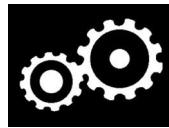


# 13

## M/T - M/T Differential

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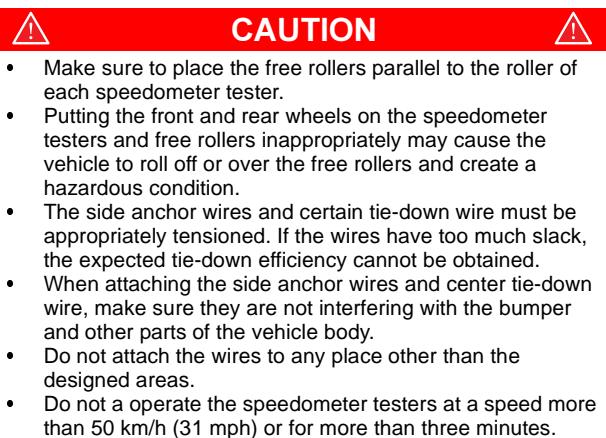
## Manual Transmission

### 4WD (Four-wheel Drive) Model Precautions

This 4WD model does not have the feature that mechanically switches between 4WD and 2WD (front-wheel drive). Therefore, speedometer testing should be conducted using simplified free rollers under the rear wheels.

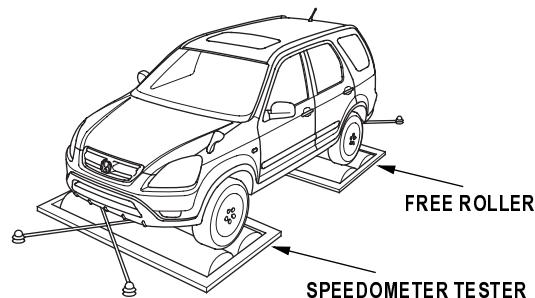
#### Precautions on using free rollers:

- Inspecting and testing using a chassis dynamometer is not feasible.
- Do not operate the accelerator pedal, brake pedal or steering wheel abruptly. It may cause the vehicle to roll and create a hazardous condition.
- The maximum testing speed should be 50 km/h (31 mph).
- The maximum continuous operating time should be three minutes.
- Make sure to tie down the vehicle securely with the side anchor wires and center tie down wire. The free rollers are to be set under the rear wheels.

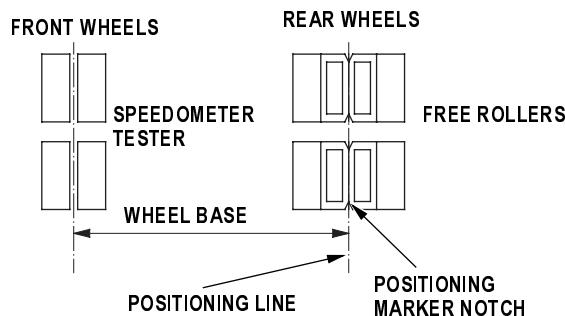


#### Testing Procedures

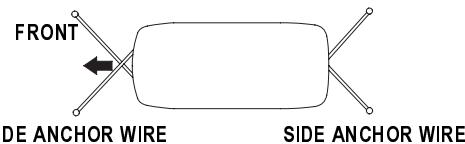
- Set the free rollers according to the wheel base and tread of the vehicle.



NOTE: Align the position marker notch to the positioning line.



- Move the vehicle to position the front wheels on the speedometer testers and the rear wheels on the free rollers. Make sure to align the center of the wheels to the center of the speedometer testers and the free rollers.



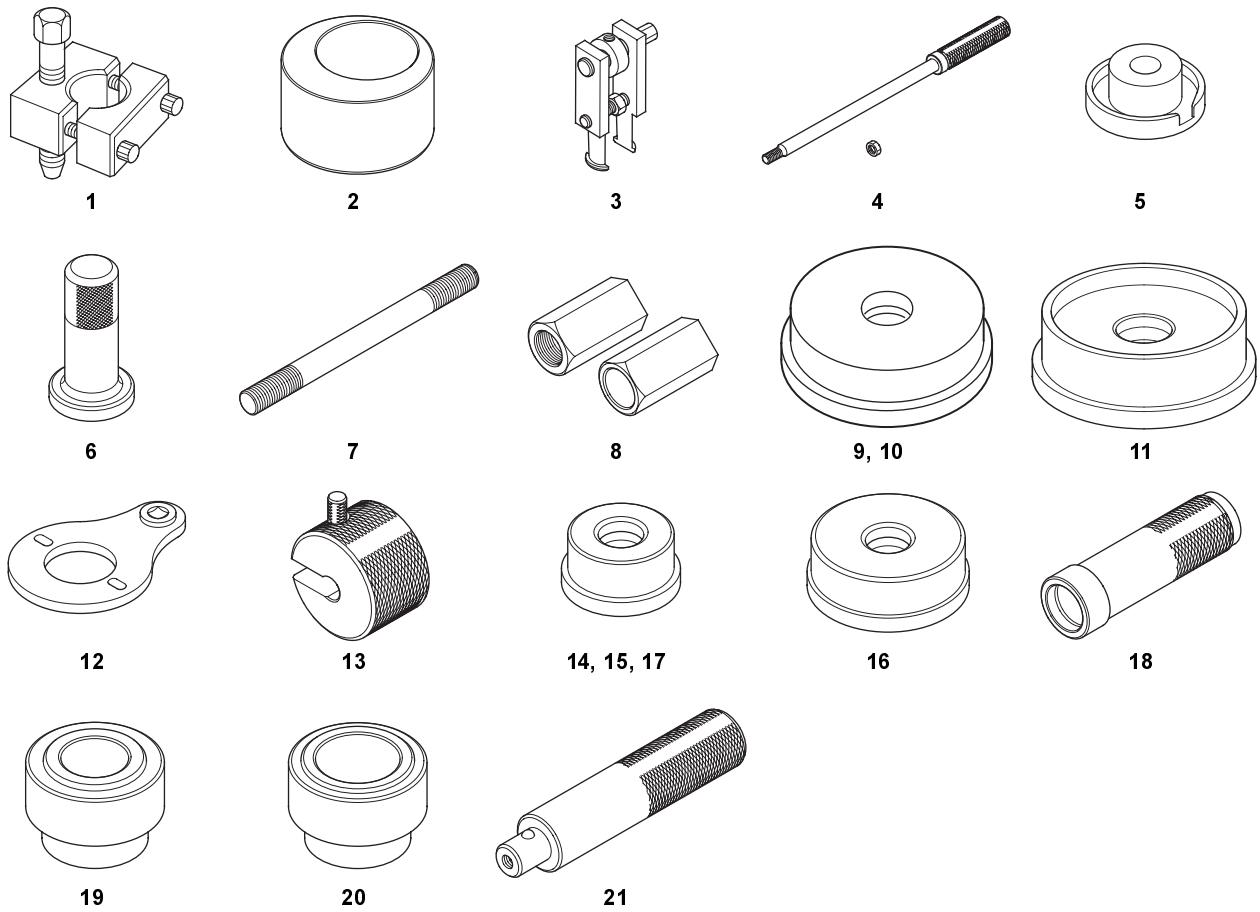
- Tie down the vehicle securely using the towing hook and the rear tie-down hook bracket to prevent the vehicle from rolling off or over the free rollers.
- Start the engine, shift the transmission to 3rd gear, accelerate the vehicle gradually, and measure the vehicle speed.
- After measurement, use the brake pedal to gradually decelerate and stop the vehicle.



## Special Tools

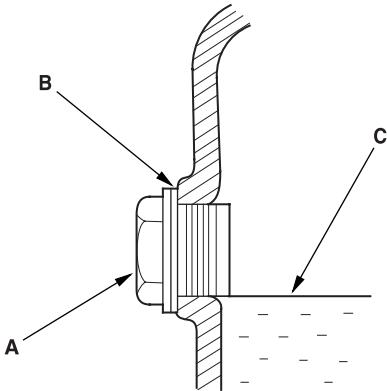
Ref. No.	Tool Number	Description	Qty
*1	07GAJ-PG20110	Mainshaft Holder	1
*2	07GAJ-PG20130	Mainshaft Base	1
3	07JAC-PH80100	Adjustable Bearing Puller, 20 - 40 mm	1
4	07JAC-PH80200	Bearing Remover Shaft	1
5	07JAD-PH80101	Oil Seal Driver Attachment	1
6	07JAD-PL90100	Oil Seal Driver	1
7	07JAF-SJ80110	Installer Shaft 14 x 165 mm	1
8	07JAF-SJ80120	Installer Nut 14 mm	1
9	07KAF-PS30120	Bearing Installer Attachment	1
10	07LAF-PZ70110	Bearing Installer Attachment	1
11	07NAD-P200100	Oil Seal Driver Attachment	1
12	07PAB-0020000	Companion Flange Holder	1
13	07741-0010201	Slide Hammer	1
14	07746-0010200	Attachment, 37 x 40 mm	1
15	07746-0010300	Attachment, 42 x 47 mm	1
16	07746-0010400	Attachment, 52 x 55 mm	1
17	07746-0010600	Attachment, 72 x 75 mm	1
18	07746-0030100	Driver, 40 mm I.D.	1
19	07746-0030300	Driver, 30 mm I.D.	1
20	07746-0030400	Attachment, 35 mm I.D.	1
21	07749-0010000	Driver	1

\* Part of Mainshaft Inspection Tool Set, 07GAJ-PG20102.

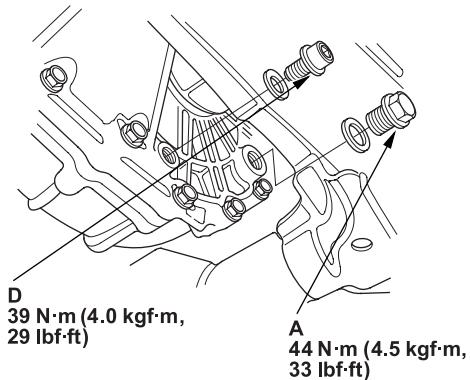


### Transmission Fluid Inspection and Replacement

- Park the vehicle on level ground, and turn the engine OFF.
- Remove the oil filler plug (A) and washer (B), check the condition of the fluid, and make sure the fluid is at the proper level (C).



- If the transmission fluid is dirty, remove the drain plug (D) and drain the fluid.



- Reinstall the drain plug with a new washer, and refill the transmission fluid to the proper level.

#### Oil Capacity

##### 2WD model:

1.9 l (1.9 US qt, 1.6 Imp qt) at fluid change  
2.1 l (2.2 US qt, 1.8 Imp qt) at overhaul

##### 4WD model:

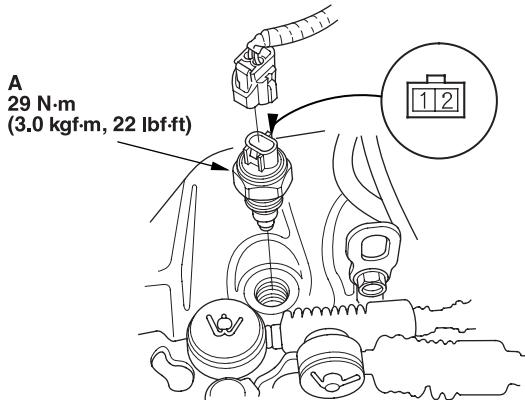
1.9 l (2.0 US qt, 1.7 Imp qt) at fluid change  
2.3 l (2.4 US qt, 2.0 Imp qt) at overhaul

Always use Honda Manual Transmission Fluid (MTF). Using motor oil can cause stiffer shifting because it does not contain the proper additives.

- Reinstall the oil filler plug with a new washer.

### Back-Up Light Switch Test

- Disconnect the back-up light switch (A) connector.



- Check for continuity between the back-up light switch 2P connector No. 1 and No. 2 terminals. There should be continuity when the shift lever is in reverse.
- If necessary, replace the back-up light switch. Apply liquid gasket (P/N 08C70-K0234M), and install it on the transmission housing.

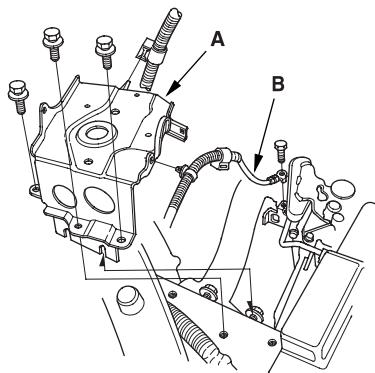


## Manual Transmission

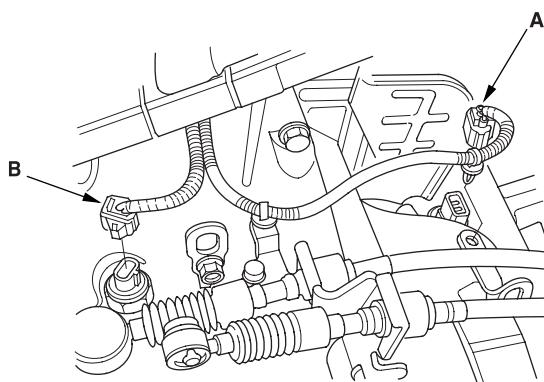
### Transmission Removal

NOTE: Use fender covers to avoid damaging painted surfaces.

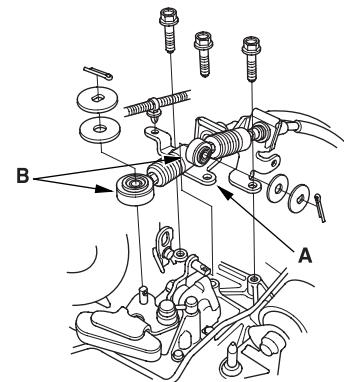
1. Write down the frequencies for the radio's preset buttons. Disconnect the negative (-) cable first, then the positive (+) cable from the battery. Remove the battery.
2. Remove the air cleaner housing (see step 5 on [page 05-3](#)).
3. Remove the intake duct (see step 6 on [page 05-3](#)).
4. Remove the battery tray (A).
5. Disconnect the transmission ground cable (B).



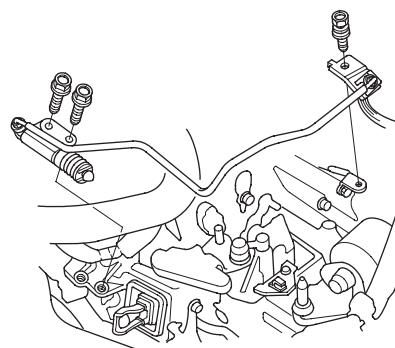
6. Disconnect the vehicle speed sensor (A) and the back-up light switch connector (B).



7. Remove the cable bracket (A), then disconnect the cables (B) from the top of the transmission housing. Carefully remove both cables and the bracket together so as not to bend the cables.



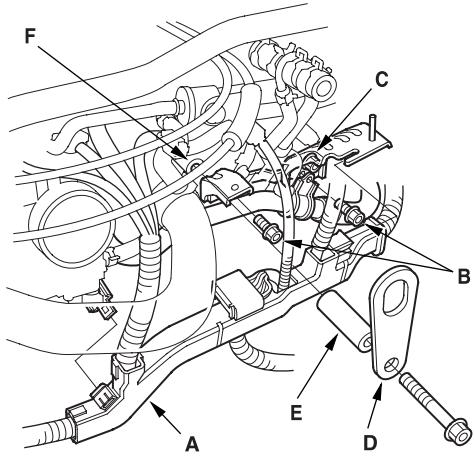
8. Carefully remove the slave cylinder so as not to bend the clutch line. Do not operate the clutch pedal once the slave cylinder has been removed.



(cont'd)

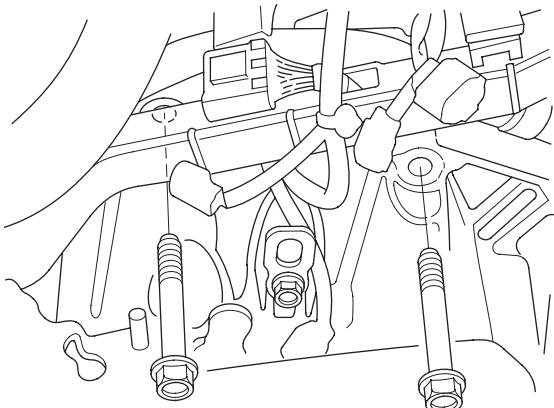
## Transmission Removal (cont'd)

9. Remove the harness cover (A), water pipe mounting bolts (B), and loosen the air cleaner housing mounting bracket bolt (C). Lower the water pipe slightly.

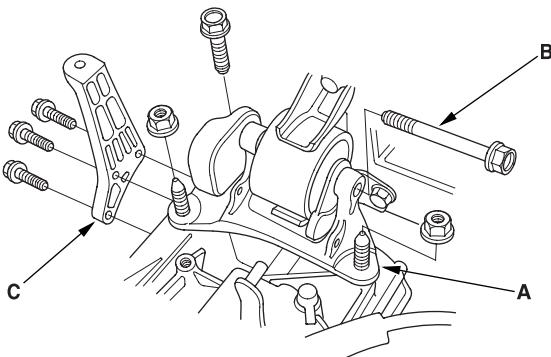


10. Attach a engine hanger (D) with a collar (E) to the bolt hole (F) on the engine cylinder block.

11. Remove the two upper transmission mounting bolts.



12. Remove the transmission mount bracket (A) and transmission mounting bolt (B).

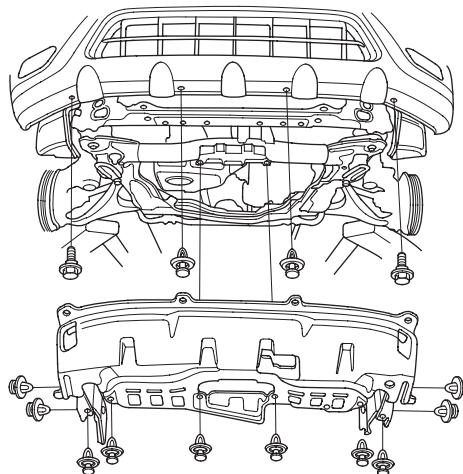


13. Remove the air cleaner bracket (C).

14. Raise vehicle and make sure it is securely supported.

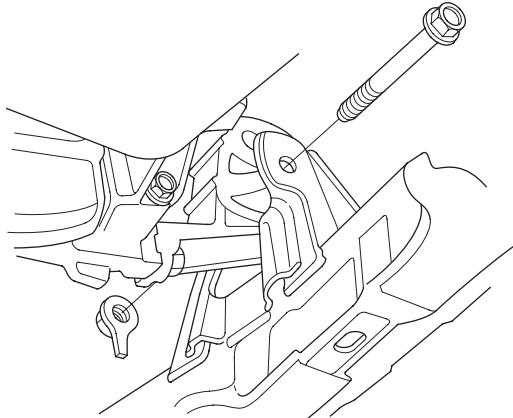
15. Drain the transmission fluid. Reinstall the drain bolt using a new washer ([see page 13-4](#)).

16. Remove the splash shield.

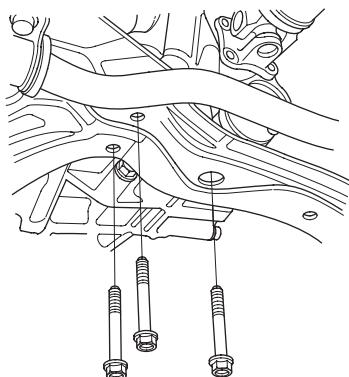




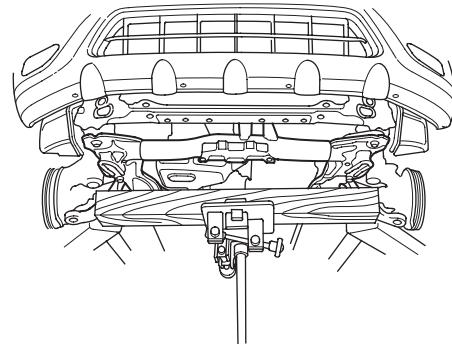
17. Remove the driveshafts (see page 16-3).
18. Remove the intermediate shaft (see page 16-19).
19. For 4WD models, remove the propeller shaft (see page 16-33).
20. Remove the front engine mount bracket mounting bolt.



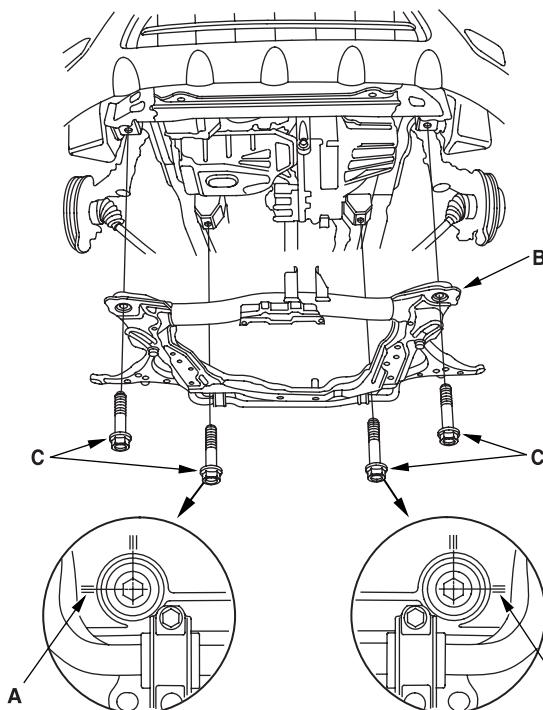
21. Remove the three bolts securing the transmission rear mount.



22. Support the subframe with a 4 x 4 x 40 in. piece of wood and a jack.



23. Make reference marks (A) on the front suspension subframe (B) and mounting bolts (C), then remove the front suspension subframe.

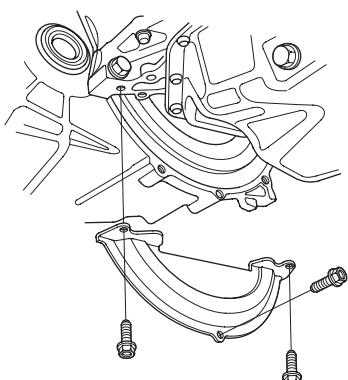


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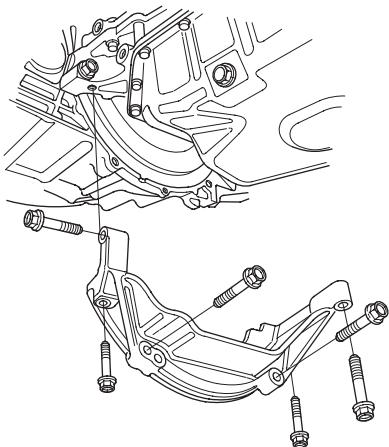
## Transmission Removal (cont'd)

**24.** Remove the clutch cover.

**2.0 / model:**

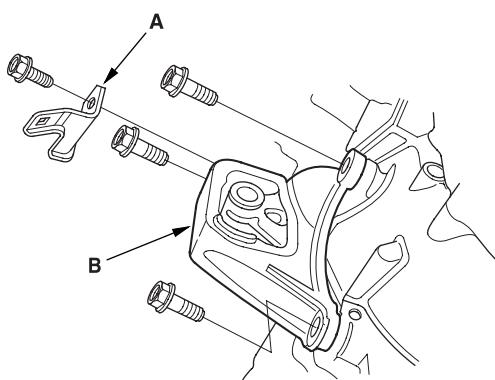


**2.4 / model:**

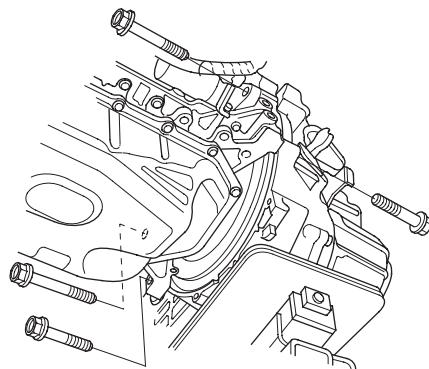


**25.** Remove the harness clamp (A).

**26.** Remove the front engine mount (B).

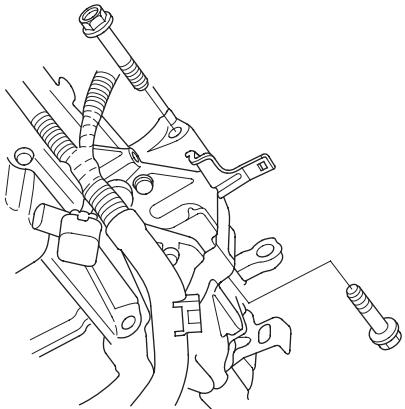


**27.** Place the transmission jack under the transmission and remove the four lower transmission mounting bolts.



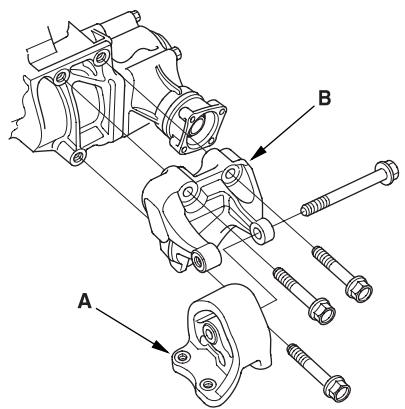


28. Remove the two lower transmission mounting bolts.

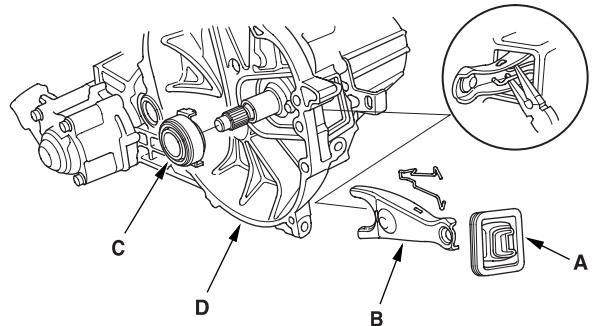


29. Pull the transmission away from the engine until the transmission mainshaft clears the clutch pressure plate, then lower the transmission on the transmission jack.

30. Remove the transmission rear mount (A) and the transmission rear mount bracket (B).

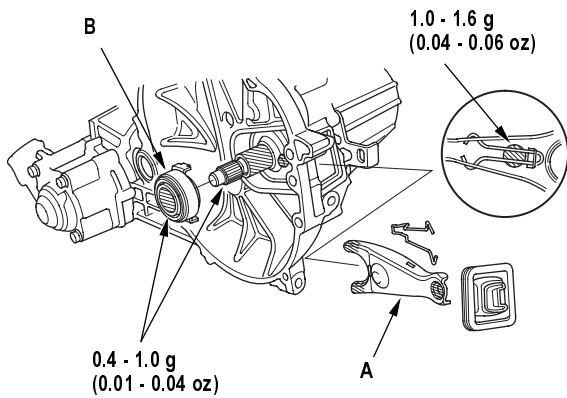


31. Remove the boot (A), the release fork (B), and the release bearing (C) from the transmission (D).

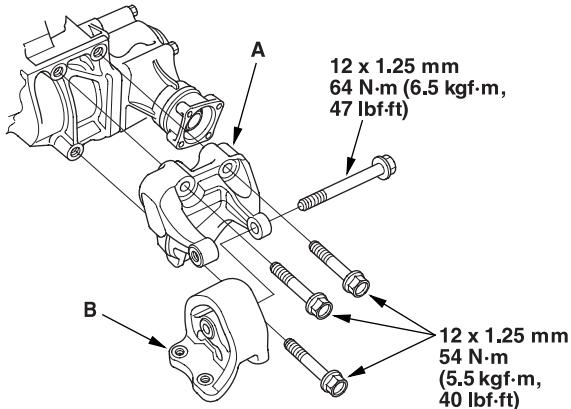


## Transmission Installation

1. Check the two dowel pins are installed in the clutch housing.
2. Apply Urea Grease UM264 (P/N 41211-PY5-305) to the release fork (A) and the release bearing (B). Install the release fork and the release bearing.

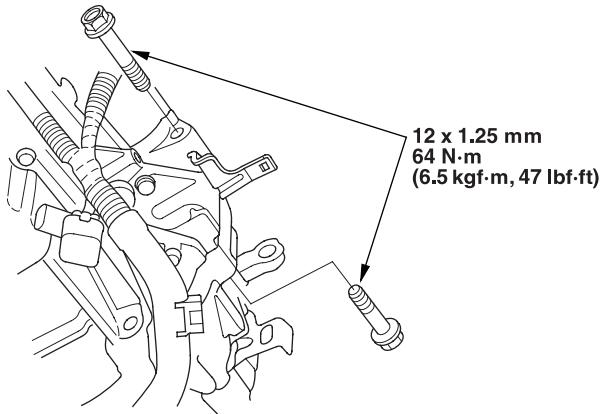


3. Install the transmission rear mount bracket (A) and the transmission rear mount (B).

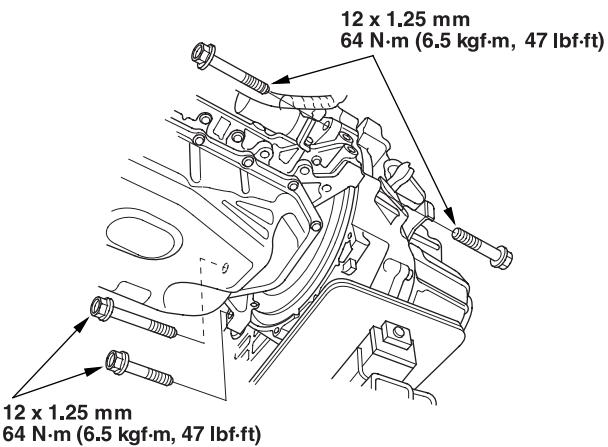


4. Place the transmission on the transmission jack, and raise it to the engine level.

5. Install the two lower transmission mounting bolts.

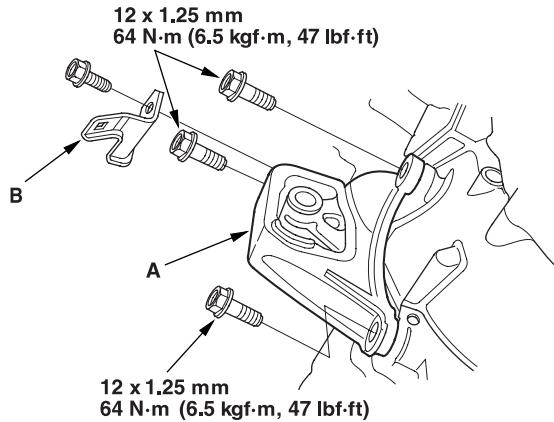


6. Install the four lower transmission mounting bolts.





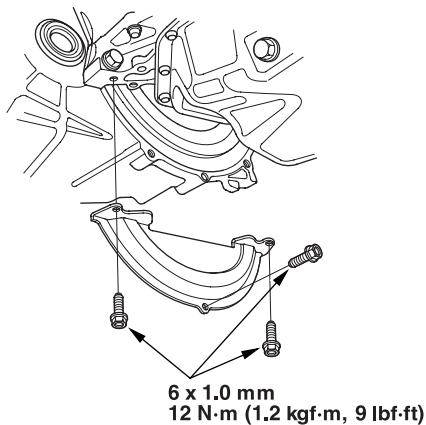
7. Install the front engine mount (A).



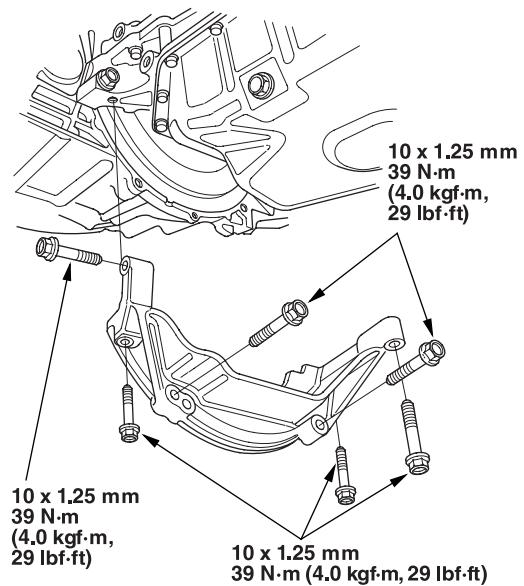
8. Install the harness clamp (B).

