

Transaxle

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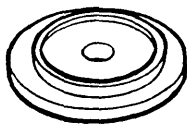
Clutch

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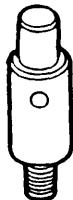


Special Tools

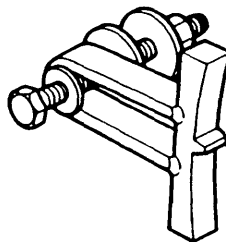
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07JAF – PM7011A	Clutch Alignment Disc	1	12-7
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③	07LAB – PV00100 or 07924 – PD20003	Ring Gear Holder	1	12-7, 9, 10, 11
④	07746 – 0010100	Attachment, 32 x 35 mm	1	12-10
⑤	07749 – 0010000	Driver	1	12-10
⑥	07936 – 3710100	Handle	1	12-7, 8, 10, 11



①



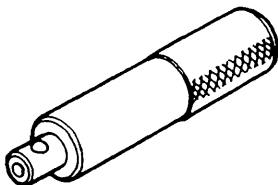
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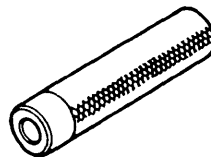
③



④



⑤



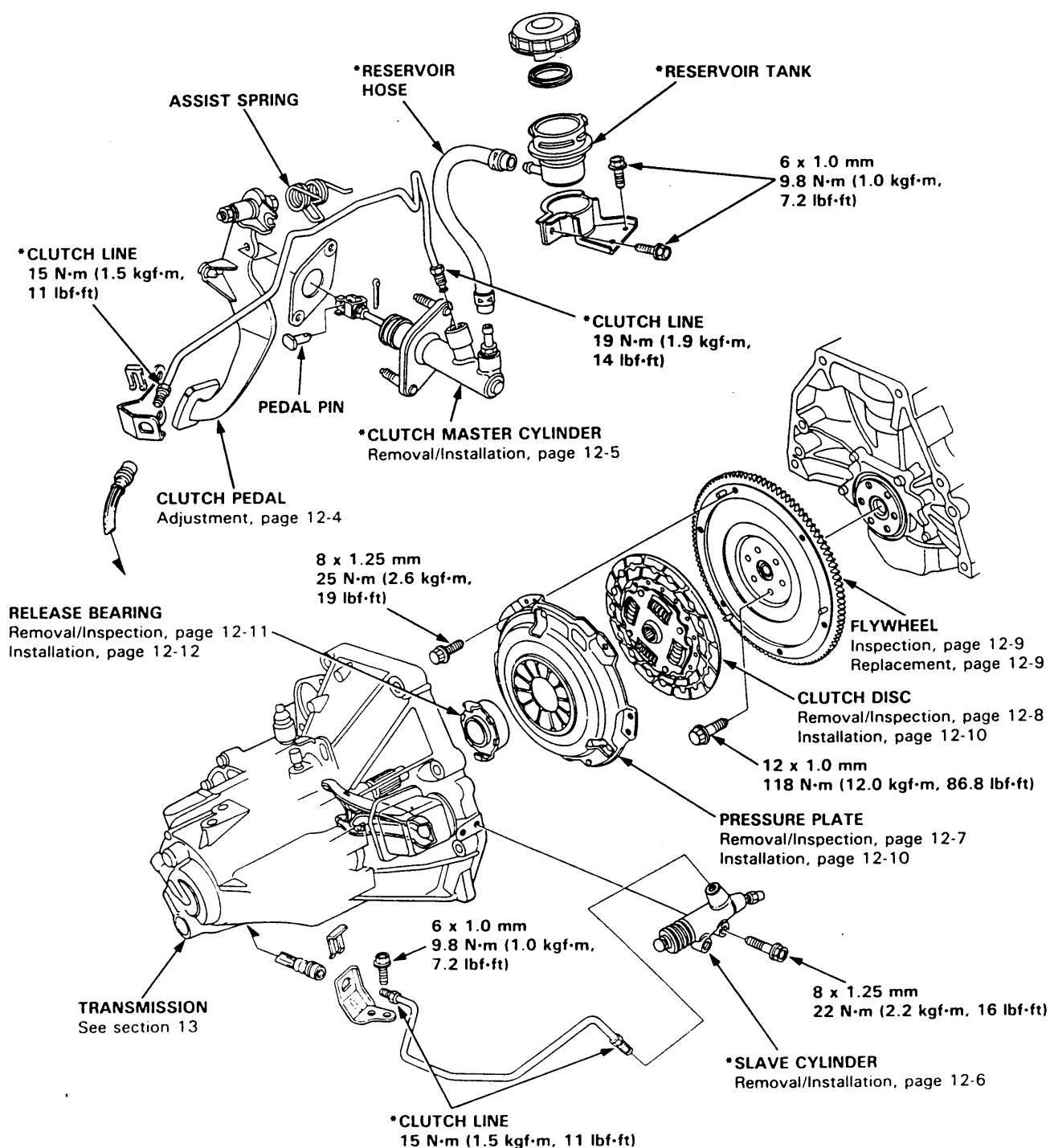
⑥



Illustrated Index

NOTE:

- Whenever the transmission is removed, clean and grease the release bearing sliding surface.
- If the parts marked with an asterisk (*) are removed, the clutch hydraulic system must be bled (see page 12-6).
- Inspect the hoses for damage, leaks, interference, and twisting.



Clutch Pedal

Adjustment

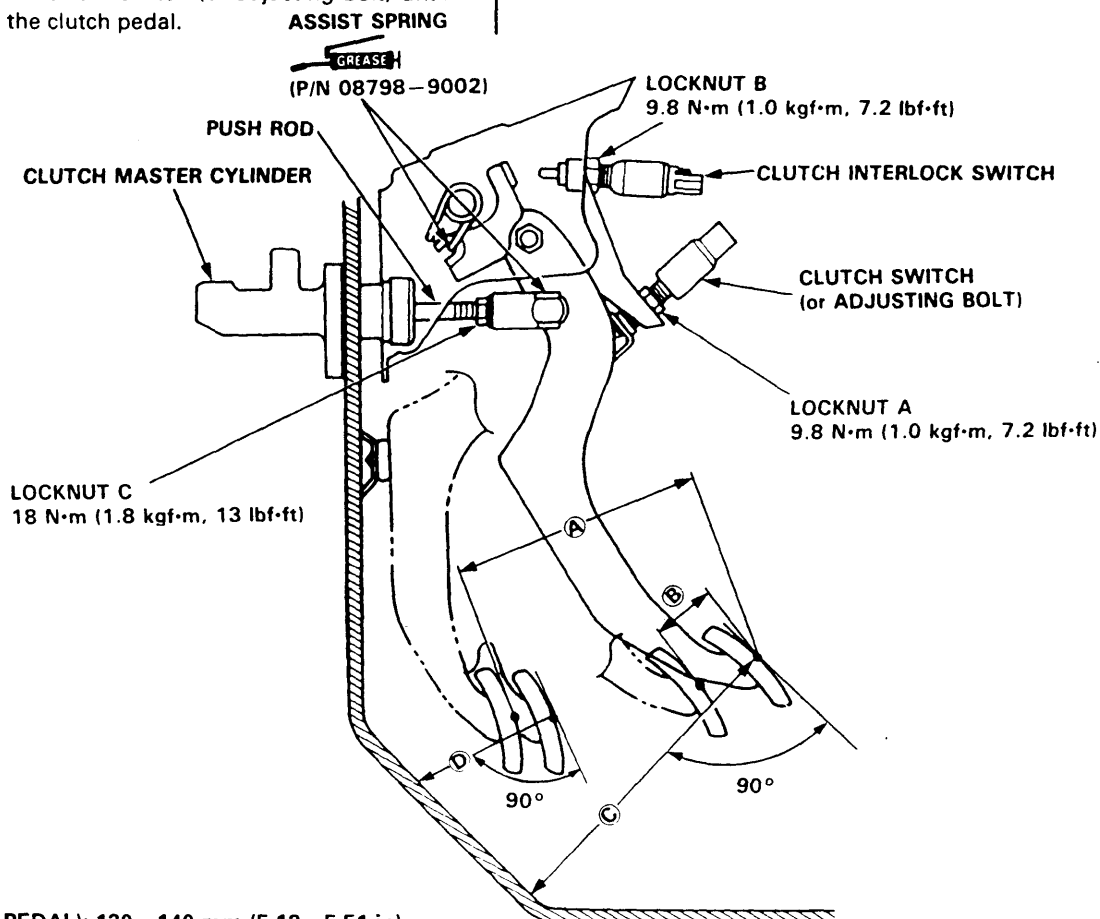
NOTE:

- To check the clutch interlock switch and clutch switch, see section 23.
- The clutch is self-adjusting to compensate for wear.

CAUTION: If there is no clearance between the master cylinder piston and push rod, the release bearing is held against the diaphragm spring, which can result in clutch slippage or other clutch problems.

1. Loosen locknut A, and back off the clutch switch (or adjusting bolt) until it no longer touches the clutch pedal.
2. Loosen locknut C, and turn the push rod in or out to get the specified stroke (A) and height (C) at the clutch pedal.
3. Tighten locknut C.
4. Thread in the clutch switch (or adjusting bolt) until it contacts the clutch pedal.

5. Turn the clutch switch (or adjusting bolt) in an additional 3/4 to 1 full turn.
6. Tighten locknut A.
7. Loosen locknut B or the clutch interlock switch.
8. Measure the clearance between the floor board and clutch pedal with the clutch pedal fully depressed.
9. Release the clutch pedal 15 – 20 mm (0.59 – 0.79 in) from the fully depressed position and hold it there. Adjust the position of the clutch interlock switch so that the engine will start with the clutch pedal in this position.
10. Thread in the clutch interlock switch an additional 3/4 to 1 full turn.
11. Tighten locknut B.



(A) (STROKE at PEDAL): 130 – 140 mm (5.12 – 5.51 in)

(B) (TOTAL CLUTCH PEDAL FREE PLAY): 12 – 21 mm (0.47 – 0.83 in) include the pedal play 1 – 10 mm (0.04 – 0.39 in)

(C) (CLUTCH PEDAL HEIGHT): 165 mm (6.50 in) to the floor

(D) (CLUTCH PEDAL DISENGAGEMENT HEIGHT): 83 mm (3.27 in) minimum to the floor

Clutch Master Cylinder

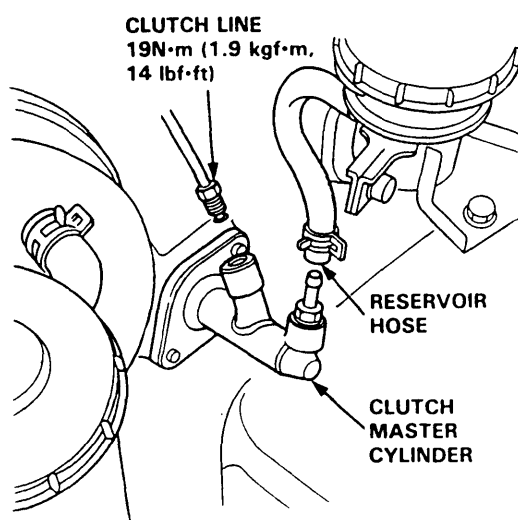


Removal/Installation

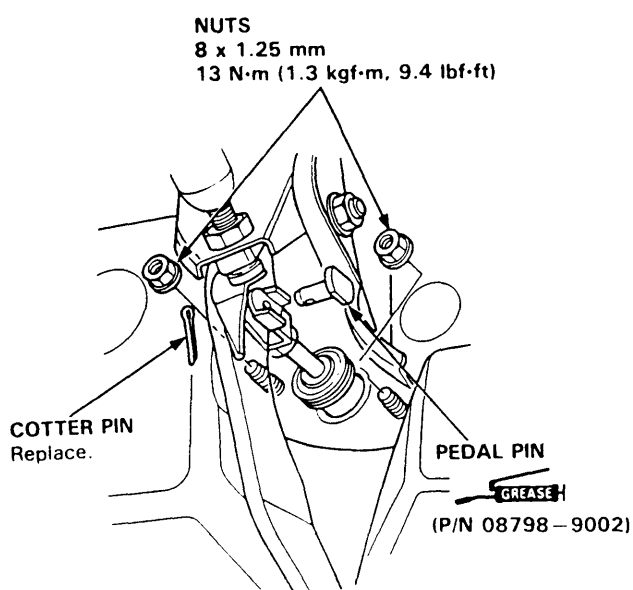
CAUTION:

- Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Plug the end of the clutch line and reservoir hose with a shop towel to prevent brake fluid from coming out.

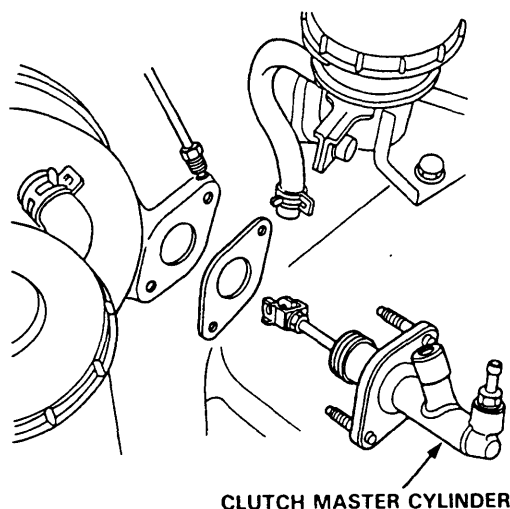
1. The brake fluid can be removed from the clutch master cylinder reservoir with a syringe.
2. Disconnect the clutch line and reservoir hose from the clutch master cylinder.



3. Pry out the cotter pin, and pull the pedal pin out of the yoke. Remove the nuts.



4. Remove the clutch master cylinder.



5. Install the clutch master cylinder in the reverse order of removal.

NOTE: Bleed the clutch hydraulic system (see page 12-6).

Slave Cylinder

Removal/Installation

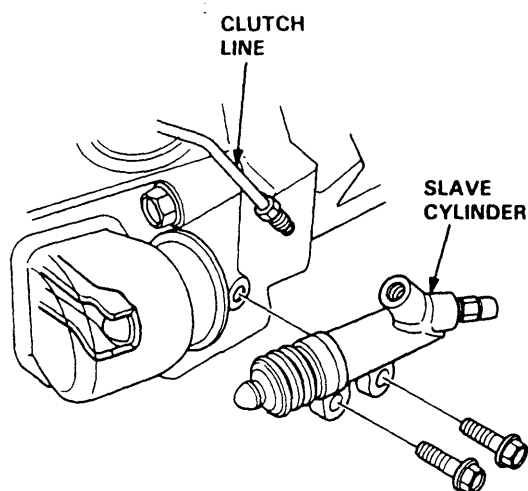
CAUTION:

- Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Plug the end of the clutch line with a shop towel to prevent brake fluid from coming out.

 **GREASE H:** Super High Temp Urea Grease (P/N 08798 - 9002).

 **GREASE H:** Brake Assembly Lube or equivalent rubber grease.

1. Disconnect the clutch line from the slave cylinder.

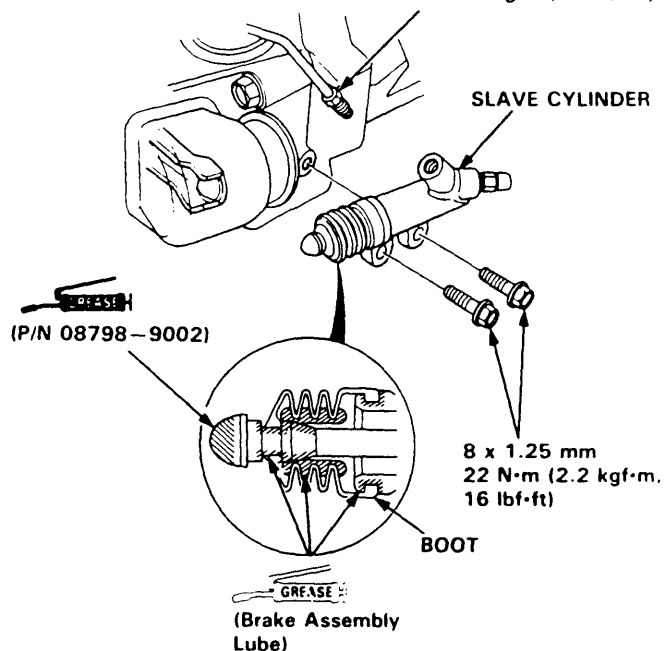


2. Remove the slave cylinder from the clutch housing.

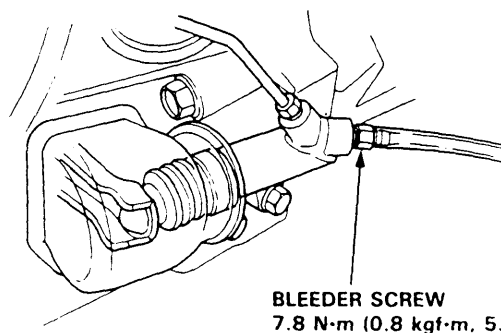
3. Install the slave cylinder in the reverse order of removal.

NOTE: Make sure the boot is installed on the slave cylinder.

CLUTCH LINE
15 N·m (1.5 kgf·m, 11 lbf·ft)



4. Bleed the clutch hydraulic system.
 - Attach a hose to the bleeder screw, and suspend the hose in a container of brake fluid.
 - Make sure there is an adequate supply of fluid at the clutch master cylinder, then slowly pump the clutch pedal until no more bubbles appear at the bleeder hose.
 - Refill the clutch master cylinder with fluid when done.
 - Always use Genuine Honda DOT 3 Brake Fluid. Using a non-Honda brake fluid can cause corrosion and decrease the life of the system.
 - Confirm clutch operation, and check for leaking fluid.



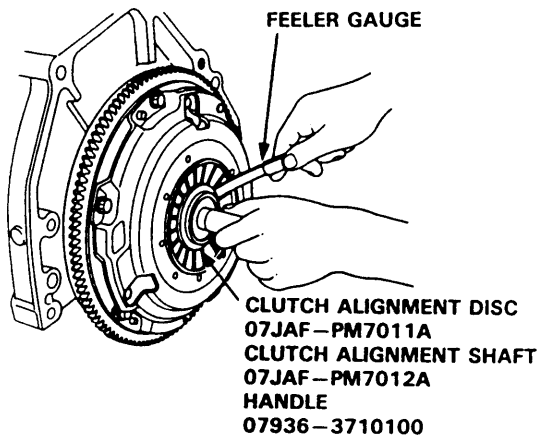
Pressure Plate



Removal/Inspection

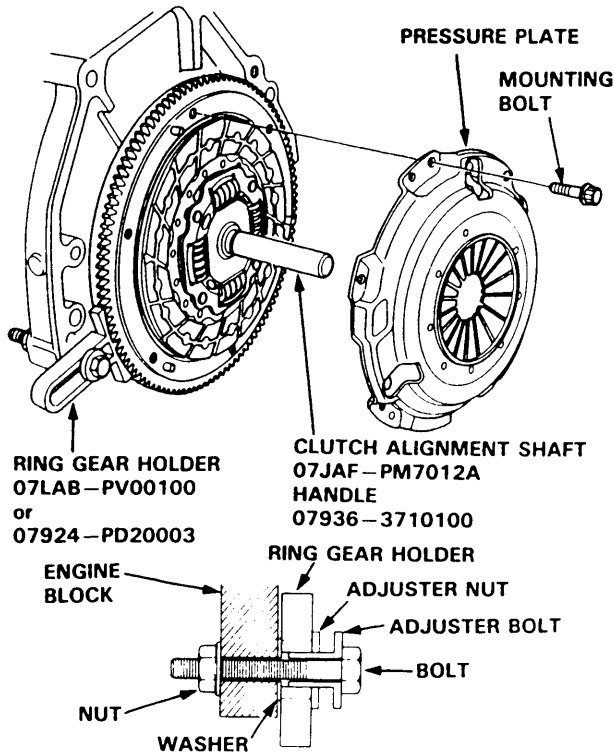
1. Inspect the fingers of the diaphragm spring for wear at the release bearing contact area.
2. Check the diaphragm spring fingers for height using the special tools and a feeler gauge.

Standard (New): 0.6 mm (0.02 in) max.
Service Limit: 1.0 mm (0.04 in)



If the height exceeds the service limit, replace the pressure plate.

3. Install the special tools.

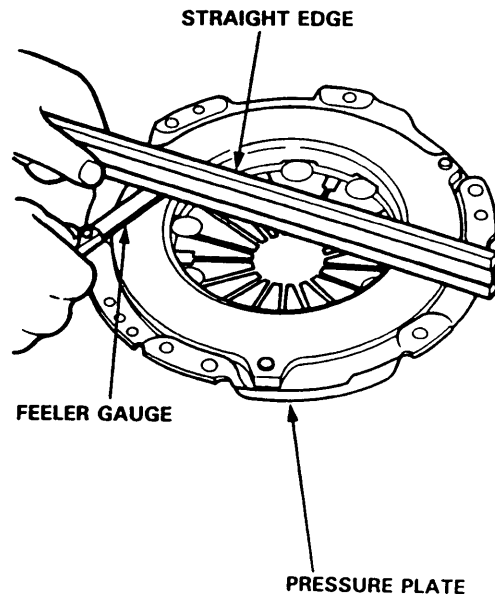


4. To prevent warping, unscrew the pressure plate mounting bolts in a crisscross pattern in several steps, then remove the pressure plate.

5. Inspect the pressure plate surface for wear, cracks, and burning.
6. Inspect for warpage using a straight edge and feeler gauge.

NOTE: Measure across the pressure plate at three points.

Standard (New): 0.03 mm (0.001 in) max.
Service Limit: 0.15 mm (0.006 in)

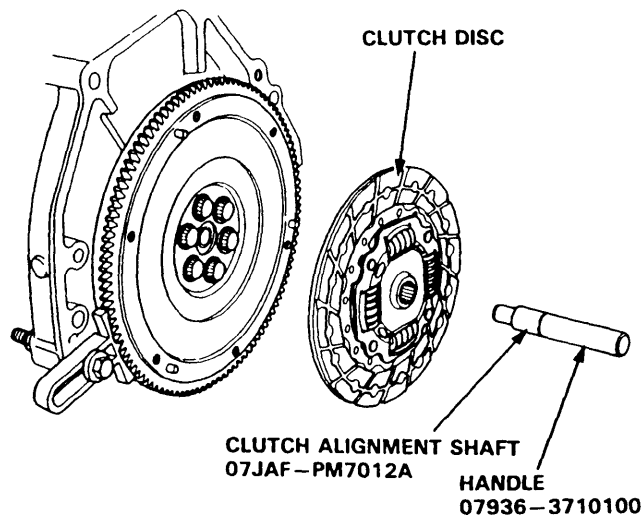


If the warpage exceeds the service limit, replace the pressure plate.

Clutch Disc

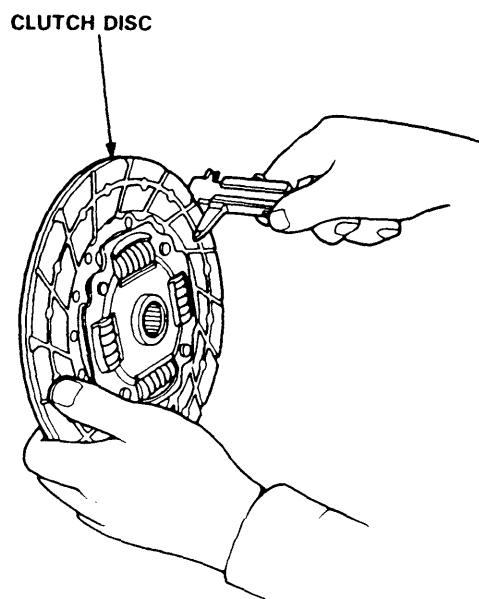
Removal/Inspection

1. Remove the clutch disc and special tools.



2. Inspect lining of the clutch disc for signs of slipping or oil. If it is burned black or oil soaked, replace it.
3. Measure the clutch disc thickness.

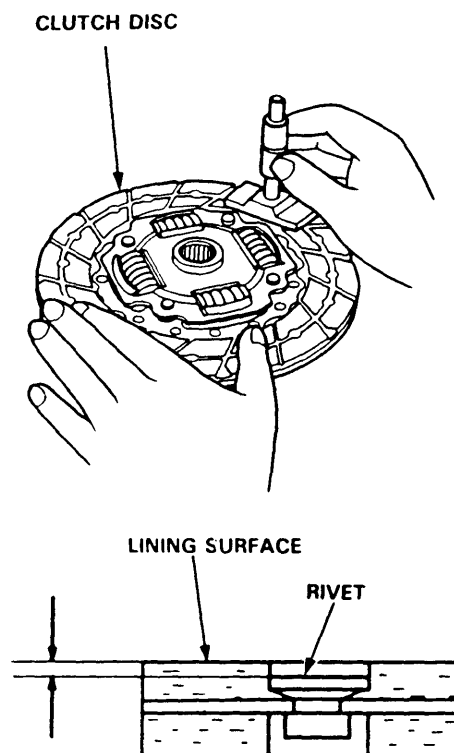
Clutch Disc Thickness:
Standard (New): 8.5 – 9.1 mm (0.33 – 0.36 in)
Service Limit: 5.5 mm (0.22 in)



If the thickness is less than the service limit, replace the clutch disc.

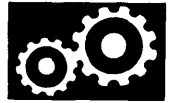
4. Measure the depth from the lining surface to the rivets, on both sides.

Rivet Depth:
Standard (New): 1.3 – 1.9 mm (0.05 – 0.07 in) min.
Service Limit: 0.2 mm (0.01 in)



If the depth is less than the service limit, replace the clutch disc.

Flywheel

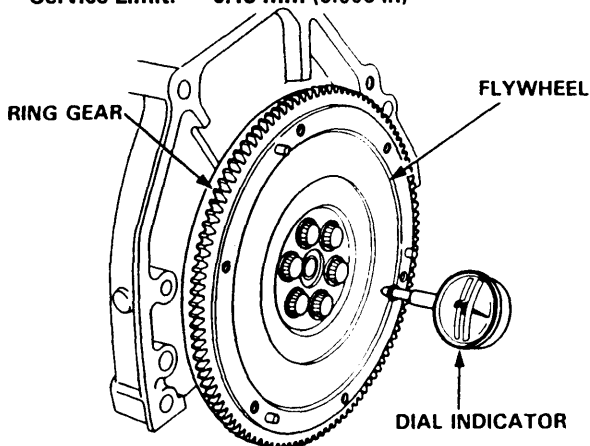


Inspection

1. Inspect the ring gear teeth for wear and damage.
2. Inspect the clutch disc mating surface on the flywheel for wear, cracks, and burning.
3. Measure the flywheel runout using a dial indicator through at least two full turns. Push against the flywheel each time you turn it to take up the crankshaft thrust washer clearance.

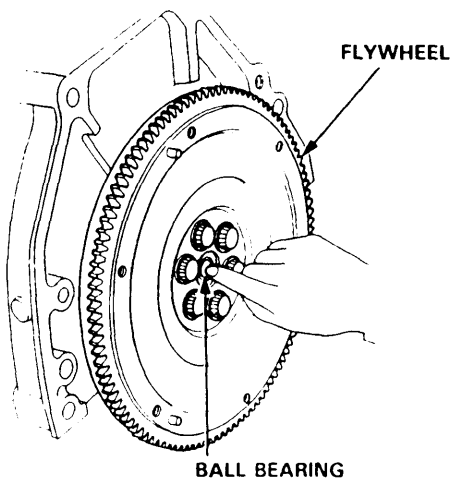
NOTE: The runout can be measured with engine installed.

Standard (New): 0.05 mm (0.002 in) max.
Service Limit: 0.15 mm (0.006 in)



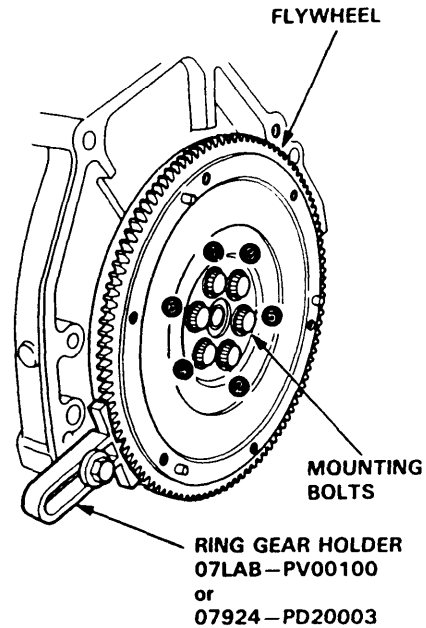
If the runout exceeds the service limit, replace the flywheel.

4. Turn the inner race of the ball bearing with your finger. The ball bearing should turn smoothly and quietly. Check that the ball bearing outer race fits tightly in the flywheel. If the inner race does not turn smoothly, quietly, or fit tight in the flywheel, replace the ball bearing.

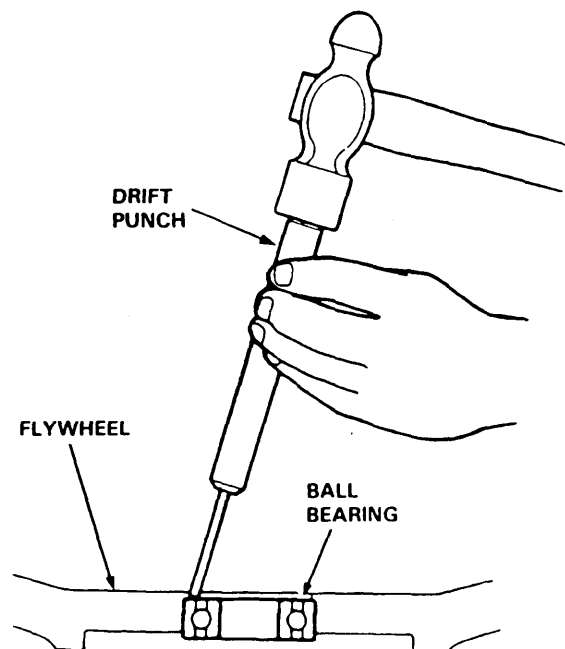


Replacement

1. Install the special tool.



2. Remove the flywheel mounting bolts in a crisscross pattern in several steps as shown, and remove the flywheel.
3. Remove the ball bearing from the flywheel.



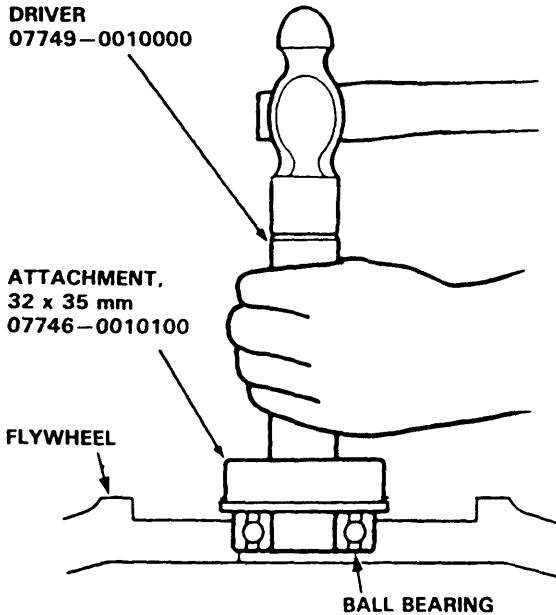
(cont'd)

Flywheel

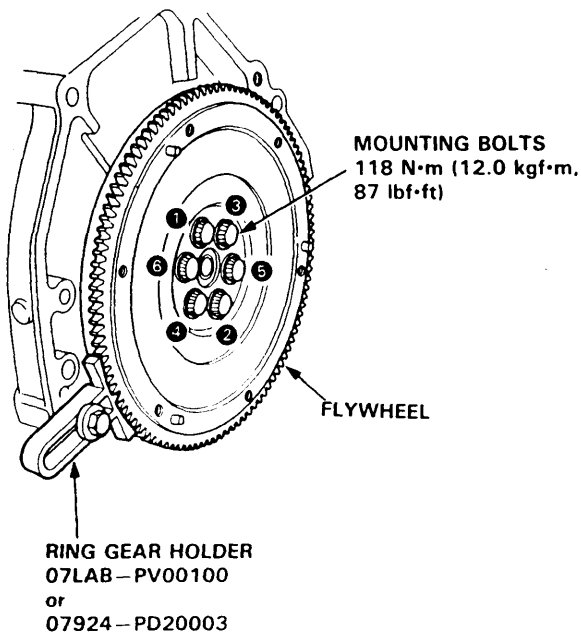
Clutch Disc, Pressure Plate

Replacement (cont'd)

4. Drive the new ball bearing into the flywheel using the special tools as shown.

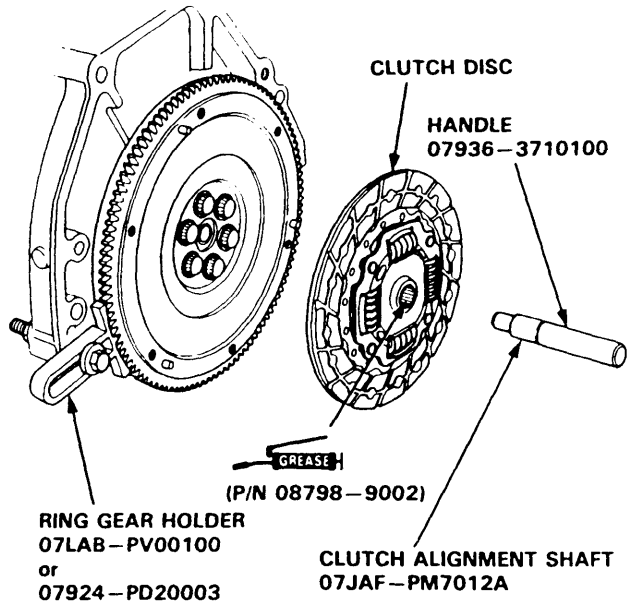


5. Align the hole in the flywheel with the crankshaft dowel pin and install the flywheel. Install the mounting bolts finger-tight.
6. Install the special tool, then torque the flywheel mounting bolts in a crisscross pattern in several steps as shown.

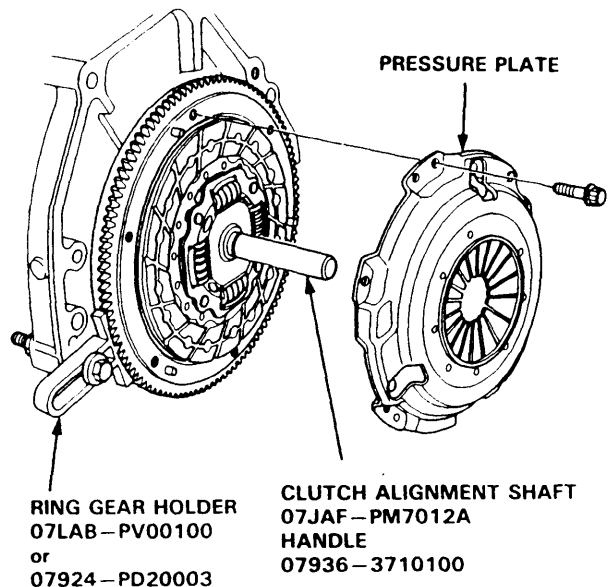


Installation

1. Install the special tool.



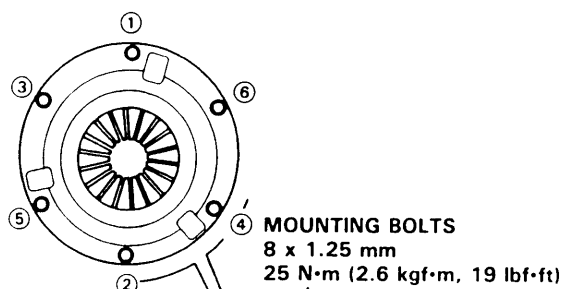
2. Install the clutch disc using the special tools.
3. Install the pressure plate.



Release Bearing



4. Torque the mounting bolts in a crisscross pattern as shown. Tighten them in several steps to prevent warping the diaphragm spring.



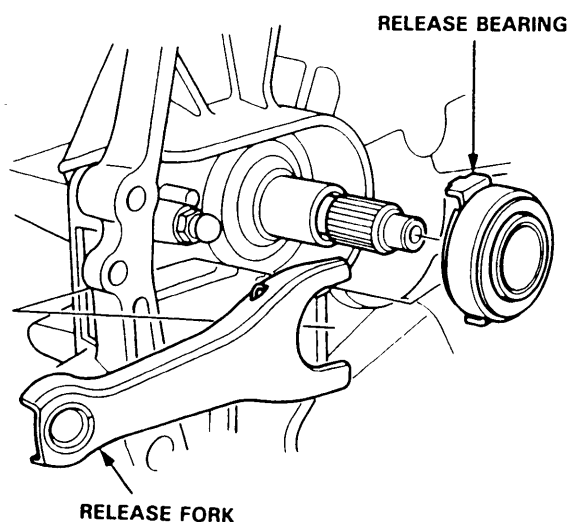
MOUNTING BOLTS
8 x 1.25 mm
25 N·m (2.6 kgf·m, 19 lbf·ft)

RING GEAR HOLDER
07LAB-PV00100
or
07924-PD20003

CLUTCH ALIGNMENT SHAFT
07JAF-PM7012A
HANDLE
07936-3710100

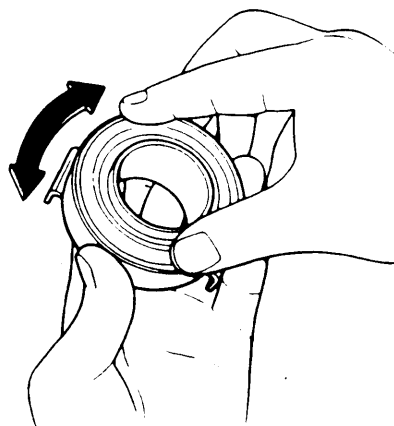
Remove/Inspection

1. Remove the release fork boot from the clutch housing.
2. Remove the release fork from the clutch housing by squeezing the release fork set spring with pliers. Remove the release bearing.



3. Check the release bearing for play by spinning it by hand.

CAUTION: The release bearing is packed with grease. Do not wash it in solvent.



4. If there is excessive play, replace the release bearing with a new one.

Release Bearing

Installation

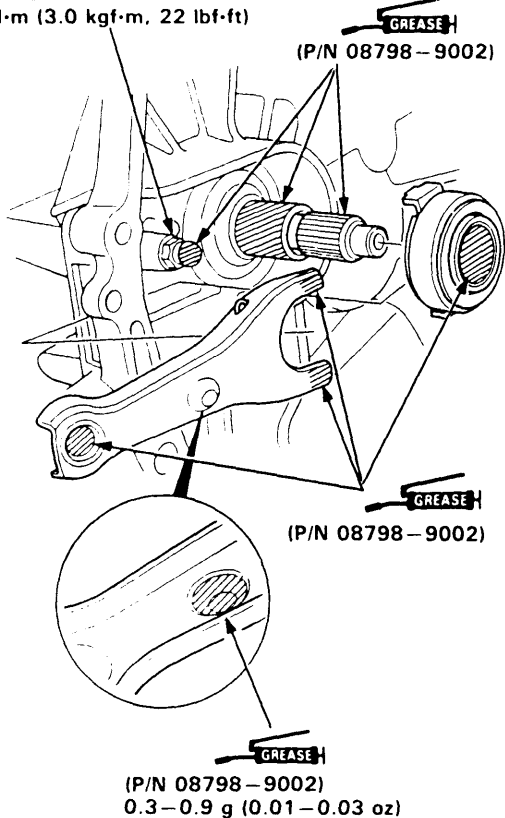
NOTE: Use only Super High Temp Urea Grease (P/N 08798 - 9002).

1. With the release fork slid between the release bearing pawls, install the release bearing on the main-shaft while inserting the release fork through the hole in the clutch housing.

RELEASE FORK BOLT

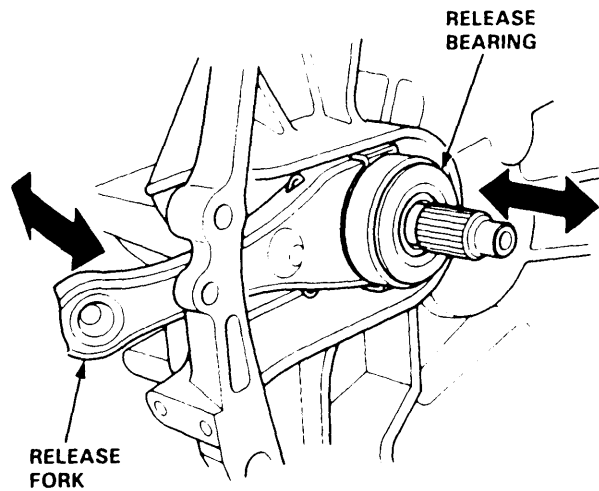
12 x 1.25 mm

29 N·m (3.0 kgf·m, 22 lbf·ft)



2. Align the detent of the release fork with the release fork bolt, then press the release fork over the release fork bolt squarely.

3. Move the release fork right and left to make sure that it fits properly against the release bearing, and that the release bearing slides smoothly.



4. Install the release fork boot; make sure the boot seals around the release fork and clutch housing.

Manual Transmission

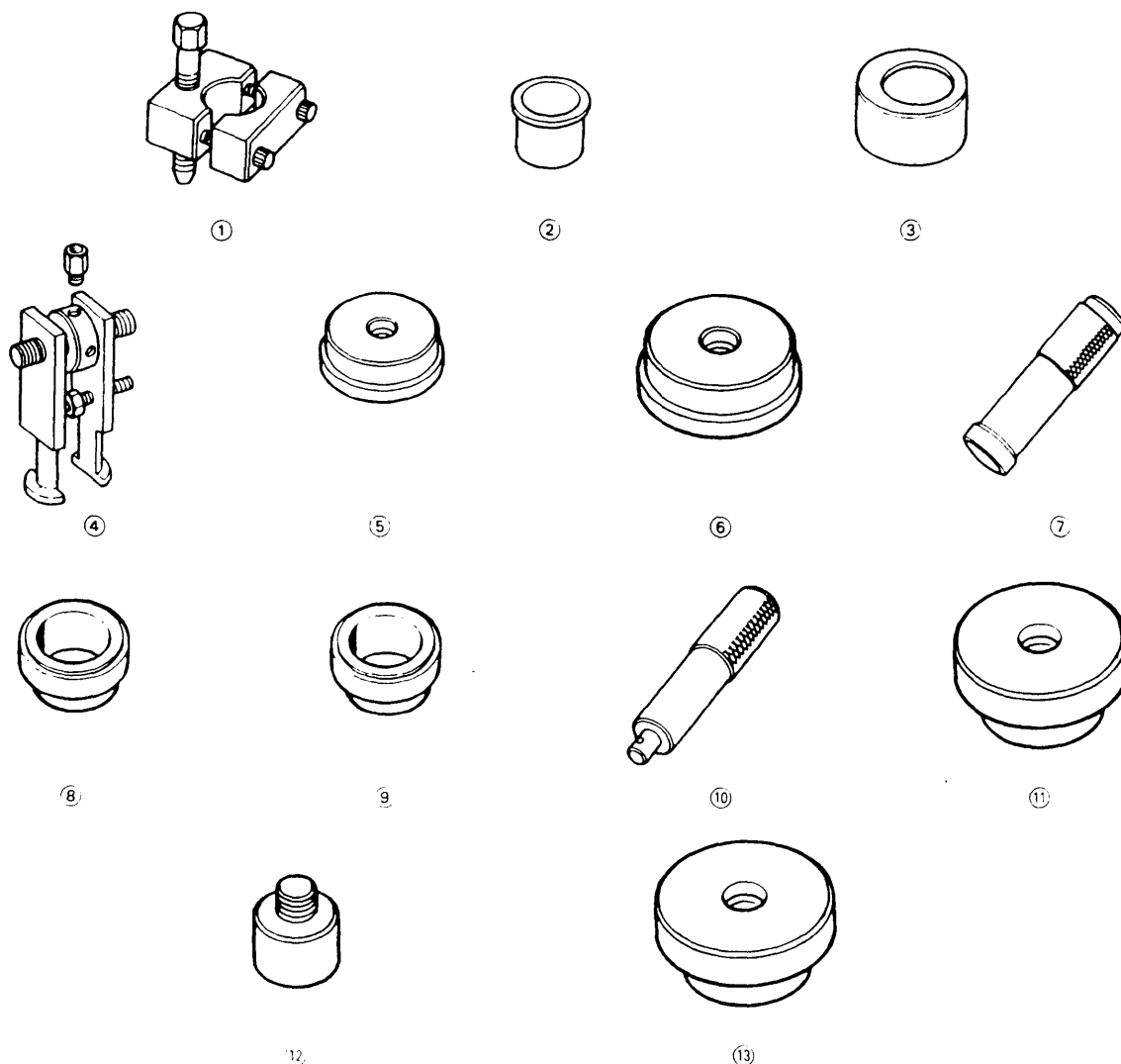
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Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07GAJ - PG20110	Mainshaft Holder	1	13-38
②	07GAJ - PG20120	Collar	1	13-37
③	07GAJ - PG20130	Mainshaft Base	1	13-37
*④	07736 - A01000A	Adjustable Bearing Puller, 25 - 40 mm	1	13-34, 35
⑤	07746 - 0010300	Attachment, 42 x 47 mm	1	13-34, 35
⑥	07746 - 0010400	Attachment, 52 x 55 mm	1	13-34, 35
⑦	07746 - 0030100	Driver, 40 mm I.D.	1	13-19, 24 31, 32
⑧	07746 - 0030300	Attachment, 30 mm I.D.	1	13-19, 24
⑨	07746 - 0030400	Attachment, 35 mm I.D.	1	13-19, 24
⑩	07749 - 0010000	Driver	1	13-34, 35, 43
⑪	07JAD - PH80101	Driver Attachment	1	13-43
⑫	07JAD - PH80200	Pilot, 26 x 30 mm	1	13-43
⑬	07947 - 6110501 or 07947 - 6110500	Seal Driver Attachment	1	13-43

* Must be used with commercially-available 3/8"-16 Slide Hammer.

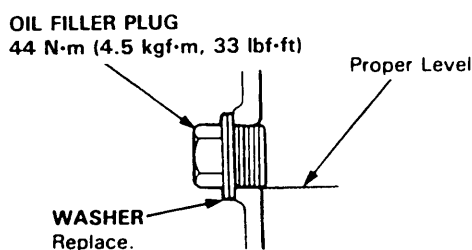




Transmission Oil

NOTE: Check the transmission oil with the engine OFF and the vehicle on level ground.

1. Remove the oil filler plug, then check the level and condition of the oil.



2. The oil level must be up to the filler hole. If it is below the hole, add oil until it runs out, then reinstall the oil filler plug with a new washer.
3. If the transmission oil is dirty, remove the drain plug and drain the oil.
4. Reinstall the drain plug with a new washer, and refill the transmission with the recommended oil to the proper level.

NOTE: The drain plug washer should be replaced at every oil change.

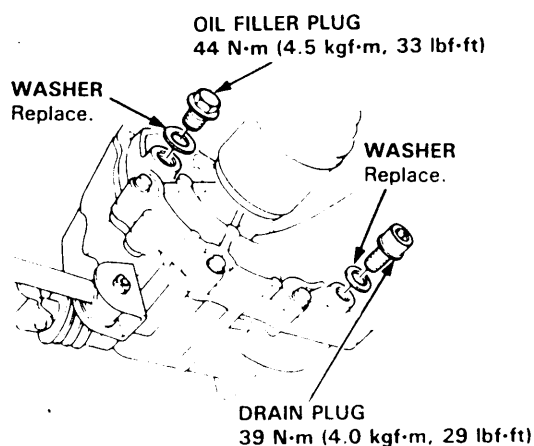
5. Reinstall the oil filler plug with a new washer.

Oil Capacity

1.8 ℓ (1.9 US qt, 1.6 Imp qt) at oil change

1.9 ℓ (2.0 US qt, 1.7 Imp qt) at overhaul

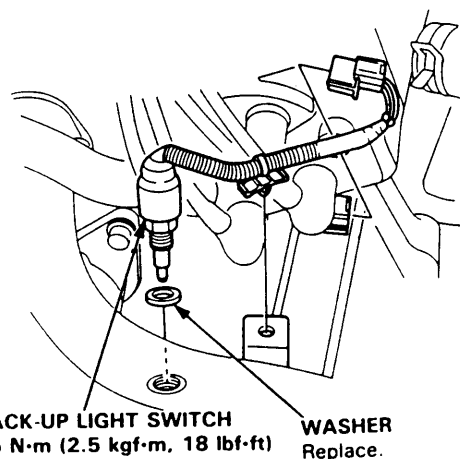
Always use Genuine Honda Manual Transmission Fluid (MTF). Using motor oil can cause stiffer shifting because it does not contain the proper additives.



Replacement

NOTE: To test the back-up light switch, see section 23.

1. Disconnect the connector, then remove the back-up light switch connector from the connector clamp.
2. Remove the back-up light switch.



3. Install the new washer and back-up light switch.
4. Connect the back-up light switch connector.

Troubleshooting

Reverse Gear Noise Reduction System

Whenever the clutch pedal is depressed to shift into reverse, the mainshaft continues to rotate because of its inertia.

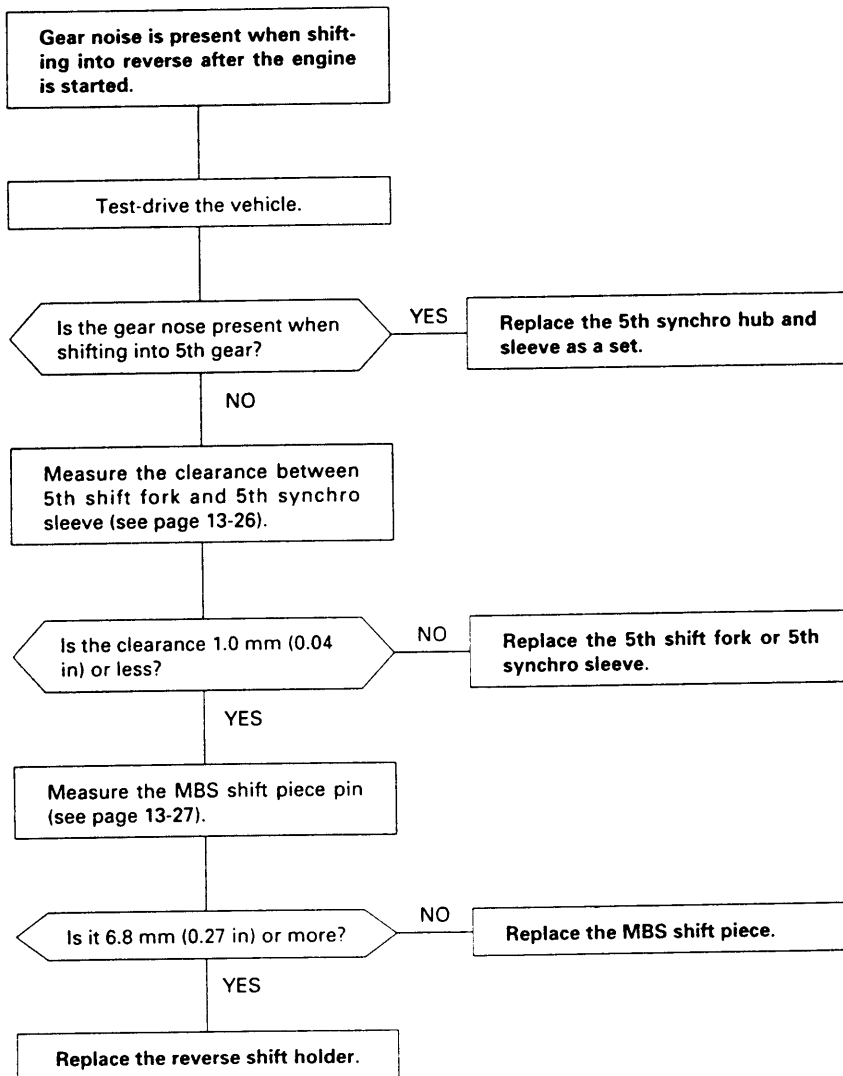
The resulting speed difference between mainshaft and reverse idler gear produces gear noise.

The reverse gear noise reduction system employs a cam plate which was added to the reverse shift holder. When shifting into reverse, the 5th/reverse shift piece, connected to the shift lever, rotates the cam plate. This cause the 5th synchro set to stop the rotating mainshaft. As there is no speed difference between mainshaft and reverse idler gear, there will be less gear noise.

NOTE: This system is not a fully-synchronized gear noise reduction system.

Therefore, you may hear gear noise when

- ① you shift into reverse with the vehicle not yet completely stopped.
- ② you shift quickly into reverse during fast idling.



Transmission Assembly



Removal

⚠ WARNING

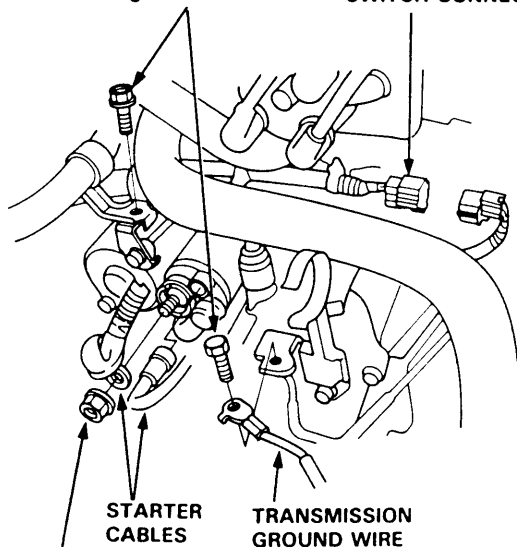
- Make sure jacks and safety stands are placed properly, and hoist brackets are attached to correct position on the engine.
- Apply parking brake and block rear wheels so the vehicle will not roll off stands and fall on you while working under it.

CAUTION: Use fender covers to avoid damaging painted surfaces.

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the negative (-) cable first, then the positive (+) cable from the battery.
3. Remove the intake air duct and air cleaner housing assembly (see section 5).
4. Disconnect the starter motor cables, transmission ground wire and back-up light switch connector.

6x1.0 mm
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)

BACK-UP LIGHT
SWITCH CONNECTOR



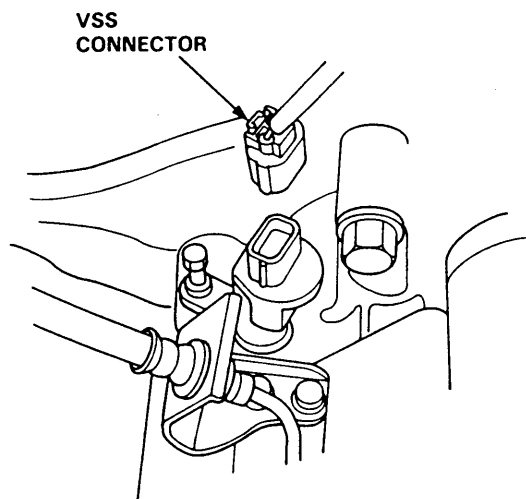
8 x 1.25 mm
9 N·m (0.9 kgf·m, 7 lbf·ft)

STARTER
CABLES

TRANSMISSION
GROUND WIRE

5. Remove the wire harness clamps.

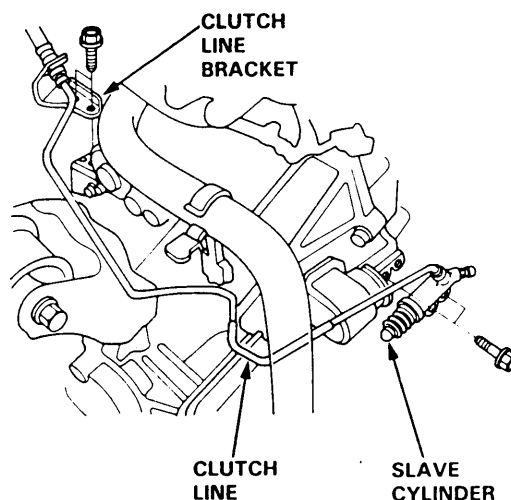
6. Disconnect the vehicle speed sensor (VSS) connector.



7. Remove the clutch line bracket, clutch line clamp, and slave cylinder.

CAUTION:

- Do not operate the clutch pedal once the slave cylinder has been removed.
- Take care not to bend the clutch line.



8. Drain transmission oil (see page 13-3).

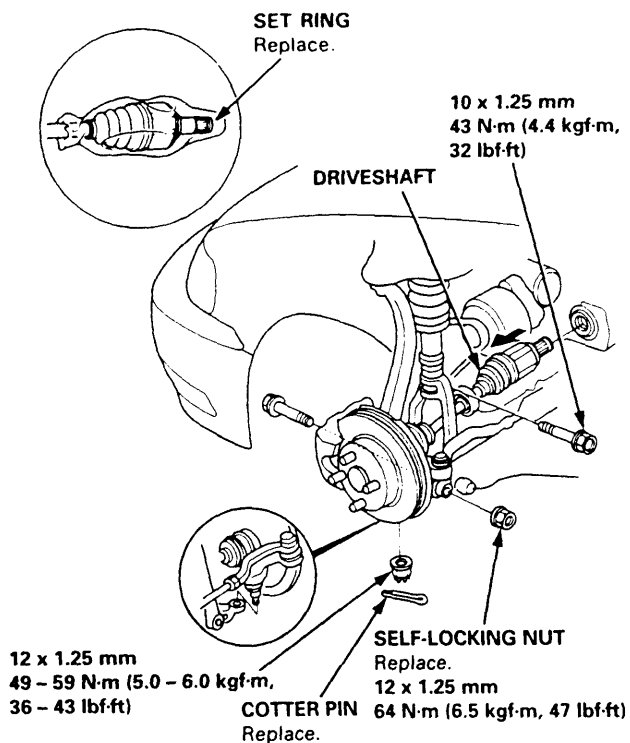
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Transmission Assembly

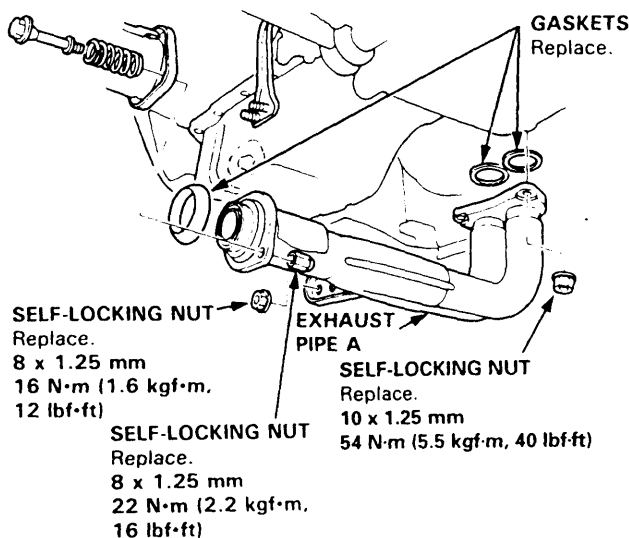
Removal (cont'd)

9. Remove the driveshafts (see section 16).

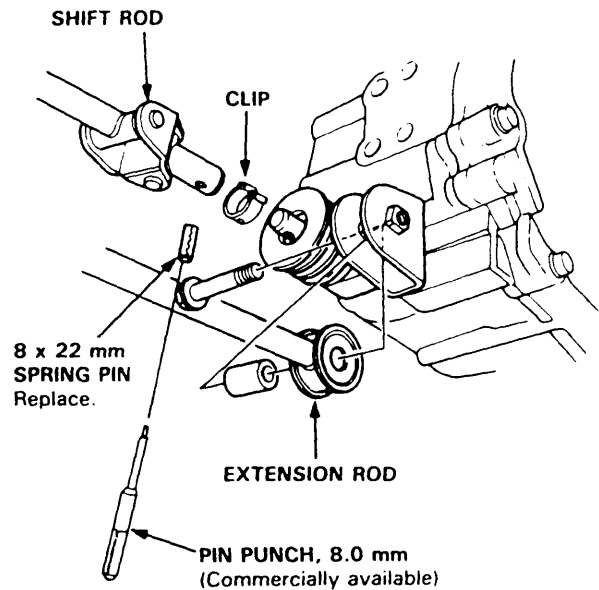
NOTE: Coat all the precision finished surfaces with clean engine oil or grease. Tie plastic bags over the driveshaft ends.



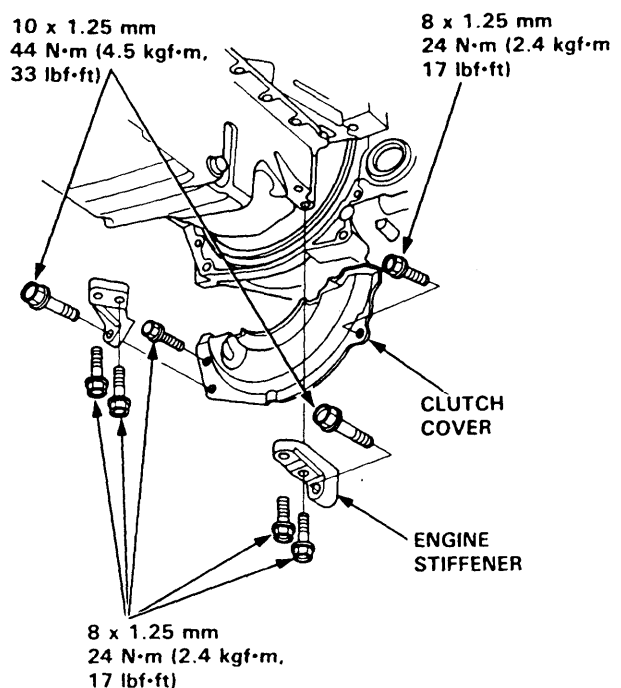
10. Remove exhaust pipe A.



11. Remove the shift rod and extension rod.

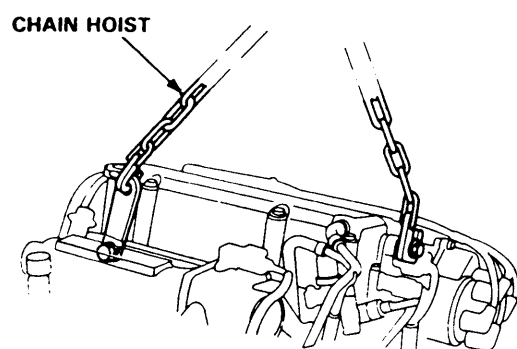


12. Remove the engine stiffeners and clutch cover.

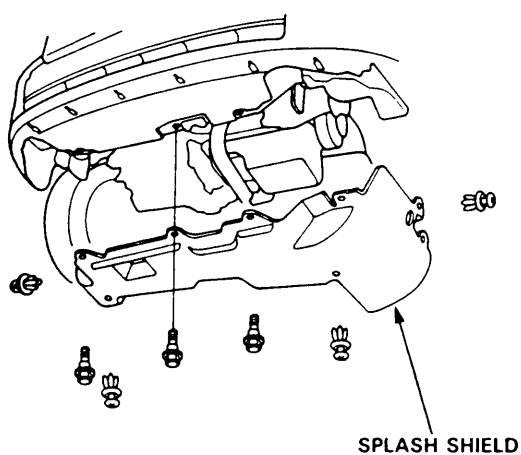




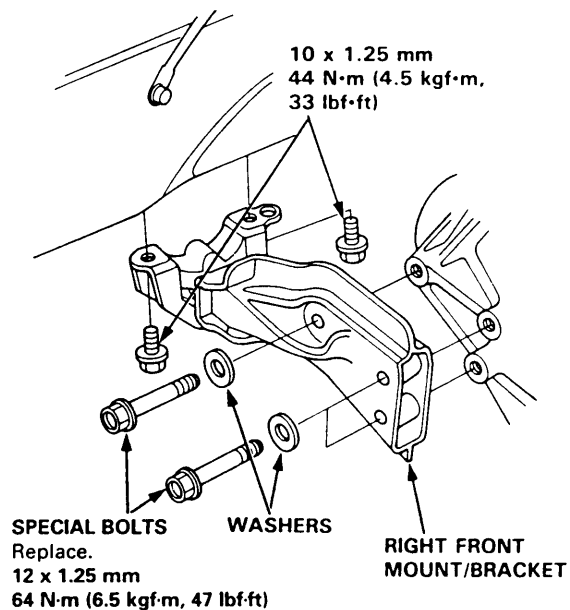
13. Install the bolts in the cylinder head and attach a chain hoist to the bolts, then lift the engine slightly to unload the engine and transmission mounts.



14. Remove the splash shield.

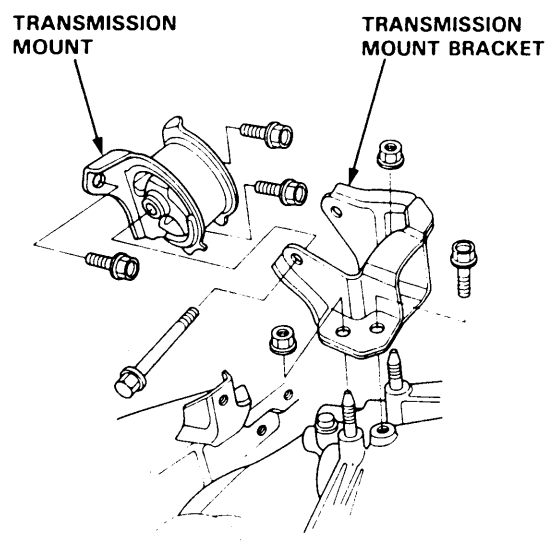


15. Remove the right front mount/bracket.



16. Place a jack under the transmission.

17. Remove the transmission mount bracket and mount.

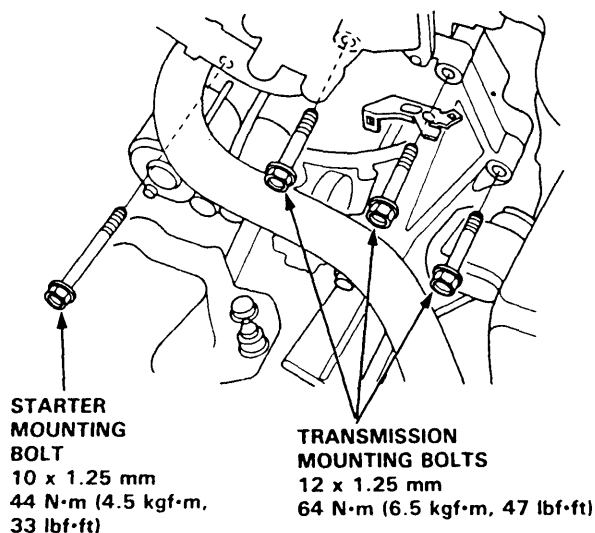


(cont'd)

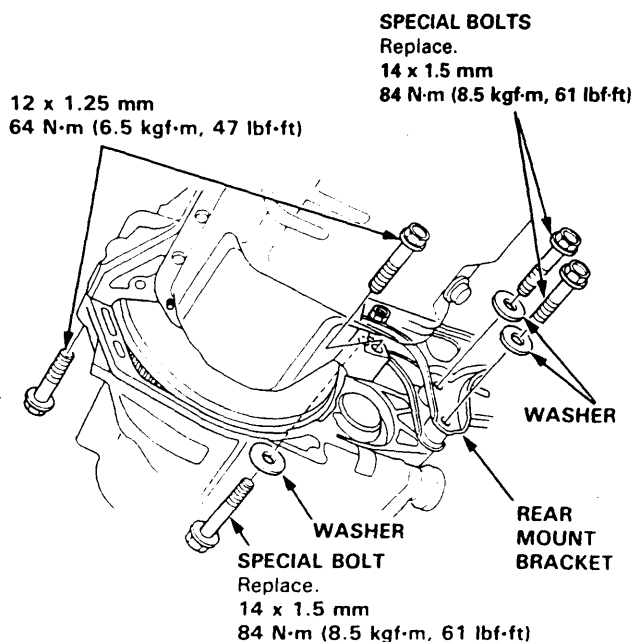
Transmission Assembly

Removal (cont'd)

18. Remove the three upper transmission mounting bolts and the lower starter mounting bolt.



19. Remove the rear mount bracket bolts and transmission mounting bolts.



20. Pull the transmission away from the engine until it clears the mainshaft, then lower it on the transmission jack.

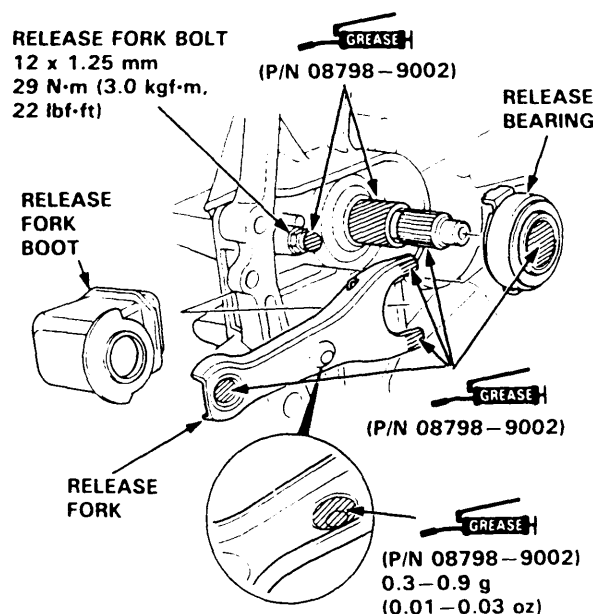
CAUTION: Take care not to bend the clutch line.

Installation

Install the transmission assembly in the reverse order of removal.

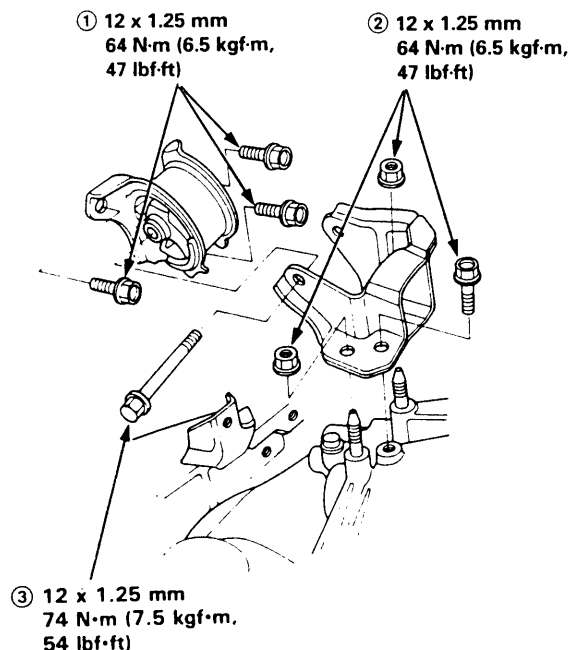
- Before installing, check that the two dowel pins are installed in the clutch housing.
- Apply grease to the parts as shown, then install the release fork and release bearing.

NOTE: Use only Super High Temp Urea Grease (P/N 08798 - 9002).

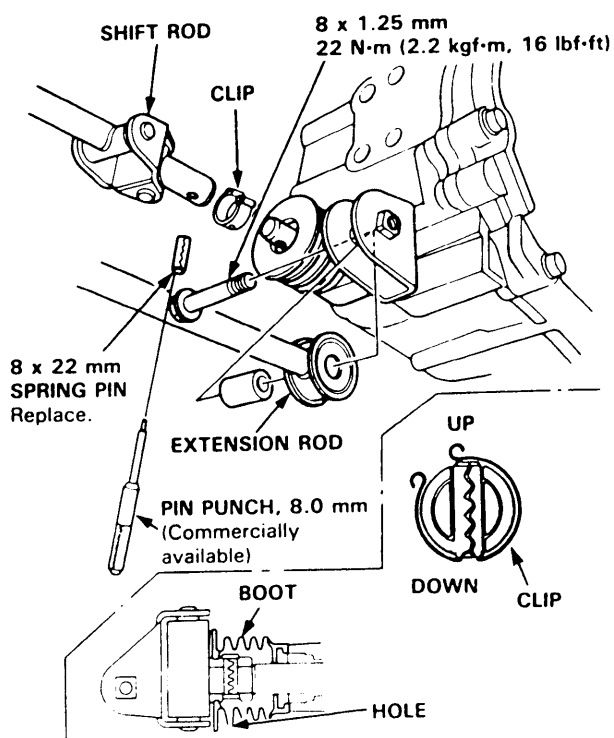




- Torque the mounting bolt and nuts in the sequence shown.



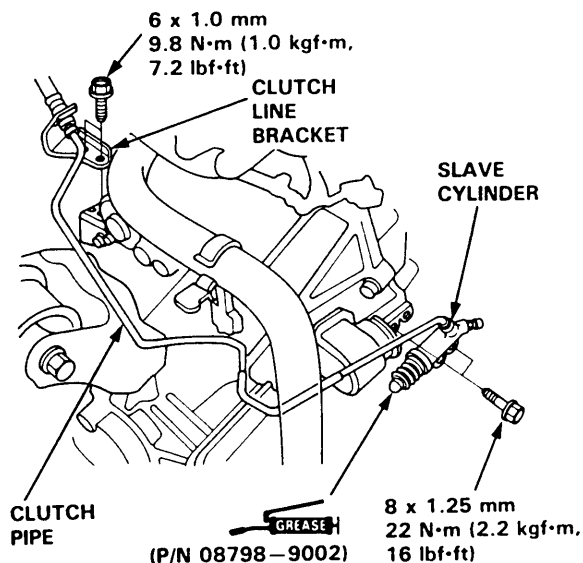
- Check that the bushings are not twisted or offset.
- Install the clip as shown.



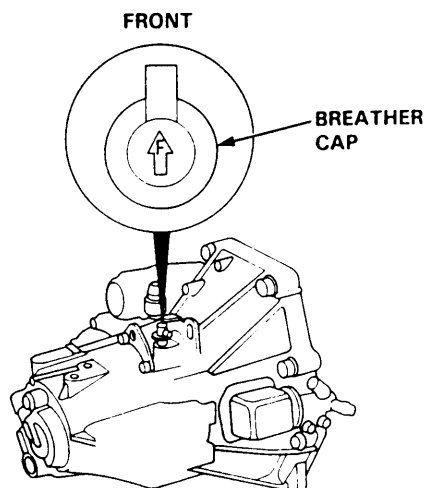
- Turn the boot so the hole is facing down.
- Make sure the boot is installed on the shift rod.

- Apply grease to the slave cylinder push rod.

NOTE: Use only Super High Temp Urea Grease (P/N 08798 – 9002).



- Turn the breather cap so that the “F” mark points at the front of the vehicle as shown.



- Installing the starter cable, make sure that the crimped side of the ring terminal is facing out (see section 4).
- Refill the transmission with the recommended oil (see page 13-3).
- Connect the positive (+) cable first, then the negative (-) cable to the battery.
- Check the clutch operation.
- Shift the transmission and check for smooth operation.
- Check the front wheel alignment (see section 18).
- Enter the anti-theft code for the radio, then enter the customer's radio station presets.

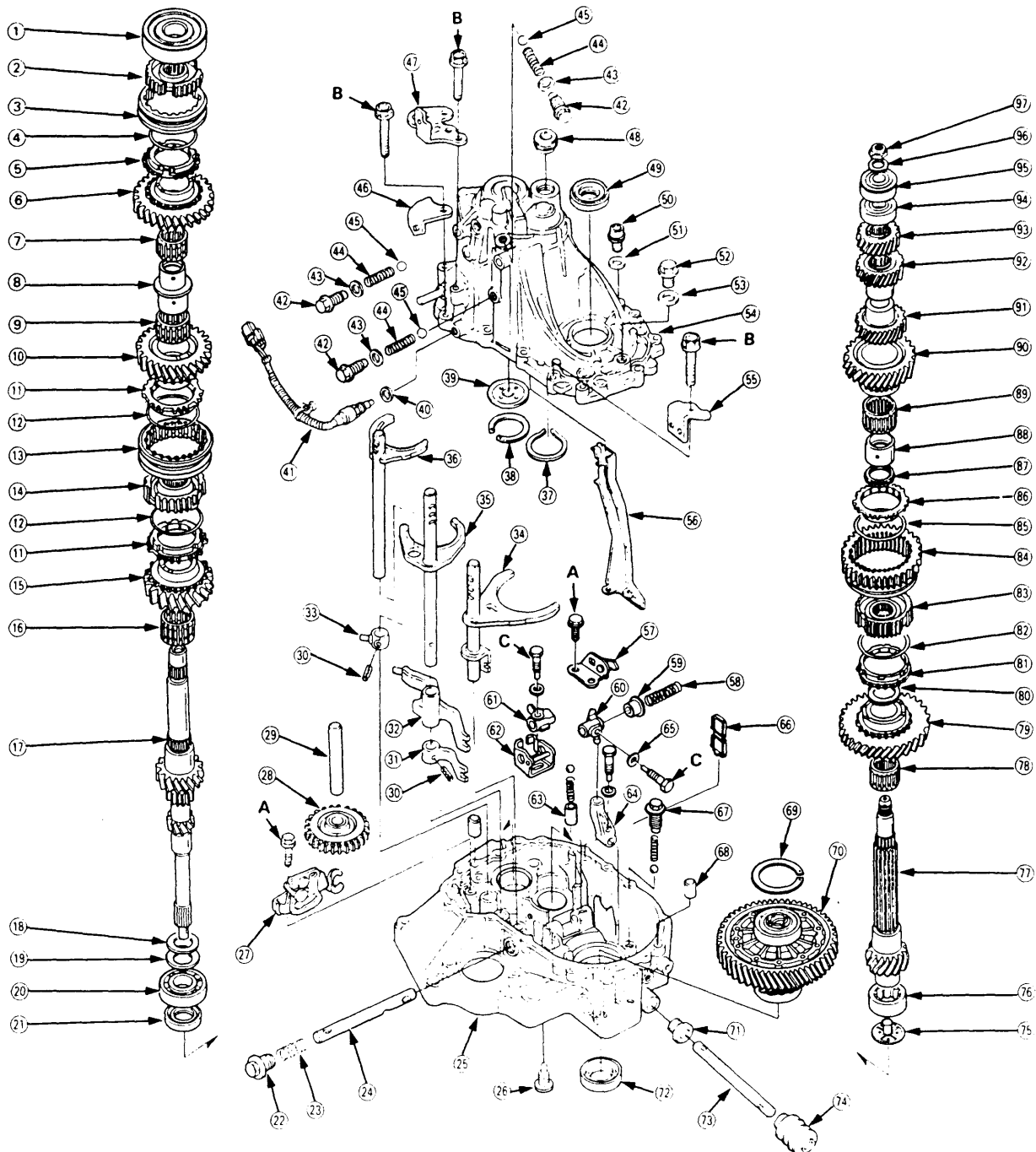
Illustrated Index

Refer to the drawing below for the transmission disassembly/reassembly.
Clean all parts thoroughly in solvent and dry with compressed air.

 Lubricate all the parts with oil before reassembly.

NOTE:

- This transmission uses no gaskets between the major housings; use liquid gasket (P/N 08718 — 0001 or 08718 — 0003) (see page 13-41).
- Always clean the magnet **66** whenever the transmission housing is disassembled.
- Inspect all the bearings for wear and operation.





Torque Value

A – 15 N·m (1.5 kgf·m, 11 lbf·ft)
B – 27 N·m (2.8 kgf·m, 20 lbf·ft)
C – 31 N·m (3.2 kgf·m, 23 lbf·ft)

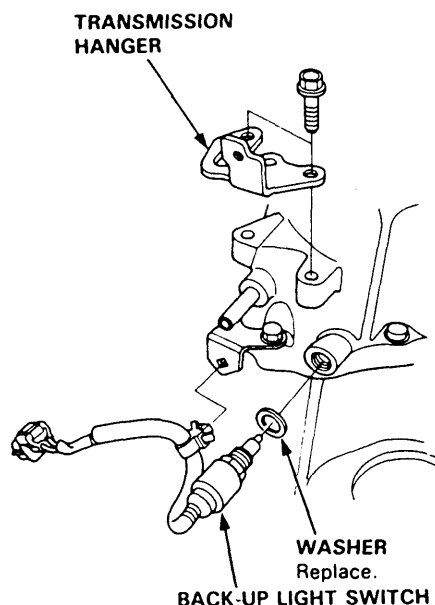
- ① BALL BEARING
- ② 5TH SYNCHRO HUB
- ③ 5TH SYNCHRO SLEEVE
- ④ SYNCHRO SPRING
- ⑤ SYNCHRO RING
- ⑥ 5TH GEAR
- ⑦ 32 x 37 x 23.5 mm
NEEDLE BEARING
- ⑧ SPACER COLLAR
- ⑨ 34 x 39 x 23 mm
NEEDLE BEARING
- ⑩ 4TH GEAR
- ⑪ SYNCHRO RING
- ⑫ SYNCHRO SPRING
- ⑬ 3RD/4TH SYNCHRO SLEEVE
- ⑭ 3RD/4TH SYNCHRO HUB
- ⑮ 3RD GEAR
- ⑯ 34 x 39 x 27.5 mm
NEEDLE BEARING
- ⑰ MAINSHAFT
- ⑱ WASHER
- ⑲ SPRING WASHER
- ⑳ BALL BEARING
Check for wear and
operation.
- ㉑ 26 x 42 x 7 mm OIL SEAL
Replace.
- ㉒ 28 mm PLUG BOLT
54 N·m (5.5 kgf·m, 40 lbf·ft)
- ㉓ 1ST/2ND SELECT SPRING
L. 36.26 mm (1.428 in)
- ㉔ SHIFT ARM SHAFT
- ㉕ CLUTCH HOUSING
- ㉖ INTERLOCK GUIDE BOLT
39 N·m (4.0 kgf·m, 29 lbf·ft)
- ㉗ REVERSE SHIFT HOLDER
- ㉘ REVERSE IDLER GEAR
- ㉙ REVERSE IDLER GEAR SHAFT
5 x 22 mm SPRING PIN
Replace.
- ㉚ 3RD/4TH SHIFT PIECE
- ㉛ 5TH/REVERSE SHIFT PIECE
- ㉜ MBS SHIFT PIECE
- ㉝ 1ST/2ND SHIFT FORK
- ㉞ 3RD/4TH SHIFT FORK
- ㉟ 5TH/REVERSE SHIFT FORK
- ㊱ 52 mm SNAP RING
- ㊲ 70 mm THRUST SHIM
Selection, page 13-36
- ㊳ OIL GUIDE PLATE
- ㊴ WASHER Replace.
- ㊵ BACK-UP LIGHT SWITCH
25 N·m (2.5 kgf·m, 18 lbf·ft)
- ㊶ SET SCREW
22 N·m (2.2 kgf·m, 16 lbf·ft)
- ㊷ WASHER Replace.
- ㊸ SPRING L. 31.6 mm (1.24 in)
- ㊹ STEEL BALL (5/16 in)
- ㊺ BACK-UP LIGHT
SWITCH HARNESS BRACKET
- ㊻ TRANSMISSION HANGER
- ㊼ 32 mm SEALING BOLT
25 N·m (2.5 kgf·m, 18 lbf·ft)
- ㊽ OIL SEAL
Replace.
- ㊾ OIL DRAIN PLUG
39 N·m (4.0 kgf·m, 29 lbf·ft)
- ㊿ WASHER Replace.
- 1 OIL FILLER PLUG
44 N·m (4.5 kgf·m, 33 lbf·ft)
- 2 WASHER Replace.
- 3 TRANSMISSION HOUSING
- 4 RELEASE PIPE BRACKET
- 5 OIL GUTTER PLATE
- 6 REVERSE LOCK CAM
- 7 REVERSE SELECT SPRING
L. 63.4 mm (2.496 in)
- 8 REVERSE SELECT RETAINER
- 9 SHIFT ARM C
- 10 SHIFT ARM B
- 11 INTERLOCK
- 12 COLLAR
- 13 SHIFT ARM A
- 14 SPRING WASHER
- 15 MAGNET
- 16 SET BALL SPRING BOLT
22 N·m (2.2 kgf·m, 16 lbf·ft)
- 17 14 x 20 mm DOWEL PIN
- 18 80 mm THRUST SHIM
Selection, page 13-33
- 19 DIFFERENTIAL ASSEMBLY
See page 13-30
- 20 14 x 25 x 17.5 mm OIL SEAL
Replace.
- 21 35 x 56 x 8 mm OIL SEAL
Replace.
- 22 SHIFT ROD
- 23 BOOT
- 24 OIL GUIDE PLATE
- 25 30 x 55 x 21 mm
NEEDLE BEARING
- 26 COUNTERSHAFT
- 27 36 x 41 x 25.5 mm
NEEDLE BEARING
Check for wear and
operation.
- 28 1ST GEAR
- 29 FRICTION DAMPER
- 30 SYNCHRO RING
- 31 SYNCHRO SPRING
- 32 1ST/2ND SYNCHRO HUB
- 33 REVERSE GEAR
- 34 SYNCHRO SPRING
- 35 SYNCHRO RING
- 36 FRICTION DAMPER
- 37 SPACER
- 38 39 x 44 x 27 mm
NEEDLE BEARING
- 39 2ND GEAR
- 40 3RD GEAR
- 41 4TH GEAR
- 42 5TH GEAR
- 43 NEEDLE BEARING
- 44 BALL BEARING
- 45 SPRING WASHER
- 46 LOCKNUT Replace.
108 → 0 → 108 N·m
(11.0 → 0 → 11.0 kgf·m,
79.6 → 0 → 79.6 lbf·ft)

Transmission Housing

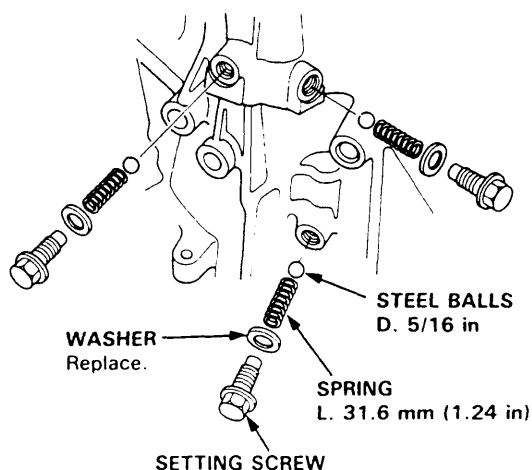
Removal

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

1. Remove the back-up light switch.

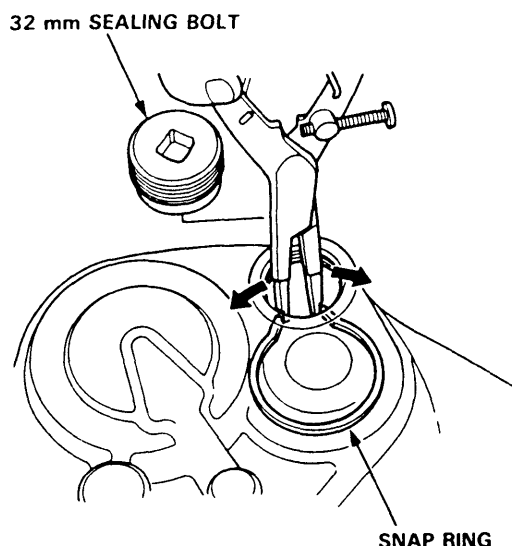


2. Remove transmission hanger.
3. Remove the setting screws, washers, springs, and steel balls.

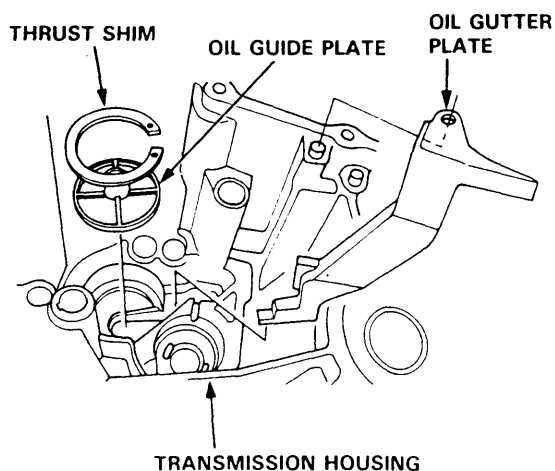


4. Loosen the transmission housing attaching bolts in a crisscross pattern in several steps, then remove them.

5. Remove the 32 mm sealing bolt.



6. Expand the snap ring on the countershaft ball bearing, and remove it from the groove using a pair of snap ring pliers.
7. Separate the transmission housing from the clutch housing, and wipe it clean of the sealant.
8. Remove the thrust shim, oil guide plate, and oil gutter plate from the transmission housing.



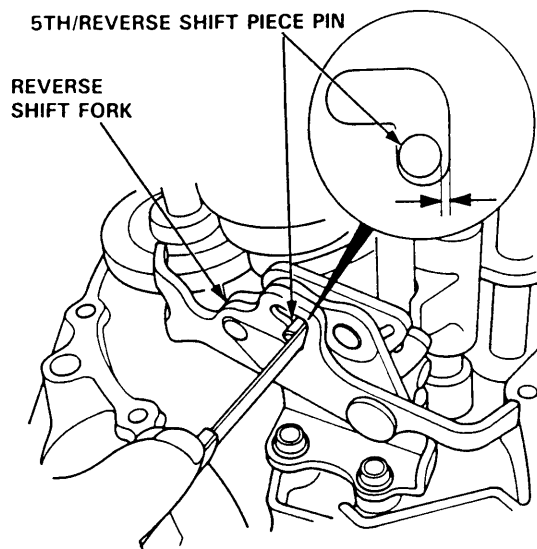
Reverse Shift Holder



Clearance Inspection

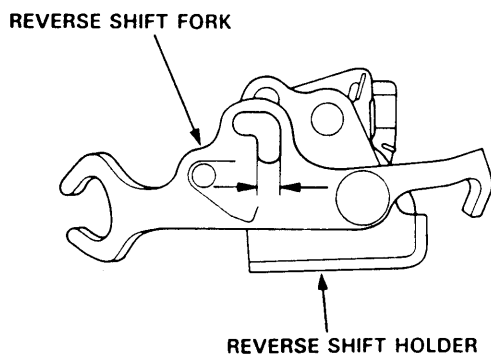
1. Measure the clearance between the reverse shift fork and 5th/reverse shift piece pin.

Standard: 0.05 – 0.35 mm (0.002 – 0.014 in)
Service Limit: 0.5 mm (0.02 in)



2. If the clearances are more than the service limit, measure the widths of the groove in the reverse shift fork.

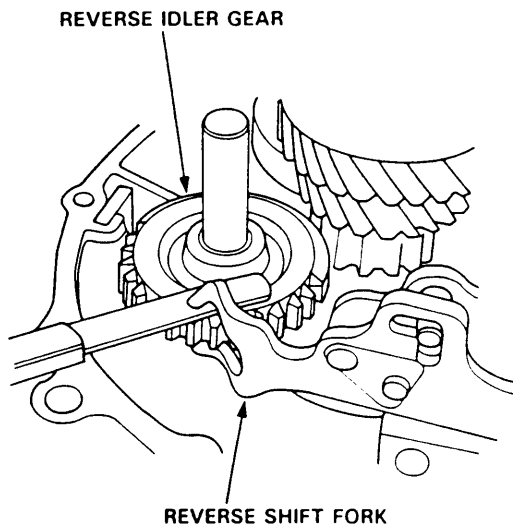
Standard: 7.05 – 7.25 mm (0.278 – 0.285 in)



- If the widths of the grooves are not within the standard, replace the reverse shift holder with a new one.
- If the width of the grooves are within the standard, replace the 5th/reverse shift piece with a new one.

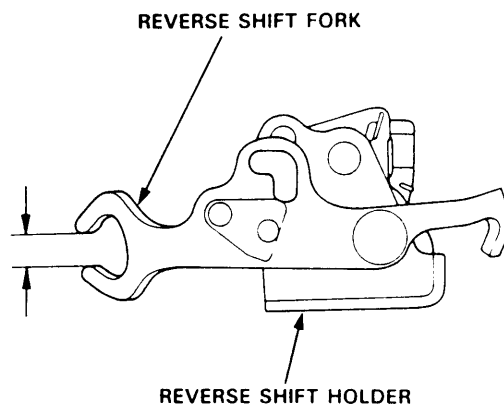
3. Measure the clearance between the reverse idler gear and the reverse shift fork.

Standard: 0.5 – 1.1 mm (0.02 – 0.04 in)
Service Limit: 1.8 mm (0.07 in)



4. If the clearance is more than the service limit, measure the width of the reverse shift fork.

Standard: 12.7 – 13.0 mm (0.500 – 0.512 in)



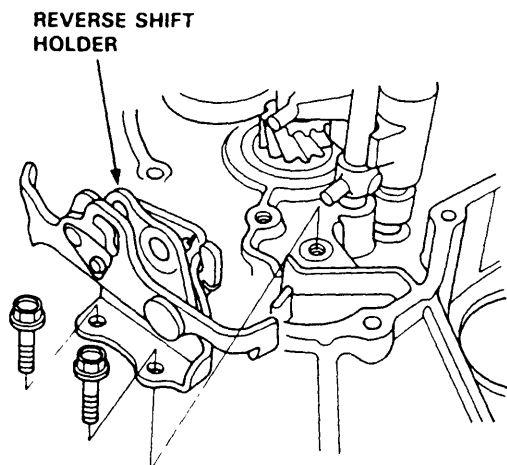
- If the width is not within the standard, replace the reverse shift holder with a new one.
- If the width is within the standard, replace the reverse idler gear with a new one.

Reverse Idler Gear

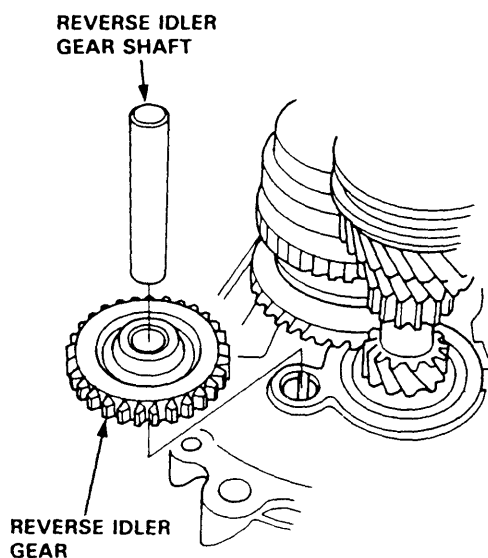
Mainshaft, Countershaft, Shift Fork

Removal

1. Remove the reverse shift holder.

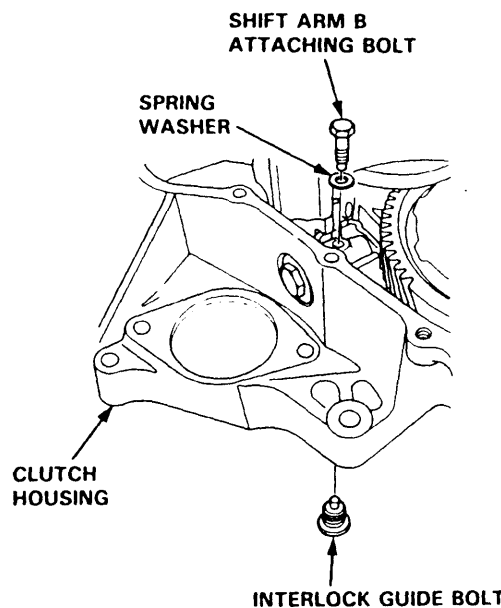


2. Remove the reverse idler gear shaft and reverse idler gear.



Disassembly

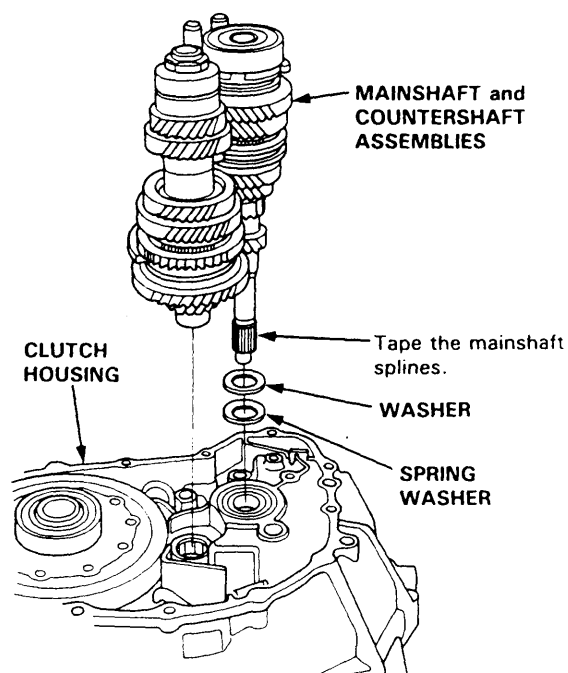
1. Remove the interlock guide bolt from under the clutch housing.



2. Remove the shift arm B attaching bolt.

3. Remove the mainshaft and countershaft assemblies with the shift fork from the clutch housing.

NOTE: Before removing the mainshaft and countershaft assemblies, tape the mainshaft splines to protect the seal.



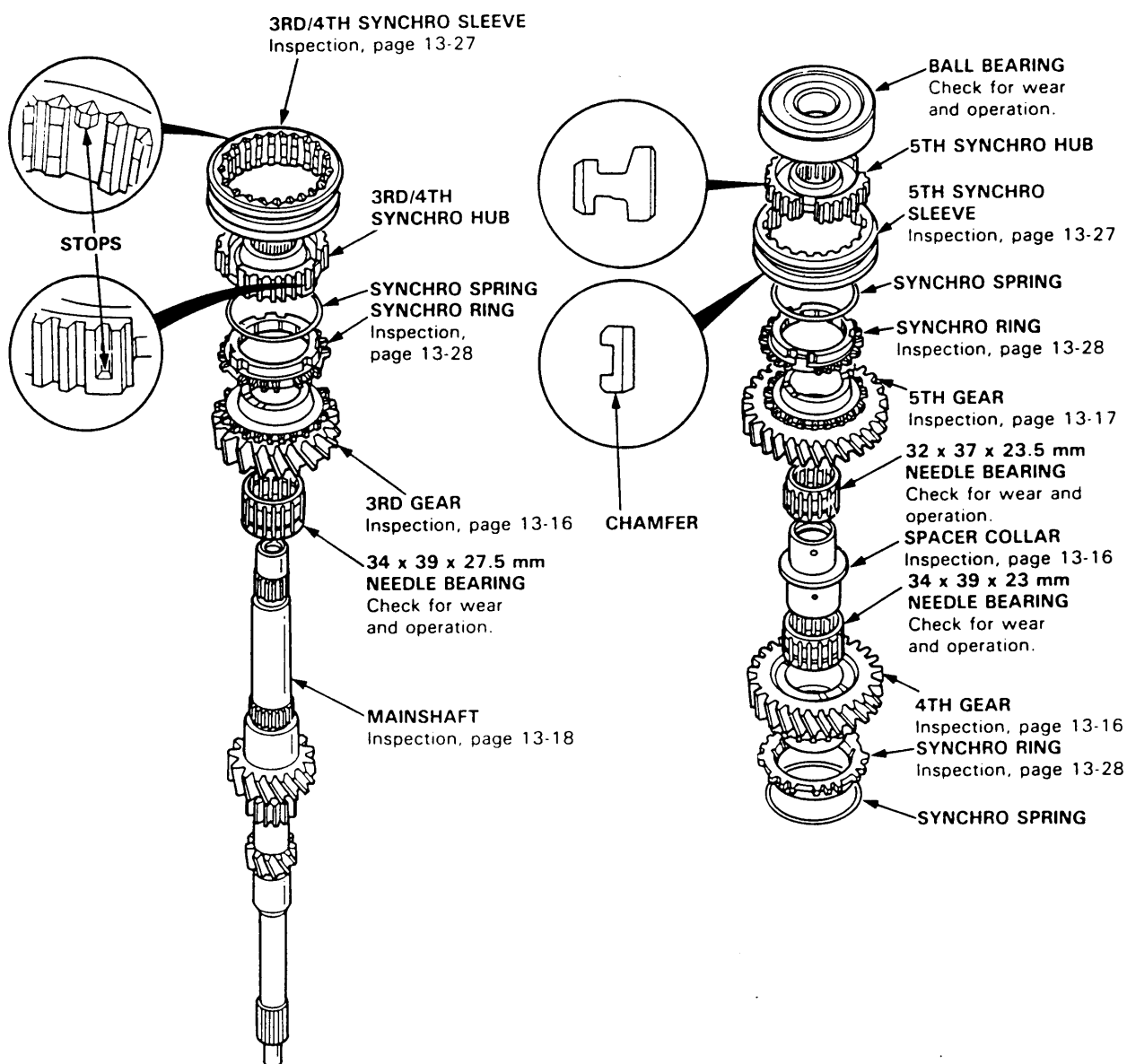
Mainshaft Assembly



Index

NOTE: The 3rd/4th and 5th synchro hubs are installed with a press.

 Prior to reassembling, clean all the parts in solvent, dry them, and apply lubricant to any contact surfaces. The 3rd/4th and 5th synchro hubs, however, should be installed with a press before lubricating them.



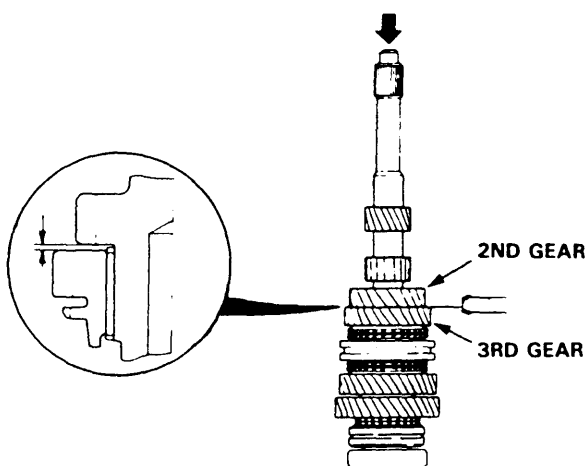
Mainshaft Assembly

Clearance Inspection

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

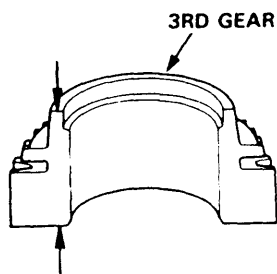
1. Measure the clearance between 2nd and 3rd gears.

Standard: 0.06 – 0.21 mm (0.002 – 0.008 in)
Service Limit: 0.33 mm (0.013 in)



2. If the clearance is more than the service limit, measure the thickness of 3rd gear.

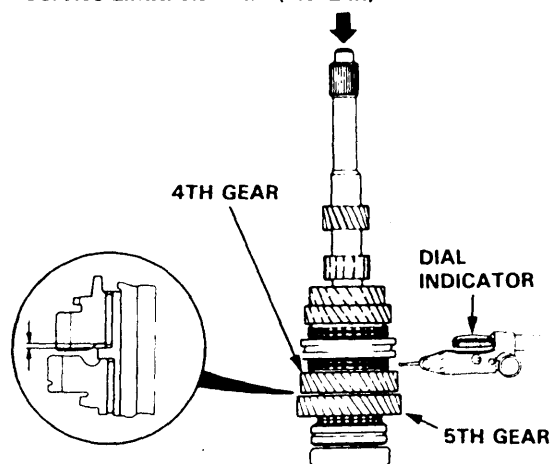
Standard: 30.22 – 30.27 mm
(1.190 – 1.192 in)
Service Limit: 30.15 mm (1.187 in)



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

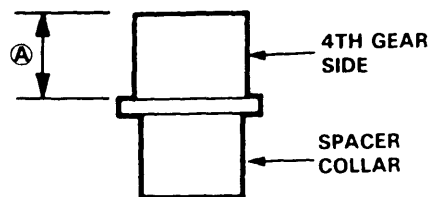
3. Measure the clearance between 4th gear and the spacer collar.

