Automatic Transmission

Automatic Transmission

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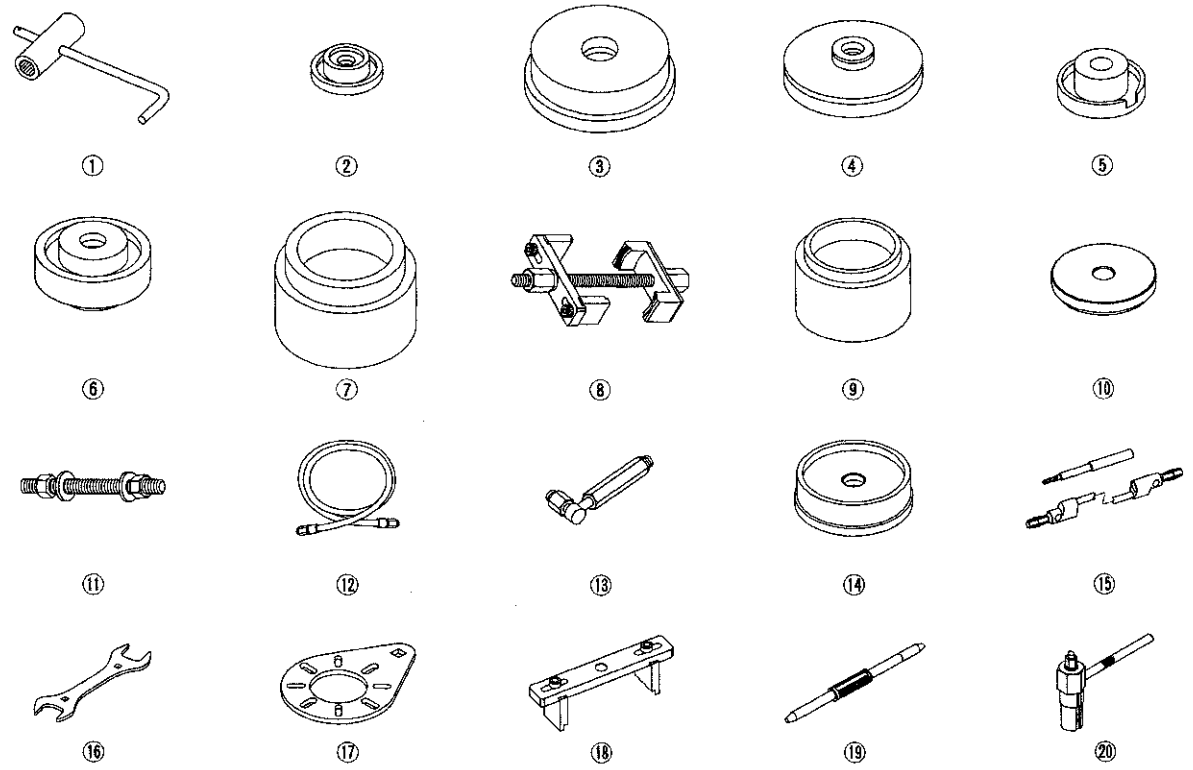
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Special Tools

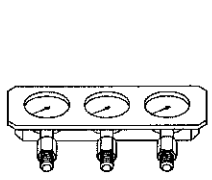
Ref. No.	Tool Number	Description	Qty
①	07GAB-PF50101 or 07GAB-PF50100	Mainshaft Holder	1
②	07GAD-PG40100	Oil Seal Driver Attachment	1
③	07GAD-SD40101	Attachment, 78 x 90 mm	1
④	07HAD-SG00100	Attachment, 83 mm	1
⑤	07JAD-PH80101	Oil Seal Driver Attachment	1
⑥	07JAD-SH30100	Attachment, 65 mm	1
⑦	07LAD-PW50601	Attachment, 40 x 50 mm	1
⑧	07LAE-PX40000	Clutch Spring Compressor Set	1
⑨	07MAD-PR90100	Attachment, 45 x 55 mm	1
⑩	07MAF-SP0011A	Tapered Bearing Race Installer A	1
⑪	07MAF-SP0013A	Installer Shaft	1
⑫	07MAJ-PY4011A	A/T Pressure Hose, 2,210 mm	3
⑬	07MAJ-PY40120	A/T Pressure Hose Adapter	3
⑭	07NAD-PX40100	Attachment, 78 x 80 mm	1
⑮	07SAZ-001000A	Backprobe Set	2
⑯	07XAA-002010A	Wrench, 40 x 42 mm	1
⑰	07XAB-0010101	Companion Flange Holder	1
⑱	07ZAE-PRP0100	Clutch Compressor Attachment	1
⑲	070AG-SJAA10S	Subframe Alignment Pin	1
⑳	070AJ-0020101	Preload Inspection Tool	1

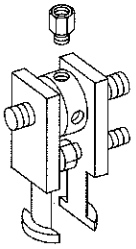


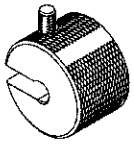
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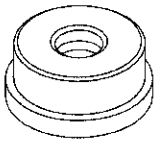
Ref. No.	Tool Number	Description	Qty
㉑	07406-0020400 or 07406-0020401	A/T Pressure Gauge Set	1
㉒	07736-A01000B or 07736-A01000A	Adjustable Bearing Puller, 25—40 mm	1
㉓	07741-0010201	Sliding Hammer Weight	1
㉔	07746-0010200	Attachment, 37 x 40 mm	1
㉕	07746-0010300	Attachment, 42 x 47 mm	1
㉖	07746-0010400	Attachment, 52 x 55 mm	1
㉗	07746-0010500	Attachment, 62 x 68 mm	1
㉘	07746-0010600	Attachment, 72 x 75 mm	1
㉙	07746-0010800	Attachment, 22 x 24 mm	1
㉚	07746-0030100	Driver, 40 mm I.D.	1
㉛	07746-0030300	Attachment, 30 mm I.D.	1
㉜	07749-0010000	Driver	1
㉝	07936-1660101	Bearing Remover Shaft Set, 12 mm	1
㉞	07936-3710100	Bearing Remover Shaft Handle	1
㉟	07936-3710600	Bearing Remover Shaft Set, 20 mm	1
㊱	07936-8890300	Bearing Remover Shaft Set, 30 mm	1
㊲	07936-GE00100	Bearing Remover Shaft, 10 mm	1
㊳	07936-GE00200	Bearing Remover Head, 10 mm	1
㊴	07947-6340500	Driver Attachment	1

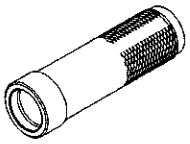
07736-A01000B or 07736-A01000A must be used with commercially available 3/8 "-16 slide hammer.

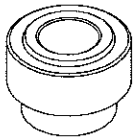

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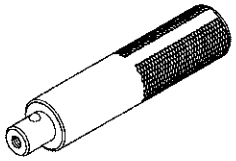

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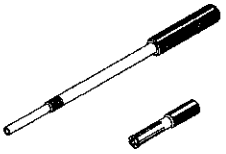

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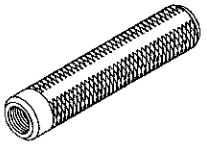

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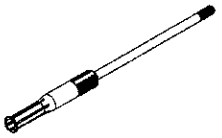

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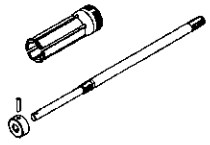

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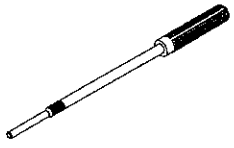

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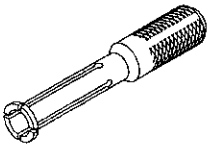

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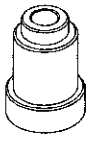

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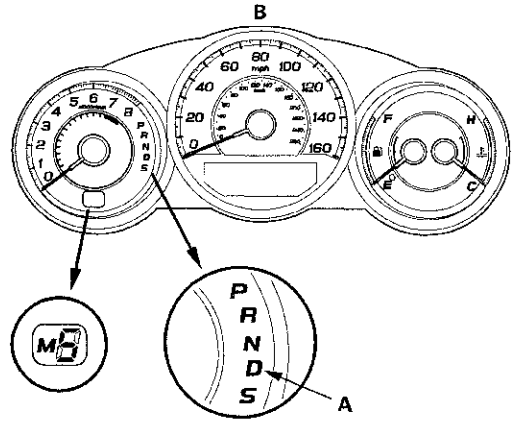

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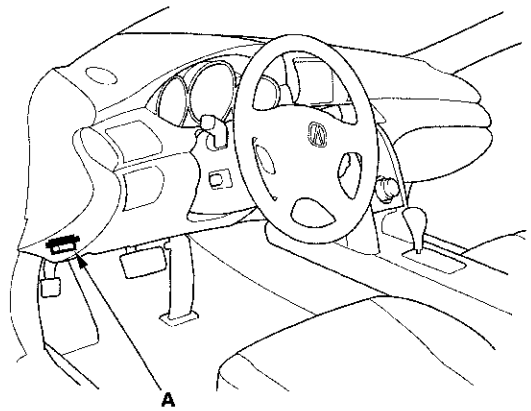
General Troubleshooting Information

How to Check for DTCs with the Honda Diagnostic System (HDS)

When the powertrain control module (PCM) senses an abnormality in the input or output system, the D indicator (A) in the gauge control module (B) will usually blink.



When the Honda Diagnostic System (HDS) is connected to the data link connector (DLC) (A) located under the left side of the dash, it will indicate the diagnostic trouble code (DTC) when the ignition switch is turned to ON (II) and the appropriate menu is selected.



If the D indicator or the malfunction indicator lamp (MIL) has been reported on, or if a driveability problem is suspected, follow this procedure:

1. Connect the HDS to the DLC. (See the HDS user's manual for specific instructions.)
2. Turn the ignition switch to ON (II). Make sure the HDS communicates with the PCM. If it does not, go to the DLC circuit troubleshooting (see page 11-211).
3. Check for Pending of Confirmed DTCs with the HDS.
4. Record the freeze data and on-board snapshots for all fuel and emissions DTC, and A/T DTCs.
5. If there is a fuel and emissions DTC, first check the fuel and emissions system as indicated by the DTC (except for DTC P0700, which means there is one or more A/T DTCs, and no problems were detected in the fuel and emissions circuit of the PCM).
6. Clear the DTC and data.
7. Drive the vehicle for several minutes under the same conditions as those indicated by the freeze data, and then recheck for a DTC. If the A/T DTC returns, go to the indicated DTC's troubleshooting. If the DTC does not return, there was an intermittent problem within the circuit. Make sure all pins and terminals in the circuit are tight.

Symptom Troubleshooting Versus DTC Troubleshooting

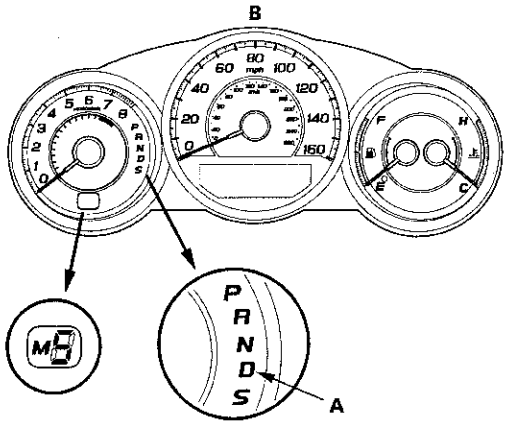
Some symptoms will not set DTCs or cause the D indicator to blink. If the MIL was reported ON or the D indicator has been blinking, check for DTCs. If the vehicle has an abnormal symptom, and there are no DTCs stored, do the symptom troubleshooting. Check the list of probable cause(s) for the symptom, in the sequence listed, until you find the problem.

