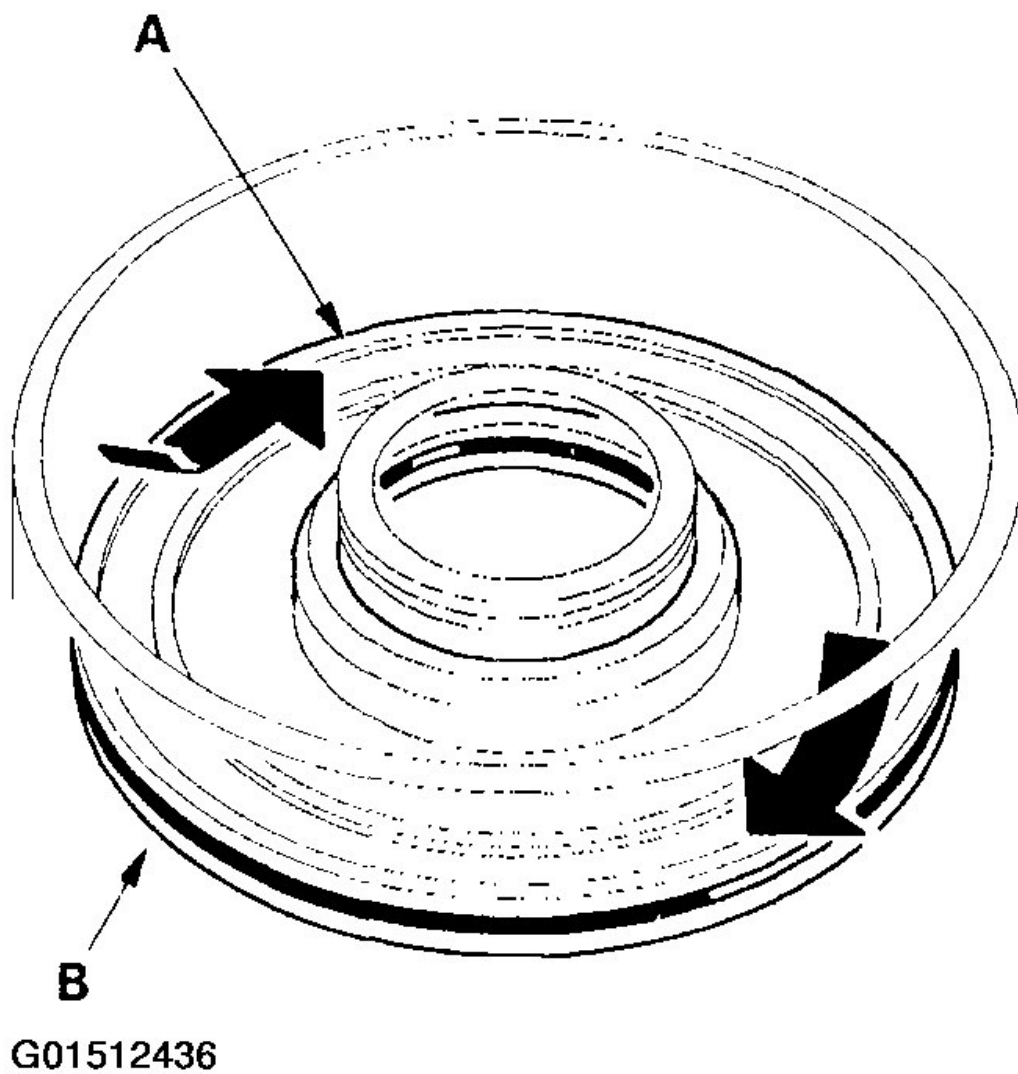
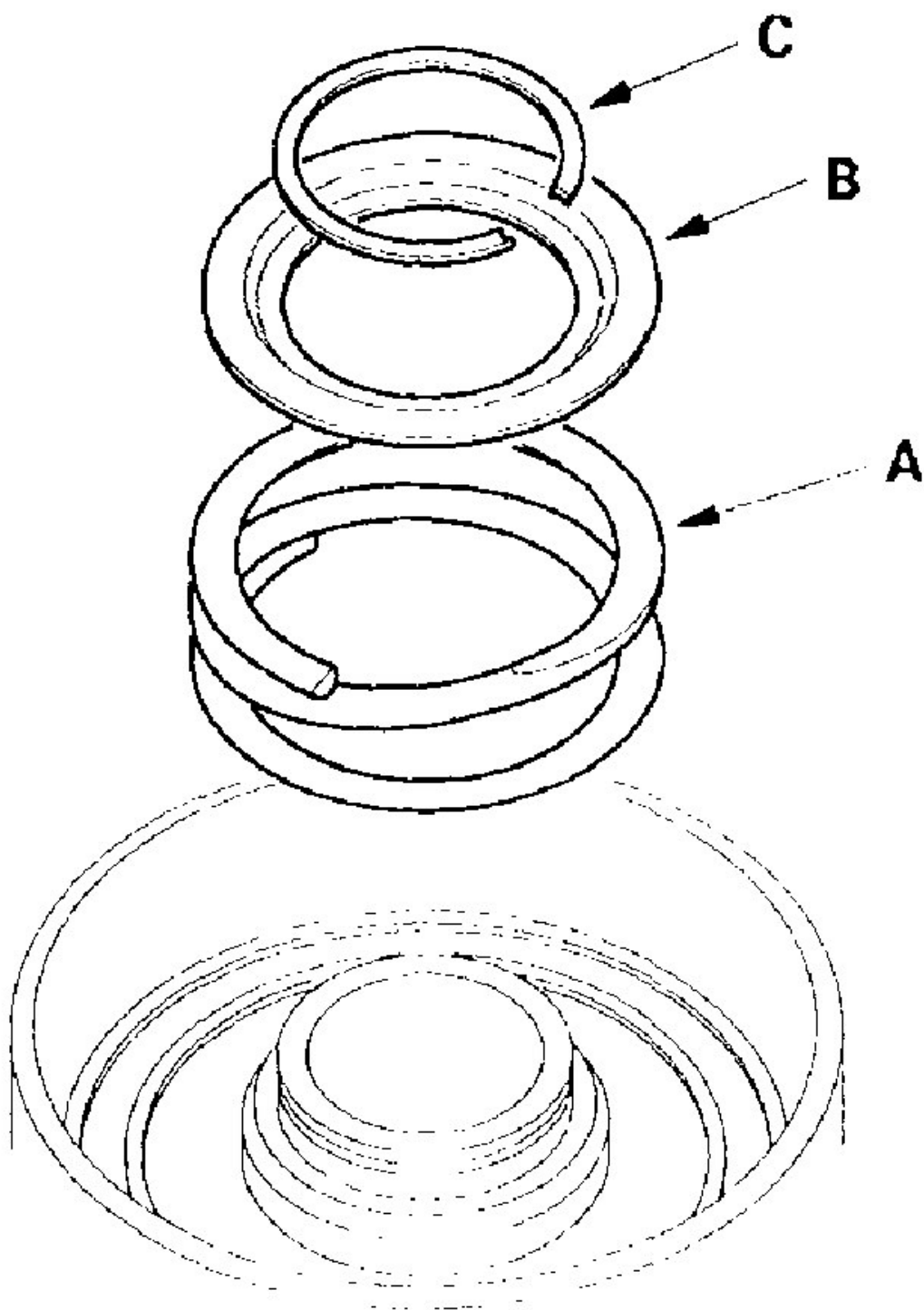


Fig. 77: Installing Piston In Clutch Drum

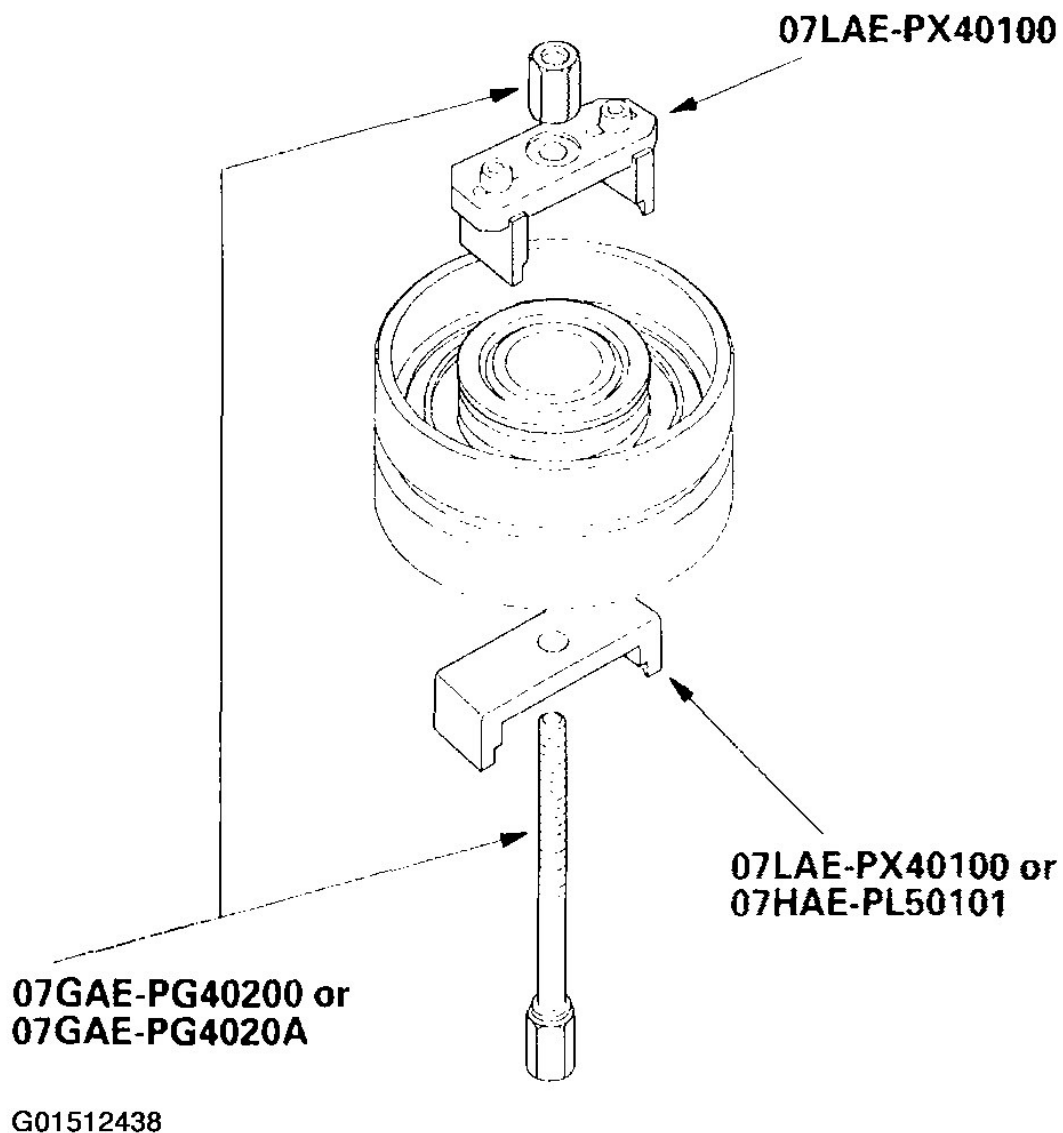
5. Install the return spring (A) and spring retainer (B), and position the snap ring (C) on the retainer.



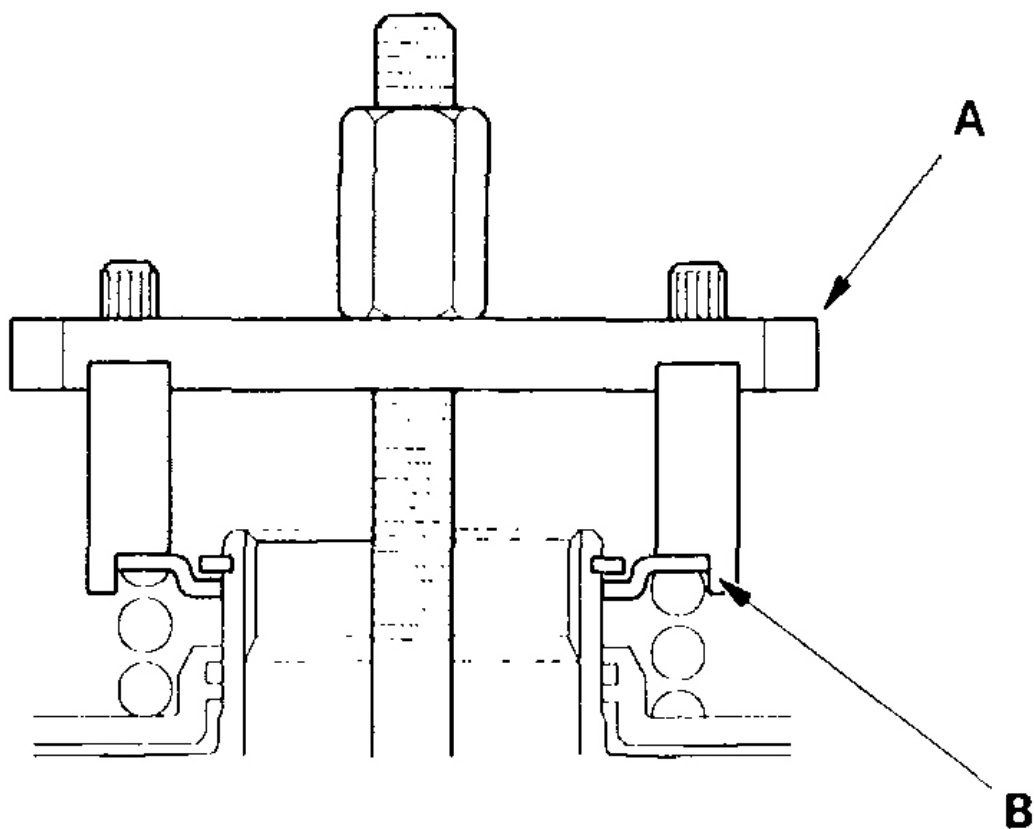
G01512437

Fig. 78: Installing Return Spring

6. Install the special tools on the clutch assembly.

**Fig. 79: Installing Special Tools On Clutch Assembly**

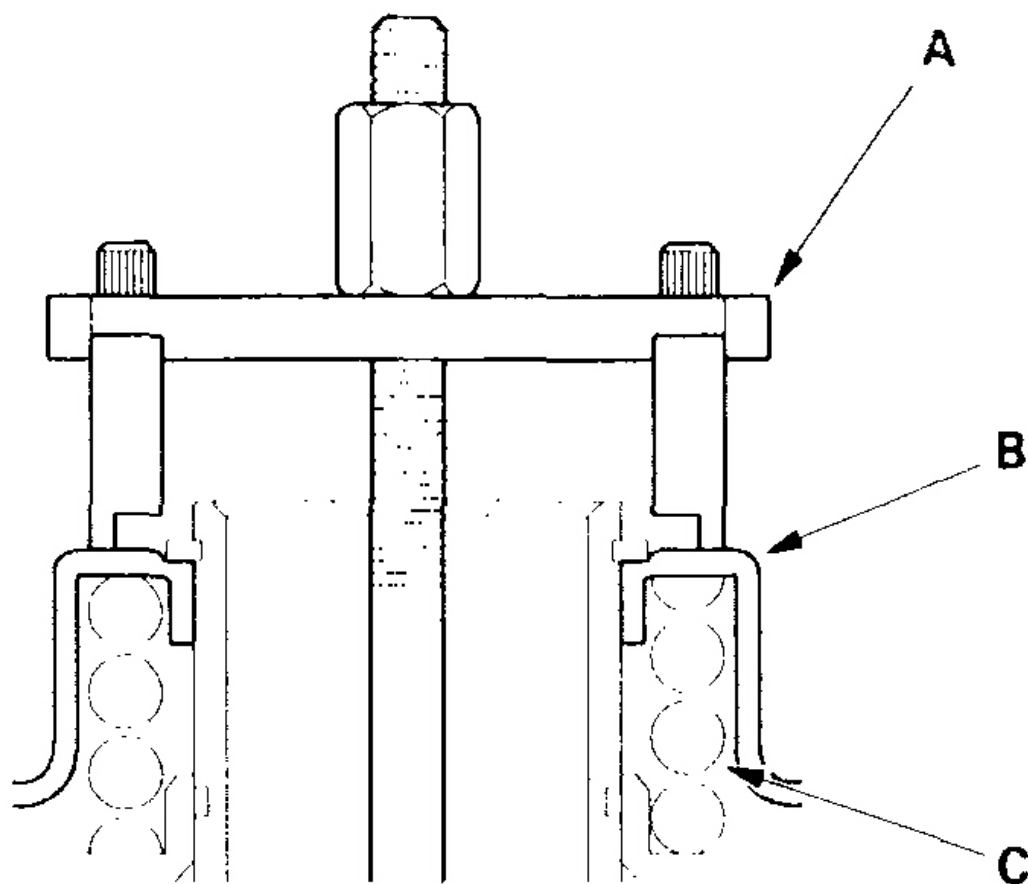
7. Be sure the special tool (A) is adjusted to have full contact with the spring retainer (B) on the 3rd and 4th clutches.



G01512439

Fig. 80: Positioning Special Tool On Spring Retainer

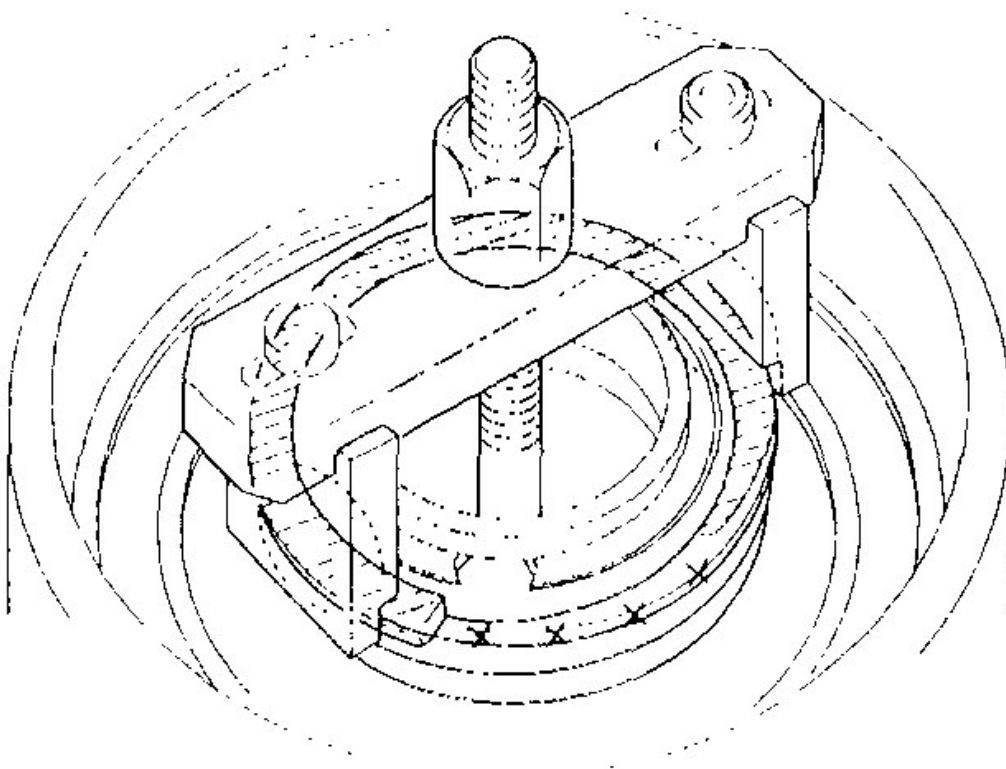
8. Set the special tool (A) on the spring retainer (B) of the 1st and 2nd clutches so the special tool contacts the clutch return spring (C).



G01512440

Fig. 81: Setting Special Tool On Spring Retainer

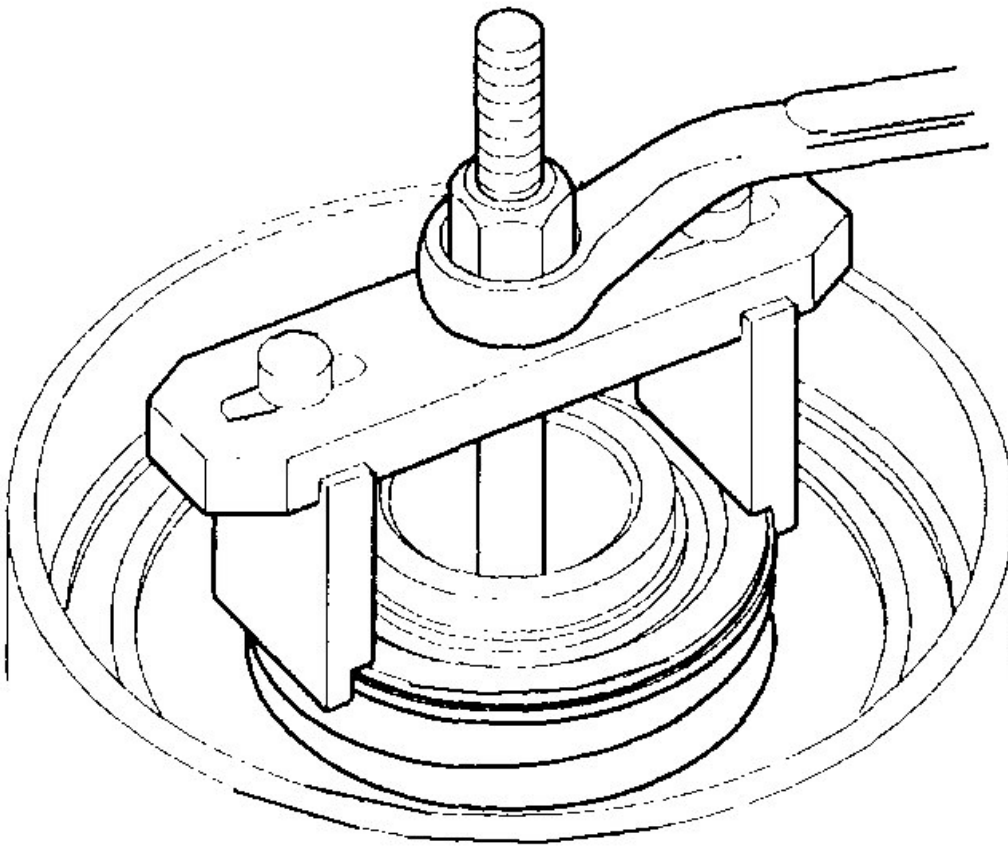
9. If either end of the special tool is set over an area of the spring retainer which is unsupported by the return spring, the retainer may be damaged.