Standard: 0.06 – 0.19 mm (0.002 – 0.007 in)
Service Limit: 0.31 mm (0.012 in)



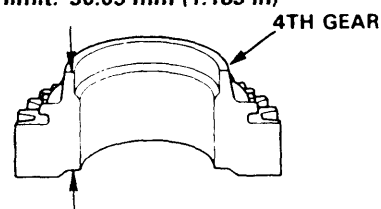
4. If the clearance is more than the service limit, measure distance A on the spacer collar.

Standard: 22.82 – 22.86 mm
(0.898 – 0.900 in)
Service Limit: 22.81 mm (0.898 in)



5. If distance A is less than the service limit, replace the spacer collar with a new one. If distance A is within the service limit, measure the thickness of 4th gear.

Standard: 30.12 – 30.17 mm
(1.186 – 1.188 in)
Service limit: 30.05 mm (1.183 in)



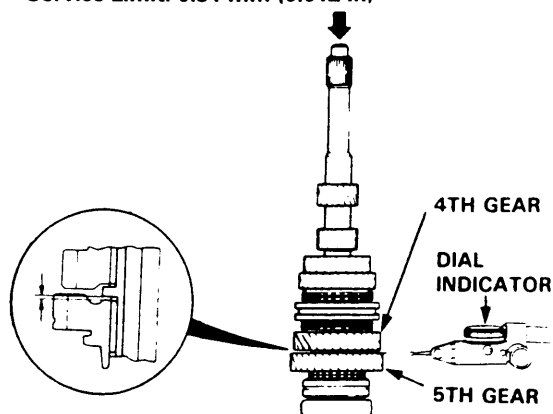
- If the thickness of 4th gear is less than the service limit, replace 4th gear with a new one.
- If the thickness of 4th gear is within the service limit, replace the 3rd/4th synchro hub with a new one.



Disassembly

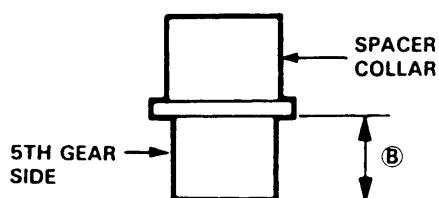
6. Measure the clearance between the spacer collar and 5th gear.

Standard: 0.06 – 0.19 mm (0.002 – 0.007 in)
Service Limit: 0.31 mm (0.012 in)



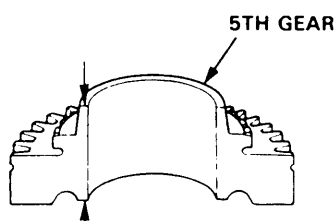
7. If the clearance is more than the service limit, measure distance ⑧ on the spacer collar.

Standard: 23.53 – 23.56 mm
 (0.926 – 0.928 in)
Service Limit: 23.51 mm (0.926 in)



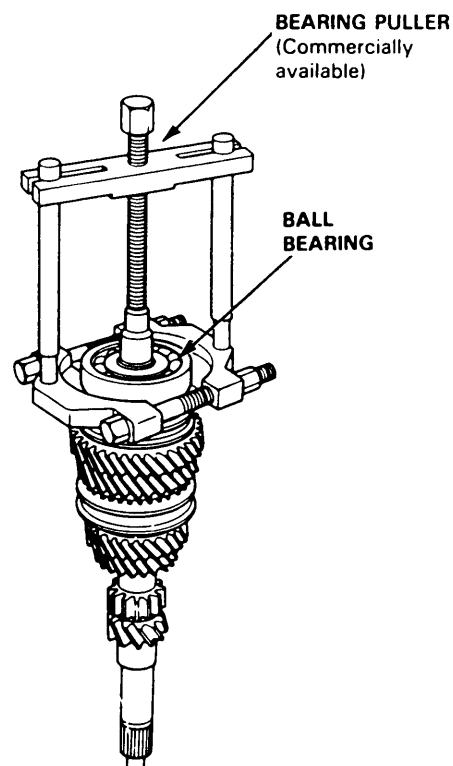
8. If distance ⑧ is less than the service limit, replace the spacer collar with a new one. If distance ⑧ is within the service limit, measure thickness of 5th gear.

Standard: 28.42 – 28.47 mm
 (1.119 – 1.121 in)
Service Limit: 28.35 mm (1.116 in)



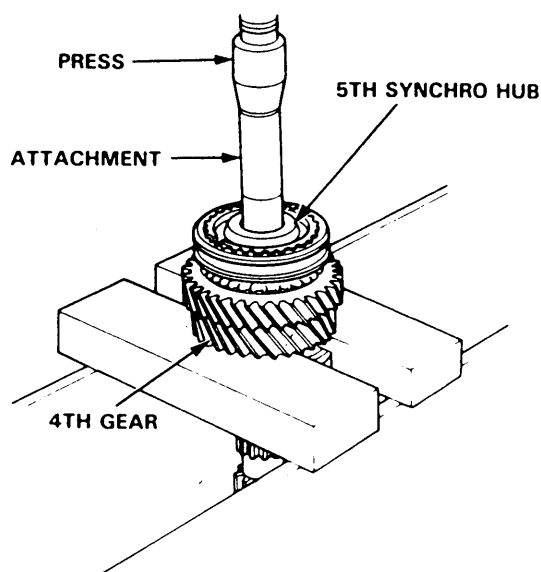
- If the thickness of 5th gear is less than the service limit, replace 5th gear with a new one.
- If the thickness of 5th gear is within the service limit, replace the 5th synchro hub with a new one.

1. Remove the ball bearing using a bearing puller as shown.



CAUTION: Remove the synchro hubs using a press and steel blocks as shown. Use of a jaw-type puller can cause damage to the gear teeth.

2. Support 4th gear on steel blocks, and press the mainshaft out of the 5th synchro hub as shown.

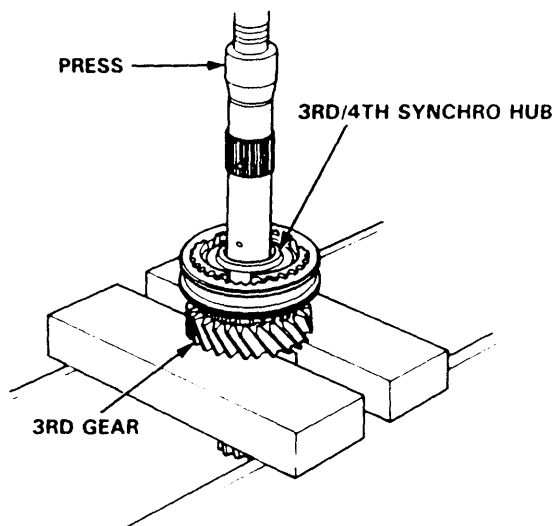


(cont'd)

Mainshaft Assembly

Disassembly (cont'd)

3. Support the 3rd gear on steel blocks, and press the mainshaft out of the 3rd/4th synchro hub as shown.

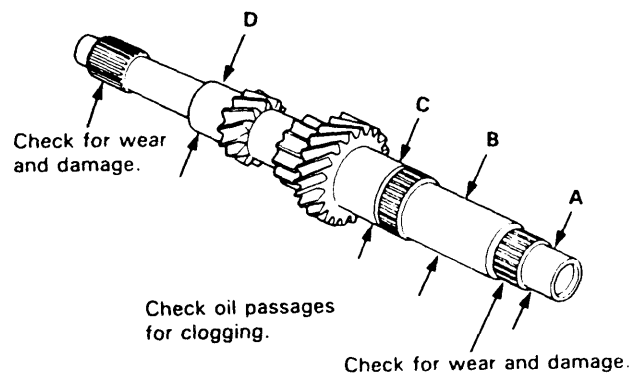


Inspection

1. Inspect the gear surface and bearing surface for wear and damage, then measure the mainshaft at points A, B, C, and D.

Standard: A: 21.987 – 22.000 mm (0.8656 – 0.8661 in)
B: 26.980 – 26.993 mm (1.0622 – 1.0627 in)
C: 33.984 – 34.000 mm (1.3380 – 1.3386 in)
D: 25.977 – 25.990 mm (1.0227 – 1.0232 in)

Service Limit: A: 21.930 mm (0.8634 in)
B: 26.930 mm (1.0602 in)
C: 33.930 mm (1.3358 in)
D: 25.920 mm (1.0205 in)

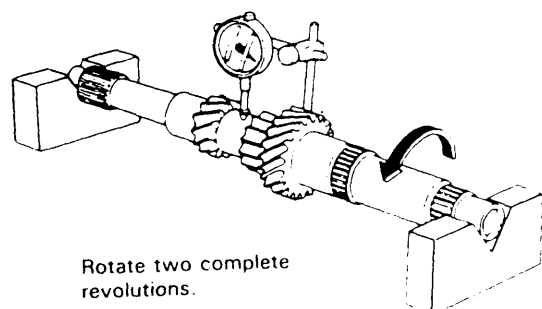


If any part of the mainshaft is less than the service limit, replace it with a new one.

2. Inspect for runout.

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

NOTE: Support the mainshaft at both ends as shown.



Rotate two complete revolutions.

If the runout is more than the service limit, replace the mainshaft with a new one.

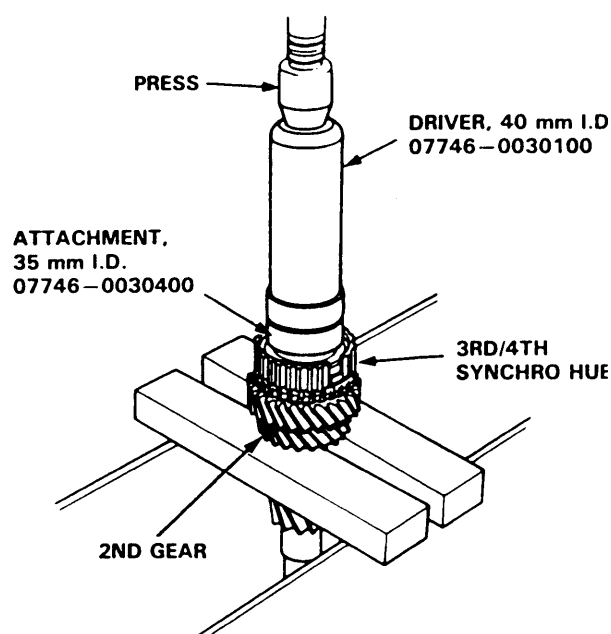


Reassembly

CAUTION: When installing the 3rd/4th and 5th synchro hubs, support the shaft on steel blocks, and install the synchro hubs using a press.

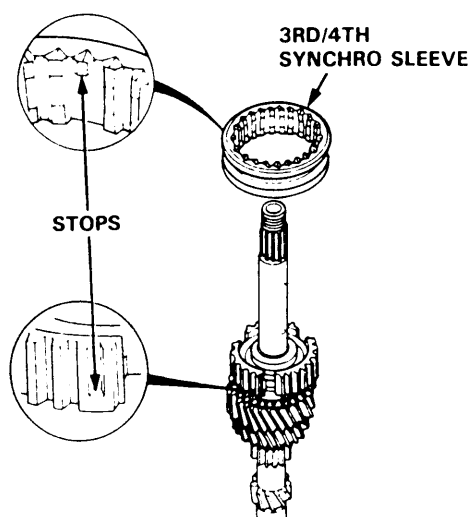
NOTE: Refer to page 13-15 for reassembly sequence.

1. Support 2nd gear on steel blocks, then install the 3rd/4th synchro hub using the special tools and a press as shown.

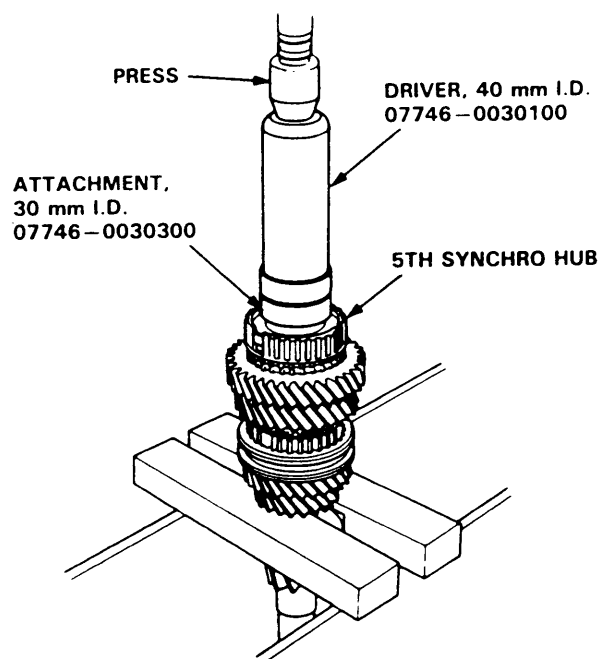


2. Install the 3rd/4th synchro sleeve by aligning the stops of the 3rd/4th synchro sleeve and hub.

NOTE: After installing, check the operation of the 3rd/4th synchro hub set.

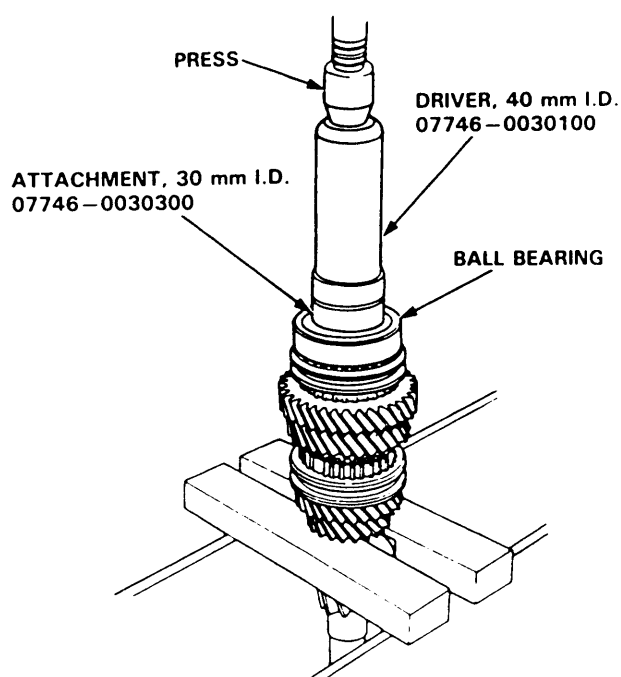


3. Install the 5th synchro hub using the special tools and a press as shown.



4. Install the ball bearing using the special tools and a press as shown.

NOTE: Install the ball bearing with the tapered end facing down.

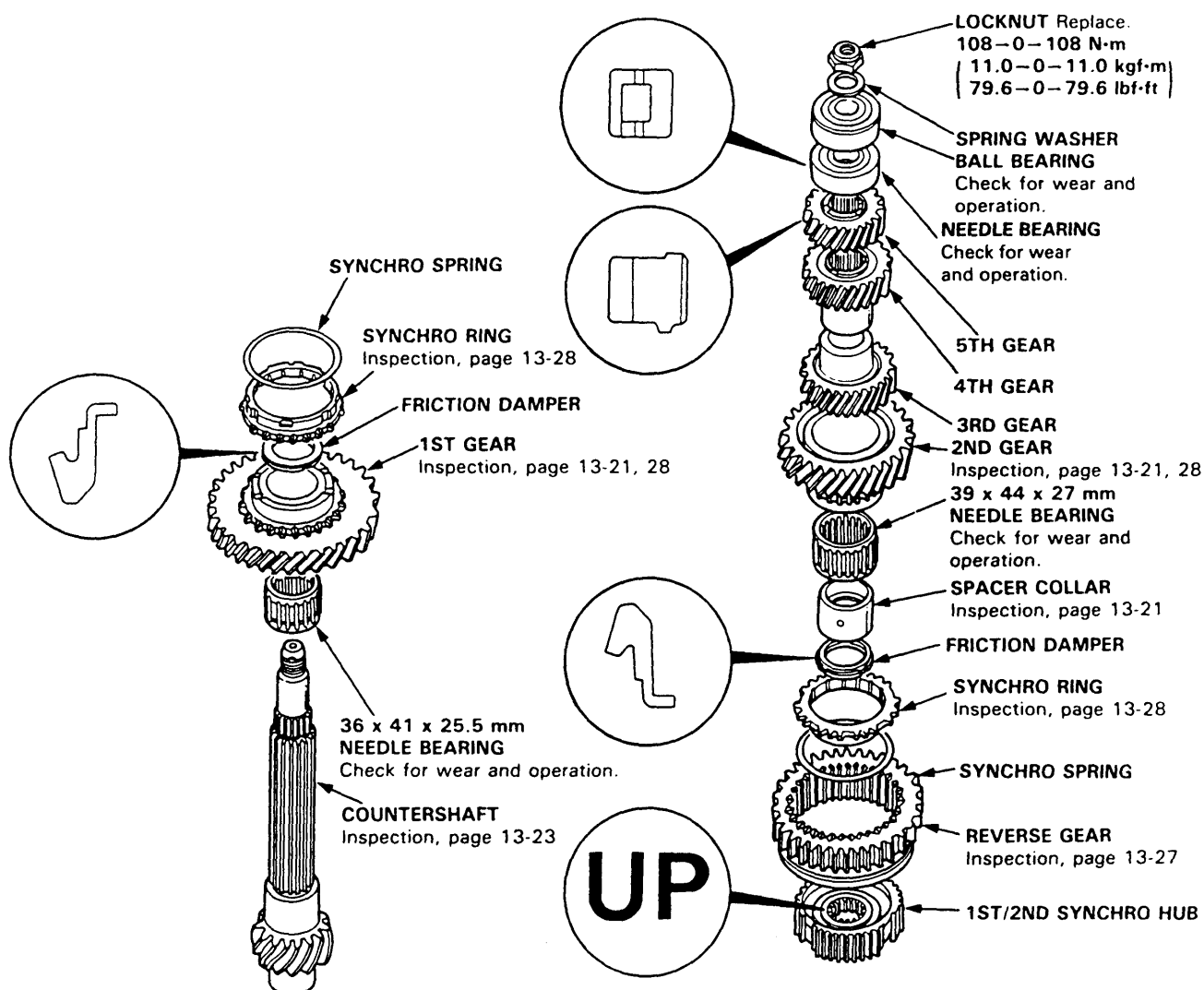


Countershaft Assembly

Index

NOTE: The 3rd, 4th, and 5th gears are installed with a press.

 Prior to reassembling, clean all the parts in solvent, dry them and apply lubricant to any contact surfaces. The 3rd, 4th, and 5th gears, however, should be installed with a press before lubricating them.



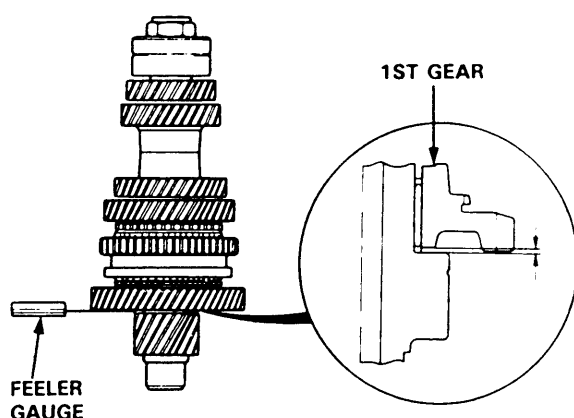


Clearance Inspection

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

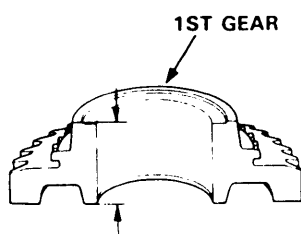
1. Measure the clearance between the countershaft and 1st gear.

Standard: 0.03 – 0.10 mm (0.001 – 0.004 in)
Service Limit: 0.22 mm (0.009 in)



2. If the clearance is more than the service limit, measure the thickness of 1st gear.

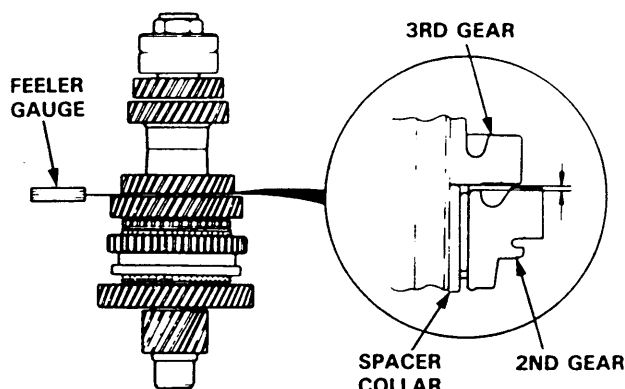
Standard: 30.41 – 30.44 mm
 (1.197 – 1.198 in)
Service Limit: 30.36 mm (1.195 in)



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

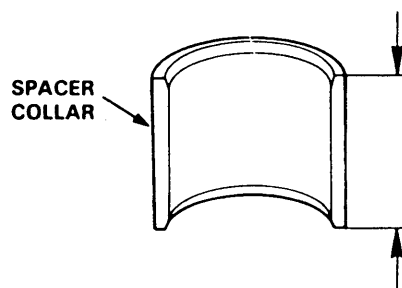
3. Measure the clearance between 2nd and 3rd gears.

Standard: 0.04 – 0.12 mm (0.002 – 0.005 in)
Service Limit: 0.24 mm (0.009 in)



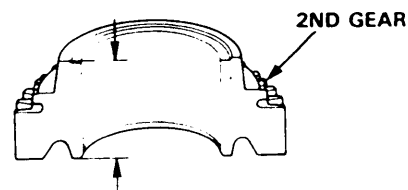
4. If the clearance is more than the service limit, measure the thickness of the spacer collar.

Standard: 32.03 – 32.06 mm
 (1.261 – 1.262 in)
Service Limit: 32.01 mm (1.260 in)



5. If the thickness is less than the service limit, replace the spacer collar with a new one. If the thickness is within the service limit, measure the thickness of 2nd gear.

Standard: 31.92 – 31.97 mm
 (1.257 – 1.259 in)
Service Limit: 31.85 mm (1.254 in)



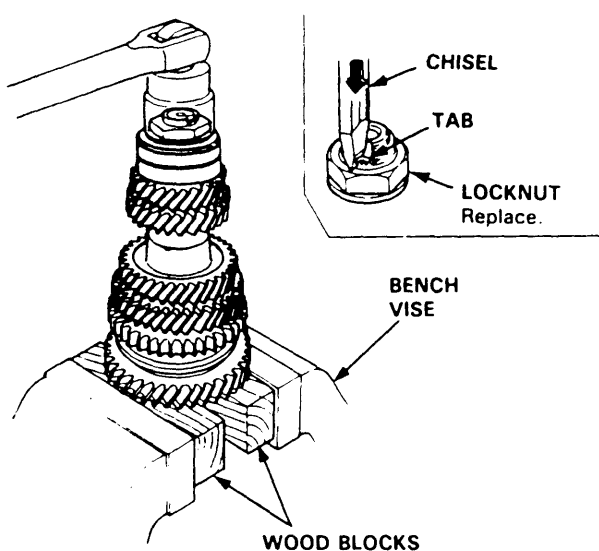
- If the thickness of 2nd gear is less than the service limit, replace 2nd gear with a new one.
- If the thickness of 2nd gear is within the service limit, replace the 1st/2nd synchro hub with a new one.

Countershaft Assembly

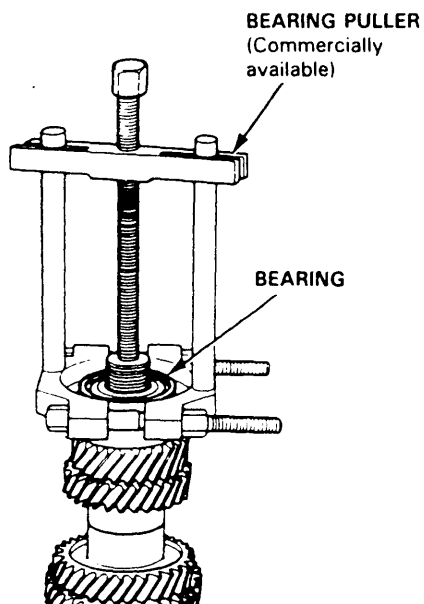
Disassembly

CAUTION: Remove the gears using a press and steel blocks as shown. Use of a jaw-type puller can damage the gear teeth.

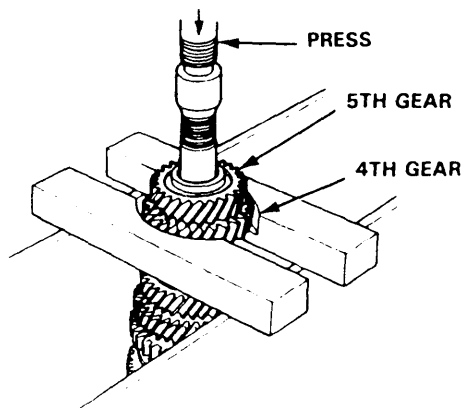
1. Securely clamp the countershaft assembly in a bench vise with wood blocks.



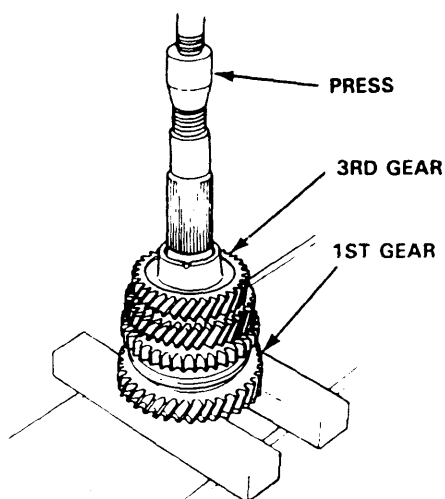
2. Raise the locknut tab from the groove of the countershaft, then remove the locknut and the spring washer.
3. Remove the bearings using a bearing puller as shown.



4. Support 4th gear on steel blocks, and press the countershaft out of 5th and 4th gears as shown.



5. Support 1st gear on steel blocks, and press the countershaft out of 3rd gear as shown.



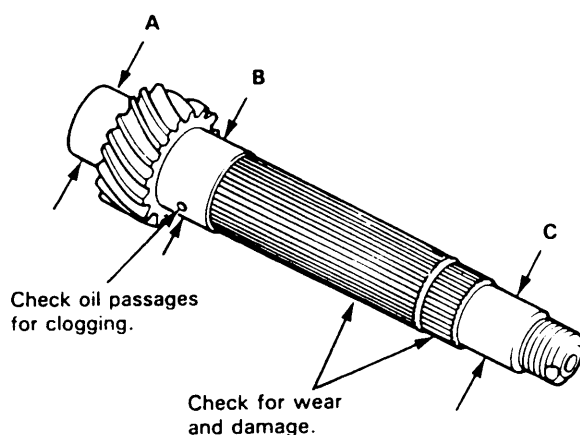


Inspection

1. Inspect the gear surfaces and bearing surfaces for wear and damage, then measure the countershaft at points A, B, and C.

Standard: A: 30.000 – 30.015 mm (1.1811 – 1.1817 in)
 B: 35.984 – 36.000 mm (1.4167 – 1.4173 in)
 C: 24.980 – 24.993 mm (0.9835 – 0.9840 in)

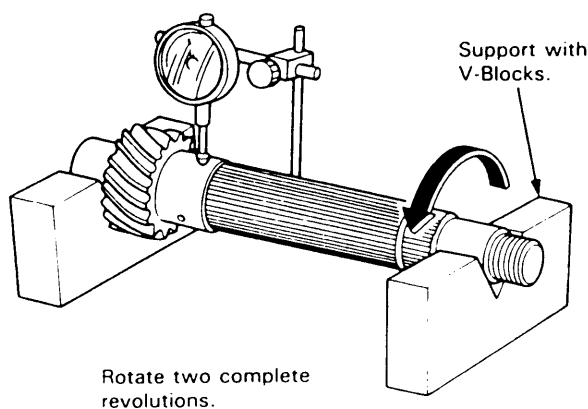
Service Limit: A: 29.950 mm (1.1791 in)
 B: 35.930 mm (1.4146 in)
 C: 24.930 mm (0.9815 in)



If any part of the countershaft is less than the service limit, replace it with a new one.

2. Inspect for runout.

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



If the runout is more than the service limit, replace the countershaft with a new one.

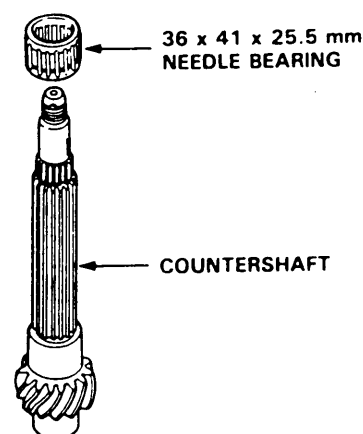
Reassembly

CAUTION:

- Press the 3rd, 4th, and 5th gears on the countershaft without lubrication.
- When installing the 3rd, 4th, and 5th gears, support the shaft on steel blocks and install the gears using a press.

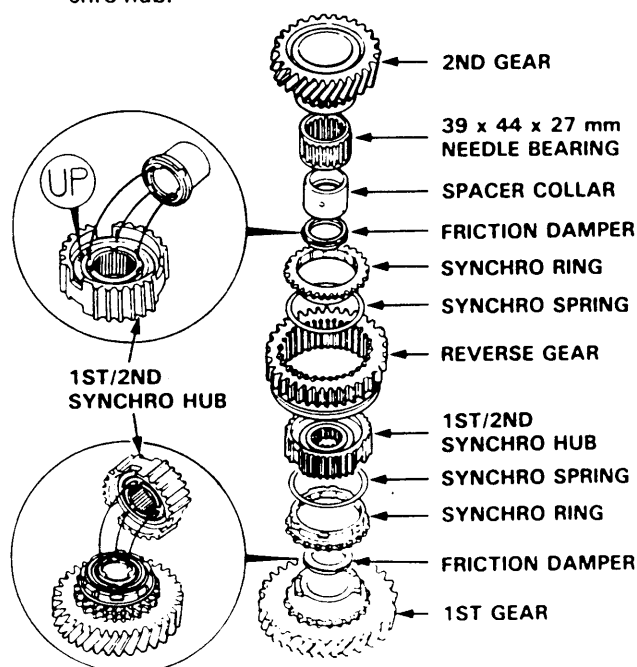
NOTE: Refer to page 13-20 for reassembly sequence.

1. Install the needle bearing on the countershaft.



2. Assemble the parts below as shown.

NOTE: Check that the fingers of the friction damper are securely set in the grooves of the 1st/2nd synchro hub.



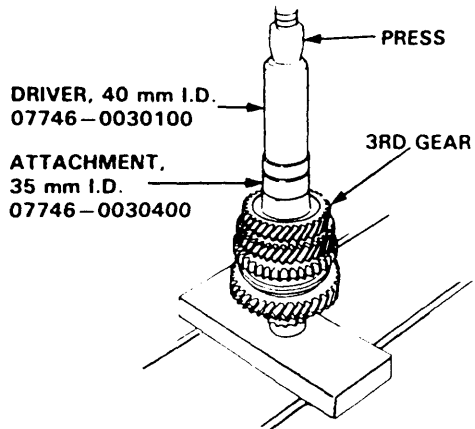
3. Install the parts on the countershaft.

(cont'd)

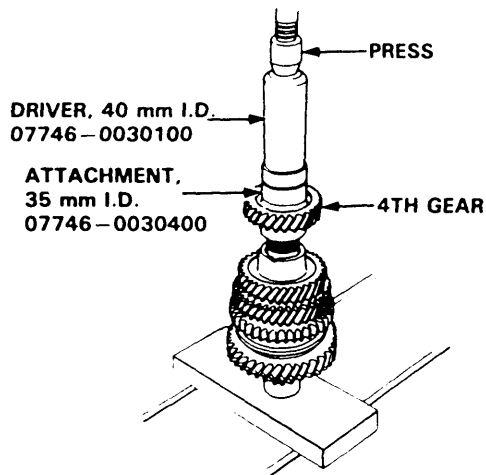
Countershaft Assembly

Reassembly (cont'd)

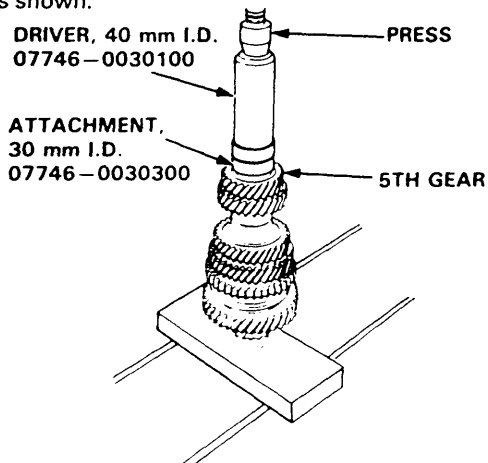
4. Support the countershaft on a steel block as shown and install 3rd gear using the special tools and a press as shown.



5. Install 4th gear using the special tools and a press as shown.

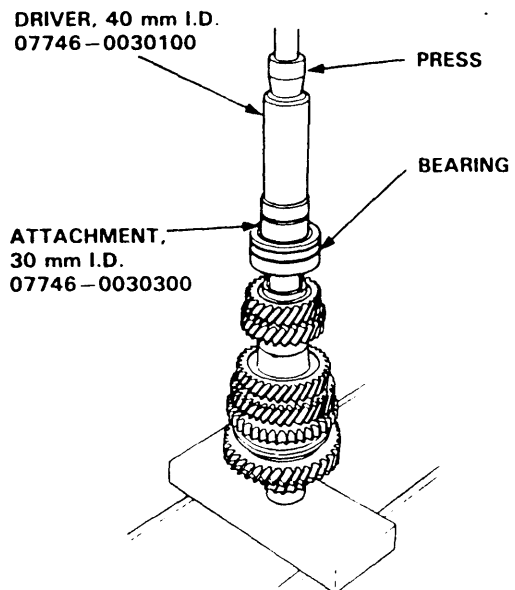


6. Install 5th gear using the special tools and a press as shown.



7. Install the bearings using the special tools and a press as shown.

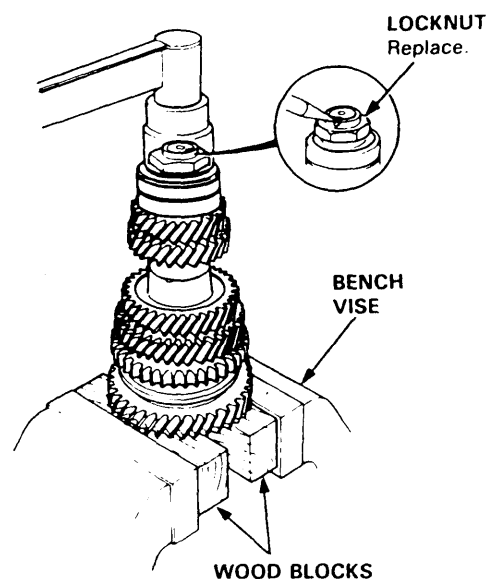
CAUTION: Install the bearings with a maximum pressure of 7.8 kN (800 kgf, 5,786 lbf).



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

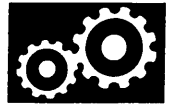
LOCKNUT

108 → 0 → 108 N·m
(11.0 → 0 → 11.0 kgf·m, 79.6 → 0 → 79.6 lbf·ft)



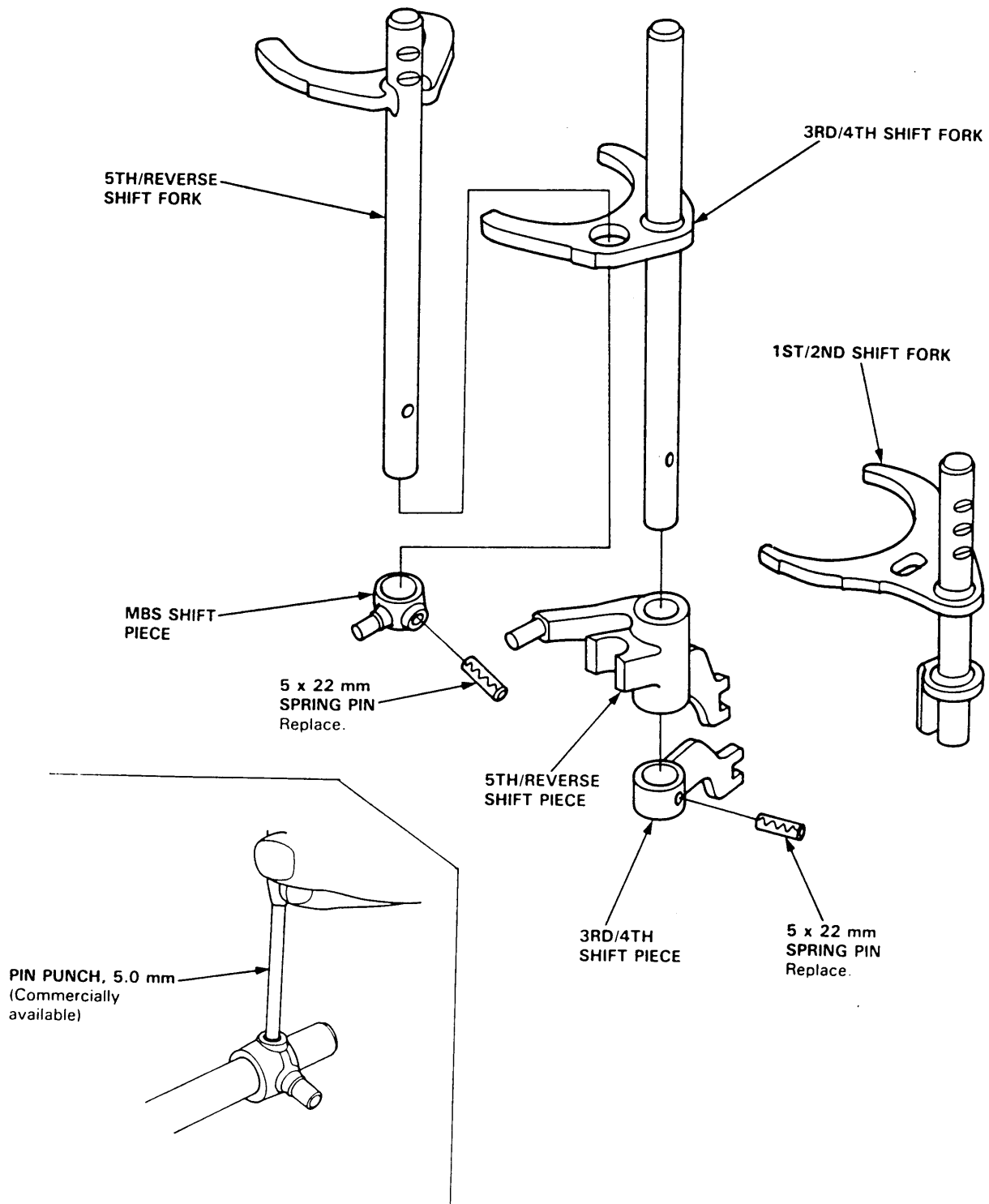
9. Install the spring washer, tighten the locknut, then stake the locknut tab into groove.

Shift Fork Assembly



Index

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



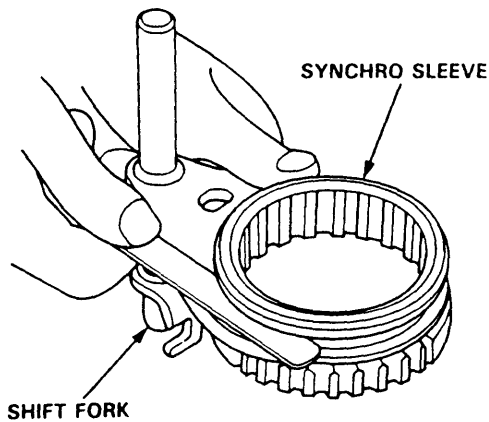
Shift Fork Assembly

Clearance Inspection

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

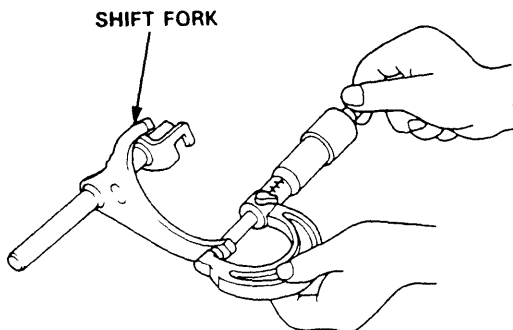
1. Measure the clearance between each shift fork and its matching synchro sleeve.

Standard: 0.35 – 0.65 mm (0.014 – 0.026 in)
Service Limit: 1.00 mm (0.04 in)



2. If the clearance is more than the service limit, measure the thickness of the shift fork fingers.

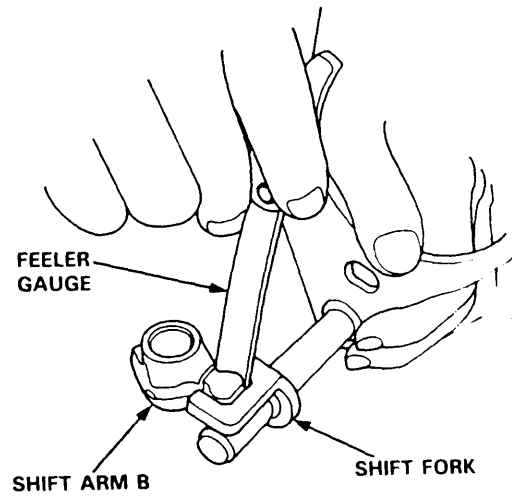
Standard:
3rd/4th: 7.4 – 7.6 mm (0.291 – 0.299 in)
1st/2nd, 5th: 6.2 – 6.4 mm (0.244 – 0.252 in)



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

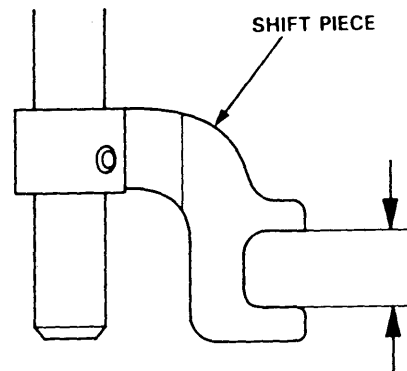
3. Measure the clearance between the shift piece or shift fork and the shift arm B.

Standard: 0.2 – 0.5 mm (0.008 – 0.02 in)
Service Limit: 0.8 mm (0.03 in)



4. If the clearance is more than the service limit, measure the groove of the shift piece or shift fork.

Standard: 13.2 – 13.4 mm (0.520 – 0.528 in)



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

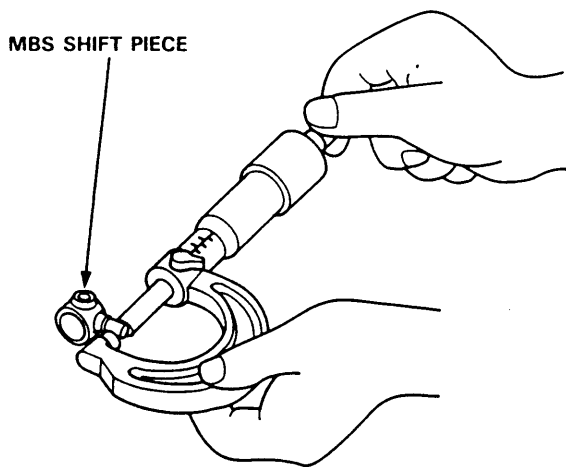
Synchro Sleeve, Synchro Hub



MBS Shift Piece Inspection

1. Measure the width of the MBS shift piece.

Standard: 6.9 – 7.1 mm (0.272 – 0.280 in)
Service Limit: 6.8 mm (0.268 in)

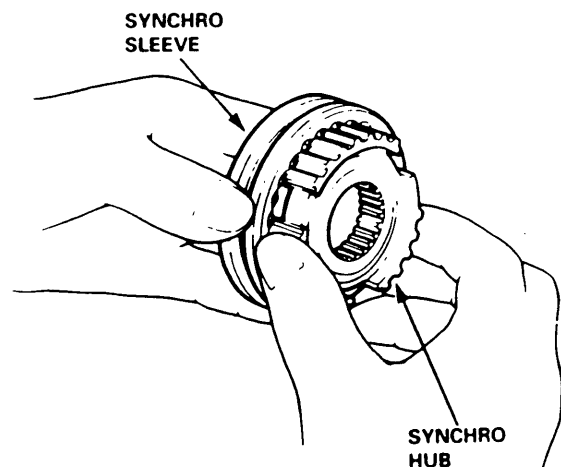


If the width of the MBS shift piece is less than the service limit, replace the MBS shift piece.

Inspection/Installation

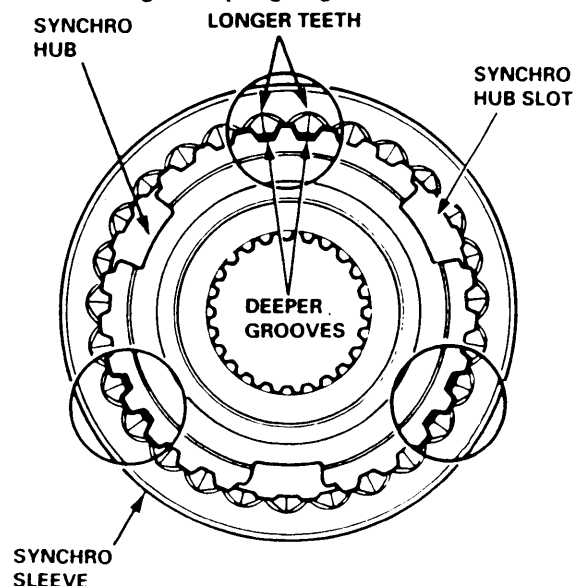
1. Inspect gear teeth on all synchro hubs and synchro sleeves for rounded off corners, which indicate wear.
2. Install each synchro hub in its mating synchro sleeve, and check for freedom of movement.

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



3. When assembling the synchro sleeve and synchro hub, be sure to match the three sets of longer teeth (120 degrees apart) on the synchro sleeve with the three sets of deeper grooves in the synchro hub.

CAUTION: Do not install the synchro sleeve with its longer teeth in the synchro hub slots because it will damage the spring ring.



Synchro Ring, Gear

Inspection

1. Inspect the synchro ring and gear.

A: Inspect the inside of the synchro ring for wear.

B: Inspect the synchro sleeve teeth and matching teeth on the synchro ring for wear (rounded off).



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



D: Inspect the gear hub thrust surface for wear.

E: Inspect the cone surface for wear and roughness.

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

2. Coat the cone surface of the gear with oil, and place the synchro ring on the matching gear. Rotate the synchro ring, making sure that it does not slip.

Measure the clearance between the synchro ring and gear all the way around.

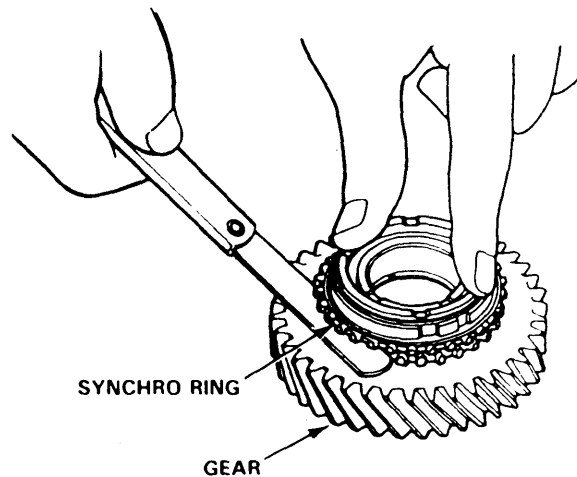
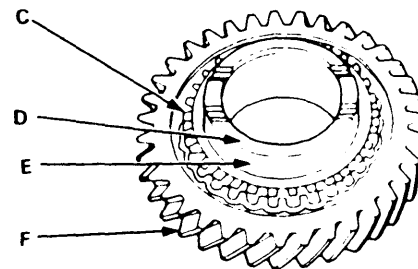
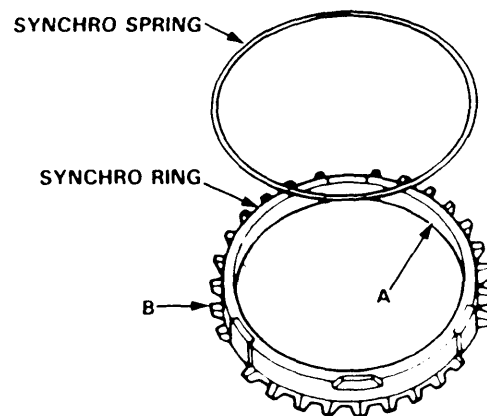
NOTE: Hold the synchro ring against the gear evenly while measuring the clearance.

Synchro Ring-to-Gear Clearance

Standard: 0.73 – 1.18 mm (0.029 – 0.046 in)

Service Limit: 0.4 mm (0.02 in)

If the clearance is less than the service limit, replace the synchro ring and synchro cone.





Shift Rod

Removal

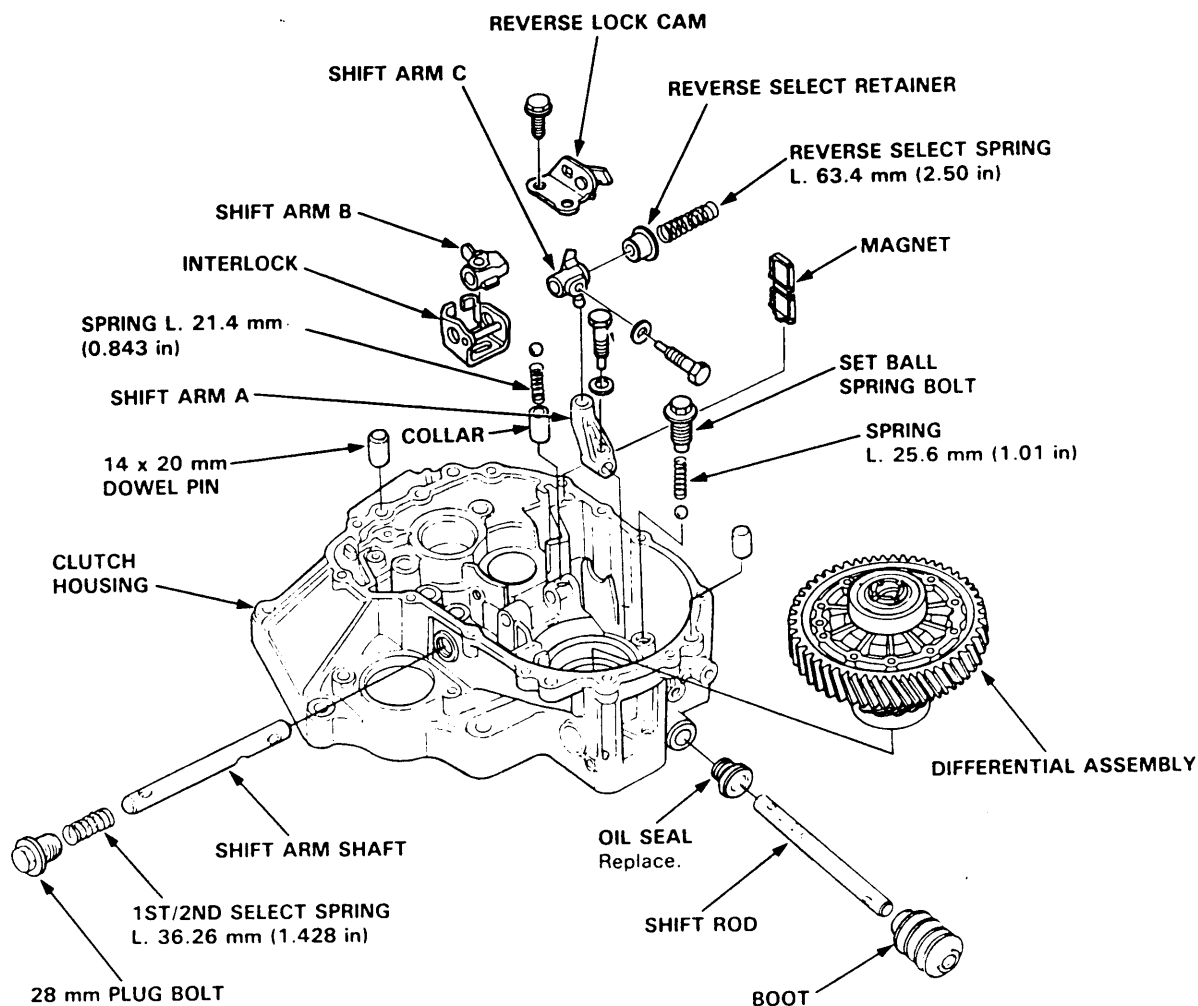
NOTE: The steel balls are all of the same size (5/16 in).

1. Remove the differential assembly.
2. Remove the 28 mm plug bolt and 1st/2nd select spring.
3. Remove the shift arm C attaching bolt.
4. Remove the shift arm shaft.

NOTE: Be careful not to lose the steel ball.

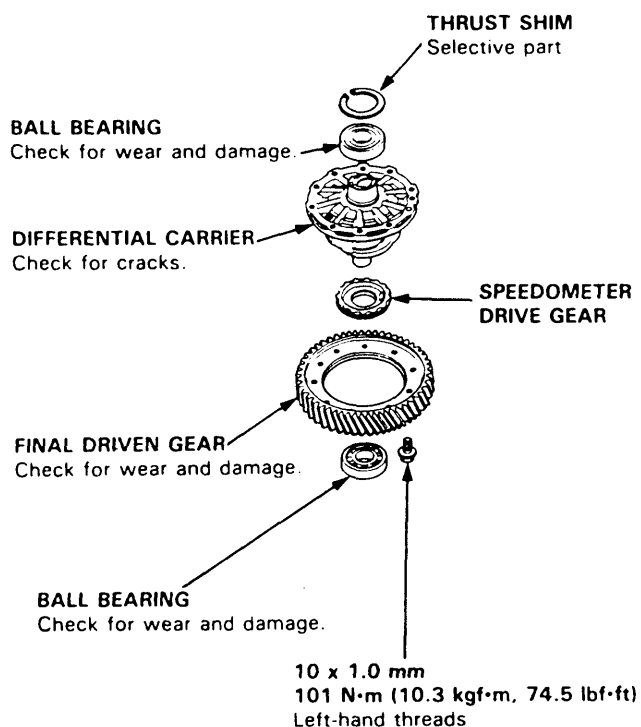
5. Remove the steel ball, spring, and collar.

6. Remove shift arms C and B, and the interlock, then remove the reverse select spring and retainer.
7. Remove the shift arm A attaching bolt, the set ball spring bolt, set spring, and steel ball.
8. Remove the shift rod, then remove the shift arm A.
9. Remove the reverse lock cam.
10. Remove the magnet.



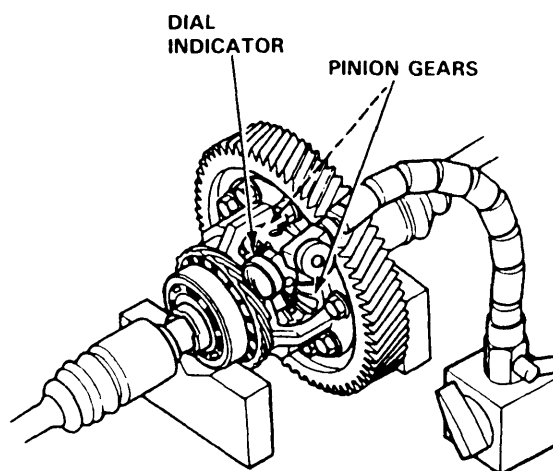
Differential

Index



Backlash Inspection

1. Place differential assembly on V-blocks, and install both driveshafts.



2. Measure backlash of both pinion gears.

Standard (New): 0.05 – 0.15 mm (0.002 – 0.006 in)

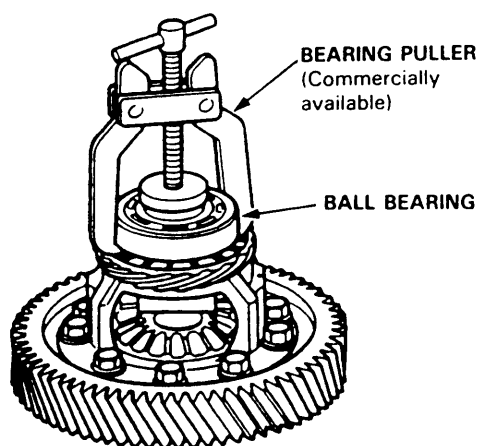
3. If the backlash is not within the standard, replace the differential carrier.



Bearing Replacement

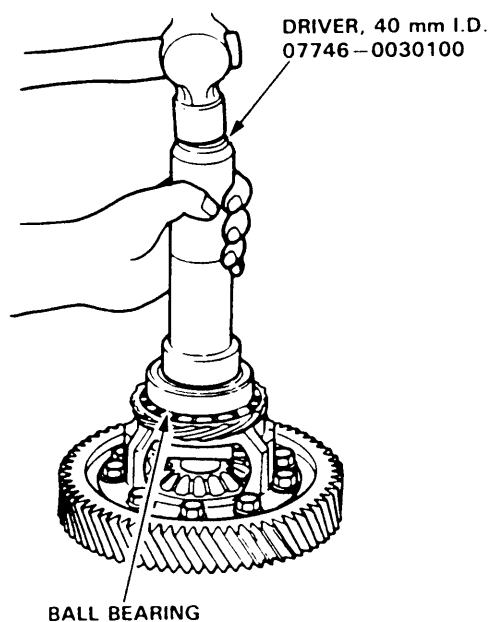
NOTE: Check bearings for wear and rough rotation. If the bearings are OK, removal is not necessary.

1. Remove the ball bearings using a bearing puller as shown.



2. Install new ball bearings using the special tool as shown.

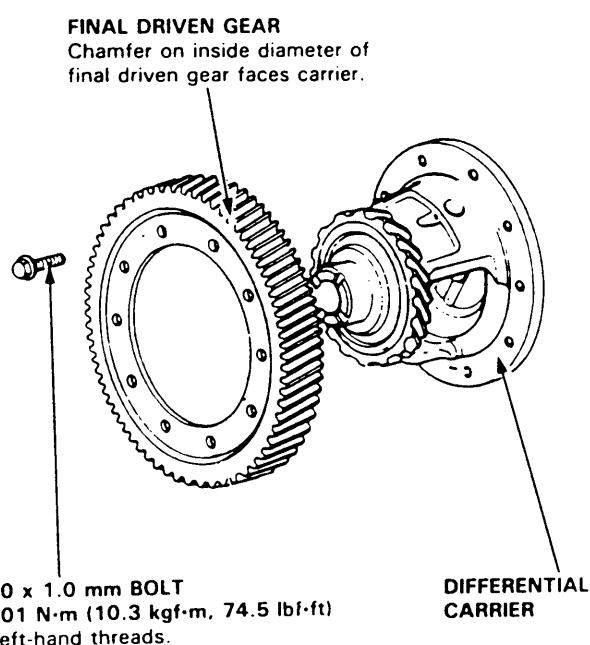
NOTE: Drive the bearings squarely until they bottom against the carrier.



Final Driven Gear Replacement

1. Remove the bolts in a crisscross pattern in several steps, then remove the final driven gear from the differential carrier.

NOTE: The final driven gear bolts have left-hand threads.

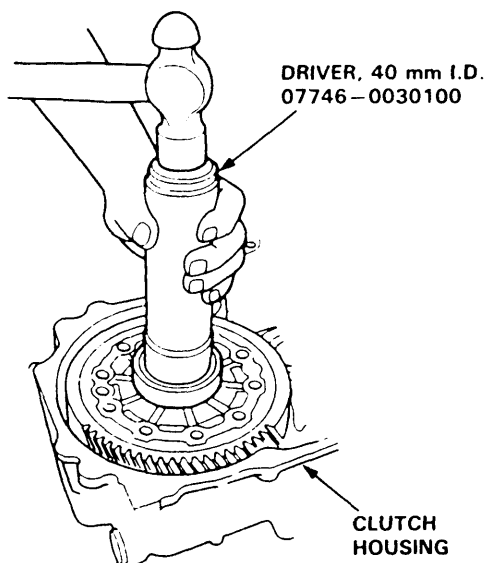


2. Install the final driven gear by tightening the bolts in a crisscross pattern in several steps.

Differential

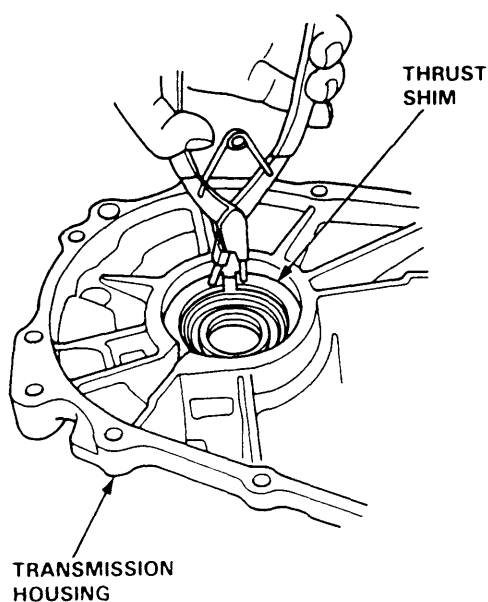
Thrust Shim Adjustment

1. Install the differential assembly, making sure it bottoms in the clutch housing, using the special tool as shown.



2. Install the thrust shim.

NOTE: Install the same size thrust shim that was removed.



3. Install the transmission housing (see page 13-41).

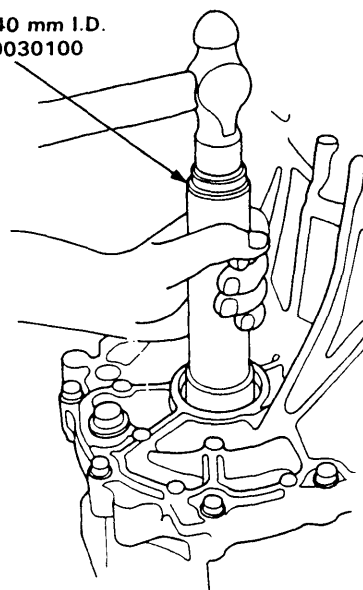
NOTE: Do not apply liquid gasket to the mating surface of the clutch housing.

4. Tighten the transmission housing attaching bolts (see page 13-42).

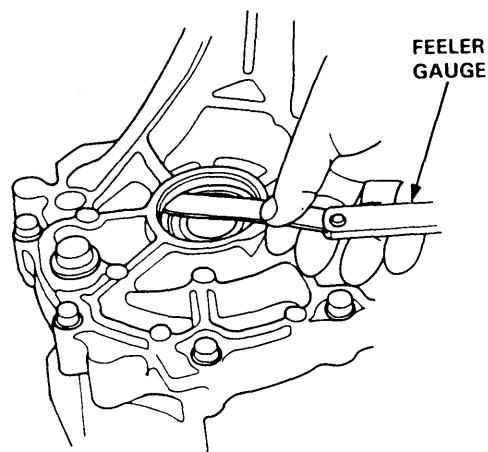
8 x 1.25 mm
27 N·m (2.8 kgf·m, 20 lbf·ft)

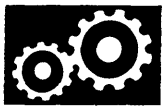
5. Use the special tool to bottom the differential assembly in the clutch housing.

DRIVER, 40 mm I.D.
07746-0030100



6. Measure clearance between thrust shim and bearing outer race in transmission housing.





7. If the clearance is more than the standard, select a new thrust shim from the following table.

NOTE: If the clearance measured in step 6 is within the standard, go to step 10.

Standard: 0 – 0.10 mm (0 – 0.004 in)

80 mm THRUST SHIM:

Part Number	Thickness
41441 – PL3 – B00	1.0 mm (0.0394 in)
41442 – PL3 – B00	1.1 mm (0.0433 in)
41443 – PL3 – B00	1.2 mm (0.0472 in)
41444 – PL3 – B00	1.3 mm (0.0512 in)
41445 – PL3 – B00	1.4 mm (0.0551 in)
41446 – PL3 – B00	1.5 mm (0.0591 in)
41447 – PL3 – B00	1.6 mm (0.0630 in)
41448 – PL3 – B00	1.7 mm (0.0669 in)
41449 – PL3 – B00	1.8 mm (0.0709 in)
41450 – PL3 – B00	1.05 mm (0.0413 in)
41451 – PL3 – B00	1.15 mm (0.0453 in)
41452 – PL3 – B00	1.25 mm (0.0492 in)
41453 – PL3 – B00	1.35 mm (0.0532 in)
41454 – PL3 – B00	1.45 mm (0.0571 in)
41455 – PL3 – B00	1.55 mm (0.0610 in)
41456 – PL3 – B00	1.65 mm (0.0650 in)
41457 – PL3 – B00	1.75 mm (0.0689 in)

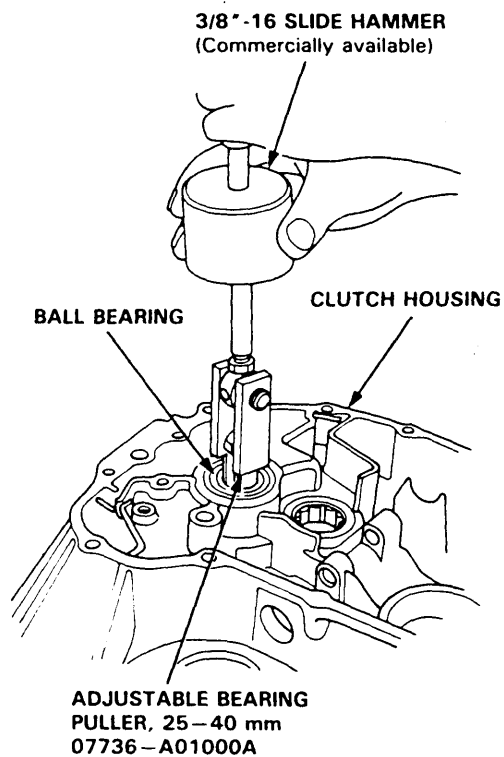
8. Remove the bolts and transmission housing.
9. Replace the thrust shim selected in step 7, then recheck the clearance.
10. Remove the bolts and transmission housing. Apply liquid gasket to the surface of the transmission housing and reassemble.

Clutch Housing Bearing

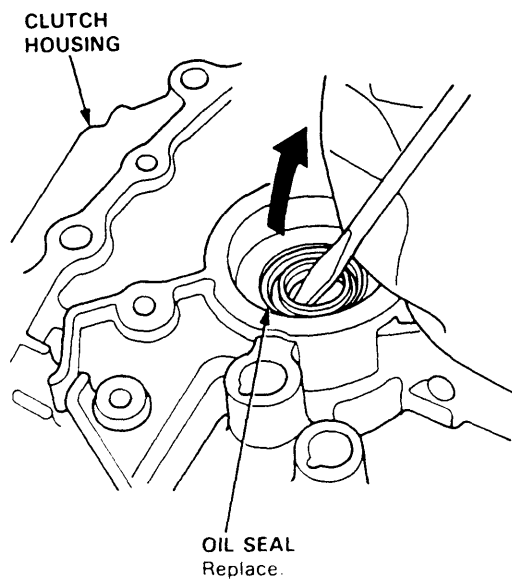
Replacement

Mainshaft

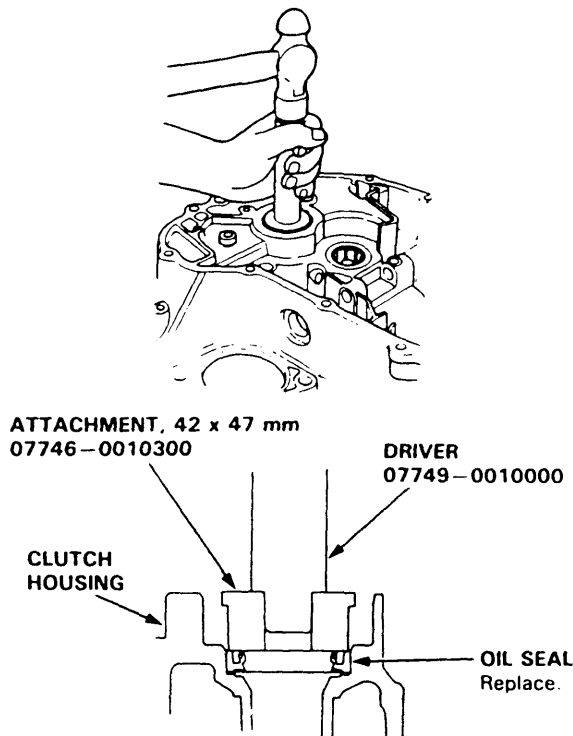
1. Remove the ball bearing using the special tool as shown.



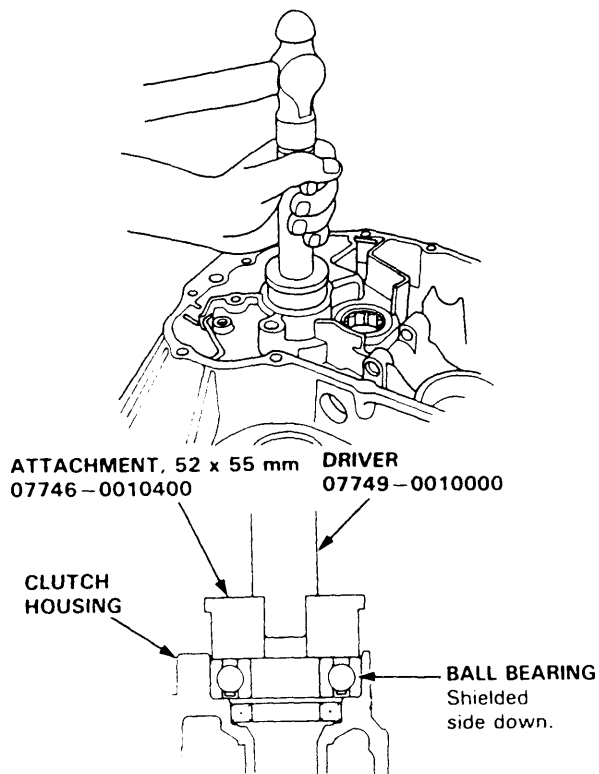
2. Remove the oil seal from the clutch housing.



3. Drive the new oil seal into the clutch housing using the special tools as shown.



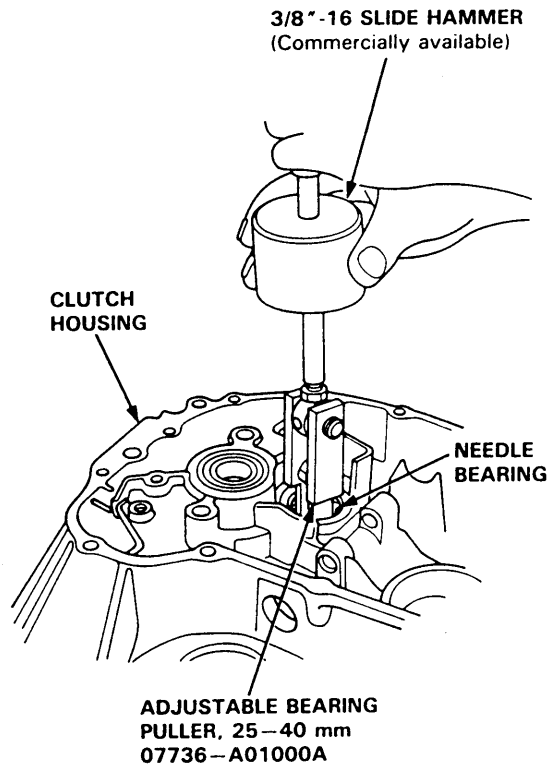
4. Drive the ball bearing into the clutch housing using the special tools as shown.



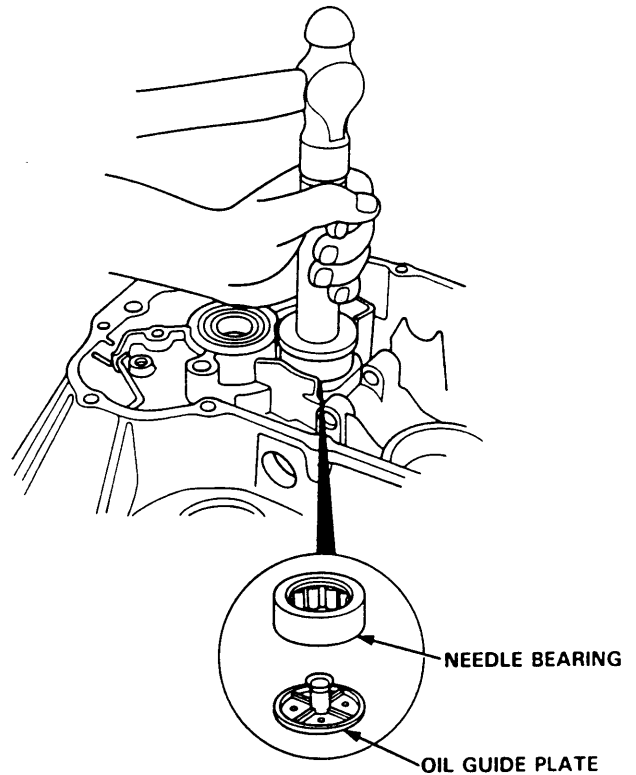


Countershaft

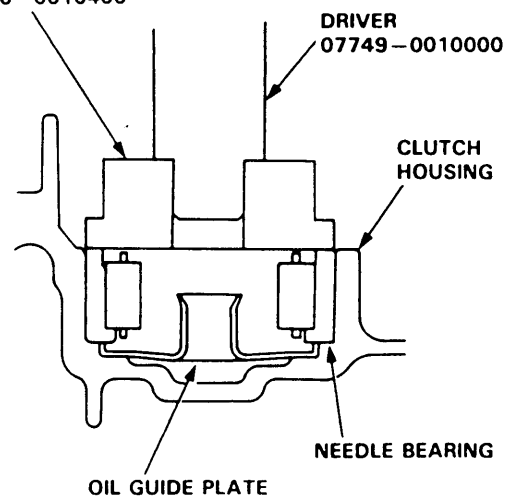
1. Remove the needle bearing using the special tool as shown, then remove the oil guide plate.



2. Install the oil guide plate, then drive the needle bearing into the clutch housing using the special tools as shown.



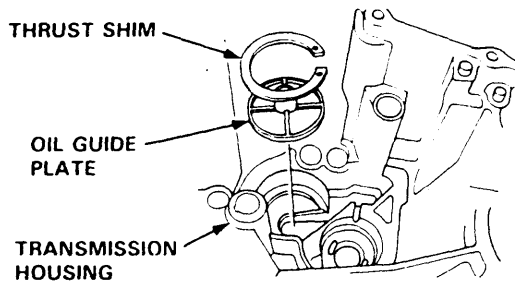
ATTACHMENT, 52 x 55 mm
07746-0010400



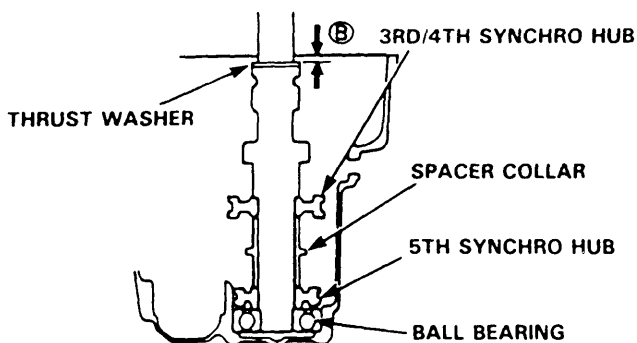
Mainshaft Thrust Shim

Adjustment

1. Remove the thrust shim and oil guide plate from the transmission housing.



2. Install the 3rd/4th synchro hub, spacer collar, 5th synchro hub, ball bearing, and thrust washer on the mainshaft. Install the assembly in the transmission housing.



3. Measure the distance **B** between the end of the transmission housing and thrust washer.

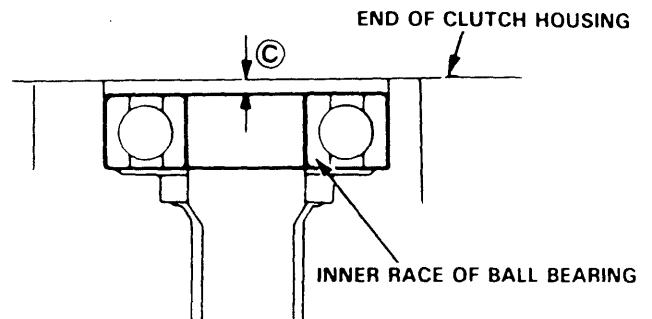
NOTE:

- Use a straight edge and vernier caliper.
- Measure at three locations and average the readings.

4. Measure the distance **C** between the surfaces of the clutch housing and bearing inner race.

NOTE:

- Use a straight edge and depth gauge.
- Measure at three locations and average the readings.



5. Select the proper shim on the basis of the following calculations:

NOTE: Use only one thrust shim.

(Basic Formula)

$$(B) + (C) - 0.95 = \text{shim thickness}$$

Example of calculation:

$$\text{Distance } \textcircled{B} (2.00 \text{ mm}) + \text{Distance } \textcircled{C} (0.09 \text{ mm}) = 2.09 \text{ mm}$$

subtract the spring washer height (0.95 mm) = the required thrust shim (1.14 mm)



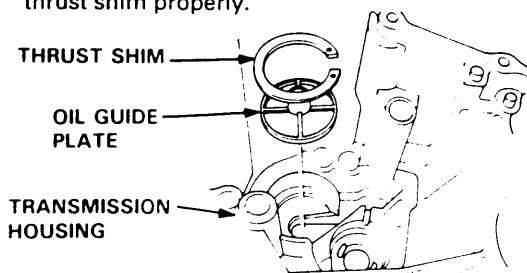
70 mm THRUST SHIM:

	Part Number	Thickness
A	23931 - PL3 - B00	0.60 mm (0.0236 in)
B	23932 - PL3 - B00	0.63 mm (0.0284 in)
C	23933 - PL3 - B00	0.66 mm (0.0260 in)
D	23934 - PL3 - B00	0.69 mm (0.0272 in)
E	23935 - PL3 - B00	0.72 mm (0.0283 in)
F	23936 - PL3 - B00	0.75 mm (0.0295 in)
G	23937 - PL3 - B00	0.78 mm (0.0307 in)
H	23938 - PL3 - B00	0.81 mm (0.0319 in)
I	23939 - PL3 - B00	0.84 mm (0.0331 in)
J	23940 - PL3 - B00	0.87 mm (0.0343 in)
K	23941 - PL3 - B00	0.90 mm (0.0354 in)
L	23942 - PL3 - B00	0.93 mm (0.0366 in)
M	23943 - PL3 - B00	0.96 mm (0.0378 in)
N	23944 - PL3 - B00	0.99 mm (0.0390 in)
O	23945 - PL3 - B00	1.02 mm (0.0402 in)
P	23946 - PL3 - B00	1.05 mm (0.0413 in)
Q	23947 - PL3 - B00	1.08 mm (0.0425 in)
R	23948 - PL3 - B00	1.11 mm (0.0437 in)
S	23949 - PL3 - B00	1.14 mm (0.0449 in)
T	23950 - PL3 - B00	1.17 mm (0.0461 in)
U	23951 - PL3 - B00	1.20 mm (0.0472 in)
V	23952 - PL3 - B00	1.23 mm (0.0484 in)
W	23953 - PL3 - B00	1.26 mm (0.0496 in)
X	23954 - PL3 - B00	1.29 mm (0.0508 in)
Y	23955 - PL3 - B00	1.32 mm (0.0520 in)
Z	23956 - PL3 - B00	1.35 mm (0.0531 in)
AA	23957 - PL3 - B00	1.38 mm (0.0543 in)
AB	23958 - PL3 - B00	1.41 mm (0.0555 in)
AC	23959 - PL3 - B00	1.44 mm (0.0567 in)
AD	23960 - PL3 - B00	1.47 mm (0.0579 in)
AE	23961 - PL3 - B00	1.50 mm (0.0591 in)
AF	23962 - PL3 - B00	1.53 mm (0.0602 in)
AG	23963 - PL3 - B00	1.56 mm (0.0614 in)
AH	23964 - PL3 - B00	1.59 mm (0.0626 in)
AI	23965 - PL3 - B00	1.62 mm (0.0638 in)
AJ	23966 - PL3 - B00	1.65 mm (0.0650 in)
AK	23967 - PL3 - B00	1.68 mm (0.0661 in)
AL	23968 - PL3 - B00	1.71 mm (0.0673 in)
AM	23969 - PL3 - B00	1.74 mm (0.0685 in)
AN	23970 - PL3 - B00	1.77 mm (0.0697 in)
AO	23971 - PL3 - B00	1.80 mm (0.0709 in)

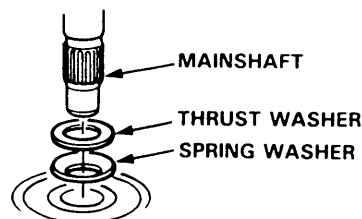
- Install the oil guide plate and selected thrust shim in the transmission housing.

NOTE:

- Clean the thrust washer, spring washer and thrust shim thoroughly before installation.
- Install the thrust washer, spring washer and thrust shim properly.



- Install the thrust washer and spring washer in the mainshaft.



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

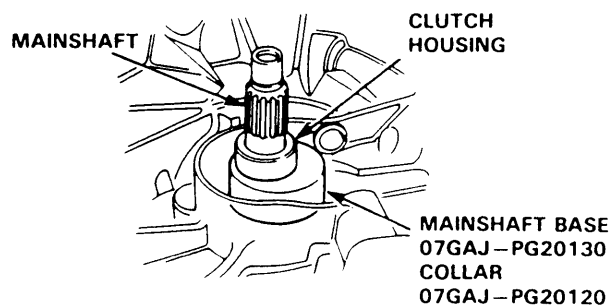
NOTE: It is not necessary to use sealing agent between the housings.

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

- Tap the mainshaft with a plastic hammer.
- Check the thrust clearance in the manner described below.

CAUTION: Measurement should be made at room temperature.

- Slide the mainshaft base and the collar over the mainshaft.



(cont'd)

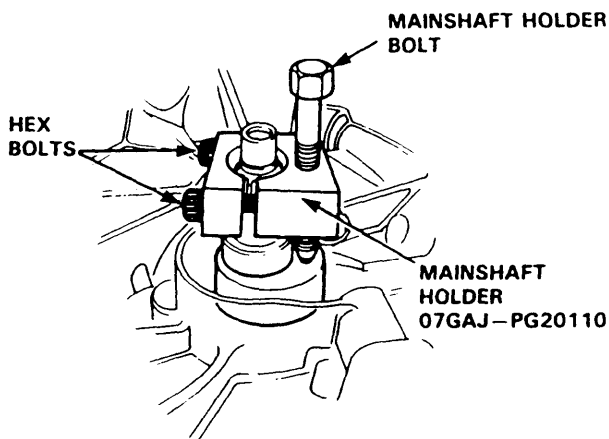
Mainshaft Thrust Shim

Adjustment (cont'd)

- b. Attach the mainshaft holder to the mainshaft as follows:

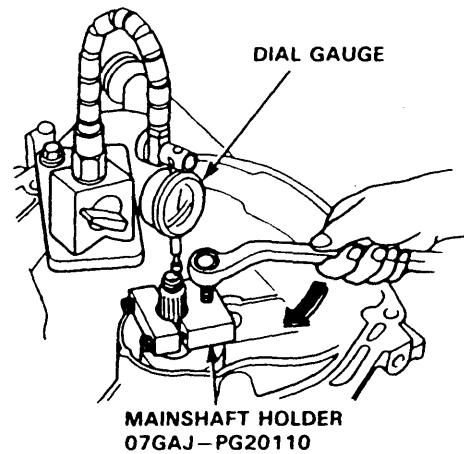
NOTE:

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



- c. Seat the mainshaft fully by tapping on the end with a plastic hammer.
- d. Thread the mainshaft holder bolt in until it just contacts the wide surface of the mainshaft base.

- e. Zero a dial gauge on the end of the mainshaft.



- f. Turn the mainshaft holder bolt clockwise; stop turning when the dial gauge has reached its maximum movement. The reading on the dial gauge is the amount of mainshaft end play.

CAUTION: Turning the mainshaft holder bolt more than 60 degrees after the needle of the dial gauge stops moving may damage the transmission.

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

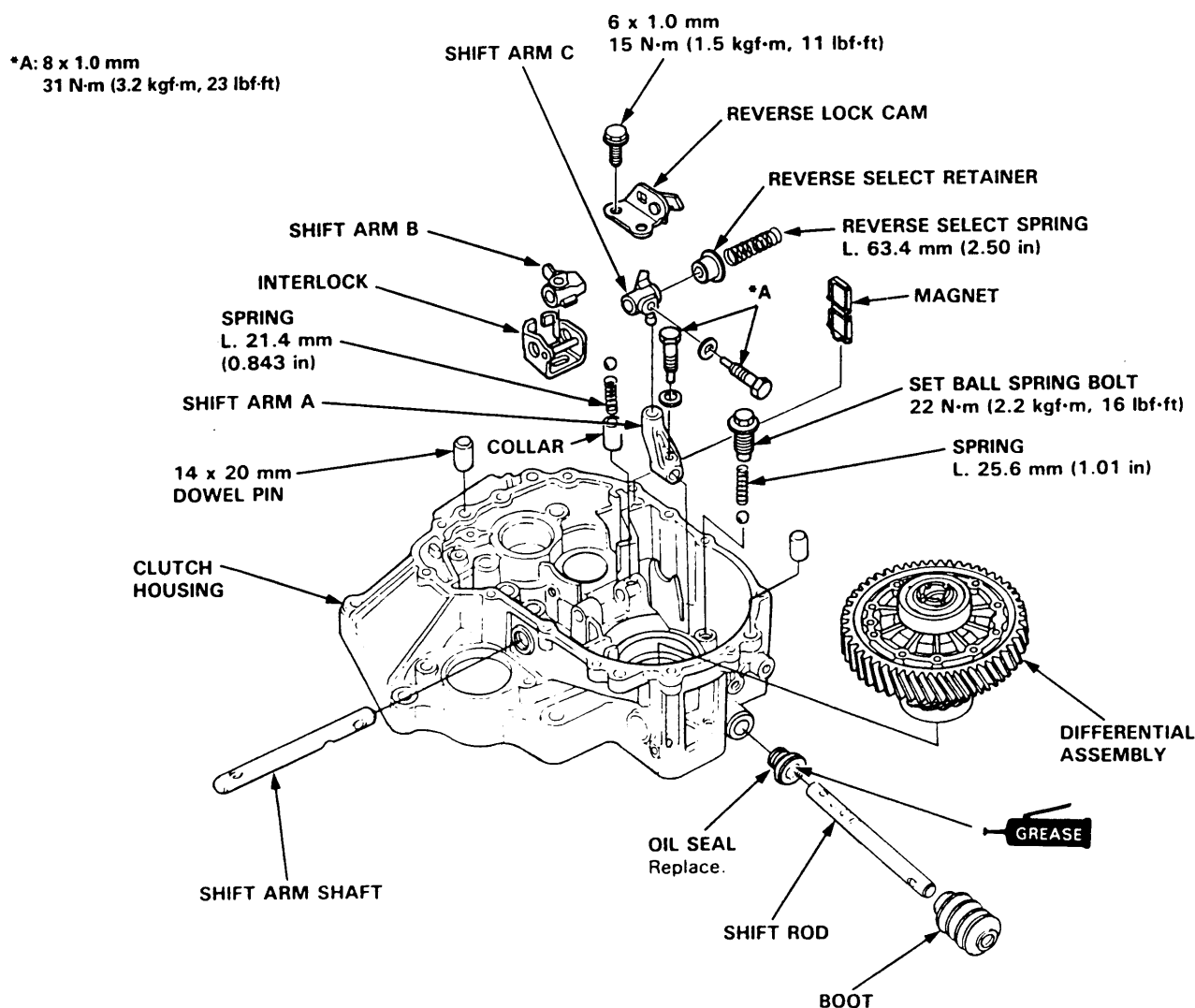
Standard: 0.11 – 0.18 mm (0.004 – 0.007 in)



Reassembly

NOTE: The steel balls are all of the same size (5/16 in).

1. Install the magnet and reverse lock cam.
2. Set shift arm A on the clutch housing, then install the shift rod.
3. Install the spring washer and shift arm A attaching bolt.
4. Install the steel ball, spring, and set ball spring bolt.
5. Install shift arm B in the interlock, then set it on the clutch housing.
6. Insert shift arm shaft in the clutch housing.
7. Install the collar, spring, and steel ball into the case. Compress the ball and insert the shift arm shaft.
8. Install shift arm C in shift arm A, then insert the shift arm shaft.
9. Install the reverse select retainer and reverse select spring onto shift arm shaft.
10. Install the differential assembly.

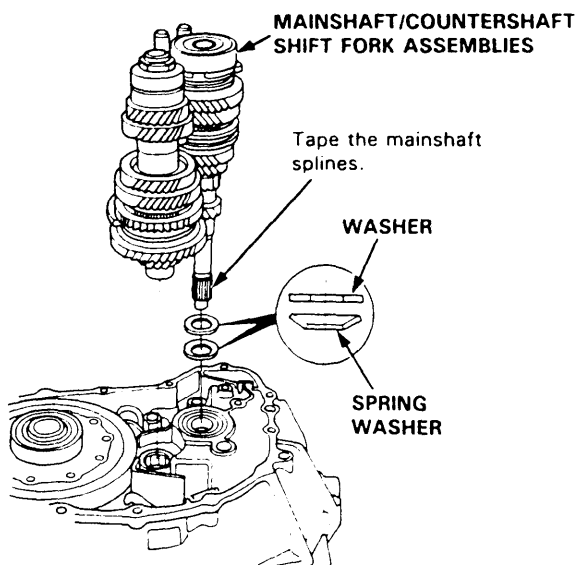


(cont'd)

Transmission

Reassembly (cont'd)

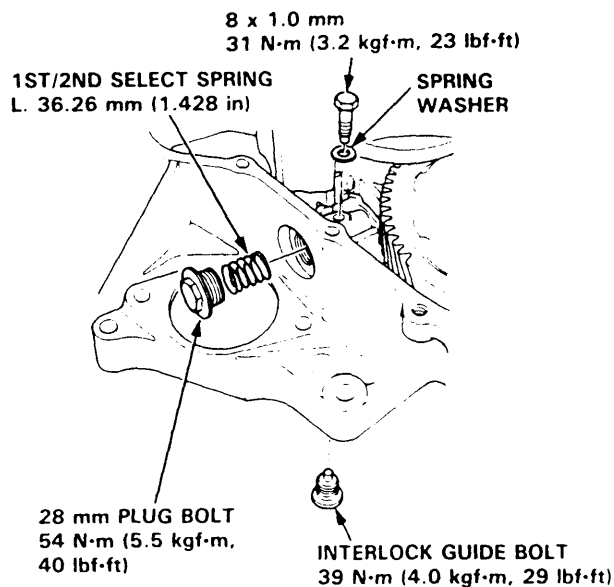
11. Position the 36 mm spring washer and washer onto the mainshaft bearing.



12. Install the mainshaft, countershaft, and shift fork assemblies.

NOTE: Align the finger of the interlock with the groove in the shift fork shaft.

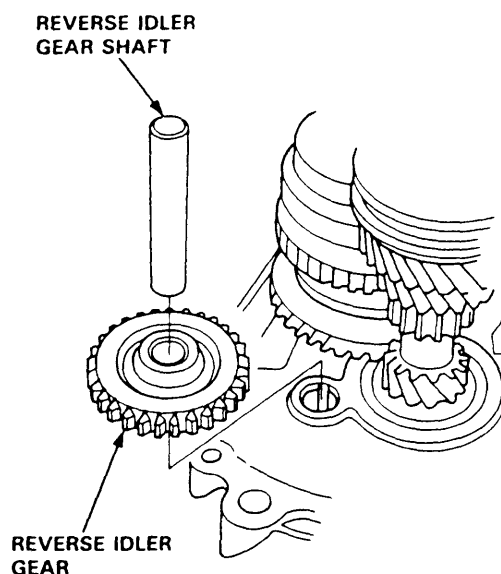
13. Install the spring washer and shift arm B attaching bolt.



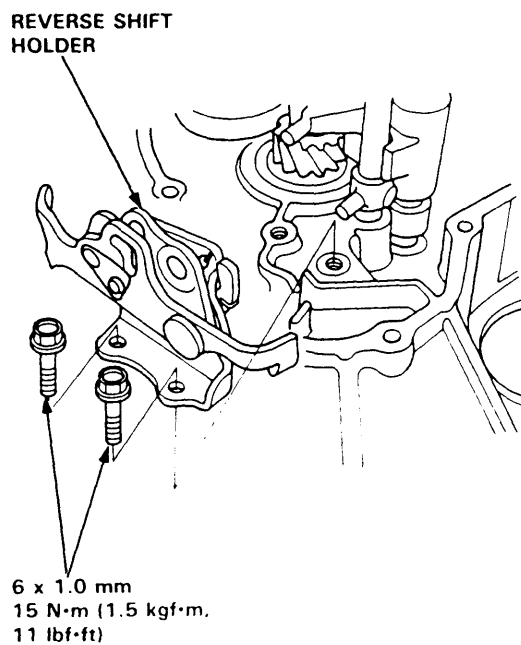
14. Install the 1st/2nd select spring, 28 mm plug bolt, and interlock guide bolt.

NOTE: Apply liquid gasket (P/N 08718 - 0001 or 08718 - 0003) to the threads of the 28 mm plug bolt and interlock guide bolt.

15. Install the reverse idler gear and reverse idler gear shaft.

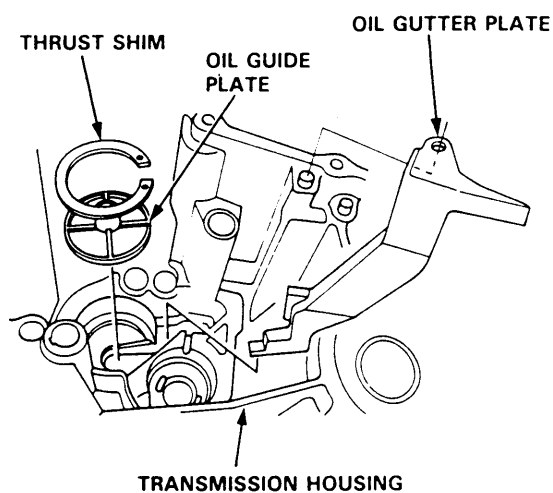


16. Install the reverse shift holder.





17. Install the oil gutter plate.

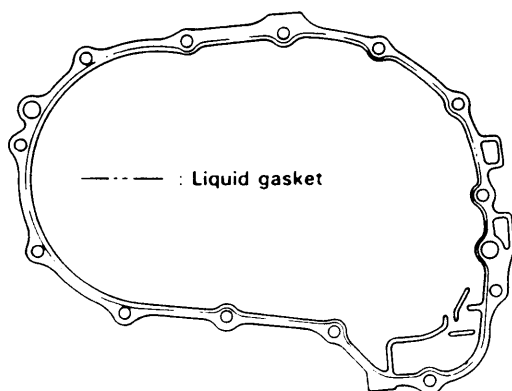


18. Install the oil guide plate and thrust shim on the transmission housing.

19. Apply liquid gasket to the surface of the transmission housing mating with the clutch housing as shown.

NOTE:

- Use liquid gasket (P/N 08718 - 0001 or 08718 - 0003).
- Remove the dirty oil from the sealing surface.
- If 20 minutes have passed after applying liquid gasket, reapply it and assemble the housings.
- Allow it to cure at least 20 minutes after assembly before filling the transmission with oil.

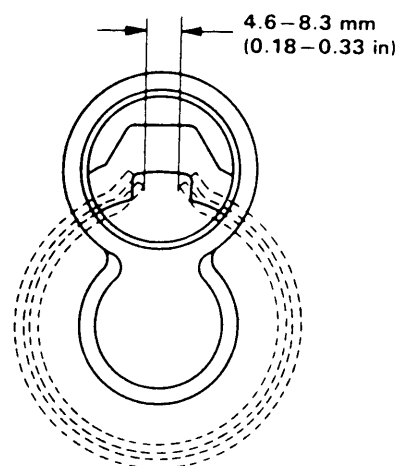
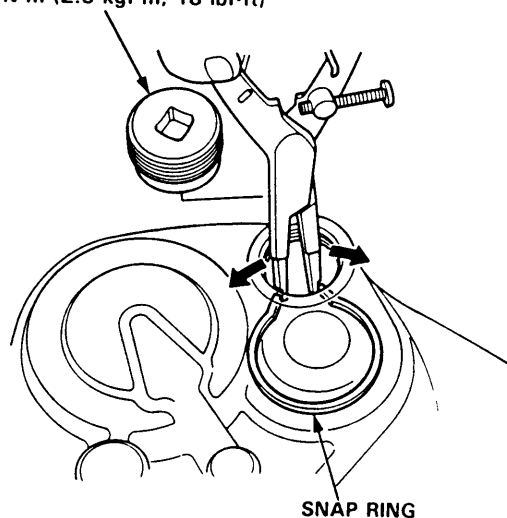


20. Install the dowel pins and the transmission housing.

21. Lower the transmission housing with the snap ring pliers, and set the snap ring into the groove of the countershaft bearing.

NOTE: Check that the snap ring is securely seated in the groove of the countershaft bearing.

32 mm SEALING BOLT
25 N·m (2.5 kgf·m, 18 lbf·ft)



22. Install the 32 mm sealing bolt.

NOTE: Apply liquid gasket (P/N 08718 - 0001 or 08718 - 0003) to the threads.

(cont'd)

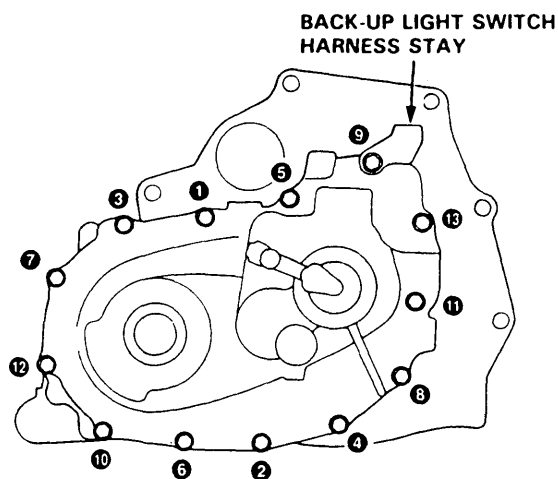
Transmission

Reassembly (cont'd)

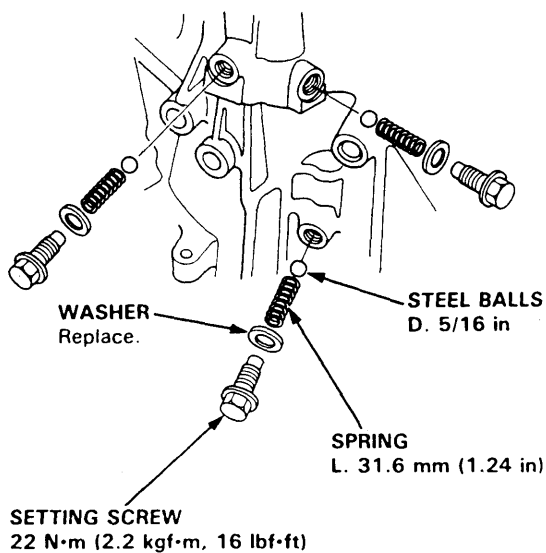
23. Tighten the transmission housing attaching bolts in the numbered sequence in several steps shown below.

8 x 1.25 mm

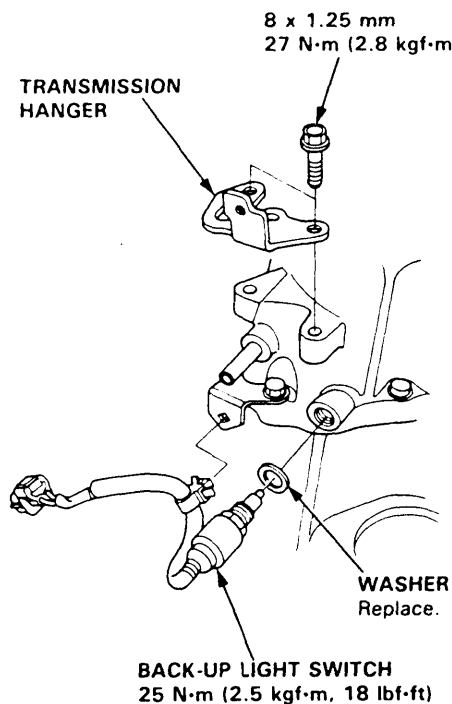
Torque: 27 N·m (2.8 kgf·m, 20 lbf·ft)



24. Install the steel balls, springs, and set screws.



25. Install the back-up light switch and transmission hanger.

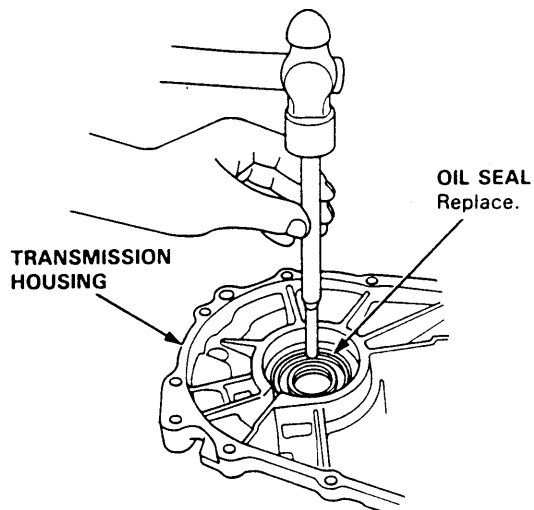




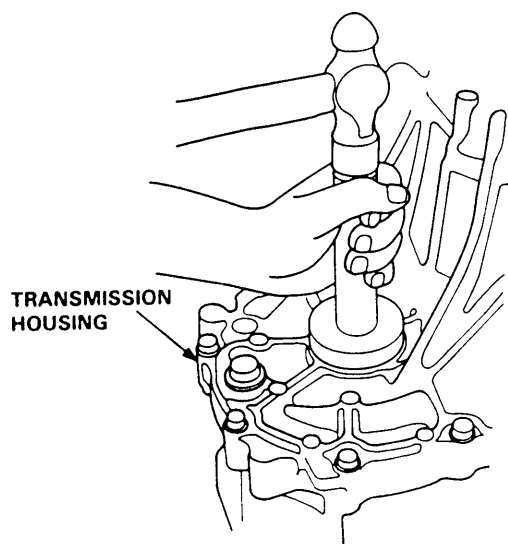
Replacement

Transmission Housing:

1. Remove the oil seal from the transmission housing.



2. Install the oil seal into the transmission housing using the special tools as shown.

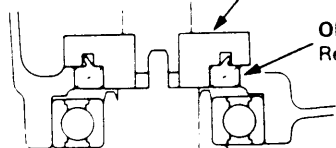


DRIVER
07749-0010000

SEAL DRIVER
ATTACHMENT
07947-6110501 or
07947-6110500

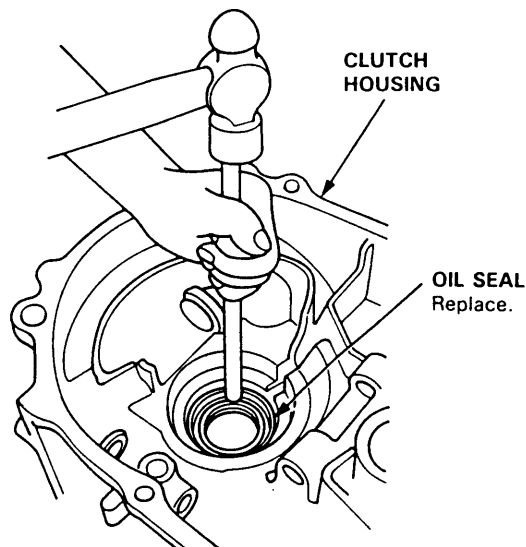
OIL SEAL
Replace.

