

SUPPLEMENTAL RESTRAINT SYSTEM (SRS) (If manual transmission maintenance is required)

The Acura TL SRS includes a driver's airbag in the steering wheel hub, a passenger's airbag in the dashboard above the glove box, seat belt tensioners in the front seat belt retractors, side curtain airbags in the sides of the roof, and side airbags in the front seat-backs. Information necessary to safely service the SRS is included in this Service Manual. Items marked with an asterisk (*) on the contents page include or are located near SRS components. Servicing, disassembling, or replacing these items requires special precautions and tools, and should be done by an authorized Acura dealer.

- To avoid rendering the SRS inoperative, which could lead to personal injury or death in the event of a severe frontal or side collision, all SRS service work should be done by an authorized Acura dealer.
- Improper service procedures, including incorrect removal and installation of the SRS, could lead to personal injury caused by unintentional deployment of the airbags, side airbags, and/or side curtain airbags.
- Do not bump or impact the SRS unit, front impact sensors, side impact sensors, or rear safing sensor, especially when the ignition switch is in ON (II)/the ON mode, for at least 3 minutes after the ignition switch is turned to LOCK (0), or after the engine start/stop button is pressed to select the OFF mode; otherwise, the system may fail in a collision, or the airbags may deploy.
- SRS electrical connectors are identified by yellow color coding. Related components are located in the steering column, center console, dashboard, dashboard undercover, in the dashboard above the glove box, in the front seats, in the roof side, and around the floor. Do not use electrical test equipment on these circuits.

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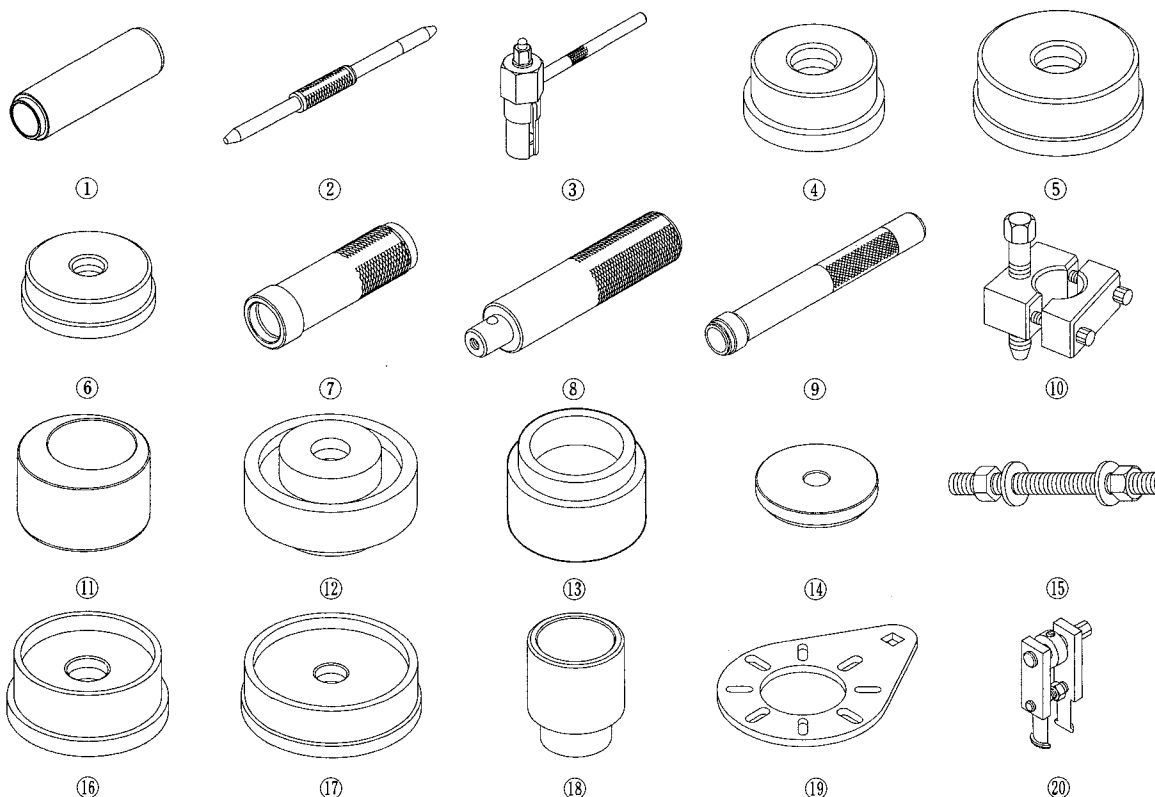
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Manual Transmission

Special Tools

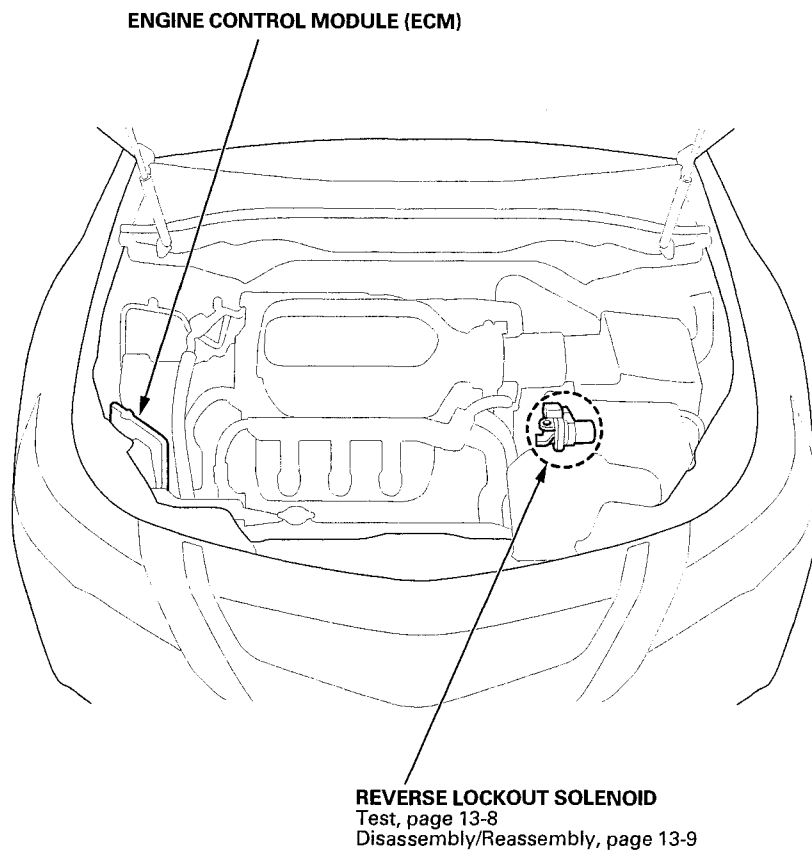
Ref.No.	Tool Number	Description	Qty
①	070AD-PYZA100	Driver, 58 x 62 mm	1
②	070AG-SJAA10S	Subframe Alignment Pin	1
③	070AJ-0020101	Preload Inspection Tool	1
④	07746-0010300	Bearing Driver Attachment, 42 x 47 mm	1
⑤	07746-0010400	Attachment, 52 x 55 mm	1
⑥	07746-0010600	Attachment, 72 x 75 mm	1
⑦	07746-0030100	Driver Handle, 40 mm I.D.	1
⑧	07749-0010000	Driver Handle, 15 x 135L	1
⑨	07946-MB00000	Driver, 30 mm I.D.	1
⑩	07GAJ-PG20110	Mainshaft Holder	1
⑪	07GAJ-PG20130	Mainshaft Base	1
⑫	07JAD-SH30100	Attachment, 65 mm	1
⑬	07LAD-PW50601	Attachment, 40 x 50 mm	1
⑭	07MAF-SP0011A	Tapered Bearing Race Installer A	1
⑮	07MAF-SP0013A	Installer Shaft	1
⑯	07NAD-P20A100	Oil Seal Driver Attachment	1
⑰	07NAD-PX40100	Attachment, 78 x 80 mm	1
⑱	07PAF-0030100	Remover Installer, 22 x 37/46 x 52	1
⑲	07XAB-0010101	Flange Holder	1
⑳	07YAC-0010100	Adjustable Bearing Puller, 45—75 mm	1



Reverse Lockout System



Component Location Index

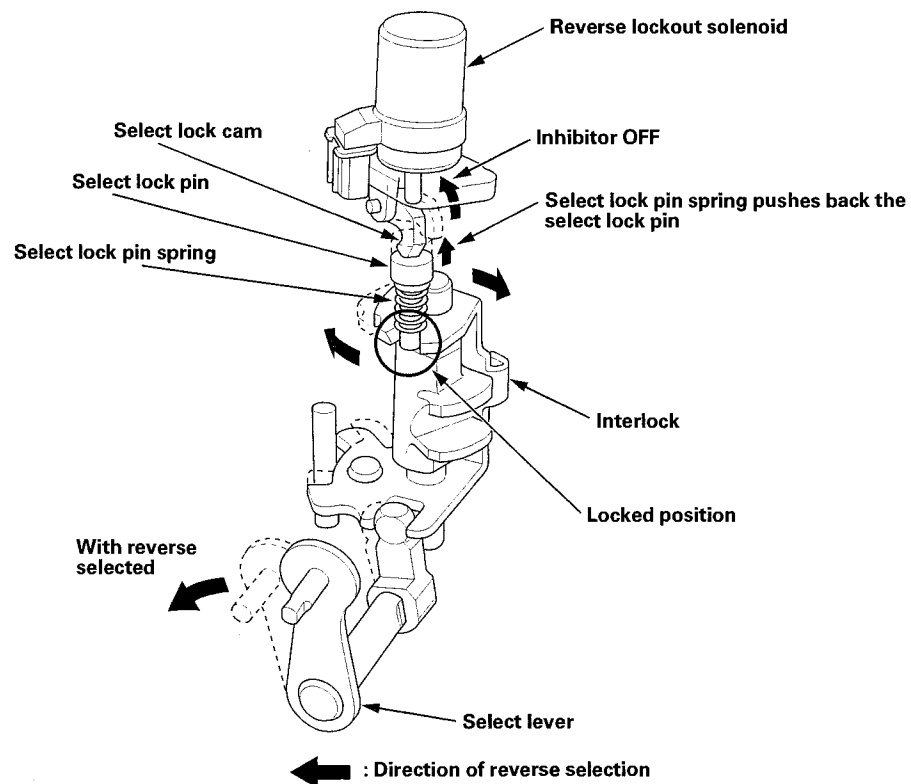


Reverse Lockout System

System Description

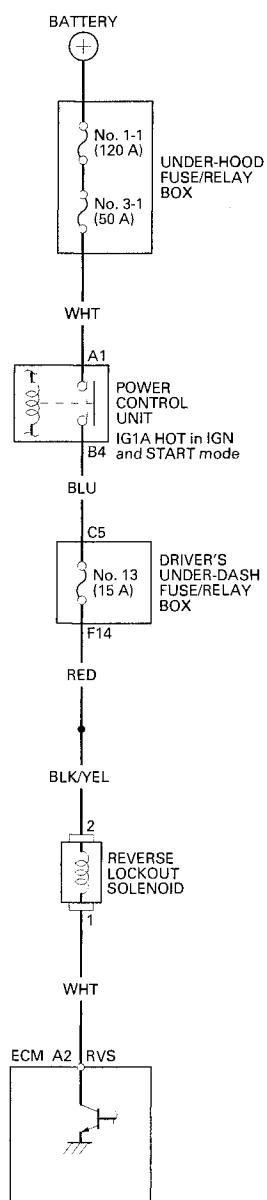
At vehicle speeds of 12 mph (20 km/h) or more, the ECM, which monitors the signals from the output shaft (countershaft) speed sensor, activates the reverse lockout solenoid, which pushes the select lock cam and the select lock pin into the locked position. As a result, the interlock cannot rotate to the reverse select position, making it impossible to engage reverse gear. As the vehicle speed drops to of 9 mph (15 km/h) or less, the ECM turns off the reverse lockout solenoid. The select lock pin spring pulls back the select lock pin, enabling the interlock to move freely so reverse gear can be selected.

Vehicle speed	Inhibitor	Reverse selection
Above 12 mph (20 km/h)	ON	Not allowed
Below 9 mph (15 km/h)	OFF	OK
Vehicle in OFF mode	OFF	OK





Circuit Diagram



Reverse Lockout System

Symptom Troubleshooting

Driver can select reverse gear when vehicle speed is 12 mph (20 km/h) or more

NOTE:

- When checking if the transmission will shift to reverse while the wheels are being driven forward, raise the vehicle on a lift, make sure it is securely supported, and allow the front wheels to rotate freely.
- Do not release the clutch pedal if you can select reverse gear while the wheels are driven forward.
- When the vehicle is on a lift, and you make the wheels rotate, turn off the VSA system by the VSA OFF switch.
- Refer to How to Troubleshoot Circuits at the ECM Connectors in the Fuel and Emissions Systems section before troubleshooting this circuit (see page 11-6).

1. Press the engine start/stop button to select the OFF mode.
2. Check the No. 13 (15 A) fuse in the driver's under-dash fuse/relay box.

Is the fuse OK?

YES—Reinstall the fuse, then go to step 3.

NO—Install a new No. 13 (15 A) fuse, and recheck. If the fuse continues to blow, check for short to body ground in the wire between the No. 13 (15 A) fuse in the driver's under-dash fuse/relay box and the reverse lockout solenoid. ■

3. Test-drive the vehicle.
4. Check for fuel and emissions system's DTC with the HDS.

Are there any DTCs stored in the ECM?

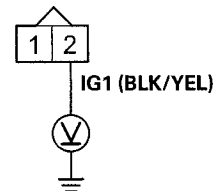
YES—Go to the indicated ECM DTC's troubleshooting. ■

NO—Go to step 5.

5. Press the engine start/stop button to select the OFF mode.
6. Disconnect the reverse lockout solenoid 2P connector.
7. Press the engine start/stop button to select the ON mode.

8. Measure the voltage between reverse lockout solenoid 2P connector terminal No. 2 and body ground.

REVERSE LOCKOUT SOLENOID 2P CONNECTOR



Wire side of female terminals

Is there battery voltage?

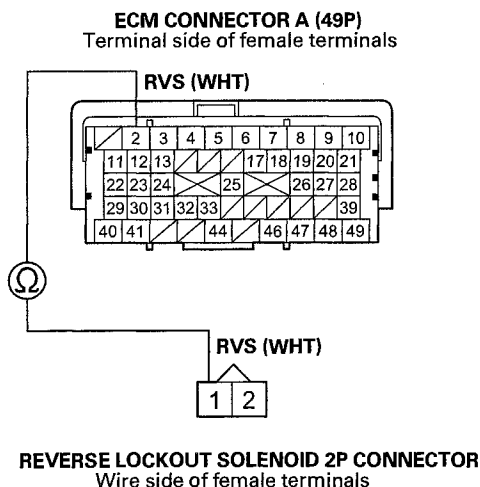
YES—Go to step 9.

NO—Repair an open in the wire between the reverse lockout solenoid and the No. 13 (15 A) fuse in the driver's under-dash fuse/relay box. ■

9. Press the engine start/stop button to select the OFF mode.
10. Jump the SCS line with the HDS.
11. Disconnect ECM connector A (49P).



12. Check for continuity between reverse lockout solenoid 2P connector terminal No. 1 and ECM connector A (49P) terminal No. 2.



Is the continuity?

YES—Go to step 13.

NO—Repair an open in the wire between the reverse lockout solenoid and the ECM. ■

13. Do the reverse lockout solenoid test (see page 13-8).

Is the reverse lockout solenoid OK?

YES—Check for loose terminals or poor connections at the ECM. If necessary, update the ECM if it does not have the latest software (see page 11-281), or substitute a known-good ECM (see page 11-7), then recheck. If the symptom goes away with a known-good ECM, replace the original ECM (see page 11-282). ■

NO—Repair or replace the reverse lockout solenoid (see page 13-9). ■

Driver cannot select reverse gear when vehicle speed is 9 mph (15 km/h) or less

NOTE:

- When checking if the transmission will shift to reverse while the wheels are being driven forward, raise the vehicle on a lift, make sure it is securely supported, and allow the front wheels to rotate freely.
- Do not release the clutch pedal if you can select reverse gear while the wheels are driven forward.
- When the vehicle is on a lift, and you make the wheels rotate, turn off the VSA system by the VSA OFF switch.

1. Press the engine start/stop button to select the OFF mode.

2. Try to shift the transmission into reverse.

Can you shift the transmission into the reverse?

YES—Go to step 4.

NO—Go to step 3.

3. Do the reverse lockout solenoid test (see page 13-8).

Is the reverse lockout solenoid OK?

YES—Check the reverse idler gear shaft assembly (see page 13-71), or inspect the internal transmission. ■

NO—Repair or replace the reverse lockout solenoid (see page 13-9). ■

4. Start the engine.

Can you shift the transmission into the reverse?

YES—Intermittent failure, the system is OK at this time. ■

NO—Go to step 5.

5. Press the engine start/stop button to select the OFF mode.

6. Jump the SCS line with the HDS.

7. Disconnect ECM connector A (49P).

8. Disconnect the reverse lockout solenoid 2P connector.

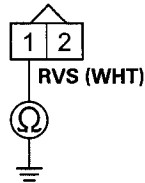
(cont'd)

Reverse Lockout System

Symptom Troubleshooting (cont'd)

9. Check for continuity between body ground and reverse lockout solenoid 2P connector terminal No. 1.

REVERSE LOCKOUT SOLENOID 2P CONNECTOR



Wire side of female terminals

Is there continuity?

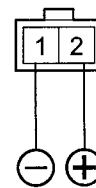
YES—Repair a short to body ground in the wire between the reverse lockout solenoid and the ECM. ■

NO—Check for loose terminals or poor connections at the ECM. If necessary, update the ECM if it does not have the latest software (see page 11-281), or substitute a known-good ECM (see page 11-7), then recheck. If the symptom goes away with a known-good ECM, replace the original ECM (see page 11-282). ■

Reverse Lockout Solenoid Test

1. Remove the reverse lockout solenoid (see page 13-9).
2. Connect jumper wires from the battery positive terminal to reverse lockout solenoid 2P connector terminal No. 2, and from the battery negative terminal to reverse lockout solenoid 2P connector terminal No. 1.

REVERSE LOCKOUT SOLENOID 2P CONNECTOR



Terminal side of male terminals

3. Make sure the reverse lockout solenoid works. If the reverse lockout solenoid does not work, replace it.

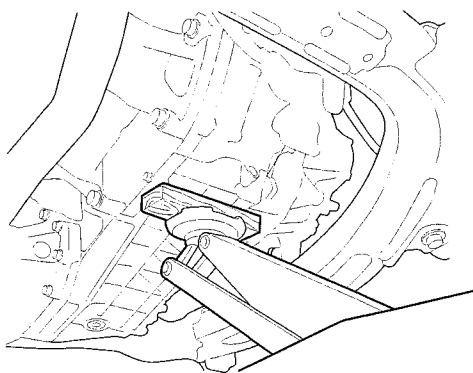
NOTE: The inhibitor should be pushed out when applying battery voltage to the solenoid, and the inhibitor should be released when there is no battery voltage at the solenoid.



Reverse Lockout Solenoid Disassembly/Reassembly

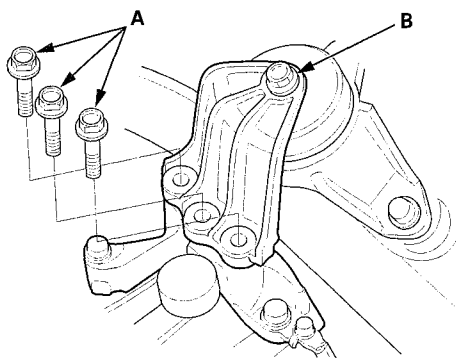
NOTE: Use fender covers to avoid damaging painted surfaces.

1. Do the battery removal procedure (see page 22-87).
2. Remove the air cleaner assembly (see page 11-421).
3. Remove the front splash shield (see page 20-205).
4. Support the under engine/transmission with a floor jack.

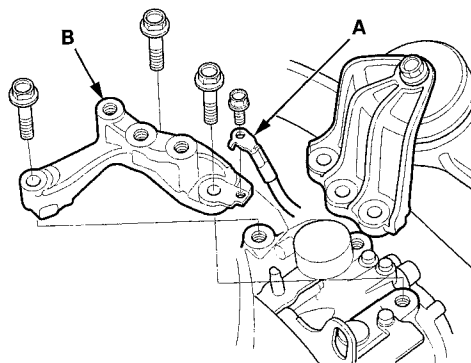


5. Remove the upper transmission mount bracket bolts (A).

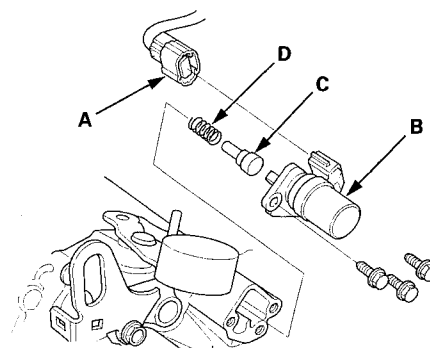
NOTE: Do not remove the bolt (B) from the upper transmission mount. If the bolt is removed, the upper transmission mount must be replaced as an assembly.



6. Disconnect the ground cable (A), then remove the upper transmission mount bracket (B).



7. Disconnect the reverse lockout solenoid connector (A).



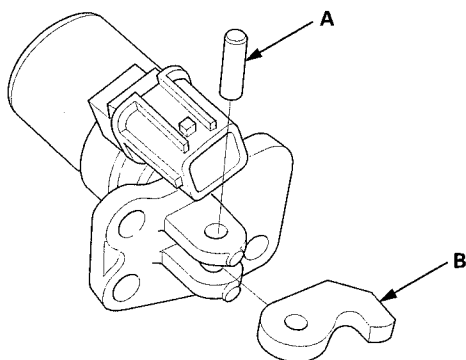
8. Remove the reverse lockout solenoid (B), the select lock pin (C), and the select lock pin spring (D).

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Reverse Lockout System

Reverse Lockout Solenoid Disassembly/Reassembly (cont'd)

9. Remove the pin (A) and the select lock cam (B).



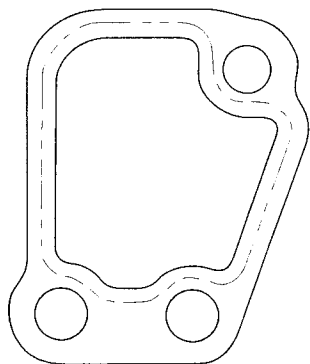
10. Install the components of the reverse lockout solenoid in the reverse order of removal.

11. Clean any dirt and oil from the sealing surface of the reverse lockout solenoid and the transmission housing.

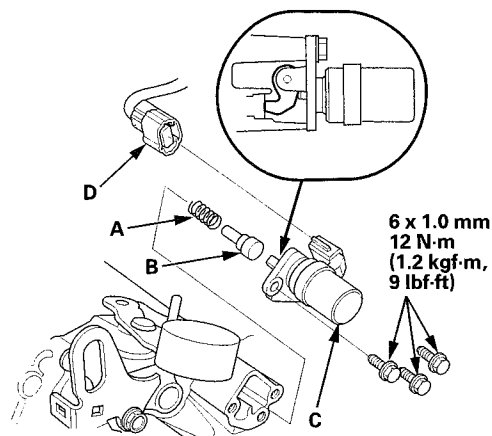
12. Apply liquid gasket, P/N 08717-0004, 08718-0001, 08718-0003, or 08718-0009 evenly to the transmission housing mating surface of the reverse lockout solenoid. Install the component within 5 minutes of applying the liquid gasket.

NOTE:

- If apply liquid gasket P/N 08718-0012, the component must be installed within 4 minutes.
- If too much time has passed after applying the liquid gasket, remove the old liquid gasket and residue, then reapply new liquid gasket.

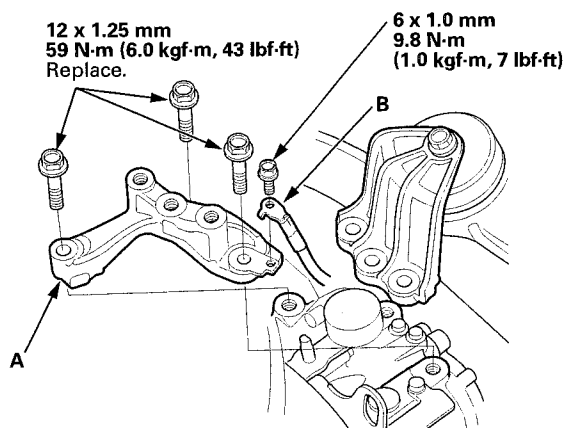


13. Install the select lock pin spring (A), the select lock pin (B), and the reverse lockout solenoid (C).



14. Connect the reverse lockout solenoid connector (D).

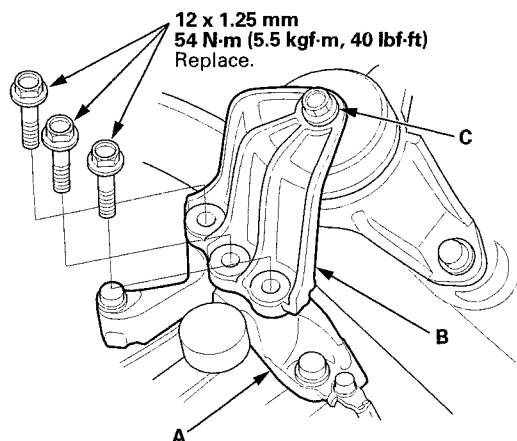
15. Install the upper transmission mount bracket (A) with new bolts, and connect the ground cable (B).





16. Connect the upper transmission mount bracket (A) and the upper transmission mount (B) with new bolts.

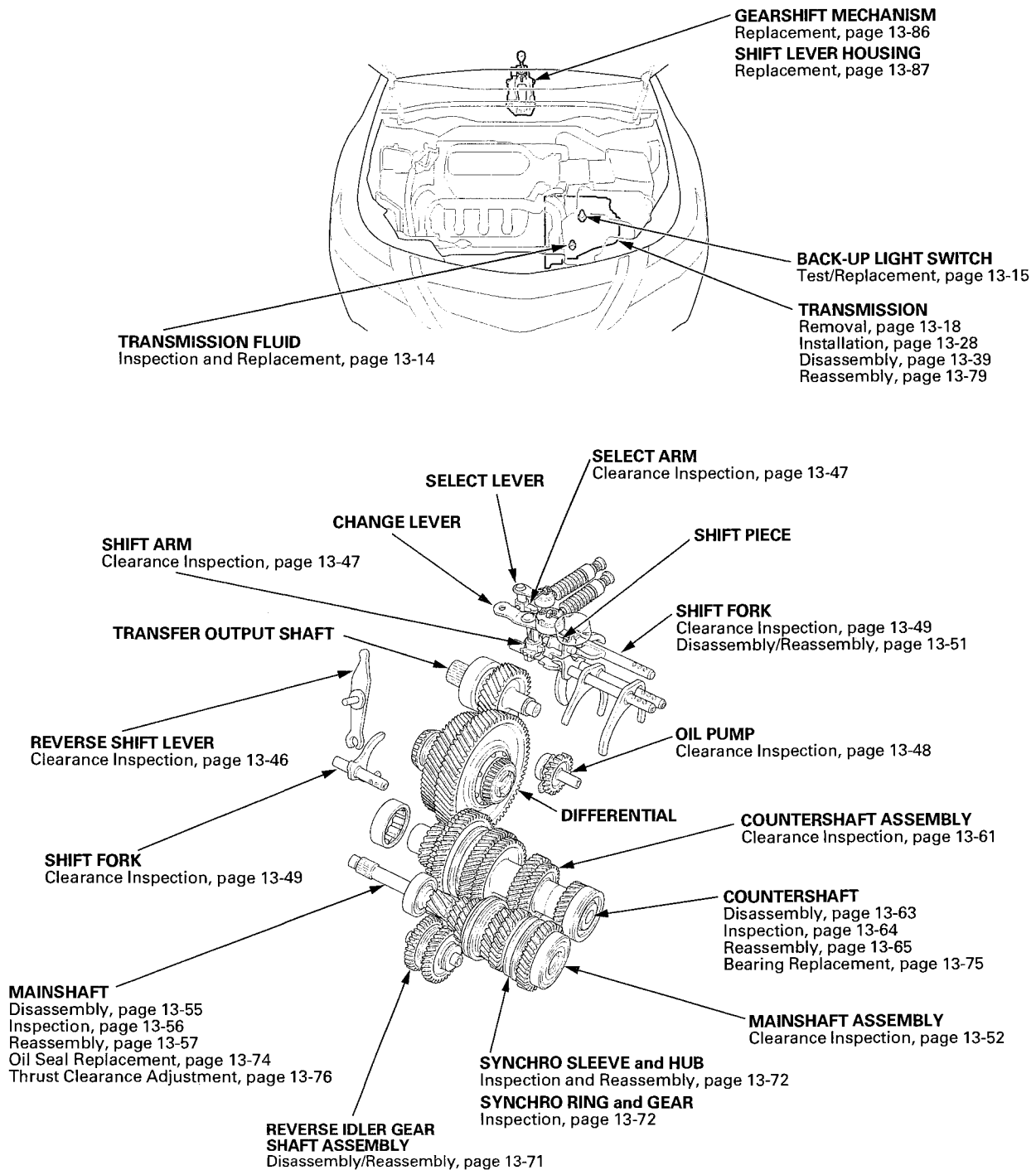
NOTE: If the bolt (C) was loosened by mistake during removal, the upper transmission mount must be replaced as an assembly.



17. Remove the floor jack that support the engine/transmission.
18. Install the front splash shield (see page 20-205).
19. Install the air cleaner assembly (see page 11-421).
20. Do the battery installation procedure (see page 22-87).

Manual Transmission

Component Location Index





Symptom Troubleshooting Index

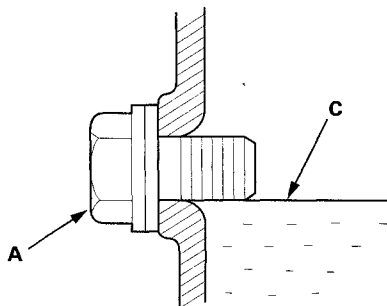
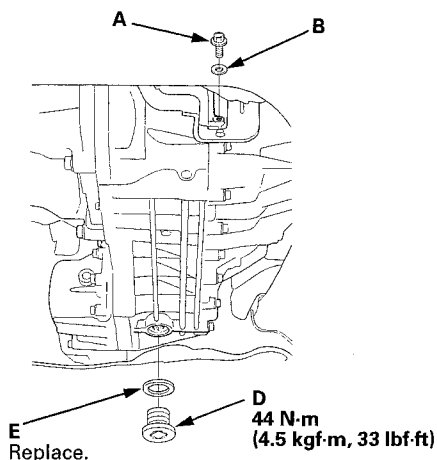
Symptom	Diagnostic procedure
Hard to shift into 1st gear	1. Check and/or replace the MTF (see page 13-14). 2. Check the clutch (see page 12-16). 3. Check the change lever and the select lever (see page 13-39). 4. Check the 1st synchro ring and 1st gear (see page 13-72). 5. Check the 1st/2nd synchro sleeve and hub (see page 13-72).
Hard to shift into 2nd gear	1. Check and/or replace the MTF (see page 13-14). 2. Check the change lever and the select lever (see page 13-39). 3. Check the 2nd synchro ring and 2nd gear (see page 13-72). 4. Check the 1st/2nd synchro sleeve and hub (see page 13-72).
Hard to shift into 3rd gear	1. Check and/or replace the MTF (see page 13-14). 2. Check the change lever and the select lever (see page 13-39). 3. Check the 3rd synchro ring and 3rd gear (see page 13-72). 4. Check the 3rd/4th synchro sleeve and hub (see page 13-72).
Hard to shift into 4th gear	1. Check and/or replace the MTF (see page 13-14). 2. Check the change lever and the select lever (see page 13-39). 3. Check the 4th synchro ring and 4th gear (see page 13-72). 4. Check the 3rd/4th synchro sleeve and hub (see page 13-72).
Hard to shift into 5th gear	1. Check and/or replace the MTF (see page 13-14). 2. Check the change lever and the select lever (see page 13-39). 3. Check the 5th synchro ring and 5th gear (see page 13-72). 4. Check the 5th/6th synchro sleeve and hub (see page 13-72).
Hard to shift into 6th gear	1. Check and/or replace the MTF (see page 13-14). 2. Check the change lever and the select lever (see page 13-39). 3. Check the 6th synchro ring and 6th gear (see page 13-72). 4. Check the 5th/6th synchro sleeve and hub (see page 13-72).
Hard to shift into reverse	1. Check and/or replace the MTF (see page 13-14). 2. Check the clutch (see page 12-16). 3. Check the change lever and the select lever (see page 13-39). 4. Check the reverse shift lever (see page 13-46). 5. Check the reverse shift fork and reverse idler gear (see page 13-49). 6. Check reverse gears.
HDS does not communicate with the ECM or the vehicle	Troubleshoot the DLC circuit (see page 11-258).
Driver can select reverse gear when vehicle speed is 12 mph (20 km/h) or more	Do the symptom troubleshooting (see page 13-6).
Driver cannot select reverse gear when vehicle speed is 9 mph (15 km/h) or less	Do the symptom troubleshooting (see page 13-7).
Noise from the transmission	1. Check and/or replace the MTF (see page 13-14). 2. Check the MTF level (unfilled or in surplus the transmission with the MTF). 3. Check the transmission gears. 4. Check the transmission bearings. 5. Check the differential carrier, the final driven gear, and the carrier bearings.
Shift lever does not operate smoothly	1. Check and/or replace the MTF (see page 13-14). 2. Check the shift cables and their joints (see page 13-86). 3. Check the shift lever housing with the shift lever shaft.
Transmission jumps out of gear	1. Check and/or replace the MTF (see page 13-14). 2. Check the detent ball springs. 3. Check the teeth of the synchro rings and the gears (see page 13-72). 4. Check for bent, deform, or damage of the shift forks.

Manual Transmission

Transmission Fluid Inspection and Replacement

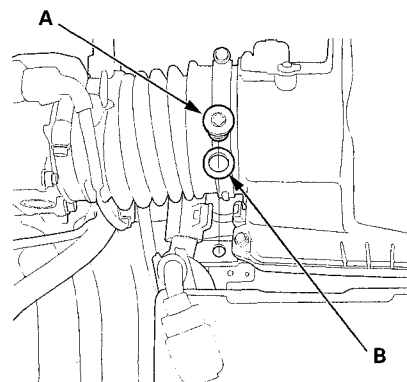
NOTE: Use fender covers to avoid damaging painted surfaces.

1. Raise the vehicle on a lift, and make sure it is securely supported.
2. Remove the front splash shield (see page 20-205).
3. Remove the fluid check bolt (A) and the sealing washer (B). Check the condition of the MTF and make sure it is at the proper level (C).



4. If the fluid is dirty, remove the drain plug (D) and the sealing washer (E), and drain the MTF.
5. Install the drain plug with a new sealing washer.
6. Lower the vehicle on the lift.

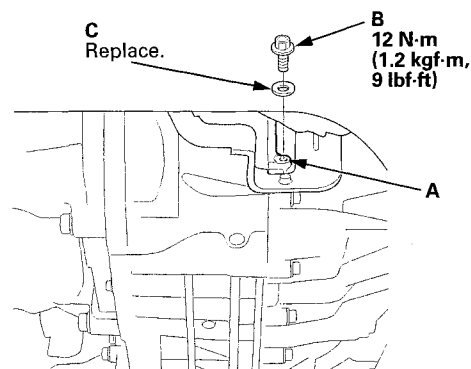
7. Remove the filler plug (A) and the sealing washer (B).



8. Refill the MTF from the filler plug hole on the transmission, until the MTF overflows from the fluid check bolt hole (A). Always use Acura Manual Transmission Fluid (MTF).

Fluid Capacity:

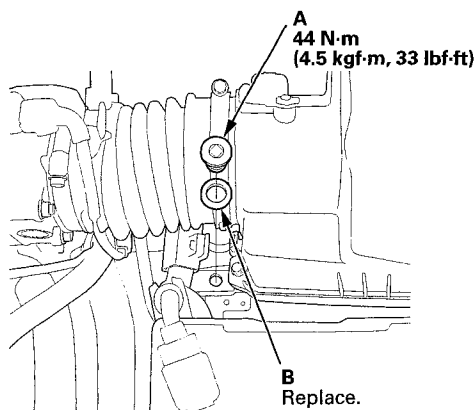
2.1 L (2.2 US qt) at fluid change
2.5 L (2.6 US qt) at overhaul



9. Raise the vehicle on a lift.
10. After the fluid stops overflowing, install the fluid check bolt (B) with a new sealing washer (C).
11. Install the front splash shield (see page 20-205).
12. Lower the vehicle on the lift.



13. Install the filler plug (A) with a new sealing washer (B).

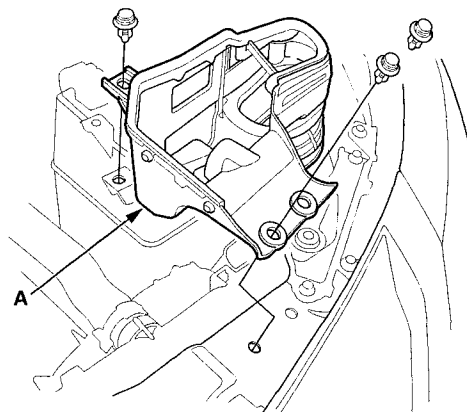


14. Connect the Honda Diagnostic System (HDS) to the data link connector (DLC) (see page 11-3).
15. Press the engine start/stop button to select the ON mode.
16. Make sure the HDS communicates with the vehicle and the engine control module (ECM). If it does not communicate, go to the DLC circuit troubleshooting (see page 11-258).
17. Select GAUGES MENU in the BODY ELECTRICAL with the HDS.
18. Select ADJUSTMENT in the GAUGES MENU with the HDS.
19. Select MAINTENANCE MINDER in the ADJUSTMENT with the HDS.
20. Select RESET in the MAINTENANCE MINDER with the HDS.
21. Select RESETTING THE MTF LIFE with the HDS.

Back-up Light Switch Test/Replacement

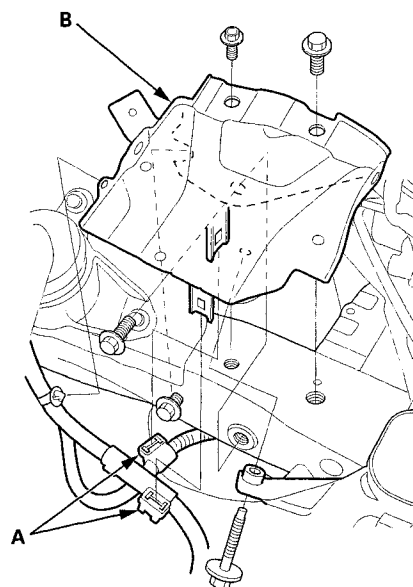
NOTE: Use fender covers to avoid damaging painted surfaces.

1. Remove the air intake duct splash separator (A).



2. Do the battery removal procedure (see page 22-87).

3. Remove the harness clamps (A), then remove the battery base (B).

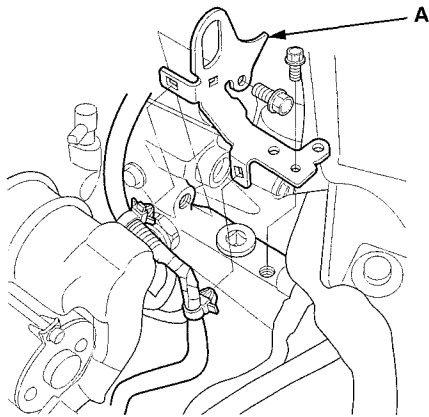


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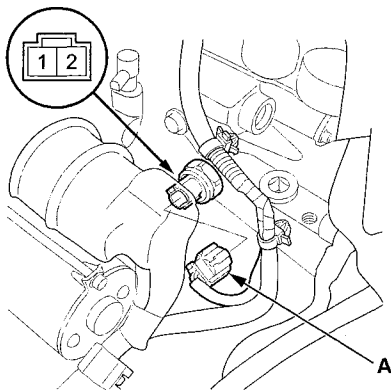
Manual Transmission

Back-up Light Switch Test/Replacement (cont'd)

4. Remove transmission hanger A.



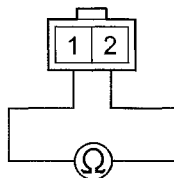
5. Disconnect the back-up light switch 2P connector (A).



6. Check for continuity between back-up light switch 2P connector terminals No. 1 and No. 2. There should be continuity only when the shift lever is in reverse.

- If the test result is OK, go to step 9.
- If the test result is not OK, go to step 7.

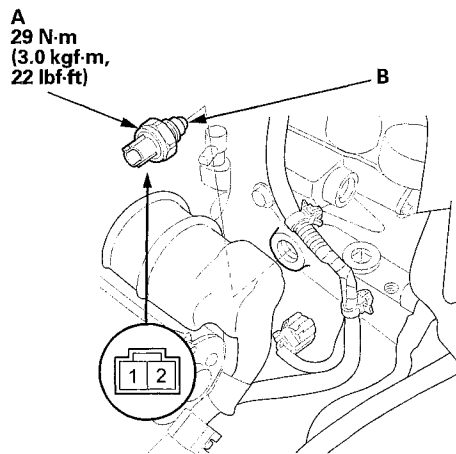
BACK-UP LIGHT SWITCH 2P CONNECTOR



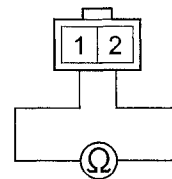
Terminal side of male terminals

7. Remove the back-up light switch (A). Check for continuity between back-up light switch 2P connector terminals No. 1 and No. 2. There should be continuity when the actuator (B) is pressed, and no continuity when the actuator is released.

- If the test result is OK, check the reverse shift mechanism in the transmission.
- If the test result is not OK, replace the back-up light switch.



BACK-UP LIGHT SWITCH 2P CONNECTOR



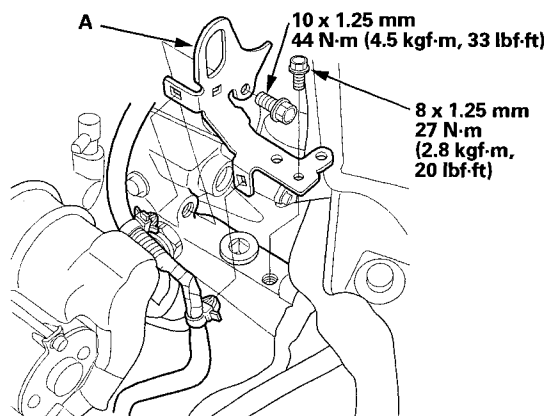
Terminal side of male terminals

8. Apply liquid gasket (P/N 08717-0004, 08718-0001, 08718-0012, 08718-0003, or P/N 08718-0009) to the threads of the back-up light switch, and install it on the transmission housing.

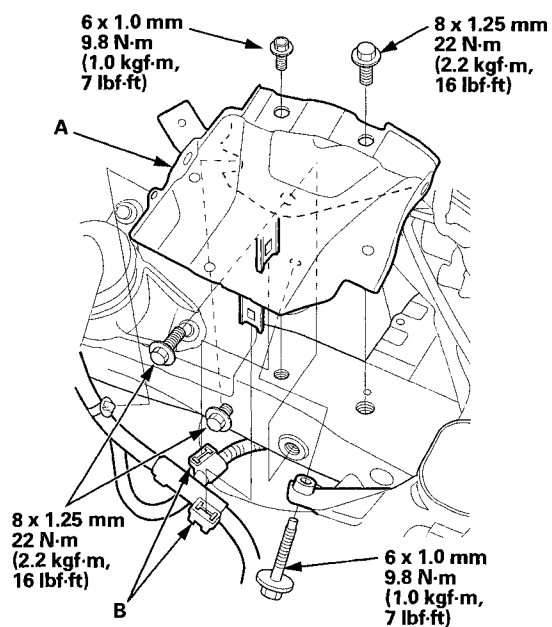
9. Connect the back-up light switch 2P connector.



10. Install transmission hanger A.

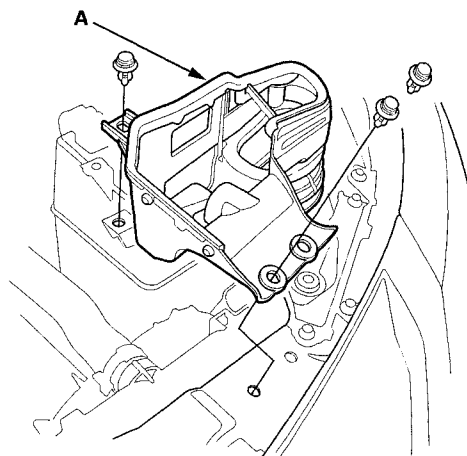


11. Install the battery base (A) and the harness clamps (B).



12. Do the battery installation procedure (see page 22-87).

13. Install the air intake duct splash separator (A).



Manual Transmission

Transmission Removal

Special Tools Required

- Engine Support Hanger, A and Reds AAR-T1256*
- Attachment Arm SIL02C000033*
- Subframe Adapter VSB02C000016*
- Engine Hanger Balance Bar VSB02C000019*

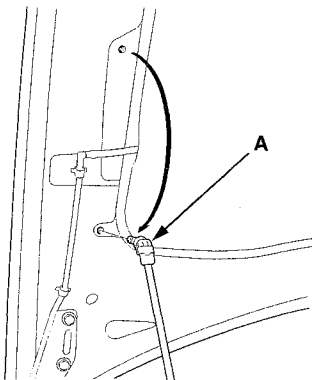
*: Available through the Acura Tool and Equipment Program 888-424-6857

SRS components are located in this area. Review the SRS component locations (see page 24-11) and the precautions and procedures (see page 24-13) before doing repairs or service.

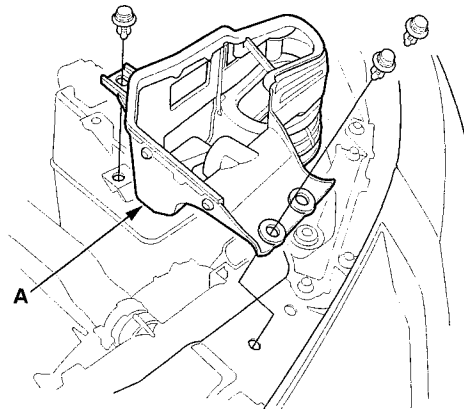
NOTE: Use fender covers to avoid damaging painted surfaces.

1. Remove the engine compartment cover (see page 20-186).
2. Disconnect the support strut (A) from the pivot ball on both sides (bolted to the hood). Raise and secure the hood in a vertical position. Remove the passenger's side pivot ball and install it into the lower threaded hole, then reattach the support strut.