G01512441

Fig. 82: Correctly Aligning Special Tool On Spring Retainer

10. Compress the return spring.



G01512442

Fig. 83: Compressing Return Spring

11. Install the snap ring (A).

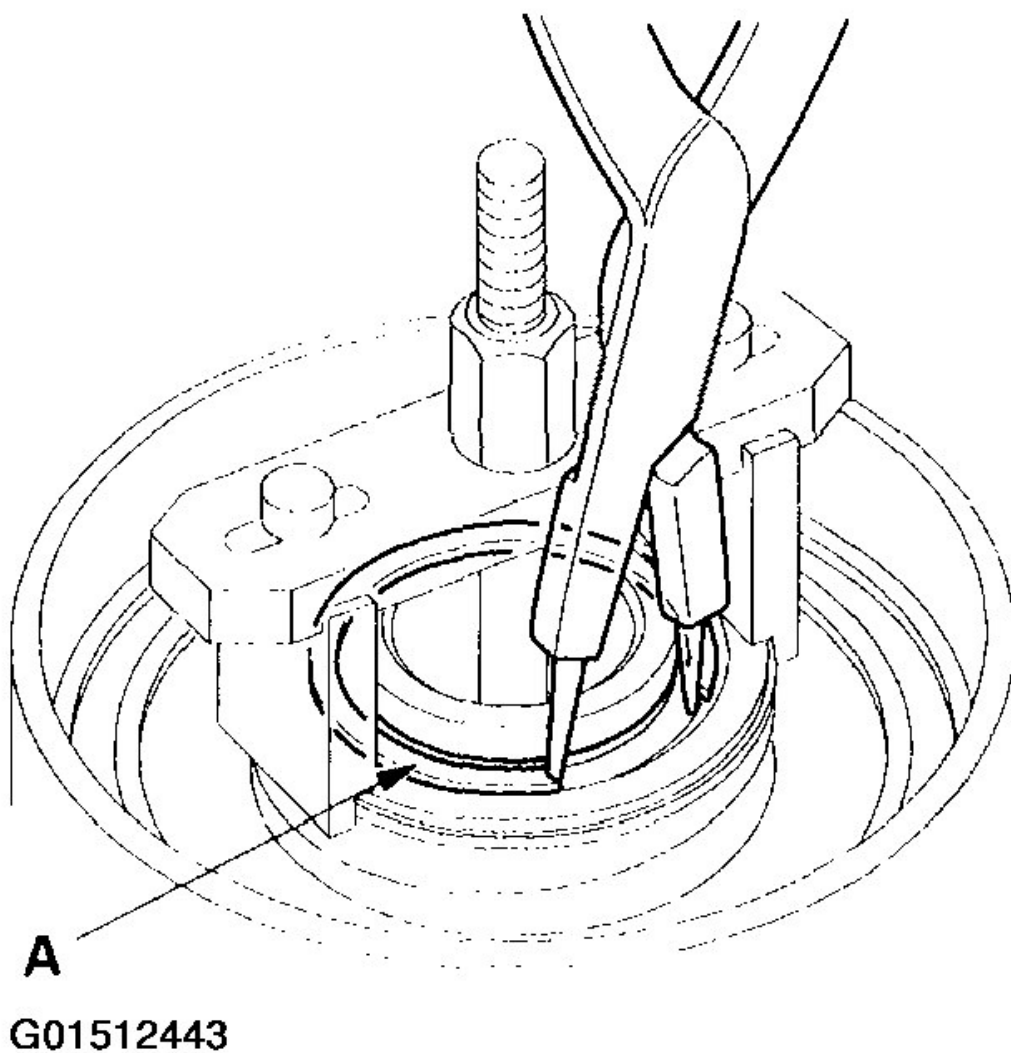
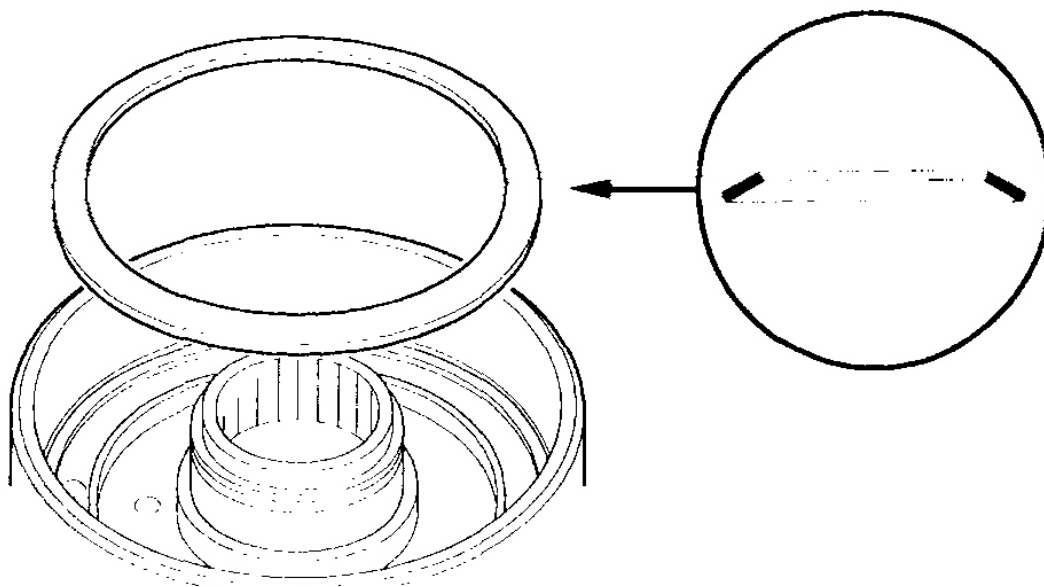


Fig. 84: Installing Snap Ring

12. Remove the special tools.
13. Install the disc spring in the 1st, 3rd, and 4th clutches in the direction shown.

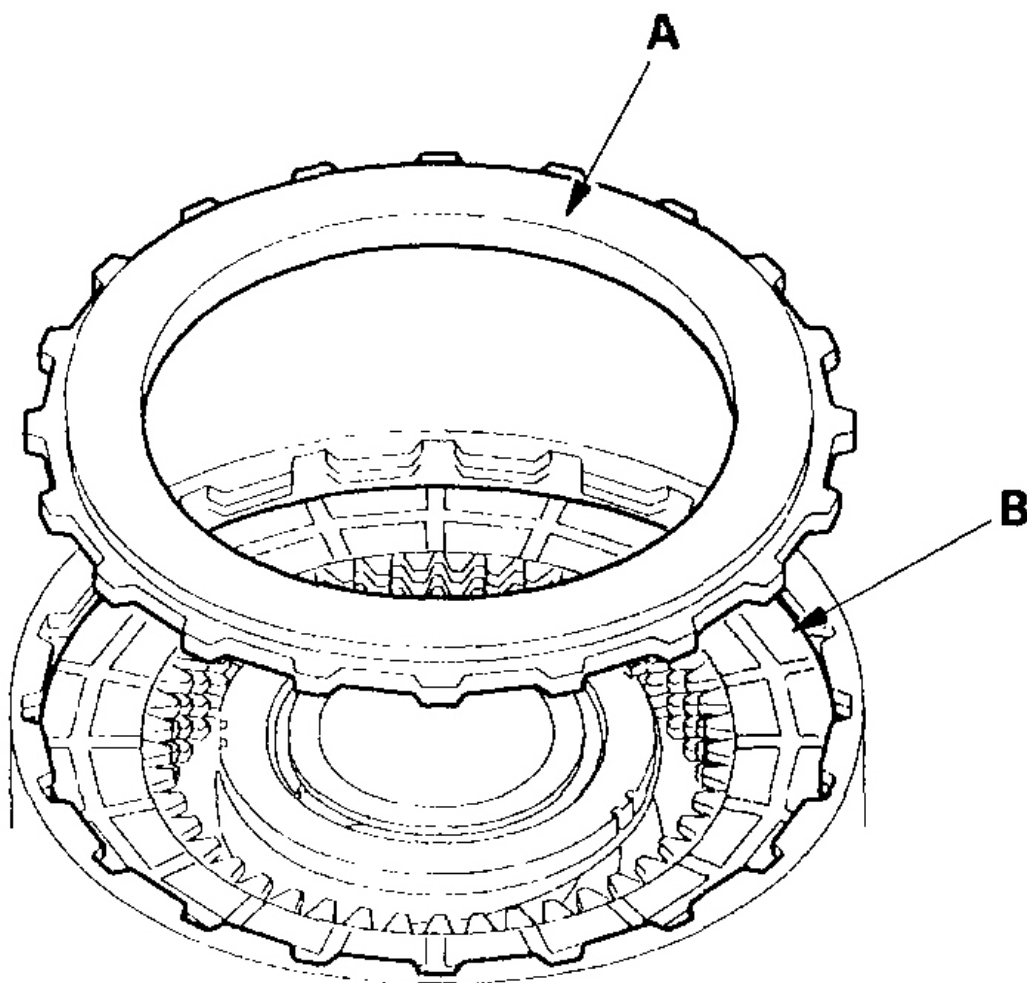
NOTE: **The 2nd clutch does not have a disc spring.**



G01512444

Fig. 85: Installing 1st, 3rd, And 4th Clutches Disc Spring

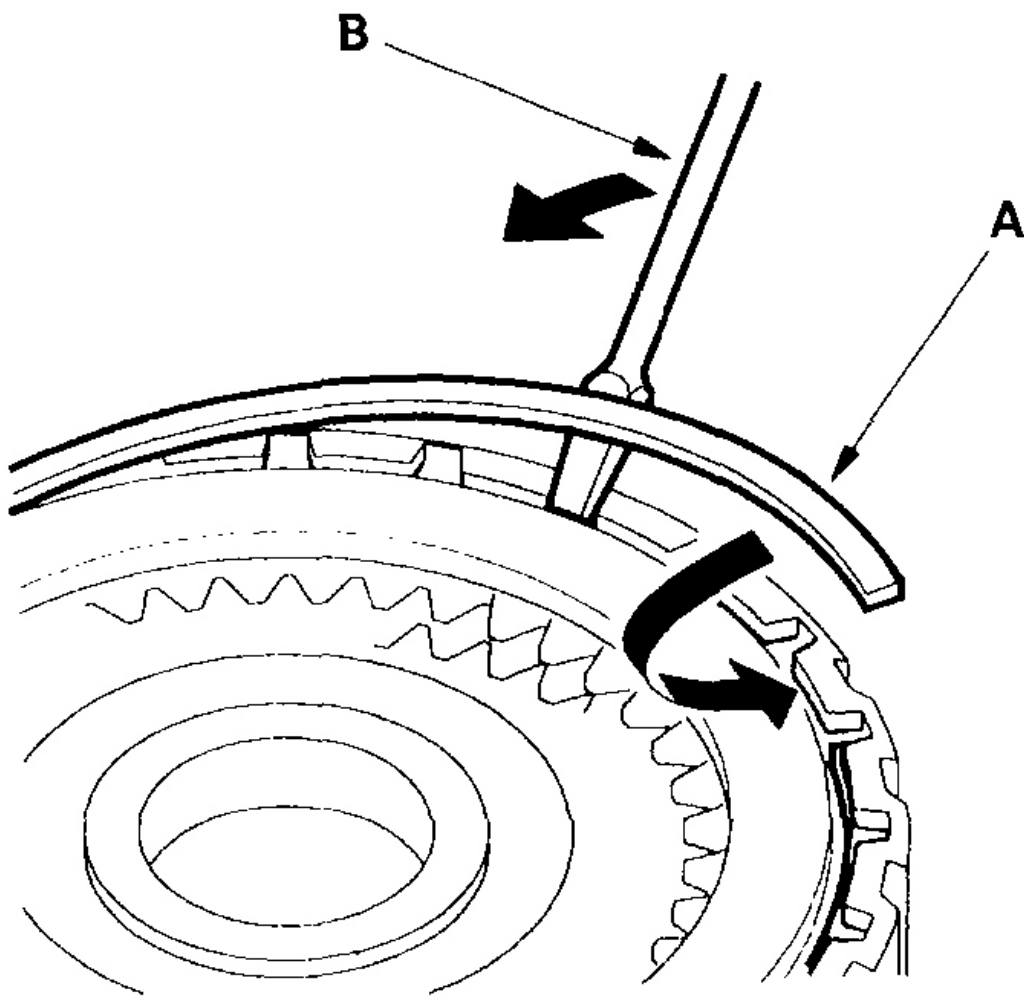
14. Make sure the inside of the clutch drum is free of dirt and other foreign matter.
15. Starting with a clutch plate, alternately install the clutch plates and discs. Install the clutch end plate (A) with the flat side toward the disc (B).



G01512445

Fig. 86: Installing Clutch End Plate

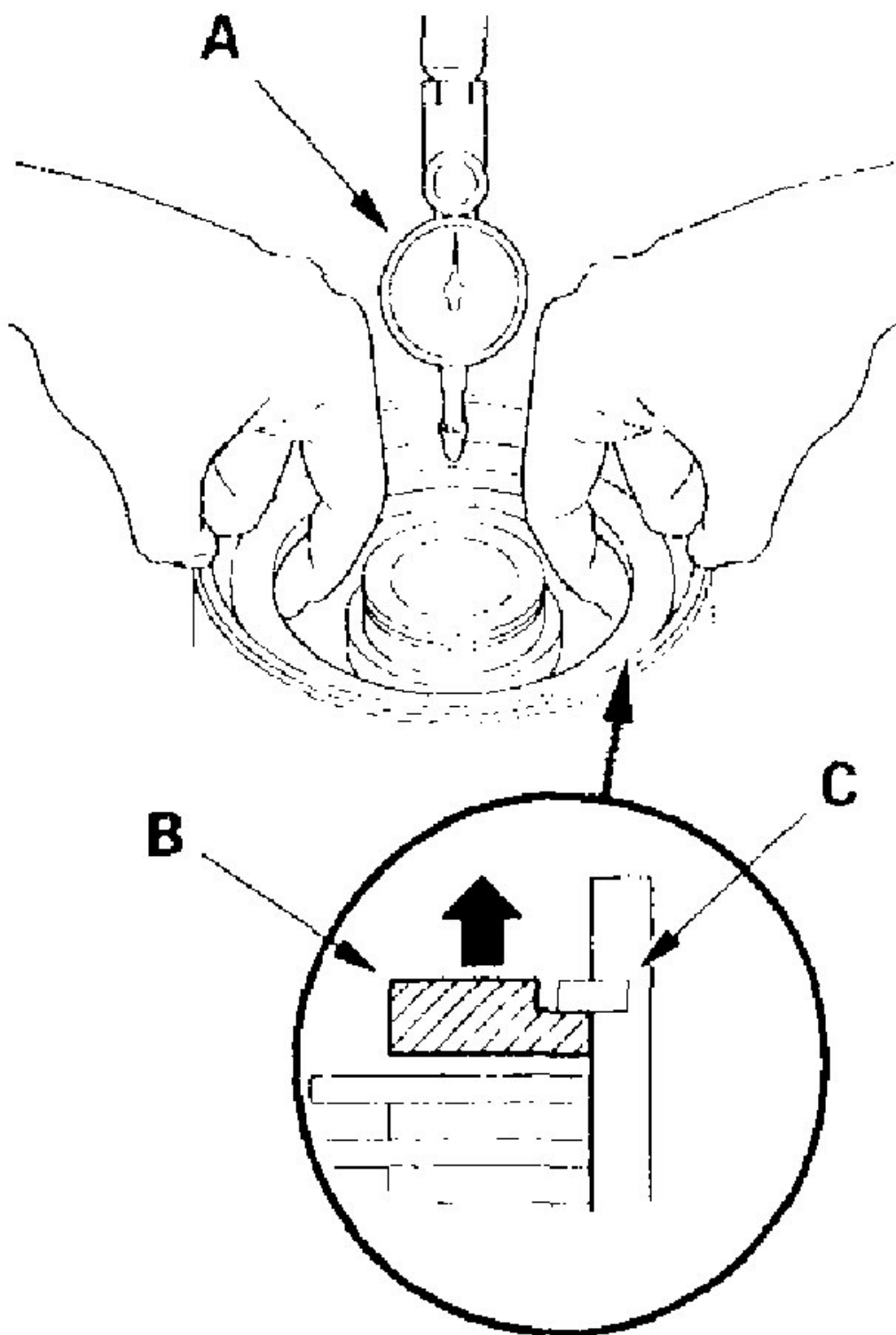
16. Install the snap ring (A) with a screwdriver (B).



G01512446

Fig. 87: Installing Snap Ring With Screwdriver

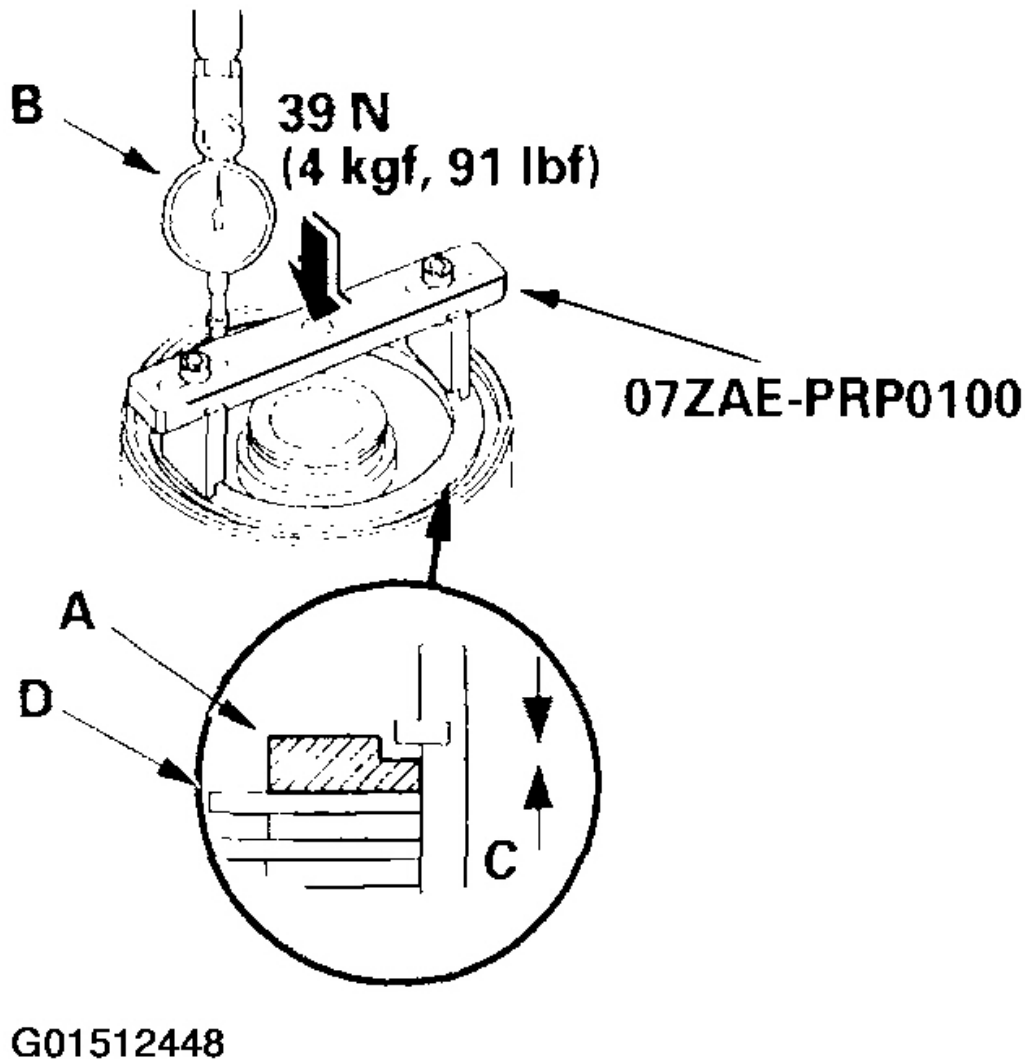
17. Set a dial indicator (A) on the clutch end plate (B).



G01512447

Fig. 88: Setting Dial Indicator On Clutch End Plate

18. Zero the dial indicator with the clutch end plate lifted up to the snap ring (C).
19. Release the clutch end plate to lower the clutch end plate, then put the special tool on the end plate (A).

**Fig. 89: Putting Special Tool On End Plate**

20. Press the special tool down with 39 N (4 kgf, 9 lbf) using a force gauge, and read the dial indicator (B). The dial indicator reads the clearance (C) between the clutch end plate and top disc (D). See **Fig. 89**. Take measurements in at least three places, and use the average as the actual clearance.

Clutch End Plate-to-Top Disc Clearance: Service Limit

1st Clutch: 1.2-1.4 mm (0.047-0.055 in.)

2nd Clutch: 0.85-1.05 mm (0.033-0.041 in.)

3rd Clutch: 0.55-0.75 mm (0.022-0.030 in.)

4th Clutch: 0.55-0.75 mm (0.022-0.030 in.)

21. If the clearance is not within the service limit, select a new clutch end plate from the following table.

NOTE: If the thickest clutch end plate is installed, but the clearance is still over the standard, replace the clutch discs and clutch plates as a set.



Fig. 90: Measuring Point For Clutch End Plate Thickness

Mark	Part Number	Thickness
6	22551-P7T-003	2.6 mm (0.102 in.)
7	22552-P7T-003	2.7 mm (0.106 in.)
8	22553-P7T-003	2.8 mm (0.110 in.)
9	22554-P7T-003	2.9 mm (0.114 in.)
0	22555-P7T-003	3.0 mm (0.118 in.)
1	22556-P7T-003	3.1 mm (0.122 in.)
2	22557-P7T-003	3.2 mm (0.126 in.)
3	22558-P7T-003	3.3 mm (0.130 in.)
4	22559-P7T-003	3.4 mm (0.134 in.)

G01512450

Fig. 91: Identifying 1st & 2nd Clutch End Plates Table

Mark	Part Number	Thickness
1	22561-P7T-003	2.1 mm (0.083 in.)
2	22562-P7T-003	2.2 mm (0.087 in.)
3	22563-P7T-003	2.3 mm (0.091 in.)
4	22564-P7T-003	2.4 mm (0.094 in.)
5	22565-P7T-003	2.5 mm (0.098 in.)
6	22566-P7T-003	2.6 mm (0.102 in.)
7	22567-P7T-003	2.7 mm (0.106 in.)
8	22568-P7T-003	2.8 mm (0.110 in.)
9	22569-P7T-003	2.9 mm (0.114 in.)

G01512451

Fig. 92: Identifying 3rd & 4th Clutch End Plates Table

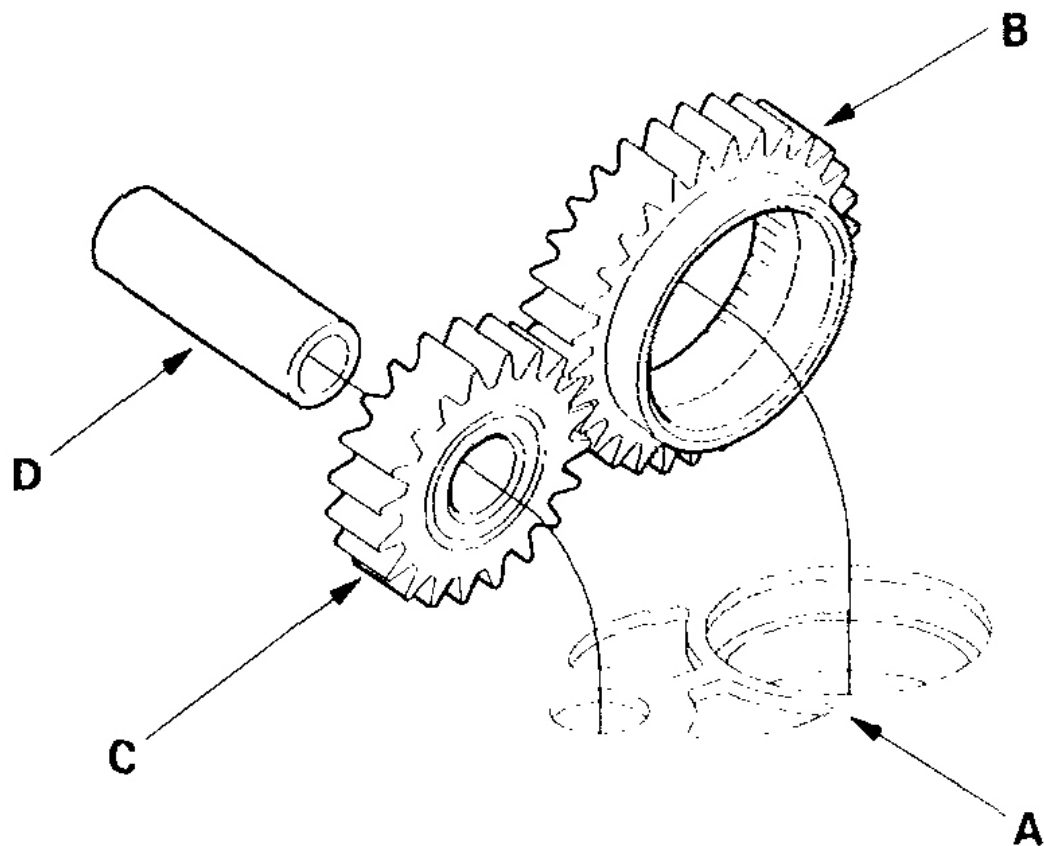
VALVE BODY

VALVE BODY AND ATF STRAINER INSTALLATION

1999-2001 AUTOMATIC TRANSMISSIONS B7TA, 4- Speed - Overhaul



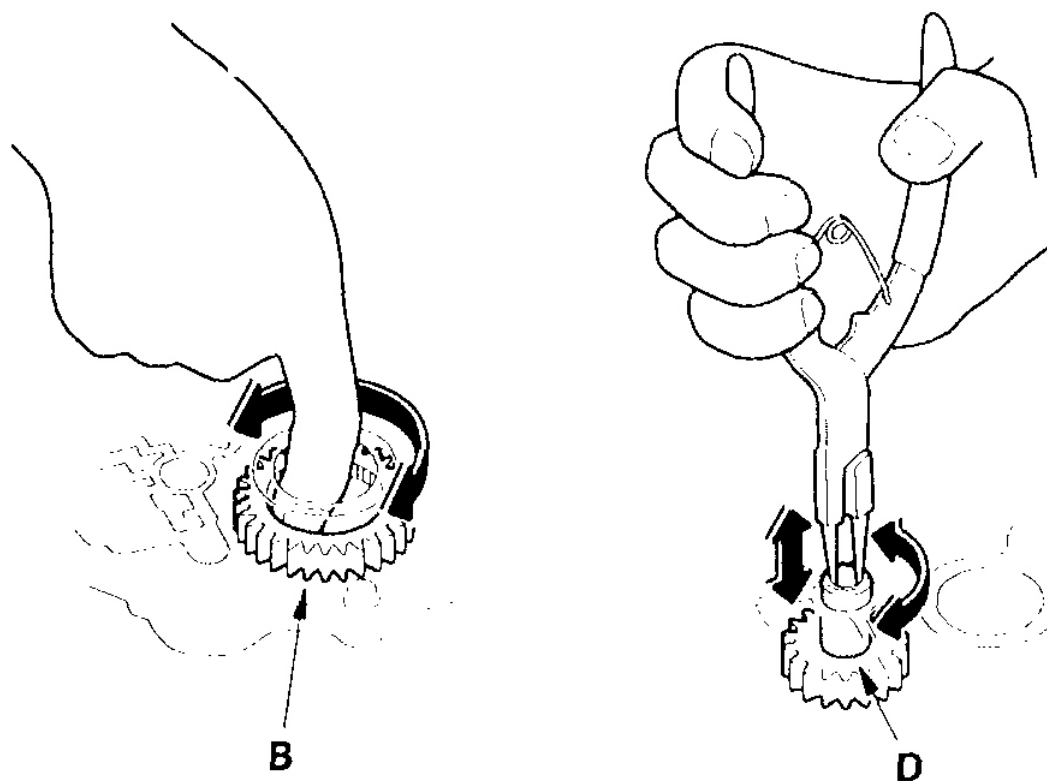
1. Install the main separator plate (A) and three dowel pins on the torque converter housing. Then install the ATF pump drive gear (B), driven gear (C) and ATF pump driven gear shaft (D). Install the ATF pump driven gear with its grooved and chamfered side facing down.