PILOT, 26 x 30 mm
07JAD-PH80200

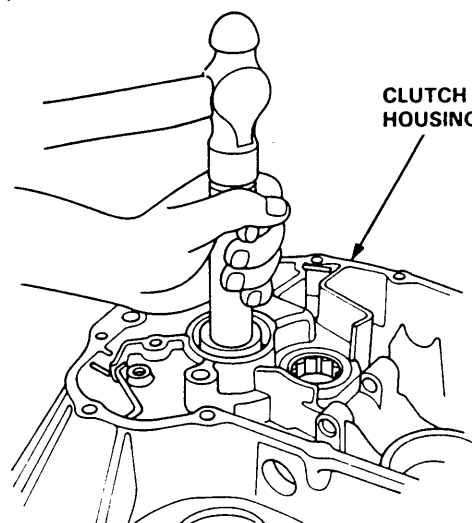


Clutch Housing:

1. Remove the oil seal from the clutch housing.



2. Install the oil seal into the clutch housing using the special tools as shown.

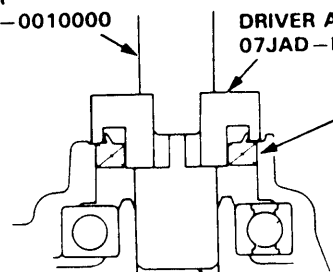


DRIVER
07749-0010000

DRIVER ATTACHMENT
07JAD-PH80101

OIL SEAL
Replace.

PILOT, 26 x 30 mm
07JAD-PH80200

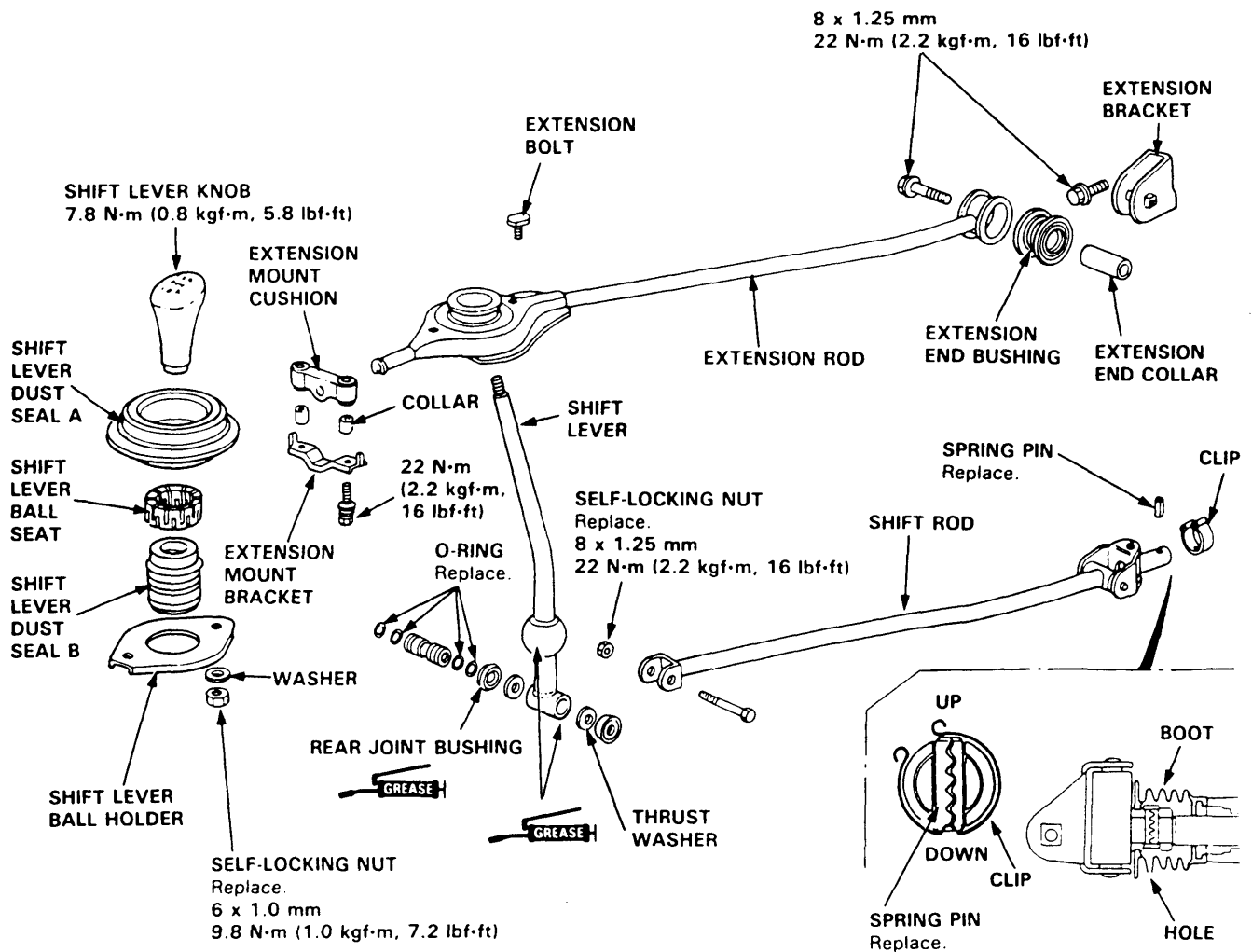


Gearshift Mechanism

Overhaul

NOTE:

- Inspect rubber parts for wear and damage when disassembling; replace any worn or damaged parts.
- Install the clip as shown.
- Turn the boot so the hole is facing down as shown.
- Make sure the boot is installed on the shift rod.



Automatic Transmission

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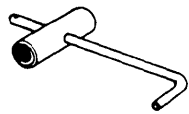


Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07GAB – PF50101	Mainshaft Holder	1	14-111, 156
②	07GAE – PG40200 or	Clutch Spring Compressor Bolt Assembly	1	14-136, 139
③	07HAC – PK4010A	Housing Puller	1	14-113
④	07JAD – PH80101	Driver Attachment	1	14-147
⑤	07JAD – PH80200	Pilot, 26 x 30 mm	1	14-147
*⑥	07LAE – PX40100	Clutch Spring Compressor Attachment	2	14-136, 139
⑦	07MAJ – PY4011A	A/T Pressure Hose, 2210 mm	4	14-96
⑧	07MAJ – PY40120	A/T Pressure Hose Adapter	4	14-96
⑨	07PAZ – 0010100	SCS Service Connector	1	14-45
⑩	07SAZ – 001000A	Backprobe Set	2	14-46, 92
⑪	07406 – 0020400	A/T Oil Pressure Gauge Set w/Panel	1	14-96
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**⑬	07736 – A01000B or 07736 – A01000A	Adjustable Bearing Puller, 25 – 40 mm	1	14-148, 149
⑭	07746 – 0010500	Attachment, 62 x 68 mm	1	14-148, 149, 150
⑮	07746 – 0010600	Attachment, 72 x 75 mm	1	14-148, 150
⑯	07746 – 0030100	Driver 40 mm I.D.	1	14-131, 143, 145, 146
⑰	07749 – 0010000	Driver	1	14-147, 148, 149, 150
⑱	07947 – 611501	Driver Attachment, 68 mm	1	14-147

* 07HAE – PL50101 may be used to substitute one of these tools.

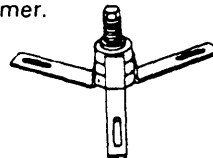
** Must be used with commercially-available 3/8" – 16 slide hammer.



①



②



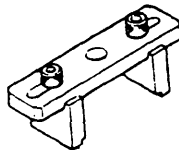
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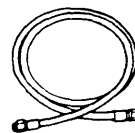
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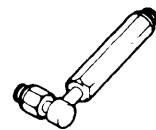
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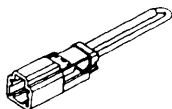
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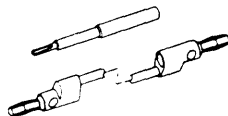
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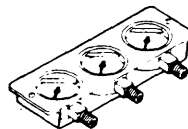
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⑨



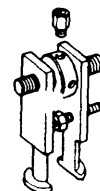
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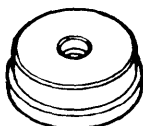
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⑫

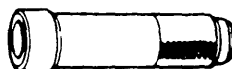


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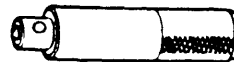


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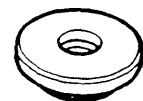
⑮



⑯



⑰



⑱



Description

The automatic transmission is a combination of a 3-element torque converter and a dual-shaft electronically controlled automatic transmission which provides 4 speeds forward and 1 reverse.

Torque Converter, Gears and Clutches

The torque converter consists of a pump, turbine and stator, assembled in a single unit. They are connected to the engine crankshaft so they turn together as a unit as the engine turns. Around the outside of the torque converter is a ring gear which meshes with the starter pinion when the engine is being started. The entire torque converter assembly serves as a flywheel while transmitting power to the transmission mainshaft.

The transmission has two parallel shafts: the mainshaft and the countershaft. The mainshaft is in line with the engine crankshaft. The mainshaft includes the 1st, 2nd and 4th clutches, gears for 2nd, 4th, reverse and 1st (3rd gear is integral with the mainshaft, while the reverse gear is integral with the 4th gear). The countershaft includes the 3rd clutch, and gears for 3rd, 2nd, 4th, reverse, 1st and parking. The gears on the mainshaft are in constant mesh with those on the countershaft. When certain combinations of gears in transmission are engaged by clutches, power is transmitted from the mainshaft to the countershaft to provide **[2]**, **[D₂]**, **[D₁]**, and **[R]** positions.

Electronic Control

The electronic control system consists of the Powertrain Control Module (PCM), sensors, a linear solenoid and four solenoid valves. Shifting and lock-up are electronically controlled for comfortable driving under all conditions. The PCM is located below the dashboard, under the front lower panel on the passenger's side.

Hydraulic Control

The valve bodies include the main valve body, the secondary valve body, the regulator valve body, the servo body and the lock-up valve body through the respective separator plates. They are bolted on the torque converter housing.

The main valve body contains the manual valve, the 1-2 shift valve, the 2nd orifice control valve, the CPB (Clutch Pressure Back-up) valve, the modulator valve, the servo control valve, the relief valve, and ATF pump gears. The secondary valve body contains the 2-3 shift valve, the 3-4 shift valve, the 3-4 orifice control valve, the 4th exhaust valve and the CPC (Clutch Pressure Control) valve. The regulator valve body contains the pressure regulator valve, the torque converter check valve, the cooler relief valve, and the lock-up control valve. The servo body contains the servo valve which is integrated with the reverse shift fork shaft, and the accumulators. The lock-up valve body contains the lock-up shift valve and the lock-up timing valve. The linear solenoid and the shift control solenoid valve A/B are bolted on the outside of the transmission housing, and the lock-up control solenoid valve A/B is bolted on the outside of the torque converter housing. Fluid from regulator passes through the manual valve to the various control valves. The clutches receive fluid from their respective feed pipes or internal hydraulic circuit.

Shift Control Mechanism

Input from various sensors located throughout the vehicle determines which shift control solenoid valve the PCM will activate. Activating a shift control solenoid valve changes modulator pressure, causing a shift valve to move. This pressurizes a line to one of the clutches, engaging that clutch and its corresponding gear. The shift control solenoid valves A and B are controlled by the PCM.

Lock-up Mechanism

In **[D₁]** position, in 3rd and 4th, and in **[D₂]** position in 3rd, pressurized fluid is drained from the back of the torque converter through a fluid passage, causing the lock-up piston to be held against the torque converter cover. As this takes place, the mainshaft rotates at the same speed as the engine crankshaft. Together with hydraulic control, the PCM optimizes the timing of the lock-up mechanism. The lock-up valves control the range of lock-up according to lock-up control solenoid valves A and B, and linear solenoid. When lock-up control solenoid valves A and B activate, the modulator pressure changes. The lock-up control solenoid valves A and B and the linear solenoid are controlled by the PCM.

(cont'd)

Description

(cont'd)

Gear Selection

The shift lever has six positions: **P** PARK, **R** REVERSE, **N** NEUTRAL, **D₄** 1st through 4th gear ranges, **D₃** 1st through 3rd gear ranges, **2** 2nd gear.

Position	Description
P PARK	Front wheels locked; parking brake pawl engaged with parking gear on countershaft. All clutches released.
R REVERSE	Reverse; reverse selector engaged with countershaft reverse gear and 4th clutch locked.
N NEUTRAL	All clutches released.
D₄ DRIVE (1st through 4th)	General driving; starts off in 1st, shifts automatically to 2nd, 3rd, then 4th, depending on vehicle speed and throttle position. Downshift through 3rd, 2nd and 1st on deceleration to stop. The lock-up mechanism comes into operation in D₄ position in 3rd and 4th gear.
D₃ DRIVE (1st through 3rd)	Use for rapid acceleration at highway speeds and general driving; up-hill and down-hill driving; starts off in 1st, shifts automatically to 2nd, then 3rd, depending on vehicle speed and throttle position. Downshifts through 2nd to 1st on deceleration to stop. The lock-up mechanism comes into operation in 3rd gear.
2 SECOND	Use for engine braking or better traction starting off on loose or slippery surfaces; stays in 2nd gear, does not shift up and down.

Starting is possible only in **P** and **N** positions through the use of a slide-type, neutral-safety switch.

Automatic Transaxle (A/T) Gear Position Indicator

The A/T gear position indicator in the instrument panel shows which gear has been selected without having to look down at the console.

Clutches

The four-speed automatic transmission uses hydraulically-actuated clutches to engage or disengage the transmission gears. When hydraulic pressure is introduced into the clutch drum, the clutch piston moves. This presses the friction discs and steel plates together, locking them so they don't slip. Power is then transmitted through the engaged clutch pack to its hub-mounted gear. Likewise, when the hydraulic pressure is bled from the clutch pack, the piston releases the friction discs and the steel plates, and they are free to slide past each other. This allows the gear to spin independently on its shaft, transmitting no power.

1st Clutch

The 1st clutch engages/disengages 1st gear, and is located at the end of the mainshaft, just behind the right side cover. The 1st clutch is supplied hydraulic pressure by its ATF feed pipe within the mainshaft.

2nd Clutch

The 2nd clutch engages/disengages 2nd gear, and is located at the middle of the mainshaft. The 2nd clutch is joined back-to-back to the 4th clutch. The 2nd clutch is supplied hydraulic pressure through the mainshaft by a circuit connected to the internal hydraulic circuit.

3rd Clutch

The 3rd clutch engages/disengages 3rd gear, and is located at the end of the countershaft. The 3rd clutch is supplied hydraulic pressure by its ATF feed pipe within the countershaft.

4th Clutch

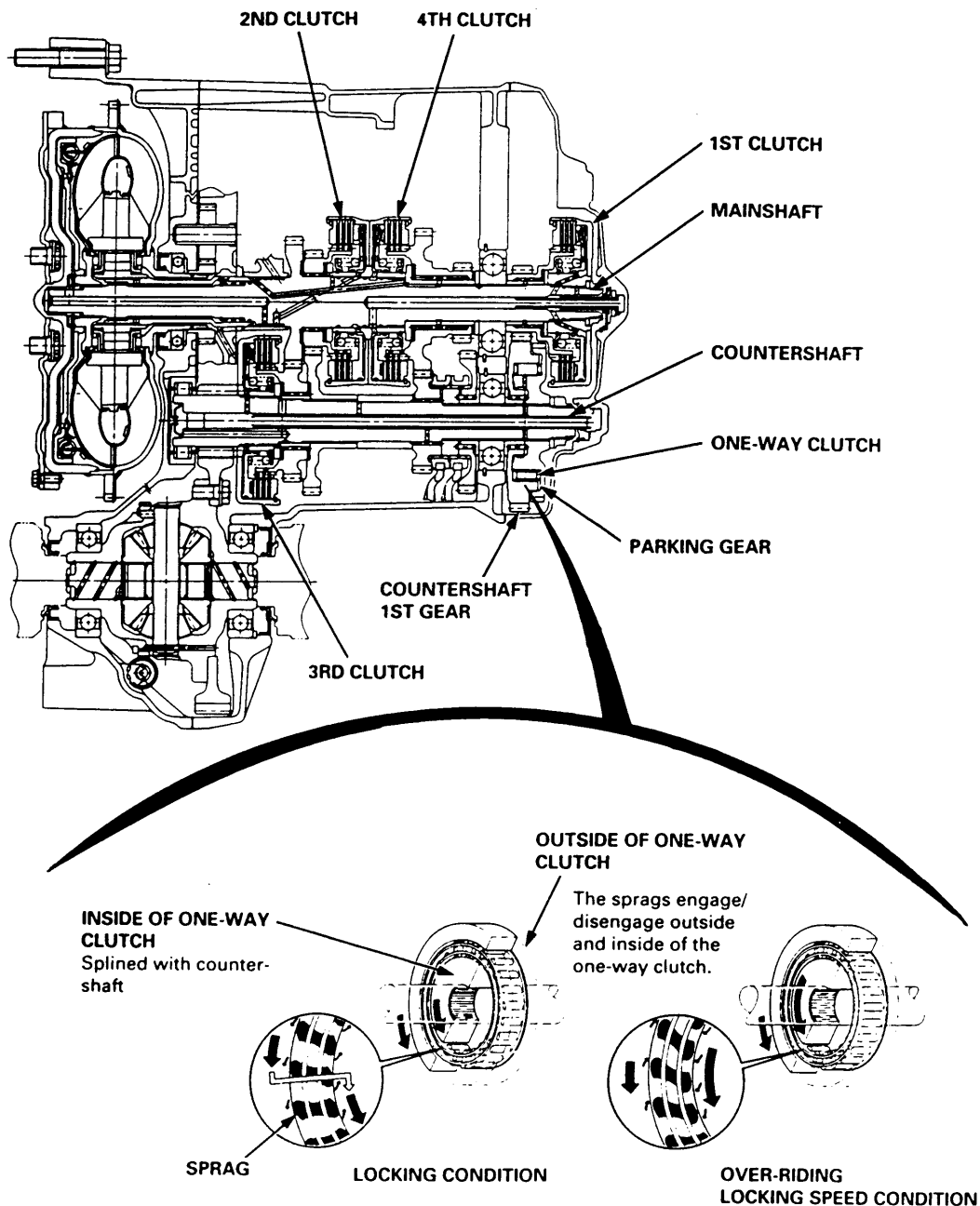
The 4th clutch engages/disengages 4th gear, as well as reverse gear, and is located at the middle of the mainshaft. The 4th clutch is joined back-to-back to the 2nd clutch. The 4th clutch is supplied hydraulic pressure by its ATF feed pipe within the mainshaft.



One-way Clutch

The one-way clutch is positioned between the countershaft 1st gear and the parking gear, with the parking gear splined to the countershaft. The 1st gear provides the outer race surface, and the parking gear provides the inner race surface. The one-way clutch locks up when power is transmitted from the mainshaft 1st gear to the countershaft 1st gear. The 1st clutch and gears remain engaged in the 1st, 2nd, 3rd, and 4th gear ranges in the **D₄**, **D₃** or **2** position.

However, the one-way clutch disengages when the 2nd, 3rd, or 4th clutches/gears are applied in the **D₄**, **D₃** or **2** position. This is because the increased rotational speed of the gears on the countershaft overrides the locking "speed range" of the one-way clutch. Thereafter, the one-way clutch free-wheels with the 1st clutch still engaged.



Description

Power Flow

PART POSITION		TORQUE CONVERTER	1ST GEAR 1ST CLUTCH	2ND GEAR 2ND CLUTCH	3RD GEAR 3RD CLUTCH	4TH		REVERSE GEAR	PARKING GEAR
						GEAR	CLUTCH		
	P	○	x	x	x	x	x	x	○
	R	○	x	x	x	x	○	○	x
	N	○	x	x	x	x	x	x	x
D₄	1ST	○	○*2	x	x	x	x	x	x
	2ND	○	○*1	○	x	x	x	x	x
	3RD	○	○*1	x	○	x	x	x	x
	4TH	○	○*1	x	x	○	○	x	x
D₃	1ST	○	○*2	x	x	x	x	x	x
	2ND	○	○*1	○	x	x	x	x	x
	3RD	○	○*1	x	○	x	x	x	x
	2	○	○*1	○	x	x	x	x	x

○: Operates, x: Doesn't operate.

*1: Although the 1st clutch engages, driving power is not transmitted as the one-way clutch slips.

*2: The one-way clutch engages when accelerating, and slips when decelerating.

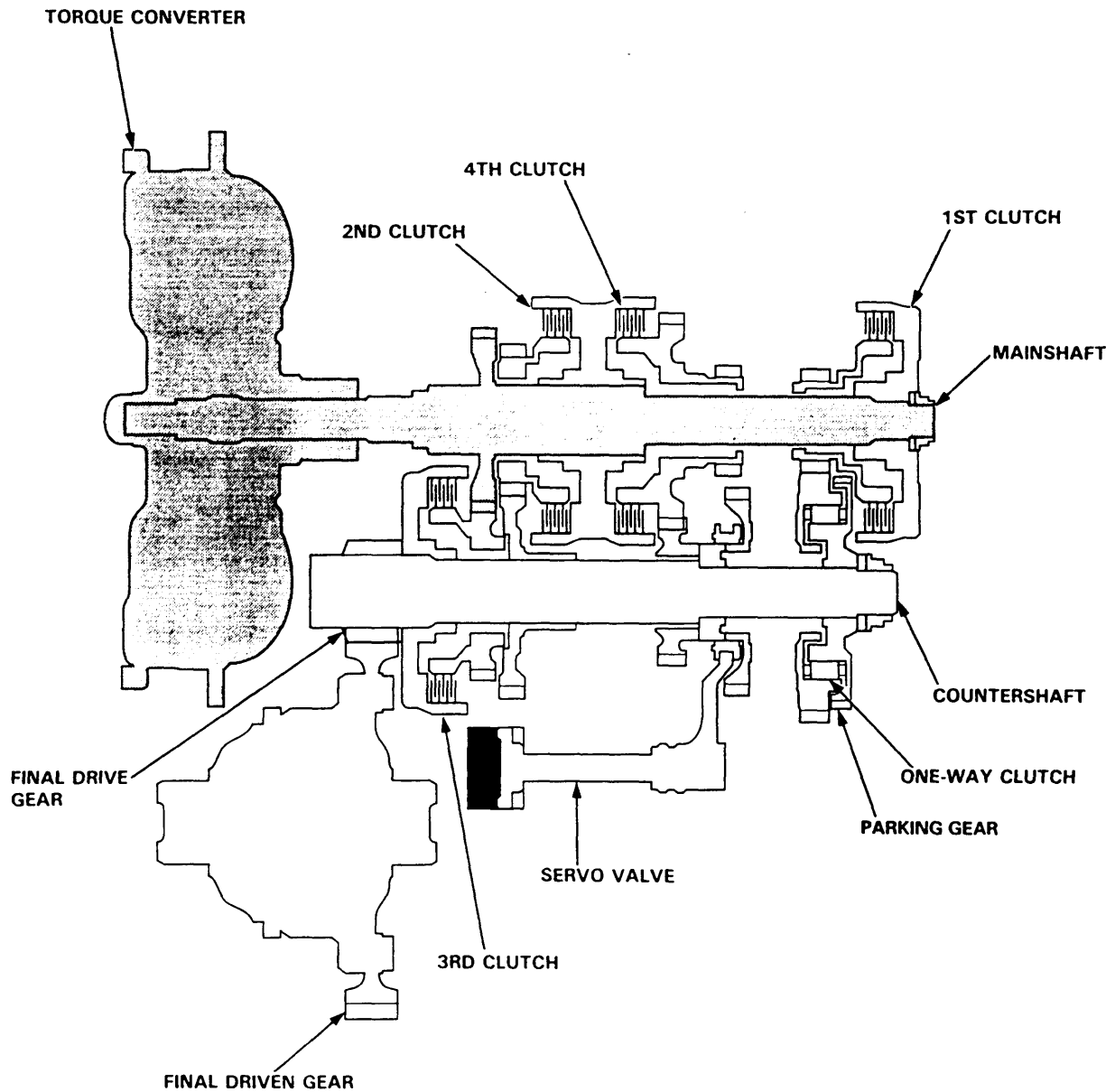


[N] Position

Hydraulic pressure is not applied to the clutches. Power is not transmitted to the countershaft.

[P] Position

Hydraulic pressure is not applied to the clutches. Power is not transmitted to the countershaft.
The countershaft is locked by the parking pawl interlocking the parking gear.



(cont'd)

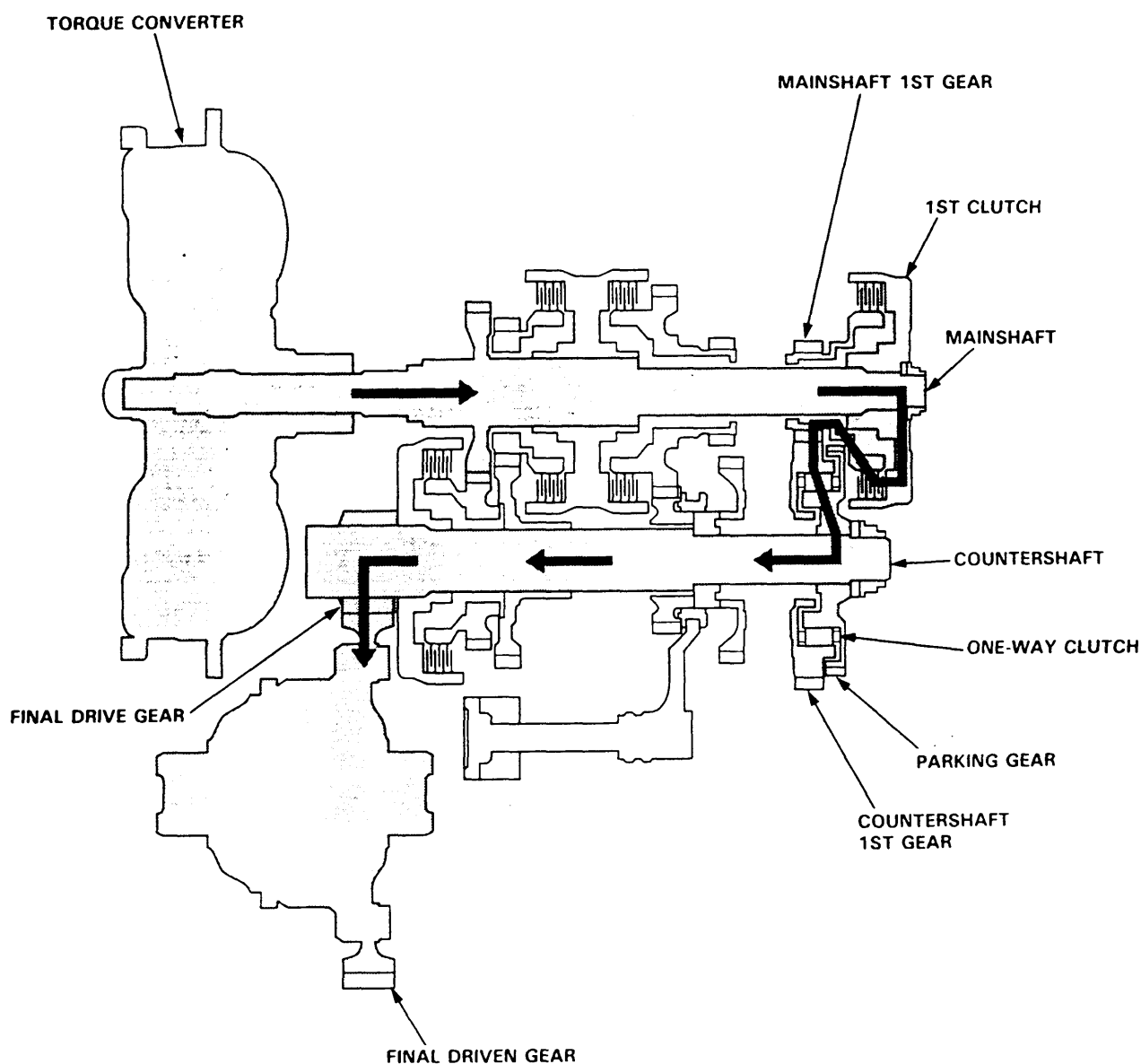
Description

Power Flow (cont'd)

1st Gear (D₄ or D₃ position)

In D₄ or D₃ position, the optimum gear is automatically selected from 1st, 2nd, 3rd and 4th gears, according to conditions such as the balance between throttle opening (engine load) and vehicle speed.

1. Hydraulic pressure is applied to the 1st clutch, which rotates together with the mainshaft, causing the mainshaft 1st gear to rotate.
2. Power is transmitted to the countershaft 1st gear, which drives the countershaft via the one-way clutch.
3. Power is transmitted to the final drive gear, which drives the final driven gear.



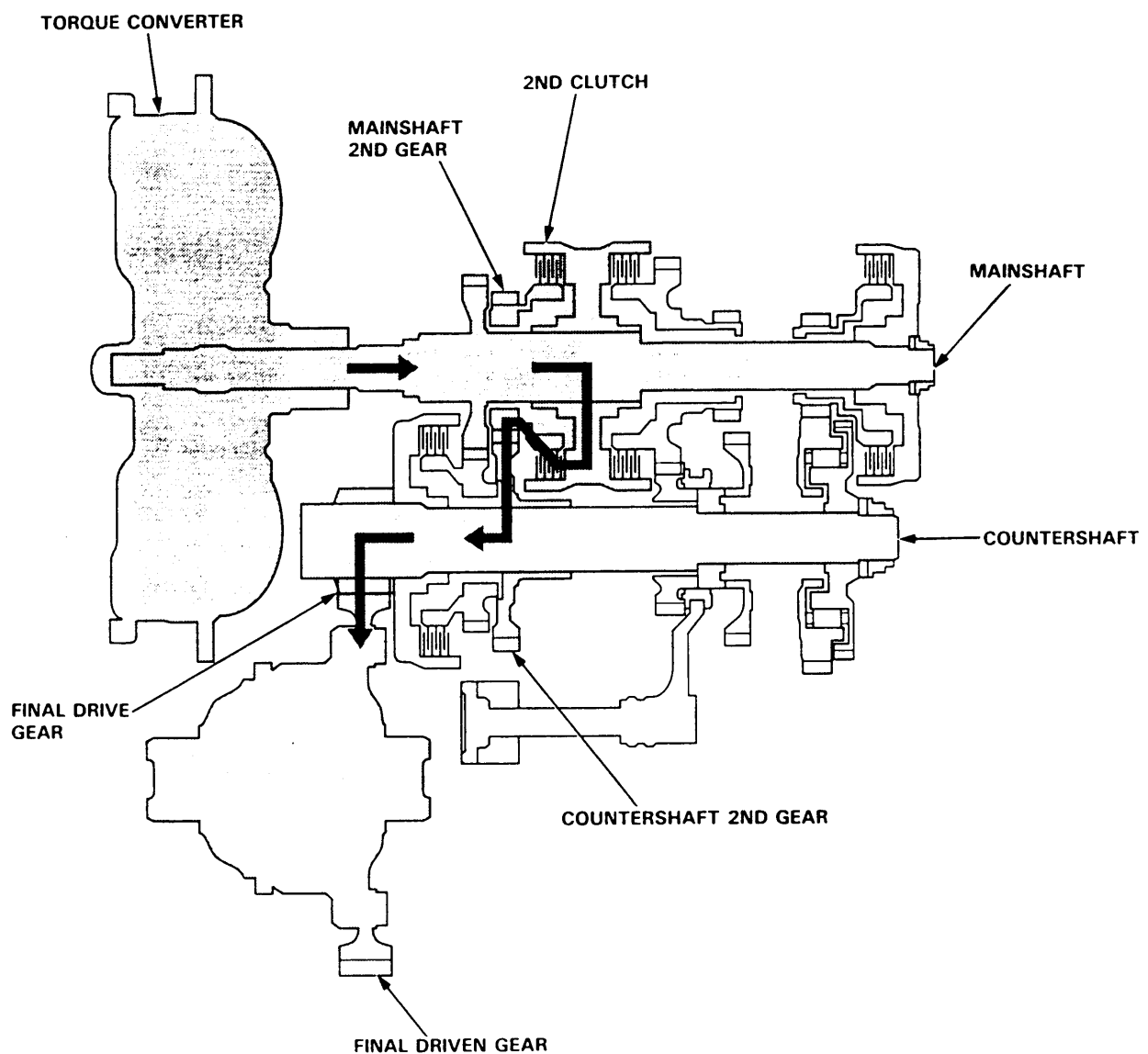


2nd Gear (D₄, D₃ or 2 position)

2 Position is provided to drive only 2nd gear.

1. Hydraulic pressure is applied to the 2nd clutch on the mainshaft, and power is transmitted via the 2nd clutch to the mainshaft 2nd gear.
2. Power transmitted to the mainshaft 2nd gear is conveyed via the countershaft 2nd gear, which drives the countershaft.
3. Power is transmitted to the final drive gear, which drives the final driven gear.

NOTE: Hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of the 2nd gear exceeds that of 1st gear, power from 1st gear is cut off at the one-way clutch.



(cont'd)

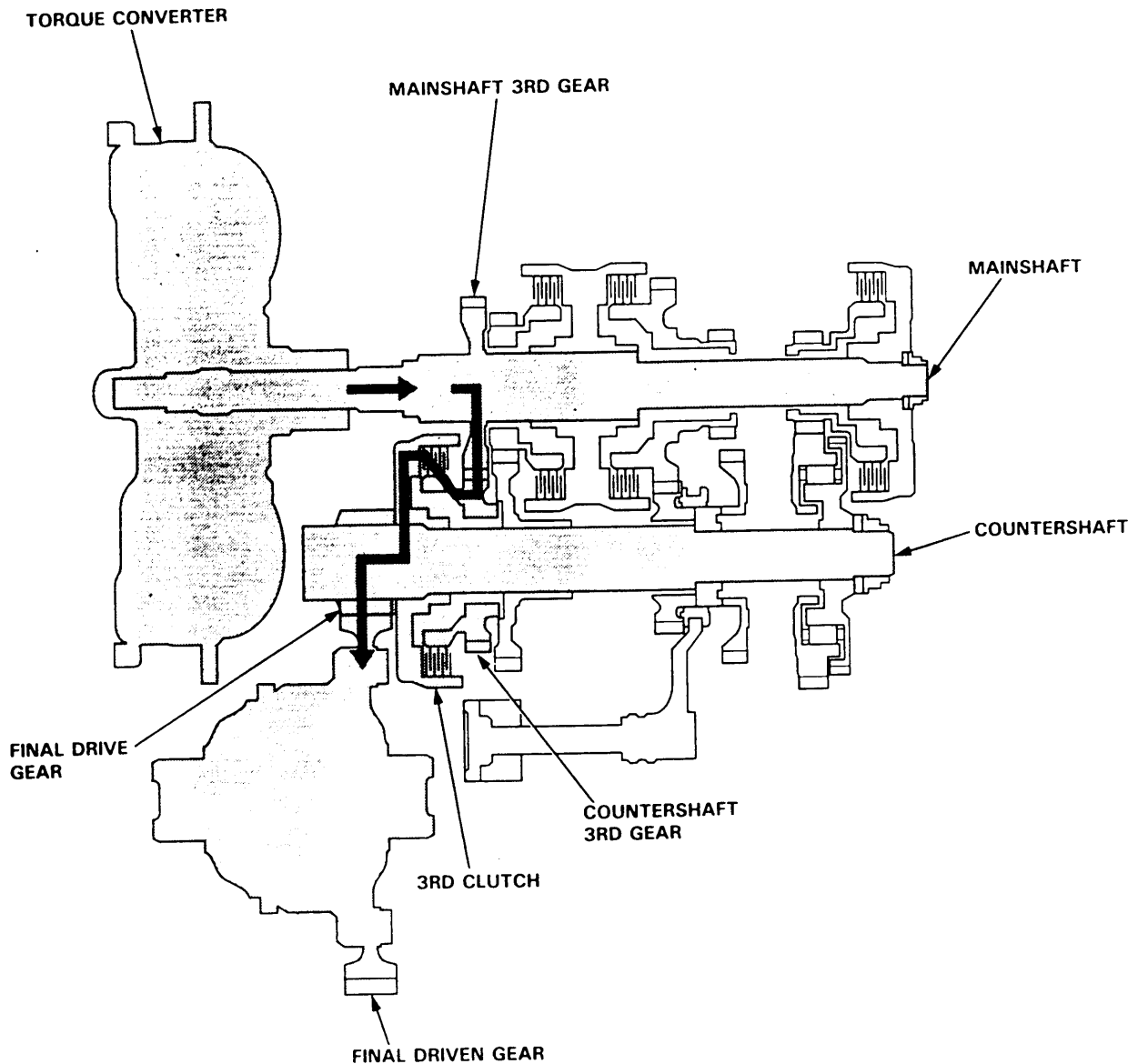
Description

Power Flow (cont'd)

3rd Gear (D₄ or D₅ position)

1. Hydraulic pressure is applied to the 3rd clutch. Power from the mainshaft 3rd gear is transmitted to the countershaft 3rd gear.
2. Power is transmitted to the final drive gear, which drives the final driven gear.

NOTE: Hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of 3rd gear exceeds that of 1st gear, power from 1st gear is cut off at the one-way clutch.

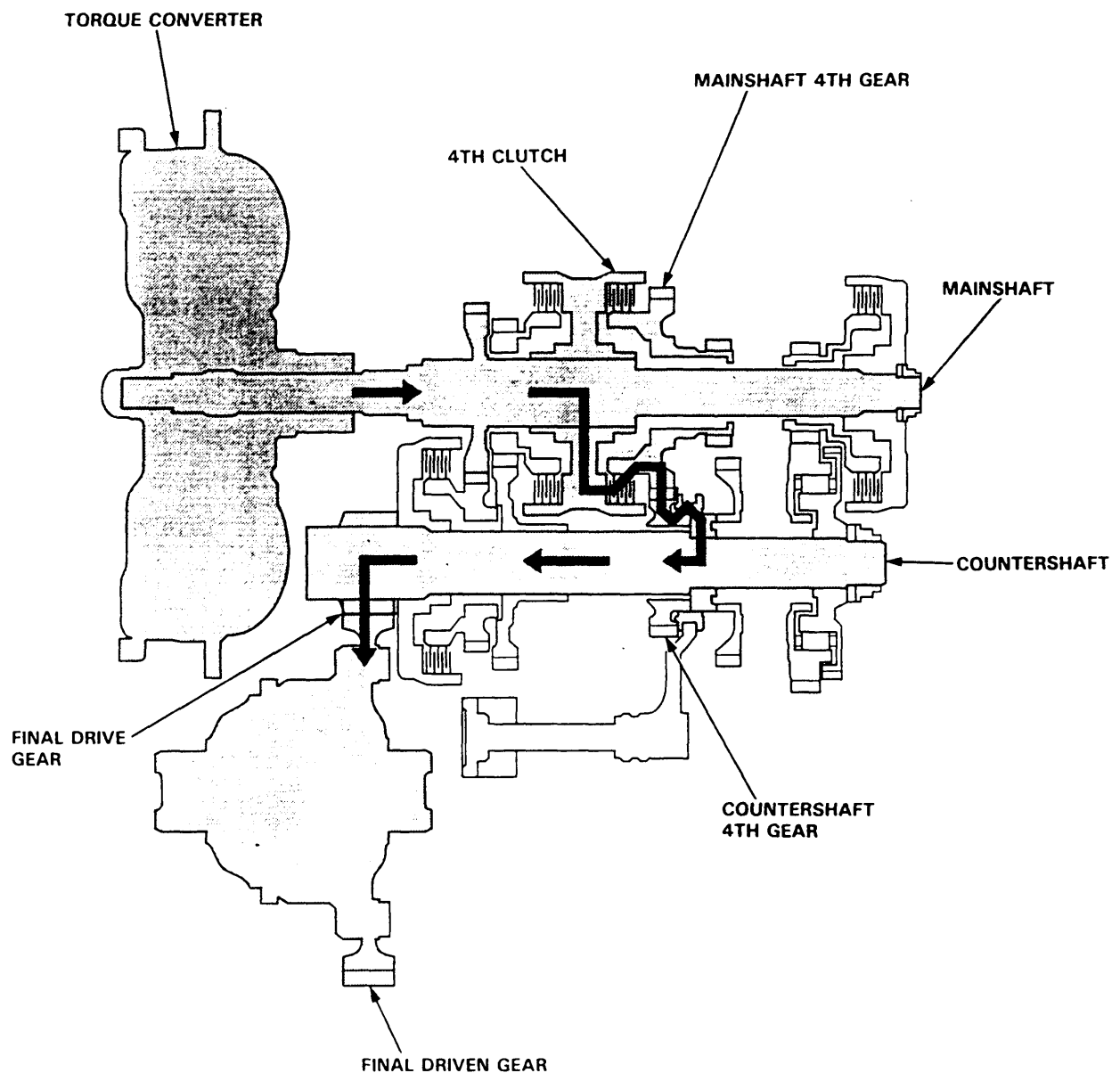




4th Gear (D₄ position)

1. Hydraulic pressure is applied to the 4th clutch, which rotates together with the mainshaft, causing the mainshaft 4th gear to rotate.
2. Power is transmitted to the countershaft 4th gear, which drives the countershaft.
3. Power is transmitted to the final drive gear, which drives the final driven gear.

NOTE: Hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of 4th gear exceeds that of 1st gear, power from 1st gear is cut off at the one-way clutch.



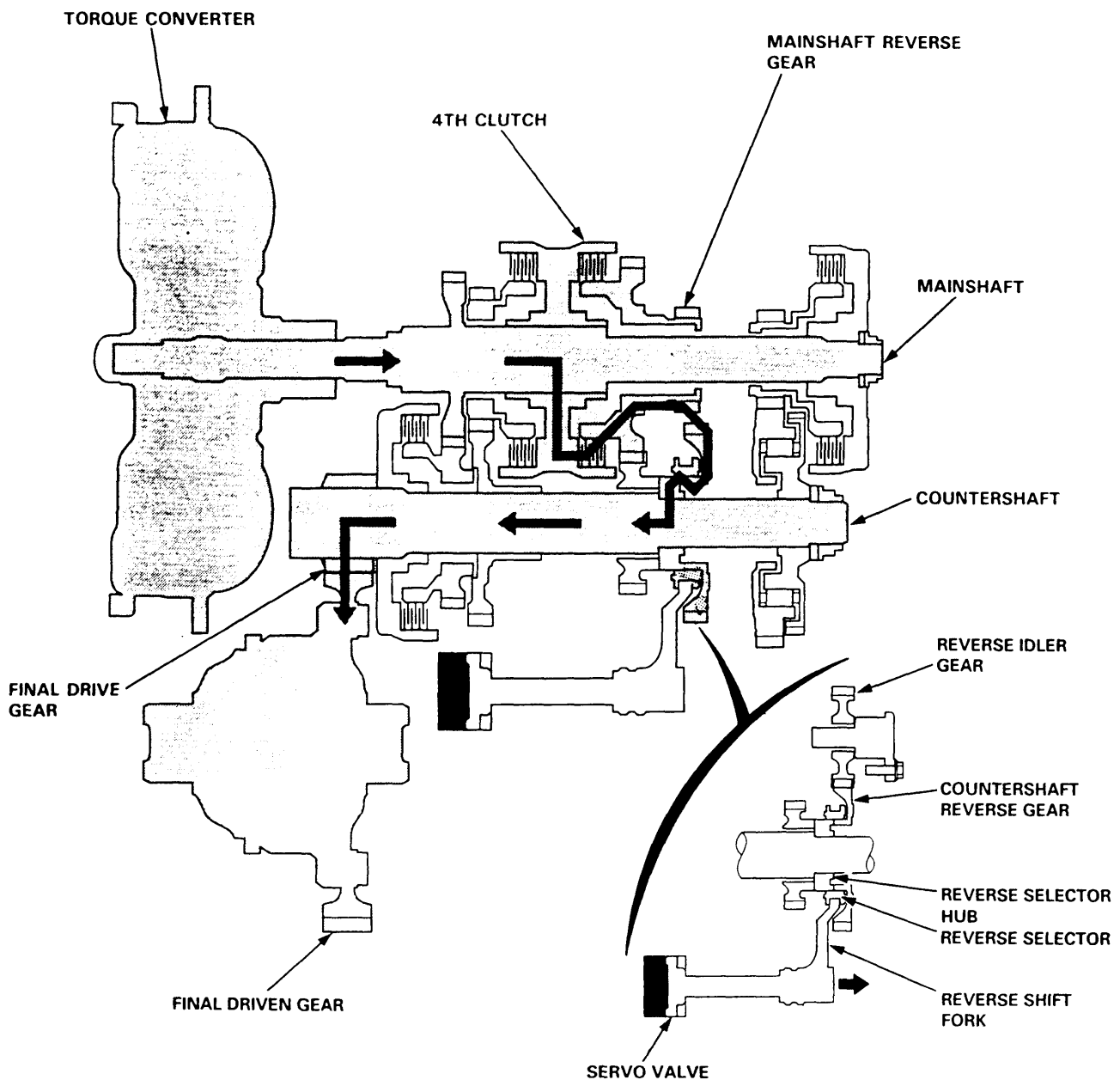
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Description

Power Flow (cont'd)

R Position

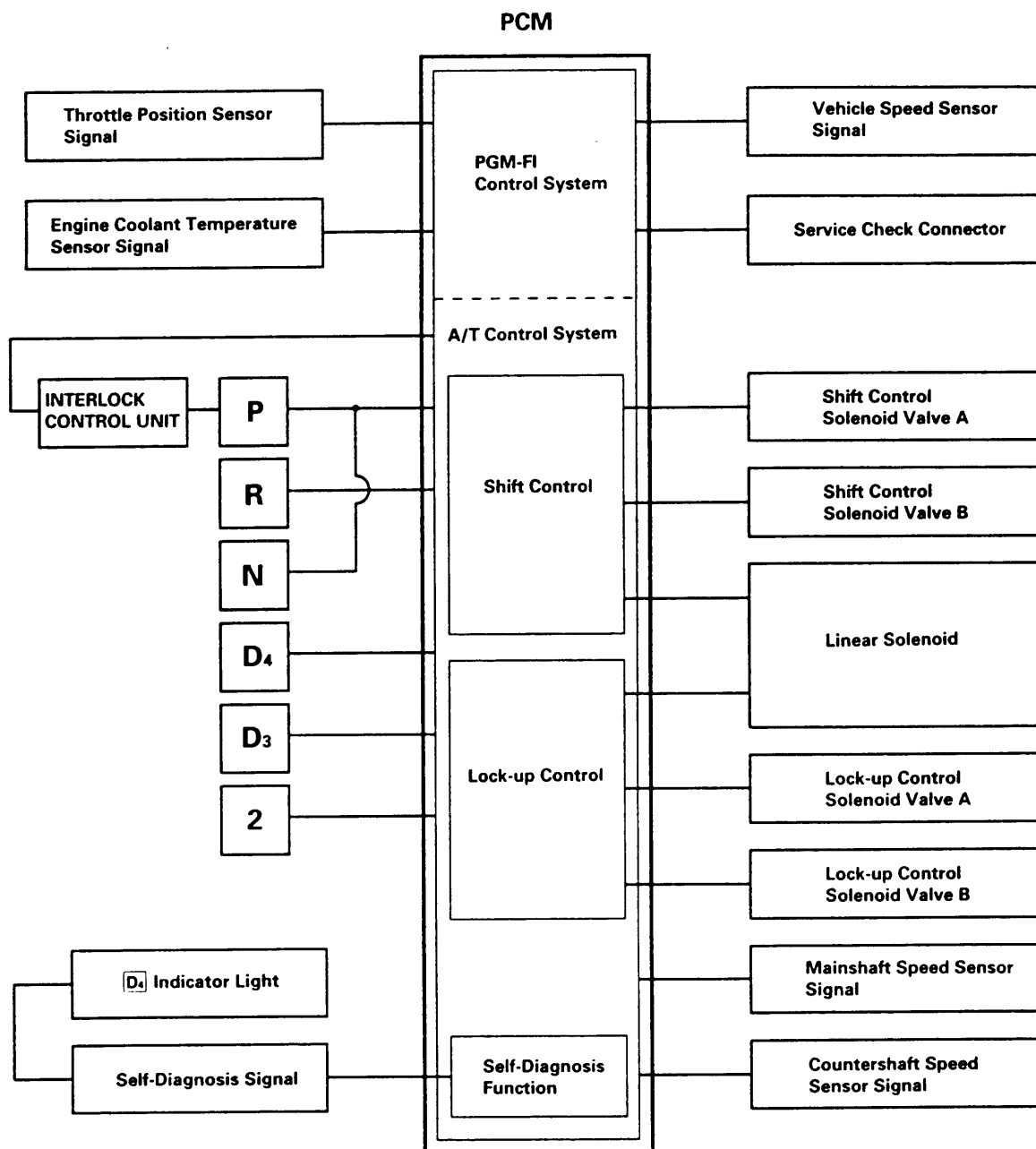
1. Hydraulic pressure is switched by the manual valve to the servo valve, which moves the reverse shift fork to the reverse position. The reverse shift fork engages with the reverse selector, reverse selector hub, and the countershaft reverse gear.
2. Hydraulic pressure is also applied to the 4th clutch. Power is transmitted from the mainshaft reverse gear via the reverse idler gear to the countershaft reverse gear.
3. The rotation direction of the countershaft reverse gear is changed via the reverse idler gear.
4. Power is transmitted to the final drive gear, which drives the final driven gear.





Electronic Control System

The electronic control system consists of a Powertrain Control Module (PCM), sensors, a linear solenoid and four solenoid valves. Shifting and lock-up are electronically controlled for comfortable driving under all conditions. The PCM is located below the dashboard, under the front lower panel on the passenger's side.



(cont'd)

Description

Electronic Control System (cont'd)

Shift Control

The PCM instantaneously determines which gear should be selected by various signals sent from sensors, and actuates the shift control solenoid valves A and B to control shifting. Also, a Grade Logic Control System has been adopted to control shifting in **D₄** position while the vehicle is ascending or descending a slope, or reducing speed.

Position	Gear	Shift Control Solenoid Valve A	Shift Control Solenoid Valve B
D₄ , D₃	1st	OFF	ON
	2nd	ON	ON
	3rd	ON	OFF
D₄	4th	OFF	OFF
2	2nd	ON	ON
R *	Reverse	ON	OFF

*See page 14-30 for reverse inhibitor control description.

Lock-up Control

From sensor input signals, the PCM determines whether to turn the lock-up ON or OFF, and activates lock-up control solenoid valve A and/or B accordingly. The combination of driving signals to lock-up control solenoid valves A and B and the linear solenoid pressure is shown in the table below.

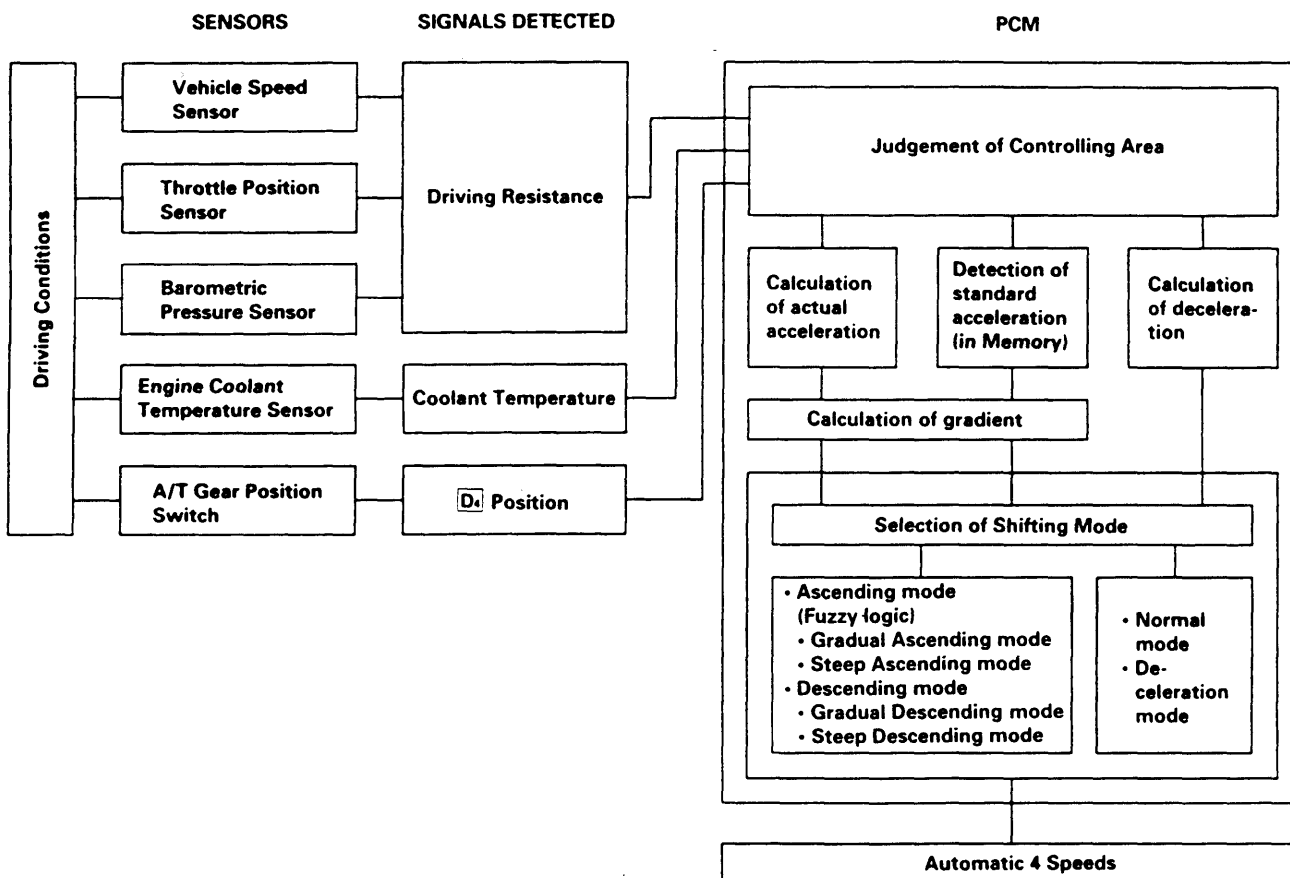
Lock-up Conditions	Lock-up Control Solenoid Valve A	Lock-up Control Solenoid Valve B	Linear Solenoid Pressure
Lock-up OFF	OFF	OFF	High
Lock-up, Half	ON	Duty operation OFF ↔ ON	Low
Lock-up, Full	ON	ON	High
Lock-up during deceleration	ON	Duty operation OFF ↔ ON	Low



Grade Logic Control System

How it works:

The PCM compares actual driving conditions with driving conditions memorized in the PCM, based on the input from the vehicle speed sensor, the throttle position sensor, the barometric pressure sensor, the engine coolant temperature sensor, the brake switch signal, and the shift lever position signal. The PCM is then able to control shifting while the vehicle is ascending or descending a slope, or reducing speed.



(cont'd)

Description

Electronic Control System (cont'd)

Ascending Control

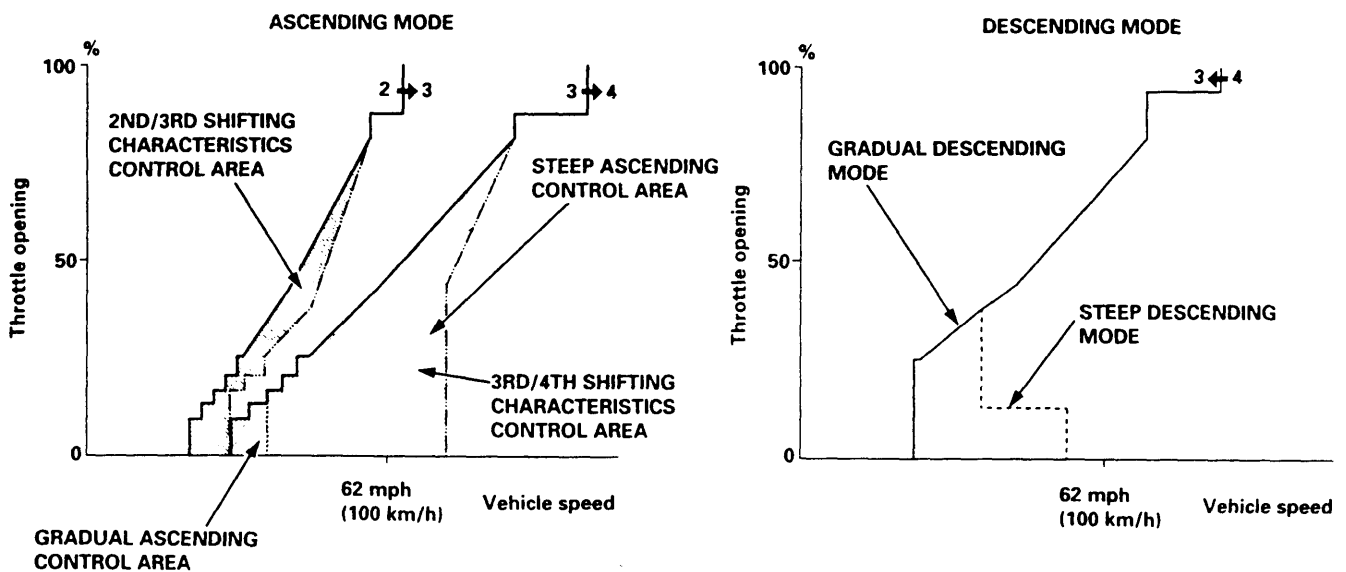
When the PCM determines that the vehicle is climbing a hill in **D₄** position, the system extends the engagement area of 2nd gear and 3rd gear to prevent the transmission from frequently shifting between 2nd and 3rd gears, and between 3rd and 4th gears, so the vehicle can run smooth and have more power when needed. There are two ascending modes with different 3rd gear driving areas according to the magnitude of a gradient stored in the PCM.

NOTE:

- The PCM memory contains shift schedules between 2nd and 3rd gears, and between 3rd and 4th gears that enable the PCM's fuzzy logic to automatically select the most suitable gear according to the magnitude of a gradient.
- Fuzzy logic is a form of artificial intelligence that lets computers respond to changing conditions much like a human mind would.

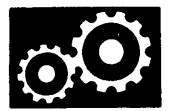
Descending Control

When the PCM determines that the vehicle is going down a hill in **D₄** position, the shift-up speed from 3rd to 4th gear when the throttle is closed becomes faster than the set speed for flat road driving to widen the 3rd gear driving area. This, in combination with engine braking from the deceleration lock-up, achieves smooth driving when the vehicle is descending. There are two descending modes with different downshift (4 – 3) schedules according to the magnitude of a gradient stored in the PCM. When the vehicle is in 4th gear, and you are decelerating on a gradual hill, or when you are applying the brakes on a steep hill, the transmission will downshift to 3rd gear. When you accelerate, the transmission will then return to 4th gear.

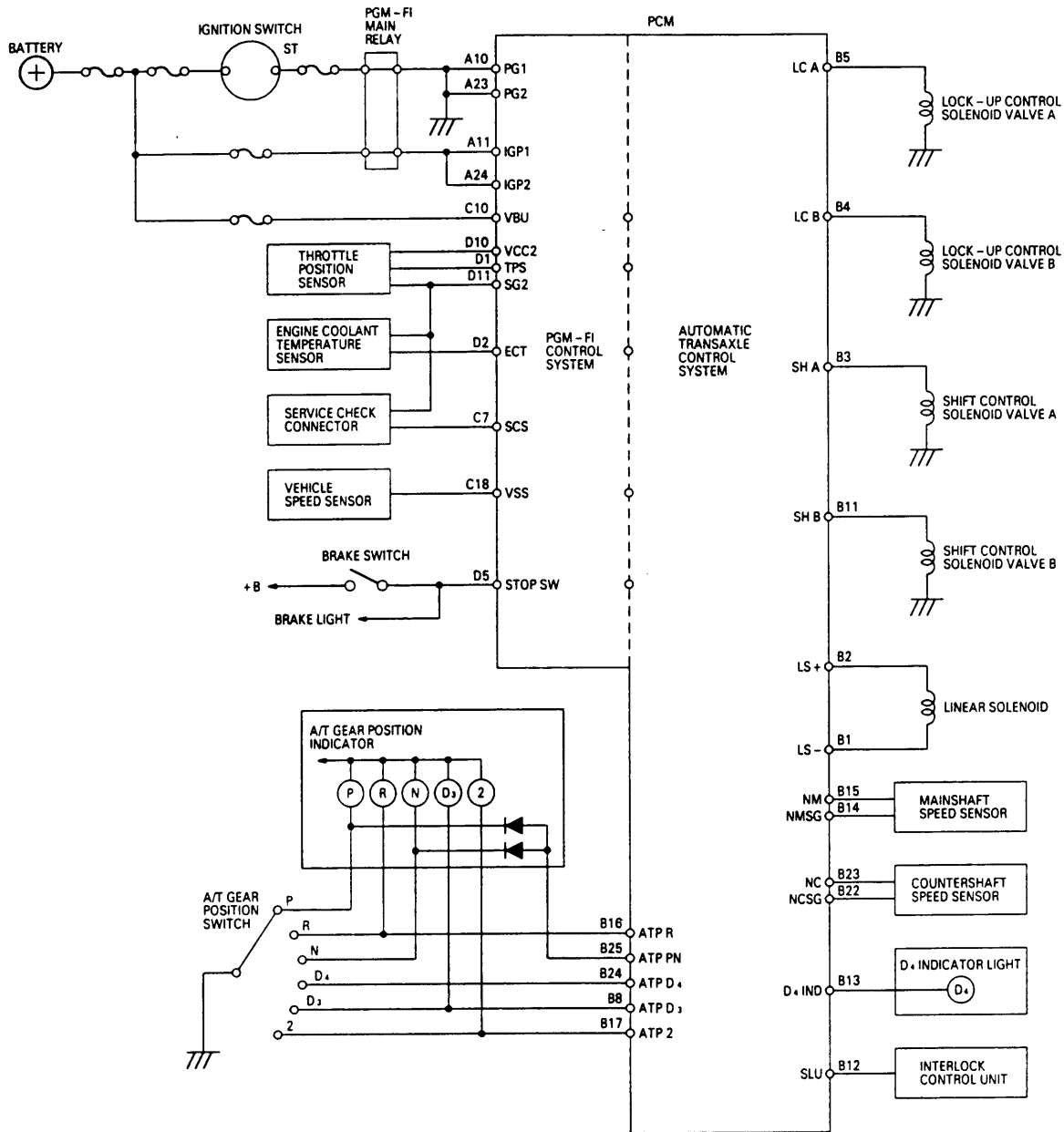


Deceleration Control

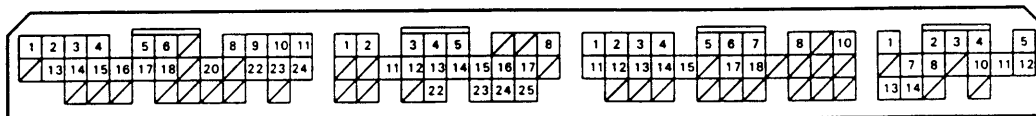
When the vehicle goes around a corner, and needs to first decelerate and then accelerate, the PCM sets the data for deceleration control to reduce the number of times the transmission shifts. When the vehicle is decelerating from speeds above 26 mph (41 km/h), the PCM shifts the transmission from 4th to 2nd earlier than normal to cope with upcoming acceleration.



Circuit Diagram and Terminal Locations



PCM Terminal Locations



A (32P) Connector

B (25P) Connector

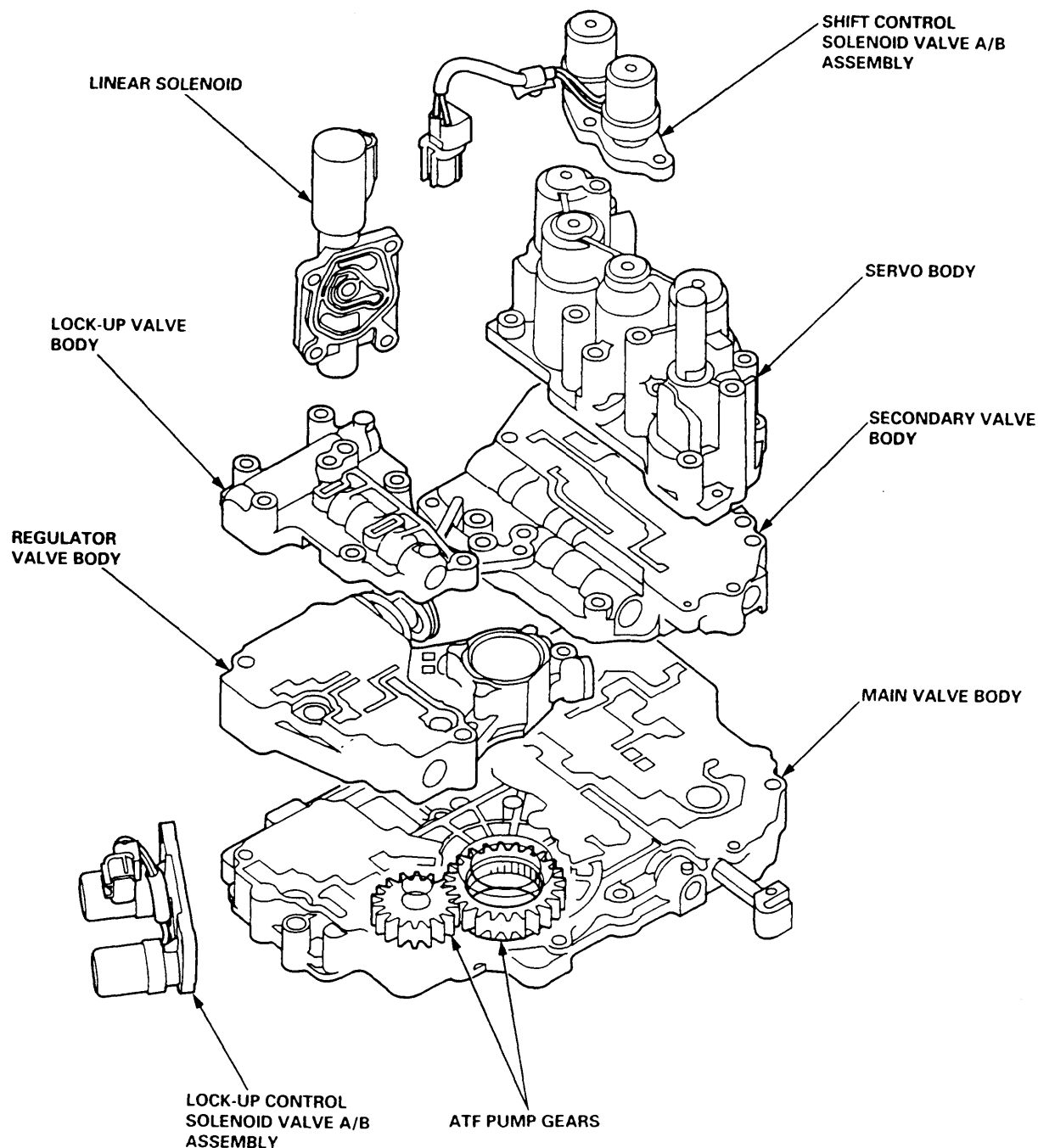
C (31P) Connector

D (16P) Connector

Description

Hydraulic Control

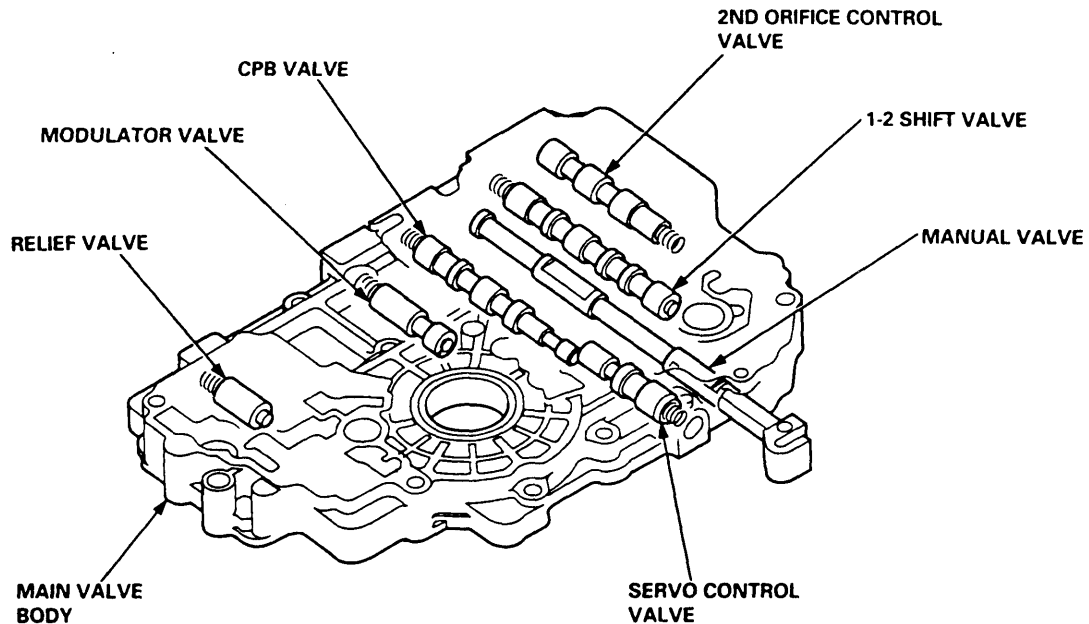
The hydraulic control system is controlled by the ATF pump, valves, accumulators, and electronically controlled solenoids. The ATF pump is driven by splines on the end of the torque converter which is attached to the engine. Fluid from the ATF pump flows through the regulator valve to maintain specified pressure through the main valve body to the manual valve, directing pressure to each clutch. The valve body includes the main valve body, the regulator valve body, the lock-up valve body, the secondary valve body, the servo body, the linear solenoid, the shift control solenoid valve A/B assembly, and the lock-up control solenoid valve A/B assembly. The shift control solenoid valve A/B assembly and the linear solenoid are bolted to the outside of the transmission housing. The lock-up control solenoid valve A/B assembly is bolted to the outside of the torque converter housing.





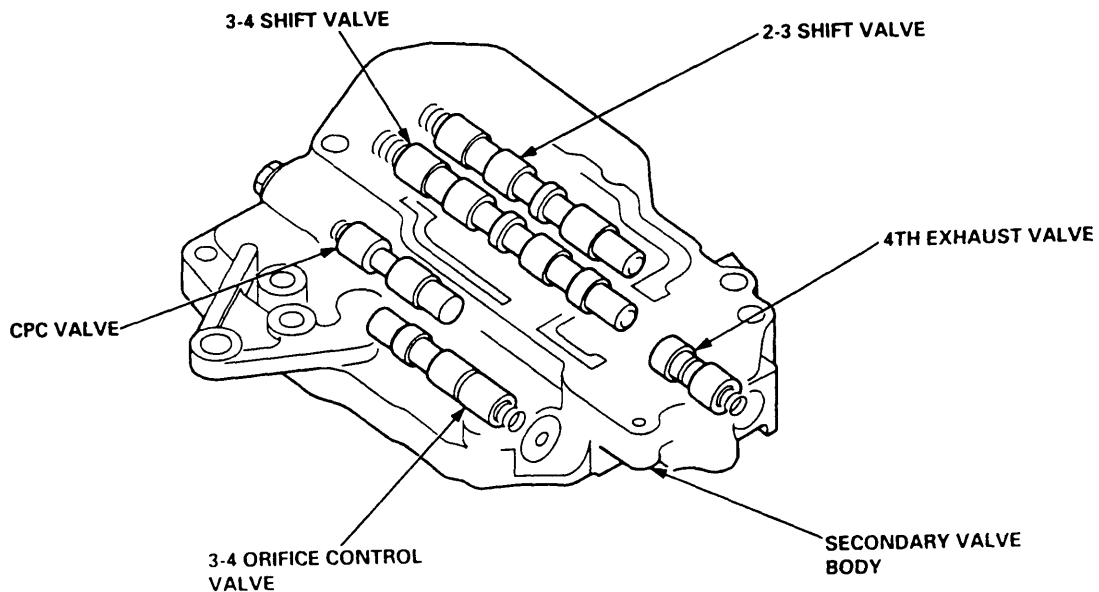
Main Valve Body

The main valve body houses the manual valve, the 1-2 shift valve, the 2nd orifice control valve, the CPB valve, the modulator valve, the servo control valve, and the relief valve. The primary functions of the main valve body are to switch fluid pressure on and off and to control the hydraulic pressure going to the hydraulic control system.



Secondary Valve Body

The secondary valve body is located on the main valve body. The secondary valve body houses the 2-3 shift valve, the 3-4 shift valve, the 3-4 orifice control valve, the 4th exhaust valve and CPC valve.



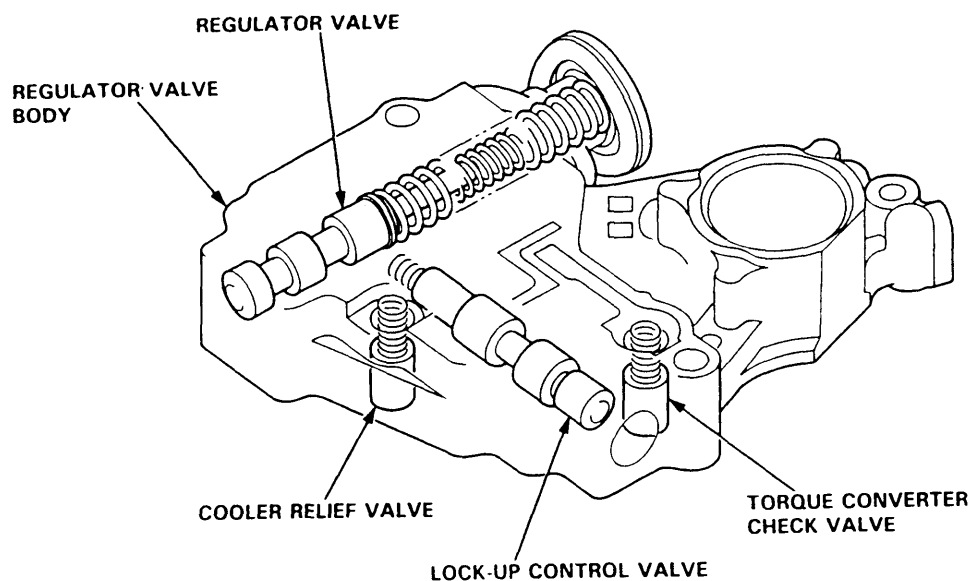
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Description

Hydraulic Control (cont'd)

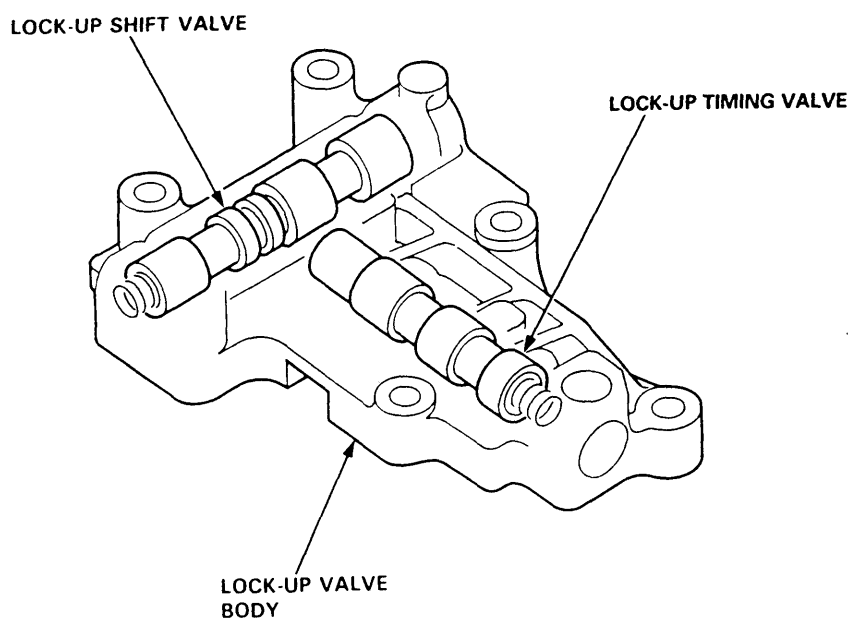
Regulator Valve Body

The regulator valve body is located on the main valve body. The regulator valve body consists of the regulator valve, the torque converter check valve, the cooler relief valve, and the lock-up control valve.



Lock-up Valve Body

The lock-up valve body with the lock-up shift valve and the lock-up timing valve is located on the regulator valve body.

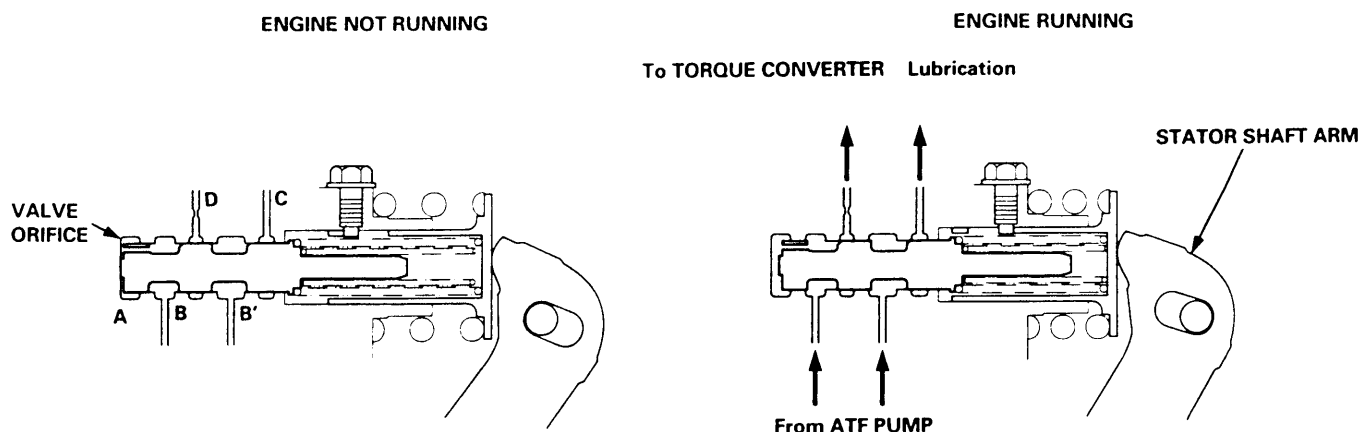




Regulator Valve

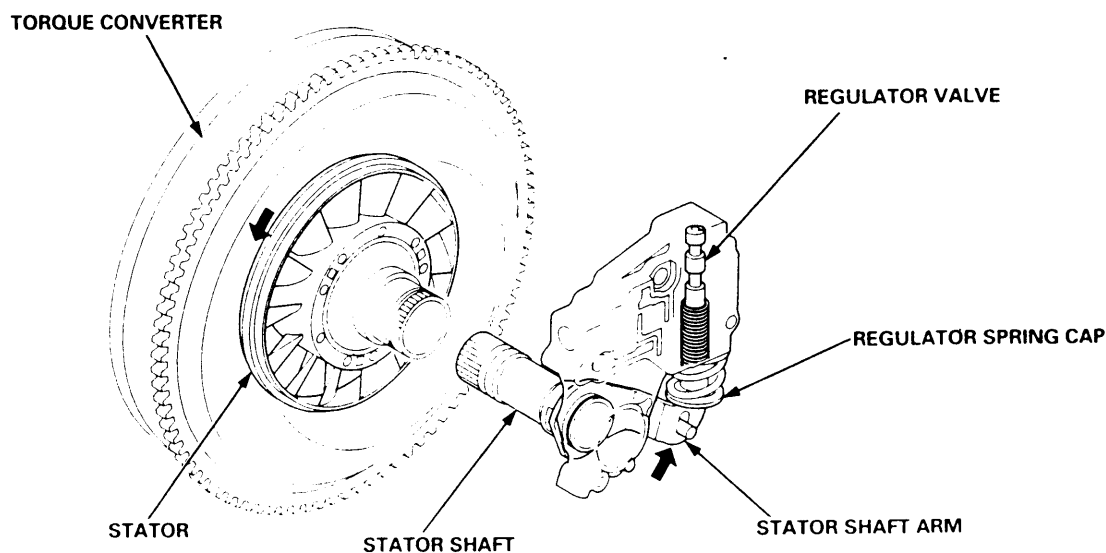
The regulator valve maintains a constant hydraulic pressure from the ATF pump to the hydraulic control system, while also furnishing fluid to the lubricating system and torque converter. The fluid from the ATF pump flows through B and B'. The regulator valve has a valve orifice. The fluid entering from B flows through the orifice to the A cavity. This pressure of the A cavity pushes the regulator valve to the right side, and this movement of the regulator valve uncovers the fluid port to the torque converter and the relief valve. The fluid flows out to the torque converter, and the relief valve and regulator valve moves to the left side. According to the level of the hydraulic pressure through B, the position of the regulator valve changes and the amount of the fluid from B' through D and C also changes. This operation is continued, maintaining the line pressure.

NOTE: When used, "left" or "right" indicates direction on the illustration below.



Stator Reaction Hydraulic Pressure Control

Increases in hydraulic pressure according to torque are performed by the regulator valve using stator torque reaction. The stator shaft is splined with the stator in the torque converter, and its arm end contacts the regulator spring cap. When the vehicle is accelerating or climbing (Torque Converter Range), the stator torque reaction acts on the stator shaft, and the stator arm pushes the regulator spring cap in the direction of the arrow in proportion to the reaction. The stator reaction spring compresses, and the regulator valve moves to increase the line pressure which is regulated by the regulator valve. The line pressure reaches its maximum when the stator torque reaction reaches its maximum.



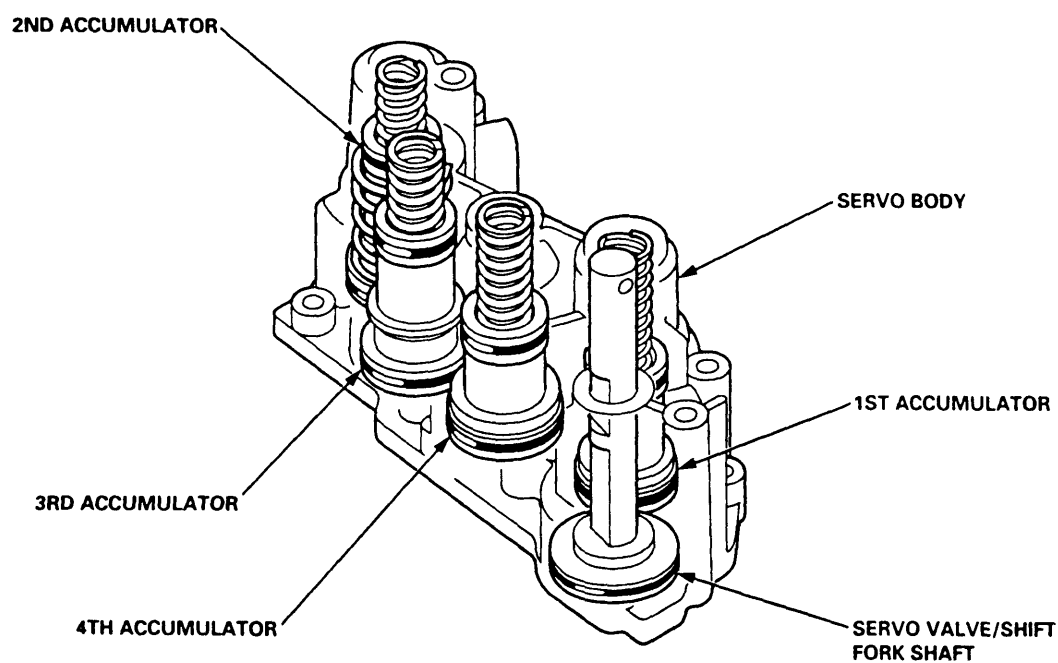
(cont'd)

Description

Hydraulic Control (cont'd)

Servo Body

The servo body is located on the secondary valve body. The servo body contains the servo valve which is integrated with the reverse shift fork shaft, and the accumulators.



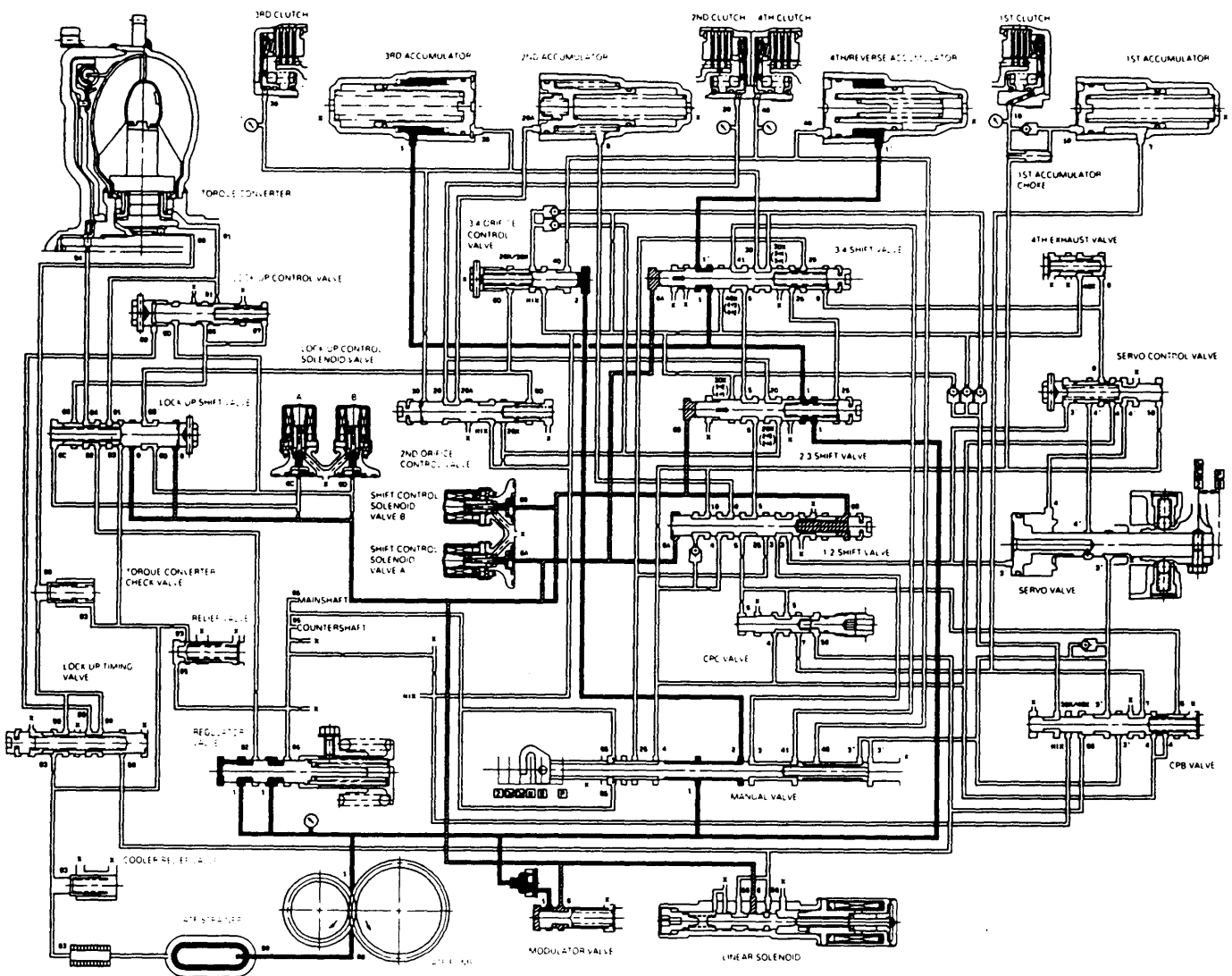
Description

Hydraulic Flow (cont'd)

N Position

As the engine turns, the ATF pump also starts to operate. Automatic transmission fluid (ATF) is drawn from (99) and discharged into (1). Then, ATF flowing from the ATF pump becomes line pressure (1). The line pressure (1) is regulated by the regulator valve. The torque converter inlet pressure (92) enters (94) of the torque converter through the lock-up shift valve and discharges into (90). The torque converter check valve prevents the torque converter pressure from rising. Under this condition, hydraulic pressure is not applied to the clutches.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.

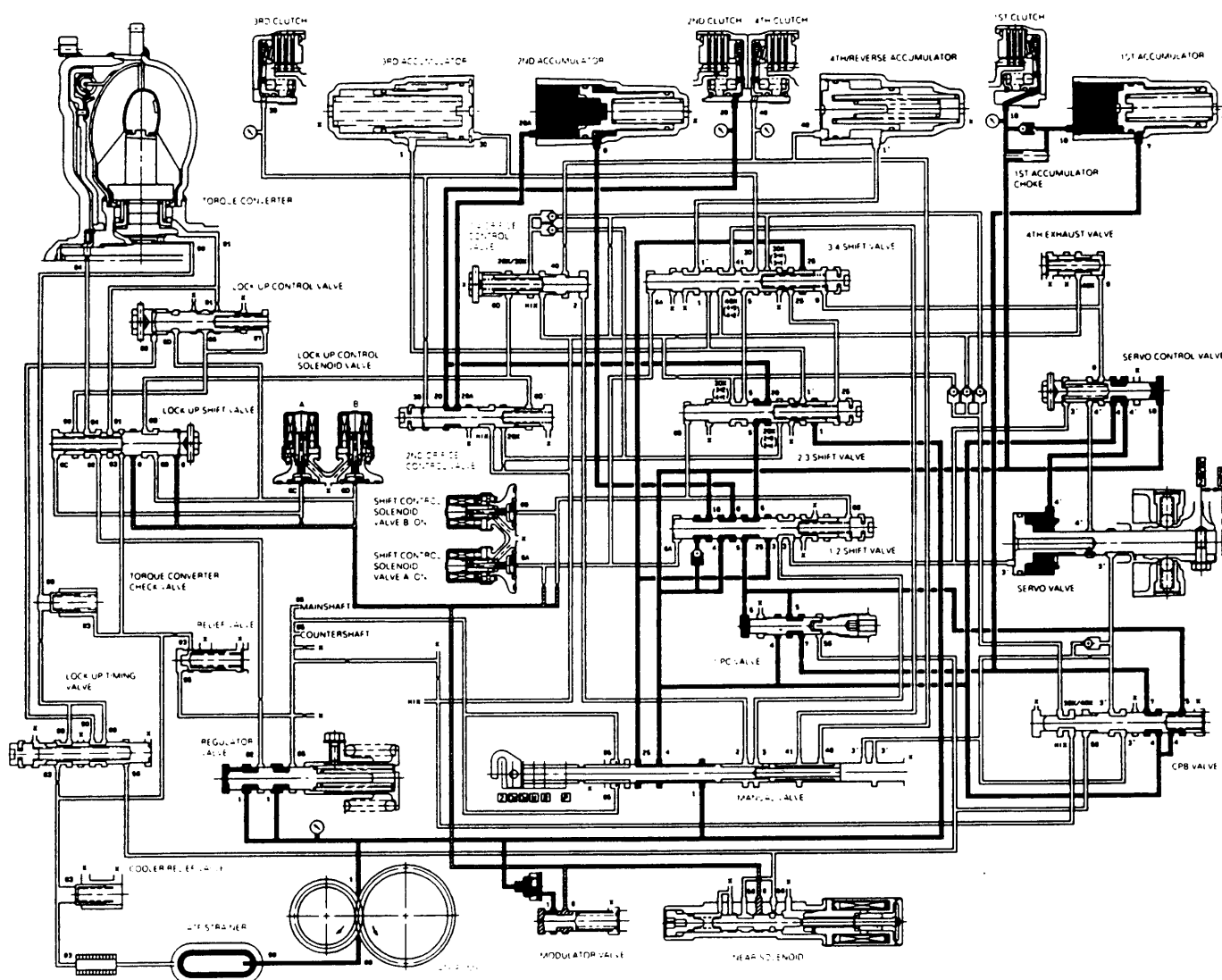




2 Position

The line pressure (1) flows to the manual valve and the modulator valve. The line pressure (1) changes to line pressure (4) and (25) at the manual valve, and changes to modulator pressure at the modulator valve. But the modulator pressure (6) does not flow to each shift valve because shift control solenoid valves A and B are turned ON by the PCM. The line pressure (4) passes through the CPB valve and the CPC valve, and changes to line pressure (5), then flows to the 1-2 shift valve. The line pressure (5) from the 1-2 shift valve changes to 2nd clutch pressure (20) at the 2-3 shift valve. The 2nd clutch pressure (20) is applied to the 2nd clutch, and the 2nd clutch is engaged. The line pressure (4) passes through the 1-2 shift valve and the orifice, and changes to 1st clutch pressure. The 1st clutch pressure (10) also flows to the 1st clutch. However, no power is transmitted because of the one-way clutch.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



(cont'd)

Description

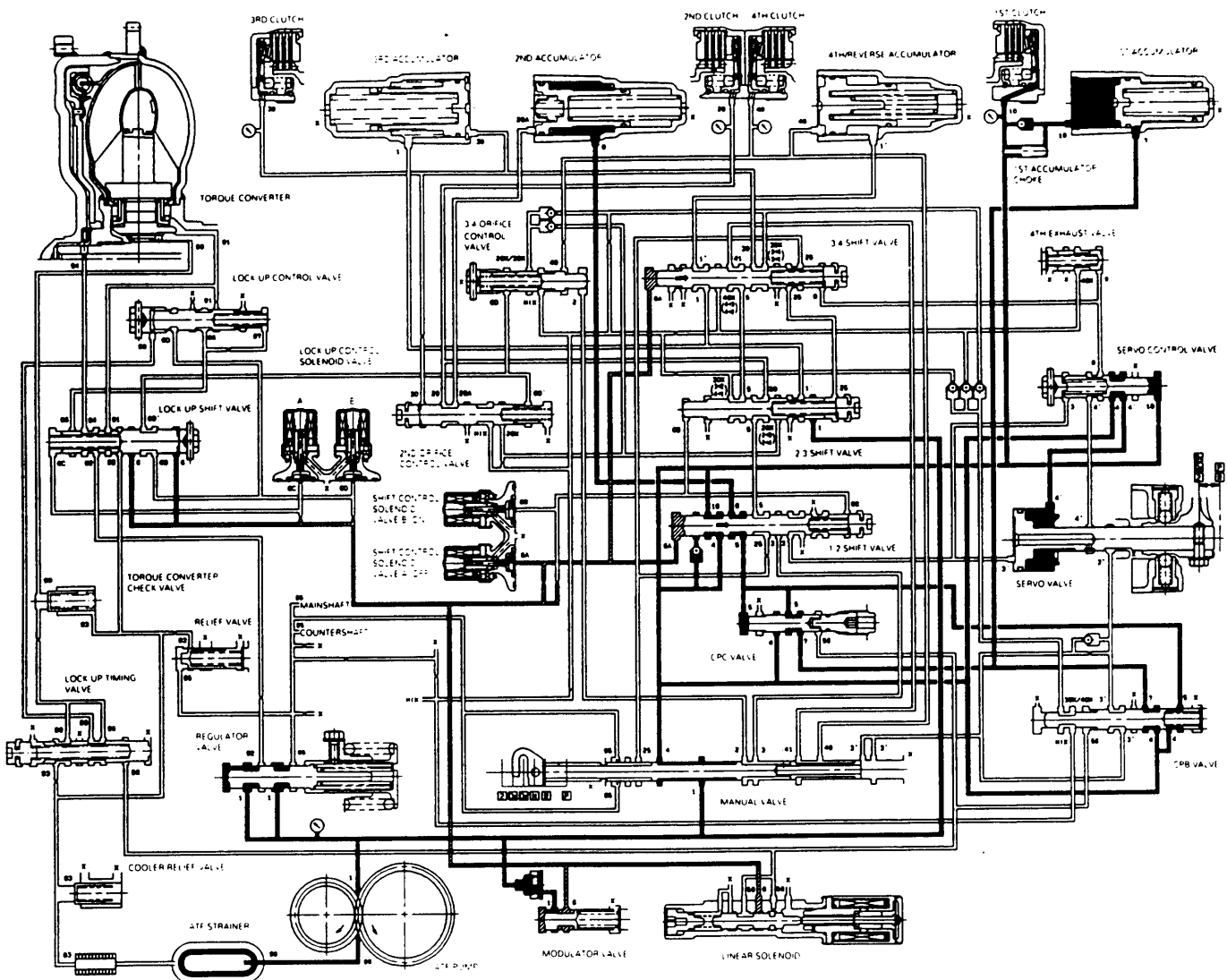
Hydraulic Flow (cont'd)

D₄ or **D₅** Position

1. 1st Gear

The flow of fluid through the torque converter circuit is same as in **N** position. The line pressure flows to the manual valve and the modulator valve. The line pressure changes to modulator pressure (6) at the modulator valve and to line pressure (4) at the manual valve. The modulator pressure (6) flows to the left end of the 1-2 shift valve and the 3-4 shift valve because shift control solenoid valve A is turned OFF and B is turned ON by the PCM. The 1-2 shift valve is moved to the right side. The line pressure (4) changes to 1st clutch pressure (10) at the 1-2 shift valve and the orifice. The 1st clutch pressure (10) is applied to the 1st clutch and the 1st accumulator; consequently, the vehicle will move as the engine power is transmitted.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.





2. 2nd Gear

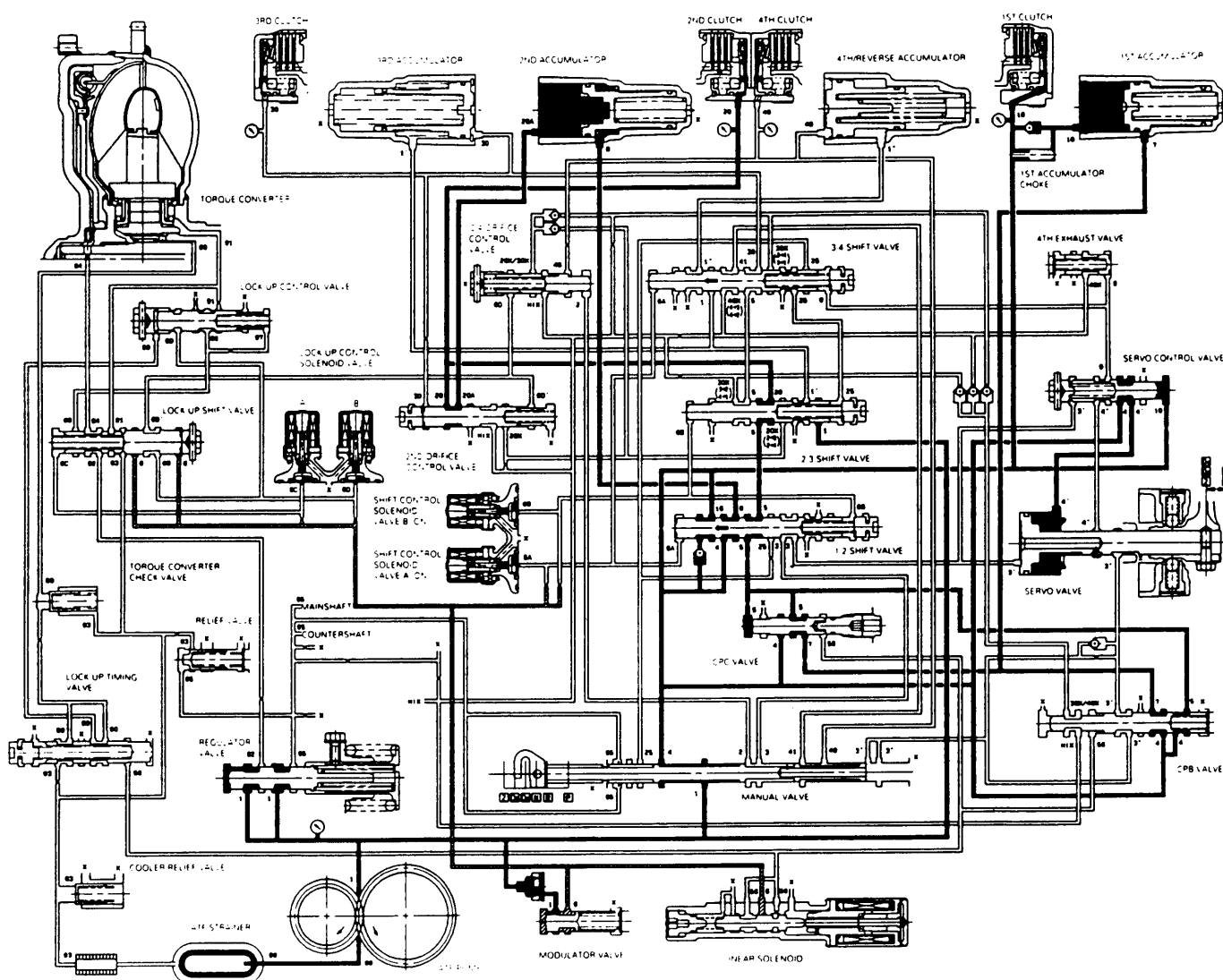
As the speed of the vehicle reaches the prescribed value, shift control solenoid valve A is turned ON by means of the PCM. The modulator pressure (6A) in the left end of the 1-2 shift valve is released by turning shift control solenoid valve A ON. The 1-2 shift valve is moved to the left side and uncovers the port to allow line pressure (5) to the 2-3 shift valve. The line pressure (5) changes to 2nd clutch pressure (20) at the 2-3 shift valve. The 2nd clutch pressure (20) is applied to the 2nd clutch, and the 2nd clutch is engaged.