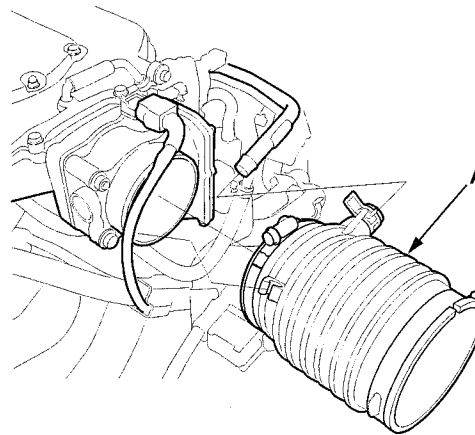
NOTE: Do not attempt to close the hood with the support strut in the vertical position; it will damage the support strut and the hood.



3. Remove the air intake duct splash separator (A).

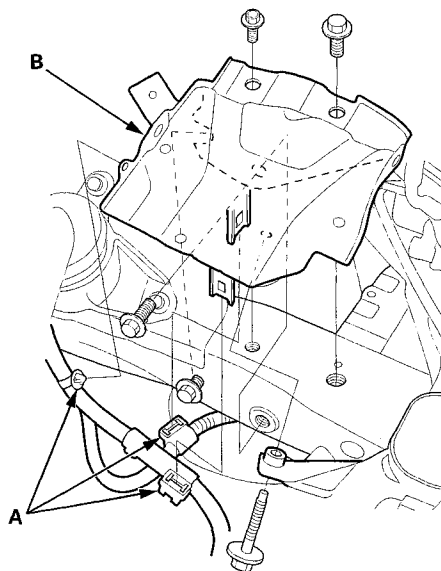


4. Do the battery removal procedure (see page 22-87).
5. Remove the air cleaner assembly (see page 11-421).
6. Remove the intake air duct (A).



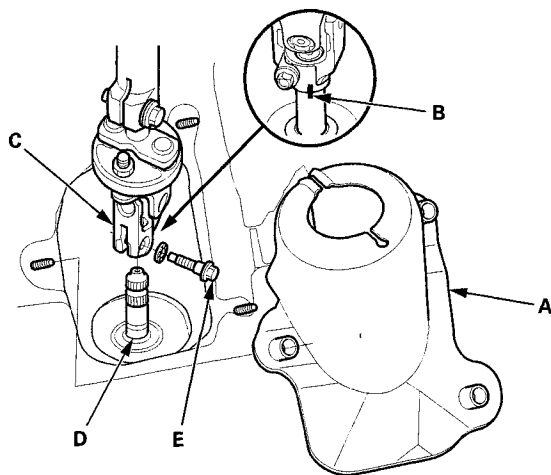


7. Remove the harness clamps (A), then remove the battery base (B).



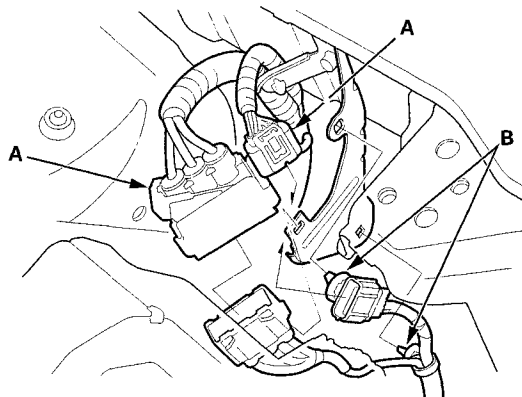
8. Set the steering wheel in the straight ahead position, then remove the steering wheel (see page 17-6).

9. Remove the steering joint cover (A).



10. Make reference marks (B) across the steering joint (C) and the steering gearbox pinion shaft (D). Remove the steering joint bolt (E), and disconnect the steering joint from the steering gearbox pinion shaft.

11. Disconnect the EPS connectors (A), and remove the harness clamps (B).

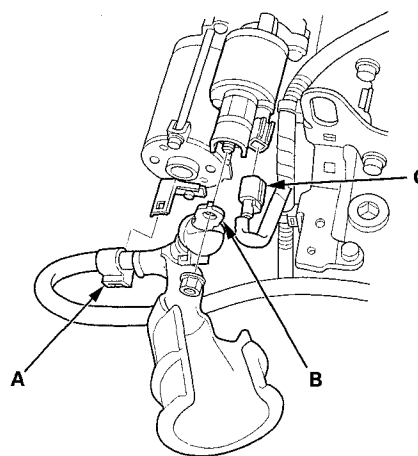


12. Raise the vehicle on a lift, and make sure it is securely supported.

13. Remove the front wheels.

14. Remove the strut brace (see page 20-210).

15. Remove the harness clamp (A), disconnect the positive starter cable (B) and the S terminal connector (C).

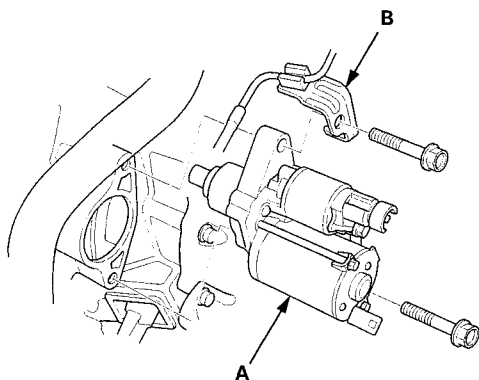


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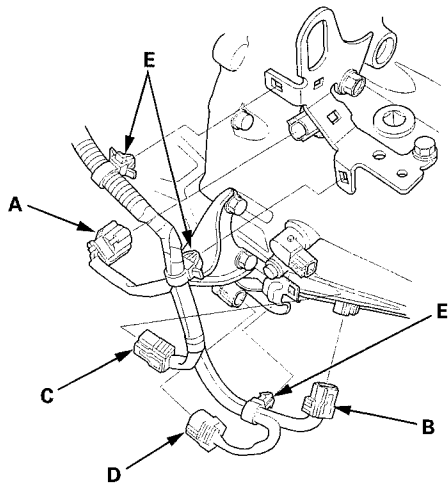
Manual Transmission

Transmission Removal (cont'd)

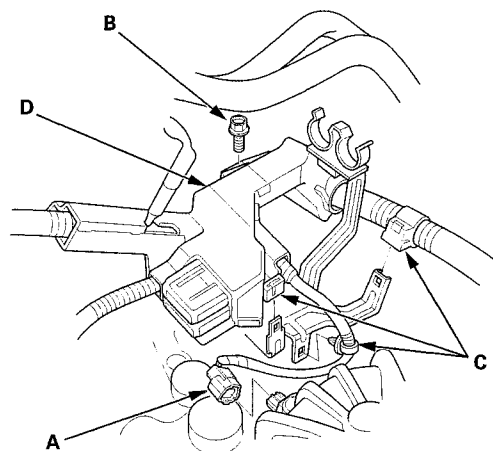
16. Remove the starter (A) and the vacuum pipe bracket (B).



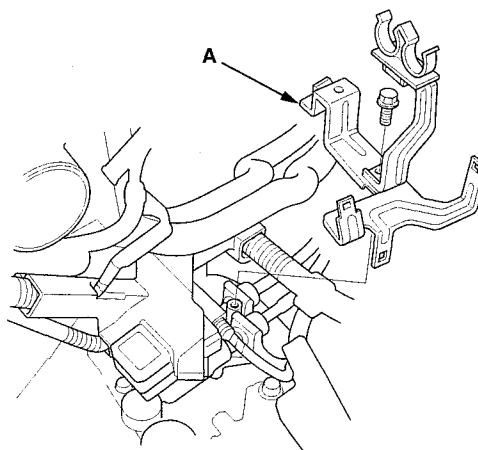
17. Disconnect the back-up light switch connector (A), the input shaft (mainshaft) speed sensor connector (B), the output shaft (countershaft) speed sensor connector (C), and the front secondary HO2S 4P connector (D), then remove the harness clamps (E).



18. Disconnect the reverse lockout solenoid connector (A), remove the harness holder mounting bolt (B) and the harness clamps (C), then swing the harness holder (D) out of the way.

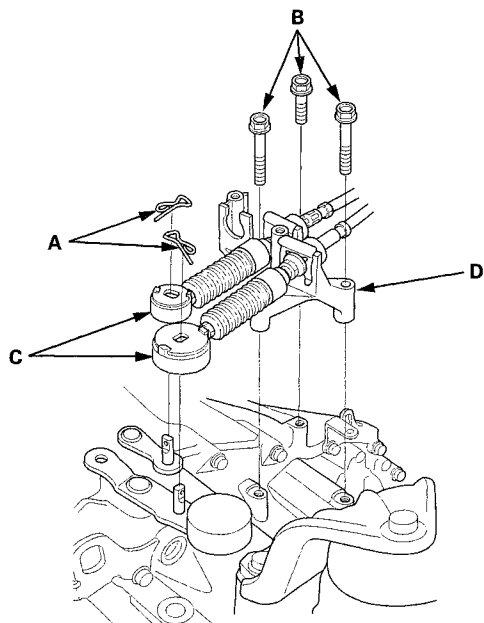


19. Remove the harness bracket (A).



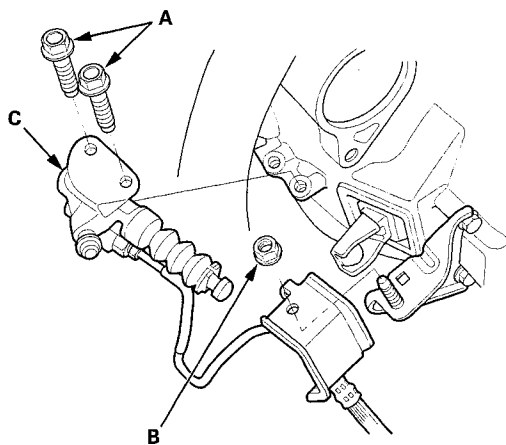


20. Remove the lock pins (A) and the shift cable bracket bolts (B), then carefully remove both cables (C) and the bracket (D) together out of the way to avoid bending the cables.

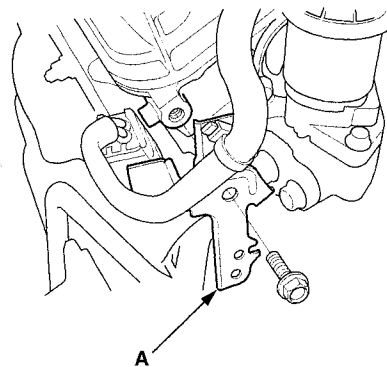


21. Remove the slave cylinder mounting bolts (A) and the clutch line bracket mounting nut (B), then carefully move the slave cylinder (C) out of the way to avoid bending the clutch line.

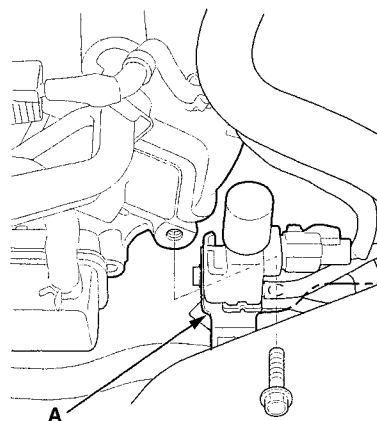
NOTE: Do not press the clutch pedal after the slave cylinder has been removed.



22. Remove the connector bracket (A) from the front cylinder head; use the bracket bolt hole to attach the engine hanger balance bar front arm.



23. Remove the engine mount control solenoid valve bracket (A) from the rear cylinder head; use the bracket bolt hole to attach the attachment arm.



(cont'd)

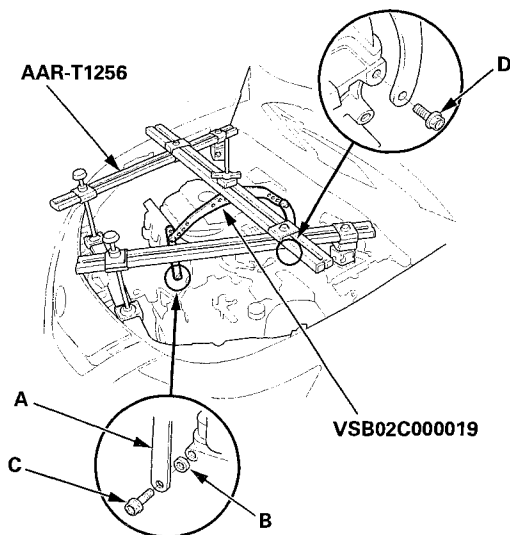
Manual Transmission

Transmission Removal (cont'd)

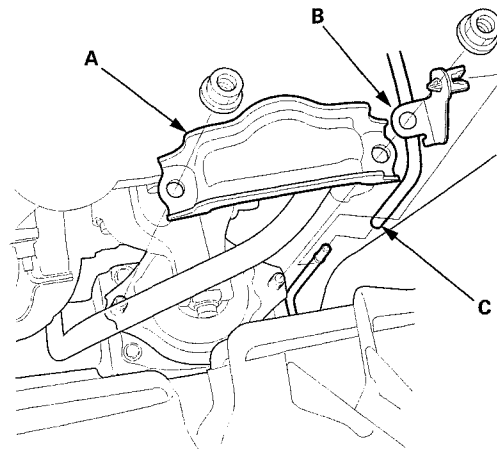
24. Lift and support the engine with the engine support hanger (AAR-T1256) and the engine hanger balance bar (VSB02C000019). Attach the front arm (A) to the front cylinder head with a spacer (B) and a 10 x 1.25 mm bolt (C). Attach the attachment arm (SIL02C000033) to the rear cylinder head with an 8 x 1.25mm bolt (D).

NOTE:

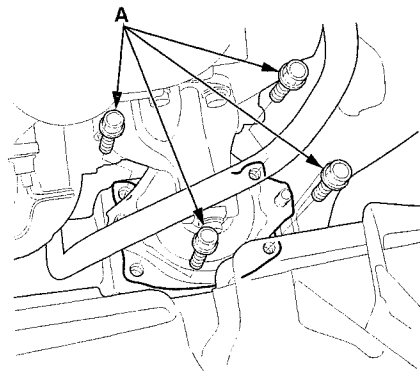
- Be careful when working around the windshield.
- Be careful not to damage the hood opener cable when installing the engine support hanger at the front bulkhead.



25. Remove the front engine mount stop (A) with the vacuum pipe bracket (B), and disconnect the vacuum hose (C).

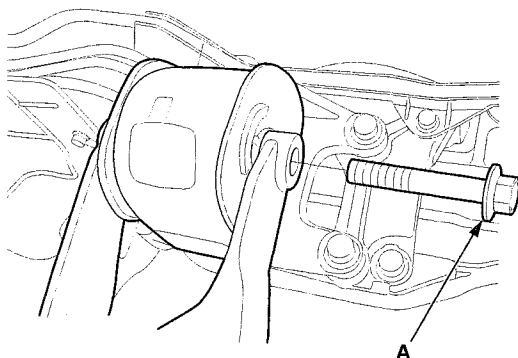


26. Remove the front engine mount bolts (A).



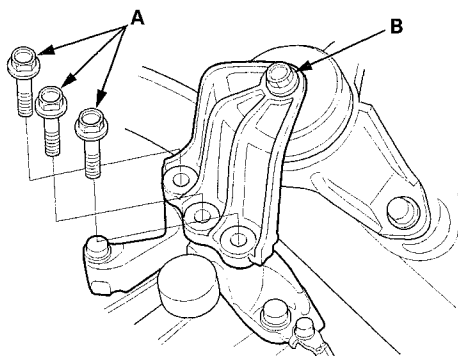


27. Remove the rear engine mount bolt (A).

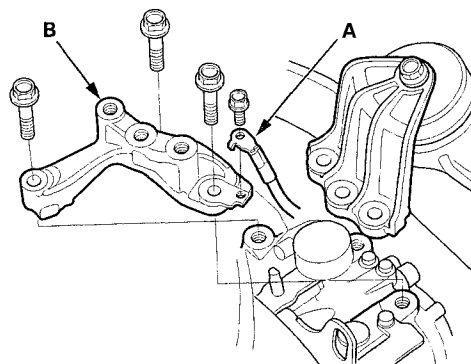


28. Remove the upper transmission mount bracket bolts (A).

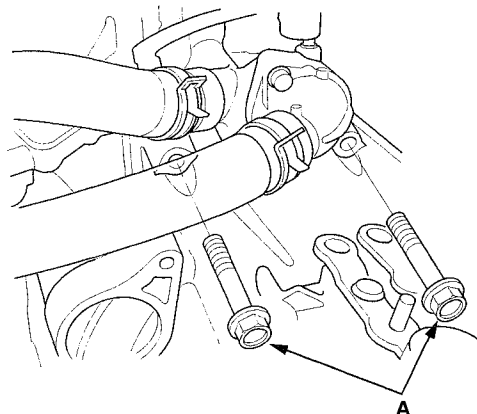
NOTE: Do not remove the bolt (B) from the upper transmission mount. If the bolt is removed, the upper transmission mount must be replaced as an assembly.



29. Disconnect the ground cable (A), then remove the upper transmission mount bracket (B).



30. Remove the upper transmission mounting bolts (A).



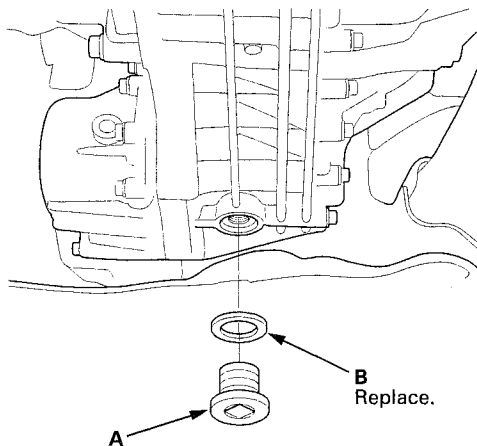
31. Remove the front splash shield (see page 20-205).

(cont'd)

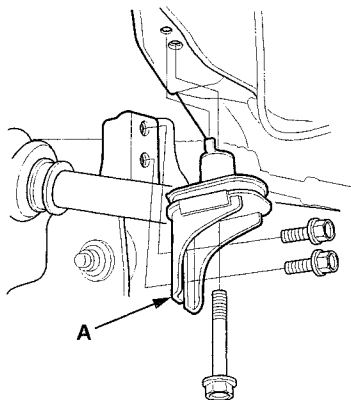
Manual Transmission

Transmission Removal (cont'd)

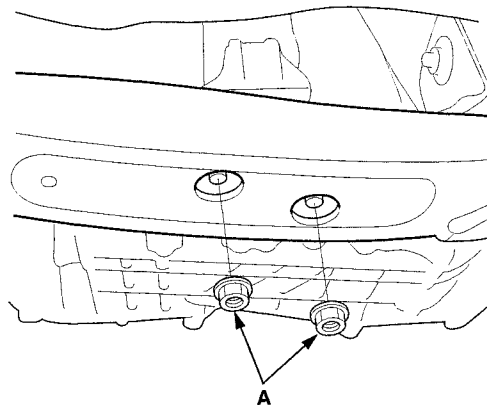
32. Remove the drain plug (A) and drain the MTF. Reinstall the drain plug with a new sealing washer (B).



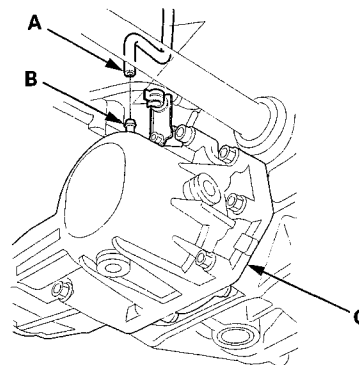
33. Remove exhaust pipes A and B (see page 9-10).
34. Remove the propeller shaft (see page 16-50).
35. Remove the damper fork (see page 18-31).
36. Remove the cotter pin from the tie-rod end ball joint, then remove the nut (see step 9 on page 18-15).
37. Disconnect the tie-rod end ball joint from the knuckle (see step 10 on page 18-15).
38. Remove the cotter pin from the knuckle ball joint, then remove the castle nut (see step 11 on page 18-15).
39. Disconnect the knuckle ball joint from the lower arm (see step 12 on page 18-15).
40. Remove the subframe mid mount (A).



41. Remove the lower transmission mount mounting nuts (A).

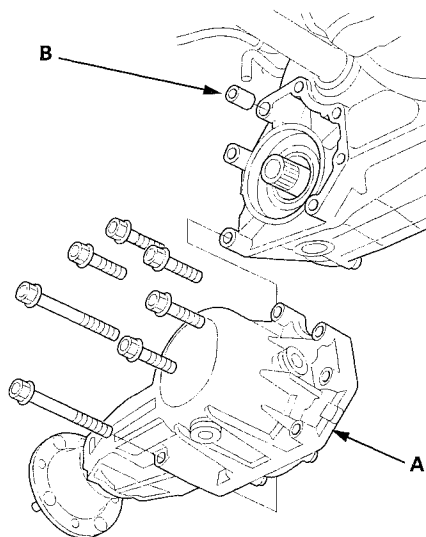


42. Disconnect the breather hose (A) from the breather pipe (B) on the transfer assembly (C).

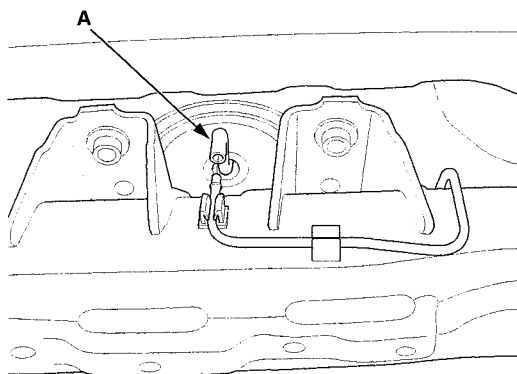




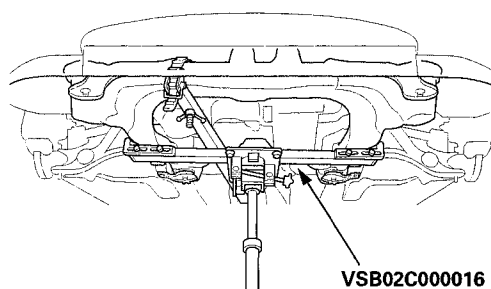
43. Remove the transfer assembly (A) and the dowel pin (B) from the transmission.



44. Disconnect the vacuum hose (A) located under the front engine mount.

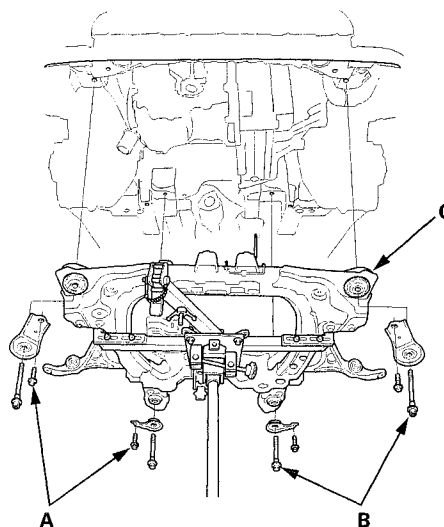


45. Attach the subframe adapter (VSB02C000016) to the front subframe and hang the belt of the subframe adapter over the front of the subframe, then secure the belt with its stop.



46. Raise the jack and line up the slots in the subframe adapter arms with the bolt holes on the jack base, then securely attach them with four bolts.

47. Remove the front stiffener mounting bolts (A) and the front subframe mounting bolts (B), then lower and remove the front subframe (C).



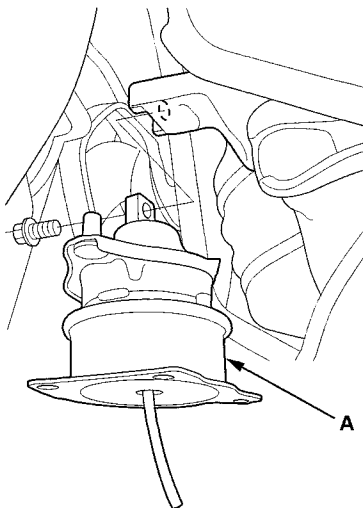
48. Support the transmission with a transmission jack.

(cont'd)

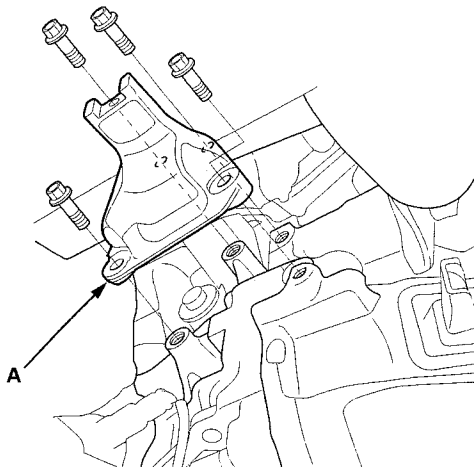
Manual Transmission

Transmission Removal (cont'd)

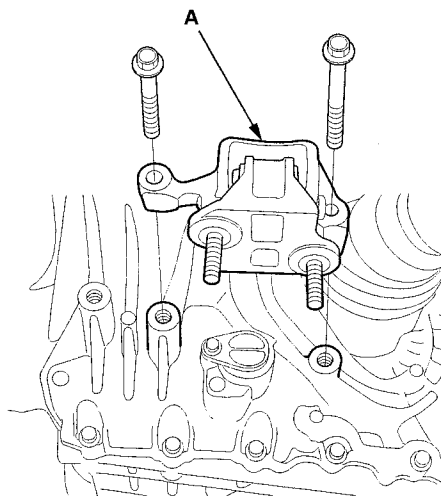
49. Remove the front engine mount (A).



50. Remove the front engine mount bracket (A).



51. Remove the lower transmission mount (A).

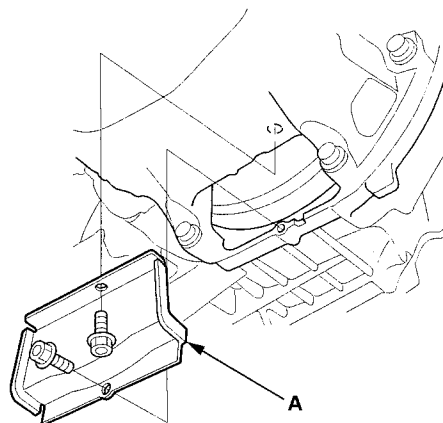


52. Separate the left driveshaft inboard joint from the differential (see step 10 on page 16-6).

53. Separate the right driveshaft inboard joint from the intermediate shaft (see step 11 on page 16-6).

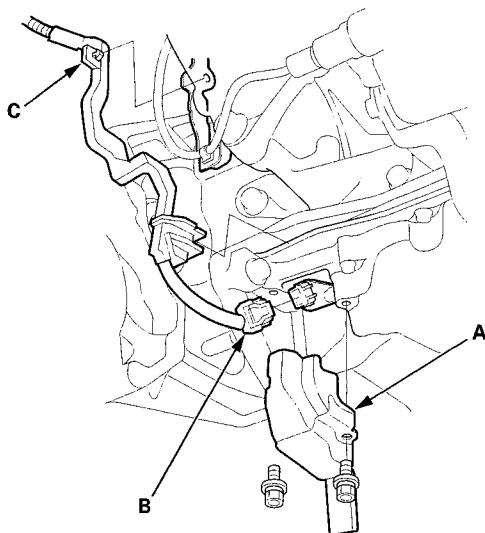
54. Remove the intermediate shaft (see page 16-23).

55. Remove the clutch cover (A).



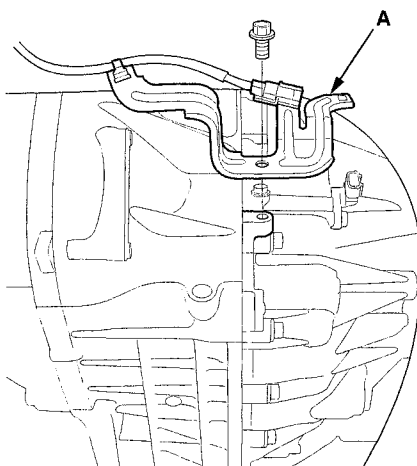


56. Remove the crankshaft position (CKP) sensor cover (A), and disconnect the CKP sensor connector (B).



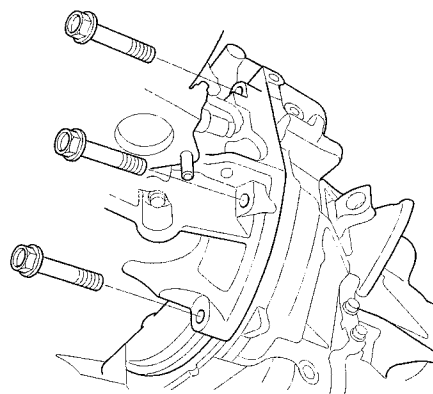
57. Remove the harness clamp (C).

58. Remove the harness clamp bracket (A).

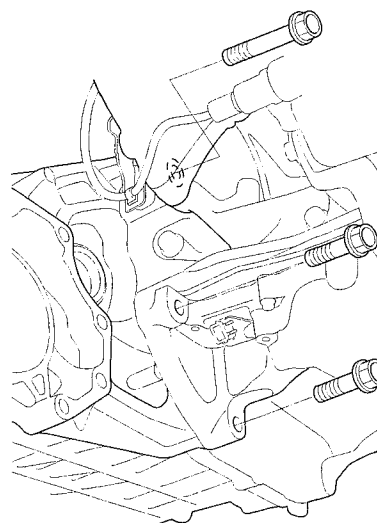


59. Remove the lower transmission mounting bolts.

Front side



Rear side



60. Pull the transmission away from the engine until the transmission mainshaft clears the clutch pressure plate.

61. Slowly lower the transmission about 150 mm (6 in). Check once again that all hoses and harnesses are disconnected and free from the transmission, then lower it completely.

Manual Transmission

Transmission Installation

Special Tools Required

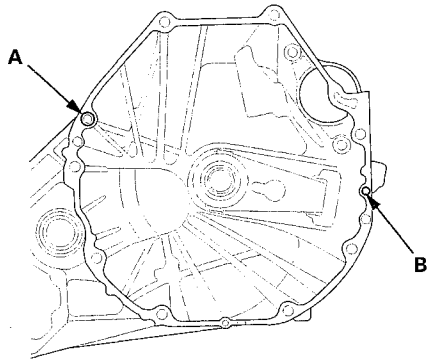
- Subframe Alignment Pin 070AG-SJAA10S
- Engine Support Hanger, A and Reds AAR-T1256*
- Attachment Arm SIL02C000033*
- Subframe Adapter VSB02C000016*
- Engine Hanger Balance Bar VSB02C000019*

*: Available through the Acura Tool and Equipment Program 888-424-6857

SRS components are located in this area. Review the SRS component locations (see page 24-11) and the precautions and procedures (see page 24-13) before doing repairs or service.

NOTE: Use fender covers to avoid damaging painted surfaces.

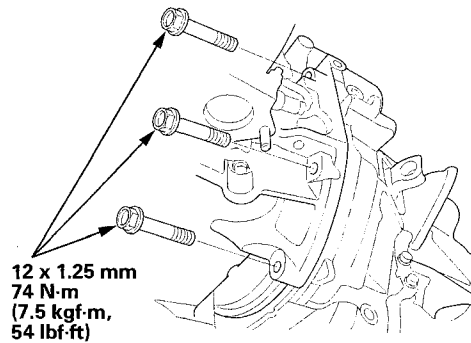
1. Check the release bearing, and reinstall the release bearing and the release fork with the appropriate grease (see page 12-21).
2. Make sure the 14 x 20 mm dowel pin (A) and the 10 x 20 mm dowel pin (B) are installed in the clutch housing.



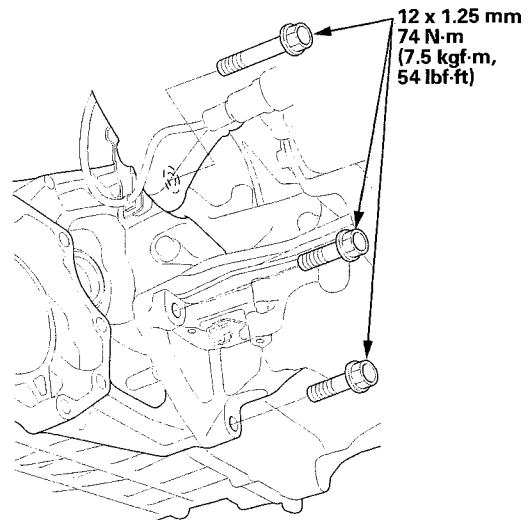
3. Place the transmission on the transmission jack, and raise it to the engine level.
4. Align the transmission mainshaft and the clutch pressure plate, then move the transmission inward until there is no gap between the transmission housing and the engine block.

5. Install the lower transmission mounting bolts.

Front side

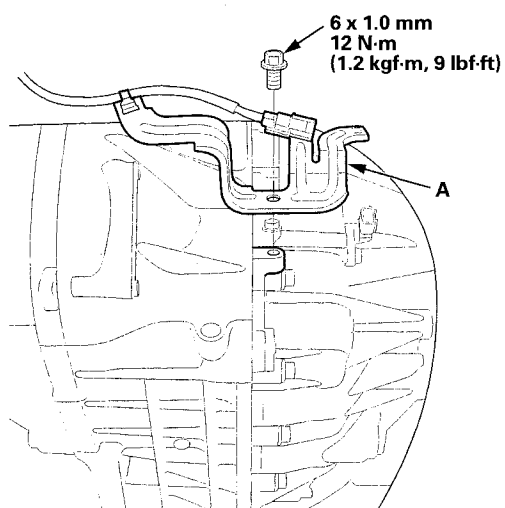


Rear side

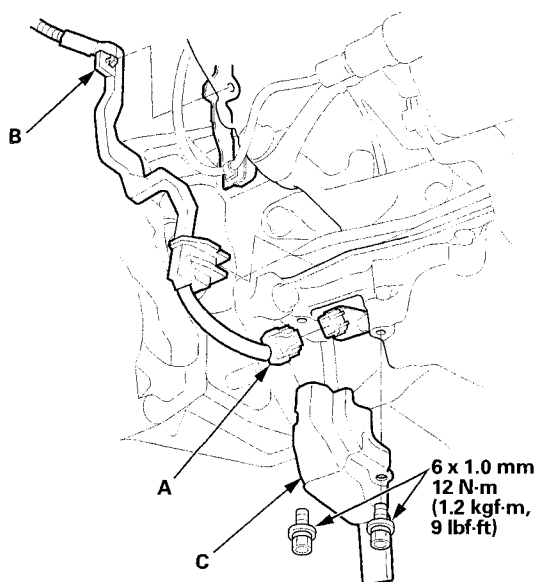




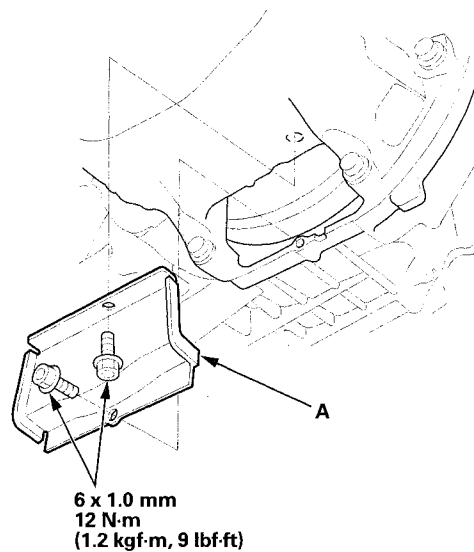
6. Install the harness clamp bracket (A).



7. Connect the CKP sensor connector (A), then install the harness clamp (B) and the CKP sensor cover (C).



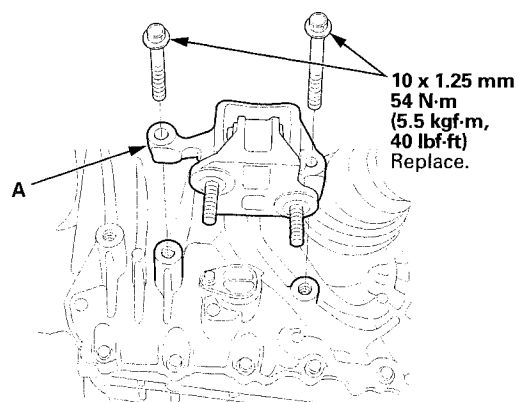
8. Install the clutch cover (A).



9. Install the intermediate shaft (see page 16-30).

10. Install both driveshafts (see page 16-20).

11. Install the lower transmission mount (A) with new bolts.

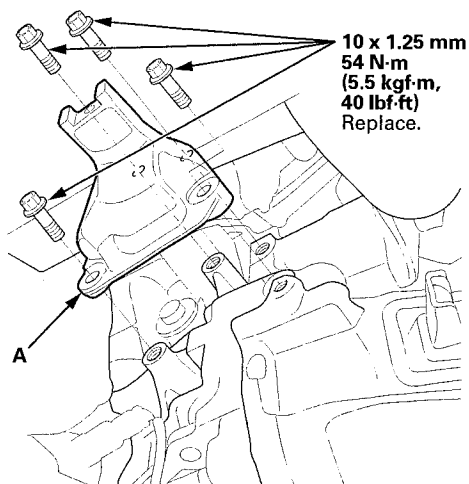


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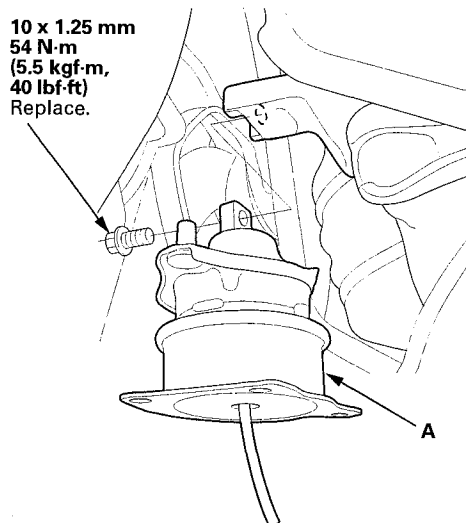
Manual Transmission

Transmission Installation (cont'd)

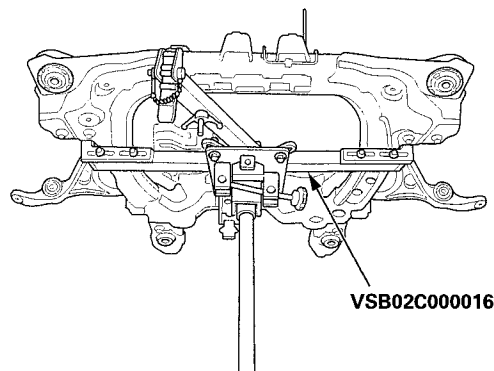
12. Install the front engine mount bracket (A) with new bolts.



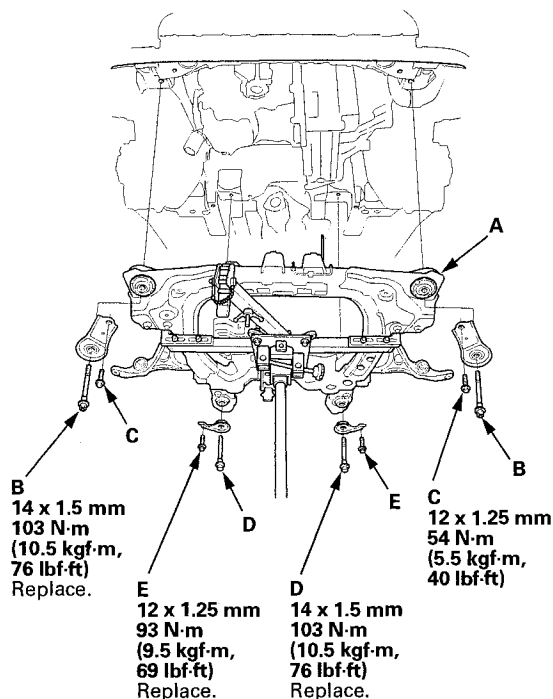
13. Install the front engine mount (A) with a new bolt by loosely tighten.



14. Support the front subframe with the subframe adapter (VSB02C000016) and a jack.



15. Lift the front subframe (A) up to the body.

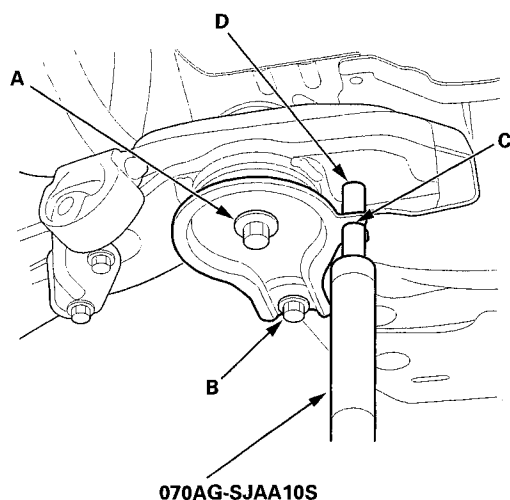


16. Install the front stiffeners; loosely install new bolts (B) to the body through the front subframe, and loosely install the bolts (C) to the body.

17. Install the rear stiffeners; loosely install new bolts (D) to the body through the front subframe, and loosely install new bolts (E) to the body.

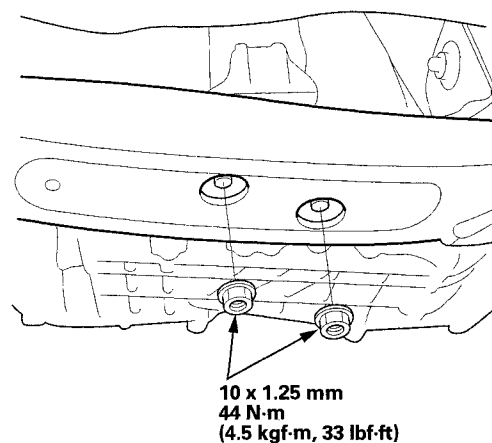


18. Loosely tighten the front subframe mounting bolt (A) and the stiffener mounting bolt (B) in the right rear stiffener, until the front subframe insulator contacts the body; insert the subframe alignment pin (070AG-SJAA10S) through the positioning slot (C) on the right rear stiffener, through the positioning hole (D) on the front subframe, and into the positioning hole on the body.

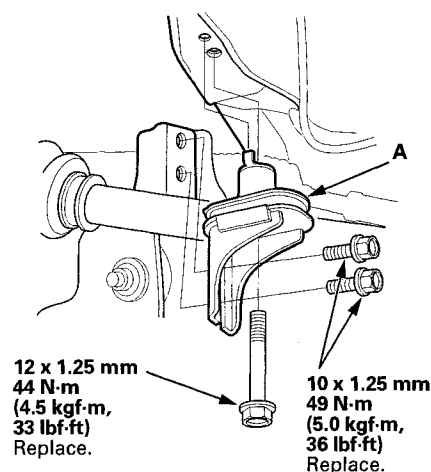


19. Loosely tighten the front subframe mounting bolt in the left rear stiffener in the same manner as in step 18.
20. Reinsert the subframe alignment pin through the positioning slot on the right rear stiffener, through the positioning hole on the front subframe, and into the positioning hole on the body, then tighten the front subframe mounting bolt to the specified torque.
21. Tighten the front subframe mounting bolt in the left rear stiffener in the same manner as in step 20.
22. Tighten the front subframe mounting bolts in the right front stiffener and the left front stiffener to the specified torque.
23. Check that the positioning holes and slots are aligned using the subframe alignment pin.
24. Tighten the front and rear stiffener mounting bolts to the specified torque.
25. Remove the subframe adapter and the jack.

26. Install the lower transmission mount mounting nuts.



27. Install the subframe mid mount (A) on both sides with new bolts.



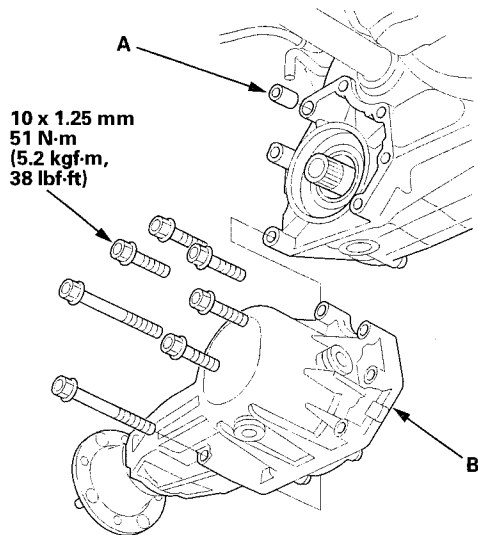
28. Install exhaust pipe A and B (see page 9-10).

(cont'd)

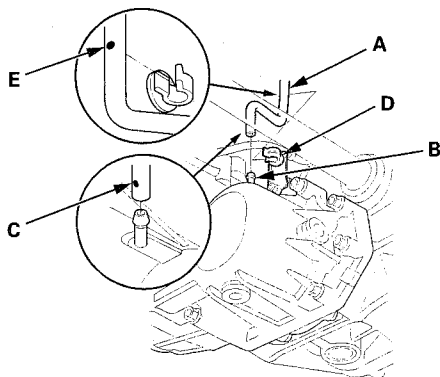
Manual Transmission

Transmission Installation (cont'd)

29. Install the dowel pin (A) in the transmission, and install the transfer assembly (B) on the transmission.

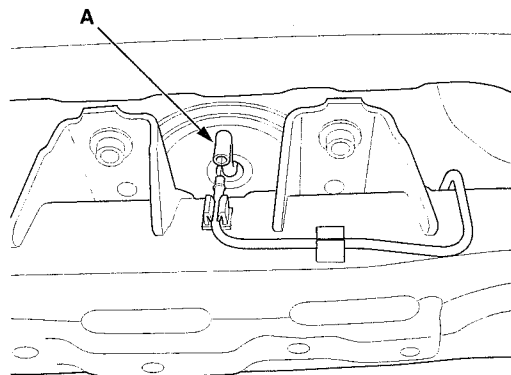


30. Connect the breather hose (A) over the breather pipe (B) with facing the dot mark (C) to the rear side of the vehicle, and install the hose on the clamp (D) at the dot mark (E).



31. Install the propeller shaft (see page 16-52).

32. Connect the vacuum hose (A) located under the front engine mount.



33. Connect the knuckle ball joint and the lower arm (see step 12 on page 18-15).

34. Install the cotter pin to the knuckle ball joint (see step 11 on page 18-15).

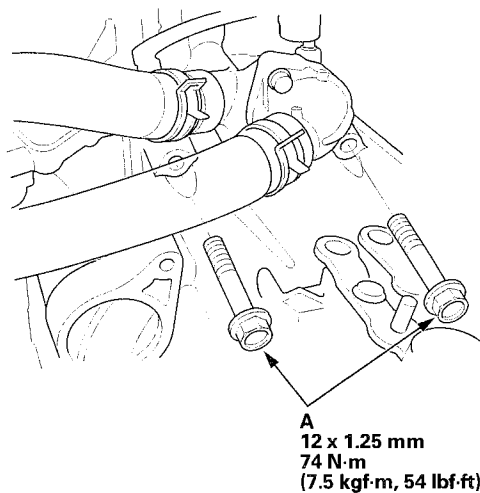
35. Connect the tie-rod end ball joint and the knuckle (see step 10 on page 18-15).