G01512453

Fig. 94: Installing ATF Pump Gears & Shaft

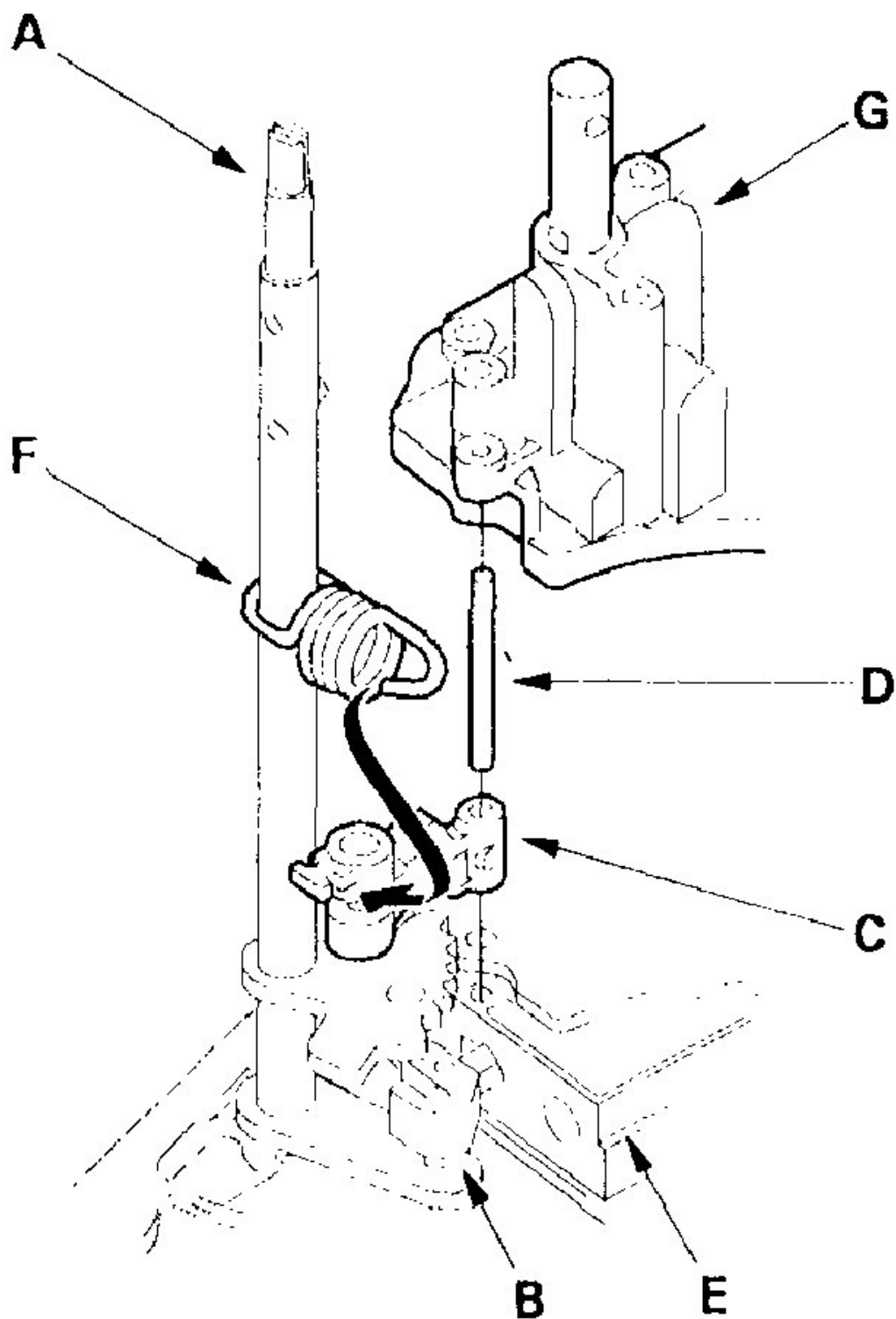
2. Install the torque converter check valve and spring, then install the main valve body (one 6 mm bolt and three 8 mm bolts). Make sure the ATF pump drive gear (B) rotates smoothly in the normal operating direction, and the ATF pump driven gear shaft (D) moves smoothly in the axial and normal operating direction.



G01512454

Fig. 95: Making Sure ATF Pump Drive Gear Rotates Smoothly

3. If the ATF pump drive gear and ATF pump driven gear shaft do not move smoothly, loosen the main valve body bolts. Realign the ATF pump driven gear shaft, retighten the bolts to the specified torque, and recheck movement. Failure to align the ATF pump driven gear shaft correctly will result in a seized ATF pump drive gear or ATF pump driven gear shaft.
4. Install the cooler check valve and spring on the main valve body, then install the two dowel pins and the regulator separator plate.
5. Install the stator shaft and stator shaft stop.
6. Install the regulator valve body (eight bolts).
7. Install the two dowel pins and the servo separator plate on the main valve body.
8. Install the control shaft (A) in the torque converter housing along with the manual valve (B).

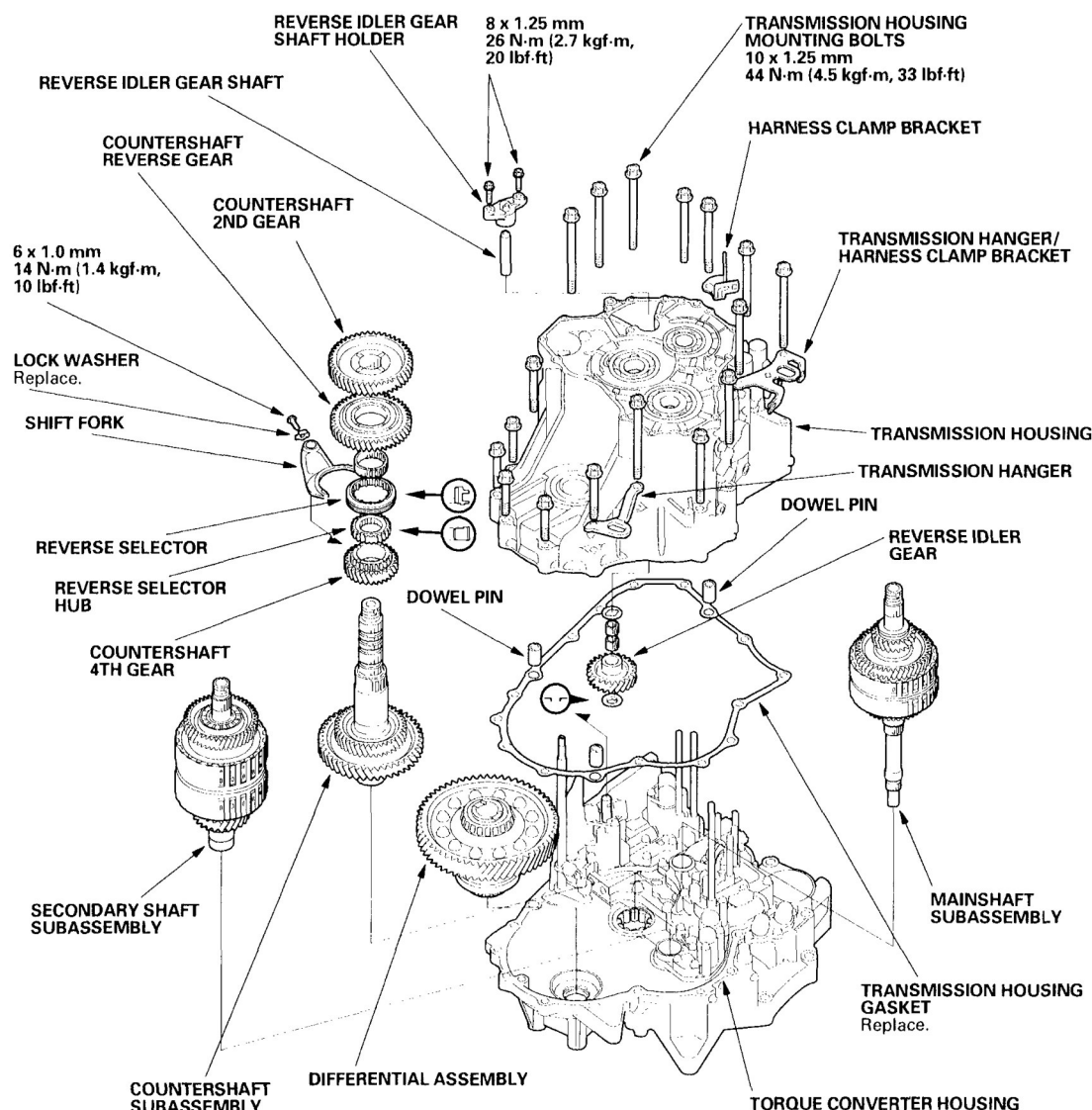


G01512455

Fig. 96: Installing Control Shaft With Manual Valve

9. Install the detent arm (C) and arm shaft (D) in the main valve body (E), then hook the detent arm spring (F) to the detent arm.
10. Install the servo body (G) (nine bolts).
11. Install the accumulator cover (two bolts).
12. Install the ATF strainer (two bolts).
13. Install the servo detent base (two bolts).
14. Install the accumulator body (six bolts).
15. Install the two ATF feed pipes in the servo body, four pipes in the regulator valve body, and one pipe in the accumulator body.

TRANSMISSION HOUSING**SHAFT ASSEMBLY AND HOUSING INSTALLATION**

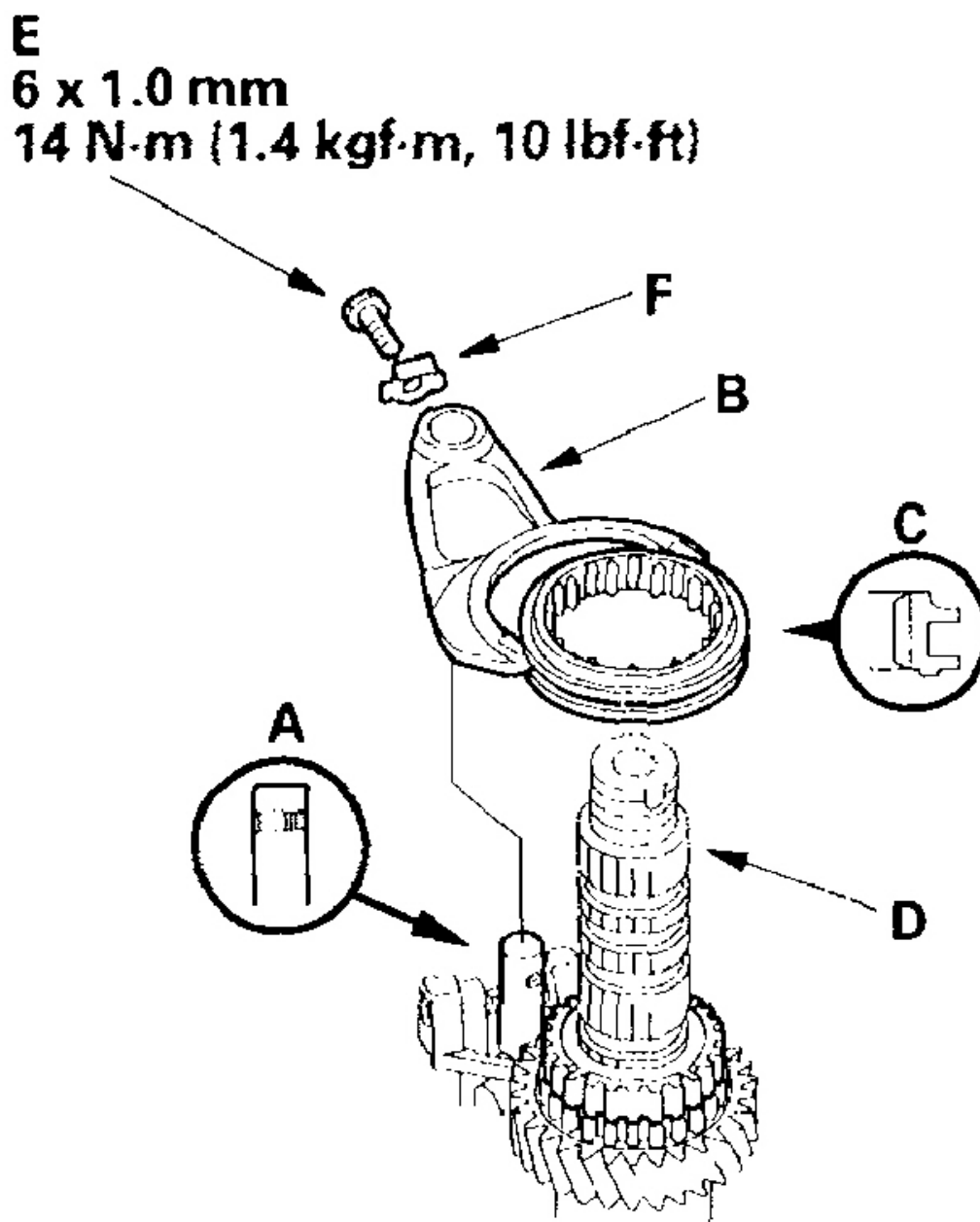


G01512456

Fig. 97: Exploded View Of Shaft Assembly & Housing Components With Torque Specifications

NOTE: Refer to Fig. 97 as needed during the following procedure.

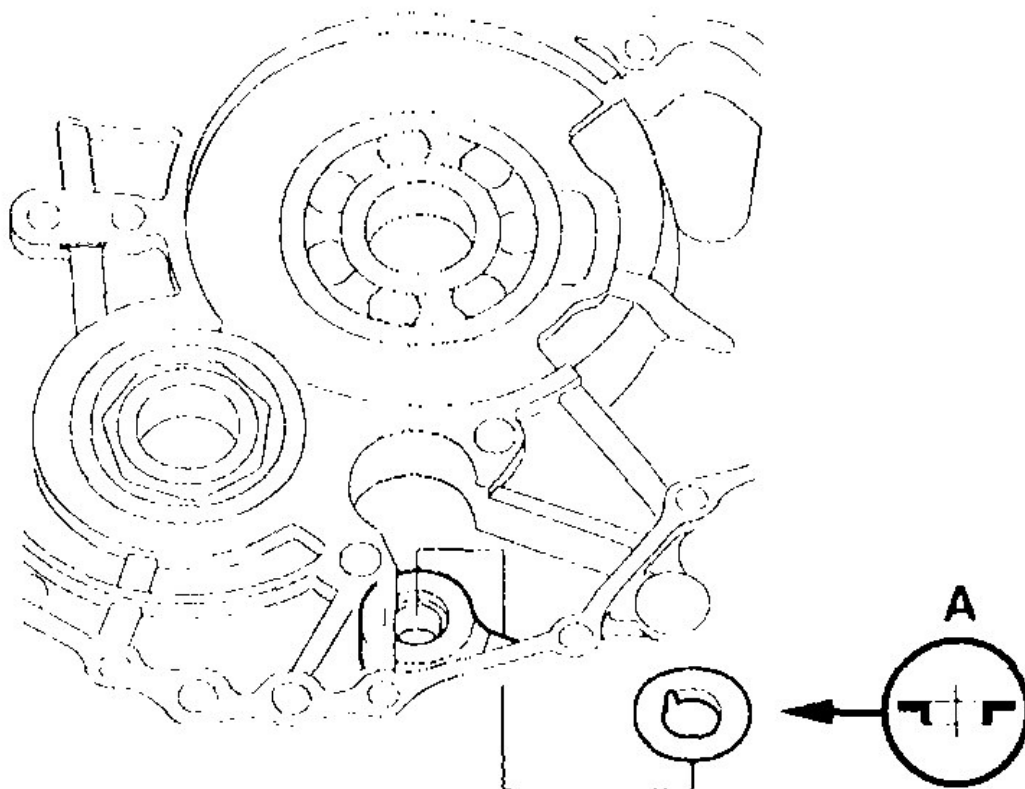
1. Install the differential assembly, countershaft subassembly, mainshaft subassembly, and secondary shaft subassembly in the torque converter housing.
2. Install the countershaft 4th gear and reverse selector hub on the countershaft. If the reverse selector hub is a press-fitted type, refer to the reverse selector hub installation procedures (see Countershaft Reverse Selector Hub, 3rd Gear, and 1st Gear Installation).
3. Turn the shift fork shaft (A) so the large chamfered hole is facing the fork bolt hole. Then install the shift fork (B) and reverse selector (C) together on the shift fork shaft and countershaft (D). Secure the shift fork to the shift fork shaft with the lock bolt (E) and a new lock washer (F), then bend the lock washer against the bolt head.



G01512457

Fig. 98: Installing Shift Fork & Shift Fork Shaft With Torque Specifications

4. Install the needle bearing, countershaft reverse gear, and countershaft 2nd gear on the countershaft.
5. Place the thrust washer (A) in the transmission housing.

**G01512458****Fig. 99: Placing Thrust Washer In Transmission Housing**

6. Place the reverse idler gear (A) in the transmission housing as shown, then slide it in the direction shown.

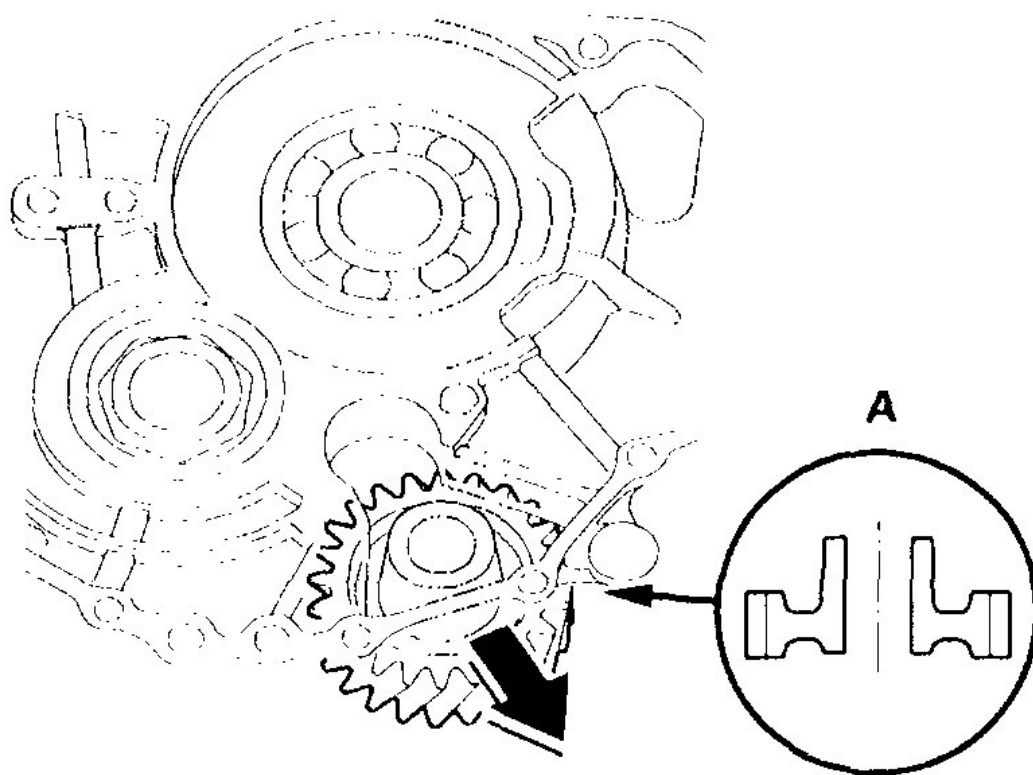
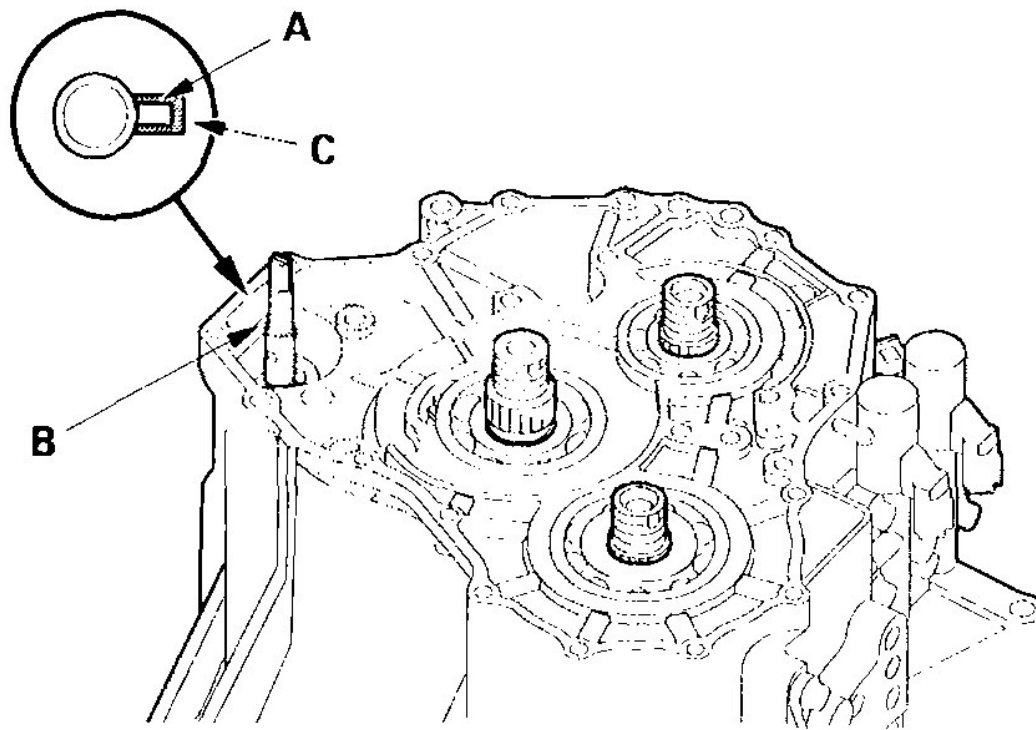
**G01512459**

Fig. 100: Placing Reverse Idler Gear In Transmission Housing

7. Align the spring pin (A) on the control shaft (B) with the transmission housing groove (C) by turning the control shaft.

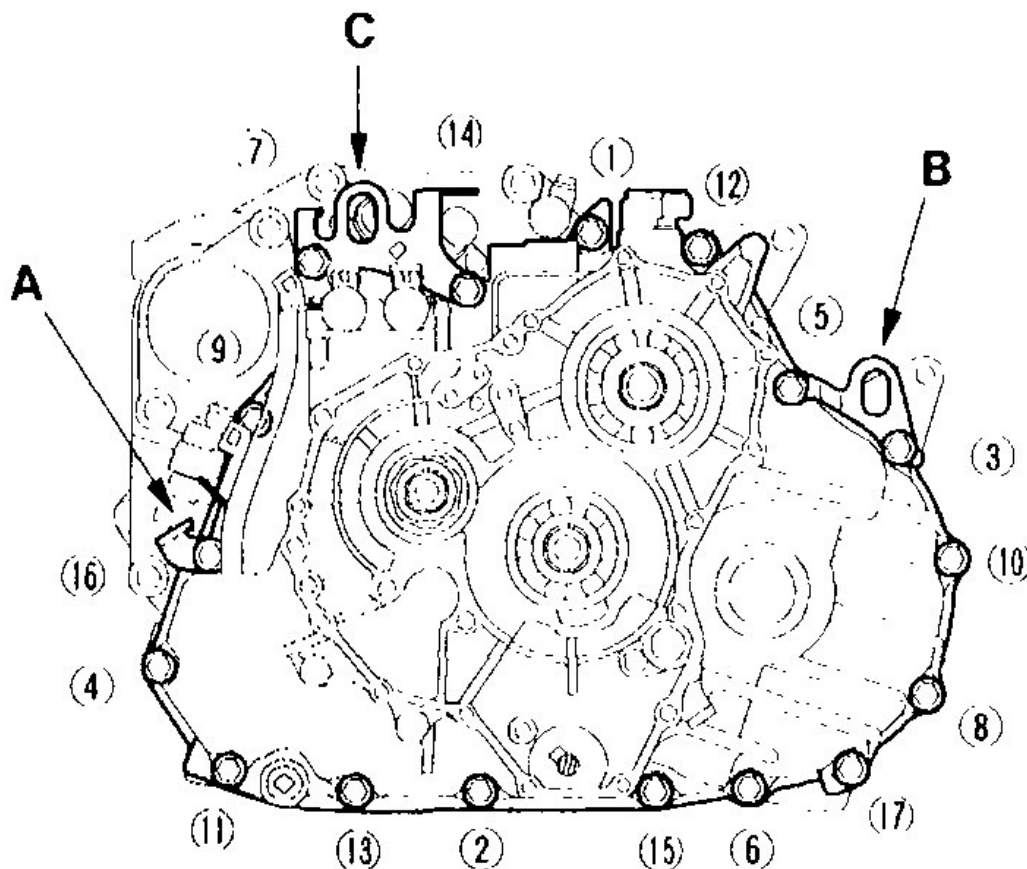


G01512460

Fig. 101: Aligning Spring Pin On Control Shaft

8. Install three dowel pins and a new gasket on the torque converter housing.
9. Place the transmission housing on the torque converter housing, then install the transmission housing mounting bolts along with the harness clamp bracket (A), transmission hanger (B), and transmission hanger/harness clamp bracket (C). Tighten the bolts in two or more steps in the sequence shown.