Fluid flows by way of:

- Line Pressure (4) → CPB Valve - Line Pressure (5) → 1-2 Shift Valve - Line Pressure (5) → 2-3 Shift Valve
- 2nd Clutch Pressure (20) → 2nd Clutch

The hydraulic pressure also flows to the 1st clutch. However, no power is transmitted because of the one-way clutch.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



(cont'd)

Description

Hydraulic Flow (cont'd)

3. 3rd Gear

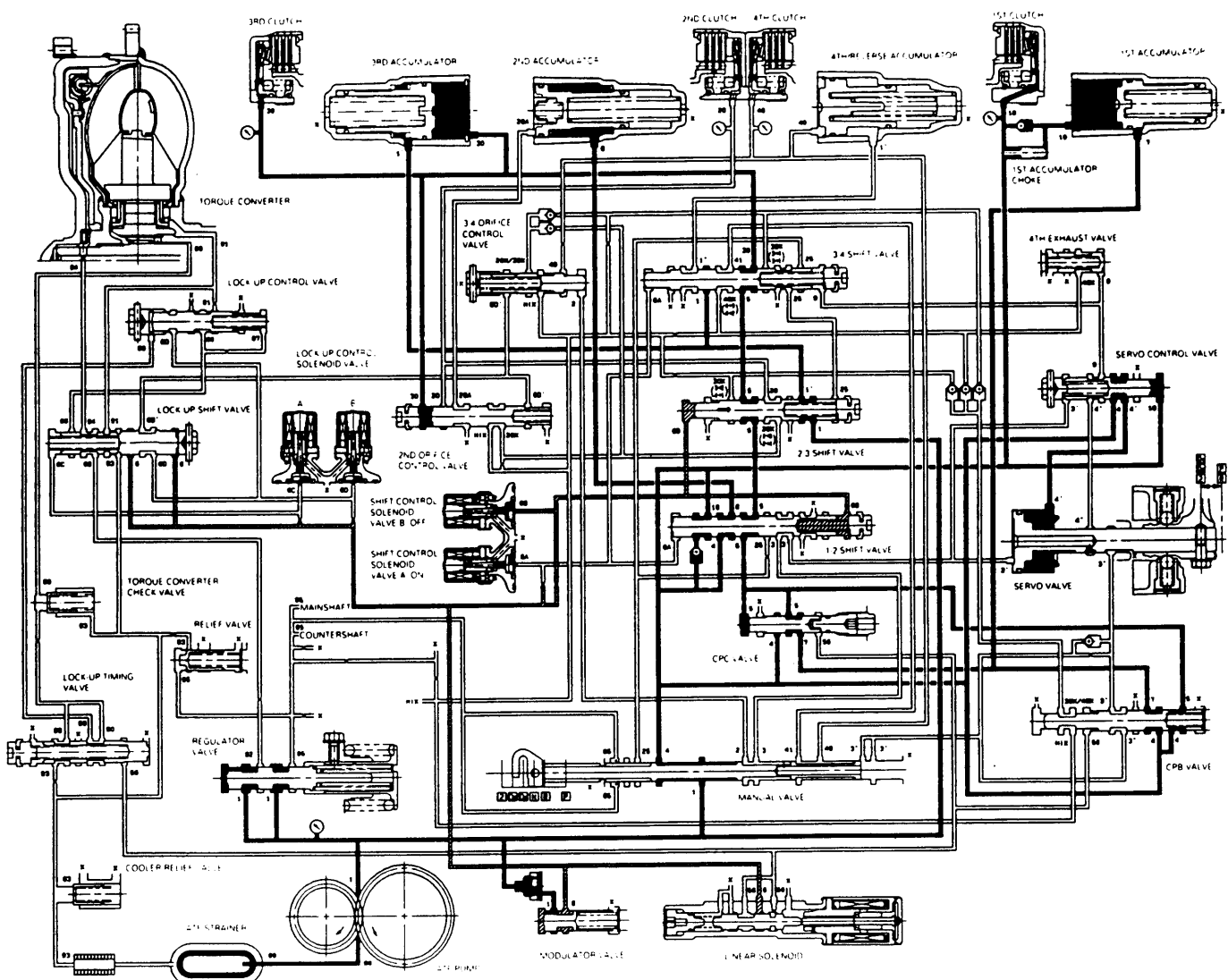
As the speed of the vehicle reaches the prescribed value, shift control solenoid valve B is turned OFF by means of the PCM. Shift control solenoid valve A remains ON. The modulator pressure (6) flows to the right end of the 1-2 shift valve and the left end of the 2-3 shift valve. The 2-3 shift valve is moved to the right side by modulator pressure (6B). The 2-3 shift valve covers the port to stop line pressure (5) to the 2nd clutch and uncovers to the 3-4 shift valve as the 2-3 shift valve is moved to the right side. The line pressure (5) becomes 3rd clutch pressure (30) at the 3-4 shift valve. The 3rd clutch pressure (30) is applied to the 3rd clutch, and the 3rd clutch is engaged.

Fluid flows by way of:

- Line pressure (4) → CPB Valve - Line Pressure (5) → 1-2 Shift Valve - Line Pressure (5) → 2-3 Shift Valve
- Line Pressure (5) → 3-4 Shift Valve - 3rd Clutch Pressure (30) → 3rd Clutch

The hydraulic pressure also flows to the 1st clutch. However, no power is transmitted because of the one-way clutch as in 2nd gear.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.





4. 4th Gear (D₄ Position)

As the speed of the vehicle reaches the prescribed value, shift control solenoid valve A is turned OFF by means of the PCM. Shift control solenoid valve B remains OFF. The modulator pressure (6) flows to the left end of the 1-2 shift valve and the left end of the 3-4 shift valve. The modulator pressure (6A) in the left end of the 1-2 shift valve equals the modulator pressure (6B) in the right end of the 1-2 shift valve, the 1-2 shift valve remains at left side by the tension of the valve spring.

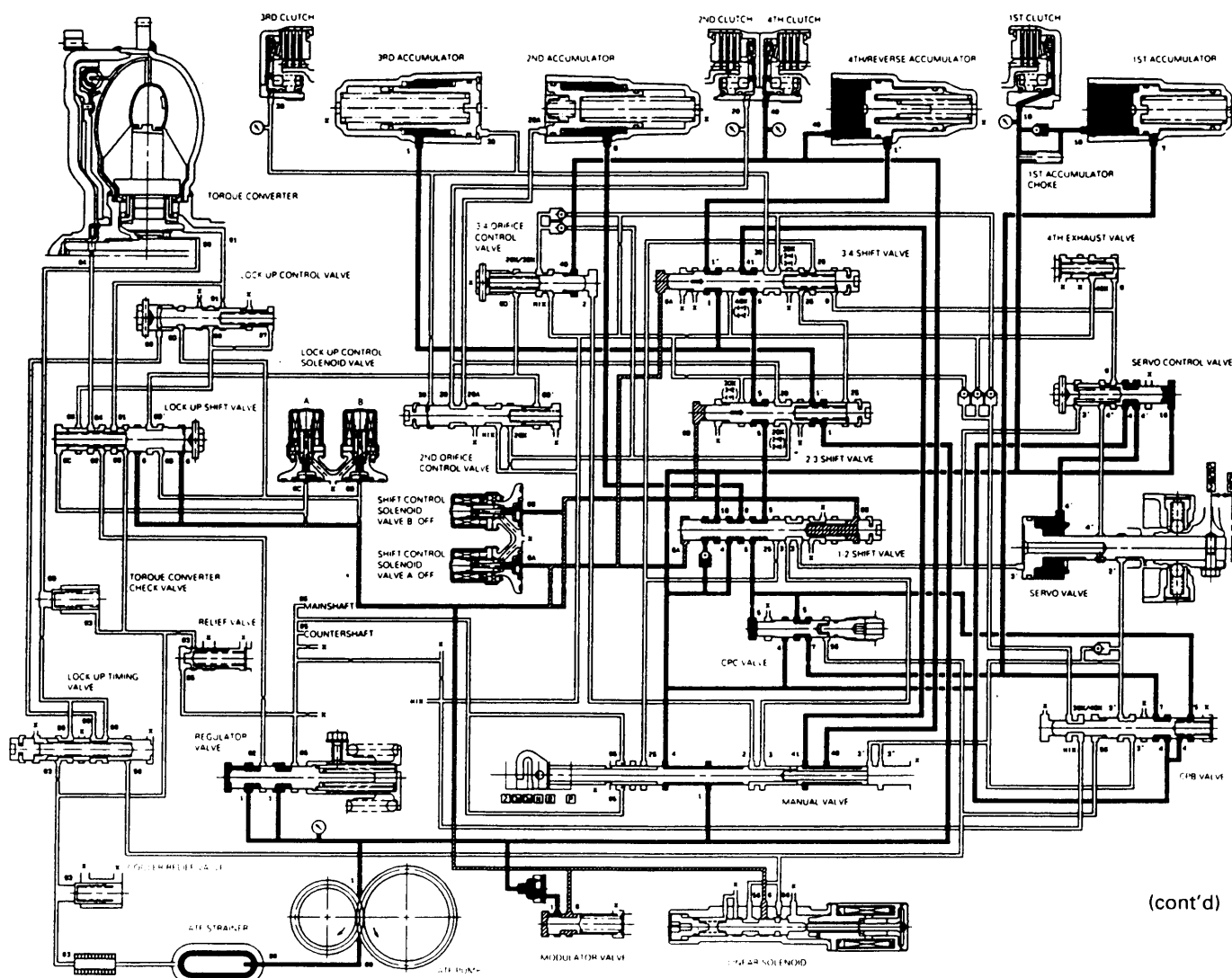
The 3-4 shift valve is moved to the right side by modulator pressure (6A). The 3-4 shift valve covers the port to the 3rd clutch and uncovers the port to the 4th clutch as this valve is moved to the right side. The 4th clutch pressure (41) from the 3-4 shift valve becomes 4th clutch pressure (40) at the manual valve. The 4th clutch pressure (40) is applied to the 4th clutch, and the 4th clutch is engaged.

Fluid flows by way of:

- Line pressure (4) → CPB Valve - Line Pressure (5) → 1-2 Shift Valve - Line Pressure (5) → 2-3 Shift Valve
- Line Pressure (5) → 3-4 Shift Valve - 4th Clutch Pressure (41) → Manual Valve - 4th Clutch Pressure (40) → 4th Clutch

The hydraulic pressure also flows to the 1st clutch. However, no power is transmitted because of the one-way clutch as in 2nd and 3rd gear.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



(cont'd)

Description

Hydraulic Flow (cont'd)

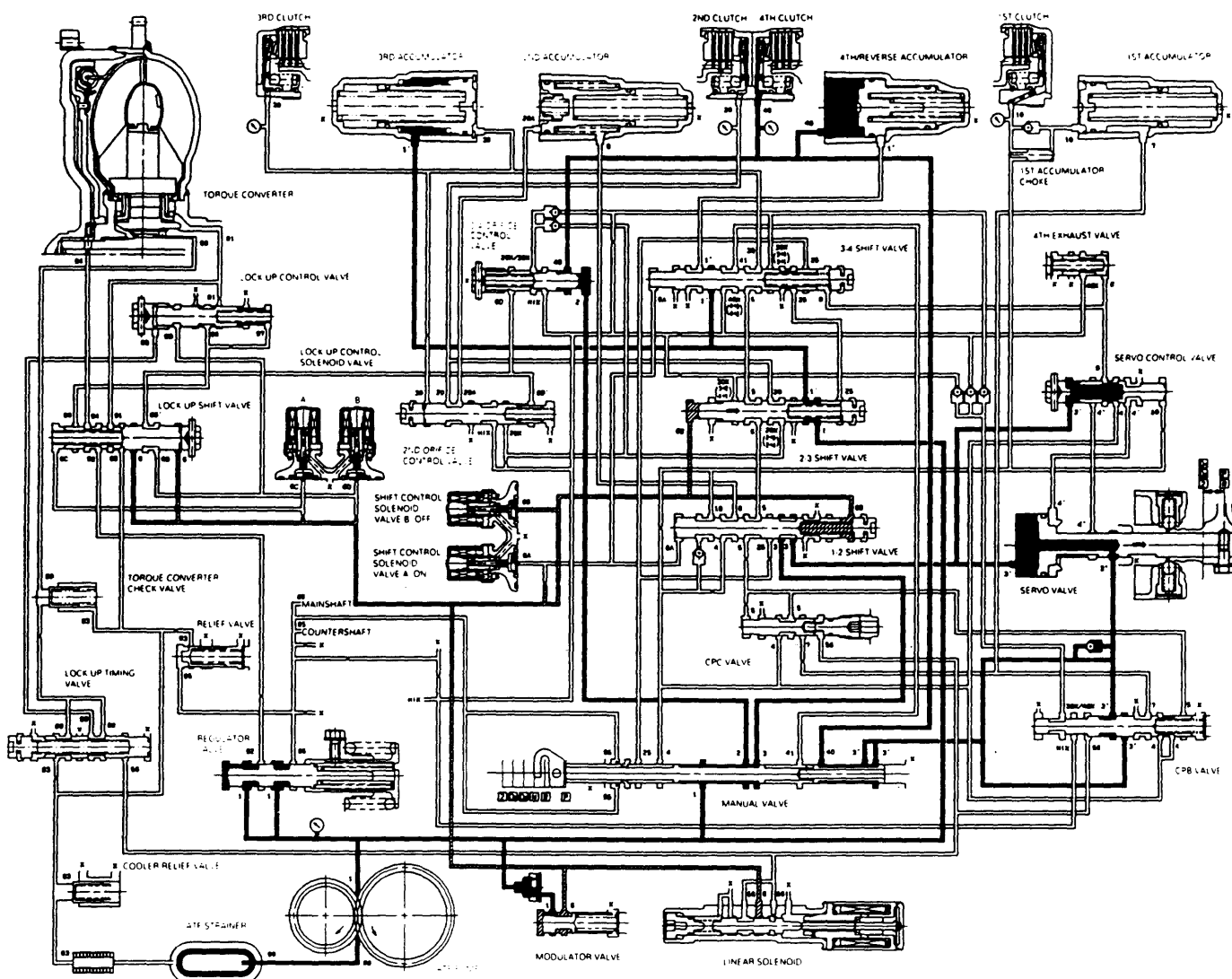
R Position

The flow of fluid through the torque converter circuit is the same as in **N** position. The line pressure (1) changes to line pressure (3) and flows to the 1-2 shift valve. The line pressure (3) changes to line pressure (3') at the 1-2 shift valve and flows to the servo valve. The servo valve is moved to the right side (Reverse range position) and uncovers the port to allow line pressure (3'') to the manual valve. The line pressure (3') from the 1-2 shift valve flows through the servo valve to the manual valve and changes to 4th clutch pressure (40). The 4th clutch pressure (40) is applied to the 4th clutch, and the 4th clutch is engaged.

Reverse Inhibitor Control

When the **R** position is selected while the vehicle is moving forward at speeds over 6 mph (10 km/h), the PCM outputs the 1st speed signal to shift control solenoid valves A and B; shift control solenoid valve A is turned OFF, shift control solenoid valve B is turned ON. The 1-2 shift valve is moved to the right side and covers the port to stop line pressure (3') to the servo valve. The line pressure (3') is not applied to the servo valve, and the 4th clutch pressure (40) is not applied to the 4th clutch, as a result, power is not transmitted to the reverse direction.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.

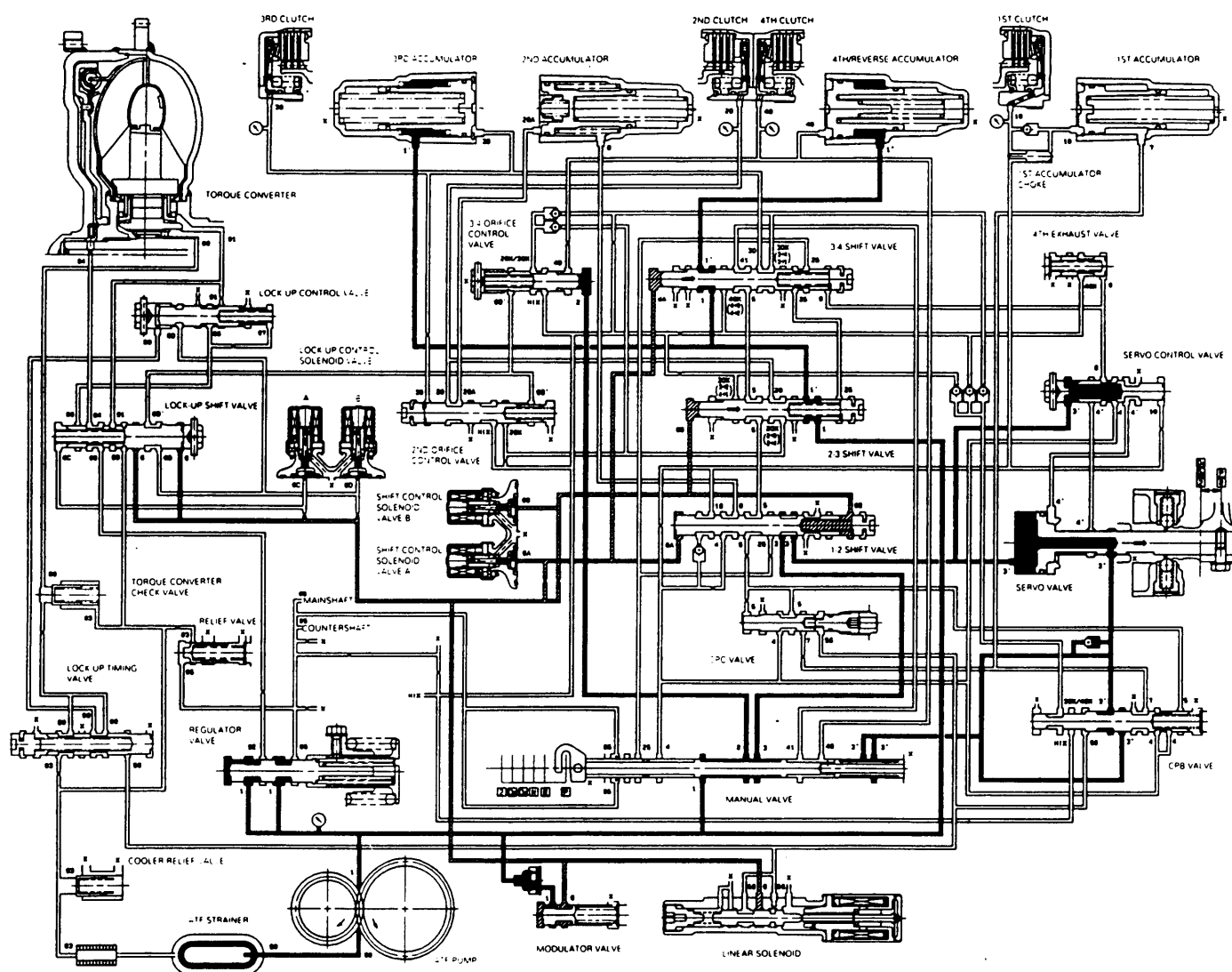




P Position

The flow of fluid through the torque converter circuit is the same as in **N** position. The line pressure (1) changes to line pressure (3) and flows to the 1-2 shift valve. The line pressure (3) changes to line pressure (3') at the 1-2 shift valve and flows to the servo valve. The servo valve is moved to the right side (Reverse range position) and uncovers the port to allow line pressure (3") to the manual valve as in **R** position. The line pressure (3") from the servo valve is intercepted by the manual valve. However, hydraulic pressure is not supplied to the clutches, and the power is not transmitted.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.

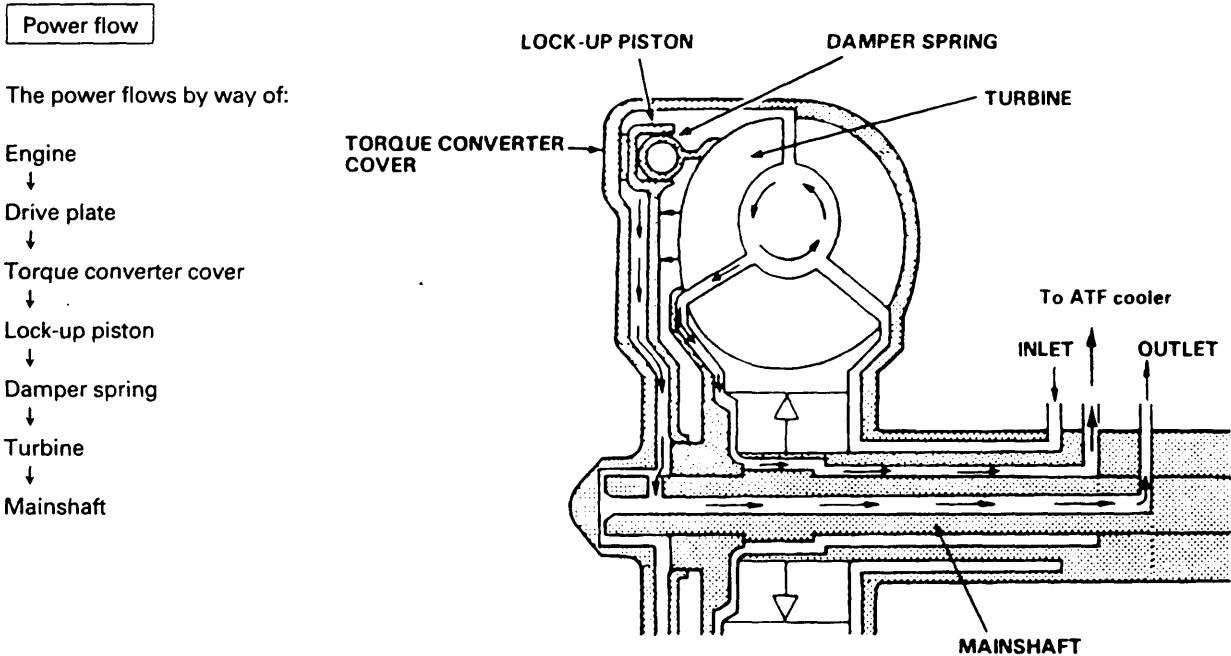


Description

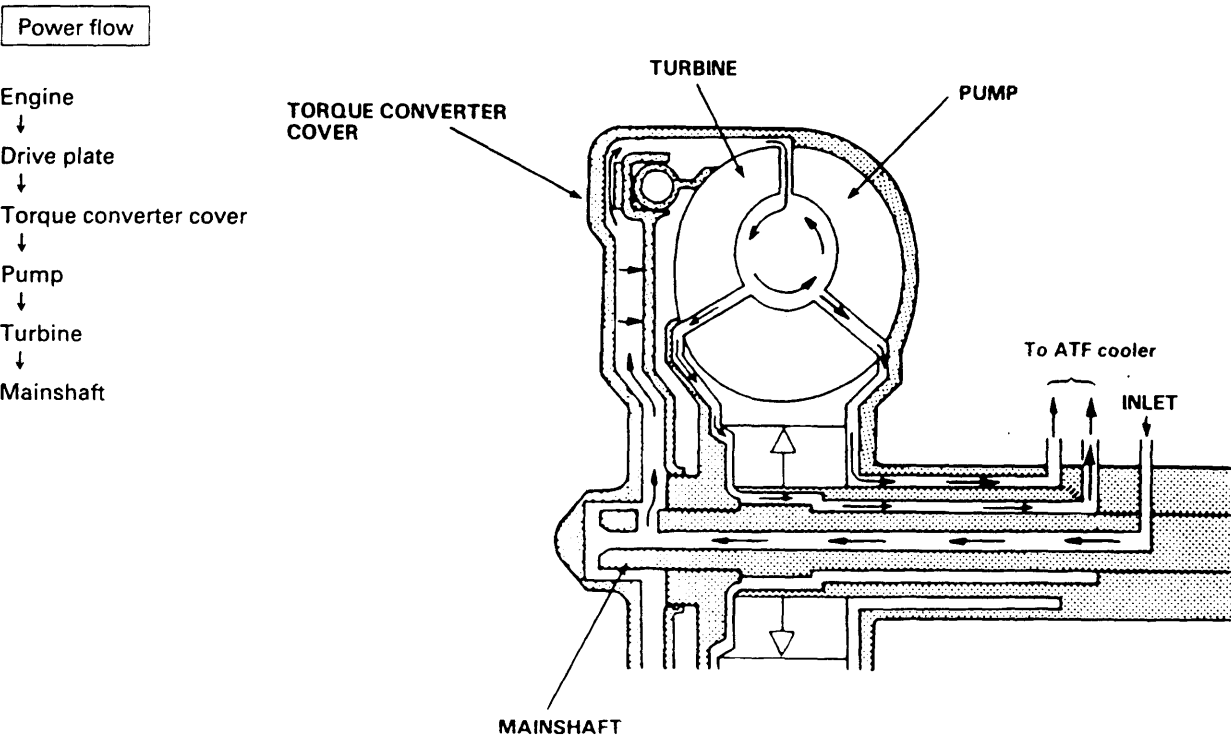
Lock-up System

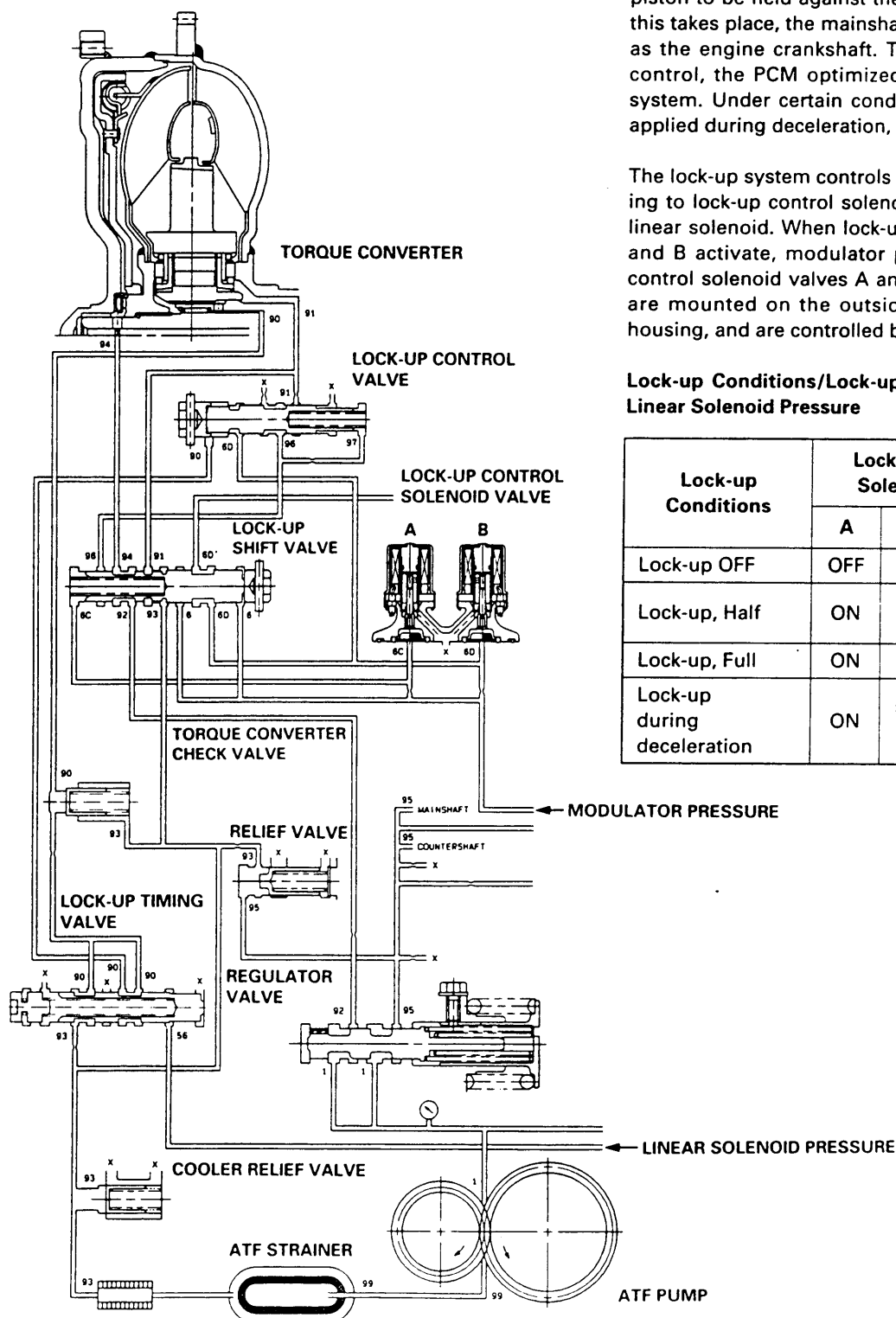
Lock-up Clutch

1. Operation (clutch on)
With the lock-up clutch on, the fluid in the chamber between the torque converter cover and the lock-up piston is drained off, and the converter fluid exerts pressure through the piston against the torque converter cover. As a result, the converter turbine is locked to the converter cover. The effect is to bypass the converter, thereby placing the vehicle in direct drive.



2. Operation (clutch off)
With the lock-up clutch off, the fluid flows in the reverse of "clutch on." As a result, the lock-up piston moves away from the converter cover, and the torque converter lock-up is released.





In **D₄** position, in 3rd and 4th, and **D₃** position in 3rd, pressurized fluid is drained from the back of the torque converter through a fluid passage, causing the lock-up piston to be held against the torque converter cover. As this takes place, the mainshaft rotates at the same speed as the engine crankshaft. Together with the hydraulic control, the PCM optimized the timing of the lock-up system. Under certain conditions, the lock-up clutch is applied during deceleration, in 3rd and 4th gear.

The lock-up system controls the range of lock-up according to lock-up control solenoid valves A and B, and the linear solenoid. When lock-up control solenoid valves A and B activate, modulator pressure changes. Lock-up control solenoid valves A and B and the linear solenoid are mounted on the outside of the torque converter housing, and are controlled by the PCM.

Lock-up Conditions/Lock-up Control Solenoid Valves/Linear Solenoid Pressure

Lock-up Conditions	Lock-up Control Solenoid Valve		Linear Solenoid Pressure
	A	B	
Lock-up OFF	OFF	OFF	High
Lock-up, Half	ON	Duty operation OFF → ON	Low
Lock-up, Full	ON	ON	High
Lock-up during deceleration	ON	Duty operation OFF → ON	Low

(cont'd)

Description

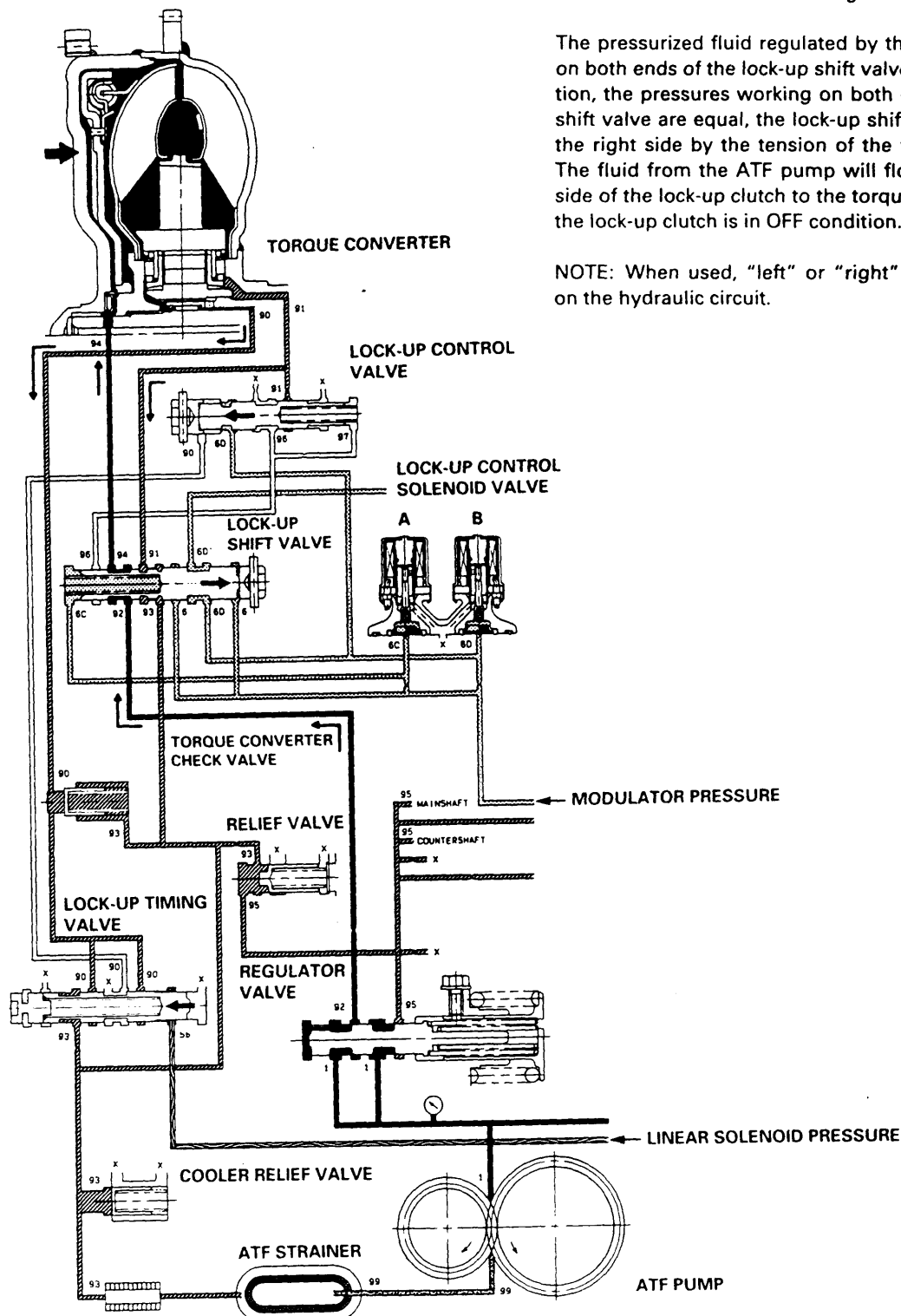
Lock-up System (cont'd)

No Lock-up

- Lock-up Control Solenoid Valve A: OFF
- Lock-up Control Solenoid Valve B: OFF
- Linear Solenoid Pressure: High

The pressurized fluid regulated by the modulator works on both ends of the lock-up shift valve. Under this condition, the pressures working on both ends of the lock-up shift valve are equal, the lock-up shift valve is moved to the right side by the tension of the valve spring alone. The fluid from the ATF pump will flow through the left side of the lock-up clutch to the torque converter; that is, the lock-up clutch is in OFF condition.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.





Half Lock-up

- Lock-up Control Solenoid Valve A: ON
- Lock-up Control Solenoid Valve B: Duty Operation
OFF ↔ ON
- Linear Solenoid Pressure: Low

The PCM switches the solenoid valve A on to release the modulator pressure in the left cavity of the lock-up shift valve. The modulator pressure in the right cavity of the lock-up shift valve overcomes the spring force; thus the lock-up shift valve is moved to the left side.

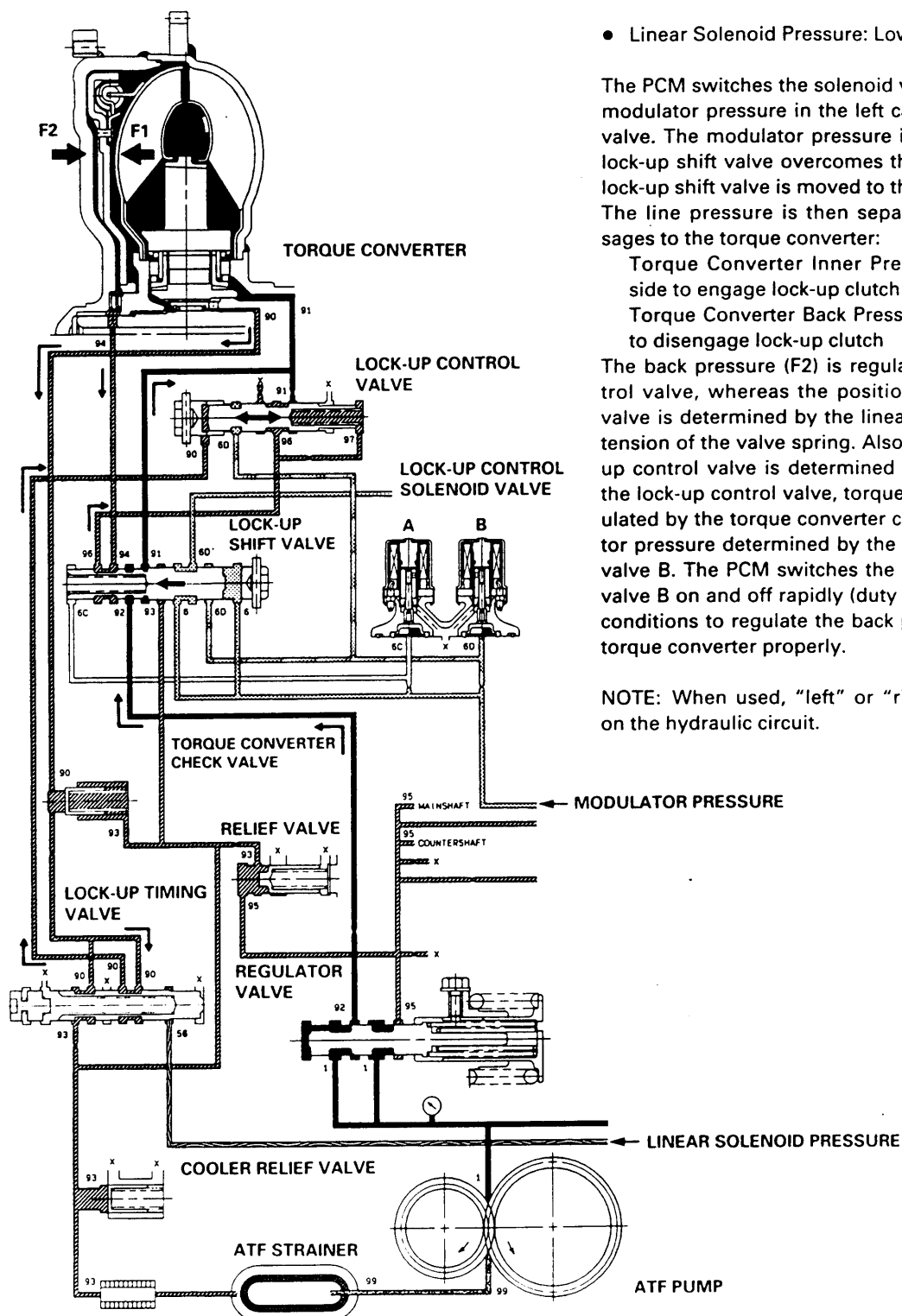
The line pressure is then separated into the two passages to the torque converter:

Torque Converter Inner Pressure: enters into right side to engage lock-up clutch

Torque Converter Back Pressure: enters into left side to disengage lock-up clutch

The back pressure (F2) is regulated by the lock-up control valve, whereas the position of the lock-up timing valve is determined by the linear solenoid pressure and tension of the valve spring. Also the position of the lock-up control valve is determined by the back pressure of the lock-up control valve, torque converter pressure regulated by the torque converter check valve, and modulator pressure determined by the lock-up control solenoid valve B. The PCM switches the lock-up control solenoid valve B on and off rapidly (duty operation) under certain conditions to regulate the back pressure (F2) to lock the torque converter properly.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



(cont'd)

Description

Lock-up System (cont'd)

Full Lock-up

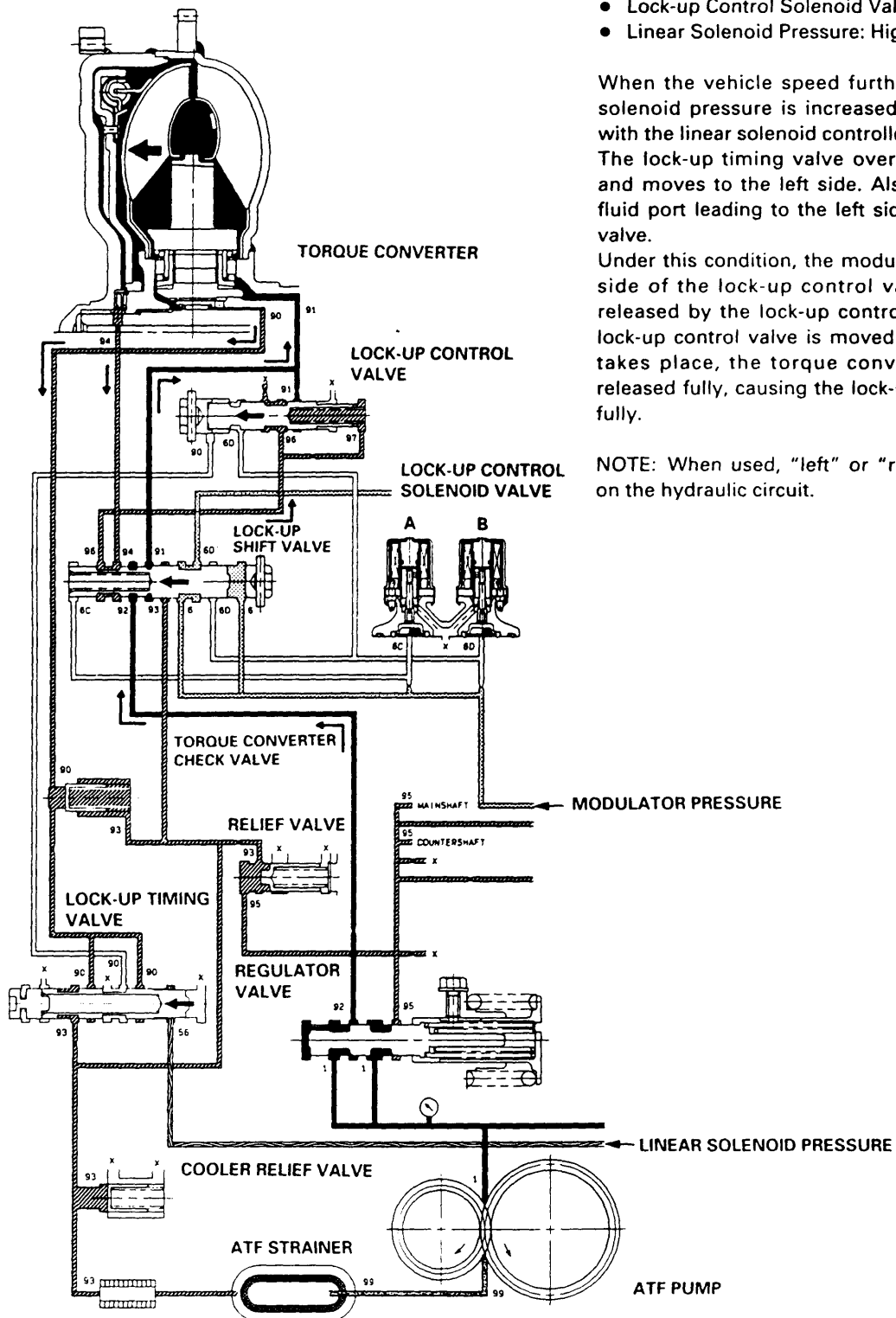
- Lock-up Control Solenoid Valve A: ON
- Lock-up Control Solenoid Valve B: ON
- Linear Solenoid Pressure: High

When the vehicle speed further increases, the linear solenoid pressure is increased to high, in accordance with the linear solenoid controlled by the PCM.

The lock-up timing valve overcomes the spring force and moves to the left side. Also, this valve closes the fluid port leading to the left side of the lock-up control valve.

Under this condition, the modulator pressure in the left side of the lock-up control valve had already been released by the lock-up control solenoid valve B; the lock-up control valve is moved to the left side. As this takes place, the torque converter back pressure is released fully, causing the lock-up clutch to be engaged fully.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



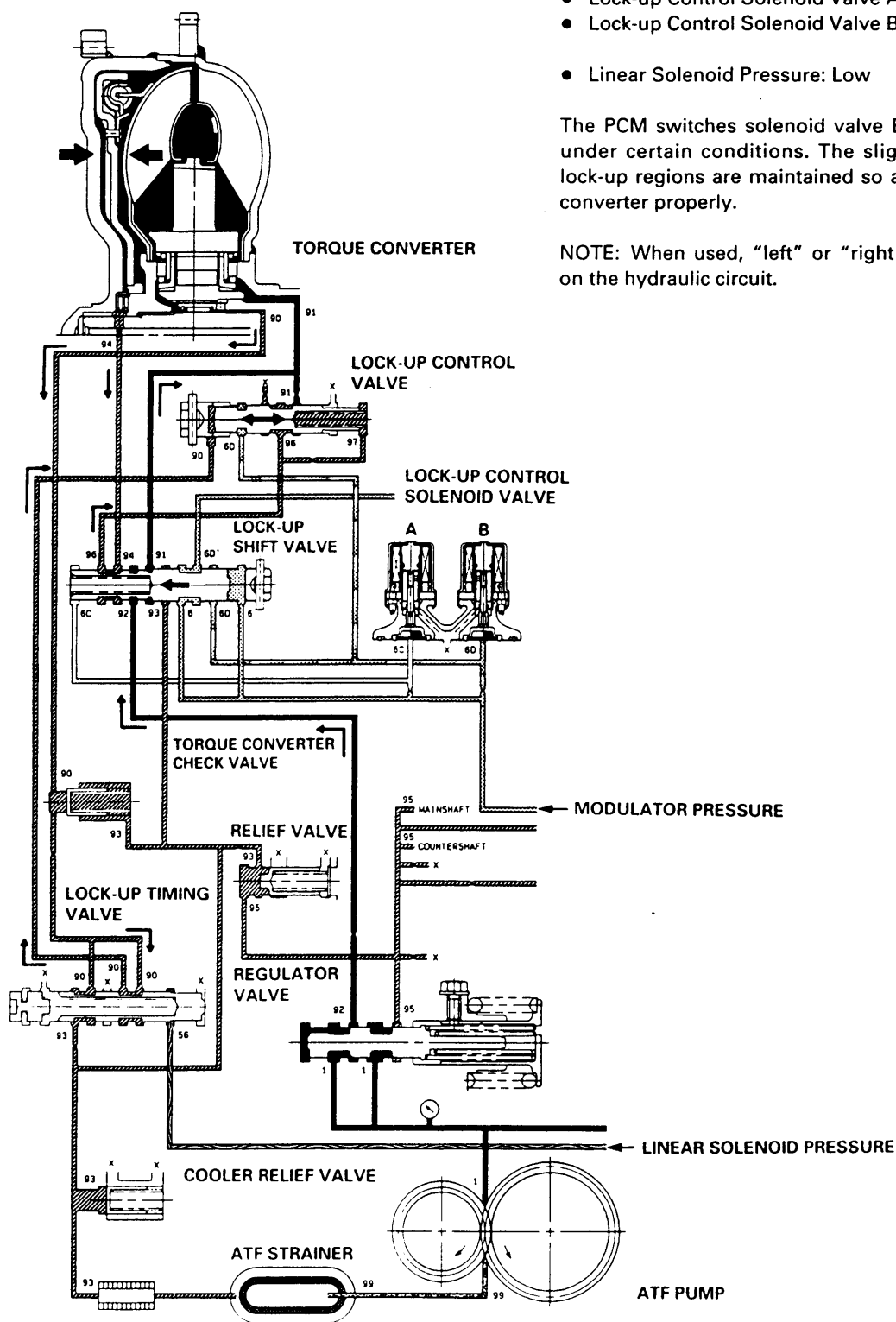


Deceleration Lock-up

- Lock-up Control Solenoid Valve A: ON
- Lock-up Control Solenoid Valve B: Duty Operation
OFF ↔ ON
- Linear Solenoid Pressure: Low

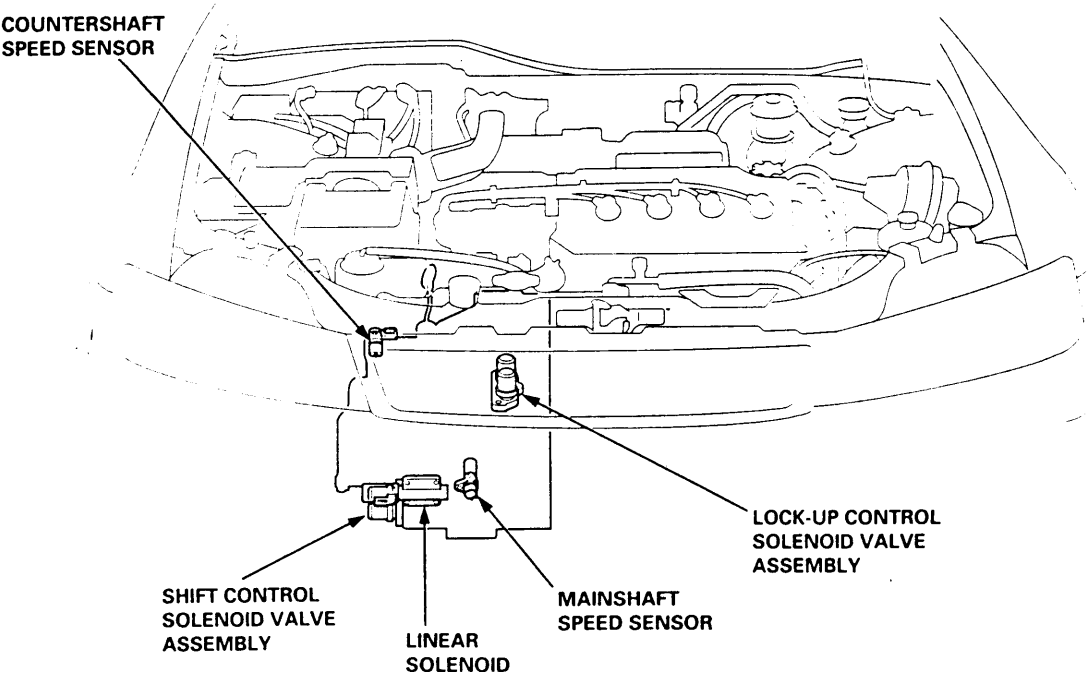
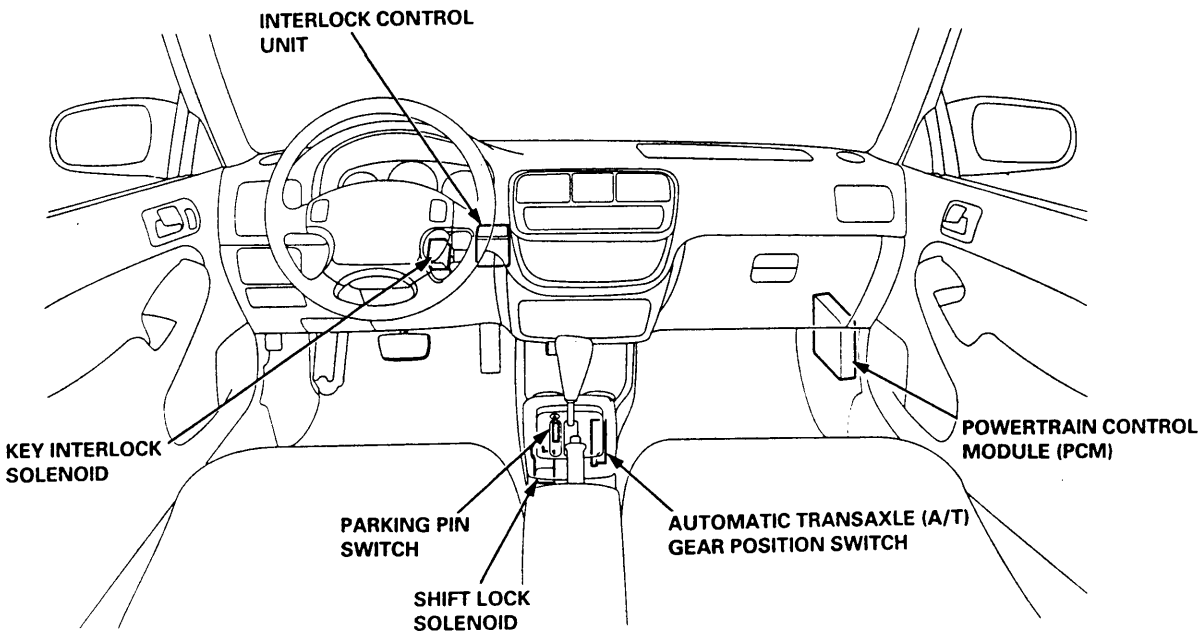
The PCM switches solenoid valve B on and off rapidly under certain conditions. The slight lock-up and half lock-up regions are maintained so as to lock the torque converter properly.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.

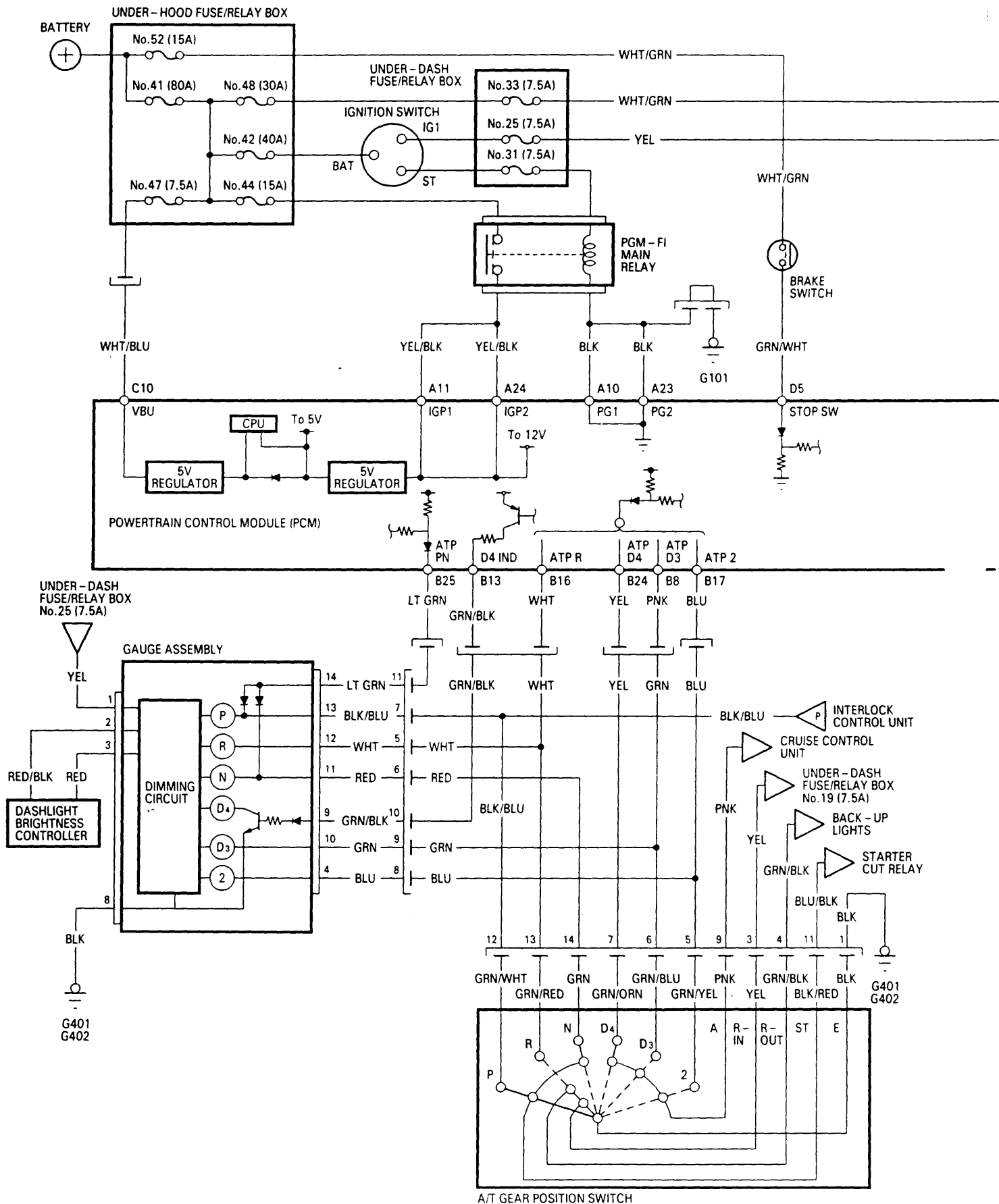


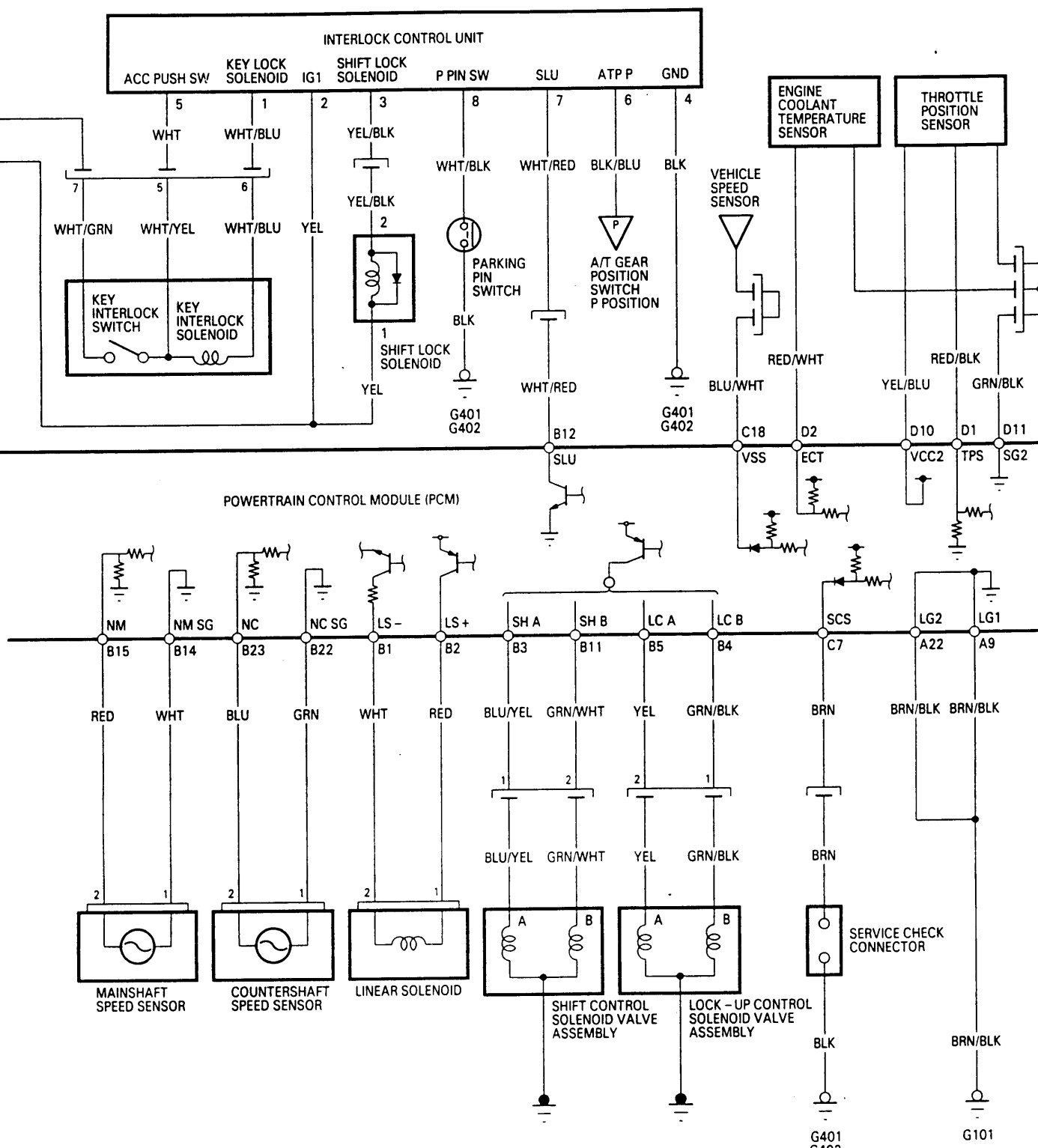


Component Locations

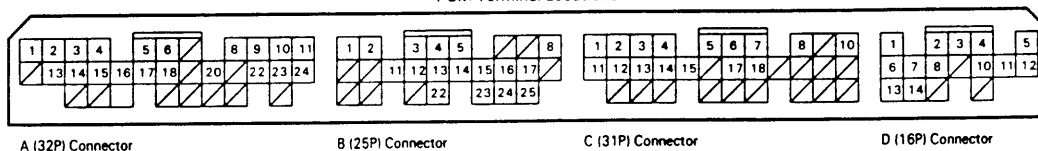


PCM Circuit Diagram (A/T Control System)





PCM Terminal Locations

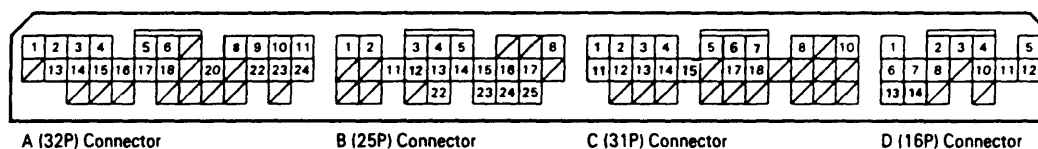


PCM Terminal Voltage/Measuring Conditions

A/T Control System

The PCM terminal voltage and measuring conditions are shown for the connector terminals related to the A/T control system. The other PCM terminal voltage and measuring conditions are described in section 11.

PCM Terminal Locations



PCM CONNECTOR A (32P)

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
A1 to A8	~ see section 11 ~		
A9	LG1	Ground	
A10	PG1	Ground	
A11	IGP1	Power supply system	With ignition switch ON (II): Battery voltage With ignition switch OFF: 0 V
A12 to A21	~ see section 11 ~		
A22	LG2	Ground	
A23	PG2	Ground	
A24	IGP2	Power supply system	With ignition switch ON (II): Battery voltage With ignition switch OFF: 0 V
A25 to A32	~ see section 11 ~		

PCM CONNECTOR B (25P)

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
B1	LS-	Linear solenoid power supply negative electrode	Ignition switch ON (II): Pulsing signal
B2	LS+	Linear solenoid power supply positive electrode	Ignition switch ON (II): Pulsing signal
B3	SHA	Shift control solenoid valve A control	In 2nd gear and 3rd gear in $\overline{D_3}$, $\overline{D_4}$ position, and in $\overline{2}$ position: Battery voltage In 1st gear and 4th gear in $\overline{D_3}$, $\overline{D_4}$ position: 0 V
B4	LCB	Lock-up control solenoid valve B control	With half lock-up, full lock-up, and during deceleration: Pulsing 0 V and battery voltage With no lock-up: 0 V
B5	LCA	Lock-up control solenoid valve A control	When lock-up is ON: Battery voltage With no lock-up: 0 V
B6 to B7	—	Not used	
B8	ATP D3	A/T gear position switch $\overline{D_3}$ position signal input	In $\overline{D_3}$ position: 0 V In other than $\overline{D_3}$ position: Battery voltage
B9 to B10	—	Not used	



PCM CONNECTOR B (25P) (cont'd)

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
B11	SHB	Shift control solenoid valve B control	In 1st gear and 2nd gear in D₃ , D₄ position, and in 2 position: Battery voltage In 3rd gear in D₃ , D₄ position and 4th gear in D₄ position: 0 V
B12	SLU	Interlock control	When ignition switch is ON (II), brake pedal depressed and accelerator pedal released: 0 V
B13	D4 IND	D4 Indicator light control	When ignition switch is first turned ON (II): Battery voltage for two seconds In D₄ position: Battery voltage
B14	NMSG	Mainshaft speed sensor ground	Always: 0 V
B15	NM	Mainshaft speed sensor signal input	Depending on engine speed: Pulsing signal When engine is stopped: 0 V
B16	ATP R	A/T gear position switch R position signal input	In R position: 0 V In other than R position: Battery voltage
B17	ATP 2	A/T gear position switch 2 position signal input	In 2 position: 0 V In other than 2 position: Battery voltage
B18 to B21	—	Not used	
B22	NCSG	Countershaft speed sensor ground	Always: 0 V
B23	NC	Countershaft speed sensor signal input	Depending on vehicle speed: Pulsing signal When vehicle is stopped: 0 V
B24	ATP D4	A/T gear position switch D₄ position signal input	In D₄ position: 0 V In other than D₄ position: 5 V
B25	ATP PN	A/T gear position switch P and N position signals input	In P and N positions: 0 V In other than P and N positions: Battery voltage

PCM CONNECTOR C (31P)

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
C1 to C6		– see section 11 –	
C7	SCS	Service check signal	With ignition switch ON (II) and service check connector open: 5 V With ignition switch ON (II) and service check connector connected with special tool: 0 V
C8 to C9		– see section 11 –	
C10	VBUS	Back-up power system	Always battery voltage
C11 to C31		– see section 11 –	

PCM CONNECTOR D (16P)

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
D1 to D4		– see section 11 –	
D5	STOP SW	Brake switch signal input	With ignition switch ON (II) and brake pedal depressed: Battery voltage With ignition switch ON (II) and brake pedal released: 0 V
D6 to D16		– see section 11 –	

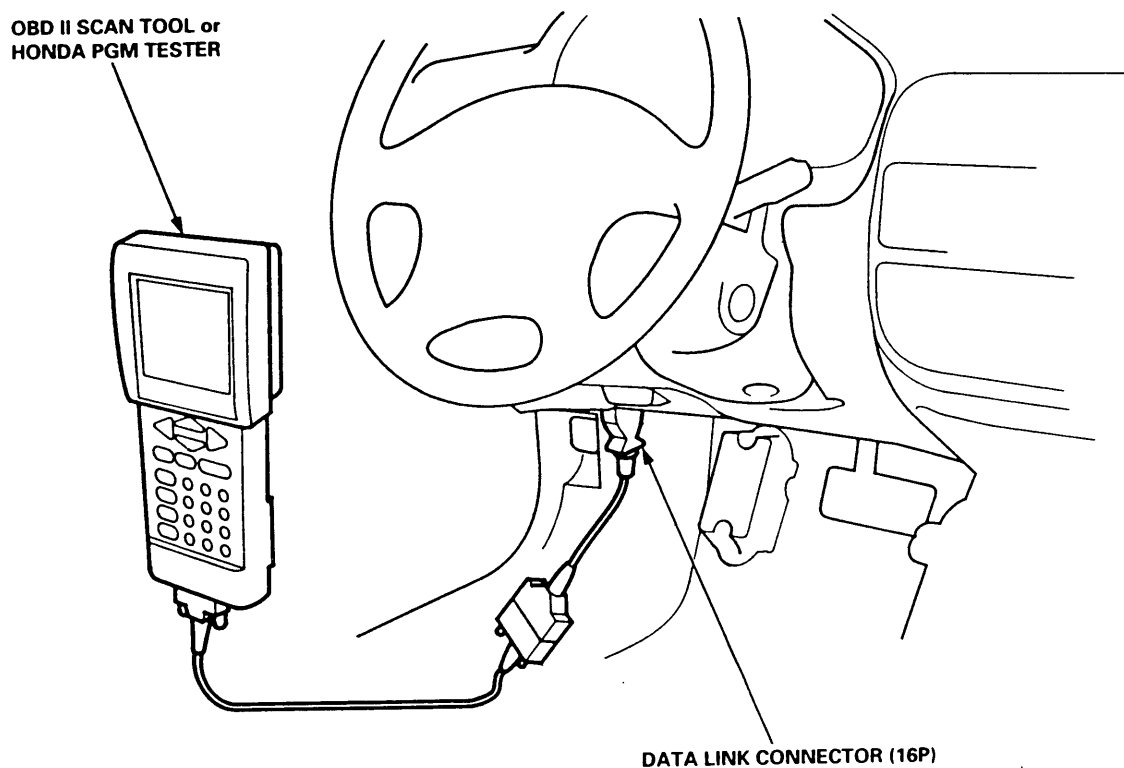
Troubleshooting Procedures

Checking the Diagnostic Trouble Code (DTC) with an OBD II Scan tool or Honda PGM Tester

When the PCM senses an abnormality in the input or output systems, the  indicator light in the gauge assembly will blink. When the 16P Data Link Connector (DLC) (located under the dash on the driver's side) is connected to the OBD II Scan Tool or Honda PGM Tester as shown, the scan tool or tester will indicate the Diagnostic Trouble Code (DTC) when the ignition switch is turned ON(II).

When the  indicator light has been reported on, connect the OBD II Scan Tool conforming to SAE J1978 or Honda PGM Tester to the DLC (16P). Turn the ignition switch on (II), and observe the DTC on the screen of the OBD II Scan Tool or Honda PGM Tester. After determining the DTC, refer to the electrical system Symptom-to-Component Chart on pages 14-48 and 14-49.

NOTE: See the OBD II Scan Tool or Honda PGM Tester user's manual for specific instruction.



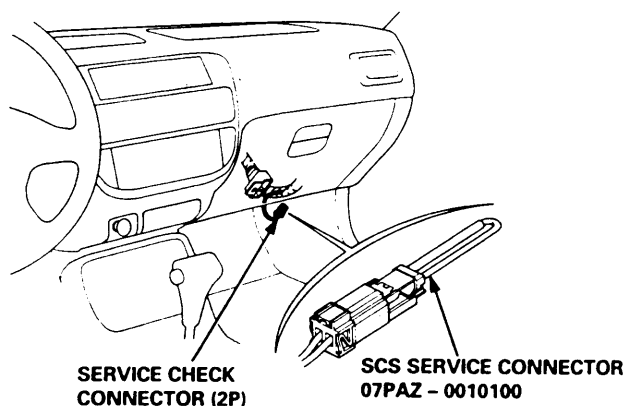
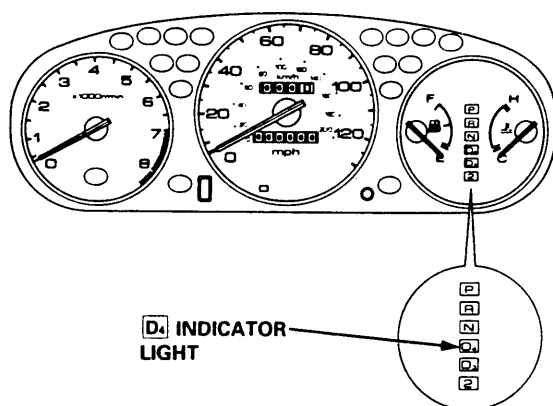


Checking the Diagnostic Trouble Code (DTC) with the Service Check Connector and Special Tool

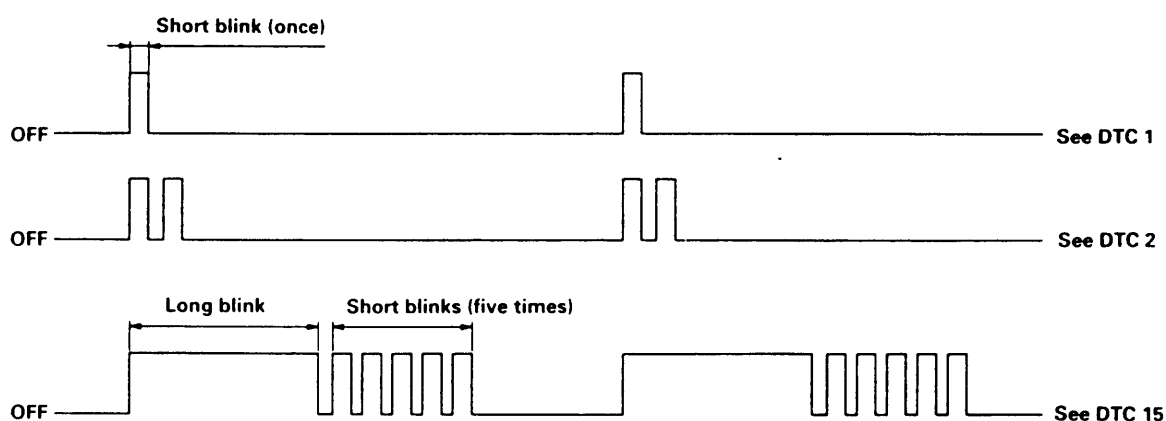
When the PCM senses an abnormality in the input or output systems, the **D₄** indicator light in the gauge assembly will blink. When the Service Check Connector (located under the dash on the passenger side) is connected with the special tool as shown, the **D₄** indicator light will blink the Diagnostic Trouble Code (DTC) when the ignition switch is turned on (II).

When the **D₄** indicator light has been reported on, connect the Service Check Connector (2P) with the special tool. Then turn on (II) the ignition switch and observe the **D₄** indicator light.

GAUGE ASSEMBLY



Codes 1 through 9 are indicated by individual short blinks. Codes 10 and above are indicated by a series of long and short blinks. One long blink equals 10 short blinks. Add the long and short blinks together to determine the code. After determining the code, refer to the electrical system Symptom-to-Component Chart on pages 14-48 and 14-49.

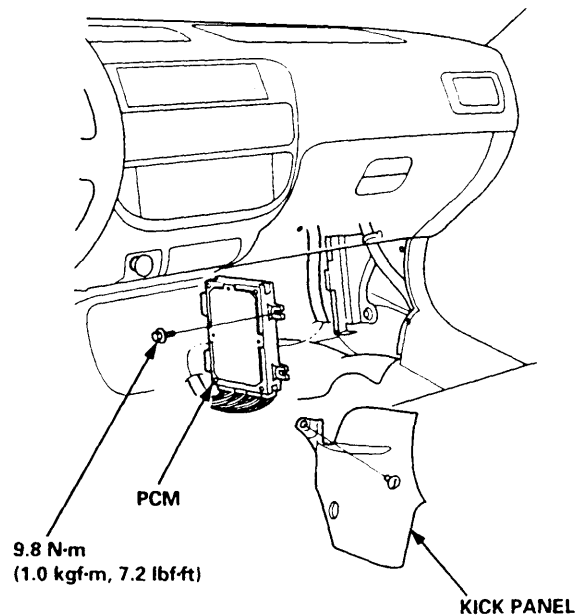


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Troubleshooting Procedures

(cont'd)

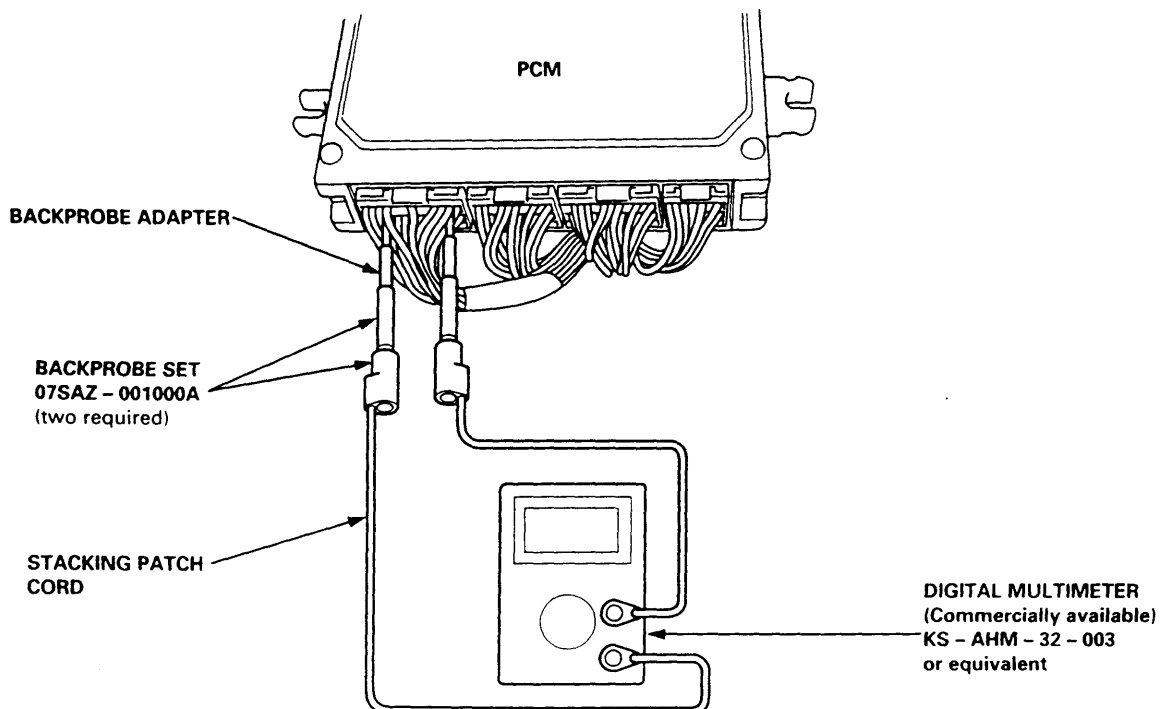
1. Remove the kick panel on the passenger's side (see section 20).
2. Remove the PCM, and turn the PCM over.



3. Inspect the circuit on the PCM according to the troubleshooting flowchart with the special tools and a digital multimeter as shown.

How to Use the Backprobe Set

Connect the backprobe adapters to the stacking patch cords, and connect the cords to a multimeter. Using the wire insulation as a guide for the contoured tip of the backprobe adapter, gently slide the tip into the connector from the wire side until it comes in contact with the terminal end of the wire.



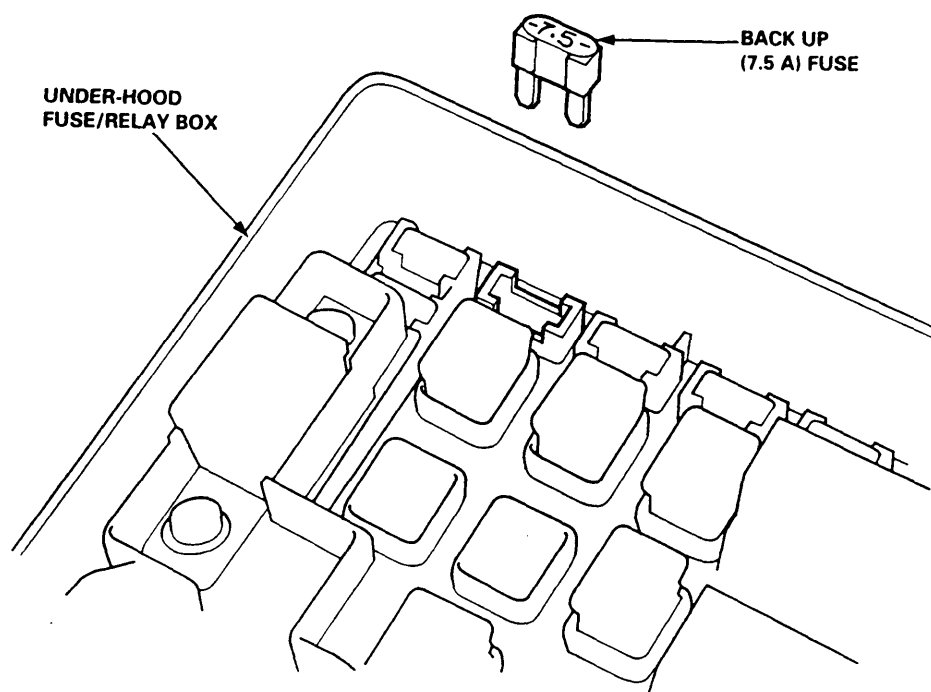


- **PCM Reset Procedure**

1. Turn the ignition switch off.
2. Remove the BACK UP fuse (7.5 A) from the under-hood fuse/relay box for 10 seconds to reset the PCM.

NOTE:

- Disconnecting the BACK UP fuse also cancels the radio preset stations and clock setting. Make note of the radio presets before removing the fuse so you can reset them.
- The PCM memory cannot be cleared by using the OBD II Scan Tool or Honda PGM Tester; be sure to remove the BACK UP fuse to reset the PCM.



- **Final Procedure**

NOTE: This procedure must be done after any troubleshooting.

1. Turn the ignition switch OFF.
2. Reset the PCM.
3. Disconnect the OBD II Scan Tool or Honda PGM Tester from the Data Link Connector (16P), or remove the special tool from the Service Check Connector (2P).
4. Turn the ignition switch ON (II), and set the radio presets and clock setting.

Symptom-to-Component Chart

Electrical System

Diagnostic Trouble Code (DTC)*	 Indicator Light	Symptom	Possible Cause	Refer to Page
P1753 (1)	Blinks	• Lock-up clutch does not engage. • Lock-up clutch does not disengage. • Unstable idle speed.	• Disconnected lock-up control solenoid valve connector • Short or open in lock-up control solenoid valve A wire • Faulty lock-up control solenoid valve A	14-50
P1758 (2)	Blinks	• Lock-up clutch does not engage.	• Disconnected lock-up control solenoid valve connector • Short or open in lock-up control solenoid valve B wire • Faulty lock-up control solenoid valve B	14-52
P1705 (5)	Blinks	• Fails to shift other than 2nd – 4th gears. • Lock-up clutch does not engage.	• Short in A/T gear position switch wire • Faulty A/T gear position switch	14-54
P1706 (6)	OFF	• Fails to shift other than 2nd – 4th gears. • Lock-up clutch does not engage. • Lock-up clutch engages and disengages alternately.	• Disconnected A/T gear position switch connector • Open in A/T gear position switch wire • Faulty A/T gear position switch	14-56
P0753 (7)	Blinks	• Fails to shift (between 1st – 4th gear only).	• Disconnected shift control solenoid valve connector • Short or open in shift control solenoid valve A wire • Faulty shift control solenoid valve A	14-58
P0758 (8)	Blinks	• Fails to shift (between 3rd – 4th gear only).	• Disconnected shift control solenoid valve connector • Short or open in shift control solenoid valve B wire • Faulty shift control solenoid valve B	14-60
P0720 (9)	Blinks	• Lock-up clutch does not engage.	• Disconnected countershaft speed sensor connector • Short or open in countershaft speed sensor wire • Faulty countershaft speed sensor	14-62

(DTC)*: The DTC in parentheses is the code the  indicator light blinks when the service check connector is connected with the special tool (SCS service connector).



Diagnostic Trouble Code (DTC)*	Indicator Light	Symptom	Possible Cause	Refer to Page
P0715 (15)	OFF	• Transmission jerks hard when shifting.	• Disconnected mainshaft speed sensor connector • Short or open in mainshaft speed sensor wire • Faulty mainshaft speed sensor	14-63
P1768 (16)	Blinks	• Transmission jerks hard when shifting. • Lock-up clutch does not engage.	• Disconnected linear solenoid connector • Short or open in linear solenoid wire • Faulty linear solenoid	14-65
P0740 (40)	OFF	• Lock-up clutch does not engage. • Lock-up clutch does not disengage. • Unstable idle speed.	• Faulty lock-up control system	14-66
P0730 (41)	OFF	• Fails to shift (between 1st – 3rd or 3rd – 4th gears only).	• Faulty shift control system	14-68
P0700 (none)	—	• Any automatic transmission problem To eliminate DTC P0700, troubleshoot the other automatic transmission problem(s) according to the DTC(s) indicated.		—

(DTC)*: The DTC in parentheses is the code the indicator light blinks when the service check connector is connected with the special tool (SCS service connector).

NOTE: When the OBD II Scan Tool or Honda PGM Tester indicate the DTC(s) for the automatic transmission control system, the scan tool or tester also indicates code P0700 simultaneously. Code P0700 means detection of some automatic transmission problem on the PGM FI control system.

If the self-diagnostic indicator light does not blink, perform an inspection according to the table below.

Symptom	Inspection	Ref. page
indicator light does not come on for two seconds after ignition is first turned on (II).	—	14-70
indicator light is on constantly (not blinking) whenever the ignition is on (II).	—	14-72
Shift lever cannot be moved from position with the brake pedal depressed.	Check interlock system-Shift lock system	14-73
Ignition key cannot be moved from ACC (I) position to LOCK (0) position while pushing the ignition key with the shift lever is in position.	Check interlock system-Key interlock system	14-75

NOTE:

- If a customer describes the symptom for code P1706 (6), it will be necessary to recreate the symptom by test-driving, then recheck the DTC.
- The indicator light and the Malfunction Indicator Lamp (MIL) may come on simultaneously. Check the PGM-FI system according to the DTC, then reset the memory by removing the BACK UP (RADIO) fuse in the under-hood fuse/relay box for more than 10 seconds. Drive the vehicle for several minutes at a speed over 30 mph (50 km/h), then recheck the DTC.
- Disconnecting the BACK UP (RADIO) fuse also cancels the radio anti-theft code, preset stations and the clock setting. Get the customer's code number, and make note of the radio presets before removing the fuse so you can reset them.

Electrical Troubleshooting

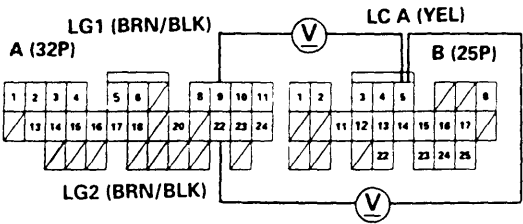
Troubleshooting Flowchart — Lock-up Control Solenoid Valve A

- OBD II Scan Tool indicates Code P1753.
- Self-diagnosis **D₄** indicator light blinks once.

- Possible Cause
- Disconnected lock-up control solenoid valve connector
 - Short or open in lock-up control solenoid valve A wire
 - Faulty lock-up control solenoid valve A

- Check for a Short to Power:
1. Turn the ignition switch OFF.
 2. Disconnect the A (32P) and B (25P) connectors from the PCM.
 3. Turn the ignition switch ON (II).
 4. Measure the voltage between the B5 and A9 or A22 terminals.

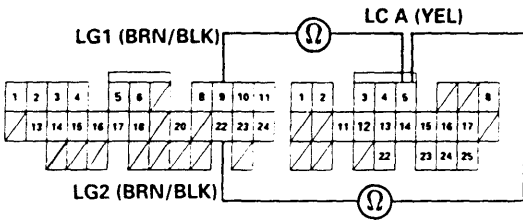
PCM CONNECTORS



Wire side of female terminals

- Is there voltage?
- YES → Repair short to power in the wire between the B5 terminal and the lock-up control solenoid valve A.

- Measure Lock-up Control Solenoid Valve A Resistance:
1. Turn the ignition switch OFF.
 2. Measure the resistance between the B5 and A9 or A22 terminals.



- Is the resistance 14 – 25 Ω?
- YES → Check for loose PCM connectors. If necessary, substitute a known-good solenoid valve assembly or PCM and recheck.

To page 14-51



From page 14-50

Check Lock-up Control Solenoid Valve A for a Short Circuit:

1. Disconnect the 2P connector from the lock-up control solenoid valve assembly.
2. Check for continuity between the B5 and A9 or A22 terminals.

Is there continuity?

YES

Repair short to ground in the wire between the B5 terminal and the lock-up control solenoid valve A.

NO

Measure Lock-up Control Solenoid Valve A Resistance at the Solenoid Connector:

Measure the resistance between the No. 2 terminal of the lock-up control solenoid connector and body ground.

Is the resistance 14 – 25 Ω ?

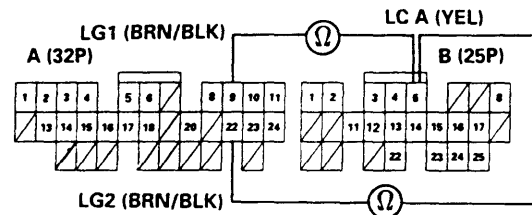
YES

Check for open in the wire between the B5 terminal and the lock-up control solenoid valve A.

NO

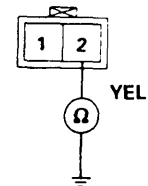
Replace the lock-up control solenoid valve assembly.

PCM CONNECTORS



Wire side of female terminals

LOCK-UP CONTROL SOLENOID CONNECTOR



Terminal side of male terminals

Electrical Troubleshooting

Troubleshooting Flowchart — Lock-up Control Solenoid Valve B

- OBD II Scan Tool indicates Code P1758.
- Self-diagnosis  indicator light blinks twice.

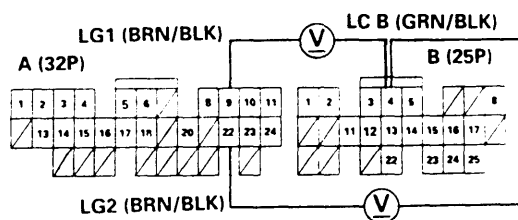
Possible Cause

- Disconnected lock-up control solenoid valve connector
- Short or open in lock-up control solenoid valve B wire
- Faulty lock-up control solenoid valve B

Check for a Short to Power:

1. Turn the ignition switch OFF.
2. Disconnect the A (32P) and B (25P) connectors from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the B4 and A9 or A22 terminals.

PCM CONNECTORS



Wire side of female terminals

Is there voltage?

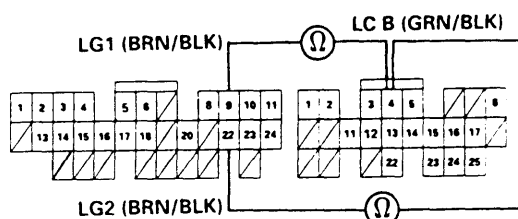
YES

Repair short to power in the wire between the B4 terminal and the lock-up control solenoid valve B.

NO

Measure Lock-up Control Solenoid Valve B Resistance:

1. Turn the ignition switch OFF.
2. Measure the resistance between the B4 and A9 or A22 terminals.



Is the resistance 14 – 25 Ω?

YES

Check for loose PCM connectors. If necessary, substitute a known-good solenoid valve assembly or PCM and recheck.

NO

To page 14-53



From page 14-52

Check Lock-up Control Solenoid Valve B for a Short Circuit:

1. Disconnect the 2P connector from the lock-up control solenoid valve assembly.
2. Check for continuity between the B4 and A9 or A22 terminals.

Is there continuity?

YES

Repair short to ground in the wire between the B4 terminal and the lock-up control solenoid valve B.

NO

Measure Lock-up Control Solenoid Valve B Resistance at the Solenoid Connector:

Measure the resistance between the No. 1 terminal of the lock-up control solenoid connector and body ground.

Is the resistance 14 – 25 Ω ?

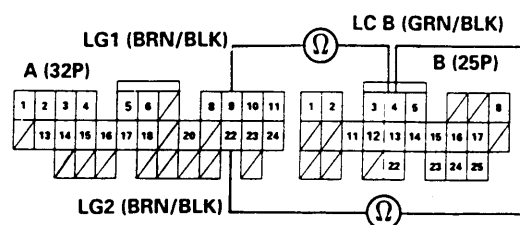
YES

Check for open in the wire between the B4 terminal and the lock-up control solenoid valve B.

NO

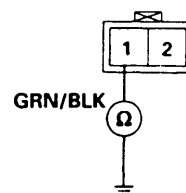
Replace the lock-up control solenoid valve assembly.

PCM CONNECTORS



Wire side of female terminals

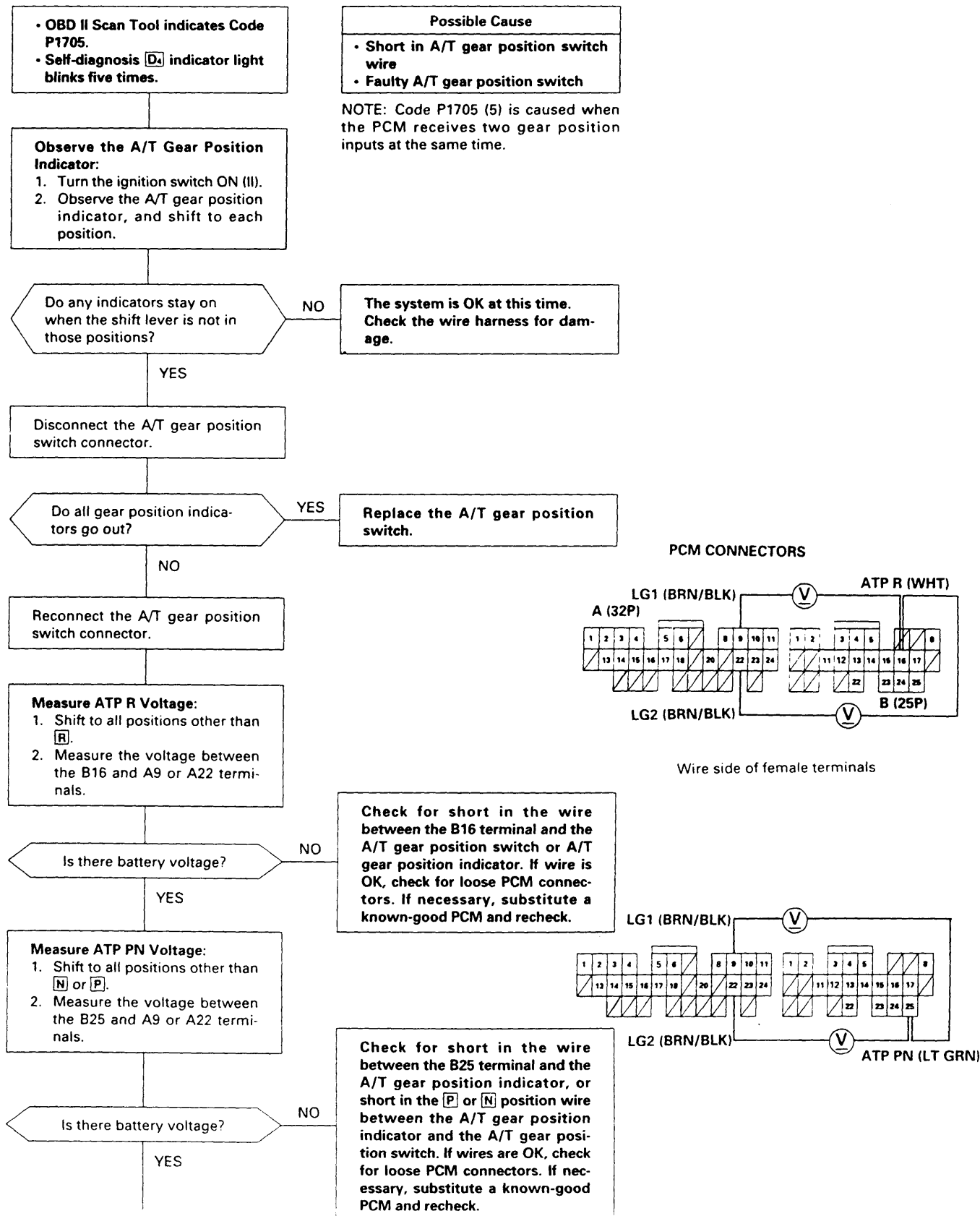
LOCK-UP CONTROL SOLENOID CONNECTOR



Terminal side of male terminals

Electrical Troubleshooting

Troubleshooting Flowchart — A/T Gear Position Switch (Short)





From page 14-54

Measure ATP D4 Voltage:

1. Shift to all positions other than **D₄**.
2. Measure the voltage between the B24 and A9 or A22 terminals.

Is there approx. 5 V?

NO

Check for short in the wire between the B24 terminal and the A/T gear position switch. If wire is OK, check for loose PCM connectors. If necessary, substitute a known-good PCM and recheck.

YES

Measure ATP D3 Voltage:

1. Shift to all positions other than **D₃**.
2. Measure the voltage between the B8 and A9 or A22 terminals.

Is there battery voltage?

NO

Check for short in the wire between the B8 terminal and the A/T gear position switch or A/T gear position indicator. If wire is OK, check for loose PCM connectors. If necessary, substitute a known-good PCM and recheck.

YES

Measure ATP2 Voltage:

1. Shift to all positions other than **2**.
2. Measure the voltage between the B17 and A9 or A22 terminals.

Is there battery voltage?

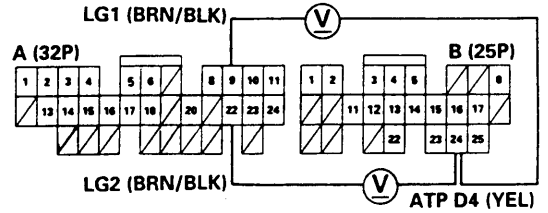
NO

Check for short in the wire between the B17 terminal and the A/T gear position switch or A/T gear position indicator. If wire is OK, check for loose PCM connectors. If necessary, substitute a known-good PCM and recheck.

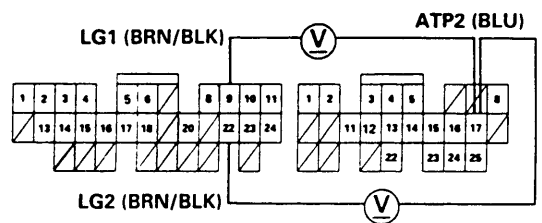
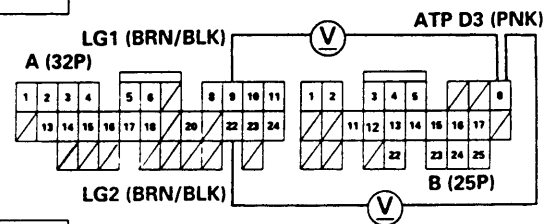
YES

Check for loose PCM connectors. If necessary, substitute a known-good PCM and recheck.

PCM CONNECTORS

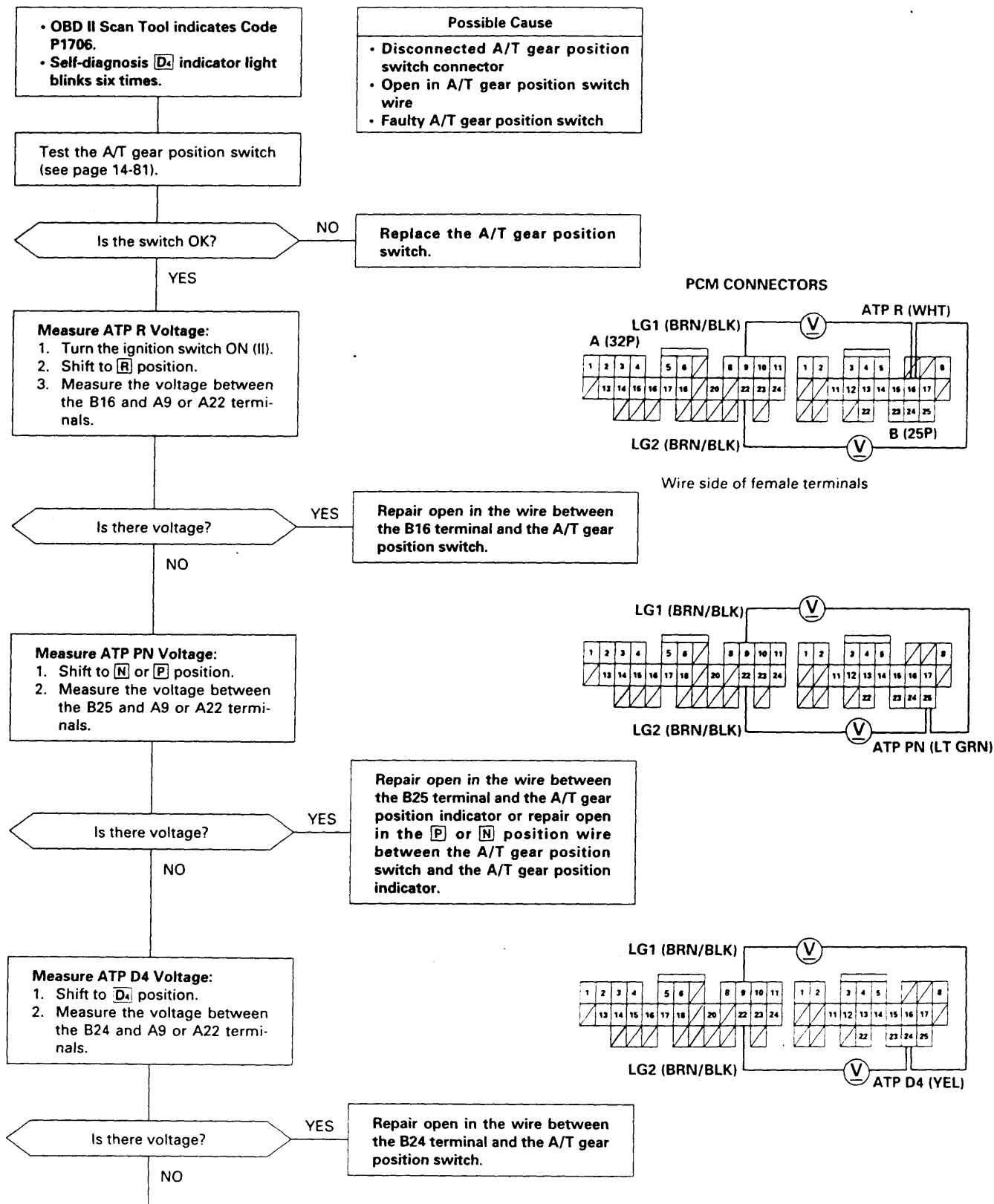


Wire side of female terminals



Electrical Troubleshooting

Troubleshooting Flowchart — A/T Gear Position Switch (Open)



To page 14-57



From page 14-56

Measure ATP D3 Voltage:

1. Shift to **D₃** position.
2. Measure the voltage between the B8 and A9 or A22 terminals.

Is there voltage?

YES

Repair open in the wire between the B8 terminal and the A/T gear position switch.

NO

Measure ATP2 Voltage:

1. Shift to **2** position.
2. Measure the voltage between the B17 and A9 or A22 terminals.

Is there voltage?

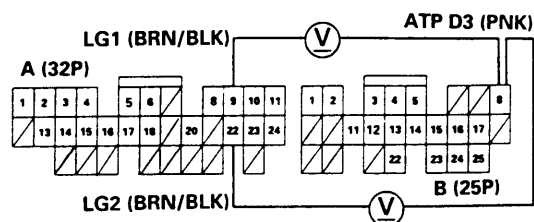
YES

Repair open in the wire between the B17 terminal and the A/T gear position switch.

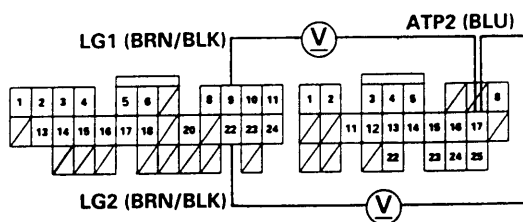
NO

Check for loose PCM connectors.
If necessary, substitute a known-good PCM and recheck.

PCM CONNECTORS



Wire side of female terminals



Electrical Troubleshooting

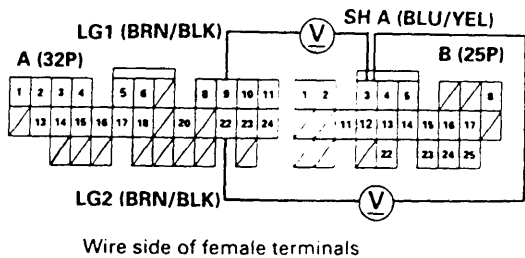
Troubleshooting Flowchart — Shift Control Solenoid Valve A

- OBD II Scan Tool indicates Code P0753.
- Self-diagnosis  indicator light blinks seven times.

- Possible Cause**
- Disconnected shift control solenoid valve connector
 - Short or open in shift control solenoid valve A wire
 - Faulty shift control solenoid valve A

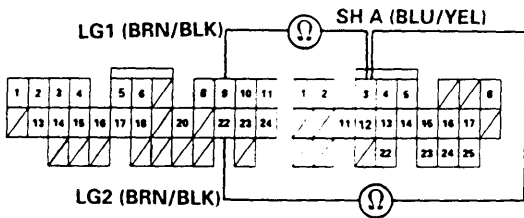
- Check for a Short to Power:**
1. Turn the ignition switch OFF.
 2. Disconnect the A (32P) and B (25P) connectors from the PCM.
 3. Turn the ignition switch ON (II).
 4. Measure the voltage between the B3 and A9 or A22 terminals.

PCM CONNECTORS



- Is there voltage?
- YES → Repair short to power in the wire between the B3 terminal and the shift control solenoid valve A.
- NO →

- Measure Shift Control Solenoid Valve A Resistance:**
1. Turn the ignition switch OFF.
 2. Measure the resistance between the B3 and A9 or A22 terminals.



- Is the resistance 14 – 25 Ω?
- YES → Check for loose PCM connectors. If necessary, substitute a known-good solenoid valve assembly or PCM and recheck.
- NO →

To page 14-59



From page 14-58

Check Shift Control Solenoid Valve A for a Short Circuit:

1. Disconnect the 2P connector from the shift control solenoid valve assembly.
2. Check for continuity between the B3 and A9 or A22 terminals.

Is there continuity?

YES

Repair short to ground in the wire between the B3 terminal and the shift control solenoid valve A.

NO

Measure Shift Control Solenoid Valve A Resistance at the Solenoid Connector:

Measure the resistance between the No. 1 terminal of the shift control solenoid connector and body ground.

Is the resistance 14 – 25 Ω ?

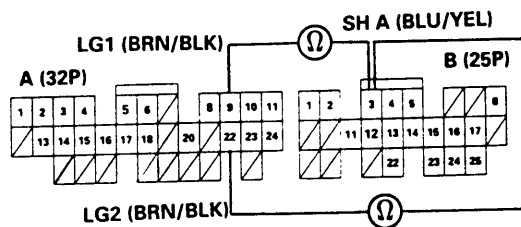
YES

Check for open in the wire between the B3 terminal and the shift control solenoid valve A.

NO

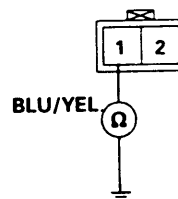
Replace the shift control solenoid valve assembly.

PCM CONNECTORS



Wire side of female terminals

SHIFT CONTROL SOLENOID CONNECTOR



Terminal side of male terminals

Electrical Troubleshooting

Troubleshooting Flowchart — Shift Control Solenoid Valve B

- OBD II Scan Tool indicates Code P0758.
- Self-diagnosis **D₅** indicator light blinks eight times.

Possible Cause

- Disconnected shift control solenoid valve connector
- Short or open in shift control solenoid valve B wire
- Faulty shift control solenoid valve B

Check for a Short to Power:

1. Turn the ignition switch OFF.
2. Disconnect the A (32P) and B (25P) connectors from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the B11 and A9 or A22 terminals.

Is there voltage?

YES

Repair short to power in the wire between the B11 terminal and the shift control solenoid valve B.