36. Install the cotter pin to the tie-rod end ball joint (see step 9 on page 18-15).

37. Install the damper fork (see page 18-32).

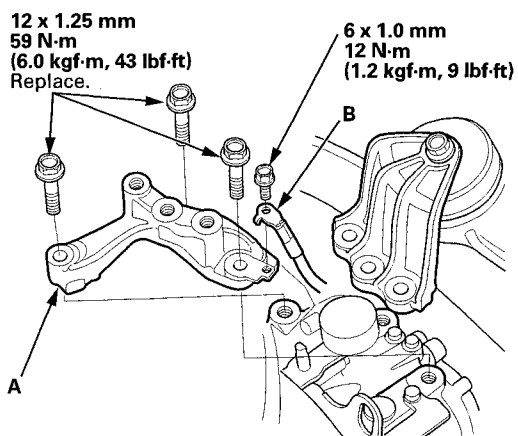
38. Lower the vehicle on the lift.

39. Install the upper transmission mounting bolts (A).



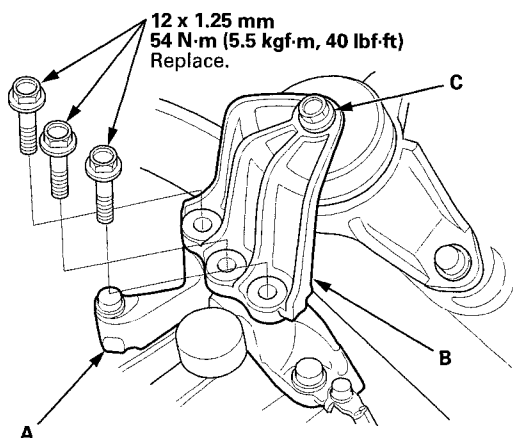


40. Install the upper transmission mount bracket (A) with new bolts, and connect the ground cable (B).

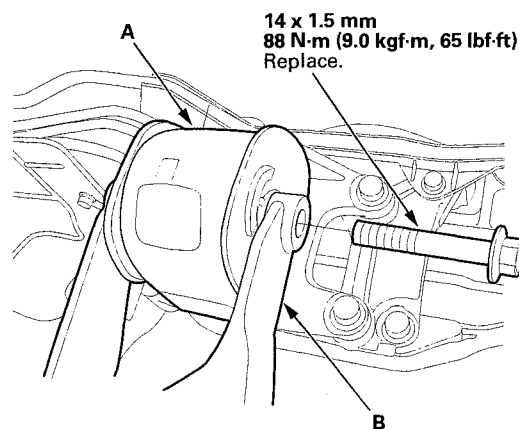


41. Connect the upper transmission mount bracket (A) and the upper transmission mount (B) with new bolts by loosely tighten.

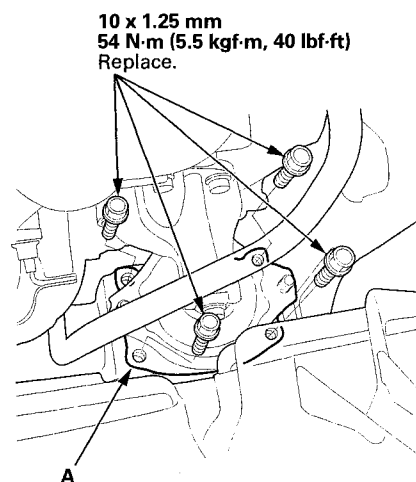
NOTE: If the bolt (C) was loosened by mistake during removal, the upper transmission mount must be replaced as an assembly.



42. Connect the rear engine mount (A) and the rear engine mount bracket (B) with a new bolt by loosely tighten.



43. Connect the front engine mount (A) and the front subframe with new bolts.

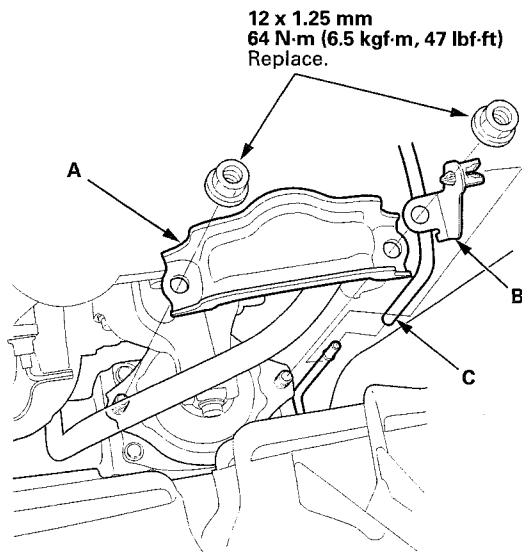


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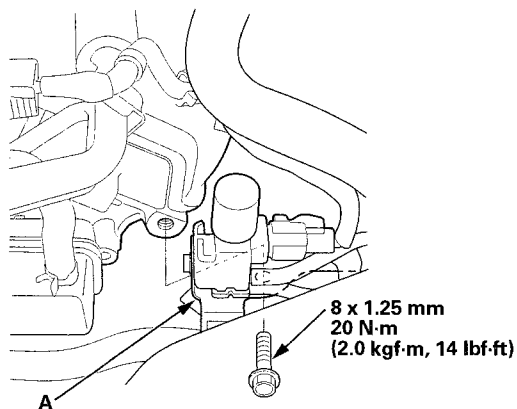
Manual Transmission

Transmission Installation (cont'd)

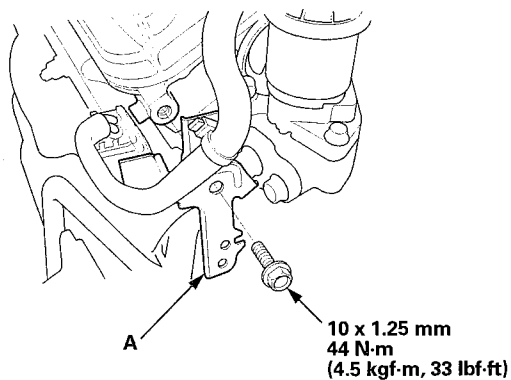
44. Install the front engine mount stop (A) and the vacuum pipe bracket (B) with new nuts, then connect the vacuum hose (C).



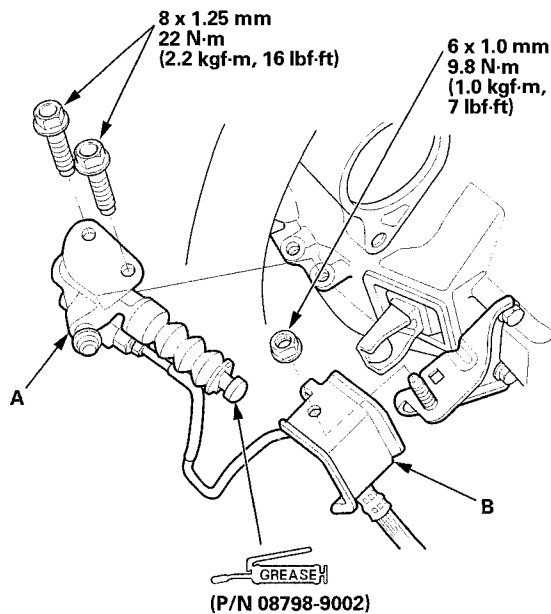
45. Remove the engine support hanger, the engine hanger balance bar, and the attachment arm from the engine.
46. Torque the bolts that were tightened loosely in steps 13, 41, and 42.
47. Install the engine mount control solenoid valve bracket (A) to the rear cylinder head.



48. Install the connector bracket (A) to the front cylinder head.



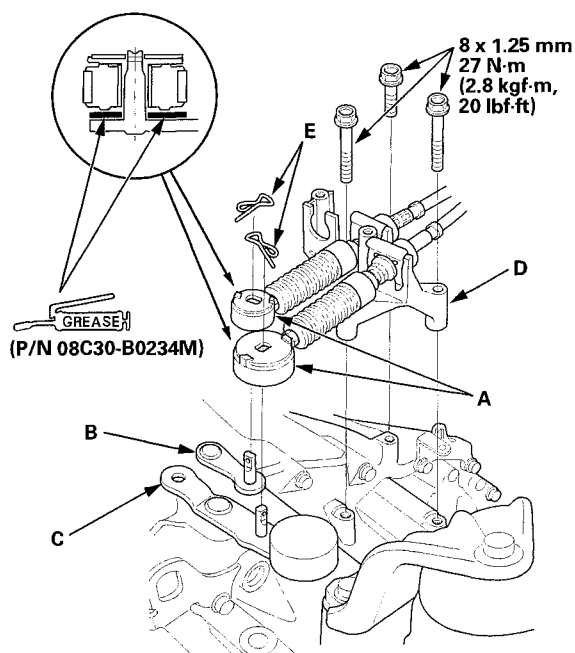
49. Apply a light coat of super high temp urea grease (P/N 08798-9002) to the end of the slave cylinder pushrod. Install the slave cylinder (A) and the clutch line bracket (B). Be careful not to bend the clutch line.



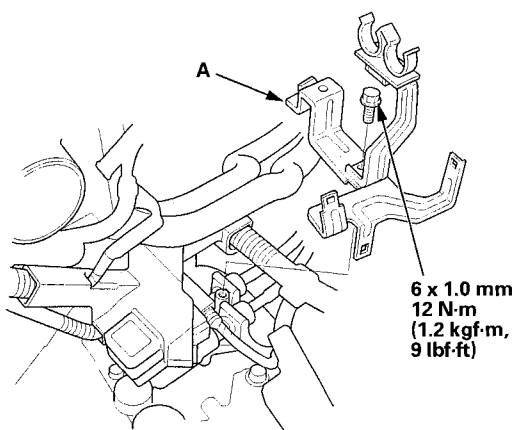


50. Apply a light coat of silicone grease (P/N 08C30-B0234M) to the cable ends (A) and connect the cable ends to the select lever (B) and the change lever (C), then install the shift cable bracket (D) and the lock pins (E). Do not bend or damage the shift cables.

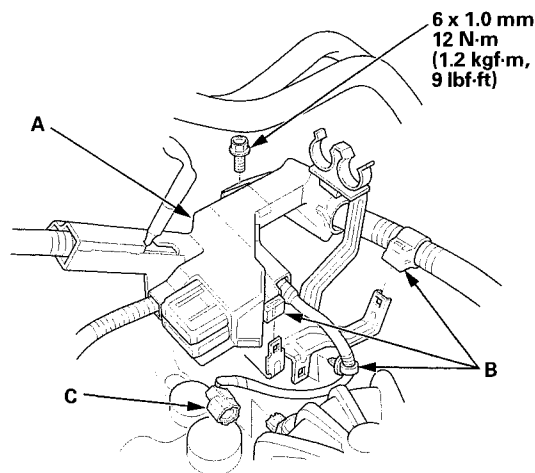
NOTE: Make sure not to get any silicone grease on the terminal part of the connectors and switches, especially if you have silicone grease on your hands or gloves.



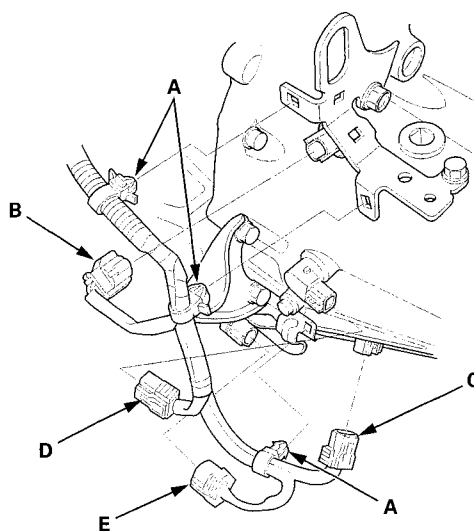
51. Install the harness bracket (A).



52. Install the harness holder (A) and the harness clamps (B), then connect the reverse lockout solenoid connector (C).



53. Install the harness clamps (A), then connect the back-up light switch connector (B), the input shaft (mainshaft) speed sensor connector (C), the output shaft (countershaft) speed sensor connector (D), and the front secondary HO2S 4P connector (E).

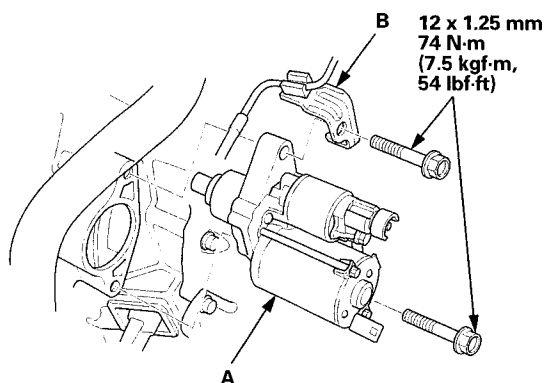


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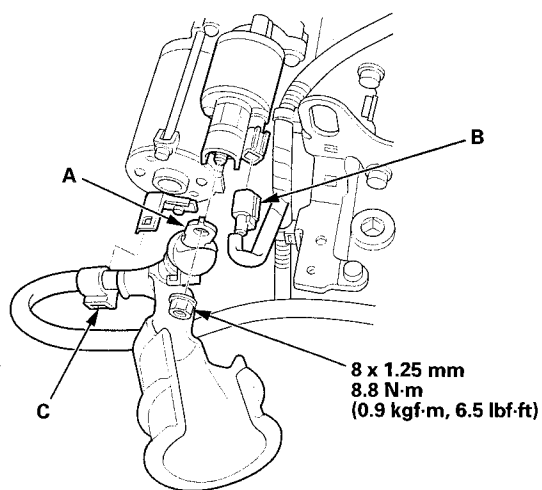
Manual Transmission

Transmission Installation (cont'd)

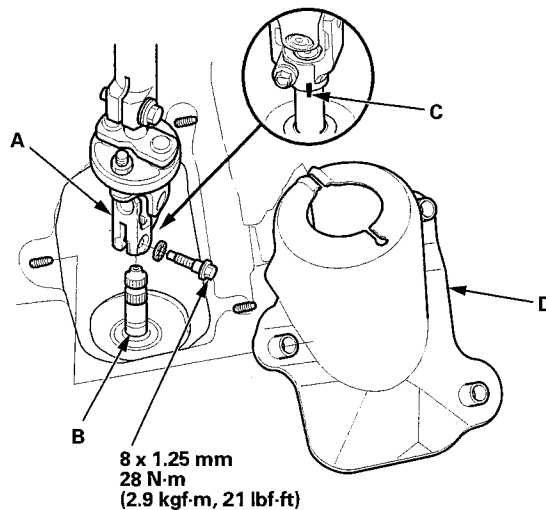
54. Install the starter (A) and the vacuum pipe bracket (B).



55. Connect the positive starter cable (A) and the S terminal connector (B), and install the harness clamp (C).



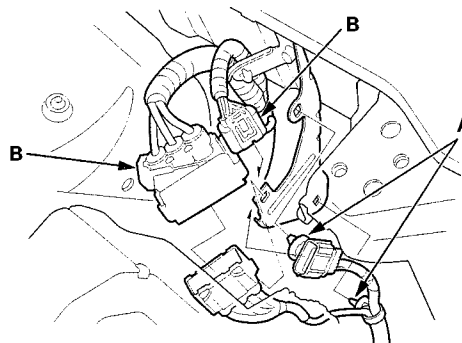
56. Connect the steering joint (A) and the steering gearbox pinion shaft (B) while aligning the reference marks (C) you made. Tighten the steering joint bolt.



57. Install the steering joint cover (D).

58. Install the steering wheel (see page 17-8).

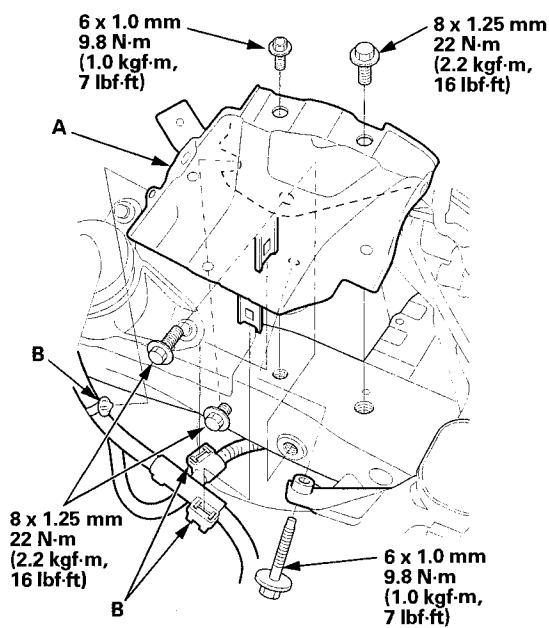
59. Install the harness clamps (A), then connect the EPS connectors (B).



60. Refill the transmission with MTF to the proper level (see page 13-14).

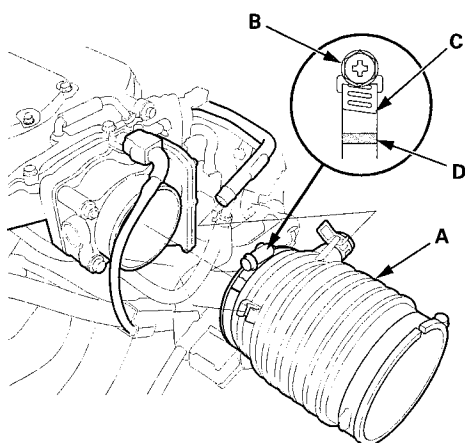


61. Install the battery base (A) and the harness clamps (B).



62. Install the intake air duct (A).

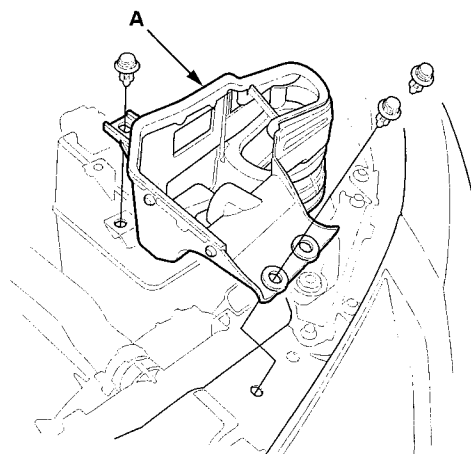
NOTE: When tightening the screw (B), align the edge (C) of the band with the mark (D) painted on the band.



63. Install the air cleaner assembly (see page 11-421).

64. Do the battery installation procedure (see page 22-87).

65. Install the air intake duct splash separator (A).



66. Install the splash shield (see page 20-205).

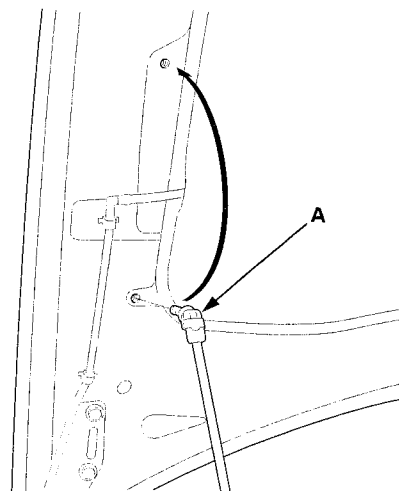
67. Place a floor jack under the lower arm, and raise the front suspension to load it with the vehicle's weight. Do not place the jack under the ball joint.

68. Torque the following parts to the specified torque.

- Damper fork mounting nut
- Damper pinch bolt
- Lower arm ball joint nut

69. Install the front strut brace (see page 20-210).

70. Install the support strut (A) on both sides to the proper location.



71. Install the engine compartment covers (see page 20-186).

(cont'd)

Manual Transmission

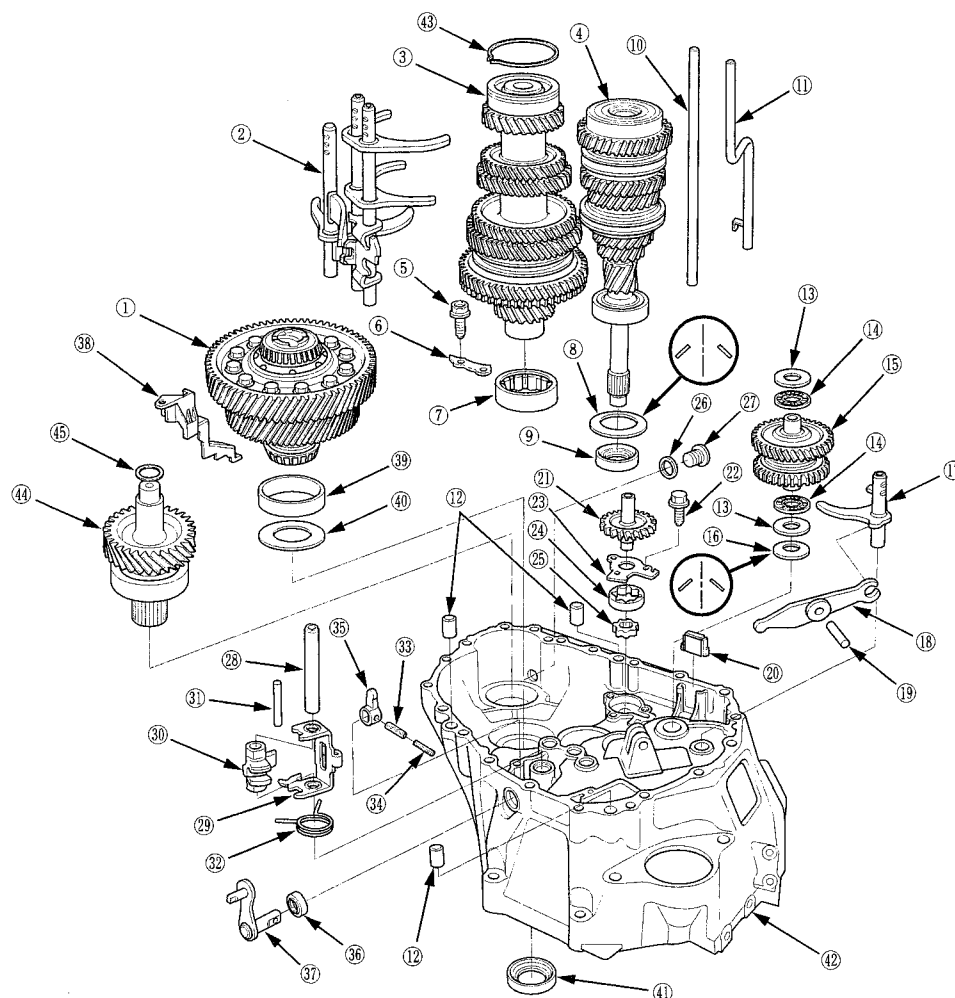
Transmission Installation (cont'd)

- 72. Check the wheel alignment (see page 18-5).
- 73. Check the shift lever and clutch operation.
- 74. Test-drive the vehicle.



Transmission Disassembly

Exploded View - Clutch Housing



- ① DIFFERENTIAL ASSEMBLY
- ② SHIFT FORK ASSEMBLY
- ③ COUNTERSHAFT ASSEMBLY
- ④ MAINSHAFT ASSEMBLY
- ⑤ 6 mm FLANGE BOLT
13 N·m (1.3 kgf-m, 9 lbf-ft)
- ⑥ BEARING SET PLATE
- ⑦ NEEDLE BEARING
- ⑧ 64 mm SPRING WASHER
- ⑨ 28 x 43 x 7 mm OIL SEAL
Replace.
- ⑩ OIL GUIDE PIPE A
- ⑪ OIL GUIDE PIPE
- ⑫ 14 x 20 mm DOWEL PIN
- ⑬ 25 mm THRUST WASHER
- ⑭ 25 mm THRUST NEEDLE BEARING
- ⑮ REVERSE IDLER GEAR SHAFT
ASSEMBLY
- ⑯ 36 mm SPRING WASHER

- ⑰ REVERSE SHIFT FORK
- ⑱ REVERSE SHIFT LEVER
- ⑲ 8 x 50 mm PIN
- ⑳ MAGNET
- ㉑ OIL PUMP SHAFT
- ㉒ 6 mm FLANGE BOLT
12 N·m (1.2 kgf-m, 9 lbf-ft)
- ㉓ OIL PUMP PLATE
- ㉔ OIL PUMP OUTER ROTOR
- ㉕ OIL PUMP INNER ROTOR
- ㉖ 20 mm SEALING WASHER
Replace.
- ㉗ DRAIN PLUG
44 N·m (4.5 kgf-m, 33 lbf-ft)
- ㉘ SHIFT PIECE SHAFT
- ㉙ INTERLOCK
- ㉚ SHIFT PIECE
- ㉛ 8 x 50 mm PIN
- ㉜ SELECT RETURN SPRING

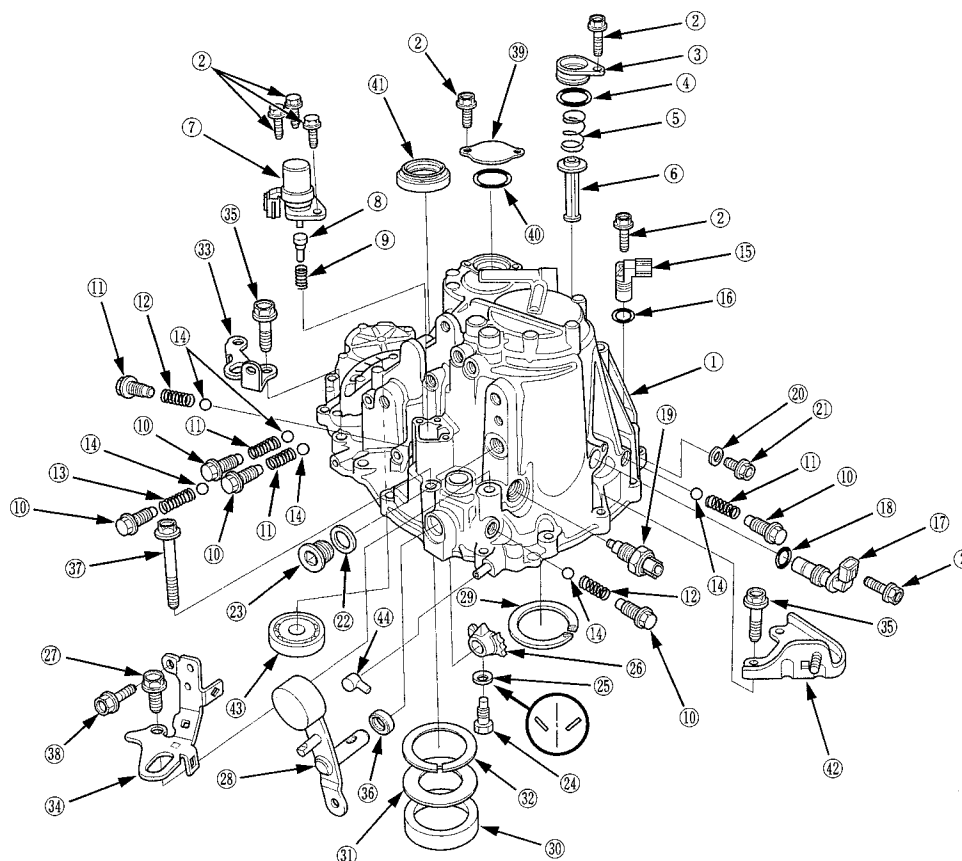
- ㉝ 5 x 22 mm SPRING PIN
Replace.
- ㉞ 3 x 22 mm SPRING PIN
Replace.
- ㉟ SELECT ARM
- ㊱ 14 x 20 x 4 mm DUST SEAL
Replace.
- ㊲ SELECT LEVER
- ㊳ OIL GUTTER PLATE
- ㊴ 45 x 80 x 21 mm BEARING OUTER RACE
- ㊵ 46 x 80 x 1 mm SPACER
- ㊶ 37 x 56 x 8 mm OIL SEAL
Replace.
- ㊷ CLUTCH HOUSING
- ㊸ 75 mm SNAP RING
- ㊹ TRANSFER OUTPUT SHAFT ASSEMBLY
- ㊺ 28.5 mm THRUST SHIM

(cont'd)

Manual Transmission

Transmission Disassembly (cont'd)

Exploded View - Transmission Housing

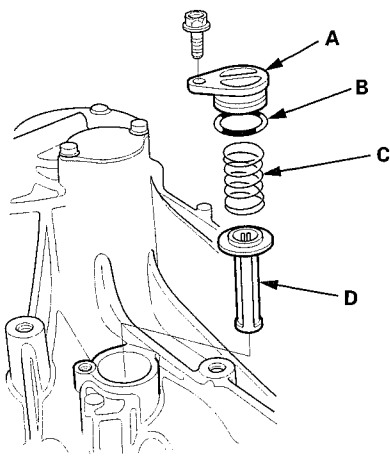


- | | | |
|--|--|--|
| ① TRANSMISSION HOUSING | ①⑦ OUTPUT SHAFT
(COUNTERSHAFT) SPEED SENSOR | ②⑨ 87 mm SHIM |
| ② 6 mm FLANGE BOLT
12 N-m (1.2 kgf-m, 9 lbf-ft) | ①⑧ O-RING
Replace. | ③① 50 x 81 x 18 mm BEARING OUTER RACE |
| ③ STRAINER COVER | ①⑨ BACK-UP LIGHT SWITCH
29 N-m (3.0 kgf-m, 22 lbf-ft) | ③② 46 x 81 x 1 mm SPACER |
| ④ O-RING
Replace. | ②① 6 mm SEALING WASHER
Replace. | ③③ 81 mm SHIM |
| ⑤ STRAINER SET SPRING | ②② FLUID CHECK BOLT
12 N-m (1.2 kgf-m, 9 lbf-ft) | ③④ TRANSMISSION HANGER B |
| ⑥ OIL PUMP STRAINER | ②③ 20 mm SEALING WASHER
Replace. | ③⑤ TRANSMISSION HANGER A |
| ⑦ REVERSE LOCKOUT SOLENOID | ②④ FILLER PLUG
44 N-m (4.5 kgf-m, 33 lbf-ft) | ③⑥ 10 x 42 mm FLANGE BOLT
44 N-m (4.5 kgf-m, 33 lbf-ft) |
| ⑧ SELECT LOCK PIN | ②⑤ 8 mm SPECIAL BOLT
31 N-m (3.2 kgf-m, 23 lbf-ft) | ③⑦ 16 x 23 x 5 mm DUST SEAL
Replace. |
| ⑨ SELECT LOCK PIN SPRING | ②⑥ 8 mm SPRING WASHER | ③⑧ 10 x 90 mm FLANGE BOLT
44 N-m (4.5 kgf-m, 33 lbf-ft) |
| ⑩ DETENT BOLT
22 N-m (2.2 kgf-m, 16 lbf-ft) | ②⑦ SHIFT ARM | ③⑨ 8 mm FLANGE BOLT
27 N-m (2.8 kgf-m, 20 lbf-ft) |
| ⑪ 27.4 mm SPRING (3) | ②⑧ 10 x 20 mm FLANGE BOLT
44 N-m (4.5 kgf-m, 33 lbf-ft) | ③⑩ TRANSMISSION CASE CAP |
| ⑫ 22.0 mm SPRING (2) | ②⑨ CHANGE LEVER | ④① O-RING
Replace. |
| ⑬ 26.1 mm SPRING (1) | | ④② 42 x 58 x 12.5 mm OIL SEAL
Replace. |
| ⑭ STEEL BALL | | ④③ CLUTCH LINE BRACKET |
| ⑮ INPUT SHAFT
(MAINSHAFT) SPEED SENSOR | | ④④ TRANSMISSION HOUSING BEARING |
| ⑯ O-RING
Replace. | | ④⑤ BREATHER CAP |

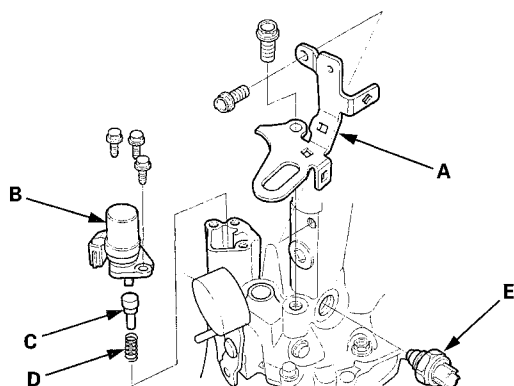


NOTE: Place the clutch housing on two pieces of wood thick enough to keep the mainshaft from hitting the workbench.

1. Remove the release bearing and the release fork (see page 12-21).
2. Remove the strainer cover (A), the O-ring (B), the strainer set spring (C), and the oil pump strainer (D).

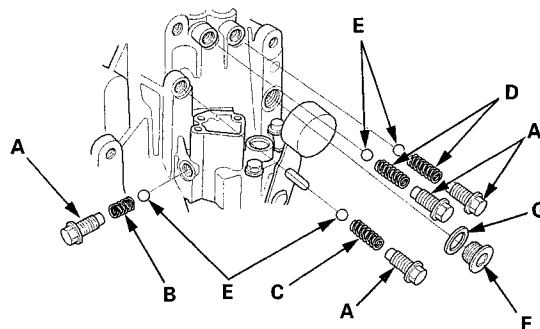


3. Remove transmission hanger A.

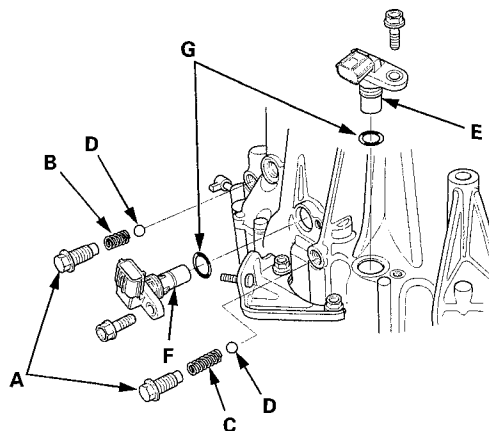


4. Remove the reverse lockout solenoid (B), the select lock pin (C), the select lock pin spring (D), and the back-up light switch (E).

5. Remove the detent bolts (A), the 22.0 mm spring (B), the 26.1 mm spring (C), the 27.4 mm springs (D), the steel balls (E), the filler plug (F), and the 20 mm sealing washer (G).



6. Remove the detent bolts (A), the 22.0 mm spring (B), the 27.4 mm spring (C), the steel balls (D), the input shaft (mainshaft) speed sensor (E), the output shaft (countershaft) speed sensor (F), and the O-rings (G).

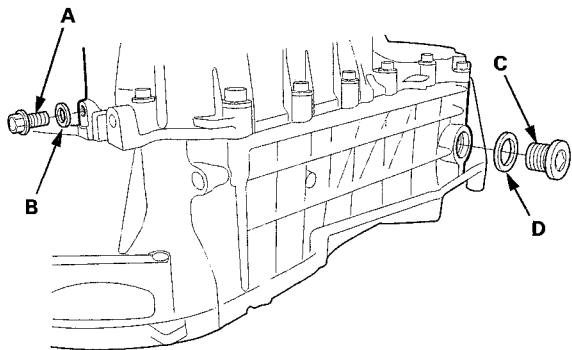


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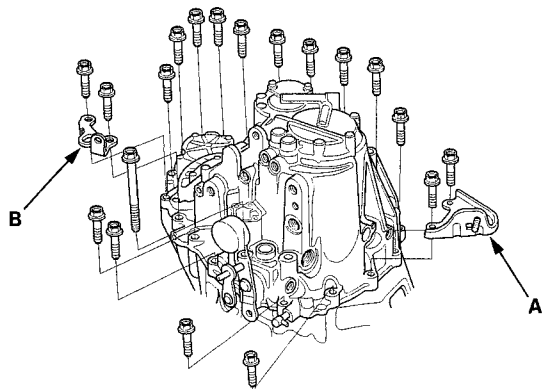
Manual Transmission

Transmission Disassembly (cont'd)

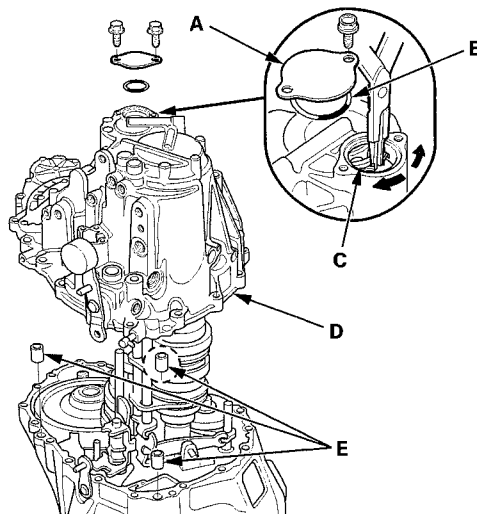
7. Remove the fluid check bolt (A), the 6 mm sealing washer (B), the drain plug (C), and the 20 mm sealing washer (D).



8. Loosen the 10 mm flange bolts in a crisscross pattern in several steps, then remove them with the clutch line bracket (A) and transmission hanger B.

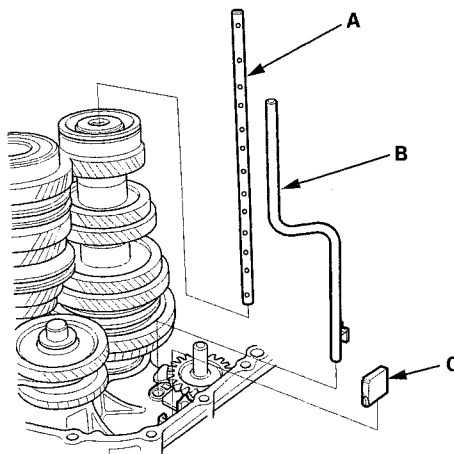


9. Remove the transmission case cap (A) and the O-ring (B).



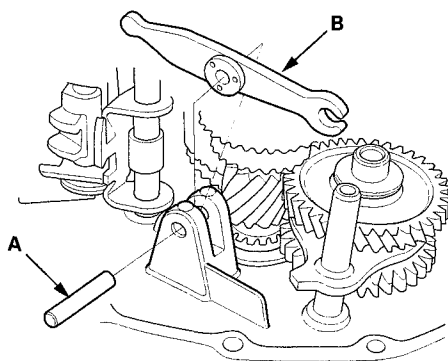
10. While expanding the 75 mm snap ring (C) on the countershaft ball bearing with snap ring pliers, lift the transmission housing (D). Release the snap ring pliers, and remove the transmission housing and the three 14 x 20 mm dowel pins (E).

11. Remove oil guide pipe A, the oil guide pipe (B), and the magnet (C).

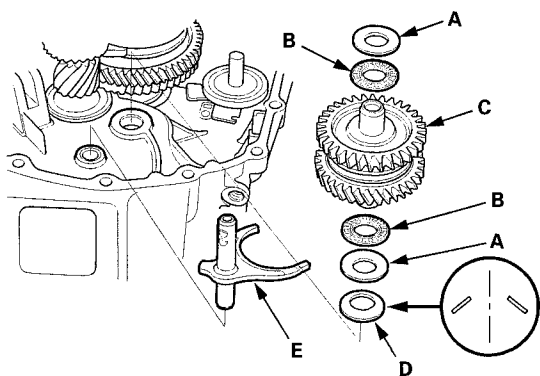




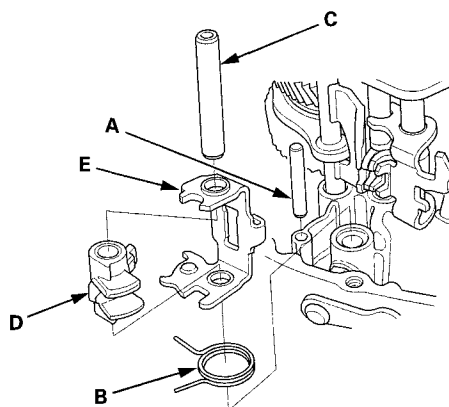
12. Remove the 8 x 50 mm pin (A) and the reverse shift lever (B).



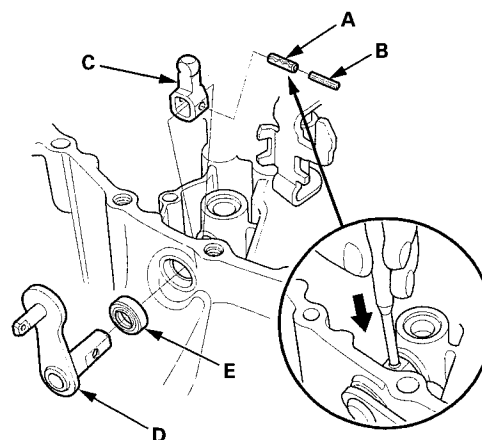
13. Remove the 25 mm thrust washers (A), the 25 mm thrust needle bearings (B), the reverse idler gear shaft assembly (C), the 36 mm spring washer (D), and the reverse shift fork (E) as an assembly.



14. Remove the 8 x 50 mm pin (A), the select return spring (B), the shift piece shaft (C), the shift piece (D), and the interlock (E).



15. Remove the 5 x 22 mm spring pin (A), the 3 x 22 mm spring pin (B), the select arm (C), the select lever (D), and the 14 x 20 x 4 mm dust seal (E).

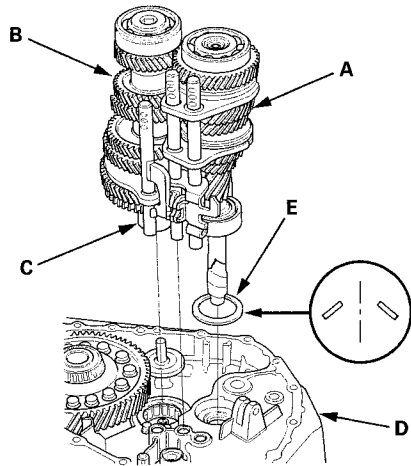


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Manual Transmission

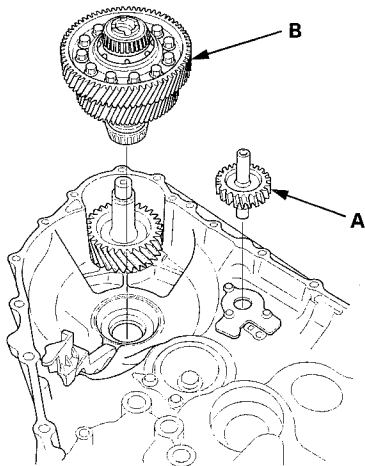
Transmission Disassembly (cont'd)

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

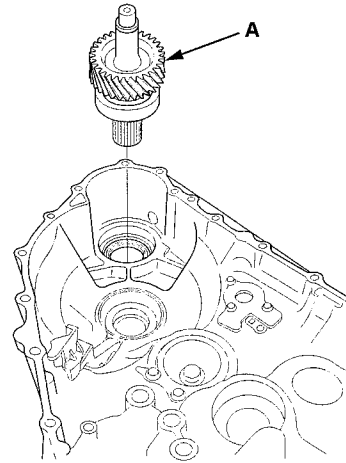


17. Remove the 64 mm spring washer (E).

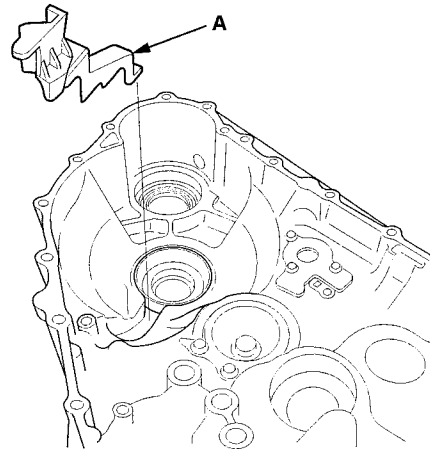
18. Remove the oil pump shaft (A) and the differential assembly (B).



19. Remove the transfer output shaft (A).

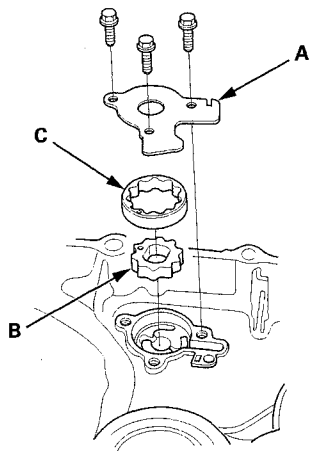


20. Remove the oil guide plate (A).

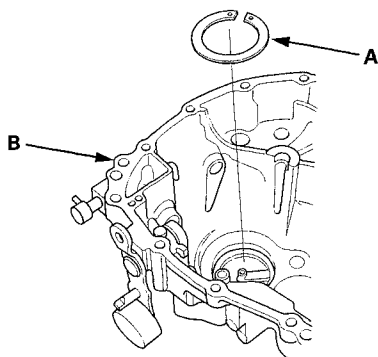




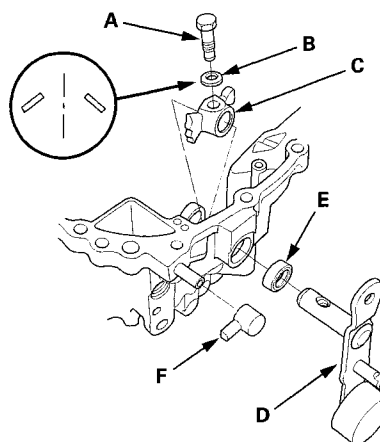
21. Remove the oil pump plate (A), the oil pump inner rotor (B), and the oil pump outer rotor (C).



22. Remove the 87 mm shim (A) from the transmission housing (B).



23. Remove the 8 mm special bolt (A), the 8 mm spring washer (B), the shift arm (C), the change lever (D), and the 16 x 23 x 5 mm dust seal (E).



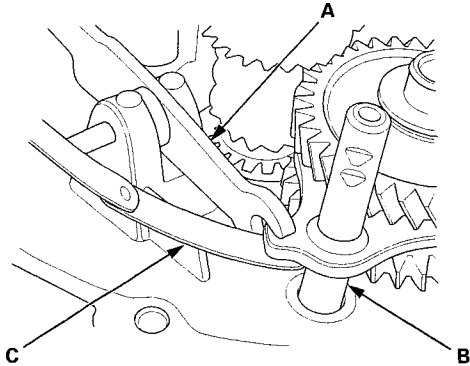
24. Remove the breather cap (F).

Manual Transmission

Reverse Shift Lever Clearance Inspection

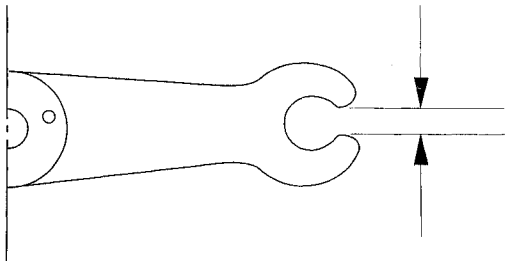
1. Measure the clearance between the reverse shift lever (A) and the reverse shift fork (B) with a feeler gauge (C). If the clearance exceeds the service limit, go to step 2.