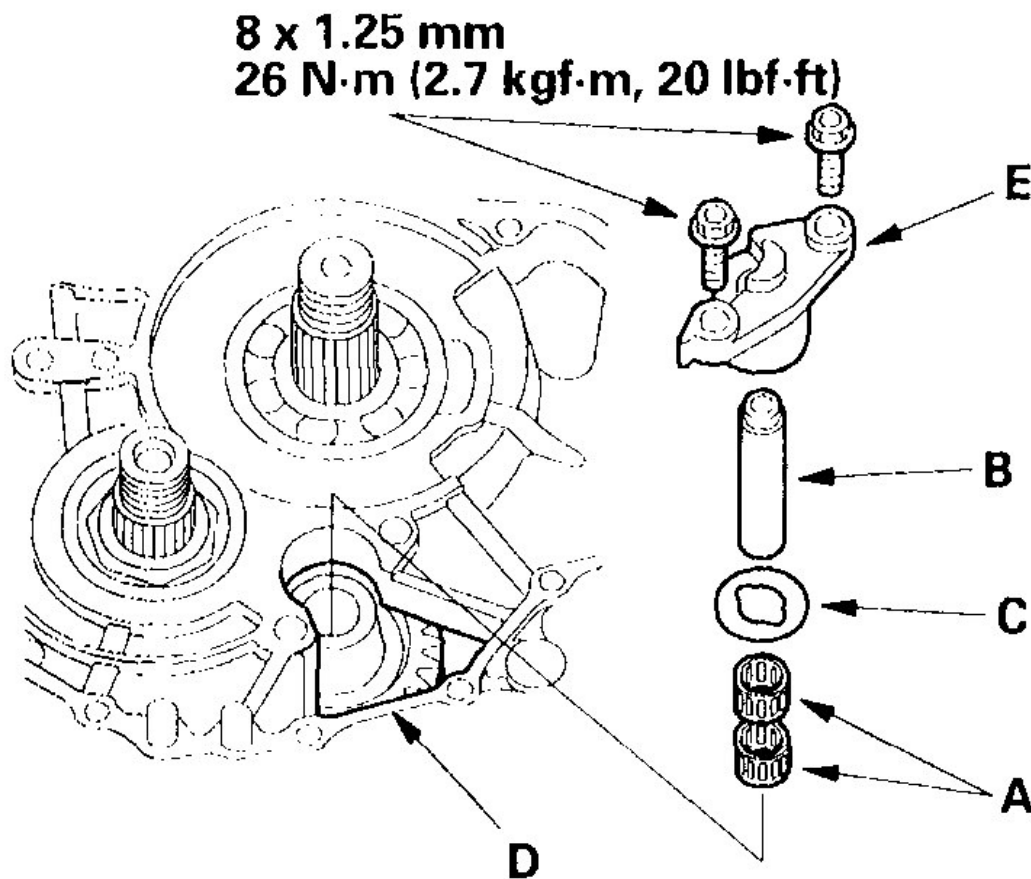
Torque: 44 N.m (4.5 kgf.m, 33 Lb. ft)



G01512461

Fig. 102: Installing Transmission Housing Mounting Bolts

10. Engage the reverse idler gear with the countershaft reverse gear and the mainshaft reverse gear. Then install the needle bearings (A), reverse idler gear shaft (B), and thrust washer (C) in the reverse idler gear (D), and install the reverse idler gear shaft holder (E) on the transmission housing.



G01512462

Fig. 103: Installing Reverse Idler Gear Shaft Needle Bearings With Torque Specifications

TRANSMISSION END COVER

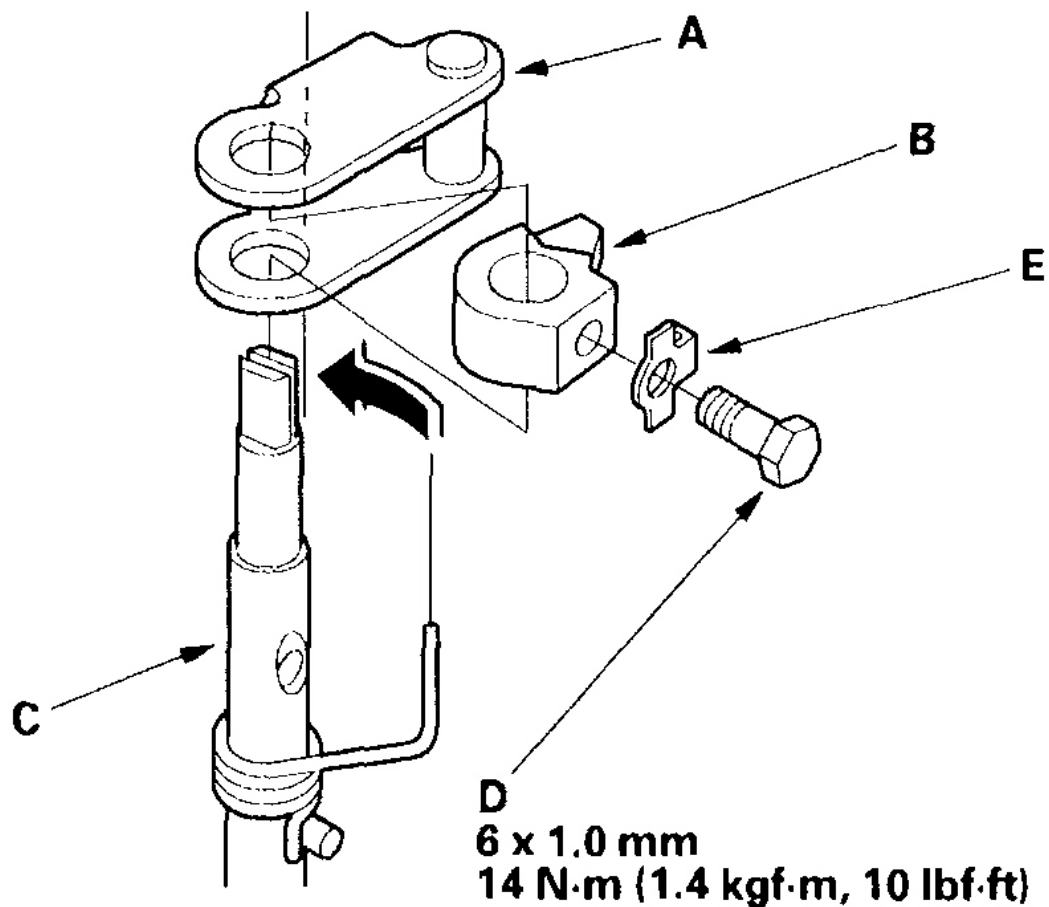
END COVER AND IDLER GEAR INSTALLATION

Special Tools Required

Mainshaft holder

07GAB-PF50101 or 07GAB-PF50100

1. Install the park lever (A) and park lever stop (B) on the control shaft (C), then install the lock bolt (D) with a new lock washer (E). Do not bend the lock tab of the lock washer until step 25.



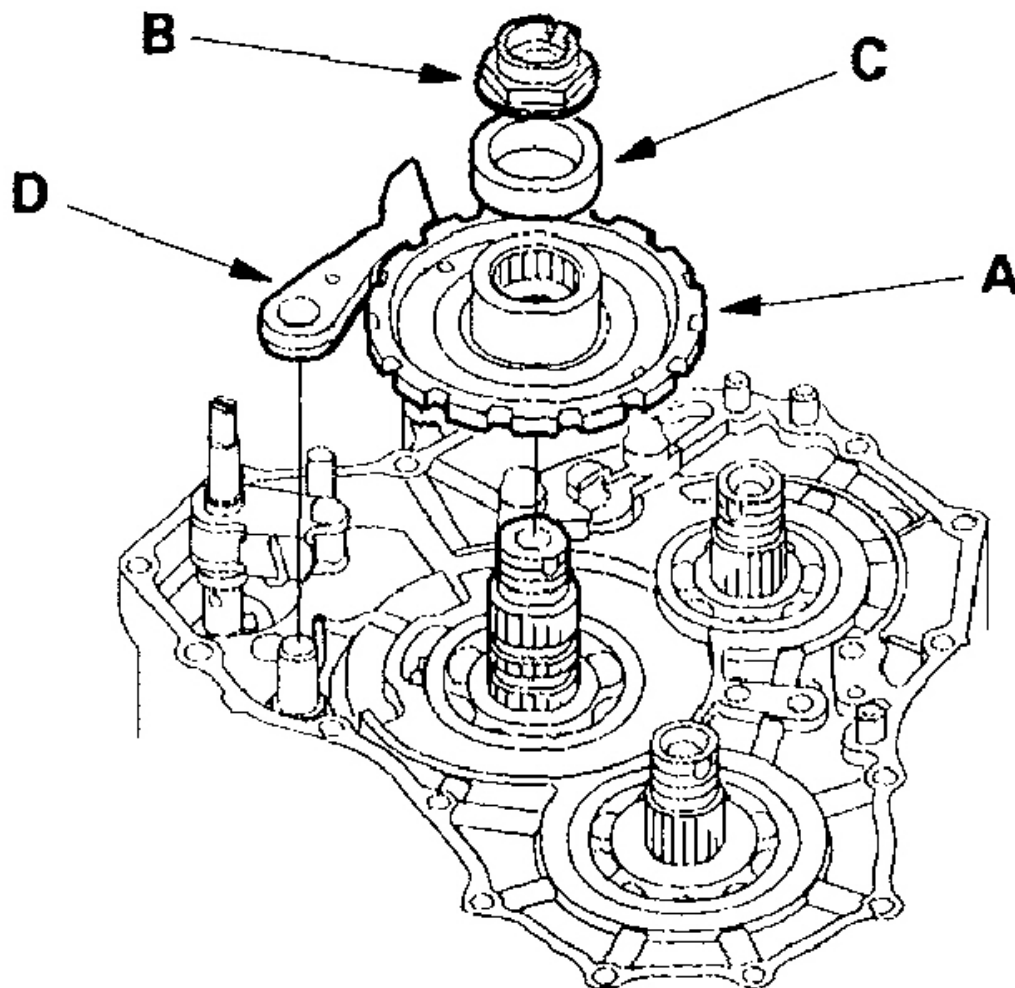
G01512463

Fig. 104: Installing Parking Lever With Torque Specifications

2. Lubricate the following parts with ATF:
 - Splines of the countershaft, the park gear, and the old locknut.
 - Threads of the countershaft and the old locknut.
 - Old conical spring washer.
3. Install the park gear (A) using the old locknut (B) and a collar (C). Hold the park pawl (D) against the park gear, then tighten the old locknut until the shaft splines come out slightly over the park gear splines.

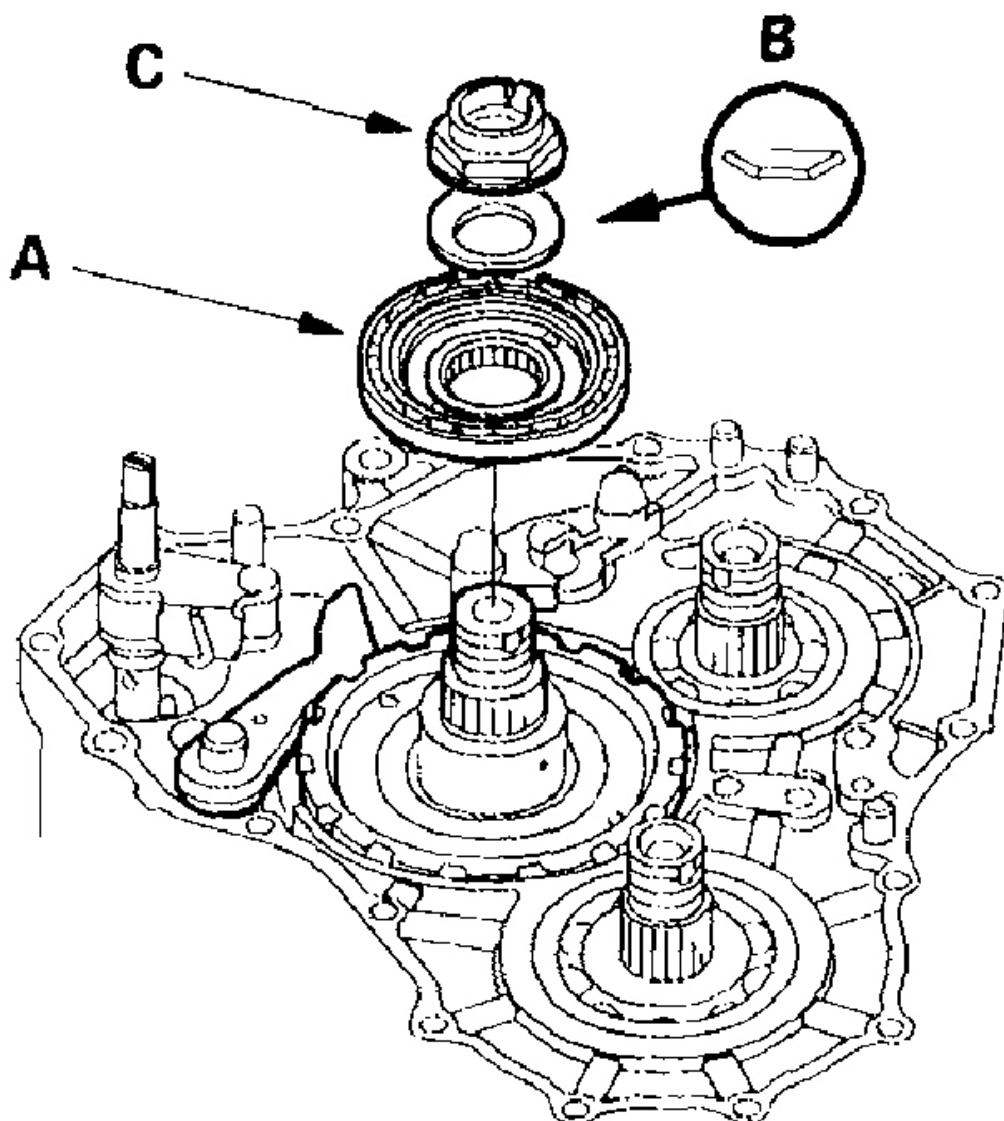
NOTE:

- **Do not use an impact wrench.**
- **Countershaft locknut has left-hand threads.**

**G01512464****Fig. 105: Installing Parking Gear**

4. Remove the locknut and the collar, then install only the bearing hub/bearing assembly (A) and old conical spring washer (B). Tighten the old locknut (C) to 226 N.m (23.0 kgf.m, 166 Lbf. ft), then remove the locknut and conical spring washer.

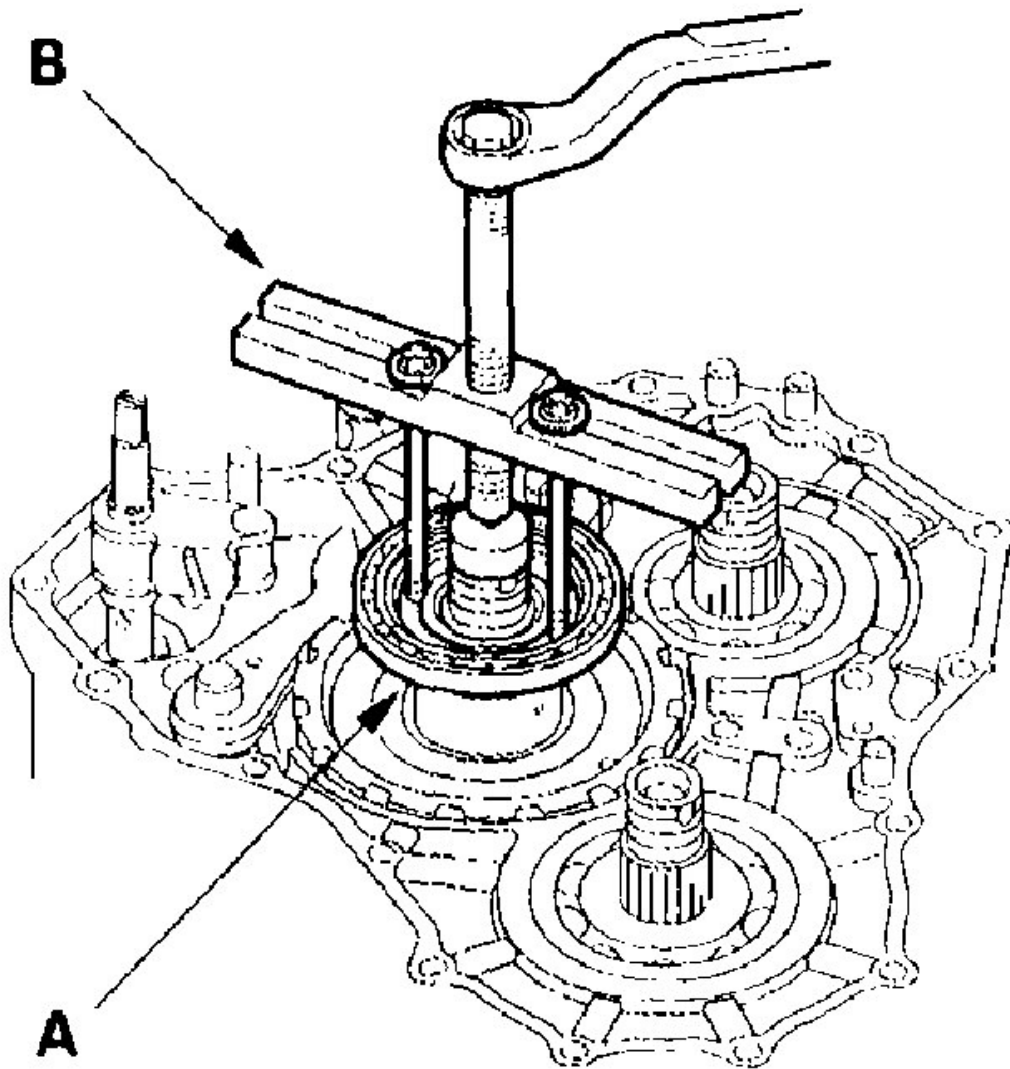
NOTE: Use a torque wrench to tighten the locknut. Do not use an impact wrench.



G01512465

Fig. 106: Installing Bearing Hub/Bearing Assembly

5. Remove the bearing hub/bearing assembly (A) with a puller (B).

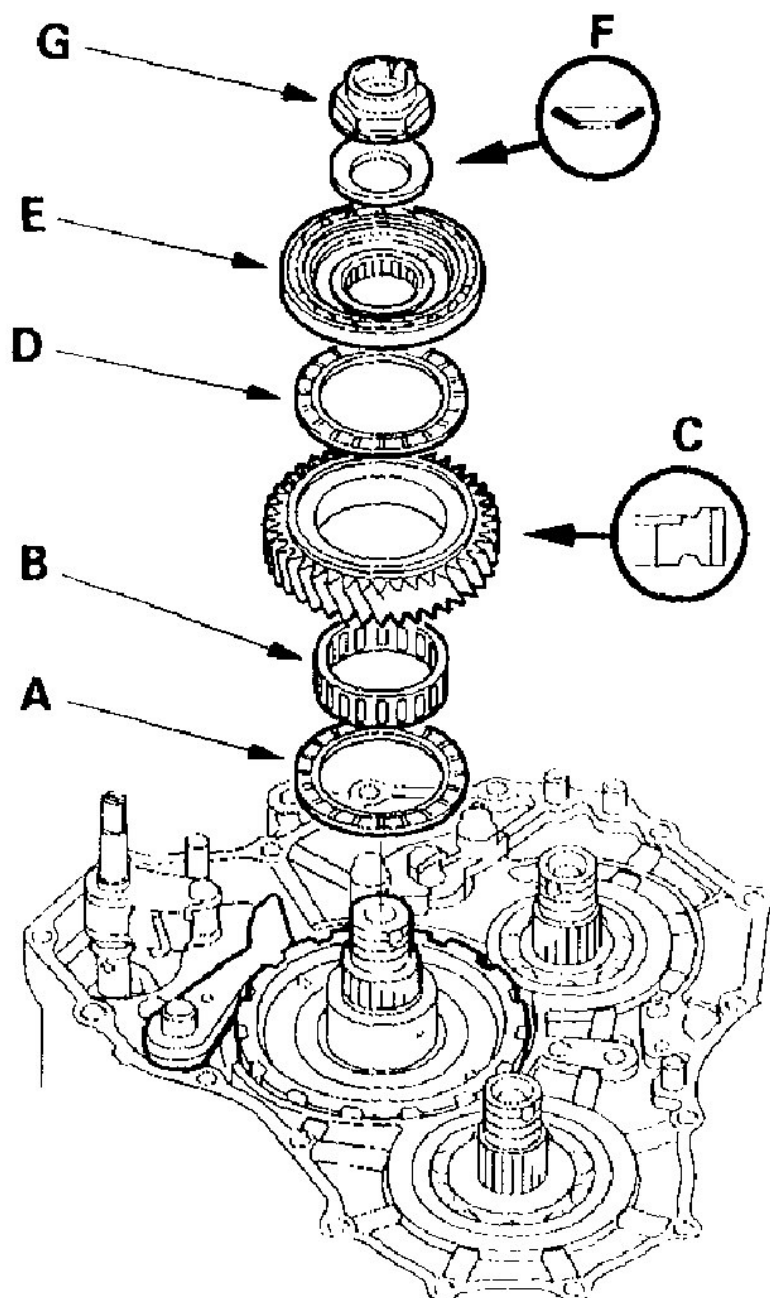


G01512466

Fig. 107: Removing Bearing Hub/Bearing Assembly With Puller

6. Install the thrust needle bearing (A), needle bearing (B), countershaft idler gear (C), thrust needle bearing (D), bearing hub/bearing assembly (E), and the old conical spring washer (F). Then tighten the old locknut (G) to 164 N.m (17.0 kgf.m, 123 Lbf. ft).

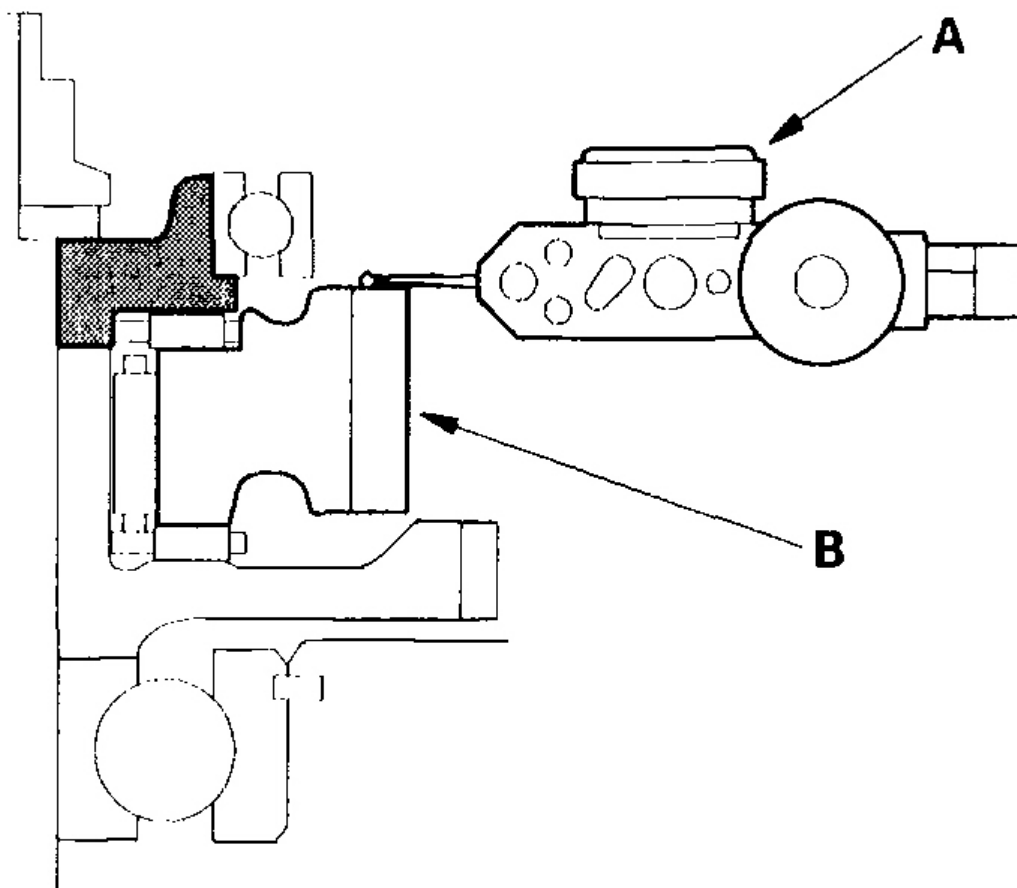
NOTE: Use a torque wrench to tighten the locknut. Do not use an impact wrench.



G01512467

Fig. 108: Identifying End Cover Components

7. Set the dial indicator (A) to the countershaft idler gear (B) as shown.



G01512468

Fig. 109: Setting Dial Indicator On Countershaft Idler Gear

8. Measure the countershaft idler gear axial clearance in at least three places, while moving the countershaft idler gear. Use the average as the actual clearance.

Standard: 0.015-0.045 mm (0.0006-0.0018 in.)