NO

Measure Shift Control Solenoid Valve B Resistance:

1. Turn the ignition switch OFF.
2. Measure the resistance between the B11 and A9 or A22 terminals.

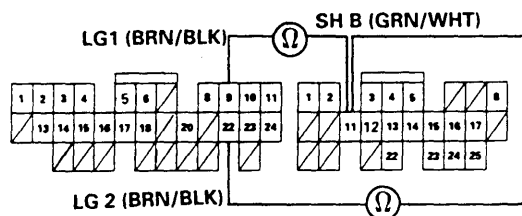
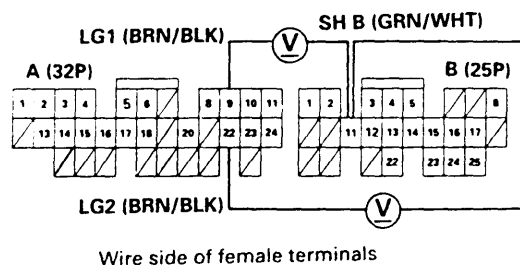
Is the resistance 14 – 25 Ω ?

YES

Check for loose PCM connectors. If necessary, substitute a known-good solenoid valve assembly or PCM and recheck.

NO

PCM CONNECTORS



To page 14-61



From page 14-60

Check Shift Control Solenoid Valve B for a Short Circuit:

1. Disconnect the 2P connector from the shift control solenoid valve assembly.
2. Check for continuity between the B11 and A9 or A22 terminals.

Is there continuity?

YES

Repair short to ground in the wire between the B11 terminal and the shift control solenoid valve B.

NO

Measure Shift Control Solenoid Valve B Resistance at the Solenoid Connector:

Measure the resistance between the No. 2 terminal of the shift control solenoid connector and body ground.

Is the resistance 14 – 25 Ω ?

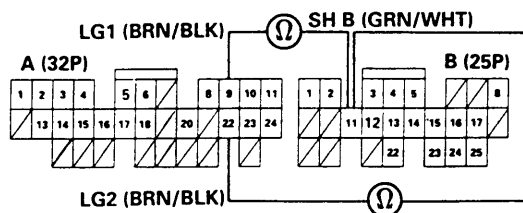
YES

Check for open in the wire between the B11 terminal and the shift control solenoid valve B.

NO

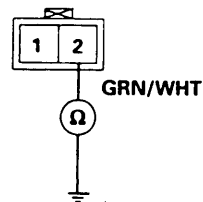
Replace the shift control solenoid valve assembly.

PCM CONNECTORS



Wire side of female terminals

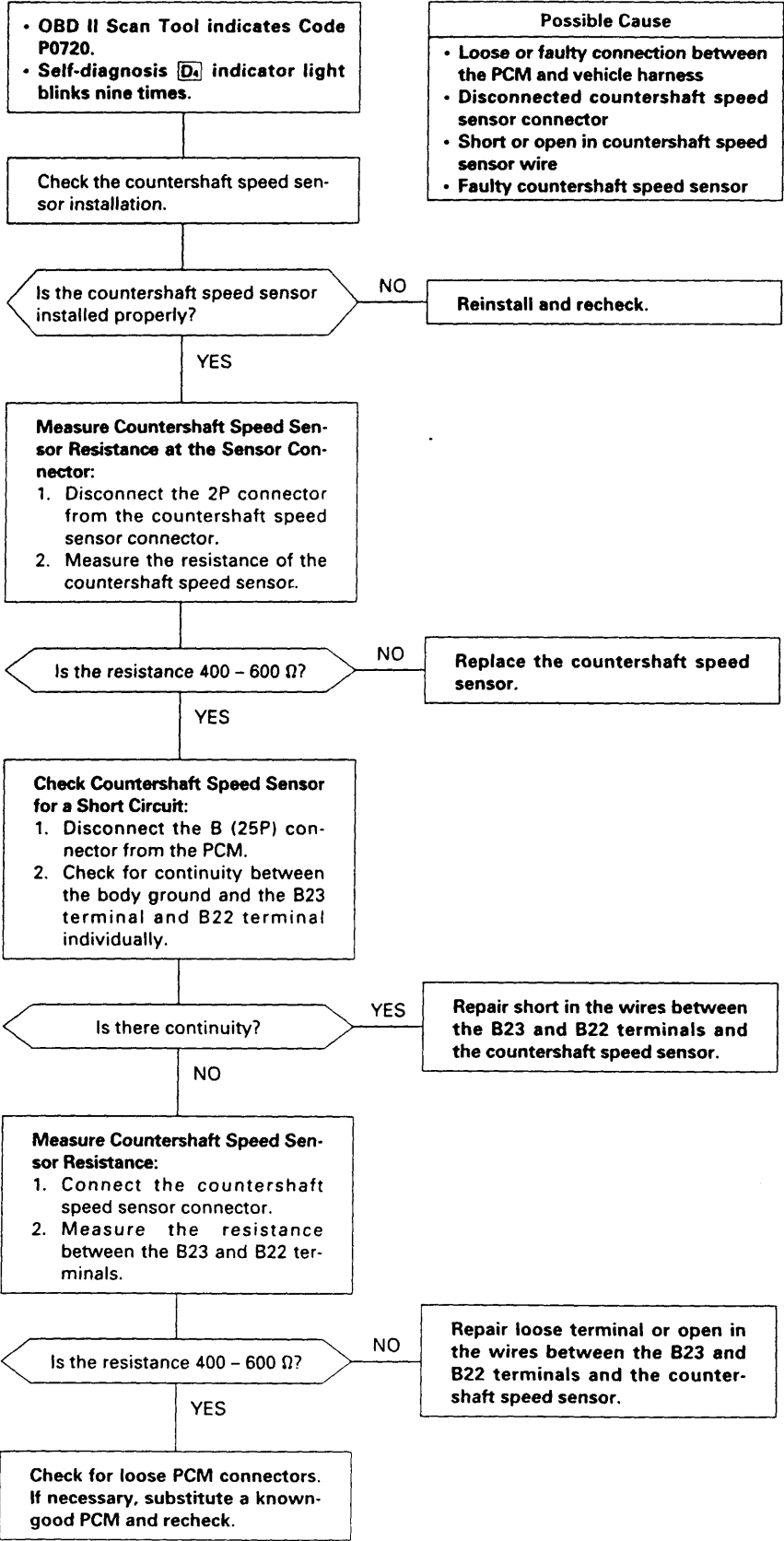
SHIFT CONTROL SOLENOID CONNECTOR



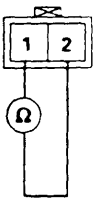
Terminal side of male terminals

Electrical Troubleshooting

Troubleshooting Flowchart — Countershaft Speed Sensor

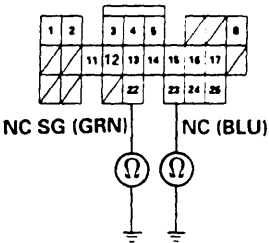


COUNTERSHAFT SPEED SENSOR CONNECTOR

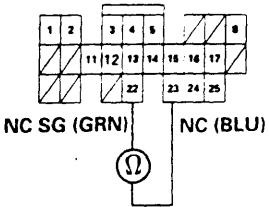


Terminal side of male terminals

PCM CONNECTOR B (25P)

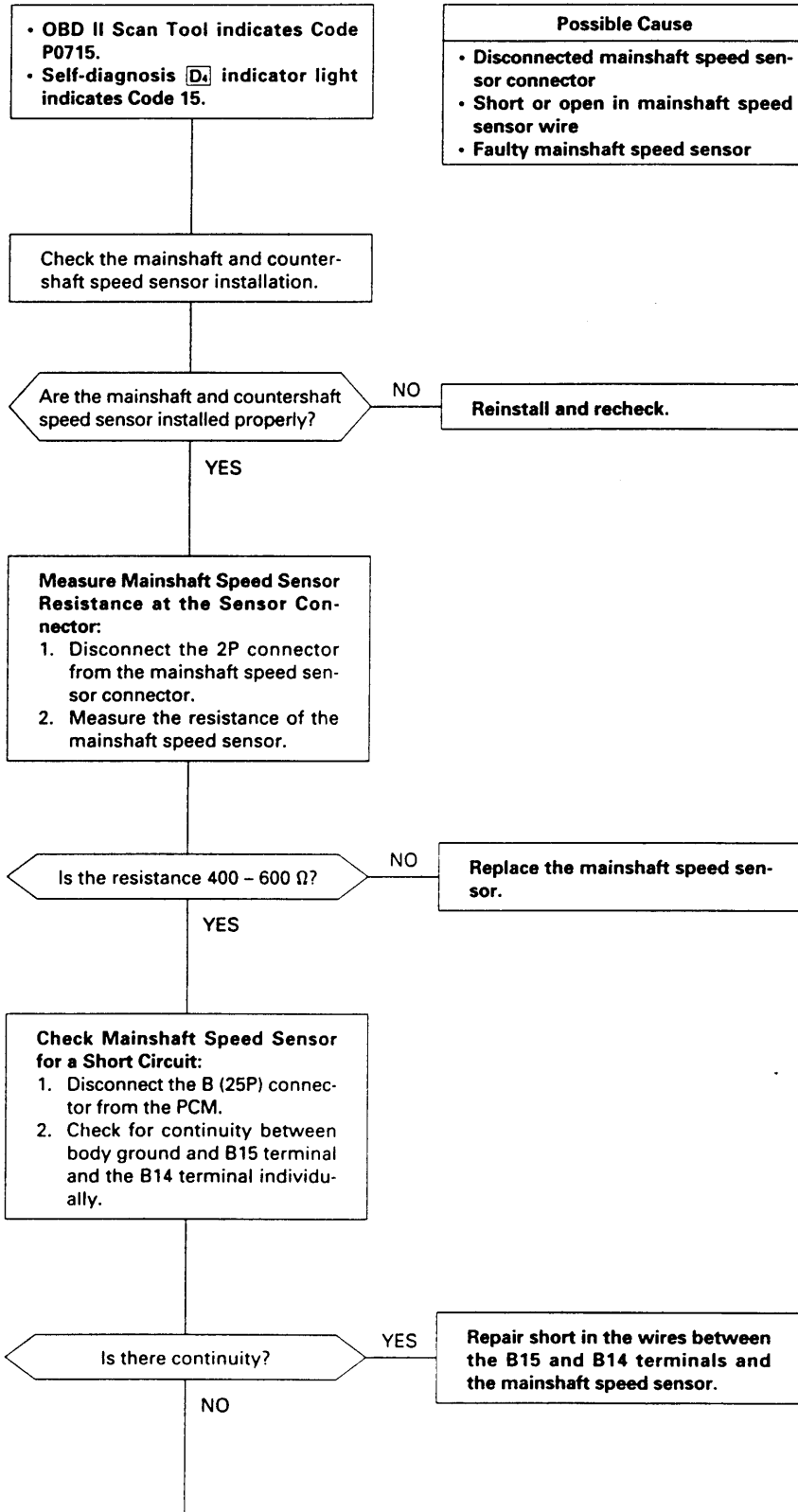


Wire side of female terminals



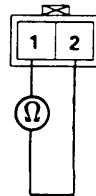


Troubleshooting Flowchart — Mainshaft Speed Sensor



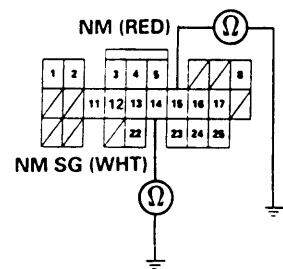
NOTE: Code P0715(15) on the PCM doesn't always mean there's an electrical problem in the mainshaft or countershaft speed sensor circuit; code P0715(15) may also indicate a mechanical problem in the transmission.

MAINSHAFT SPEED SENSOR CONNECTOR



Terminal side of male terminals

PCM CONNECTOR B (25P)



Wire side of female terminals

(cont'd)

Electrical Troubleshooting

Troubleshooting Flowchart — Mainshaft Speed Sensor (cont'd)

From page 14-63

Measure Mainshaft Speed Sensor Resistance:
1. Connect the mainshaft speed sensor 2P connector.
2. Measure the resistance between the B15 and B14 terminals.

Is the resistance 400 – 600 Ω ?

YES

Run the Electrical Troubleshooting Flowchart for code P0720 (9). Check for loose PCM connectors. If necessary, substitute a known-good PCM and recheck.

NO

Check NM Wire Continuity:
1. Disconnect the 2P connector from the mainshaft speed sensor connector.
2. Check for continuity between the B15 terminal and the No. 2 terminal of the mainshaft speed sensor connector.

Is there continuity?

NO

Repair open in the wire between the B15 terminal and the mainshaft speed sensor.

YES

Check NMSG Wire Continuity:
Check for continuity between the B14 terminal and the No. 1 terminal of the mainshaft speed sensor connector.

Is there continuity?

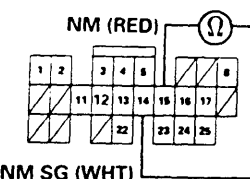
NO

Repair open in the wire between the B14 terminal and the mainshaft speed sensor.

YES

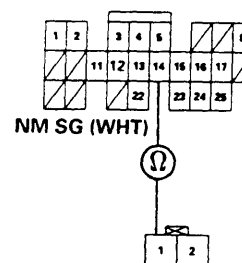
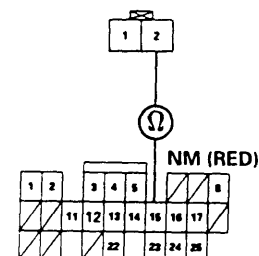
Check for loose PCM connectors. If necessary, substitute a known-good PCM and recheck.

PCM CONNECTOR B (25P)



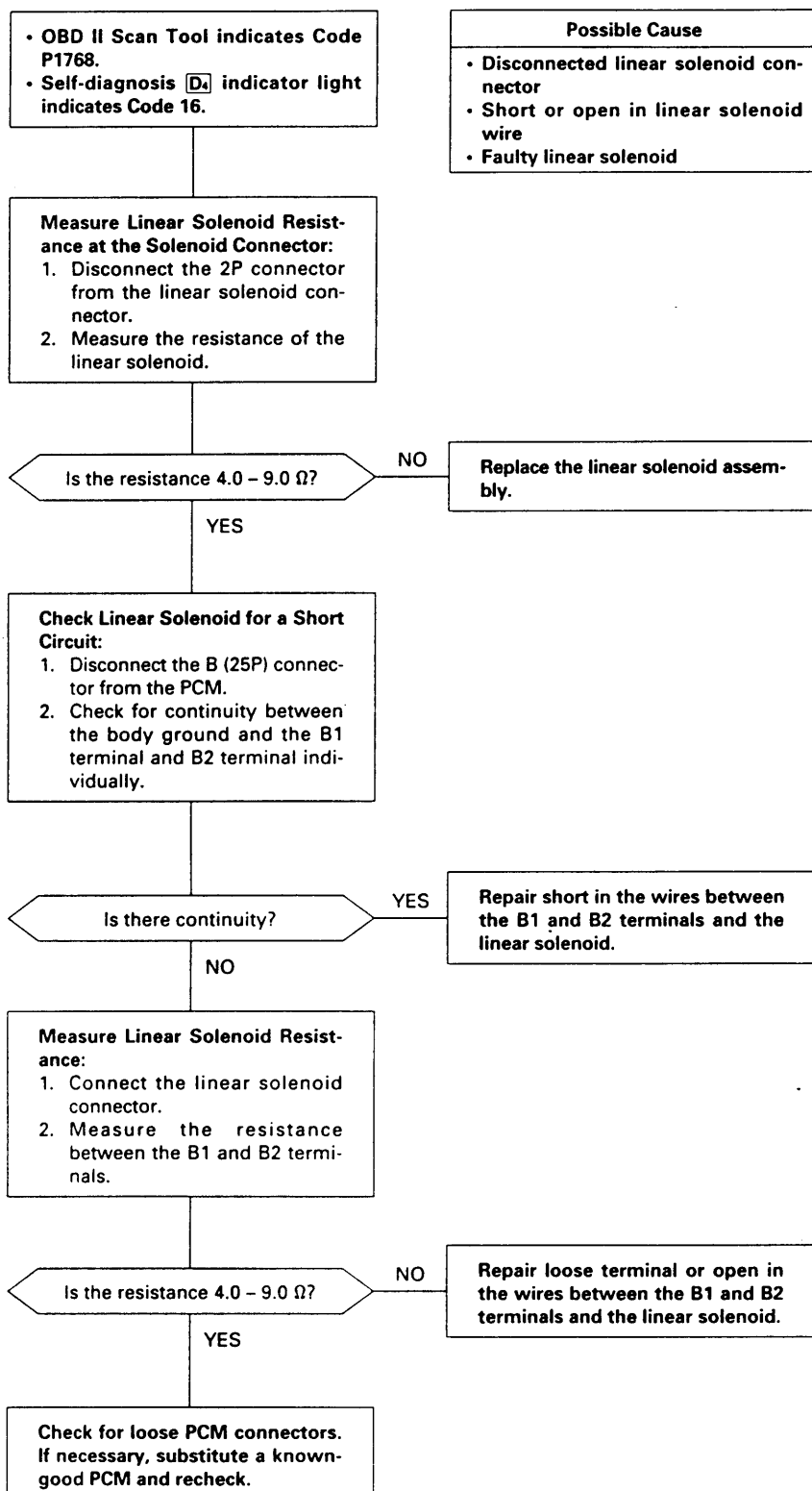
Wire side of female terminals

MAINSHAFT SPEED SENSOR CONNECTOR

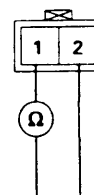




Troubleshooting Flowchart — Linear Solenoid



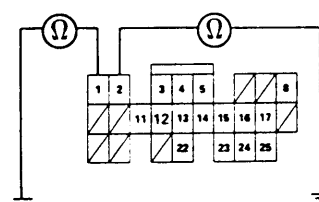
LINEAR SOLENOID CONNECTOR



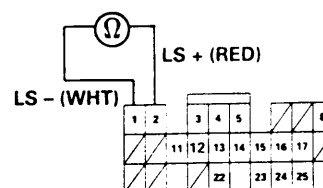
Terminal side of male terminals

PCM CONNECTOR B (25P)

LS - (WHT) LS + (RED)

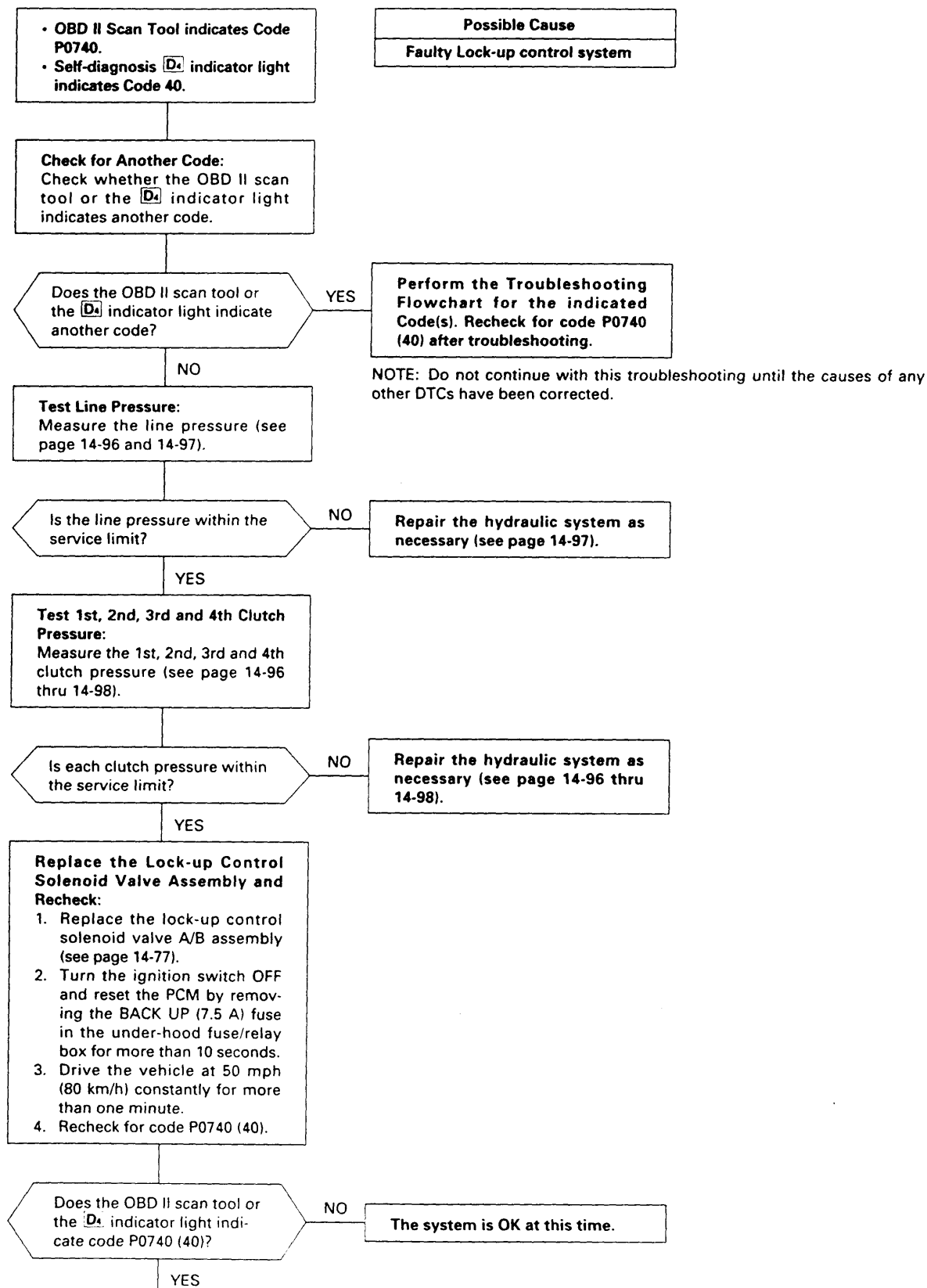


Wire side of female terminals



Electrical Troubleshooting

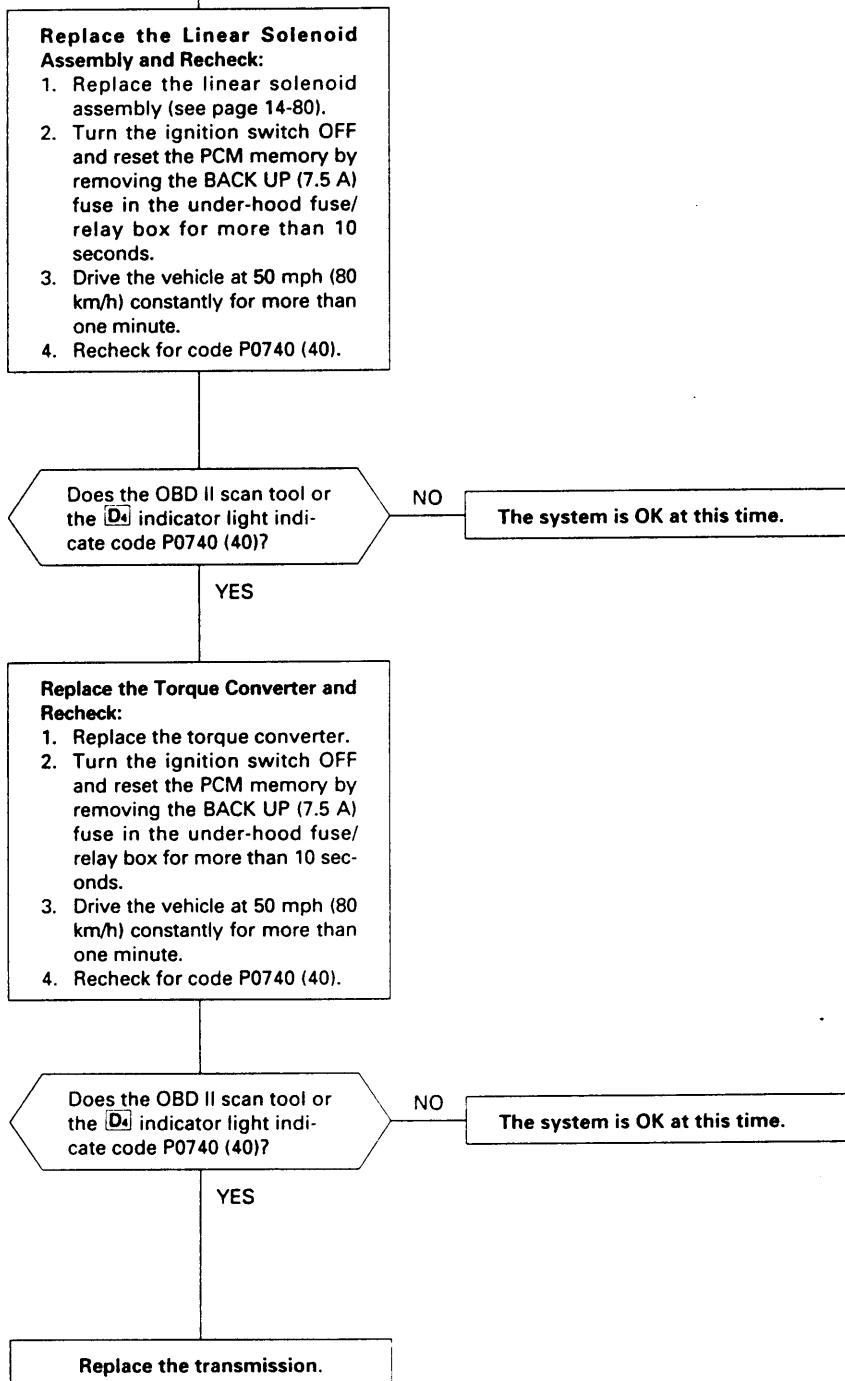
Troubleshooting Flowchart — Lock-up Control System



To page 14-67

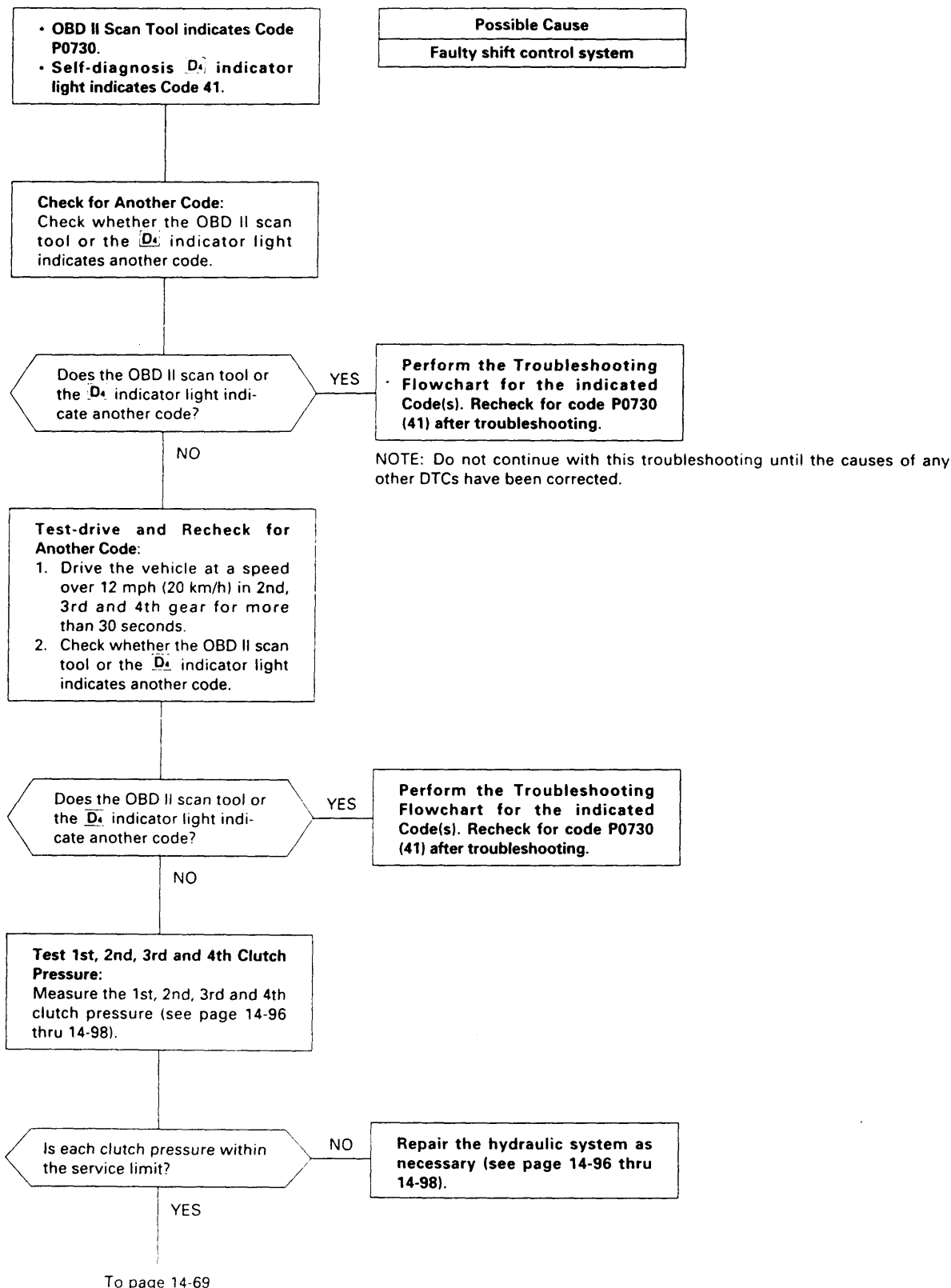


From page 14-66



Electrical Troubleshooting

Troubleshooting Flowchart — Shift Control System





From page 14-68

Replace Shift Control Solenoid Valve Assembly and Recheck:

1. Replace the shift control solenoid valve A/B assembly (see page 14-78).
2. Turn the ignition switch OFF and reset the PCM memory by removing the BACK UP (7.5 A) fuse in the under-hood fuse/relay box for more than 10 seconds.
3. Drive the vehicle at over 12 mph (20 km/h) in 2nd, 3rd and 4th gear for more than 30 seconds.
4. Recheck for code P0730 (41).

Does the OBD II scan tool or the  indicator light indicate code P0730 (41)?

NO

The system is OK at this time.

YES

Replace Linear Solenoid Assembly and Recheck:

1. Replace the linear solenoid assembly (see page 14-80).
2. Turn the ignition switch OFF and reset the PCM memory by removing the BACK UP (7.5 A) fuse in the under-hood fuse/relay box for more than 10 seconds.
3. Drive the vehicle at over 12 mph (20 km/h) in 2nd, 3rd and 4th gear for more than 30 seconds.
4. Recheck for code P0730 (41).

Does the OBD II scan tool or the  indicator light indicate code P0730 (41)?

NO

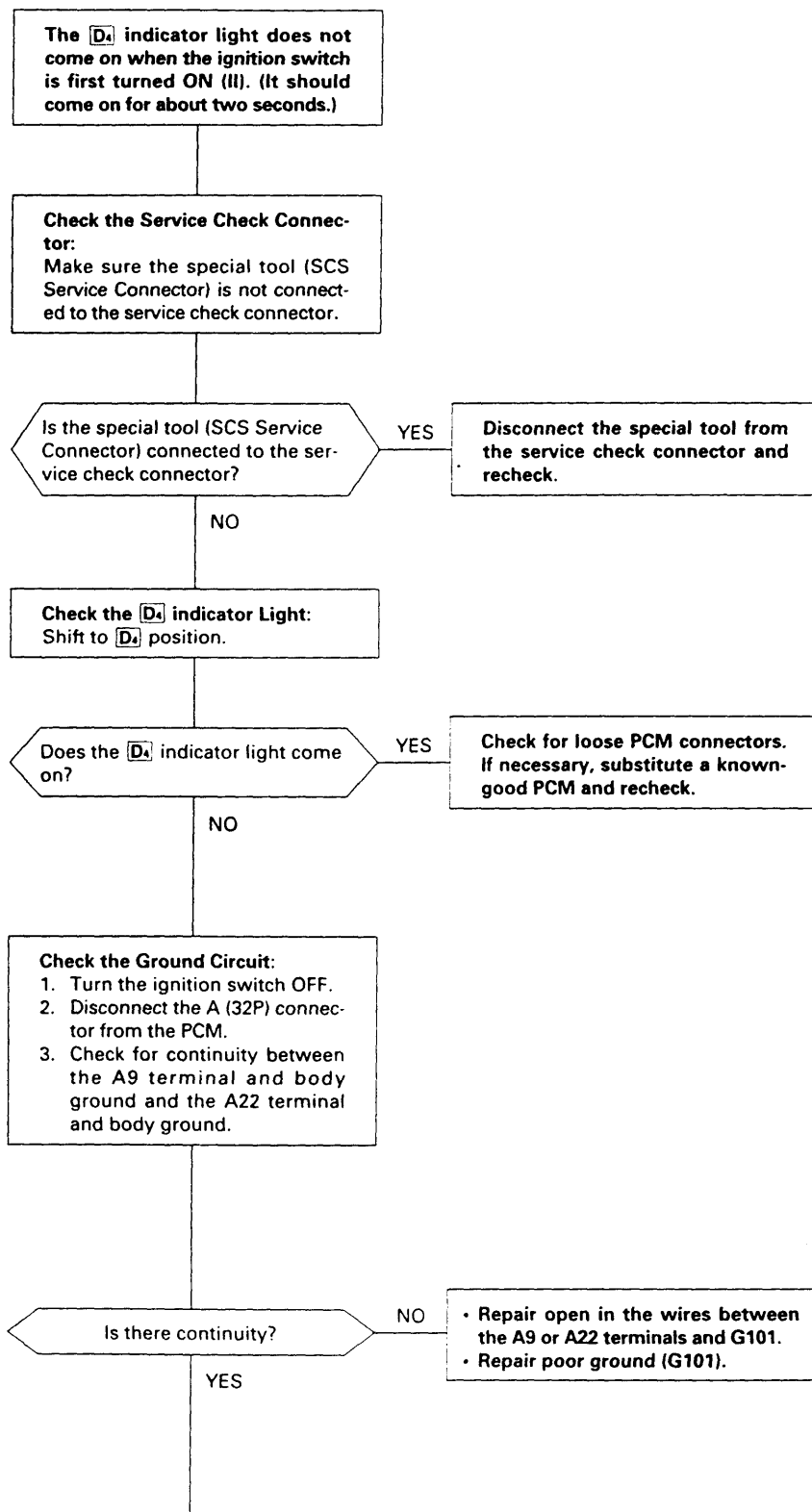
The system is OK at this time.

YES

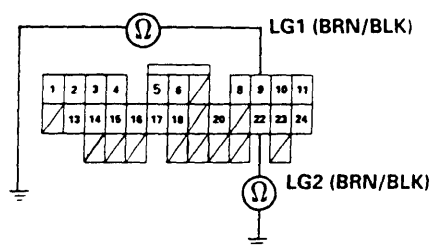
Replace the transmission.

Electrical Troubleshooting

Troubleshooting Flowchart — **D₄** Indicator Light Does Not Come On



PCM CONNECTOR A (32P)



Wire side of female terminals

To page 14-71



From page 14-70

Measure Power Supply Circuit Voltage:

1. Turn the ignition switch ON (II).
2. Measure the voltage between the A11 and A9 terminals and between the A22 and A24 terminals.

Is there battery voltage?

NO

Repair open or short in the wire between the A11 and/or A24 terminals and the PGM-FI main relay, and the fuse box.

YES

Measure D4 IND Voltage:

1. Turn the ignition switch OFF.
2. Connect the A (32P) connector to the PCM.
3. Connect a digital multimeter to the B13 and A9 or A22 terminals.
4. Turn the ignition switch ON (II) and make sure that the voltage is available for two seconds.

Is there voltage?

YES

Check for open in the wire between the B13 terminal and the gauge assembly. If wire is OK, check for a faulty **D4** indicator light bulb or a faulty gauge assembly printed circuit board.

NO

Check D4 IND for a Open Circuit:

1. Turn the ignition switch OFF.
2. Disconnect the B (25P) connector from the PCM.
3. Check for continuity between the B13 terminal and the No. 9 terminal of the gauge assembly 14P connector.

Is there continuity?

NO

Repair open in the wire between the B13 terminal and the gauge assembly.

YES

Check D4 IND for a Short Circuit:
Check for continuity between the B13 terminal and body ground.

Is there continuity?

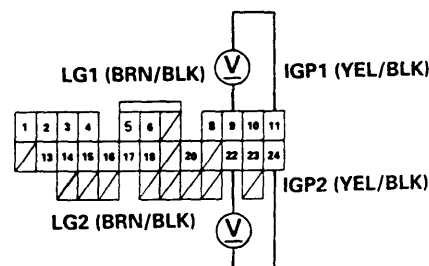
YES

Repair short in the wire between the B13 terminal and the gauge assembly.

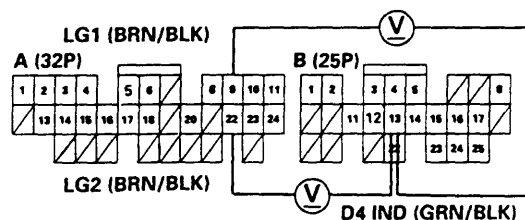
NO

Check for loose PCM connectors. Check the A/T gear position switch. If necessary, substitute a known-good PCM and recheck.

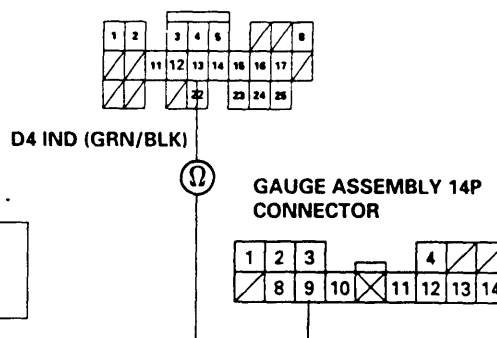
PCM CONNECTOR A (32P)



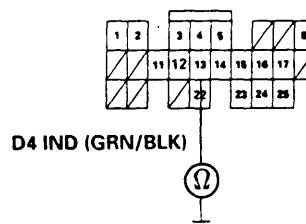
Wire side of female terminals



PCM CONNECTOR B (25P)



Wire side of female terminals



Electrical Troubleshooting

Troubleshooting Flowchart — **D4** Indicator Light On Constantly

The **D4** indicator light is on constantly (not blinking) whenever the ignition switch is ON (II).

Measure D4 IND Voltage:

1. Turn the ignition switch OFF.
2. Disconnect the B (25P) connector from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the B13 terminal and body ground.

Is there voltage?

YES

NO

Repair short to power in the wire between the B13 terminal and the gauge assembly.

Measure ATP D4 Voltage:

1. Turn the ignition switch OFF.
2. Connect the B (25P) connector to the PCM.
3. Turn the ignition switch ON (II).
4. Shift to any position other than **D4**.
5. Measure the voltage between the B24 terminal and body ground.

Is there approx. 5 V?

YES

NO

Replace the PCM.

Test the A/T gear position switch (see page 14-81).

Is the switch OK?

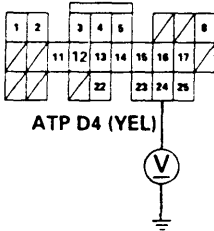
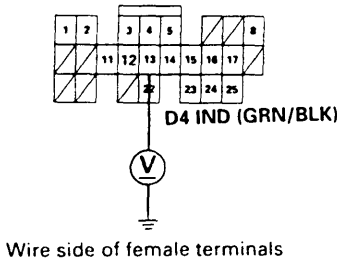
NO

YES

Replace the A/T gear position switch.

Check for a short to ground in the wire between the B24 terminal and the A/T gear position switch. If the wire is OK, substitute a known-good PCM and recheck.

PCM CONNECTOR B (25P)





Troubleshooting Flowchart — Interlock System — Shift Lock System

Shift lever cannot be moved from **P** position with the brake pedal depressed.

Check Brake Light Operation:
Depress the brake pedal.

Are the brake lights ON?

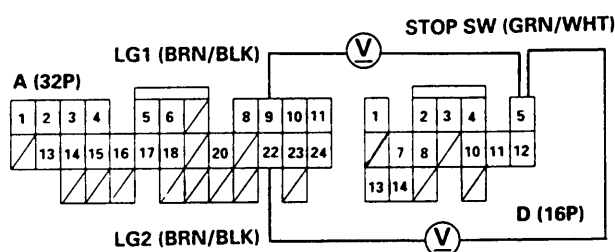
NO

Repair faulty brake switch circuit
(see section 23).

YES

Measure STOP SW Voltage:
1. Turn the ignition switch OFF.
2. Disconnect the A (32P) and D (16P) connectors from the PCM.
3. Measure the voltage between the D5 and A9 or A22 terminals with the brake pedal depressed.

PCM CONNECTORS



Wire side of female terminals

Is there battery voltage?

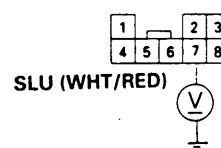
NO

Repair open in the wire between
the D5 terminal and the brake
switch.

YES

Measure SLU Voltage:
1. Connect the A (32P) and D (16P) connectors to the PCM.
2. Disconnect the 8P connector from the interlock control unit.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the No. 7 terminal of the interlock control unit and body ground with the brake pedal depressed.

INTERLOCK CONTROL UNIT (8P) CONNECTOR



Wire side of female terminals

Is there 1 V or less?

NO

Check open in the wire between
the No. 7 terminal of the interlock
control unit and the B12 terminal
of the PCM. If wire is OK, check for
loose PCM connectors. If neces-
sary, substitute a known-good
PCM and recheck.

YES

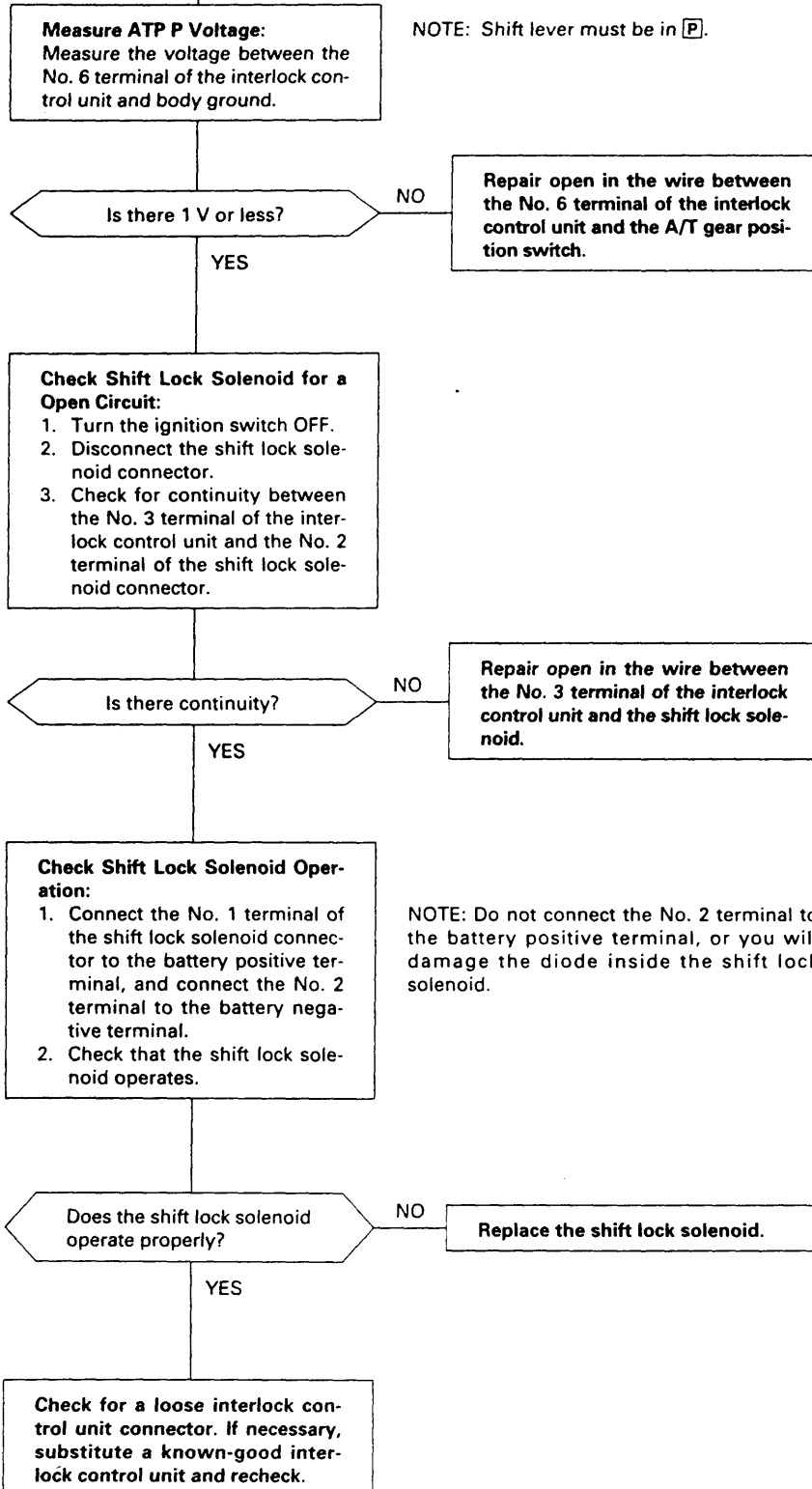
To page 14-74

(cont'd)

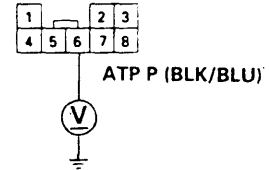
Electrical Troubleshooting

Troubleshooting Flowchart — Interlock System — Shift Lock System (cont'd)

From page 14-73

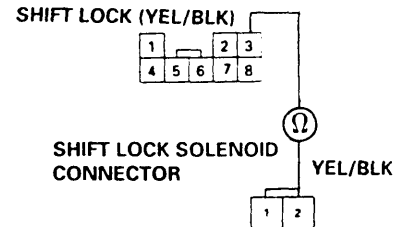


INTERLOCK CONTROL UNIT (8P) CONNECTOR



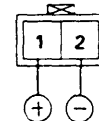
Wire side of female terminals

INTERLOCK CONTROL UNIT CONNECTOR (8P)



Wire side of female terminals

SHIFT LOCK SOLENOID CONNECTOR (directly on solenoid)



Terminal side of male terminals



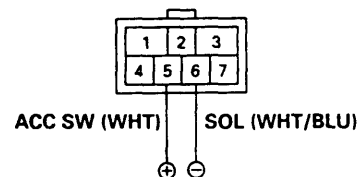
Troubleshooting Flowchart — Interlock System — Key Interlock System

Ignition key cannot be moved from ACC (I) position to LOCK (O) position while pushing the ignition key with the shift lever in **P** position.

Check Key Interlock Solenoid Operation:

1. Disconnect the ignition switch connector (7P).
2. Connect the No. 5 terminal of the ignition switch connector to the battery positive terminal, and connect the No. 6 terminal to the battery negative terminal.
3. Check the key interlock solenoid operation. A clicking sound should be heard.

IGNITION SWITCH CONNECTOR (7P)



Terminal side of male terminals

Does the key interlock solenoid operate properly?

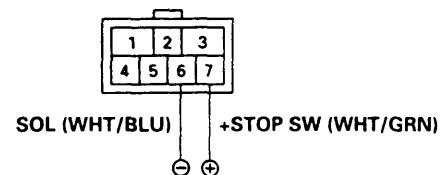
NO

Faulty key interlock solenoid.
Replace the ignition key cylinder/
steering lock assembly.

YES

Check Key Interlock Switch Operation:

1. Connect the No. 7 terminal of the ignition switch connector to the battery positive terminal, and connect the No. 6 terminal to the battery negative terminal.
2. Turn the ignition switch to ACC (I), then push it.
3. Check the key interlock solenoid operation. A clicking sound should be heard while pushing the ignition key, and no sound should be heard when releasing the ignition key.



Does the key interlock solenoid operate properly?

NO

Faulty key interlock switch.
Replace the ignition key cylinder/
steering lock assembly.

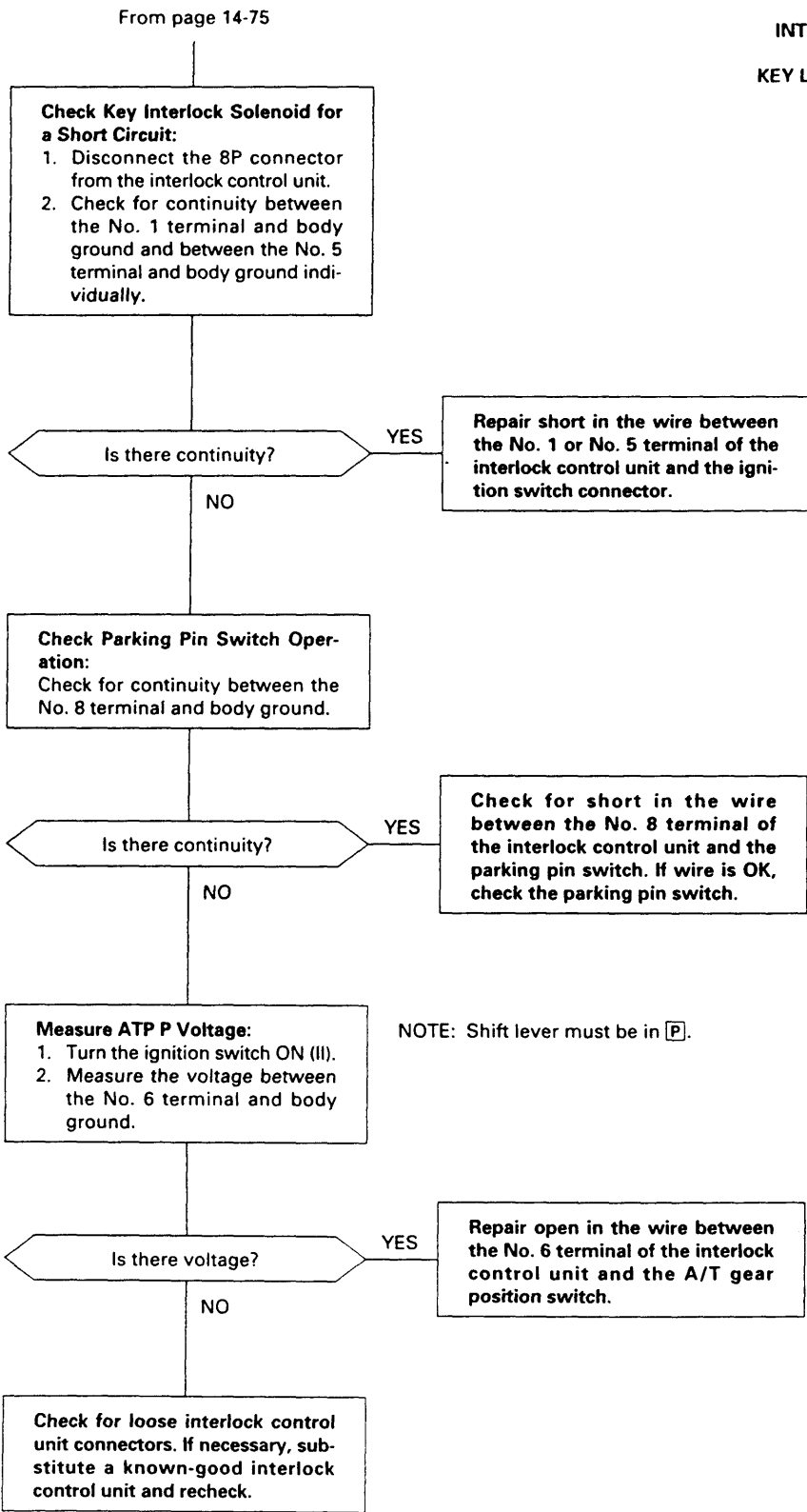
YES

To page 14-76

(cont'd)

Electrical Troubleshooting

Troubleshooting Flowchart — Interlock System – Key Interlock System (cont'd)

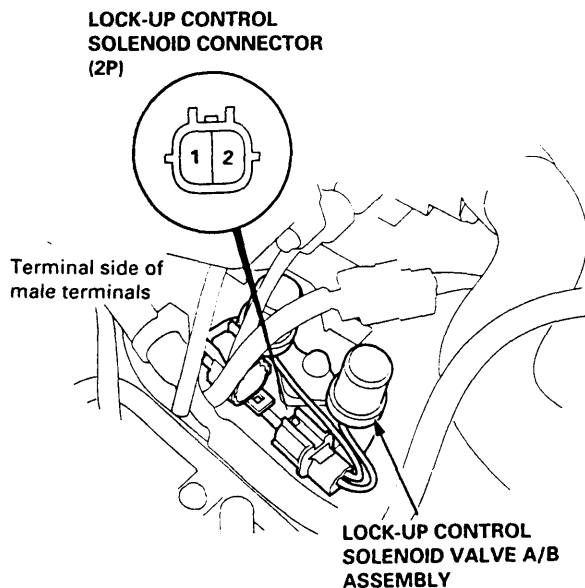


Lock-up Control Solenoid Valve A/B Assembly



Test

1. Disconnect the 2P connector from the lock-up control solenoid valve A/B assembly.



2. Measure the resistance between the No. 2 terminal (solenoid valve A) of the lock-up control solenoid valve connector and body ground, and between the No. 1 terminal (solenoid valve B) and body ground.

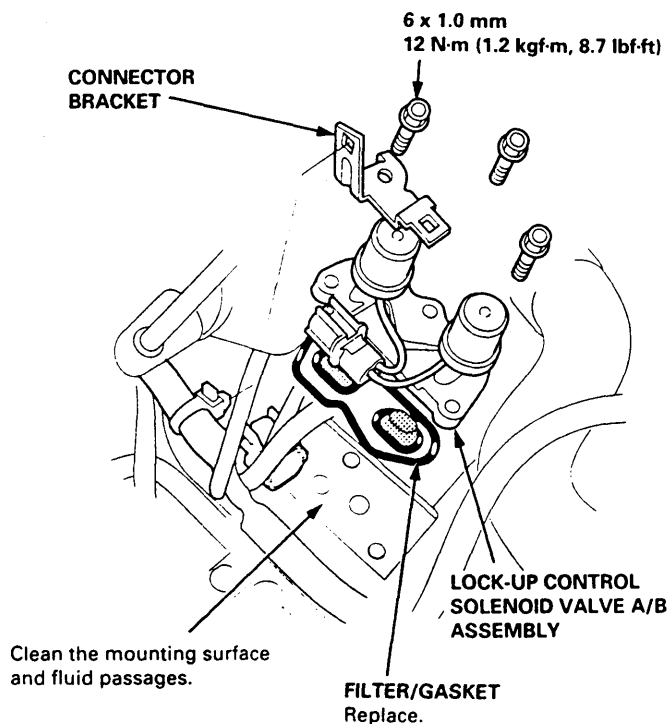
STANDARD: 14 – 25 Ω

3. Replace the lock-up control solenoid valve A/B assembly if the resistance is out of specification.
4. If the resistance is within the standard, connect the No. 1 terminal of the lock-up control solenoid valve connector to the battery positive terminal. A clicking sound should be heard. Connect the No. 2 terminal to the battery positive terminal. A clicking sound should be heard. Replace the lock-up control solenoid valve assembly if no clicking sound is heard.

Replacement

NOTE: Lock-up control solenoid valves A and B must be removed/replaced as an assembly.

1. Remove the mounting bolts and lock-up control solenoid valve A/B assembly.

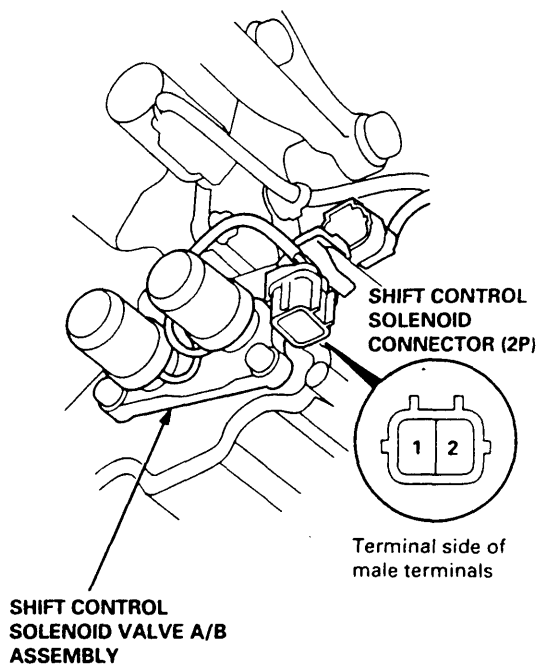


2. Clean the mounting surface and fluid passages of the lock-up control solenoid valve A/B assembly, and install a new lock-up control solenoid valve A/B with a new filter/gasket.
3. Check the connector for rust, dirt or oil, and reconnect it securely.

Shift Control Solenoid Valve A/B Assembly

Test

1. Disconnect the 2P connector from the shift control solenoid valve A/B assembly.



2. Measure the resistance between the No. 1 terminal (solenoid valve A) of the shift control solenoid valve connector and body ground, and between the No. 2 terminal (solenoid valve B) and body ground.

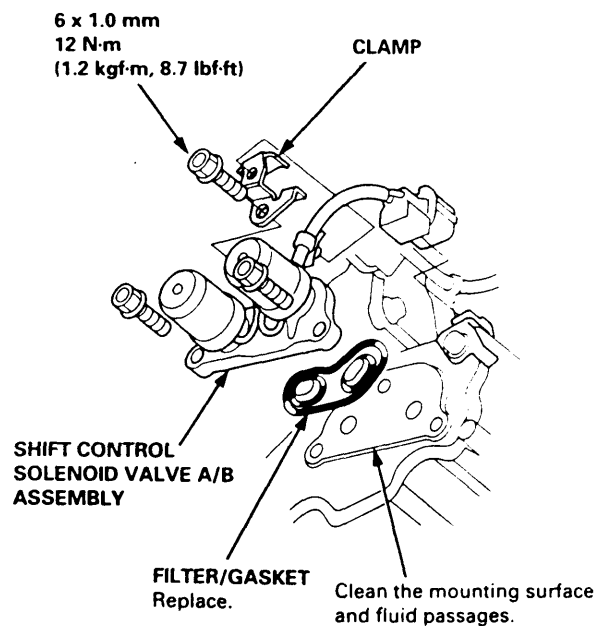
STANDARD: 14 – 25 Ω

3. Replace the shift control solenoid valve A/B assembly if the resistance is out of specification.
4. If the resistance is within the standard, connect the No. 1 terminal of the shift control solenoid valve connector to the battery positive terminal. A clicking sound should be heard. Connect the No. 2 terminal to the battery positive terminal. A clicking sound should be heard. Replace the shift control solenoid valve assembly if no clicking sound is heard.

Replacement

NOTE: Shift control solenoid valves A and B must be removed/replaced as an assembly.

1. Remove the mounting bolts, the clamp and the shift control solenoid valve A/B assembly. Then, disconnect the connector.



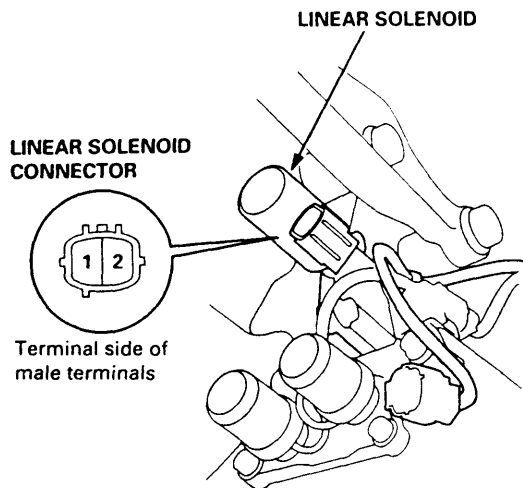
2. Clean the mounting surface and fluid passages of the shift control solenoid valve assembly, and install a new shift control solenoid valve A/B assembly with a new filter/gasket and the clamp.
3. Check the connector for rust, dirt or oil, and reconnect it securely.

Linear Solenoid Assembly



Test

1. Disconnect the linear solenoid connector.



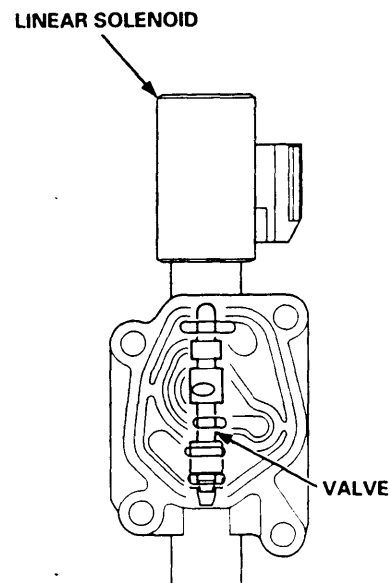
2. Measure the resistance between the No. 1 and the No. 2 terminals of the linear solenoid connector.

STANDARD: 4.0 – 9.0 Ω

3. If the resistance is out of specification, replace the linear solenoid assembly.
4. Connect the No. 2 terminal of the linear solenoid connector to the battery positive terminal and connect the No. 1 terminal to the battery negative terminal. A clicking sound should be heard.

5. If a clicking sound is not heard, remove the linear solenoid assembly.
6. Check the linear solenoid fluid passage for dust or dirt.
7. Connect the No. 2 terminal of the linear solenoid connector to the battery positive terminal and connect the No. 1 terminal to the battery negative terminal. Make sure the valve moves.
8. Disconnect the negative battery terminal, and make sure the valve releases.

NOTE: You can see the valve movement through the fluid passage in the mounting surface of the linear solenoid assembly.



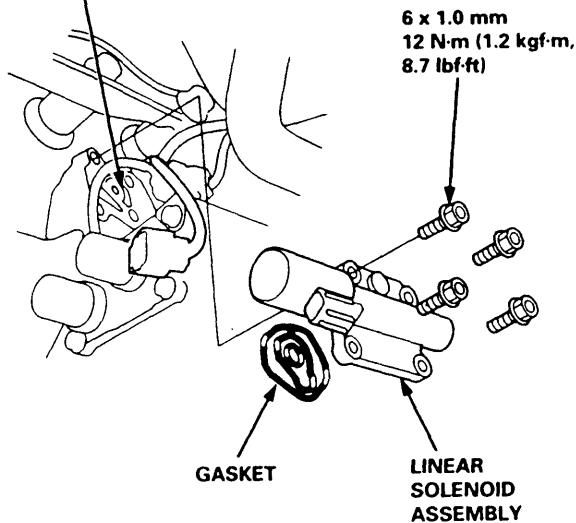
9. If the valve binds, or moves sluggishly, or if the linear solenoid does not operate, replace the linear solenoid assembly.

Linear Solenoid Assembly

Replacement

1. Remove the mounting bolts and the linear solenoid assembly.

Clean the mounting surface and fluid passages.



2. Clean the mounting surface and fluid passage of the linear solenoid assembly and transmission housing.
3. Install a new linear solenoid assembly with a new gasket.

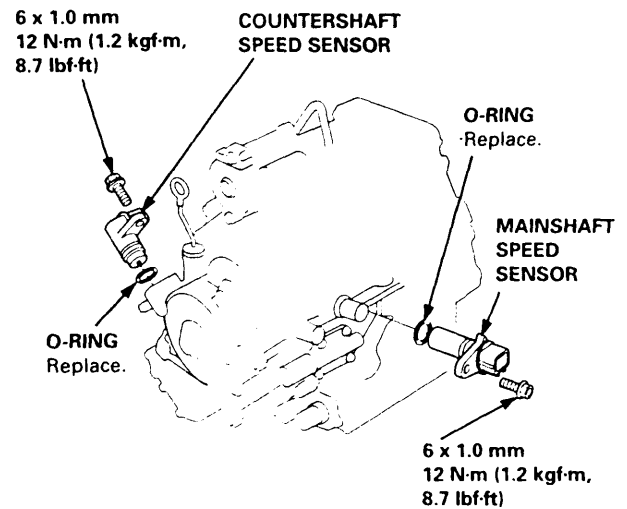
NOTE: Do not pinch the gasket when installing the linear solenoid; make sure that the gasket is installed properly in the mounting groove of the linear solenoid.

4. Check the linear solenoid connector for rust, dirt or oil, and connect it securely.

Mainshaft/Countershaft Speed Sensors

Replacement

1. Remove the 6 mm bolt and the countershaft speed sensor from the right side cover.



2. Remove the 6 mm bolt and the mainshaft speed sensor from the transmission housing.
3. Replace the O-ring with a new one before installing the countershaft speed sensor or the mainshaft speed sensor.

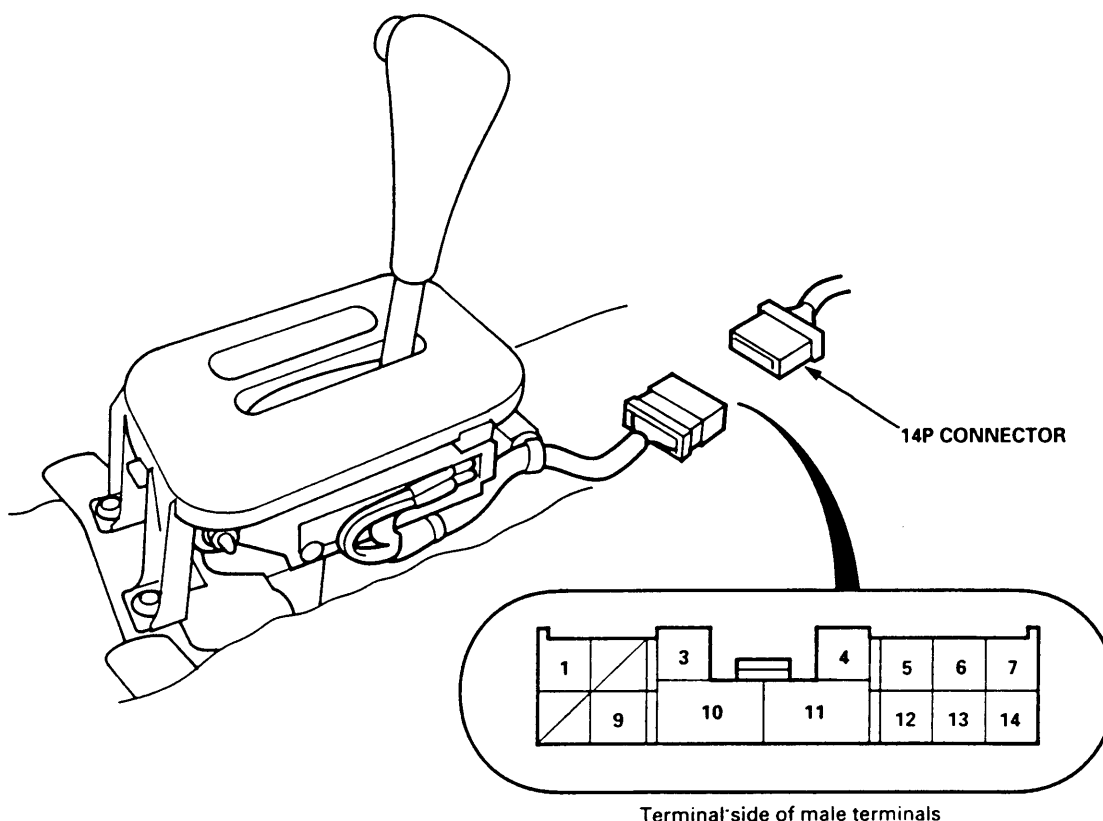


A/T Gear Position Switch

Test

1. Remove the front console (see section 20).
2. Disconnect the A/T gear position switch connector (14P).
3. Check for continuity between the terminals in each switch position according to the table below.
4. Move the shift lever back and forth without pushing the push button at each switch position, and check for continuity within the range of free play.

If there is no continuity within the range of free play, adjust the position of the switch as described on the next page.



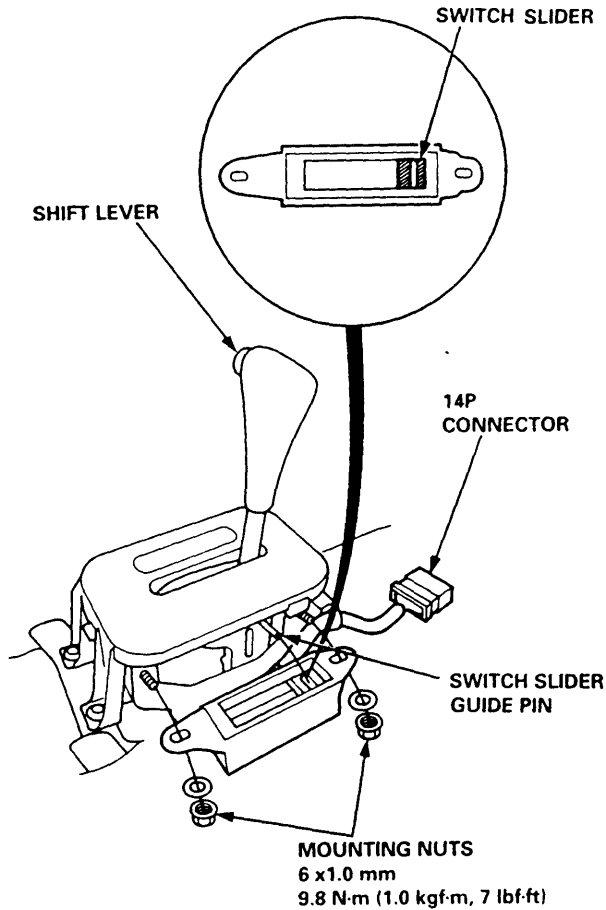
A/T Gear Position Switch									Back-up Light Switch		Neutral Position Switch	
Terminal Position	1	5	6	7	9*1	12	13	14	3	4	10	11
[2]	○	○			○							
[D₂]	○		○		○							
[D₄]	○			○	○							
[N]	○							○			○	○
[R]	○						○		○	○		
[P]	○					○					○	○

*1: With cruise control system

A/T Gear Position Switch

Replacement

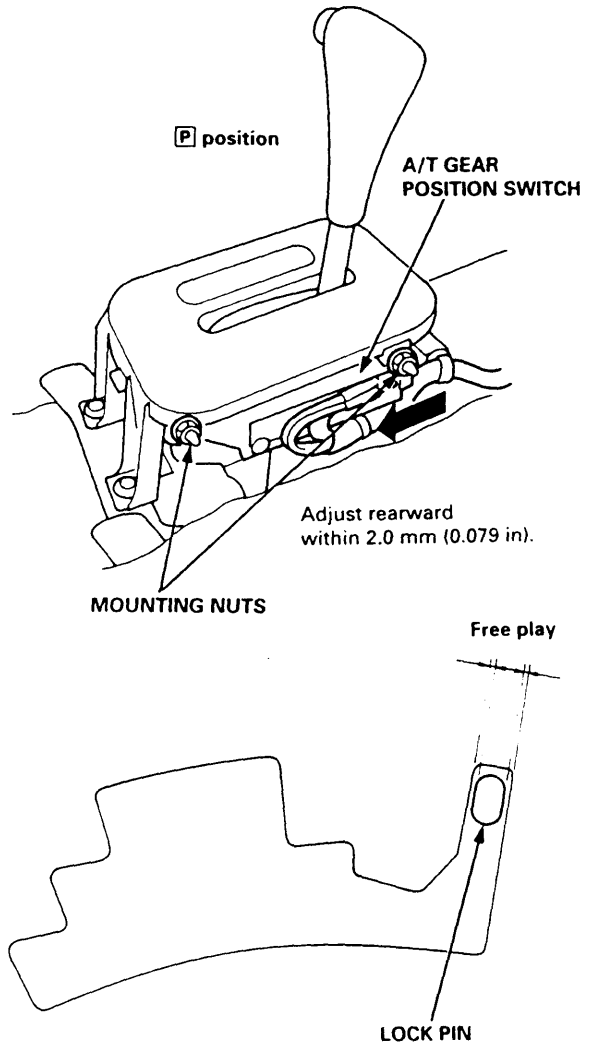
1. Remove the front console (see section 20).
2. Disconnect the A/T gear position switch connector (14P).



3. Remove the A/T gear position switch from the shift lever mounting bracket.
4. Position the switch slider of the new A/T gear position switch to **[N]** position.
5. Move the shift lever to **[N]** position, then install the A/T gear position switch while aligning the switch slider with the switch slider guide pin.
6. Test the A/T gear position switch.
7. Connect the 14P connector.

Adjustment

1. Shift to the **[P]** position, and loosen the A/T gear position switch mounting nuts.



2. Move the A/T gear position switch to the rear side up to 2.0 mm (0.079 in). There should be continuity between the No. 1 and No. 12 terminals of the A/T gear position switch connector, in the range of the free play of the shift lever.
3. Check for continuity between each of the terminals.

NOTE: If adjustment is not possible, check for damage to the shift lever detent and/or the shift lever mounting bracket.

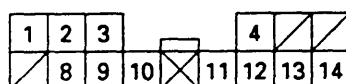
A/T Gear Position Indicator



Input Test

1. Remove the gauge assembly from the dashboard (see section 20), and disconnect the 14P connector from the gauge assembly (see section 23).
2. Inspect the connector and socket terminals to be sure they are all making good contact.
 - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, make the following input tests at the 14P connector.
 - If a test indicates a problem, find and correct the cause, then recheck the system.
 - If all the input tests prove OK, but the indicator is faulty, replace the printed circuit board.

GAUGE ASSEMBLY 14P CONNECTOR



Wire side of female terminals

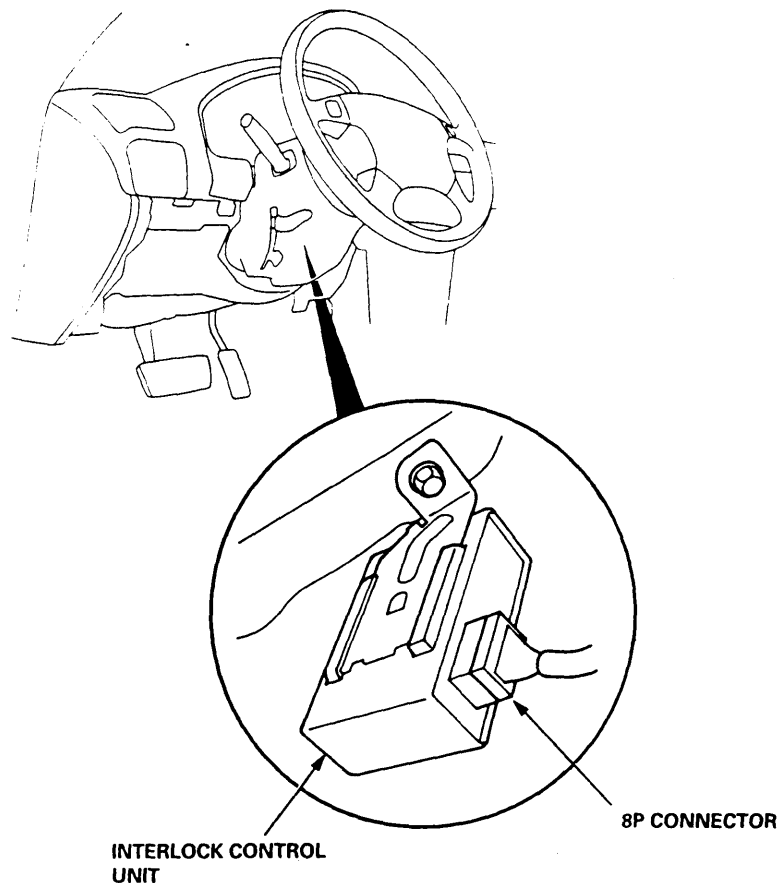
Terminal Number	Wire Color	Test Condition	Test: Desired Result	Possible Cause (If result is not obtained)
1	YEL	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 25 (7.5 A) fuse in the under-dash fuse/relay box • An open in the wire
2	RED/BLK	Combination light switch ON and dash lights brightness control dial on full bright	Check for voltage between No. 2 and No. 3 terminals: There should be battery voltage.	• Blown No. 25 (7.5 A) fuse in the under-dash fuse/relay box • Faulty combination light switch • Faulty dash light brightness controller • An open in the wire
3	RED			
4	BLU	Shift lever in [2]	Check for continuity to ground: There should be continuity. NOTE: There should be no continuity in any other shift lever position.	• Faulty A/T gear position switch • An open in the wire
8	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G402) • An open in the wire
9	GRN/BLK	Ignition switch ON (II) and shift lever in any position except [D₁]	Check for voltage to ground: There should be battery voltage for two seconds after the ignition switch is turned ON (II), and less than 1 V two seconds later.	• Faulty PCM • An open in the wire
10	GRN	Shift lever in [D₂]	Check for continuity to ground: There should be continuity. NOTE: There should be no continuity in any other shift lever position.	• Faulty A/T gear position switch • An open in the wire
11	RED	Shift lever in [N]		
12	WHT	Shift lever in [R]		
13	BLK/BLU	Shift lever in [P] NOTE: Do not push the brake pedal.		
14	LT GRN	Ignition switch ON (II)	Check for voltage to ground: There should be about 5 V.	• Faulty PCM • An open in the wire

Interlock System

Interlock Control Unit Input Test

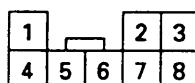
1. Disconnect the 8P connector from the interlock control unit.
2. Inspect the connector and connector terminals to be sure they are all making good contact.
 - If the terminals are bent, loose, or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, make the following input test at the connector.
 - If a test indicates a problem, find and correct the cause, then recheck the system.
 - If all the input tests prove OK, substitute a known-good control unit, and recheck the system. If the check is OK, the control unit must be faulty; replace it.

NOTE: If the shift lock solenoid clicks when the ignition switch is turned ON (II) and brake pedal is depressed with the shift lever in **P** position, the shift lock system is electronically normal; if the shift lever cannot be shifted from **P** position, test the A/T gear position switch.





INTERLOCK CONTROL UNIT CONNECTOR (8P)



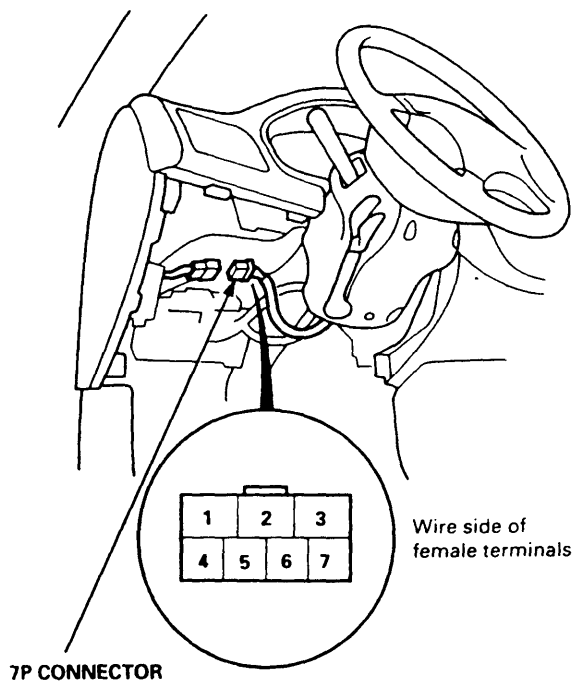
Wire side of female terminals

Terminal Number	Wire Color	Test Condition	Test: Desired Result	Possible Cause (If result is not obtained)
1	WHT/BLU	Ignition switch turned to ACC (I), ignition key pushed all the way in	Check for voltage to ground: There should be battery voltage.	• Blown No. 48 (30A) fuse in the under-hood fuse/relay box • Blown No. 33 (7.5 A) fuse in the under-dash fuse/relay box • Faulty steering lock assembly (key interlock solenoid) • An open in the wire
2	YEL	Ignition switch turned ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 19 (7.5 A) fuse in the under-dash fuse/relay box • Faulty steering lock assembly (key interlock solenoid) • An open in the wire
3	YEL/BLK	Ignition switch turned ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 19 (7.5 A) fuse in the under-dash fuse/relay box • Faulty shift lock solenoid • An open in the wire
4	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G402) • An open in the wire
5	WHT	Ignition switch turned to ACC (I), ignition key pushed all the way in	Check for voltage to ground: There should be battery voltage.	• Blown No. 48 (30 A) fuse in the under-hood fuse/relay box • Blown No. 33 (7.5 A) fuse in the under-dash fuse/relay box • Faulty steering lock assembly (key interlock solenoid) • An open in the wire
6	BLK/BLU	Shift lever in P	Check for continuity to ground: There should be continuity.	• Faulty A/T gear position switch • Poor ground (G401, G402) • An open in the wire
8	WHT/BLK	Shift lever in P and push button pressed	Check for continuity to ground: There should be continuity.	• Faulty parking pin switch • Short to ground
		Shift lever in P and push button released	Check for continuity to ground: There should be no continuity.	
Reconnect the interlock control unit 8P connector.				
7	WHT/RED	Ignition switch ON (II) and brake pedal pushed	Check for voltage to ground: There should be 1 V or less.	• Faulty brake switch • Faulty throttle position (TP) sensor • Faulty PCM • An open in the wire
		Ignition switch ON (II), brake pedal and accelerator pedal depressed at the same time	Check for voltage to ground: There should be battery voltage.	

Interlock System

Key Interlock Solenoid Test

1. Remove the driver's dashboard lower cover and knee bolster (see section 20).
2. Disconnect the 7P connector from the main wire harness.



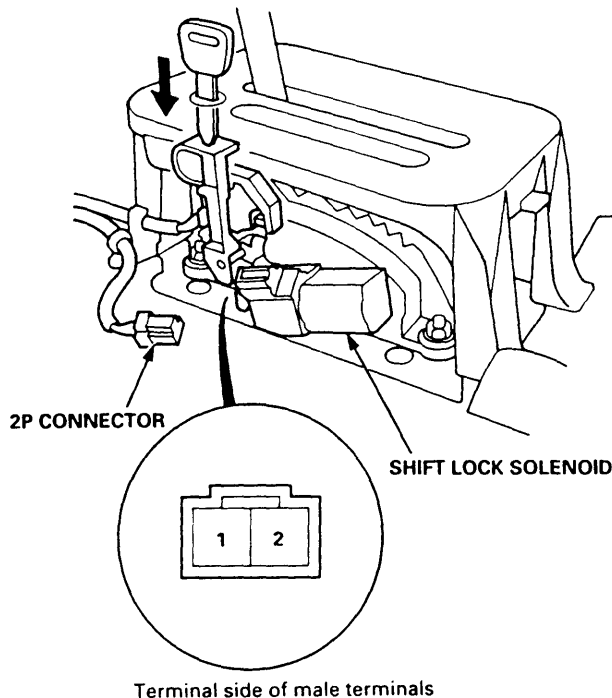
3. Check for continuity between the terminals in each key position according to the table.

Terminal		5	6	7
Position				
Ignition switch ACC (I)	Key pushed in	○	○	○
	Key released	○	○	

4. Check that the key cannot be removed with power and ground connected to the No. 7 and No. 5 terminals.
 - If the key cannot be removed, the key interlock solenoid is OK.
 - If the key can be removed, replace the steering lock assembly (the interlock solenoid is not available separately).

Shift Lock Solenoid Test

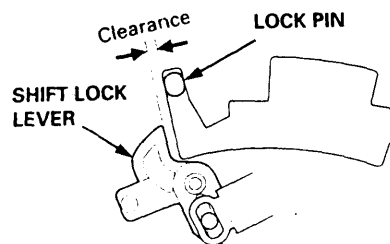
1. Remove the front console (see section 20).
2. Disconnect the shift lock solenoid 2P connector.



3. Connect battery power to the No. 1 terminal, and to the No. 2 terminal of the solenoid, momentarily.

NOTE:

- Do not connect power to the No. 2 (–) terminal (reverse polarity), or you will damage the diode inside the solenoid.
- Make sure there is clearance between the stop pin and the base bracket when the solenoid switches ON and OFF.

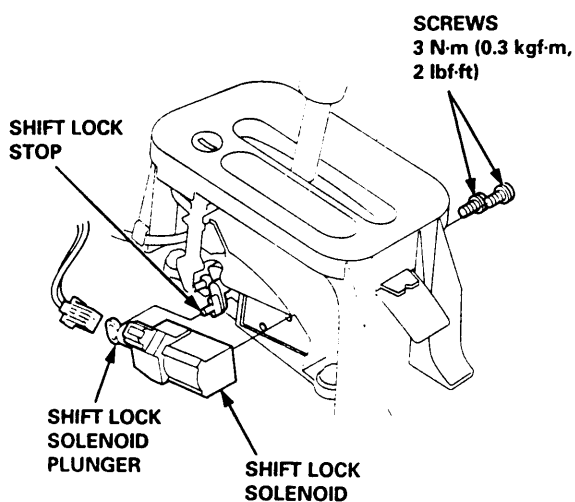


4. Check that the shift lock releases when the release lever is pushed, and check that it locks when the release lever is released.
5. If the solenoid does not work, replace it.



Shift Lock Solenoid Replacement

1. Remove the front console (see section 20).
2. Shift to **P** position, then disconnect the 2P connector from the shift lock solenoid.
3. Remove the A/T gear position switch.
4. Remove the two screws securing the shift lock solenoid, then remove the shift lock solenoid.
5. Apply silicone grease to the shift lock solenoid plunger mating surfaces with the shift lock stop.
6. Install the shift lock solenoid and connect the shift lock solenoid plunger to the shift lock stop.

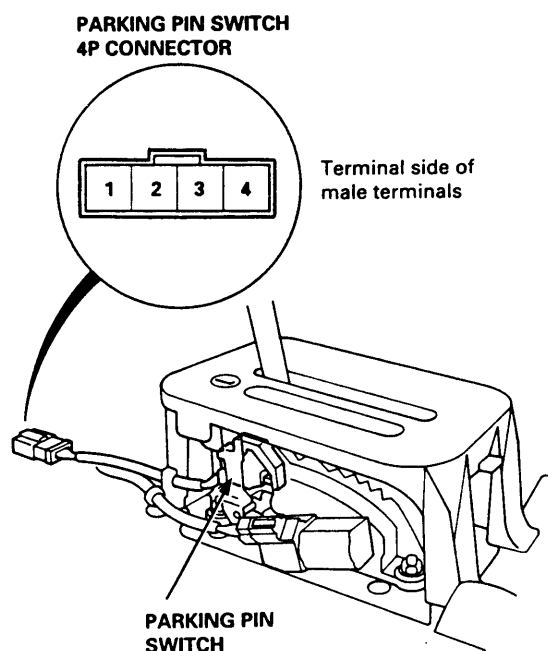


7. Be sure to install the projected tips of the shift lock solenoid in the holes of the position plate, then tighten the screws.
8. Install the A/T gear position switch.
9. Connect the 2P connector to the shift lock solenoid.
10. Check the shift lock solenoid operation.

Parking Pin Switch Test

1. Remove the front console (see section 20).
2. Shift to **P** position.
3. Disconnect the parking pin switch 4P connector.
4. Check for continuity between the No. 3 and No. 4 terminals.

There should be continuity while pushing the push button.
There should be no continuity when the push button is released.



5. If necessary, replace the parking pin switch.

NOTE: The parking pin switch is assembled with the position plate. If parking pin switch replacement is required, refer to page 14-168.

Symptom-to-Component Chart

Hydraulic System

SYMPTOM	Check these items on the PROBABLE CAUSE List	Check these items on the NOTES List
Engine runs, but vehicle does not move in any gear.	1, 2, 3, 5, 6, 7, 36, 38	K, L, R, S
Vehicle moves in [2] , [R] , but not in [D₃] , [D₄] position.	6, 8, 9, 10, 30, 54	C, M, O
Vehicle moves in [D₃] , [D₄] , [R] , but not in [2] position.	6, 11, 12, 24	C, L
Vehicle moves in [D₃] , [D₄] , [2] , but not in [R] position.	4, 6, 14, 15, 31	C, L, Q
Vehicle moves in [N] position.	10, 12, 13, 14, 16, 29, 33, 34, 35	C, D
Excessive idle vibration	1, 2, 19, 32, 36, 45, 47, 48, 52	B, K, L
Poor acceleration; flares on starting off in [D₄] , [D₃] position		
Stall rpm high in [D₄] , [D₃] , [2] position	1, 2, 3, 6, 38, 41	K, L, R
Stall rpm high in [D₄] , [D₃] position	6, 8, 10	C, D
Stall rpm high in [2] position	6, 12	C, D
Stall rpm is in specification	14	N
Stall rpm low	17, 18, 32, 45, 47, 48, 52	R
No shift	19, 20, 40, 48, 49, 52	G, L
Fails to shift in [D₃] , [D₄] position; from 1st to 3rd gear	22, 49, 52	
Fails to shift in [D₃] , [D₄] position; from 1st to 4th gear	22, 23, 48, 52	
Erratic upshifting		
1-2 upshift, 2-3 upshift, 3-4 upshift	18, 52, 59	
1-2 upshift	21, 48, 52	
2-3 upshift	22, 49, 52	
3-4 upshift	23, 48, 52	
Harsh upshift (1-2)	12, 19, 20, 29, 50, 51, 52, 58, 59	C, D, E
Harsh upshift (2-3)	13, 19, 20, 24, 27, 29, 50, 51, 52, 58, 59	C, D, E, H, L
Harsh upshift (3-4)	14, 19, 20, 25, 28, 29, 50, 51, 52, 58, 59	C, D, E, I, L
Harsh downshift (2-1)	19, 20, 24, 43, 52, 55, 58, 59	O
Harsh downshift (3-2)	12, 19, 20, 25, 43, 52, 56, 58, 59	C, D, E, H
Harsh downshift (4-3)	13, 19, 20, 26, 43, 52, 57, 58, 59	C, D, E, I
Flares on 2-3 upshift	13, 19, 20, 24, 27, 51, 52	E, L
Flares on 3-4 upshift	14, 19, 20, 25, 28, 51, 52	E, L, N
Excessive shock on 2-3 upshift	13, 19, 20, 24, 27, 43, 50, 51, 52, 58, 59	E, L, N
Excessive shock on 3-4 upshift	14, 19, 20, 25, 28, 43, 50, 51, 52, 58, 59	E, L, N
Late shift from [N] position to [D₄] or [D₃] position	10, 30	M
Late shift from [N] position to [R] position	4, 14, 21, 53	Q
Noise from transmission in all shift lever positions	2, 37	K, L, Q
Vehicle does not accelerate more than 31 mph (50 km/h).	17	
Shift lever does not operate smoothly.	6, 39	P
Fails to shift; stuck in 4th gear	48, 49, 52	
Transmission will not shift into parking gear in [P] position.	6, 39	P
Stall rpm high; all clutch pressures are in specification.	41	D, K, O
Lock-up clutch does not disengage.	19, 44, 45, 46, 47, 50, 51, 52, 59	E, L
Lock-up clutch does not operate smoothly.	19, 41, 44, 45, 46, 47, 50, 51, 52, 59	L
Lock-up clutch does not engage.	19, 41, 44, 45, 46, 47, 50, 51, 52, 59	E, L
Vibration in all positions	36	



PROBABLE CAUSE			
1	Low ATF	41	Torque converter check valve stuck
2	ATF pump worn or binding	42	Foreign material in separator plate
3	Regulator valve stuck	43	CPB valve stuck
4	Servo valve stuck	44	Lock-up timing valve stuck
5	Mainshaft worn/damaged	45	Lock-up shift valve stuck
6	Shift cable broken/out of adjustment	46	Lock-up control valve stuck
7	Final gears worn/damaged	47	Lock-up piston defective
8	One-way (sprag) clutch worn/damaged	48	Shift control solenoid valve A defective
9	1st gears worn/damaged (2 gears)	49	Shift control solenoid valve B defective
10	1st clutch defective	50	Lock-up control solenoid valve A defective
11	2nd gears worn/damaged (2 gears)	51	Lock-up control solenoid valve B defective
12	2nd clutch defective	52	PCM defective
13	3rd clutch defective	53	Servo control valve stuck
14	4th clutch defective	54	1st accumulator defective
15	Reverse gears worn/damaged (3 gears)	55	Foreign material in 2nd exhaust orifice
16	Excessive ATF	56	Foreign material in 3rd exhaust orifice
17	Torque converter one-way clutch defective	57	Foreign material in 4th exhaust orifice
18	Engine throttle cable out of adjustment	58	Mainshaft speed sensor defective
19	Linear solenoid assembly defective	59	Countershaft speed sensor defective
20	CPC valve stuck		
21	1-2 shift valve stuck		
22	2-3 shift valve stuck		
23	3-4 shift valve stuck		
24	2nd accumulator defective		
25	3rd accumulator defective		
26	4th accumulator defective		
27	2nd orifice control valve stuck		
28	3-4 orifice control valve stuck		
29	Foreign material in main orifice		
30	Foreign material in 1st orifice		
31	Foreign material in reverse orifice		
32	Engine output low		
33	Needle bearing worn/damaged		
34	Thrust washer worn/damaged		
35	Clutch clearance incorrect		
36	Drive plate defective or transmission misassembly		
37	Torque converter housing or transmission housing bearing worn/damaged		
38	ATF strainer clogged		
39	Joint in shift cable and transmission or body worn		
40	Modulator valve stuck		

(cont'd)

Symptom-to-Component Chart

Hydraulic System (cont'd)

The following symptoms can be caused by improper repair or assembly	Check these items on the PROBABLE CAUSE DUE TO IMPROPER REPAIR List	Items on the NOTES List
Vehicle creeps in [N] position.	R1, R2	
Vehicle does not move in [D₂] or [D₄] position.	R4	
Transmission locks up in [R] position.	R3, R11	
Excessive drag in transmission	R6	K, R
Excessive vibration, rpm related	R7	
Noise with wheels moving only	R5	
Main seal pops out.	R8	S
Various shifting problems	R9, R10	

PROBABLE CAUSE DUE TO IMPROPER REPAIR	
R1	Improper clutch clearance
R2	Improper gear clearance
R3	Parking brake lever installed upside down.
R4	One-way (sprag) clutch installed upside down.
R5	Reverse selector hub installed upside down.
R6	ATF pump binding
R7	Torque converter not fully seated in ATF pump.
R8	Main seal improperly installed.
R9	Springs improperly installed.
R10	Valves improperly installed.
R11	Shift fork bolt not installed.



NOTES	
A	See flushing procedure, page 14-164 and 165.
B	Set idle rpm in gear to specified idle speed. If still no good, adjust the motor mounts as outlined in the engine section of this manual.
C	If the large clutch piston O-ring is broken, inspect the piston groove for rough machining.
D	If the clutch pack is seized or is excessively worn, inspect the other clutches for wear, and check the orifice control valves, CPC valve, and linear solenoid for free movement.
E	If the linear solenoid is stuck, inspect the clutches for wear.
G	If the 1-2 shift valve is stuck closed, the transmission will not upshift. If stuck open, the transmission has no 1st gear.
H	If the 2nd orifice control valve is stuck, inspect the 2nd and 3rd clutch packs for wear.
I	If the 3-4 orifice control valve is stuck, inspect the 3rd and 4th clutch packs for wear.
J	If the clutch pressure control valve is stuck closed, the transmission will not shift out of 1st gear.
K	Improper alignment of main valve body and torque converter housing may cause ATF pump seizure. The symptoms are mostly an rpm-related ticking noise or a high-pitched squeak.
L	If the ATF strainer is clogged with particles of steel or aluminum, inspect the ATF pump and differential pinion shaft. If both are OK and no cause for the contamination is found, replace the torque converter.
M	If the 1st clutch feed pipe guide in the right side cover is scored by the mainshaft, inspect the ball bearing for excessive movement in the transmission housing. If OK, replace the right side cover as it is dented. The O-ring under the guide is probably worn.
N	• Replace the mainshaft if the bushing for the 4th feed pipe is loose or damaged. If the 4th feed pipe is damaged or out of round, replace the right side cover. • Replace the mainshaft if the bushing for the 1st feed pipe is loose or damaged. If the 1st feed pipe is damaged or out of round, replace it.
O	A worn or damaged sprag clutch is mostly a result of shifting the transmission in D₃ or D₄ position while the wheels rotate in reverse, such as rocking the vehicle in snow.
P	Inspect the frame for collision damage.
Q	Inspect for damage and wear: 1. Reverse selector gear teeth chamfers. 2. Engagement teeth chamfers of countershaft 4th and reverse gear. 3. Shift fork for scuff marks in center. 4. Differential pinion shaft for wear under pinion gears. 5. Bottom of 3rd clutch for swirl marks. Replace items 1, 2, 3 and 4 if worn or damaged. If the transmission makes a clicking, grinding, or whirring noise, also replace mainshaft 4th gear, reverse idler gear, and countershaft 4th gear. If the differential pinion shaft is worn, overhaul the differential assembly, replace ATF strainer, thoroughly clean the transmission and flush the torque converter, cooler, and lines. If bottom of 3rd clutch is swirled and transmission makes gear noise, replace the countershaft and final driven gear.
R	Be very careful not to damage the torque converter housing when replacing the main ball bearing. You may also damage the ATF pump when you torque down the main valve body. This will result in ATF pump seizure if not detected. Use the proper tools.
S	Install the main seal flush with the torque converter housing. If you push it into the torque converter housing until it bottoms out, it will block the fluid return passage and result in damage.

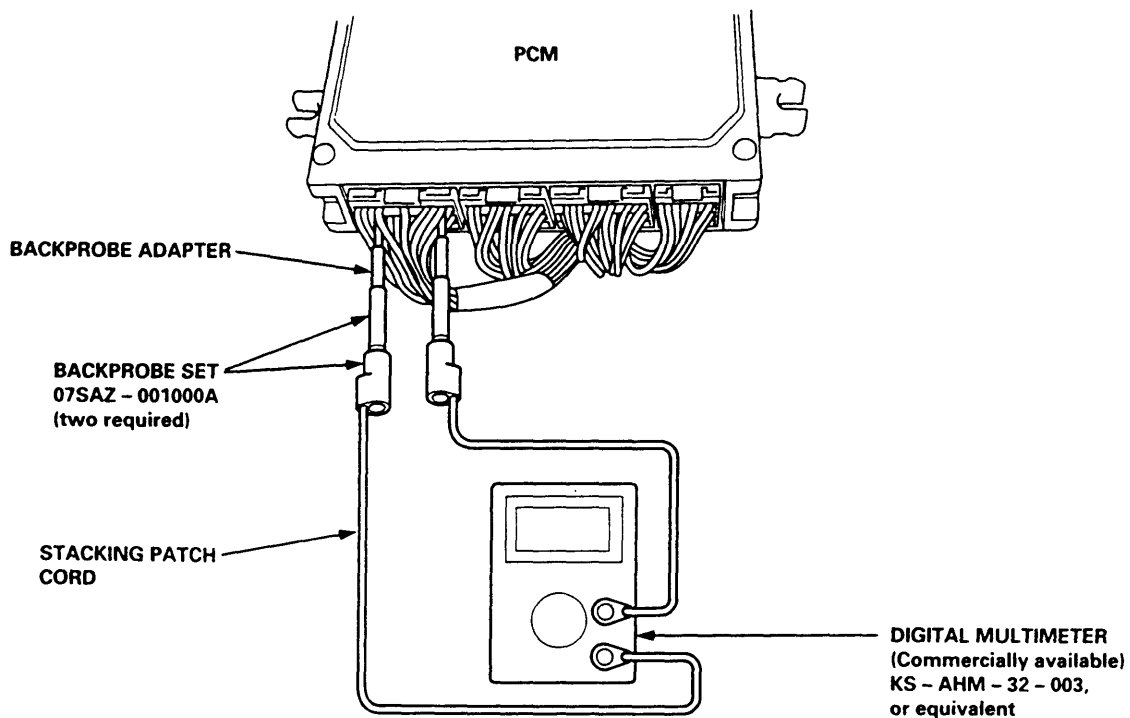
Road Test

NOTE: Warm up the engine to normal operating temperature (the radiator fan comes on).

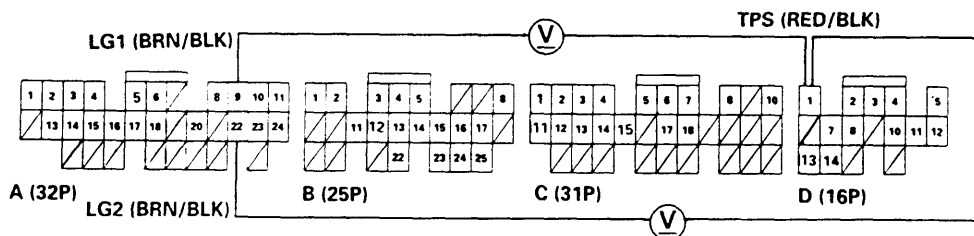
1. Apply the parking brake and block the wheels. Start the engine, then shift to **D₄** position while depressing the brake pedal. Depress the accelerator pedal and release it suddenly. The engine should not stall.
2. Repeat same test in **D₃** position.
3. Test-drive the vehicle on a flat road in the **D₄** position. Check that the shift points occur at the approximate speeds (shown on the next page) on a flat road. Also check for abnormal noise and clutch slippage.

NOTE: Throttle position sensor voltage represents the throttle opening.

- a. Unbolt the PCM for road testing; refer to page 14-46.
- b. Set the digital multimeter to check voltage between D1 (+) terminal and A9 (-) or A22 (-) terminal of the PCM for the throttle position sensor.



PCM CONNECTORS



Wire side of female terminals



• **Upshift**

Throttle Opening	Unit of speed	1st → 2nd	2nd → 3rd	3rd → 4th	Lock-up ON
Throttle position sensor voltage: 0.75 V	mph	9 – 12	20 – 23	28 – 33	22 – 25
	km/h	15 – 19	32 – 37	45 – 52	34 – 39
Throttle position sensor voltage: 2.25 V	mph	22 – 26	41 – 47	59 – 65	61 – 67
	km/h	34 – 40	65 – 73	95 – 104	99 – 108
Fully-opened throttle Throttle position sensor voltage: 4.5 V	mph	32 – 38	62 – 71	97 – 108	96 – 107
	km/h	51 – 59	99 – 112	155 – 172	153 – 170

• **Downshift**

Throttle Opening	Unit of speed	Lock-up OFF	4th → 3rd	3rd → 2nd	2nd → 1st
Fully-closed throttle Throttle position sensor voltage: 0.5 V	mph	19 – 22	17 – 20	7 – 10 (3rd → 1st)	
	km/h	30 – 35	27 – 32	10 – 15 (3rd → 1st)	
Fully-opened throttle Throttle position sensor voltage: 4.5 V	mph	92 – 103	86 – 97	54 – 61	25 – 31
	km/h	147 – 163	137 – 153	87 – 98	40 – 48

NOTE:

- Lock-up ON: The lock-up control solenoid valve A turns ON.
- Lock-up OFF: The lock-up control solenoid valve A turns OFF.

- Accelerate to about 35 mph (57 km/h) so the transmission is in 4th, then shift from **D₄** position to **2** position. The vehicle should immediately begin slowing down from engine braking.

CAUTION: Do not shift from **D₄** or **D₃** position to **2** position at speeds over 63 mph (100 km/h); you may damage the transmission.

- Check for abnormal noise and clutch slippage in the following positions.

2 (2nd Gear) Position

- Accelerate from a stop at full throttle. Check that there is no abnormal noise or clutch slippage.
- Upshifts and downshifts should not occur with the selector in this position.

R (Reverse) Position

Accelerate from a stop at full throttle, and check for abnormal noise and clutch slippage.

- Test in **P** (Parking) Position

Park the vehicle on slope (approx. 16°), apply the parking brake, and shift into **P** position. Release the brake; the vehicle should not move.

Stall Speed

Test

CAUTION:

- To prevent transmission damage, do not test stall speed for more than 10 seconds at a time.
- Do not shift the lever while raising the engine speed.
- Be sure to remove the pressure gauge before testing stall speed.

1. Engage the parking brake, and block the front wheels.
2. Connect a tachometer to the engine, and start the engine.
3. Make sure the A/C switch is OFF.
4. After the engine has warmed up to normal operating temperature (the radiator fan comes on), shift into **[2]** position.
5. Fully depress the brake pedal and accelerator for 6 to 8 seconds, and note engine speed.
6. Allow two minutes for cooling, then repeat the test in **[D_s]** and **[R]** positions.