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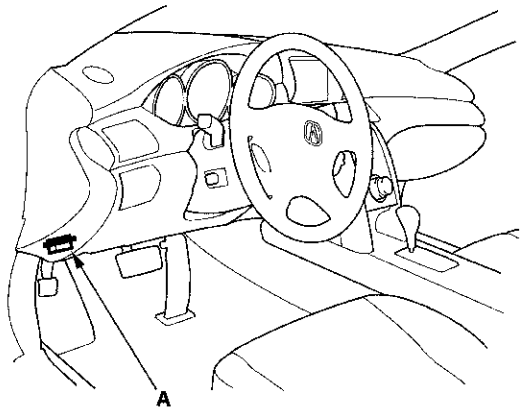
How to Check for DTCs with the SCS Mode (retrieving the flash codes)

NOTE: The preferred method is to use the HDS to retrieve the P-code.

When the PCM senses an abnormality in the input or output system, the D indicator (A) in the gauge control module (B) will usually blink.



When the D indicator has been reported on, connect the HDS to the DLC (A) located under the left side of the dash. Turn the ignition switch to ON (II), select SCS mode, then the D indicator will indicate (blink) the DTC.



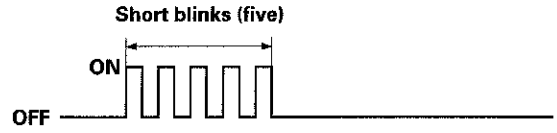
If the D indicator and the MIL come on at the same time, or if a driveability problem is suspected, follow this procedure:

1. Connect the HDS to the DLC. (See the HDS user's manual for specific instructions.)

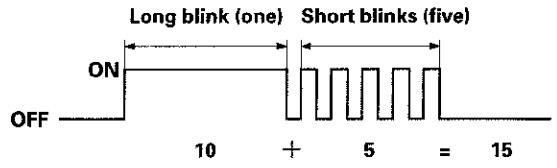
2. Turn the ignition switch to ON (II). Make sure the HDS communicates with the PCM. If it does not, go to the DLC circuit troubleshooting (see page 11-211).

3. Select SCS mode, then observe the D indicator in the gauge control module. Codes 1 through 9 are indicated by individual short blinks. Code 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.

Example: DTC P0705 (5)



Example: DTC P0717 (15)



4. Record all fuel and emissions DTCs and A/T DTCs.

5. If there is a fuel and emissions DTC, first check the fuel and emissions system as indicated by the DTC (except DTC 70, which means there is one or more A/T DTCs, and no problems were detected in the fuel and emissions circuit of the PCM).

6. Clear the DTC and data.

7. Drive the vehicle for several minutes under the same conditions as those indicated by the freeze data, and then recheck for DTC. If the A/T DTC returns, go to the indicated DTC's troubleshooting. If the DTC does not return, there was an intermittent problem within the circuit. Make sure all pins and terminals in the circuit are tight.

(cont'd)

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General Troubleshooting Information (cont'd)

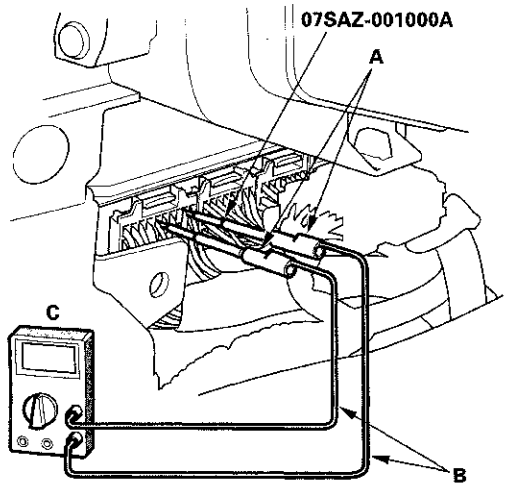
How to Troubleshoot Circuits at the PCM

Special Tools Required
Backprobe set 07SAZ-001000A (two required)

1. Pull back the carpet, and remove the passenger's front console cover and the rear vent duct (see step 6 on page 20-93).

2. Inspect the circuit on the PCM, according to the DTC troubleshooting, with the special tools and a digital multimeter.

3. Connect the backprobe adapters (A) to the stacking patch cords (B), and connect the cords to a multimeter (C).

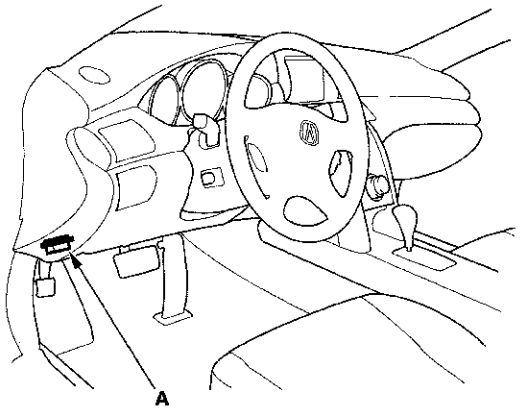


4. Using the wire insulation as a guide for the contoured tip of the backprobe adapter, gently slide the tip into the connector from the wire side until it touches the end of the wire terminal.

5. If you cannot get to the wire side of the connector or the wire side is sealed, disconnect the connector and use the tester probe to probe the connectors from the terminal side. Do not force the probe into the connector.

How to Clear A/T DTCs

1. Connect the HDS to the DLC (A).



2. Turn the ignition switch to ON (II). Make sure the HDS communicates with the PCM. If it does not, go to the DLC circuit troubleshooting (see page 11-211).

3. Clear the DTC(s) on the HDS screen.

OBD Status

The OBD Status shows the current system status of each DTC and all of the parameters. This function is used to see if the repair was successfully completed. The results of diagnostic tests for the DTC are displayed as:

- PASSED: The on-board diagnosis is successfully finished.
- FAILED: The on-board diagnosis has finished but failed.
- NOT COMPLETED: The on-board diagnosis was running but is out of the enable conditions of the DTC.

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PCM/TCM Reset

NOTE: To reset the PCM/TCM, initialize only the automatic transmission memory stored in the PCM or TCM.

1. Select the A/T system with the HDS.
2. Reset the TCM with the HDS while the engine is stopped.
3. Turn the ignition switch to LOCK (0).
4. Turn the ignition switch to ON (II), and wait for 30 seconds.
5. Turn the ignition switch to LOCK (0), and disconnect the HDS from the DLC.

Replacing the PCM
Refer to the PCM replacement (see page 11-232) when replacing the PCM is needed in the DTC troubleshooting.

Updating the A/T Software in the PCM
Refer to the PCM update (see page 11-230) when the A/T software updating is needed in the DTC troubleshooting.

Substituting the PCM

Refer to the PCM substituting (see page 11-7) when substituting a known-good PCM is needed in the DTC troubleshooting.

How to End a Troubleshooting Session (required after any troubleshooting)

NOTE: Reset the PCM/TCM with the HDS while the engine is stopped.

1. Turn the ignition switch to LOCK (0).
2. Turn the ignition switch to ON (II), and wait for 30 seconds.
3. Turn the ignition switch to LOCK (0), and disconnect the HDS from the DLC.
4. Start the engine in P or N, and warm it to normal operating temperature (the radiator fan comes on).
5. To verify that the problem is repaired, test-drive the vehicle for several minutes at speeds over 30 mph (50 km/h) or under the same conditions as those indicated by the freeze data.

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DTC Troubleshooting Index

NOTE: Record all freeze data and any on-board snapshot, and review the General Troubleshooting Information (see page 14-4) before you troubleshoot.

DTC *[1]	Two Drive Cycle Detection	D Indicator	MIL	Detection Item	Page
P0705 (5) *[2]	———	Blinks	ON	Transmission Range Switch (Multiple Shift-position Input)	(see page 14-80)
P0706 (6) *[2]	○	OFF	ON	Transmission Range Switch (Open)	(see page 14-81)
P0711 (28) *[2]	○	Blinks	OFF	ATF Temperature Sensor (Range/ Performance)	(see page 14-82)
P0712 (28) *[2]	○	Blinks	OFF	ATF Temperature Sensor (Short)	(see page 14-84)
P0713 (28) *[2]	○	Blinks	OFF	ATF Temperature Sensor (Open)	(see page 14-86)
P0716 (15) *[2]	———	Blinks	ON	Problem in Input Shaft (Mainshaft) Speed Sensor Circuit	(see page 14-89)
P0717 (15) *[2]	———	Blinks	ON	Input Shaft (Mainshaft) Speed Sensor (No Signal Input)	(see page 14-90)
P0718 (15) *[2]	○	Blinks	ON	Input Shaft (Mainshaft) Speed Sensor (Intermittent Failure)	(see page 14-90)
P0721 (9) *[2]	———	Blinks	ON	Problem in Output Shaft (Countershaft) Speed Sensor Circuit	(see page 14-89)
P0722 (9) *[2]	———	Blinks	ON	Output Shaft (Countershaft) Speed Sensor (No Signal Input)	(see page 14-92)
P0723 (9) *[2]	○	Blinks	ON	Output Shaft (Countershaft) Speed Sensor (Intermittent Failure)	(see page 14-92)
P0731 (64)	○	Blinks	OFF	1st Gear Incorrect Ratio	(see page 14-94)
P0732 (64)	○	Blinks	OFF	2nd Gear Incorrect Ratio	(see page 14-95)
P0733 (64)	○	Blinks	OFF	3rd Gear Incorrect Ratio	(see page 14-97)
P0734 (64)	○	Blinks	OFF	4th Gear Incorrect Ratio	(see page 14-98)
P0735 (64)	○	Blinks	OFF	5th Gear Incorrect Ratio	(see page 14-100)
P0741 (40)	○	OFF	ON	Torque Converter Clutch Circuit Performance or Stuck OFF	(see page 14-101)
P0746 (76)	○	Blinks	ON	A/T Clutch Pressure Control Solenoid Valve A Stuck OFF	(see page 14-102)
P0747 (76)	○	Blinks	ON	A/T Clutch Pressure Control Solenoid Valve A Stuck ON	(see page 14-102)
P0751 (70)	○	Blinks	ON	Shift Solenoid Valve A Stuck OFF	(see page 14-103)
P0752 (70)	○	Blinks	ON	Shift Solenoid Valve A Stuck ON	(see page 14-103)
P0756 (71)	○	Blinks	ON	Shift Solenoid Valve B Stuck OFF	(see page 14-104)
P0757 (71)	○	Blinks	ON	Shift Solenoid Valve B Stuck ON	(see page 14-104)
P0761 (72)	○	Blinks	ON	Shift Solenoid Valve C Stuck OFF	(see page 14-105)
P0762 (72)	○	Blinks	ON	Shift Solenoid Valve C Stuck ON	(see page 14-105)
P0766 (73)	○	Blinks	ON	Shift Solenoid Valve D Stuck OFF	(see page 14-106)
P0767 (73)	○	Blinks	ON	Shift Solenoid Valve D Stuck ON	(see page 14-106)