9. Install the clutch cover.

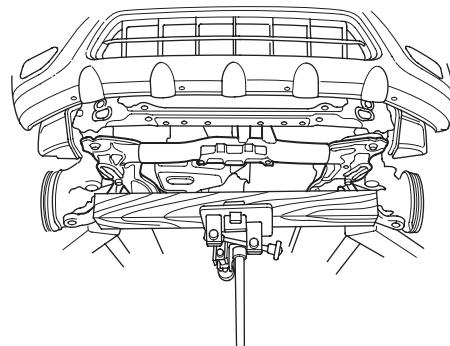
## 2.0 l model:



## 2.4 l model:



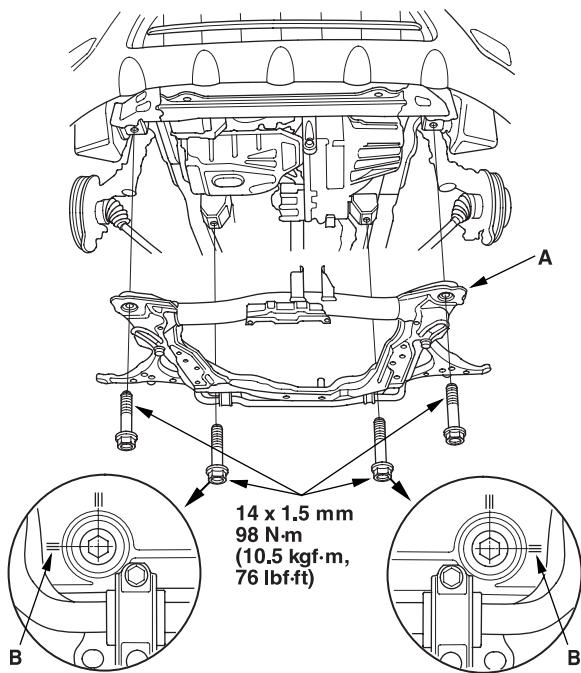
10. Support the subframe with a 4 x 4 x 40 in. piece of wood and a jack.



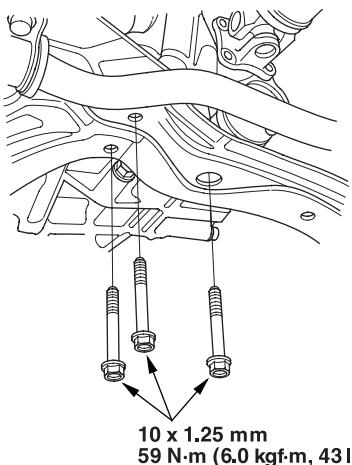
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## Transmission Installation (cont'd)

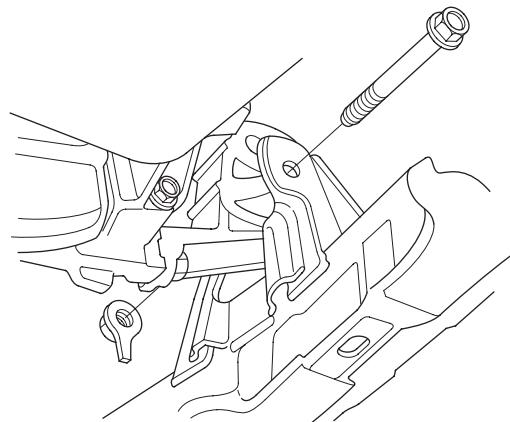
11. Install the front suspension subframe (A) in its original position by aligning the marks (B) you made in the removal procedure.



12. Install the three rear mounting bolts for the transmission rear mount.



13. Loosely tighten the front engine mount bracket mounting bolt.

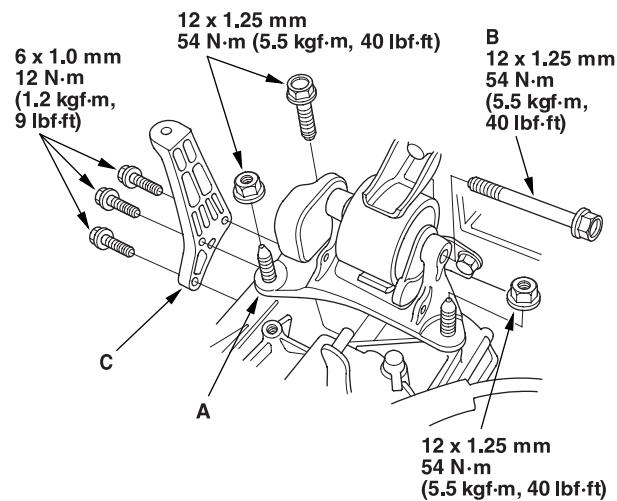


14. Install the intermediate shaft (see page 16-23).

15. Install the driveshafts (see page 16-17).

16. For 4WD models, Install the propeller shaft (see page 16-34).

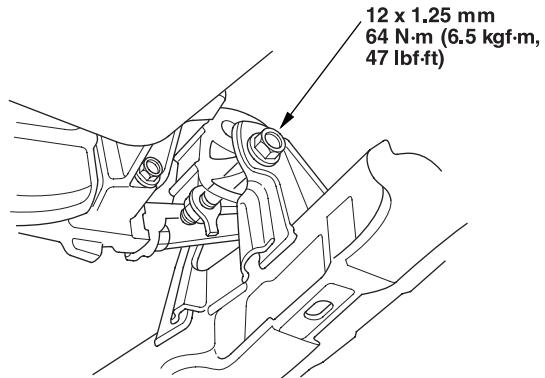
17. Install the transmission mount bracket (A) and the transmission mounting bolt (B).



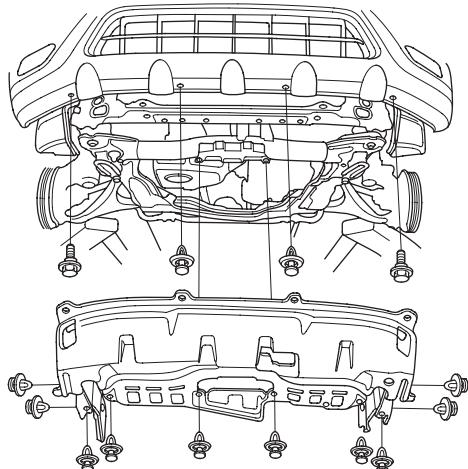
18. Install the air cleaner bracket (C).



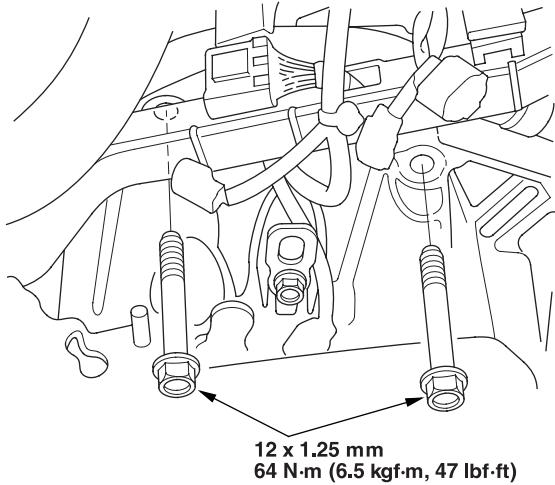
19. Loosen the front engine mount bracket mounting bolt, then tighten the front engine mount bracket mounting bolt.



20. Install the splash shield.

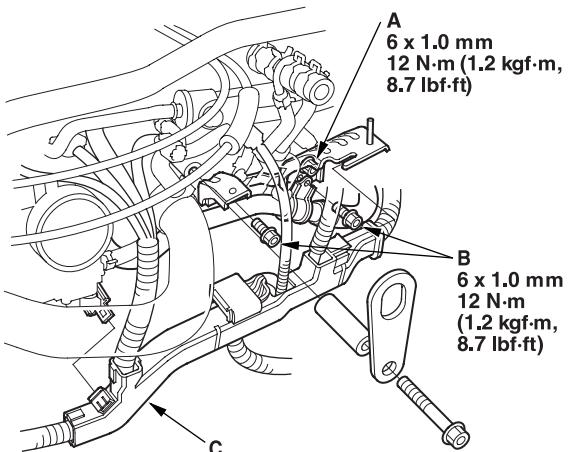


21. Install the two upper transmission mounting bolts.



22. Remove the chain hoist.

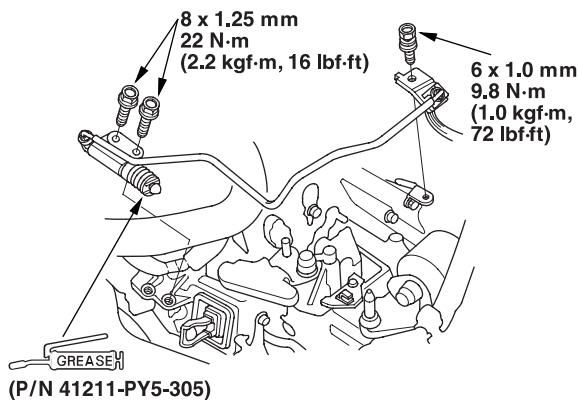
23. Install the air cleaner housing mounting bracket bolt (A), water pipe mounting bolts (B), harness cover (C).



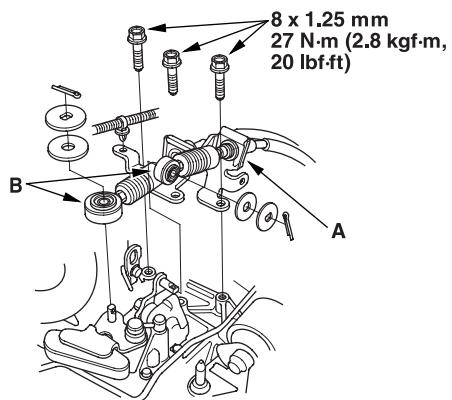
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## Transmission Installation (cont'd)

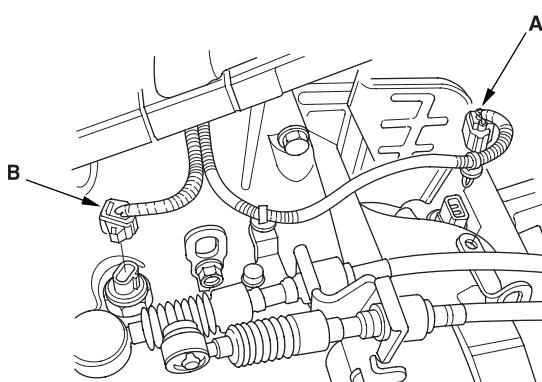
24. Apply Urea Grease UM264 (P/N 41211-PY5-305) to the end of the cylinder rod. Install the slave cylinder. Take care not to bend the clutch line.



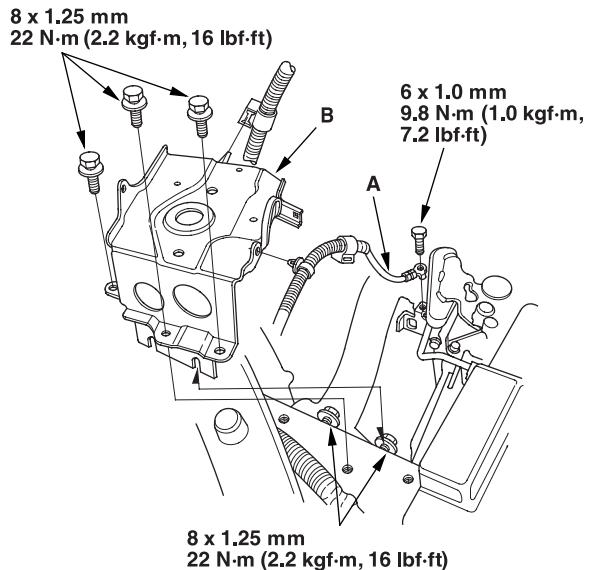
25. Install the cable bracket (A) and cables (B).



26. Connect the vehicle speed sensor (A) and the back-up light switch connector (B).



27. Install the transmission ground cable (A).



28. Install the battery tray (B).

29. Install the intake duct (see step 38 on [page 05-16](#)).

30. Install the air cleaner housing (see step 39 on [page 05-17](#)).

31. Install the battery. Connect the positive (+) cable first, then the negative (-) cable to the battery.

32. Refill the transmission fluid ([see page 13-4](#)).

33. Test-drive the vehicle.

34. Check the clutch operation.

35. Check the front wheel alignment ([see page 18-4](#)).

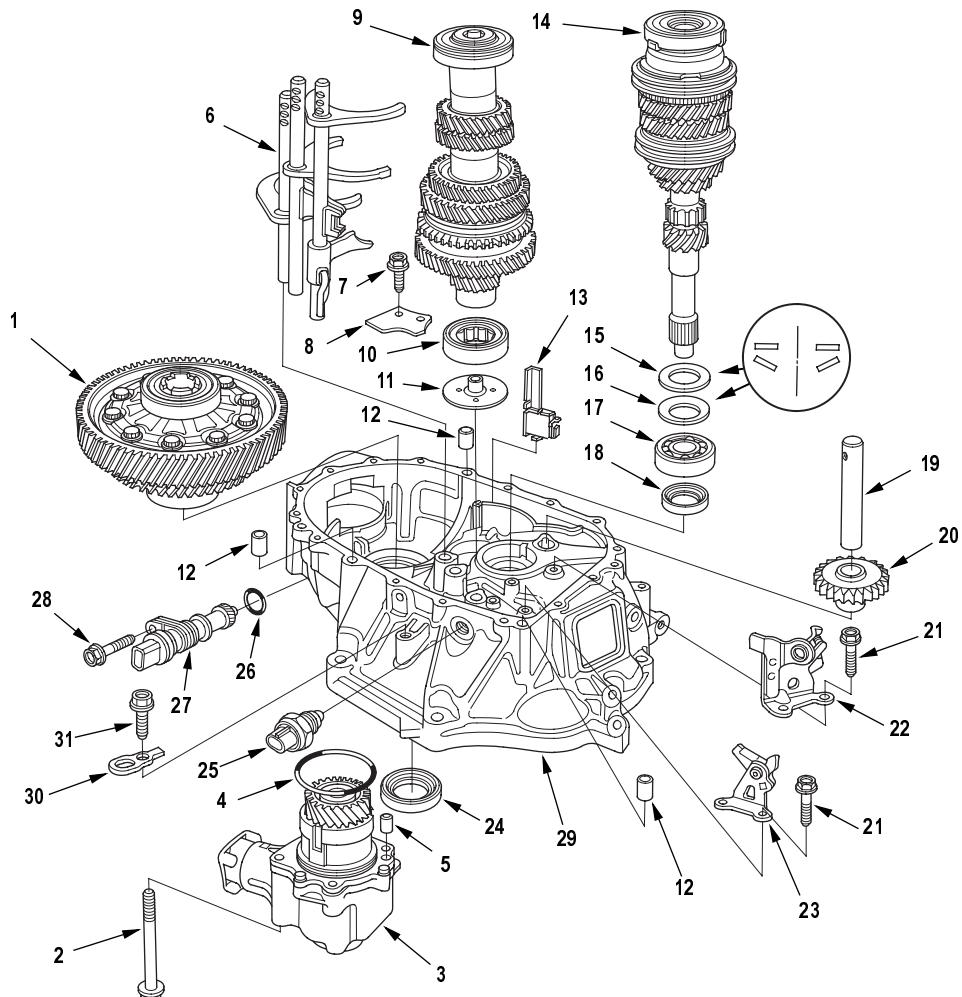
36. Enter the anti-theft code for the radio, then enter the customer's radio station presets.



## Transmission Disassembly

## Exploded View-Clutch Housing

4WD model



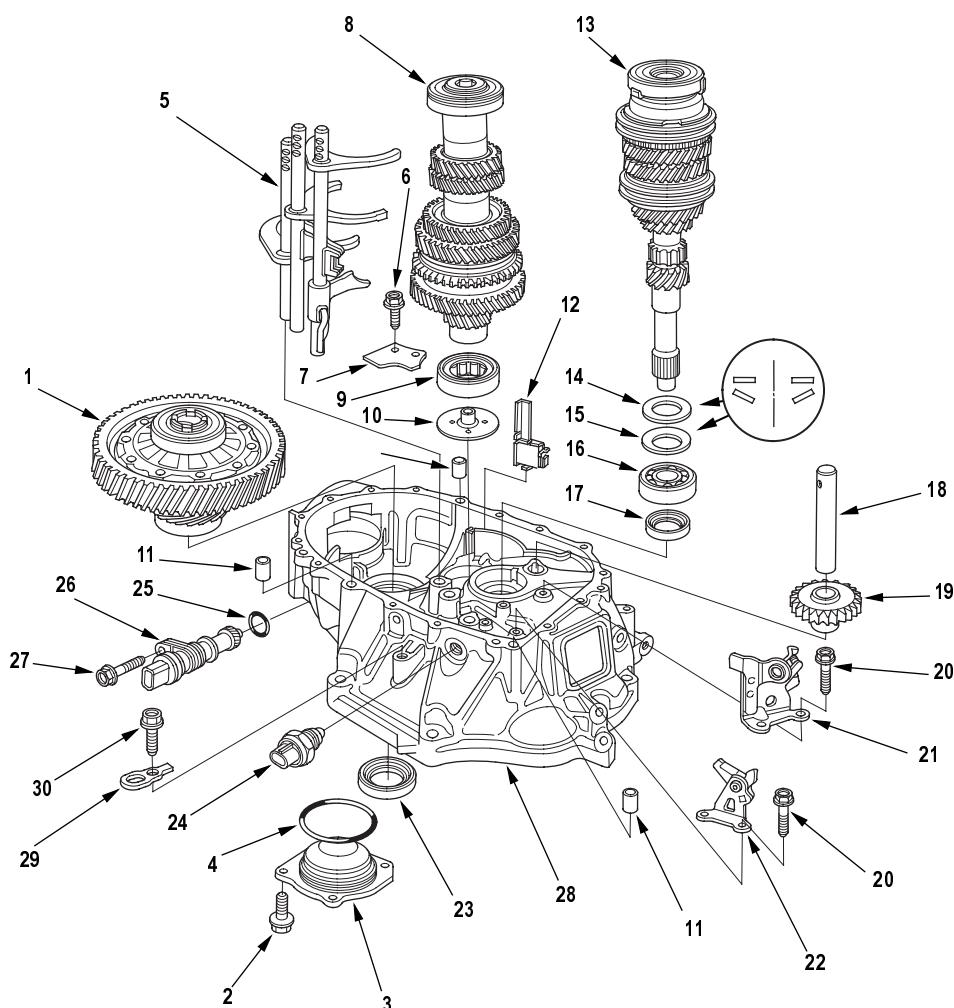
1 DIFFERENTIAL ASSEMBLY	12 14 x 20 mm DOWEL PIN	23 REVERSE LOCK CAM
2 10 mm FLANGE BOLT 44 N·m (4.5 kgf·m, 33 lbf·ft)	13 MAGNET	24 35 x 58 x 8 mm OIL SEAL Replace.
3 TRANSFER ASSEMBLY	14 MAINSHAFT ASSEMBLY	25 BACK-UP LIGHT SWITCH 29 N·m (3.0 kgf·m, 22 lbf·ft)
4 O-RING Replace.	15 28 mm WASHER	26 O-RING Replace.
5 10 x 20 mm DOWEL PIN	16 28 mm SPRING WASHER	27 VEHICLE SPEED SENSOR (VSS)
6 SHIFT FORK ASSEMBLY	17 BALL BEARING	28 8 mm FLANGE BOLT 22 N·m (2.2 kgf·m, 16 lbf·ft)
7 6 x 1.0 mm FLANGE BOLT 12 N·m (1.2 kgf·m, 9 lbf·ft)	18 28 x 43 x 7 mm OIL SEAL Replace.	29 CLUTCH HOUSING
8 BEARING SET PLATE	19 REVERSE GEAR SHAFT	30 TRANSMISSION HANGER
9 COUNTERSHAFT ASSEMBLY	20 REVERSE IDLER GEAR	31 10 mm FLANGE BOLT 44 N·m (4.5 kgf·m, 33 lbf·ft)
10 NEEDLE BEARING	21 6 mm SPECIAL BOLT 15 N·m (1.5 kgf·m, 11 lbf·ft)	
11 OIL GUIDE PLATE C	22 REVERSE SHIFT FORK	

(cont'd)

## Transmission Disassembly (cont'd)

## Exploded View-Clutch Housing (cont'd)

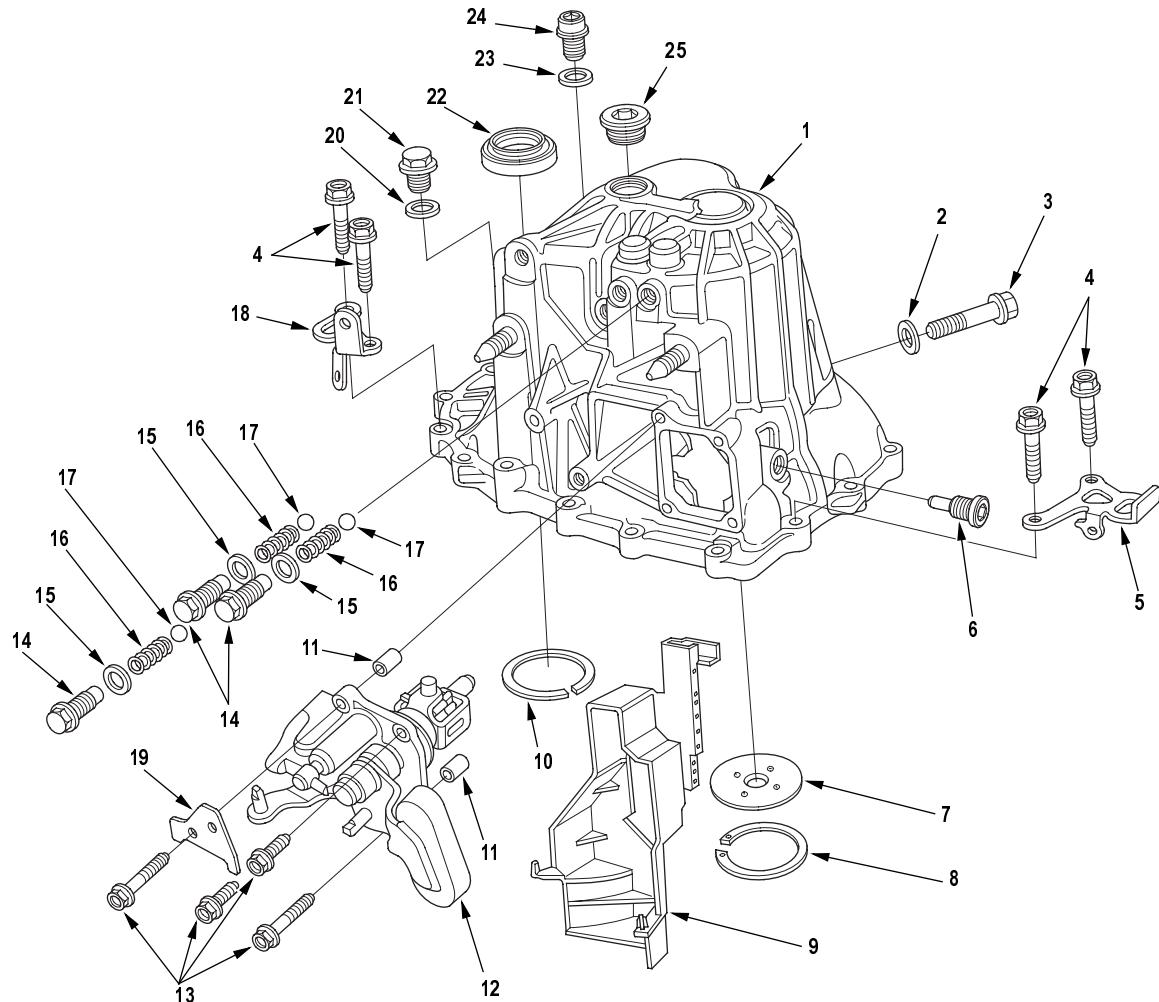
2WD model



1 DIFFERENTIAL ASSEMBLY	11 14 x 20 mm DOWEL PIN	21 REVERSE SHAFT FORK
2 10 mm FLANGE BOLT 44 N·m (4.5 kgf·m, 33 lbf·ft)	12 MAGNET	22 REVERSE LOCK CAM
3 SIDE COVER	13 MAINSHAFT ASSEMBLY	23 35 x 58 x 8 mm OIL SEAL Replace.
4 O-RING Replace.	14 28 mm WASHER	24 BACK-UP LIGHT SWITCH 29 N·m (3.0 kgf·m, 22 lbf·ft)
5 SHIFT FORK ASSEMBLY	15 28 mm SPRING WASHER	25 O-RING Replace.
6 6 mm FLANGE BOLT 12 N·m (1.2 kgf·m, 9 lbf·ft)	16 BALL BEARING	26 VEHICLE SPEED SENSOR (VSS)
7 BEARING SET PLATE	17 28 x 43 x 7 mm OIL SEAL Replace.	27 8 mm SPECIAL BOLT 22 N·m (2.2 kgf·m, 16 lbf·ft)
8 COUNTERSHAFT ASSEMBLY	18 REVERSE GEAR SHAFT	28 CLUTCH HOUSING
9 NEEDLE BEARING	19 REVERSE IDLER GEAR	29 TRANSMISSION HANGER
10 OIL GUIDE PLATE C	20 6 mm SPECIAL BOLT 15 N·m (1.5 kgf·m, 11 lbf·ft)	30 10 mm FLANGE BOLT 44 N·m (4.5 kgf·m, 33 lbf·ft)



## Exploded View-Transmission Housing



1 TRANSMISSION HOUSING

10 80 mm SHIM

19 CLUTCH LINE CLIP BRACKET

2 10 mm WASHER  
Replace.

11 8 x 14 mm DOWEL PIN

20 20 mm WASHER  
Replace.3 10 x 1.25 mm FLANGE BOLT  
44 N·m (4.5 kgf·m, 33 lbf·ft)

12 CHANGE LEVER ASSEMBLY

21 FILLER PLUG  
44 N·m (4.5 kgf·m, 33 lbf·ft)4 8 x 1.25 mm FLANGE BOLT  
27 N·m (2.8 kgf·m, 20 lbf·ft)13 6 x 1.0 mm FLANGE BOLT  
12 N·m (1.2 kgf·m, 9 lbf·ft)22 40 x 56 x 8 mm OIL SEAL  
Replace.

5 TRANSMISSION HANGER A

14 DETENT BOLT  
22 N·m (2.2 kgf·m, 16 lbf·ft)23 14 mm WASHER  
Replace.6 INTERLOCK BOLT  
39 N·m (4.0 kgf·m, 29 lbf·ft)15 12 mm WASHER  
Replace.24 DRAIN PLUG  
39 N·m (4.0 kgf·m, 29 lbf·ft)

7 OIL GUIDE PLATE M

16 SPRING

25 32 mm SEALING CAP  
34 N·m (3.5 kgf·m, 25 lbf·ft)

8 72 mm SHIM

17 STEEL BALL

9 OIL GUTTER PLATE

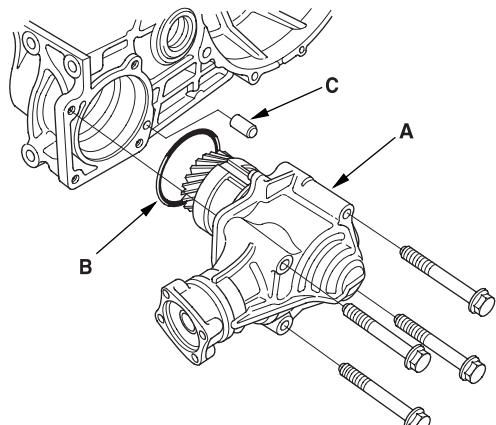
18 TRANSMISSION HANGER B

(cont'd)

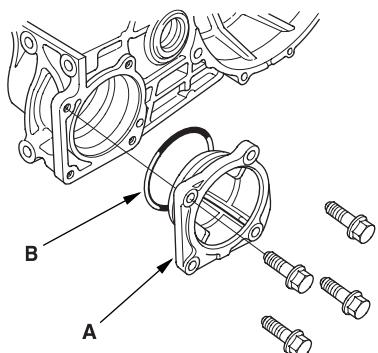
## Transmission Disassembly (cont'd)

NOTE: Place the clutch housing on two pieces of wood thick enough to keep the mainshaft from hitting the workbench.

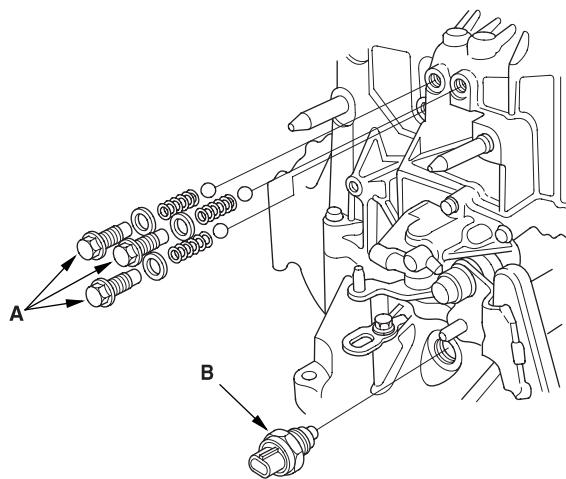
1. Remove the transfer assembly (A), O-ring (B) and 10 x 20 mm dowel pin (C). (4WD model)



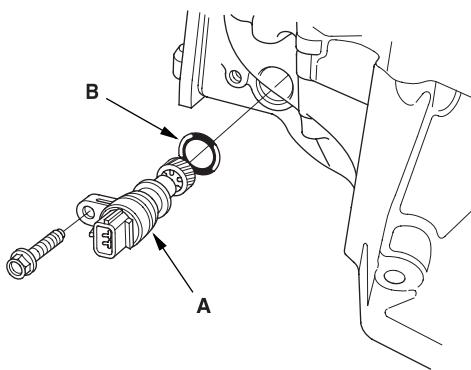
2. Remove the side cover (A) and O-ring (B). (2WD model)



3. Remove the detent bolts (A), springs, steel balls and back-up light switch (B).

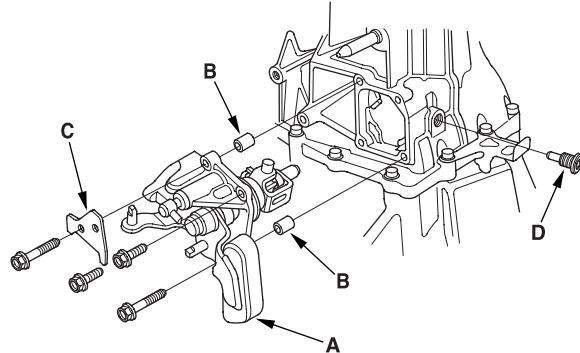


4. Remove the vehicle speed sensor (VSS)(A) and O-ring (B).

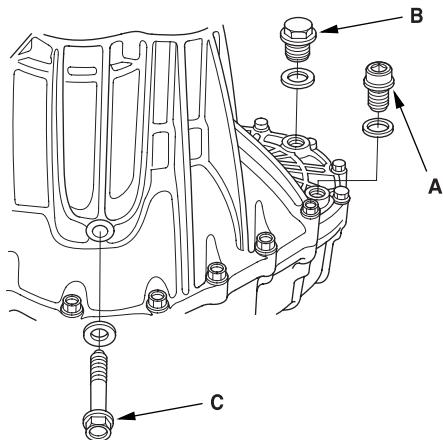




5. Remove the change lever assembly (A), 8 x 14 mm dowel pins (B), clutch line clip bracket (C) and interlock bolt (D).

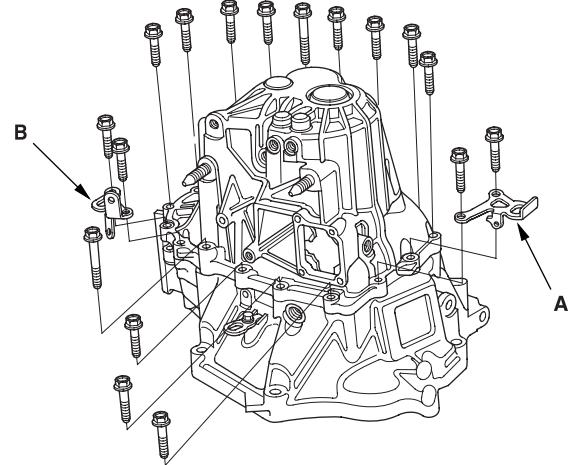


6. Remove the drain plug (A), filler plug (B) and 10 mm flange bolt (C).

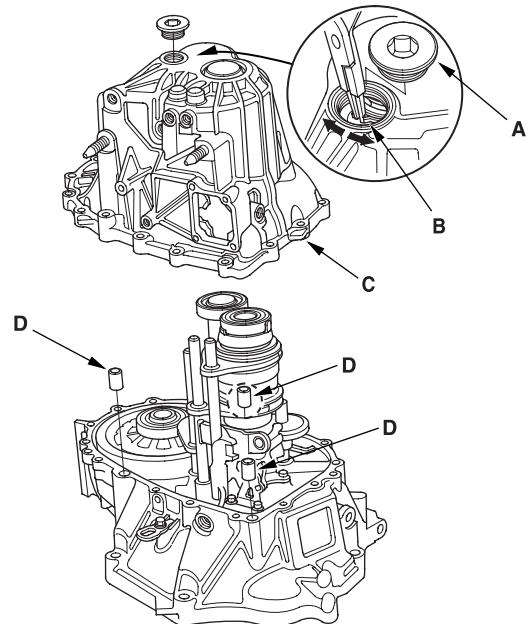


7. Remove the 8 mm flange bolts in a crisscross pattern in several steps.

8. Remove the transmission hanger A and transmission hanger B.



9. Remove the 32 mm sealing cap (A).



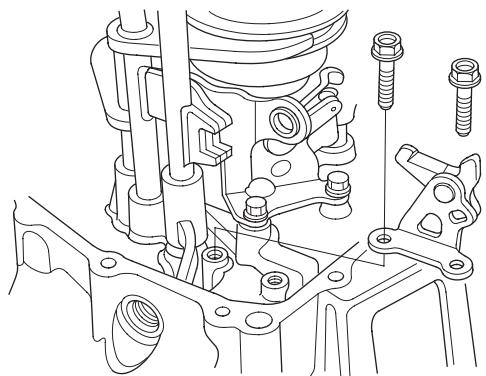
10. Expand the 72 mm snap ring (B) on the countershaft ball bearing, and remove it from the groove using a pair of snap ring pliers.