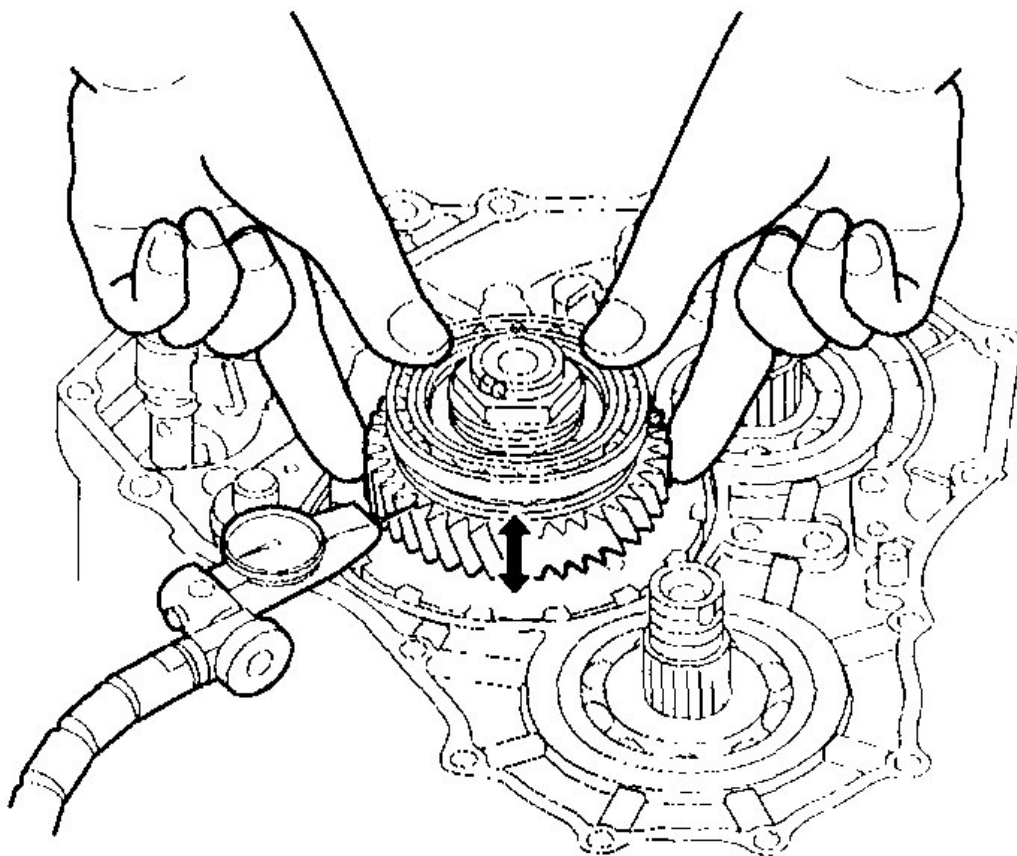
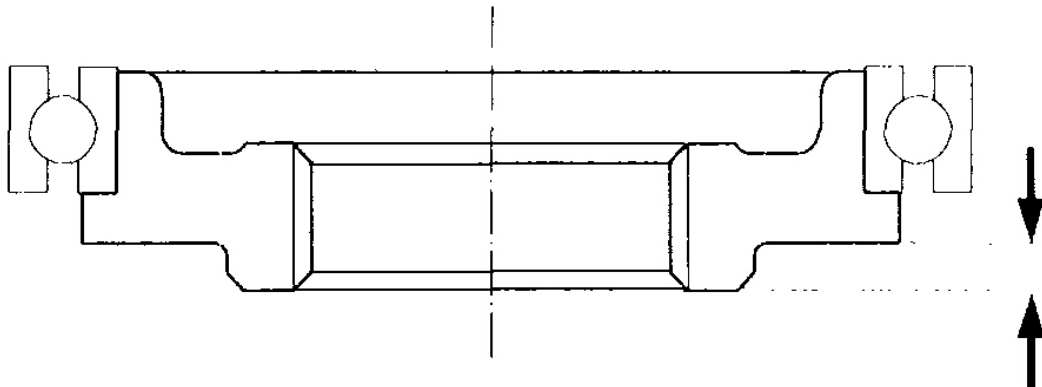
**G01512469**

Fig. 110: Measuring Countershaft Idler Gear Axial Clearance

9. If the clearance is out of standard, remove the bearing hub/bearing assembly using a puller as described.
10. Select and install the new bearing hub/bearing assembly, then recheck.



G01512470

Fig. 111: Measuring Hub/Bearing Dimensions

Mark	Part Number	Difference
A	90520-P6H-000	3.503 mm (0.1379 in.)
B	90521-P6H-000	3.490 mm (0.1374 in.)
C	90522-P6H-000	3.477 mm (0.1369 in.)
D	90523-P6H-000	3.464 mm (0.1364 in.)

G01512471

Fig. 112: Bearing Hub Mark/Part Number Identification Table

11. After replacing the bearing hub/bearing assembly, make sure the clearance is within standard.
12. Remove the old locknut and old conical spring washer from the countershaft.
13. Install the special tool onto the mainshaft.

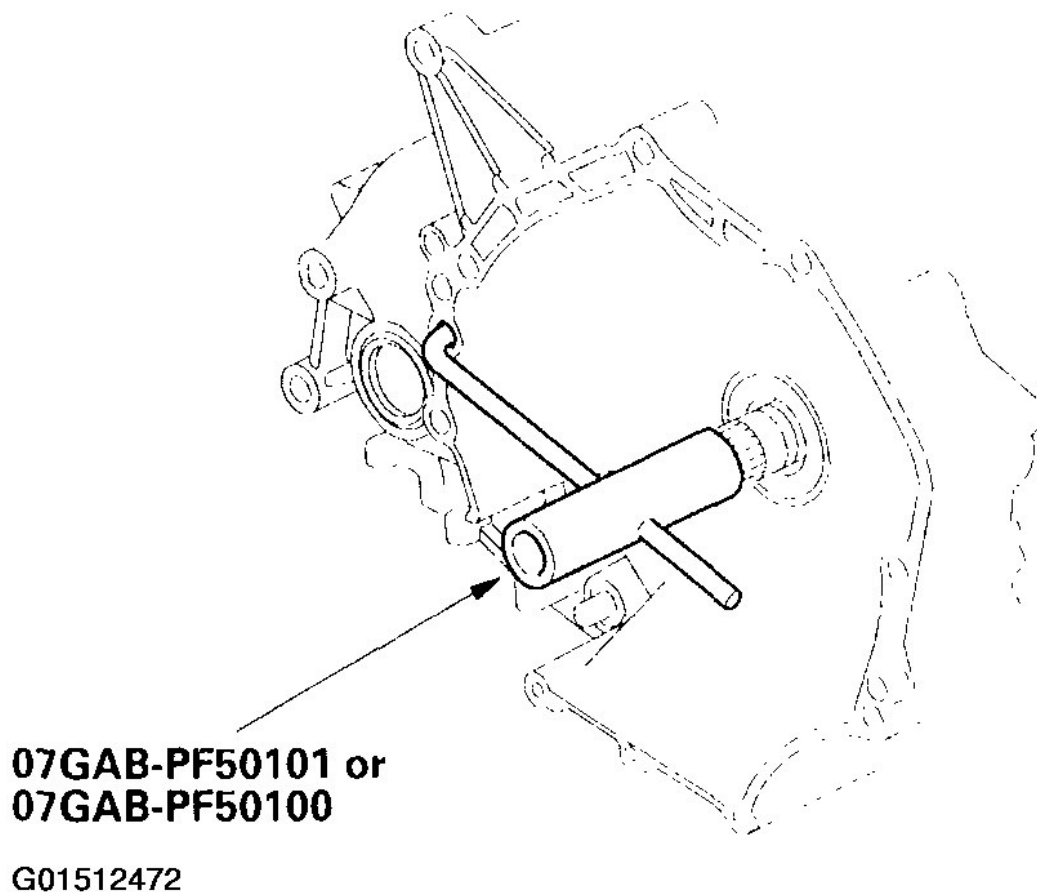
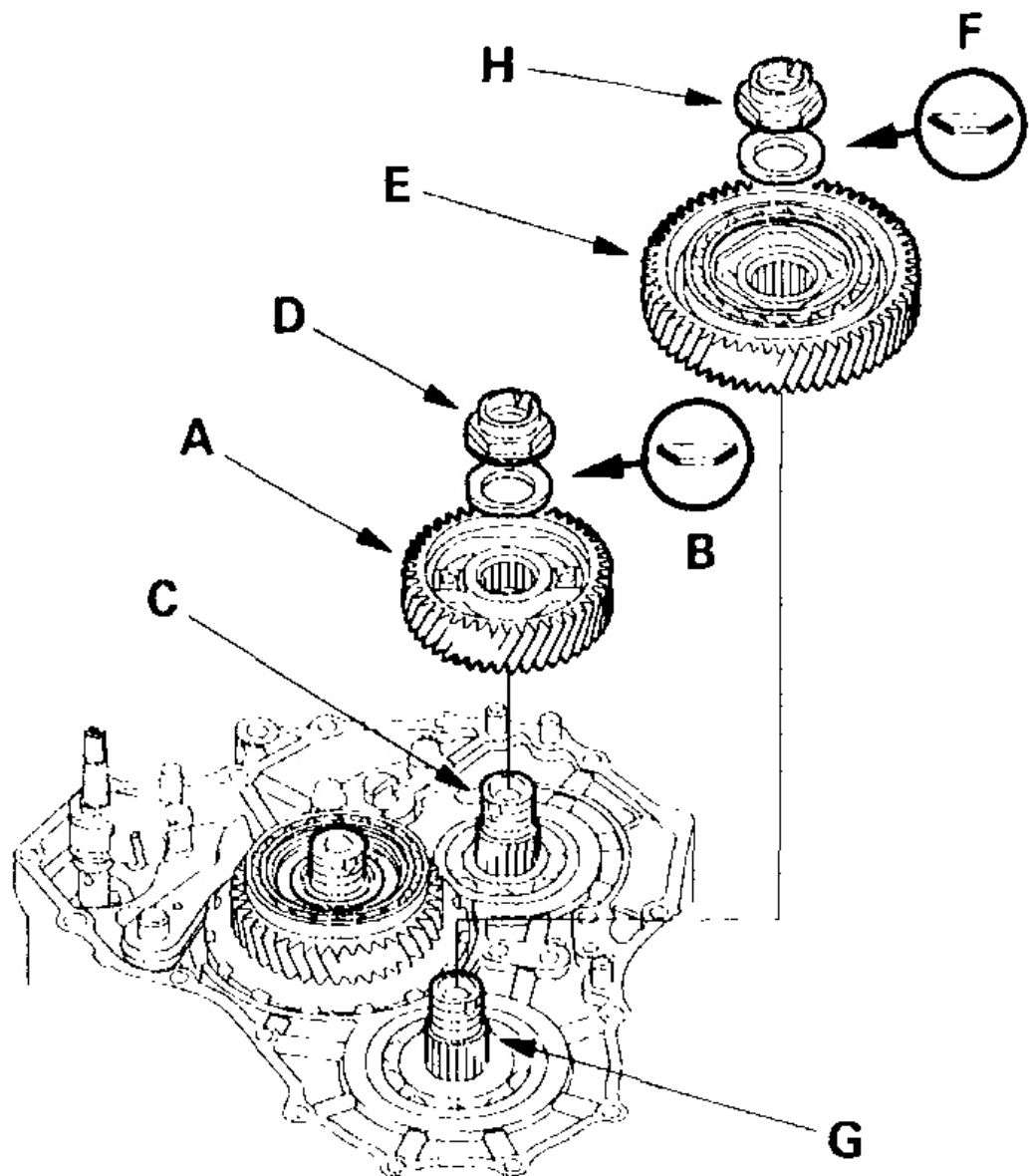


Fig. 113: Installing Special Tool Onto Mainshaft

14. Lubricate the following parts with ATF:
 - Splines of the mainshaft, secondary shaft, and idler gears.
 - Threads of the mainshaft and secondary shaft.
 - Threads of the old mainshaft and secondary shaft locknuts.
 - Old conical spring washers.
15. Install the mainshaft idler gear (A) and the old conical spring washer (B) on the mainshaft (C). Tighten the old locknut (D) to 226 N.m (23.0 kgf.m, 166 lbf. ft) to seat the mainshaft idler gear.

NOTE: Use a torque wrench to tighten the locknut. Do not use an impact wrench.



G01512473

Fig. 114: Installing Mainshaft Idler Gear

16. Install the secondary shaft idler gear (E) and the old conical spring washer (F) on the secondary shaft (G). Tighten the old locknut (H) to 226 N.m (23.0 kgf.m, 166 Lbf. ft) to seat the secondary shaft idler gear.

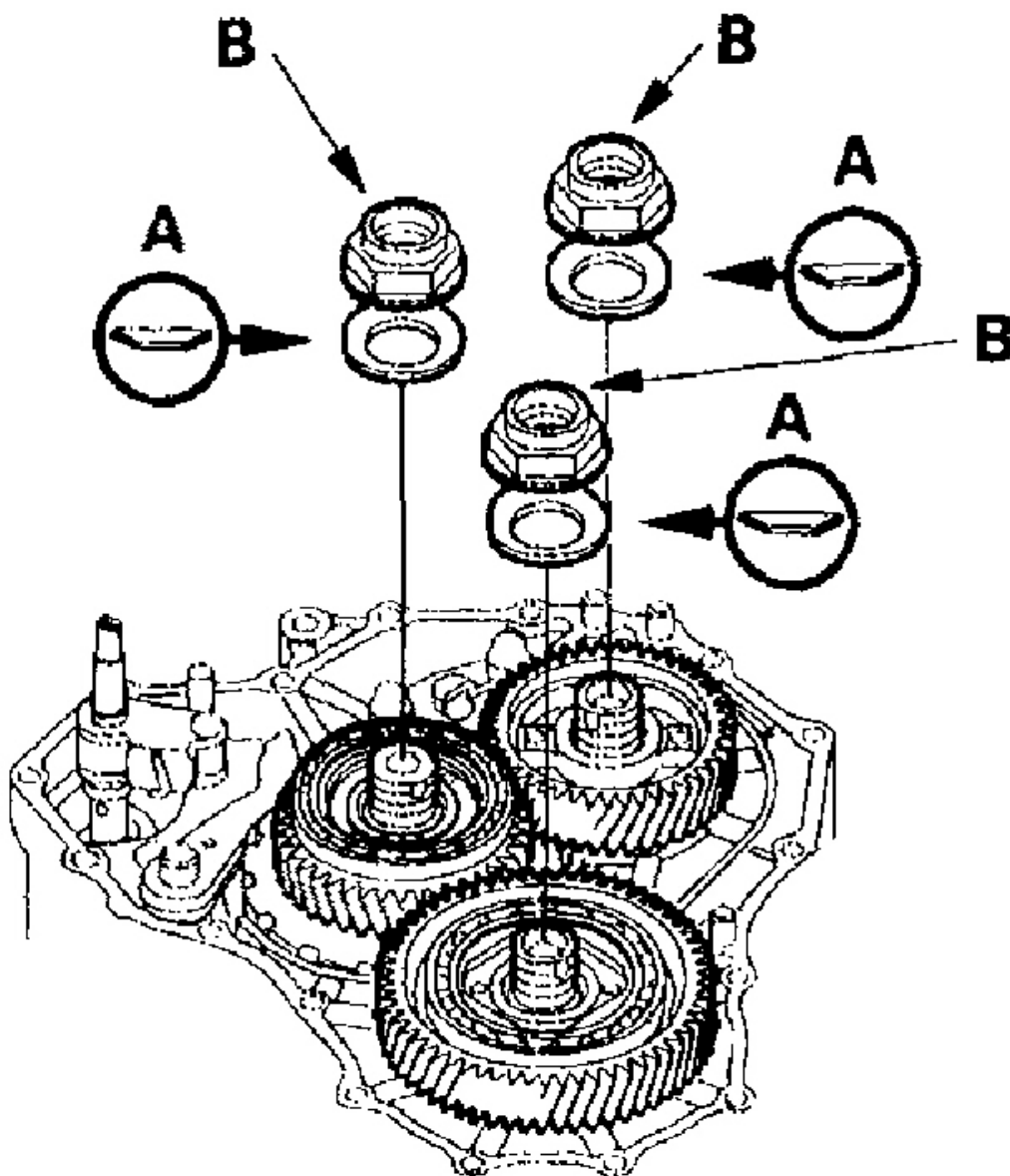
NOTE:

- Use a torque wrench to tighten the locknut. Do not use an impact

wrench.

- **Secondary shaft locknut has LEFT-HAND threads.**

17. Remove the old locknuts and old conical spring washers from the mainshaft and the secondary shaft.
18. Lubricate the threads of each shaft, the new locknuts, and the new conical spring washers with ATF.
19. Install the new conical spring washers (A) in the direction shown, and install the new locknuts (B).



G01512474

Fig. 115: Installing New Conical Spring Washers

20. Tighten the lock nut to 167 N.m, (17.0 kgf.m, 123 Lbf. ft).

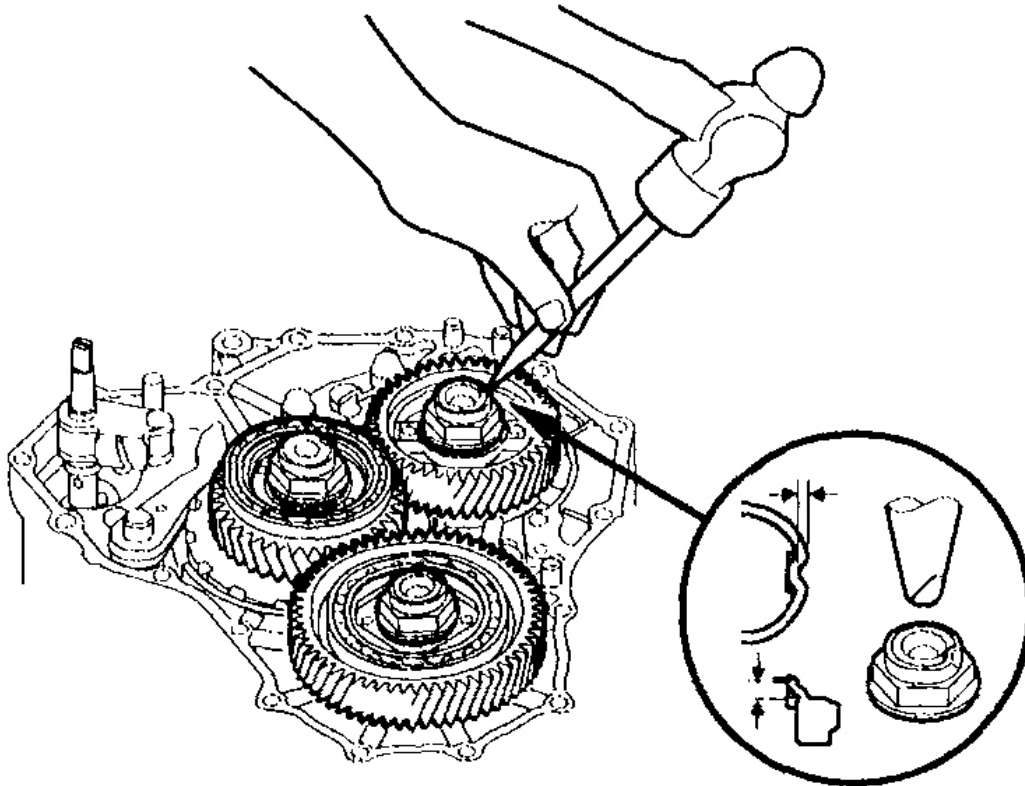
NOTE:

- Use a torque wrench to tighten the locknut. Do not use an impact

wrench.

- Countershaft and secondary shaft locknuts have LEFT-HAND threads.

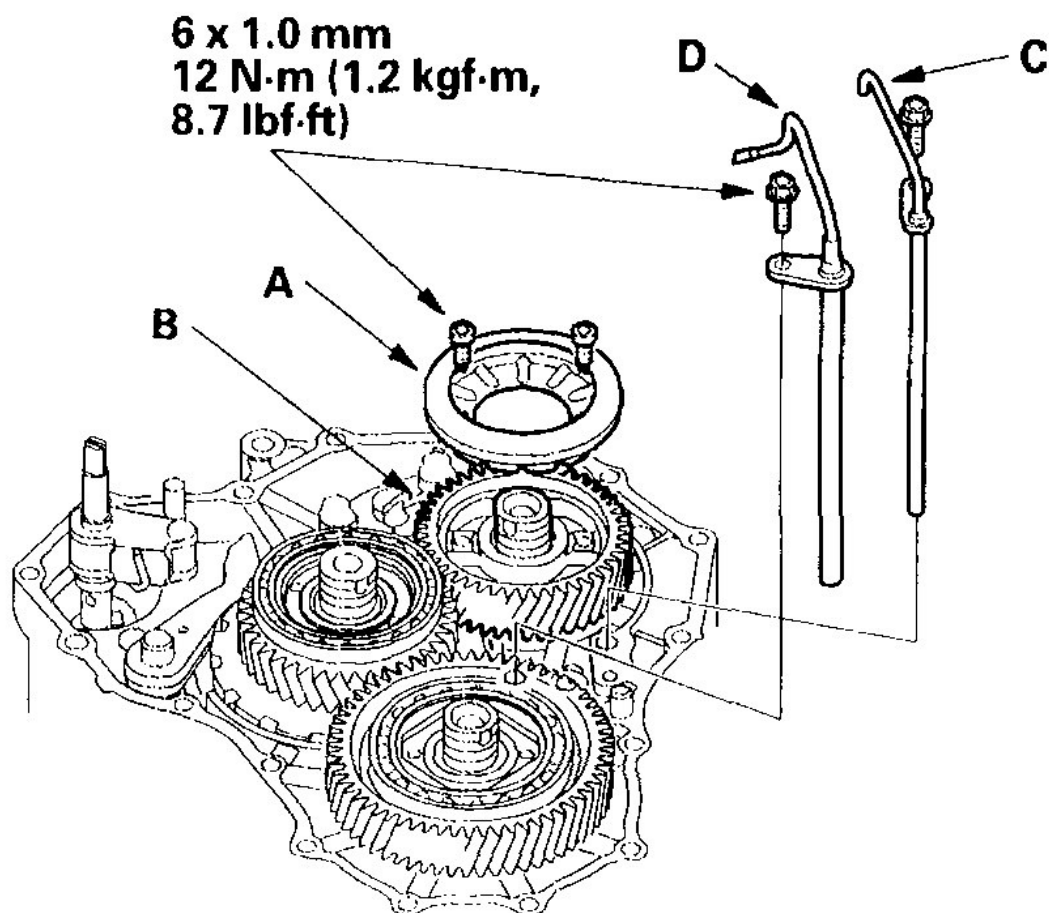
21. Stake each locknut into its shaft using a 3.5 mm punch.



G01512475

Fig. 116: Staking Each Locknut Into Its Shaft

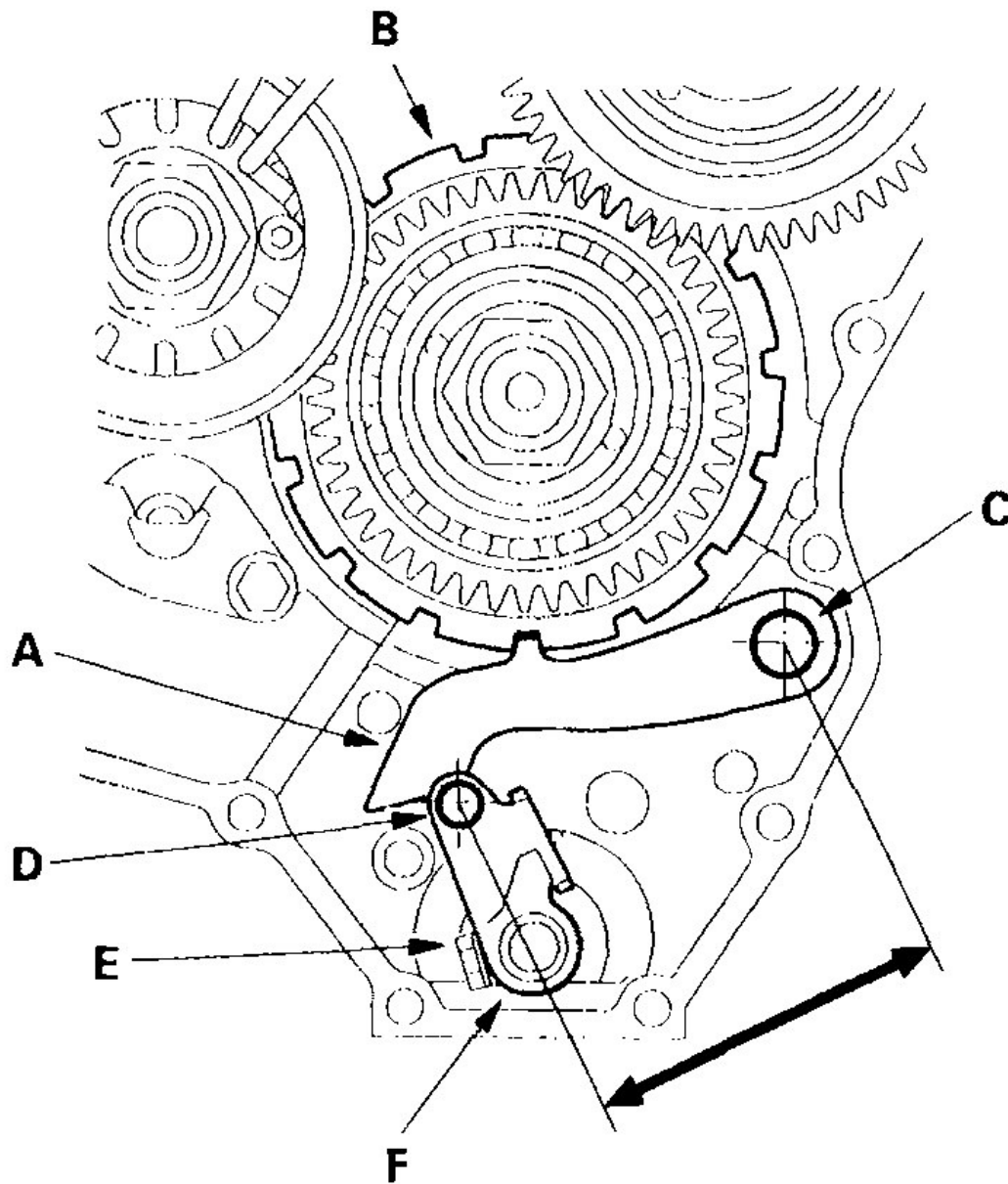
22. Install the pitot flange (A) on the mainshaft idler gear (B), then install the lubrication pitot pipe (C) and the pitot pipe (D) on the transmission housing.