NOTE:

- Stall speed tests should be used for diagnostic purposes only.
- Stall speed should be the same in **[D_s]**, **[2]** and **[R]** positions.

Stall Speed RPM:

Specification: 2,700 rpm

Service Limit: 2,550 – 2,850 rpm²

TROUBLE	PROBABLE CAUSE
Stall rpm high in [D_s] , [2] and [R] positions	• Low fluid level or ATF pump output • Clogged ATF strainer • Pressure regulator valve stuck closed • Slipping clutch
Stall rpm high in [R] position	Slippage of 4th clutch
Stall rpm high in [2] position	Slippage of 2nd clutch
Stall rpm high in [D_s] position	Slippage of 1st clutch or 1st gear one-way clutch
Stall rpm low in [D_s] , [2] and [R] positions	• Engine output low • Torque converter one-way clutch slipping

Fluid Level



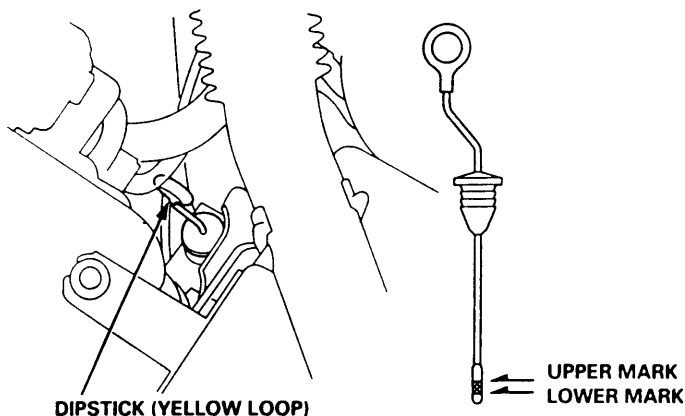
Checking/Changing

CAUTION: While checking or changing fluid, be sure not to allow dust and other foreign particles to enter into the transmission.

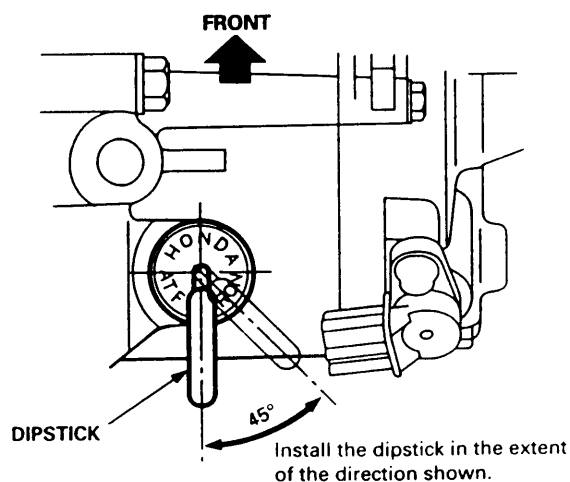
Checking

NOTE: Check the fluid level with the engine at normal operating temperature (the radiator fan comes on).

1. Park the vehicle on level ground. Turn off the engine.
2. Remove the dipstick (yellow loop) from the transmission, and wipe it with a clean cloth.



3. Insert the dipstick into the transmission.
4. Remove the dipstick and check the fluid level. It should be between the upper and lower marks.
5. If the level is below the lower mark, pour the recommended fluid* into the filler hole to bring it to the upper mark.
6. Reinstall the dipstick in the direction shown.



Changing

1. Bring the transmission up to operating temperature by driving the vehicle. Park the vehicle on level ground, turn the engine off, then remove the drain plug.

NOTE: If a cooler flusher is to be used, see page 14-164 and 165.

2. Reinstall the drain plug with a new sealing washer, then refill the transmission with the recommended fluid* to the upper mark on the dipstick.

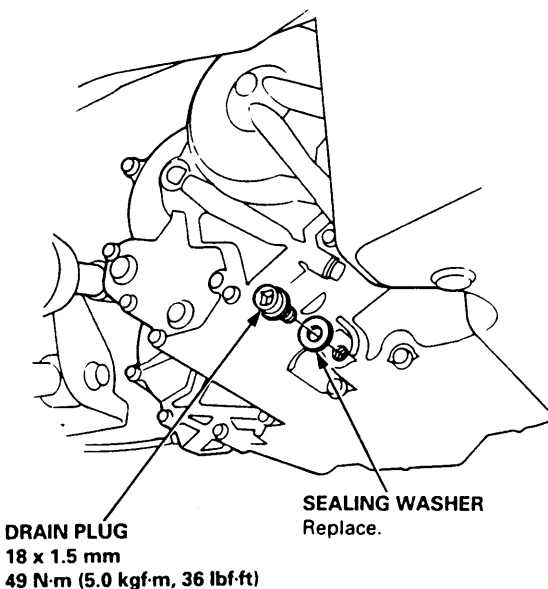
Automatic Transmission Fluid Capacity:

2.7 l (2.9 US qt, 2.4 Imp qt) at change

5.9 l (6.2 US qt, 5.2 Imp qt) at overhaul

Recommended Automatic Transmission Fluid:

Genuine Honda Premium Formula Automatic Transmission Fluid (ATF)*



* Always use Genuine Honda Premium Formula Automatic Transmission Fluid (ATF). Using a non-Honda ATF can affect shift quality.

Pressure Testing

⚠ WARNING

- While testing, be careful of the rotating front wheels.
- Make sure lifts, jacks, and safety stands are placed properly (see section 1).

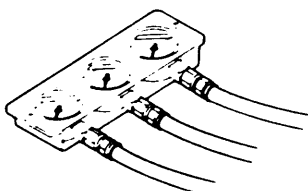
CAUTION:

- Before testing, be sure the transmission fluid is filled to the proper level.
- Warm up the engine before testing.

1. Set the parking brake, and block both rear wheels securely.
2. Raise the front of the vehicle, and support it with safety stands (see section 1).
3. Warm up the engine, then stop the engine and connect a tachometer.
4. Connect the oil pressure gauges to each inspection hole.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

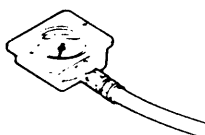
CAUTION: Connect the oil pressure gauges securely; be sure not to allow dust or other foreign particles to enter the inspection holes.



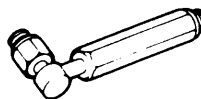
A/T OIL PRESSURE GAUGE
SET W/PANEL
07406 - 0020400



A/T PRESSURE HOSE,
2210 mm
07MAJ - PY4011A
(4 Required)



A/T LOW PRESSURE
GAUGE W/PANEL
07406 - 0070300



A/T PRESSURE HOSE
ADAPTER
07MAJ - PY40120
(4 Required)

NOTE: the A/T Oil Pressure Gauge Set (07406 - 0020003) or A/T Low Pressure Gauge (07406 - 0070000) may also be used.

5. Measure the following pressure:
 - Line Pressure: page 14-97
 - 1st Clutch Pressure: page 14-97
 - 2nd, 3rd and 4th Clutch Pressure: page 14-98
6. Install a new washer and the sealing bolt in the inspection hole, and tighten to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

NOTE: Do not reuse old sealing washers.



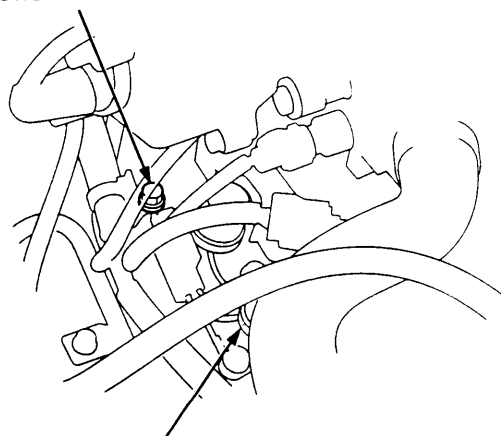
Line Pressure/1st Clutch Pressure Measurement

1. Start the engine, and run it at 2,000 rpm.
2. Shift to **N** or **P** position, then measure line pressure.

NOTE: Higher pressure may be indicated if measurements are made in shift lever positions other than **N** or **P** position.

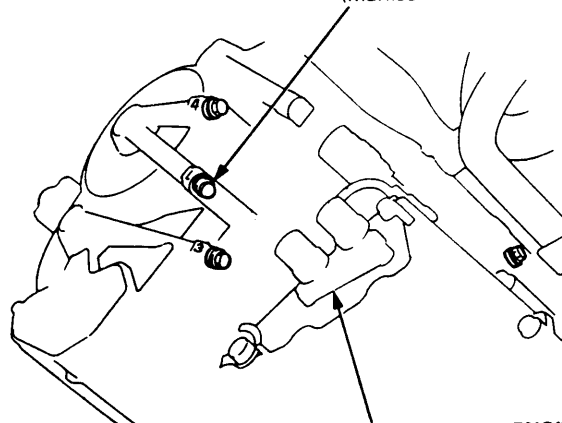
3. Shift to **D₄** position, then measure 1st clutch pressure.

LINE PRESSURE
INSPECTION HOLE



LOCK-UP CONTROL
SOLENOID VALVE A/B
ASSEMBLY

1ST CLUTCH PRESSURE
INSPECTION HOLE
(Marked with "L")



SHIFT CONTROL SOLENOID
VALVE A/B ASSEMBLY

PRESSURE	SHIFT LEVER POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Line	N or P	No (or low) line pressure	Torque converter, ATF pump, pressure regulator, torque converter check valve	830 – 880 kPa (8.5 – 9.0 kgf/cm ² , 120 – 130 psi)	780 kPa (8.0 kgf/cm ² , 110 psi)
1st Clutch	D₄	No or low 1st pressure	1st Clutch		

(cont'd)

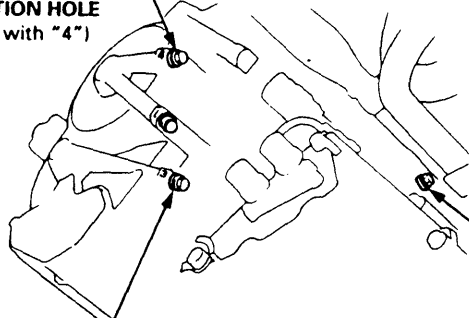
Pressure Testing

(cont'd)

2nd, 3rd and 4th Clutch Pressure Measurement

1. Disconnect the linear solenoid connector.
2. Start the engine, and run it at 2,000 rpm.
3. Shift to **D₄** position, and measure each clutch pressure.
4. Connect battery voltage and ground to the linear solenoid connector terminals, then measure each clutch pressure.

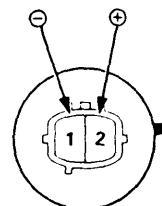
**4TH CLUTCH PRESSURE
INSPECTION HOLE**
(Marked with "4")



**3RD CLUTCH PRESSURE
INSPECTION HOLE**
(Marked with "3")

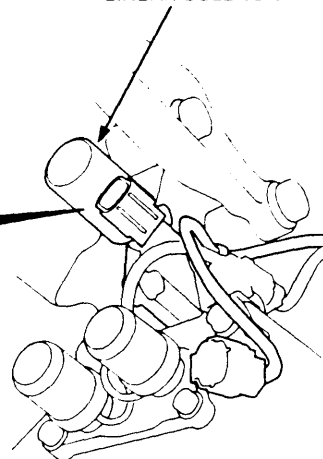
**2ND CLUTCH PRESSURE
INSPECTION HOLE**

**LINEAR SOLENOID
CONNECTOR**



Terminal side of
male terminals

LINEAR SOLENOID



PRESSURE	SHIFT LEVER POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
2nd Clutch	D₄	No or low 2nd pressure	2nd Clutch	800 – 850 kPa (8.2 – 8.7 kgf/cm ² , 120 – 120 psi) with linear solenoid disconnected	760 kPa (7.7 kgf/cm ² , 110 psi) with linear solenoid disconnected
3rd Clutch		No or low 3rd pressure	3rd Clutch	0 – 150 kPa (0 – 1.5 kgf/cm ² , 0 – 21 psi) with linear solenoid connected to battery voltage	150 kPa (1.5 kgf/cm ² , 21 psi) with linear solenoid connected to battery voltage
4th Clutch		No or low 4th pressure	4th Clutch	810 – 860 kPa (8.3 – 8.8 kgf/cm ² , 120 – 130 psi) with linear solenoid disconnected	760 kPa (7.8 kgf/cm ² , 110 psi) with linear solenoid disconnected
	R		Servo Valve or 4th Clutch	0 – 150 kPa (0 – 1.5 kgf/cm ² , 0 – 21 psi) with linear solenoid connected to battery voltage	150 kPa (1.5 kgf/cm ² , 21 psi) with linear solenoid connected to battery voltage



Transmission

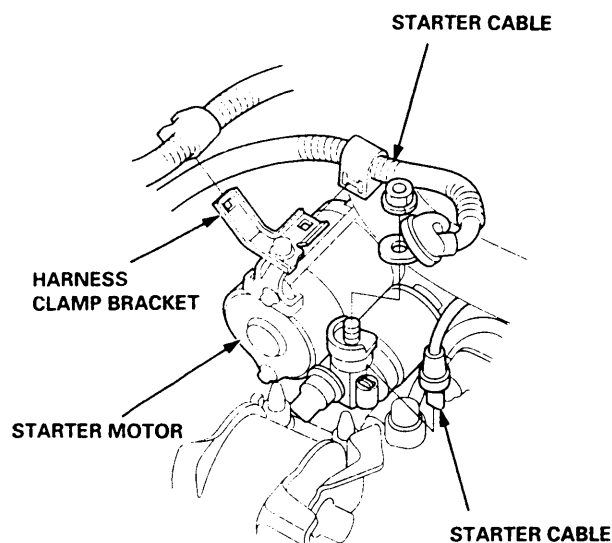
Removal

⚠ WARNING

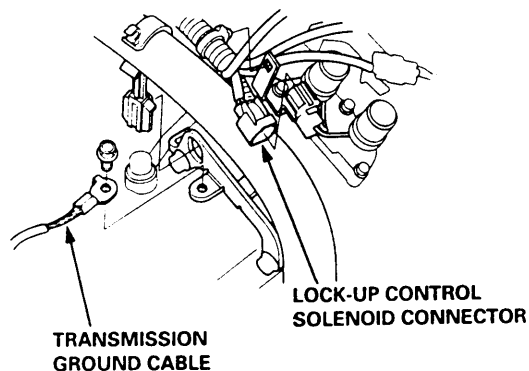
- Make sure lifts, jacks and safety stands are placed properly, and hoist bracket are attached to the correct position on the engine (see section 1).
- Apply parking brake and block rear wheels so vehicle will not roll off stands and fall on you while working under it.

CAUTION: Use fender covers to avoid damaging painted surfaces.

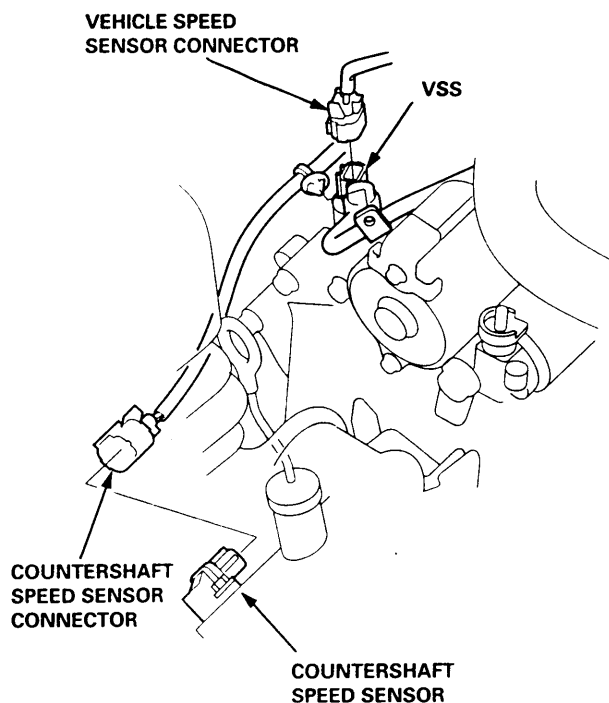
1. Before disconnecting power, make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative (-) terminal from the battery, then remove the positive (+) terminal.
3. Remove the intake air duct and the air cleaner housing assembly.
4. Remove the starter cables and cable holder from the starter motor.



5. Remove the transmission ground cable, and disconnect the lock-up control solenoid connector.



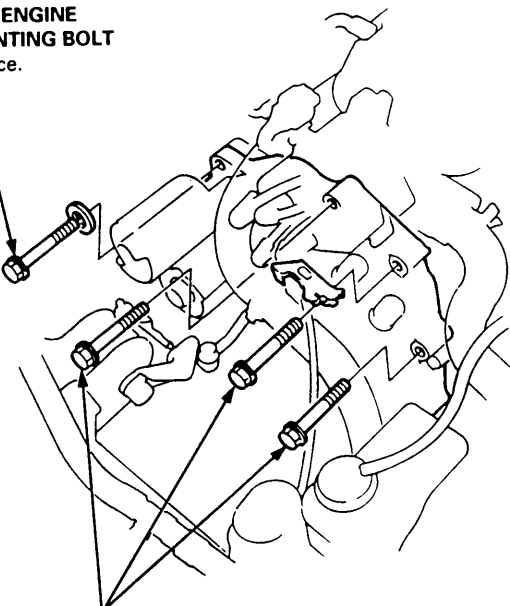
6. Disconnect the vehicle speed sensor (VSS) connector and the countershaft speed sensor connector.





7. Remove the transmission housing mounting bolts and the rear engine mounting bolt.

**REAR ENGINE
MOUNTING BOLT**
Replace.

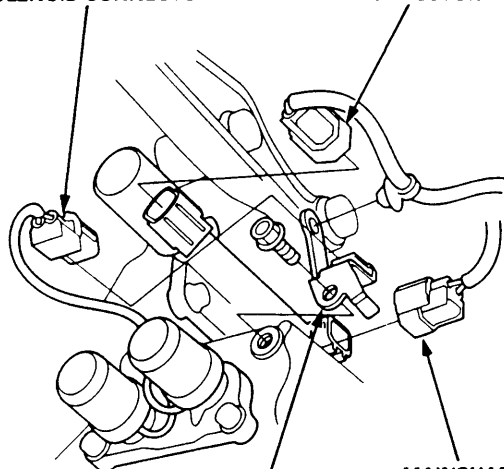


**TRANSMISSION HOUSING
MOUNTING BOLTS**

8. Disconnect the shift control solenoid, the linear solenoid, and the mainshaft speed sensor connectors.

**SHIFT CONTROL
SOLENOID CONNECTOR**

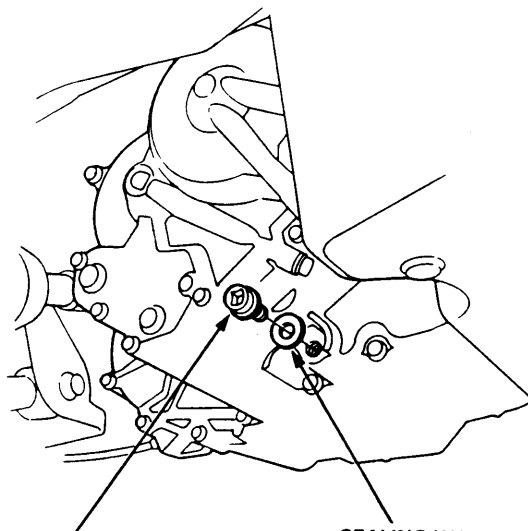
**LINEAR SOLENOID
CONNECTOR**



**CONNECTOR
BRACKET**

**MAINSHAFT
SPEED SENSOR
CONNECTOR**

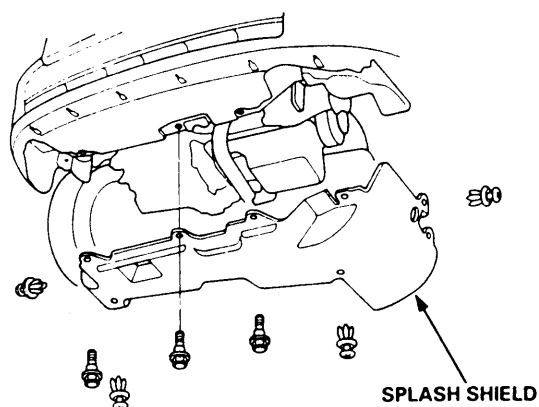
9. Remove the drain plug, and drain the automatic transmission fluid (ATF). Reinstall the drain plug with a new sealing washer.



DRAIN PLUG
18 x 1.5 mm
49 N·m (5.0 kgf-m, 36 lbf-ft)

SEALING WASHER
Replace.

10. Remove the splash shield.

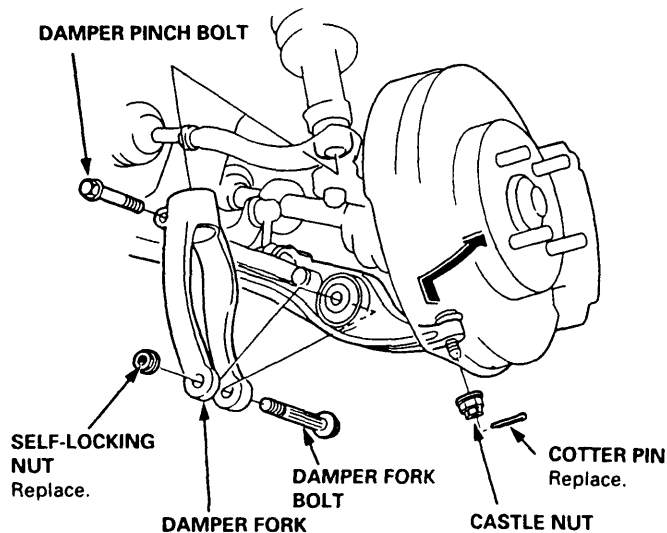


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Transmission

Removal (cont'd)

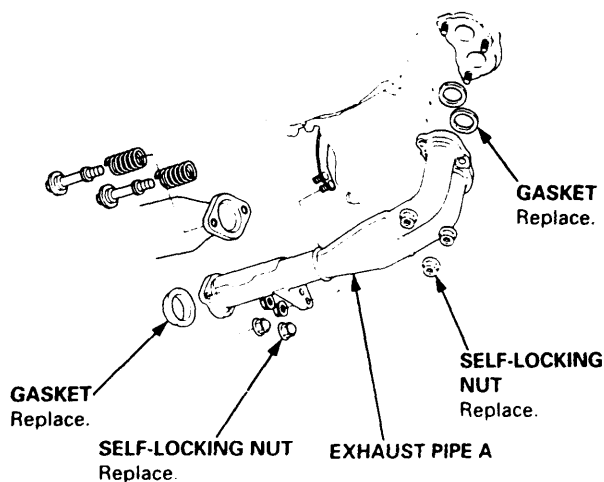
11. Remove the cotter pins and castle nuts, then separate the right and left ball joints from the lower arms (see section 18).



12. Remove the right damper fork bolt, then separate the right damper fork and damper.
13. Pry the right and left driveshafts out of the differential.
14. Pull on the inboard joint and the right and left driveshafts (see section 16).
15. Tie plastic bags over the driveshaft ends.

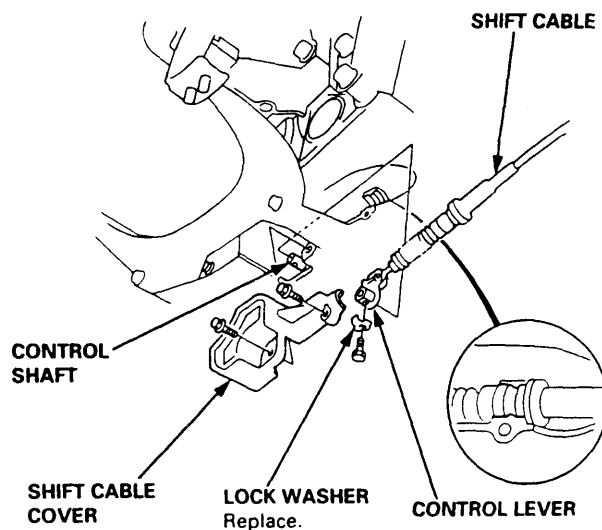
NOTE: Coat all precision finished surfaces with clean engine oil.

16. Remove the exhaust pipe A.



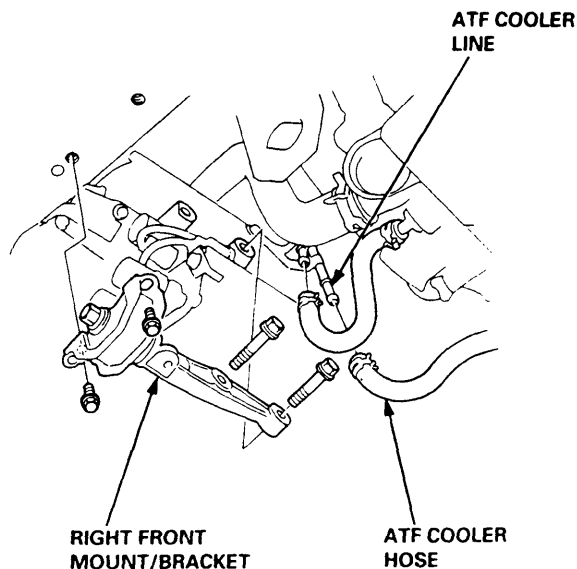
17. Remove the shift cable cover, then remove the shift cable by removing the control lever.

CAUTION: Take care not to bend the shift cable.



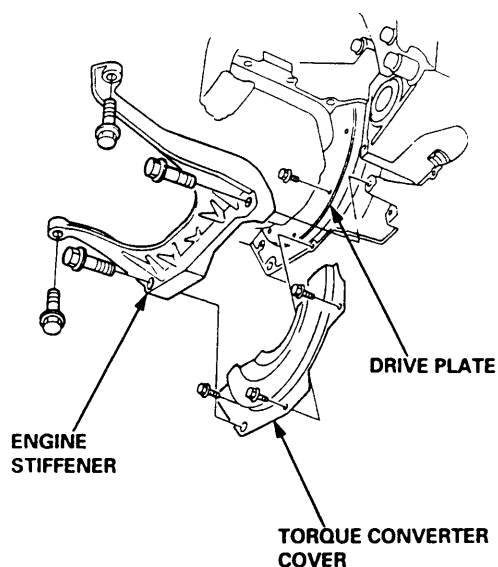
18. Remove the right front mount/bracket.
19. Remove the ATF cooler hoses at the ATF cooler lines. Turn the ends of the ATF cooler hoses up to prevent ATF from flowing out, then plug the ATF cooler hoses and lines.

NOTE: Check for any sign of leakage at the hose joints.

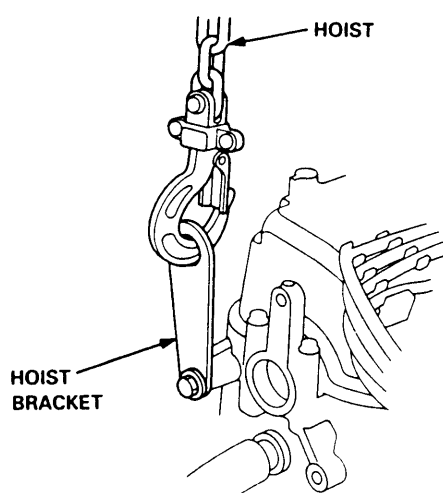




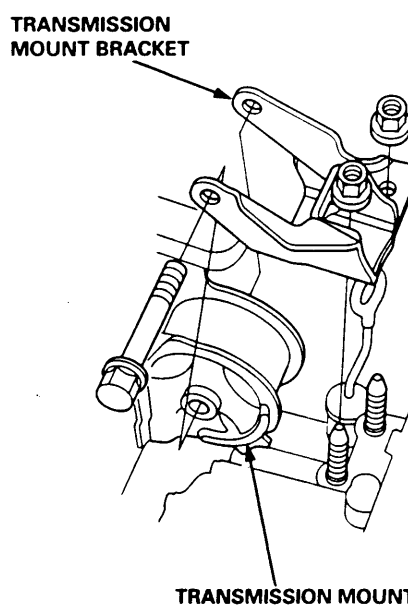
20. Remove the engine stiffener and the torque converter cover.



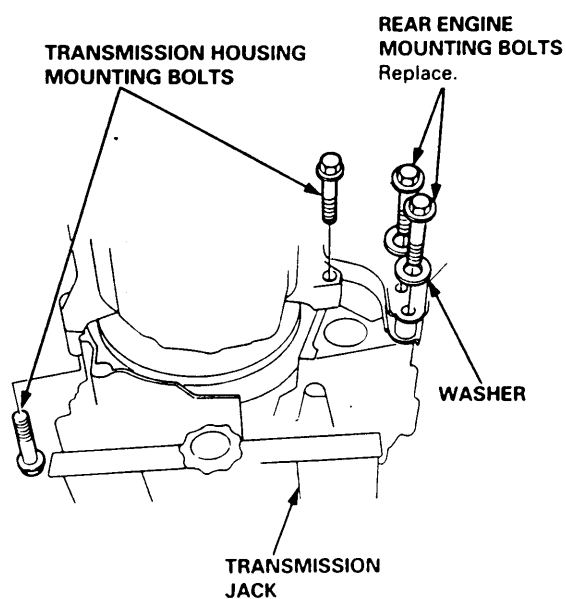
21. Remove the eight drive plate bolts one at a time while rotating the crankshaft pulley.
22. Remove the distributor.
23. Attach a hoisting bracket to the engine, then lift the engine slightly.



24. Place a jack under the transmission, and raise the transmission just enough to take weight off of the mounts, then remove the transmission mount.

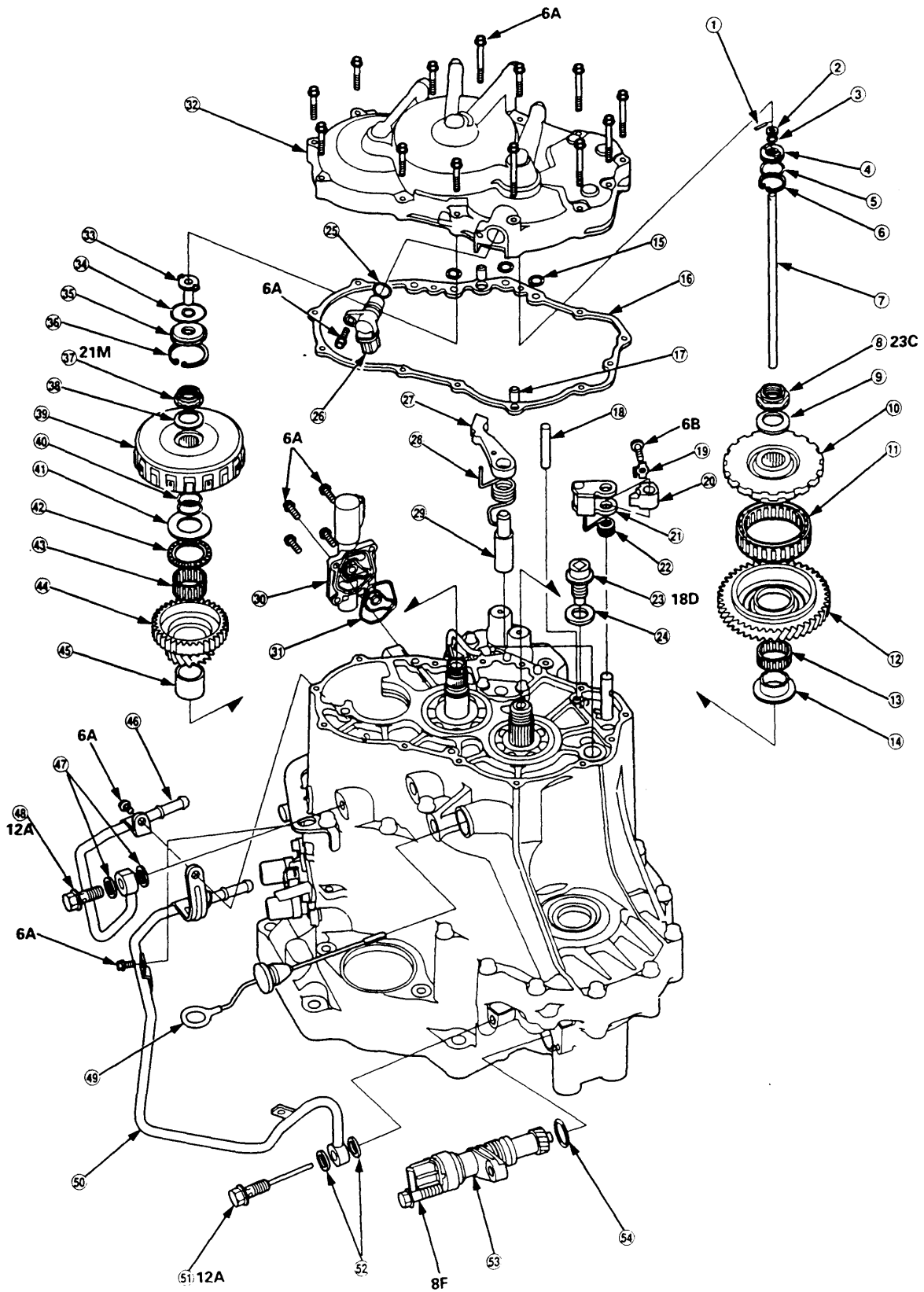


25. Remove the transmission housing mounting bolts and the rear engine mounting bolts.
26. Pull the transmission away from the engine until it clears the 14 mm dowel pins, then lower it on the transmission jack.



Illustrated Index

Transmission/Right Side Cover





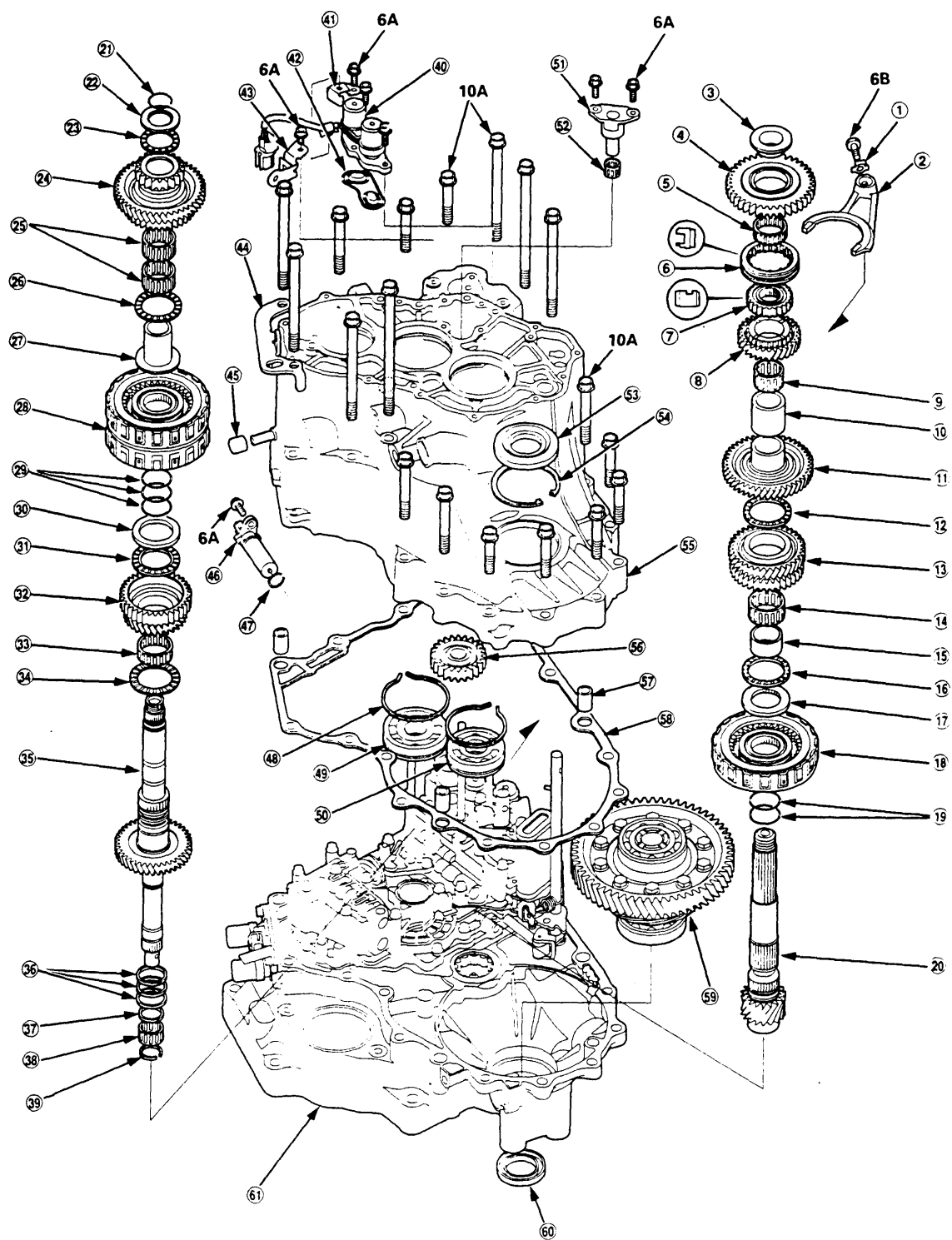
- | | |
|--|--|
| ① ROLLER | ③② RIGHT SIDE COVER |
| ② COLLAR | ③③ 1ST CLUTCH FEED PIPE |
| ③ O-RING Replace. | ③④ O-RINGS Replace. |
| ④ FEED PIPE FLANGE | ③⑤ FEED PIPE FLANGE |
| ⑤ O-RING Replace. | ③⑥ SNAP RING |
| ⑥ SNAP RING | ③⑦ MAINSHAFT LOCKNUT (FLANGE NUT) 21 x 1.25 mm
Replace. |
| ⑦ 3RD CLUTCH FEED PIPE | ③⑧ CONICAL SPRING WASHER Replace. |
| ⑧ COUNTERSHAFT LOCKNUT (FLANGE NUT)
23 x 1.25 mm Replace. | ③⑨ 1ST CLUTCH ASSEMBLY |
| ⑨ CONICAL SPRING WASHER Replace. | ④① O-RINGS Replace. |
| ⑩ PARKING GEAR | ④② THRUST WASHER |
| ⑪ ONE-WAY CLUTCH | ④③ THRUST NEEDLE BEARING |
| ⑫ COUNTERSHAFT 1ST GEAR | ④④ NEEDLE BEARING |
| ⑬ NEEDLE BEARING | ④⑤ MAINSHAFT 1ST GEAR |
| ⑭ COUNTERSHAFT 1ST GEAR COLLAR | ④⑥ MAINSHAFT 1ST GEAR COLLAR |
| ⑮ O-RINGS Replace. | ④⑦ ATF COOLER LINE |
| ⑯ RIGHT SIDE COVER GASKET Replace. | ④⑧ SEALING WASHERS Replace. |
| ⑰ DOWEL PINS | ④⑨ JOINT BOLT |
| ⑱ PARKING BRAKE PAWL STOP | ④⑩ ATF DIPSTICK |
| ⑲ LOCK WASHER Replace. | ⑤① ATF COOLER LINE |
| ⑳ PARKING BRAKE STOP Selective part | ⑤② JOINT BOLT |
| ㉑ PARKING BRAKE LEVER | ⑤③ SEALING WASHERS Replace. |
| ㉒ PARKING BRAKE LEVER SPRING | ⑤④ VEHICLE SPEED SENSOR |
| ㉓ DRAIN PLUG | ⑤⑤ O-RING Replace. |
| ㉔ SEALING WASHER Replace. | |
| ㉕ O-RING Replace. | |
| ㉖ COUNTERSHAFT SPEED SENSOR | |
| ㉗ PARKING BRAKE PAWL | |
| ㉘ PARKING BRAKE PAWL SPRING | |
| ㉙ PARKING BRAKE PAWL SHAFT | |
| ㉚ LINEAR SOLENOID ASSEMBLY | |
| ㉛ LINEAR SOLENOID GASKET Replace. | |

TORQUE SPECIFICATIONS

Bolt/Nut No.	Torque Value	Size	Remarks
6A	12 N·m (1.2 kgf·m, 8.7 lbf·ft)	6 x 1.0 mm	
6B	14 N·m (1.4 kgf·m, 10 lbf·ft)	6 x 1.0 mm	
8F	22 N·m (2.2 kgf·m, 16 lbf·ft)	8 x 1.25 mm	
12A	28 N·m (2.9 kgf·m, 21 lbf·ft)	12 x 1.25 mm	Joint bolt
18D	49 N·m (5.0 kgf·m, 36 lbf·ft)	18 x 1.5 mm	Drain plug
21M	78 N·m (8.0 kgf·m, 58 lbf·ft)	21 x 1.25 mm	Mainshaft locknut: Left-hand threads
23C	103 N·m (10.5 kgf·m, 75.9 lbf·ft) → 0 → 103 N·m (10.5 kgf·m, 75.9 lbf·ft)	23 x 1.25 mm	Countershaft locknut: Left-hand threads

Illustrated Index

Transmission Housing





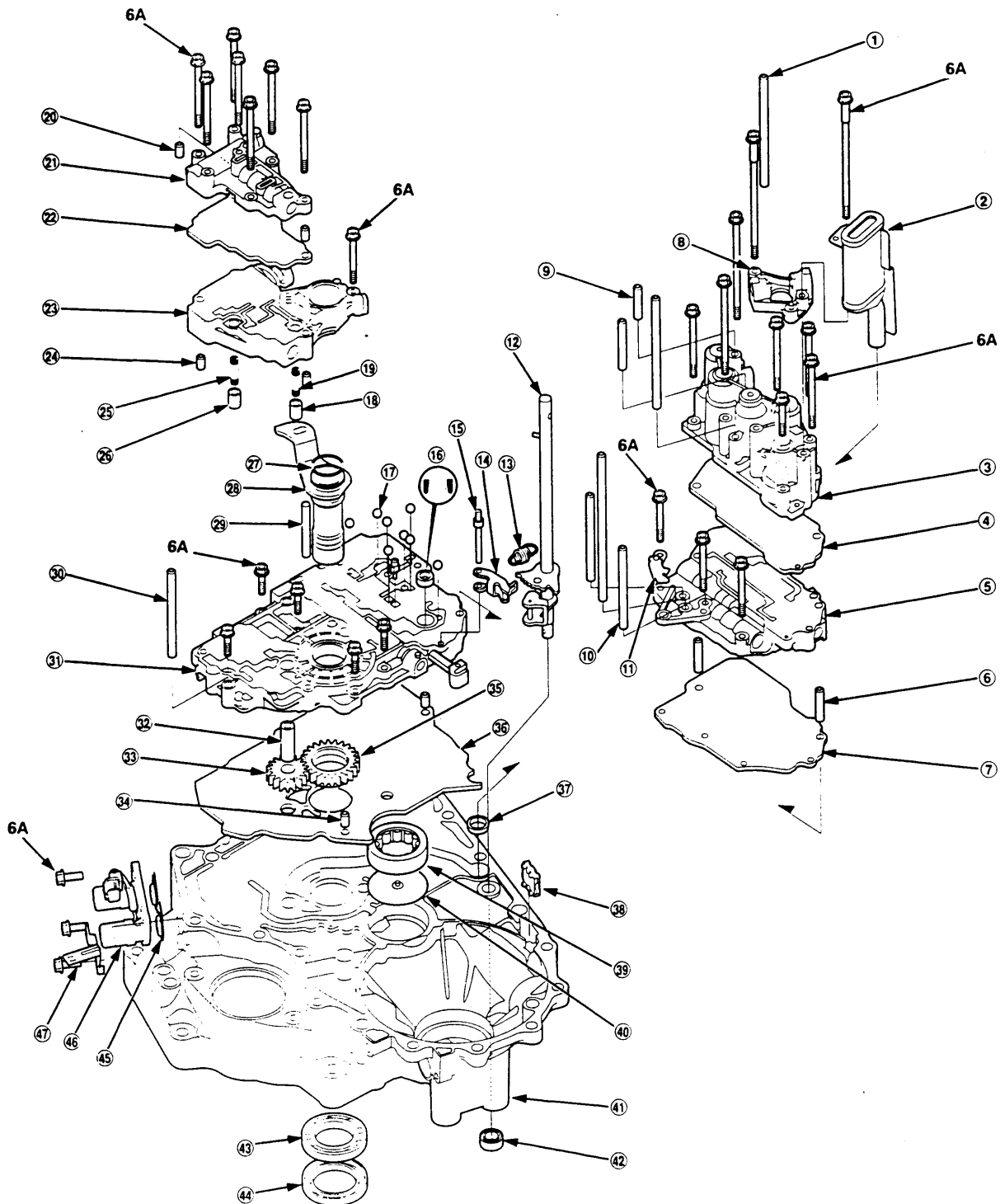
- | | |
|--|--|
| ① LOCK WASHER Replace. | ②④ THRUST NEEDLE BEARING |
| ② REVERSE SHIFT FORK | ②⑤ MAINSHAFT |
| ③ COUNTERSHAFT REVERSE GEAR COLLAR | ②⑥ SEALING RINGS, 35 mm |
| ④ COUNTERSHAFT REVERSE GEAR | ②⑦ SEALING RING, 29 mm |
| ⑤ NEEDLE BEARING | ②⑧ NEEDLE BEARING |
| ⑥ REVERSE SELECTOR | ②⑨ SET RING |
| ⑦ REVERSE SELECTOR HUB | ④⑩ SHIFT CONTROL SOLENOID VALVE A/B ASSEMBLY |
| ⑧ COUNTERSHAFT 4TH GEAR | ④⑪ HARNESS CLAMP BRACKET |
| ⑨ NEEDLE BEARING | ④⑫ SHIFT CONTROL SOLENOID FILTER/GASKET Replace. |
| ⑩ DISTANCE COLLAR, 28 mm Selective part | ④⑬ CONNECTOR BRACKET |
| ⑪ COUNTERSHAFT 2ND GEAR | ④⑭ TRANSMISSION HANGER |
| ⑫ THRUST NEEDLE BEARING | ④⑮ BREATHER CAP |
| ⑬ COUNTERSHAFT 3RD GEAR | ④⑯ MAINSHAFT SPEED SENSOR |
| ⑭ NEEDLE BEARING | ④⑰ O-RING Replace. |
| ⑮ COUNTERSHAFT 3RD GEAR COLLAR | ④⑱ SNAP RING |
| ⑯ THRUST NEEDLE BEARING | ④⑲ TRANSMISSION HOUSING MAINSHAFT BEARING |
| ⑰ SPLINED WASHER | ④⑳ TRANSMISSION HOUSING COUNTERSHAFT BEARING |
| ⑱ 3RD CLUTCH ASSEMBLY | ⑤① REVERSE IDLER GEAR SHAFT HOLDER ASSEMBLY |
| ⑲ O-RINGS Replace. | ⑤② NEEDLE BEARING |
| ⑳ COUNTERSHAFT | ⑤③ OIL SEAL Replace. |
| ㉑ SNAP RING | ⑤④ SET RING, 80 mm Selective part |
| ㉒ THRUST WASHER | ⑤⑤ TRANSMISSION HOUSING |
| ㉓ THRUST NEEDLE BEARING | ⑤⑥ REVERSE IDLER GEAR |
| ㉔ MAINSHAFT 4TH GEAR/REVERSE GEAR | ⑤⑦ DOWEL PINS |
| ㉕ NEEDLE BEARINGS | ⑤⑧ TRANSMISSION HOUSING GASKET Replace. |
| ㉖ THRUST NEEDLE BEARING | ⑤⑨ DIFFERENTIAL ASSEMBLY |
| ㉗ MAINSHAFT 4TH GEAR COLLAR | ⑥⑩ OIL SEAL Replace. |
| ㉘ 2ND/4TH CLUTCH ASSEMBLY | ⑥⑪ TORQUE CONVERTER HOUSING |
| ㉙ O-RINGS Replace. | |
| ㉚ THRUST WASHER, 36.5 x 55 mm Selective part | |
| ㉛ THRUST NEEDLE BEARING | |
| ㉜ MAINSHAFT 2ND GEAR | |
| ㉝ NEEDLE BEARING | |

TORQUE SPECIFICATIONS

Bolt/Nut No.	Torque Value	Size	Remarks
6A	12 N·m (1.2 kgf·m, 8.7 lbf·ft)	6 x 1.0 mm	
6B	14 N·m (1.4 kgf·m, 10 lbf·ft)	6 x 1.0 mm	
10A	44 N·m (4.5 kgf·m, 33 lbf·ft)	10 x 1.25 mm	

Illustrated Index

Torque Converter Housing/Valve Body





- ① ATF FEED PIPE
- ② ATF STRAINER
- ③ SERVO BODY
- ④ SERVO SEPARATOR PLATE
- ⑤ SECONDARY VALVE BODY
- ⑥ DOWEL PINS
- ⑦ SECONDARY SEPARATOR PLATE
- ⑧ SERVO DETENT BASE
- ⑨ ATF FEED PIPES
- ⑩ ATF FEED PIPES
- ⑪ SHAFT STOP
- ⑫ CONTROL SHAFT
- ⑬ DETENT ARM SPRING
- ⑭ DETENT ARM
- ⑮ DETENT ARM SHAFT
- ⑯ FILTER Replace.
- ⑰ CHECK BALLS
- ⑱ TORQUE CONVERTER CHECK VALVE
- ⑲ TORQUE CONVERTER CHECK VALVE SPRING
- ⑳ DOWEL PINS
- ㉑ LOCK-UP VALVE BODY
- ㉒ LOCK-UP SEPARATOR PLATE
- ㉓ REGULATOR VALVE BODY
- ㉔ DOWEL PINS
- ㉕ COOLER RELIEF VALVE SPRING
- ㉖ COOLER RELIEF VALVE
- ㉗ O-RING Replace.
- ㉘ STATOR SHAFT
- ㉙ STOP SHAFT
- ㉚ ATF FEED PIPE
- ㉛ MAIN VALVE BODY
- ㉜ ATF PUMP DRIVEN GEAR SHAFT
- ㉝ ATF PUMP DRIVEN GEAR
- ㉞ DOWEL PINS
- ㉟ ATF PUMP DRIVE GEAR
- ㊱ MAIN SEPARATOR PLATE
- ㊲ SUCTION PIPE COLLAR

- ㊳ ATF MAGNET
- ㊴ TORQUE CONVERTER HOUSING COUNTERSHAFT BEARING
- ㊵ ATF GUIDE PLATE
- ㊶ TORQUE CONVERTER HOUSING
- ㊷ OIL SEAL Replace.
- ㊸ TORQUE CONVERTER HOUSING MAINSHAFT BEARING
- ㊹ OIL SEAL Replace.
- ㊺ LOCK-UP CONTROL SOLENOID FILTER/GASKET Replace.
- ㊻ LOCK-UP CONTROL SOLENOID VALVE A/B ASSEMBLY
- ㊼ CONNECTOR BRACKET

TORQUE SPECIFICATIONS

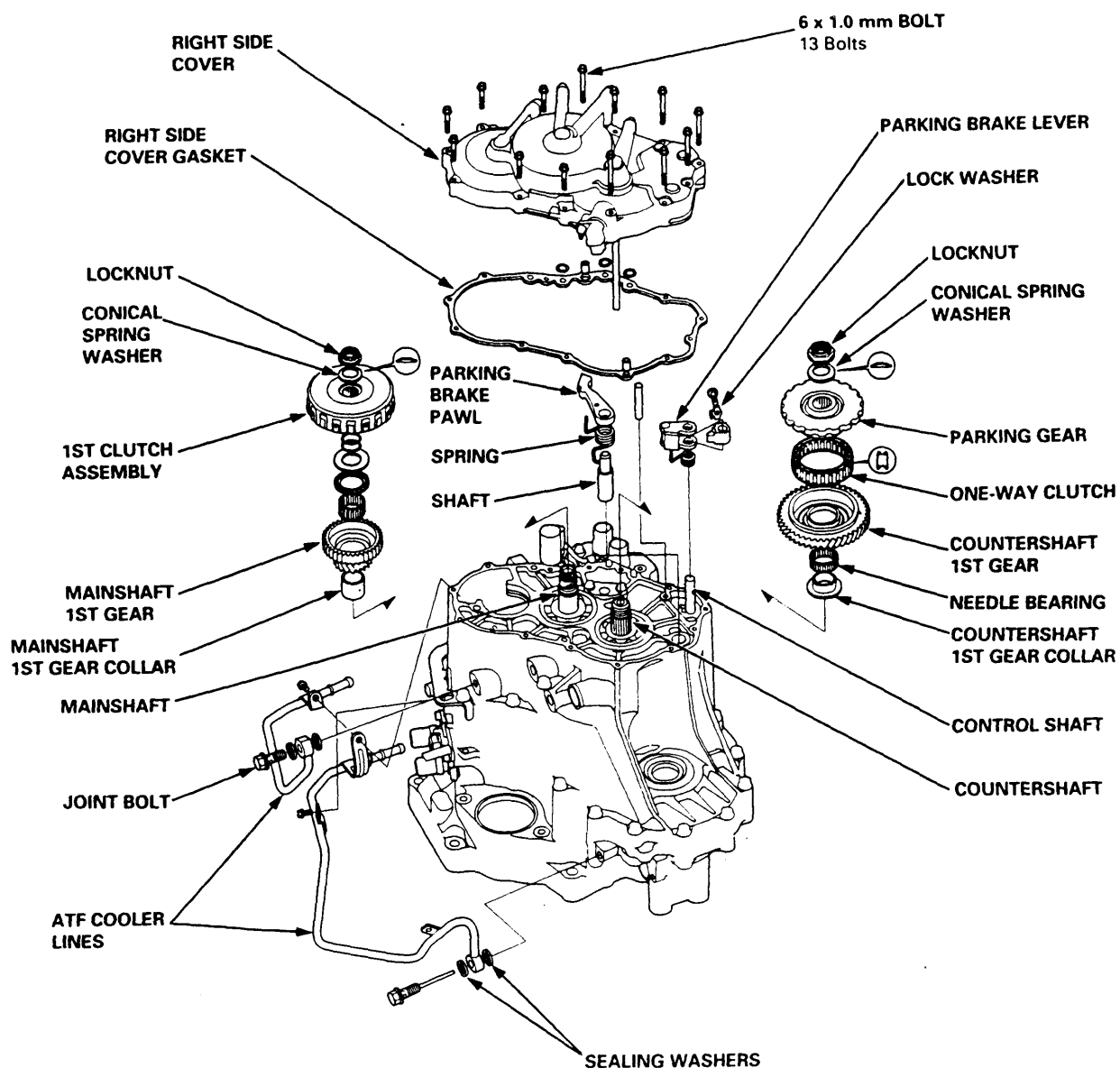
Bolt/Nut No.	Torque Value	Size	Remarks
6A	12 N·m (1.2 kgf·m, 8.7 lbf·ft)	6 x 1.0 mm	

Right Side Cover

Removal

NOTE:

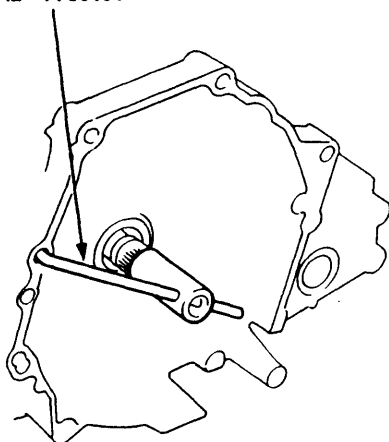
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- When removing the right side cover, replace the following:
 - O-rings
 - Mainshaft and countershaft locknuts
 - Conical spring washers
 - Right side cover gasket
 - Lock washer
 - Sealing washers





1. Remove the 13 bolts securing the right side cover, then remove the right side cover.
2. Slip the special tool onto the mainshaft as shown.

MAINSHAFT HOLDER
07GAB - PF50101

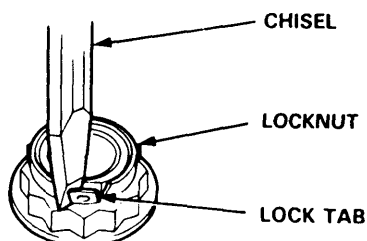


3. Engage the parking brake pawl with the parking gear.
4. Cut the lock tabs of the mainshaft and countershaft locknuts using a chisel as shown, then remove the locknuts and conical spring washers.

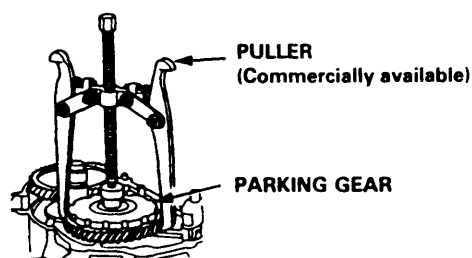
CAUTION: Keep all of the chiseled particles out of the transmission.

NOTE:

- Mainshaft and countershaft locknuts have left-hand threads.
- Always wear safety glasses.



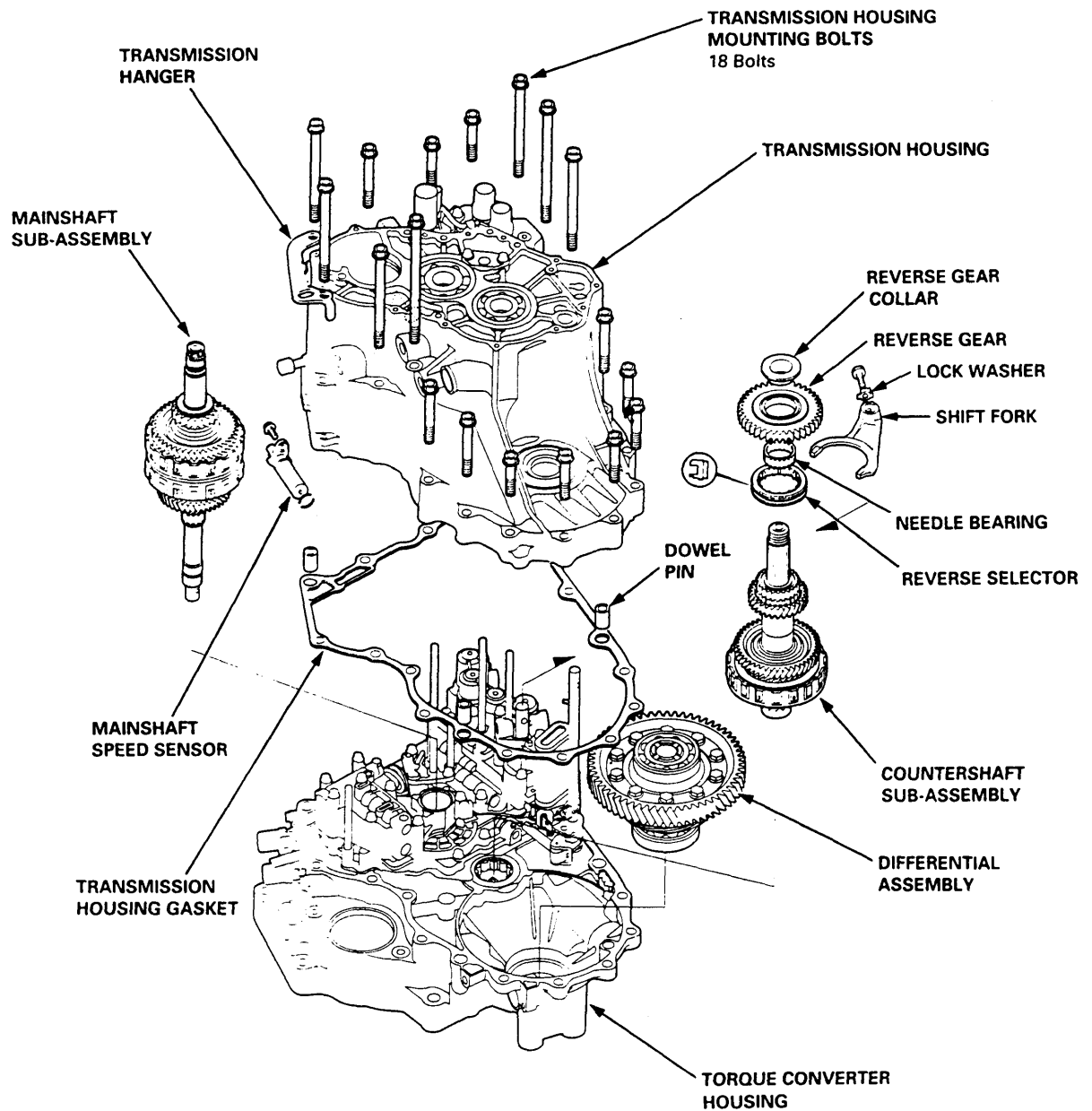
5. Remove the special tool from the mainshaft after removing the locknuts.
6. Remove the 1st clutch and mainshaft 1st gear assembly and mainshaft 1st gear collar from the mainshaft.
7. Remove the parking brake pawl, spring and shaft.
8. Remove the parking brake lever from the control shaft.
9. Using a universal two-jaw puller, remove the parking gear, one-way clutch and countershaft 1st gear assembly.



10. Remove the needle bearing and the countershaft 1st gear collar from the countershaft.
11. Remove the ATF cooler lines and ATF dipstick.

Transmission Housing

Removal

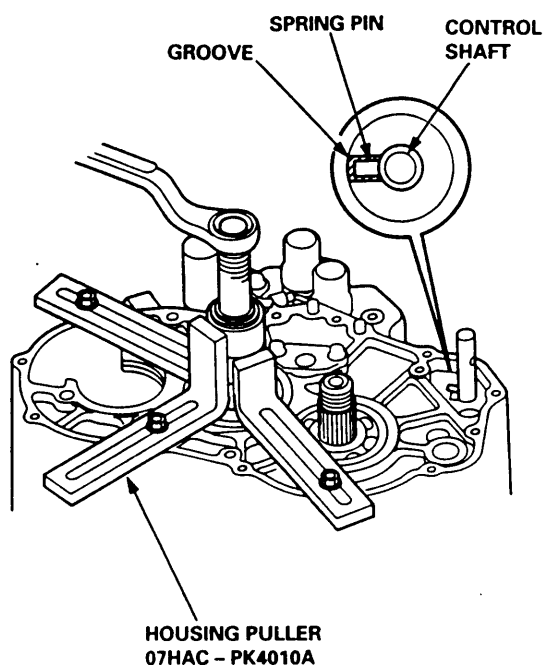




NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- When removing the transmission housing, replace the following:
 - O-ring
 - Transmission housing gasket
 - Lock washer

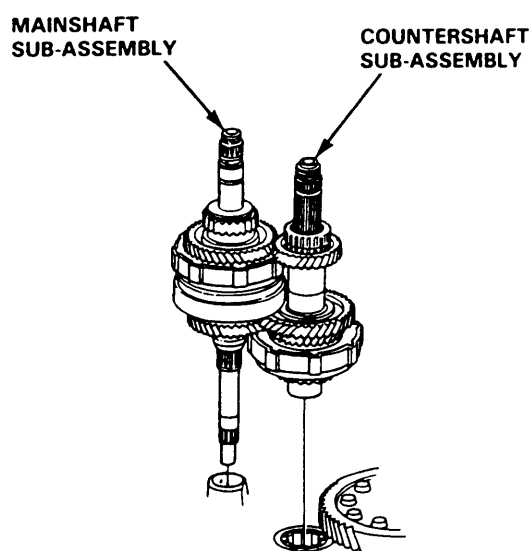
1. Remove the mainshaft speed sensor from the transmission housing.
2. Remove the transmission housing mounting bolts and hanger.
3. Align the spring pin on the control shaft with the transmission housing groove by turning the control shaft.



4. Install the special tool on the transmission housing, then remove the housing as shown.

CAUTION: Make sure the mainshaft speed sensor has been removed from the transmission housing before removing the transmission housing from the torque converter housing.

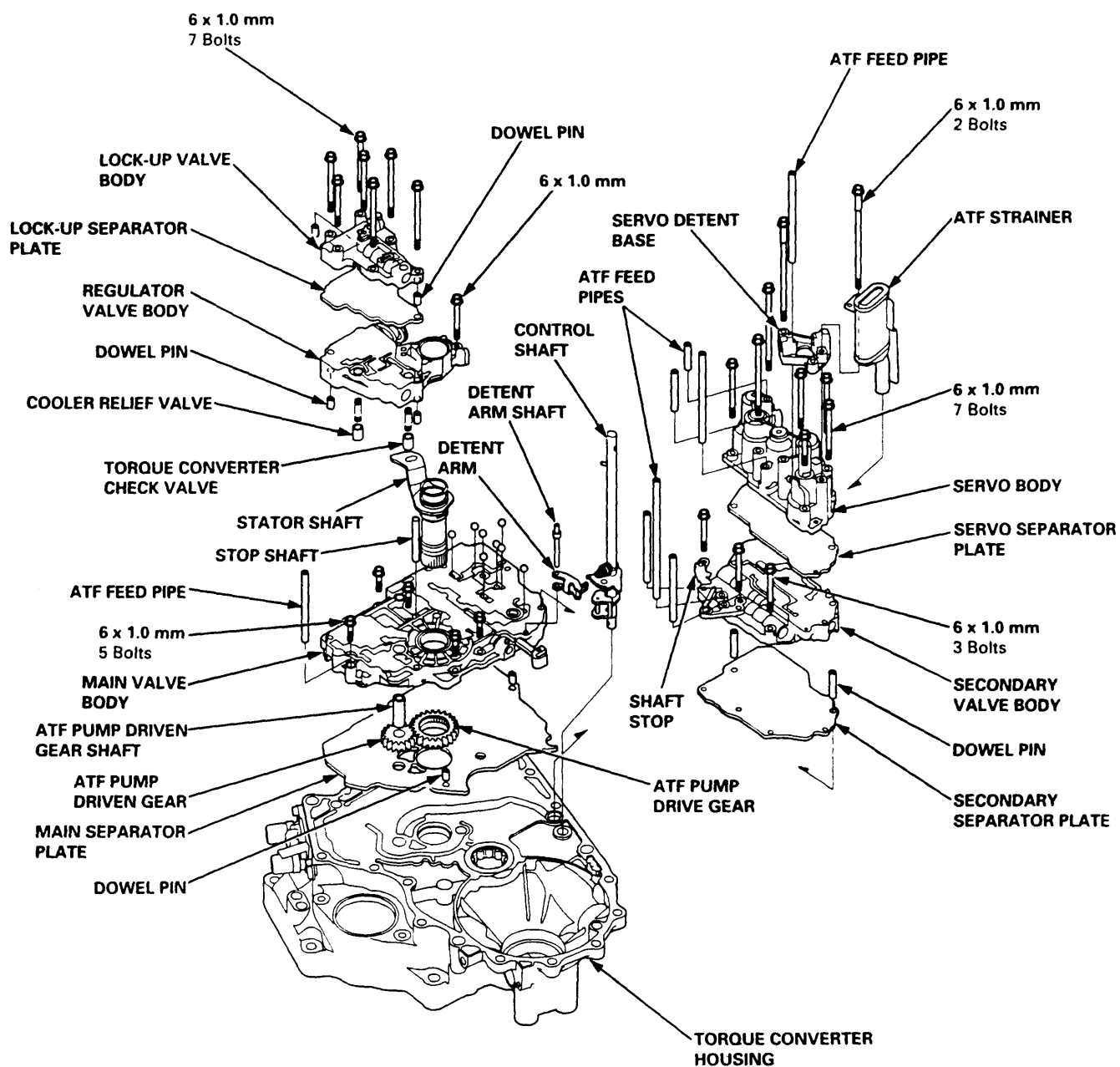
5. Remove the countershaft reverse gear with the collar and needle bearing.
6. Remove the lock bolt securing the shift fork, then remove the fork with the reverse selector from the countershaft.
7. Remove the countershaft sub-assembly and the mainshaft sub-assembly together.

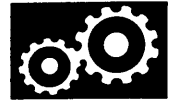


8. Remove the differential assembly from the torque converter housing.

Torque Converter Housing/Valve Body

Removal





NOTE:

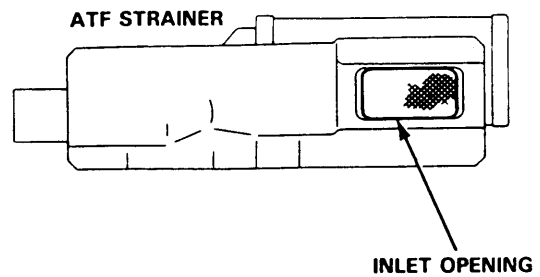
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- When removing the valve body, replace the O-ring.

1. Remove the ATF feed pipes from the servo body, secondary valve body and main valve body.
2. Remove the ATF strainer and servo detent base (two bolts).
3. Remove the servo body and servo separator plate (seven bolts).
4. Remove the secondary valve body, shaft stop and secondary separator plate (three bolts).
5. Remove the lock-up valve body and separator plate (seven bolts).
6. Remove the regulator valve body (one bolt).
7. Remove the stator shaft and stop shaft.
8. Remove the detent spring from the detent arm, then remove the control shaft from the torque converter housing.
9. Remove the detent arm and detent arm shaft from the main valve body.
10. Remove the main valve body (five bolts).

NOTE: Do not let the eight check balls fall out of the main valve body when removing the main valve body.

11. Remove the ATF pump driven gear shaft, then remove the ATF pump gears.
12. Remove the main separator plate and two dowel pins.

13. Clean the inlet opening of the ATF strainer thoroughly with compressed air, then check that it is in good condition, and the inlet opening is not clogged.



14. Test the filter by pouring clean ATF fluid through the inlet opening. Replace the ATF strainer if it is clogged or damaged.

NOTE: The ATF strainer can be reused if it is not clogged.

Valve Caps

Description

- Caps with one projected tip and one flat end are installed with the flat end toward the inside of the valve body.
- Caps with a projected tip on each end are installed with the smaller tip toward the inside of the valve body. The small tip is a spring guide.

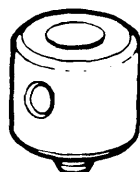
Toward outside of valve body.



Toward inside of valve body.

- Caps with one projected tip and hollow end are installed with the tip toward the inside of the valve body. The tip is a spring guide.

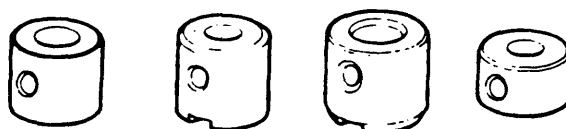
Toward outside of valve body.



Toward inside of valve body.

- Caps with hollow ends are installed with the hollow end away from the inside of the valve body.
- Caps with notched ends are installed with the notch toward the inside of the valve body.
- Caps with flat ends and a hole through the center are installed with the smaller hole toward the inside of the valve body.

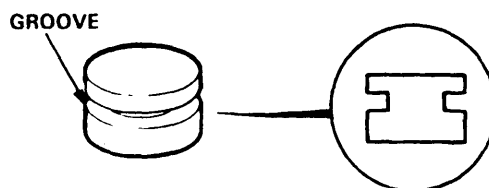
Toward outside of valve body.



Toward inside of valve body.

- Caps with flat ends and a groove around the cap are installed with the grooved side toward the outside of the valve body.

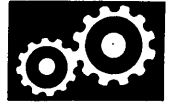
Toward outside of valve body.



Sectional view.

Toward inside of valve body.

Valve Body



Repair

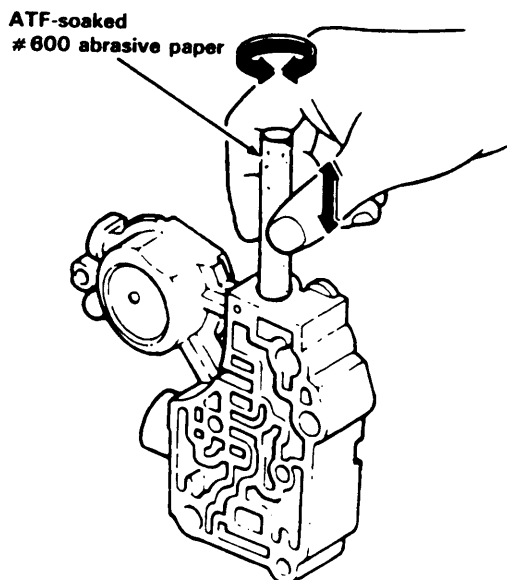
NOTE: This repair is only necessary if one or more of the valves in a valve body do not slide smoothly in their bores. You may use this procedure to free the valves in the valve bodies.

1. Soak a sheet of #600 abrasive paper in ATF for about 30 minutes.
2. Carefully tap the valve body so the sticking valve drops out of its bore.

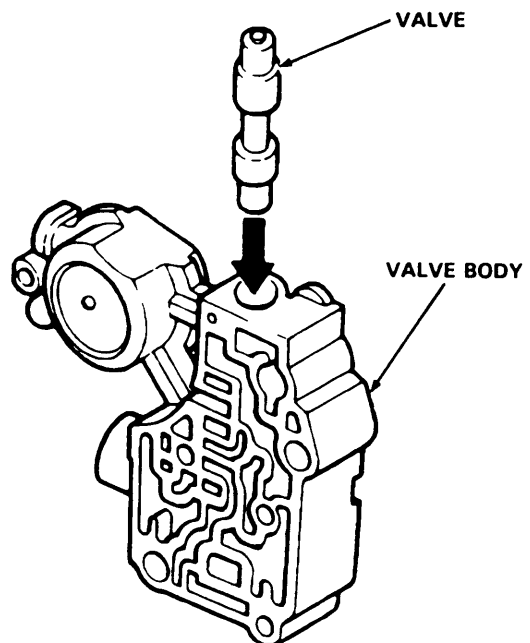
CAUTION: It may be necessary to use a small screwdriver to pry the valve free. Be careful not to scratch the bore with the screwdriver.

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

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



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



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

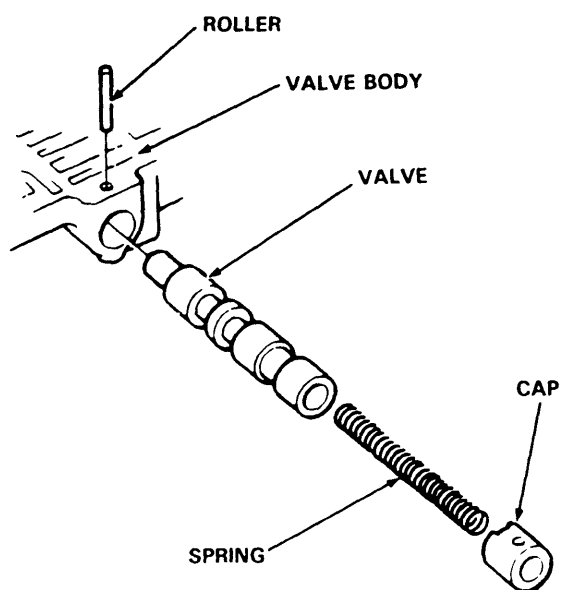
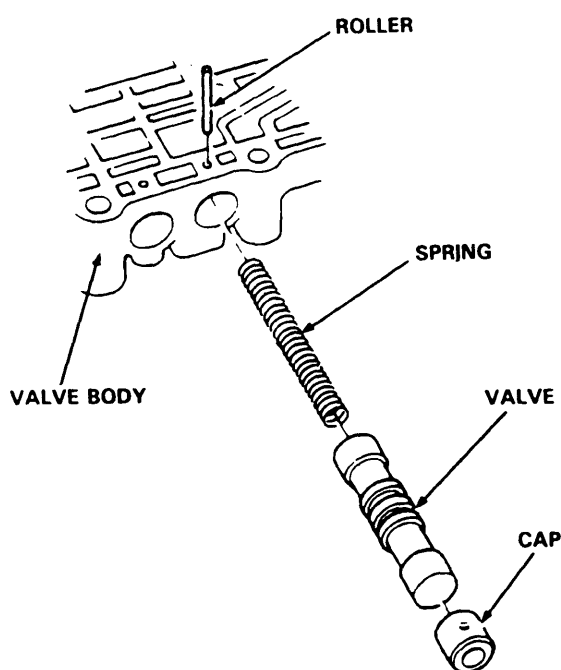
Valve

Assembly

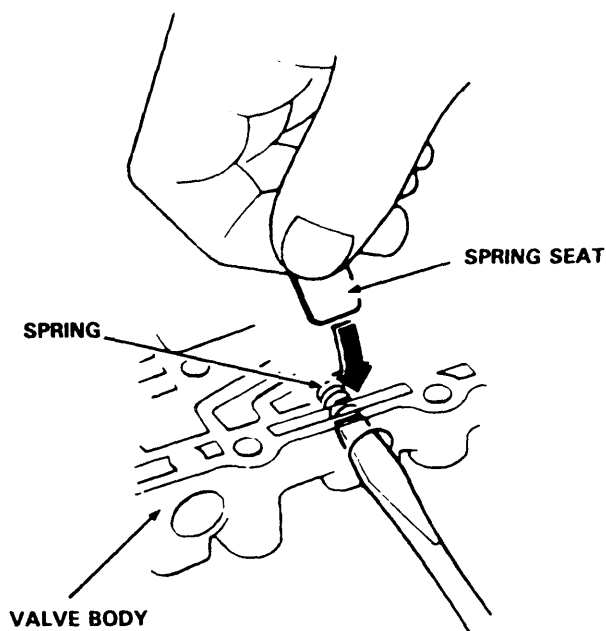
NOTE:

Coat all parts with ATF before assembly.

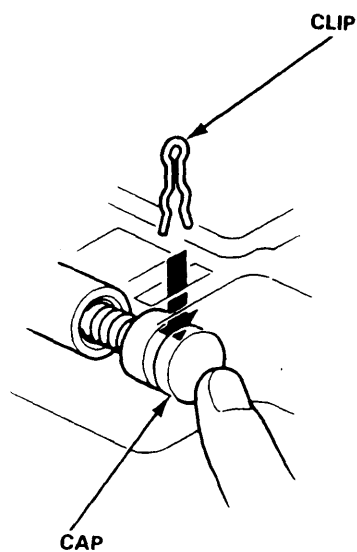
- Install the valve, valve spring and cap in the valve body and secure with the roller.



- Set the spring in the valve and install it in the valve body. Push the spring in with a screwdriver, then install the spring seat.



- Install the valve, spring and cap in the valve body. Push the cap, then install the clip.



ATF Pump

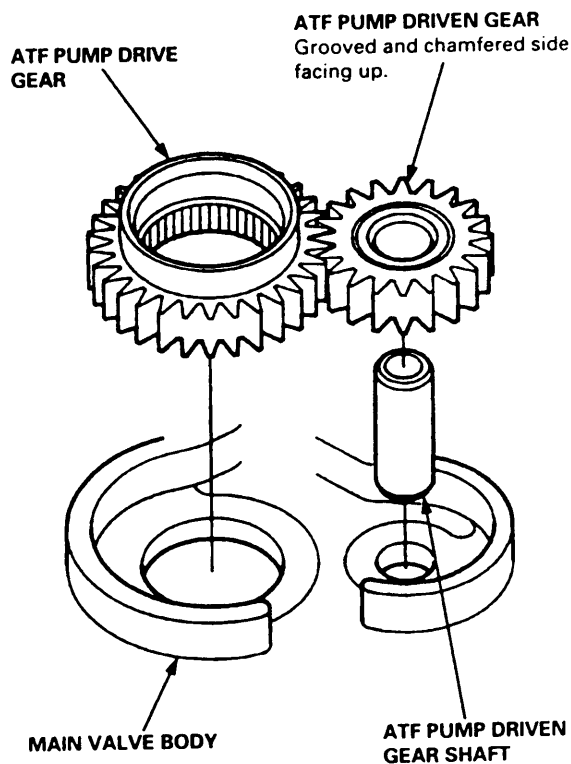


Inspection

1. Install the ATF pump gears and ATF pump driven gear shaft in the main valve body.

NOTE:

- Lubricate all parts with ATF during inspection.
- Install the ATF pump driven gear with its grooved and chamfered side facing up as shown.



2. Measure the side clearance of the ATF pump drive and driven gears.

ATF Pump Gears Side (Radial) Clearance:

Standard (New):

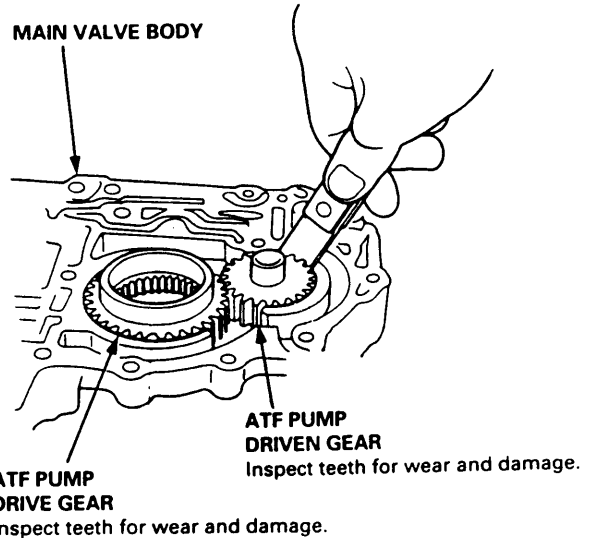
ATF Pump Drive Gear

0.105 – 0.1325 mm (0.004 – 0.005 in)

ATF Pump Driven Gear

0.035 – 0.0625 mm (0.0014 – 0.0025 in)

MAIN VALVE BODY

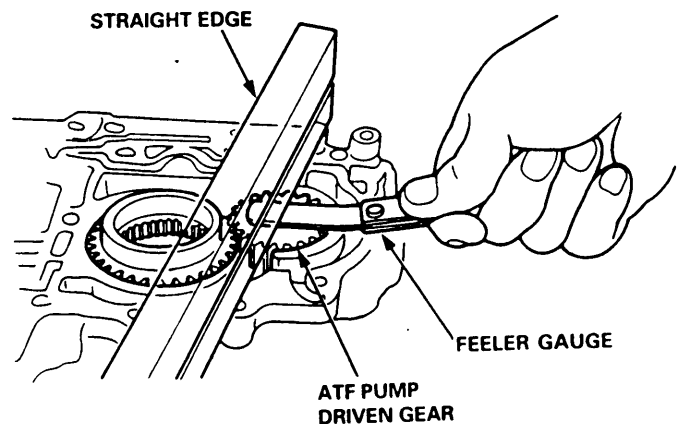


3. Remove the ATF pump driven gear shaft. Measure the thrust clearance of the ATF pump driven gear-to-valve body.

ATF Pump Drive/Driven Gear Thrust (Axial) Clearance:

Standard (New): 0.03 – 0.05 mm (0.001 – 0.002 in)

Service Limit: 0.07 mm (0.003 in)



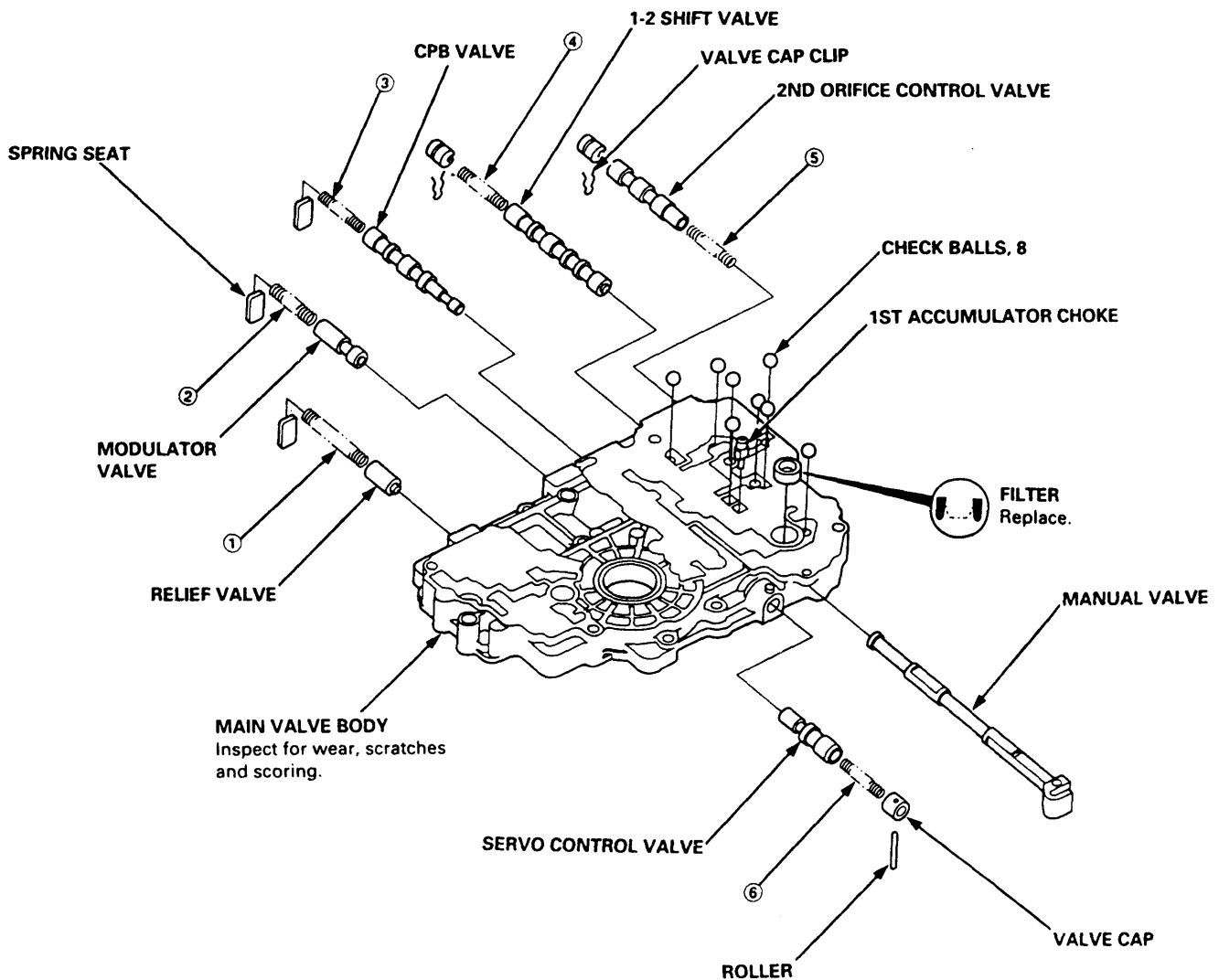
Main Valve Body

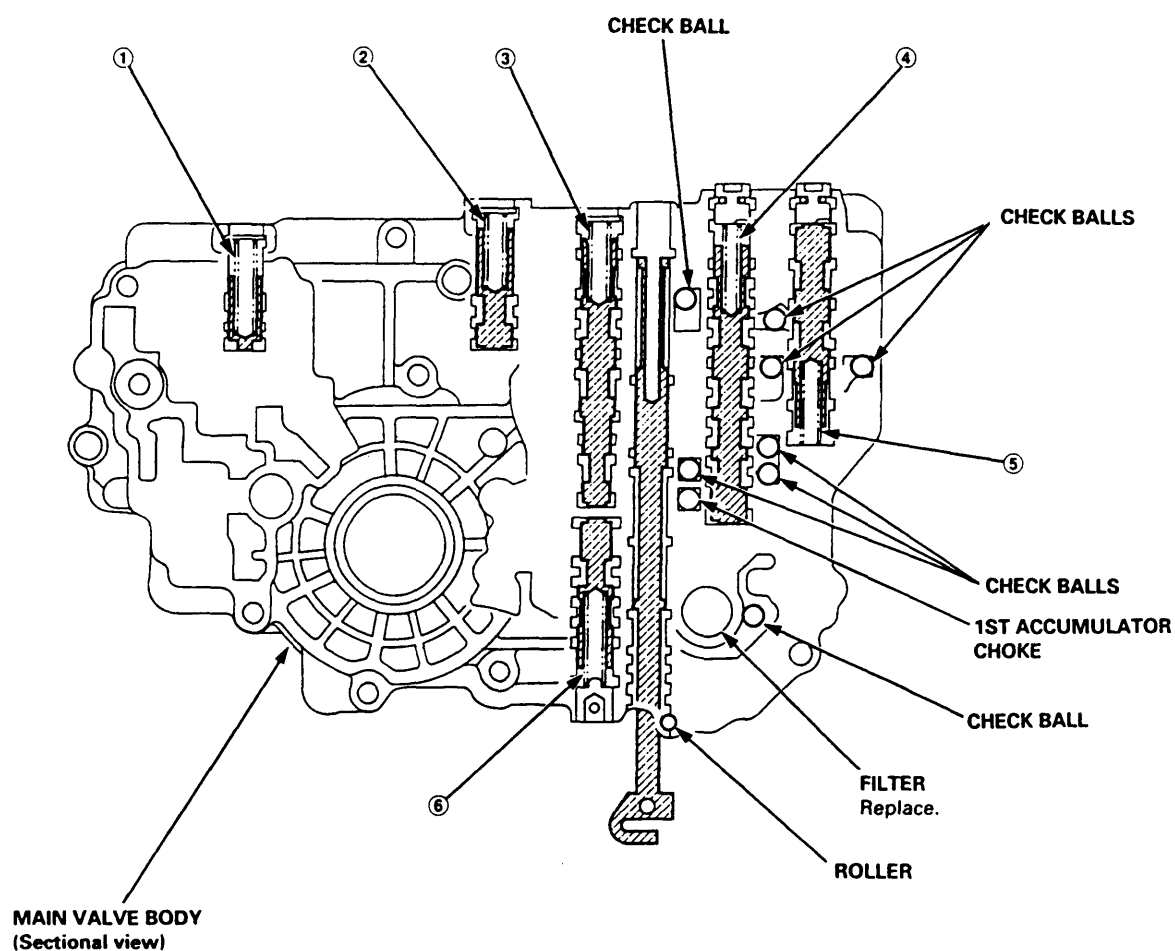
Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Replace the valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-117.
- Coat all parts with ATF during assembly.

CAUTION: Do not use a magnet to remove the check balls; it may magnetize the balls.





SPRING SPECIFICATIONS

Unit: mm (in)

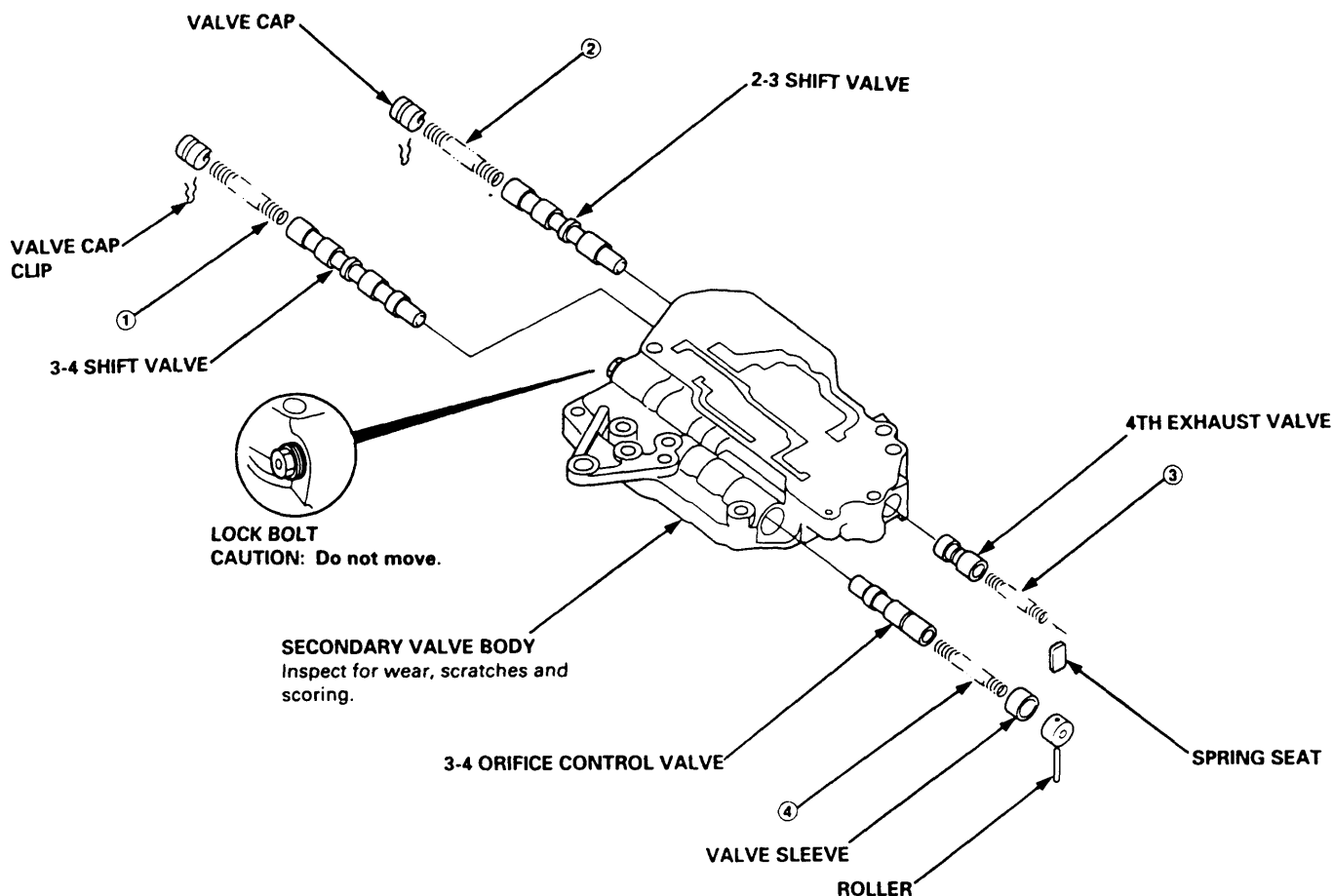
No.	Springs	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Relief valve spring	1.1 (0.043)	8.6 (0.342)	37.1 (1.461)	13.4
②	Modulator valve spring	1.4 (0.055)	9.4 (0.374)	35.0 (1.378)	10.9
③	CPB valve spring	0.9 (0.035)	8.1 (0.322)	47.2 (1.858)	18.3
④	1-2 shift valve spring	0.9 (0.035)	7.6 (0.302)	41.3 (1.626)	16.3
⑤	2nd orifice control valve spring	0.7 (0.028)	6.6 (0.262)	34.8 (1.370)	22.0
⑥	Servo control valve spring	1.0 (0.039)	8.1 (0.322)	52.1 (2.051)	20.8

Secondary Valve Body

Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Replace the secondary valve body kit, P/N 27700 – P4R – 305 (The secondary valve body kit includes the linear solenoid assembly) if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-117.
- Coat all parts with ATF during assembly.
- The CPC valve is installed in the secondary valve body, held in place by the lock bolt.



SPRING SPECIFICATIONS

Unit: mm (in)

No.	Springs	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	3-4 shift valve spring	0.9 (0.035)	7.6 (0.302)	57.0 (2.244)	26.8
②	2-3 shift valve spring	0.9 (0.035)	7.6 (0.302)	57.0 (2.244)	26.8
③	4th exhaust valve spring	0.9 (0.035)	6.1 (0.242)	36.4 (1.433)	19.5
④	3-4 orifice control valve spring	0.7 (0.028)	6.6 (0.262)	37.5 (1.476)	24.6



Regulator Valve Body

Disassembly/Inspection/Reassembly

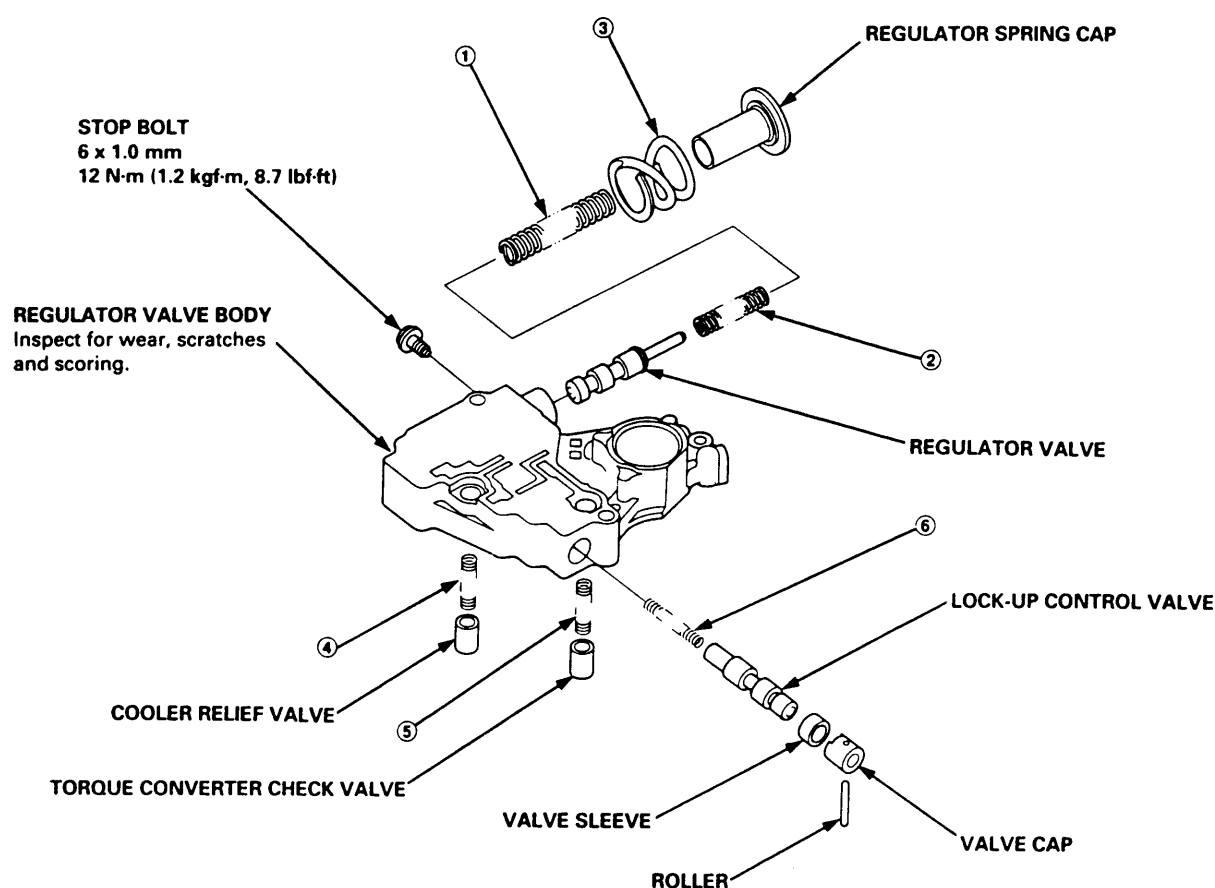
NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Replace the valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-117.

1. Hold the regulator spring cap in place while removing the stop bolt. The regulator spring cap is spring loaded. Once the stop bolt is removed, release the spring cap slowly so it does not pop out.
2. Reassembly is the reverse order of the disassembly procedure.

NOTE:

- Coat all parts with ATF during assembly.
- Align the hole in the regulator spring cap with the hole in the valve body, then press the spring cap into the valve body, and tighten the stop bolt.



SPRING SPECIFICATIONS

Unit: mm (in)

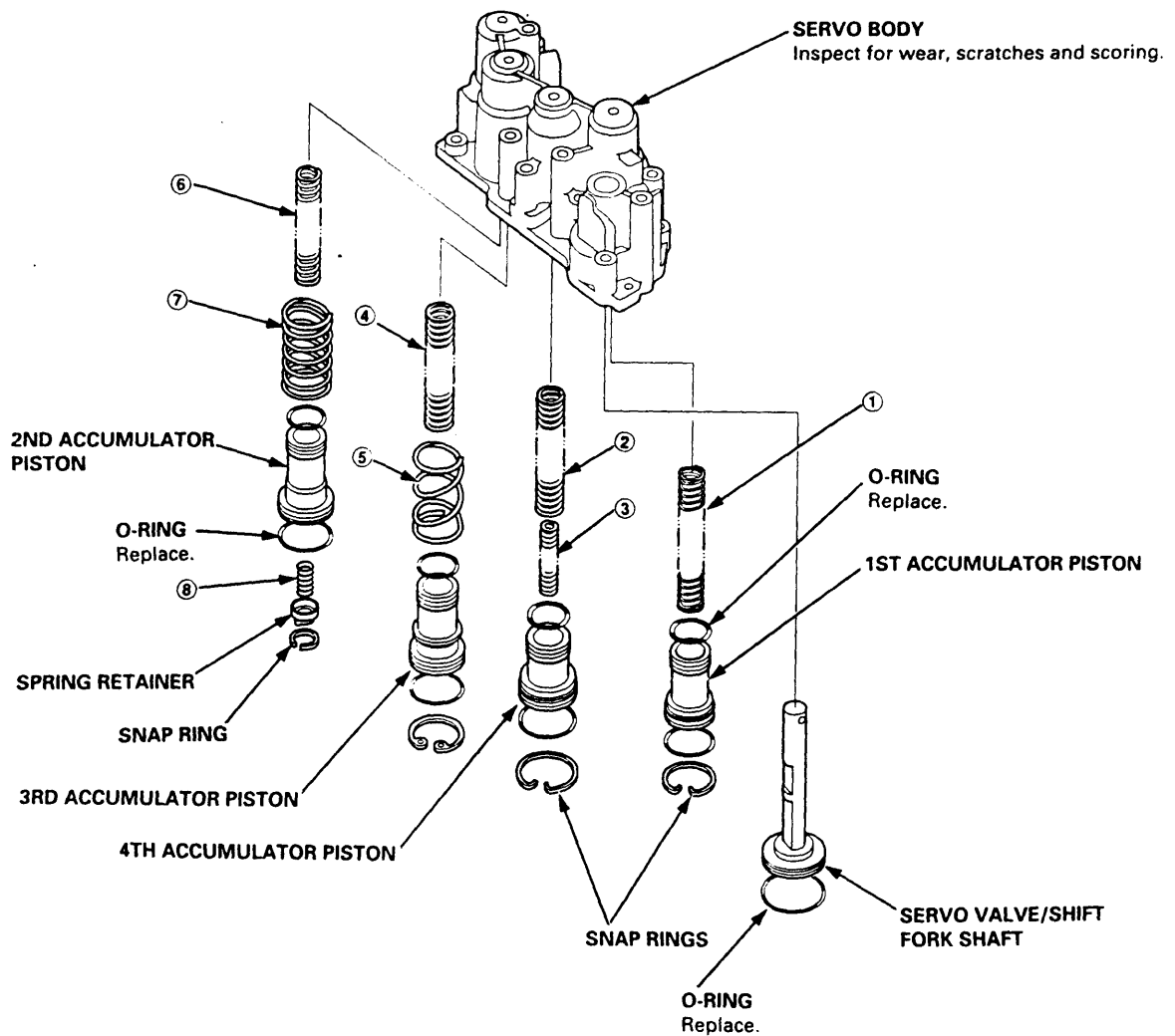
No.	Springs	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Regulator valve spring A	1.8 (0.071)	14.7 (0.584)	87.8 (3.457)	16.5
②	Regulator valve spring B	1.8 (0.071)	9.6 (0.381)	44.0 (1.732)	11.0
③	Stator reaction spring	4.5 (0.177)	35.4 (1.407)	30.3 (1.193)	1.9
④	Cooler relief valve spring	1.0 (0.039)	8.4 (0.334)	33.8 (1.331)	8.2
⑤	Torque converter check valve spring	1.0 (0.039)	8.4 (0.334)	33.8 (1.331)	8.2
⑥	Lock-up control valve spring	0.7 (0.028)	6.6 (0.262)	38.0 (1.496)	14.1

Servo Body

Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Replace the valve body as an assembly if any parts are worn or damaged.
- Coat all parts with ATF during assembly.
- Replace the O-rings.