11. Remove the transmission housing (C) and 14 x 20 mm dowel pins (D).

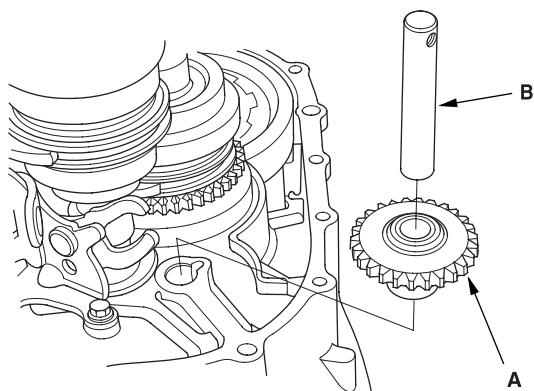
(cont'd)

## Transmission Disassembly (cont'd)

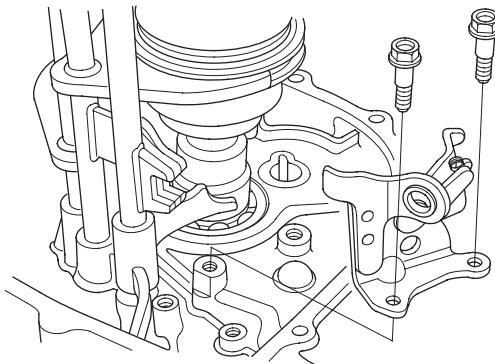
12. Remove the reverse lock cam.



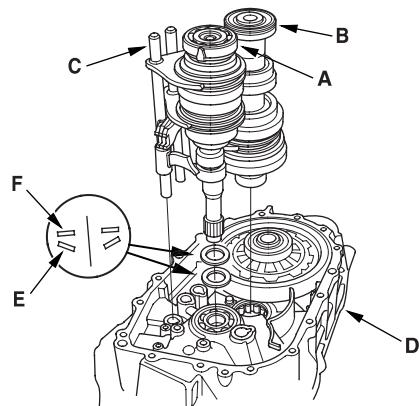
13. Remove the reverse idler gear (A) and reverse gear shaft (B).



14. Remove the reverse shift fork.



15. Apply tape to the mainshaft splines to protect the seal, then remove the mainshaft assembly (A) and countershaft assembly (B) with the shift forks (C) from the clutch housing (D).

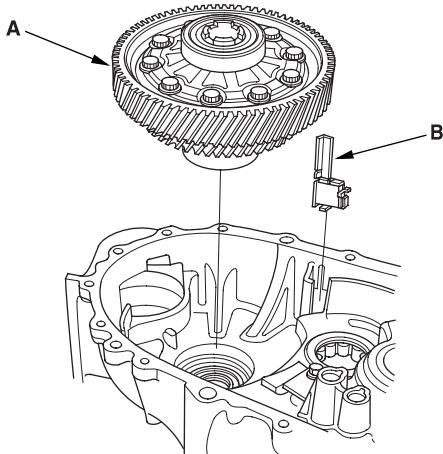


16. Remove the 28 mm spring washer (E) and 28 mm washer (F).

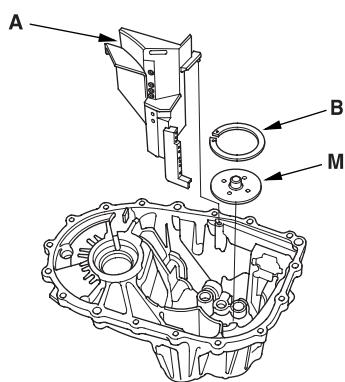


### Reverse Shift Fork Clearance Inspection

17. Remove the differential assembly (A) and magnet (B).

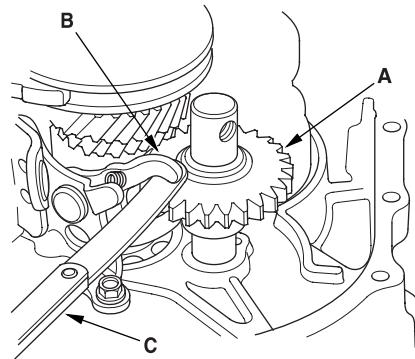


18. Remove the oil gutter plate (A), 72 mm shim (B) and oil guide plate M.



1. Measure the clearance between the reverse idler gear (A) and the reverse shift fork (B) with a feeler gauge (C). If the clearance is more than the service limit, go to step 2.

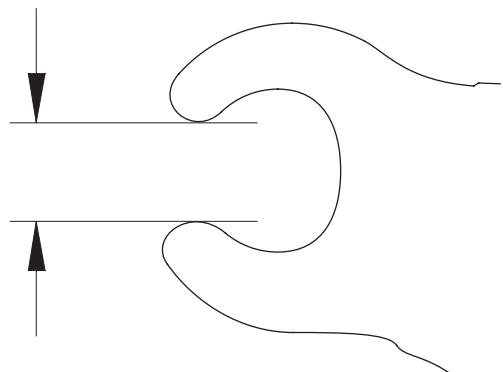
**Standard:** 0.20 - 0.59 mm (0.007 - 0.023 in.)  
**Service Limit:** 1.2 mm (0.047 in.)



2. Measure the width of the reverse shift fork.

- If distance is not within the standard, replace the reverse shift fork with a new one.
- If distance is within the standard, replace the reverse gear with a new one.

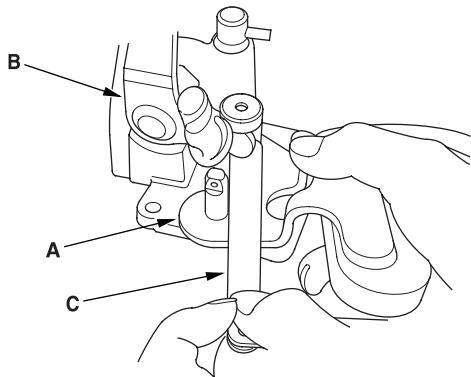
**Standard:** 13.4 - 13.7 mm (0.527 - 0.539 in.)



**Shift Lever Clearance Inspection**

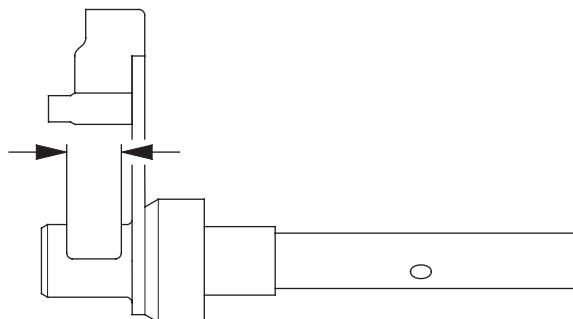
1. Measure the clearance between shift lever (A) and the select lever (B) with a feeler gauge (C). If the clearance is more than the service limit, go to step 2.

**Standard:** 0.05 - 0.25 mm (0.002 - 0.010 in.)  
**Service Limit:** 0.50 mm (0.020 in.)



2. Measure the groove of the shift lever.
  - If distance is not within the standard, replace the shift lever with a new one.
  - If distance is within the standard, replace the select lever with a new one.

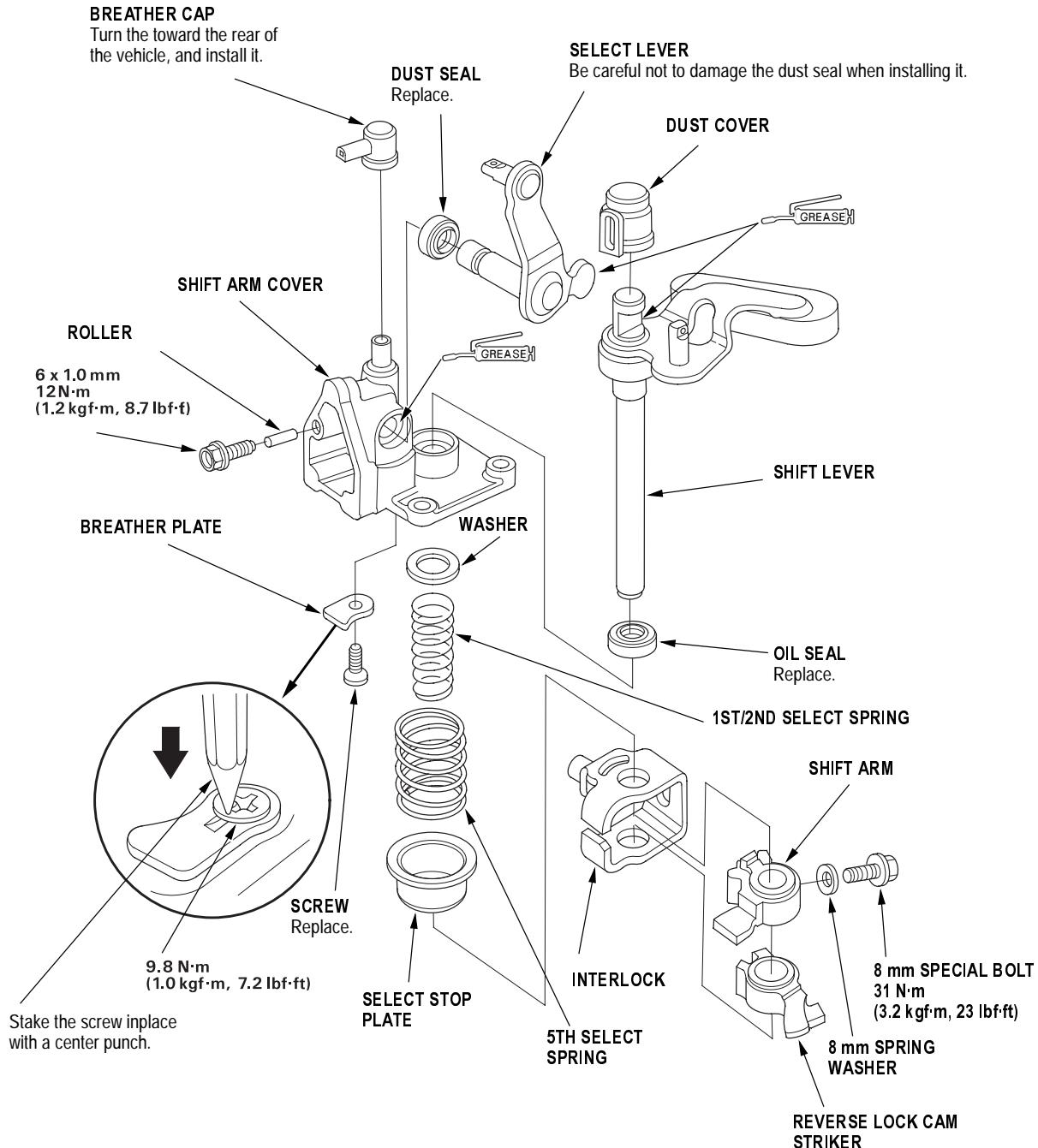
**Standard:** 15.00 - 15.10 mm (0.591 - 0.594 in.)





### Change Lever Assembly Disassembly/Reassembly

Prior to reassembling, clean all the parts in solvent, dry them, and apply lubricate to any contact surface.

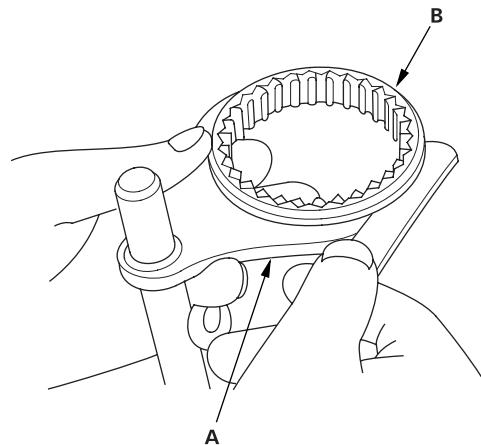


### Shift Forks Clearance Inspection

NOTE: The synchro sleeve and synchro hub should be replaced as a set.

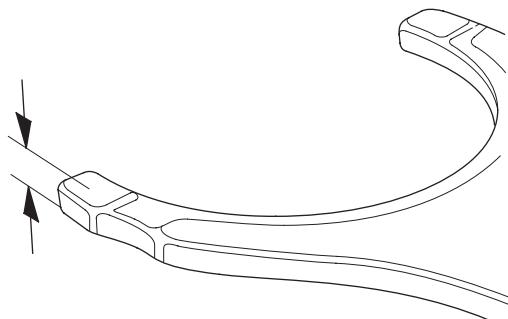
1. Measure the clearance between each shift fork (A) and its matching synchro sleeve (B). If the clearance exceeds the service limit, go to step 2.

Standard: 0.35 - 0.65 mm (0.014 - 0.026 in.)  
Service Limit: 1.0 mm (0.039 in.)



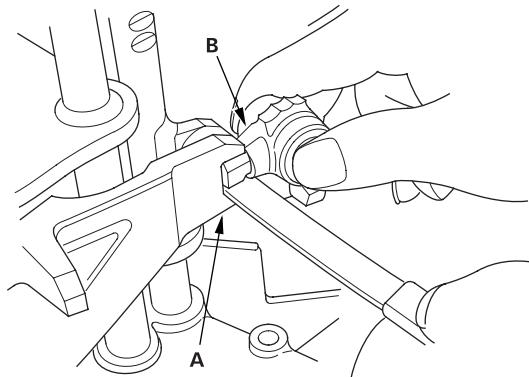
2. Measure the thickness of the shift fork fingers.
  - If the thickness of the shift fork finger is not within the standard, replace the shift fork with a new one.
  - If the thickness of the shift fork finger is within the standard, replace the synchro sleeve with a new one.

Standard: 7.4 - 7.6 mm (0.29 - 0.30 in.)



3. Measure the clearance between the shift fork (A) and the shift arm (B). If the clearance exceeds the service limit, go to step 4.

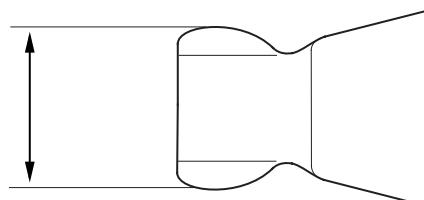
Standard: 0.2 - .5 mm (0.008 - 0.020 in.)  
Service Limit: 0.60 mm (0.023 in.)



4. Measure the width of the shift arm.

- If the width of the shift arm is not within the standard, replace the shift arm with a new one.
- If the width of the shift arm is within the standard, replace the shift fork or shift piece with a new one.

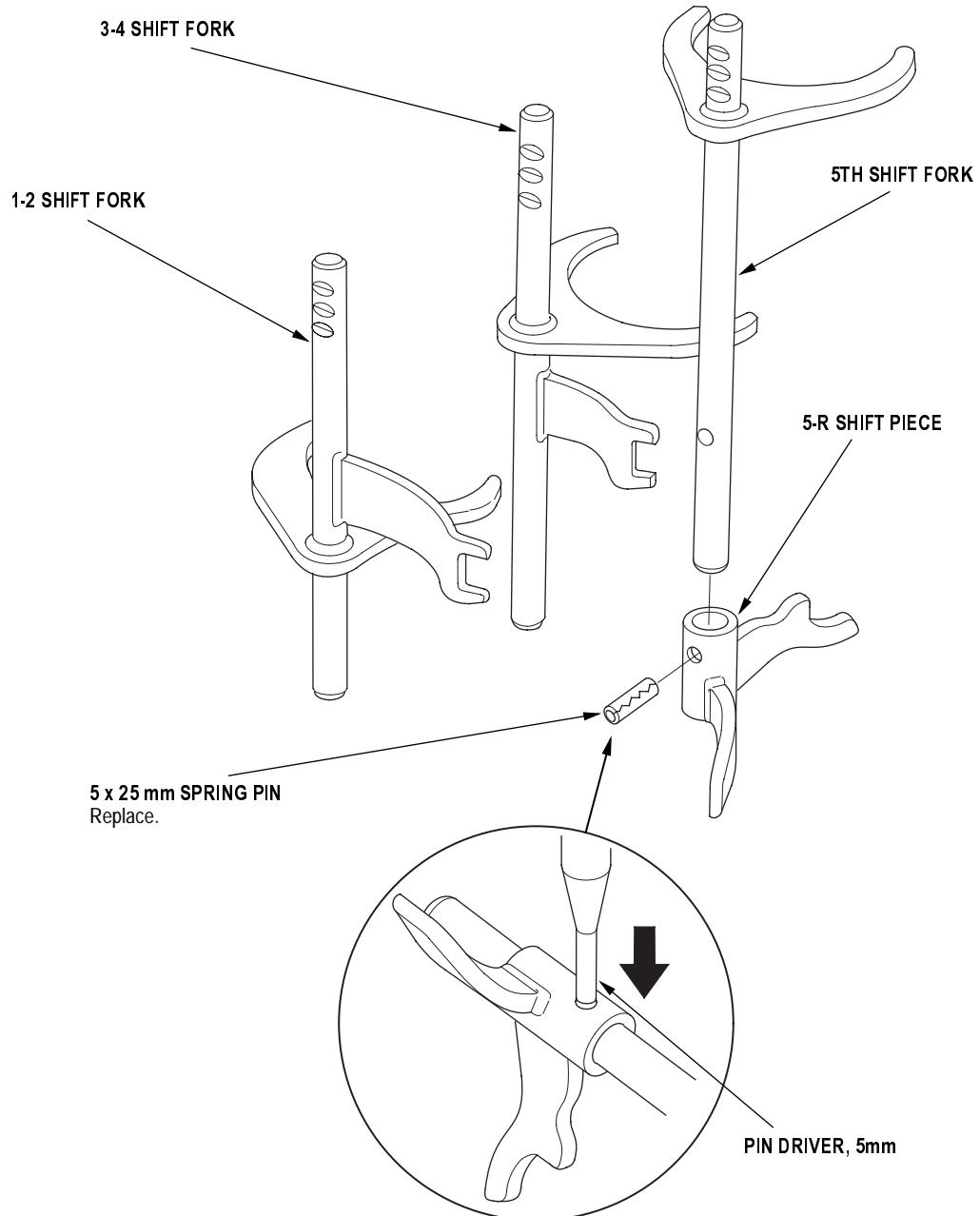
Standard: 16.9 - 17.0 mm (0.665 - 0.669 in.)





## Shift Forks Disassembly/Reassembly

Prior to reassembling, clean all the parts in solvent, dry them, and apply lubricant to any contact parts.



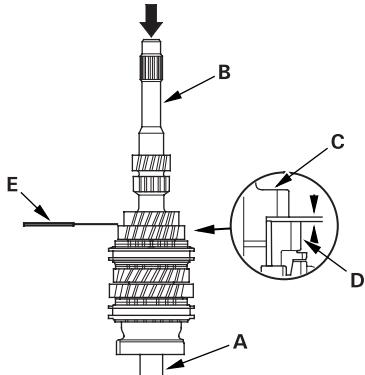
### Mainshaft Assembly Clearance Inspection

NOTE: If replacement is required, always replace the synchro sleeve and hub as a set.

1. Support the bearing inner race with an appropriate sized socket (A), and push down on the mainshaft (B).

Standard: 0.06 - 0.16 mm  
(0.002 - 0.006 in.)

Service Limit: 0.25 mm (0.010 in.)



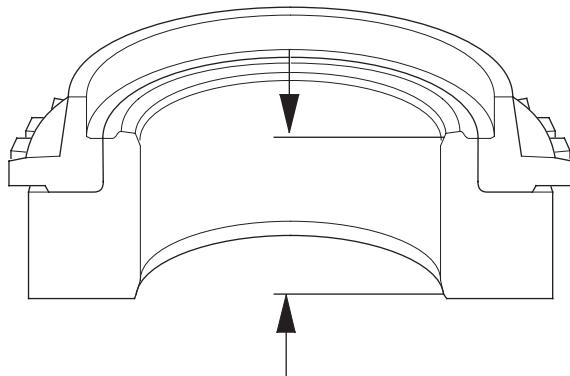
2. Measure the clearance between 2nd (C) and 3rd (D) gears with a feeler gauge (E).
  - If the clearance is more than the service limit, go to step 3.
  - If the clearance is within the service limit, go to step 4.

3. Measure the thickness of 3rd gear.

- If the thickness of 3rd gear is less than the service limit, replace 3rd gear with a new one.
- If the thickness of 3rd gear is within the service limit, replace the 3rd/4th synchro hub with a new one.

Standard: 23.92 - 23.97 mm  
(0.981 - 0.944 in.)

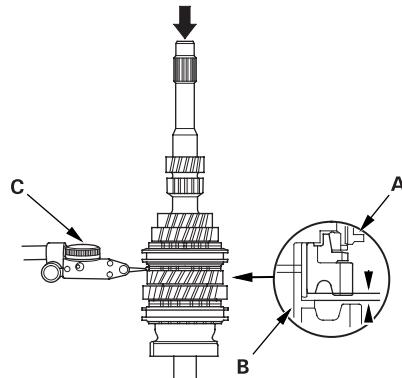
Service Limit: 23.80 mm (0.937 in.)



4. Measure the clearance between 4th gear (A) and the spacer collar (B) with a dial indicator (C). If the clearance is more than the service limit, go to step 5.

Standard: 0.06 - 0.16 mm  
(0.002 - 0.006 in.)

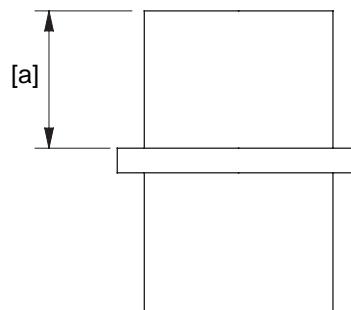
Service Limit: 0.25 mm (0.010 in.)



5. Measure distance [a] on the distance collar.

- If distance [a] is not within the standard, replace the distance collar with a new one.
- If distance [a] is within the standard, go to step 6.

Standard: 24.03 - 24.08 mm  
(0.946 - 0.947 in.)





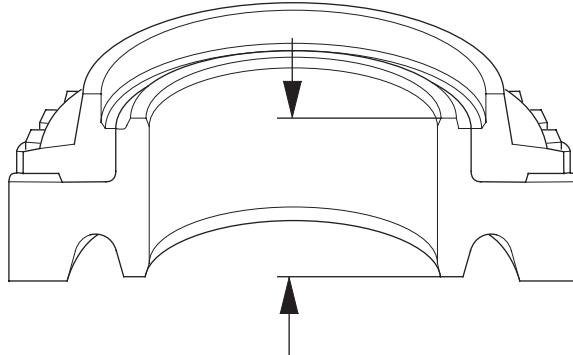
## 6. Measure the thickness of 4th gear.

- If the thickness of 4th gear is less than the service limit, replace 4th gear with a new one.
- If the thickness of 4th gear is within the service limit, replace the 3rd/4th synchro hub with a new one.

**Standard:** 23.92 - 23.97 mm

(0.981 - 0.944 in.)

**Service Limit:** 23.80 mm (0.937 in.)

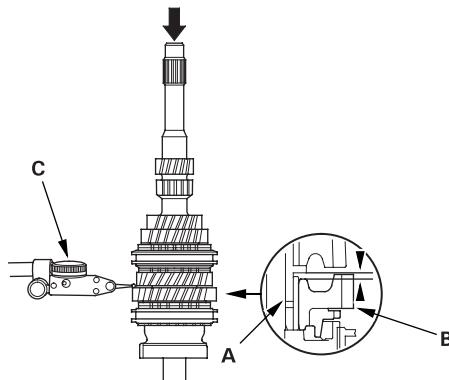


## 7. Measure the clearance between the distance collar (A) and 5th gear (B) with a dial indicator (C). If the clearance is more than the service limit, go to step 8.

**Standard:** 0.06 - 0.16 mm

(0.002 - 0.006 in.)

**Service Limit:** 0.25 mm (0.010 in.)

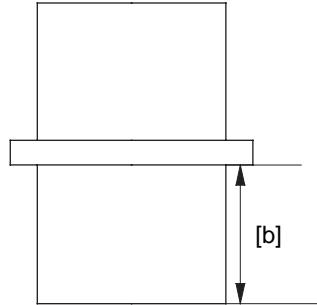


## 8. Measure distance b on the distance collar.

- If distance [b] is not within the standard, replace the distance collar with a new one.
- If distance [b] is within the standard, go to step 9.

**Standard:** 24.03 - 24.08 mm

(0.946 - 0.947 in.)



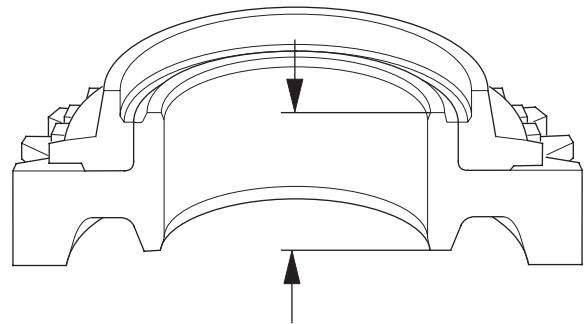
## 9. Measure the thickness of 5th gear.

- If the thickness of 5th gear is less than the service limit, replace 5th gear with a new one.
- If the thickness of 5th gear is within the service limit, replace the 5th synchro hub with a new one.

**Standard:** 23.92 - 23.97 mm

(0.981 - 0.944 in.)

**Service Limit:** 23.80 mm (0.937 in.)



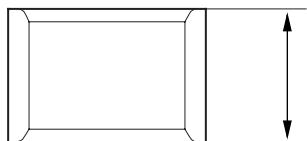
(cont'd)

### Mainshaft Assembly Clearance Inspection (cont'd)

10. Measure the thickness of the MBS distance collar.

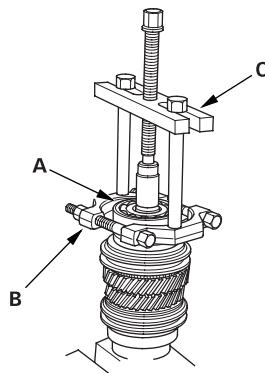
- If the thickness of MBS distance collar is not within standard, replace the MBS distance collar with a new one.

Standard: 23.95 - 24.05 mm  
(0.943 - 0.947 in.)

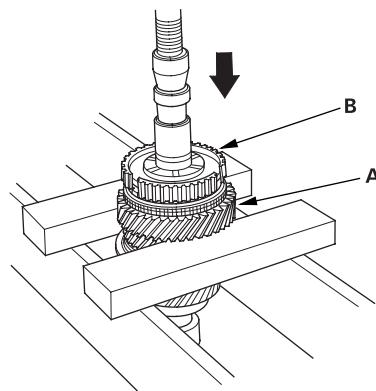


### Mainshaft Disassembly

1. Remove the angular ball bearing (A) and the tapered cone ring using a commercially available bearing separator (B) and a commercially available bearing puller (C). Be sure the bearing separator is under the tapered cone ring.



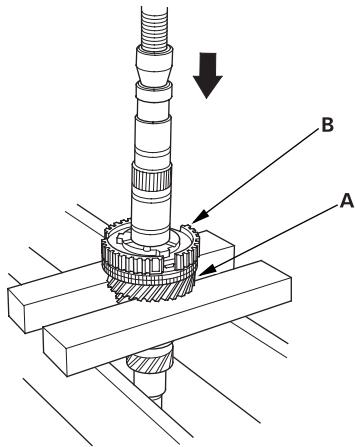
2. Support 5th gear (A) on steel blocks, and press the mainshaft out of the 5th synchro hub (B). Use of a jaw-type puller can damage the gear teeth.





### Mainshaft Inspection

3. Support the 3rd gear (A) on steel blocks, and press the mainshaft out of the 3rd/4th synchro hub (B). Use of a jaw-type puller can damage the gear teeth.



1. Inspect the gear surface and bearing surface for wear and damage, then measure the mainshaft at points A, B, and C. If any part of the mainshaft is less than the service limit, replace it with a new one.

#### Standard:

**A Ball bearing surface (transmission housing side):**  
27.987 - 28.000 mm (1.1019-1.1024 in.)

**B Distance collar surface:**

31.984 - 32.000 mm (1.2594 - 1.2598 in.)

**C Needle bearing surface:**

38.984 - 39.000 mm (1.5348 - 1.5354 in.)

**D Ball bearing surface (clutch housing side):**  
27.977 - 27.990 mm (1.1015 - 1.1020 in.)

**E Bush surface:**

20.80 - 20.85 mm (0.8189 - 0.8209 in.)

#### Service Limit:

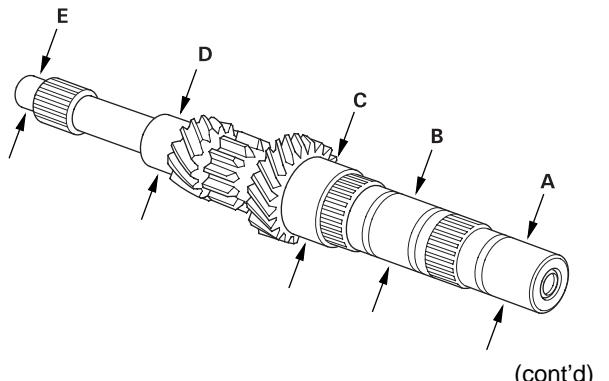
**A:** 27.94 mm (1.100 in.)

**B:** 31.93 mm (1.257 in.)

**C:** 38.93 mm (1.533 in.)

**D:** 27.94 mm (1.100 in.)

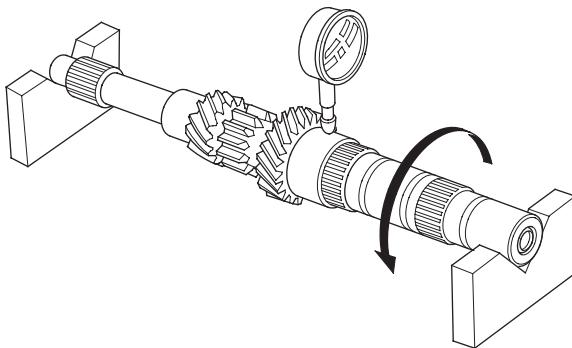
**E:** 20.75 mm (0.817 in.)