Standard: 0.15–0.60 mm (0.006–0.024 in)
Service Limit: 0.7 mm (0.03 in)



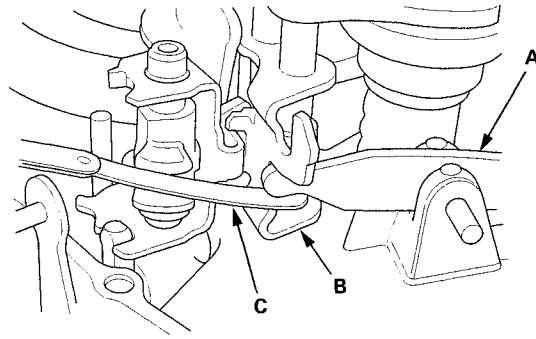
2. Measure the width of the reverse shift lever.
 - If the width is not within the standard, replace the reverse shift lever.
 - If the width is within the standard, replace the reverse shift fork.

Standard: 6.50–6.75 mm (0.256–0.266 in)



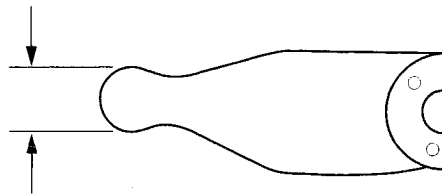
3. Measure the clearance between the reverse shift lever (A) and the reverse shift piece (B) with a feeler gauge (C). If the clearance exceeds the service limit, go to step 4.

Standard: 0–0.4 mm (0.0–0.02 in)
Service Limit: 0.5 mm (0.02 in)



4. Measure the width of the reverse shift lever.
 - If the width is not within the standard, replace the reverse shift lever.
 - If the width is within the standard, replace the reverse shift piece.

Standard: 13.0–13.2 mm (0.51–0.52 in)



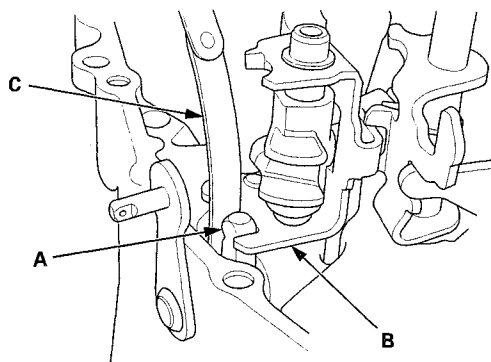


Select Arm Clearance Inspection

1. Measure the clearance between the select arm (A) and the interlock (B) with a feeler gauge (C). If the clearance exceeds the service limit, go to step 2.

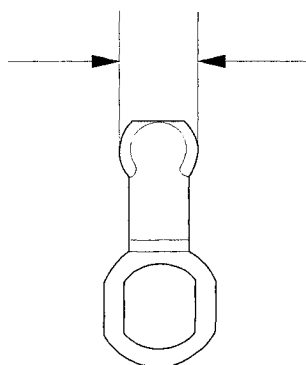
Standard: 0.05–0.25 mm (0.002–0.010 in)

Service Limit: 0.5 mm (0.02 in)



2. Measure the width of the select arm.
 - If the width is not within the standard, replace the select arm.
 - If the width is within the standard, replace the interlock.

Standard: 12.9–13.0 mm (0.508–0.512 in)

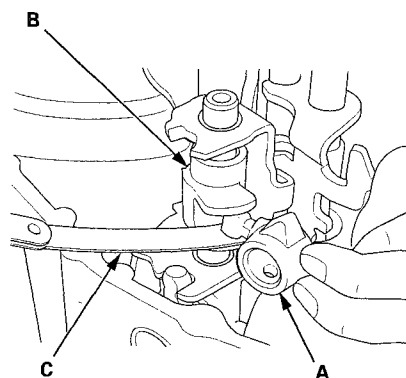


Shift Arm Clearance Inspection

1. Measure the clearance between the shift arm (A) and the shift piece (B) with a feeler gauge (C). If the clearance exceeds the service limit, go to step 2.

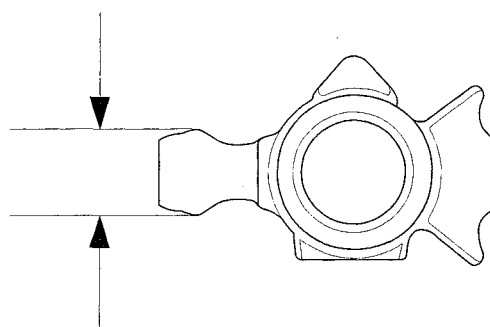
Standard: 0.26–0.57 mm (0.010–0.022 in)

Service Limit: 0.75 mm (0.030 in)



2. Measure the width of the shift arm.
 - If the width is not within the standard, replace the shift arm.
 - If the width is within the standard, replace the shift piece.

Standard: 13.6–13.8 mm (0.535–0.543 in)

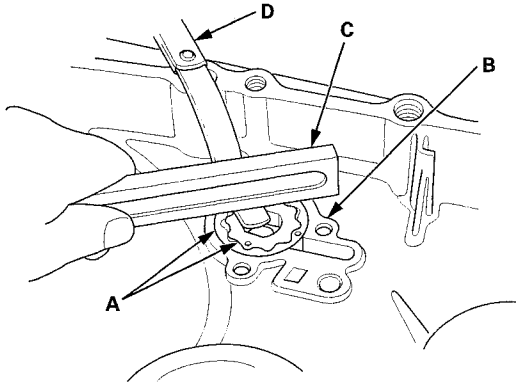


Manual Transmission

Oil Pump Clearance Inspection

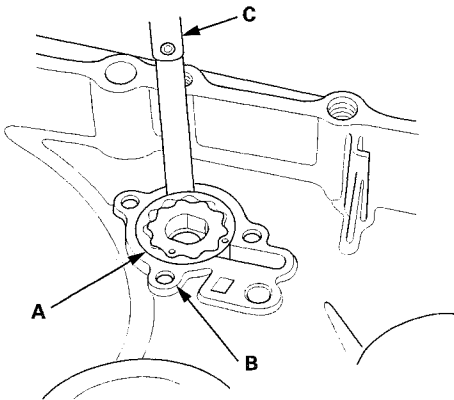
1. Measure the thrust clearance between the oil pump rotors (A) and the clutch housing (B) with a straight edge (C) and a feeler gauge (D).

Standard (new): 0.03—0.13 mm (0.001—0.005 in)
Service Limit: 0.15 mm (0.006 in)



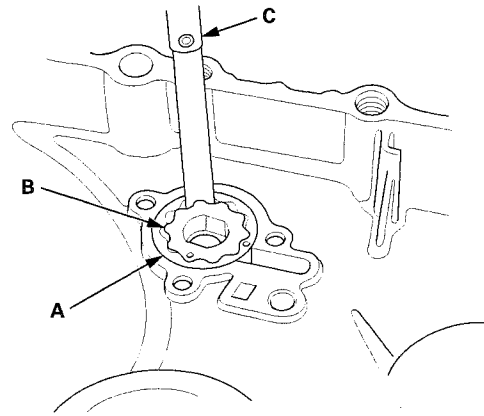
2. Measure the side clearance between the outer rotor (A) and the clutch housing (B) with a feeler gauge (C).

Standard (new): 0.1—0.2 mm (0.004—0.008 in)
Service Limit: 0.22 mm (0.009 in)



3. Measure the side clearance between the outer rotor (A) and the inner rotor (B) with a feeler gauge (C).

Standard (new): 0.14 mm (0.006 in) max.
Service Limit: 0.2 mm (0.01 in)



4. If any clearance is not within the standard, replace the oil pump outer and inner rotors as a set.



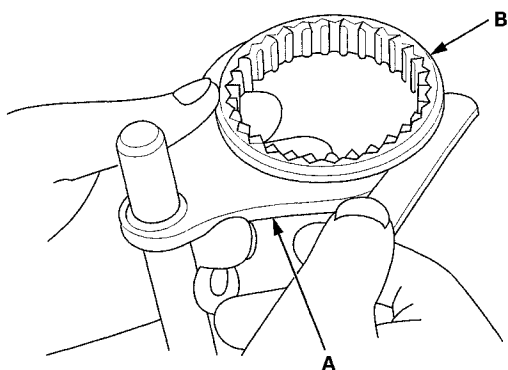
Shift Fork Clearance Inspection

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.

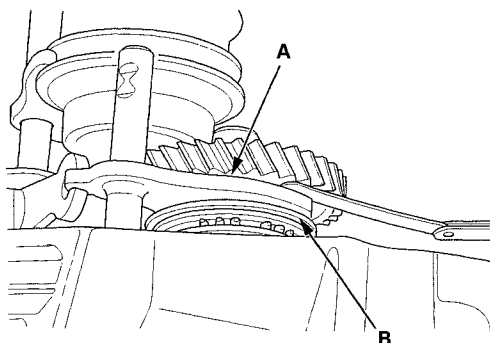
Standard: 0.35–0.65 mm (0.014–0.026 in)

Service Limit: 1.0 mm (0.04 in)

1st/2nd, 3rd/4th, 5th/6th



Reverse



2. Measure the thickness of the shift fork fingers.

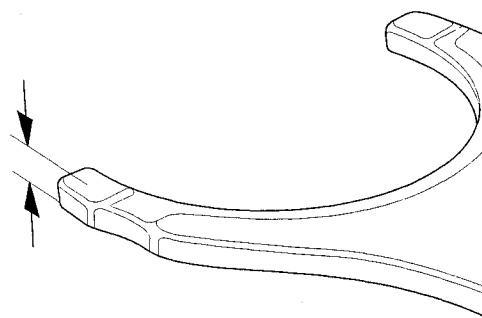
- If the thickness is not within the standard, replace the shift fork.
- If the thickness is within the standard, replace the synchro sleeve and the synchro hub as a set.
- If one arm of the shift fork shows more wear than others, the fork may be bent and needs to be replaced.

Standard:

1st/2nd, 3rd/4th, 5th/6th:

7.4–7.6 mm (0.29–0.30 in)

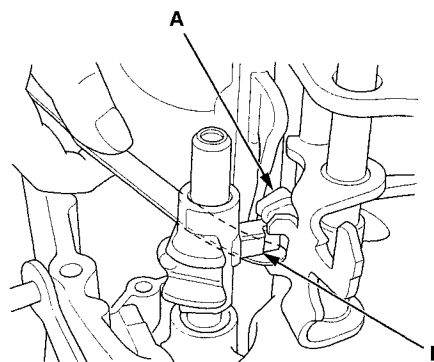
Reverse: 6.2–6.4 mm (0.24–0.25 in)



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

Standard: 0.2–0.6 mm (0.01–0.02 in)

Service Limit: 0.7 mm (0.03 in)



(cont'd)

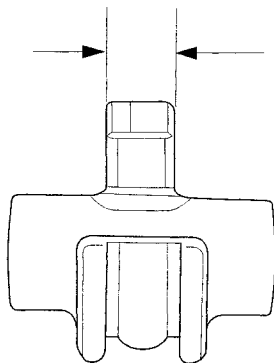
Manual Transmission

Shift Fork Clearance Inspection (cont'd)

4. Measure the width of the shift piece.

- If the width is not within the standard, replace the shift piece.
- If the width is within the standard, replace the shift fork.

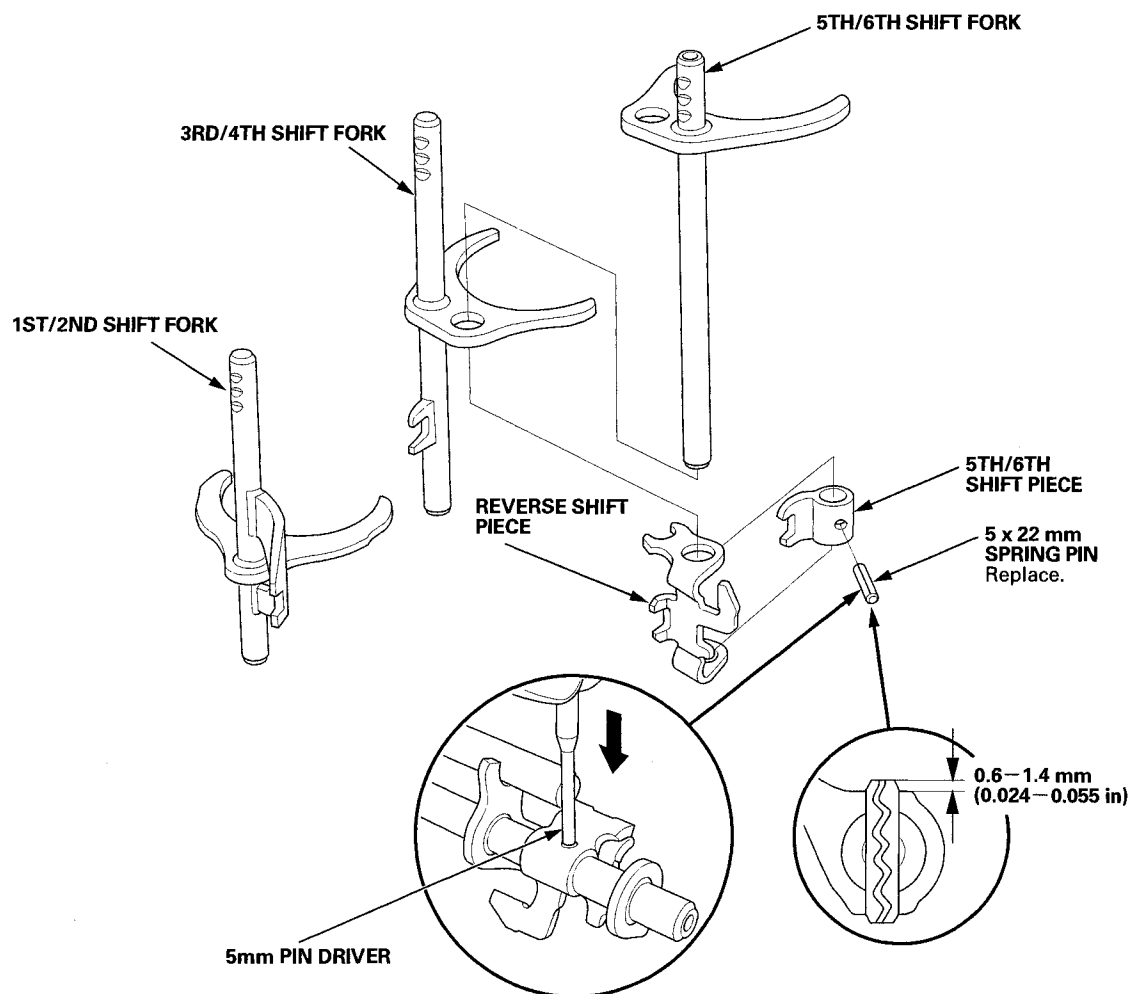
Standard: 12.8—13.0 mm (0.50—0.51 in)





Shift Fork Disassembly/Reassembly

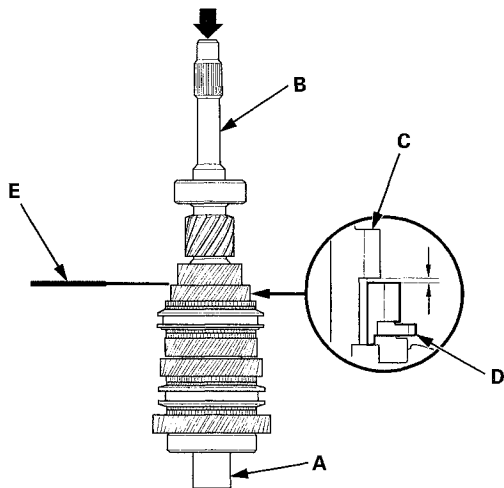
NOTE: Prior to reassembling, clean all parts in solvent, dry them, and apply MTF to all contact surfaces.



Manual Transmission

Mainshaft Assembly Clearance Inspection

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

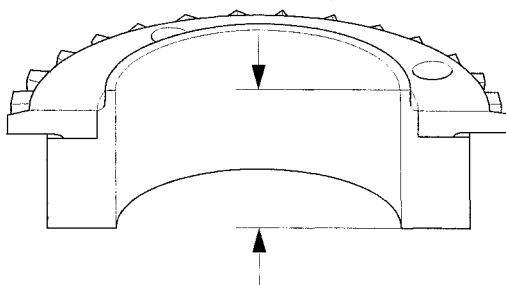


2. Measure the clearance between 2nd gear (C) and 3rd gear (D) with a feeler gauge (E).
 - If the clearance exceeds the service limit, go to step 3.
 - If the clearance is within the service limit, go to step 4.

Standard: 0.06–0.19 mm (0.002–0.007 in)
Service Limit: 0.3 mm (0.01 in)

3. Measure the thickness of 3rd gear.
 - If the thickness is less than the service limit, replace 3rd gear.
 - If the thickness is within the service limit, replace the 3rd/4th synchro hub and the 3rd/4th synchro sleeve as a set.

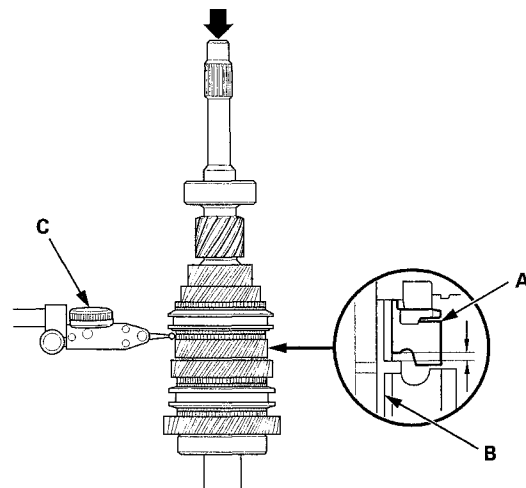
Standard: 23.89–23.97 mm (0.941–0.944 in)
Service Limit: 23.8 mm (0.94 in)



4. Measure the clearance between 4th gear (A) and the 4th/5th gear distance collar (B) with a dial indicator (C).

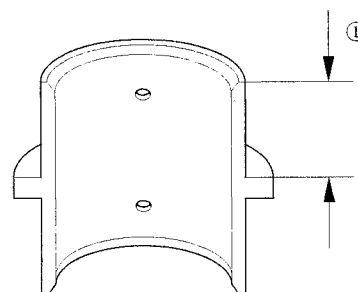
- If the clearance exceeds the service limit, go to step 5.
- If the clearance is within the service limit, go to step 7.

Standard: 0.06–0.19 mm (0.002–0.007 in)
Service Limit: 0.3 mm (0.01 in)



5. Measure the length ① of the 4th/5th gear distance collar as shown.
 - If the length ① is not within the standard, replace the 4th/5th gear distance collar.
 - If the length ① is within the standard, go to step 6.

Standard: 22.53–22.58 mm (0.887–0.889 in)



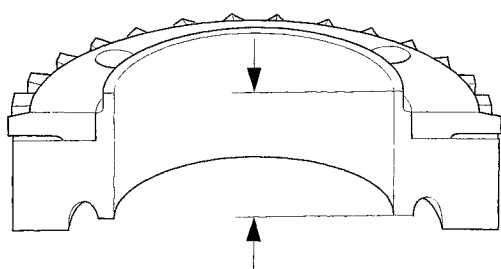


6. Measure the thickness of 4th gear.

- If the thickness is less than the service limit, replace 4th gear.
- If the thickness is within the service limit, replace the 3rd/4th synchro hub and the 3rd/4th synchro sleeve as a set.

Standard: 22.39–22.47 mm (0.881–0.885 in)

Service Limit: 22.3 mm (0.88 in)

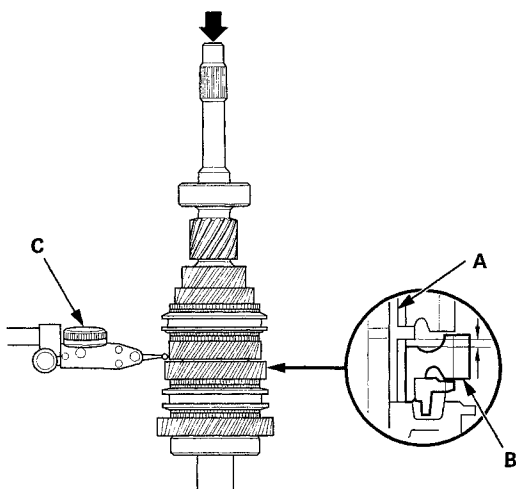


7. Measure the clearance between the 4th/5th gear distance collar (A) and 5th gear (B) with a dial indicator (C).

- If the clearance exceeds the service limit, go to step 8.
- If the clearance is within the service limit, go to step 10.

Standard: 0.06–0.19 mm (0.002–0.007 in)

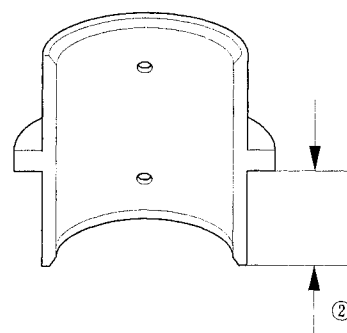
Service Limit: 0.3 mm (0.01 in)



8. Measure the length ② of the 4th/5th gear distance collar as shown.

- If the length ② is not within the standard, replace the 4th/5th gear distance collar.
- If the length ② is within the standard, go to step 9.

Standard: 22.53–22.58 mm (0.887–0.889 in)

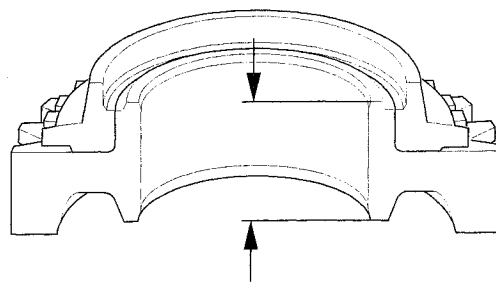


9. Measure the thickness of 5th gear.

- If the thickness is less than the service limit, replace 5th gear.
- If the thickness is within the service limit, replace the 5th/6th synchro hub and the 5th/6th synchro sleeve as a set.

Standard: 22.39–22.47 mm (0.881–0.885 in)

Service Limit: 22.3 mm (0.88 in)



(cont'd)

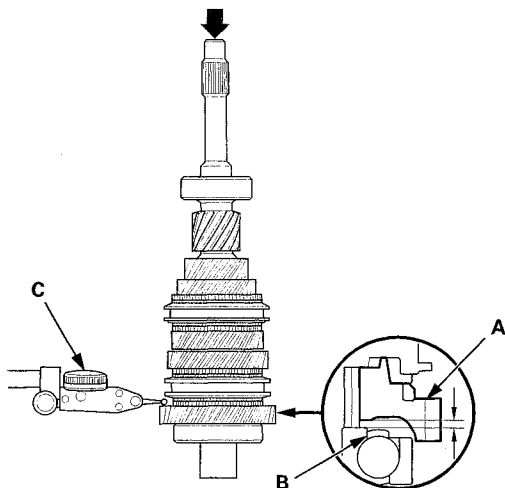
Manual Transmission

Mainshaft Assembly Clearance Inspection (cont'd)

10. Measure the clearance between 6th gear (A) and the angular ball bearing inner race (B) with a dial indicator (C). If the clearance exceeds the service limit, go to step 11.

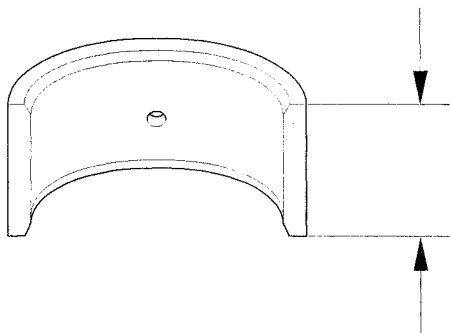
Standard: 0.06—0.19 mm (0.002—0.007 in)

Service Limit: 0.3 mm (0.01 in)



11. Measure the length of the 6th gear distance collar.
- If the length is not within the standard, replace the 6th gear distance collar.
 - If the length is within the standard, go to step 12.

Standard: 26.03—26.08 mm (1.025—1.027 in)

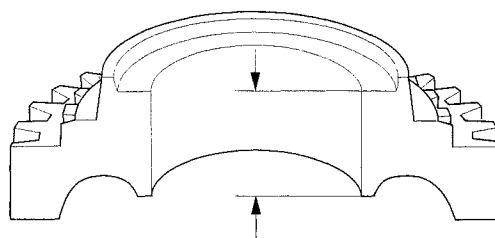


12. Measure the thickness of 6th gear.

- If the thickness is less than the service limit, replace 6th gear.
- If the thickness is within the service limit, replace the 5th/6th synchro hub and the 5th/6th synchro sleeve as a set.

Standard: 25.89—25.97 mm (1.019—1.022 in)

Service Limit: 25.8 mm (1.02 in)



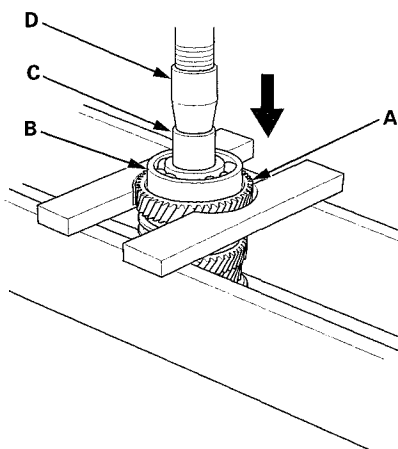


Mainshaft Disassembly

NOTE: Refer to the Exploded View in the Mainshaft Reassembly, as needed, when removing components pressed onto the mainshaft (see page 13-57).

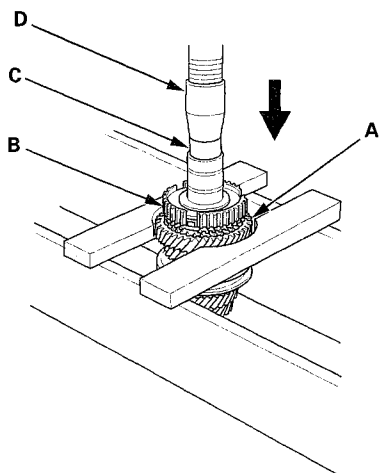
1. Support 6th gear (A) on steel blocks, and press the mainshaft out of the ball bearing (B) and 6th gear using an attachment (C) and a press (D).

NOTE: Do not use a jaw-type puller; it can damage the gear teeth.



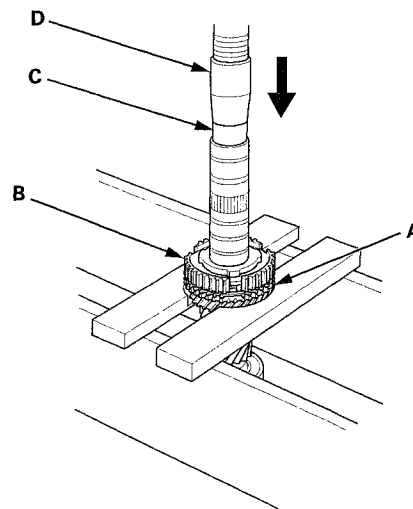
2. Support 5th gear (A) on steel blocks, and press the mainshaft out of the 5th/6th synchro hub (B) and 5th gear using an attachment (C) and a press (D).

NOTE: Do not use a jaw-type puller; it can damage the gear teeth.

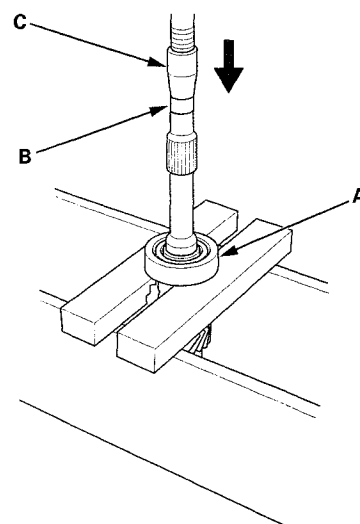


3. Support 3rd gear (A) on steel blocks, and press the mainshaft out of the 3rd/4th synchro hub (B) and 3rd gear using an attachment (C) and a press (D).

NOTE: Do not use a jaw-type puller; it can damage the gear teeth.



4. Support the angular ball bearing (A) on steel blocks, and press out the mainshaft using an attachment (B) and a press (C).



Manual Transmission

Mainshaft Inspection

1. Inspect the oil passage, gear, and bearing contact areas for wear and damage, then measure the mainshaft at points A, B, C, D, E, and F. If any part of the mainshaft is less than the service limit, replace it.

Standard:

A Ball Bearing Contact Area (Transmission Housing Side):

38.984—39.000 mm (1.5348—1.5354 in)

B 6th Gear Distance Collar Contact Area:

38.984—39.000 mm (1.5348—1.5354 in)

C 4th/5th Gear Distance Collar Contact Area:

41.984—42.000 mm (1.6529—1.6535 in)

D Needle Bearing Contact Area:

47.984—48.000 mm (1.8891—1.8898 in)

E Ball Bearing Contact Area (Clutch Housing Side):

28.002—28.015 mm (1.1024—1.1030 in)

F Pilot Bearing Contact Area:

19.967—19.980 mm (0.7861—0.7866 in)

Service Limit:

A: 38.93 mm (1.533 in)

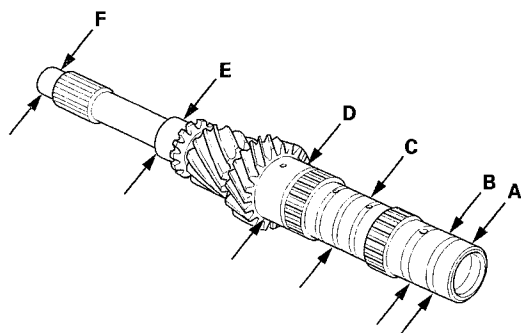
B: 38.93 mm (1.533 in)

C: 41.93 mm (1.651 in)

D: 47.93 mm (1.887 in)

E: 27.95 mm (1.100 in)

F: 19.91 mm (0.784 in)

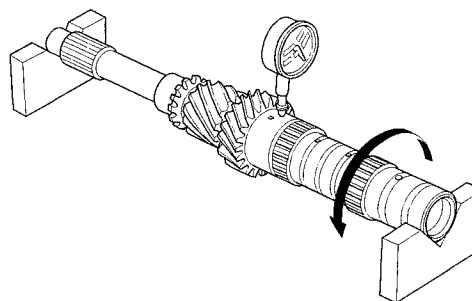


2. Inspect the runout by supporting both ends of the mainshaft. Then rotate the mainshaft two complete turns while measuring with a dial gauge. If the runout exceeds the service limit, replace the mainshaft.

Standard:

0.02 mm (0.001 in) max.

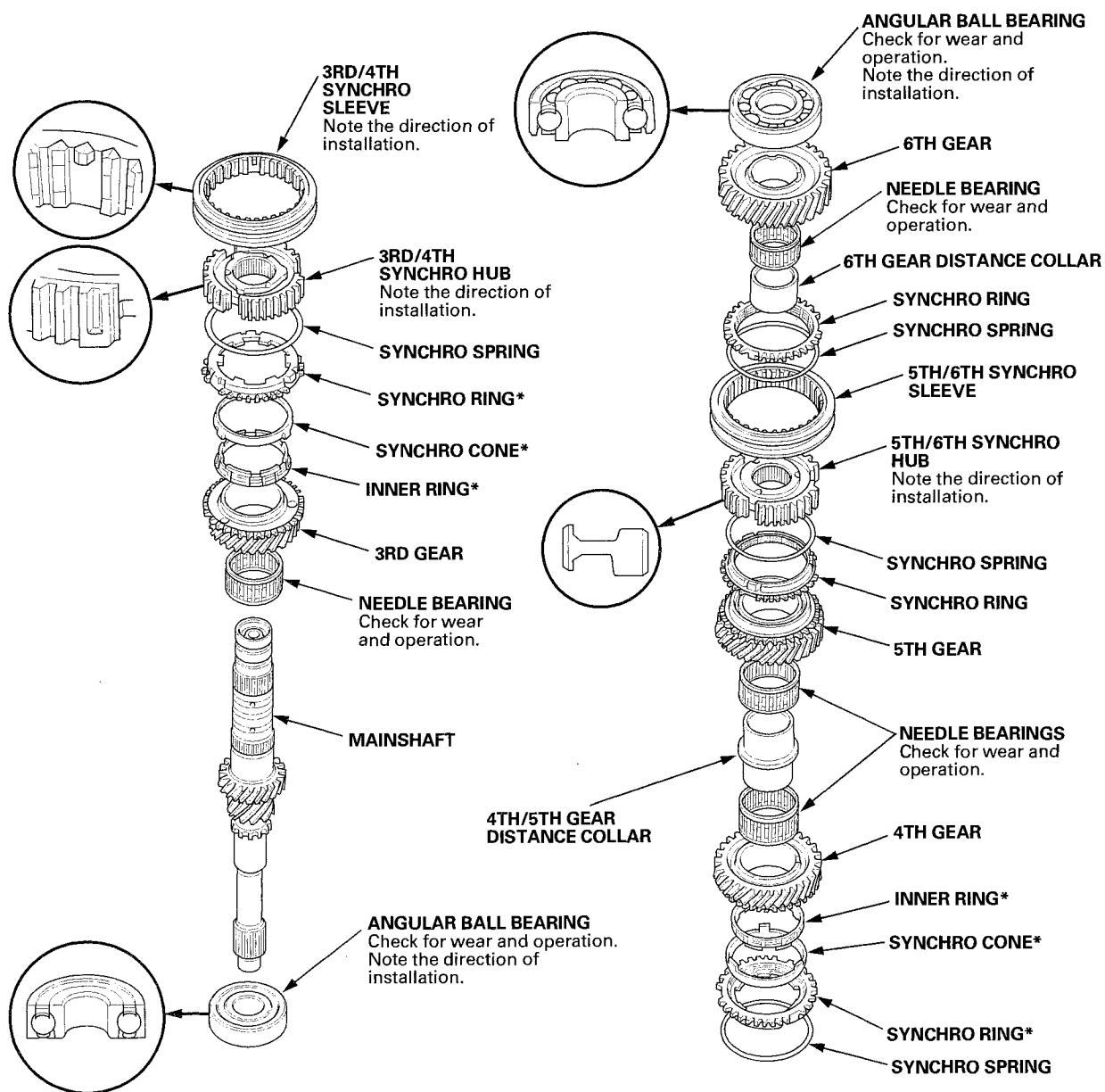
Service Limit: 0.05 mm (0.002 in)





Mainshaft Reassembly

Exploded View



*: The components of the double cone synchro assembly.

(cont'd)

Manual Transmission

Mainshaft Reassembly (cont'd)

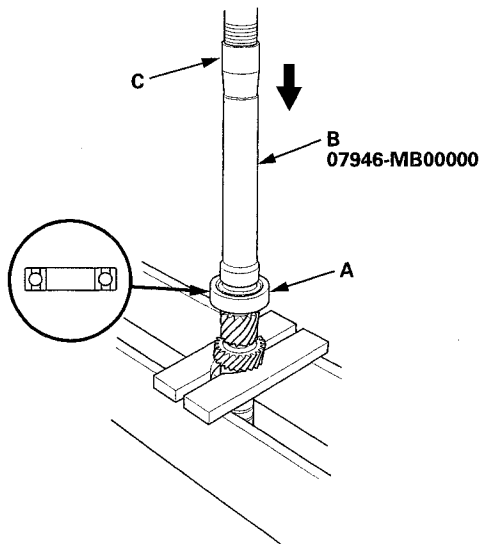
Special Tools Required

- Driver Handle, 40 mm I.D. 07746-0030100
- Driver, 30 mm I.D. 07946-MB00000

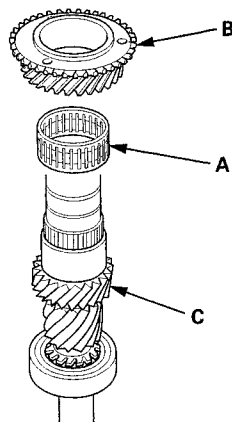
NOTE: Refer to the Exploded View, as needed, during this procedure.

1. Clean all parts in solvent, dry them, and apply MTF to all contact surfaces.
2. Press in a new angular ball bearing (A) using the 30 x 36 mm inner driver (B) and a press (C).

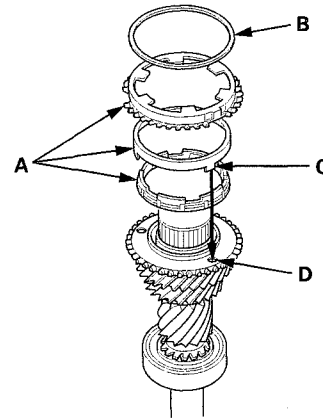
NOTE: Check the ball bearing install direction.



3. Install the needle bearing (A) and 3rd gear (B) onto the mainshaft (C).

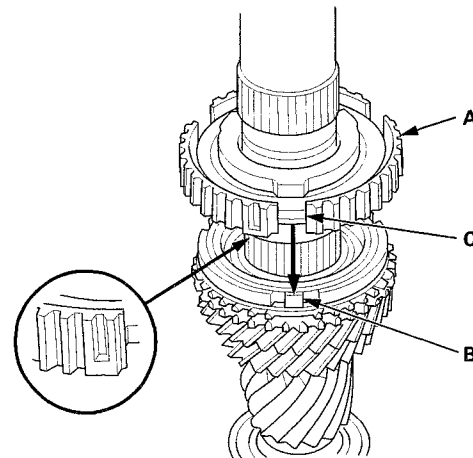


4. Install the double cone synchro assembly (A) with the synchro spring (B) by aligning the synchro cone fingers (C) with the holes (D) in 3rd gear.



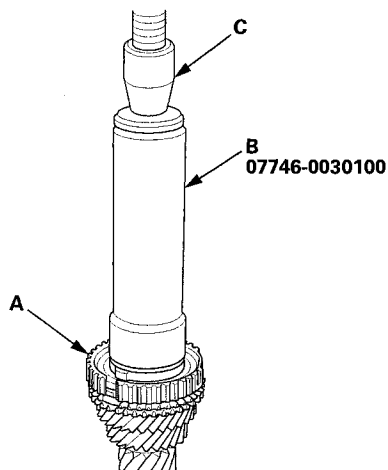
5. Install the 3rd/4th synchro hub (A) by aligning the synchro ring fingers (B) with the grooves (C) in the 3rd/4th synchro hub.

NOTE: Make sure to install the 3rd/4th synchro hub in the direction shown.

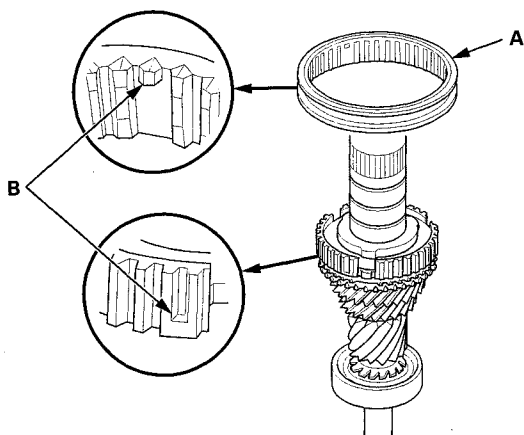




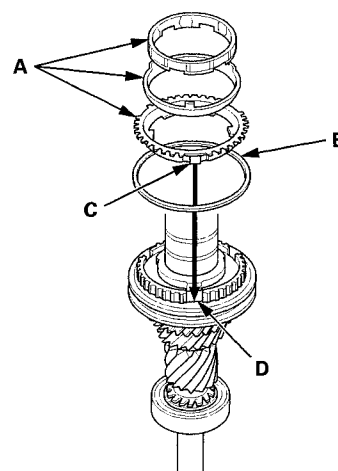
6. Press on the 3rd/4th synchro hub (A) using the 40 mm inner driver handle (B) and a press (C).



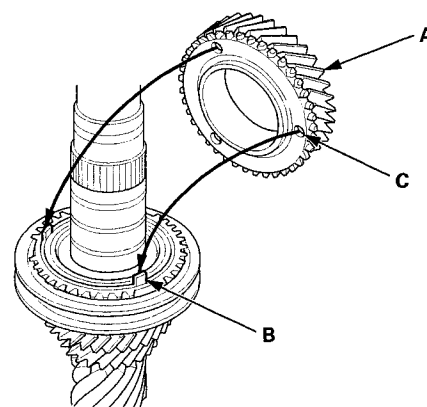
7. Install the 3rd/4th synchro sleeve (A) by aligning the stops (B) of the 3rd/4th synchro sleeve and the 3rd/4th synchro hub. After installing, check the operation of the 3rd/4th synchro hub set.



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



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

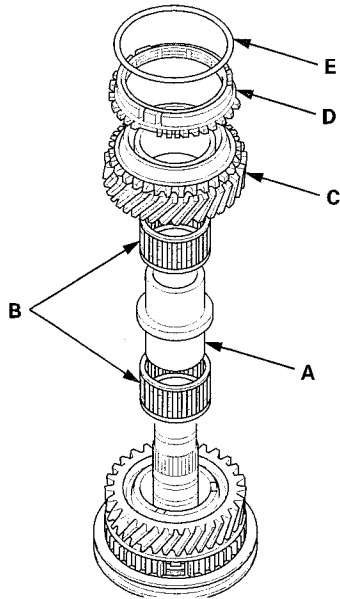


(cont'd)

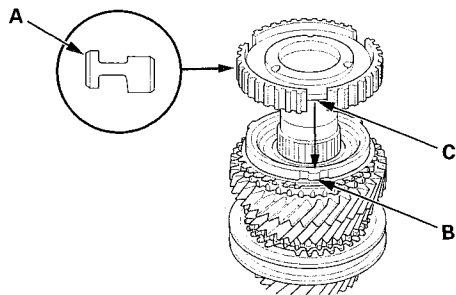
Manual Transmission

Mainshaft Reassembly (cont'd)

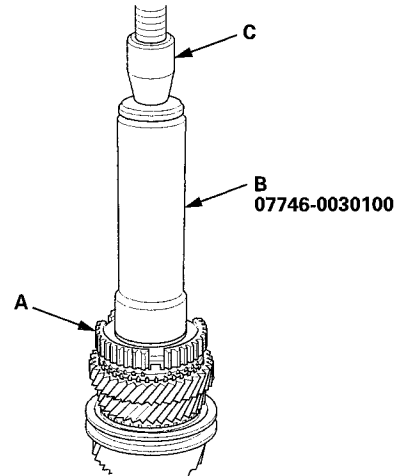
10. Install the 4th/5th gear distance collar (A) with the needle bearings (B) and 5th gear (C).



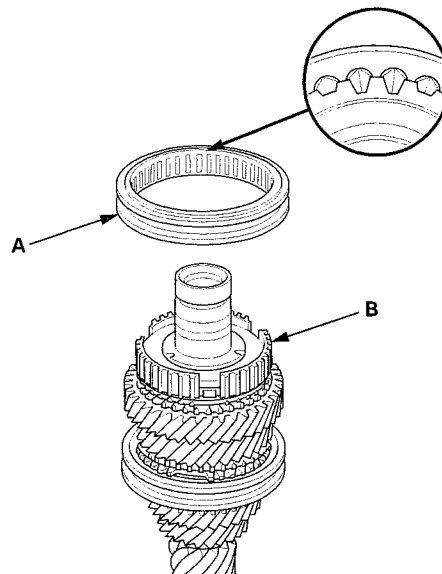
11. Install the synchro ring (D) with the synchro spring (E) onto the 5th gear.
12. Install the 5th/6th synchro hub (A) by aligning the synchro ring fingers (B) with the grooves (C) in the 5th/6th synchro hub.



13. Press on the 5th/6th synchro hub (A) using the 40 mm inner driver handle (B) and a press (C).

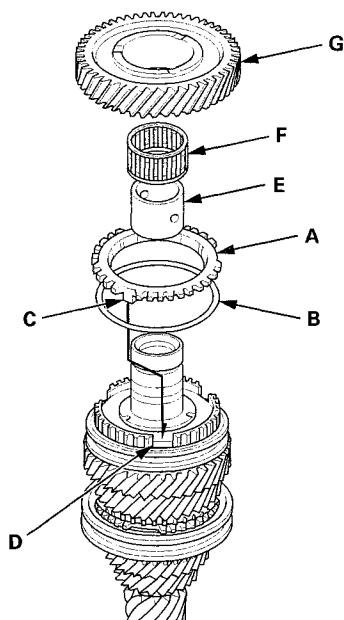


14. Install the 5th/6th synchro sleeve (A) by aligning the slots of the 5th/6th synchro sleeve and the 5th/6th synchro hub (B). After installing, check the operation of the 5th/6th synchro hub set.





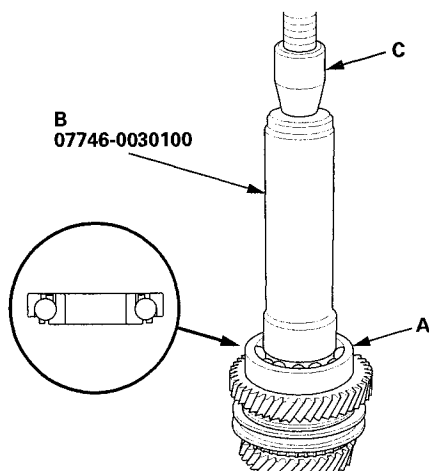
15. Install the synchro ring (A) with the synchro spring (B) by aligning the synchro ring fingers (C) with the grooves (D) in the 5th/6th synchro hub.



16. Install the 6th gear distance collar (E) with the needle bearing (F) and 6th gear (G).

17. Press on a new angular ball bearing (A) using the 40 mm inner driver handle (B) and a press (C).

NOTE: Check the ball bearing install direction.

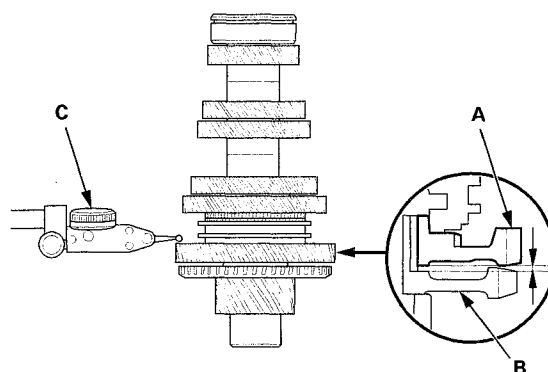


Countershaft Assembly Clearance Inspection

NOTE: Before inspection, make sure the special bolt is tightened to the specified torque (see page 13-65).

1. Measure the clearance between 1st gear (A) and the countershaft reverse gear (B) with a dial indicator (C).
 - If the clearance exceeds the service limit, go to step 2.
 - If the clearance is within the service limit, go to step 4.