SPRING SPECIFICATIONS

Unit: mm (in)

No.	Springs	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	1st accumulator spring	2.1 (0.083)	16.0 (0.636)	89.1 (3.508)	16.2
②	4th accumulator spring A	2.6 (0.102)	17.0 (0.676)	87.0 (3.425)	14.2
③	4th accumulator spring B	2.3 (0.091)	10.2 (0.402)	51.6 (2.031)	13.8
④	3rd accumulator spring A	2.8 (0.110)	17.5 (0.695)	89.3 (3.516)	15.6
⑤	3rd accumulator spring B	2.2 (0.087)	31.0 (1.220)	35.1 (1.382)	2.4
⑥	2nd accumulator spring C	2.2 (0.087)	14.5 (0.576)	68.0 (2.677)	13.9
⑦	2nd accumulator spring A	2.4 (0.094)	29.0 (1.152)	39.0 (1.535)	2.9
⑧	2nd accumulator spring B	1.6 (0.063)	9.0 (0.358)	20.7 (0.815)	6.1

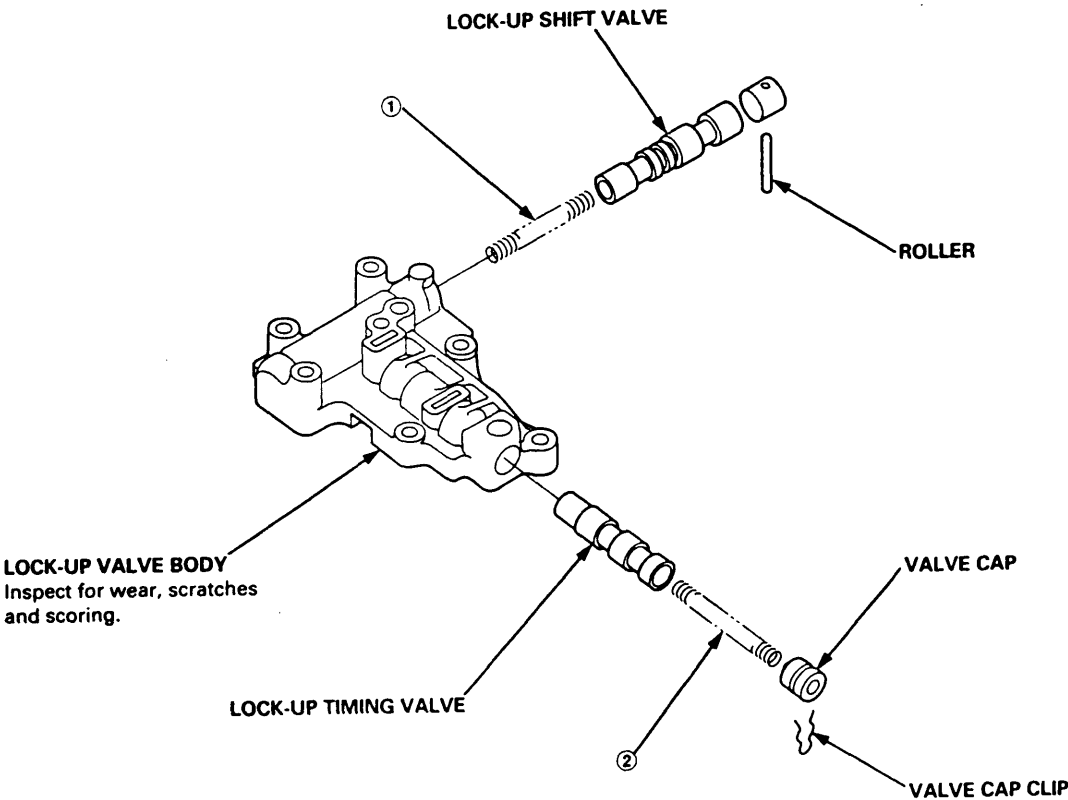


Lock-up Valve Body

Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Replace the valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-117.
- Coat all parts with ATF during assembly.



SPRING SPECIFICATIONS

Unit: mm (in)

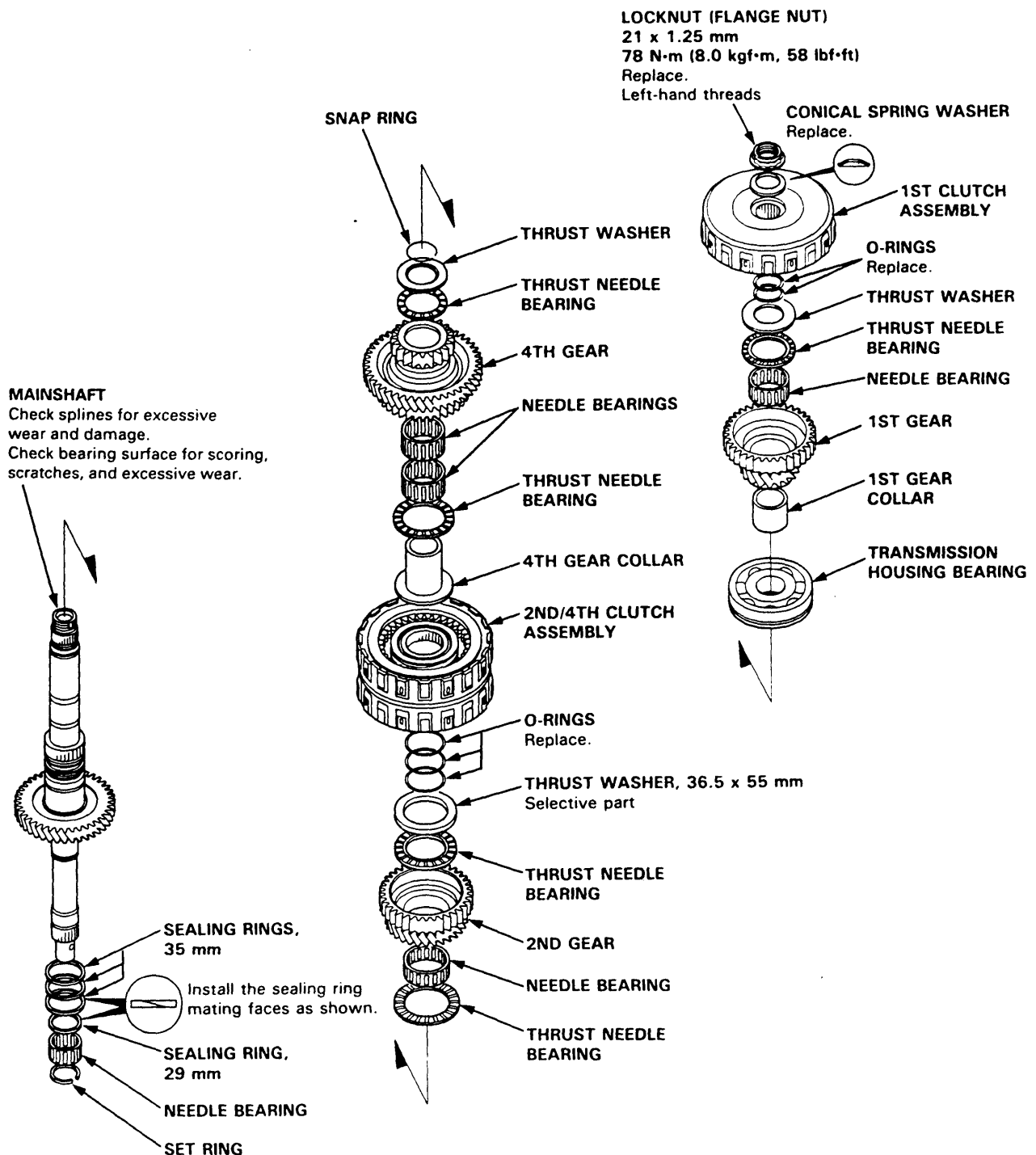
No.	Springs	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Lock-up shift valve spring	0.9 (0.035)	7.6 (0.302)	73.7 (2.902)	32.0
②	Lock-up timing valve spring	0.9 (0.035)	8.1 (0.319)	80.7 (3.177)	45.8

Mainshaft

Disassembly/Inspection/Reassembly

NOTE:

- Lubricate all parts with ATF during reassembly.
- Inspect the thrust needle bearings and the needle bearings for galling and rough movement.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damaging the O-rings.
- Locknut has left-hand threads.
- Inspect the condition of the sealing rings. If the sealing rings are worn, distorted, or damaged, replace them (see page 14-128).





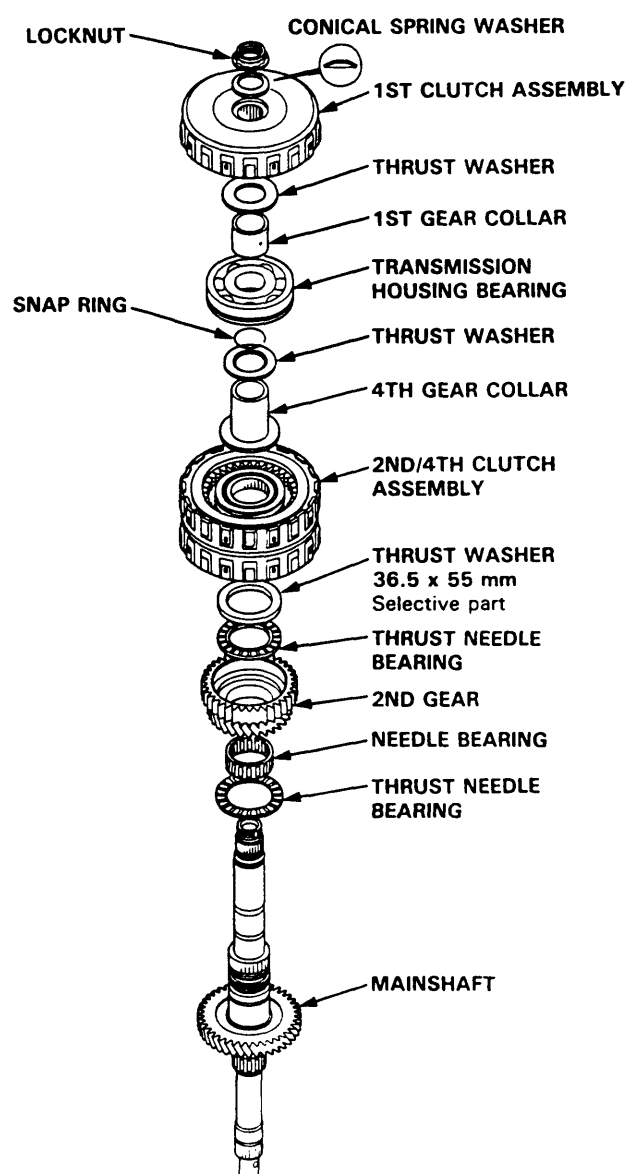
Inspection

Clearance Measurement

NOTE: Lubricate all parts with ATF during assembly.

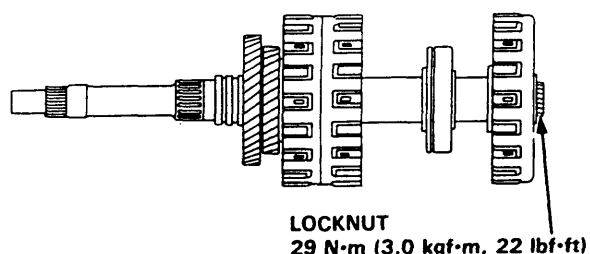
1. Remove the mainshaft bearing from the transmission housing (see page 14-150).
2. Assemble the parts below on the mainshaft.

NOTE: Do not assemble the O-rings during inspection.



3. Torque the mainshaft locknut to 29 N·m (3.0 kgf·m, 22 lbf·ft).

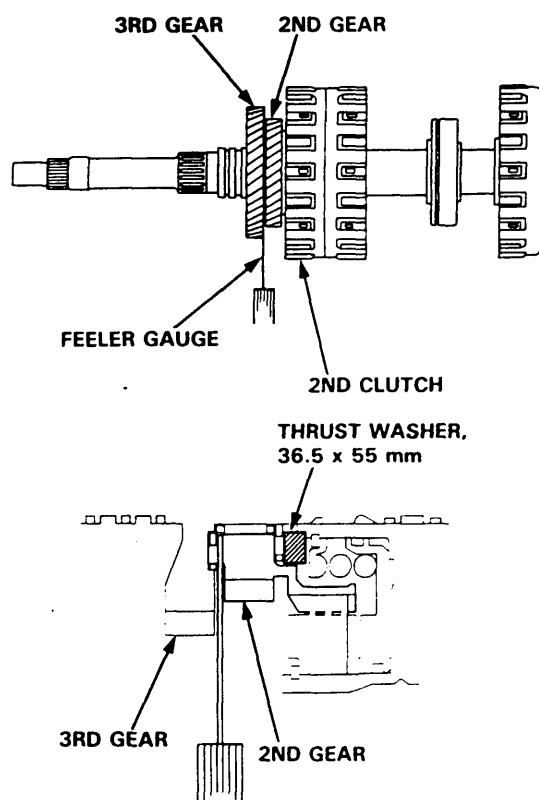
NOTE: Mainshaft locknut has left-hand threads.



4. Hold 2nd gear against the 2nd clutch, then measure the clearance between 2nd gear and 3rd gear with a feeler gauge.

NOTE: Take measurements in at least three places, and use the average as the actual clearance.

STANDARD: 0.05 – 0.13 mm (0.002 – 0.005 in)



(cont'd)

Mainshaft

Sealing Rings

Inspection (cont'd)

5. If the clearance is out of tolerance, remove the thrust washer and measure the thickness.
6. Select and install a new washer, then recheck.

THRUST WASHER 36.5 x 55 mm

No.	Part Number	Thickness
1	90441 - P4P - 010	4.00 mm (0.157 in)
2	90442 - P4P - 010	4.05 mm (0.159 in)
3	90443 - P4P - 010	4.10 mm (0.161 in)
4	90444 - P4P - 010	4.15 mm (0.163 in)
5	90445 - P4P - 010	4.20 mm (0.165 in)
6	90446 - P4P - 010	4.25 mm (0.167 in)
7	90447 - P4P - 010	4.30 mm (0.169 in)
8	90448 - P4P - 010	4.35 mm (0.171 in)
9	90449 - P4P - 010	4.40 mm (0.173 in)
10	90450 - P4P - 000	4.45 mm (0.175 in)

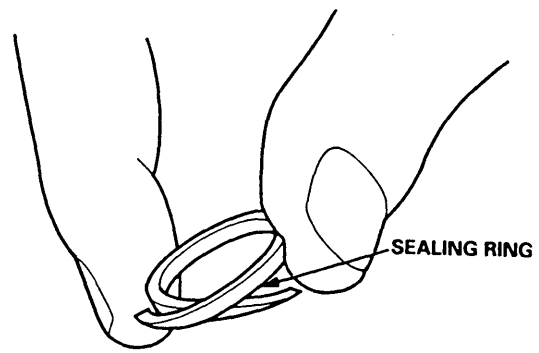
7. After replacing the thrust washer, make sure the clearance is within tolerance.

Replacement

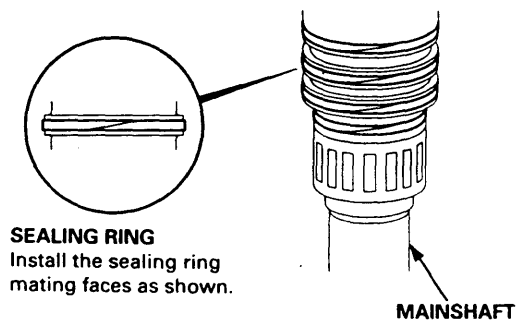
The sealing rings (35 mm and 29 mm) are synthetic resin with chamfered ends. Check the condition of the sealing rings and replace them only if they are worn, distorted or damaged.

NOTE: Lubricate all parts with ATF during assembly.

1. Squeeze the sealing ring together slightly before installing, for better fit.



2. Install new sealing rings on the mainshaft.
3. After installing the sealing rings, verify the following:
 - The sealing rings are fully seated in the groove.
 - The sealing rings are not twisted.
 - The chamfered ends of the sealing ring are properly joined.



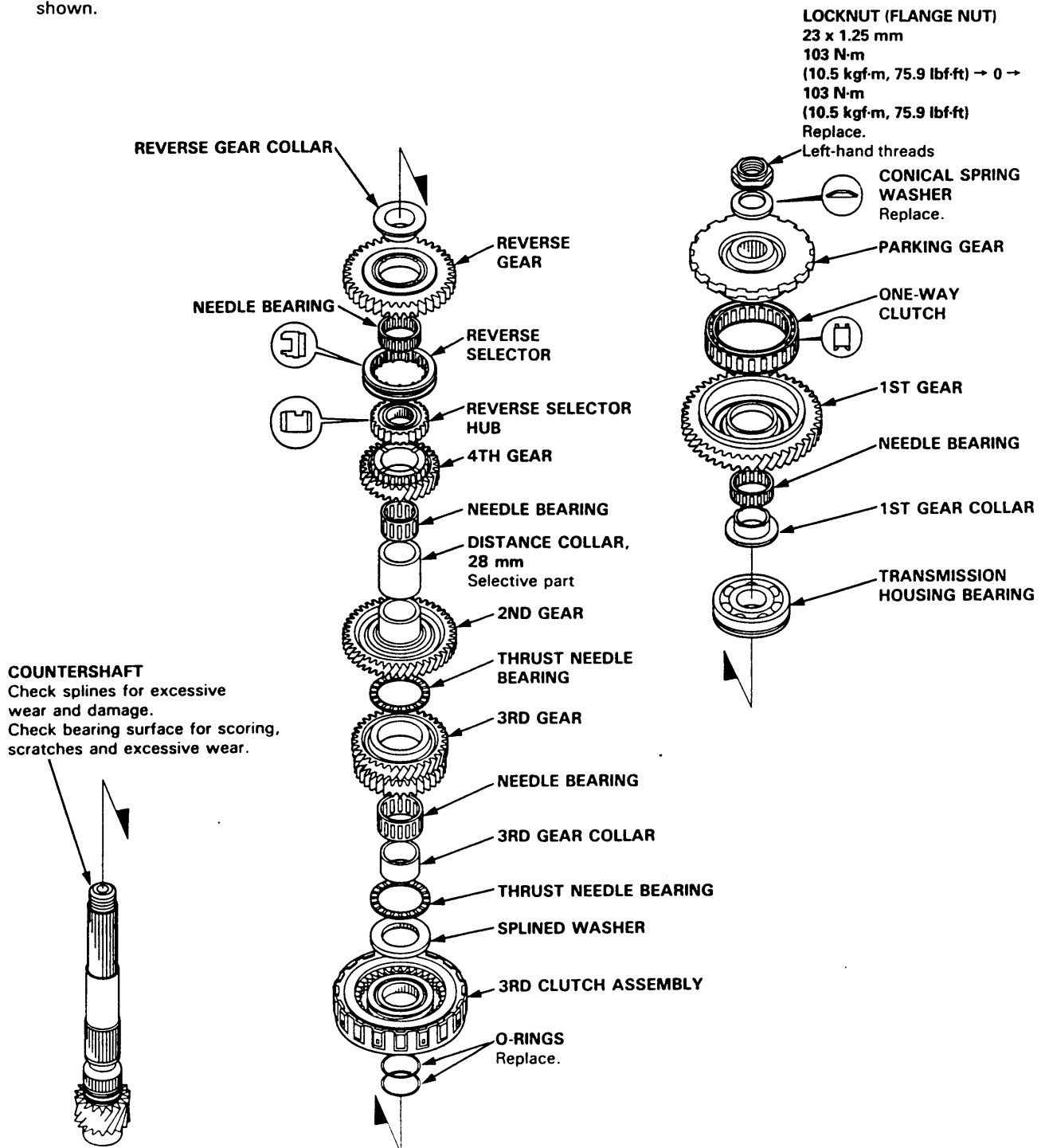
Countershaft



Disassembly/Inspection/Reassembly

NOTE:

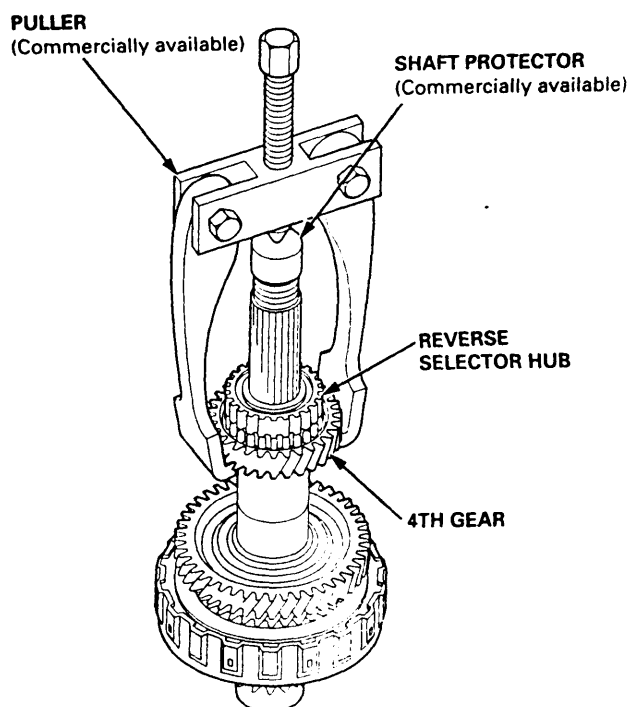
- Lubricate all parts with ATF before reassembly.
- Inspect the thrust needle bearings and the needle bearings for galling and rough movement.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damaging the O-rings.
- Locknut has left-hand threads.
- Install the conical spring washer, the one-way clutch, the reverse selector, and the reverse selector hub in the direction shown.



Countershaft

Disassembly/Reassembly

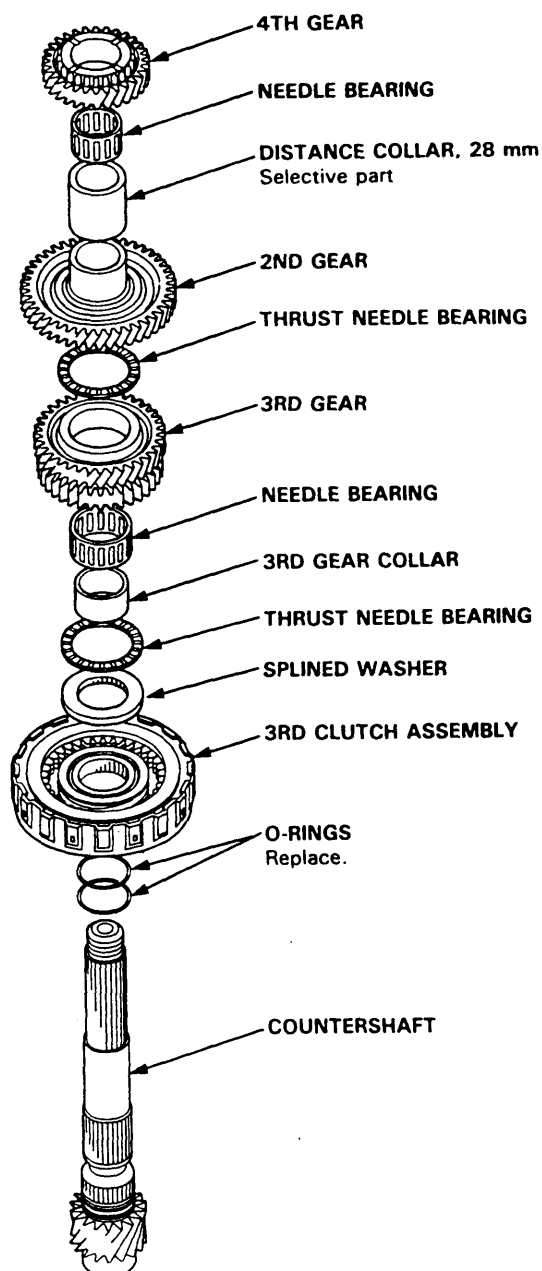
1. Remove the reverse selector hub and the 4th gear using a universal two-jaw (or three-jaw) puller as shown.



2. Assemble the parts on the countershaft as shown below.

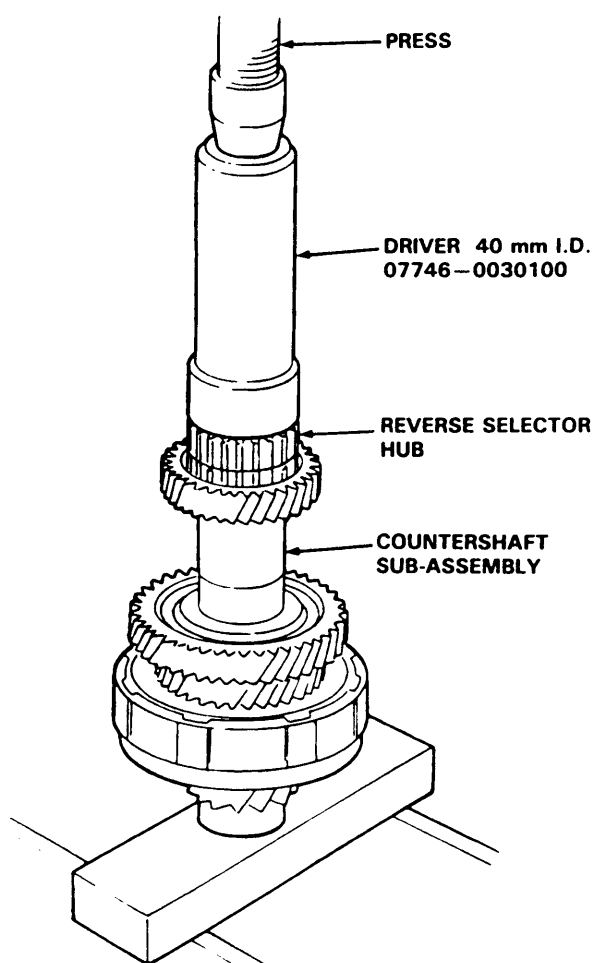
NOTE:

- Lubricate all parts with ATF during assembly.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damaging the O-rings.





3. Install the reverse selector hub on the countershaft sub-assembly, and then press the reverse selector hub using the special tool and a press as shown.



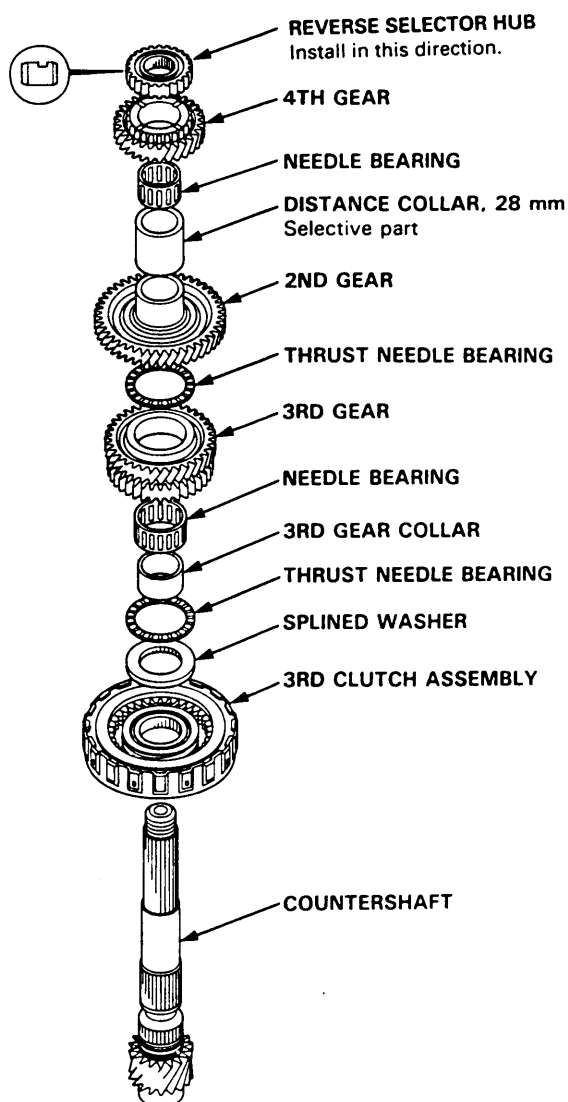
Inspection

Clearance Measurement

NOTE: Lubricate all parts with ATF during assembly.

1. Remove the countershaft bearing from the transmission housing (see page 14-150).
2. Install the parts below on the countershaft using the special tool and a press as described on this page.

NOTE: Do not assemble the O-rings during inspection.



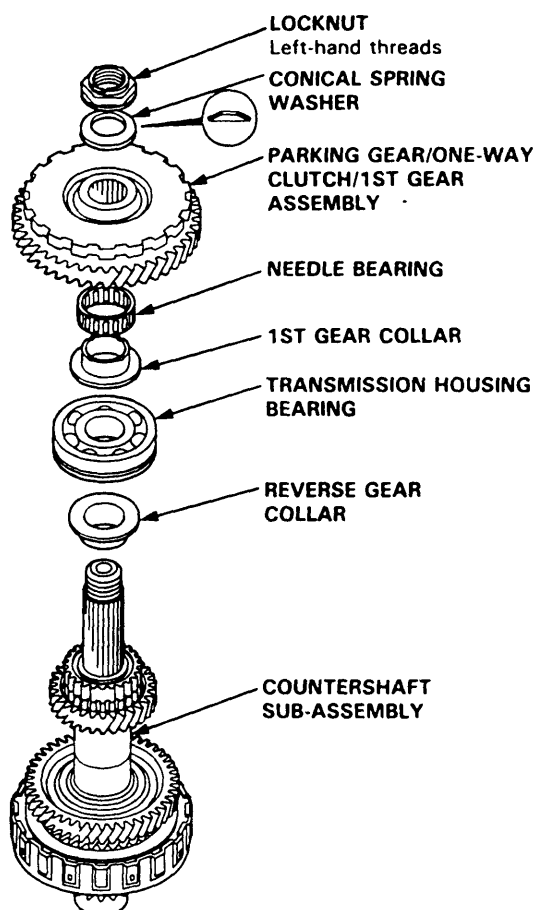
(cont'd)

Countershaft

Inspection (cont'd)

3. Install the parts below on the countershaft sub-assembly, then torque the locknut to 29 N·m (3.0 kgf·m, 22 lbf·ft).

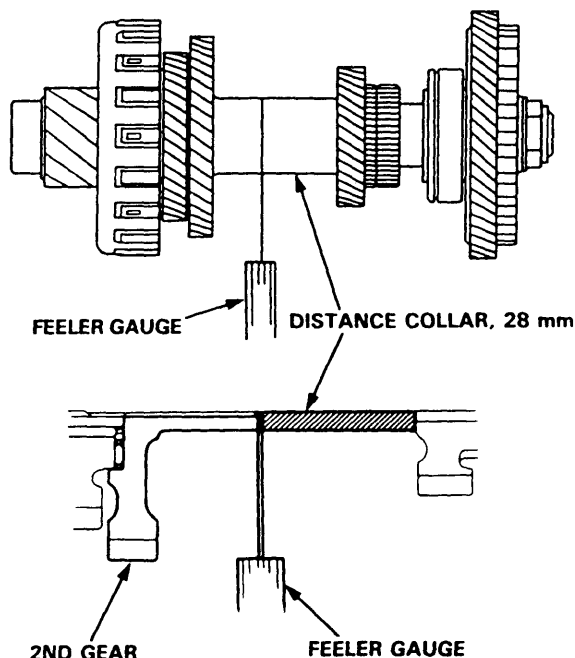
NOTE: Countershaft locknut has left-hand threads.



4. Measure the clearance between the 2nd gear and the 28 mm distance collar with a feeler gauge.

NOTE: Take measurements in at least three places, and use the average as the actual clearance.

STANDARD: 0.10 – 0.18 mm (0.004 – 0.007 in)



5. If the clearance is out of tolerance, remove the 28 mm distance collar and measure the width.
6. Select and install a new distance collar, then recheck.

DISTANCE COLLAR, 28 mm

No.	Part Number	Width
1	90503 – PC9 – 000	39.00 mm (1.535 in)
2	90504 – PC9 – 000	39.10 mm (1.539 in)
3	90505 – PC9 – 000	39.20 mm (1.543 in)
4	90507 – PC9 – 000	39.30 mm (1.547 in)
5	90508 – PC9 – 000	39.05 mm (1.537 in)
6	90509 – PC9 – 000	39.15 mm (1.541 in)
7	90510 – PC9 – 000	39.25 mm (1.545 in)
8	90511 – PC9 – 000	38.90 mm (1.531 in)
9	90512 – PC9 – 000	38.95 mm (1.533 in)

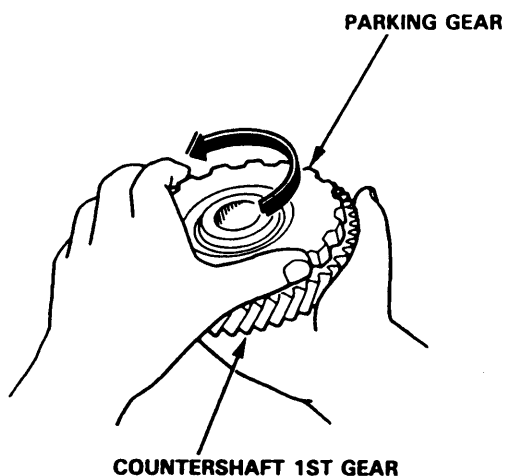
7. Recheck the distance collar clearance to make sure it is within tolerance.

One-way Clutch

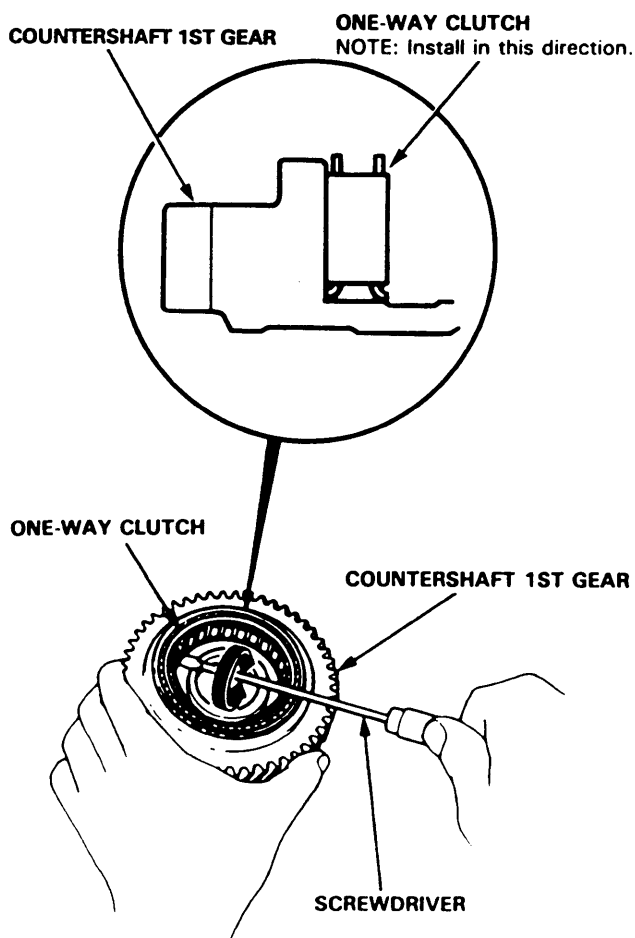


Disassembly/Inspection/Reassembly

1. Separate countershaft 1st gear from the parking gear by turning the parking gear in the direction shown.



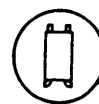
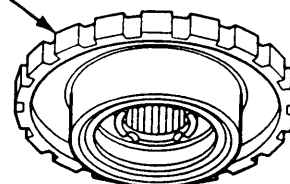
2. Remove the one-way clutch by prying it up with the end of a screwdriver.



3. Inspect the parts as follows:

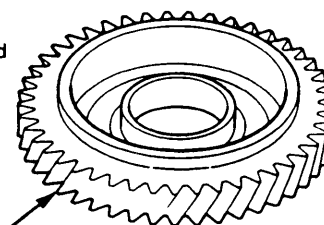
PARKING GEAR

Inspect the parking gear for wear and scoring.



ONE-WAY CLUTCH

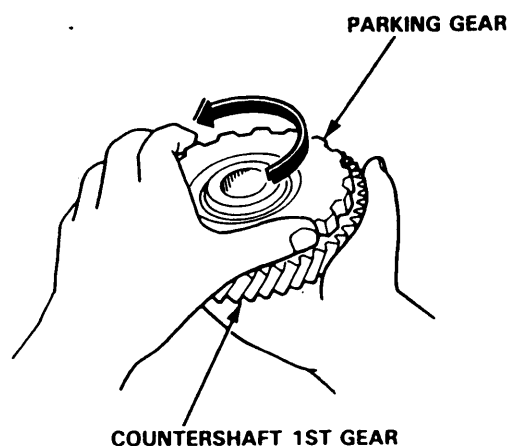
Inspect the one-way clutch for damage and faulty movement.



1ST GEAR

Inspect countershaft 1st gear for wear and scoring.

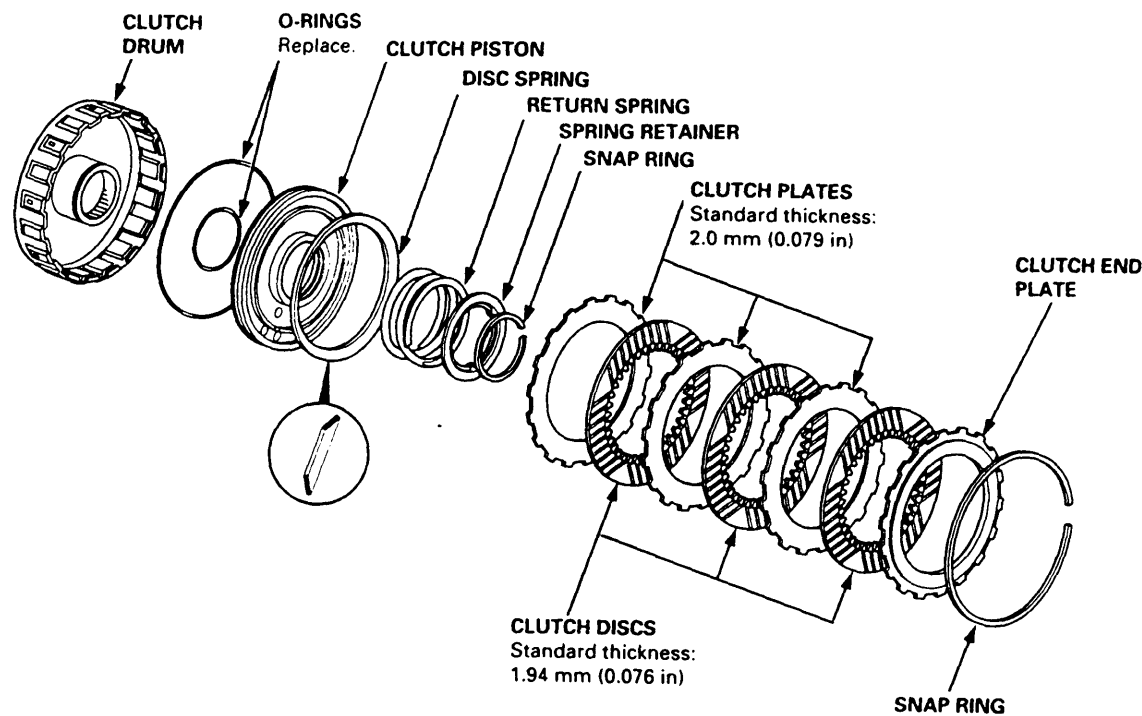
4. After the parts are assembled, hold countershaft 1st gear and turn the parking gear in the direction shown to be sure it turns freely. Also make sure the parking gear does not turn in the opposite direction.



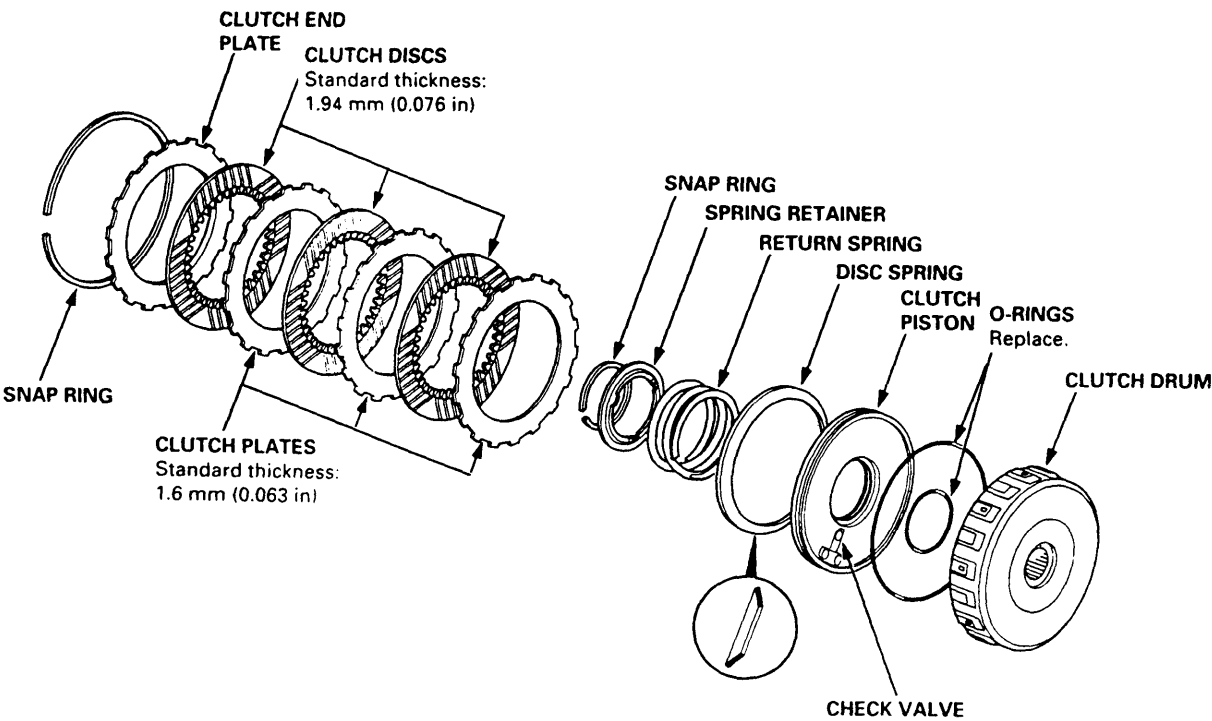
Clutch

Illustrated Index

3RD CLUTCH

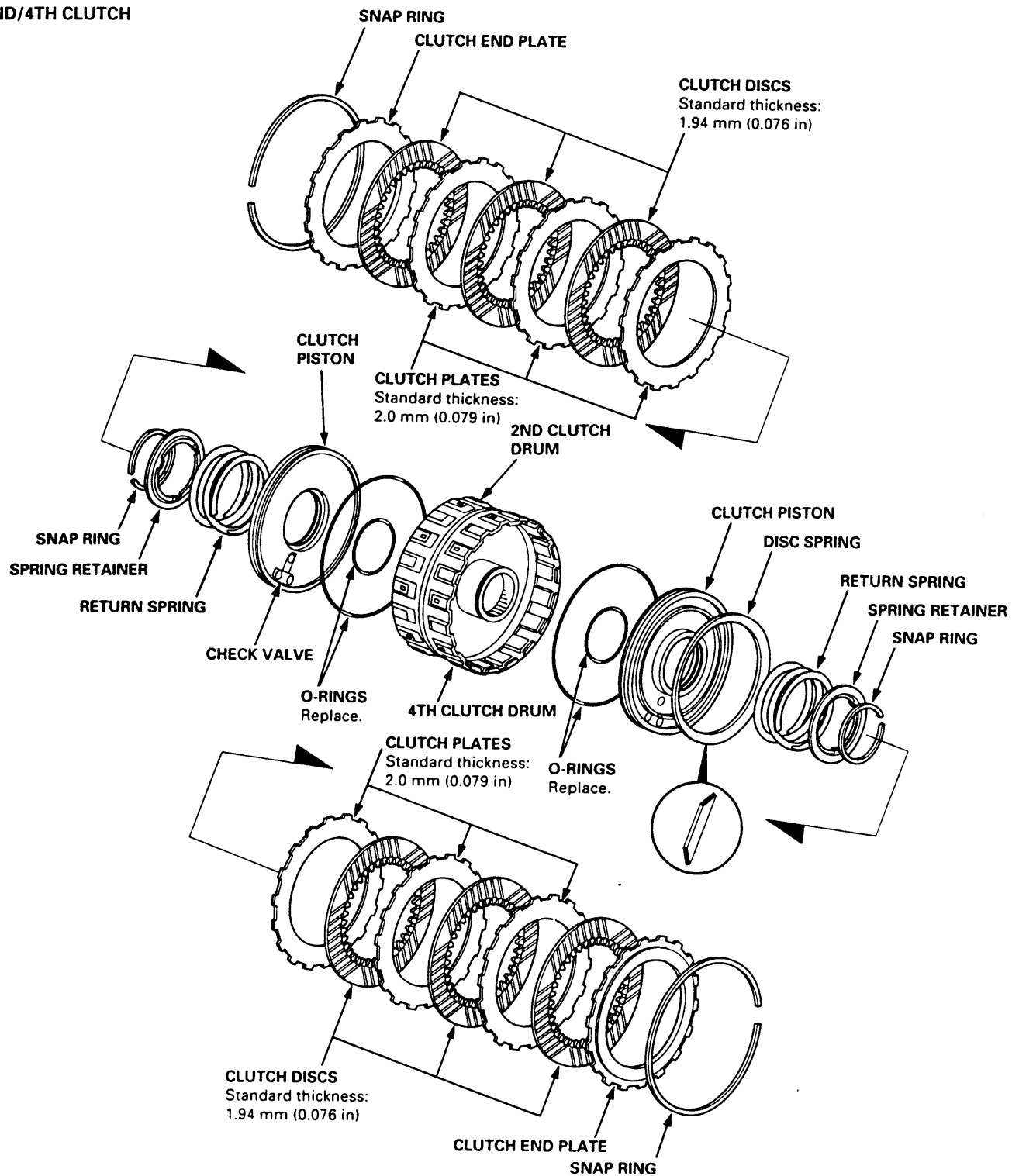


1ST CLUTCH





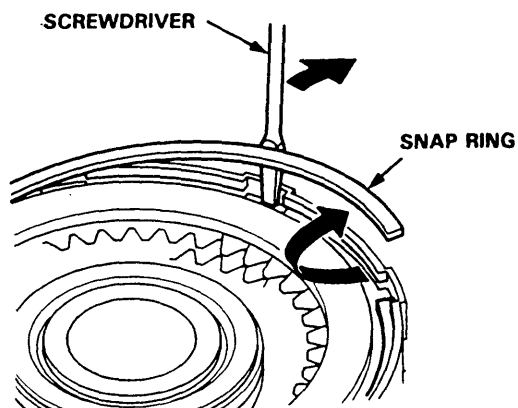
2ND/4TH CLUTCH



Clutch

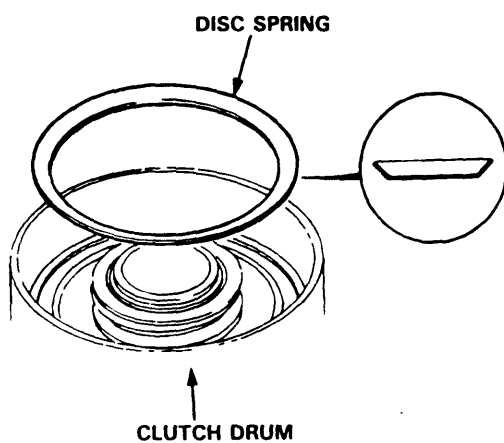
Disassembly

1. Remove the snap ring, then remove the clutch end plate, clutch discs and plates.

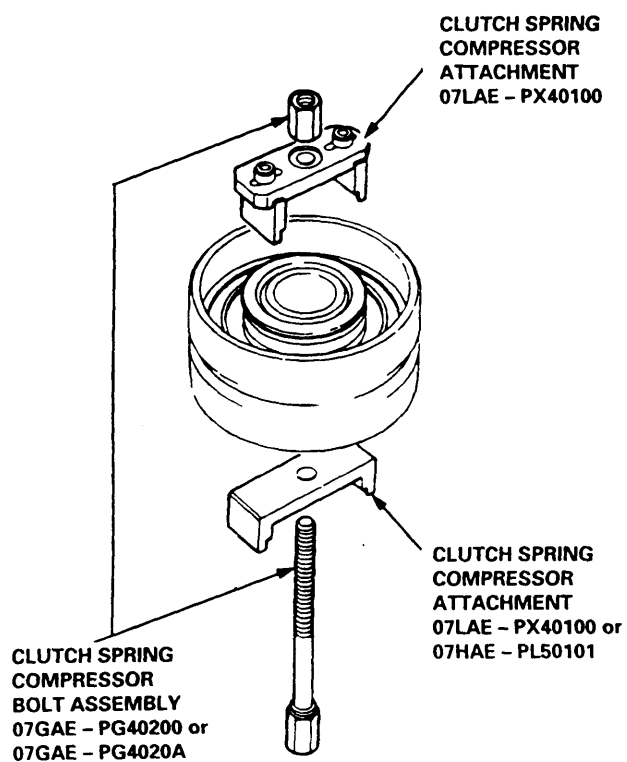
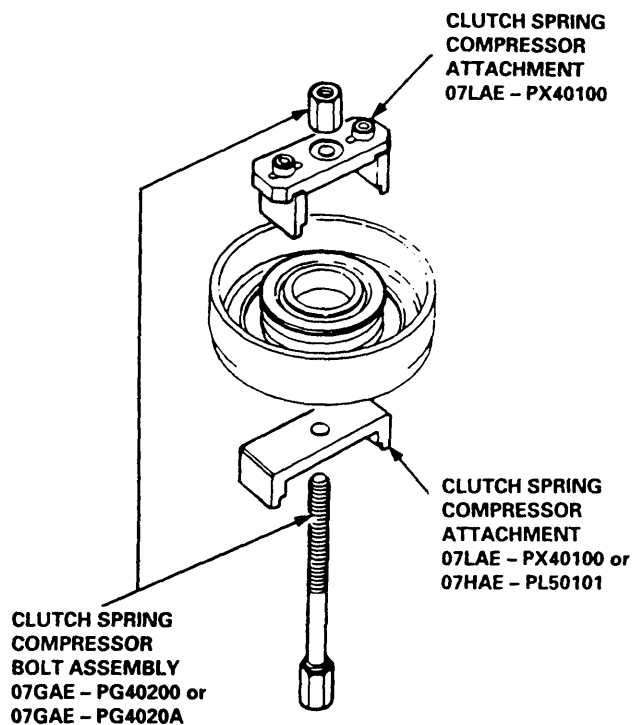


2. Remove the disc spring.

NOTE: Except 2nd clutch.

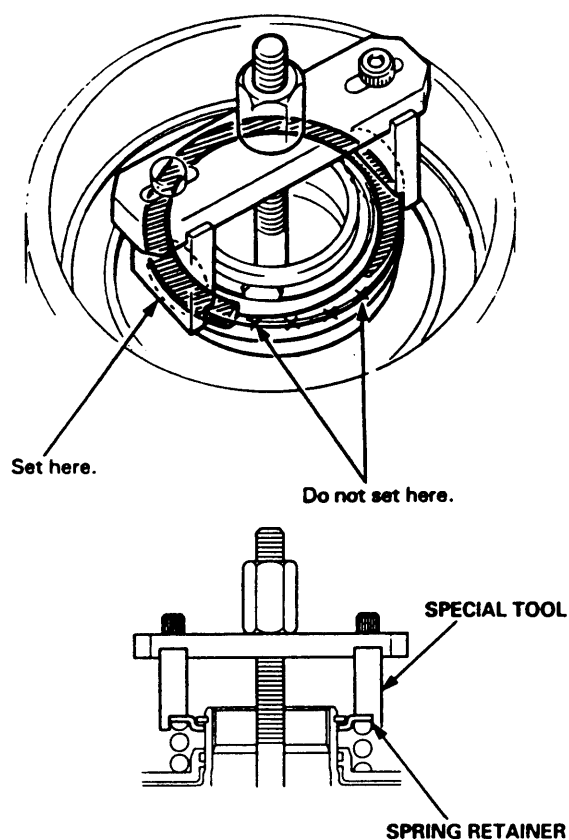


3. Install the special tools as shown.

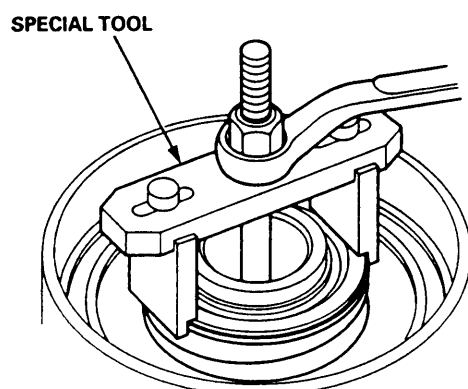




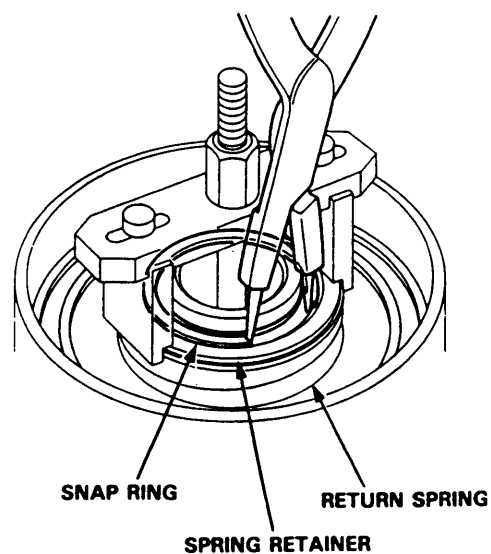
CAUTION: If either end of the special tool is set over an area of the spring retainer which is unsupported by the return spring, the retainer may be damaged. Be sure the special tool is adjusted to have full contact with the spring retainer.



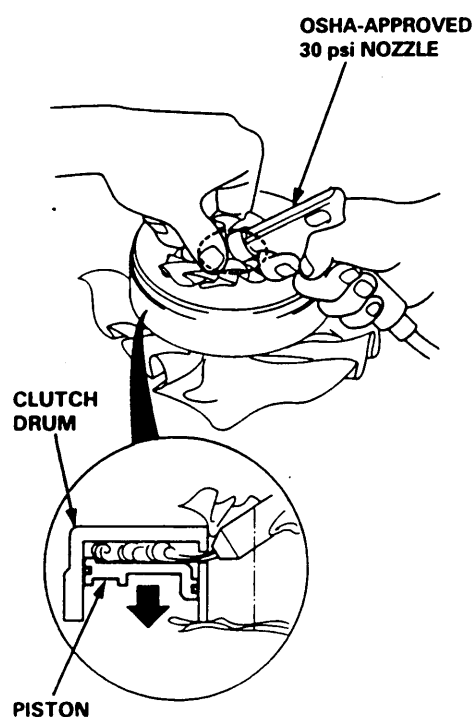
4. Compress the return spring.



5. Remove the snap ring. Then remove the special tools, spring retainer and return spring.



6. Wrap a shop rag around the clutch drum, and apply air pressure to the ATF passage to remove the piston. Place a finger tip on the other end while applying air pressure.



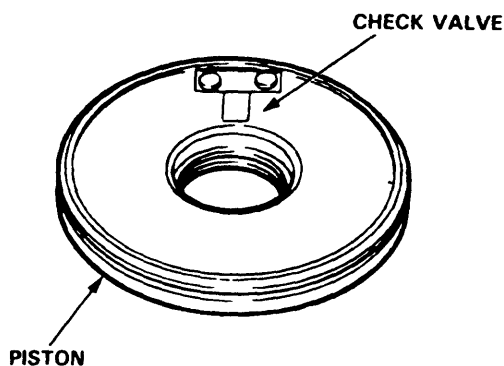
Clutch

Reassembly

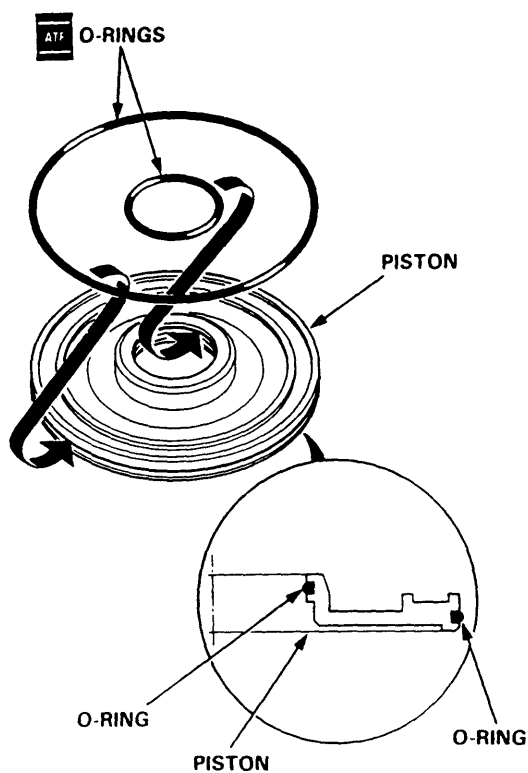
NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air.
- Blow out all passages.
- Lubricate all parts with ATF before reassembly.

1. Inspect the check valve; if it's loose, replace the piston.



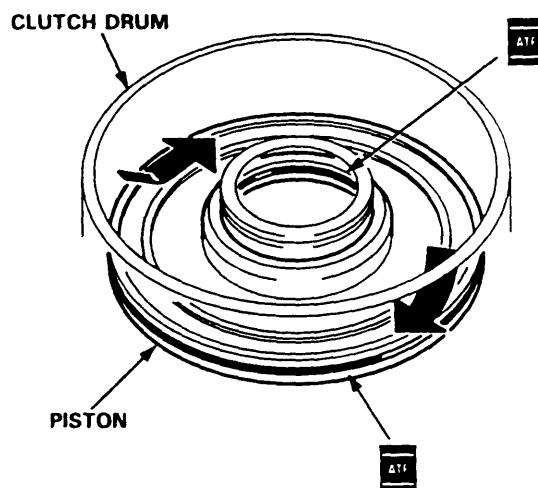
2. Install new O-rings on the clutch piston.



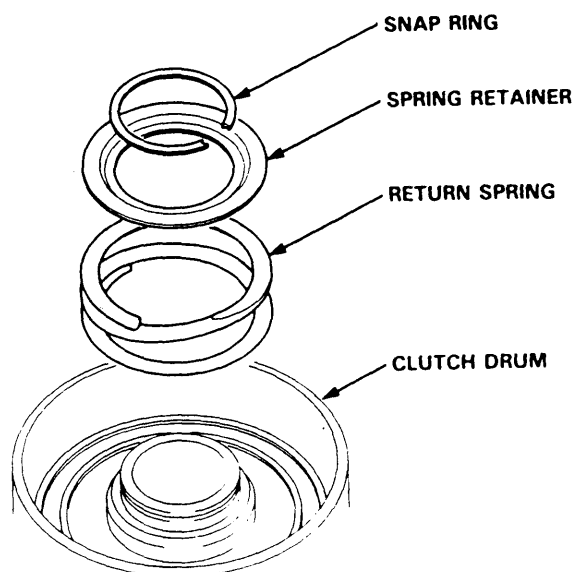
3. Install the piston in the clutch drum. Apply pressure and rotate to ensure proper seating.

NOTE: Lubricate the piston O-ring with ATF before installing.

CAUTION: Do not pinch the O-ring by installing the piston with too much force.

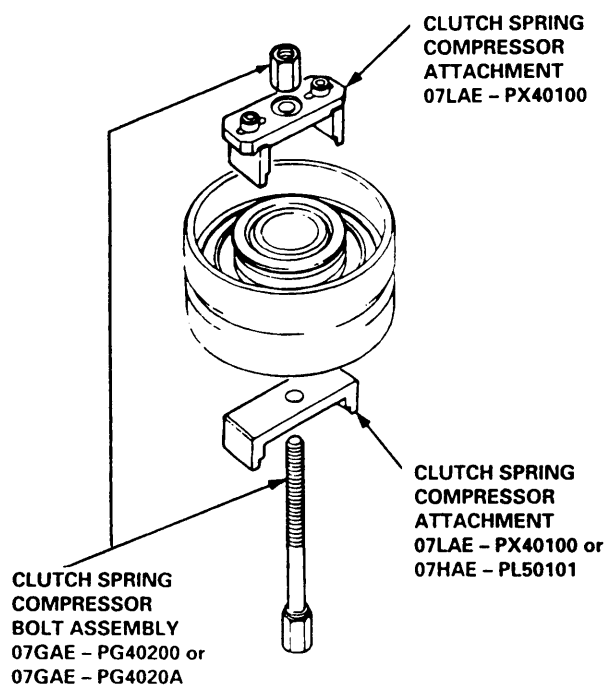
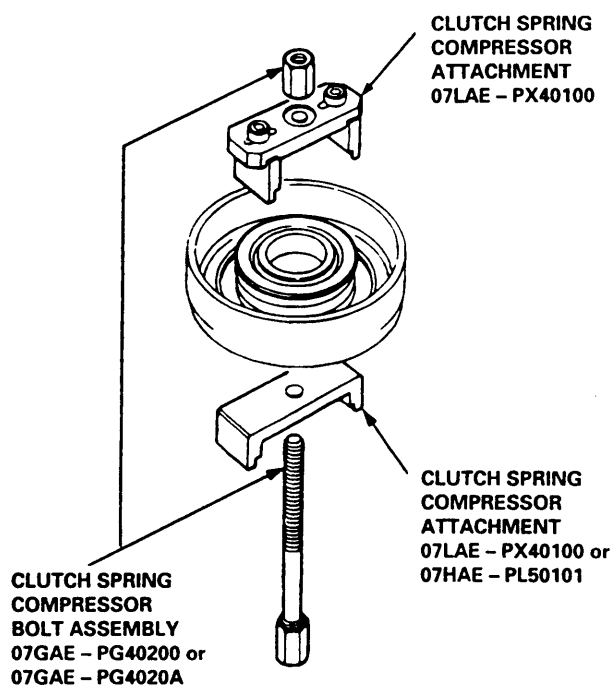


4. Install the return spring and spring retainer, and position the snap ring on the retainer.

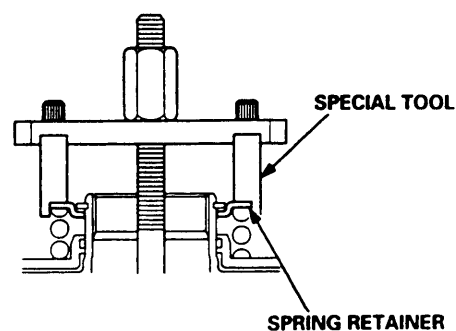
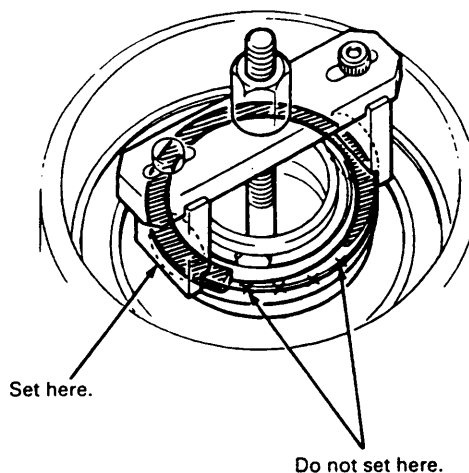




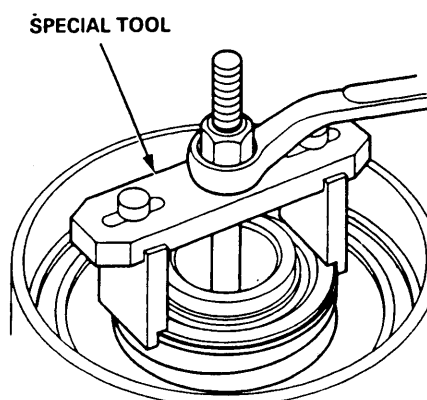
5. Install the special tools as shown.



CAUTION: If either end of the special tool is set over an area of the spring retainer which is unsupported by the return spring, the retainer may be damaged. Be sure the special tool is adjusted to have full contact with the spring retainer.



6. Compress the return spring.

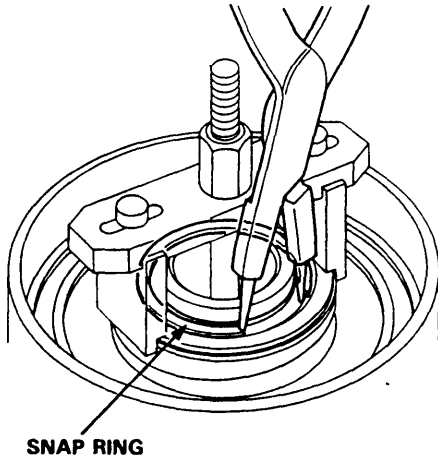


(cont'd)

Clutch

Reassembly (cont'd)

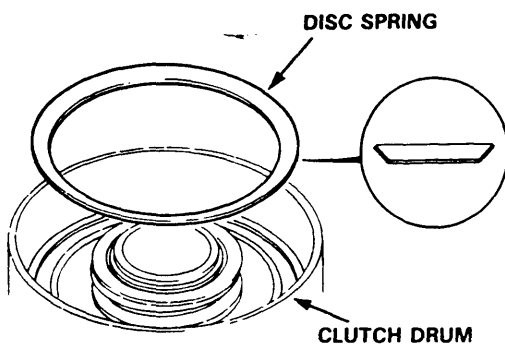
7. Install the snap ring.



8. Remove the special tools.

9. Install the disc spring.

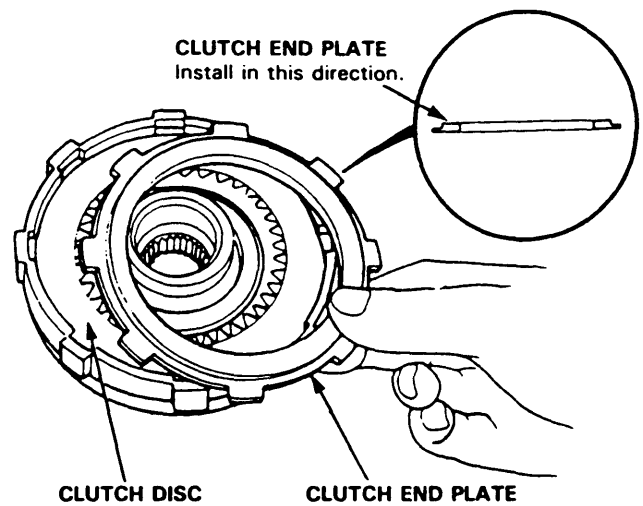
NOTE: Install the disc spring in the direction shown, except 2nd clutch.



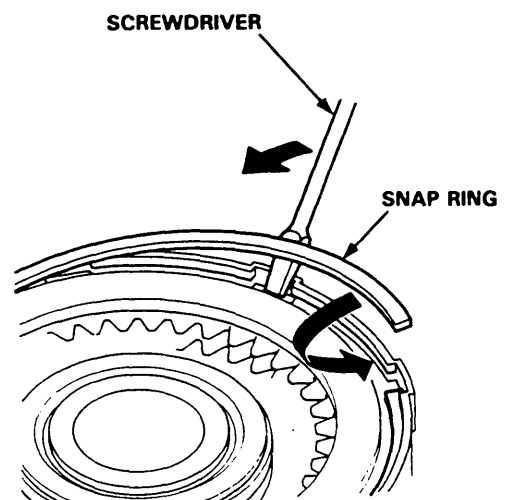
10. Soak the clutch discs thoroughly in ATF for a minimum of 30 minutes.

11. Starting with a clutch plate, alternately install the clutch plates and discs. Install the clutch end plate with flat side toward the disc.

NOTE: Before installing the plates and discs, make sure the inside of the clutch drum is free of dirt or other foreign matter.



12. Install the snap ring.



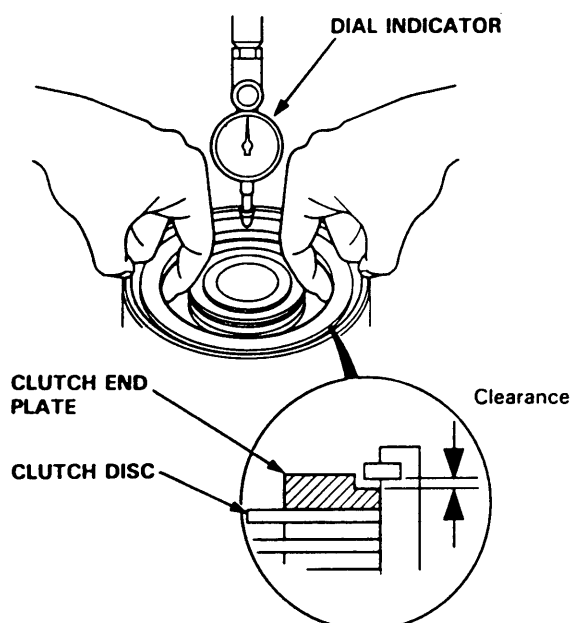


13. Measure the clearance between the clutch end plate and top disc with a dial indicator. Zero the dial indicator with the clutch end plate lowered and lift it up to the snap ring. The distance that the clutch end plate moves is the clearance between the clutch end plate and top disc.

NOTE: Take measurements in at least three places, and use the average as the actual clearance.

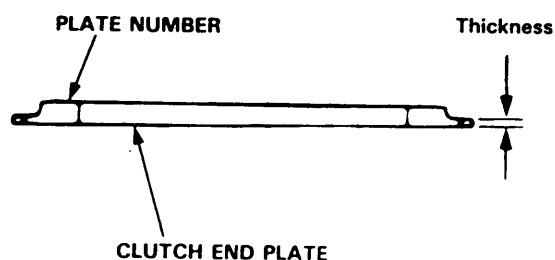
Clutch End Plate-to-Top Disc Clearance:

Clutch	Service Limit
1st	0.65 – 0.85 mm (0.026 – 0.033 in)
2nd	0.65 – 0.85 mm (0.026 – 0.033 in)
3rd	0.40 – 0.60 mm (0.016 – 0.024 in)
4th	0.40 – 0.60 mm (0.016 – 0.024 in)



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

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

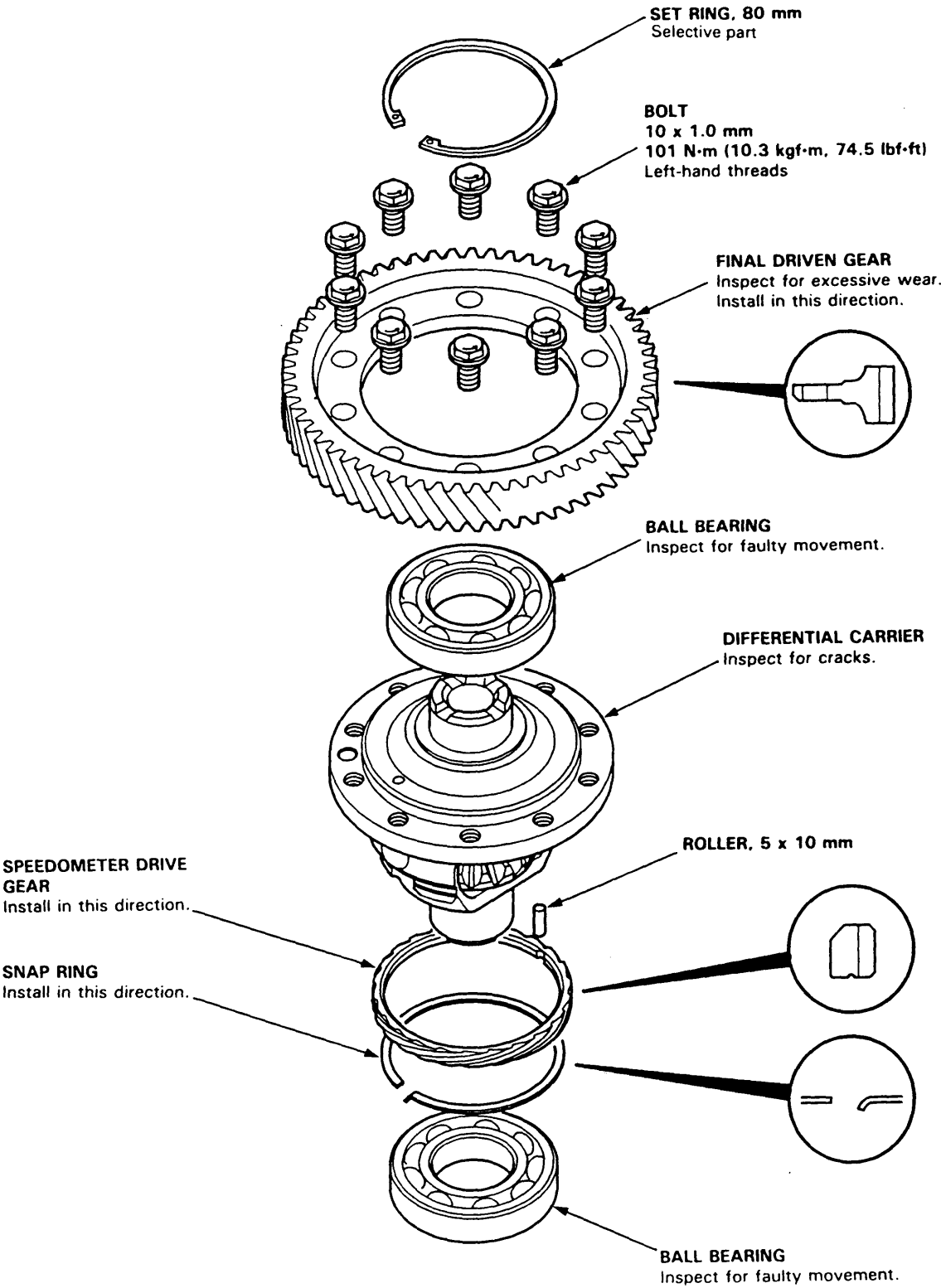


CLUTCH END PLATE

Plate No.	Part Number	Thickness
1	22551 – P4R – 003	2.1 mm (0.083 in)
2	22552 – P4R – 003	2.2 mm (0.087 in)
3	22553 – P4R – 003	2.3 mm (0.091 in)
4	22554 – P4R – 003	2.4 mm (0.094 in)
5	22555 – P4R – 003	2.5 mm (0.098 in)
6	22556 – P4R – 003	2.6 mm (0.102 in)
7	22557 – P4R – 003	2.7 mm (0.106 in)
8	22558 – P4R – 003	2.8 mm (0.110 in)
9	22559 – P4R – 003	2.9 mm (0.114 in)

Differential

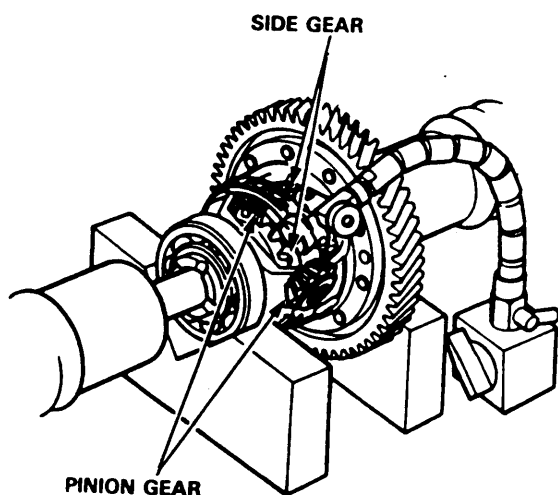
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Backlash Inspection

1. Place differential assembly on V-blocks and install both axles.



2. Check backlash of both pinion gears.

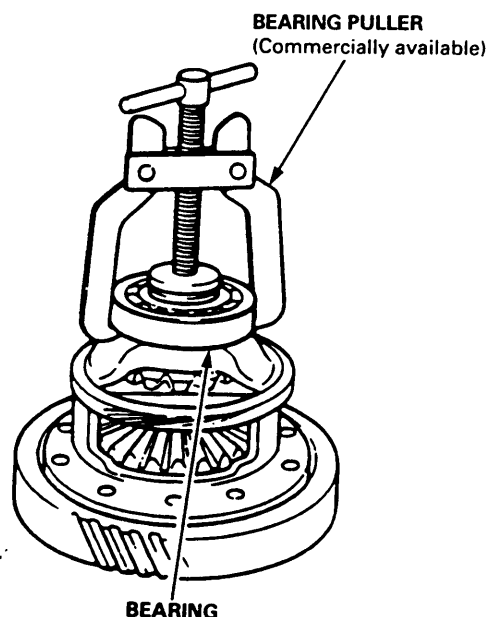
Standard (New): 0.05 – 0.15 mm (0.002 – 0.006 in)

3. If backlash is out of tolerance, replace the differential carrier (see page 14-144).

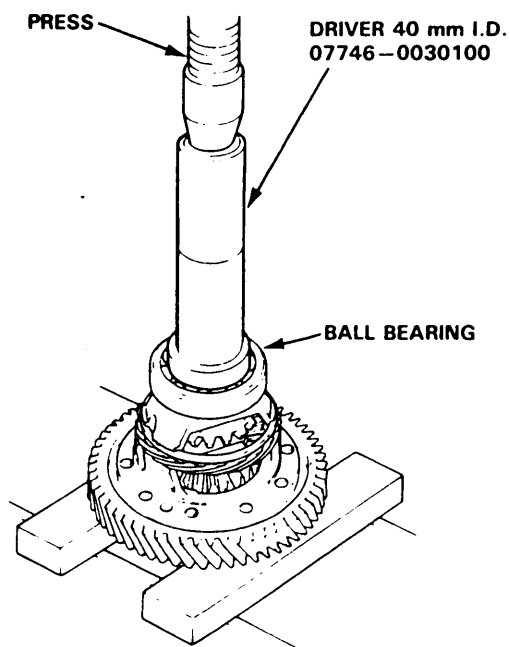
Bearing Replacement

NOTE: Check bearings for wear and rough rotation. If bearings are OK, removal is not necessary.

1. Remove bearings using a bearing puller.



2. Install new bearings using the special tool as shown.



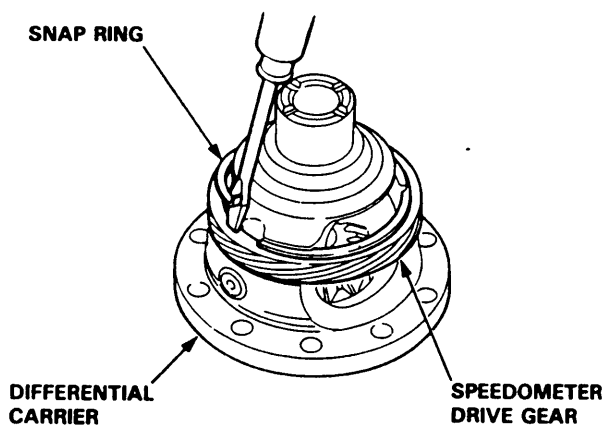
Differential

Differential Carrier Replacement

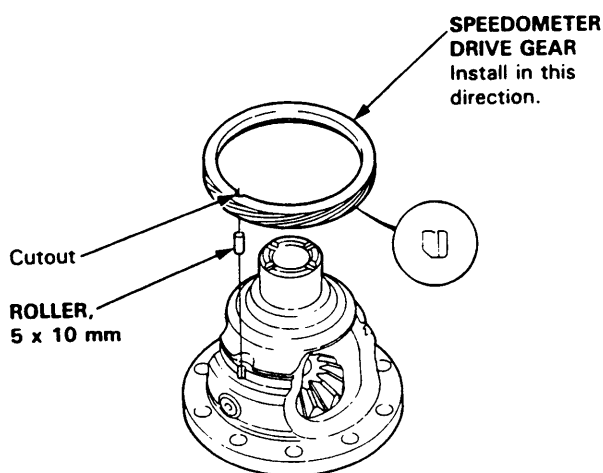
1. Remove the final driven gear from the differential carrier.

NOTE: The final driven gear bolts have left-hand threads.

2. Pry the snap ring off differential carrier, then remove the speedometer drive gear and 5 x 10 mm roller.

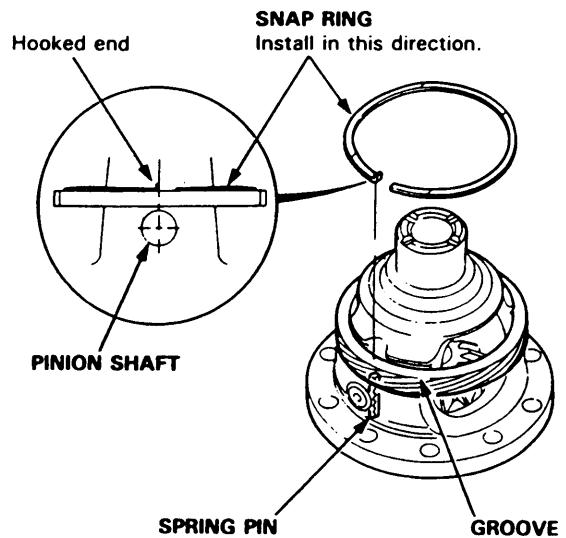


3. Install the 5 x 10 mm roller in the differential carrier.



4. Install the speedometer drive gear with its chamfered side facing the carrier. Align the cutout on the bore of the speedometer drive gear with the 5 x 10 mm roller.

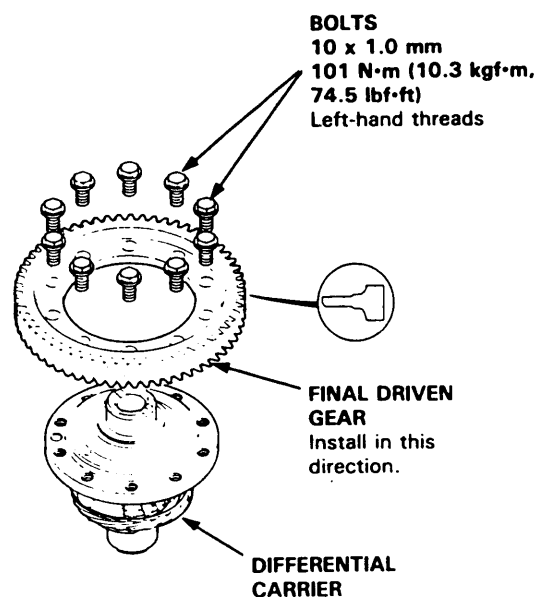
5. Align the hooked end of the snap ring with the pinion shaft as shown, then install the snap ring in the differential carrier groove.



6. Install the final driven gear, then tighten the bolts to the specified torque.

TORQUE: 101 N·m (10.3 kgf·m, 74.5 lbf·ft)

NOTE: The final driven gear bolts have left-hand threads.

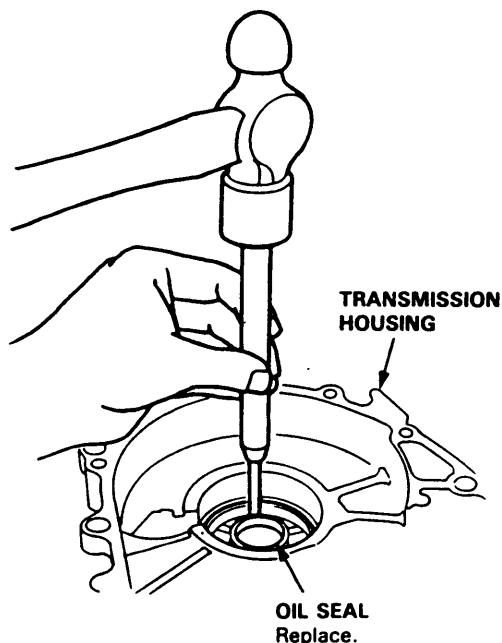


7. Install the ball bearings (see page 14-143).

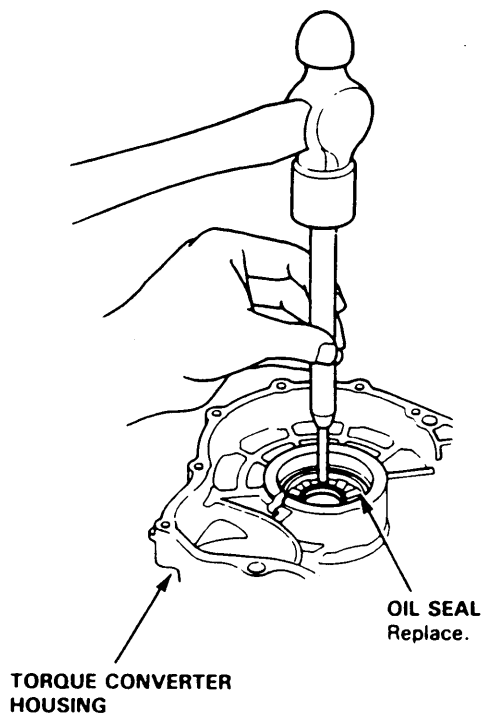


Oil Seal Removal

1. Remove the differential assembly.
2. Remove the oil seal from the transmission housing.



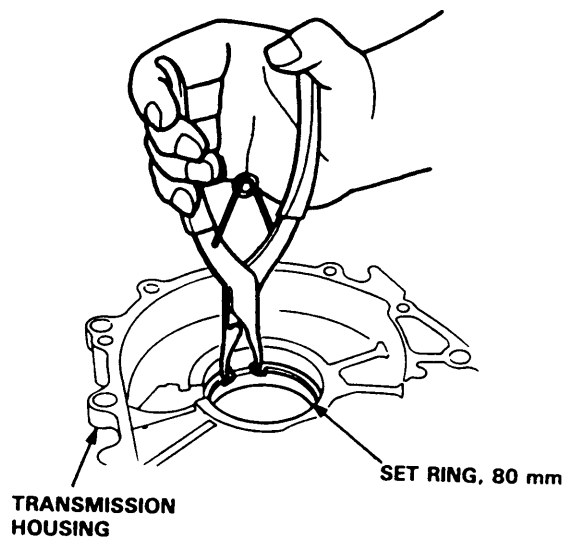
3. Remove the oil seal from the torque converter housing.



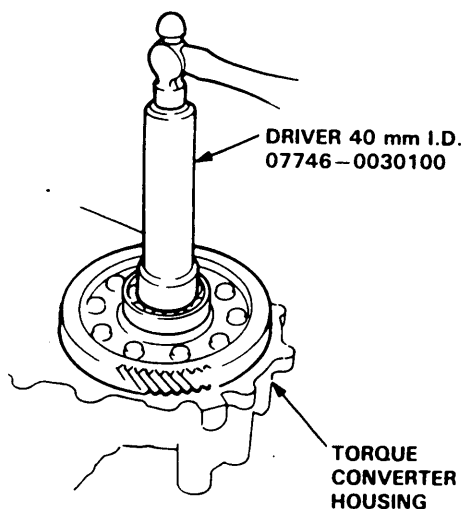
Oil Seal Installation/Side Clearance

1. Install a 2.50 mm (0.098 in) set ring, 80 mm in transmission housing.

NOTE: Do not install the oil seal yet.



2. Install the differential assembly into the torque converter housing using the special tool as shown.



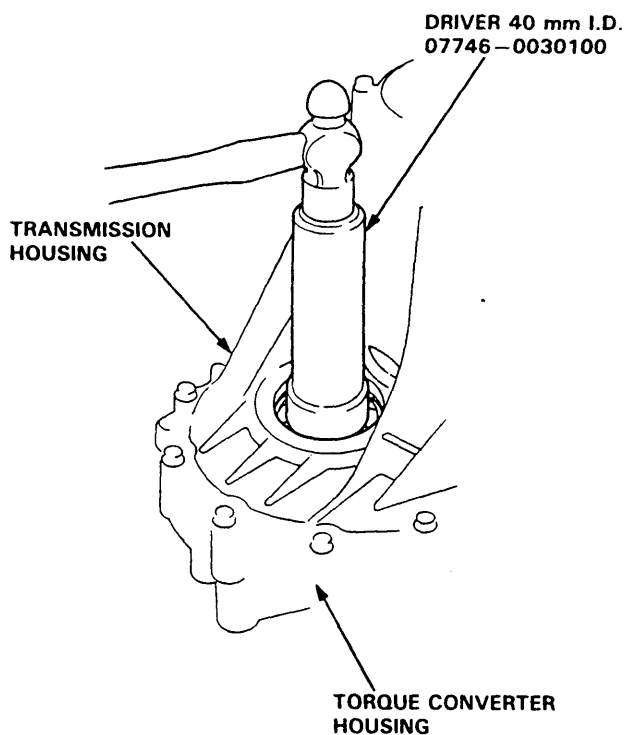
3. Install the transmission housing and tighten the bolts (see page 14-154 and 14-155).

(cont'd)

Differential

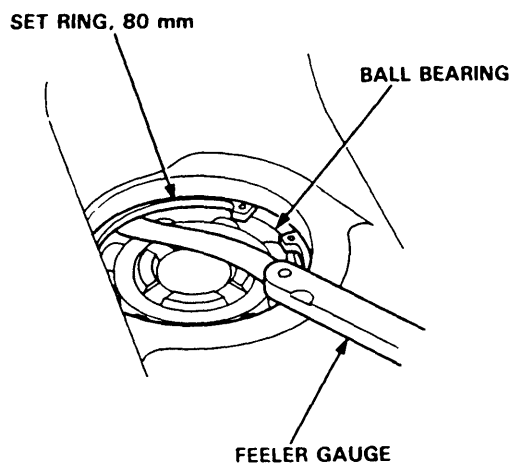
Oil Seal Installation/Side Clearance (cont'd)

4. Tap on the transmission housing side of the differential assembly with the special tool to seat the differential assembly in the torque converter housing.



5. Measure the clearance between the 80 mm set ring and outer race of the ball bearing in the transmission housing.

STANDARD: 0 - 0.15 mm (0 - 0.006 in)



6. If the clearance is more than the standard, select a new 80 mm set ring from the following table and install:

SET RING, 80 mm

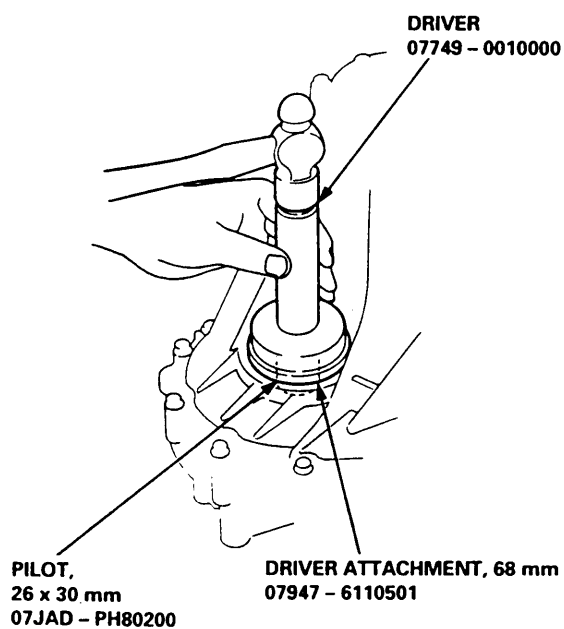
Part Number	Thickness
90414 - 689 - 000	2.50 mm (0.098 in)
90415 - 689 - 000	2.60 mm (0.102 in)
90416 - 689 - 000	2.70 mm (0.106 in)
90417 - 689 - 000	2.80 mm (0.110 in)
90418 - 689 - 000	2.90 mm (0.114 in)
90419 - PH8 - 000	3.00 mm (0.118 in)

NOTE: If the 80 mm set ring-to-ball bearing outer race clearance measured in step 5 is less than the specification, it is not necessary to perform steps 7 and 8.

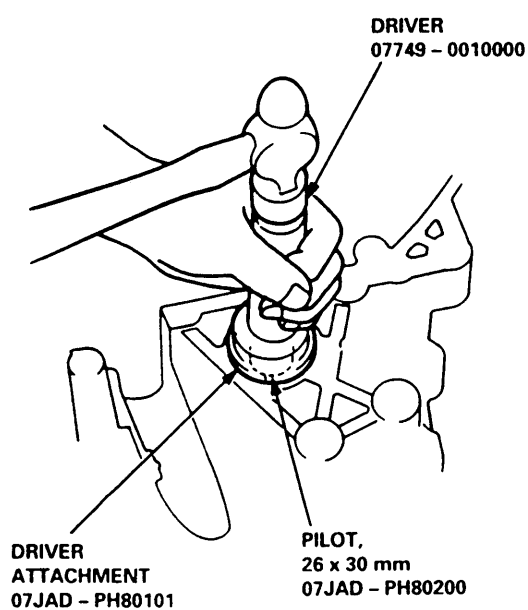
7. Remove the transmission housing.
8. Replace the 2.50 mm (0.098 in) 80 mm set ring with the one of the correct thickness selected in step 6.



9. Install the oil seal in the transmission housing using the special tools as shown.



10. Install the oil seal in the torque converter housing using the special tools as shown.

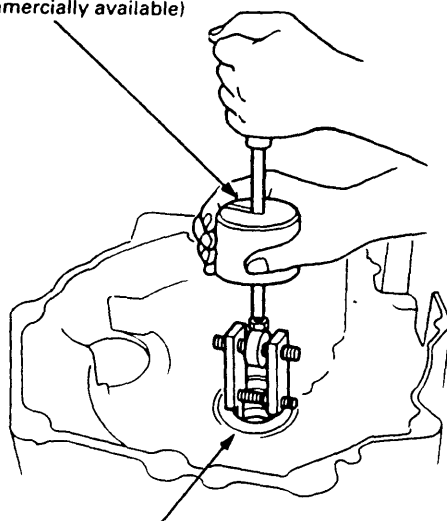


Torque Converter Housing Bearings

Mainshaft Bearing/Oil Seal Replacement

1. Remove the mainshaft bearing and oil seal using the special tools as shown.

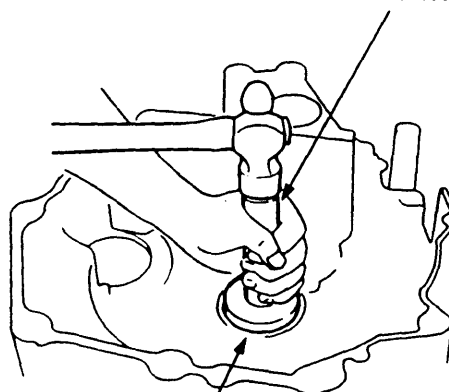
SLIDE HAMMER, 3/8"-16
(Commercially available)



ADJUSTABLE BEARING
PULLER, 25 - 40 mm
07736 - A01000B or
07736 - A01000A

2. Drive in the new mainshaft bearing until it bottoms in the housing using the special tools as shown.

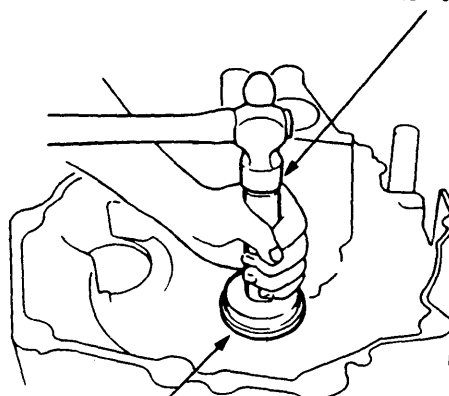
DRIVER
07749 - 0010000



ATTACHMENT,
62 x 68 mm
07746 - 0010500

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

DRIVER
07749 - 0010000

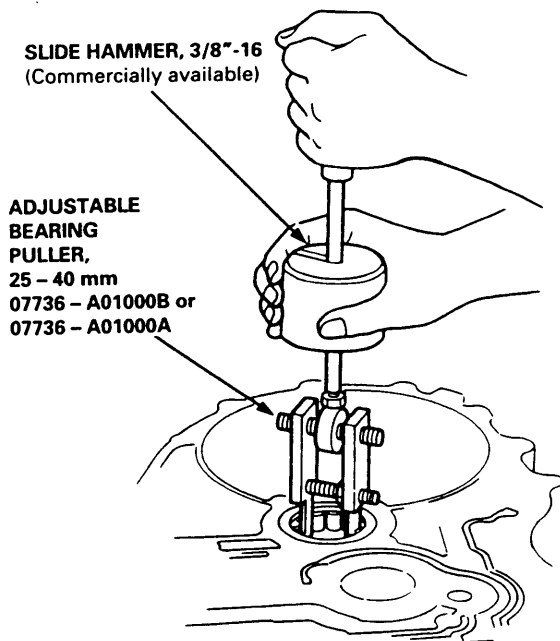


ATTACHMENT,
72 x 75 mm
07746 - 0010600

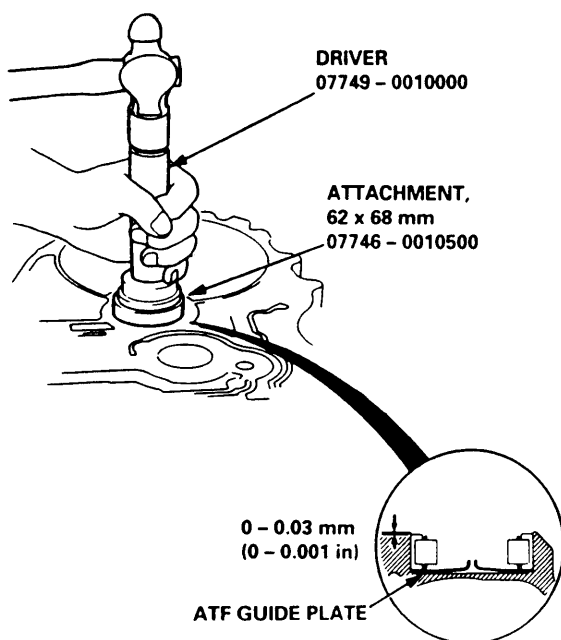


Countershaft Bearing Replacement

1. Remove the countershaft bearing using the special tools as shown.



2. Install the ATF guide plate.
3. Drive the new bearing into the housing using the special tools as shown.

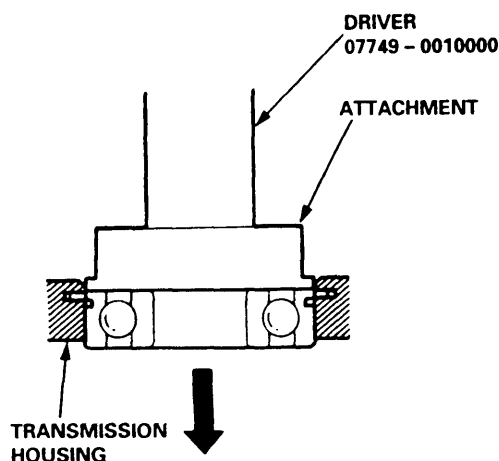
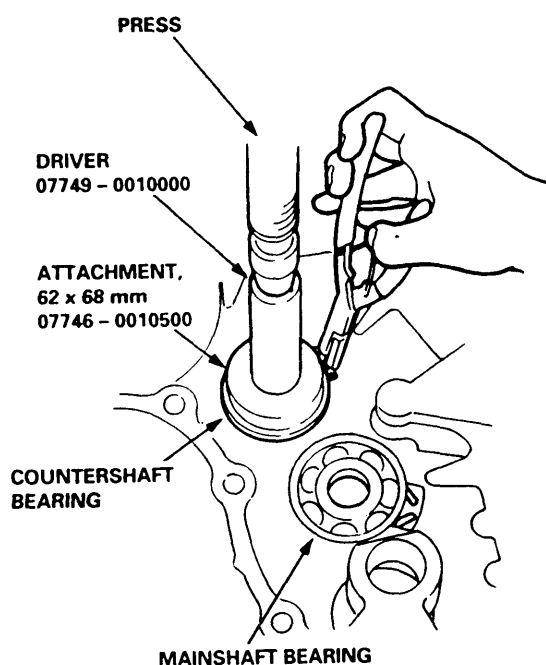


Transmission Housing Bearings

Mainshaft/Countershaft Bearings Replacement

1. To remove the mainshaft and countershaft bearings from the transmission housing, expand each snap ring with snap ring pliers, then push the bearing out using the special tools and a press as shown.

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



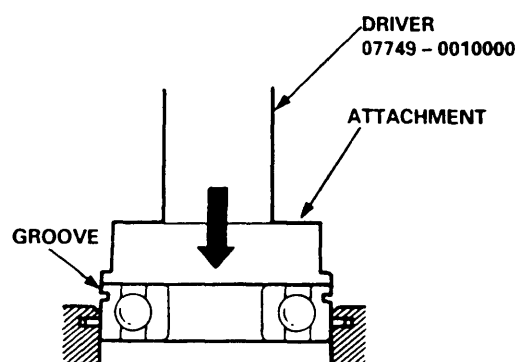
ATTACHMENT

- Mainshaft Bearing Installation use:
ATTACHMENT, 72 x 75 mm
07746 - 0010600
- Countershaft Bearing Installation use:
ATTACHMENT, 62 x 68 mm
07746 - 0010500

2. Expand each snap ring with snap ring pliers, then insert the new bearing part-way into the housing using the special tools and a press as shown. Install the bearing with the groove facing outside the housing.

NOTE: Coat all parts with ATF.

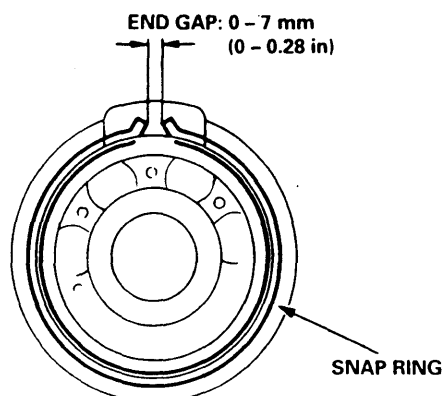
3. Release the pliers, then push the bearing down into the housing until the ring snaps in place around it.



ATTACHMENT

- Mainshaft Bearing Removal use:
ATTACHMENT, 72 x 75 mm
07746 - 0010600
- Countershaft Bearing Removal use:
ATTACHMENT, 62 x 68 mm
07746 - 0010500

4. After installing the bearing verify the following:
 - The snap ring is seated in the bearing and housing grooves.
 - The snap ring operates properly.
 - The ring end gap is correct.



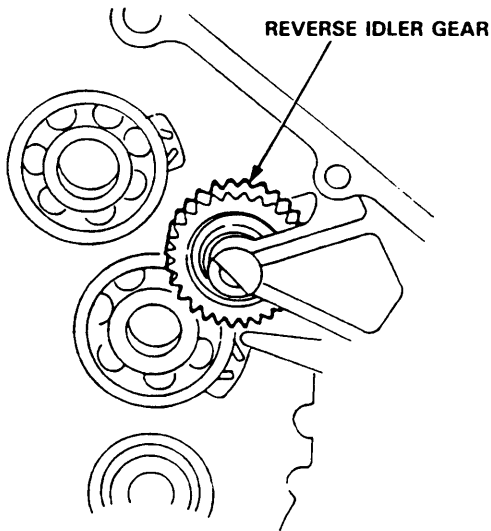
Reverse Idler Gear

Parking Brake Stop

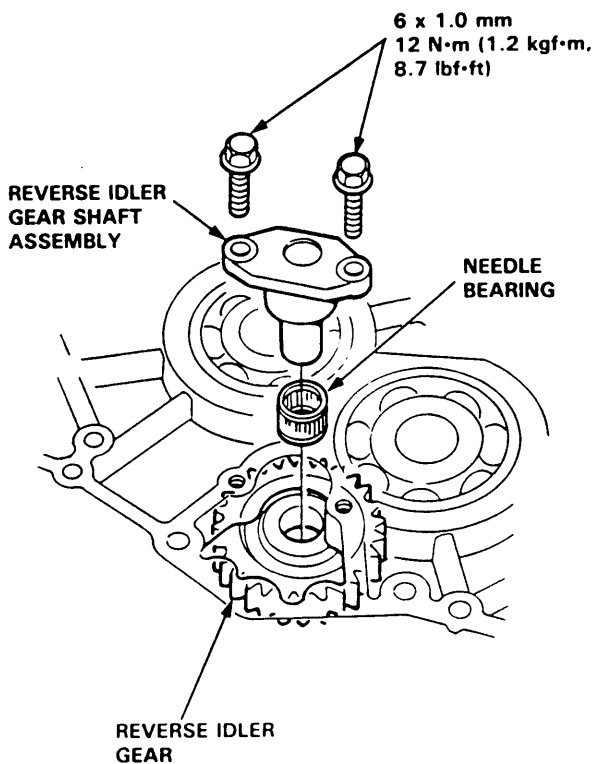


Installation

1. Install the reverse idler gear.



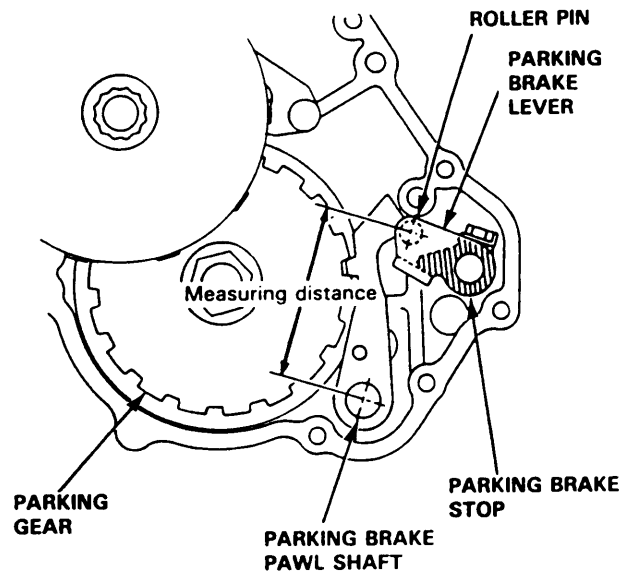
2. Install the reverse idler gear shaft holder and needle bearing into the transmission housing, then tighten the bolts.