## Mainshaft Inspection (cont'd)

2. Inspect the runout by supporting both ends of the mainshaft. Rotate the mainshaft two complete revolutions when measuring the runout. If the runout is more than the service limit, replace the mainshaft with a new one.

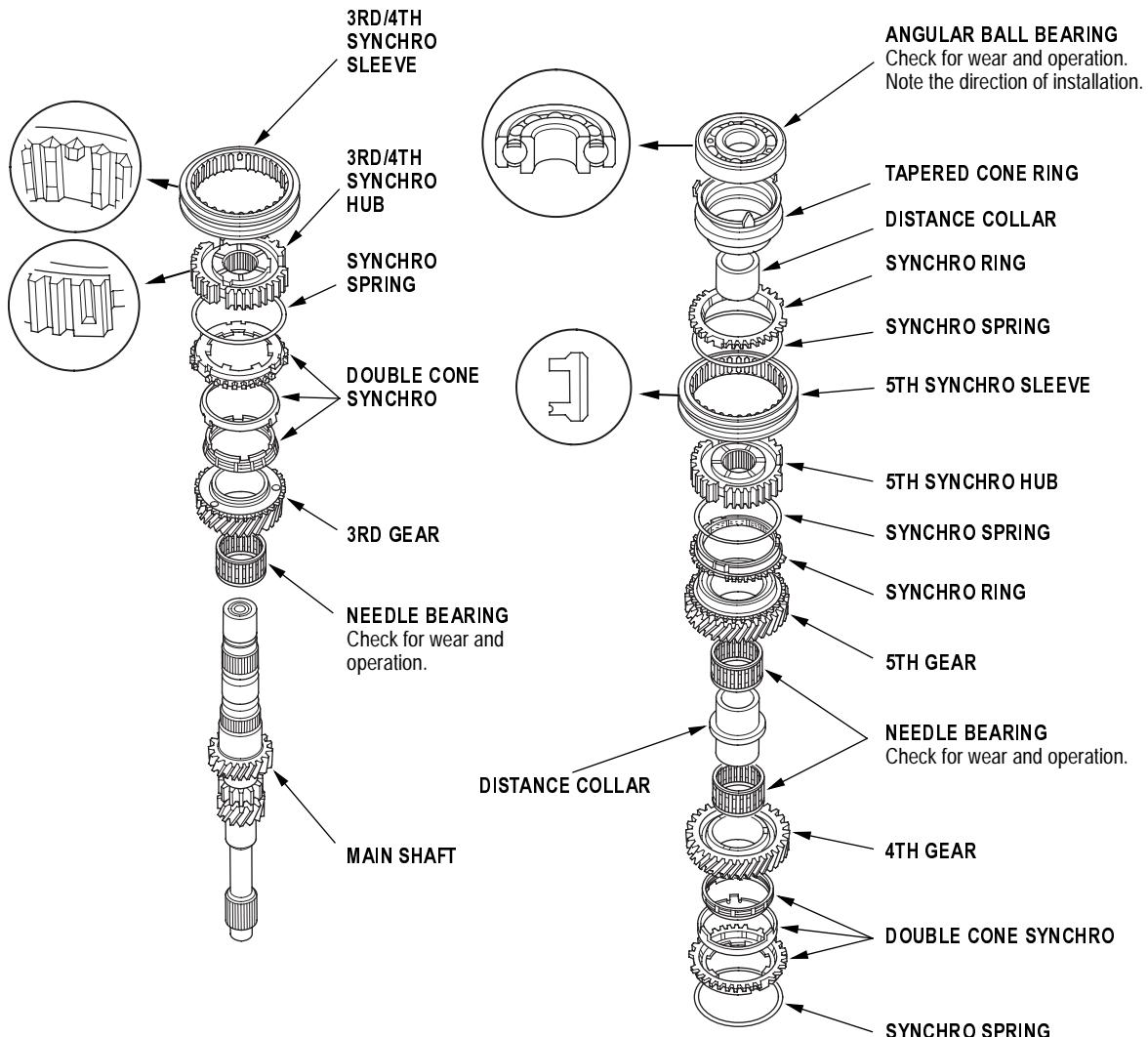
**Standard:** 0.02 mm (0.001 in.) max.  
**Service Limit:** 0.05 mm (0.002 in.)





## Mainshaft Reassembly

### Exploded View



(cont'd)

## Mainshaft Reassembly (cont'd)

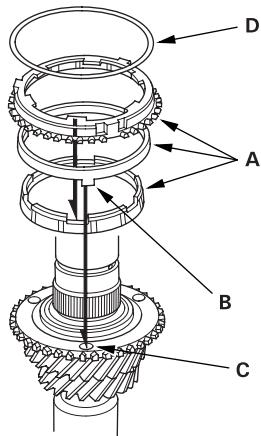
## Special Tools Required

- Driver, 40 mm I.D. 07746-0030100
- Attachment, 30 mm I.D. 07746-0030300

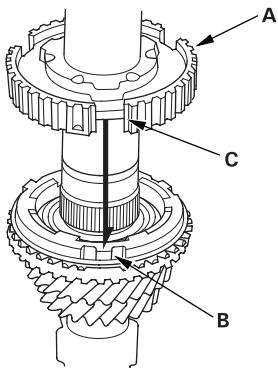
## NOTE:

- Refer to the Exploded View as needed during this procedure.

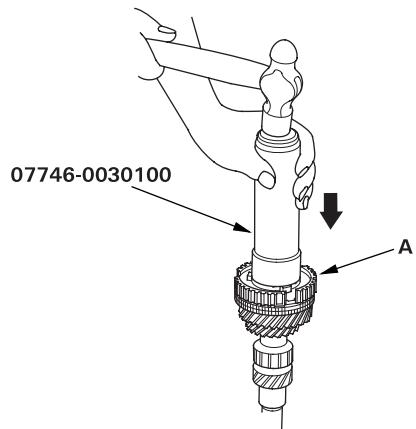
1. Clean all the parts in solvent, dry them, and apply lubricant to all contact surfaces except the 3rd/4th and 5th synchro hubs.
2. Install the needle bearing and 3rd gear on the mainshaft.
3. Install the double cone synchro assembly (A) by aligning the synchro cone fingers (B) with the holes in 3rd gear (C), then install the synchro spring (D).



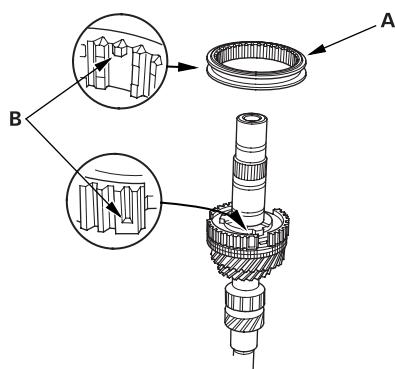
4. Install the 3rd/4th synchro hub (A) by aligning the synchro cone fingers (B) with the grooves in 3rd/4th synchro hub (C).

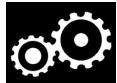


5. Install the 3rd/4th synchro hub (A) using the special tool.

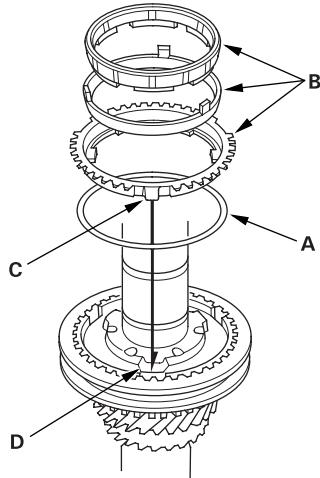


6. Install the 3rd/4th synchro sleeve (A) by aligning the stops (B) with the 3rd/4th synchro sleeve and hub. After installing, check the operation of the 3rd/4th synchro hub set.



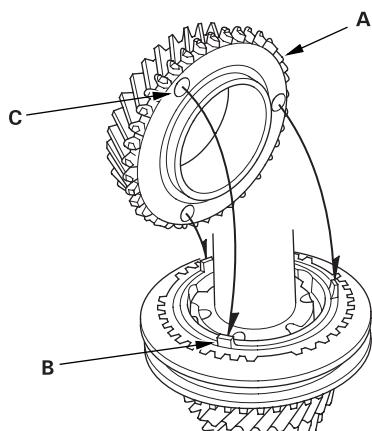


7. Install the synchro spring (A).



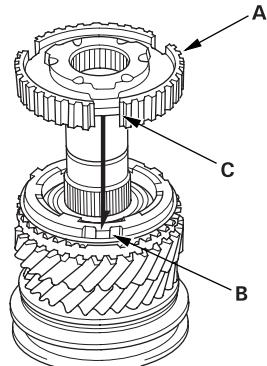
8. Install the double cone synchro assembly (B) by aligning the synchro cone fingers (C) with the grooves in 3rd/4th synchro hub (D).

9. Install the 4th gear (A) by aligning the synchro cone fingers (B) with holes in 4th gear (C).

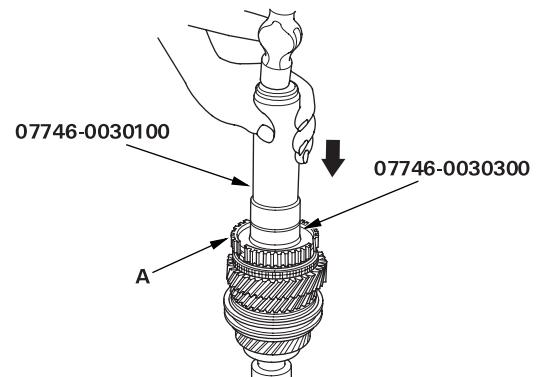


10. Install the needle bearings, distance collar, 5th gear, and 5th gear synchro spring and ring.

11. Install the 5th synchro hub (A) by aligning the synchro cone fingers (B) with the grooves in 5th/6th synchro hub (C).



12. Install the 5th synchro hub (A) using the special tools.

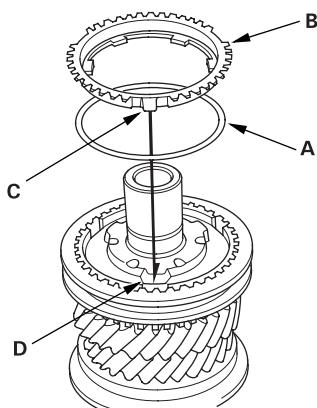


13. Install the 5th synchro sleeve.

(cont'd)

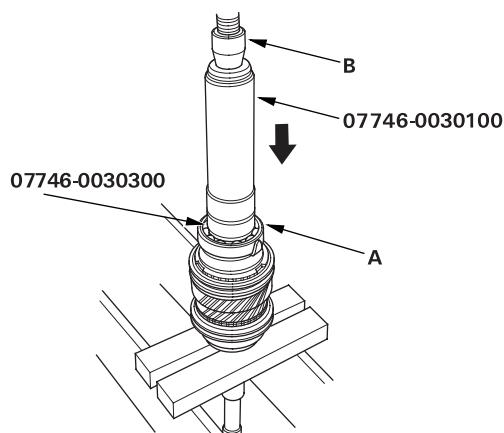
## Mainshaft Reassembly (cont'd)

14. Install the synchro spring (A).



15. Install the synchro ring (B) by aligning the synchro cone fingers (C) with the grooves in 5th synchro hub (D).

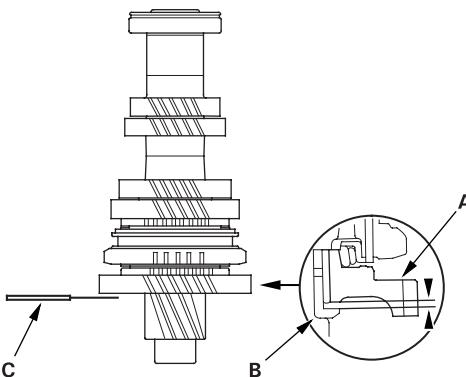
16. Install the new ball bearing (A) using the special tools and press (B).



## Countershaft Assembly Clearance Inspection

1. Measure the clearance between the 1st gear (A) and the distance collar (B) with a feeler gauge (C). If the clearance is more than the service limit, go to step 2.

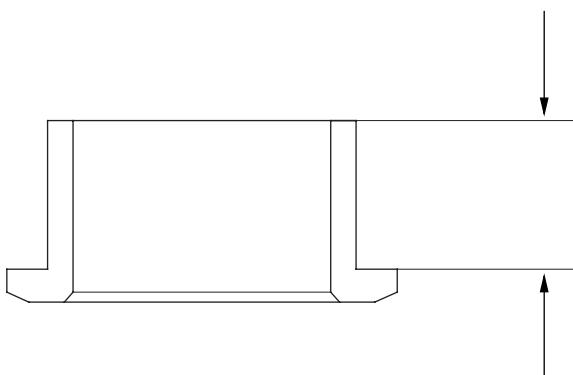
Standard: 0.06 - 0.16 mm (0.002 - 0.006 in.)  
Service Limit: 0.25 mm (0.010 in.)



2. Measure the thickness of the distance collar.

- If the thickness is not within the standard, replace the distance collar with a new one.
- If the thickness is within the standard, go to step 3.

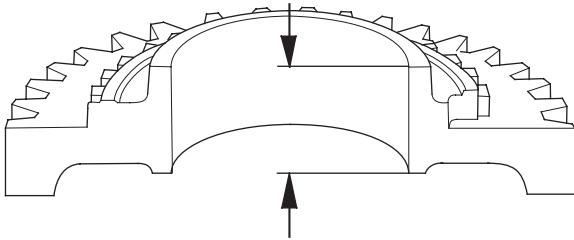
Standard: 23.03 - 23.08 mm (0.907 - 0.909 in.)





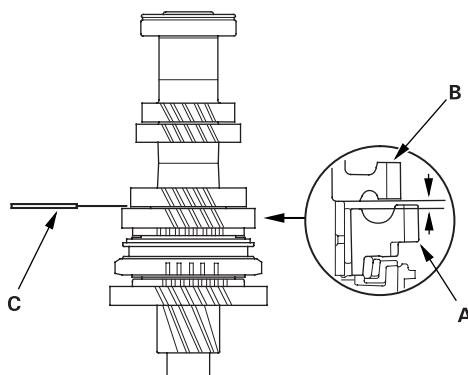
3. Measure the thickness of the 1st gear.
  - If the thickness of 1st gear is less than the service limit, replace 1st gear with a new one.
  - If the thickness of 1st gear is within the service limit, replace the 1st/2nd synchro hub with a new one.

**Standard:** 22.92 - 22.97 mm (0.902 - 0.904 in.)  
**Service Limit:** 22.87 mm (0.900 in.)



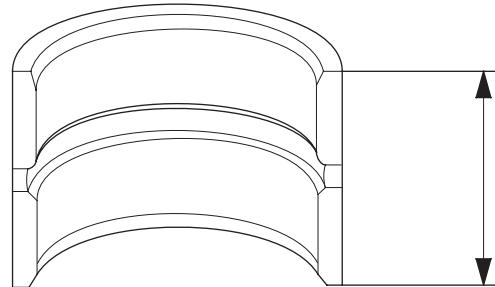
4. Measure the clearance between the 2nd gear (A) and 3rd gear (B) with a feeler gauge (C). If the clearance is more than the service limit, go to step 5.

**Standard:** 0.06 - 0.16 mm (0.002 - 0.006 in.)  
**Service Limit:** 0.25 mm (0.010 in.)



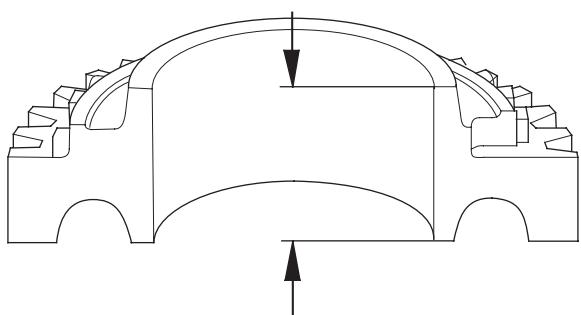
5. Measure the thickness of the distance collar.
  - If the thickness is not within the standard, replace the distance collar with a new one.
  - If the thickness is within the standard, go to step 6.

**Standard:** 28.03 - 28.08 mm (1.104 - 1.106 in.)



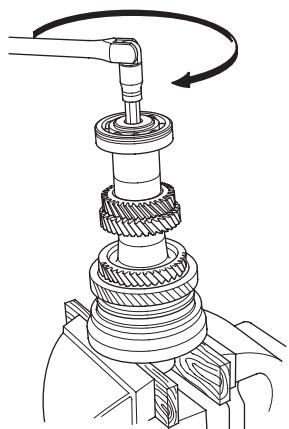
6. Measure the thickness of the 2nd gear.
  - If the thickness of 2nd gear is less than the service limit, replace 2nd gear with new one.
  - If the thickness of 1st gear is within the service limit, replace the 1st/2nd synchro hub with a new one.

**Standard:** 27.92 - 27.97 mm (1.099 - 1.101 in.)  
**Service Limit:** 27.87 mm (1.097 in.)

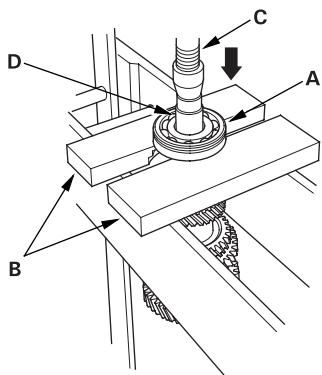


## Countershaft Disassembly

1. Securely clamp the countershaft assembly in a bench vise with wood blocks.

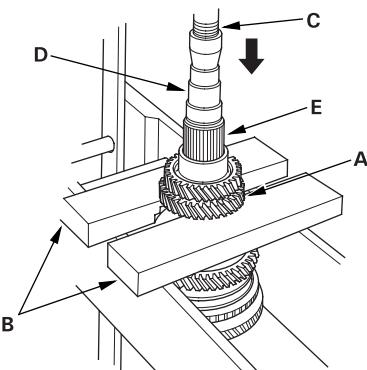


2. Remove the special bolt (left-hand threads).
3. Support ball bearing (A) on steel blocks (B), then use a press (C) and an attachment (D) to press the countershaft out of the ball bearing.

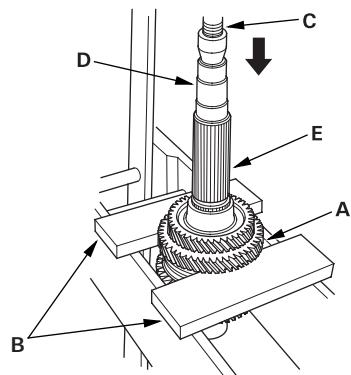


4. Remove the 35 mm shim and distance collar.

5. Support 4th gear (A) on steel blocks (B), then use a press (C) and an attachment (D) to press the countershaft (E) out of the 5th gear.



6. Support 2nd gear (A) on steel blocks (B), then use a press (C) and an attachment (D) to press the countershaft (E) out of the 3rd gear.





### Countershaft Inspection

1. Inspect the gear surface and bearing surface for wear and damage, then measure the countershaft at points A, B, and C. If any part of the countershaft is less than the service limit, replace it with a new one.

**Standard:**

**A Ball bearing surface (transmission housing side):**

30.020 - 30.033 mm (1.1819 - 1.1824 in.)

**B Distance collar surface:**

39.937 - 39.950 mm (1.5723 - 1.5728 in.)

**C Needle bearing surface (clutch housing side):**

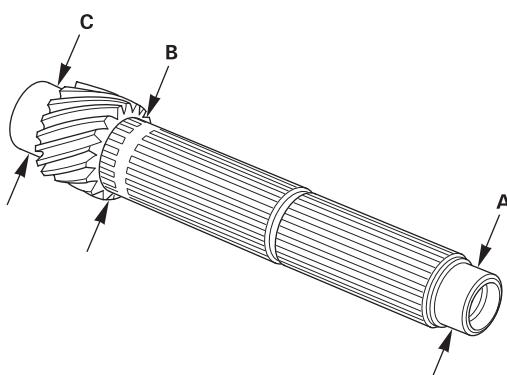
35.000 - 35.015 mm (1.3780 - 1.3785 in.)

**Service Limit:**

**A:** 29.97 mm (1.180 in.)

**B:** 39.88 mm (1.570 in.)

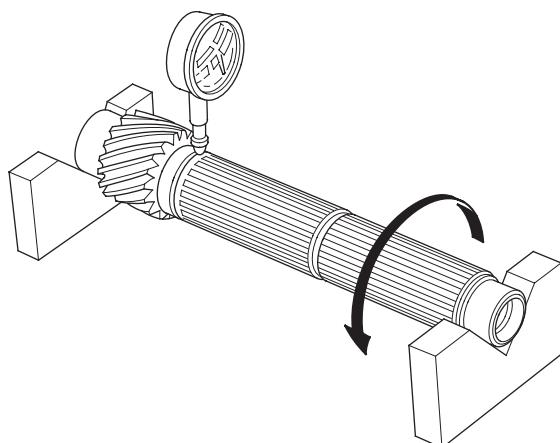
**C:** 34.95 mm (1.376 in.)



2. Inspect the runout by supporting both ends of the countershaft, Rotate the countershaft two complete revolutions when measuring the runout. If the runout exceeds the service limit, replace the countershaft with a new one.

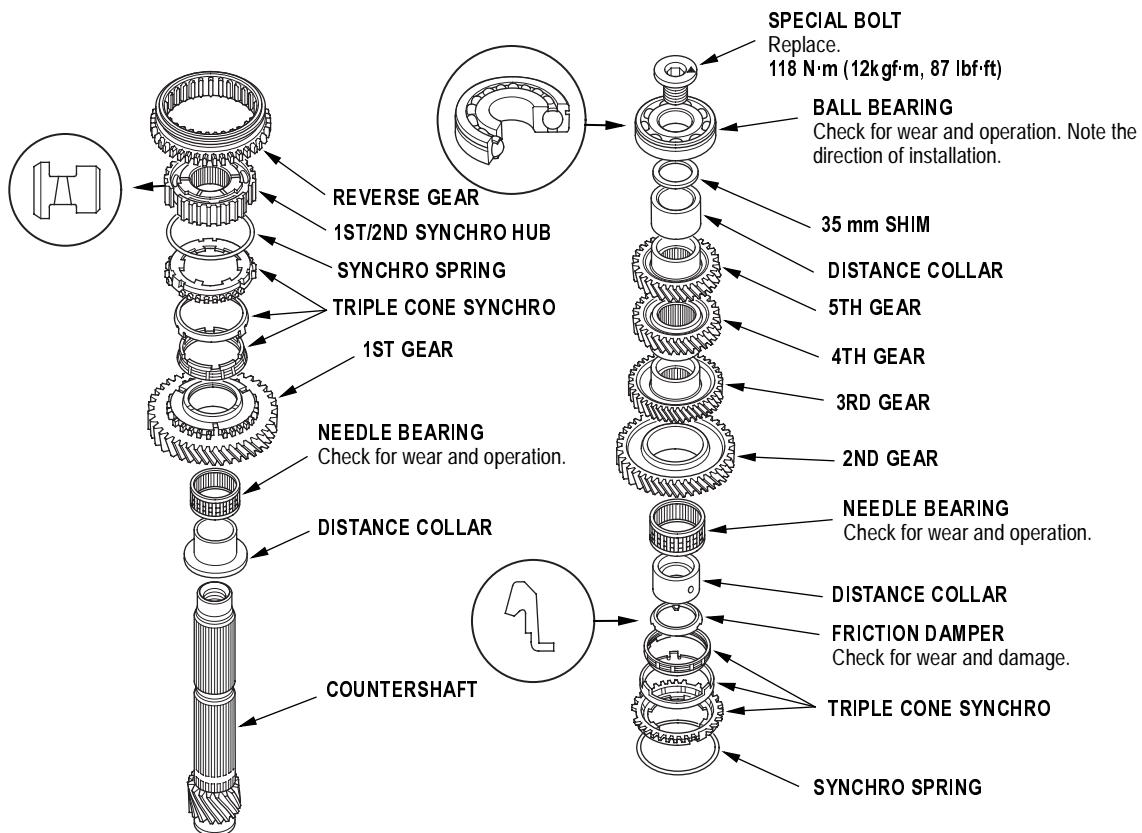
**Standard:** 0.02 mm (0.001 in.) max.

**Service Limit:** 0.05 mm (0.002 in.)



## Countershaft Reassembly

## Exploded View

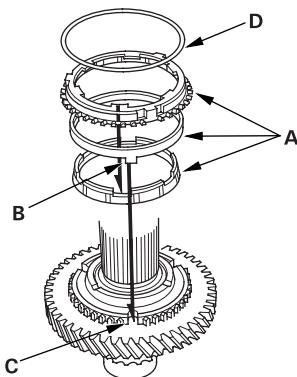


**Special Tools Required**

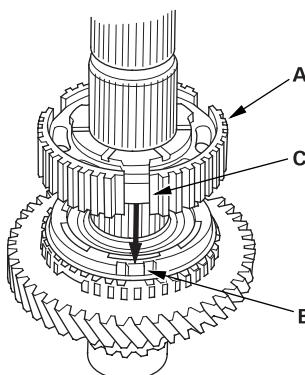
- Attachment, 42 x 47 mm 07746-0010300
- Driver, 40 mm I.D. 07746-0030100
- Attachment, 30 mm 07746-0030300
- Driver 07749-0010000

NOTE: Refer to the Exploded View as needed during this procedure.

1. Clean all parts in solvent, dry them, and apply lubricant to all contact surfaces.
2. Install the distance collar and needle bearing onto the countershaft.
3. Install the triple cone synchro assembly (A) by aligning the synchro cone fingers (B) with 1st gear grooves (C), then install the synchro spring (D).

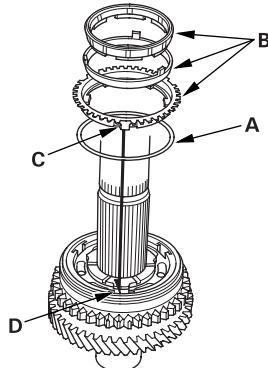


4. Install the 1st/2nd synchro hub (A) by aligning the synchro cone fingers (B) with 1st/2nd synchro hub grooves (C).

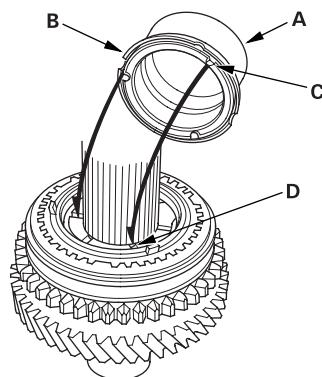


5. Install the reverse gear.

6. Install the synchro spring (A).



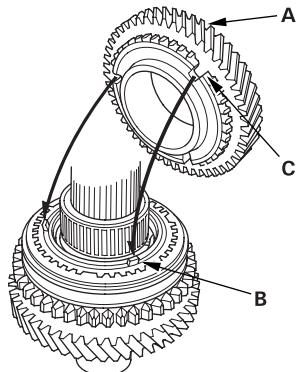
7. Install the triple cone synchro assembly (B) by aligning the synchro cone fingers (C) with 1st/2nd synchro hub grooves (D).
8. Install the distance collar (A) and friction damper (B) by aligning the friction damper fingers (C) with 1st/2nd synchro hub grooves (D).



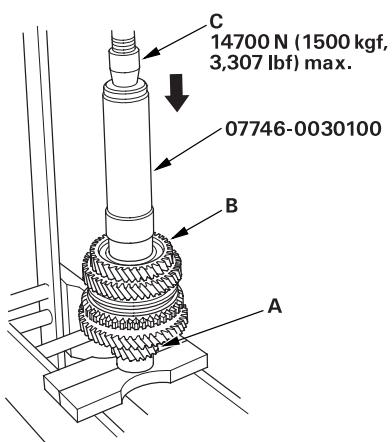
(cont'd)

## Countershaft Reassembly (cont'd)

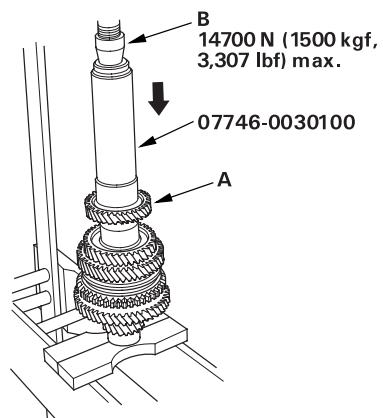
9. Install the needle bearing.
10. Install the 2nd gear (A) by aligning the synchro cone fingers (B) with 2nd gear grooves (C).



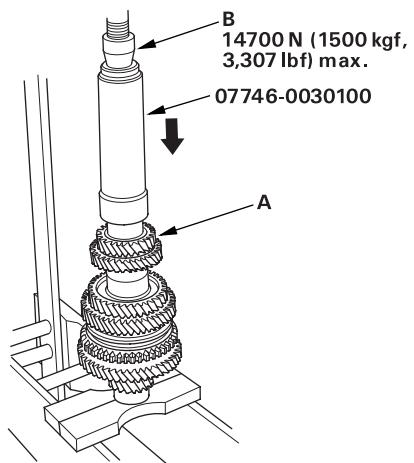
11. Support the countershaft (A) on the steel blocks, then install the 3rd gear (B) using the special tool and a press (C). Do not exceed the maximum pressure.



12. Install the 4th gear (A) using the special tool and a press (B). Do not exceed the maximum pressure.

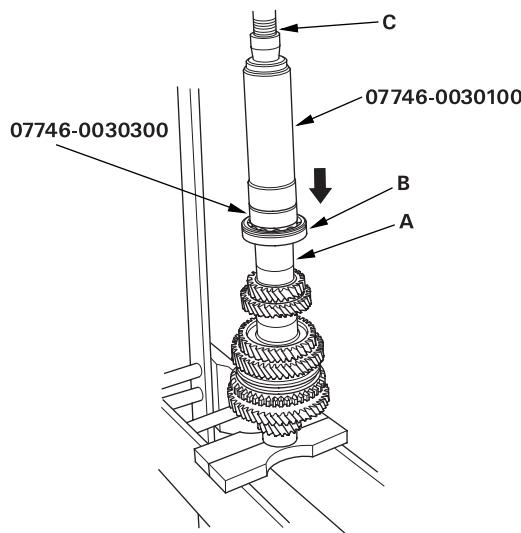


13. Install the 5th gear (A) using the special tool and a press (B). Do not exceed the maximum pressure.



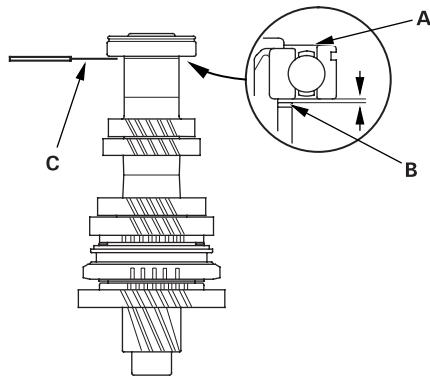


14. Install the distance collar (A), 35 mm shim, and old ball bearing (B) using a special tools and a press (C).



15. Measure the clearance between the old bearing (A) and the 35 mm shim (B) with a feeler gauge (C).

Standard: 0.04 - 0.10 mm (0.002 - 0.004 in.)



16. If the clearance is more than the standard, select a new shim from the following table. If the clearance measured in step 15 is within the standard, replace the new ball bearing.