G01512476

Fig. 117: Installing Pitot Flange With Torque Specifications

23. Set the park lever in P position, then verify that the park pawl (A) engages the park gear (B).

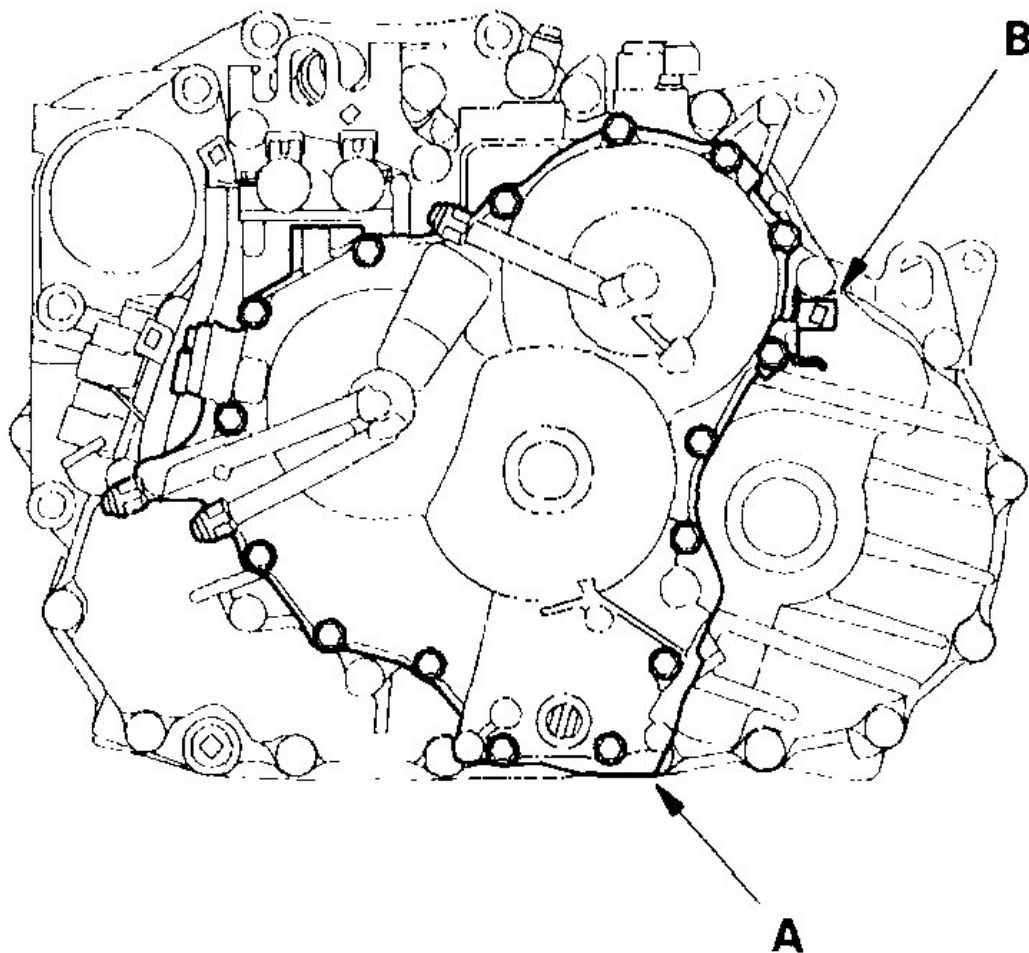


G01512477

Fig. 118: Verifying Park Pawl Engages Park Gear

24. If the park pawl does not engage fully, check the distance between the pawl shaft (C) and the park lever roller pin (D) (see **Park Lever Stop Inspection and Adjustment**).
25. Tighten the lock bolt (E), and bend the lock tab of the lock washer (F) against the lock bolt head.
26. Install the end cover (A) with the two dowel pins, new O rings, new gasket, and harness clamp bracket

(B) Tighten the 16 bolts to 12 N.m, (1.2 kgf-m, 8.7 Lbf. ft).

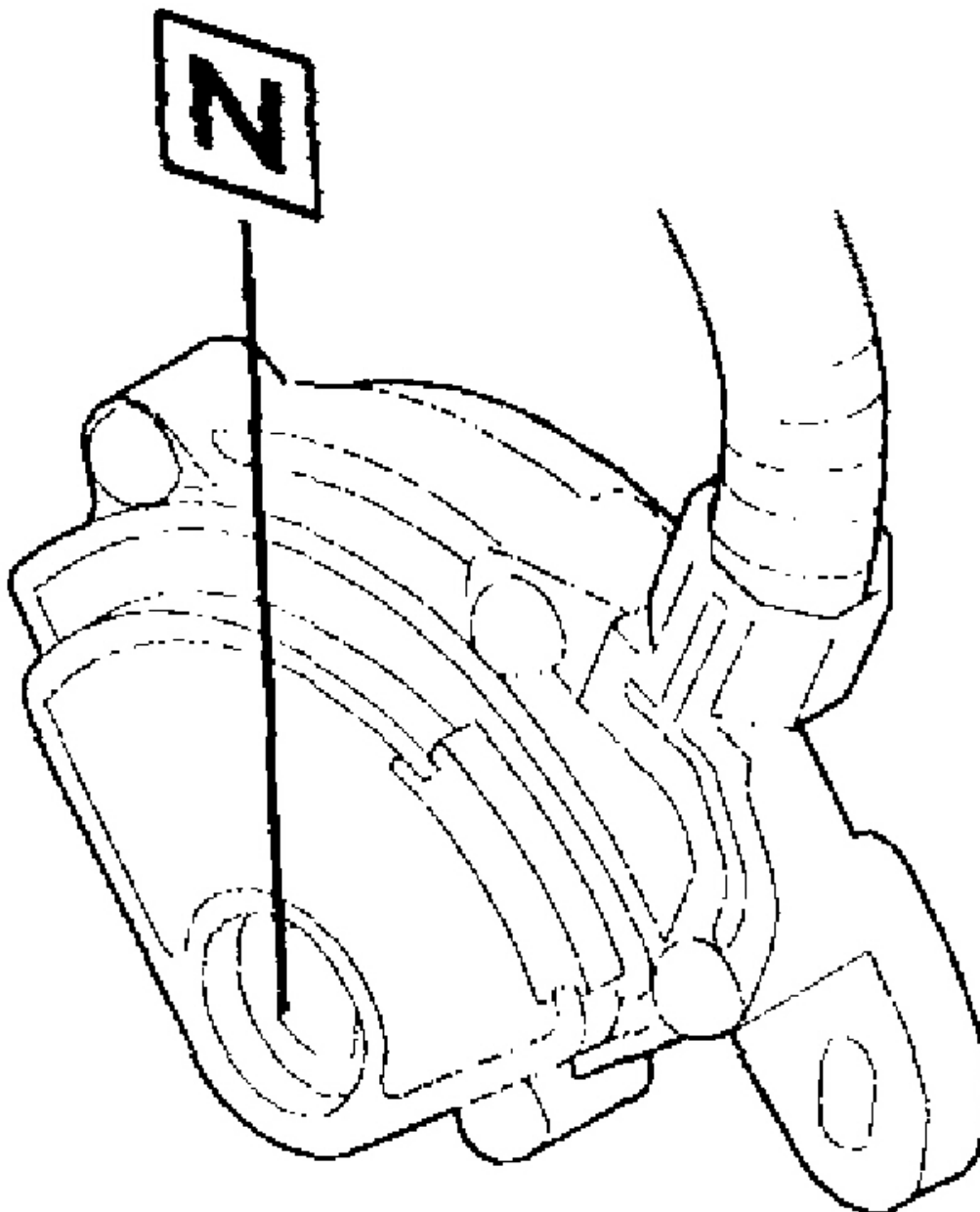


G01512478

Fig. 119: Installing End Cover

27. Set the transmission range switch to N position.

NOTE: The transmission range switch clicks in N position.

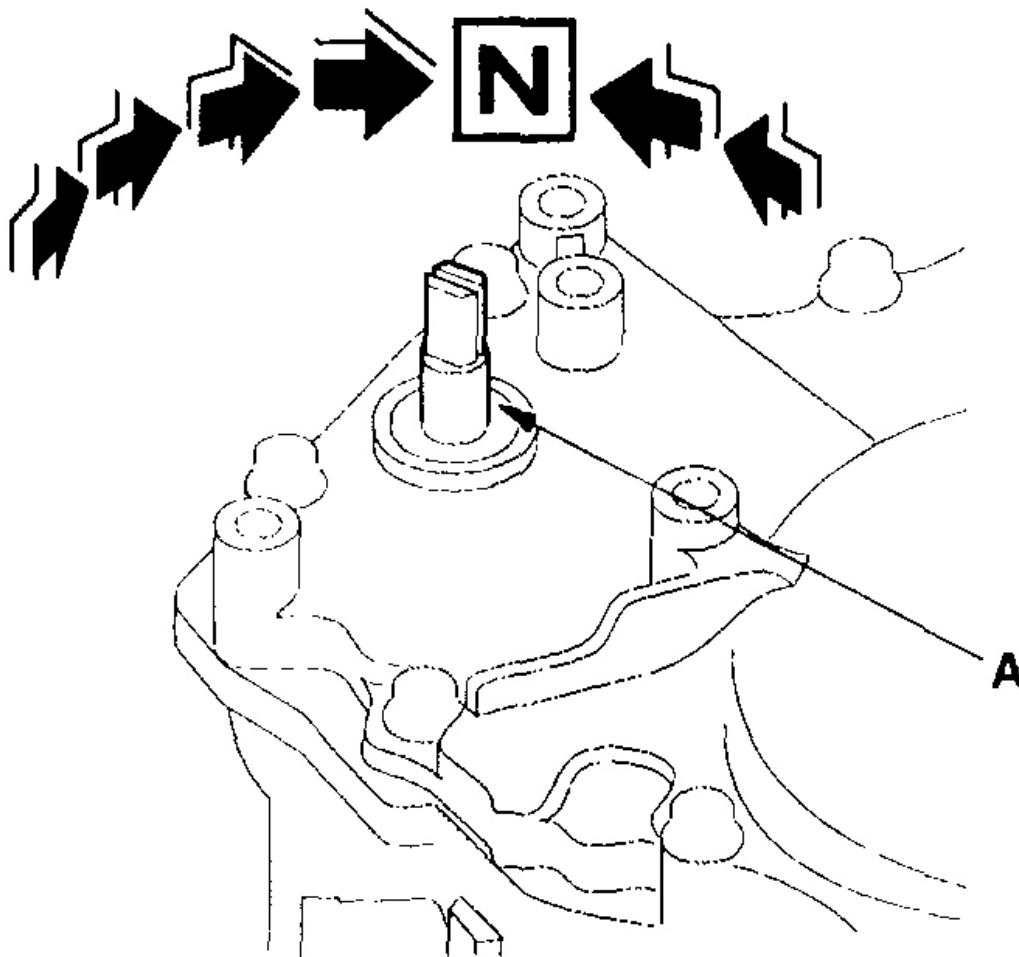


G01512479

Fig. 120: Setting Transmission Range To N Position

28. Set the control shaft (A) to the N position by turning it.

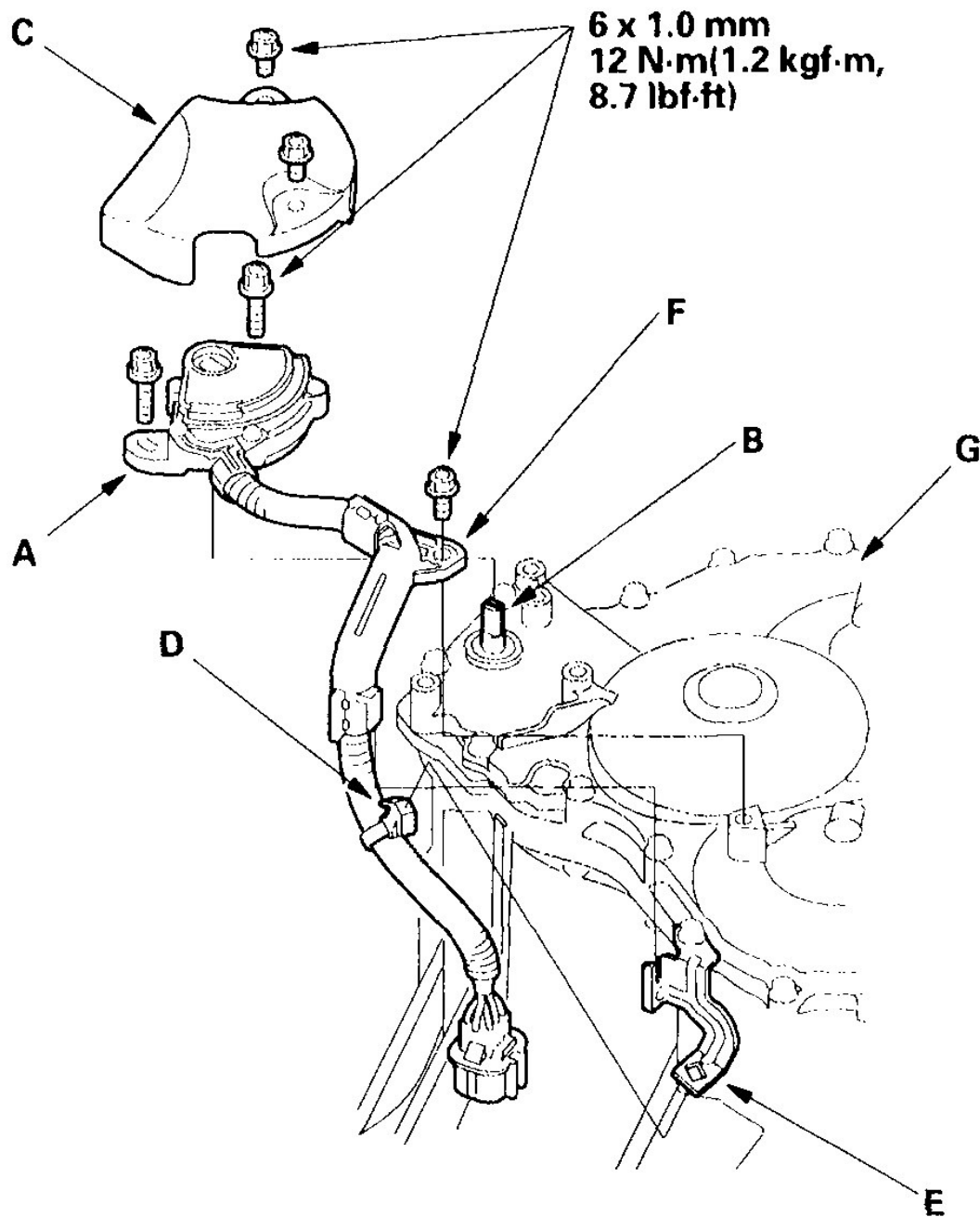
NOTE: Be careful not to squeeze the end of the control shaft tips together when turning into position. If the tips are squeezed together it will cause a faulty shift signal or position due to the play between the control shaft and position switch.



G01512480

Fig. 121: Setting Control Shaft To N Position

29. Install the transmission range switch (A) gently on the control shaft (B), then secure it with the bolts. Take care not to move the transmission range switch when tightening the bolts.



G01512481

Fig. 122: Installing Transmission Range Switch With Torque Specifications

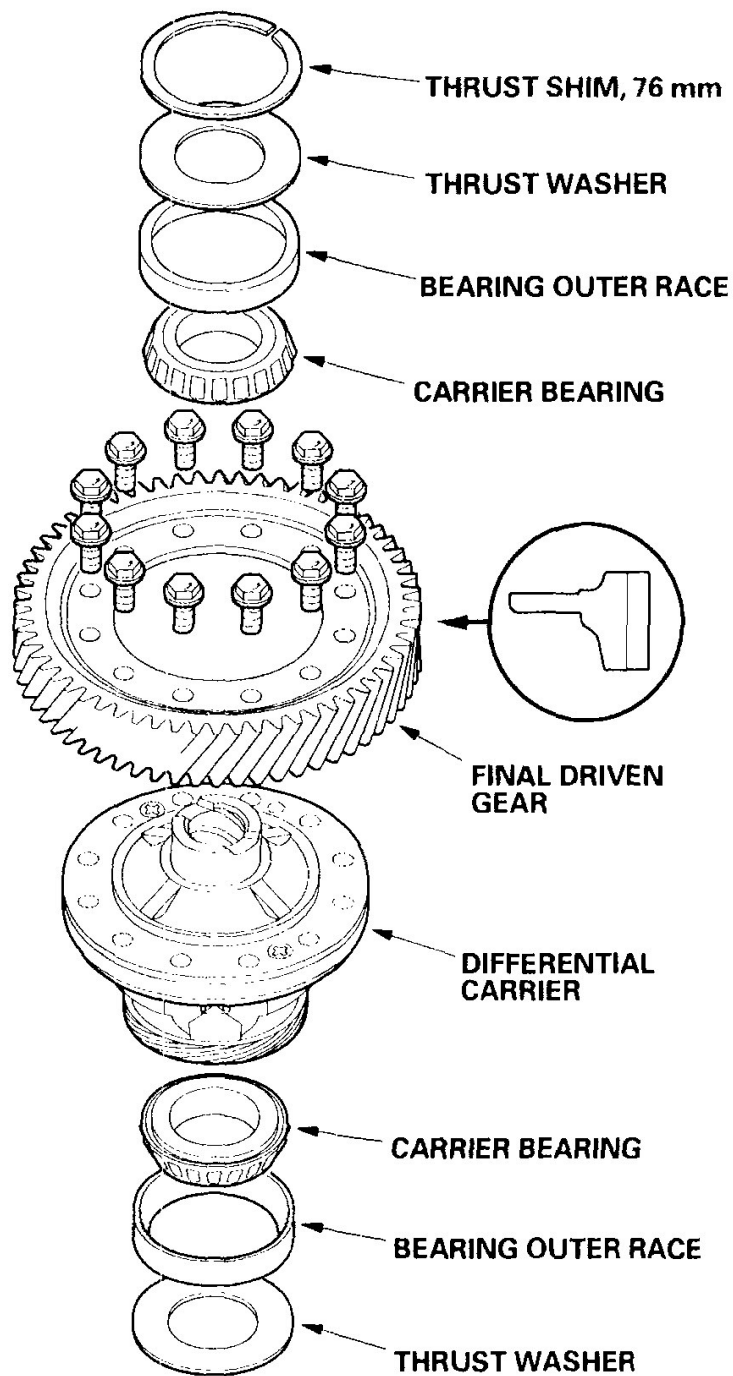
30. Install the transmission range switch cover (C); install the harness clamp (D) on the clamp bracket (E); install the harness clamp (F) on the end cover (G).
31. Install the ATF cooler lines and new sealing washers. Tighten the line fittings to 28 N·m (2.9 kgf·m, 21

Lbf.ft).

32. Install the breather tube.
33. Install the ATF dipstick.

A/T DIFFERENTIAL

COMPONENT LOCATION INDEX

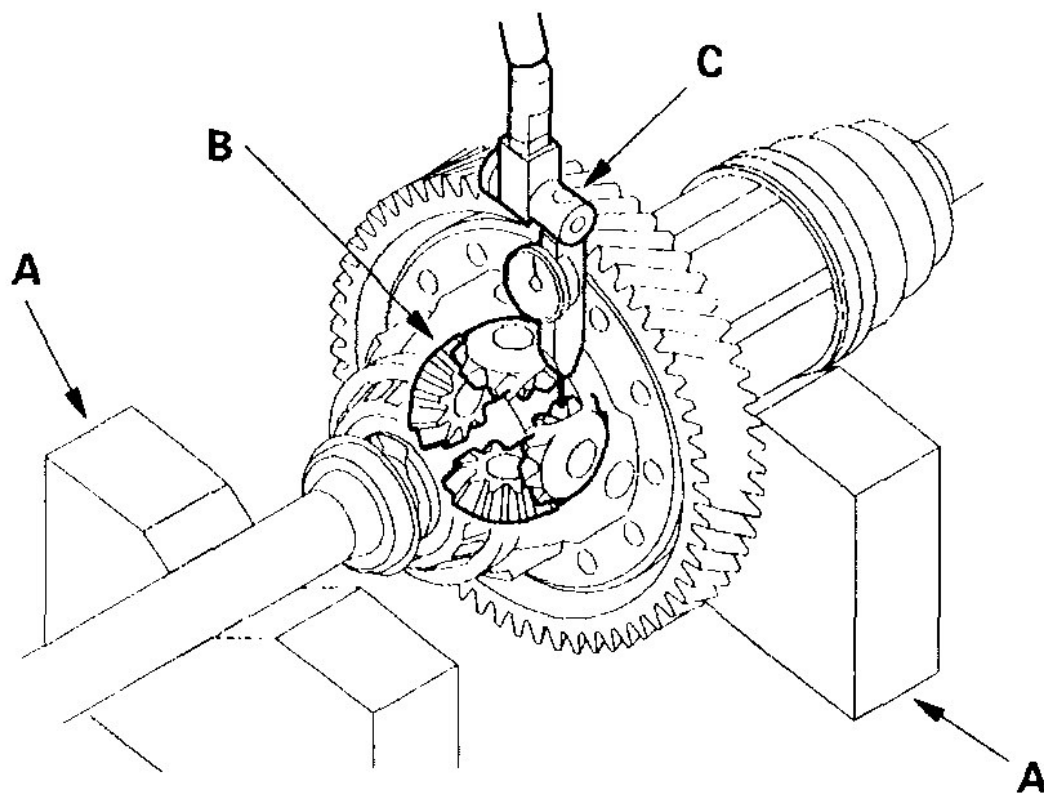


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Fig. 123: Exploded View Of A/T Differential Components

BACKLASH INSPECTION

1. Install both axles, and place the differential assembly on V-blocks (A).



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Fig. 124: Placing Differential Assembly On V-Blocks

2. Check the backlash of the pinion gears (B) with a dial indicator (C).

Standard: 0.175-0.275 mm (0.007-0.011 in.)

3. If the backlash is out of standard, replace the differential carrier.

DIFFERENTIAL CARRIER, FINAL DRIVEN GEAR REPLACEMENT

1. Remove the final driven gear from the differential carrier.

NOTE: The final driven gear bolts have **LEFT-HAND** threads.

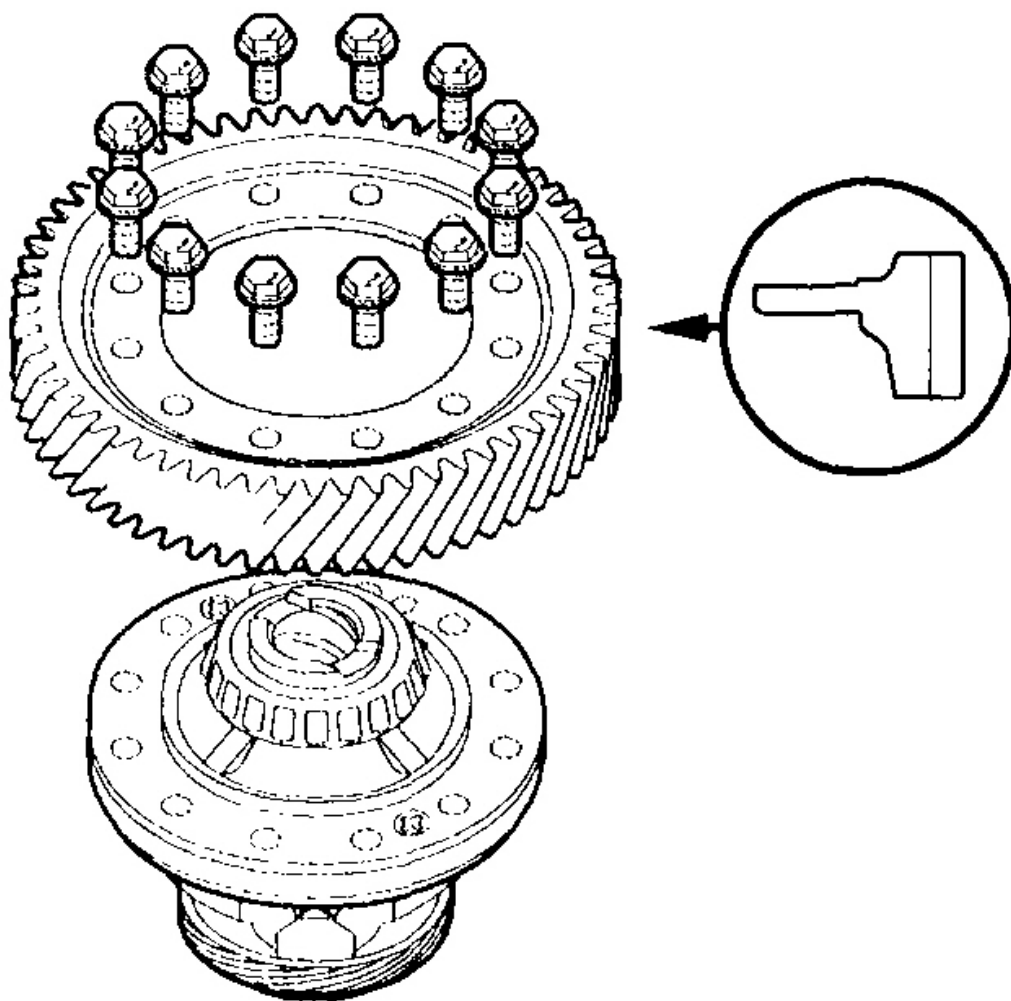
**G01512484**

Fig. 125: Removing Final Driven Gear From Differential Carrier

2. Install the final driven gear with the chamfered side on the inner bore facing the differential carrier.
3. Tighten the bolts to the specified torque in a crisscross pattern.