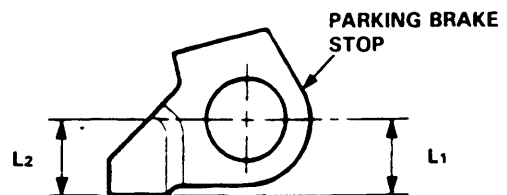
Inspection/Adjustment

1. Set the parking brake lever in the **P** position.
2. Measure the distance between the parking brake pawl shaft and the parking brake lever roller pin as shown.

STANDARD: 72.9 – 73.9 mm (2.87 – 2.91 in)



3. If the measurement is out of tolerance, select and install the appropriate parking brake stop from the table below.



PARKING BRAKE STOP

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

4. After replacing the parking brake stop, make sure the distance is within tolerance.

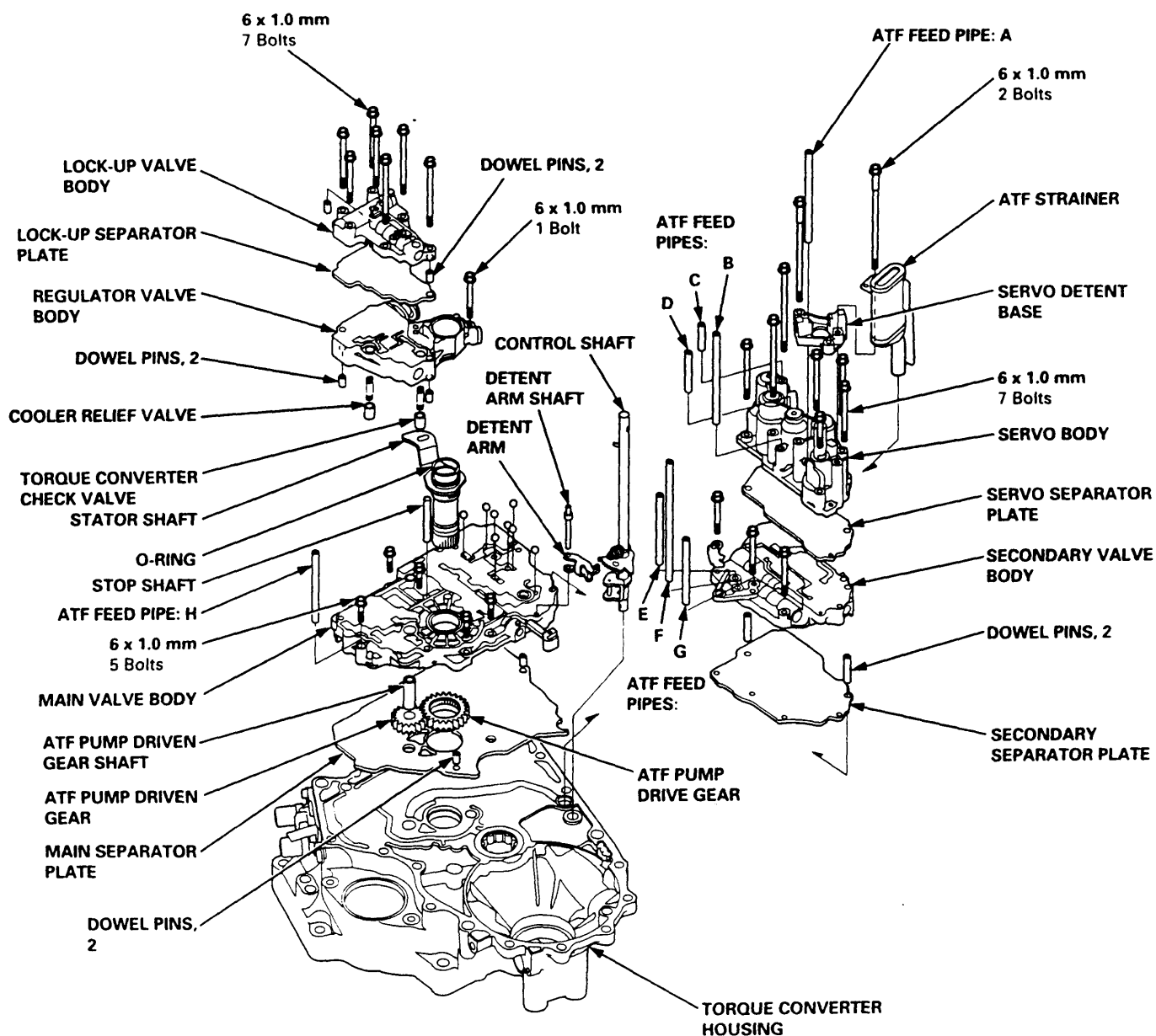
Transmission

Reassembly

NOTE:

- Coat all parts with ATF.
- Replace the following parts:
 - O-rings
 - Lock washers
 - Gaskets
 - Mainshaft and countershaft locknuts and conical spring washers
 - Sealing washers

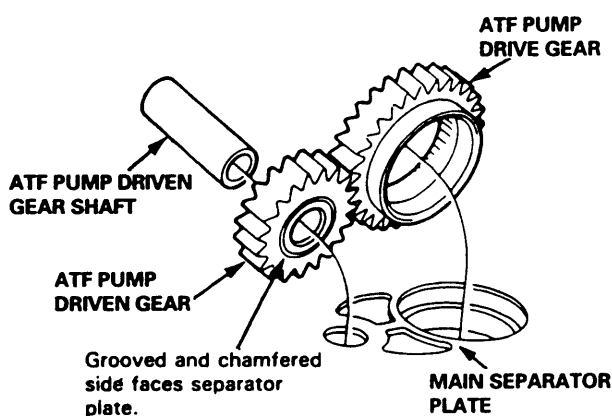
TORQUE: 12 N·m (1.2 kgf·m, 8.7 lbf·ft)





1. Install the ATF magnet and suction pipe collar in the torque converter housing, if necessary.
2. Install the main separator plate and the two dowel pins on the torque converter housing.
3. Install the ATF pump drive gear, ATF pump driven gear and ATF pump driven gear shaft on the torque converter housing.

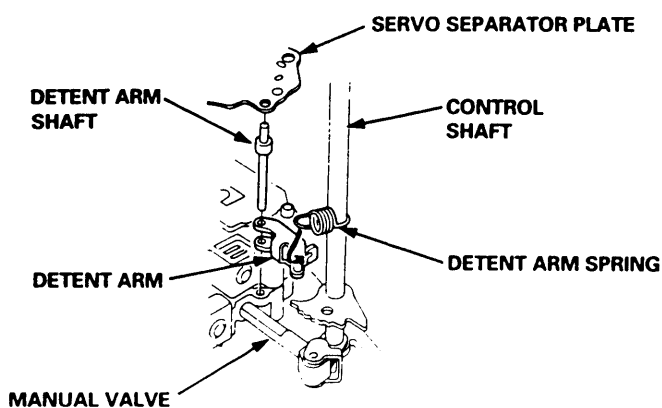
NOTE: Install the ATF pump driven gear with its grooved and chamfered side faces separator plate.



4. Loosely install the main valve body with five bolts. Make sure the ATF pump drive gear rotates smoothly in the normal operating direction and the ATF pump driven gear shaft moves smoothly in the axial and normal operating directions.
5. Install the secondary valve body, separator plate and two dowel pins on the main valve body.

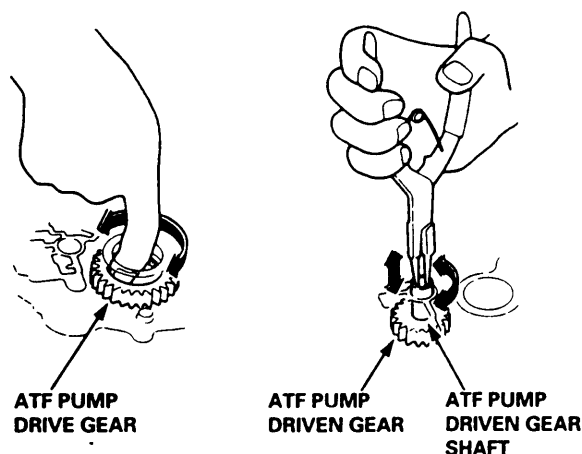
NOTE: Do not install the bolts.

6. Install the control shaft in the housing with the control shaft and manual valve together.
7. Install the detent arm and arm shaft in the main valve body, then hook the detent arm spring to the detent arm.



8. Install the servo body and separator plate on the secondary valve body (seven bolts).
9. Install the servo detent base and the ATF strainer (two bolts).
10. Tighten the five bolts on the main valve body to 12 N·m (1.2 kgf·m, 8.7 lbf·ft). Make sure the ATF pump drive gear and ATF pump driven gear shaft move smoothly.
11. If the ATF pump drive gear and ATF pump driven gear shaft do not move freely, loosen the five bolts on the main valve body, and disassemble the valve bodies. Realign the ATF pump driven gear shaft and reassemble the valve bodies, then retighten the bolts to the specified torque.

CAUTION: Failure to align the ATF pump driven gear shaft correctly will result in a seized ATF pump drive gear or ATF pump driven gear shaft.

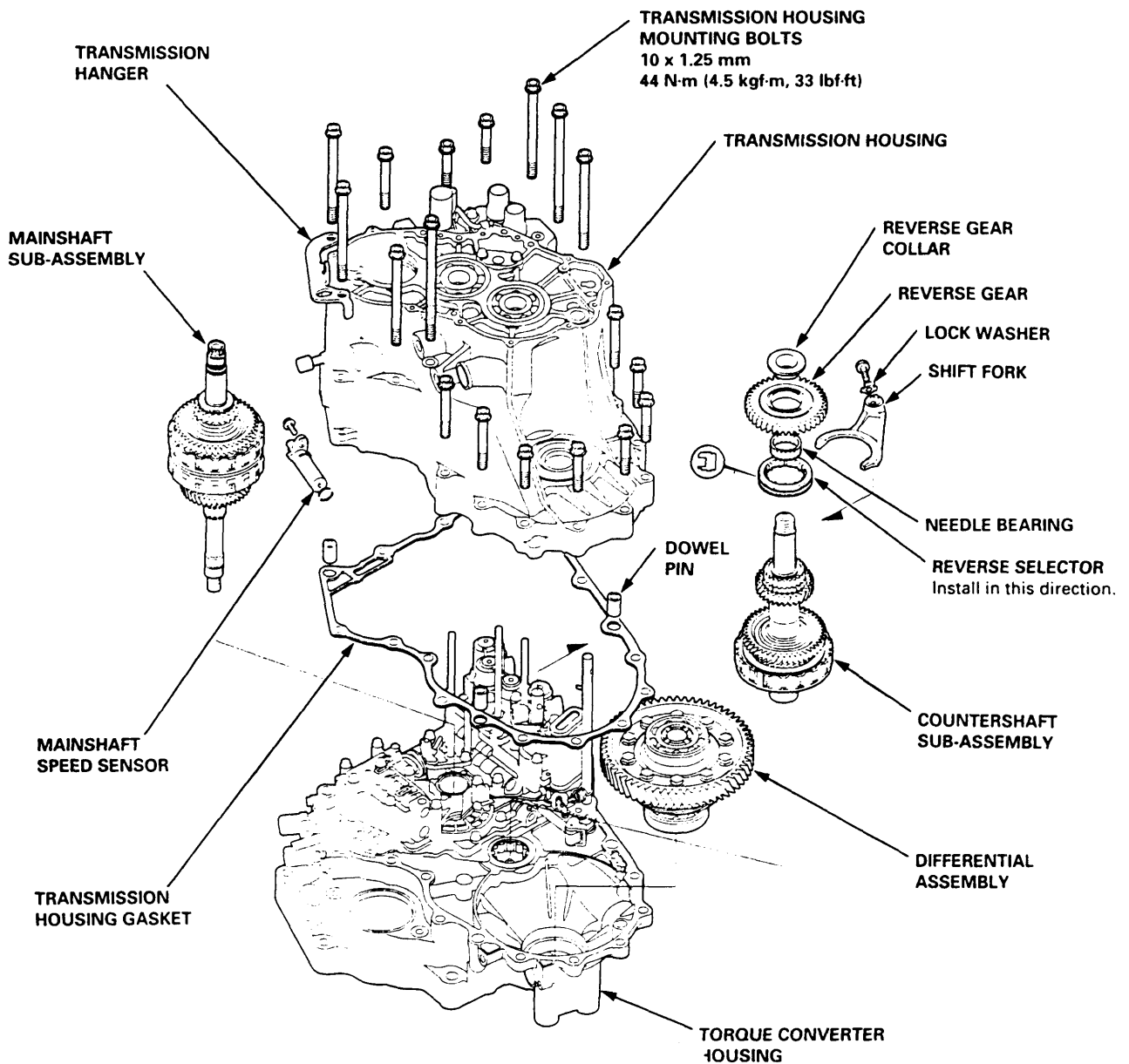


12. Install the stator shaft and stop shaft.
13. Install the bolts and the shaft stop on the secondary valve body, then tighten the bolts (three bolts).
14. Install the torque converter check valve, cooler relief valve and valve springs in the regulator valve body, then install the regulator valve body on the main valve body (one bolt).
15. Install the lock-up valve body on the regulator valve body (seven bolts).
16. Install the ATF feed pipe in the main valve body, the three ATF feed pipes in the secondary valve and the four ATF feed pipes in the servo body.

(cont'd)

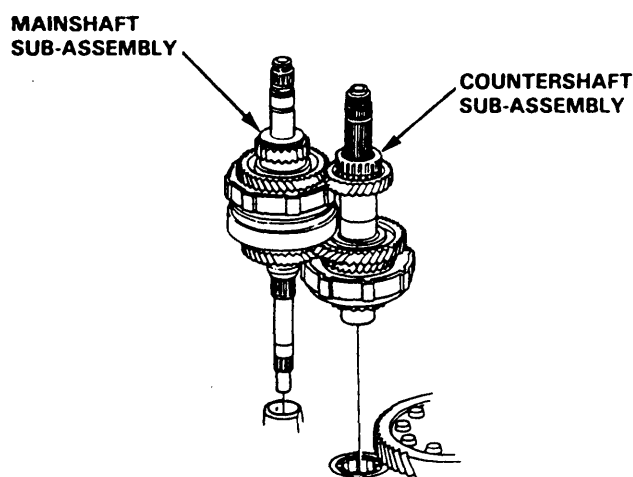
Transmission

Reassembly (cont'd)

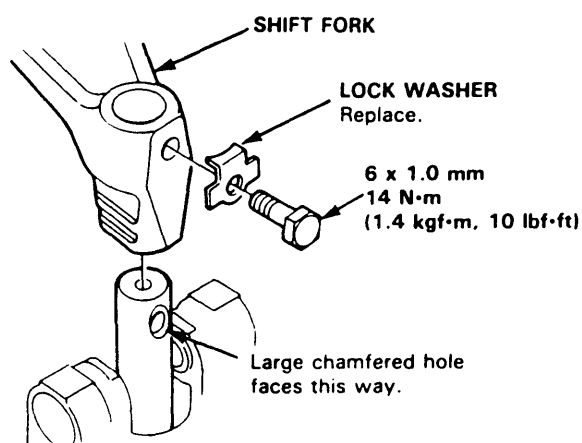




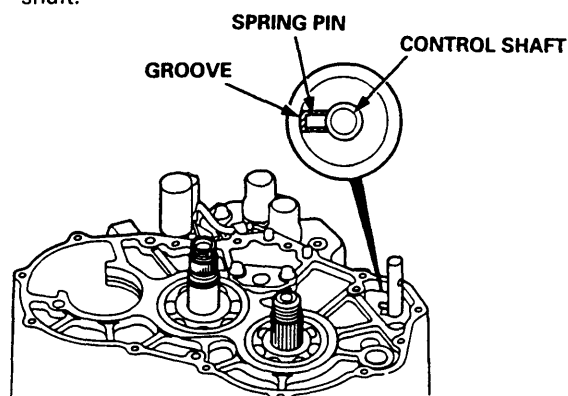
17. Install the reverse idler gear and the gear shaft holder (see page 14-151).
18. Install the differential assembly in the torque converter housing.
19. Assemble the mainshaft and the countershaft sub-assembly, then install them together in the torque converter housing.



20. Turn the shift fork so the large chamfered hole is facing the fork bolt hole, then install the shift fork with the reverse selector, and torque the lock bolt. Bend the lock tab against the bolt head.



21. Install the needle bearing, countershaft reverse gear and reverse gear collar on the countershaft.
22. Align the spring pin on the control shaft with the transmission housing groove by turning the control shaft.

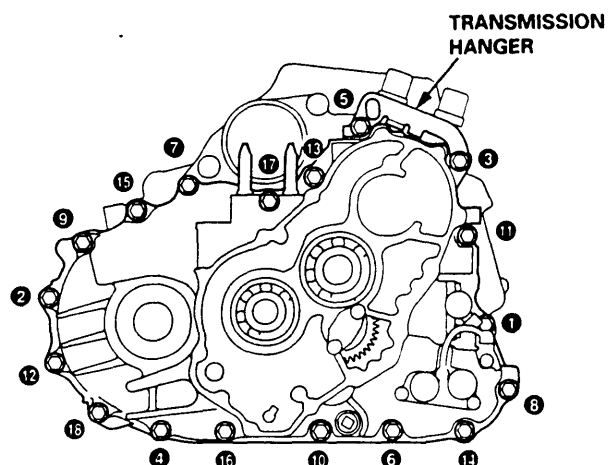


23. Install the two dowel pins and a new gasket on the torque converter housing.
24. Place the transmission housing on the torque converter housing.

CAUTION: Make sure that the mainshaft speed sensor is not installed on the transmission housing before installing the transmission housing on the torque converter housing.

25. Install the transmission housing mounting bolts along with the transmission hanger, then tighten the bolts in two or more steps in the sequence as shown.

TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)

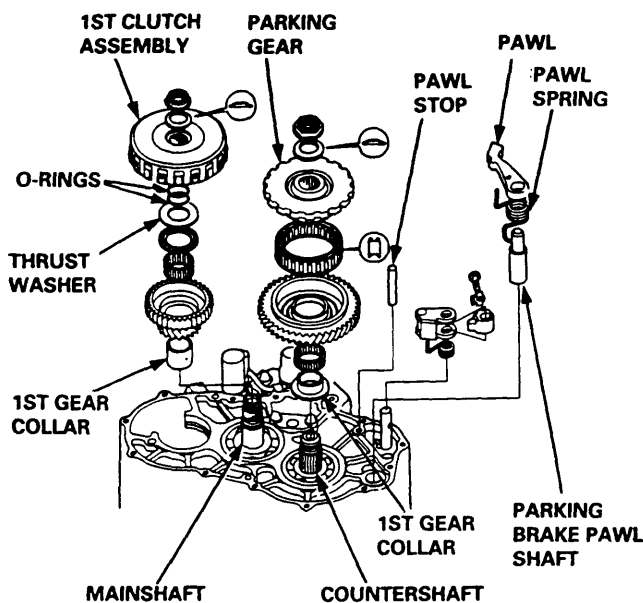


26. Install the mainshaft speed sensor on the transmission housing.
(cont'd)

Transmission

Reassembly (cont'd)

27. Install the parking brake lever on the control shaft.
28. Assemble the one-way clutch and the parking gear with the countershaft 1st gear (see page 14-133).
29. Lubricate the following parts with ATF:
 - Countershaft threads
 - Old locknut threads and flat end
 - Old conical spring washer
 - Parking gear contact area with conical spring washer
30. Install the countershaft 1st gear collar, needle bearing, and the countershaft 1st gear/parking gear assembly on the countershaft.
31. Install the parking brake pawl shaft, pawl spring, pawl, and pawl stop on the transmission housing, then engage the parking brake pawl with the parking gear.

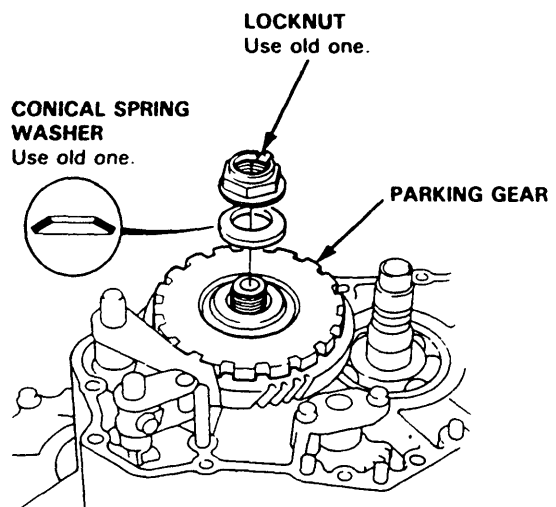


32. Install the old locknut and conical spring washer on the countershaft. Tighten the old locknut to seat the parking gear to the specified torque, then remove them.

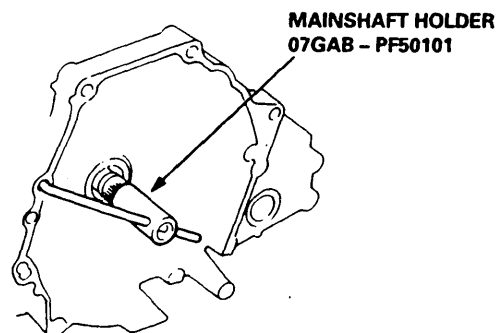
NOTE:

- The locknut has left-hand threads.
- Do not use an impact wrench, always use a torque wrench to tighten the locknut.

TORQUE: 103 N·m (10.5 kgf·m, 75.9 lbf·ft)



33. Slip the special tool onto the mainshaft as shown.





34. Install the mainshaft 1st gear collar, mainshaft 1st gear, needle bearing, thrust needle bearing, and the thrust washer on the mainshaft.
35. Wrap the shaft splines with tape to prevent O-ring damage, then install new O-rings on the mainshaft.
36. Install the 1st clutch assembly on the mainshaft.
37. Install the new conical spring washer with the "C" facing the locknut side on the countershaft in the direction as shown.
38. Install the new conical spring washer with the "U" facing the locknut side on the mainshaft in the direction shown.
39. Lubricate the flat side of the new locknuts with ATF, then install and tighten the locknuts to the specified torque.

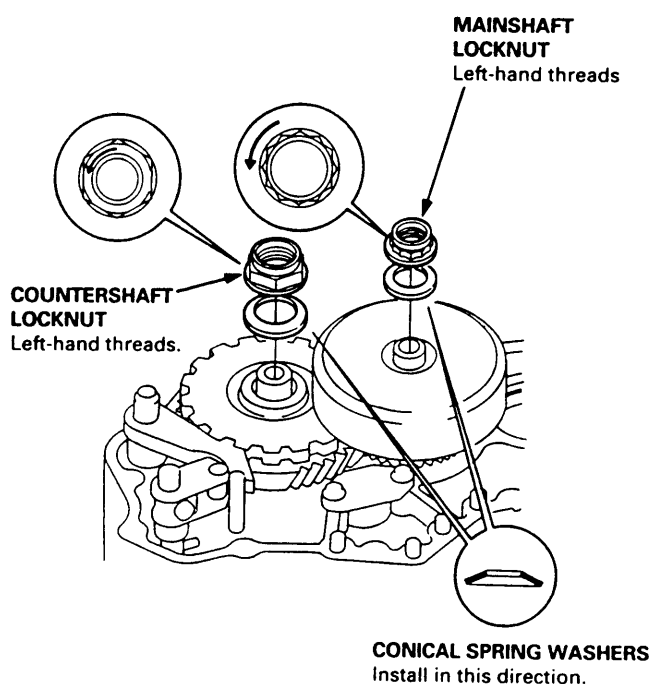
TORQUE:

MAINSHAFT: 78 N·m (8.0 kgf·m, 58 lbf·ft)

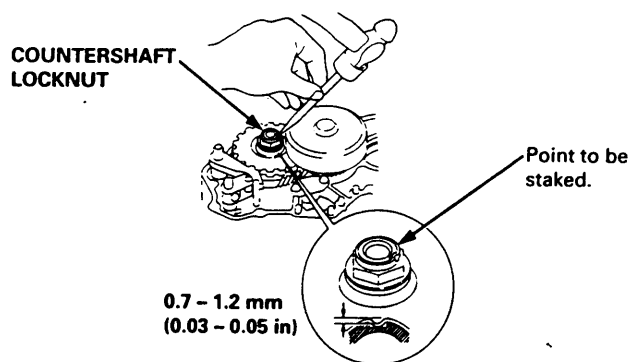
COUNTERSHAFT: 103 N·m (10.5 kgf·m, 75.9 lbf·ft)

NOTE:

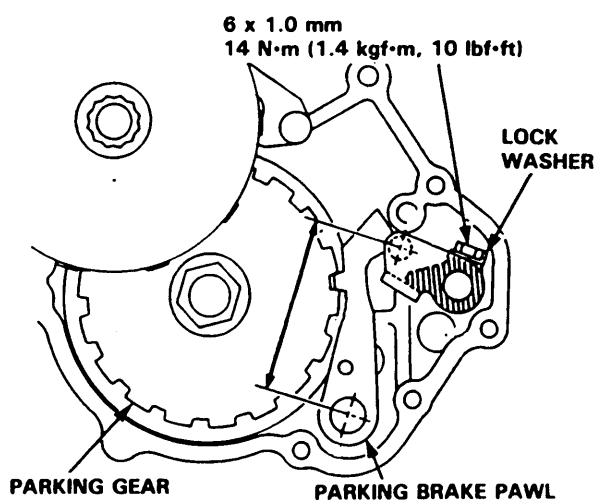
- The locknuts have left-hand threads.
- Do not use an impact wrench, always use a torque wrench to tighten the locknuts.



40. Stake each locknut using a 3.5 mm punch as shown.



41. Set the parking brake lever in the **P** position, then verify that the parking brake pawl engages the parking gear.
42. If the pawl does not engage fully, check the distance between the parking brake pawl shaft and the parking brake lever roller pin (see page 14-151).
43. Tighten the lock bolt and bend the lock tab.



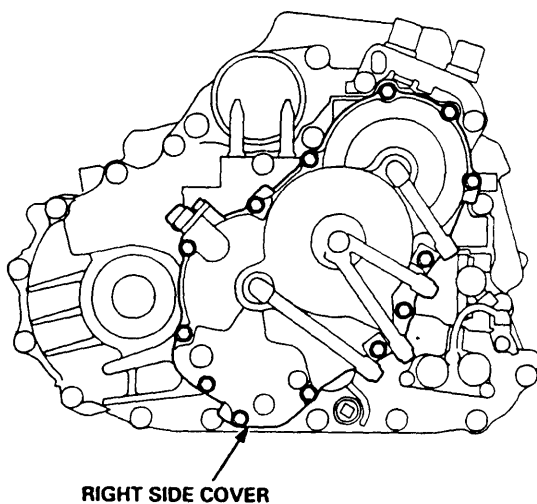
(cont'd)

Transmission

Reassembly (cont'd)

44. Install the right side cover with two dowel pins and a new gasket (thirteen bolts).

TORQUE: 12 N·m (1.2 kgf·m, 8.7 lbf·ft)

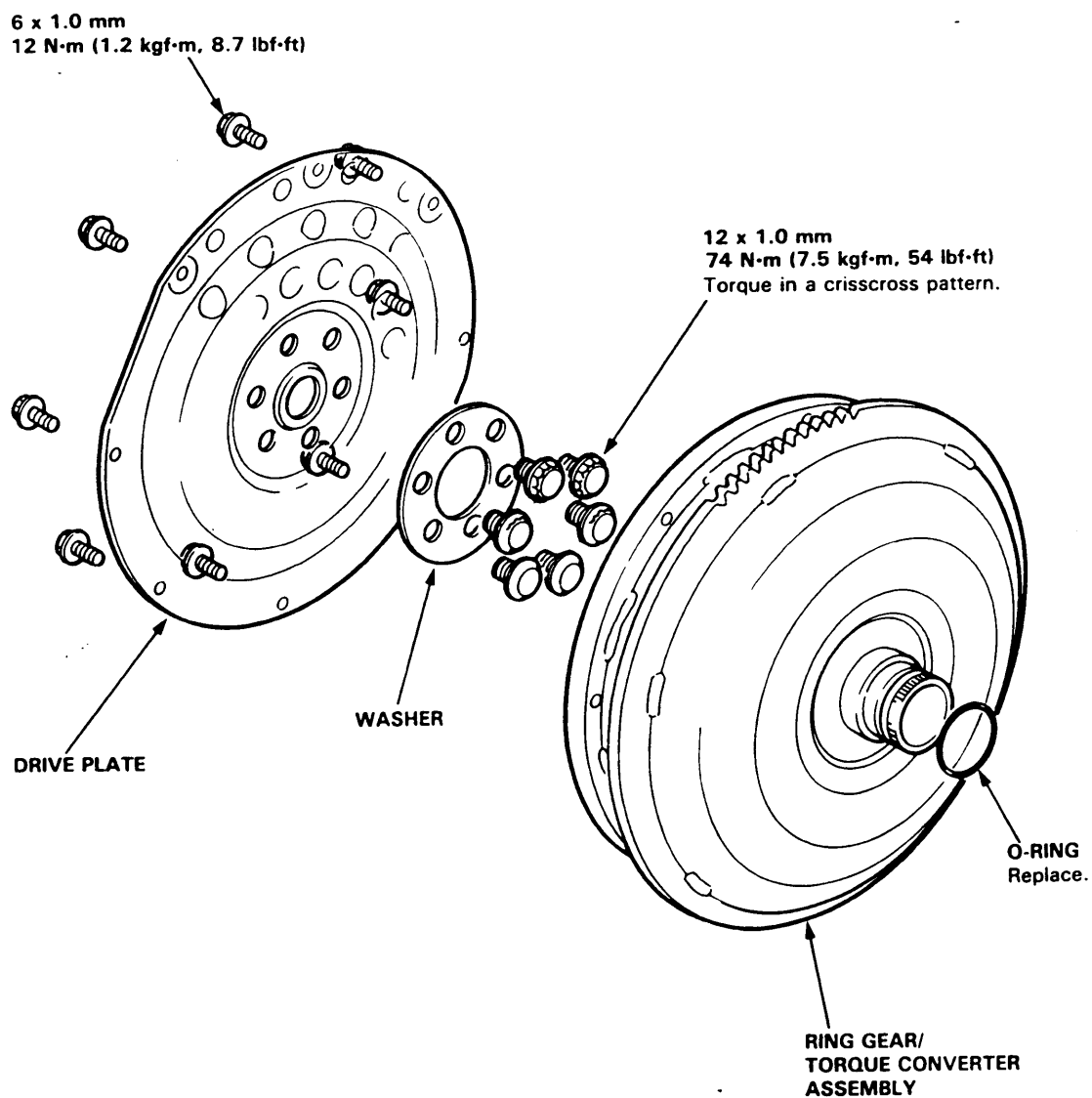


45. Install the ATF cooler lines with new sealing washers.

TORQUE: 28 N·m (2.9 kgf·m, 21 lbf·ft)

46. Install the ATF dipstick.

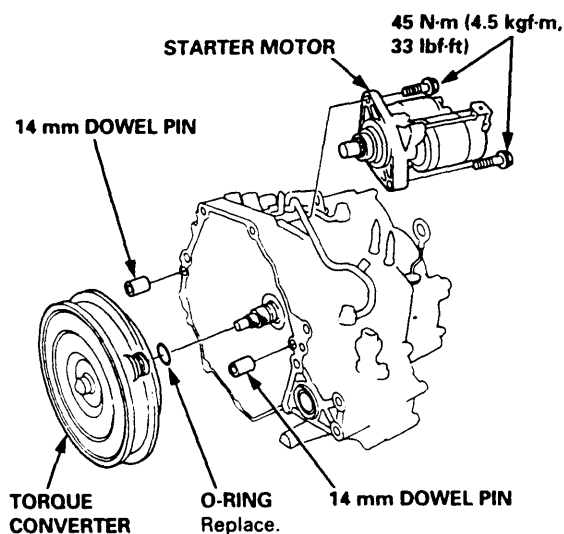
Torque Converter/Drive Plate



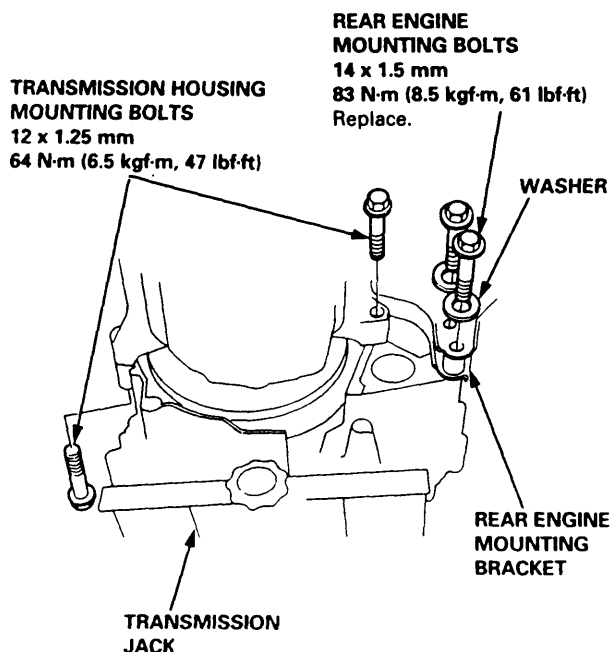
Transmission

Installation

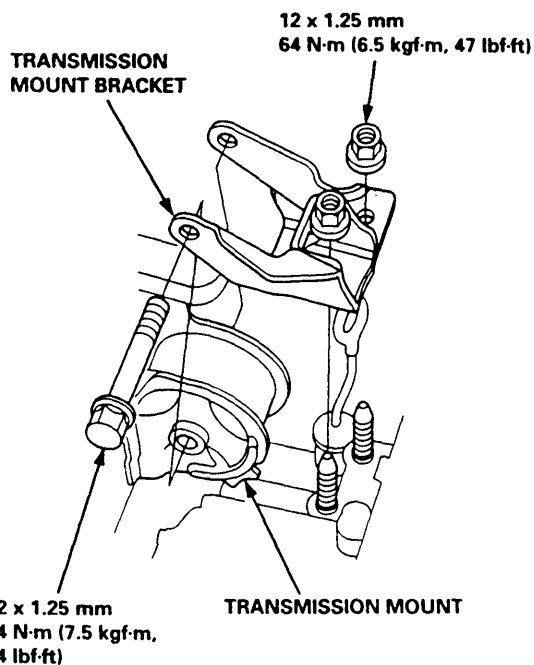
1. Flush the ATF cooler as described on page 14-164 and 14-165.
2. Install the torque converter assembly securely with a new O-ring on the mainshaft.



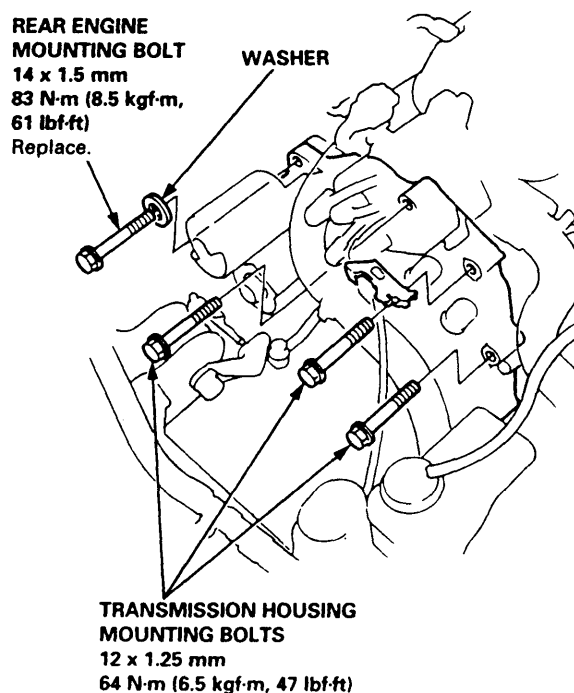
3. Install the starter motor on the torque converter housing, then install the two 14 mm dowel pins in the torque converter housing.
4. Place the transmission on a jack, and raise it to the engine assembly level.
5. Attach the transmission to the engine, then install two transmission housing mounting bolts and two rear engine mounting bolts.



6. Install the transmission mount bracket.



7. Install the remaining transmission housing mounting bolts and remaining rear engine mounting bolt.

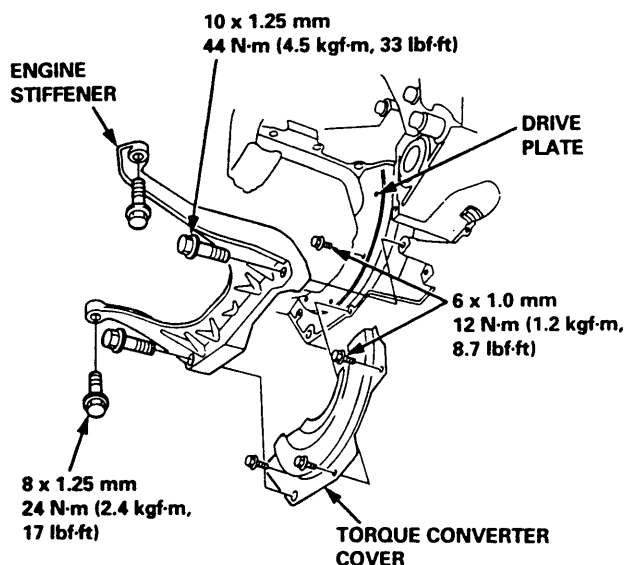


8. Remove the transmission jack.

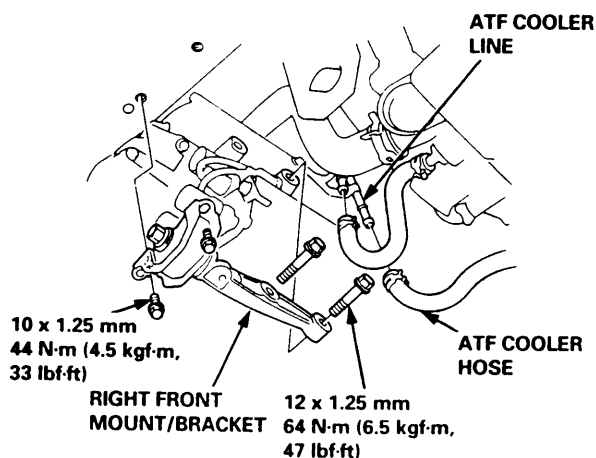


9. Attach the torque converter to the drive plate with eight drive plate bolts and torque as follows: Rotate the crankshaft pulley as necessary to tighten the bolts to 1/2 of the specified torque, then to the final torque, in a crisscross pattern. After tightening the last bolt, check that the crankshaft rotates freely.

TORQUE: 12 N·m (1.2 kgf·m, 8.7 lbf·ft)



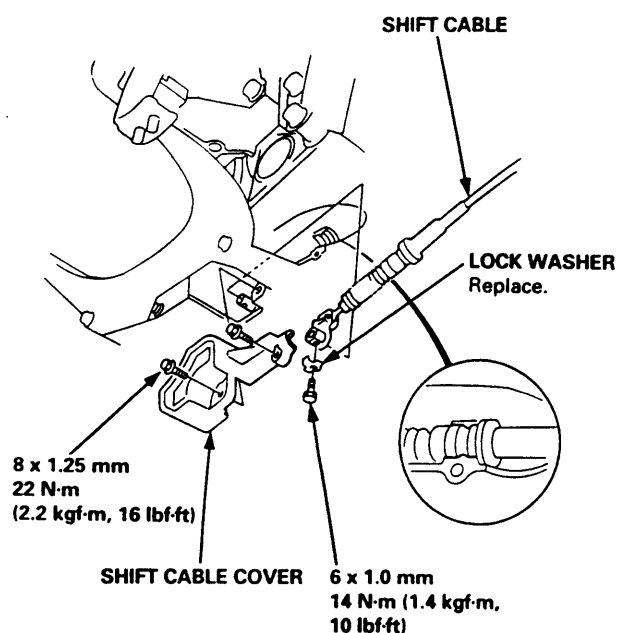
10. Install the torque converter cover and the engine stiffener.
11. Tighten the crankshaft pulley bolt, if necessary (see section 6).
12. Connect the ATF cooler hoses to the ATF cooler lines (see page 14-169).



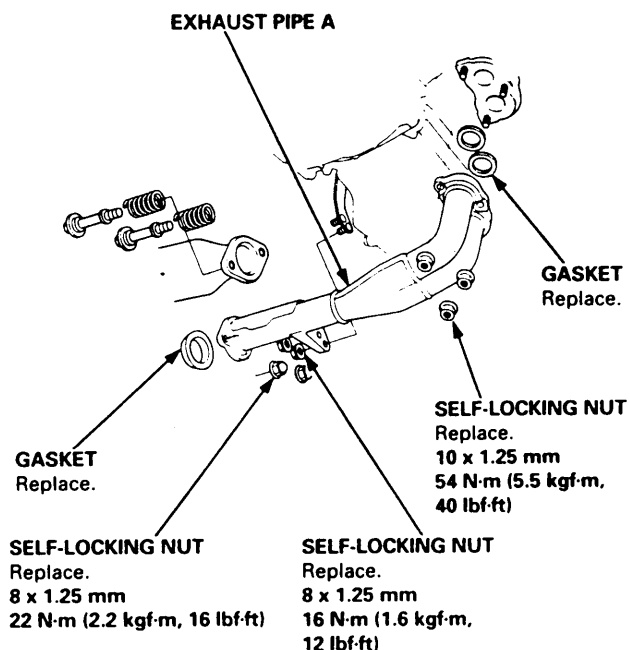
13. Install the right front mount/bracket.

14. Install the control lever with a new lock washer to the control shaft, then install the shift cable cover.

CAUTION: Take care not to bend the shift cable.



15. Install the exhaust pipe A.



(cont'd)

Transmission

Installation (cont'd)

16. Install a new set ring on the end of each driveshaft.
17. Install the right and left driveshafts (see section 16).
CAUTION: While installing the driveshafts in the differential, be sure not to allow dust and other foreign particles to enter into the transmission.

NOTE:

- Clean the areas where the driveshafts contact the transmission (differential) thoroughly with solvent or carburetor cleaner, and dry with compressed air.
- Turn the right and left steering knuckle fully outward, and slide each driveshaft into the differential until you feel its set ring clip engage the side gear.

18. Install the damper fork, then install the right and left ball joints to the each lower arm with the castle nuts and new cotter pins.

DAMPER PINCH BOLT

10 x 1.25 mm
43 N·m (4.4 kgf·m,
32 lbf·ft)

DAMPER FORK

SELF-LOCKING NUT

12 x 1.25 mm
64 N·m (6.5 kgf·m, 47 lbf·ft)
Replace.

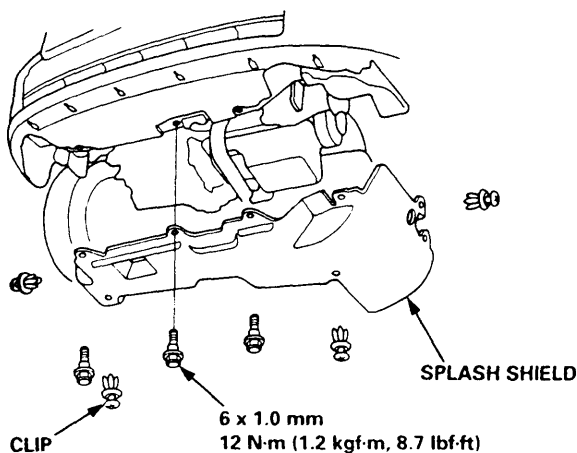
CASTLE NUT

12 x 1.25 mm
49 – 59 N·m
(5.0 – 6.0 kgf·m, 36 – 43 lbf·ft)

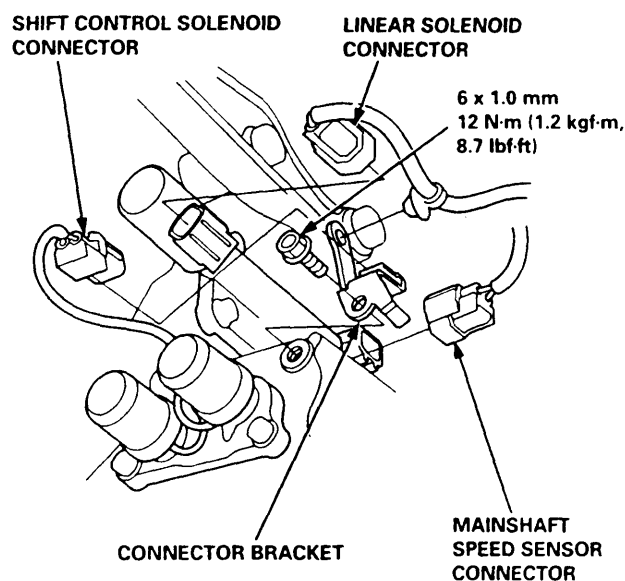
COTTER PIN

Replace.

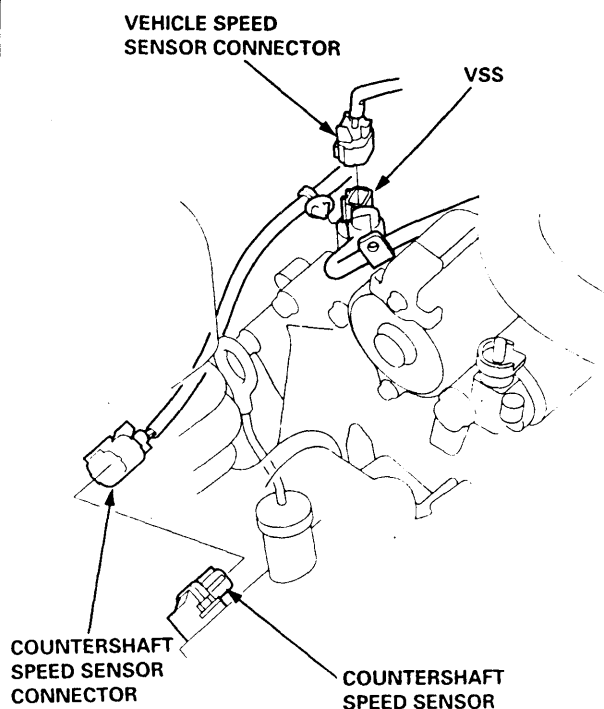
19. Install the splash shield.



20. Connect the mainshaft speed sensor, the linear solenoid and the shift control solenoid connectors.

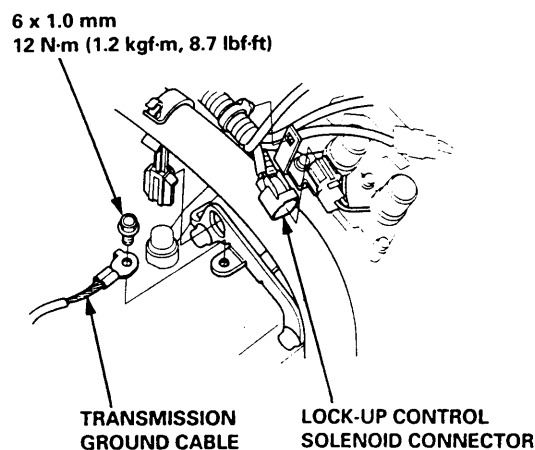


21. Connect the countershaft speed sensor and the vehicle speed sensor (VSS) connectors.



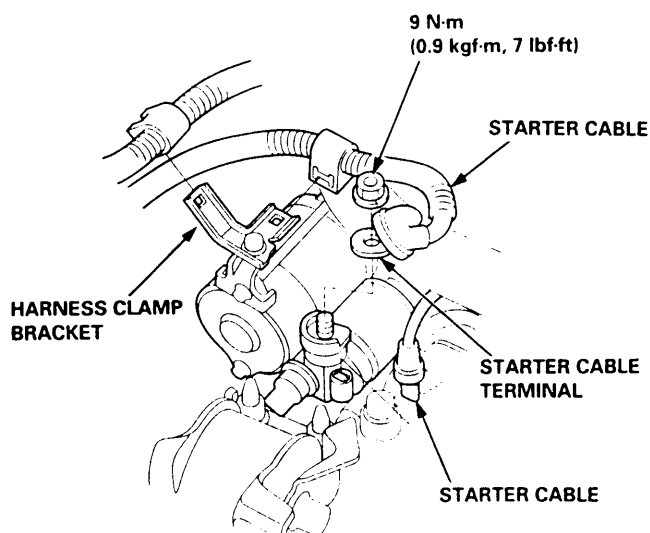


22. Connect the lock-up control solenoid connector, and install the transmission ground cable.



23. Connect the starter cables on the starter motor, and install the cable holder.

NOTE: When installing the starter cable terminal, make sure that the crimped side of the ring terminal is facing out.



24. Install the intake air duct and the air cleaner housing assembly.
25. Refill the transmission with ATF (see page 14-95).
26. Connect the positive (+) cable first, then the negative (-) cable to the battery.
27. Check the ignition timing (see section 23).
28. Start the engine. Set the parking brake, and shift the transmission through all gears, three times. Check the shift cable adjustment (see page 14-167).
29. Check the front wheel alignment (see section 18).
30. Let the engine reach operating temperature (the cooling fan comes on) with the transmission in **N** or **P** position, then turn it off and check the fluid level.
31. Road test as described on pages 14-92 and 14-93.
32. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Transmission

Cooler Flushing

⚠ WARNING To prevent injury to face and eyes, always wear safety glasses or a face shield when using the transmission flusher.

NOTE: This procedure should be performed before reinstalling the transmission.

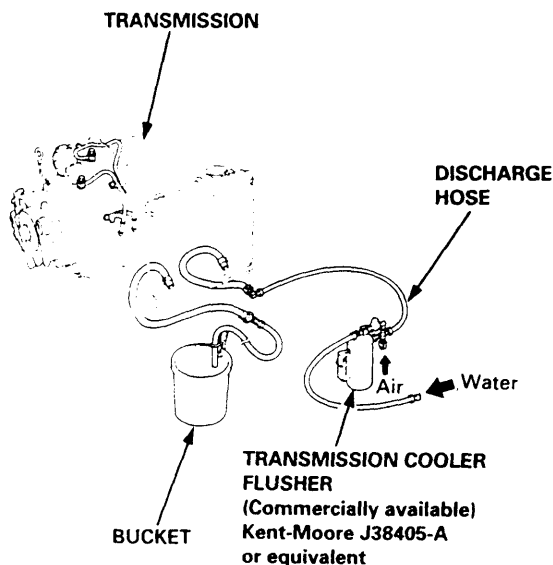
1. Check tool and hoses for wear and cracks before using. If wear or cracks are found, replace the hoses before using.
2. Using the measuring cup, fill the tank with 21 ounces (approximately 2/3 full) of biodegradable flushing fluid (J35944 - 20). Do not substitute with any other fluid. Follow the handling procedure on the fluid container.
3. Secure the flusher filler cap, and pressurize the tank with compressed air to between 550 - 829 kpa (5.6 - 8.45 kgf/cm², 80 - 120psi).

NOTE: The air line should be equipped with a water trap to ensure a dry air system.

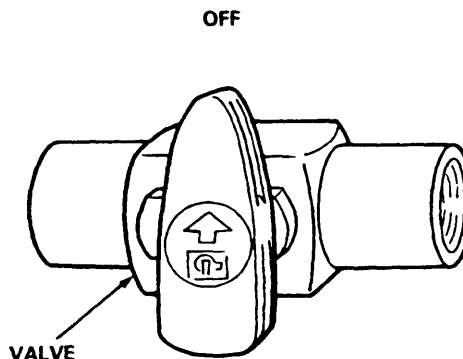
4. Hang the tool under the vehicle.
5. Attach the tank's discharge hose to the return line of the transmission cooler using a clamp.
6. Connect the drain hose to the inlet line on the transmission cooler using a clamp.

IMPORTANT:

Securely clamp the opposite end of the drain hose to a bucket or floor drain.



7. With the water and air valves off, attach the water and air supplies to the flusher. (Hot water if available.)



8. Turn on the flusher water valve so water will flow through the cooler for 10 seconds.

NOTE: If water does not flow through the cooler, it is completely plugged, cannot be flushed, and must be replaced.

9. Depress the trigger to mix the flushing fluid into the water flow. Use the wire clip to hold the trigger down.
10. While flushing with the water and flushing fluid for two minutes, turn the air valve on for five seconds every 15 - 20 seconds to create a surging action.
AIR PRESSURE: MAX 845 kpa (8.45 kgf/cm², 120 psi)
11. Turn the water valve off. Release the trigger, then reverse the hoses to the cooler so you can flush in the opposite direction. Repeat steps 8 through 10.
12. Release the trigger, and rinse the cooler with water only for one minute.
13. Turn the water valve off, and turn off the water supply.
14. Turn the air valve on to dry the system out with air for two full minutes or until no moisture is visible leaving the drain hose.

CAUTION: Residual moisture in the cooler or pipes can damage the transmission.

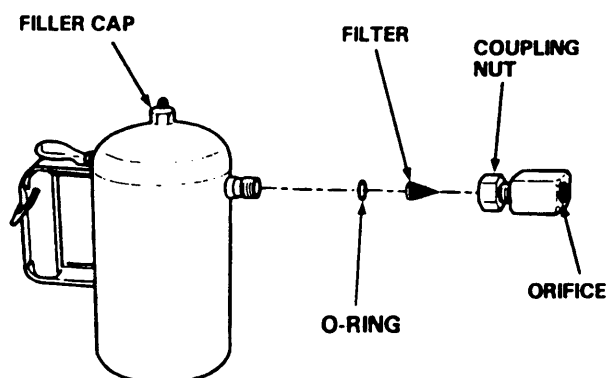
15. Remove the flusher from the cooler line. Attach the drain hose to a container.
16. Install the transmission, and leave the drain hose attached to the cooler line.



17. Make sure the transmission is in the **P** position. Fill the transmission with ATF, and run the engine for 30 seconds or until approximately 0.95 ℓ (1.0 US qt., 0.8 Imp qt.) is discharged.
18. Remove the drain hose, and reconnect the cooler return hose to the transmission (see page 14-169).
19. Refill the transmission with ATF to the proper level (see page 14-95).

TOOL MAINTENANCE

1. Empty and rinse after each use. Fill the can with water and pressurize the can. Flush the discharge line to ensure that the unit is clean.
2. If discharge liquid does not foam, the orifice may be blocked.
3. To clean, disconnect the plumbing from the tank at the large coupling nut.



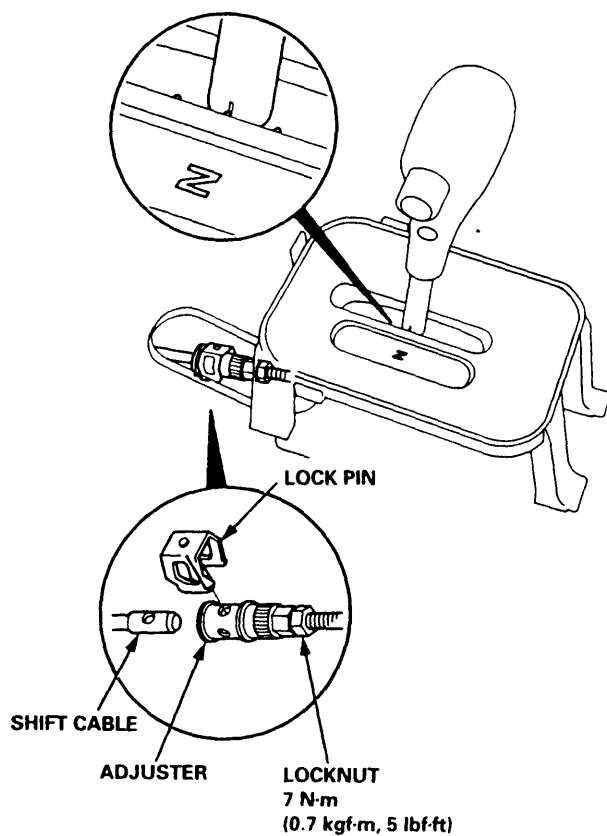
4. Remove the in-line filter from the discharge side and clean if necessary.
5. The fluid orifice is located behind the filter. Clean it with the pick stored in the bottom of the tank handle, or blow it clean with air. Securely reassemble all parts.

Shift Cable

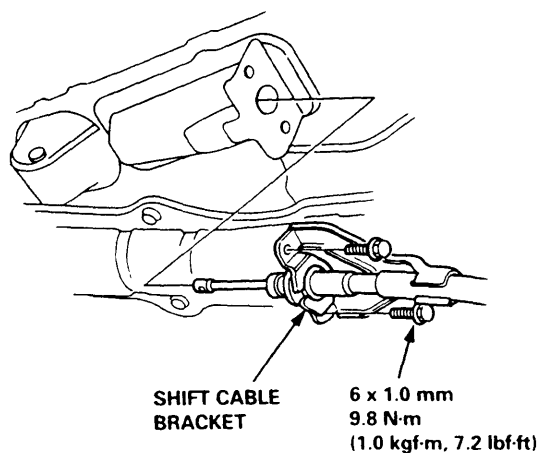
Removal/Installation

⚠ WARNING Make sure lifts are placed properly (see section 1).

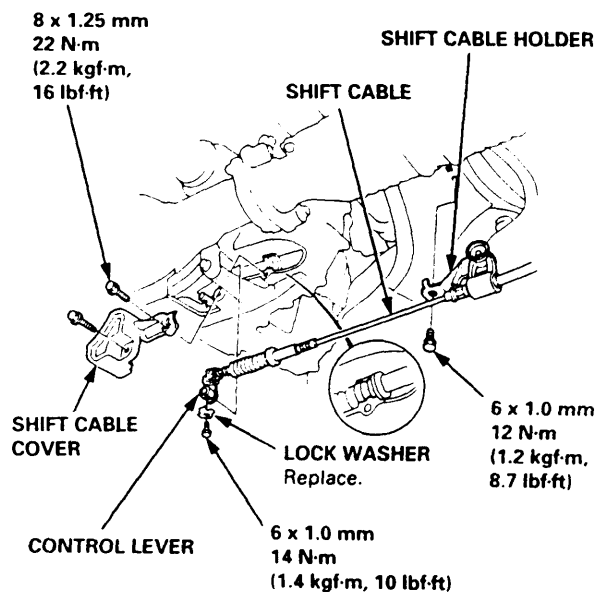
1. Remove the front console (see section 20).
2. Shift to **N** position, then remove the lock pin from the adjuster.



3. Remove the shift cable bracket.



4. Remove the shift cable holder.
5. Remove the shift cable cover.
6. Remove the control lever from the control shaft, then remove the shift cable. Take care not to bend the cable when removing/installing it.



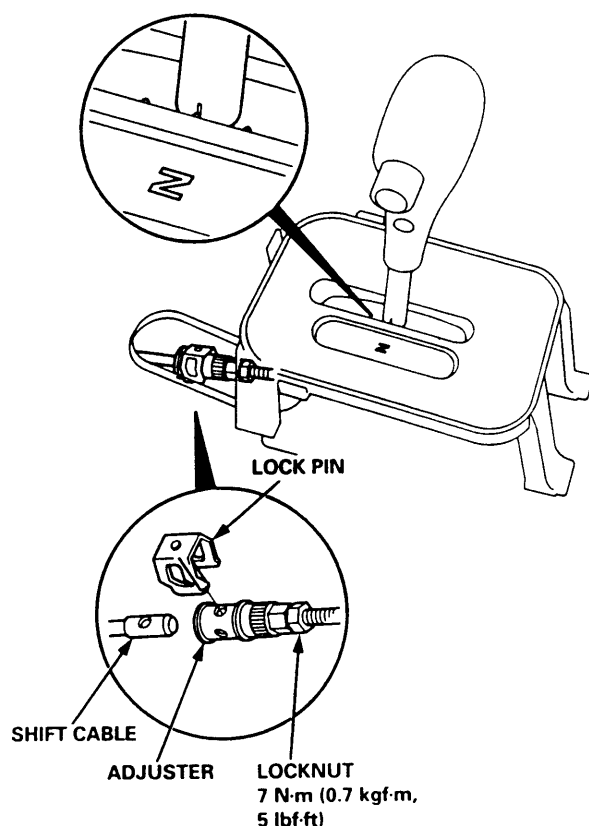
7. Install the shift cable in the reverse order of removal.
8. Check the cable adjustment on reassembly.



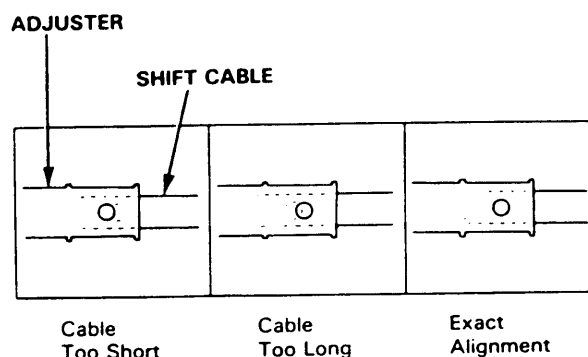
Adjustment

⚠ WARNING Make sure lifts are placed properly (see section 1).

1. Remove the front console (see section 20).
2. Shift to **N** position, then remove the lock pin from the adjuster.

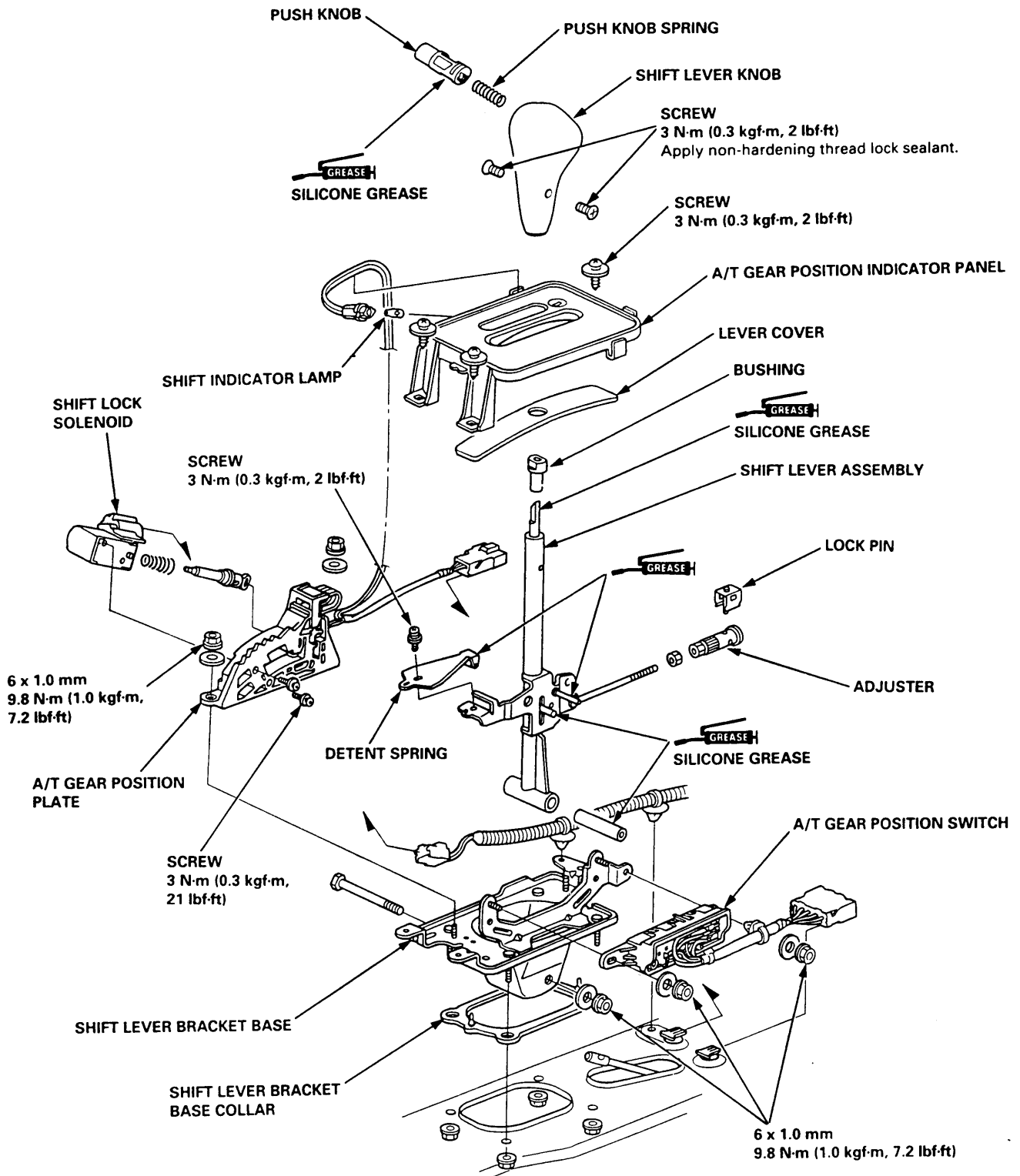


3. Check that the hole in the adjuster is perfectly aligned with the hole in the shift cable. There are two holes in the adjuster. They are positioned 90° apart to allow cable adjustment in 1/4 turn increments.



4. If the hole is not perfectly aligned, loosen the locknut on the adjuster and adjust as required.
5. Tighten the locknut to 7 N·m (0.7 kgf·m, 5 lbf·ft).
6. Install the lock pin on the adjuster. If you feel the lock pin binding as you reinstall it, the cable is still out of adjustment and must be readjusted.
7. Make sure the lock pin is seated in the adjuster securely.
8. Move the shift lever to each gear, and verify that the shift position indicator follows the automatic trans-axle gear position switch.
9. Start the engine, and check the shift lever in all gears. If any gear does not work properly, refer to troubleshooting (see page 14-92 and 14-93).
10. Insert the ignition key into the key cylinder on the A/T gear position indicator panel, and verify that the shift lock lever is released.

Shift Lever



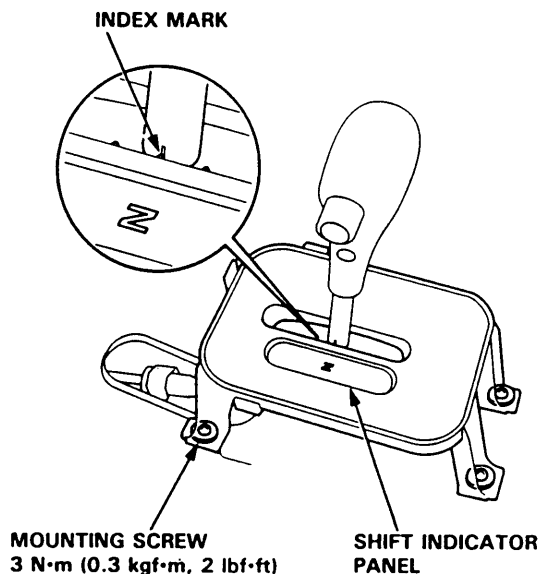
Shift Indicator Panel

ATF Cooler Hoses



Adjustment

1. Check that the index mark on the shift lever aligns with the **N** mark on the shift indicator panel when the transmission is in NEUTRAL.

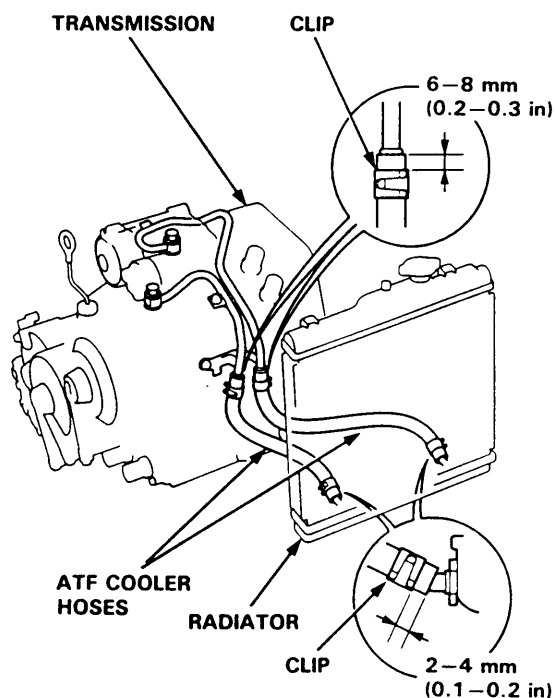


2. If not aligned, remove the front console (see section 20).
3. Remove the shift indicator panel mounting screws and adjust by moving the panel.

NOTE: Whenever the shift indicator panel is removed, reinstall the panel as described above.

Connection

1. Connect the ATF cooler hoses to the ATF cooler lines and ATF cooler, and secure them with the clips as shown.



Differential

Manual Transmission section 13

Automatic Transmission section 14



Driveshafts

Special Tools 16-2

Driveshafts

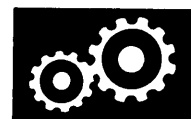
Inspection 16-3

Removal 16-3

Disassembly 16-5

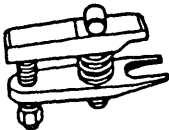
Reassembly 16-7

Installation 16-10



Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07MAC – SL00200	Ball Joint Remover, 28 mm	1	16-4



①

Driveshafts



Inspection

Driveshaft Boot

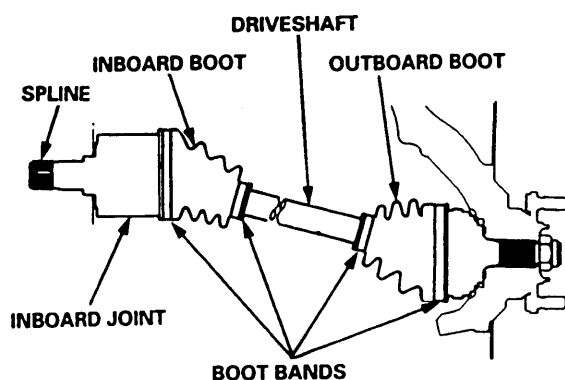
Check the boots on the driveshaft for cracks, damage, leaking grease and loose boot bands. If any damage is found, replace the boot and boot bands.

Loose Splines

Turn the driveshaft by hand and make sure the splines and joint are not excessively loose. If any damage is found, replace the inboard joint.

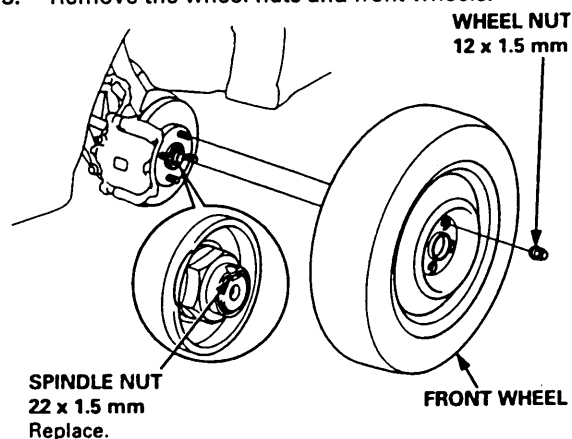
Twisted or Cracked

Make sure the driveshaft is not twisted or cracked. Replace it if necessary.

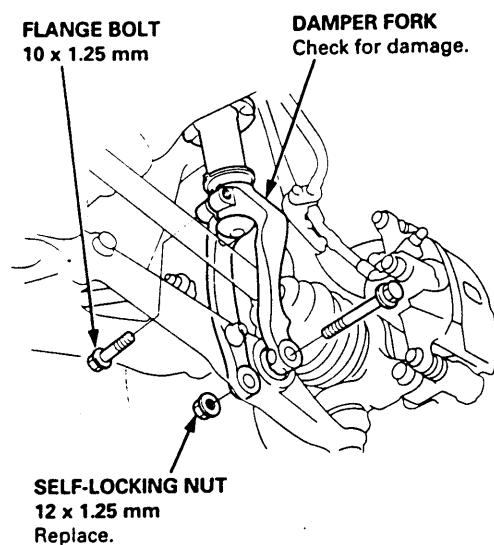


Removal

1. Loosen the wheel nuts slightly.
2. Raise the front of the vehicle, and support it with safety stands in the proper locations (see section 1).
3. Remove the wheel nuts and front wheels.



4. Drain the transmission fluid (see section 13 or 14).
5. Raise the locking tab on the spindle nut, then remove the nut.
6. Remove the self-locking nut and flange bolts.



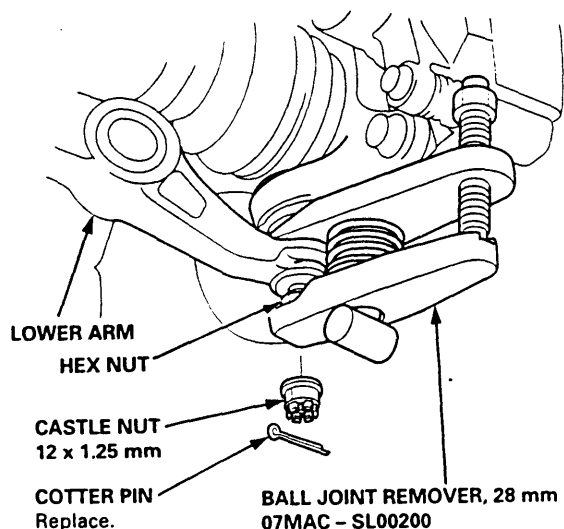
7. Remove the damper fork.

(cont'd)

Driveshafts

Removal (cont'd)

8. Remove the cotter pin from the lower arm ball joint castle nut, and remove the nut.

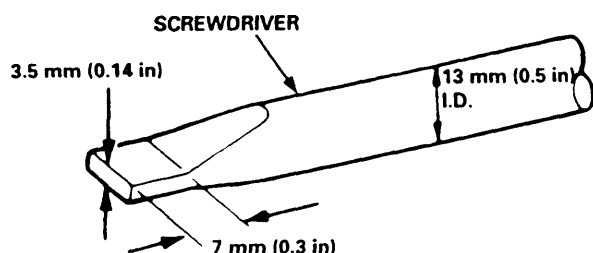


9. Install a 12 mm hex nut on the ball joint. Be sure that the hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the special tool.
10. Use the special tool as shown in section 18, to separate the ball joint and lower arm.

CAUTION: Be careful not to damage the ball joint boot.

NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.

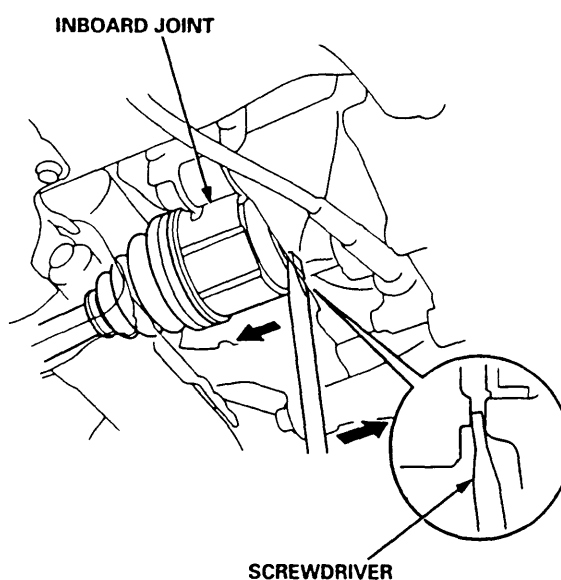
11. Pry the driveshaft assembly with a screwdriver, as shown, to force the set ring at the driveshaft end past the groove.



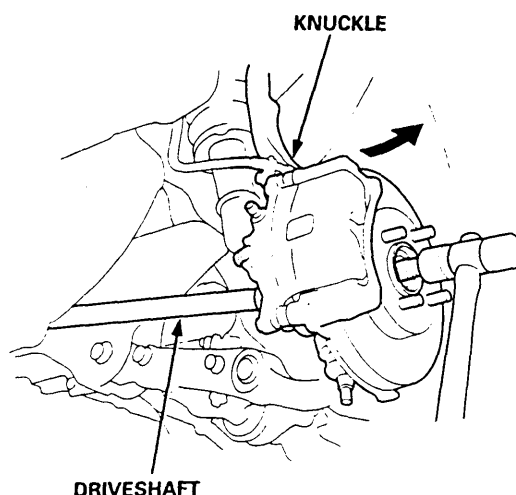
12. Pull the inboard joint, and remove the driveshaft from the differential case as an assembly.

CAUTION:

- Do not pull on the driveshaft; the inboard joint may come apart.
- Use care when prying out the assembly, and pull it straight to avoid damaging the differential oil seal.



13. Pull the knuckle outward, and remove the driveshaft outboard joint from the front wheel hub using a plastic hammer.



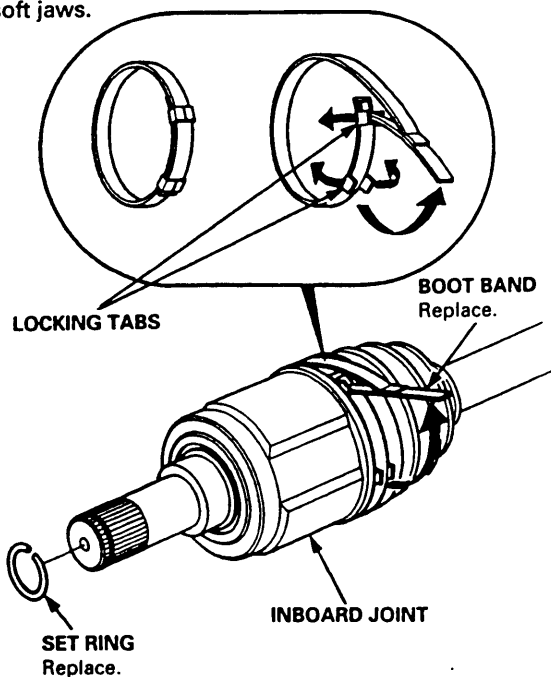


Disassembly

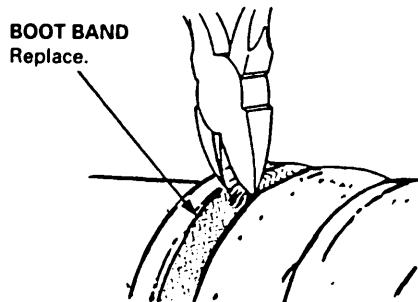
1. Remove the set ring from the inboard joint.
2. To remove the boot band, pry up the locking tabs with a screwdriver and raise the end of the band.

CAUTION: Take care not to damage the boot.

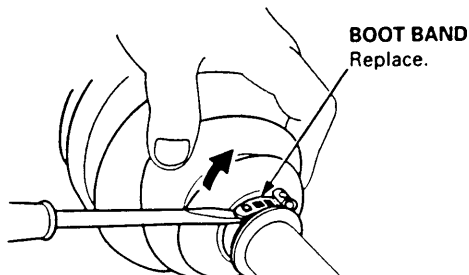
NOTE: Carefully clamp the driveshaft in a vise with soft jaws.



- If the boot band is the welded type, cut it off as shown.

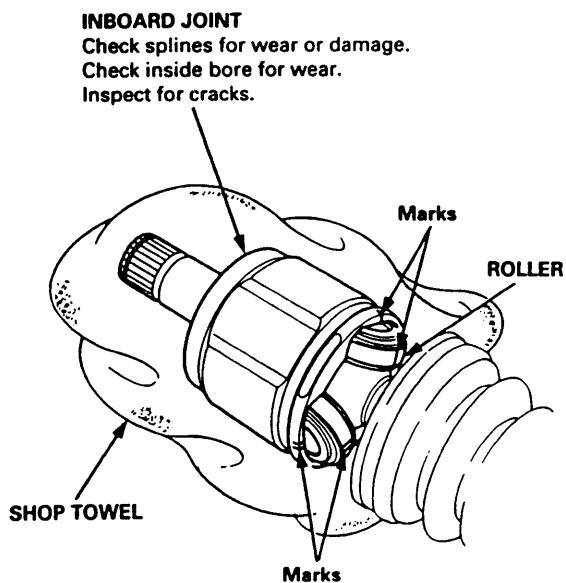


- If the boot band is the crimping type, pry up the end of the band with a screwdriver.



3. Mark each roller and inboard joint to identify the locations of rollers and grooves in the inboard joint. Then remove the inboard joint on the shop towel.

NOTE: Be careful not to drop the rollers when separating them from the inboard joint.

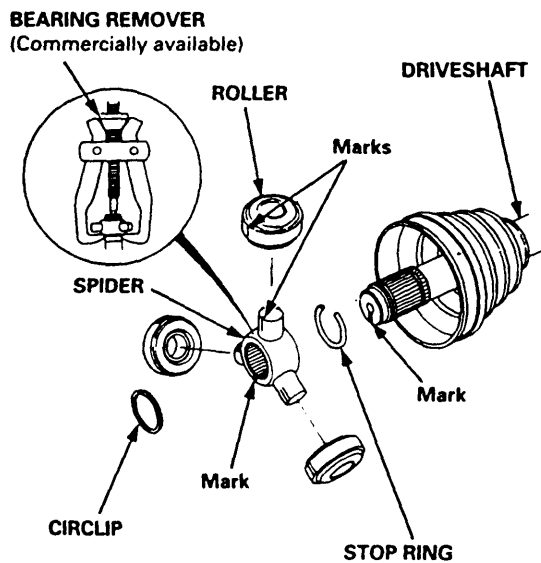


(cont'd)

Driveshafts

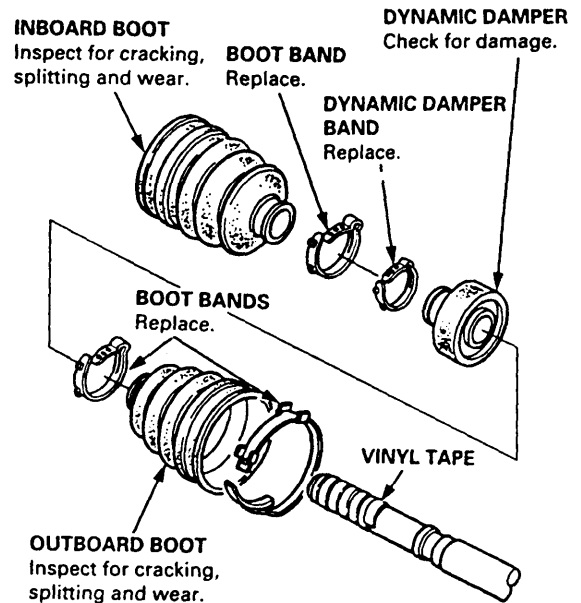
Disassembly (cont'd)

4. Mark the rollers and spider to identify the locations of rollers on the spider, then remove the rollers.



5. Remove the circlip.
6. Mark the spider and driveshaft to identify the position of the spider on the shaft.
7. Remove the spider using a bearing remover.
8. Remove the stop ring.

9. Wrap the splines on the driveshaft with vinyl tape to prevent damage to the boots and dynamic damper.



10. Remove the boot band and inboard boot.

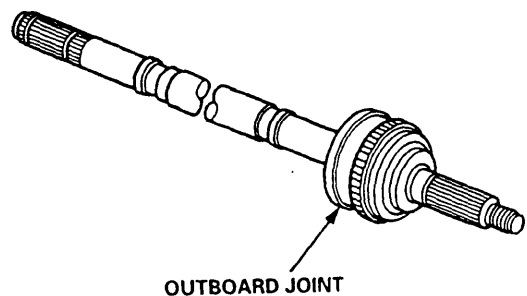
CAUTION: Take care not to damage the boot.

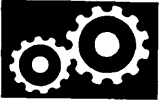
11. Remove the dynamic damper band and dynamic damper, if equipped.

CAUTION: Take care not to damage the dynamic damper.

12. Remove the boot bands and outboard boot, then remove the vinyl tape.

13. Inspect the outboard joint for faulty movement and wear. If any roughness or excess play is felt, replace the outboard joint.





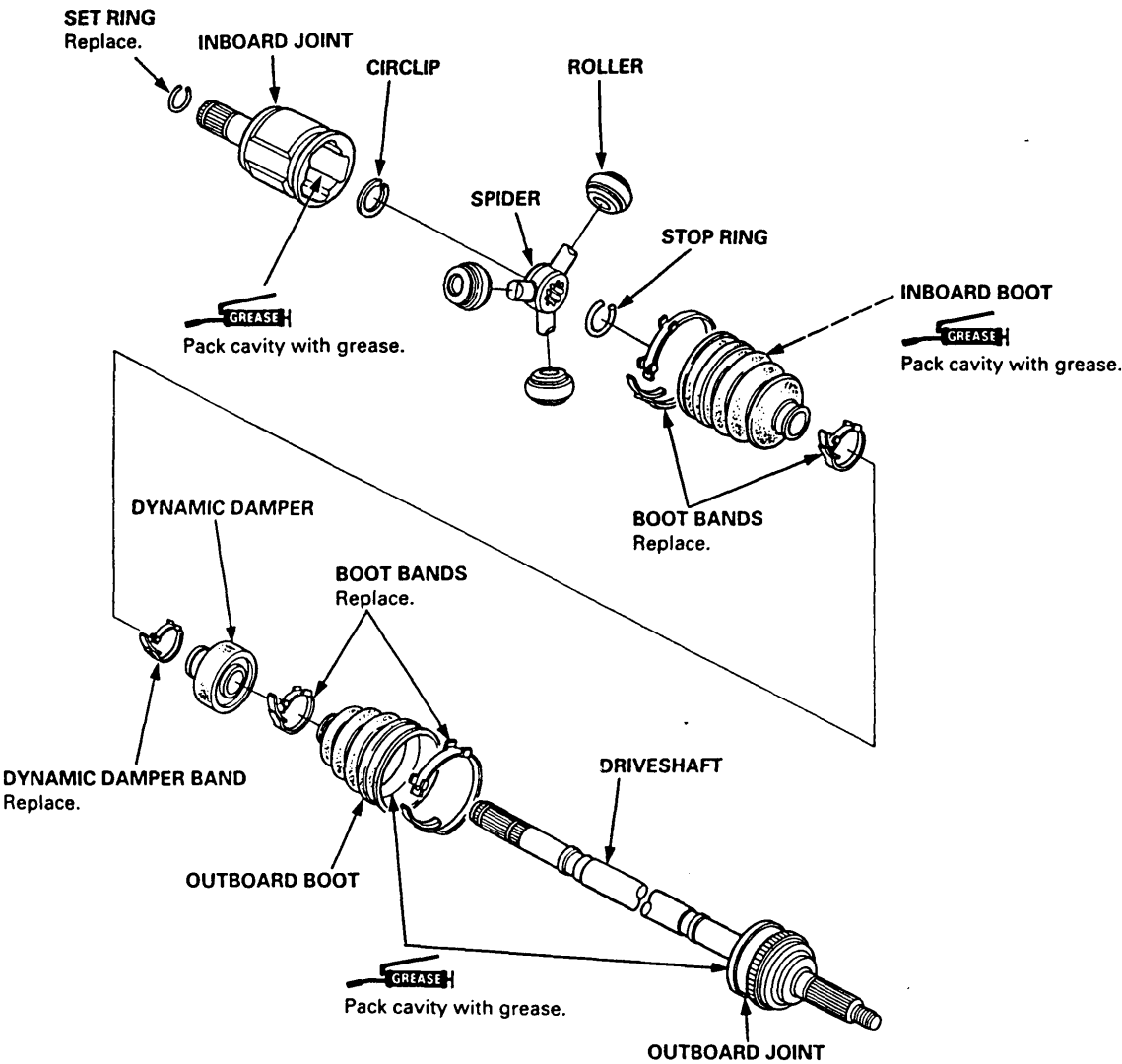
Reassembly

NOTE: Clean the disassembled parts with solvent, and dry them thoroughly with compressed air. Do not wash the rubber parts with solvent.

 : Thoroughly pack the inboard joint and both joint boots with the joint grease included in the new driveshaft set.

Grease quantity:

Inboard Joint	120 – 130 g (4.2 – 4.6 oz)
Outboard Joint	115 – 135 g (4.0 – 4.8 oz)

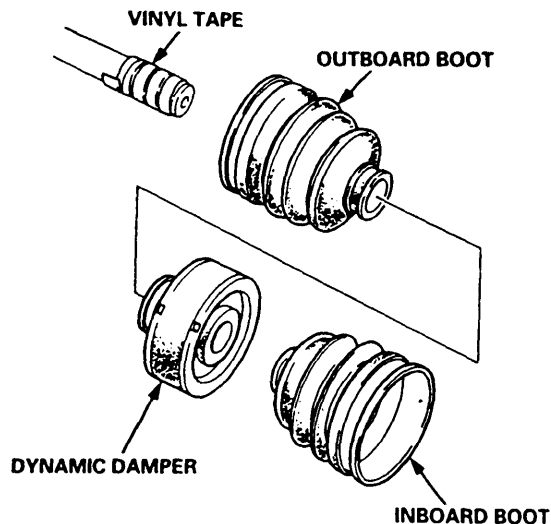


(cont'd)

Driveshafts

Reassembly (cont'd)

1. Wrap the splines with vinyl tape to prevent damage to the boots and dynamic damper.

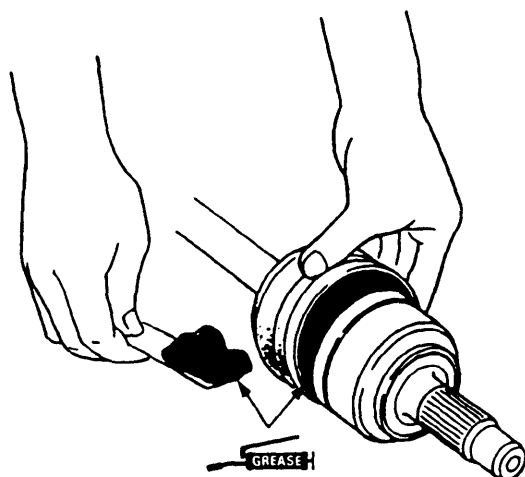


2. Install the outboard boot, dynamic damper and inboard boot to the driveshaft, then remove the vinyl tape.

CAUTION: Take care not to damage the boots and dynamic damper.

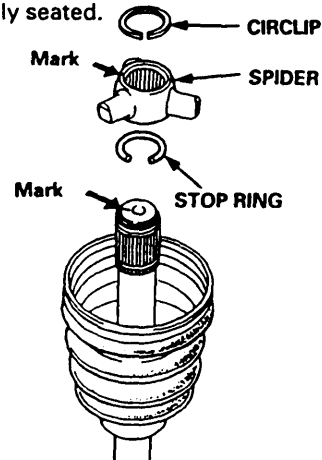
3. Pack the outboard joint with the joint grease included in the new driveshaft set.

Grease quantity:
115 – 135 g (4.0 – 4.8 oz)



4. Install the stop ring into the driveshaft groove.

NOTE: Always rotate the stop ring in its groove to be sure it is fully seated.



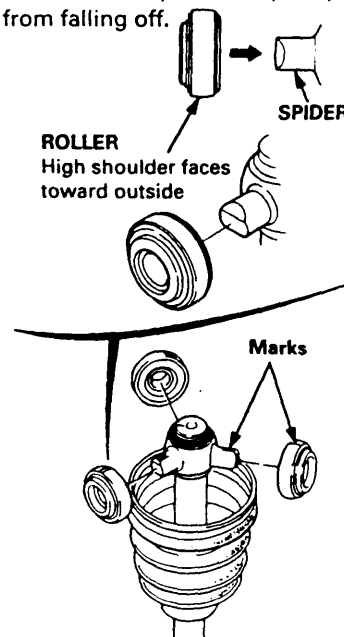
5. Install the spider on the driveshaft by aligning the marks on the spider and end of the driveshaft.
6. Fit the circlip into the driveshaft groove.

NOTE: Always rotate the circlip in its groove to be sure it is fully seated.

7. Fit the rollers to the spider with their high shoulders facing outward.

NOTE:

- Reinstall the rollers in their original positions on the spider by aligning the marks.
- Hold the driveshaft pointed up to prevent the rollers from falling off.

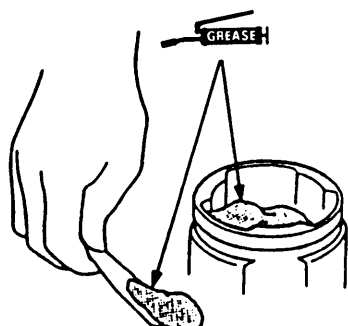




8. Pack the inboard joint with the joint grease included in the new driveshaft set.

Grease quantity:

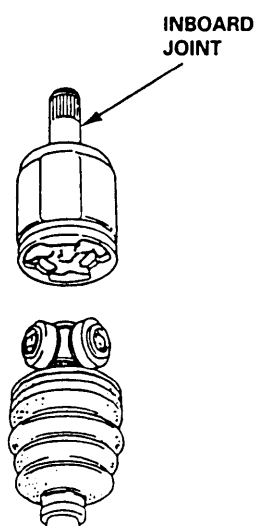
120 – 130 g (4.2 – 4.6 oz)



9. Fit the inboard joint onto the driveshaft.

NOTE:

- Reinstall the inboard joint onto the driveshaft by aligning the marks on the inboard joint with the marks on the rollers.
- Hold the driveshaft so the inboard joint points up to prevent it from falling off.

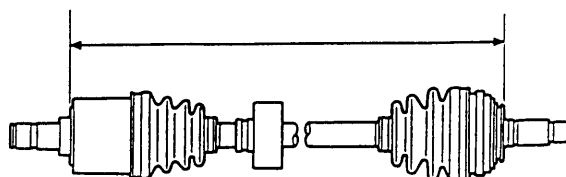


10. Adjust the length of the driveshafts to the figure below, then adjust the boots to halfway between full compression and full extension.

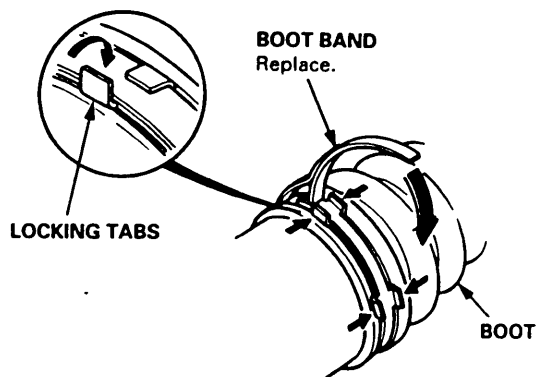
NOTE: The ends of boots seat in the groove of the driveshaft and joint.

Left driveshaft: 773.1 – 778.1 mm (30.44 – 30.63 in)

Right driveshaft: 500.6 – 505.6 mm (19.70 – 19.91 in)



11. Install new boot bands on the boots, and bend both sets of locking tabs.



12. Lightly tap on the doubled-over portions to reduce their height.

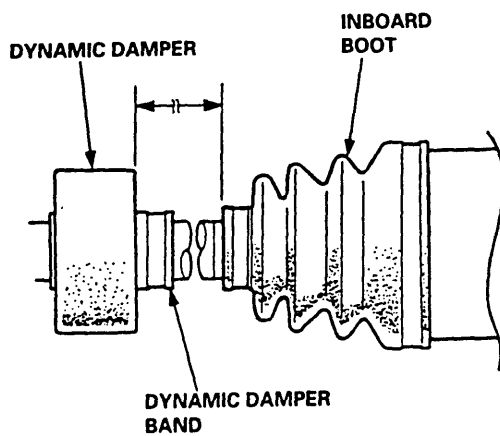
(cont'd)

Driveshafts

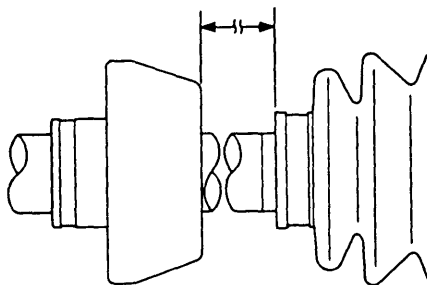
Reassembly (cont'd)

13. Position the dynamic damper as shown below.
- Install a new dynamic damper band, and bend down both sets of locking tabs.
 - Lightly tap on the doubled-over portion of the band to reduce its height.

Left: $75 \pm 2 \text{ mm}$ ($2.9 \pm 0.1 \text{ in}$)

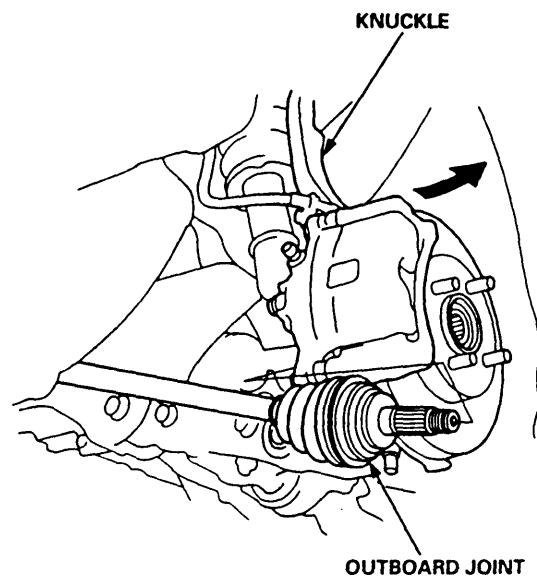


Right: $55 \pm 2 \text{ mm}$ ($2.2 \pm 0.1 \text{ in}$)



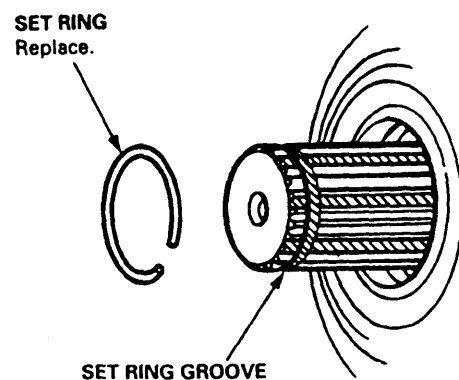
Installation

1. Install the outboard joint into the knuckle.



2. Install the new set ring onto the driveshaft groove.

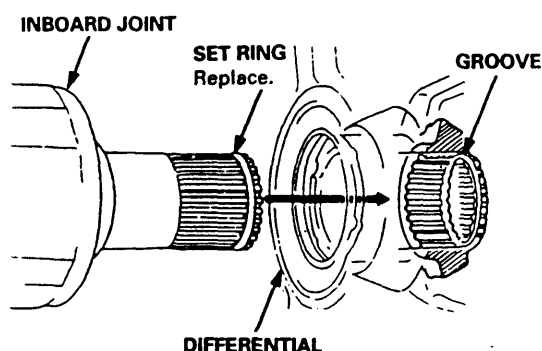
CAUTION: Always use a new set ring whenever the driveshaft is being installed.





3. Insert the inboard end of the driveshaft into the differential until the set ring locks in the groove.

NOTE: Clean the areas where the driveshaft contact the transmission (differential) thoroughly with solvent or carburetor cleaner, and dry with compressed air.

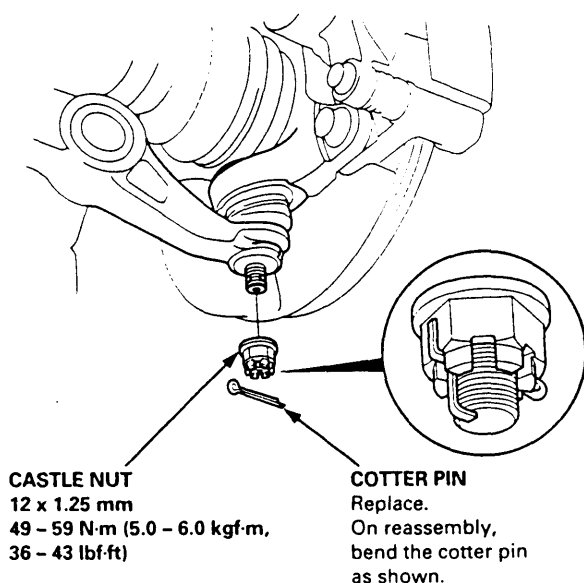


4. Install the knuckle on the lower arm, then tighten the castle nut and install a new cotter pin.

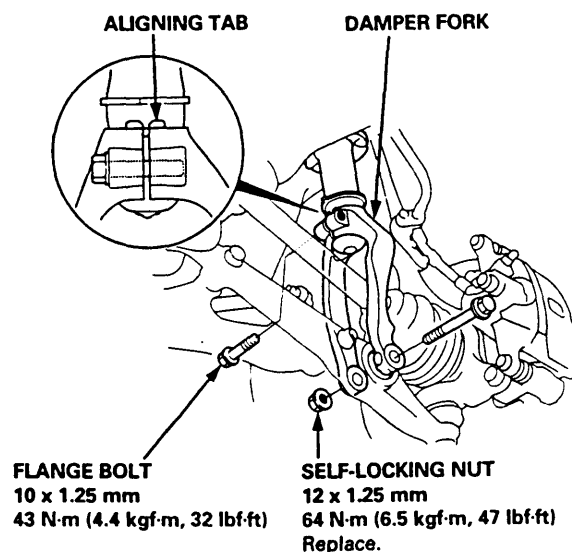
NOTE: Wipe off the grease before tightening the nut at the ball joint.

CAUTION:

- Be careful not to damage the ball joint boot.
- Torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening.



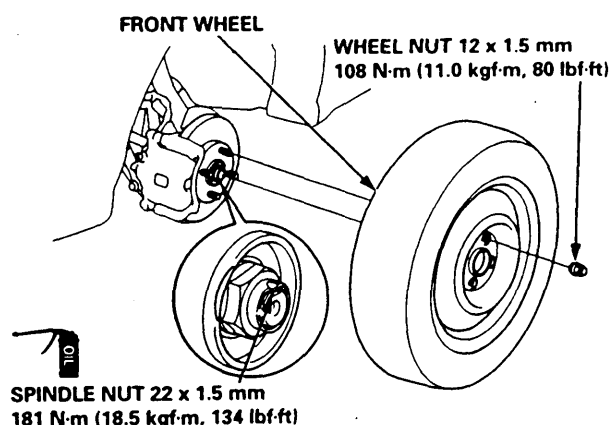
5. Install the damper fork over the driveshaft and onto the lower arm. Install the damper in the damper fork so the aligning tab is aligned with the slot in the damper fork.



6. Loosely install the flange bolts and the new self-locking nut.

NOTE: The bolts and nut should be tightened with the vehicle's weight on the damper.

7. Install a new spindle nut, then tighten the nut.



8. Install the front wheel with the wheel nuts.
NOTE: Before installing the wheel, clean the mating surfaces of the brake disc and the wheel.
9. Tighten the flange bolts and the new self-locking nut with the vehicle's weight on the damper.
10. Refill the transmission with recommended fluid (see section 13 or 14).
11. Check the front wheel alignment and adjust if necessary (see section 18).