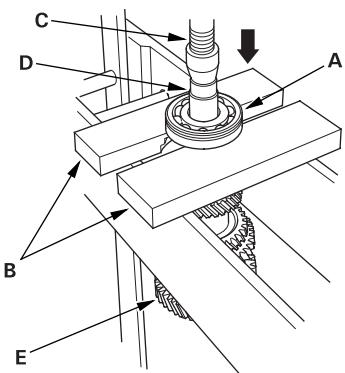
**35 mm Shim**

	Part Number	Thickness
A	23981-PPP-000	0.87 mm (0.0343 in.)
B	23981-PPP-900	0.91 mm (0.0358 in.)
C	23982-PPP-000	0.95 mm (0.0374 in.)
D	23982-PPP-900	0.99 mm (0.0390 in.)
E	23983-PPP-000	1.03 mm (0.0406 in.)
F	23983-PPP-900	1.07 mm (0.0421 in.)
G	23984-PPP-000	1.11 mm (0.0437 in.)
H	23984-PPP-900	1.15 mm (0.0453 in.)
J	23985-PPP-000	1.19 mm (0.0469 in.)
K	23985-PPP-900	1.23 mm (0.0484 in.)
L	23986-PPP-000	1.27 mm (0.0500 in.)
M	23986-PPP-900	1.31 mm (0.0516 in.)
N	23987-PPP-000	1.35 mm (0.0531 in.)
P	23987-PPP-900	1.39 mm (0.0547 in.)
Q	23988-PPP-000	1.43 mm (0.0563 in.)
R	23988-PPP-900	1.47 mm (0.0579 in.)
S	23989-PPP-000	1.51 mm (0.0594 in.)
T	23989-PPP-900	1.55 mm (0.0610 in.)
U	23990-PPP-000	1.59 mm (0.0626 in.)
W	23990-PPP-900	1.63 mm (0.0642 in.)
X	23991-PPP-000	1.67 mm (0.0657 in.)
Y	23991-PPP-900	1.71 mm (0.0673 in.)
Z	23992-PPP-000	1.75 mm (0.0689 in.)
AA	23992-PPP-900	1.79 mm (0.0705 in.)
AB	23993-PPP-000	1.83 mm (0.0720 in.)
AC	23993-PPP-900	1.87 mm (0.0736 in.)
AD	23994-PPP-000	1.91 mm (0.0752 in.)
AE	23994-PPP-900	1.95 mm (0.0768 in.)
AF	23995-PPP-000	1.99 mm (0.0783 in.)

(cont'd)

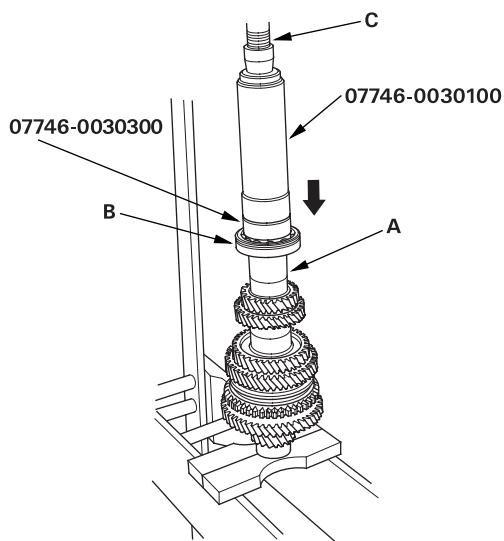
## Countershaft Reassembly (cont'd)

17. Support ball bearing (A) on steel blocks (B), then use a press (C) and an attachment (D) to press the countershaft (E) out of the ball bearing.

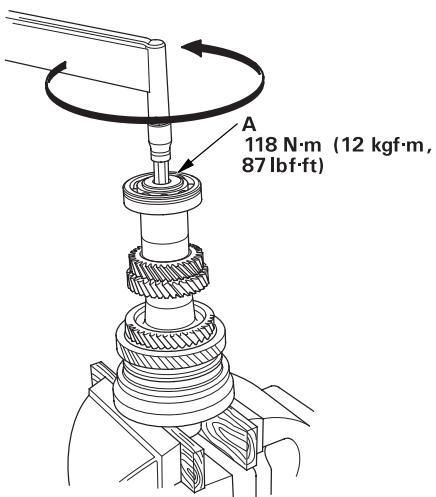


18. Replace the 35 mm shim selected in step 16, then recheck the clearance.

19. Install the distance collar (A) 35 mm shim, and new ball bearing (B) using a special tools and a press (C).



20. Tighten the new special bolt (A) (left-hand threads).



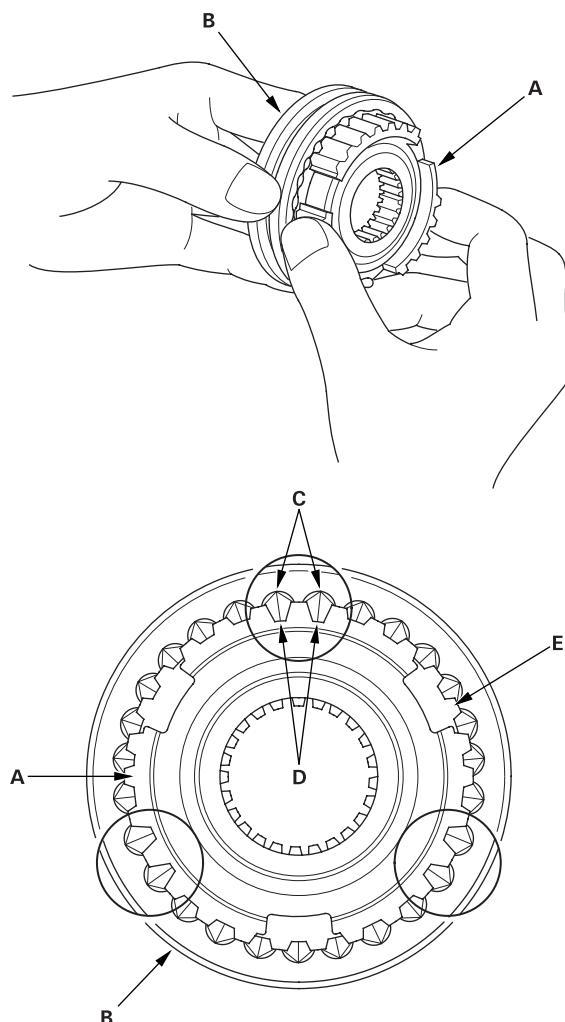


## Manual Transmission

### Synchro Sleeve and Hub Inspection and Reassembly

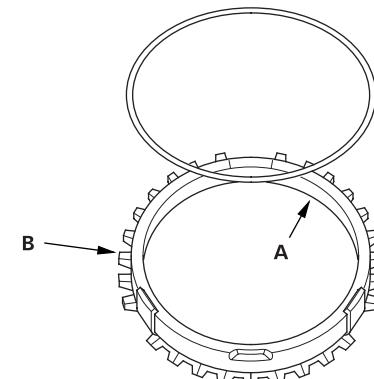
1. Inspect gear teeth on all synchro hubs and synchro sleeves for rounded off corners, which indicate wear.
2. Install each synchro hub (A) in its mating synchro sleeve (B), and check for freedom of movement. Be sure to match the 3 sets of longer teeth (C) (120 degrees apart) on the synchro sleeve with the 3 sets of deeper grooves (D) in the synchro hub. Do not install the synchro sleeve with its longer teeth in the 1st/2nd synchro hub slots (E) because it will damage the spring ring.

NOTE: If replacement is required, always replace the synchro sleeve and synchro hub as a set.

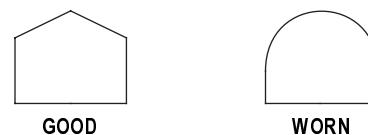


### Synchro Ring and Gear Inspection

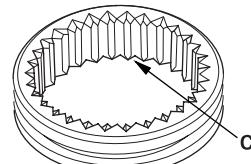
1. Inspect the inside of each synchro ring (A) for wear. Inspect the teeth (B) on each synchro ring for wear (rounded off).



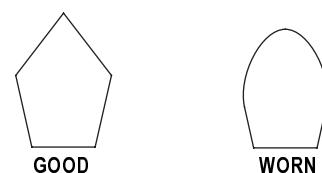
Example of synchro ring teeth



2. Inspect the teeth (C) on each synchro sleeve and matching teeth on each gear for wear (rounded off).



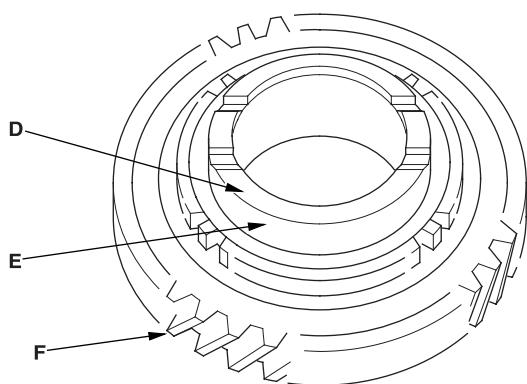
Example of synchro sleeve teeth and gear teeth



(cont'd)

## Synchro Ring and Gear Inspection (cont'd)

3. Inspect the thrust surface (D) on each gear hub for wear.



4. Inspect the cone surface (E) on each gear hub for wear and roughness.

5. Inspect the teeth on all gears (F) for uneven wear, scoring, galling, and cracks.

6. Coat the cone surface of each gear (E) with oil, and place its synchro ring on it. Rotate the synchro ring, making sure that it does not slip.

7. Measure the clearance between each gear (A) and its synchro ring (B) all the way around. Hold the synchro ring against the gear evenly while measuring the clearance. If the clearance is less than the service limit, replace the synchro ring and gear.

## Synchro Ring-to-Gear Clearance

Standard: 0.70 - 1.49 mm (0.028 - 0.059 in.)

Service Limit: 0.4 mm (0.016 in.)

## Double cone synchro and triple cone synchro-to-Gear Clearance

## Standard:

[a]: Outer Synchro Ring (B) to Synchro Cone (C)  
0.70 - 1.19 mm (0.028 - 0.047 in.)

[b]: Synchro Cone (C) to Gear (A)  
0.50 - 1.04 mm (0.020 - 0.041 in.)

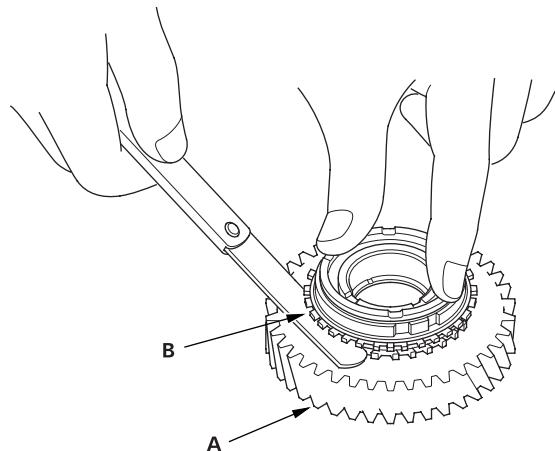
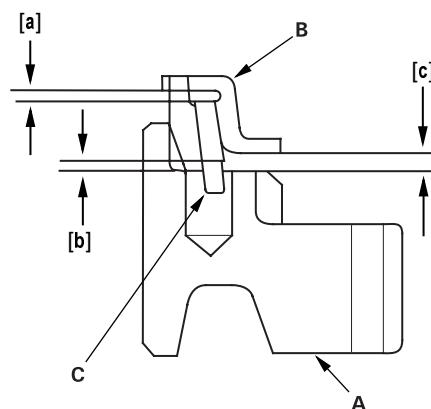
[c]: Outer Synchro Ring (B) to Gear (A)  
0.95 - 1.68 mm (0.037 - 0.066 in.)

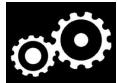
## Service Limit:

[a]: 0.3 mm (0.012 in.)

[b]: 0.3 mm (0.012 in.)

[c]: 0.6 mm (0.024 in.)



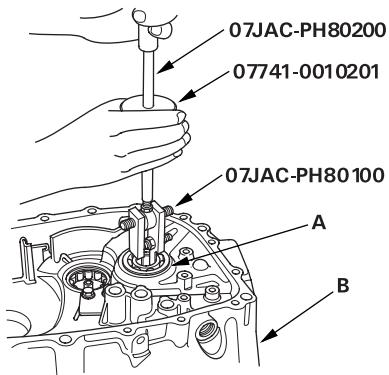


## Mainshaft Bearing and Oil Seal Replacement

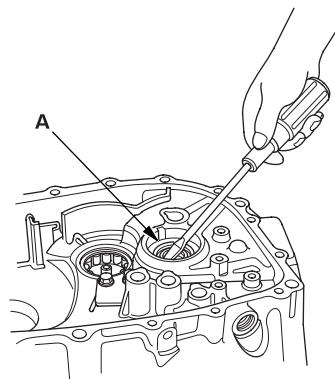
### Special Tools Required

- Adjustable bearing puller, 25 - 40 mm 07JAC-PH80100
- Bearing remover shaft 07JAC-PH80200
- Oil seal driver 07JAD-PL90100
- Slide hammer 07741-0010201
- Driver 07749-0010000
- Attachment, 42 x 47 mm 07746-0010300

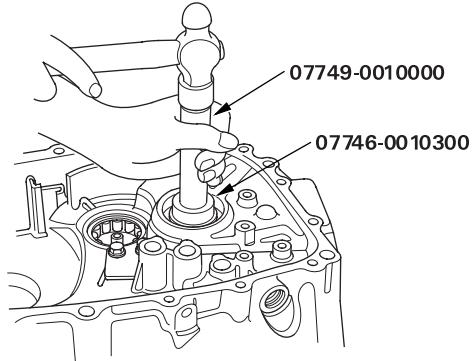
1. Remove the differential assembly.
2. Remove the ball bearing (A) from the clutch housing (B) using the special tools.



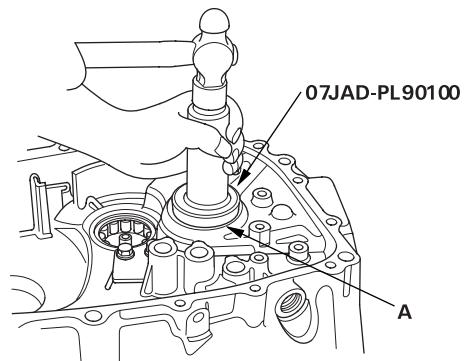
3. Remove the oil seal (A) from the clutch side.



4. Drive the new oil seal in from the transmission side using the special tools.



5. Drive the new ball bearing (A) in from the transmission side using the special tools.

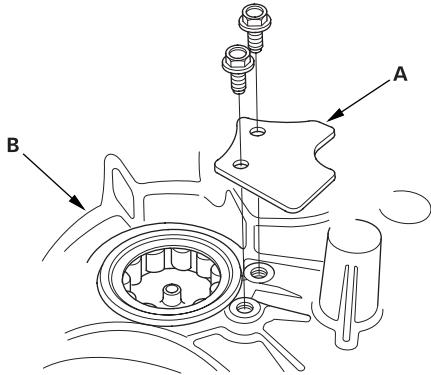


## Countershaft Bearing Replacement

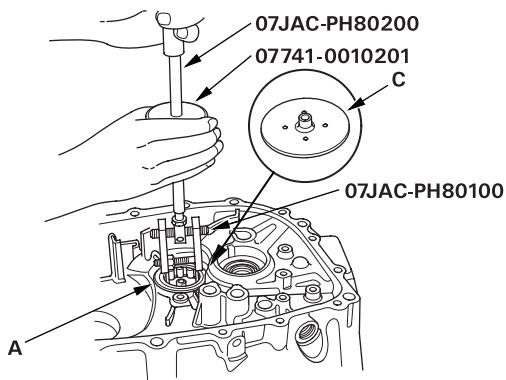
## Special Tools Required

- Adjustable bearing puller, 25 - 40 mm 07JAC-PH80100
- Bearing remover shaft 07JAC-PH80200
- Slide hammer 07741-0010201
- Oil seal driver 07JAD-PL90100

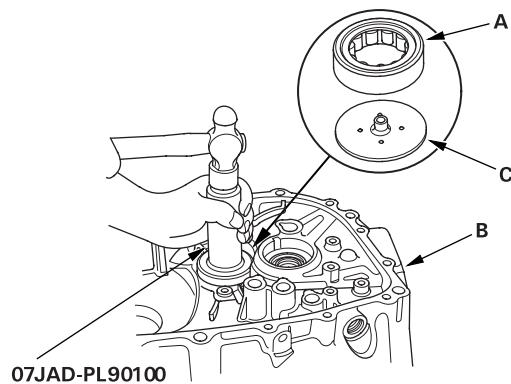
1. Remove the bearing set plate (A) from the clutch housing (B).



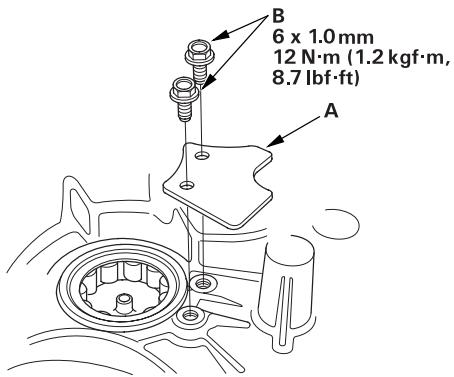
2. Remove the needle bearing (A) using the special tools, then remove the oil guide plate C.



3. Position the oil guide plate C and new needle bearing (A) in the bore of the clutch housing (B).



4. Install the needle bearing using the special tools.
5. Install the bearing set plate (A) with bolts (B).



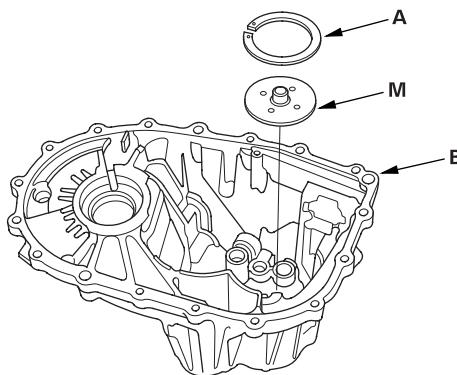


## Mainshaft Thrust Clearance Adjustment

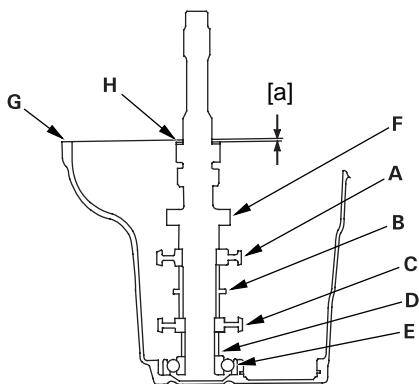
### Special Tools Required

- Mainshaft base 07GAJ-PG20130
- Mainshaft holder 07GAJ-PG20110

1. Remove the 72 mm shim (A) and oil guide plate M from the transmission housing (B).

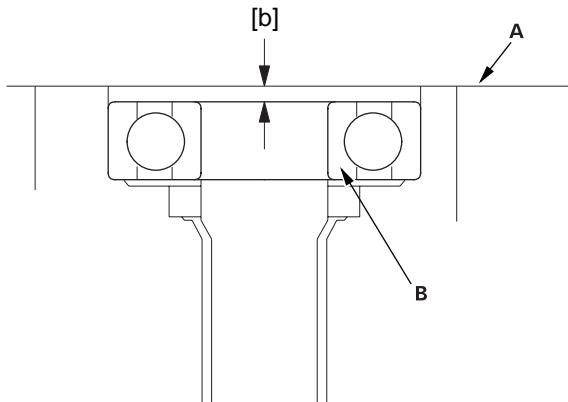


2. Install the 3rd/4th synchro hub (A), the distance collar (B), the 5th synchro hub (C), distance collar (D), and ball bearing (E) on the mainshaft (F), then install the assembled mainshaft in the transmission housing (G).



3. Install the washer (H) on the mainshaft.
4. Measure distance [a] between the end of the transmission housing and washer with a straight edge and vernier caliper. Measure at three locations and average the reading.

5. Measure distance [b] between the end of the clutch housing (A) and bearing inner race (B) with a straight edge and depth gauge. Measure at three locations and average the readings.



### Shim Selection Formula:

6. Select the proper 72 mm shim from the chart. Follow the example below, and use the measurements you made in steps 4 and 5:

(Basic Formula)

$$[a] + [b] - (0.8 + 0.11) = \text{shim thickness (maximum)}$$

$$[a] + [b] - (0.8 + 0.17) = \text{shim thickness (minimum)}$$

- Add distance [b] (step 5) to distance [a] (step 4).
- 0.8 mm (0.031 in): Spring washer, a dimension in the installation.
- 0.11 mm (0.004 in): Minimum thrust clearance.
- 0.17 mm (0.007 in): Maximum thrust clearance.

(For example)

$$2.32 + 0.15 - (0.8 + 0.11) = 1.56 \text{ mm (0.061 in.)}$$

$$2.32 + 0.15 - (0.8 + 0.17) = 1.50 \text{ mm (0.059 in.)}$$

Take the middle value of the minimum value and the maximum value, and select shim of 1.53 mm (0.060 in.).

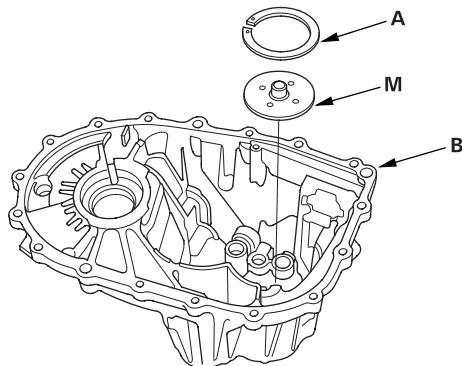
(cont'd)

## Mainshaft Thrust Clearance Adjustment (cont'd)

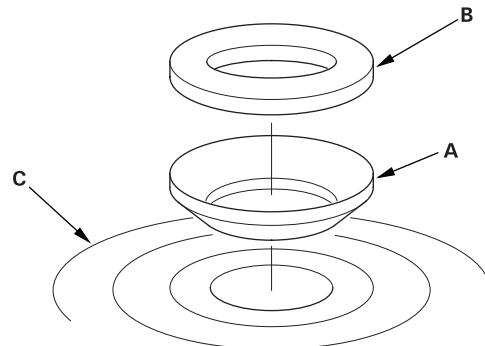
## 72 mm Shim

	Part Number	Thickness
A	23931-P21-000	0.60 mm (0.0236 in.)
B	23932-P21-000	0.63 mm (0.0248 in.)
C	23933-P21-000	0.66 mm (0.0260 in.)
D	23934-P21-000	0.69 mm (0.0271 in.)
E	23935-P21-000	0.72 mm (0.0283 in.)
F	23936-P21-000	0.75 mm (0.0295 in.)
G	23937-P21-000	0.78 mm (0.0307 in.)
H	23938-P21-000	0.81 mm (0.0319 in.)
I	23939-P21-000	0.84 mm (0.0331 in.)
J	23940-P21-000	0.87 mm (0.0343 in.)
K	23941-P21-000	0.90 mm (0.0354 in.)
L	23942-P21-000	0.93 mm (0.0366 in.)
M	23943-P21-000	0.96 mm (0.0378 in.)
N	23944-P21-000	0.99 mm (0.0390 in.)
O	23945-P21-000	1.02 mm (0.0402 in.)
P	23946-P21-000	1.05 mm (0.0413 in.)
Q	23947-P21-000	1.08 mm (0.0425 in.)
R	23948-P21-000	1.11 mm (0.0437 in.)
S	23949-P21-000	1.14 mm (0.0449 in.)
T	23950-P21-000	1.17 mm (0.0461 in.)
U	23951-P21-000	1.20 mm (0.0472 in.)
V	23952-P21-000	1.23 mm (0.0484 in.)
W	23953-P21-000	1.26 mm (0.0496 in.)
X	23954-P21-000	1.29 mm (0.0508 in.)
Y	23955-P21-000	1.32 mm (0.0520 in.)
Z	23956-P21-000	1.35 mm (0.0531 in.)
AA	23957-P21-000	1.38 mm (0.0543 in.)
AB	23958-P21-000	1.41 mm (0.0555 in.)
AC	23959-P21-000	1.44 mm (0.0567 in.)
AD	23960-P21-000	1.47 mm (0.0579 in.)
AE	23961-P21-000	1.50 mm (0.0591 in.)
AF	23962-P21-000	1.53 mm (0.0602 in.)
AG	23963-P21-000	1.56 mm (0.0614 in.)
AH	23964-P21-000	1.59 mm (0.0626 in.)
AI	23965-P21-000	1.62 mm (0.0638 in.)
AJ	23966-P21-000	1.65 mm (0.0650 in.)
AK	23967-P21-000	1.68 mm (0.0661 in.)
AL	23968-P21-000	1.71 mm (0.0673 in.)
AM	23969-P21-000	1.74 mm (0.0685 in.)
AN	23970-P21-000	1.77 mm (0.0697 in.)
AO	23971-P21-000	1.80 mm (0.0709 in.)

7. Install the 72 mm shim (A) selected and oil guide plate M in the transmission housing (B).



8. Thoroughly clean the spring washer (A) and washer (B) before installing them on the clutch housing side ball bearing (C). Note the installation direction of the spring washer.



9. Install the mainshaft in the clutch housing.

10. Place the transmission housing over the mainshaft and onto the clutch housing.

11. Tighten the clutch and transmission housings with several 8 mm bolts.

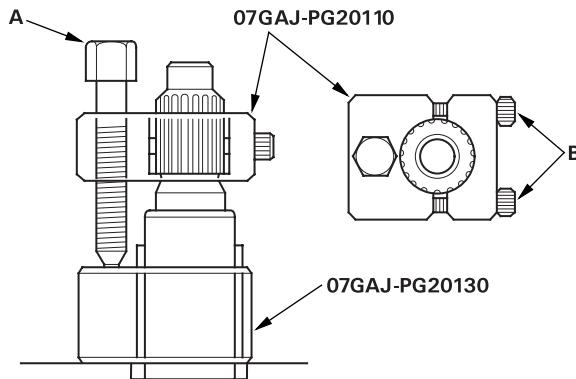
NOTE: It is not necessary to use sealing agent between the housings.

12. Tap the mainshaft with a plastic hammer.



**13.** Attach the special tool to the mainshaft as follows:

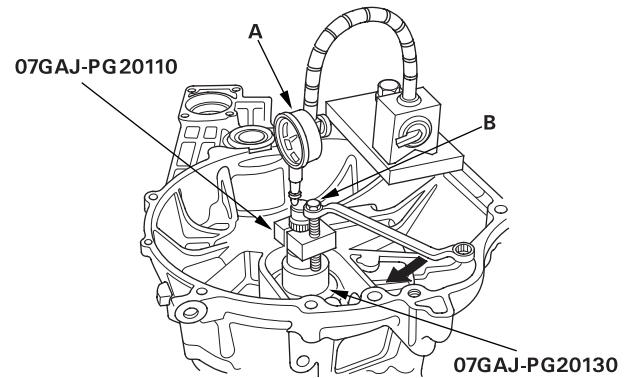
- Back-out the mainshaft holder bolt (A) and loosen the two hex bolts (B).
- Fit the holder over the mainshaft so its lip is towards the transmission.
- Align the mainshaft holder's lip around the groove at the inside of the mainshaft splines, then tighten the hex bolts.



**14.** Seat the mainshaft fully by tapping its end with a plastic hammer.

**15.** Thread the mainshaft holder bolt in until it just contacts the wide surface of the mainshaft base.

**16.** Zero a dial gauge (A) on the end of the mainshaft.



**17.** Turn the mainshaft holder bolt (B) clockwise; stop turning when the dial gauge (A) has reached its maximum movement. The reading on the dial gauge is the amount of mainshaft end play. Do not turn the mainshaft holder bolt more than 60 degrees after the needle of the dial gauge stops moving, this may damage the transmission.

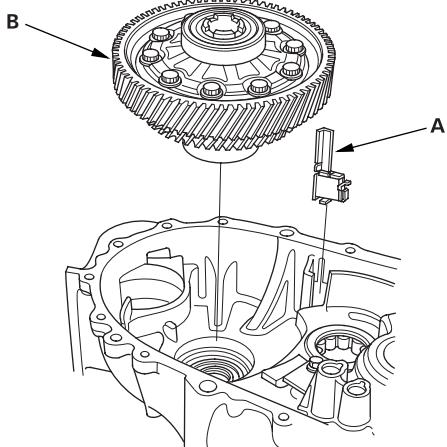
**18.** If the reading is within the standard, the clearance is correct. If the reading is not within the standard, recheck the shim thickness.

**Standard:** 0.11 - 0.17 mm (0.004 - 0.007 in.)

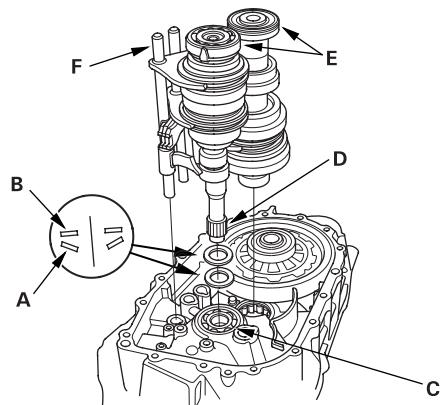
## Transmission Reassembly

NOTE: Prior to reassembling, clean all the parts in solvent, dry them, and apply lubricant to any contact surfaces.

1. Install the magnet (A) and differential assembly (B).

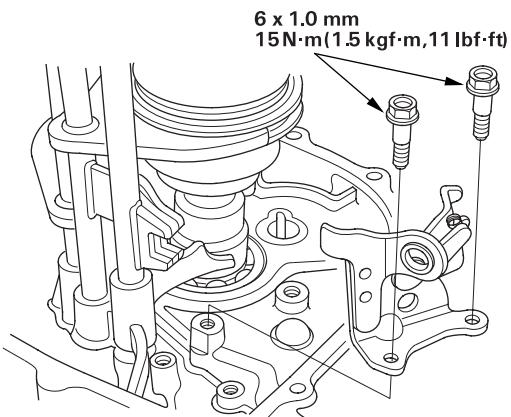


2. Install the 28 mm spring washer (A) and 28 mm washer (B) over the ball bearing (C). Note the installation direction of the spring washer (A).

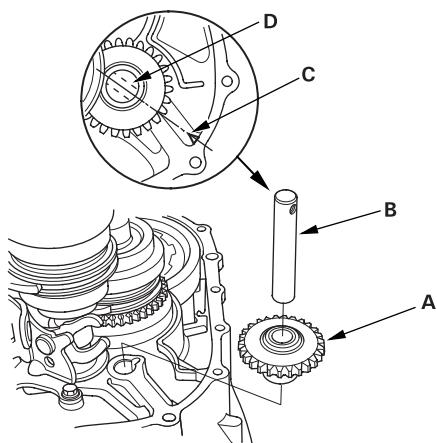


3. Apply vinyl tape the mainshaft splines (D) to protect the seal. Install the mainshaft and countershaft (E) into the shift forks (F), and install them as an assembly.

4. Install the reverse shift fork.

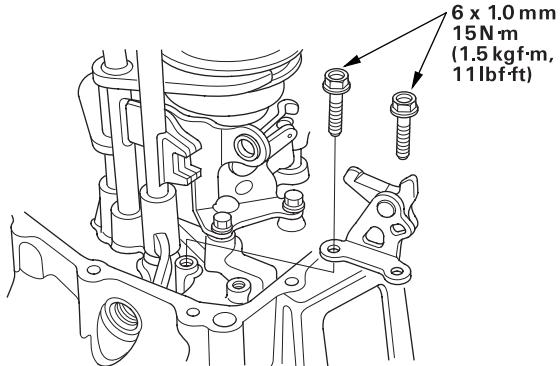


5. Install the reverse idler gear (A) and reverse gear shaft (B) by aligning the mark (C) with reverse gear shaft hole (D).