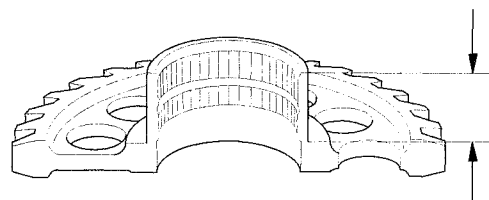
Standard: 0.04–0.17 mm (0.002–0.007 in)
Service Limit: 0.28 mm (0.011 in)



2. Measure the length of the countershaft reverse gear as shown.

- If the length is not within the standard, replace the countershaft reverse gear.
- If the length is within the standard, go to step 3.

Standard: 23.03–23.08 mm (0.907–0.909 in)



(cont'd)

Manual Transmission

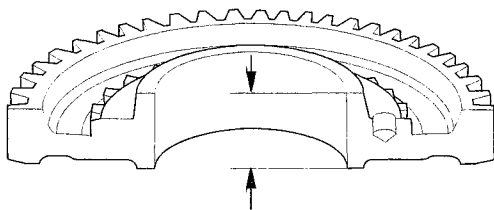
Countershaft Assembly Clearance Inspection (cont'd)

3. Measure the thickness of 1st gear.

- If the thickness is less than the service limit, replace 1st gear.
- If the thickness is within the service limit, replace the 1st/2nd synchro hub and the 1st/2nd synchro sleeve as a set.

Standard: 22.91–22.99 mm (0.902–0.905 in)

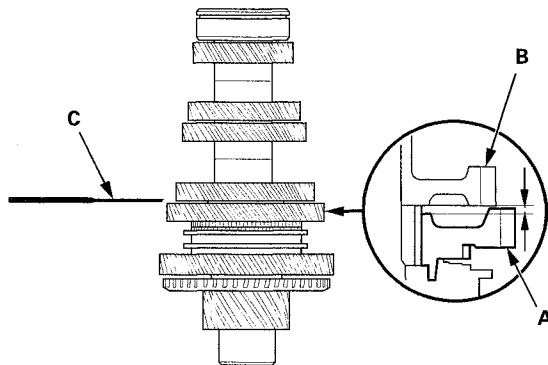
Service Limit: 22.86 mm (0.900 in)



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

Standard: 0.04–0.17 mm (0.002–0.007 in)

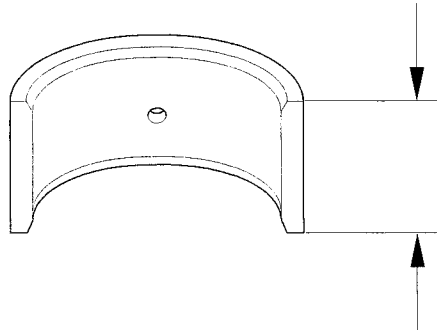
Service Limit: 0.28 mm (0.011 in)



5. Measure the length of the 2nd gear distance collar.

- If the length is not within the standard, replace the 2nd gear distance collar.
- If the length is within the standard, go to step 6.

Standard: 23.03–23.08 mm (0.907–0.909 in)

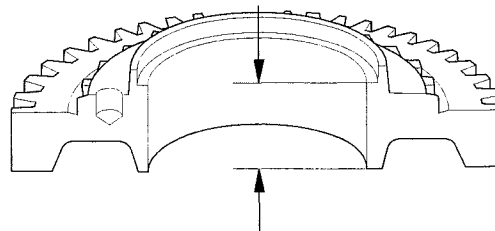


6. Measure the thickness of 2nd gear as shown.

- If the thickness is less than the service limit, replace 2nd gear.
- If the thickness is within the service limit, replace the 1st/2nd synchro hub and the 1st/2nd synchro sleeve as a set.

Standard: 22.91–22.99 mm (0.902–0.905 in)

Service Limit: 22.86 mm (0.900 in)

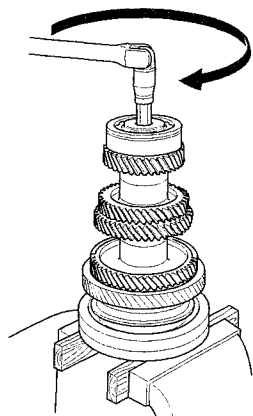




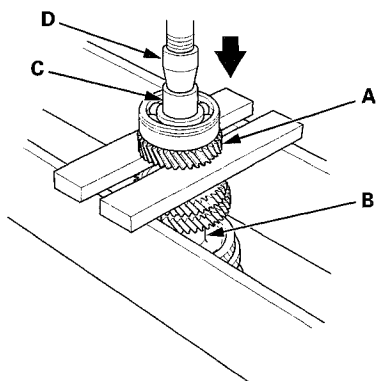
Countershaft Disassembly

NOTE: Refer to the Exploded View in the Countershaft Reassembly, as needed, when removing components pressed onto the countershaft (see page 13-65).

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

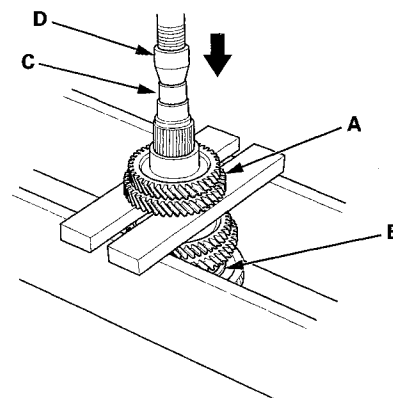


2. Remove the special bolt (left-hand threads).
3. Support 6th gear (A) on steel blocks, and press the countershaft (B) out of the ball bearing and 6th gear using an attachment (C) and a press (D).

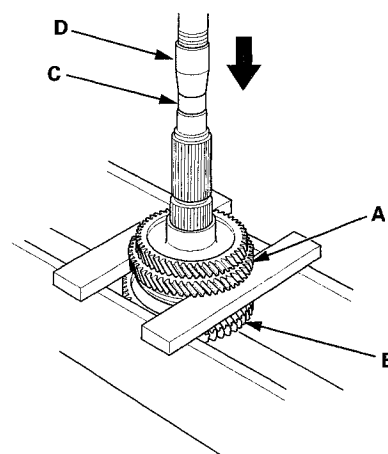


4. Remove the 35 mm shim.

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



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



Manual Transmission

Countershaft Inspection

1. Inspect the oil passage, gear, and bearing contact areas for wear and damage, then measure the countershaft at points A, B, C, and D. If any part of the countershaft is less than the service limit, replace it.

Standard:

A Ball Bearing Contact Area
(Transmission Housing Side):

30.002—30.015 mm (1.1812—1.1817 in)

B 2nd Gear Distance Collar Contact Area:

42.975—42.991 mm (1.6919—1.6926 in)

C Countershaft Reverse Gear Contact Area:

45.934—45.950 mm (1.8084—1.8091 in)

D Needle Bearing Contact Area
(Clutch Housing Side):

43.974—43.990 mm (1.7313—1.7319 in)

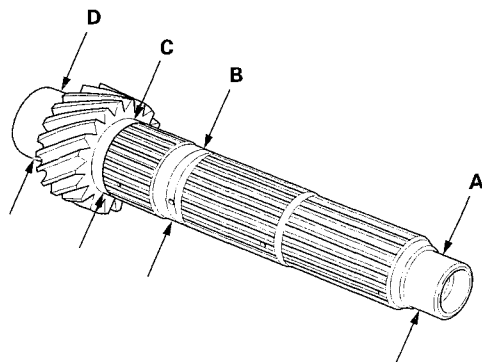
Service Limit:

A: 29.95 mm (1.179 in)

B: 42.92 mm (1.690 in)

C: 45.88 mm (1.806 in)

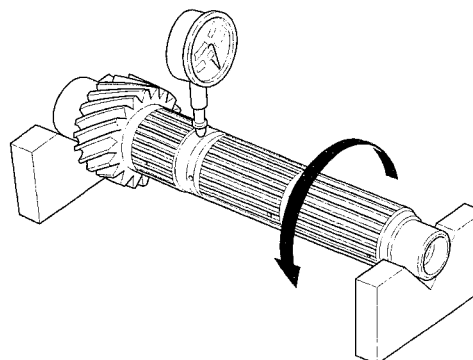
D: 43.92 mm (1.729 in)



2. Inspect the runout by supporting both ends of the countershaft. Then rotate the countershaft two complete turns while measuring with a dial gauge. If the runout exceeds the service limit, replace the countershaft.

Standard: 0.02 mm (0.001 in) max.

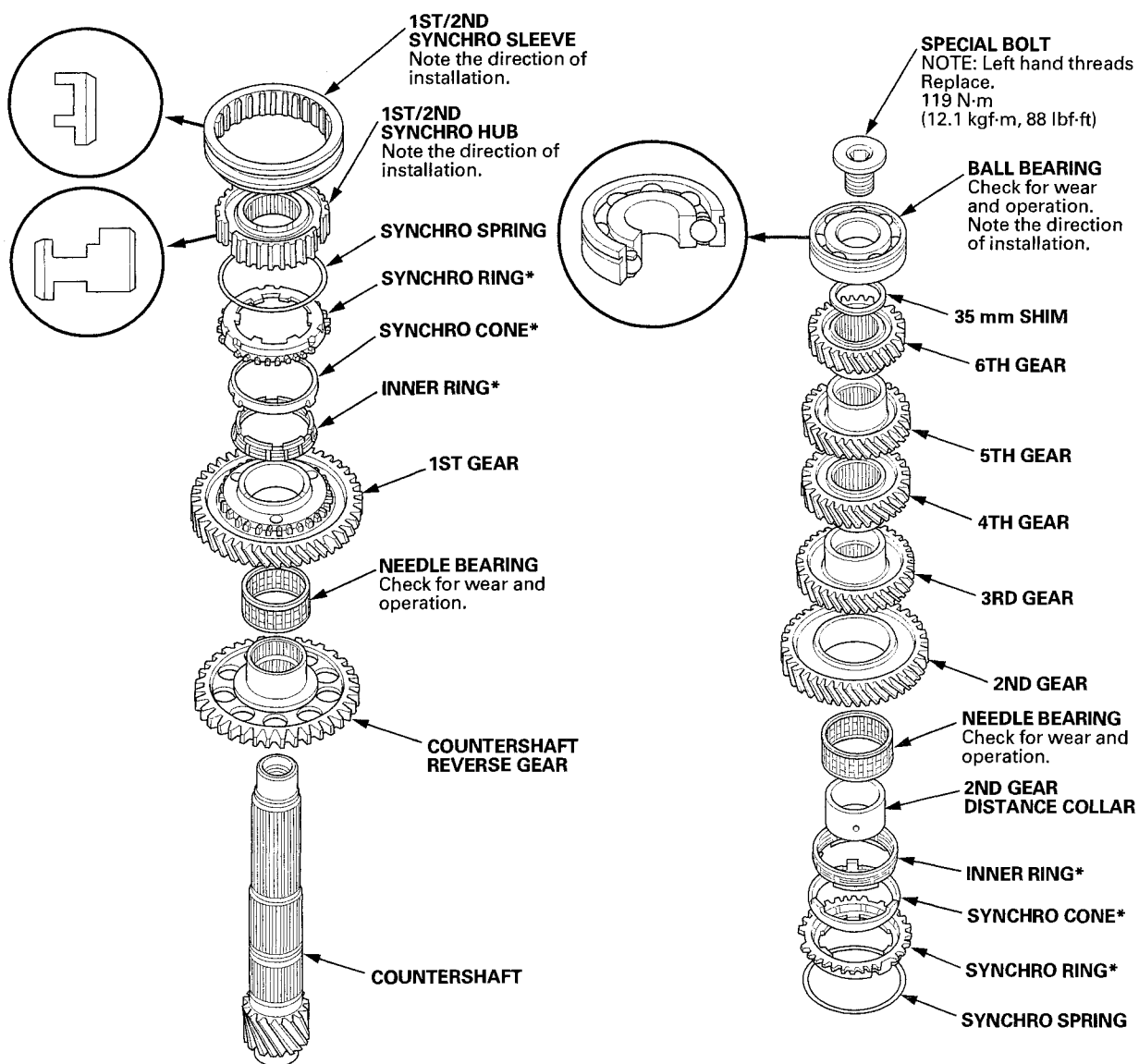
Service Limit: 0.05 mm (0.002 in)





Countershaft Reassembly

Exploded View



*: The components of the triple cone synchro assembly.

(cont'd)

Manual Transmission

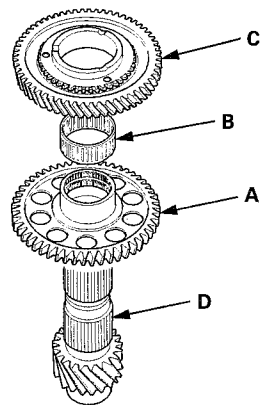
Countershaft Reassembly (cont'd)

Special Tools Required

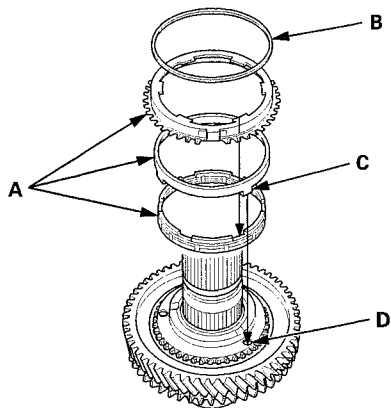
- Driver, 58 x 62 mm 070AD-PYZA100
- Driver Handle, 40 mm I.D. 07746-0030100

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

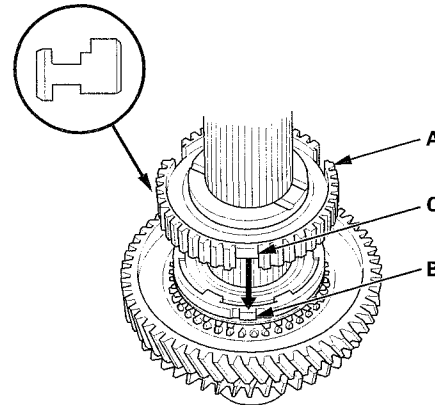
1. Clean all parts in solvent, dry them, and apply MTF to all contact surfaces.
2. Install the countershaft reverse gear (A) with the needle bearing (B), and 1st gear (C) onto the countershaft (D).



3. Install the triple cone synchro assembly (A) with the synchro spring (B) by aligning the synchro cone fingers (C) with the holes (D) in 1st gear.

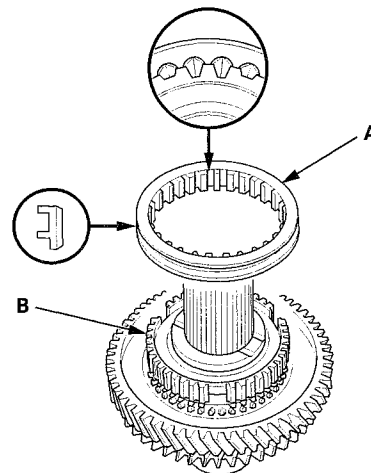


4. Install the 1st/2nd synchro hub (A) by aligning the synchro ring fingers (B) with the grooves (C) in the 1st/2nd synchro hub.



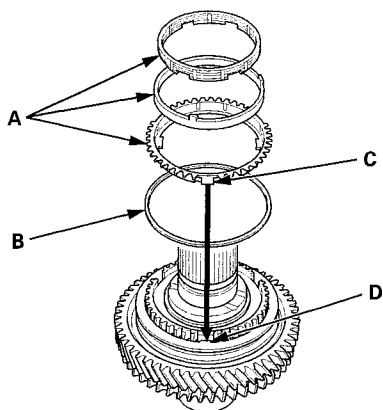
5. Install the 1st/2nd synchro sleeve (A) by aligning the slots of the 1st/2nd synchro sleeve and the 1st/2nd synchro hub (B). After installing, check the operation of the 1st/2nd synchro hub set.

NOTE: Make sure to align the slots in the 1st/2nd synchro hub as shown.

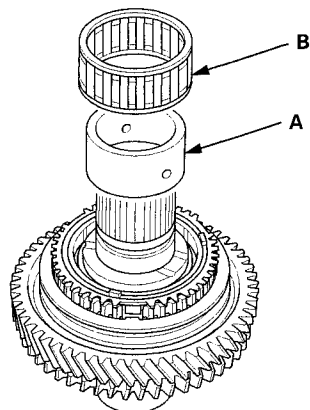




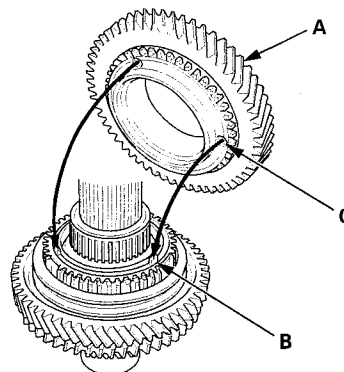
6. Install the triple cone synchro assembly (A) with the synchro spring (B) by aligning the synchro ring fingers (C) with the grooves (D) in the 1st/2nd synchro hub.



7. Install the 2nd gear distance collar (A) with the needle bearing (B).

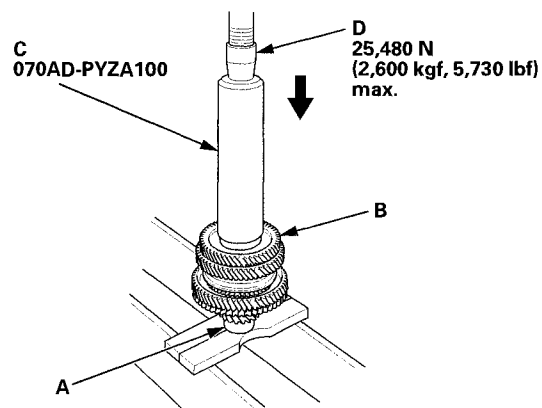


8. Install 2nd gear (A) by aligning the synchro cone fingers (B) with the holes in 2nd gear (C).



9. Support the countershaft (A) on steel blocks, then press on 3rd gear (B) using the 58 x 62 mm driver (C) and a press (D).

NOTE: Do not exceed the maximum pressure.



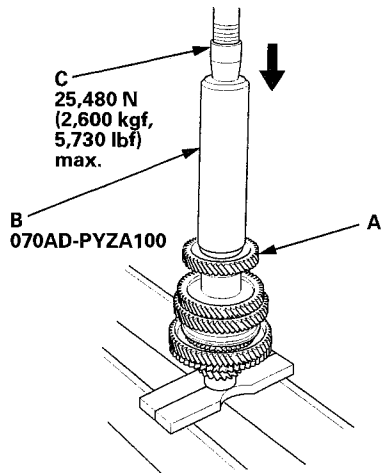
(cont'd)

Manual Transmission

Countershaft Reassembly (cont'd)

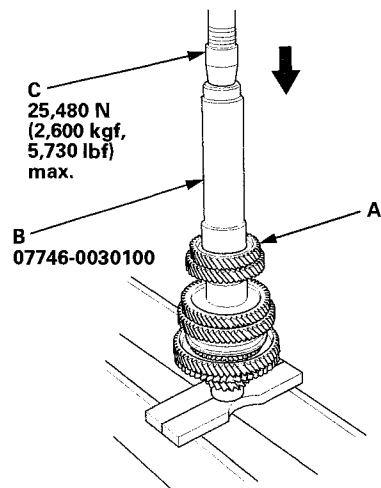
10. Press on 4th gear (A) using the 58 x 62 mm driver (B) and a press (C).

NOTE: Do not exceed the maximum pressure.



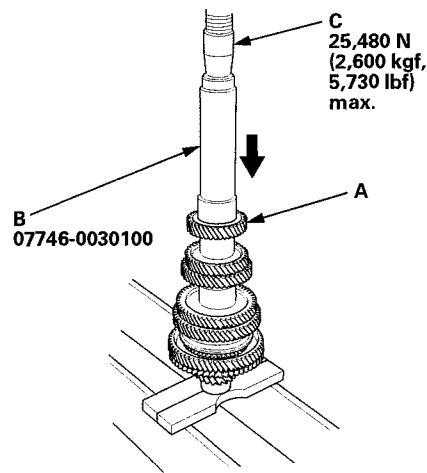
11. Press on 5th gear (A) using the 40 mm inner driver handle (B) and a press (C).

NOTE: Do not exceed the maximum pressure.



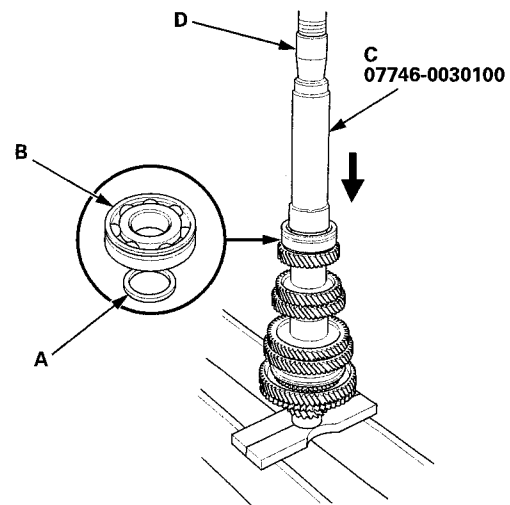
12. Press on 6th gear (A) using the 40 mm inner driver handle (B) and a press (C).

NOTE: Do not exceed the maximum pressure.



13. Install the 35 mm shim (A), and temporarily press on the used ball bearing (B) using the 40 mm inner driver handle (C) and a press (D).

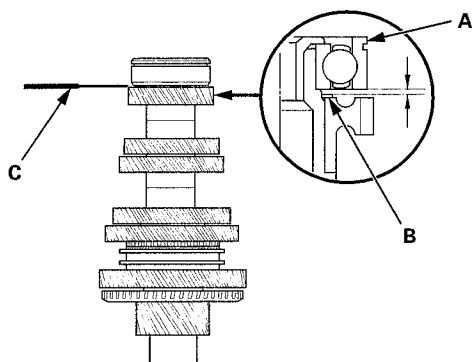
- Use any size of 35 mm shim, and note size you used. Measurements taken in the following steps will determine the correct shim to use for final assembly.
- Make sure the ball bearing is installed in the correct direction.





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

Standard: 0.04–0.10 mm (0.002–0.004 in)



15. If the measured clearance in step 14 is not within the standard, select another suitable 35 mm shim from the table, then go to next step to replace the 35 mm shim and the ball bearing with new ones. If the measured clearance in step 14 is within the standard, go to the next step to replace only the ball bearing with a new one.

35 mm Shim

Type	Thickness
A	0.87 mm (0.034 in)
AA	0.91 mm (0.036 in)
B	0.95 mm (0.037 in)
AB	0.99 mm (0.039 in)
C	1.03 mm (0.041 in)
AC	1.07 mm (0.042 in)
D	1.11 mm (0.044 in)
AD	1.15 mm (0.045 in)
E	1.19 mm (0.047 in)
AE	1.23 mm (0.048 in)
F	1.27 mm (0.050 in)
AF	1.31 mm (0.052 in)
G	1.35 mm (0.053 in)
AG	1.39 mm (0.055 in)
H	1.43 mm (0.056 in)
AH	1.47 mm (0.058 in)
J	1.51 mm (0.059 in)
AJ	1.55 mm (0.061 in)
K	1.59 mm (0.063 in)
AK	1.63 mm (0.064 in)
L	1.67 mm (0.066 in)
AL	1.71 mm (0.067 in)
M	1.75 mm (0.069 in)
AM	1.79 mm (0.070 in)
N	1.83 mm (0.072 in)
AN	1.87 mm (0.074 in)
P	1.91 mm (0.075 in)
AP	1.95 mm (0.077 in)
Q	1.99 mm (0.078 in)

16. Remove 6th gear with the ball bearing and the 35 mm shim using a press (see step 3 on page 13-63).
17. Repeat step 12 to install 6th gear.

(cont'd)

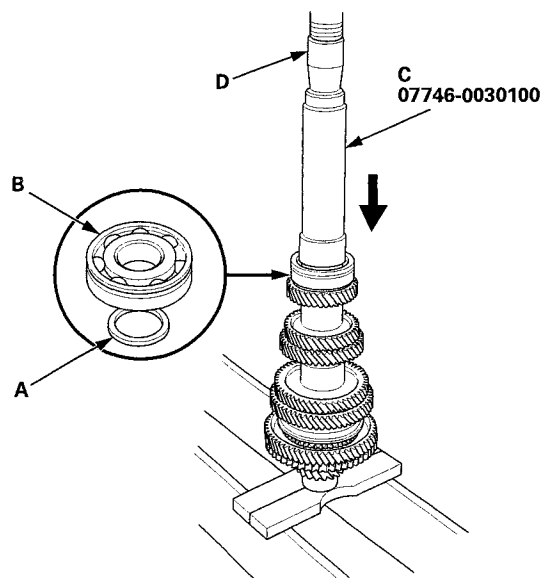
Manual Transmission

Countershaft Reassembly (cont'd)

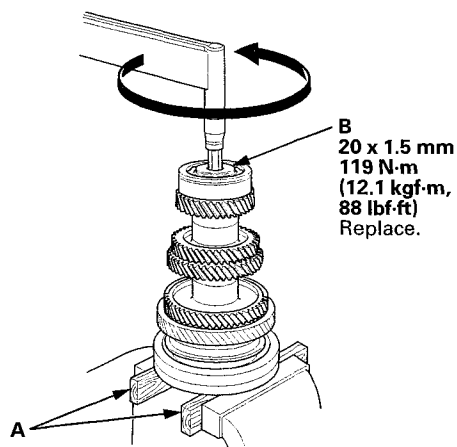
18. Install the correct 35 mm shim (A) and a new ball bearing (B) using the 40 mm inner driver handle (C) and a press (D).

NOTE:

- If necessary, replace the 35 mm shim with the correct one selected in step 15.
- Make sure the ball bearing is installed in the correct direction.



19. Recheck the clearance between the bearing and the 35 mm shim with a feeler gauge.
20. Securely clamp the countershaft assembly in a bench vise with wood blocks (A).



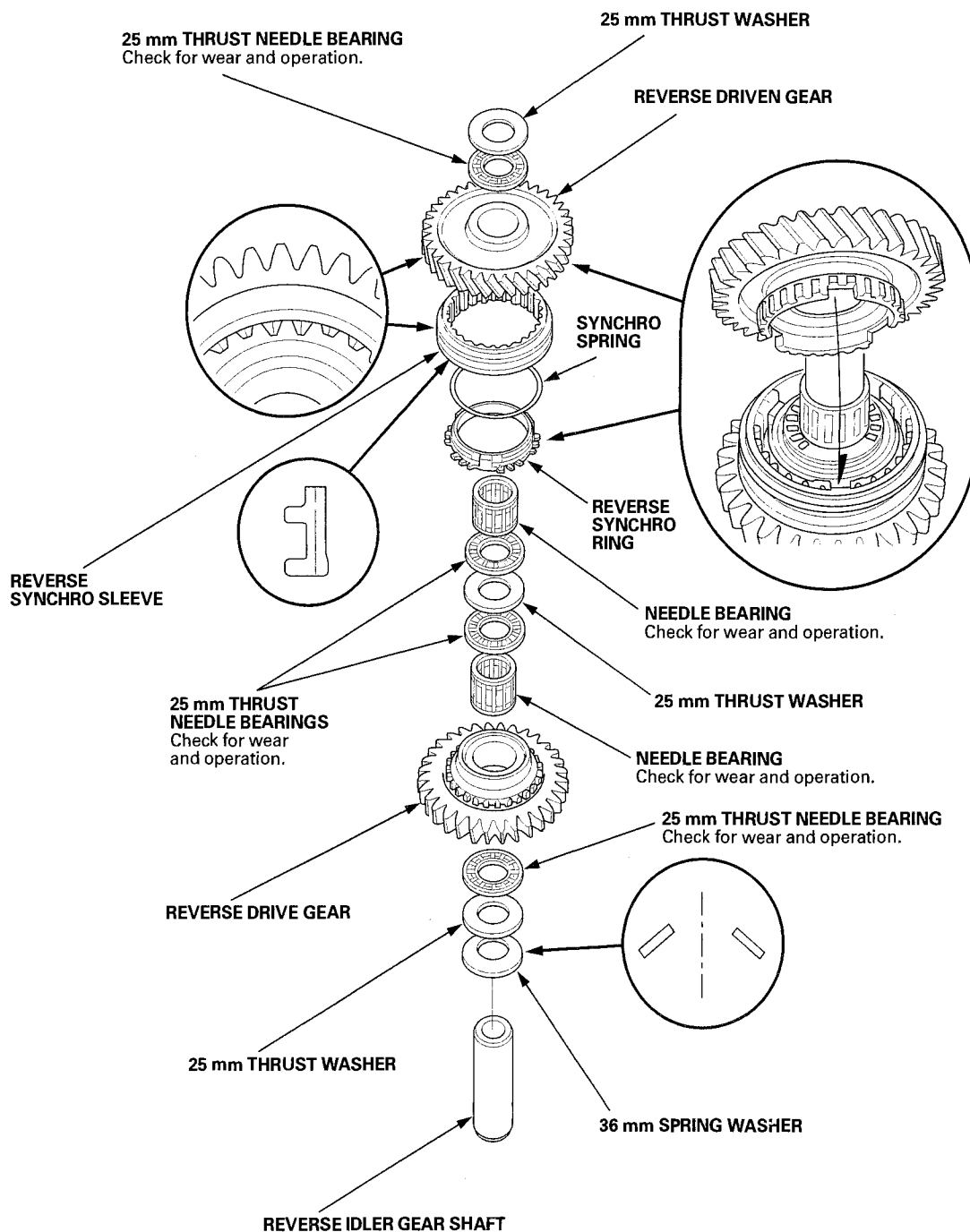
21. Tighten a new special bolt (B) (left-hand threads).

NOTE: Apply new MTF to the bolt threads and flange.



Reverse Idler Gear Shaft Assembly Disassembly/Reassembly

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



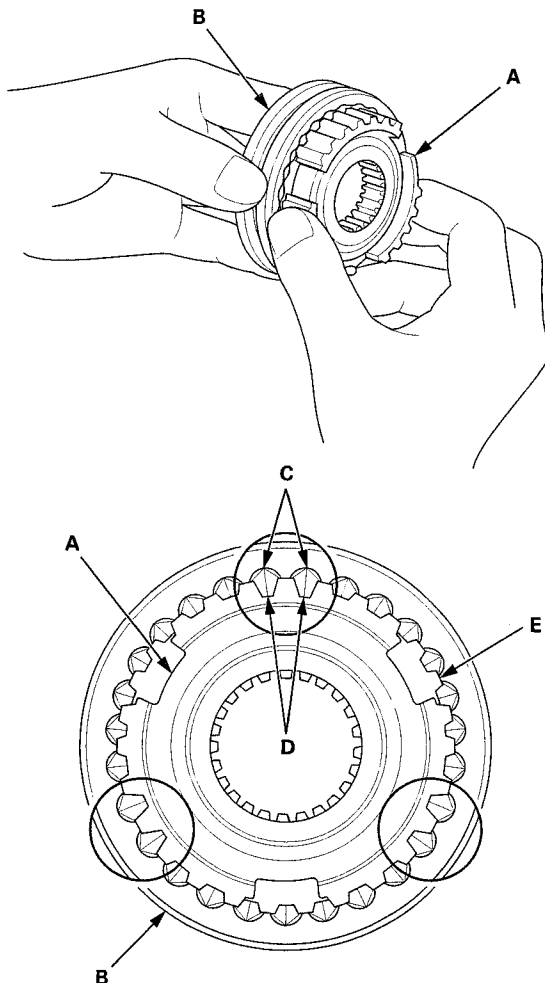
Manual Transmission

Synchro Sleeve and Hub Inspection and Reassembly

1. Inspect the gear teeth on all synchro hubs and synchro sleeves for wear (rounded off corners).
2. Install each synchro hub (A) in its mating synchro sleeve (B), and check for free movement. Make sure to match the three sets of longer teeth (C) (120 degrees apart) on the synchro sleeve with the three sets of deeper grooves (D) in the synchro hub.

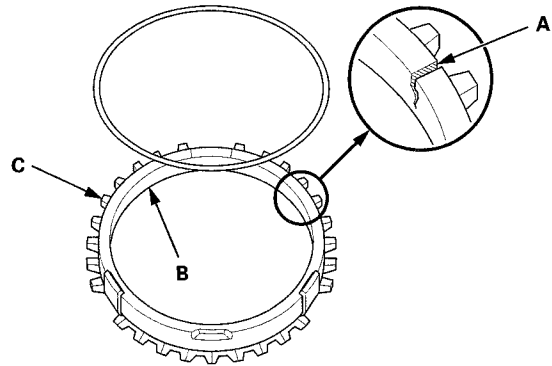
NOTE:

- Do not install the synchro sleeve with its longer teeth in the 1st/2nd and 5th/6th synchro hub slots (E) because it will damage the spring ring.
- If replacement is required, always replace the synchro sleeve and the synchro hub as a set.

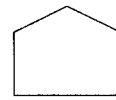


Synchro Ring and Gear Inspection

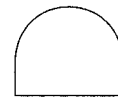
1. Inspect the synchro rings for scoring, cracks, and damage (A).



Example of synchro ring teeth

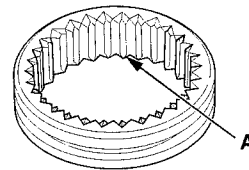


GOOD

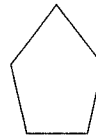


WORN

2. Inspect the inside of each synchro ring (B) for wear. Inspect the teeth (C) on each synchro ring for wear (rounded off).
3. Inspect the teeth (A) on each synchro sleeve and matching teeth on each gear for wear (rounded off).



Example of synchro sleeve teeth and gear teeth



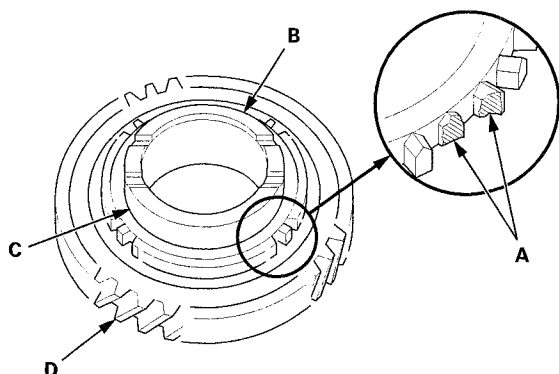
GOOD



WORN



4. Inspect the synchro teeth on gear, for scoring, cracks, and damage (A).



5. Inspect the thrust surface (B) on each gear hub for wear.
6. Inspect the cone surface (C) on each gear hub for wear and roughness.
7. Inspect the teeth on all gears (D) for uneven wear, scoring, and cracks.
8. Coat the cone surface of each gear with MTF, and place its synchro ring on it. Rotate the synchro ring, making sure that it does not slip.
9. Measure the clearance between each gear (A) and its synchro ring (B) all around the gear. 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 (5th gear): 0.70—1.49 mm (0.028—0.059 in)

Standard (6th gear): 0.73—1.44 mm (0.029—0.057 in)

Service Limit: 0.4 mm (0.02 in)

Double Cone Synchro and Triple Cone Synchro-to-Gear Clearance

Standard: (1st Gear)

- ①: Outer Synchro Ring (B)-to-Synchro Cone (C)
0.70—1.19 mm (0.028—0.047 in)
- ②: Synchro Cone (C)-to-Gear (A)
0.70—1.88 mm (0.028—0.074 in)
- ③: Outer Synchro Ring (B)-to-Gear (A)
1.12—1.68 mm (0.044—0.066 in)

Standard: (2nd Gear)

- ①: Outer Synchro Ring (B)-to-Synchro Cone (C)
0.70—1.19 mm (0.028—0.047 in)
- ②: Synchro Cone (C)-to-Gear (A)
0.70—1.88 mm (0.028—0.074 in)
- ③: Outer Synchro Ring (B)-to-Gear (A)
1.12—1.68 mm (0.044—0.066 in)

Standard: (3rd Gear)

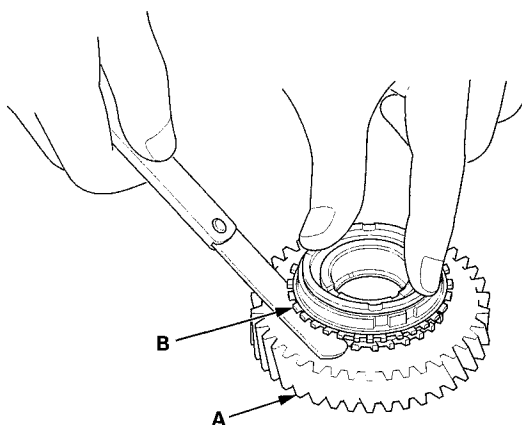
- ①: Outer Synchro Ring (B)-to-Synchro Cone (C)
0.68—1.19 mm (0.027—0.047 in)
- ②: Synchro Cone (C)-to-Gear (A)
0.48—1.04 mm (0.019—0.041 in)
- ③: Outer Synchro Ring (B)-to-Gear (A)
0.95—1.68 mm (0.037—0.066 in)

Standard: (4th Gear)

- ①: Outer Synchro Ring (B)-to-Synchro Cone (C)
0.70—1.19 mm (0.028—0.047 in)
- ②: Synchro Cone (C)-to-Gear (A)
0.50—1.14 mm (0.020—0.045 in)
- ③: Outer Synchro Ring (B)-to-Gear (A)
0.95—1.68 mm (0.037—0.066 in)

Service Limit:

- ①: 0.3 mm (0.01 in)
- ②: 0.3 mm (0.01 in)
- ③: 0.6 mm (0.02 in)

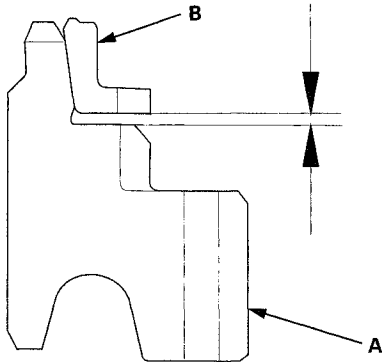


(cont'd)

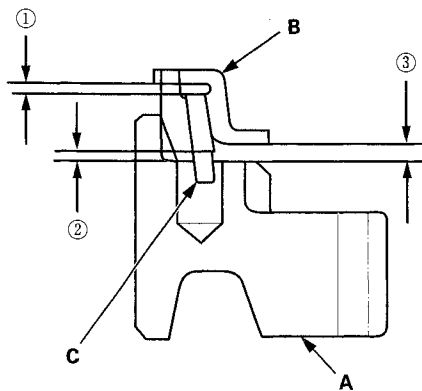
Manual Transmission

Synchro Ring and Gear Inspection (cont'd)

Synchro Ring-to-Gear Clearance



Double Cone Synchro and Triple Cone Synchro-to-Gear Clearance

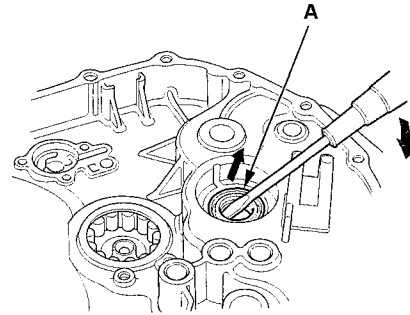


Mainshaft Oil Seal Replacement

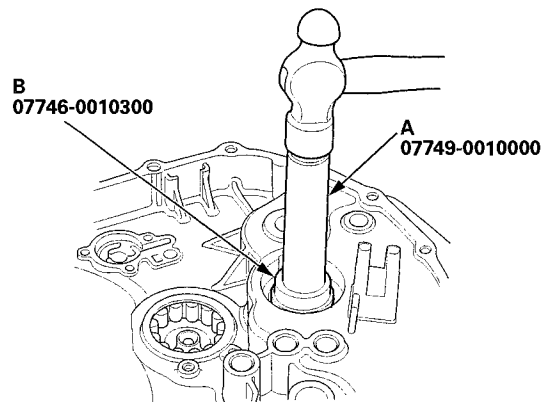
Special Tools Required

- Bearing Driver Attachment, 42 x 47 mm 07746-0010300
- Driver Handle, 15 x 135L 07749-0010000

1. Remove the oil seal (A) from the clutch housing. Be careful not to damage the clutch housing when removing the seal.



2. Drive in a new oil seal from the transmission side using the 15 x 135L driver handle (A) and the 42 x 47 mm bearing driver attachment (B).



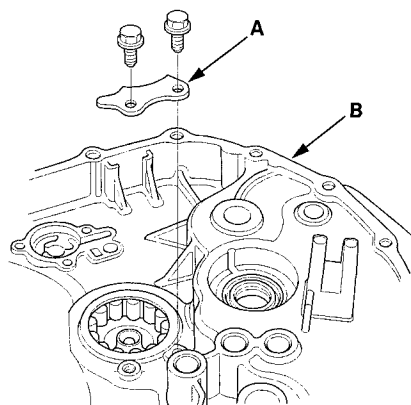


Countershaft Bearing Replacement

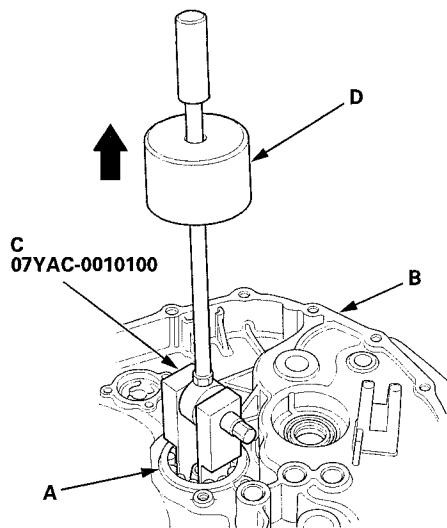
Special Tools Required

- Adjustable Bearing Puller, 45—75 mm 07YAC-0010100
- Attachment, 72 x 75 mm 07746-0010600
- Driver Handle, 15 x 135L 07749-0010000
- Slide Hammer 3/8"-16 UNF, commercially available

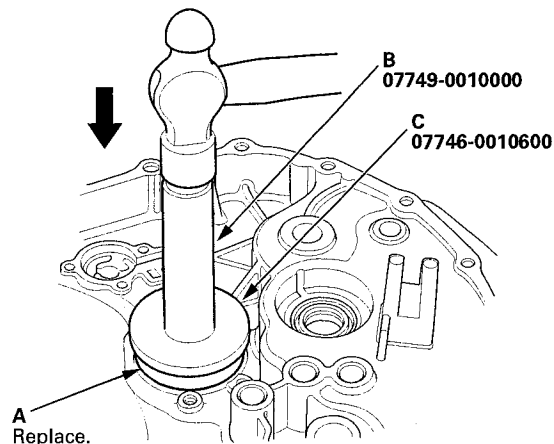
1. Remove the bearing set plate (A) from the clutch housing (B).



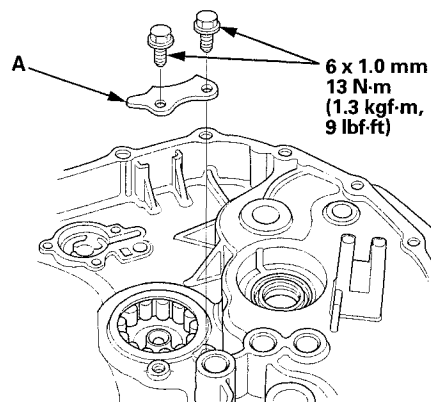
2. Remove the needle bearing (A) from the clutch housing (B) using the 45—75 mm adjustable bearing puller (C) and a commercially available 3/8"-16 UNF slide hammer (D).



3. Install a new needle bearing (A) using the 15 x 135L driver handle (B) and the 72 x 75 mm bearing driver attachment (C).



4. Install the bearing set plate (A).



Manual Transmission

Mainshaft Thrust Clearance Adjustment

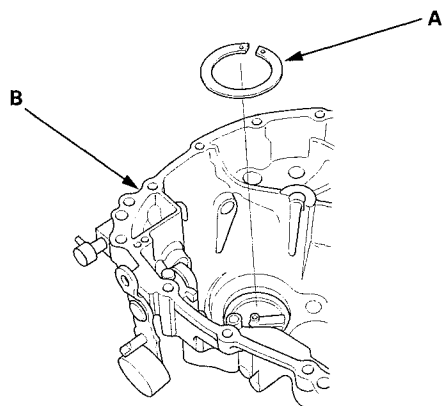
Special Tools Required

- Mainshaft Holder 07GAJ-PG20110
- Mainshaft Base 07GAJ-PG20130

NOTE:

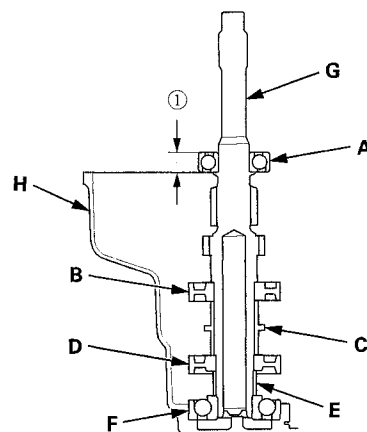
- Take measurements at normal room temperature.
- Clean all the parts thoroughly before installation.

1. Remove the 87 mm shim (A) from the transmission housing (B).



2. Install the ball bearing (A), the 3rd/4th synchro hub (B), the 4th/5th gear distance collar (C), the 5th/6th synchro hub (D), the 6th gear distance collar (E), and the angular ball bearing (F) on the mainshaft (G), then install the assembled mainshaft in the transmission housing (H).

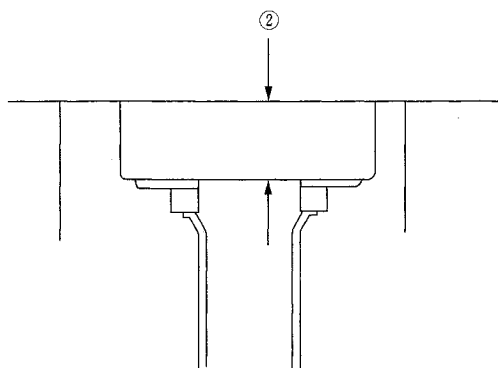
NOTE: The angular ball bearing is directional. If installed the wrong way, the measurements will not be accurate.



3. Measure the distance ① between the rim of the transmission housing and the ball bearing with a straight edge and a depth gauge. Measure at three locations, and average the readings.



4. Measure the distance ② (the depth of the clutch housing) with a straight edge and a depth gauge. Measure at three locations, and average the readings.



Shim Selection Formula

5. Select the proper 87 mm shim from the table. Follow the example below, and use the measurements you made in steps 3 and 4.

(Basic Formula)

$$\textcircled{2} - \textcircled{1} - (0.85 + 0.14) = \text{shim thickness (maximum)}$$

$$\textcircled{2} - \textcircled{1} - (0.85 + 0.21) = \text{shim thickness (minimum)}$$

- Subtract distance ① (step 3) from distance ② (step 4).
- 0.85 mm (0.033 in): Spring washer, a dimension in the installation.
- 0.14 mm (0.006 in): Minimum thrust clearance.
- 0.21 mm (0.008 in): Maximum thrust clearance.