Torque: 101 N.m (10.3 kgf.m, 74.5 Lbf.ft)

CARRIER BEARING REPLACEMENT

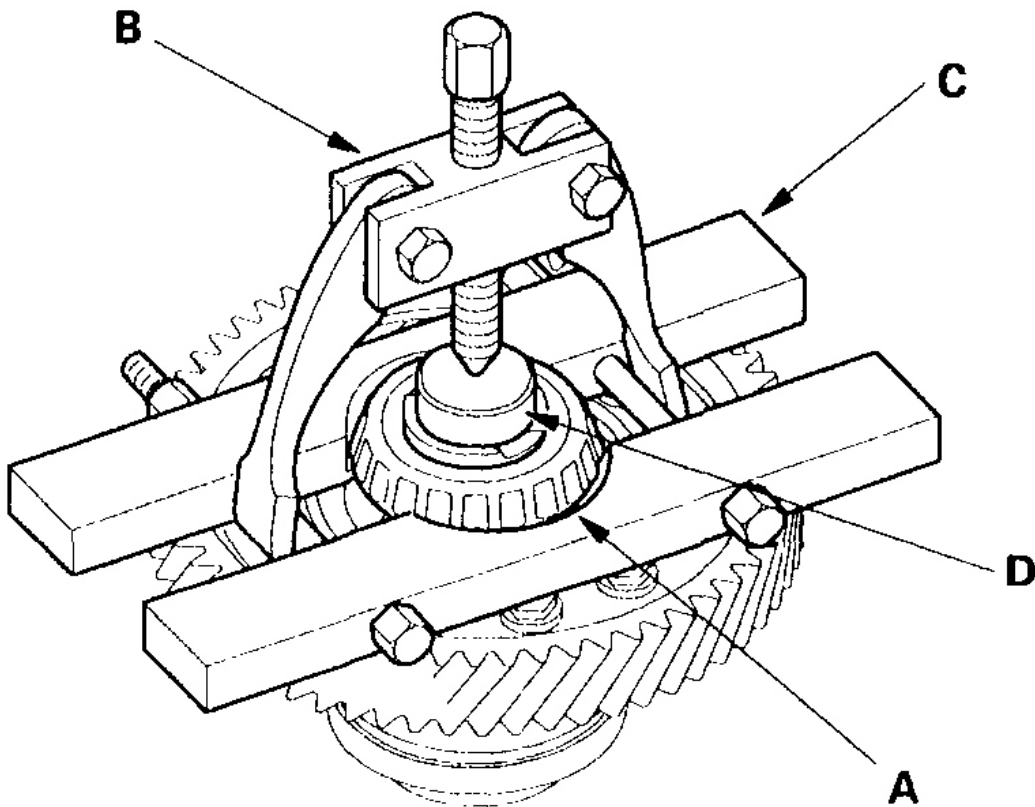
Special Tools Required

Attachment, 40 x 50 mm 07LAD-PW50601

NOTE:

- The bearing and outer race should be replaced as a set.
- Inspect and adjust the bearing preload whenever the bearing is replaced.
- Check the bearing for wear and rough rotation. If the bearing is OK, removal is not necessary.

1. Remove the carrier bearing (A) with a commercially available bearing puller (B), bearing separator (C), and stepped adapter (D).



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Fig. 126: Removing Carrier Bearing

2. Install the new carrier bearings with the special tool and a press.

NOTE:

- Press the bearings on until they bottom.

- Use the small end of the special tool to install the bearing.
- Press the bearings on securely so there is no clearance between the bearings and the differential carrier.

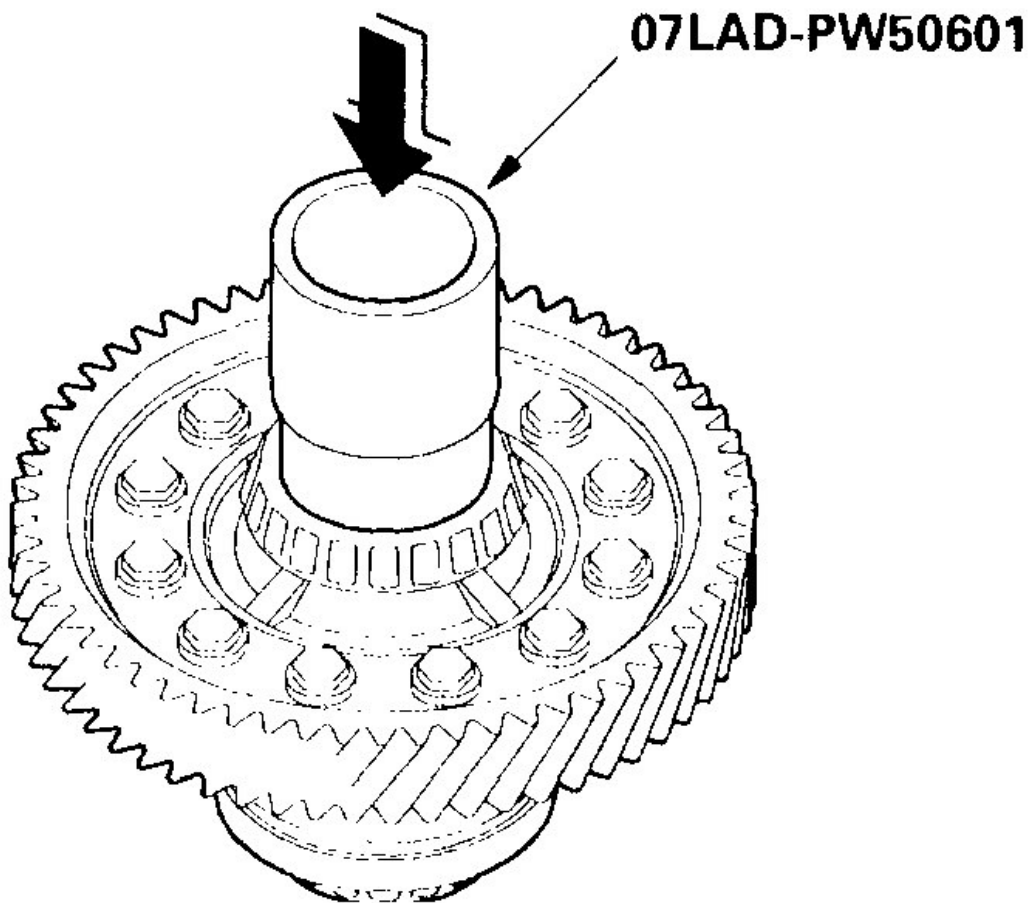
**G01512486**

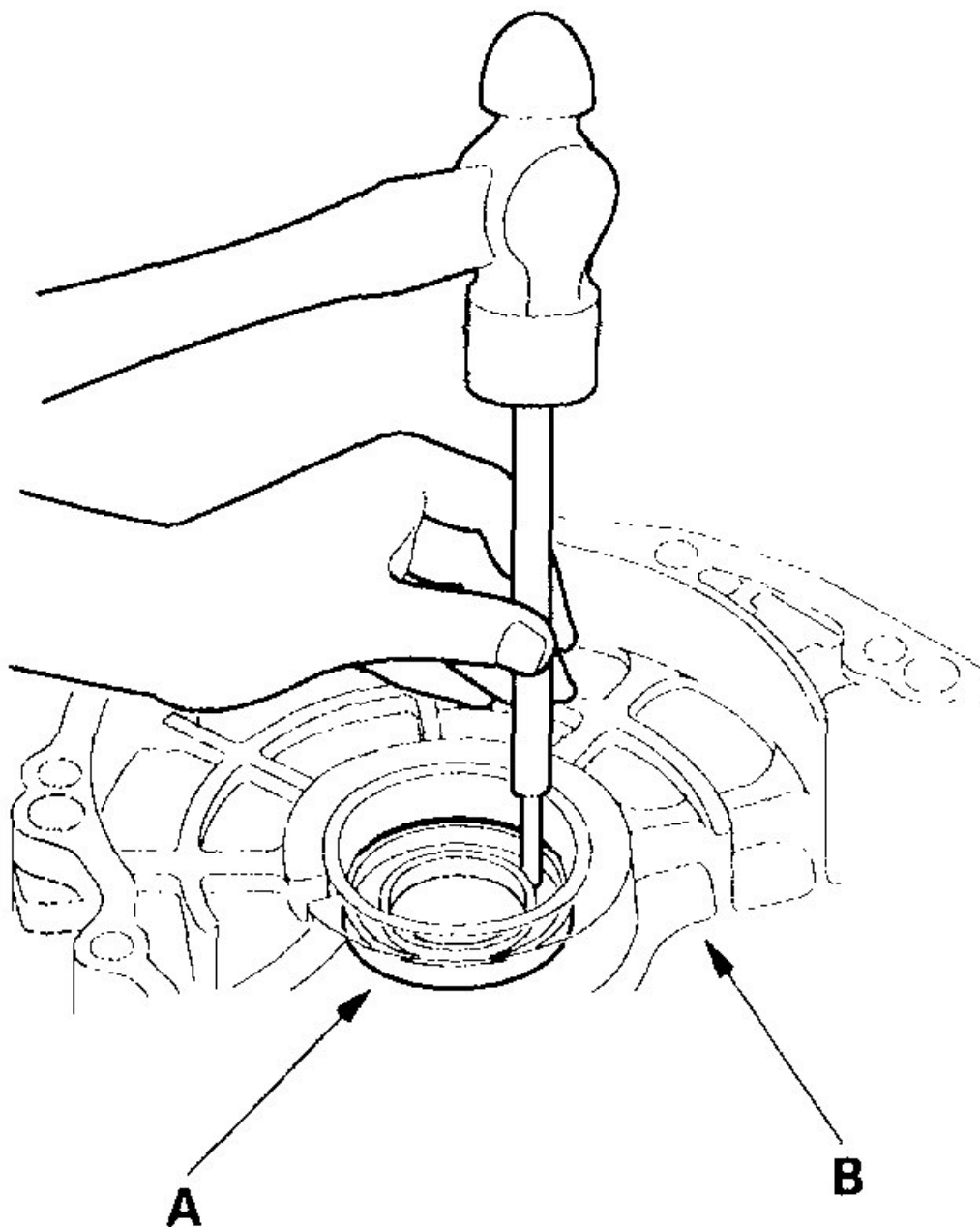
Fig. 127: Installing New Carrier Bearings

OIL SEAL REPLACEMENT

Special Tools Required

- Driver 07749-0010000
- Seal driver attachment 07GAD-PG40101 or 07GAD-PG40100
- Oil seal driver attachment 07JAD-PH80101

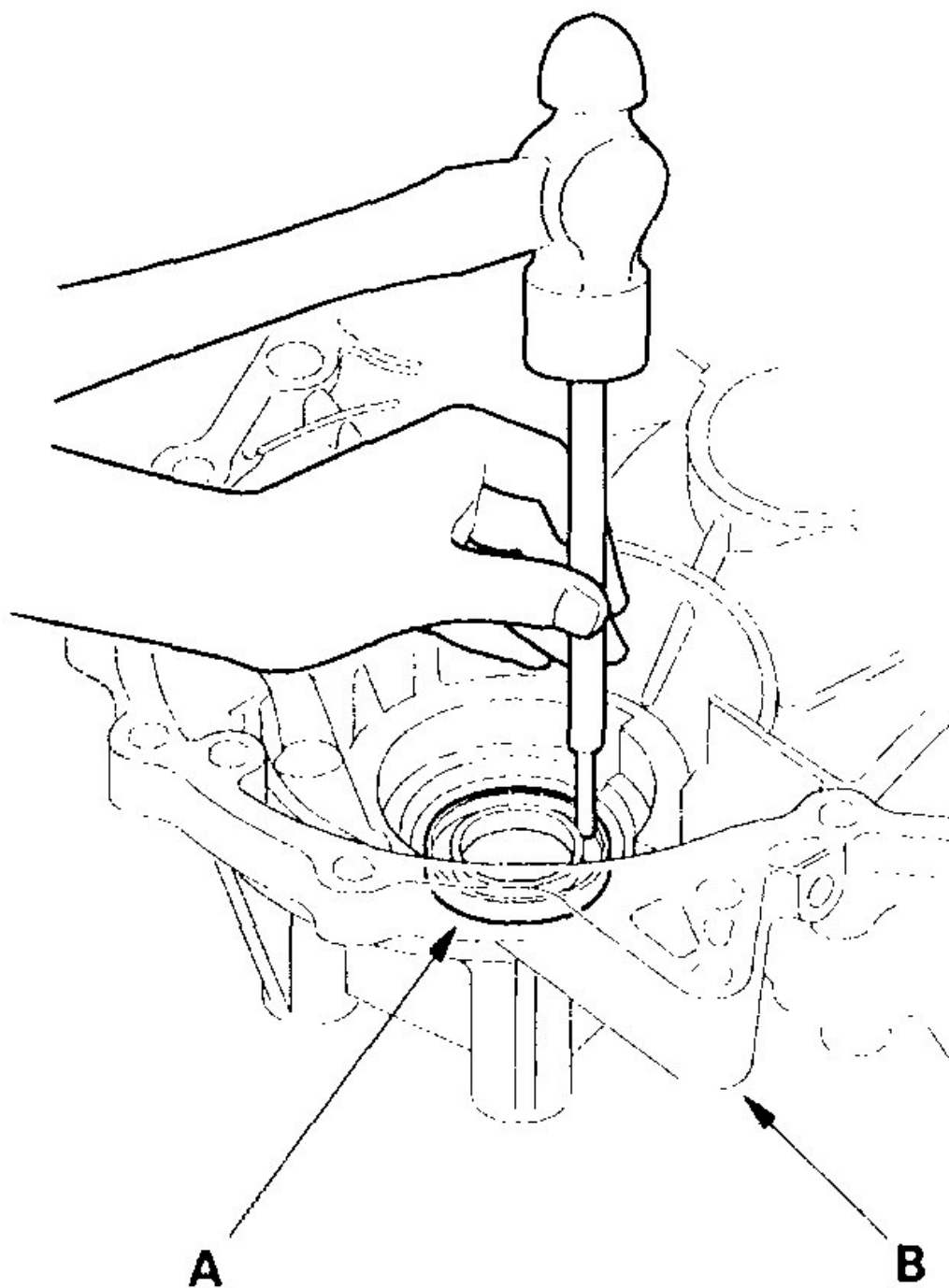
1. Remove the differential assembly.
2. Remove the oil seal (A) from the transmission housing (B).



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Fig. 128: Removing Oil Seal From Transmission Housing

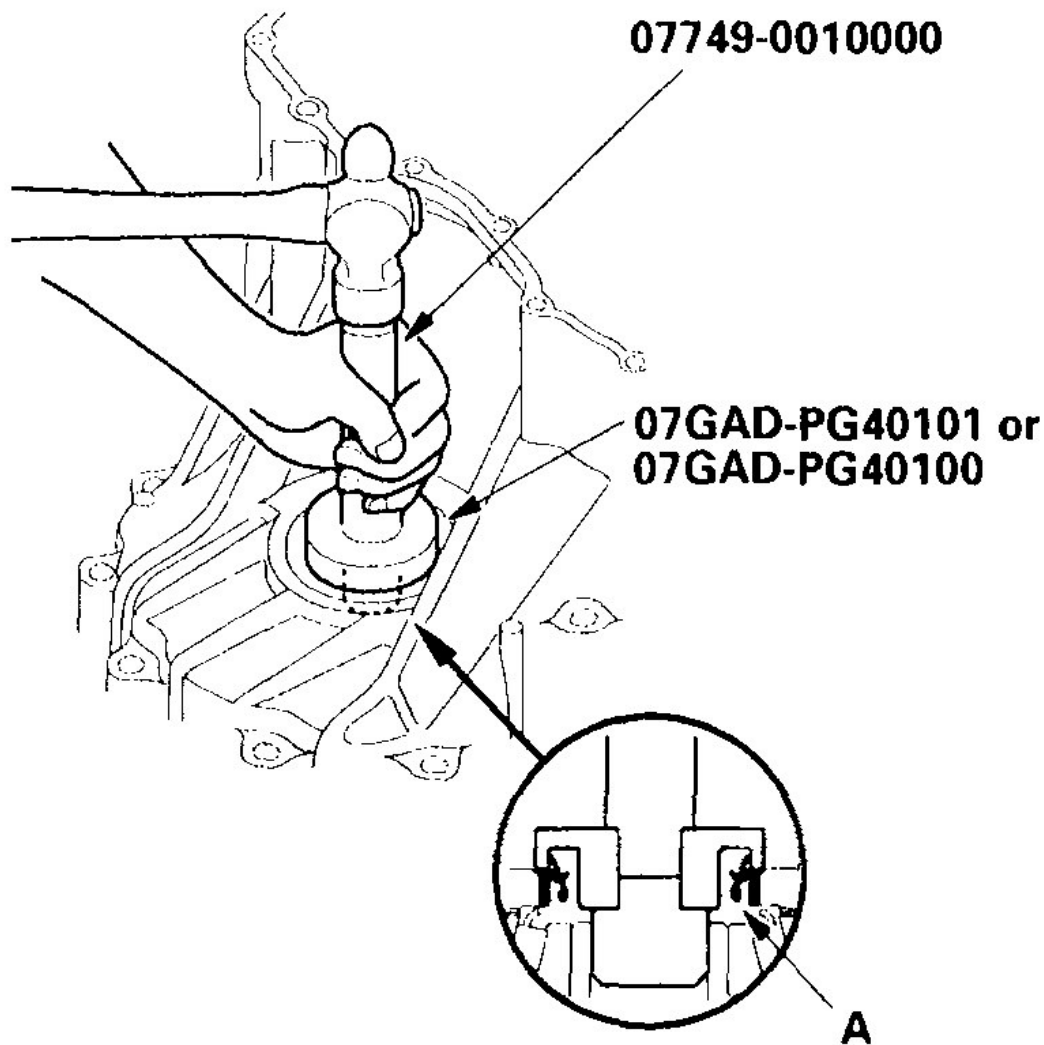
3. Remove the oil seal (A) from the torque converter housing (B).



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Fig. 129: Removing Oil Seal From Torque Converter Housing

4. Install the oil seal (A) in the transmission housing with the special tools.



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Fig. 130: Installing Oil Seal In Transmission Housing

5. Install the oil seal (A) in the torque converter housing with the special tools.

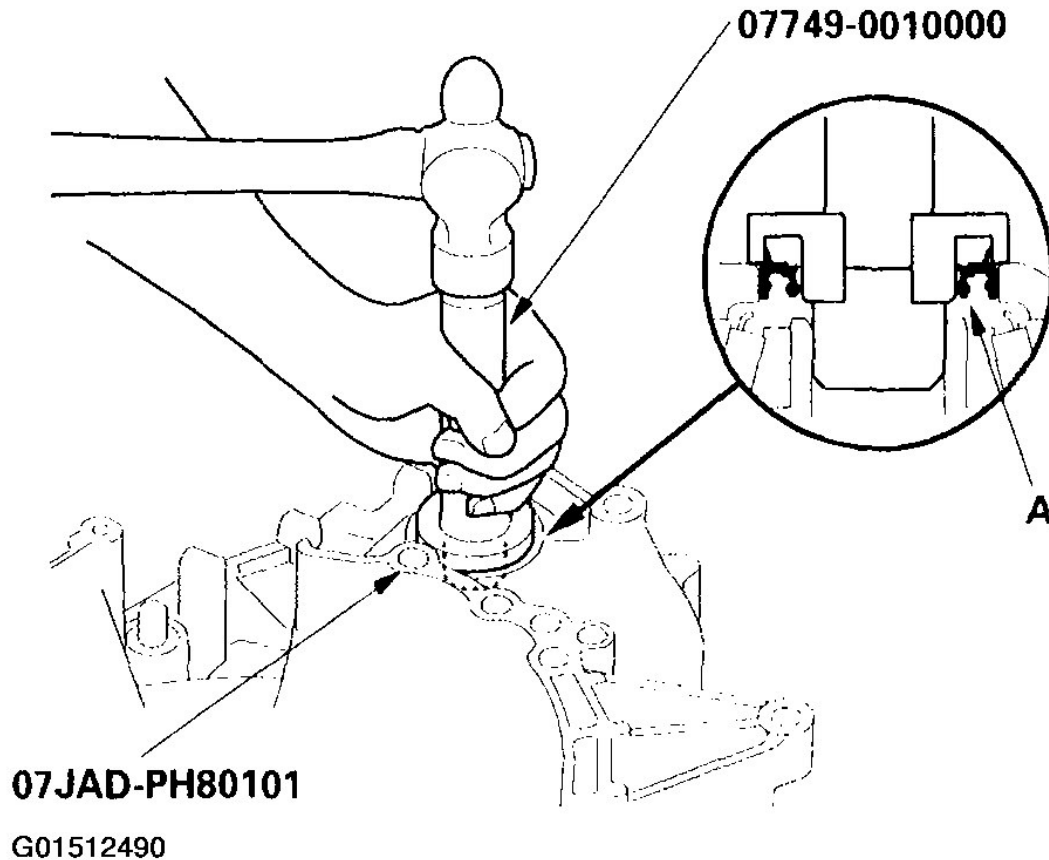


Fig. 131: Installing Oil Seal In Torque Converter Housing

CARRIER BEARING OUTER RACE REPLACEMENT

Special Tools Required

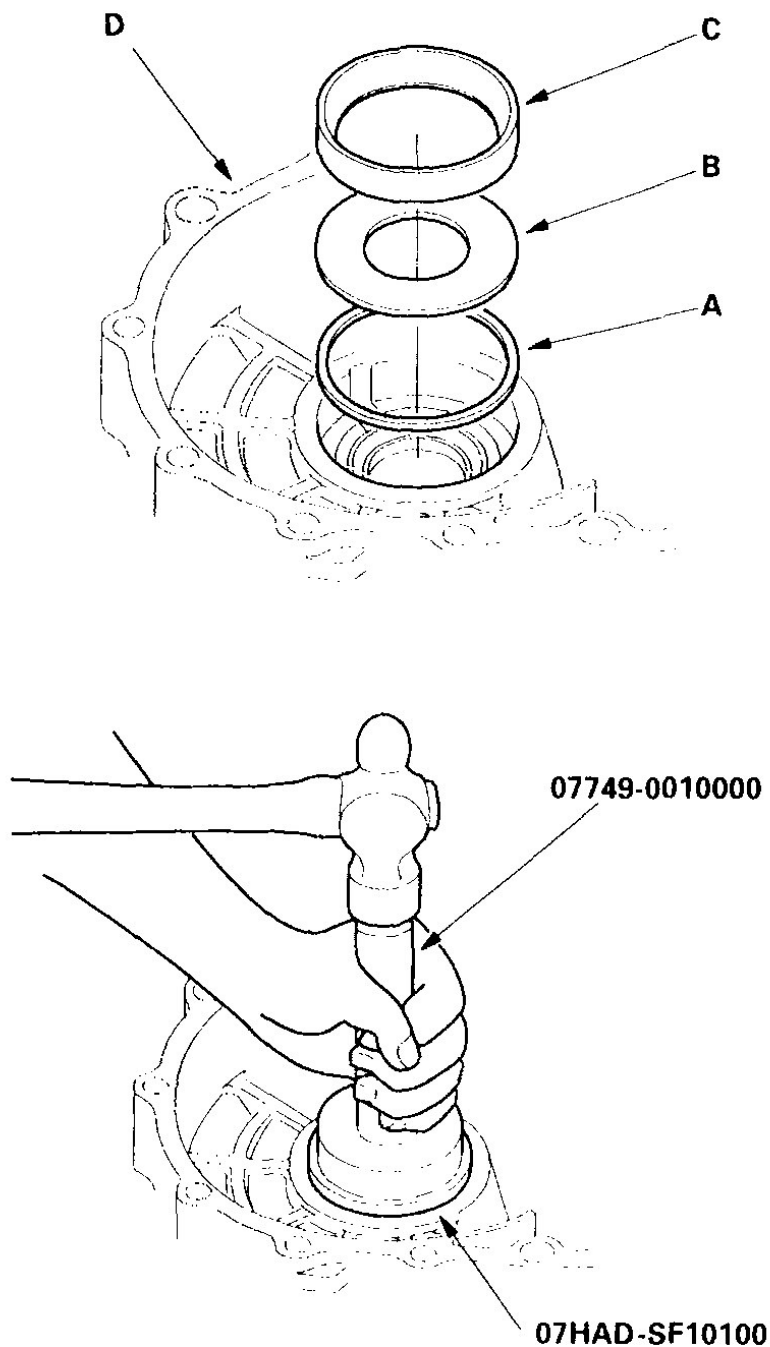
- Driver 07749-0010000
- Driver attachment 07HAD-SF10100

NOTE:

- Replace the bearing with a new one whenever the outer race is replaced.
- Do not use shim(s) on the torque converter housing side.
- Adjust preload after replacing the bearing and outer race.
- Coat all parts with ATF during installation.