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DTC *(1)	Two Drive Cycle Detection	D Indicator	MIL	Detection Item	Page
P0776 (77)	○	Blinks	ON	A/T Clutch Pressure Control Solenoid Valve B Stuck OFF	(see page 14-107)
P0777 (77)	○	Blinks	ON	A/T Clutch Pressure Control Solenoid Valve B Stuck ON	(see page 14-107)
P0796 (78)	○	Blinks	ON	A/T Clutch Pressure Control Solenoid Valve C Stuck OFF	(see page 14-108)
P0797 (78)	○	Blinks	ON	A/T Clutch Pressure Control Solenoid Valve C Stuck ON	(see page 14-109)
P0812 (65) *(2)	○	Blinks	ON	Transmission Range Switch ATP R Switch (Open)	(see page 14-110)
P0842 (25) *(2)	———	Blinks	ON	2nd Clutch Transmission Fluid Pressure Switch (Short or Stuck ON)	(see page 14-113)
P0843 (25)	———	Blinks	ON	2nd Clutch Transmission Fluid Pressure Switch (Open or Stuck OFF)	(see page 14-115)
P0847 (26) *(2)	———	Blinks	ON	3rd Clutch Transmission Fluid Pressure Switch (Short or Stuck ON)	(see page 14-118)
P0848 (26)	———	Blinks	ON	3rd Clutch Transmission Fluid Pressure Switch (Open or Stuck OFF)	(see page 14-120)
P0872 (27) *(2)	———	Blinks	OFF	4th Clutch Transmission Fluid Pressure Switch (Short or Stuck ON)	(see page 14-123)
P0873 (27)	———	Blinks	OFF	4th Clutch Transmission Fluid Pressure Switch (Open or Stuck OFF)	(see page 14-125)
P0962 (16) *(2)	———	Blinks	ON	A/T Clutch Pressure Control Solenoid Valve A (Open)	(see page 14-128)
P0963 (16) *(2)	———	Blinks	ON	A/T Clutch Pressure Control Solenoid Valve A (Short)	(see page 14-131)
P0966 (23) *(2)	———	Blinks	ON	A/T Clutch Pressure Control Solenoid Valve B (Open)	(see page 14-133)
P0967 (23) *(2)	———	Blinks	ON	A/T Clutch Pressure Control Solenoid Valve B (Short)	(see page 14-137)
P0970 (29) *(2)	———	Blinks	ON	A/T Clutch Pressure Control Solenoid Valve C (Open)	(see page 14-139)
P0971 (29) *(2)	———	Blinks	ON	A/T Clutch Pressure Control Solenoid Valve C (Short)	(see page 14-142)
P0973 (7) *(2)	———	Blinks	ON	Shift Solenoid Valve A (Short)	(see page 14-144)
P0974 (7) *(2)	———	Blinks	ON	Shift Solenoid Valve A (Open)	(see page 14-147)
P0976 (8) *(2)	———	Blinks	ON	Shift Solenoid Valve B (Short)	(see page 14-150)
P0977 (8) *(2)	———	Blinks	ON	Shift Solenoid Valve B (Open)	(see page 14-152)
P0979 (22) *(2)	———	Blinks	ON	Shift Solenoid Valve C (Short)	(see page 14-155)
P0980 (22) *(2)	———	Blinks	ON	Shift Solenoid Valve C (Open)	(see page 14-157)

NOTE:

* (1): The DTC in parentheses is the flash code the D indicator indicates when the data link connector (DLC) is connected to the HDS, and in the SCS mode.
* (2): This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

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DTC Troubleshooting Index (cont'd)

NOTE: Record all freeze data and any on-board snapshot, and review the General Troubleshooting Information (see page 14-4) before you troubleshoot.

DTC *(1)	Two Drive Cycle Detection	D Indicator	MIL	Detection Item	Page
P0982 (60) *(2)	———	Blinks	ON	Shift Solenoid Valve D (Short)	(see page 14-160)
P0983 (60) *(2)	———	Blinks	ON	Shift Solenoid Valve D (Open)	(see page 14-163)
P1717 (62)	———	Blinks	ON	Transmission Range Switch ATP RVS Switch (Open)	(see page 14-165)
P1743 (45)	○	Blinks	OFF	Shift Error	(see page 14-168)
P1744 (45)	○	Blinks	OFF	Shift Error	(see page 14-169)
P1745 (45)	○	Blinks	OFF	Shift Error	(see page 14-170)
P1780 (49)	○	Blinks	ON	Shift Control System (Transmission Default Mode)	(see page 14-171)

NOTE:
* (1): The DTC in parentheses is the flash code the D indicator indicates when the data link connector (DLC) is connected to the HDS, and in the SCS mode.
* (2): This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

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Symptom Troubleshooting Index

NOTE: Check for DTCs with the HDS and troubleshoot those frist before following the repair procedures listed in the index.

Symptom	Probable cause(s)	Notes
HDS does not communicate with the PCM	DLC circuit	Troubleshoot the DLC circuit (see page 11-211).
When you turn the ignition switch to ON (II), the D indicator comes on and stays on in all shift lever positions, or it never comes on at all	• F-CAN communication line error • Gauge control module defective • PCM defective	• Check the F-CAN communication line for a DTC (see page 22-409). • Check the F-CAN communication line by using the gauge control module self-diagnostic function (see page 22-396). • Check the indicator drive circuit in the gauge control module by using the gauge control module self-diagnostic function (see page 22-397).
A/T gear position indicator does not come on while the shift lever is in that position; shift indicator does not work	• F-CAN communication line error • Gauge control module defective • PCM defective • Transmission range switch defective	• Check the F-CAN communication line for a DTC (see page 22-409). • Check the F-CAN communication line by using the gauge control module self-diagnostic function (see page 22-396). • Check the indicator drive circuit in the gauge control module by using the gauge control module self-diagnostic function (see page 22-397). • Inspect the transmission range switch (see page 14-244).
Speedometer does not work	• F-CAN communication line error • Gauge control module defective • PCM defective • Output shaft (countershaft) speed sensor defective	• Check the F-CAN communication line for a DTC (see page 22-409). • Check the F-CAN communication line by using the gauge control module self-diagnostic function (see page 22-396). • Check the speedometer drive circuit in the gauge control module using the HDS. • Inspect the transmission range switch (see page 14-244). • Check for a stored DTC, and check for loose connections. • Check the speed sensor installation. • Inspect the sensor O-ring for wear and damage.
When you press the paddle shifter + (upshift switch) in D and S, the transmission does not upshift	A problem in the paddle shifter + (upshift switch) circuit	Check the paddle shifter + (upshift switch) circuit (see page 14-248).
When you press the paddle shifter — (downshift switch) in D and S, the transmission does not downshift	A problem in the paddle shifter — (downshift switch) circuit	Check the paddle shifter — (downshift switch) circuit (see page 14-250).

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Symptom Troubleshooting Index (cont'd)

Symptom	Probable cause(s)	Notes
M indicator does not come on even when the paddle shifter + (upshift switch) or paddle shifter — (downshift switch) is operated in sequential sportshift mode	• F-CAN communication line error • Gauge control module defective • PCM defective	• Check the F-CAN communication line for a DTC (see page 22-409). • Check the F-CAN communication line by using the gauge control module self-diagnostic function (see page 22-396). • Check the indicator drive circuit in the gauge control module by using the gauge control module self-diagnostic function (see page 22-397).
The paddle shifter + (upshift switch) illumination does not come on when the combination light switch is turned on while the ignition switch is ON (II)	Paddle shifter + (upshift switch) illumination circuit	Check the paddle shifter + (upshift switch) illumination circuit (see page 14-252).
The paddle shifter — (downshift switch) illumination does not come on when the combination light switch is turned on while the ignition switch is ON (II)	Paddle shifter — (downshift switch) illumination circuit	Check the paddle shifter — (downshift switch) illumination circuit (see page 14-252).
Shift lever cannot be moved from P while pressing on the brake pedal	• Accelerator pedal position sensor circuit • Accelerator pedal position sensor defective • Brake pedal position switch circuit • Brake pedal position switch defective • Shift lock solenoid defective • Shift lock solenoid control circuit • Shift lock mechanism defective • Throttle body defective • Transmission range switch ATPP switch stuck OFF • Transmission range switch ATPP switch circuit open • PCM defective	• Inspect the APP sensor signal (see page 11-281). • Troubleshoot the shift lock system circuit (see page 14-257). • Test the shift lock solenoid (see page 14-261). • Inspect the transmission range switch (see page 14-244).
Ignition switch cannot be moved from ACCESSORY (I) to LOCK (0) (key is pushed in, the shift lever in P)	A problem in the key interlock system of the interlock system	Check the interlock system - key interlock system circuit (see page 22-98).

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Symptom	Probable cause(s)	Notes
Engine runs, but vehicle does not move in any gear	• Low ATF level • Shift cable broken or out of adjustment • Connection between shift cable and transmission or body is worn • ATF pump worn or binding • Regulator valve stuck or spring worn • ATF strainer clogged • Mainshaft worn or damaged • Final gears worn or damaged • Park mechanism defective • Transmission-to-engine assembly error • Axle disengaged	• Check the ATF level and check the ATF cooler lines for leaks and loose connections. If necessary, clean the ATF cooler lines. • Check for a loose shift cable at the shift lever and the selector control lever. • Improper alignment of the ATF pump and the torque converter housing may cause the ATF pump seizure. The symptoms are mostly an rpm-related ticking noise or a high pitched squeak. • Check the line pressure (see page 14-174). • Check the ATF strainer for debris. If the strainer is clogged, find the damaged components that caused the debris. • Inspect the differential pinion gears for wear. If the differential pinion gears are worn, replace the differential assembly, replace the ATF strainer, thoroughly clean the transmission, and clean the cooler and lines. Replace the torque converter. • Be 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. • 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.

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Symptom Troubleshooting Index (cont'd)

Symptom	Probable cause(s)	Notes
Vehicle moves in R, but not in D, or 1st in S	• 1st accumulator defective • Idler gears worn or damaged • 1st clutch defective	• Check the 1st clutch pressure (see page 14-174). • Inspect the secondary shaft and 1st/1st-hold clutch assembly for wear and damage. • Inspect the clutch piston, the clutch piston check valve, and the O-rings. Check the spring retainer for wear and damage. Inspect the clearance between the clutch end-plate and the top disc. If the clearance is out of tolerance, inspect the clutch discs and the plates for wear and damage, and inspect the clutch wave-plate height. If the discs and the flat-plates are worn or damaged, replace the discs and the flat-plates as a set. If the wave-plate height is out of tolerance, replace the wave-plate. If the discs and the plates are OK, adjust the clearance with the clutch end-plate.
Vehicle moves in D and R, but not in 1st in S	• 1st-hold accumulator defective • 1st-hold clutch defective	• Check the 1st-hold clutch pressure (see page 14-174). • Inspect the secondary shaft and 1st/1st-hold clutch assembly for wear and damage. • Inspect the clutch piston, the clutch piston check valve, and the O-rings. Check the spring retainer for wear and damage. Inspect the clearance between the clutch end-plate and the top disc. If the clearance is out of tolerance, inspect the clutch discs and the plates for wear and damage, and inspect the clutch wave-plate height. If the discs and the flat-plates are worn or damaged, replace the discs and the flat-plates as a set. If the wave-plate height is out of tolerance, replace the wave-plate. If the discs and the plates are OK, adjust the clearance with the clutch end-plate.
Vehicle moves in D and R, but not in 2nd in S	• 2nd accumulator defective • 2nd clutch defective	• Check the 2nd clutch pressure (see page 14-174). • Inspect the secondary shaft and 2nd clutch assembly for wear and damage. • Inspect the clutch piston, the clutch piston check valve, and the O-rings. Check the spring retainer for wear and damage. Inspect the clearance between the clutch end-plate and the top disc. If the clearance is out of tolerance, inspect the clutch discs and the plates for wear and damage, and inspect the clutch wave-plate height. If the discs and the flat-plates are worn or damaged, replace the discs and the flat-plates as a set. If the wave-plate height is out of tolerance, replace the wave-plate. If the discs and the plates are OK, adjust the clearance with the clutch end-plate.