(For example)

$$21.04 - 17.97 - (0.85 + 0.14) = 2.08 \text{ mm (0.082 in)}$$

$$21.04 - 17.97 - (0.85 + 0.21) = 2.01 \text{ mm (0.079 in)}$$

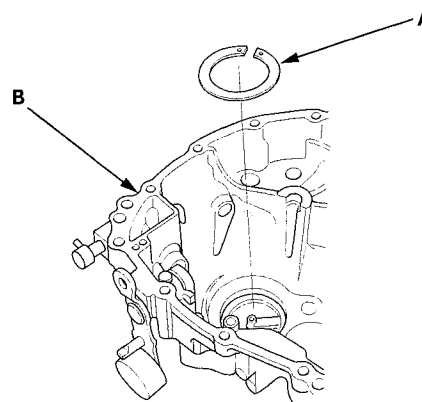
Take the middle value 2.04 mm (0.080 in) of the minimum value and the maximum value, and select the 0.93 mm (0.037 in) and 1.11 mm (0.044 in) shims.

NOTE: It is acceptable to select two 87 mm shims and put them together to get the required thickness. Make sure the washers are clean and dry to achieve an accurate measurement.

87 mm Shim

No.	Thickness
A	0.60 mm (0.024 in)
B	0.63 mm (0.025 in)
C	0.66 mm (0.026 in)
D	0.69 mm (0.027 in)
E	0.72 mm (0.028 in)
F	0.75 mm (0.030 in)
G	0.78 mm (0.031 in)
H	0.81 mm (0.032 in)
J	0.84 mm (0.033 in)
K	0.87 mm (0.034 in)
L	0.90 mm (0.035 in)
M	0.93 mm (0.037 in)
N	0.96 mm (0.038 in)
P	0.99 mm (0.039 in)
R	1.02 mm (0.040 in)
S	1.05 mm (0.041 in)
T	1.08 mm (0.043 in)
U	1.11 mm (0.044 in)
V	1.14 mm (0.045 in)
W	1.17 mm (0.046 in)
X	1.20 mm (0.047 in)
Y	1.23 mm (0.048 in)
Z	1.26 mm (0.050 in)
AA	1.29 mm (0.051 in)
AB	1.32 mm (0.052 in)
AC	1.35 mm (0.053 in)
AD	1.38 mm (0.054 in)
AE	1.41 mm (0.056 in)
AF	1.44 mm (0.057 in)

6. Install the selected 87 mm shim (A) in the transmission housing (B).

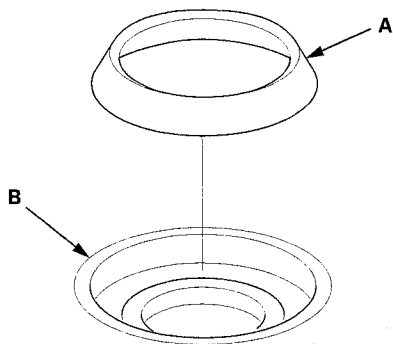


(cont'd)

Manual Transmission

Mainshaft Thrust Clearance Adjustment (cont'd)

7. Thoroughly clean the 64 mm spring washer (A) before installing it on the clutch housing (B). Note the installation direction of the spring washer.



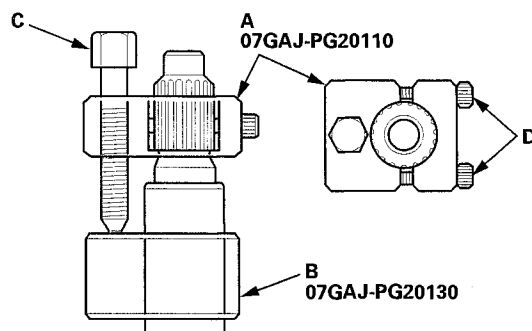
8. Install the assembled mainshaft in the clutch housing.
9. Place the transmission housing over the mainshaft and onto the clutch housing.
10. Tighten the clutch and transmission housings with several 10 mm bolts.

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

11. Lightly tap on the mainshaft with a soft-face hammer.

12. Attach the mainshaft holder (A) and the mainshaft base (B) to the mainshaft as follows:

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

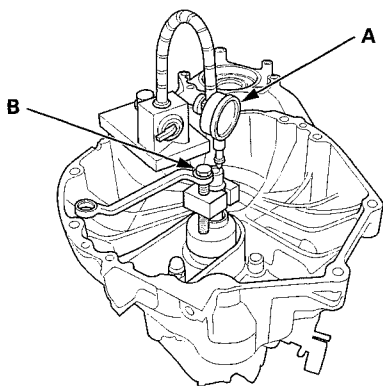


13. Fully seat the mainshaft by tapping on its end with a soft-face hammer.
14. Thread in the mainshaft holder bolt until it just contacts the wide surface of the mainshaft base.



Transmission Reassembly

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



16. Turn the mainshaft holder bolt (B) clockwise; stop turning when the dial gauge has reached its maximum movement. The reading on the dial gauge is the amount of mainshaft thrust clearance.

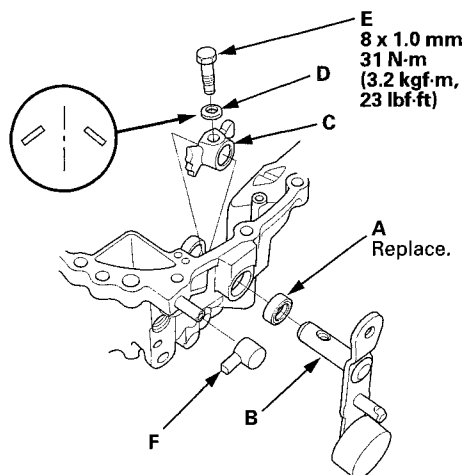
NOTE: Do not turn the mainshaft holder bolt more than 60 degrees after the needle of the dial gauge stops moving. Applying more pressure with the mainshaft holder bolt could damage the transmission.

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

Standard: 0.14—0.21 mm (0.006—0.008 in)

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

1. If any of the items listed were replaced, do the differential carrier bearing preload adjustment before reassembling the transmission (see page 13-39).
 - Transmission housing
 - Clutch housing
 - Differential carrier
 - Spacer
 - Differential carrier bearing and outer race
2. Press a new 16 x 23 x 5 mm dust seal (A) flush with the transmission housing surface, then install the change lever (B), the shift arm (C), the 8 mm spring washer (D), and the 8 mm special bolt (E).



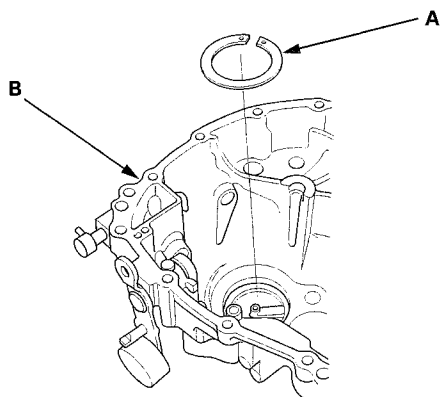
3. Install the breather cap (F) with the arrow on the cap toward the front of the vehicle.

(cont'd)

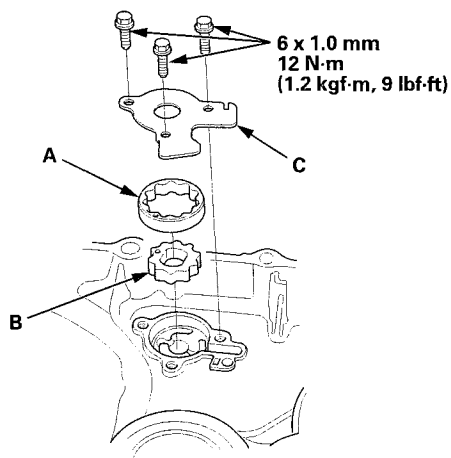
Manual Transmission

Transmission Reassembly (cont'd)

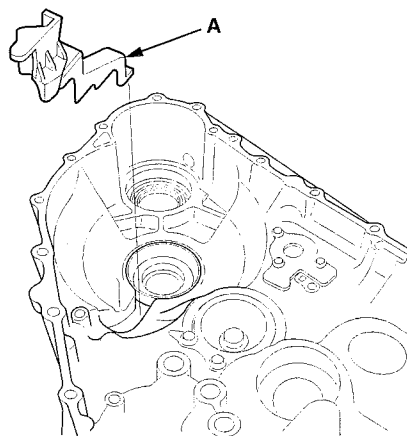
4. Select the proper size 87 mm shim (A) according to the measurements made during the Mainshaft Thrust Clearance Adjustment (see page 13-76). Install it into the transmission housing (B).



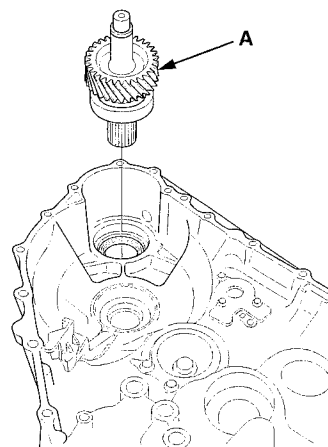
5. Install the oil pump outer rotor (A), the oil pump inner rotor (B), and the oil pump plate (C).



6. Install the oil gutter plate (A).

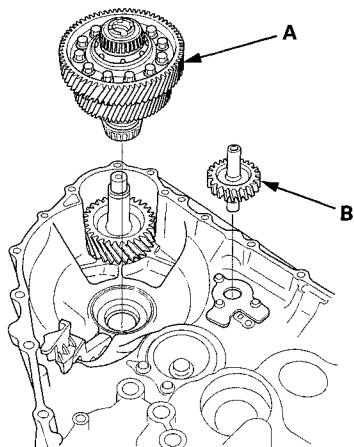


7. Install the transfer output shaft (A).

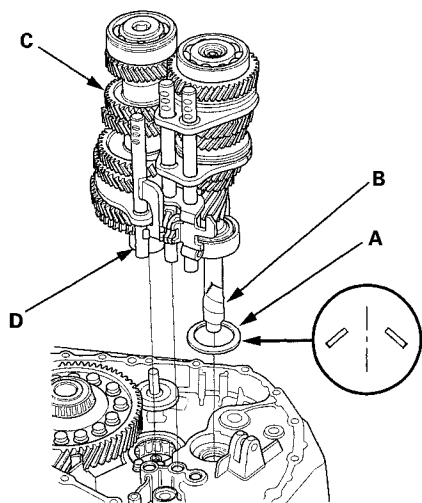




8. Install the differential assembly (A) and the oil pump shaft (B).



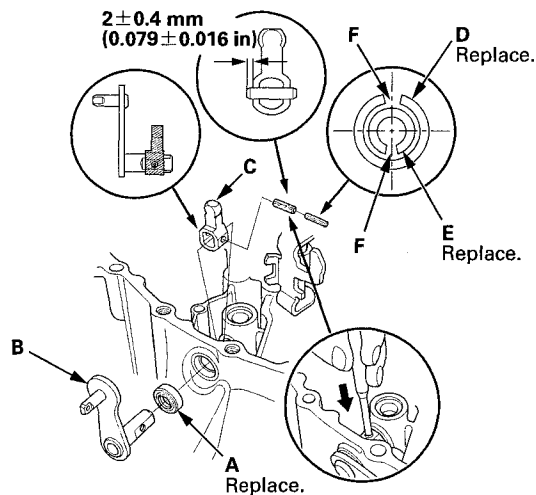
9. Install the 64 mm spring washer (A). Note the installation direction of the 64 mm spring washer.



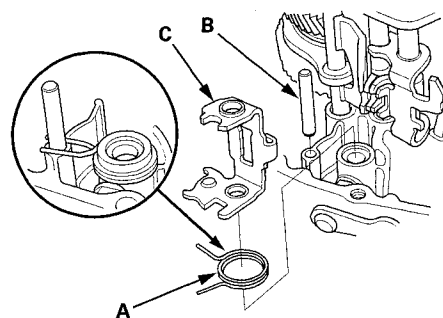
10. Apply tape to the mainshaft splines (B) to protect the seal. Install the mainshaft and the countershaft (C) with the shift fork assembly (D) as an assembly.

11. Press a new 14 x 20 x 4 mm dust seal (A) flush with the clutch housing surface, then install the select lever (B), the select arm (C), a new 5 x 22 mm spring pin (D), and a new 3 x 22 mm spring pin (E).

NOTE: Make the seams (F) of the 5 x 22 mm and 3 x 22 mm spring pin are opposite side.



12. Set the select return spring (A), the 8 x 50 mm pin (B), and the interlock (C) as shown.

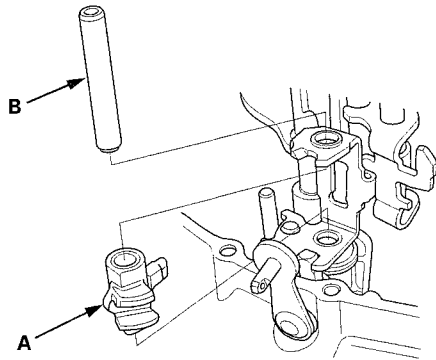


(cont'd)

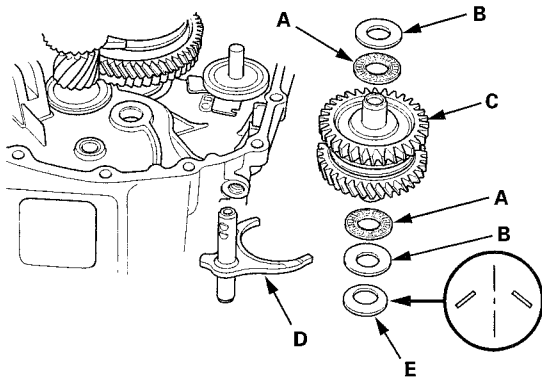
Manual Transmission

Transmission Reassembly (cont'd)

13. Install the shift piece (A) and the shift piece shaft (B).

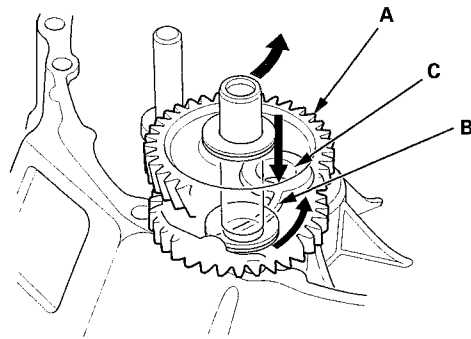


14. Assemble the 25 mm thrust needle bearings (A), the 25 mm thrust washers (B), the reverse idler gear shaft assembly (C), and the reverse shift fork (D) (see page 13-71).

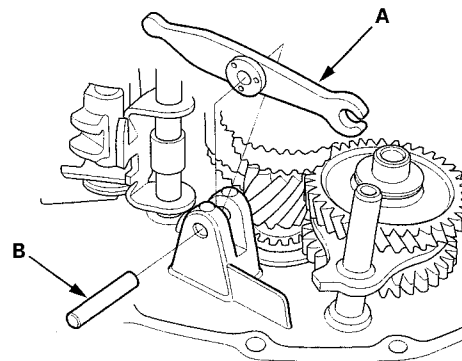


15. Install the 36 mm spring washer (E) to the reverse idler gear shaft assembly. Note the installation direction of the spring washer.

16. Slide the reverse idler gear shaft assembly (A) on the rib (B) of the clutch housing, then install it into the hole (C) of the clutch housing.



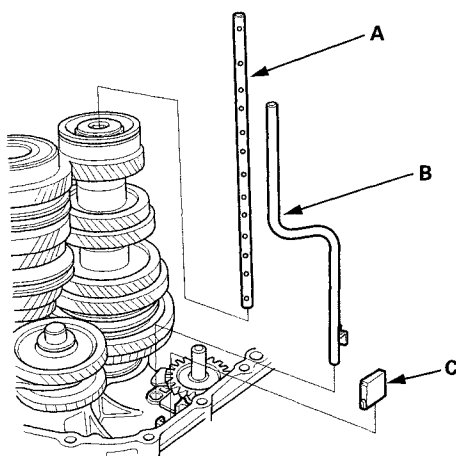
17. Install the reverse shift lever (A) and the 8 x 50 mm pin (B).





18. Install oil guide pipe A, the oil guide pipe (B), and the magnet (C).

NOTE: Clean the magnet anytime the transmission is disassembled.

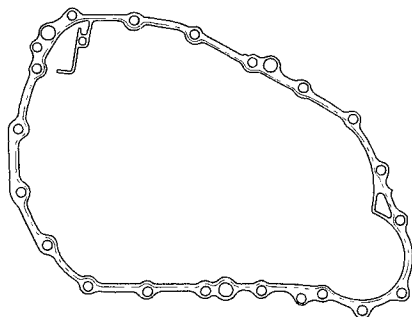


19. Clean any dirt and oil from the transmission housing sealing surface.

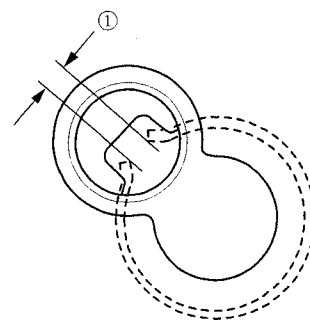
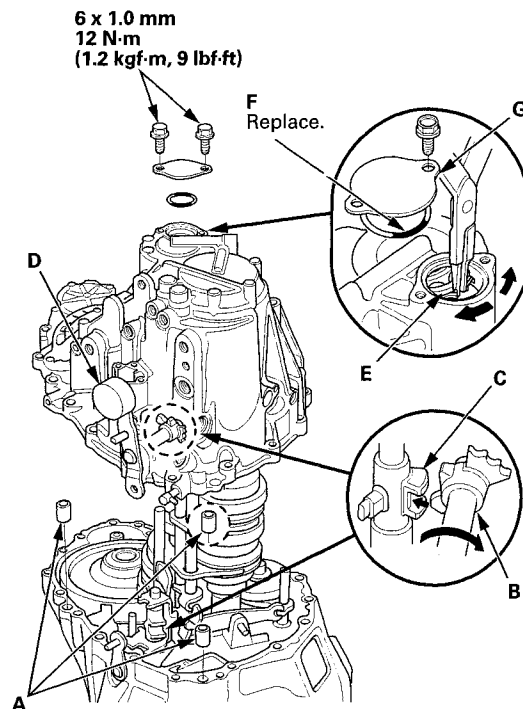
20. Apply liquid gasket, P/N 08717-0004, 08718-0001, 08718-0003, or 08718-0009 evenly to the clutch housing mating surface of the transmission housing. Install the component within 5 minutes of applying the liquid gasket.

NOTE:

- If apply liquid gasket P/N 08718-0012, the component must be installed within 4 minutes.
- If too much time has passed after applying the liquid gasket, remove the old liquid gasket and residue, then reapply new liquid gasket.



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



22. Lower the transmission housing, then place the shift arm (B) in the groove of the shift piece (C) by turning the change lever (D).

23. While expanding the 75 mm snap ring (E) on the countershaft ball bearing using snap ring pliers, push the transmission housing down to start the countershaft ball bearing through the snap ring. Release the pliers, and push down the housing unit it bottoms and the snap ring snaps in place in the countershaft ball bearing snap ring groove.

(cont'd)

Manual Transmission

Transmission Reassembly (cont'd)

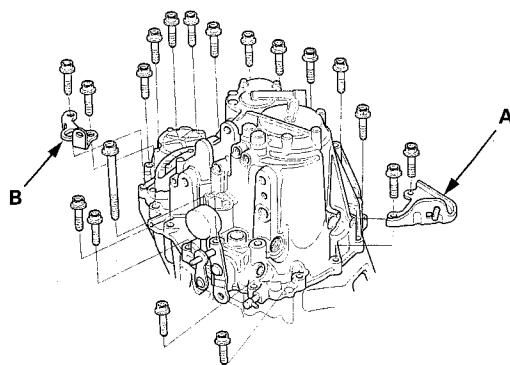
24. Make sure the 75 mm snap ring is securely seated in the groove of the countershaft bearing.

Dimension ① as installed: 1.67–9.42 mm
(0.066–0.371 in)

25. Install a new O-ring (F) and the transmission case cap (G).

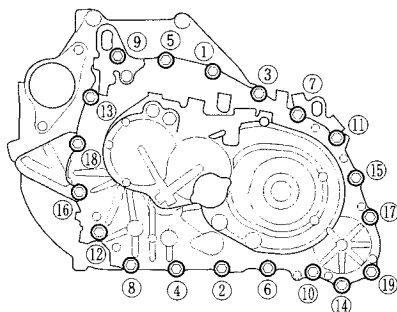
NOTE: Check the operation of the change lever and the select lever.

26. Install the 10 mm flange bolts finger-tight, with transmission hanger B and the clutch line bracket (A).

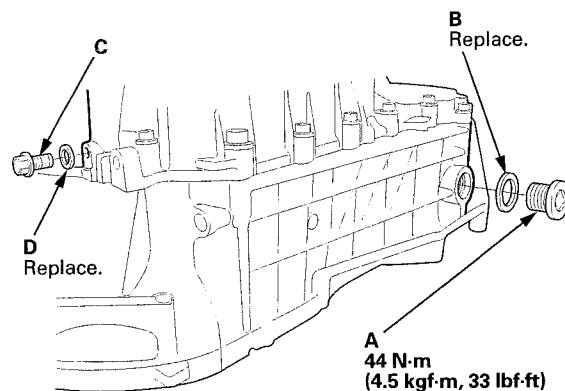


27. Tighten the 10 mm flange bolts in a crisscross pattern in several steps.

Specified Torque: 10 x 1.25 mm 44 N·m
(4.5 kgf·m, 33 lbf·ft)

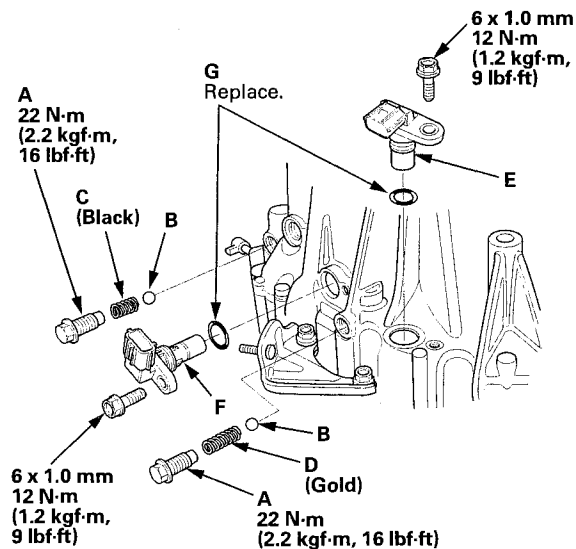


28. Install the drain plug (A) with a new sealing washer (B).



29. Install the oil check bolt (C) with a new sealing washer (D) by finger-tight.

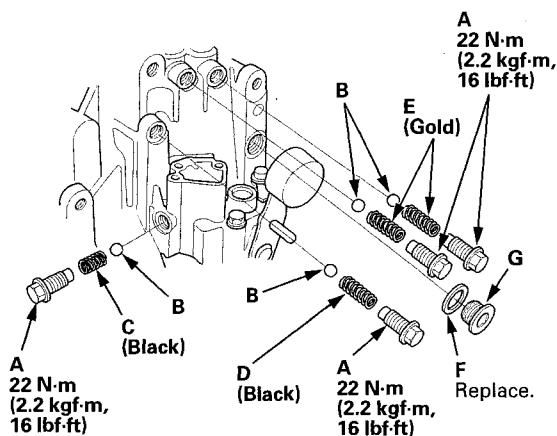
30. Apply liquid gasket (P/N 08717-0004, 08718-0001, 08718-0012, 08718-0003, or 08718-0009) to the thread of the detent bolts (A), then install the steel balls (B), the 22.0 mm spring (C), the 27.4 mm spring (D), and the detent bolts.



31. Install the input shaft (mainshaft) speed sensor (E), the output shaft (countershaft) speed sensor (F), and new O-rings (G).



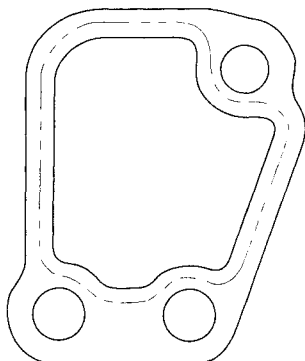
32. Apply liquid gasket (P/N 08717-0004, 08718-0001, 08718-0012, 08718-0003, or 08718-0009) to the thread of the detent bolts (A), then install the steel balls (B), the 22.0 mm spring (C), the 26.1 mm spring (D), the 27.4 mm spring (E), and the detent bolts.



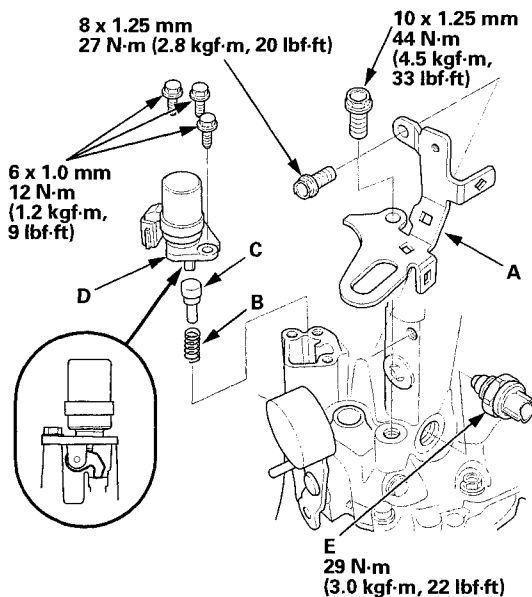
33. Install the filler plug (F) with a new sealing washer (G) by finger-tight.
34. Clean any dirt or oil from the reverse lockout solenoid sealing surface.
35. Apply liquid gasket, P/N 08717-0004, 08718-0001, 08718-0003, or 08718-0009 evenly to the transmission housing mating surface of the reverse lockout solenoid. Install the component within 5 minutes of applying the liquid gasket.

NOTE:

- If apply liquid gasket P/N 08718-0012, the component must be installed within 4 minutes.
- If too much time has passed after applying the liquid gasket, remove the old liquid gasket and residue, then reapply new liquid gasket.



36. Install the select lock pin spring (B), the select lock pin (C), and the reverse lockout solenoid (D).

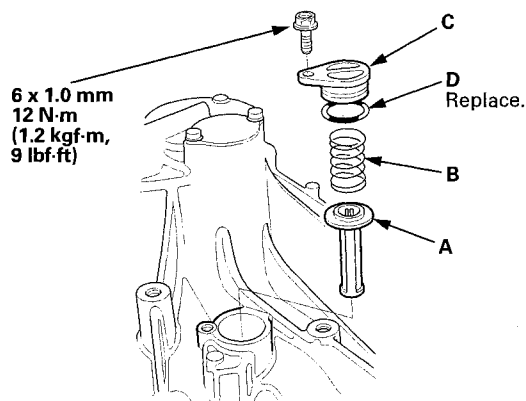


37. Apply liquid gasket, (P/N 08717-0004, 08718-0001, 08718-0012, 08718-0003, or 08718-0009) to the threads of the back-up light switch (E), and install it in the transmission housing.

38. Install transmission hanger A.

39. Install the oil pump strainer (A), the strainer set spring (B), and the strainer cover (C) with a new O-ring (D).

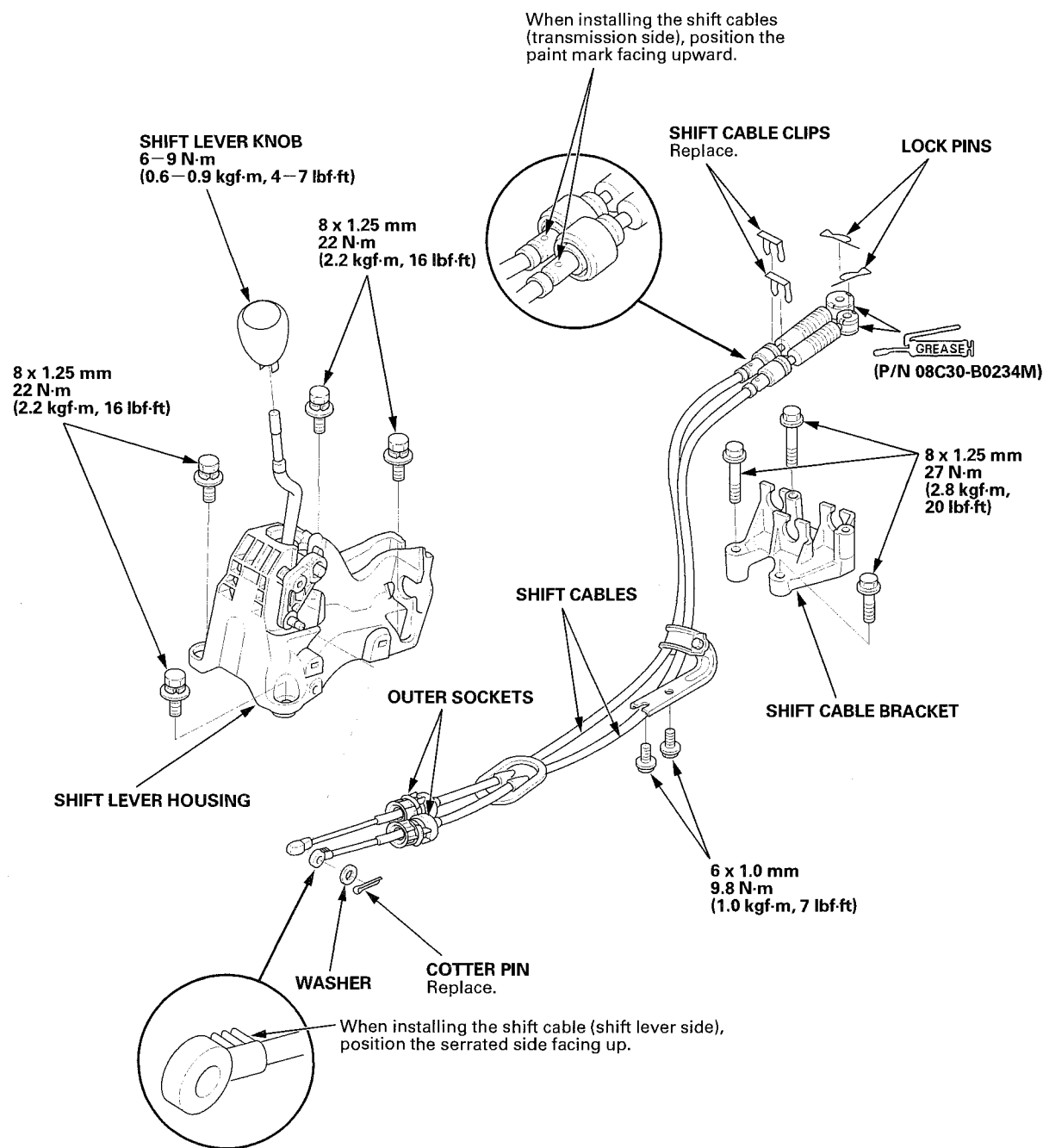
NOTE: Clean the strainer anytime the transmission is disassembled.



Manual Transmission

Gearshift Mechanism Replacement

NOTE: Make sure not to get any silicone grease on the terminal part of the connectors and switches, especially if you have silicone grease on your hands or gloves.

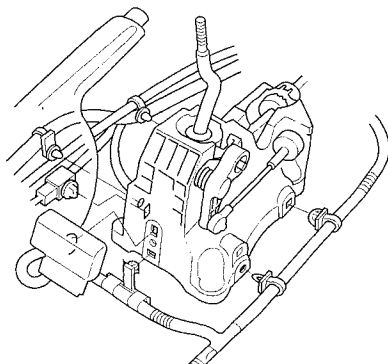




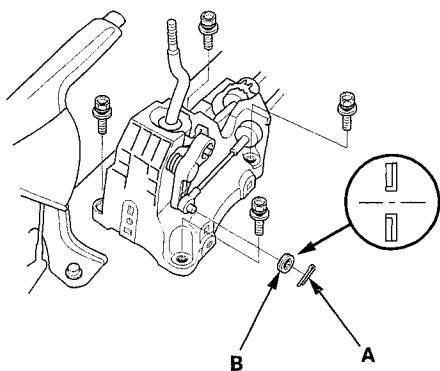
Shift Lever Housing Replacement

NOTE: Take care not to scratch the center console, the dashboard, and the related parts.

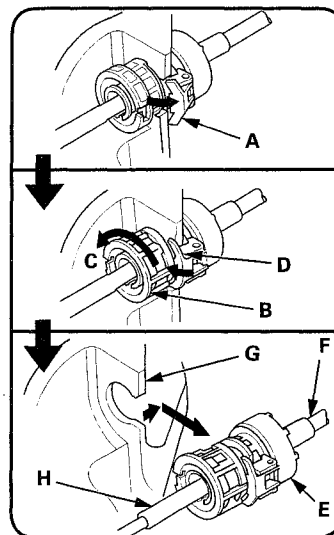
1. Remove the center console (see page 20-109).
2. Remove the harness clamps.



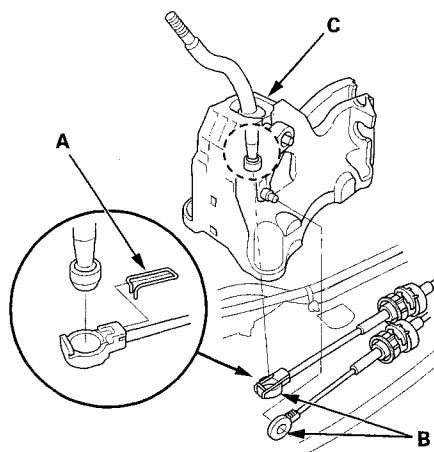
3. Remove the cotter pin (A), the washer (B), and the bolts.



4. Unlock the retainer (A).



5. Rotate the socket holder retainer (B) counterclockwise (C) until it stops, and push the retainer lock (D) into the socket holder retainer to lock the retainer.
6. Slide the socket holder (E) and the shift cable (F) out of the shift cable bracket (G). Do not remove the shift cable by pulling the shift cable guide (H).
7. Remove the clip (A), and disconnect the shift cable ends (B) from the shift lever, then remove the shift lever housing (C).

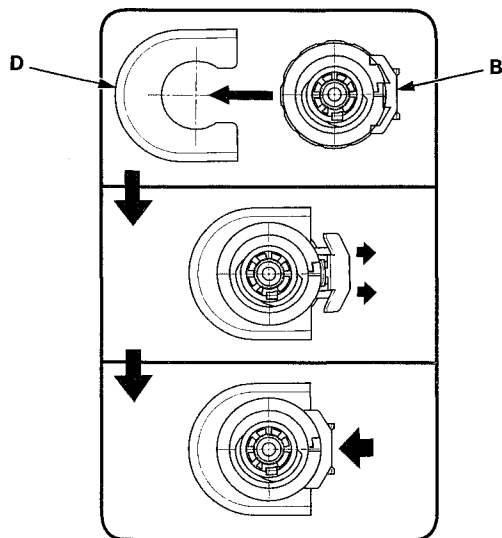
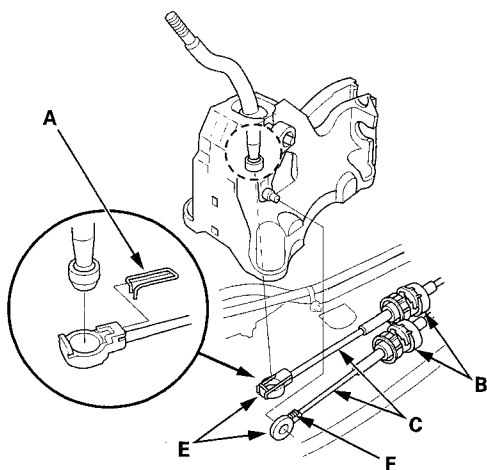


(cont'd)

Manual Transmission

Shift Lever Housing Replacement (cont'd)

8. Install the clip (A).

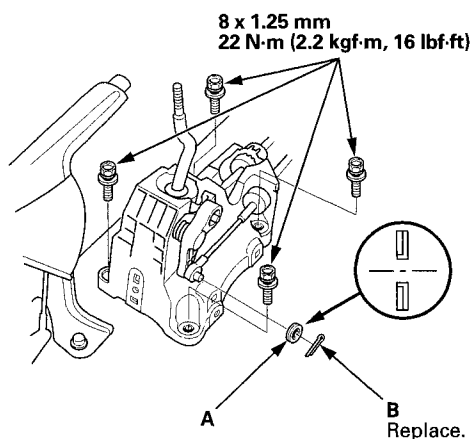


9. Align the socket holder (B) on the shift cables (C) with the slot in the bracket base (D), then slide the holder into the base. Install the shift cable ends (E) to the shift lever then install the shift lever housing.

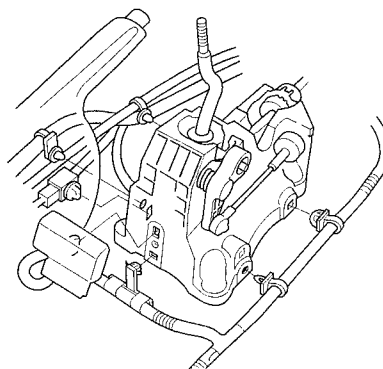
NOTE: When installing the shift cable, position the serrated side (F) facing up.

10. Install the bolts, the washer (A), and a new cotter pin (B), then bend the cotter pin ends.

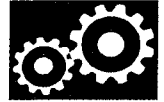
NOTE: You can install the cotter pin from either direction.



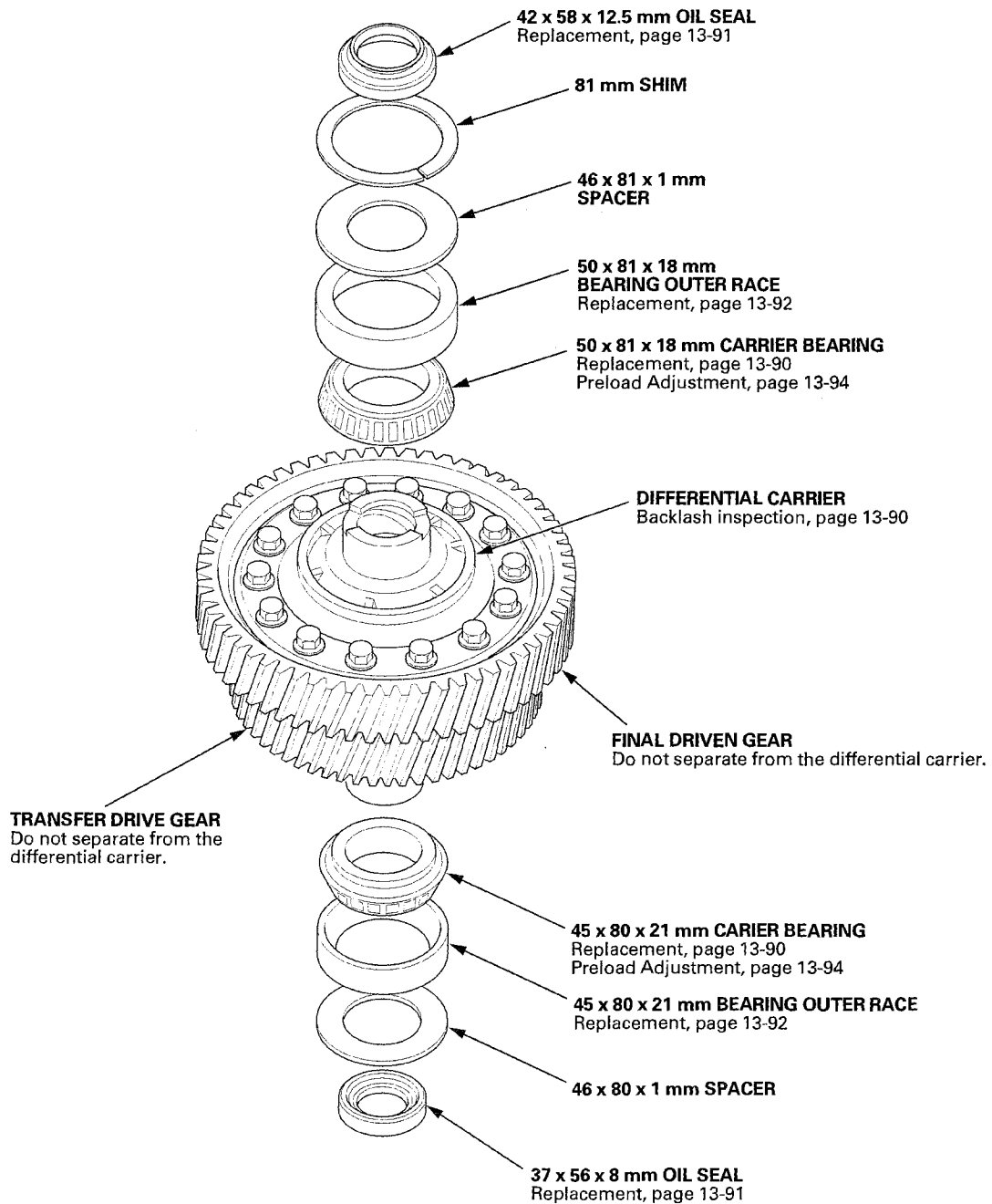
11. Install the harness clamps.



12. Install the center console (see page 20-109).



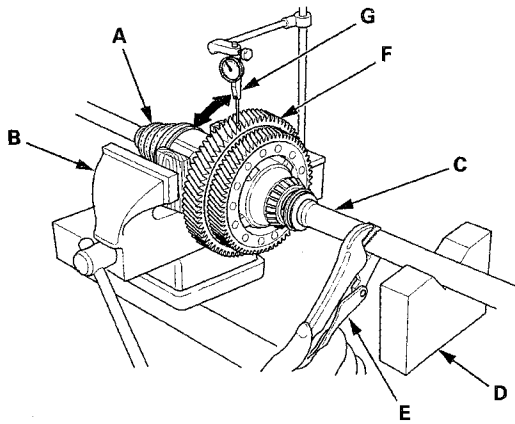
Component Location Index



M/T Differential

Backlash Inspection

1. Install the driveshaft and the intermediate shaft into the differential assembly.
2. Carefully clamp the driveshaft (A) in a bench vise (B).



3. Place the intermediate shaft (C) on a V-block (D), then fix the intermediate shaft using vise grips or equivalent (E).
4. Measure the backlash of the final driven gear (F) with a dial indicator (G). If the backlash is not within the standard, replace the differential assembly.

NOTE: If it needs to replace the differential carrier, the final driven gear and the transfer drive gear as a set. Do not separate the final driven gear and the transfer drive gear from the differential carrier.

Standard (New): 0.6—1.2 mm (0.02—0.05 in)

Carrier Bearing Replacement

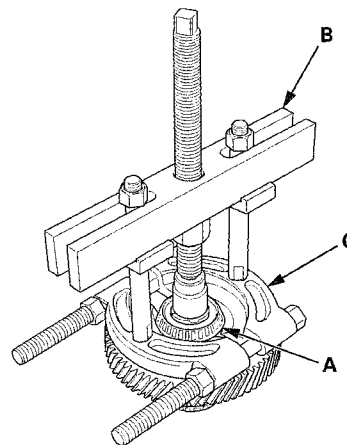
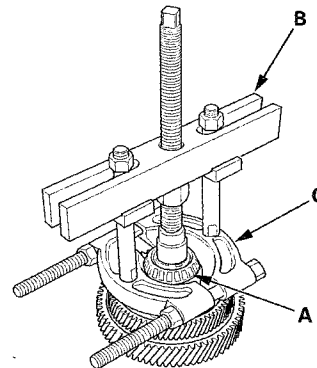
Special Tools Required

Remover Installer, 22 x 37/46 x 52 07PAF-0030100

NOTE:

- The bearing outer race and the tapered roller bearing should be replaced as a set.
- Whenever the tapered roller bearing is replaced, do the carrier bearing preload adjustment (see page 13-94) while reassembling the transmission.

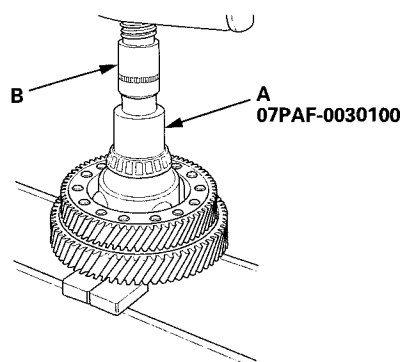
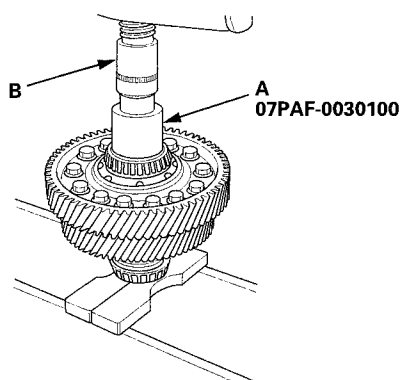
1. Check the carrier bearings for wear and rough rotation on the transmission or the clutch housing with the bearing outer race. If they rotate smoothly and their rollers show no signs of wear, the bearings are OK.
2. Remove the carrier bearings (A) using a commercially available bearing puller (B) and a bearing separator (C).





Oil Seal Replacement

3. Install new bearings using the 22 x 37/46 x 52 mm installer (A) and a press (B). Press on each bearing until it bottoms out. There should be no clearance between the bearings and the differential carrier.

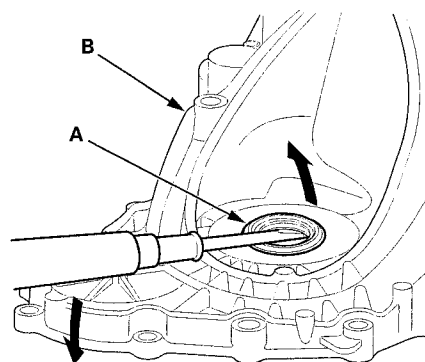


Special Tools Required

- Driver Handle, 15 x 135L 07749-0010000
- Oil Seal Driver Attachment 07NAD-P20A100

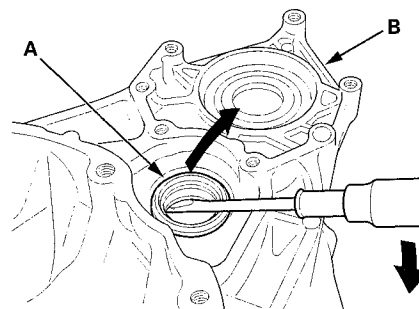
1. Remove the oil seal (A) from the transmission housing (B).

NOTE: Be careful not to damage the transmission housing while removing the oil seal.



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

NOTE: Be careful not to damage the clutch housing while removing the oil seal.