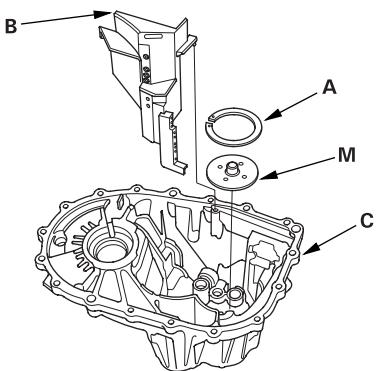




6. Install the reverse lock cam.

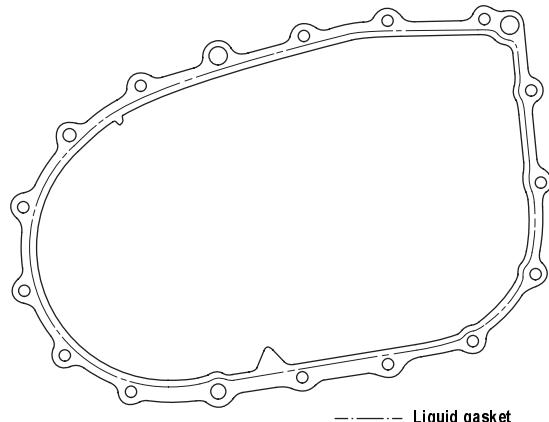


7. Select the proper size 72 mm shim (A) according to the measurements made during the Mainshaft Thrust Clearance Adjustment (see page 13-47). Install the oil gutter plate (B), oil guide plate M, and 72 mm shim into the transmission housing (C).



8. Remove the dirt and oil from the transmission housing sealing surface. Apply liquid gasket (P/N 08C70-K0234M) to the sealing surface. Be sure to seal the entire circumference of the bolt holes to prevent oil leakage.

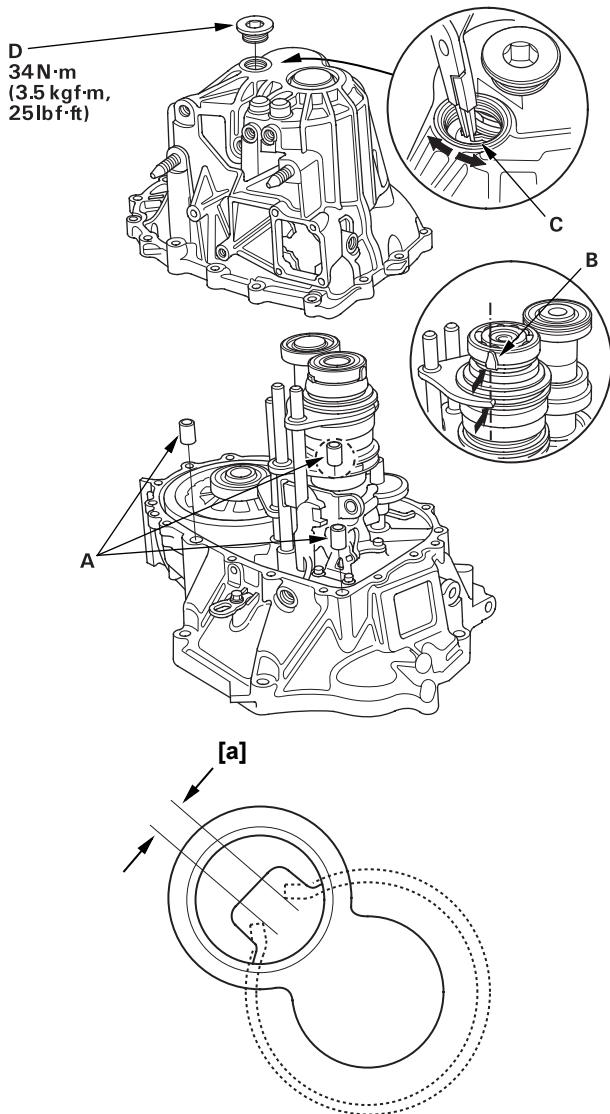
NOTE: If 5 minutes have passed after applying liquid gasket, reapply it and assemble the housings. Allow it to cure at least 20 minutes after assembly before filling the transmission with oil.



(cont'd)

## Transmission Reassembly (cont'd)

9. Install the 14 x 20 mm dowel pins (A).



10. Set the tapered cone ring (B) as shown. Place the transmission housing over the clutch housing, being careful to line up the shafts.

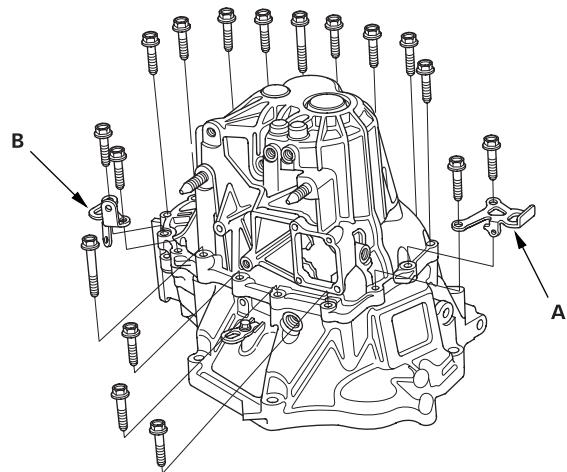
11. Lower the transmission housing the rest of the way as you expand the 72 mm snap ring (C). Release the snap ring so it seats in the groove of the countershaft bearing.

12. Check that the 52 mm snap ring is securely seated in the groove of the countershaft bearing.

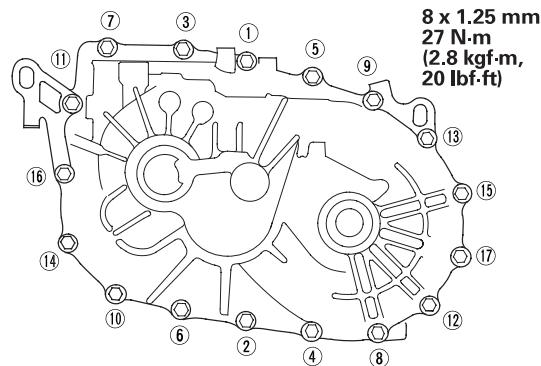
Dimension [a] as installed: 3.3 - 6.0 mm  
(0.13 - 0.24 in.)

13. Apply liquid gasket (P/N 08C70-K023M) to the threads of the 32 mm sealing cap (D), and install it on the transmission housing.

14. Install the transmission hangers A, B, and the 8 mm flange bolts finger-tight.



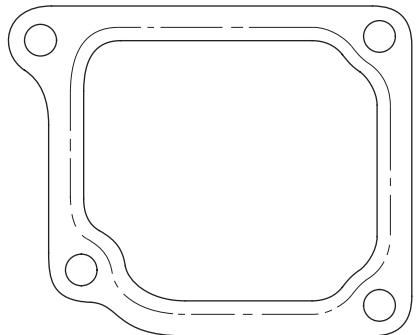
15. Tighten the 8 mm flange bolts in a crisscross pattern in several steps.





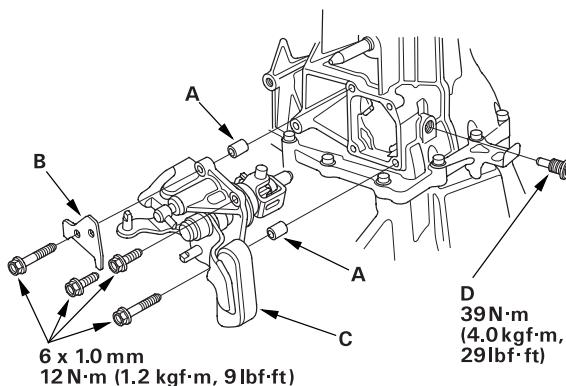
16. Remove the dirt and oil from the shift lever cover sealing surface. Apply liquid gasket (P/N 08C70-K0234M) to the sealing surface.

NOTE: If 5 minutes have passed after applying liquid gasket, reapply it and assemble the housings. Allow it to cure at least 20 minutes after assembly before filling the transmission with oil.



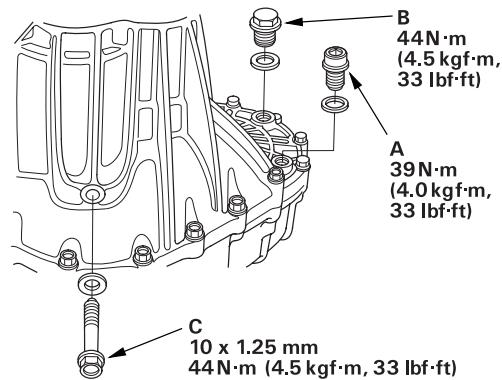
— Liquid gasket

17. Install the 8 x 14 mm dowel pins (A) clutch line clip bracket (B), and change lever assembly (C).

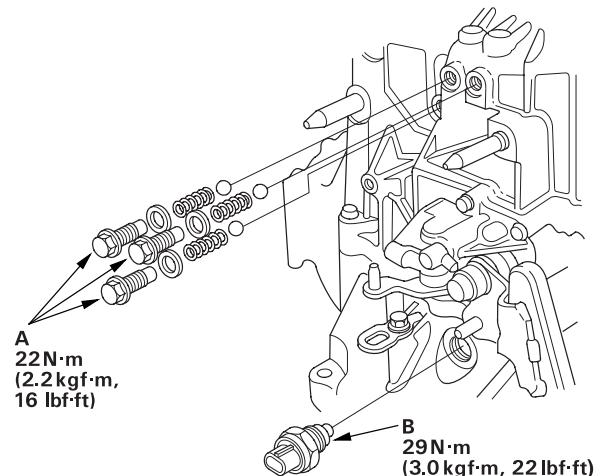


18. Apply liquid gasket (P/N 08C70-K0234M) to the threads of the interlock bolt (D), and install it on the transmission housing.

19. Install the drain plug (A), filler plug (B) and 10 mm flange bolt (C) with new washers.



20. Install the detent bolts (A), spring, steel balls, with new washers.

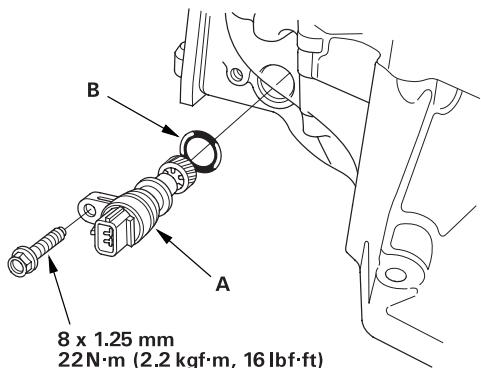


21. Apply liquid gasket (P/N 08C70-K0234M) to the threads of the back-up light switch (B), and install it on the transmission housing.

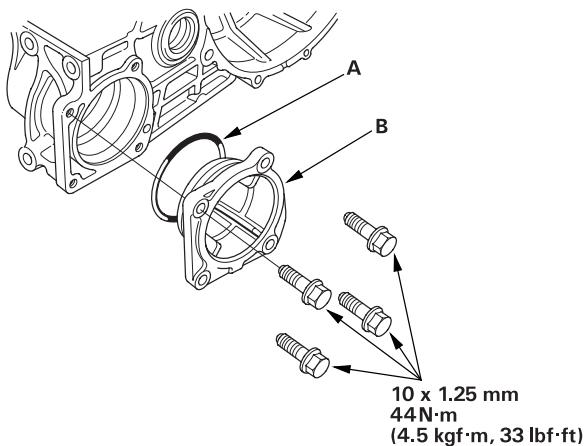
(cont'd)

## Transmission Reassembly (cont'd)

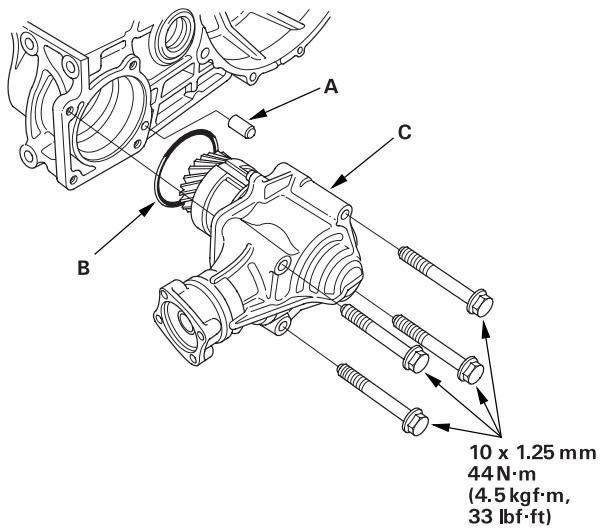
22. Install the vehicle speed sensor (VSS) (A) and O-ring (B).



23. Install the O-ring (A) and side cover (B). (2WD model)

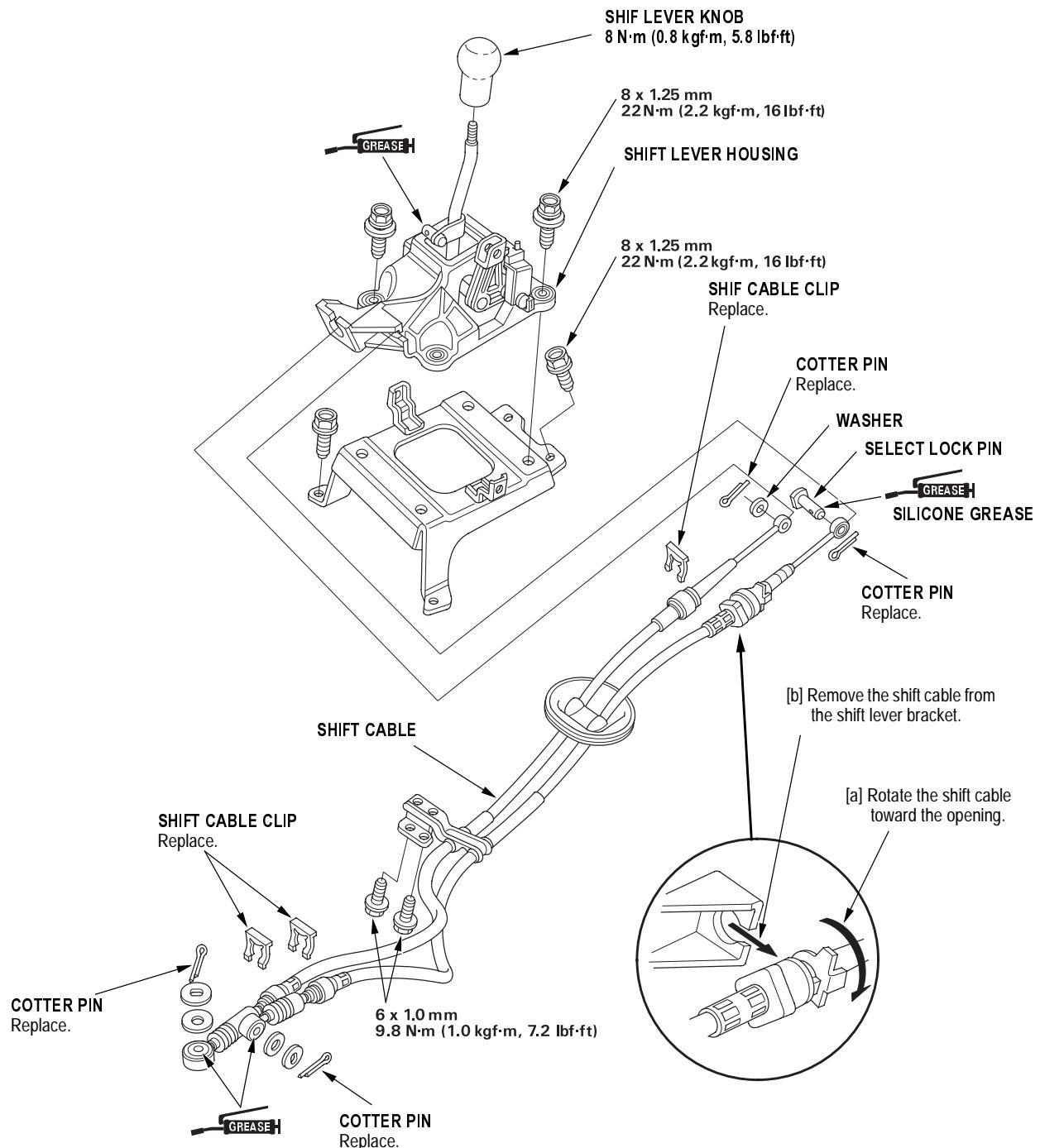


24. Install the 10 x 20 mm dowel pin (A), O-ring (B), and transfer assembly (C). (4WD model)





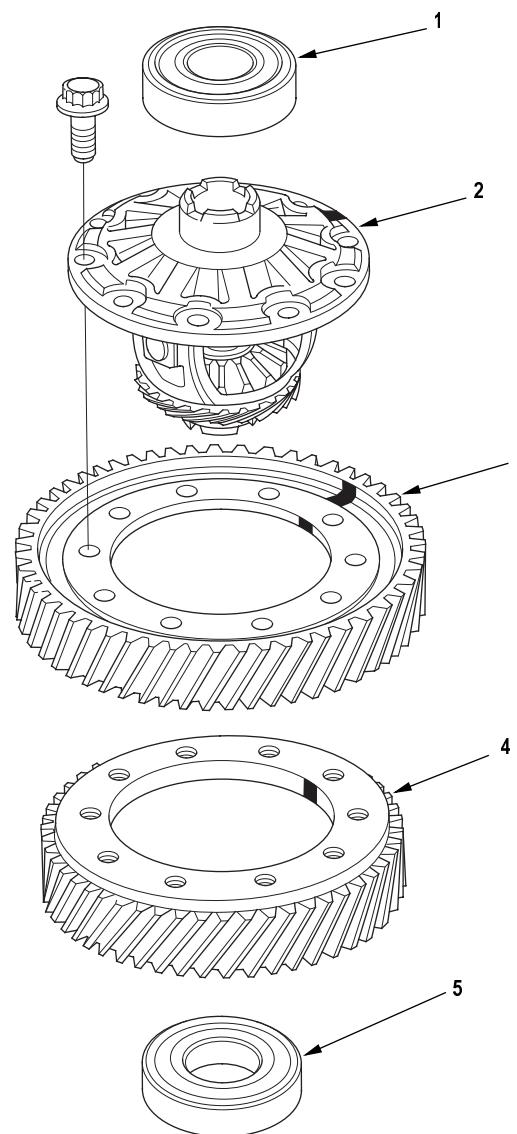
## Gearshift Mechanism Replacement



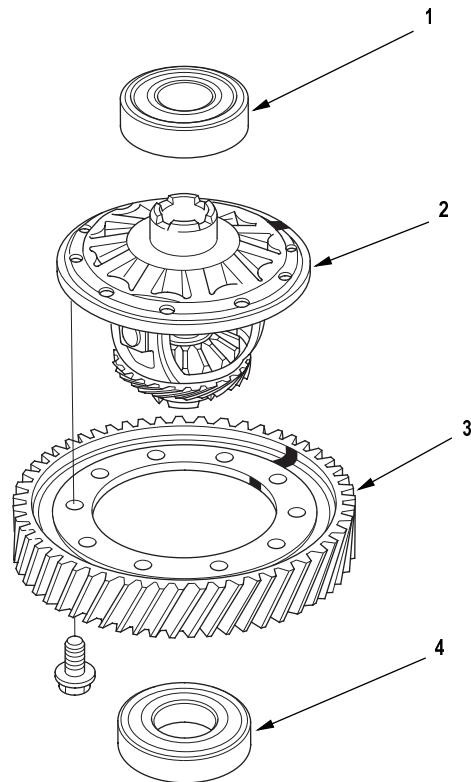
## M/T Differential

### Component Location Index

4WD model



1	BALL BEARING	Replacement, <a href="#">page 13-59</a>
2	DIFFERENTIAL CARRIER	Backlash Inspection, <a href="#">page 13-58</a> ; Replacement, <a href="#">page 13-58</a>
3	FINAL DRIVEN GEAR	Replacement, <a href="#">page 13-58</a>
4	TRANSFER DRIVEN GEAR	Replacement, <a href="#">page 13-58</a>
5	BALL BEARING	Replacement, <a href="#">page 13-59</a>

**2WD model**

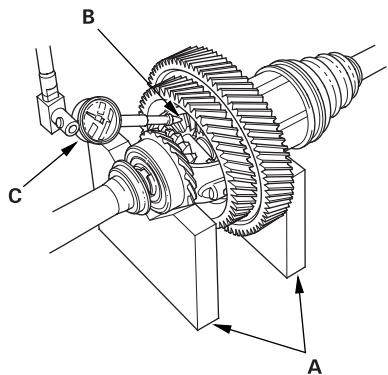
- 1 BALL BEARING
- 2 DIFFERENTIAL CARRIER
- 3 FINAL DRIVEN GEAR
- 4 BALL BEARING

- Replacement, [page 13-59](#)
- Backlash Inspection, [page 13-58](#); Replacement, [page 13-58](#)
- Replacement, [page 13-58](#)
- Replacement, [page 13-59](#)

**Backlash Inspection**

NOTE: 4WD model is shown, 2WD model is similar.

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



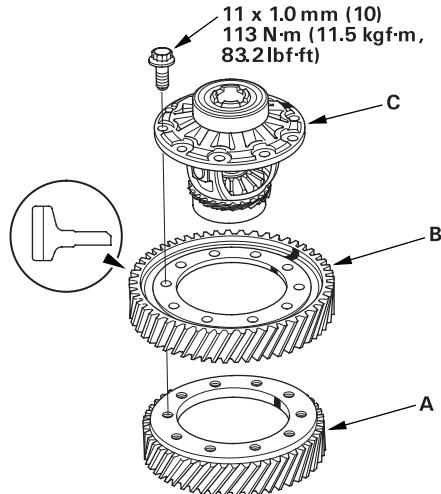
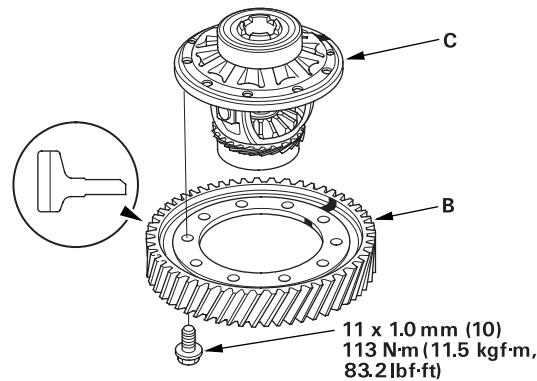
2. Measure the backlash of both pinion gears (B) with a dial indicator (C). If the backlash is not within the standard, replace the differential carrier.

Standard (New): 0.05 - 0.15 mm (0.002 - 0.006 in.)

**Driven Gear/Carrier Replacement**

1. Remove the bolts (left-hand threads) in a crisscross pattern in several steps, then remove the transfer driven gear (A), final driven gear (B) from the differential carrier(C).

NOTE: Align the mark of driven gear and the carrier.

**4WD model:****2WD model:**

2. Install the final driven gear with the chamfer on the inside diameter facing the carrier. Tighten the bolts in a crisscross pattern in several steps.



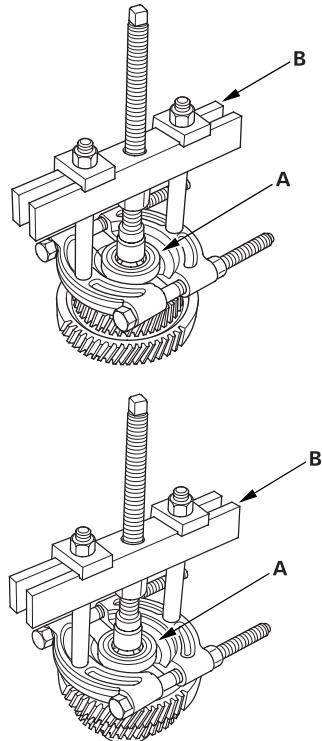
## Carrier Bearings Replacement

### Special Tool Required

Driver, 40 mm I.D. 07746-0030100

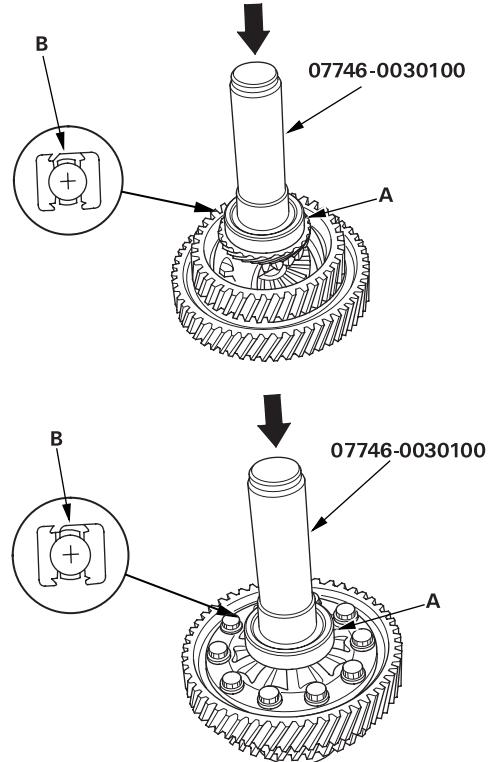
NOTE: 4WD model is shown, 2WD model is similar.

1. Check the carrier bearings for wear and rough rotation. If they rotate smoothly and their rollers show no signs of wear, the bearings are OK.
2. Remove the carrier bearing (A) with a commercially-available bearing puller (B).



3. Install the new bearings (A) with the special tool and a press. Press each bearing on until it bottoms. There should be no clearance between the bearings and the carrier.

NOTE: Turn the seal (B) part of the bearing to the outside of differential, and install it.

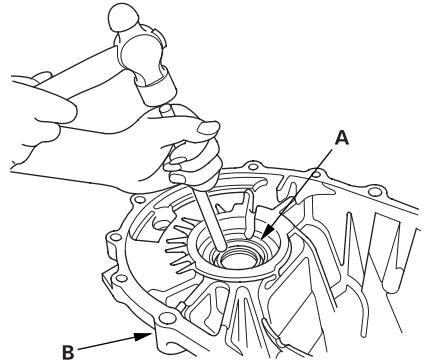


### Oil Seal Replacement

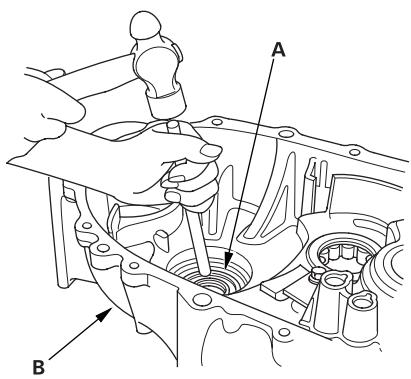
#### Special Tools Required

- Driver 07749-0010000
- Oil seal driver attachment 07NAD-P200100

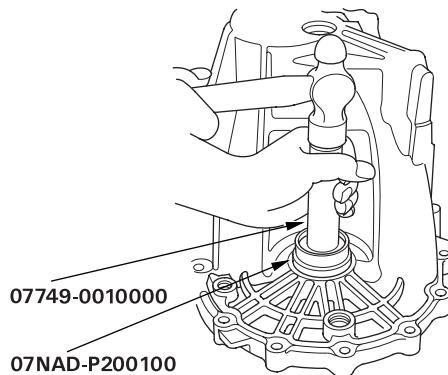
1. Remove the differential assembly.
2. Remove the oil seal (A) from the transmission housing (B).



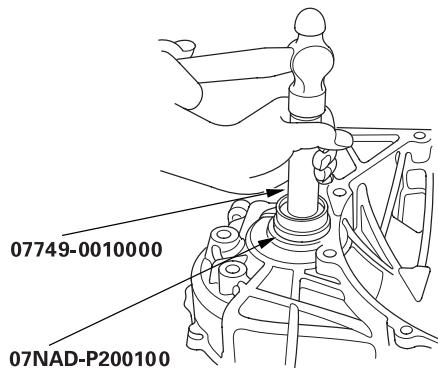
3. Remove the oil seal (A) from the clutch housing (B).

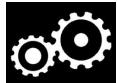


4. Install the new oil seal in the transmission housing with the special tools.



5. Install the new oil seal in the clutch housing with the special tools.



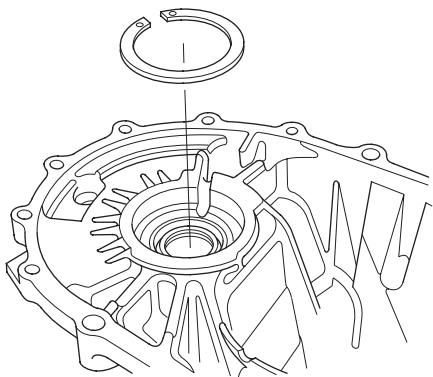


## Differential Thrust Clearance Adjustment

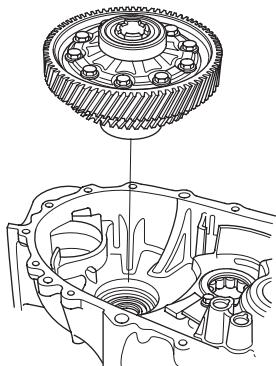
### Special Tool Required

Driver, 40 mm I.D. 07746-0030100

1. Install the 80 mm shim that's the same size as the one you removed.



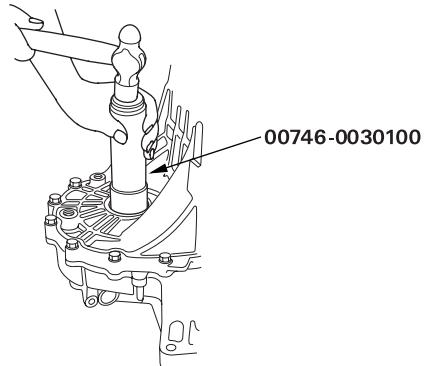
2. Install the differential assembly into the clutch housing.



3. Install the transmission housing onto the clutch housing, then tighten the 8 mm flange bolts in a crisscross pattern in several steps.

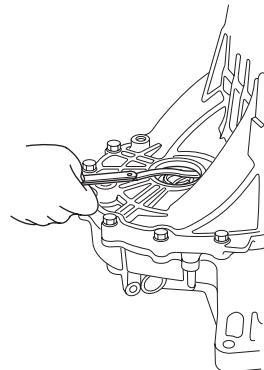
**8 x 1.25 mm  
27 N·m (2.8 kgf·m, 20 lbf·ft)**

4. Use the special tool to bottom the differential assembly in the clutch housing.



5. Measure clearance between 80 mm shim and bearing outer race in transmission housing.

**Standard: 0 - 0.10 mm (0 - 0.004 in.)**



(cont'd)

**Differential Thrust Clearance Adjustment (cont'd)**

6. If the clearance is more than the standard, select a new shim from the following table. If the clearance measured in step 5 is within the standard, go to step 9.

**80 mm Shim**

	Part Number	Thickness
A	41441-PL3-B00	1.0 mm (0.0394 in.)
B	41442-PL3-B00	1.1 mm (0.0433 in.)
C	41443-PL3-B00	1.2 mm (0.0472 in.)
D	41444-PL3-B00	1.3 mm (0.0512 in.)
E	41445-PL3-B00	1.4 mm (0.0551 in.)
F	41446-PL3-B00	1.5 mm (0.0591 in.)
G	41447-PL3-B00	1.6 mm (0.0630 in.)
H	41448-PL3-B00	1.7 mm (0.0669 in.)
J	41449-PL3-B00	1.8 mm (0.0709 in.)
K	41450-PL3-B00	1.05 mm (0.0413 in.)
L	41451-PL3-B00	1.15 mm (0.0453 in.)
M	41452-PL3-B00	1.25 mm (0.0492 in.)
N	41453-PL3-B00	1.35 mm (0.0531 in.)
P	41454-PL3-B00	1.45 mm (0.0571 in.)
Q	41455-PL3-B00	1.55 mm (0.0610 in.)
R	41456-PL3-B00	1.65 mm (0.0650 in.)
S	41457-PL3-B00	1.75 mm (0.0689 in.)

7. Remove the bolts and transmission housing.  
8. Replace the thrust shim selected in step 7, then recheck the clearance.  
9. Reinstall the transmission.