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Symptom	Probable cause(s)	Notes
Vehicle moves in D and S, but not in R (or moves forward in R)	• Shift fork shaft stuck • Modulator valve defective • Reverse CPC valve defective • 5th accumulator defective • 5th clutch defective • Reverse gears worn or damaged	• Check the line pressure and 5th clutch pressure (see page 14-174). • Check for a missing shift fork bolt on the shift fork shaft. • Inspect the reverse selector gear teeth chamfers, and inspect the engagement teeth chamfers of the countershaft 5th gear and reverse gear. Replace the reverse gears and the reverse selector if they are worn or damaged. If the transmission makes clicking, grinding, or whirring noises, also replace the mainshaft 5th gear, reverse idler gear, and countershaft 5th gear. • Inspect the clutch piston, the clutch piston check valve, and the O-rings. Check the spring retainer for wear and damage. Inspect the clearance between the clutch end-plate and the top disc. If the clearance is out of tolerance, inspect the clutch discs and the plates for wear and damage, and inspect the clutch wave-plate height. If the discs and the flat-plates are worn or damaged, replace the discs and the flat-plates as a set. If the wave-plate height is out of tolerance, replace the wave-plate. If the discs and the plates are OK, adjust the clearance with the clutch end-plate.
Poor acceleration; flares when starting off in D, S, and R	• Low ATF level • Shift cable broken or out of adjustment • ATF pump worn or binding • Regulator valve stuck or spring worn • ATF strainer clogged • Torque converter check valve defective	• Check the ATF level and check the ATF cooler lines for leakage and loose connections. If necessary, clean the ATF cooler lines. • Check for a loose shift cable at the shift lever and the selector control lever. • Check the line pressure (see page 14-174). • Check the ATF strainer for debris. If the strainer is clogged, find the damaged components that caused the debris. • Improper alignment of the ATF pump and the torque converter housing may cause ATF pump seizure. The symptom is mostly an rpm-related ticking noise or a high pitched squeak.
Poor acceleration; flares when starting off in D, S, and R; stall speed high in D	• Low ATF level • 1st accumulator defective • 1st clutch defective	• Check the 1st clutch pressure (see page 14-174). • Inspect the clutch piston, the clutch piston check valve, and the O-rings. Check the spring retainer for wear and damage. Inspect the clearance between the clutch end-plate and the top disc. If the clearance is out of tolerance, inspect the clutch discs and the plates for wear and damage, and inspect the clutch wave-plate height. If the discs and the flat-plates are worn or damaged, replace the discs and the flat-plates as a set. If the wave-plate height is out of tolerance, replace the wave-plate. If the discs and the plates are OK, adjust the clearance with the clutch end-plate.

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Symptom Troubleshooting Index (cont'd)

Symptom	Probable cause(s)	Notes
Poor acceleration; flares when starting off in D, S, and R; stall speed high in R	• Low ATF level • Shift solenoid valve C defective • Shift cable broken or out of adjustment • Reverse CPC valve defective • 5th accumulator defective • 5th clutch defective	• Check for a stored DTC, and check for loose connectors. Inspect the O-ring, and check for a seized shift solenoid valve. • Check for a loose shift cable at the shift lever and the transmission control lever. • Check the 5th clutch pressure (see page 14-174). • Inspect the clutch piston, the clutch piston check valve, and the O-rings. Check the spring retainer for wear and damage. Inspect the clearance between the clutch end-plate and the top disc. If the clearance is out of tolerance, inspect the clutch discs and the plates for wear and damage, and inspect the clutch wave-plate height. If the discs and the flat-plates are worn or damaged, replace the discs and the flat-plates as a set. If the wave-plate height is out of tolerance, replace the wave-plate. If the discs and the plates are OK, adjust the clearance with the clutch end-plate.
Poor acceleration in D, S, and R; stall speed low; engine does not rev to high rpm; transmission does not upshift under hard acceleration	• Shift solenoid valve D defective • Torque converter one-way clutch defective • Engine output low • Torque converter clutch piston defective	• Check the stall speed (see page 14-173). • Check the engine control system. • Check the fuel pressure (see page 11-335). • Check for exhaust restriction. • Check for intake restriction. • Check the VTEC rocker arm. • Replace the torque converter.
Engine idle vibration; engine stalls, idles low or rough	• Worn engine or transmission mounts • Low ATF level • Shift solenoid valve D defective • Engine output low • Torque converter clutch piston defective • Lock-up control valve defective • Lock-up timing valve defective • A/T clutch pressure control solenoid valve C defective	• Check the engine and transmission mounts. • Check the ATF level and check the ATF cooler lines for leakage and loose connections. If necessary, clean the ATF cooler lines. • Check for a stored DTC, and check for loose connectors. Inspect the O-ring, and check for a seized shift solenoid valve. • Replace the torque converter. • Check the lock-up control valve in the regulator valve body for free movement, and check the valve spring for wear and damage. • Check the lock-up timing valve in the main valve body for free movement, and check the valve spring for wear and damage. • Inspect the shift solenoid valve D function with the HDS (see page 14-178). • Check for a seized shift solenoid valve, and inspect the O-rings. • Inspect the A/T clutch pressure control solenoid valve C with the HDS (see page 14-187).

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Symptom	Probable cause(s)	Notes
Vehicle moves in N	• Excessive ATF • Foreign material in separator plate orifice • Relief valve defective • Lubrication control valve defective • 1st-hold clutch defective • 1st clutch defective • 2nd clutch defective • 3rd clutch defective • 4th clutch defective • 5th clutch defective • Clutch end-plate clearance incorrect • Needle bearing seized, worn, or damaged	• Check the ATF level, and drain the ATF if necessary. • Check all clutch pressures. • Inspect the clutch piston, the clutch piston check valve, and the O-rings. Check the spring retainer for wear and damage. Inspect the clearance between the clutch end-plate and the top disc. If the clearance is out of tolerance, inspect the clutch discs and the plates for wear and damage, and inspect the clutch wave-plate height. If the discs and the flat-plates are worn or damaged, replace the discs and the flat-plates as a set. If the wave-plate height is out of tolerance, replace the wave-plate. If the discs and the plates are OK, adjust the clearance with the clutch end-plate.
Delayed engagement after shifting from N to D or S, or excessive shock when shifting	• Worn engine or transmission mounts • Shift solenoid valve C defective • A/T clutch pressure control solenoid valve A defective • A/T clutch pressure control solenoid valve B defective • A/T clutch pressure control solenoid valve C defective • Shift cable broken or out of adjustment • Connection between shift cable and transmission or body is worn • Input shaft (mainshaft) speed sensor defective • Output shaft (countershaft) speed sensor defective • ATF temperature sensor defective • CPC valve A defective • CPC valve B defective • CPC valve C stuck • Foreign material in separator plate orifice • Shift valve C defective • Shift valve E defective • Servo control valve defective • 1st accumulator defective • 1st check ball stuck • One-way check ball stuck • 1st clutch defective	• Check the engine and transmission mounts. • Check for a stored DTC, and check for loose connectors. • Inspect the O-ring, and check for a seized shift solenoid valve. • Inspect the A/T clutch pressure control solenoid valve body gasket and the ATF feed pipes for wear and damage. If the A/T clutch pressure control solenoid valve is stuck, inspect the CPC valves. • Check for a loose shift cable at the shift lever and the selector control lever. • Inspect the ATF temperature sensor O-rings. • Check the 1st clutch pressure. • Inspect the clutch piston, the clutch piston check valve, and the O-rings. Check the spring retainer for wear and damage. Inspect the clearance between the clutch end-plate and the top disc. If the clearance is out of tolerance, inspect the clutch discs and the plates for wear and damage, and inspect the clutch wave-plate height. If the discs and the flat-plates are worn or damaged, replace the discs and the flat-plates as a set. If the wave-plate height is out of tolerance, replace the wave-plate. If the discs and the plates are OK, adjust the clearance with the clutch end-plate.

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Symptom Troubleshooting Index (cont'd)

Symptom	Probable cause(s)	Notes
Delayed engagement after shifting from N to R, or excessive shock when shifting	• Worn engine or transmission mounts • Shift solenoid valve C defective • A/T clutch pressure control solenoid valve B defective • A/T clutch pressure control solenoid valve C defective • Shift cable broken or out of adjustment • Connection between shift cable and transmission or body is worn • Input shaft (mainshaft) speed sensor defective • Output shaft (countershaft) speed sensor defective • ATF temperature sensor defective • Shift fork shaft stuck • CPC valve C stuck • Reverse CPC valve defective • Foreign material in separator plate orifice • Shift valve E defective • 5th accumulator defective • 5th clutch defective • Clearance between clutch end-plate and top disc incorrect	• Check the engine and transmission mounts. • Check for a stored DTC, and check for loose connectors. • Inspect the O-ring, and check for a seized shift solenoid valve. • Inspect the A/T clutch pressure control solenoid valve body gasket and ATF feed pipes for wear and damage. If the A/T clutch pressure control solenoid valve is stuck, inspect the CPC valves. • Check for a loose shift cable at the shift lever and the transmission control lever. • Inspect the sensor O-rings. • Check the 5th clutch pressure (see page 14-174). • Inspect the clutch piston, the clutch piston check valve, and the O-rings. Check the spring retainer for wear and damage. Inspect the clearance between the clutch end-plate and the top disc. If the clearance is out of tolerance, inspect the clutch discs and the plates for wear and damage, and inspect the clutch wave-plate height. If the discs and the flat-plates are worn or damaged, replace the discs and the flat-plates as a set. If the wave-plate height is out of tolerance, replace the wave-plate. If the discs and the plates are OK, adjust the clearance with the clutch end-plate.
Transmission does not shift	• Input shaft (mainshaft) speed sensor defective • Output shaft (countershaft) speed sensor defective • Modulator valve defective • Engine output low	• Check for a stored DTC, and check for loose connectors. • Inspect the sensor O-rings. • Check the line pressure (see page 14-174). • Check the fuel pressure (see page 11-335). • Check for exhaust restriction. • Check for intake restriction. • Check the VTEC rocker arm.
Erratic shifting: fails to shift in D and S; starts off in 5th	• Shift solenoid valve B defective • Shift valve B defective	• Check for a stored DTC, and check for loose connectors. • Inspect the O-ring, and check for a seized shift solenoid valve.
Erratic shifting: fails to shift in 2nd in S; starts off in 4th	• Shift solenoid valve B defective • Shift valve B defective	• Check for a stored DTC, and check for loose connectors. • Inspect the O-ring, and check for a seized shift solenoid valve.
Erratic shifting: fails to shift in D, S, and 1st in S; starts off in 3rd	• Shift solenoid valve A defective • Shift valve A defective	• Check for a stored DTC, and check for loose connectors. • Inspect the O-ring, and check for a seized shift solenoid valve.
Erratic shifting: fails to shift in 2nd in S; starts off in 1st	• Shift solenoid valve A defective • Shift valve A defective	• Check for a stored DTC, and check for loose connectors. • Inspect the O-ring, and check for a seized shift solenoid valve.

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Symptom	Probable cause(s)	Notes
Excessive shock or flares on all upshifts and downshifts	• Worn engine or transmission mounts • A/T clutch pressure control solenoid valve A defective • Input shaft (mainshaft) speed sensor defective • Output shaft (countershaft) speed sensor defective • ATF temperature sensor defective • CPC valve A defective • Foreign material in separator plate orifice	• Check the engine and transmission mounts. • Check for a stored DTC, and check for loose connectors. • Inspect the A/T clutch pressure control solenoid valve body gasket and the ATF feed pipes for wear and damage. If the A/T clutch pressure control solenoid valve is stuck, inspect the CPC valves. • Inspect the sensor O-rings.
Excessive shock or flares on 1-2 upshift or 2-1 downshift	• Worn engine or transmission mounts • A/T clutch pressure control solenoid valve A defective • A/T clutch pressure control solenoid valve C defective • 2nd clutch transmission fluid pressure switch defective • CPC valve A defective • CPC valve C defective • Foreign material in separator plate orifice • 2nd accumulator defective • 2nd check ball stuck • 2nd clutch defective • Clearance between clutch end-plate and top disc incorrect	• Check the engine and transmission mounts. • Check for a stored DTC, and check for loose connectors. • Inspect the A/T clutch pressure control solenoid valve body gasket and the ATF feed pipes for wear and damage. If the A/T clutch pressure control solenoid valve is stuck, inspect the CPC valves. • Check for a clogged orifice in the transmission fluid pressure switch connector. If the orifice is clogged, remove it and clean the connector. • Check the 1st and 2nd clutch pressures (see page 14-174). • Inspect the clutch piston, the clutch piston check valve, and the O-rings. Check the spring retainer for wear and damage. Inspect the clearance between the clutch end-plate and the top disc. If the clearance is out of tolerance, inspect the clutch discs and the plates for wear and damage, and inspect the clutch wave-plate height. If the discs and the flat-plates are worn or damaged, replace the discs and the flat-plates as a set. If the wave-plate height is out of tolerance, replace the wave-plate. If the discs and the plates are OK, adjust the clearance with the clutch end-plate.