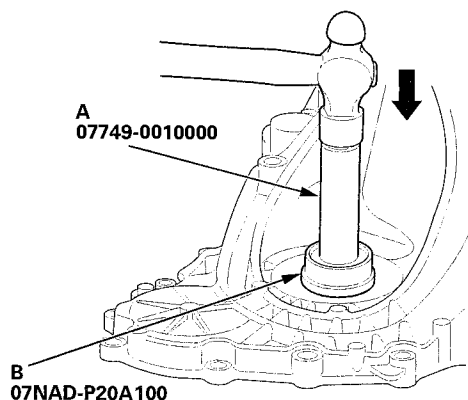


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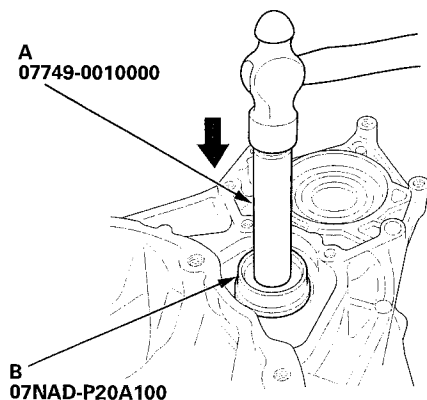
M/T Differential

Oil Seal Replacement (cont'd)

3. Install a new oil seal flush with the transmission housing using the 15 x 135L driver handle (A) and the oil seal driver attachment (B).



4. Install a new oil seal flush with clutch housing using the 15 x 135L driver handle (A) and the oil seal driver attachment (B).



Bearing Outer Race Replacement

Special Tools Required

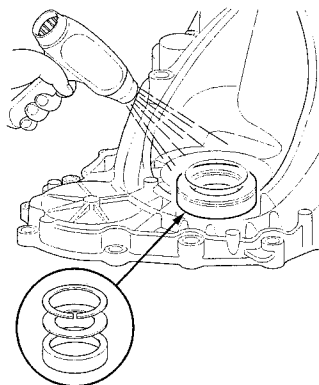
- Attachment, 78 x 80 mm 07NAD-PX40100
- Driver Handle, 15 x 135L 07749-0010000

NOTE:

- The bearing outer race and the tapered roller bearing should be replaced as a set.
- Whenever the tapered roller bearing and the bearing outer race are replaced, do the carrier bearing preload adjustment (see page 13-94) while reassembling the transmission.

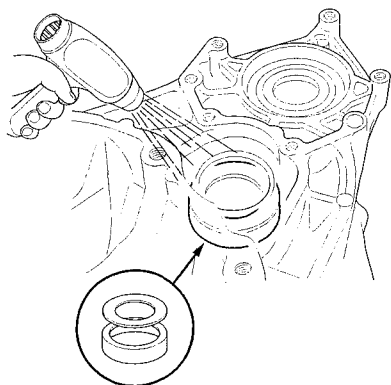
1. Remove the oil seals from the transmission housing and the clutch housing (see page 13-91).
2. Remove the bearing outer race, the spacer, and the 81 mm thrust shim from the transmission housing by heating the housing to about 212 °F (100 °C) with a heat gun.

NOTE: Do not reuse the 81 mm thrust shim if the outer race was driven out.

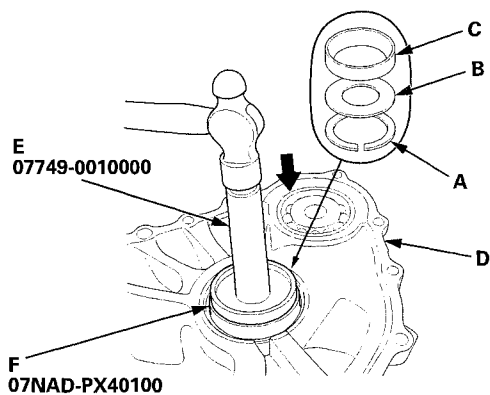




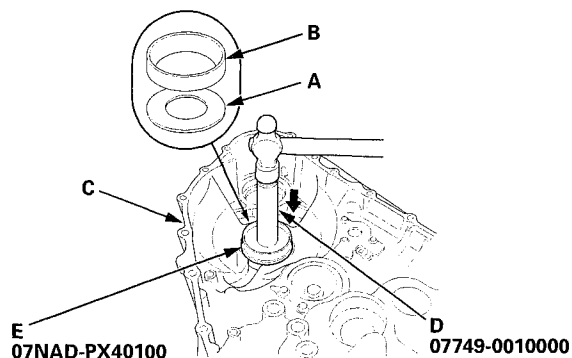
3. Remove the bearing outer race and the spacer from the clutch housing by heating the housing to about 212 °F (100 °C) with a heat gun.



4. Install the 81 mm thrust shim (A), the spacer (B), and the bearing outer race (C) into the transmission housing (D) using the 15 x 135L driver handle (E) and the 78 x 80 mm bearing driver attachment (F).



5. Install the spacer (A) and the bearing outer race (B) into the clutch housing (C) using the 15 x 135L driver handle (D) and the 78 x 80 mm bearing driver attachment (E).



6. Install the oil seals into the transmission housing and the clutch housing (see page 13-91).

M/T Differential

Carrier Bearing Preload Adjustment

Special Tools Required

Preload Inspection Tool 070AJ-0020101

If any of the items listed below were replaced, the carrier bearing preload must be adjusted.

- Transmission housing
- Clutch housing
- Differential carrier
- Spacer
- Carrier bearing and outer race

1. Disassemble the transmission (see page 13-39).

2. Install the 81 mm thrust shim, the spacer, and the bearing outer race into the transmission housing, and install the spacer and the bearing outer race into the clutch housing, if they are removed (see page 13-92).

NOTE:

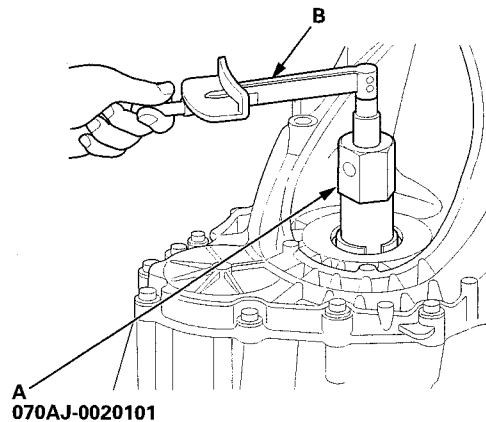
- The tapered roller bearing and the bearing outer race compose the carrier bearing are always should be a set. Do not combine the other one.
- Note the thickness size of the used 81 mm thrust shim.

3. Install the differential carrier with the tapered roller bearing, and assemble the transmission housing and the clutch housing using the bolts by specified tightening torque (see step 27 on page 13-84).

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

4. Rotate the differential assembly in both directions to seat the carrier bearings.

5. At normal room temperature, measure the starting torque of the differential assembly by rotating it in both directions using the preload inspection tool (A) and a torque wrench (B).



6. If the carrier bearing preload is not within the standard, select an 81 mm shim that will provide the correct preload:

- Compare the bearing preload you got on the first try with the standard preload of 3.43–4.51 N·m (35–46 kgf·cm, 30–40 lbf·in).
- If the preload you measure was less than standard, subtract it from the standard preload.
- If the preload you measure was more than standard, subtract the standard preload from the preload you measure.

Standard: 3.4–4.5 N·m
(35–46 kgf·cm, 30–40 lbf·in)



7. Subtract the appropriate thrust shim thickness from the middle of the standard preload: 4.0 N·m (41 kgf·cm, 36 lbf·in).

NOTE:

- Each shim size up or down from standard makes about 0.3–0.4 N·m (3–4 kgf·cm, 2.6–3.5 lbf·in) difference in preload.
- Assemble only one 81 mm thrust shim. Do not install two or more 81 mm thrust shim combined.

Example 1 (measured preload was less than the standard):

Measured preload: 2.1 N·m (21 kgf·cm, 18 lbf·in) with a 2.50 mm (0.098 in) thrust shim:

① Standard	4.0 N·m (41 kgf·cm, 36 lbf·in)
– Measurement	2.1 N·m (21 kgf·cm, 18 lbf·in)
	1.9 N·m (20 kgf·cm, 17 lbf·in) less

The subtracted preload was 1.9 N·m (20 kgf·cm, 18 lbf·in) less than the standard, so you need a shim five sizes thicker than in measured (try the 2.65 mm (0.104 in) 81 mm thrust shim, and recheck).

Example 2 (measured preload was more than the standard):

Measured preload: 4.8 N·m (49 kgf·cm, 43 lbf·in) with a 2.50 mm (0.098 in) thrust shim:

② Standard	4.8 N·m (49 kgf·cm, 43 lbf·in)
– Measurement	4.0 N·m (41 kgf·cm, 36 lbf·in)
	0.8 N·m (8 kgf·cm, 7 lbf·in) more

The subtracted preload was 0.8 N·m (8 kgf·cm, 7 lbf·in) more than the standard, so you need a shim two sizes thinner than in measured (try the 2.44 mm (0.096 in) 81 mm thrust shim, and recheck).

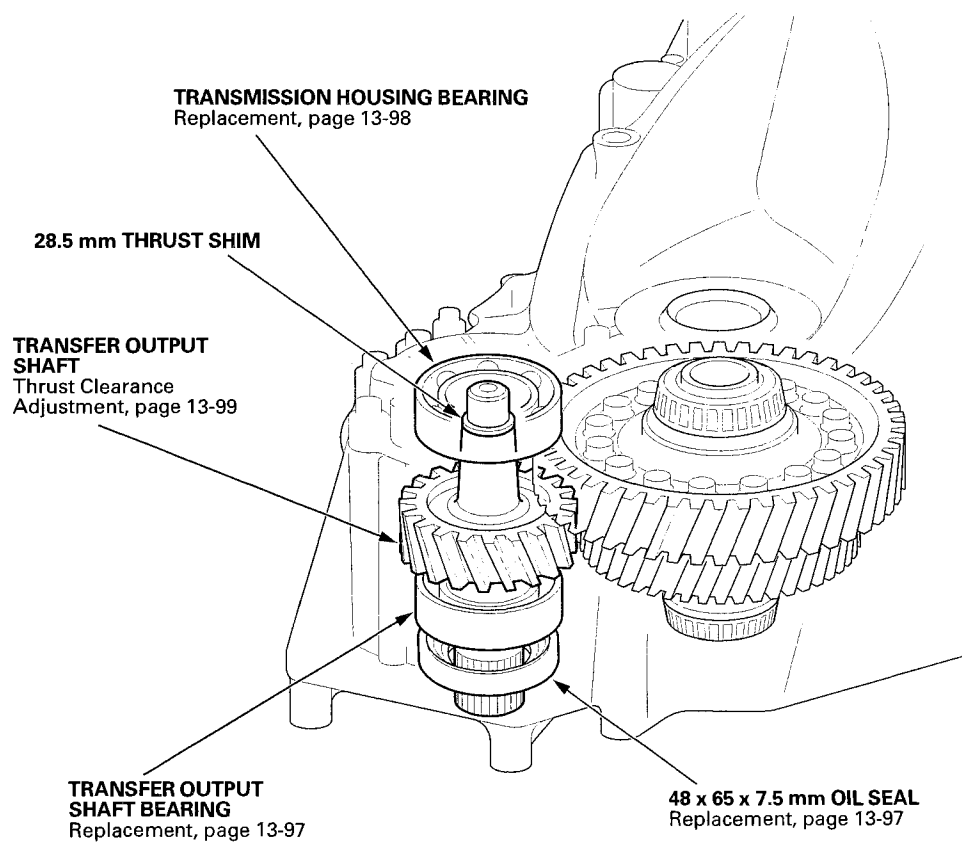
81 mm Thrust Shim

No.	Thickness
A	2.05 mm (0.081 in)
B	2.08 mm (0.082 in)
C	2.11 mm (0.083 in)
D	2.14 mm (0.084 in)
E	2.17 mm (0.085 in)
F	2.20 mm (0.087 in)
G	2.23 mm (0.088 in)
H	2.26 mm (0.089 in)
J	2.29 mm (0.090 in)
K	2.32 mm (0.091 in)
L	2.35 mm (0.093 in)
M	2.38 mm (0.094 in)
N	2.41 mm (0.095 in)
P	2.44 mm (0.096 in)
Q	2.47 mm (0.097 in)
R	2.50 mm (0.098 in)
S	2.53 mm (0.100 in)
T	2.56 mm (0.101 in)
U	2.59 mm (0.102 in)
V	2.62 mm (0.103 in)
W	2.65 mm (0.104 in)
X	2.68 mm (0.106 in)
Y	2.71 mm (0.107 in)
Z	2.74 mm (0.108 in)
AA	2.77 mm (0.109 in)
AB	2.80 mm (0.110 in)
AC	2.83 mm (0.111 in)
AD	2.86 mm (0.113 in)
AE	2.89 mm (0.114 in)
AF	2.92 mm (0.115 in)
AG	2.95 mm (0.116 in)
AH	2.98 mm (0.117 in)
AJ	3.01 mm (0.119 in)
AK	3.04 mm (0.120 in)
AL	3.07 mm (0.121 in)
AM	3.10 mm (0.122 in)
AN	3.13 mm (0.123 in)
AP	3.16 mm (0.124 in)

8. Replace the 81 mm thrust shim to appropriate one (see page 13-92).
9. With the appropriate size 81 mm thrust shim installed in the transmission housing, check the initial preload again to verify the preload is within the standard.
10. Reassemble the transmission (see page 13-79).

Transfer Output Shaft

Component Location Index



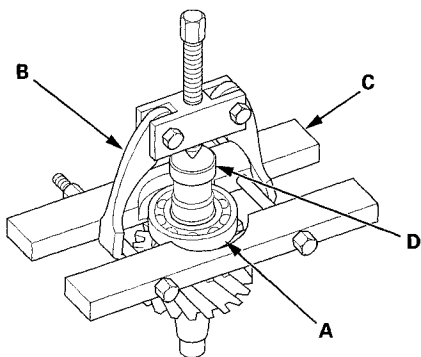


Transfer Output Shaft Bearing Replacement

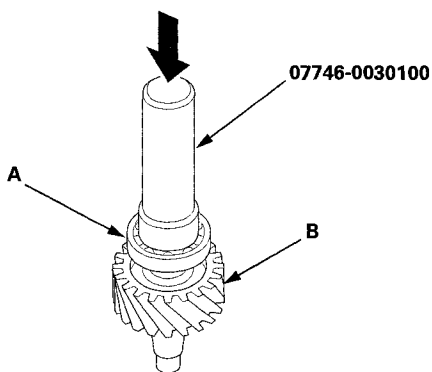
Special Tools Required

Driver Handle, 40 mm I.D. 07746-0030100

1. Remove the transfer output shaft bearing (A) using a commercially available puller (B), a bearing separator (C), and a spacer (D). Place the spacer between the transfer output shaft and the puller to prevent damaging the transfer output shaft.



2. Install a new bearing (A) on the transfer output shaft (B) using the 40 mm driver handle and a press.

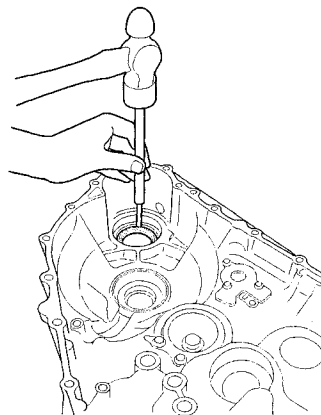


Oil Seal Replacement

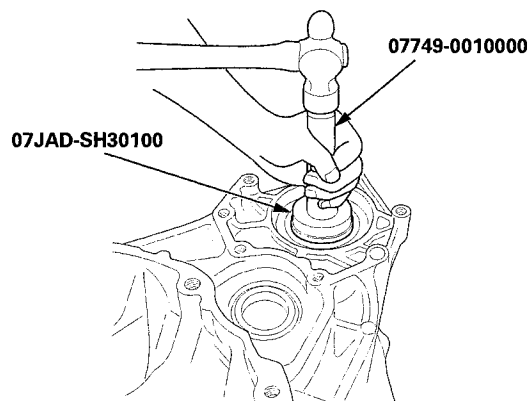
Special Tools Required

- Driver Handle, 15 x 135L 07749-0010000
- Attachment, 65 mm 07JAD-SH30100

1. Remove the oil seal from the clutch housing.



2. Install a new oil seal flush with the clutch housing using the driver handle and the 65 mm attachment.



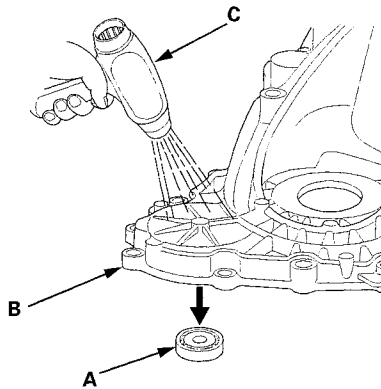
Transfer Output Shaft

Transmission Housing Bearing Replacement

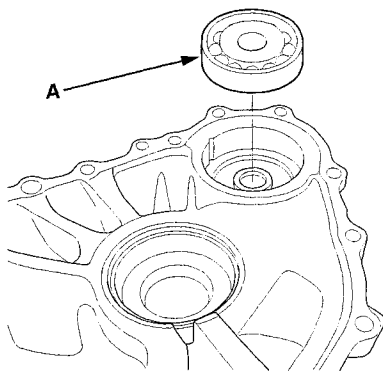
Special Tools Required

- Driver Handle, 15 x 135L 07749-0010000
- Attachment, 72 x 75 mm 07746-0010600

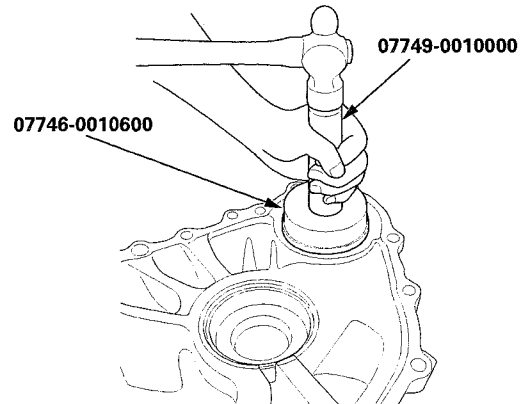
1. Remove the transfer output shaft bearing (A) from the transmission housing (B) by heating the transmission housing to about 212 °F (100 °C) using a heat gun (C). Do not heat the transmission housing more than 212 °F (100 °C).



2. Install a new bearing in the transmission housing (A).



3. Drive a new bearing until it bottoms in the housing using the driver handle and the 72 x 75 mm attachment.

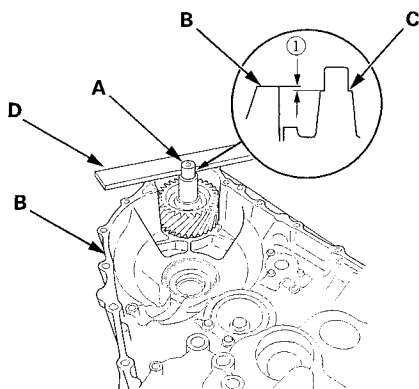




Transfer Output Shaft Thrust Clearance Adjustment

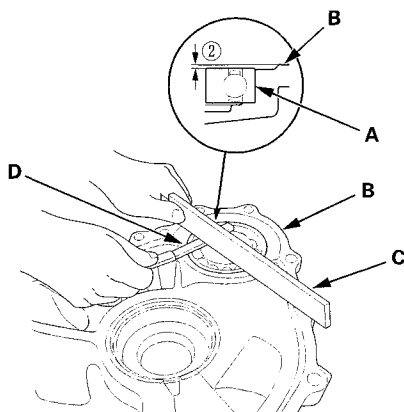
NOTE: If the transfer output shaft, the transfer output shaft bearing, the transmission housing bearing, the transmission housing, or the clutch housing were replaced, adjust the transfer output shaft thrust clearance with the 28.5 mm thrust shim.

1. Install the transfer output shaft (A) in the clutch housing.



2. Measure the clearance ① between the rim of the clutch housing (B) and the 28.5 mm thrust shim contact area (C) using a straight edge (D) and a depth gauge in at least three places. Use the average as the actual clearance.

3. Measure the clearance ② between the transmission housing bearing (A) and the rim of the transmission housing (B) using a straight edge (C) and a feeler gauge (D) in at least three places. Use the average as the actual clearance.



4. To make the standard clearance, select a 28.5 mm thrust shim from the table; subtract the middle of the standard clearance from the sum of ① and ②.

Standard Clearance:

0.08—0.17 mm (0.003—0.007 in)

Basic Formula

① + ② - 0.13* = Shim thickness

Therefore, select a closest size shim from the table.

*: Middle of the standard clearance.

For Example

①: 1.47 mm (0.058 in)

②: 0.58 mm (0.023 in)

$1.47 + 0.58 - 0.13 = 1.92$

Select the No. F (1.92 mm (0.076 in)) shim.

THRUST SHIM, 28.5 mm

No.	Thickness
A	1.82 mm (0.0717 in)
B	1.84 mm (0.0724 in)
C	1.86 mm (0.0732 in)
D	1.88 mm (0.0740 in)
E	1.90 mm (0.0748 in)
F	1.92 mm (0.0756 in)
G	1.94 mm (0.0764 in)
H	1.96 mm (0.0772 in)
I	1.98 mm (0.0780 in)
J	2.00 mm (0.0787 in)
K	2.02 mm (0.0795 in)
L	2.04 mm (0.0803 in)
M	2.06 mm (0.0811 in)
N	2.08 mm (0.0819 in)
O	2.10 mm (0.0827 in)
P	2.12 mm (0.0835 in)
Q	2.14 mm (0.0843 in)
R	2.16 mm (0.0850 in)
S	2.18 mm (0.0858 in)
T	2.20 mm (0.0866 in)
U	2.22 mm (0.0874 in)
V	2.24 mm (0.0882 in)
W	2.26 mm (0.0890 in)
X	2.28 mm (0.0898 in)
Y	2.30 mm (0.0906 in)
Z	2.32 mm (0.0913 in)
AA	2.34 mm (0.0921 in)

Transfer Assembly

Component Location Index

TRANSFER BREATHER HOSE
Replacement, page 13-104

TRANSFER ASSEMBLY
Inspection on Vehicle, page 13-101
Removal, page 13-102
Installation, page 13-103
Inspection, page 13-106
Disassembly, page 13-107
Reassembly, page 13-114

TRANSFER FLUID
Inspection and Replacement, page 13-102

TRANSFER COVER OIL SEAL
Replacement, page 13-113

TRANSFER HYPOID DRIVE GEAR BEARING
Replacement, page 13-110

**TRANSFER COVER TAPERED
ROLLER BEARING OUTER RACE**
Removal/Installation, page 13-112

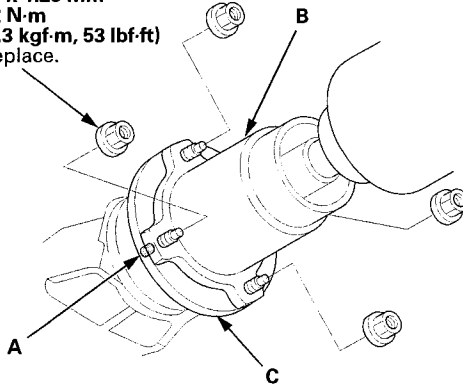
**TRANSFER OUTPUT SHAFT
(HYPOID GEAR) BEARING**
Removal/Installation, page 13-110



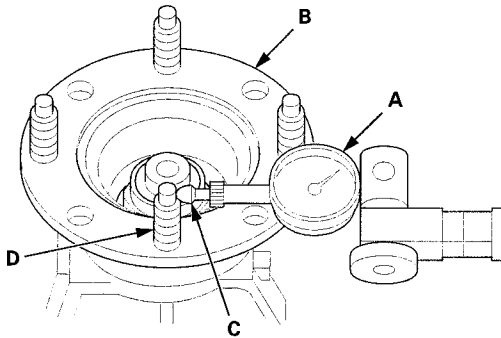
Transfer Assembly Inspection on Vehicle

1. Raise the vehicle on a lift, and make sure it is supported securely.
2. Shift the transmission into neutral.
3. Make reference marks (A) across the No. 1 propeller shaft (B) and the transfer companion flange (C).

10 x 1.25 mm
72 N·m
(7.3 kgf·m, 53 lbf·ft)
Replace.



4. Separate the No. 1 propeller shaft from the transfer companion flange.
5. Set a dial indicator (A) on the transfer companion flange (B); position the dial indicator tip (C) on the top of the bolt (D).



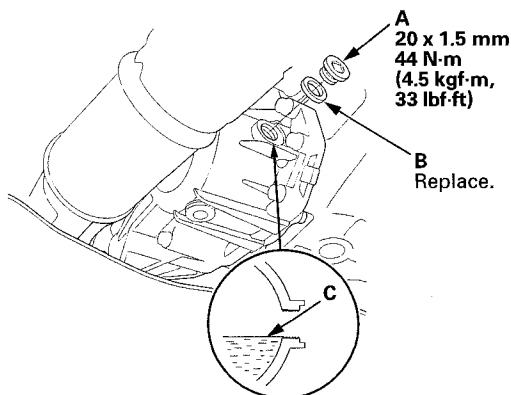
6. Measure the transfer gear backlash.
Standard: 0.06–0.16 mm (0.002–0.006 in)

7. If the backlash is out of the standard, remove and disassemble the transfer assembly, and adjust the transfer gear backlash (see page 13-114).
8. Check for fluid leaks between the mating surfaces of the transfer assembly and the transmission.
9. If there is a leak, remove the transfer assembly, remove the transfer cover, and replace the O-ring.
10. Check for fluid leaks between the transfer companion flange and the transfer oil seal.
11. If there is a leak, remove the transfer assembly from the transmission, and replace the transfer oil seal and the O-ring on the transfer output shaft (hypoid gear). If an oil seal and O-ring replacement is required, you will need to check and adjust the transfer gear tooth contact, the transfer gear backlash, the tapered roller bearing starting torque, and the total starting torque (see page 13-114). Do not replace the oil seal with the transfer assembly on the transmission.

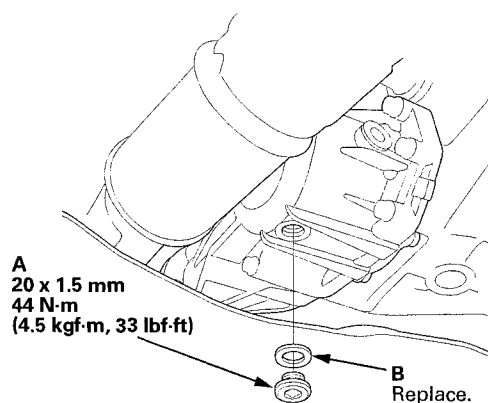
Transfer Assembly

Transfer Assembly Fluid Inspection and Replacement

1. Raise the vehicle on a lift, and make sure it is supported securely.
2. Remove the filler plug (A) and the sealing washer (B), check the condition of the transfer fluid, and make sure it is at the proper level (C).



3. If the transfer fluid is dirty, remove the drain plug (A) and the sealing washer (B), drain the transfer fluid.



4. Refill the transfer assembly with the recommended fluid (hypoid gear oil) through the filler plug hole until the fluid flows out. Use an SAE 90 viscosity hypoid gear oil, API classified GL4 or GL5 only.

Viscosity:

SAE 90: Above 0 °F (–18 °C)

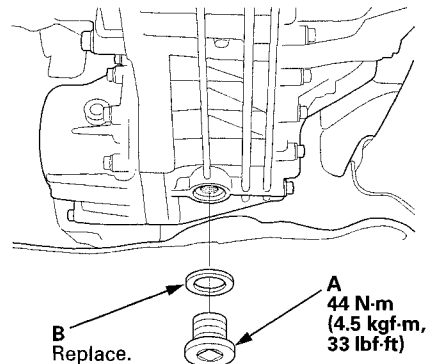
Transfer Fluid (Hypoid Gear Oil) Capacity:

0.45 L (0.48 US qt)

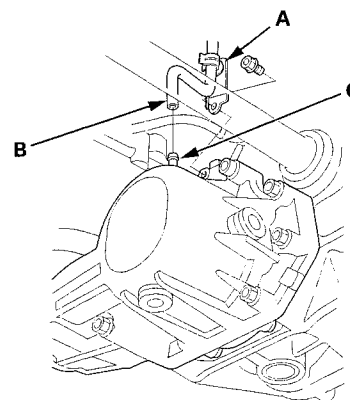
5. Install the filler plug with a new sealing washer.

Transfer Assembly Removal

1. Raise the vehicle on a lift, and make sure it is supported securely.
2. Shift the transmission into neutral.
3. Remove the drain plug (A), and drain the MTF.



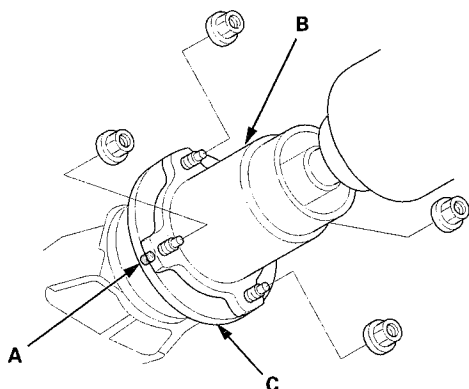
4. Reinstall the drain plug with a new sealing washer (B).
5. Remove exhaust pipe A (see page 9-10).
6. Remove the bolt securing the transfer breather hose bracket (A), and disconnect the breather hose (B) from the breather pipe (C) on the transfer assembly.





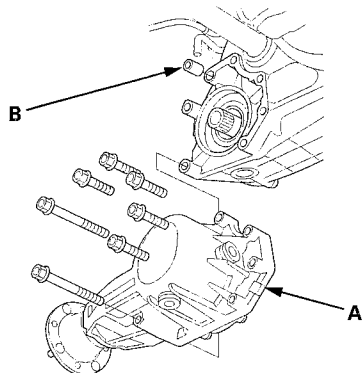
Transfer Assembly Installation

7. Make reference marks (A) across the No. 1 propeller shaft (B) and the transfer companion flange (C).

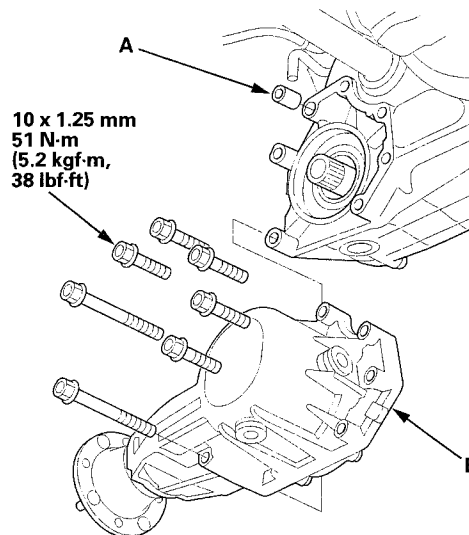


8. Separate the No. 1 propeller shaft from the transfer companion flange.

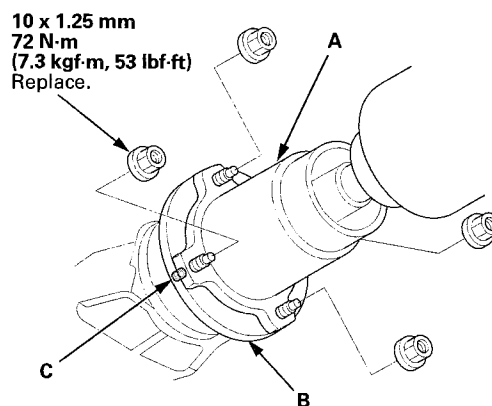
9. Remove the transfer assembly (A) and the dowel pin (B) from the transmission.



1. Clean the areas where the transfer assembly contacts the transmission with solvent, and dry with compressed air.
2. Install the dowel pin (A) in the transmission, and install the transfer assembly (B) on the transmission.



3. Install the No. 1 propeller shaft (A) to the transfer companion flange (B) by aligning the reference marks (C) you made.

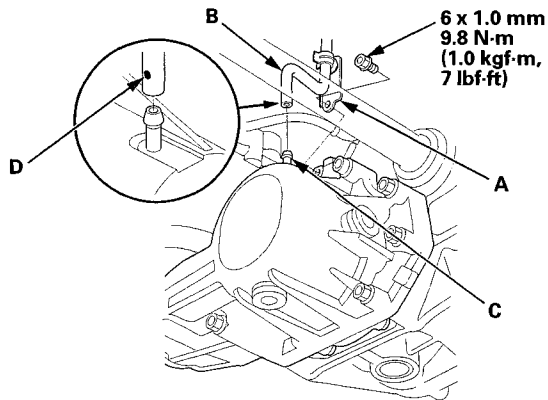


(cont'd)

Transfer Assembly

Transfer Assembly Installation (cont'd)

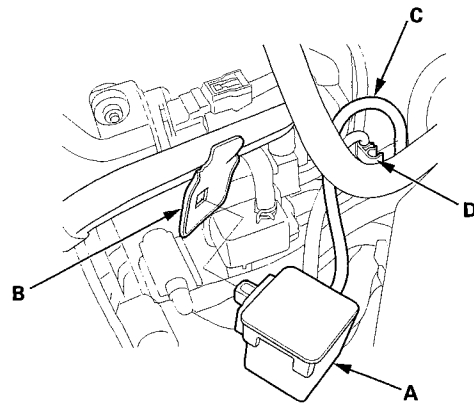
- Secure the transfer breather hose bracket (A) on the transfer assembly with the bolt, and install the breather hose (B) over the breather pipe (C) with facing the dot mark (D) to the rear side of the vehicle.



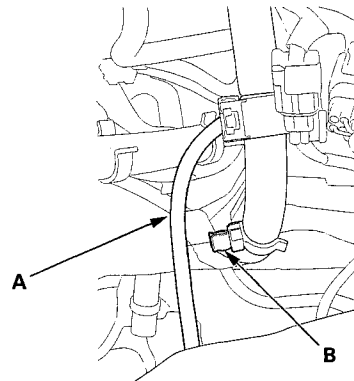
- Install exhaust pipe A (see page 9-10).
- Check the fluid level, and refill the transfer assembly with transfer fluid (hypoid gear oil), if necessary (see page 13-102).
- Refill the transmission with MTF (see page 13-14).
- Test-drive the vehicle.

Transfer Breather Hose Replacement

- Raise the vehicle on a lift, and make sure it is supported securely.
- Remove the transfer breather box (A) from its bracket (B).

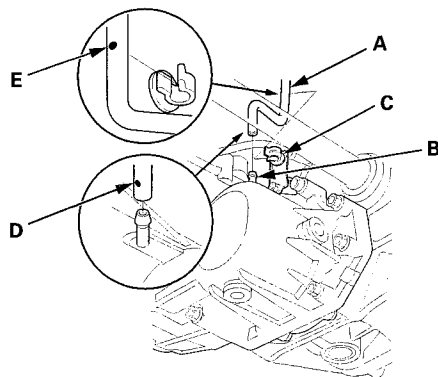


- Remove the breather hose (C) from the hose clamp (D).
- Remove the breather hose (A) from the hose clamp (B).



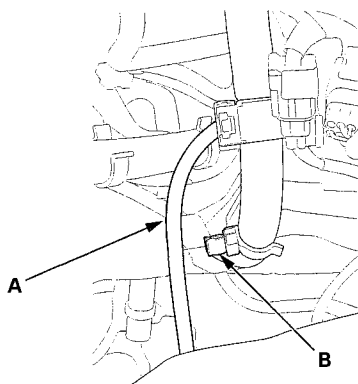


5. Disconnect the breather hose (A) from the transfer breather pipe (B), and remove the breather hose from the hose clamp (C).

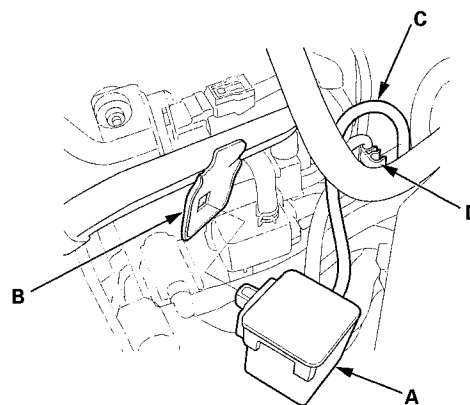


6. Connect the breather hose over the breather pipe with facing the dot mark (D) to the rear side of the vehicle, and install the hose on the hose clamp at the dot mark (E).

7. Install the breather hose (A) on the hose clamp (B).



8. Install the transfer breather box (A) on its bracket (B).



9. Install the breather hose (C) on the hose clamp (D).

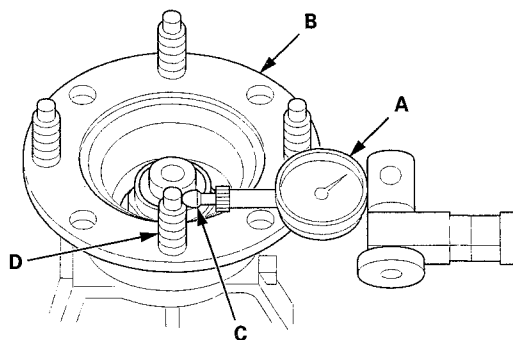
Transfer Assembly

Transfer Assembly Inspection

NOTE: To prevent damaging the transfer housing, always use soft jaws or equivalent materials between the transfer housing and a bench vise.

Transfer Gear Backlash Measurement

1. Set a dial indicator (A) on the transfer companion flange (B); position the dial indicator tip (C) on the top of the bolt (D).

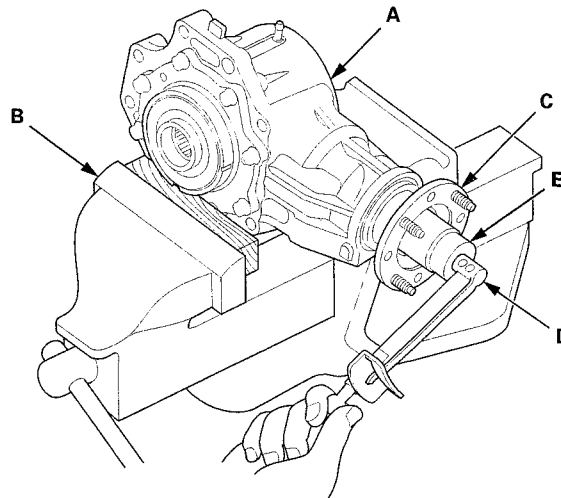


2. Measure the transfer gear backlash.

Standard: 0.06—0.16 mm (0.002—0.006 in)

Total Starting Torque Measurement

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



4. Rotate the transfer companion flange several times to seat the tapered roller bearings.
5. Measure the starting torque at the companion flange (C) using a torque wrench (D) and a socket (E).

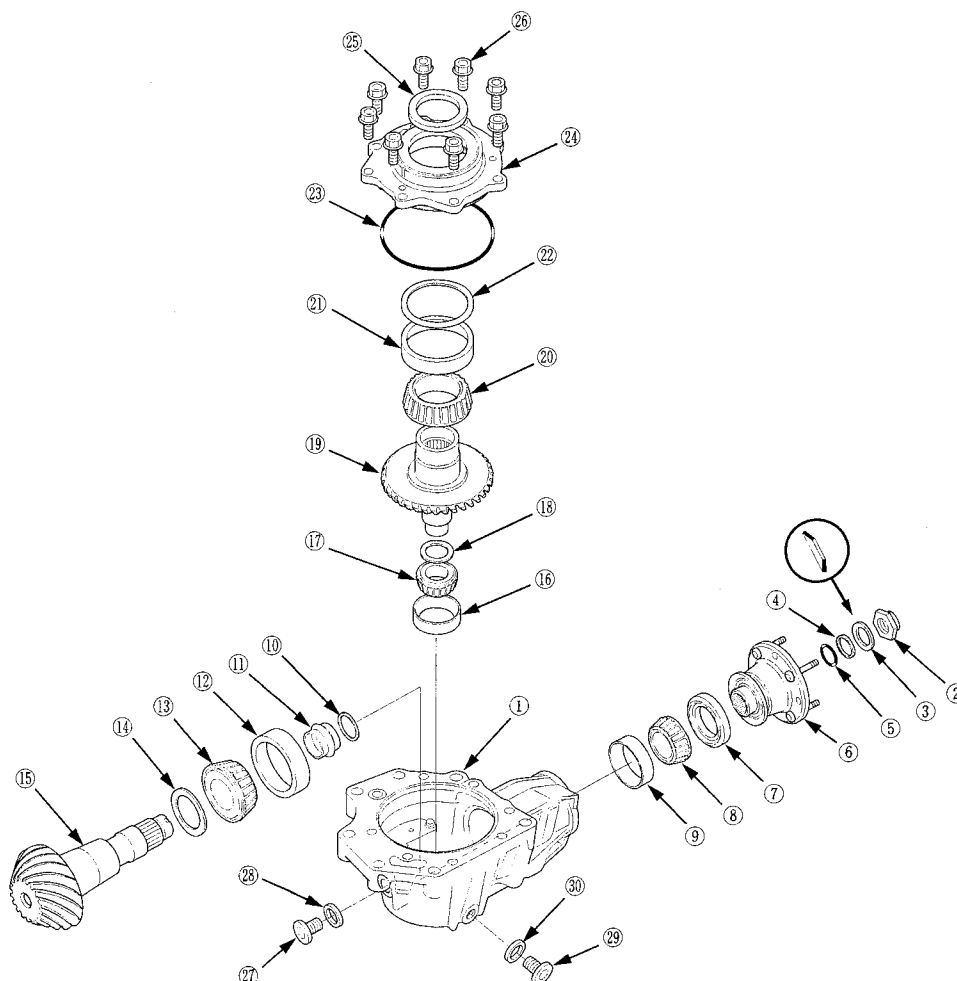
**Standard: 2.64—4.23 N·m
(26.9—43.1 kgf·cm, 23.3—37.4 lbf·in)**

6. If the measurements are out of the standard, disassemble the transfer assembly, and repair it.



Transfer Assembly Disassembly

Exploded View



- ① TRANSFER HOUSING
- ② 27 mm LOCKNUT
Replace.
- ③ CONICAL SPRINGWASHER
Replace.
- ④ BACK-UP RING
- ⑤ O-RING
Replace.
- ⑥ COMPANION FLANGE
- ⑦ 42 x 67 x 9 mm OIL SEAL
Replace.
- ⑧ 65 mm TAPERED ROLLER BEARING
- ⑨ 65 mm BEARING OUTER RACE
- ⑩ 32.1 x 37 x 1 mm THRUST WASHER
- ⑪ TRANSFER SPACER
Replace.

- ⑫ 75 mm BEARING OUTER RACE
- ⑬ TRANSFER OUTPUT SHAFT (HYPOID GEAR) BEARING
- ⑭ 40 mm THRUST SHIM
- ⑮ TRANSFER OUTPUT SHAFT (HYPOID GEAR)
- ⑯ 52 mm BEARING OUTER RACE
- ⑰ 52 mm TAPERED ROLLER BEARING
- ⑱ 25 mm THRUST SHIM
- ⑲ TRANSFER HYPOID DRIVE GEAR/SHAFT ASSEMBLY
- ⑳ TRANSFER HYPOID GEAR BEARING
- ㉑ 80 mm BEARING OUTER RACE
- ㉒ 80 mm THRUST SHIM

- ㉓ O-RING
Replace.
- ㉔ TRANSFER COVER
- ㉕ 48 x 67 x 7.5 mm OIL SEAL
Replace.
- ㉖ 8 mm FLANGE BOLT
26 N·m (2.7 kgf·m, 20 lbf·ft)
- ㉗ FILLER PULG
44 N·m (4.5 kgf·m, 33 lbf·ft)
- ㉘ 20 mm SEALING WASHER
Replace.
- ㉙ DRAIN PLUG
44 N·m (4.5 kgf·m, 33 lbf·ft)
- ㉚ 20 mm SEALING WASHER
Replace.

(cont'd)

Transfer Assembly

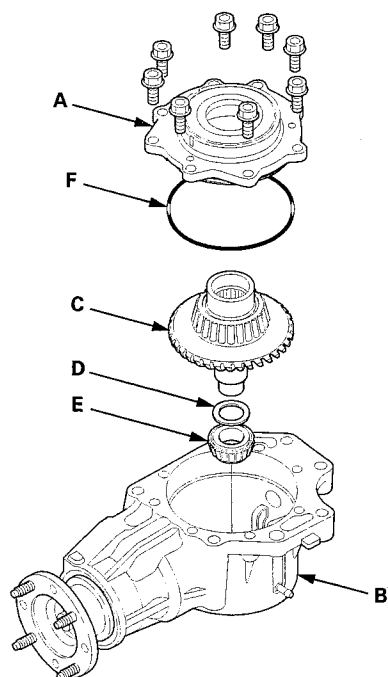
Transfer Assembly Disassembly (cont'd)

Special Tools Required

Flange Holder 07XAB-0010101

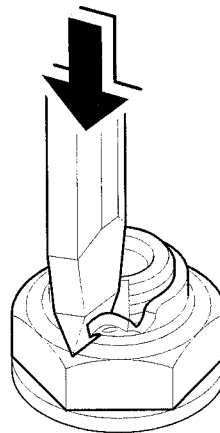
NOTE: To prevent damaging the transfer housing, always use soft jaws or equivalent materials between the transfer housing and the bench vise.

1. Remove the transfer cover (A) from the transfer housing (B).

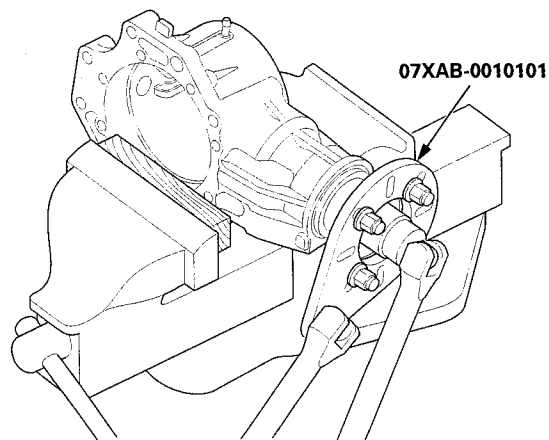


2. Remove the transfer hypoid drive gear/shaft assembly (C), the 25 mm thrust shim (D), and the tapered roller bearing (E).
3. Remove the O-ring (F) from the transfer cover.
4. Remove the oil seal from the transfer cover (see page 13-113).
5. Drain the transfer fluid (hypoid gear oil) from the transfer housing.

6. Cut the lock tab on the locknut using a chisel.



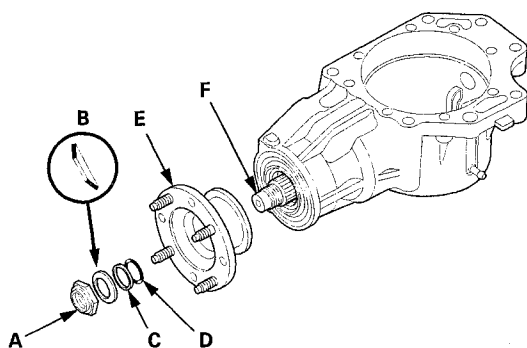
7. Secure the transfer housing in a bench vise with soft jaws.