1. Remove the bearing outer race from the transmission housing by heating the housing to about 212°F (100°C) with a heat gun.
2. Remove the bearing outer race from the torque converter housing.

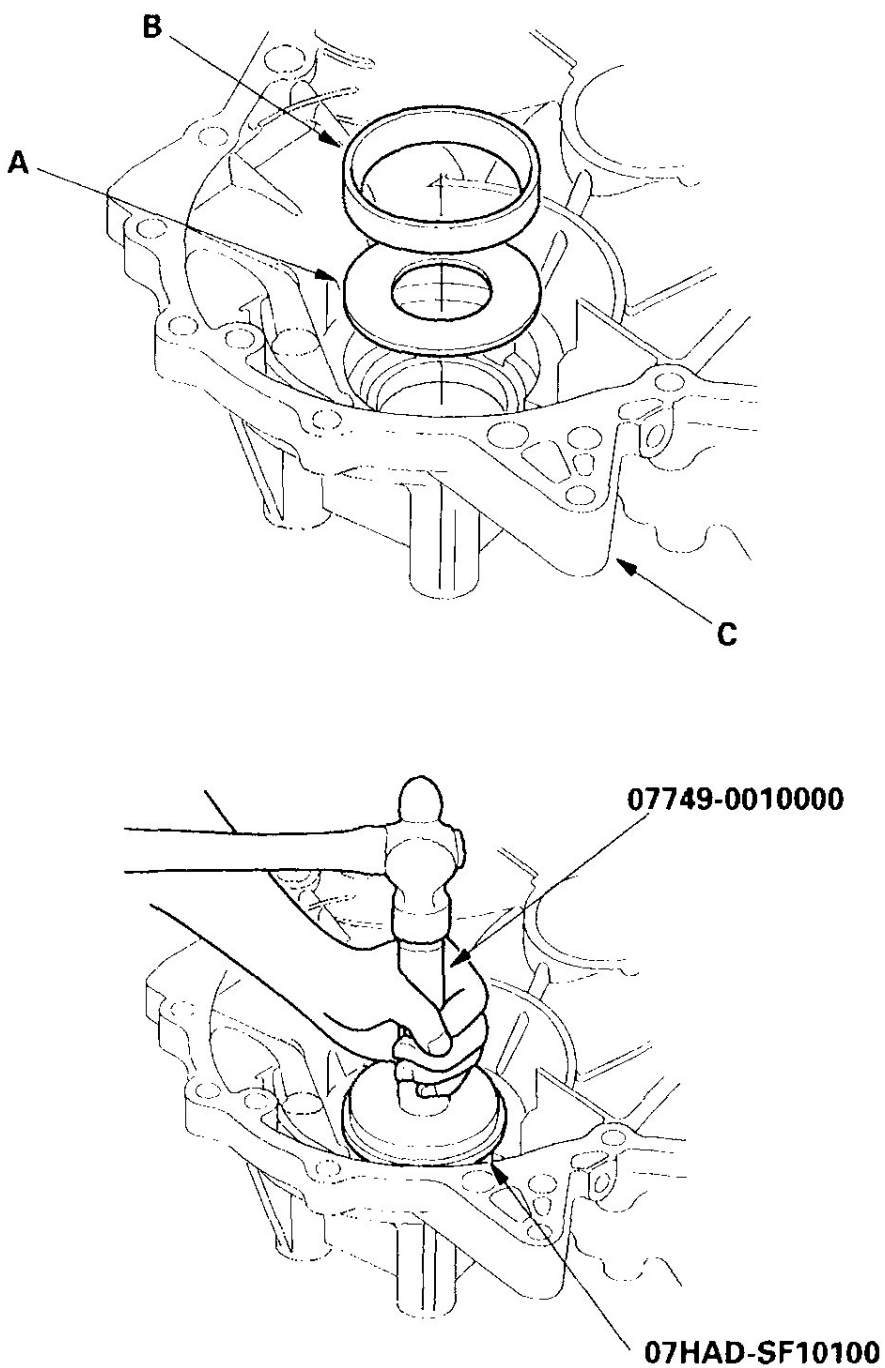
3. Install the thrust shim (A), thrust washer (B), and outer race (C) in the transmission housing (D) with the special tools.



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Fig. 132: Installing Carrier Bearing Outer Race Thrust Shim

4. Install the thrust washer (A) and outer race (B) in the torque converter housing (C), and use the special tools to make sure the outer race bottoms out in the housing.



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Fig. 133: Installing Carrier Bearing Outer Race Thrust Washer

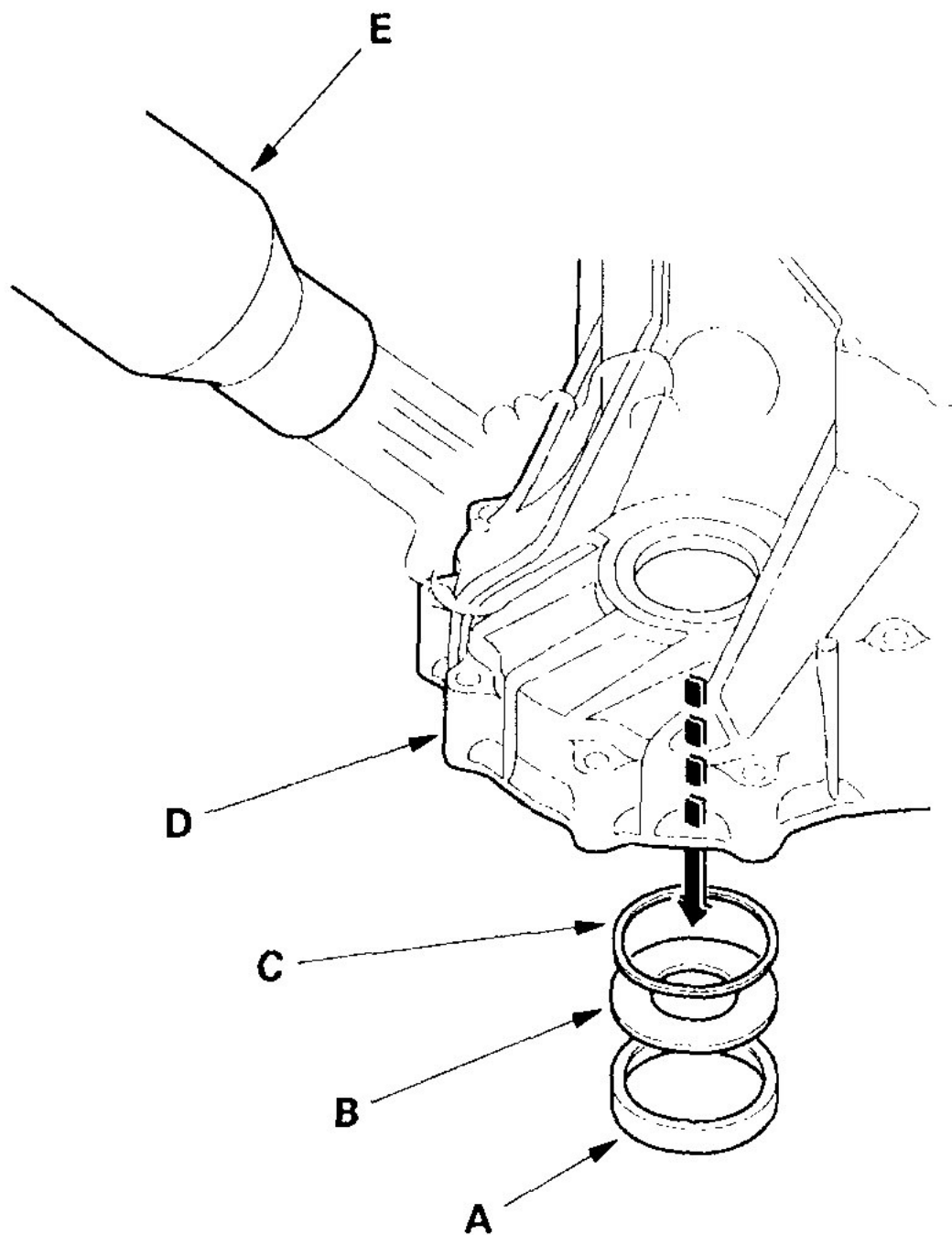
CARRIER BEARING PRELOAD INSPECTION**Special Tools Required**

- Driver 07749-0010000
- Driver attachment 07HAD-SF10100
- Preload inspection tool 07XAJ-S0KA100

NOTE: If the transmission housing, torque converter housing, differential carrier, tapered roller bearing, outer race, or thrust shim were replaced, the bearing preload must be adjusted.

1. Remove the bearing outer race (A), thrust washer (B), and thrust shim (C) from the transmission housing (D) by heating the housing to about 212°F (100°C) with a heat gun (E). Do not heat the housing in excess of 212°F (100°C).

NOTE: Let the transmission housing cool to room temperature before adjusting the bearing preload.



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Fig. 134: Removing Carrier Bearing Outer Race

2. Replace the tapered roller bearing when the outer race is to be replaced.

3. Do not use a shim on the torque converter housing side.
4. Install the 76 mm thrust shim (A), thrust washer (B), and bearing outer race (C) in the transmission housing (D). If you replace the 76 mm thrust shim with a new one, use the same thickness shim as the old one.

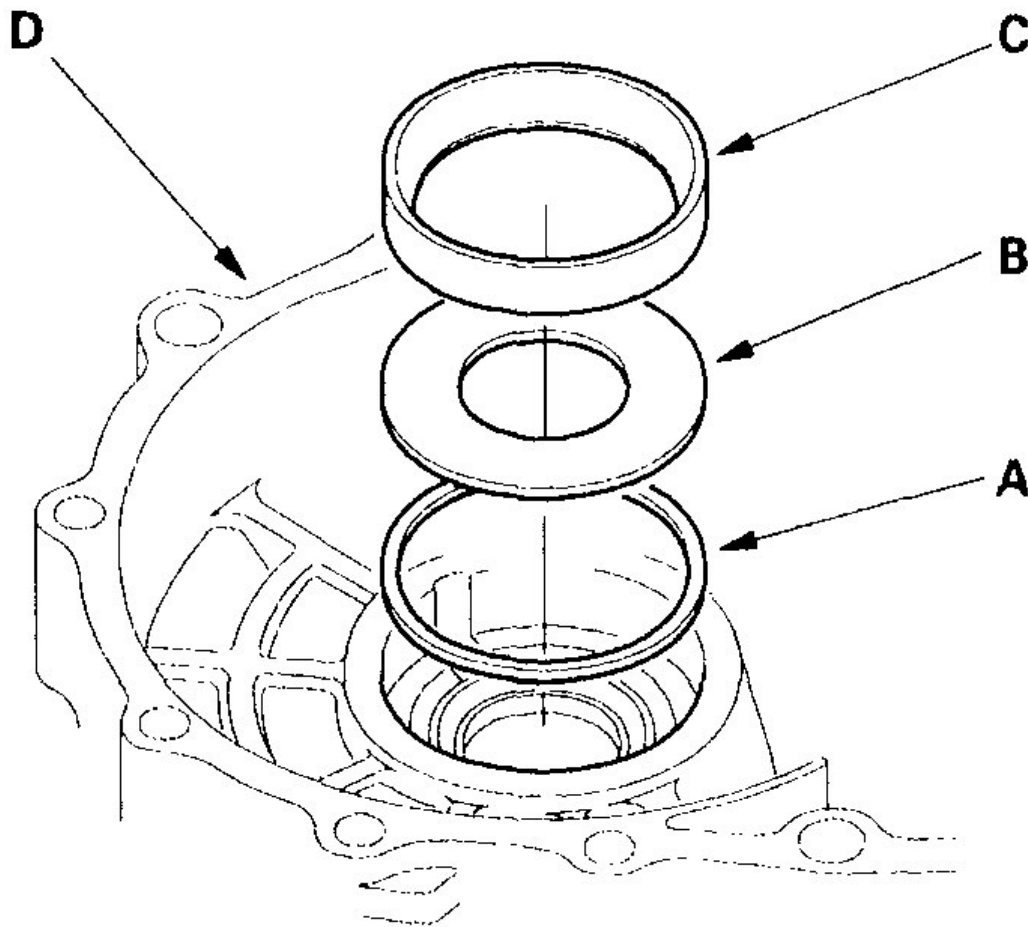
**G01512494**

Fig. 135: Installing Thrust Shim

5. Drive the outer race with the special tools, and install it securely in the transmission housing.

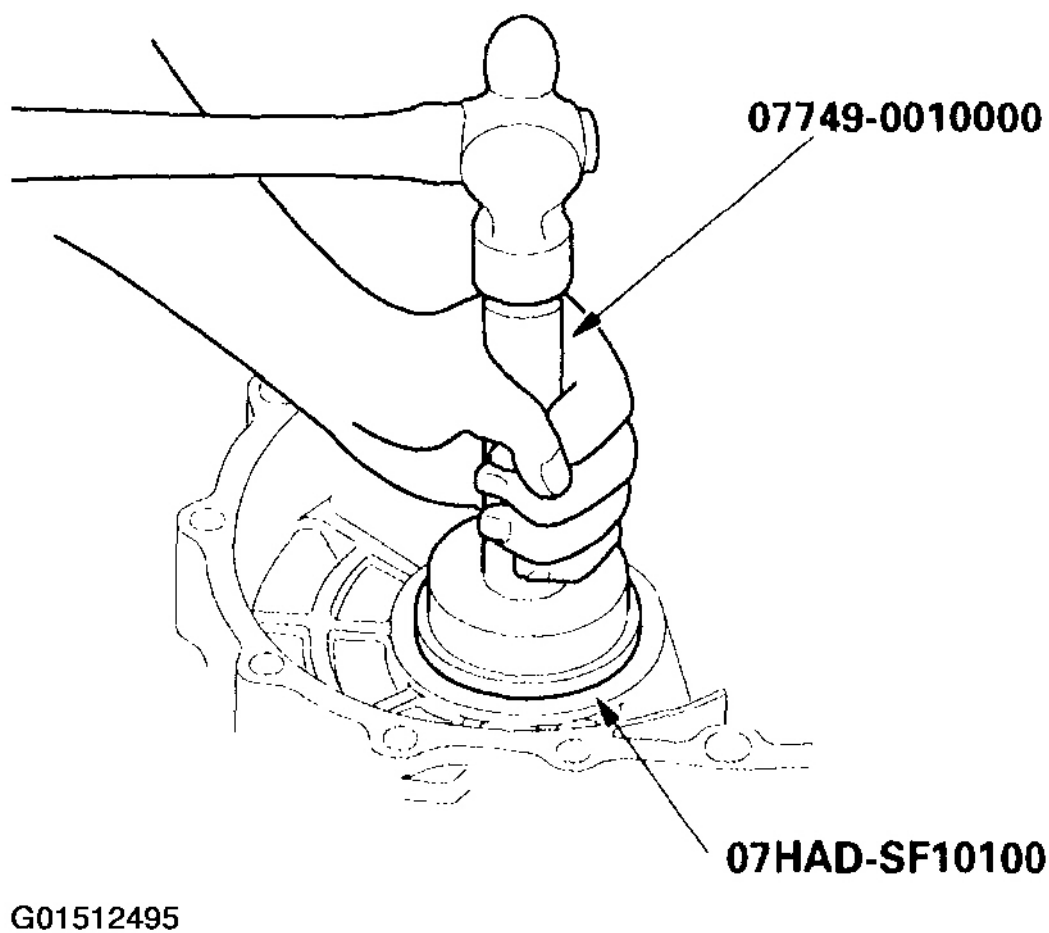
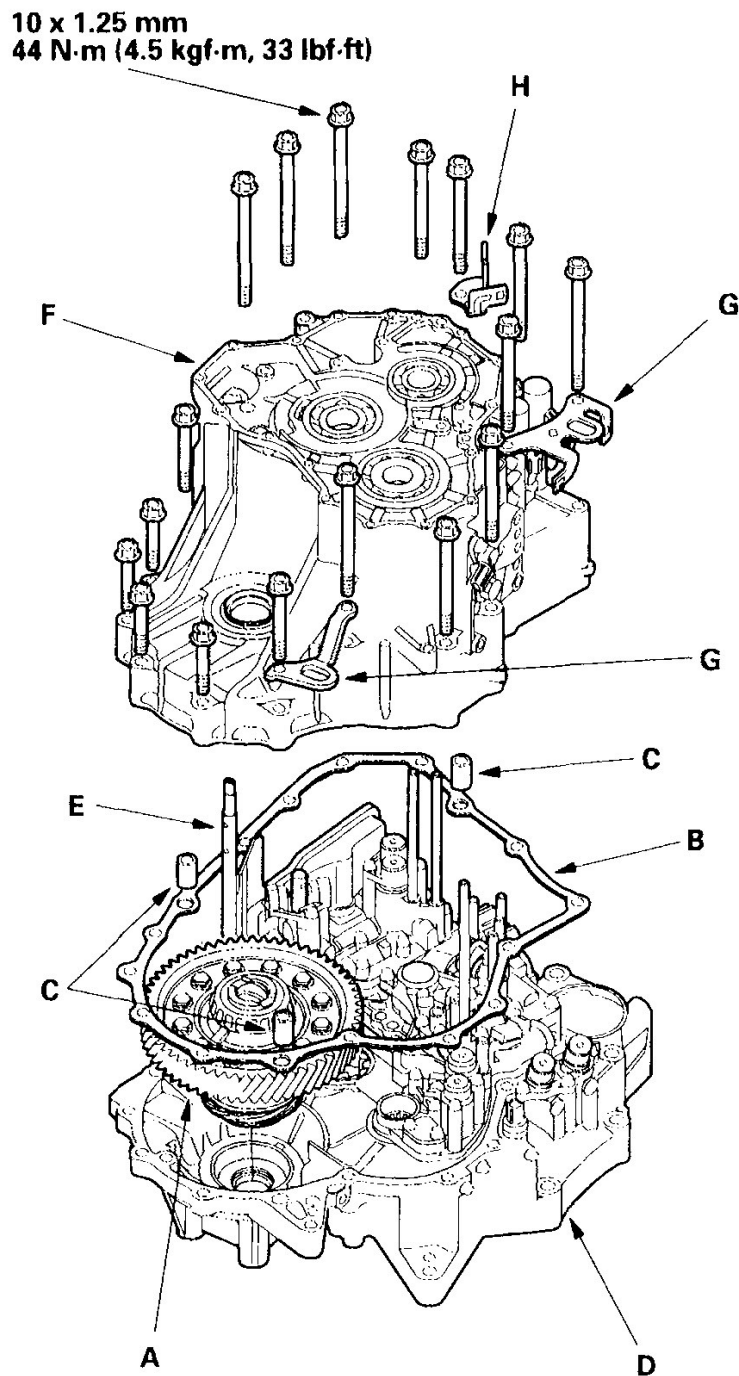


Fig. 136: Installing Outer Race In The Transmission Housing

6. Check that there is no clearance between the thrust washer, outer race, shim, and transmission housing.
7. Install the differential assembly (A), gasket (B), and dowel pins (C) on the torque converter housing (D). Align the spring pin on the control shaft (E) with the transmission housing groove.



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Fig. 137: Installing Differential Assembly With Torque Specifications

8. Install the transmission housing (F) with the transmission hangers (G) and harness clamp bracket (H), then tighten the bolts.
9. Rotate the differential assembly in both directions to seat the bearings.

10. Measure the starting torque of the differential assembly with the special tool, a torque wrench, and socket. Measure the starting torque at normal room temperature in both directions. Standard:

New bearing: 2.7-3.9 N.m (28-40 kgf.cm, 24-35 lbf.in.)

Reused bearings: 2.5-3.6 N.m (25-37 kgf.cm, 22-32 lbf.in.)

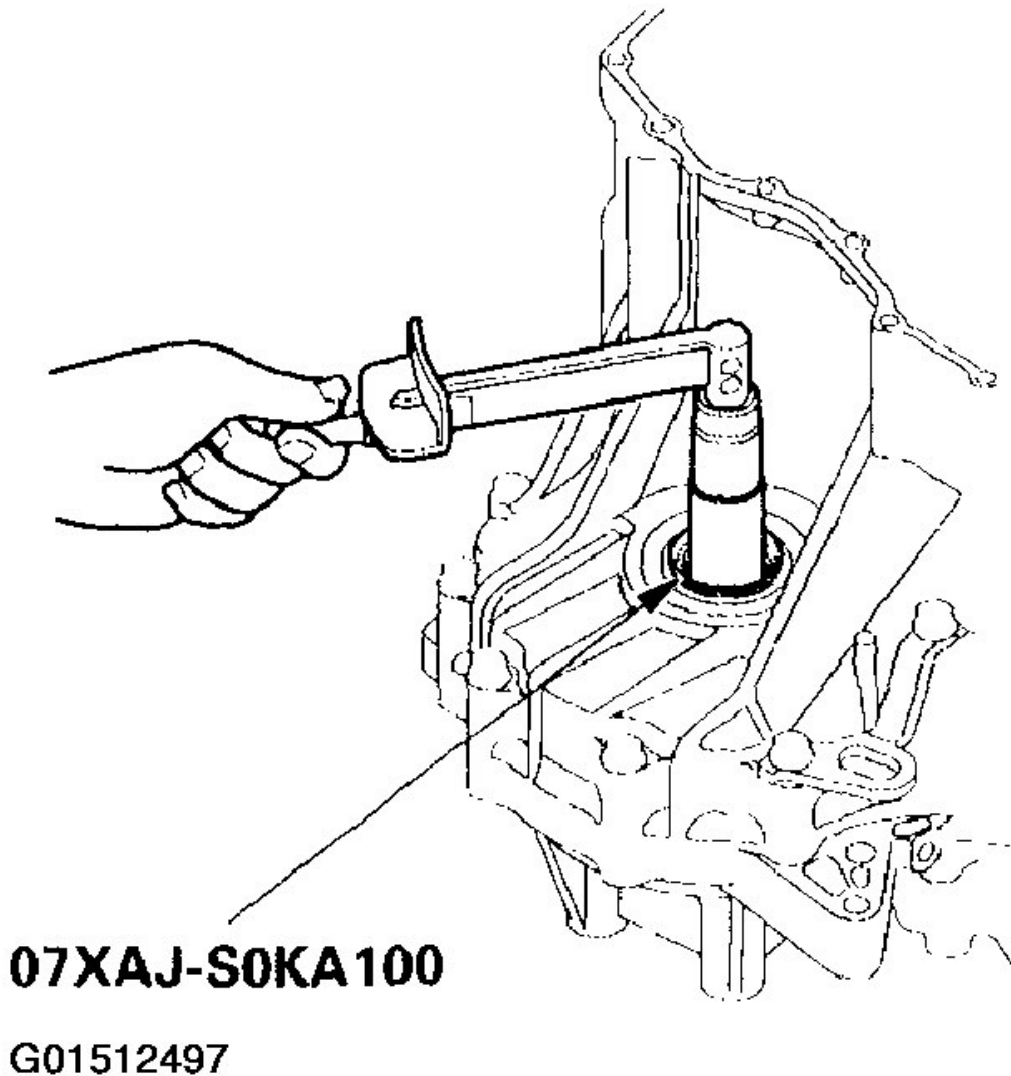


Fig. 138: Measuring Starting Torque Of Differential Assembly

11. If the measurement is out of standard, remove the thrust shim and select the thrust shim from table. Install the new thrust shim and recheck. To increase the starting torque, increase the thickness of the thrust shim. To decrease the starting torque, decrease the thickness of the shim. Changing the shim to the next size

will increase or decrease starting torque about 0.3-0.4 N.m (3-4 kgf.cm, 2-3 lbf.in.).

NO.	Part Number	Thickness
S	41438-PX4-700	2.05 mm (0.081 in.)
T	41439-PX4-700	2.01 mm (0.083 in.)
U	41440-PX4-700	2.15 mm (0.085 in.)
A	41441-PK4-000	2.20 mm (0.087 in.)
B	41442-PK4-000	2.25 mm (0.089 in.)
C	41443-PK4-000	2.30 mm (0.091 in.)
D	41444-PK4-000	2.35 mm (0.093 in.)
E	41445-PK4-000	2.40 mm (0.094 in.)
F	41446-PK4-000	2.45 mm (0.096 in.)
G	41447-PK4-000	2.50 mm (0.098 in.)
H	41448-PK4-000	2.55 mm (0.100 in.)
I	41449-PK4-000	2.60 mm (0.102 in.)
J	41450-PK4-000	2.65 mm (0.104 in.)
K	41451-PK4-000	2.70 mm (0.106 in.)
L	41452-PK4-000	2.75 mm (0.108 in.)
M	41453-PK4-000	2.80 mm (0.110 in.)
N	41454-PK4-000	2.85 mm (0.112 in.)
O	41455-PK4-000	2.90 mm (0.114 in.)
P	41456-PK4-000	2.95 mm (0.116 in.)
Q	41457-PK4-000	3.00 mm (0.118 in.)
R	41458-PK4-000	3.05 mm (0.120 in.)

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Fig. 139: Carrier Bearing Preload Shim Identification Table