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Symptom Troubleshooting Index (cont'd)

Symptom	Probable cause(s)	Notes
Excessive shock or flares on 2-3 upshift or 3-2 downshift	• Worn engine or transmission mounts • Shift solenoid valve C defective • A/T clutch pressure control solenoid valve B defective • A/T clutch pressure control solenoid valve C defective • 3rd clutch transmission fluid pressure switch defective • CPC valve B defective • CPC valve C defective • Foreign material in separator plate orifice • Shift valve C defective • 2nd accumulator defective • 3rd accumulator defective • 2nd check ball stuck • 2nd clutch defective • 3rd clutch defective • Clearance between clutch end-plate and top disc incorrect	• Check the engine and transmission mounts. • Check for a stored DTC, and check for loose connectors. • Inspect the O-rings, and check for a seized shift solenoid valve. • Inspect the A/T clutch pressure control solenoid valve body gasket and the ATF feed pipes for wear and damage. If the A/T clutch pressure control solenoid valve is stuck, inspect the CPC valves. • Check for a clogged orifice in the transmission fluid pressure switch connector. If the orifice is clogged, remove it and clean the connector. • Check the 2nd and 3rd clutch pressures (see page 14-174). • Inspect the clutch piston, the clutch piston check valve, and the O-rings. Check the spring retainer for wear and damage. Inspect the clearance between the clutch end-plate and the top disc. If the clearance is out of tolerance, inspect the clutch discs and the plates for wear and damage, and inspect the clutch wave-plate height. If the discs and the flat-plates are worn or damaged, replace the discs and the flat-plates as a set. If the wave-plate height is out of tolerance, replace the wave-plate. If the discs and the plates are OK, adjust the clearance with the clutch end-plate.

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Symptom	Probable cause(s)	Notes
Excessive shock or flares on 3-4 upshift or 4-3 downshift	• Worn engine or transmission mounts • Shift solenoid valve C defective • A/T clutch pressure control solenoid valve B defective • A/T clutch pressure control solenoid valve A defective • 4th clutch transmission fluid pressure switch defective • CPC valve A defective • CPC valve B defective • Foreign material in separator plate orifice • Shift valve C defective • 3rd accumulator defective • 4th accumulator defective • 3rd clutch defective • 4th clutch defective • Clearance between clutch end-plate and top disc incorrect	• Check the engine and transmission mounts. • Check for a stored DTC, and check for loose connectors. • Inspect the O-rings, and check for a seized shift solenoid valve. • Inspect the A/T clutch pressure control solenoid valve body gasket and the ATF feed pipes for wear and damage. If the A/T clutch pressure control solenoid valve is stuck, inspect the CPC valves. • Check for a clogged orifice in the transmission fluid pressure switch connector. If the orifice is clogged, remove it and clean the connector. • Check the 3rd and 4th clutch pressures (see page 14-174). • Inspect the clutch piston, the clutch piston check valve, and the O-rings. Check the spring retainer for wear and damage. Inspect the clearance between the clutch end-plate and the top disc. If the clearance is out of tolerance, inspect the clutch discs and the plates for wear and damage, and inspect the clutch wave-plate height. If the discs and the flat-plates are worn or damaged, replace the discs and the flat-plates as a set. If the wave-plate height is out of tolerance, replace the wave-plate. If the discs and the plates are OK, adjust the clearance with the clutch end-plate.
Excessive shock or flares on 4-5 upshift or 5-4 downshift	• Shift solenoid valve C defective • A/T clutch pressure control solenoid valve B defective • A/T clutch pressure control solenoid valve C defective • CPC valve B defective • CPC valve C defective • Foreign material in separator plate orifice • Shift valve C defective • Shift valve E defective • Kick-down valve or kick-down short valve defective • 4th accumulator defective • 5th accumulator defective • 4th clutch defective • 5th clutch defective • Clearance between clutch end-plate and top disc incorrect	• Check for a stored DTC, and check for loose connectors. • Inspect the O-rings, and check for a seized shift solenoid valve. • Inspect the A/T clutch pressure control solenoid valve body gasket and ATF feed pipes for wear and damage. If the A/T clutch pressure control solenoid valve is stuck, inspect the CPC valves. • Check the 4th and 5th clutch pressures (see page 14-174). • Inspect the clutch piston, the clutch piston check valve, and the O-rings. Check the spring retainer for wear and damage. Inspect the clearance between the clutch end-plate and the top disc. If the clearance is out of tolerance, inspect the clutch discs and the plates for wear and damage, and inspect the clutch wave-plate height. If the discs and the flat-plates are worn or damaged, replace the discs and the flat-plates as a set. If the wave-plate height is out of tolerance, replace the wave-plate. If the discs and the plates are OK, adjust the clearance with the clutch end-plate.

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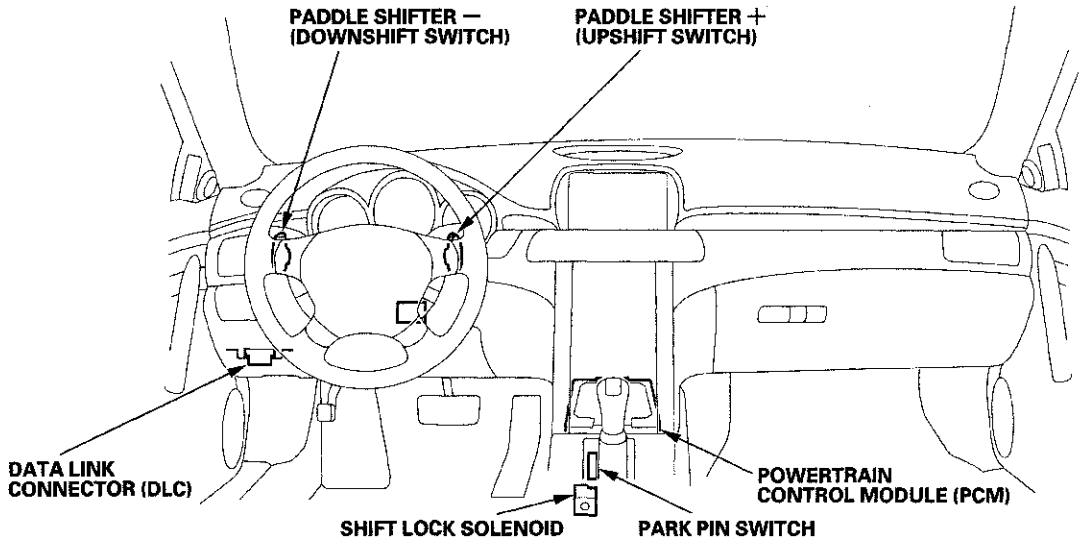
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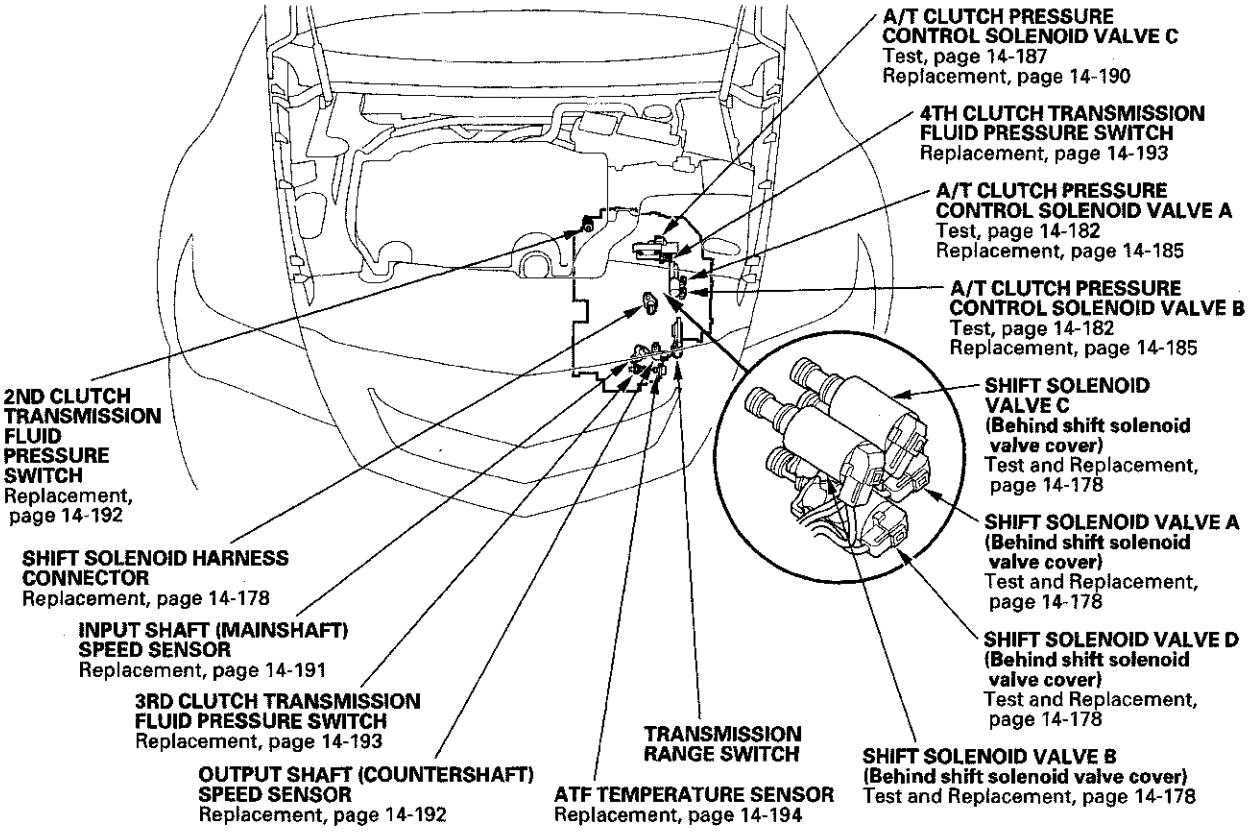
Symptom Troubleshooting Index (cont'd)

Symptom	Probable cause(s)	Notes
Noise from transmission in all shift lever positions	• ATF pump worn or binding • Idler gears worn or damaged • Thrust washer seized up, worn, or damaged	Improper alignment of the ATF pump and the torque converter housing may cause the ATF pump seizure. The symptoms are mostly an rpm-related ticking noise or a high pitched squeak.
Vehicle does not accelerate above 31 mph (50 km/h)	Torque converter one-way clutch defective	Replace torque converter.
Vibration in all shift lever positions	Drive plate defective or transmission misassembled	• Check for a misinstalled/damaged drive plate. • Adjust the engine and transmission mounts. • Check the stall speed.
Shift lever does not operate smoothly	• Transmission range switch defective or out of adjustment • Shift cable broken or out of adjustment • Connection between shift cable and transmission or body is worn	• Check for a stored DTC, and check for loose connectors. • Inspect the transmission range switch. If the transmission range switch is faulty, replace it. If the transmission range switch is out of adjustment, adjust it and the shift cable. • Check for a loose shift cable at the shift lever and the transmission control lever.
Transmission does not shift into P	• Shift cable broken or out of adjustment • Connection between shift cable and transmission or body is worn • Park mechanism defective	• Check for a loose shift cable at the shift lever and the transmission control lever. • Check the park pawl, the control shaft, and the park lever link for wear and damage. Check if the control shaft lever pin is disengaged from the manual valve guide.
Torque converter clutch does not operate smoothly; torque converter clutch does not engage or disengage	• Shift solenoid valve D defective • A/T clutch pressure control solenoid valve C defective • Torque converter clutch piston defective • Torque converter check valve defective • Lock-up shift valve defective • Lock-up control valve defective • Lock-up timing valve defective	• Check for a stored DTC, and check for loose connectors. • Inspect the O-rings, and check for a seized shift solenoid valve. • Inspect the A/T clutch pressure control solenoid valve C body gasket for wear and damage. If the A/T clutch pressure control solenoid valve C is stuck, inspect the CPC valves. • Center all engine mounts. • Replace the torque converter.
A/T gear position indicator does not indicate shift lever positions	• Transmission range switch defective or out of adjustment • Shift cable broken or out of adjustment • Connection between shift cable and transmission or body is worn	• Check for a stored DTC, and check for loose connectors. • Inspect the transmission range switch. If the transmission range switch is faulty, replace it. If the transmission range switch is out of adjustment, adjust it and the shift cable. • Check for a loose shift cable at the shift lever and the transmission control lever.