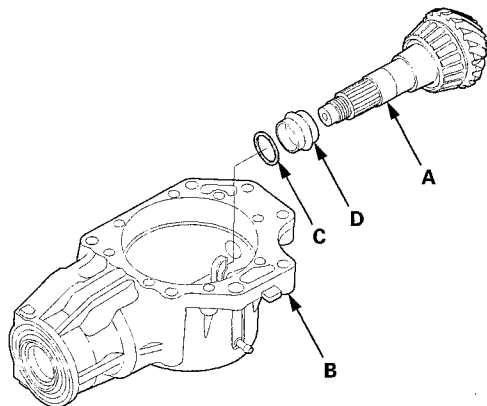
8. Install the flange holder on the companion flange, then loosen the locknut.
9. Remove the flange holder.



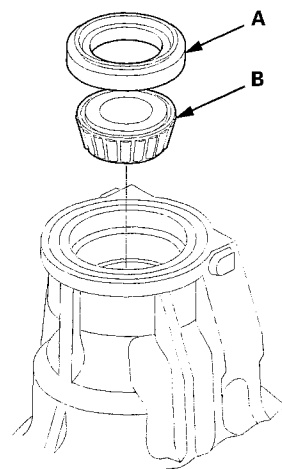
10. Remove the locknut (A), the conical spring washer (B), the back-up ring (C), the O-ring (D), and the companion flange (E) from the transfer output shaft (hypoid gear) (F).



11. Remove the transfer output shaft (hypoid gear) (A) from the transfer housing (B), then remove the thrust washer (C) and the transfer spacer (D) from the transfer output shaft (hypoid gear).



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



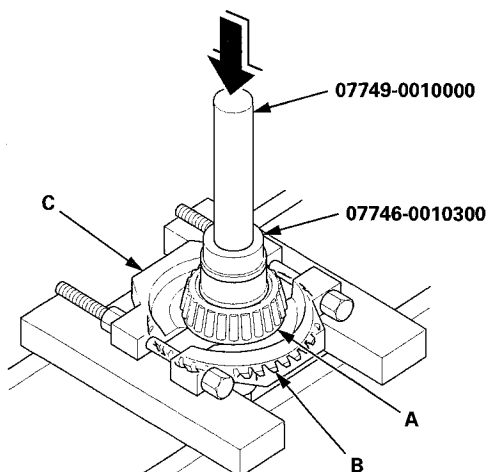
Transfer Assembly

Transfer Hypoid Drive Gear Bearing Replacement

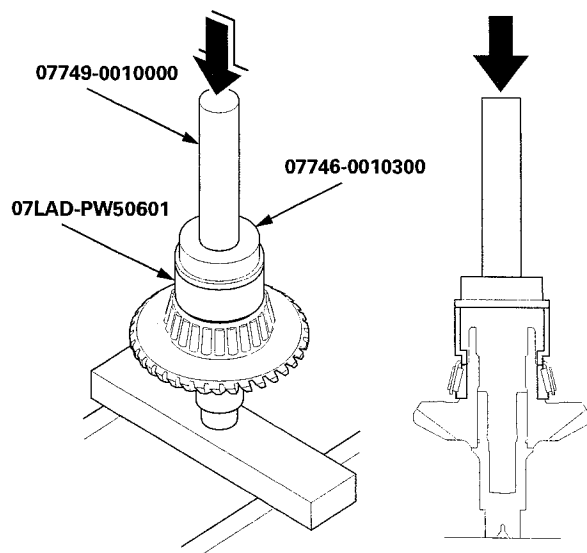
Special Tools Required

- Driver Handle, 15 x 135L 07749-0010000
- Bearing Driver Attachment, 42 x 47 mm 07746-0010300
- Attachment, 40 x 50 mm 07LAD-PW50601

1. Remove the tapered roller bearing (A) from the transfer hypoid drive gear (B) using the driver handle, the 42 x 47 mm bearing driver attachment, a bearing separator (C), and a press.



2. Install a new bearing on the transfer hypoid drive gear using the driver handle, the 40 x 50 mm attachment, and a press.

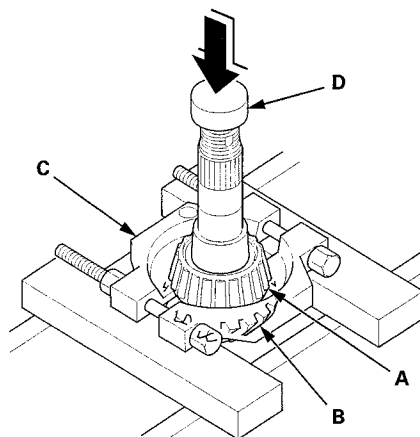


Transfer Output Shaft (Hypoid Gear) Bearing Removal/Installation

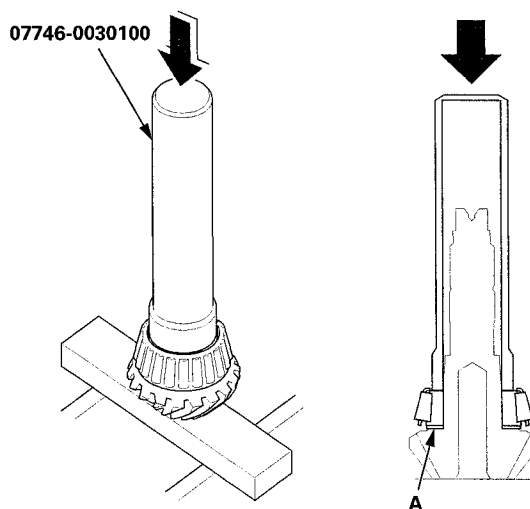
Special Tools Required

Driver Handle, 40 mm I.D. 07746-0030100

1. Remove the tapered roller bearing (A) from the transfer output shaft (hypoid gear) (B) using a bearing separator (C) and a press. Place a spacer (D) between the transfer output shaft and a press to prevent damaging the transfer output shaft.



2. Install the 40 mm thrust shim (A) over the transfer output shaft (hypoid gear).



3. Install the tapered roller bearing over the transfer output shaft (hypoid gear) using the 40 mm driver handle and a press.



Transfer Housing Tapered Roller Bearing Outer Race Replacement

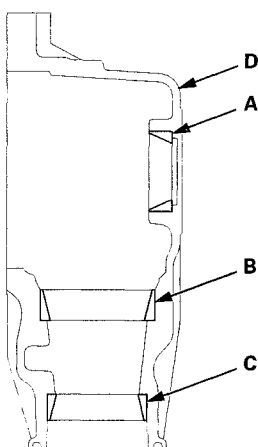
Special Tools Required

- Driver Handle, 15 x 135L 07749-0010000
- Attachment, 52 x 55 mm 07746-0010400
- Attachment, 65 mm 07JAD-SH30100
- Tapered Bearing Race Installer A 07MAF-SP0011A
- Installer Shaft 07MAF-SP0013A

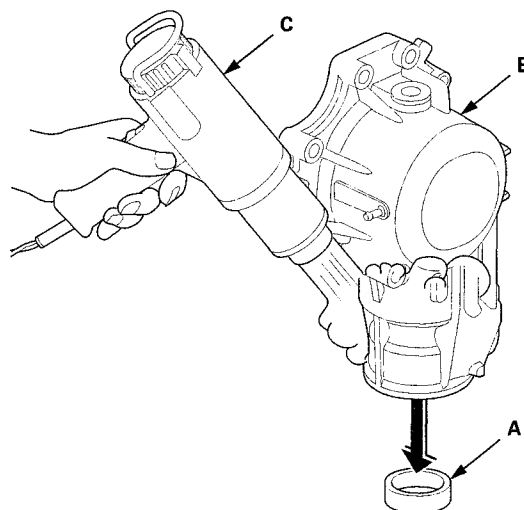
NOTE: Replace the tapered roller bearing outer race whenever the tapered roller bearing is replaced.

1. Remove the 52 mm tapered roller bearing outer race (A), the 75 mm tapered roller bearing outer race (B), and the 65 mm tapered roller bearing outer race (C) from the transfer housing (D).

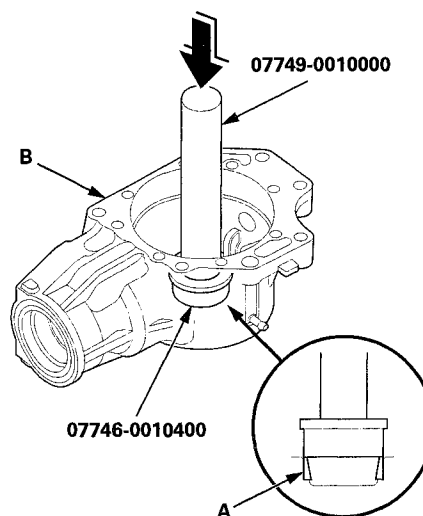
NOTE: Some tapered roller bearing outer races (52 mm, 65 mm, and 75 mm) are press-fitted in the transfer housing and must be removed by heating the transfer housing.



2. Remove the press-fitted tapered roller bearing outer races (A) from the transfer housing (B) by heating the transfer housing to about 212 °F (100 °C) using a heat gun (C). Do not heat the transfer housing more than 212 °F (100 °C).



3. Install a new 52 mm tapered roller bearing outer race (A) until it bottoms in the transfer housing (B) using the driver handle and the 52 x 55 mm attachment.

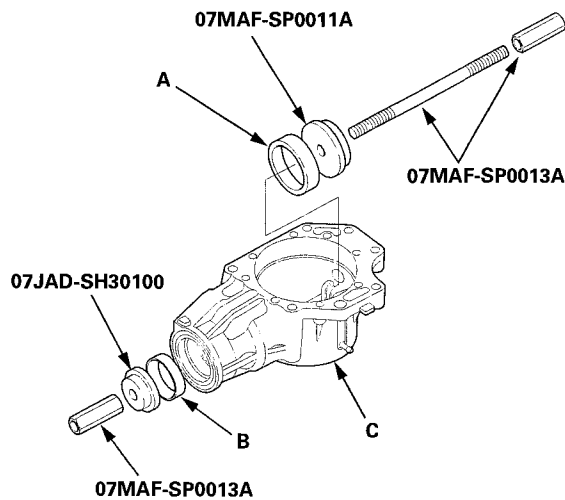


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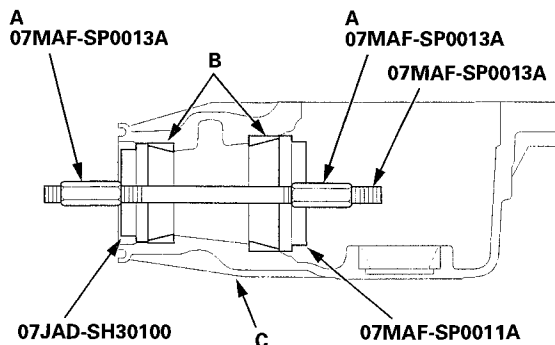
Transfer Assembly

Transfer Housing Tapered Roller Bearing Outer Race Replacement (cont'd)

4. Install a new 75 mm tapered roller bearing outer race (A) and a new 65 mm tapered roller bearing outer race (B) in the transfer housing (C), set the 65 mm attachment and tapered bearing race installer A over the tapered roller bearing outer races, and install the installer shaft through the 65 mm attachment and installer.



5. Tighten the installer shaft nut (A) to install the tapered roller bearing outer races (B) into the transfer housing (C) securely.



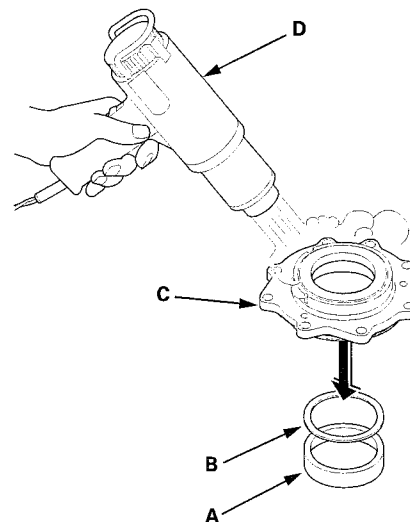
Transfer Cover Tapered Roller Bearing Outer Race Removal/Installation

Special Tools Required

- Driver Handle, 15 x 135L 07749-0010000
- Attachment, 78 x 80 mm 07NAD-PX40100

NOTE: Replace the tapered roller bearing outer race whenever the tapered roller bearing is replaced.

1. Remove the 80 mm bearing outer race (A) and the 80 mm thrust shim (B) from the transfer cover (C). If the tapered roller bearing outer race is press-fitted, remove the tapered roller bearing outer race by heating the transfer cover to about 212 °F (100 °C) using a heat gun (D). Do not heat the transfer cover more than 212 °F (100 °C).



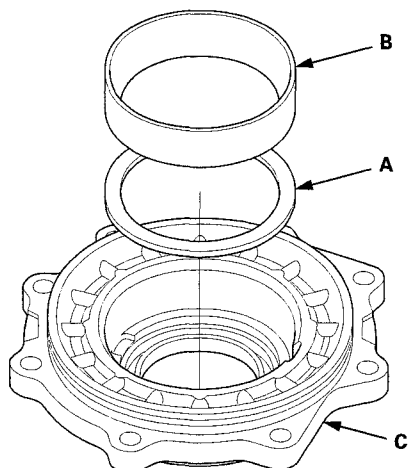


Transfer Cover Oil Seal Replacement

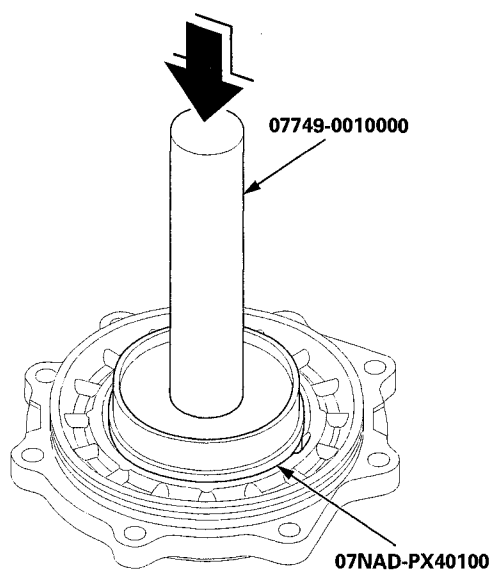
Special Tools Required

- Driver Handle, 15 x 135L 07749-0010000
- Attachment, 65 mm 07JAD-SH30100

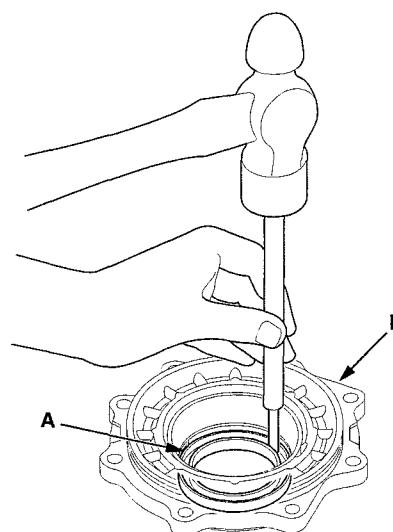
2. Install the 80 mm thrust shim (A) and the 80 mm tapered roller bearing outer race (B) in the transfer cover (C).



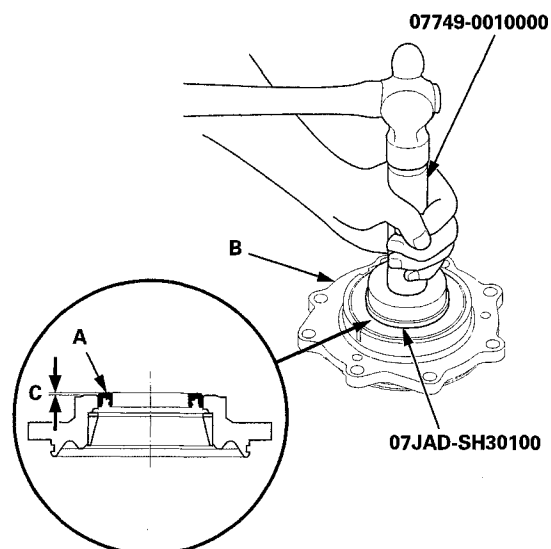
3. Drive the 80 mm tapered roller bearing outer race securely in the transfer cover using the driver handle and the 78 x 80mm attachment so there is no clearance between the tapered roller bearing outer race, the 80 mm thrust shim, and the transfer cover.



1. Remove the oil seal (A) from the transfer cover (B).



2. Install a new oil seal (A) in the transfer cover (B) to a height (C) of 0–1 mm (0–0.04 in) above the transfer cover surface using the driver handle and the 65 mm attachment.



Transfer Assembly

Transfer Assembly Reassembly

Special Tools Required

- Driver Handle, 40 mm I.D. 07746-0030100
- Driver Handle, 15 x 135L 07749-0010000
- Attachment, 65 mm 07JAD-SH30100
- Flange Holder 07XAB-0010101
- Attachment, 78 x 80 mm 07NAD-PX40100

NOTE:

- 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 transfer fluid (hypoid gear oil) during reassembly.
- Replace the tapered roller bearing and the tapered roller bearing outer race as a set if either part is replaced.
- Replace the transfer hypoid drive gear and the transfer output shaft (hypoid gear) as a set if either part is replaced.
- To prevent damaging the transfer housing, always use soft jaws or equivalent materials between the transfer housing and the bench vise.

1. Select the 40 mm thrust shim if the transfer output shaft (hypoid gear) is replaced. Calculate the thickness of the 40 mm thrust shim using the following formula, and select the shim from the following table.

FORMULA: $A/100 - B/100 + C = X$

- A:** Number on the existing transfer output shaft (hypoid gear)
B: Number on the replacement transfer output shaft (hypoid gear)
C: Thickness of the existing 40 mm thrust shim
X: Thickness needed for the replacement 40 mm thrust shim

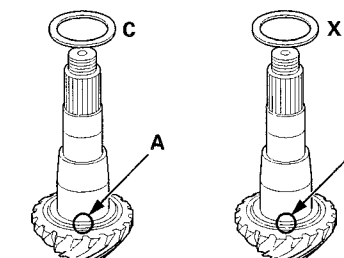
NOTE: The number on the transfer output shaft (hypoid gear) is shown in 1/100 mm.

EXAMPLE

- A:** Existing transfer output shaft (hypoid gear)
Number = +2
B: Replacement transfer output shaft (hypoid gear)
Number = -1
C: Existing 40 mm thrust shim
thickness = 1.05 mm
X: Replacement 40 mm thrust shim thickness

$$\begin{aligned} X &= A/100 - B/100 + C \\ &= 2/100 - (-1)/100 + 1.05 \\ &= 0.02 + 0.01 + 1.05 = 1.08 \text{ (mm)} \end{aligned}$$

Select No. M 40 mm thrust shim of 1.08 mm (0.043 in)



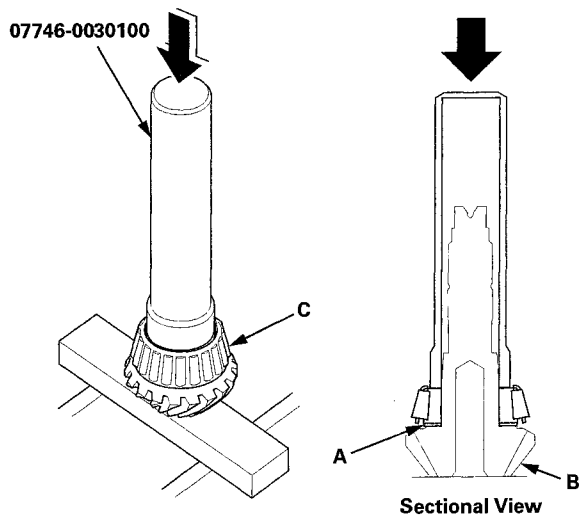
THRUST SHIM, 40 mm

No.	Thickness
A	0.72 mm (0.028 in)
B	0.75 mm (0.030 in)
C	0.78 mm (0.031 in)
D	0.81 mm (0.032 in)
E	0.84 mm (0.033 in)
F	0.87 mm (0.034 in)
G	0.90 mm (0.035 in)
H	0.93 mm (0.037 in)
I	0.96 mm (0.038 in)
J	0.99 mm (0.039 in)
K	1.02 mm (0.040 in)
L	1.05 mm (0.041 in)
M	1.08 mm (0.043 in)
N	1.11 mm (0.044 in)
O	1.14 mm (0.045 in)

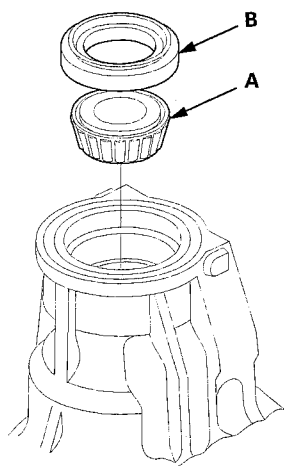
2. Select the 40 mm thrust shim if the tapered roller bearing on the transfer output shaft (hypoid gear) is replaced. Measure the thickness of the replacement bearing and the existing bearing, and calculate the difference of the bearing thickness. Adjust the thickness of the existing 40 mm thrust shim by the amount of difference in bearing thickness, and select the replacement 40 mm thrust shim.



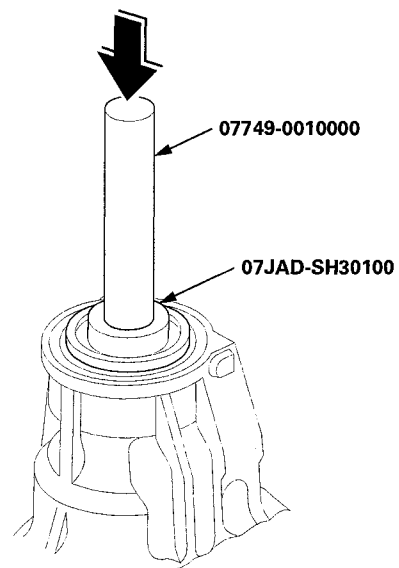
3. Install the 40 mm thrust shim (A) on the transfer output shaft (hypoid gear) (B), then install the tapered roller bearing (C) using the 40 mm driver handle and a press.



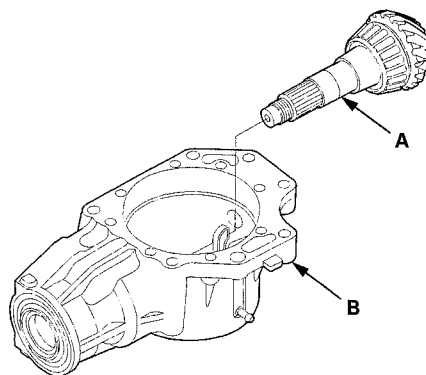
4. Place the tapered roller bearing (A) on the tapered roller bearing outer race of the companion flange side of the transfer housing, and install a new oil seal (B).



5. Drive the oil seal flush with the transfer housing using the driver handle and the 65 mm attachment.



6. Install the transfer output shaft (hypoid gear) (A) in the transfer housing (B). Do not install the transfer spacer and the thrust washer on the transfer output shaft (hypoid gear).

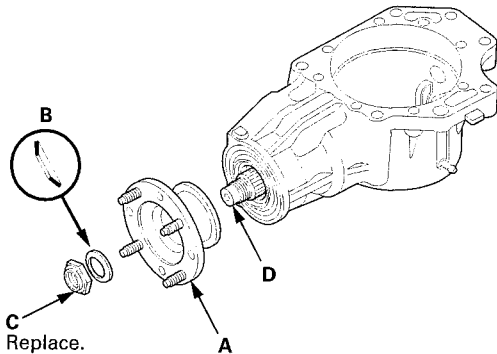


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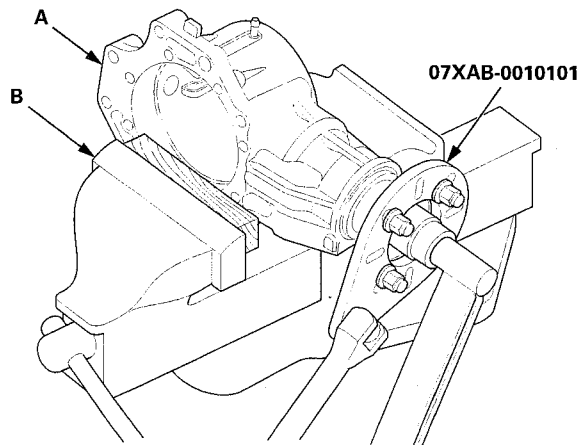
Transfer Assembly

Transfer Assembly Reassembly (cont'd)

7. Install the companion flange (A), the conical spring washer (B) (in the direction shown), and a new locknut (C) on the transfer output shaft (hypoid gear) (D). Do not install the O-ring and the back-up ring.

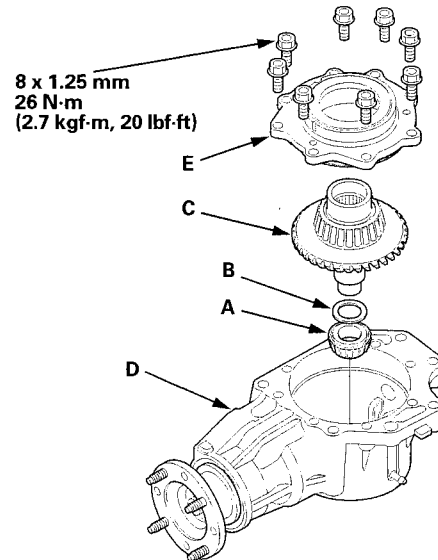


8. Secure the transfer housing (A) in a bench vise (B) with soft jaws.

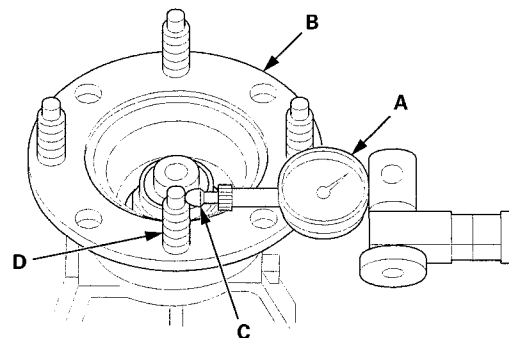


9. Install the flange holder on the companion flange.
10. Tighten the locknut while measuring the starting torque of the transfer output shaft (hypoid gear) so the starting torque is within 1.15–1.71 N·m (11.7–17.4 kgf·cm, 10.2–15.1 lbf·in). Do not stake the locknut in this step.
11. Remove the flange holder.
12. Apply Prussian Blue to both sides of the transfer hypoid drive gear teeth lightly and evenly.

13. Install the tapered roller bearing (A), the 25 mm thrust shim (B), and the transfer hypoid drive gear/shaft assembly (C) in the transfer housing (D).



14. Install the transfer cover (E). Do not install the O-ring on the transfer cover.
15. Rotate the companion flange in both directions until the transfer gears rotate one full turn in both directions.
16. Set a dial indicator (A) on the transfer companion flange (B); position the dial indicator tip (C) on the top of the bolt (D).



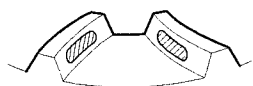
17. Measure the transfer gear backlash.

Standard: 0.06–0.16 mm (0.002–0.006 in)



18. Remove the transfer cover and the transfer hypoid drive gear/shaft assembly, and check the transfer hypoid drive gear tooth contact pattern.

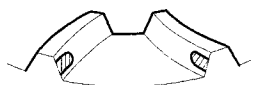
CORRECT TOOTH CONTACT PATTERN



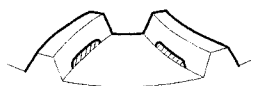
INCORRECT TOOTH CONTACT PATTERN



TOE CONTACT



HEEL CONTACT



FLANK CONTACT



FACE CONTACT

19. If the backlash is out of the standard, adjust the backlash with the 40 mm thrust shim, and recheck. Do not use more than two 40 mm thrust shims to adjust the backlash.

20. If the transfer gear tooth contact is incorrect, adjust the tooth contact with the 25 mm, 40 mm, or 80 mm thrust shim. Do not use more than two shims of each thrust shim to adjust the tooth contact.

• **Toe Contact**

Use a thinner 40 mm thrust shim to move the transfer output shaft (hypoid gear) away from the transfer hypoid drive gear. Because this movement causes the transfer gear backlash to change, move the transfer hypoid drive gear toward the transfer output shaft (hypoid gear) to adjust the transfer gear backlash as follows:

- Reduce the thickness of the 25 mm thrust shim.
- Increase the thickness of the 80 mm thrust shim by amount the 25 mm thrust shim was reduced.

• **Heel Contact**

Use a thicker 40 mm thrust shim to move the transfer output shaft (hypoid gear) toward the transfer hypoid drive gear. Because this movement causes the transfer backlash to change, move the transfer hypoid drive gear away from the transfer output shaft (hypoid gear) to adjust the transfer gear backlash as follows:

- Increase the thickness of the 25 mm thrust shim.
- Reduce the thickness of the 80 mm thrust shim by the amount the 25 mm thrust shim was reduced.

• **Flank Contact**

Use a thicker 25 mm thrust shim to move the transfer hypoid drive gear away from the transfer output shaft (hypoid gear). 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.

• **Face Contact**

Use a thinner 25 mm thrust shim to move the transfer hypoid drive gear toward the transfer output shaft (hypoid gear). 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.

(cont'd)

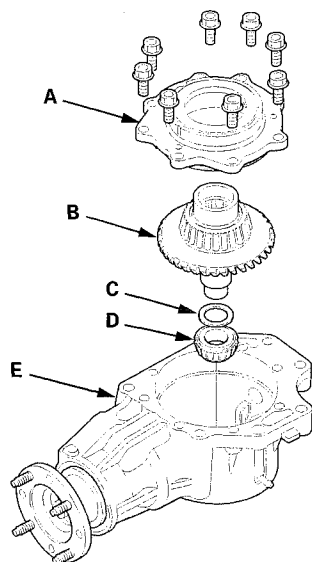
Transfer Assembly

Transfer Assembly Reassembly (cont'd)

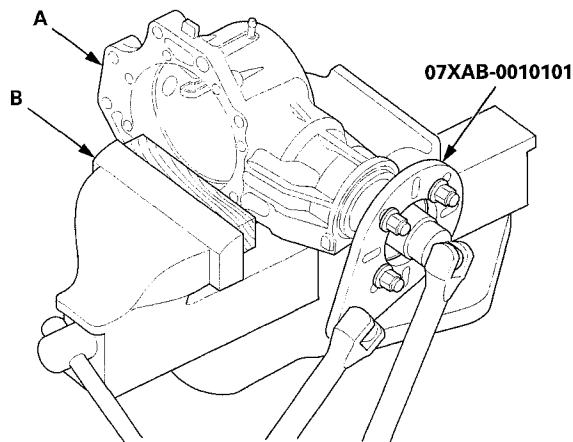
THRUST SHIM, 25 mm

No.	Thickness
1	1.70 mm (0.067 in)
2	1.73 mm (0.068 in)
3	1.76 mm (0.069 in)
4	1.79 mm (0.070 in)
5	1.82 mm (0.072 in)
6	1.85 mm (0.073 in)
7	1.88 mm (0.074 in)
8	1.91 mm (0.075 in)
9	1.94 mm (0.076 in)
10	1.97 mm (0.078 in)
11	2.00 mm (0.079 in)
12	2.03 mm (0.080 in)
13	2.06 mm (0.081 in)
14	2.09 mm (0.082 in)
15	2.12 mm (0.083 in)
16	2.15 mm (0.085 in)
17	2.18 mm (0.086 in)
18	2.21 mm (0.087 in)
19	2.24 mm (0.088 in)

21. Remove the transfer cover (A), the transfer hypoid drive gear/shaft assembly (B), the 25 mm thrust shim (C), and the tapered roller bearing (D) from the transfer housing (E) after adjusting the transfer gear backlash or the transfer gear tooth contact.



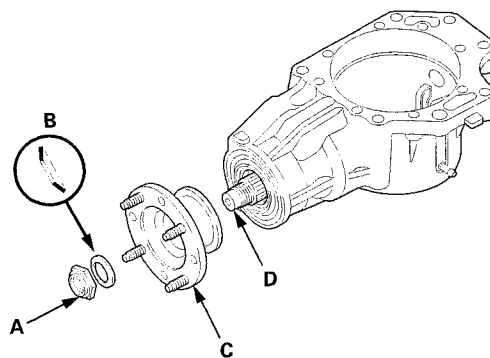
22. Secure the transfer housing (A) in a bench vise (B) with soft jaws.



23. Install the flange holder on the companion flange, then loosen the locknut.

24. Remove the flange holder.

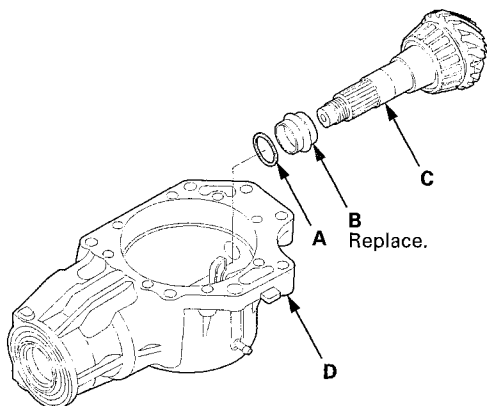
25. Remove the locknut (A), the conical spring washer (B), and the companion flange (C) from the transfer output shaft (hypoid gear) (D).



26. Remove the transfer output shaft (hypoid gear) from the transfer housing.

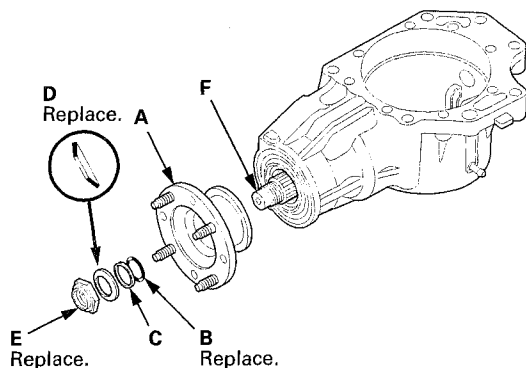


27. Install a thrust washer (A) and a new transfer spacer (B) on the transfer output shaft (hypoid gear) (C), and install them in the transfer housing (D).

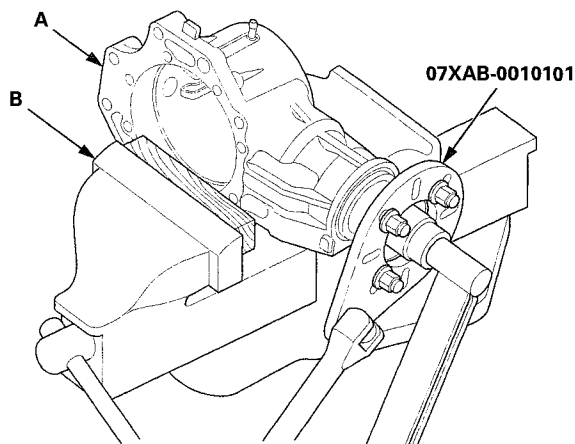


28. Coat the threads of the locknut and the transfer output shaft (hypoid gear) with transfer fluid (hypoid gear oil).

29. Install the companion flange (A). Coat a new O-ring (B) with transfer fluid (hypoid gear oil), then install the O-ring, the back-up ring (C), a new conical spring washer (D), and a new locknut (E) on the transfer output shaft (hypoid gear) (F). Install the conical spring washer in the direction shown.



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



31. Install the flange holder on the companion flange.

32. Tighten the locknut while measuring the starting torque of the transfer output shaft (hypoid gear) so the starting torque is within the standard.

Standard

Tightening Torque:

108—294 N·m

(11.0—30.0 kgf·m, 79.6—217.0 lbf·ft)

Starting Torque:

1.15—1.71 N·m

(11.7—17.4 kgf·cm, 10.2—15.1 lbf·in)

NOTE:

- Rotate the companion flange several times to seat the tapered roller bearings, then measure the starting torque.
- If the starting torque exceeds the standard, replace the transfer spacer and reassemble the parts. Do not adjust the torque with the locknut loose.
- If the tightening torque exceeds the standard, replace the transfer spacer and reassemble the parts.

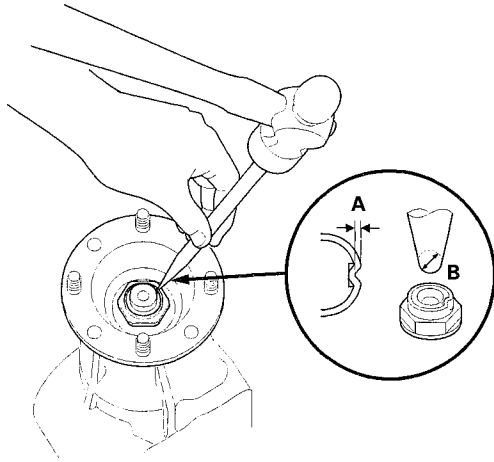
33. Remove the flange holder.

(cont'd)

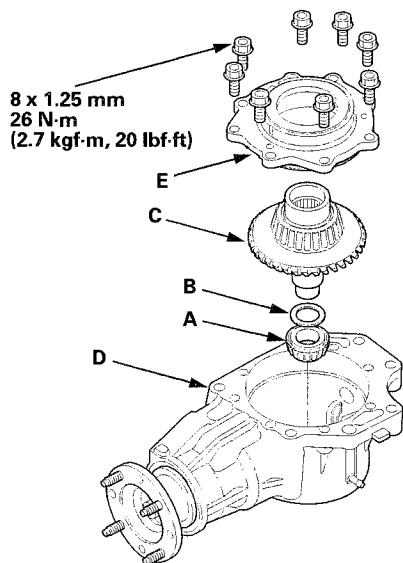
Transfer Assembly

Transfer Assembly Reassembly (cont'd)

34. Stake the locknut to a depth (A) at least 0.7 mm (0.03 in) using a 3.5 mm punch (B). Be careful not to make a crack on the locknut when staking.

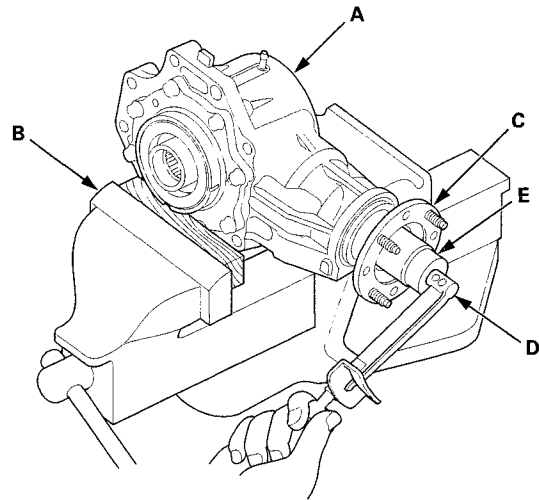


35. Install the tapered roller bearing (A), the 25 mm thrust shim (B), and the transfer hypoid drive gear/shaft assembly (C) in the transfer housing (D).



36. Temporarily install the transfer cover (E) without the O-ring. Install and tighten the bolts.

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



38. Rotate the transfer companion flange (C) several times to seat the tapered roller bearings.
39. Measure the total starting torque at the companion flange by using a torque wrench (D) and a socket (E).
40. Calculate the transfer hypoid drive gear/shaft starting torque by using the following formula.

Transfer Hypoid Drive Gear/Shaft Starting Torque Formula:

$$A - B = X$$

A: Actual total starting torque (measured in step 39)

B: Actual transfer output shaft (hypoid gear) starting torque (measured in step 32)

X: Transfer hypoid drive gear/shaft starting torque

41. Check that the calculated transfer hypoid drive gear/shaft starting torque is within the following reference value range.

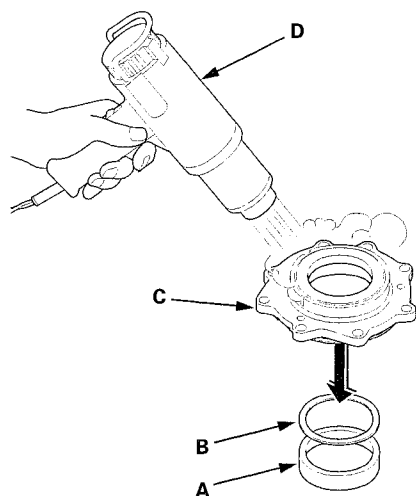
Reference Value Range of Transfer Hypoid Drive Gear/Shaft Starting Torque:

1.49—2.52 N·m (15.2—25.7 kgf-cm, 13.1—22.3 lbf-in)

- If the calculated transfer hypoid drive gear/shaft starting torque is within the reference value range, remove the transfer cover from the transfer housing, then go to step 48.
- If the calculated transfer hypoid drive gear/shaft starting torque is out of the reference value range, go to step 42.



42. Remove the bearing outer race (A) and the 80 mm thrust shim (B) from the transfer cover (C). If the tapered roller bearing outer race is press-fitted, remove the tapered roller bearing outer race by heating the transfer cover to about 212 °F (100 °C) using a heat gun (D). Do not heat the transfer cover more than 212 °F (100 °C).



43. Measure the thickness of the removed 80 mm thrust shim, and select a new 80 mm thrust shim.

THRUST SHIM, 80 mm

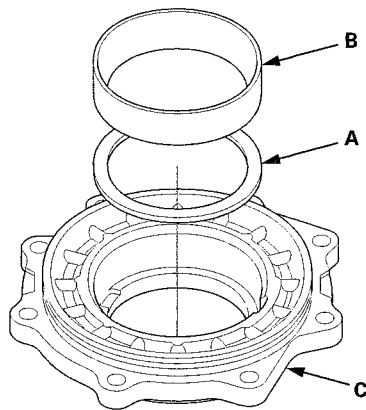
No.	Thickness
A	1.52 mm (0.060 in)
B	1.55 mm (0.061 in)
C	1.58 mm (0.062 in)
D	1.61 mm (0.063 in)
E	1.64 mm (0.065 in)
F	1.67 mm (0.066 in)
G	1.70 mm (0.067 in)
H	1.73 mm (0.068 in)
I	1.76 mm (0.069 in)
J	1.79 mm (0.070 in)
K	1.82 mm (0.072 in)
L	1.85 mm (0.073 in)
M	1.88 mm (0.074 in)
N	1.91 mm (0.075 in)
O	1.94 mm (0.076 in)
P	1.97 mm (0.078 in)
Q	2.00 mm (0.079 in)
R	2.03 mm (0.080 in)
S	2.06 mm (0.081 in)
T	2.09 mm (0.082 in)
U	2.12 mm (0.083 in)
V	2.15 mm (0.085 in)
W	2.18 mm (0.086 in)
X	2.21 mm (0.087 in)
Y	2.24 mm (0.088 in)
Z	2.27 mm (0.089 in)
AA	2.30 mm (0.091 in)
AB	2.33 mm (0.092 in)
AC	2.36 mm (0.093 in)
AD	2.39 mm (0.094 in)
AE	2.42 mm (0.095 in)
AF	2.45 mm (0.096 in)
AG	2.48 mm (0.098 in)
AH	2.51 mm (0.099 in)
AI	2.54 mm (0.100 in)
AJ	2.57 mm (0.101 in)
AK	2.60 mm (0.102 in)
AL	2.63 mm (0.104 in)
AM	2.66 mm (0.105 in)

(cont'd)

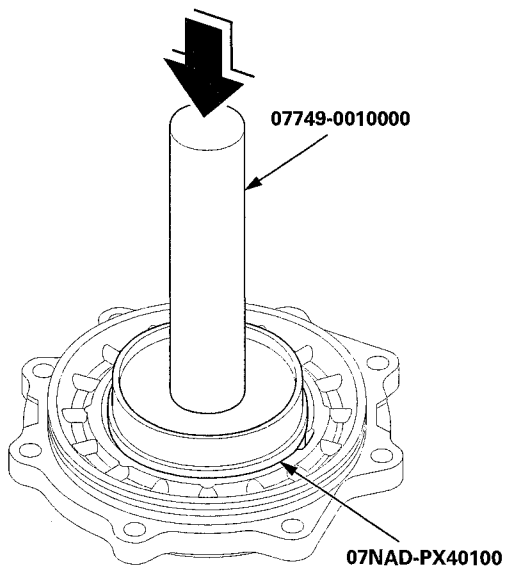
Transfer Assembly

Transfer Assembly Reassembly (cont'd)

44. Install the 80 mm thrust shim (A) and the tapered roller bearing outer race (B) in the transfer cover (C). If you heated the transfer cover, let it cool to room temperature before installing the 80 mm thrust shim.

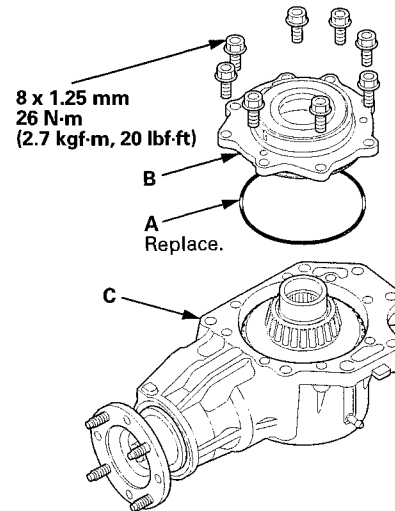


45. Drive the tapered roller bearing outer race securely in the transfer cover using the driver handle and the 78 x 80 mm attachment so there is no clearance between the tapered roller bearing outer race, the 80 mm thrust shim, and the transfer cover.



46. Install a new oil seal (see page 13-113).
47. After replacing the 80 mm thrust shim, recheck and make sure that the total starting torque is within the standard.

48. Install a new O-ring (A) on the transfer cover (B), then install the transfer cover on the transfer housing (C).

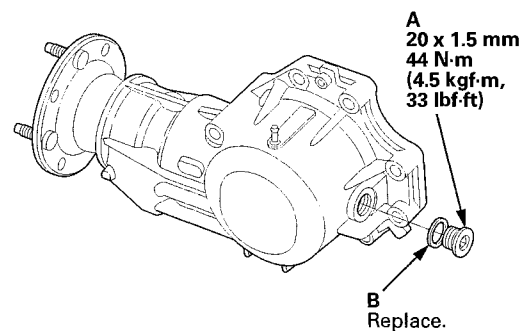


49. Remove the filler plug (A), then refill the transfer assembly with transfer fluid (hypoid gear oil). Use an SAE 90 viscosity hypoid gear oil, API classified GL4 or GL5 only.

Viscosity:

SAE 90: Above 0 °F (– 18 °C)

Transfer Fluid (Hypoid Gear Oil) Capacity:
0.45 L (0.48 US qt)



50. Install the filler plug with a new sealing washer (B).