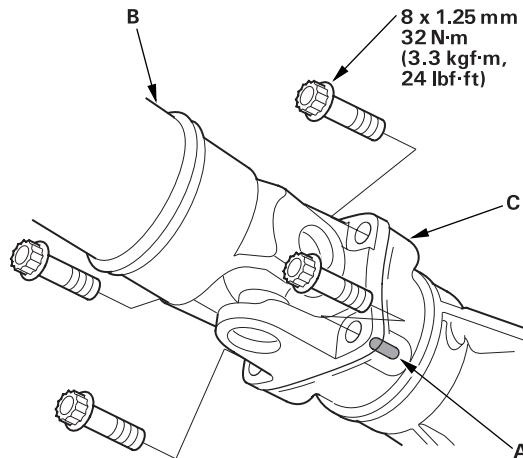


## Transfer Assembly

### Transfer Assembly

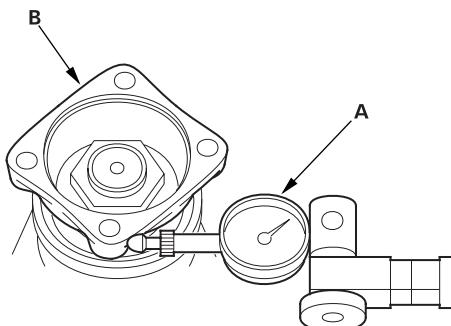
#### Backlash Inspection on Car

1. Raise the front of the vehicle, and support it with safety stands (see section 01).
2. Set the parking brake, and block both rear wheels securely.
3. Shift to neutral position.
4. Make a reference mark (A) across the propeller shaft (B) and the companion flanges (C).



5. Separate the propeller shaft from the transfer assembly.
6. Set a dial indication (A) on the companion flange (B), then measure the transfer gear backlash.

**STANDARD: 0.06 - 0.16 mm (0.002 - 0.006 in.)**



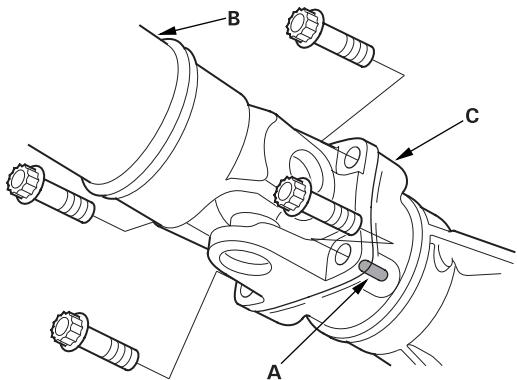
7. If the measurement is out of specification, remove the transfer assembly (see page 13-64) and inspect the transfer assembly (see page 13-67).

8. Before reinstalling the propeller shaft, check the transfer assembly oil seal for damage and fluid leaks.
  - If the seal is leaking, remove the transfer assembly (see page 13-64), replace the oil seal, and adjust the total starting torque (see step 4 on page 13-67). Do not replace the oil seal with the transfer assembly installed on the transmission.
  - If the seal is OK, reinstall the propeller shaft.

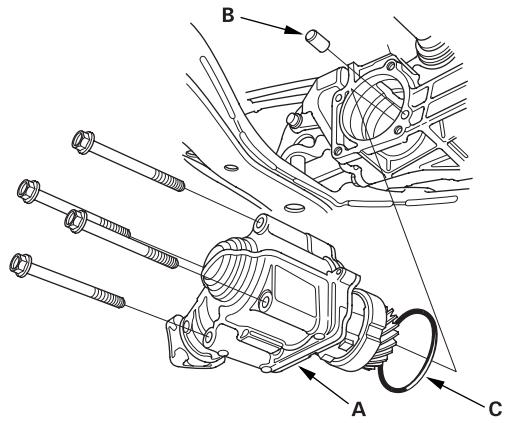
### Transfer Removal

NOTE: Make sure the lifts, jacks, and safety stands are placed properly ([see page 01-7](#)).

1. Raise the front of the vehicle, and support it with safety stands ([see section 01](#)).
2. Set the parking brake, and block both rear wheels securely.
3. Drain the manual transmission fluid. Reinstall the drain plug with a new sealing washer ([see page 13-4](#)).
4. Make reference marks (A) across the propeller shaft (B) and the companion flanges (C).



5. Separate the propeller shaft from the transfer assembly.
6. Remove the transfer (A), dowel pin (B) and O-ring (C).

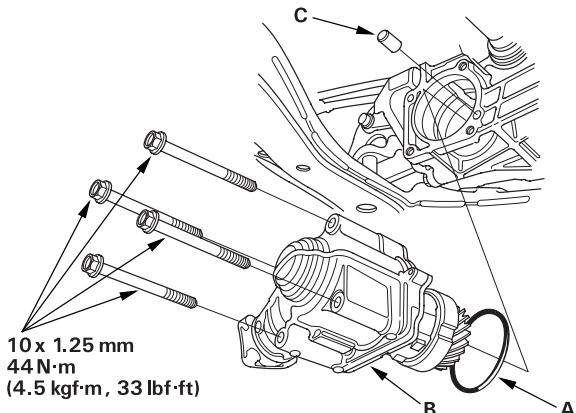


### Transfer Installation

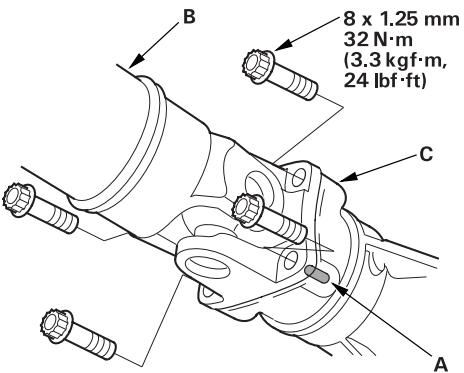
NOTE:

- While installing the transfer assembly on the transmission, do not allow dust or other foreign particles to enter the transmission.
- Be careful not to damage the clutch housing with transfer driven gear.

1. Install a new O-ring (A) on the transfer (B), then install the dowel pin (C) on the transmission.
2. Apply MTF to the transfer driven gear and transmission contact area, then install the transfer to the transmission.



3. Install the propeller shaft to the transfer assembly by aligning the reference marks.



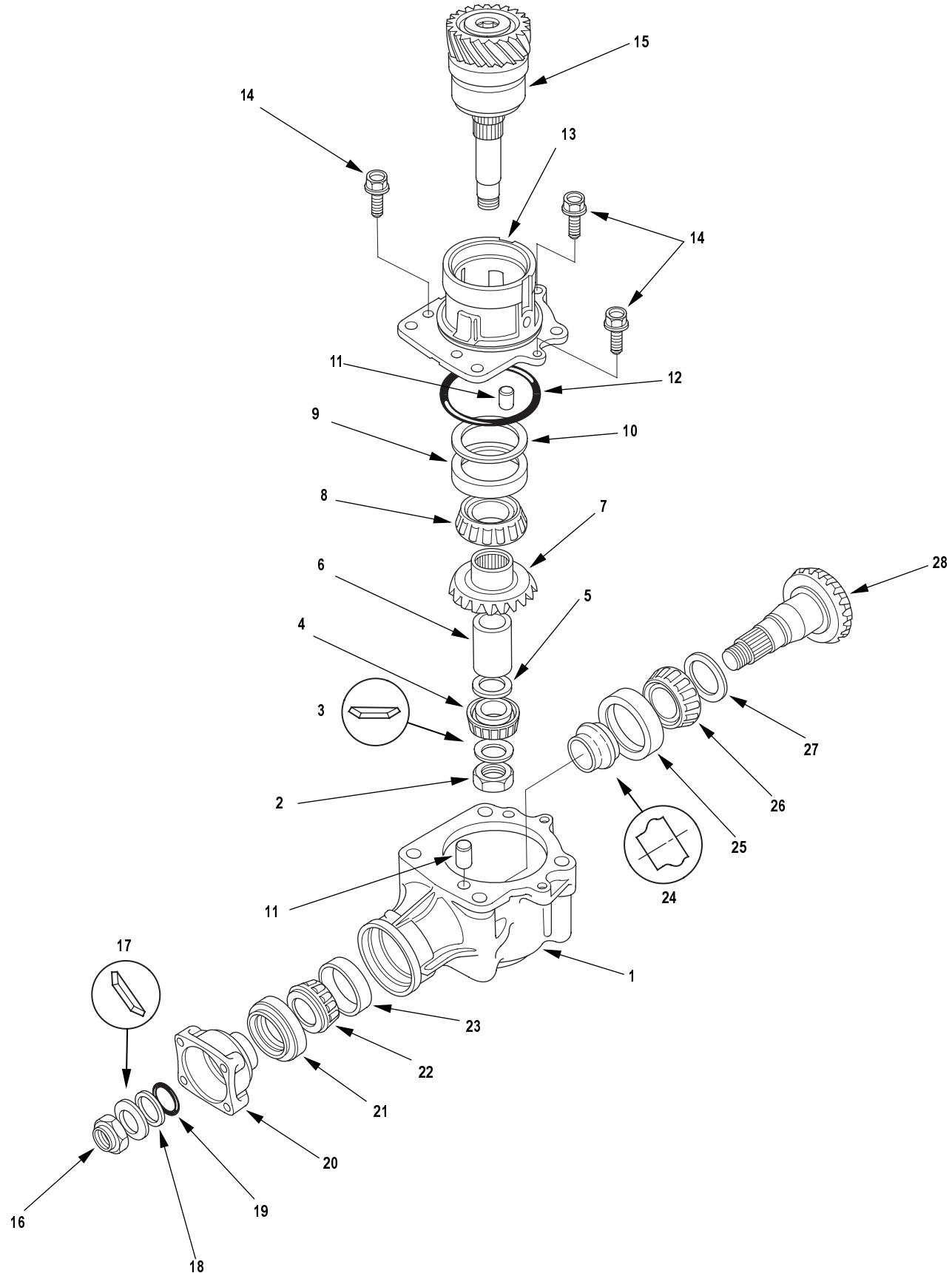
4. Refill the transmission with MTF ([see page 13-4](#)).
5. Start the engine, and run it to normal operating temperature (the radiator fan comes on). Turn the engine off, and check fluid level.



## Transfer Assembly

### Transfer Overhaul

#### Exploded View



(cont'd)

**Exploded View (cont'd)**

1	TRANSFER HOUSING	11	DOWEL PIN	21	OIL SEAL Replace.
2	22 mm LOCKNUT Replace.	12	O-RING Replace.	22	TAPERED ROLLER BEARING
3	CONICAL SPRING WASHER Replace.	13	TRANSFER HOLDER	23	TAPERED ROLLER BEARING OUTER RACE
4	TAPERED ROLLER BEARING	14	6 mm FLANGE BOLTS	24	TRANSFER SPACER Replace.
5	25 mm THRUST SHIM	15	TRANSFER SHAFT ASSEMBLY	25	TAPERED ROLLER BEARING OUTER RACE
6	TRANSFER COLLAR	16	22 mm LOCKNUT Replace.	26	TAPERED ROLLER BEARING
7	TRANSFER DRIVE GEAR	17	CONICAL SPRING WASHER Replace.	27	35 mm THRUST SHIM
8	TAPERED ROLLER BEARING	18	BACK-UP RING	28	TRANSFER DRIVEN GEAR
9	TAPERED ROLLER BEARING OUTER RACE	19	O-RING Replace.		
10	76 mm THRUST SHIM	20	COMPANION FLANGE		

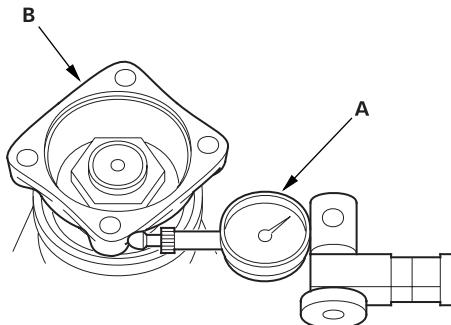


## Transfer Assembly

### Transfer Inspection

#### Transfer Gear (Hypoid gear) Backlash Measurement

1. Set a dial indicator (A) on the companion flange (B) as shown.



2. Measure the transfer gear backlash.

**STANDARD:** 0.06 - 0.16 mm (0.002 - 0.006 in.)

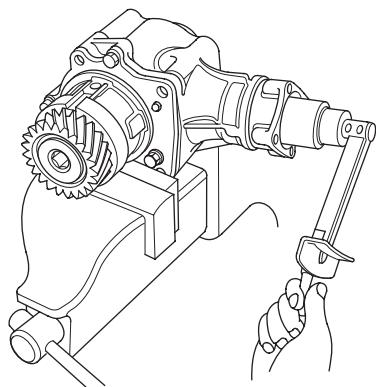
#### Total Starting Torque Measurement

3. Rotate the companion flange several times to seat the tapered roller bearing.
4. Measure the starting torque (companion flange side) using a torque wrench.

**NOTE:** To prevent damage to the transfer housing, always use soft jaws or equivalent materials between the transfer housing and the vise.

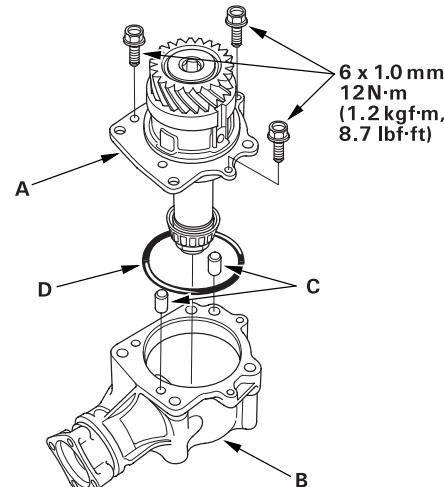
**STANDARD:**

2.24 - 3.71 N·m  
(22.0 - 36.4 kgf·cm, 19.1 - 31.6 lbf·in.)

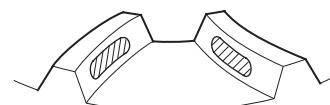


#### Transfer Drive Gear Tooth Contact Inspection

5. Remove the transfer from the vise.
6. Remove the transfer holder assembly (A) from the transfer housing (B), then remove the dowel pin (C) and O-ring (D).



7. Apply Prussian Blue to the transfer drive gear teeth lightly and evenly.
8. Install the transfer holder assembly to the transfer housing, then tighten the bolts.
9. Rotate the companion flange in both directions until the transfer gear rotates one full turn in both directions.
10. Check the transfer gear tooth contact pattern.



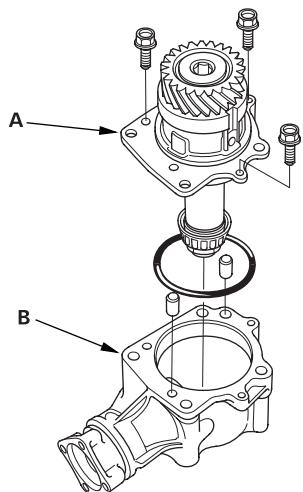
11. If the measurements or the tooth contact pattern are not within the standard, disassemble the transfer assembly, replace worn or damaged parts, and reassemble it.

## Transfer Disassembly

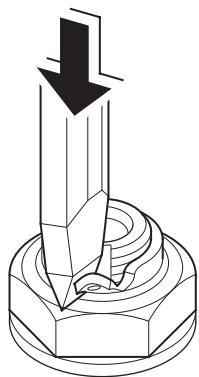
## Special Tools Required

Companion Flange Holder 07PAB-0020000

1. Remove the transfer holder assembly (A) from the transfer housing (B).

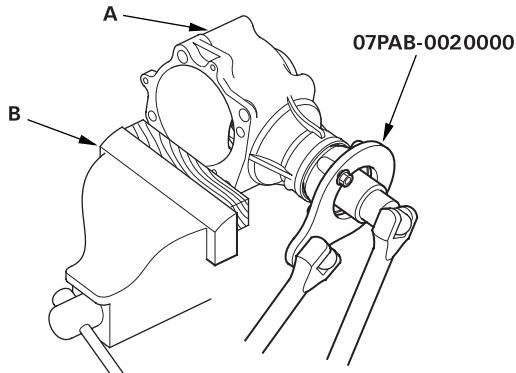


2. Cut the lock tabs of the locknut using a chisel. Keep all of the chiseled particles out of the transfer driven gear.



3. Secure the transfer housing (A) in a bench vise (B) with soft jaws.

NOTE: To prevent damage to the transfer housing, always use soft jaws or equivalent materials between the transfer housing and the vise.

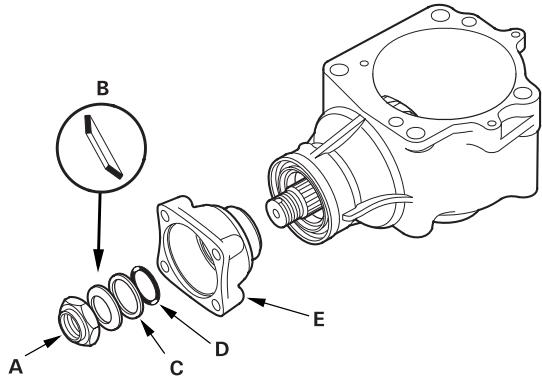


4. Install the special tool on the companion flange, then loosen the transfer driven gear shaft locknut.

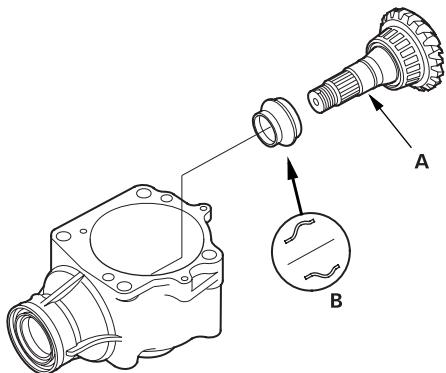


## Transfer Assembly

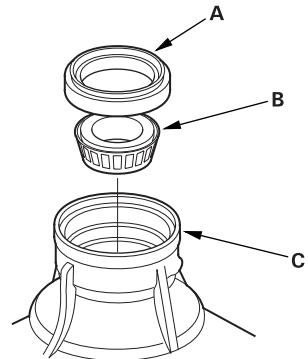
5. Remove the transfer driven gear locknut (A), conical spring washer (B), back-up ring (C), O-ring (D) and companion flange (E).



6. Remove the transfer driven gear (A), then remove the transfer spacer (B) from the transfer driven gear.

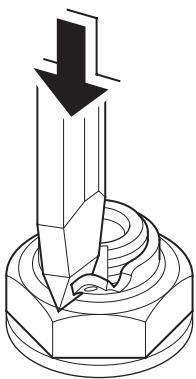


7. Remove the oil seal (A) and the tapered roller bearing (B) from the transfer housing (C).

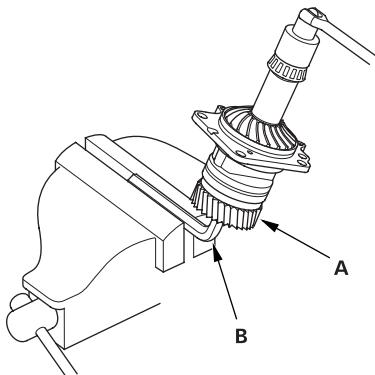


## Transfer Holder Disassembly

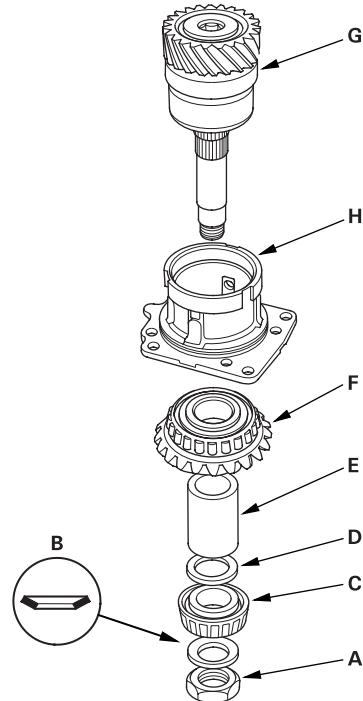
1. Cut the lock tabs of the locknut using a chisel. Keep all of the chiseled particles out of the transfer shaft.



2. Hold the transfer shaft (A) with a 14 mm Allen wrench (B) clamped in a bench vise, then loosen the locknut.



3. Remove the locknut (A), conical spring washer (B), tapered roller bearing (C), 25 mm thrust shim (D), transfer shaft collar (E), transfer drive gear (F), and transfer shaft assembly (G) from the transfer holder (H).





## Transfer Assembly

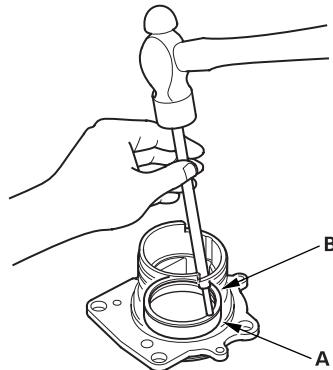
### Transfer Holder Tapered Roller Bearing Outer Race Replacement

#### Special Tools Required

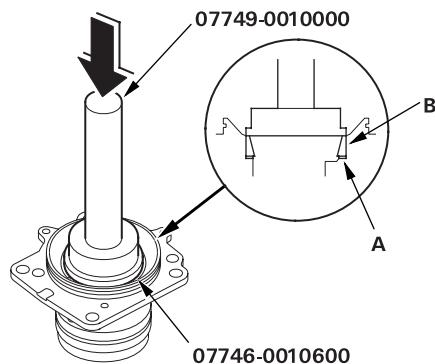
- Attachment, 72 x 75 mm 07746-0010600
- Driver 07749-0010000

NOTE: Coat all parts with MTF during reassembly.

1. Remove the tapered roller bearing outer race (A) and 76 mm thrust shim (B) from the transfer holder.



2. Install the 76 mm thrust shim (A) in the transfer holder.



3. Install the tapered roller bearing outer race (B) using the special tools and a press.

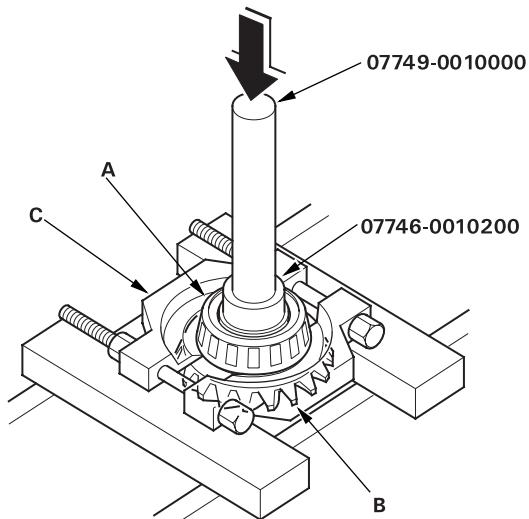
### Transfer Drive Gear Bearing Replacement

#### Special Tools Required

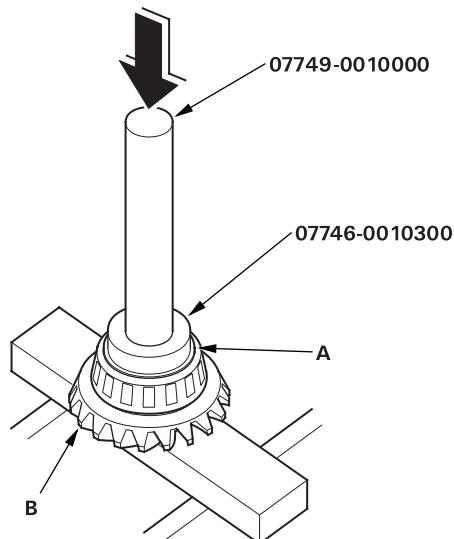
- Attachment, 37 x 40 mm 07746-0010200
- Attachment, 42 x 47 mm 07746-0010300
- Driver 07749-0010000

NOTE: Coat all parts with MTF during reassembly.

1. Remove the tapered roller bearing (A) from the transfer drive gear (B) using a commercially available bearing separator (C), the special tools and a press.



2. Install the new tapered roller bearing (A) in the transfer drive gear (B) using the special tools and a press.



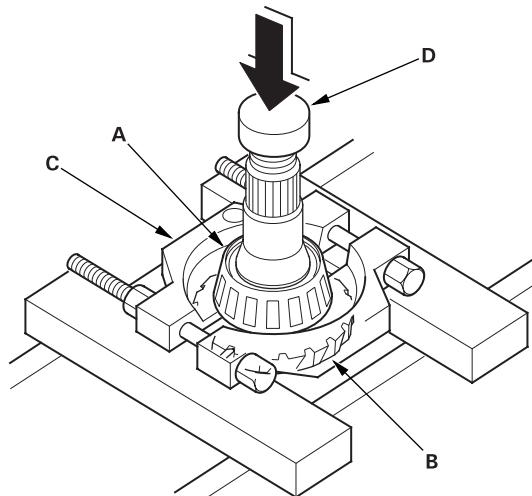
## Transfer Driven Gear Bearing Replacement

## Special Tools Required

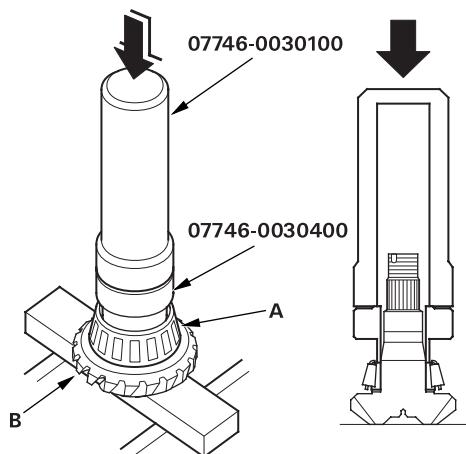
- Driver, 40 mm I.D 07746-0030100
- Attachment, 35 mm I.D 07746-0030400

NOTE: Coat all parts with MTF during reassembly.

1. Remove the tapered roller bearing (A) from the transfer driven gear (B) using a commercially available bearing separator (C), an adapter (D), and a press.



2. Install the new tapered roller bearing (A) on the transfer driven gear (B) using the special tools and a press.



## Transfer Housing Bearing Outer Race Replacement

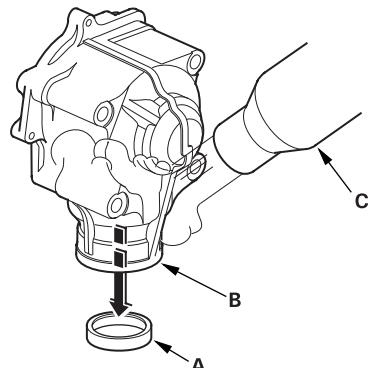
## Special Tools Required

- Installer shaft, 14 x 165 mm 07JAF-SJ80110
- Installer nut, 14 mm 07JAF-SJ80120
- Bearing installer attachment 07KAF-PS30120
- Bearing installer attachment 07LAF-PZ70110
- Attachment, 52 x 55 mm 07746-0010400
- Driver 07749-0010000

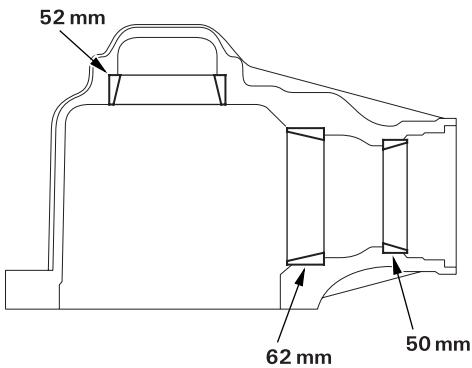
NOTE:

- Coat all parts with MTF during reassembly.
- Replace the tapered roller bearing and the bearing outer race as a set if either part is replaced.

1. Remove the tapered roller bearing outer race (A) from transfer housing (B) by heating the cover to almost 212°F (100°C) using a heat gun (C). Do not heat the cover over 212°F (100°C).



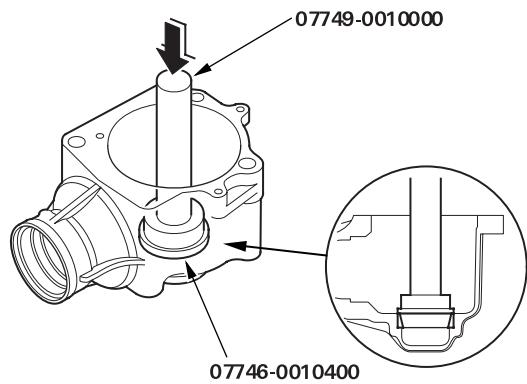
## Bearing Outer Race Locations



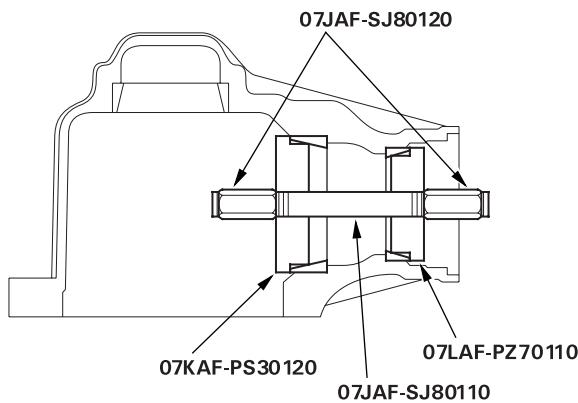


## Transfer Assembly

2. Install the 52 mm tapered roller bearing outer race using the special tools.



3. Install the 62 mm tapered roller bearing outer race and 50 mm tapered roller bearing outer race using the special tools.



## Transfer Reassembly

### Special Tools Required

- Oil seal driver attachment 07JAD-PH80101
- Companion flange holder 07PAB-0020000
- Attachment, 72 x 75 mm 07746-0010600
- Driver, 40 mm I.D 07746-0030100
- Attachment, 35 mm I.D 07746-0030400
- Driver 07749-0010000

Note these items during reassembly:

- While reassembling the transfer assembly:
  - Check and adjust the transfer gear tooth contact.
  - Measure and adjust the transfer gear backlash.
  - Check and adjust the tapered roller bearing starting torque.
- Coat all parts with MTF during reassembly.
- Replace the tapered roller bearing and the bearing outer race as a set if either part is replaced.
- Replace the transfer drive gear and the transfer driven gear shaft as a set if either part is replaced.

### Outline of Assembly

1. Select the 35 mm thrust shim.  
Perform this procedure if the transfer driven gear shaft or the tapered roller bearing on the transfer driven gear shaft is replaced.
2. Preassemble the parts to check and adjust transfer gear backlash and transfer gear tooth contact.
3. Disassemble the parts, then assemble the transfer driven gear shaft and its related parts.
4. Measure and adjust the starting torque of the transfer driven gear shaft tapered roller bearing.
5. Assemble the transfer shaft and its related parts.
6. Measure and adjust the total starting torque.

(cont'd)

## Transfer Reassembly (cont'd)

## 35 mm Thrust Shim Selection

1. Select the 35 mm thrust shim if the transfer driven gear shaft or the tapered roller bearing on the transfer driven gear shaft is replaced.

Calculate the thickness of the 35 mm thrust shim using the formula below.

$$\text{FORMULA: } \frac{A}{100} - \frac{B}{100} + C = X$$

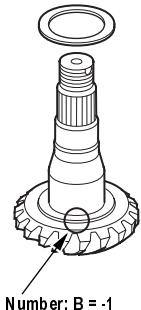
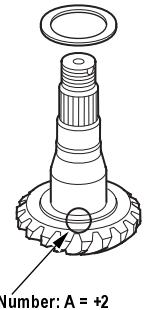
**A:** Number on the existing transfer driven gear shaft  
**B:** Number on the replacement transfer driven gear shaft.  
**C:** Thickness of the existing 35 mm thrust shim  
**X:** Thickness needed for the replacement 35 mm thrust shim.

**NOTE:** The number on the transfer driven gear shaft is shown in 1/100 mm.

## EXAMPLE:

C: EXISTING 35 mm THRUST SHIM  
 Thickness: C = 1.05 mm

X: REPLACEMENT 35 mm THRUST SHIM  
 Thickness: X = ?? mm



A: EXISTING TRANSFER DRIVEN GEAR SHAFT

B: REPLACEMENT TRANSFER DRIVEN GEAR SHAFT

$$X = \frac{A}{100} - \frac{B}{100} + C = \frac{2}{100} - \frac{-1}{100} + 1.05$$

$$= 0.02 + 0.01 + 1.05 = 1.08 \text{ (mm)}$$

Select 35 mm thrust shim thickness of 1.08 mm (0.043 in.). If the tapered roller bearing on the transfer driven gear shaft is replaced. Measure the thickness of the replacement bearing and the existing bearing, and calculate the difference of the bearing thickness. Adjust the thickness of the existing 35 mm thrust shim by the amount of difference in bearing thickness, and select the replacement 35 mm thrust shim. Do not use more than one 35 mm thrust shim to adjust the transfer gear backlash.