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Component Location Index





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System Description

General description

The automatic transmission is a transversally mounted four-shaft design, implementing an electronically controlled hydraulic circuit that provides five forward speeds and one in reverse. Engine power is transmitted through the torque converter, a combination of shafts which hold gears and clutches and a differential that transmits power to the driving wheels. SH-AWD equipped models also have a transfer assembly which transmits power to the SH-AWD differential.

Shaft, Gears and Clutches
Four parallel shafts hold gears and clutches. The gears on the input shaft (mainshaft), secondary shaft and intermediary shaft are in constant mesh with those on the output shaft (countershaft). When specific gears are engaged by the clutches, power is transmitted through the mainshaft, to the secondary shaft, the intermediary shaft, and/or the countershaft, then to the final drive gear of the differential to provide drive.

Shift Control Mechanism
To shift gears, the PCM controls shift solenoid valves A, B, C and D, and automatic transmission (A/T) clutch pressure control solenoid valves A, B, and C. The shift solenoid valves change the positions of the shift valves in the valve body which open and close ports to sending hydraulic pressure to the appropriate clutch. A/T clutch pressure control solenoid valves A, B, and C change the position of CPC valves A and B, and the reverse CPC valve, to control hydraulic pressure going to the clutches, which allows smooth shifts between gears.

Electronic Control
Shifting and lock-up is achieved by a system of solenoid valves driven by the PCM to control ATF flow through various valves in the valve bodies to select the appropriate gears for all driving conditions.

Hydraulic Control
The valve bodies include the main valve body, the regulator valve body, the secondary valve body, and the accumulator body. They are mounted to the torque converter housing. Fluid from the regulator valve passes through the manual valve to the various control valves. All the clutches receive fluid from the internal hydraulic circuit.

Torque Converter
The torque converter is a fluid coupling, which allows the engine to spin independently of the transmission yet connects them together as needed. It is an assembly that consists of an impeller (pump), turbine, stator and lock-up clutch, which uses automatic transmission fluid (ATF) to transmit engine power to the input shaft (mainshaft), and acts as a flywheel to help the engine run smoothly. During certain conditions the lock-up clutch is engaged by the PCM to mechanically connect the engine's crankshaft with the input shaft (mainshaft) which improves fuel economy. Around the outside of the torque converter housing is a ring gear which meshes with the starter ring gear, used by the starter to start the engine.

Lock-up Mechanism
The lock-up mechanism causes the input shaft (mainshaft) to rotate at the same speed as the engine crankshaft. Pressurized ATF is drained from between the torque converter cover and the torque converter clutch piston through a fluid passage, causing the torque converter clutch piston to be held against the torque converter housing. Together with the hydraulic control, the PCM optimizes the timing and degree of lock-up. The lock-up mechanism operates in D (2nd, 3rd, 4th, and 5th gears) and S (2nd, 3rd, and 4th gears).

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Gear Selection
The shift lever has five positions; P: PARK, R: REVERSE, N: NEUTRAL, D: DRIVE 1st through 5th gear, and S: DRIVE 1st through 4th gear with automatic shift mode and 1st through 5th with sequential sportshift mode.

Position		Description
P: PARK		Front wheels locked; park pawl engaged with park gear on secondary shaft. All clutches are released.
R: REVERSE		Reverse; reverse selector engaged with countershaft reverse gear and 5th clutch engaged.
N: NEUTRAL		All clutches are released.
D: DRIVE (1st through 5th)		General driving; starts off in 1st, shifts automatically to 2nd, 3rd, 4th, then 5th, depending on vehicle speed and accelerator pedal position. Downshifts through 4th, 3rd, 2nd, and 1st on deceleration to stop. D-paddle shift mode is also equipped; the transmission can be shifted manually with the paddle shifter + (upshift switch) and paddle shifter − (downshift switch) under certain particular conditions. The lock-up mechanism operates in 2nd, 3rd, 4th, and 5th gears.
S: DRIVE	Automatic shift mode (1st through 4th)	Used for rapid acceleration at highway speeds and general driving, up-hill and down-hill driving; starts off in 1st, shifts automatically to 2nd, 3rd then 4th, depending on vehicle speed and accelerator pedal position. Downshifts through 3rd, 2nd and 1st on deceleration to stop. The lock-up mechanism operates in 3rd and 4th gears.
	Sequential sportshift mode (1st through 5th)	Manual gear shift driving; vehicle can start off in 1st gear, and does not upshift automatically. Vehicle can also start off in 2nd gear, and does not upshift and downshift automatically. Downshifts automatically to 1st on deceleration to stop. The lock-up mechanism operates in 2nd, 3rd, 4th, and 5th gears.

Starting is possible only in P and N because of a neutral-safety switch.

Automatic Transmission (A/T) Gear Position Indicator
The A/T gear position indicator in the gauge control module shows which shift lever position has been selected.

Shift Indicator and M Indicator
When the transmission is switched into the sequential sportshift mode, the shift indicator in the gauge control module displays the gear selected, and the M indicator next to the shift indicator comes on. The shift indicator also displays the gear selected in the D-paddle shift mode, but the M indicator does not come on.

Transfer Assembly
The transfer assembly consists of the transfer drive gear on the differential, the transfer output shaft in the transmission, the transfer drive gear (hypoid gear), the transfer shaft, the transfer output shaft (hypoid gear), and the companion flange. The transfer assembly is on the rear side of the transmission, beside the differential. The transfer drive gear on the differential drives the transfer output shaft in the transmission. The transfer output shaft in the transmission is connected to the transfer drive gear (hypoid gear) by splines. Power is transmitted from the transfer drive gear on the differential to the rear differential via the transfer assembly and the propeller shaft.

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System Description (cont'd)

Clutches and Gears

The five-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 left end of the secondary shaft. The 1st clutch is supplied hydraulic pressure by its ATF feed pipe within the secondary shaft.

1st-hold Clutch
The 1st-hold clutch engages/disengages 1st-hold in 1st gear in S, and in the D-paddle shift mode. The 1st-hold clutch is located in the 1st clutch drum, and is supplied hydraulic pressure by its ATF feed pipe within the secondary shaft.

2nd Clutch
The 2nd clutch engages/disengages 2nd gear, and is located at the right end of the secondary shaft. The 2nd clutch is supplied hydraulic pressure through the secondary shaft 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 intermediary shaft. The 3rd clutch is supplied hydraulic pressure through the intermediary shaft by a circuit connected to the internal hydraulic circuit.

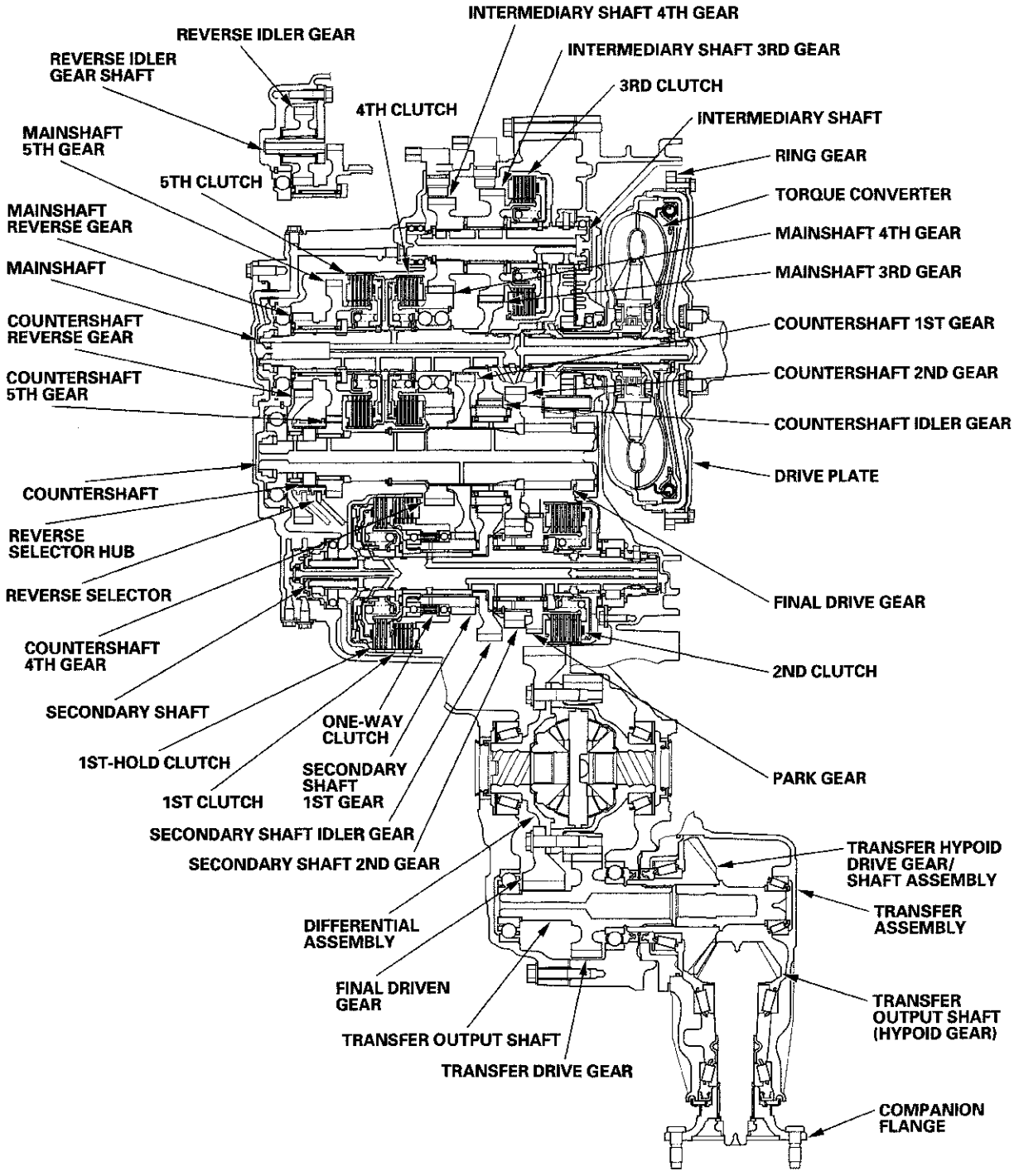
4th Clutch
The 4th clutch engages/disengages 4th gear, and is located at the middle of the mainshaft. The 4th clutch is joined back-to-back to the 5th clutch. The 4th clutch is supplied hydraulic pressure through the mainshaft by a circuit connected to the internal hydraulic circuit.

5th Clutch
The 5th clutch engages/disengages 5th gear, as well as reverse gear, and is located at the middle of the mainshaft. The 5th clutch is joined back-to-back to the 4th clutch. The 5th clutch is supplied hydraulic pressure through the mainshaft by a circuit connected to the internal hydraulic circuit.