## THRUST SHIM, 35 mm

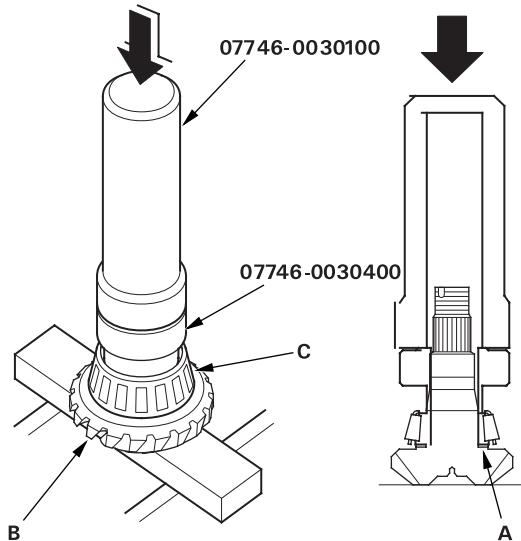
	Part Number	Thickness
A	41361-PS3-000	0.72 mm (0.028 in.)
B	41362-PS3-000	0.75 mm (0.030 in.)
C	41363-PS3-000	0.78 mm (0.031 in.)
D	41364-PS3-000	0.81 mm (0.032 in.)
E	41365-PS3-000	0.84 mm (0.033 in.)
F	41366-PS3-000	0.87 mm (0.034 in.)
G	41367-PS3-000	0.90 mm (0.035 in.)
H	41368-PS3-000	0.93 mm (0.037 in.)
I	41369-PS3-000	0.96 mm (0.038 in.)
J	41370-PS3-000	0.99 mm (0.039 in.)
K	41371-PS3-000	1.02 mm (0.040 in.)
L	41372-PS3-000	1.05 mm (0.041 in.)
M	41373-PS3-000	1.08 mm (0.043 in.)
N	41374-PS3-000	1.11 mm (0.044 in.)



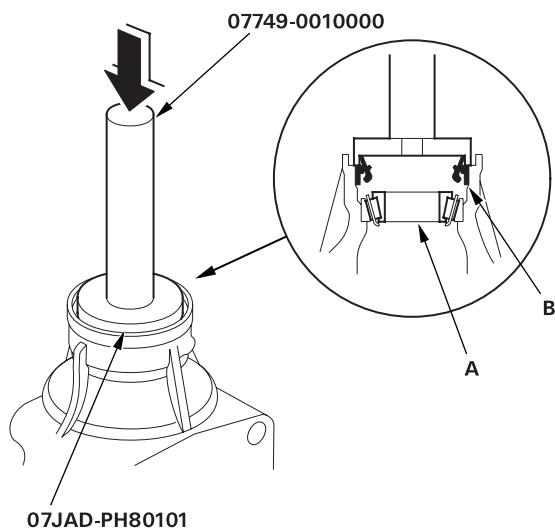
## Transfer Assembly

### Transfer Gear Backlash Inspection and Transfer Gear Tooth Contact Inspection

2. Install the 35 mm thrust shim (A) on the transfer driven gear (B), then install the tapered roller bearing (C) using the special tools and a press.

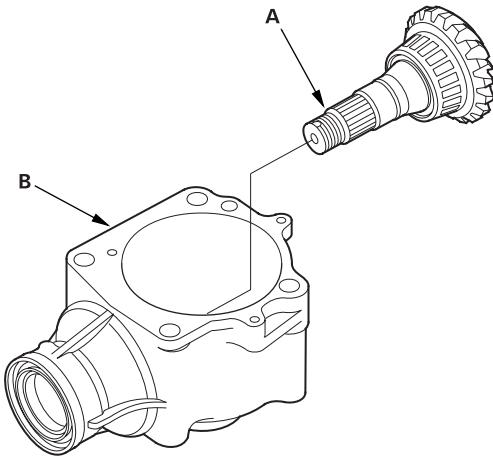


3. Install the bearing outer race, then the tapered bearing (A) on the companion flange side of the transfer housing.

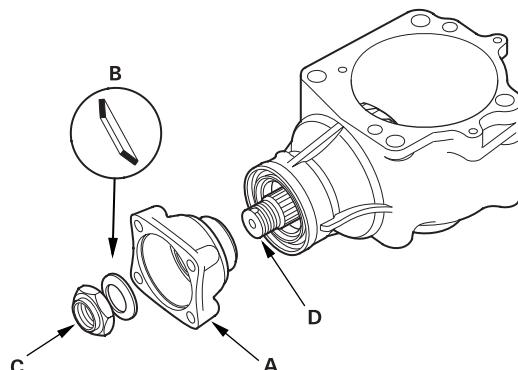


4. Install the new oil seal (B) on the transfer housing using the special tools.

5. Install the transfer driven gear (A) in the transfer housing (B). Do not install the transfer spacer on the transfer driven gear shaft in this step.



6. Install the companion flange (A), conical spring washer (B) and locknut (C) on the transfer driven gear (D). Do not install the O-ring and the back-up ring on the transfer gear shaft in this step.



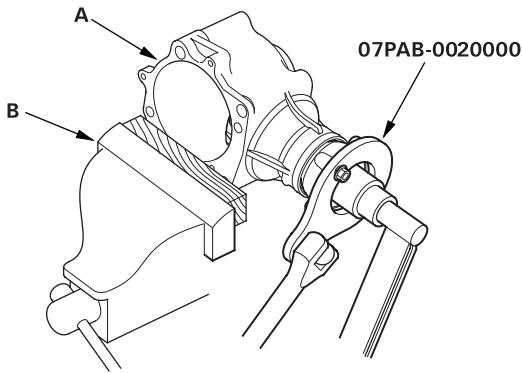
(cont'd)

## Transfer Reassembly (cont'd)

## 35 mm Thrust Shim Selection (cont'd)

7. Secure the transfer housing (A) in a bench vise (B) with soft jaws, then install the special tool on the companion flange.

NOTE: To prevent damage to the transfer housing, always use soft jaws or equivalent materials between the transfer housing and the vise.



8. Tighten the locknut while measuring the starting torque so the starting torque is within 1.08-1.47 N·m (11.0 - 15.0 kgf·cm, 9.55 - 13.0 lbf·in.).

NOTE:

- Coat the threads of the locknut, and the shaft with MTF before installing the locknut.
- Do not stake the locknut in this step.

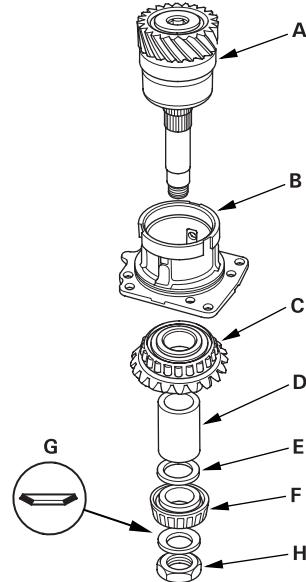
## STARTING TORQUE:

1.08 - 1.47 N·m  
(11.0 - 15.0 kgf·cm, 9.55 - 13.0 lbf·in.)

9. Install the transfer shaft assembly (A) in the transfer holder (B), then install the transfer drive gear (C), transfer collar (D), 25 mm thrust shim (E), tapered roller bearing (F), conical spring washer (G), and locknut (H) on the transfer shaft assembly.

NOTE:

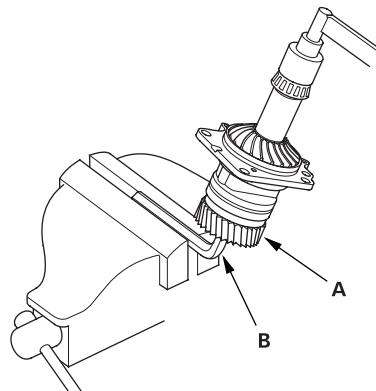
- Coat the threads of the locknut, and the shaft with MTF before installing the locknut.
- Do not stake the locknut in this step.



10. Hold the transfer shaft (A) with a 14 mm Allen wrench (B) clamped in a bench vise, and tighten the locknut.

NOTE: Do not stake the locknut in this step.

TORQUE: 118 N·m (12.0 kgf·m, 86.8 lbf·ft)



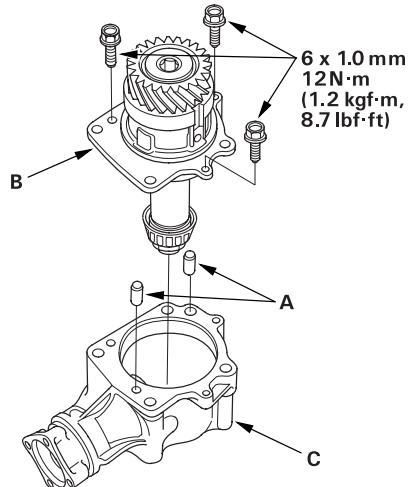


## Transfer Assembly

11. Apply Prussian Blue to both sides of the transfer drive gear teeth lightly and evenly.

12. Install the dowel pin (A) and transfer holder assembly (B) to the transfer housing (C).

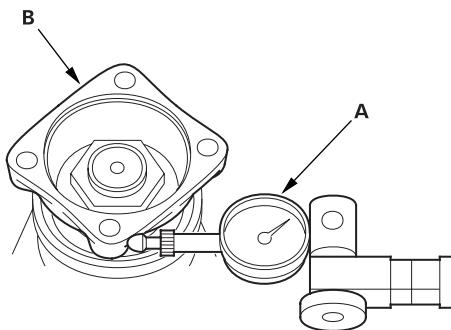
NOTE: Temporarily install the transfer holder assembly without the O-ring.



13. Rotate the companion flange several times to seat the tapered roller bearing.

14. Set a dial indicator (A) on the companion flange (B), then measure the transfer gear backlash.

STANDARD: 0.06 - 0.16 mm (0.002 - 0.006 in.)

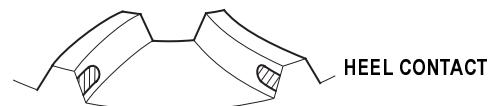
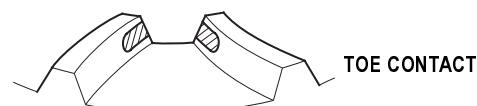


15. Check the transfer gear tooth contact pattern.

### CORRECT TOOTH CONTACT PATTERN



### INCORRECT TOOTH CONTACT PATTERN



(cont'd)

## Transfer Reassembly (cont'd)

## 35 mm Thrust Shim Selection (cont'd)

**16.** If the transfer gear tooth contact is incorrect, adjust the transfer gear tooth contact with a 35 mm or 25 mm thrust shim. If the gear tooth contact is correct, go to step 17.

## NOTE:

- To select a 35 mm thrust shim, refer to [page 13-74](#).
- Do not use more than one 35 mm shim to adjust the transfer gear tooth contact.
- To select the 25 mm thrust shim, refer to [page 13-78](#).
- Do not use more than one 25 mm shim to adjust the transfer gear tooth contact.

• **Toe Contact**

Use a thicker 35 mm thrust shim to move the transfer driven gear shaft toward the transfer drive gear. Because this movement causes the transfer gear backlash to change, move the transfer drive gear away from the transfer driven gear shaft to adjust the transfer gear backlash as follows:

- Increase the thickness of the 25 mm thrust shim.
- Reduce the thickness of the 76 mm thrust shim by the amount of increased thickness of the 25 mm thrust shim.

• **Flank Contact**

Use a thinner thrust shim to move the transfer drive gear toward the transfer driven gear shaft. Flank contact must be adjusted within the limits of the transfer gear backlash. If the backlash exceeds the limits, adjust as described under Heel Contact.

• **Heel Contact**

Use a thinner 35 mm thrust shim to move the transfer driven gear shaft away from the transfer drive gear. Because this movement causes the transfer gear backlash to change, move the transfer drive gear toward the transfer driven gear shaft to adjust the transfer gear backlash as follows:

- Reduce the thickness of the 25 mm thrust shim.
- Increase the thickness of the 76 mm thrust shim by the amount of reduced thickness of the 25 mm thrust shim.

• **Face Contact**

Use a thicker thrust shim to move the transfer drive gear away from the transfer driven gear shaft. Face contact must be adjusted within the limits of the transfer gear backlash. If the backlash exceeds the limits, adjust as described under Toe Contact.

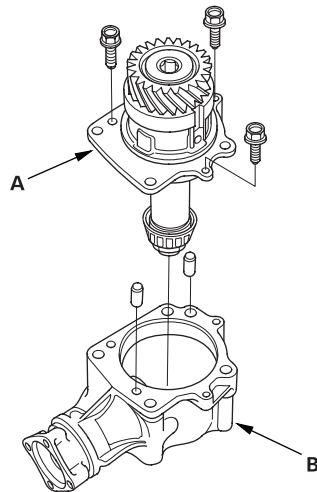
## THRUST SHIM, 25 mm

Shim No.	Part Number	Thickness
1.70	29411-P1C-000	1.70 mm (0.067 in.)
1.73	29412-P1C-000	1.73 mm (0.068 in.)
1.76	29413-P1C-000	1.76 mm (0.069 in.)
1.79	29414-P1C-000	1.79 mm (0.070 in.)
1.82	29415-P1C-000	1.82 mm (0.072 in.)
1.85	29416-P1C-000	1.85 mm (0.073 in.)
1.88	29417-P1C-000	1.88 mm (0.074 in.)
1.91	29418-P1C-000	1.91 mm (0.075 in.)
1.94	29419-P1C-000	1.94 mm (0.076 in.)
1.97	29420-P1C-000	1.97 mm (0.078 in.)
2.00	29421-P1C-000	2.00 mm (0.079 in.)
2.03	29422-P1C-000	2.03 mm (0.080 in.)
2.06	29423-P1C-000	2.06 mm (0.081 in.)
2.09	29424-P1C-000	2.09 mm (0.082 in.)
2.12	29425-P1C-000	2.12 mm (0.083 in.)
2.15	29426-P1C-000	2.15 mm (0.085 in.)
2.18	29427-P1C-000	2.18 mm (0.086 in.)
2.21	29428-P1C-000	2.21 mm (0.087 in.)
2.24	29429-P1C-000	2.24 mm (0.088 in.)



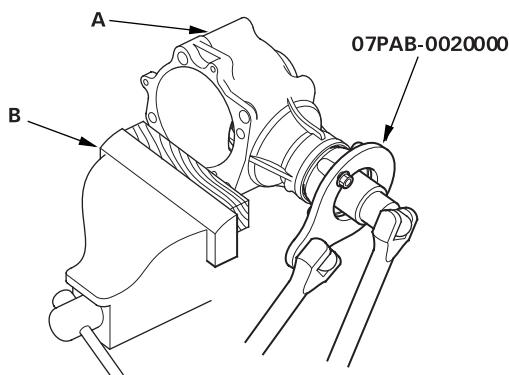
## Transfer Assembly

17. Remove the transfer holder assembly (A) from the transfer housing (B).



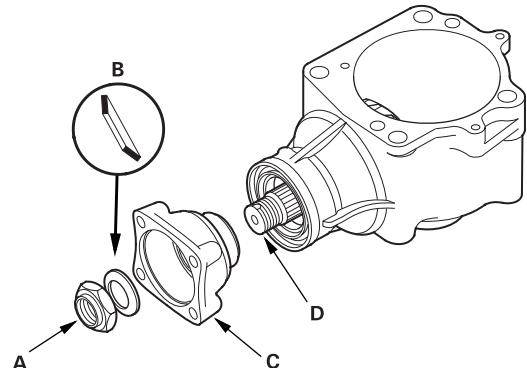
18. Secure the transfer housing (A) in a bench vise (B) with soft jaws.

NOTE: To prevent damage to the transfer housing, always use soft jaws or equivalent materials between the transfer housing and the vise.

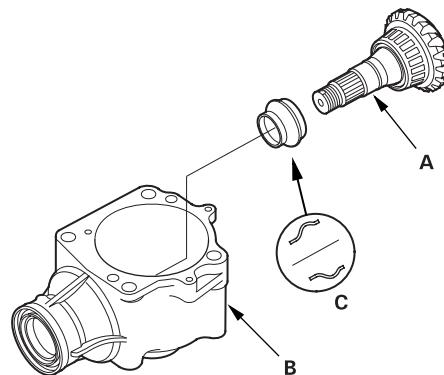


19. Install the special tool on the companion flange, then loosen the locknut.

20. Remove the locknut (A), conical spring washer (B) and companion flange (C) from the transfer driven gear (D).



21. Remove the transfer driven gear (A) from the transfer housing (B).



22. Install the new transfer spacer (C) on the transfer driven gear (A), then install them in the transfer housing (B).

(cont'd)

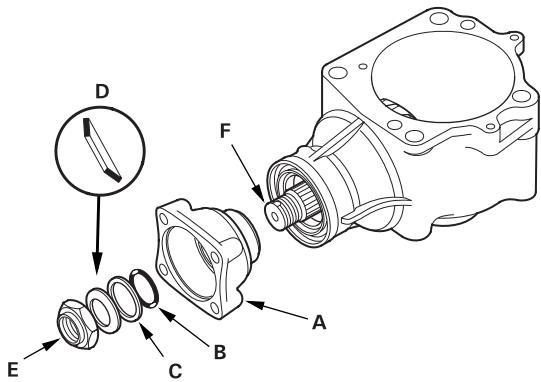
## Transfer Reassembly (cont'd)

## 35 mm Thrust Shim Selection (cont'd)

23. Install the companion flange (A), O-ring (B), back-up ring (C), conical spring washer (D) and locknut (E) on the transfer driven gear (F).

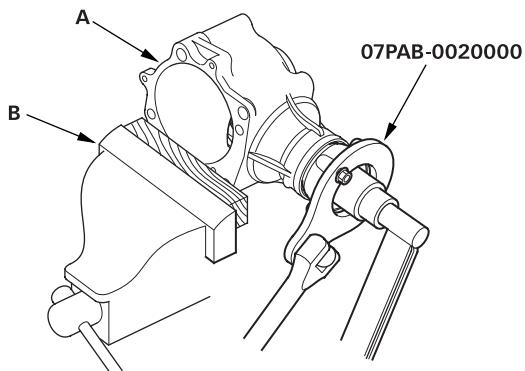
NOTE:

- Coat the threads of the locknut, O-ring and transfer shaft with MTF before installing the locknut.
- Install the conical spring washer in the direction shown.



24. Secure the transfer housing (A) in a bench vise (B) with soft jaws.

NOTE: To prevent damage to the transfer housing, always use soft jaws or equivalent materials between the transfer housing and the vise.



25. Install the special tool on the companion flange, then tighten the transfer driven gear shaft locknut while measuring the starting torque of the transfer driven gear shaft.

## STARTING TORQUE:

1.08 - 1.47 N·m

(11.0 - 15.0 kgf·cm, 9.55 - 13.0 lbf·in)

## TIGHTENING TORQUE:

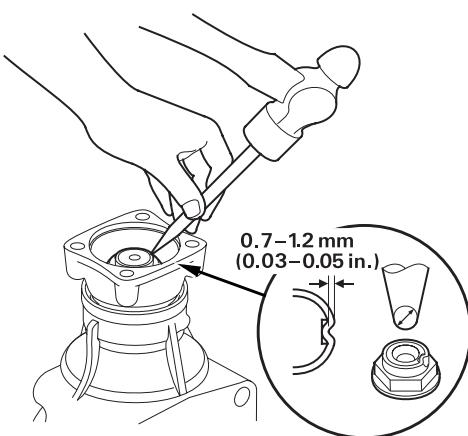
132 - 260 N·m

(13.5 - 26.5 kgf·m, 97.6 - 192 lbf·ft)

NOTE:

- Rotate the companion flange several times to seat the tapered roller bearing, then measure the starting torque.
- If the starting torque exceeds 1.47 N·m (15.0 kgf·cm, 13.0 lbf·in.), replace the transfer spacer and reassemble the parts. Do not adjust the torque with the locknut loose.
- If the tightening torque exceeds 260 N·m (26.5 kgf·m, 192 lbf·ft), replace the transfer spacer and reassemble the parts.
- Write down the measurement of the starting torque: it is used to measure the total starting torque.

26. Stake the locknut into the transfer driven gear shaft using a 3.5 mm punch.

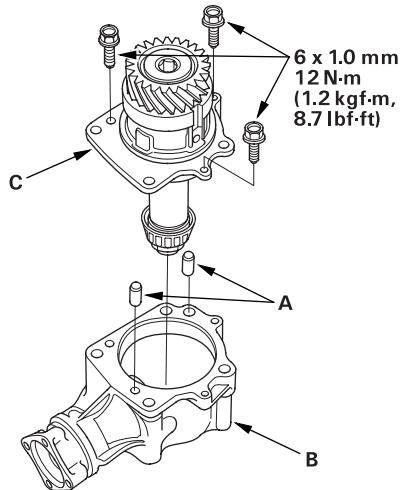




## Transfer Assembly

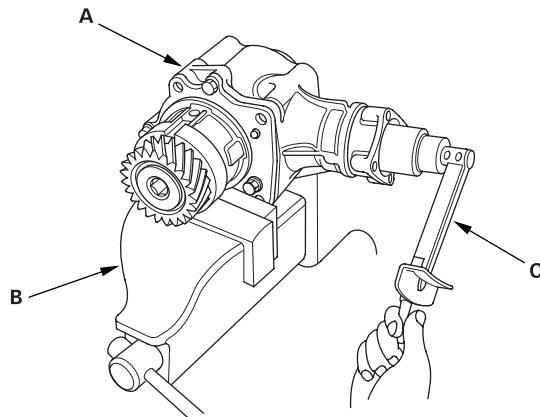
27. Install the dowel pin (A) to the transfer housing (B), then install the transfer holder assembly (C).

NOTE: Temporarily install the transfer holder assembly without the O-ring.



28. Secure the transfer housing (A) in a bench vise (B) with soft jaws, then rotate the companion flange several times to fit the tapered roller bearing.

NOTE: To prevent damage to the transfer housing, always use soft jaws or equivalent materials between the transfer housing and the vise.



29. Measure the total starting torque using the torque wrench (C).

**TOTAL STARTING TORQUE:**

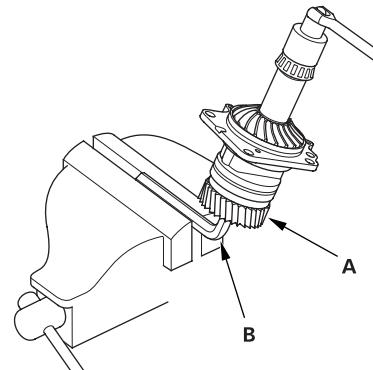
1.70 - 2.08 N·m (17.3 - 21.2 kgf·cm, 15.0 - 18.4 lbf·in.) + Transfer Driven Gear Shaft Starting Torque Value (wrote down in step 25).

30. Remove the transfer holder assembly from the transfer housing.

31. If the measurement is not within the specification, go to step 32.

If the measurement is within the specification, go to step 43.

32. Hold the transfer shaft (A) with a 14 mm Allen wrench (B) clamped in a bench vise then loosen the locknut.

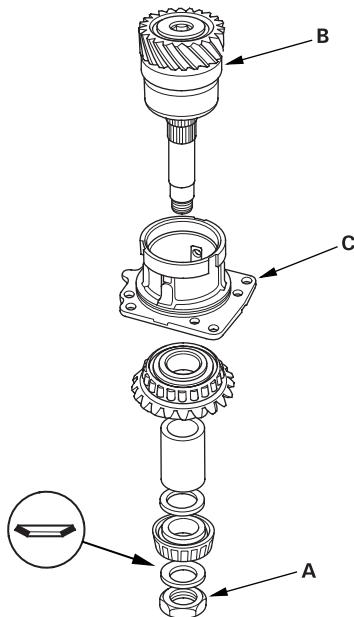


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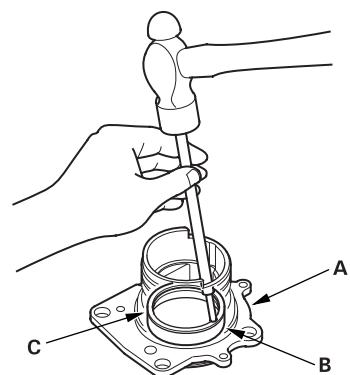
## Transfer Reassembly (cont'd)

## 35 mm Thrust Shim Selection (cont'd)

33. Remove the locknut (A) and transfer shaft assembly (B) from the transfer holder (C).



34. Remove the tapered roller bearing outer race (A) and 76 mm thrust shim (B) from the transfer holder (C).



35. Measure the thickness of the removed 76 mm thrust shim, and select a new 76 mm shim.

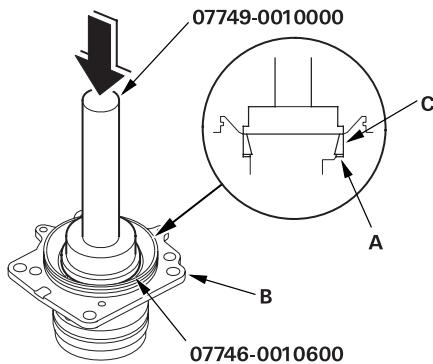
## THRUST SHIM, 76 mm

Shim No.	Part Number	Thickness
A	41361-PPS-000	1.20 mm (0.047 in.)
B	41362-PPS-000	1.23 mm (0.048 in.)
C	41363-PPS-000	1.26 mm (0.049 in.)
D	41364-PPS-000	1.29 mm (0.050 in.)
E	41365-PPS-000	1.32 mm (0.052 in.)
F	41366-PPS-000	1.35 mm (0.053 in.)
G	41367-PPS-000	1.38 mm (0.054 in.)
H	41368-PPS-000	1.41 mm (0.055 in.)
J	41369-PPS-000	1.44 mm (0.057 in.)
K	41370-PPS-000	1.47 mm (0.058 in.)
L	41371-PPS-000	1.50 mm (0.059 in.)
M	41372-PPS-000	1.53 mm (0.060 in.)
N	41373-PPS-000	1.56 mm (0.061 in.)
P	41374-PPS-000	1.59 mm (0.062 in.)
R	41375-PPS-000	1.62 mm (0.064 in.)
S	41376-PPS-000	1.65 mm (0.065 in.)
T	41377-PPS-000	1.68 mm (0.066 in.)
U	41378-PPS-000	1.71 mm (0.067 in.)
W	41379-PPS-000	1.74 mm (0.068 in.)
X	41380-PPS-000	1.77 mm (0.070 in.)
Y	41381-PPS-000	1.80 mm (0.071 in.)
Z	41382-PPS-000	1.83 mm (0.072 in.)
AA	41383-PPS-000	1.86 mm (0.073 in.)
AB	41384-PPS-000	1.89 mm (0.074 in.)
AC	41385-PPS-000	1.92 mm (0.076 in.)
AD	41386-PPS-000	1.95 mm (0.077 in.)
AE	41387-PPS-000	1.98 mm (0.078 in.)
AF	41388-PPS-000	2.01 mm (0.079 in.)
AG	41389-PPS-000	2.04 mm (0.080 in.)
AH	41390-PPS-000	2.07 mm (0.081 in.)
AJ	41391-PPS-000	2.10 mm (0.083 in.)
AK	41392-PPS-000	2.13 mm (0.084 in.)
AL	41393-PPS-000	2.16 mm (0.085 in.)
AM	41394-PPS-000	2.19 mm (0.086 in.)
AN	41395-PPS-000	2.22 mm (0.087 in.)
AP	41396-PPS-000	2.25 mm (0.089 in.)
AR	41397-PPS-000	2.28 mm (0.090 in.)
AS	41398-PPS-000	2.31 mm (0.091 in.)
AT	41399-PPS-000	2.34 mm (0.092 in.)
AU	41400-PPS-000	2.37 mm (0.093 in.)
AW	41401-PPS-000	2.40 mm (0.094 in.)
AX	41402-PPS-000	2.43 mm (0.096 in.)
AY	41403-PPS-000	2.46 mm (0.097 in.)
AZ	41404-PPS-000	2.49 mm (0.098 in.)
BA	41405-PPS-000	2.52 mm (0.099 in.)
BB	41406-PPS-000	2.55 mm (0.100 in.)
BC	41407-PPS-000	2.58 mm (0.102 in.)
BD	41408-PPS-000	2.61 mm (0.103 in.)
BE	41409-PPS-000	2.64 mm (0.104 in.)
BF	41410-PPS-000	2.67 mm (0.105 in.)



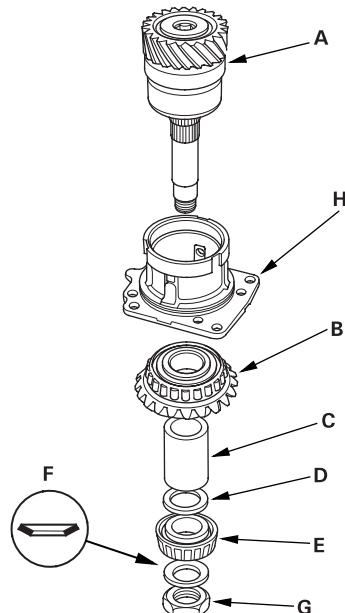
## Transfer Assembly

36. Install the 76 mm thrust shim (A) in the transfer holder (B).



37. Install the tapered roller bearing outer race (C) using the special tool and a press.

38. Install the transfer shaft assembly (A), transfer drive gear (B), transfer shaft collar (C), 25 mm thrust shim (D), tapered roller bearing (E), conical spring washer (F) and locknut (G) in the transfer holder (H).

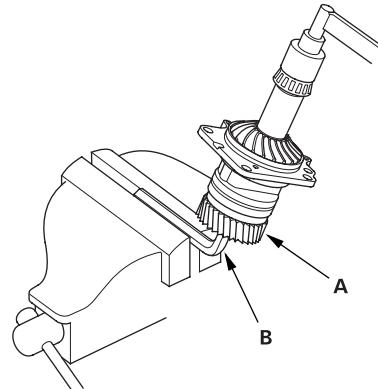


39. Hold the transfer shaft (A) with a 14 mm Allen wrench (B) clamped in a bench vise then tighten the locknut.

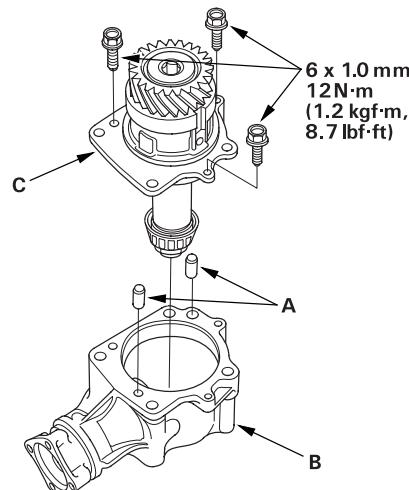
NOTE: Do not stake the locknut in this step.

**TIGHTENING TORQUE:**

118 N·m (12.0 kgf·m, 86.8 lbf·ft)



40. Install the dowel pin (A) to the transfer housing (B), then install the transfer holder assembly (C).



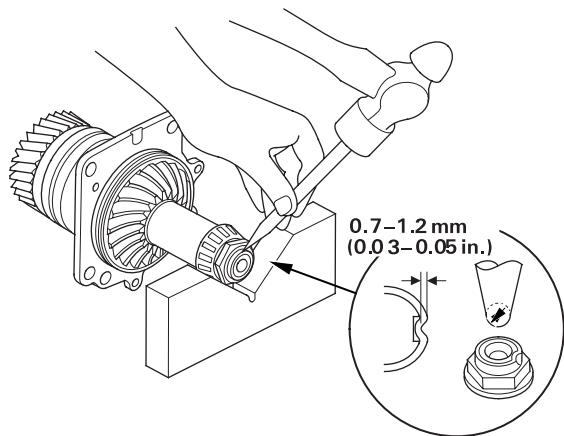
41. Recheck and make sure the total starting torque is within the specification.

(cont'd)

## Transfer Reassembly (cont'd)

## 35 mm Thrust Shim Selection (cont'd)

42. Remove the transfer holder assembly from the transfer housing.
43. Stake the locknut on the transfer shaft using a 3.5 mm punch.



44. Coat the new O-ring (A) with MTF, install it on the transfer holder, then install the dowel pin (B) and transfer holder assembly (C) to the transfer housing (D).