One-way Clutch
The one-way clutch is positioned between the 1st clutch hub and the secondary shaft 1st gear. The secondary shaft 1st gear is splined to the 1st-hold clutch hub, with the 1st-hold clutch hub splined to the secondary shaft. The secondary shaft 1st gear provides the outer race surface, and the 1st clutch hub provides the inner race surface. The one-way clutch locks when power is transmitted from the secondary shaft 1st gear to the countershaft 1st gear. The 1st clutch and gears remain engaged in 1st, 2nd, 3rd, 4th, and 5th gear ranges in D or S.
However, the one-way clutch disengages when the 2nd, 3rd, 4th, or 5th clutches and gears are applied in D or S. This is because the increased rotational speed of the gears on the secondary shaft causes the one-way clutch to free-wheel with the 1st clutch still engaged.

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Transmission Cutaway View



(cont'd)

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System Description (cont'd)

Clutches and Gears (cont'd)

Gear Operation

Gears on the mainshaft:
- 4th gear is engaged/disengaged with the mainshaft by the 4th clutch.
- 5th gear is engaged/disengages with the mainshaft by the 5th clutch.
- Reverse gear is engaged/disengaged with the mainshaft by the 5th clutch.
- 3rd gear is splined with the mainshaft and rotates with the mainshaft.

Gears on the countershaft:
- Final drive gear is integral with the countershaft.
- 1st gear, 2nd gear, and 4th gear are splined with the countershaft, and rotate with the countershaft.
- 5th gear and reverse gear rotate freely from the countershaft. The reverse selector engages 5th gear and reverse gear with the reverse selector hub. The reverse selector hub is splined to the countershaft so 5th gear and reverse gear engage with the countershaft.
- Idler gear is located over 2nd gear, and rotates freely from the countershaft.

Gears on the secondary shaft:
- 1st gear is engaged with the secondary shaft by the 1st clutch and the one-way clutch when accelerating, and 1st gear is disengaged from the 1st clutch at the one-way clutch when decelerating. 1st gear is engaged with the secondary shaft by the 1st-hold clutch when decelerating for engine braking.
- 2nd gear is engaged/disengaged with the secondary shaft by the 2nd clutch.
- Idler gear is splined with the secondary shaft, and rotates with the secondary shaft.
- Park gear is integral with the 2nd gear.

Gears on the intermediary shaft:
- 3rd gear is engaged/disengaged with the intermediary shaft by the 3rd clutch.
- 4th gear is splined with the intermediary shaft.

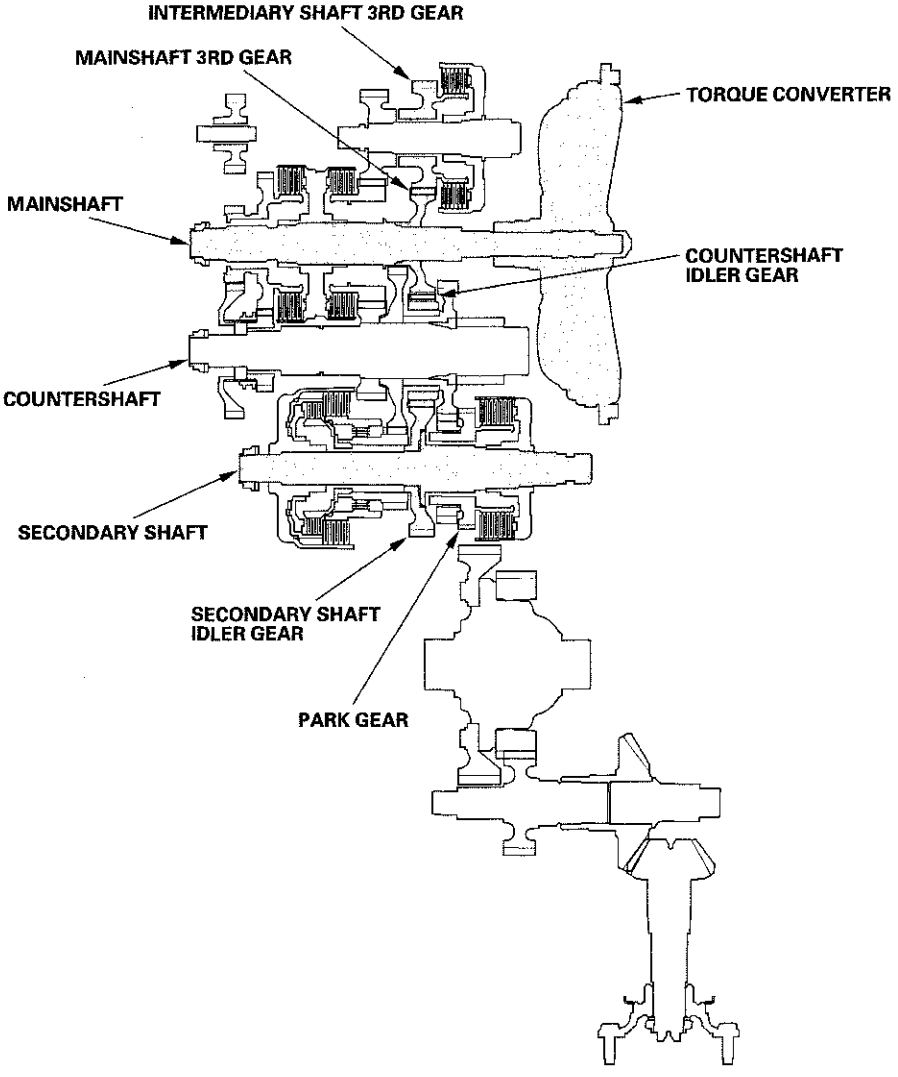
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Power Flow

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

N Position
Engine power transmitted from the mainshaft drives the mainshaft 3rd gear, the intermediary shaft 3rd gear, but hydraulic pressure is not applied to the clutches. Power is not transmitted to the countershaft. In this position, the position of the reverse selector differs according to whether the shift lever shifted from D or R:

- When shifted from D, the reverse selector engages with the countershaft 5th gear and the reverse selector hub, and the 5th gear engages with the countershaft.
- When shifted from R, the reverse selector engages with the countershaft reverse gear and the reverse selector hub, and the reverse gear engages with the countershaft.



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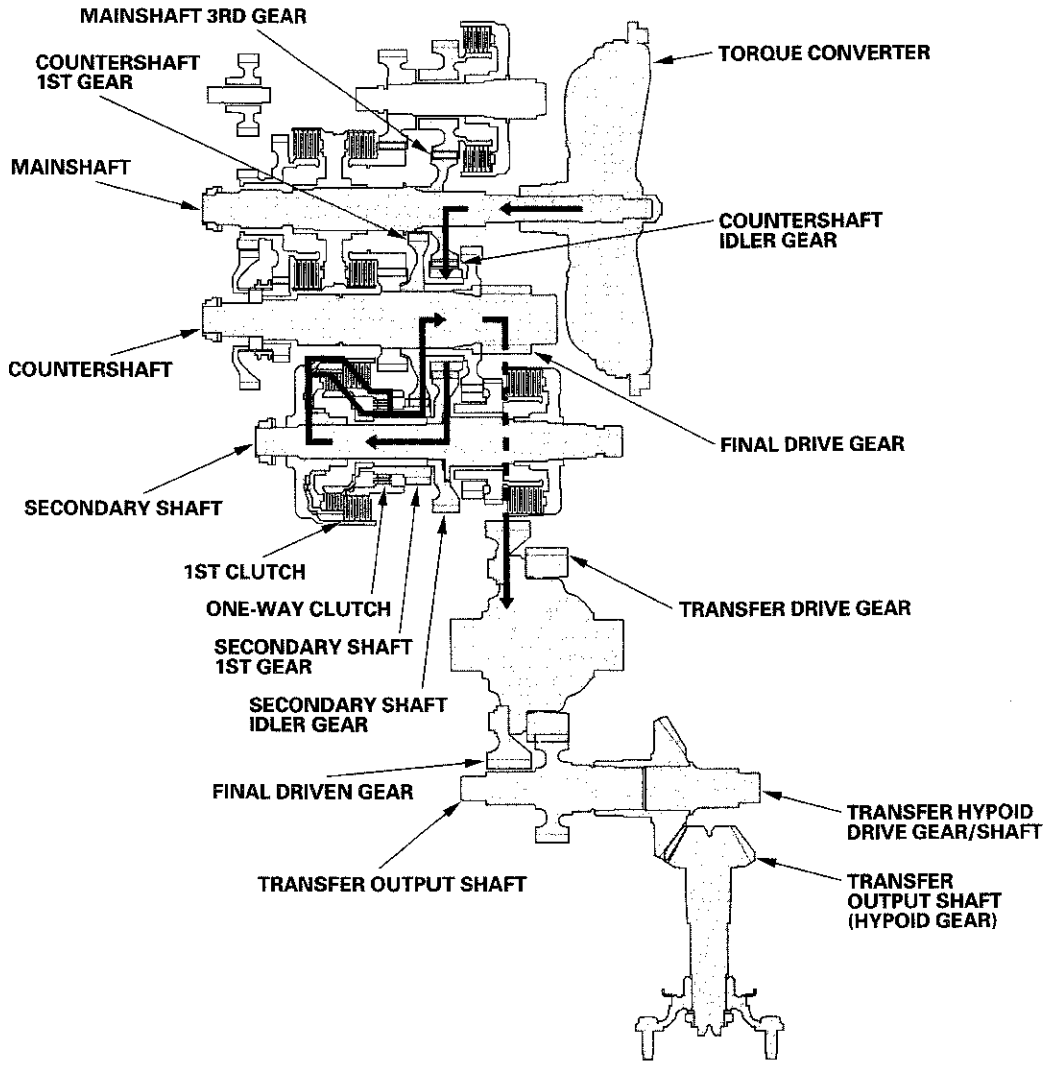
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System Description (cont'd)

Power Flow (cont'd)

D Position and S Position with Automatic Shift Mode
In D, the optimum gear is automatically selected from the 1st, 2nd, 3rd, 4th, and 5th gears; and 1st, 2nd, 3rd and 4th gears in S with automatic shift mode according to conditions such as the balance between the accelerator pedal opening (engine loading) and vehicle speed.

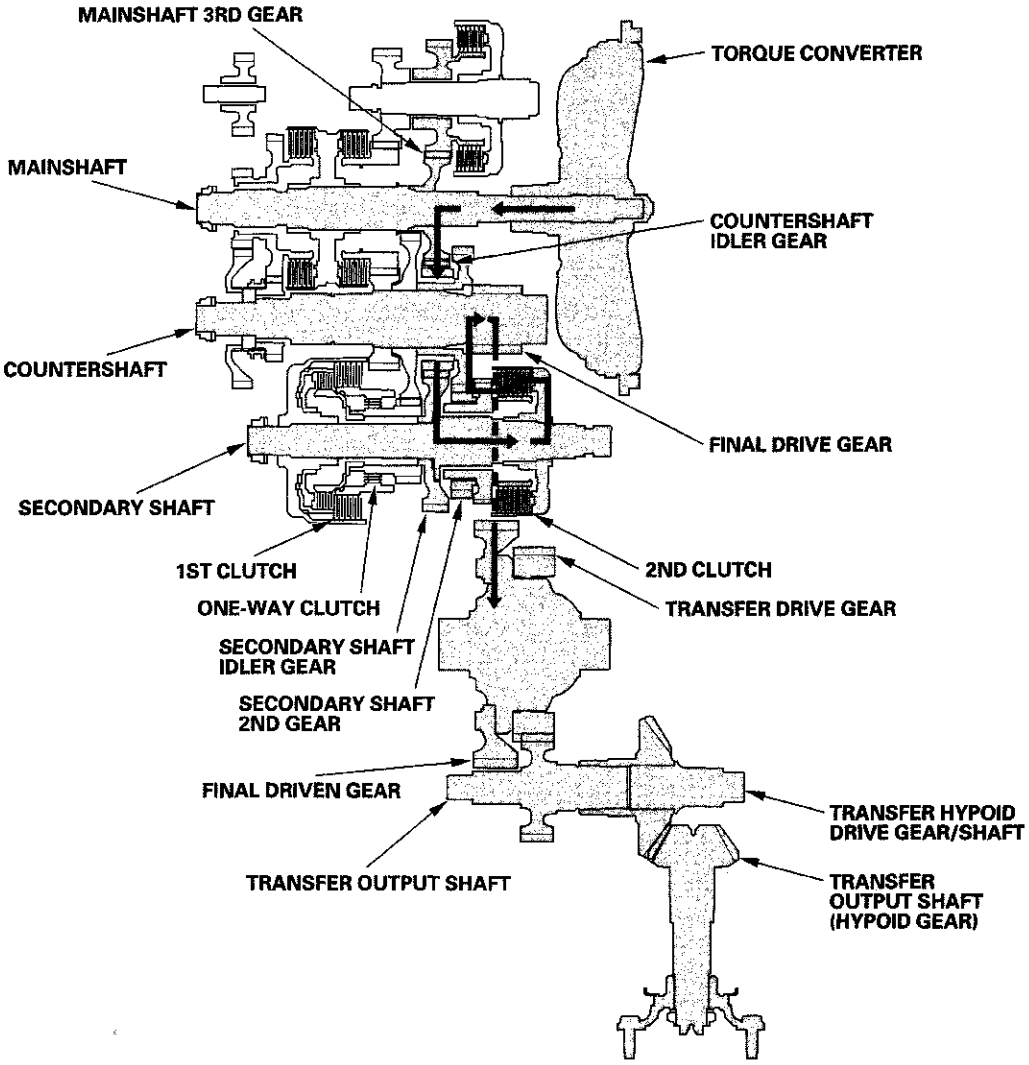
In 1st gear
- Hydraulic pressure is applied to the 1st clutch, then the 1st clutch engages the secondary shaft 1st gear with the secondary shaft by the one-way clutch.
- The mainshaft 3rd gear drives the secondary shaft via the countershaft idler gear and secondary shaft idler gear.
- The secondary shaft 1st gear drives the countershaft 1st gear and the countershaft.
- Power is transmitted to the final drive gear, which in turn drives the final driven gear and the transfer drive gear.
- The transfer output shaft drives the transfer hypoid drive gear/shaft and the transfer output shaft (hypoid gear).



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In 2nd gear

- Hydraulic pressure is applied to the 2nd clutch, then the 2nd clutch engages the secondary shaft 2nd gear with the secondary shaft.
- The mainshaft 3rd gear drives the secondary shaft via the countershaft idler gear and secondary shaft idler gear.
- The secondary shaft 2nd gear drives the countershaft 2nd gear and the countershaft.
- Power is transmitted to the final drive gear, which in turn drives the final driven gear and the transfer drive gear.
- The transfer output shaft drives the transfer hypoid drive gear/shaft and the transfer output shaft (hypoid gear).
- Hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of 2nd gear exceeds that of 1st gear, power from 1st gear is cut off at the one-way clutch.



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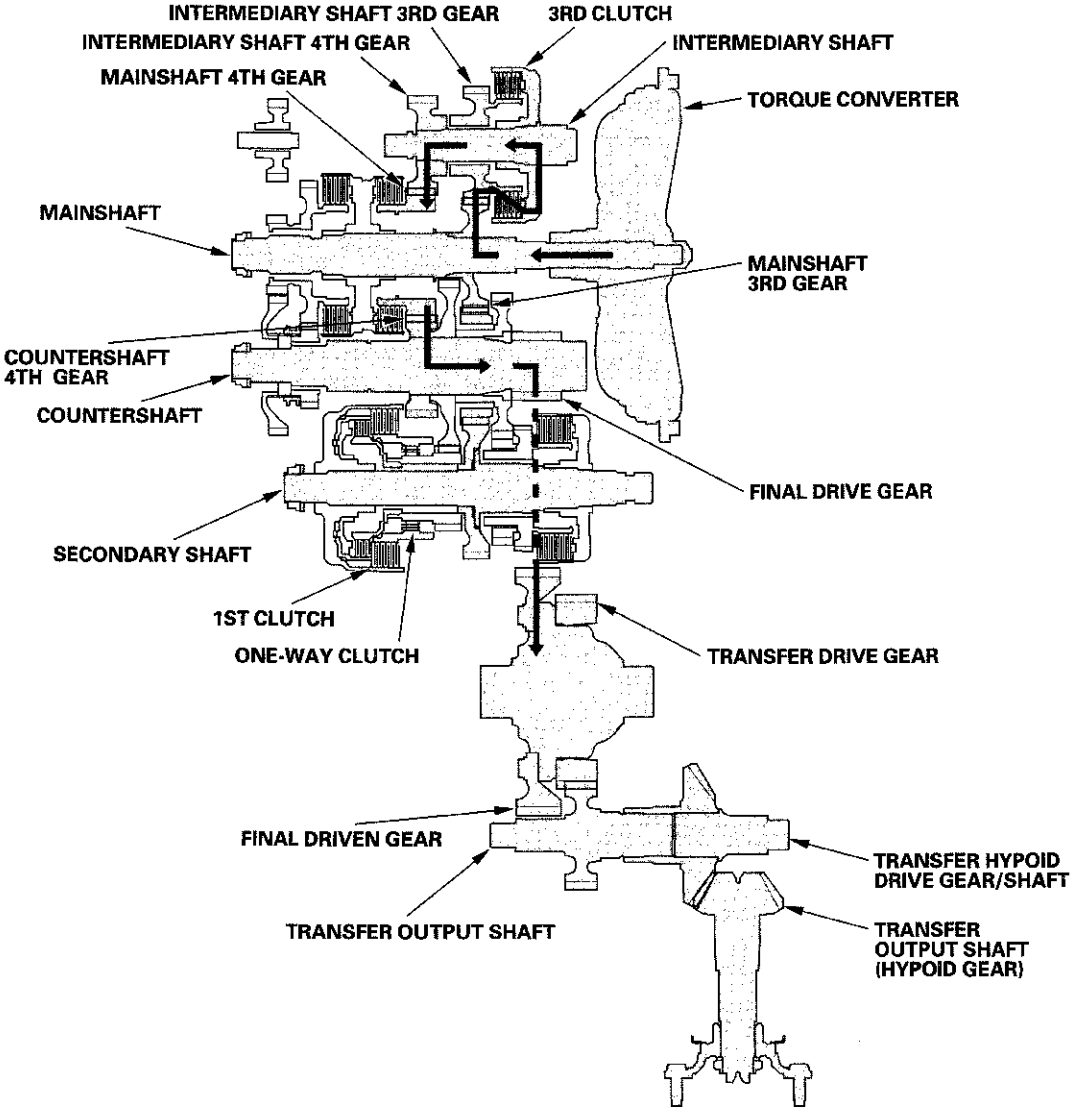
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System Description (cont'd)

Power Flow (cont'd)

In 3rd gear

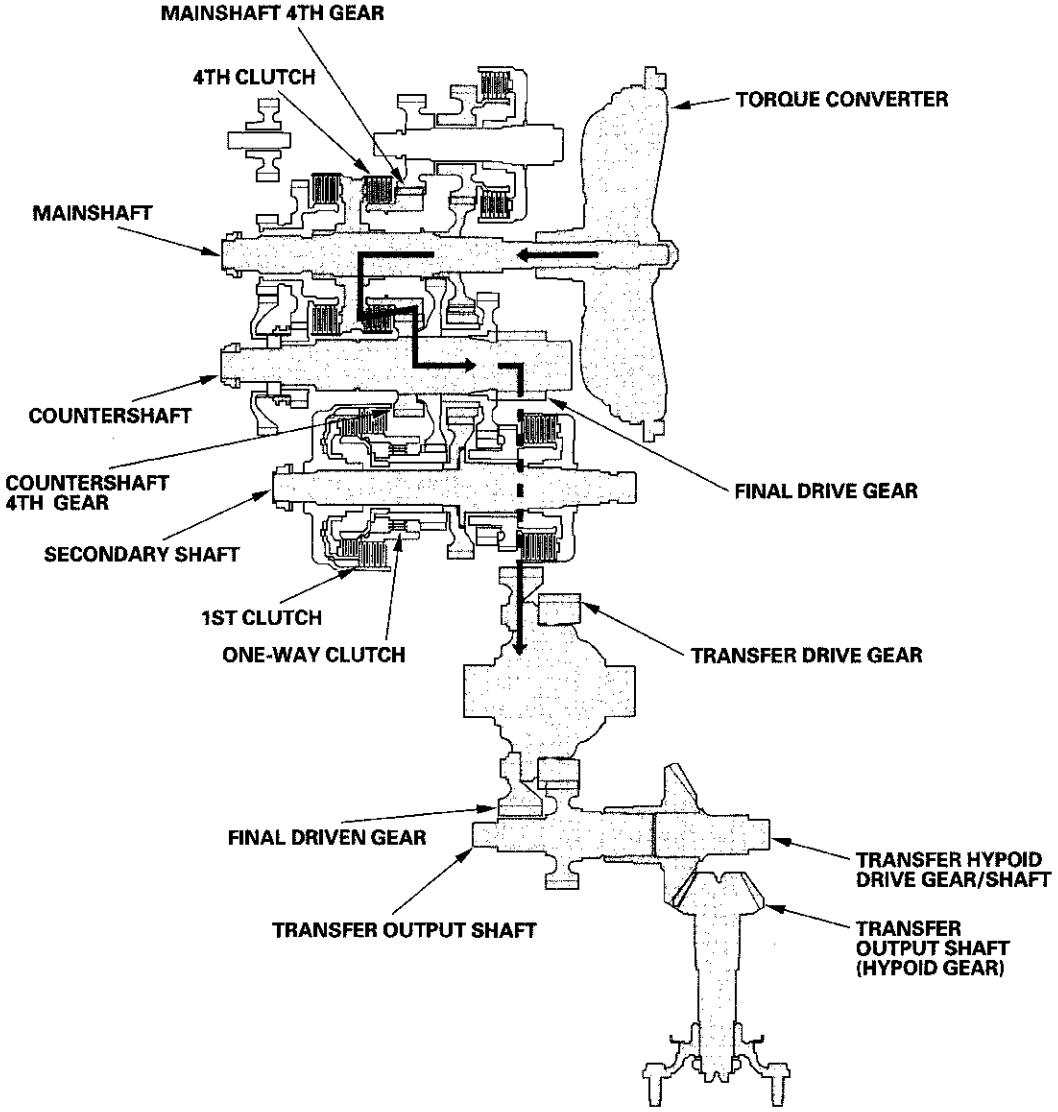
- Hydraulic pressure is applied to the 3rd clutch, then the 3rd clutch engages the intermediary shaft 3rd gear with the intermediary shaft.
- The mainshaft 3rd gear drives the intermediary shaft 4th gear via the intermediary shaft 3rd gear and the 3rd clutch.
- The intermediary shaft 4th gear drives the countershaft 4th gear and the countershaft via the mainshaft 4th gear.
- Power is transmitted to the final drive gear, which in turn drives the final driven gear and the transfer drive gear.
- The transfer output shaft drives the transfer hypoid drive gear/shaft and the transfer output shaft (hypoid gear).
- 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.



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In 4th gear

- Hydraulic pressure is applied to the 4th clutch, then the 4th clutch engages the mainshaft 4th gear with the mainshaft.
- The mainshaft 4th gear drives the countershaft 4th gear and the countershaft.
- Power is transmitted to the final drive gear, which in turn drives the final driven gear and the transfer drive gear.
- The transfer output shaft drives the transfer hypoid drive gear/shaft and the transfer output shaft (hypoid gear).
- 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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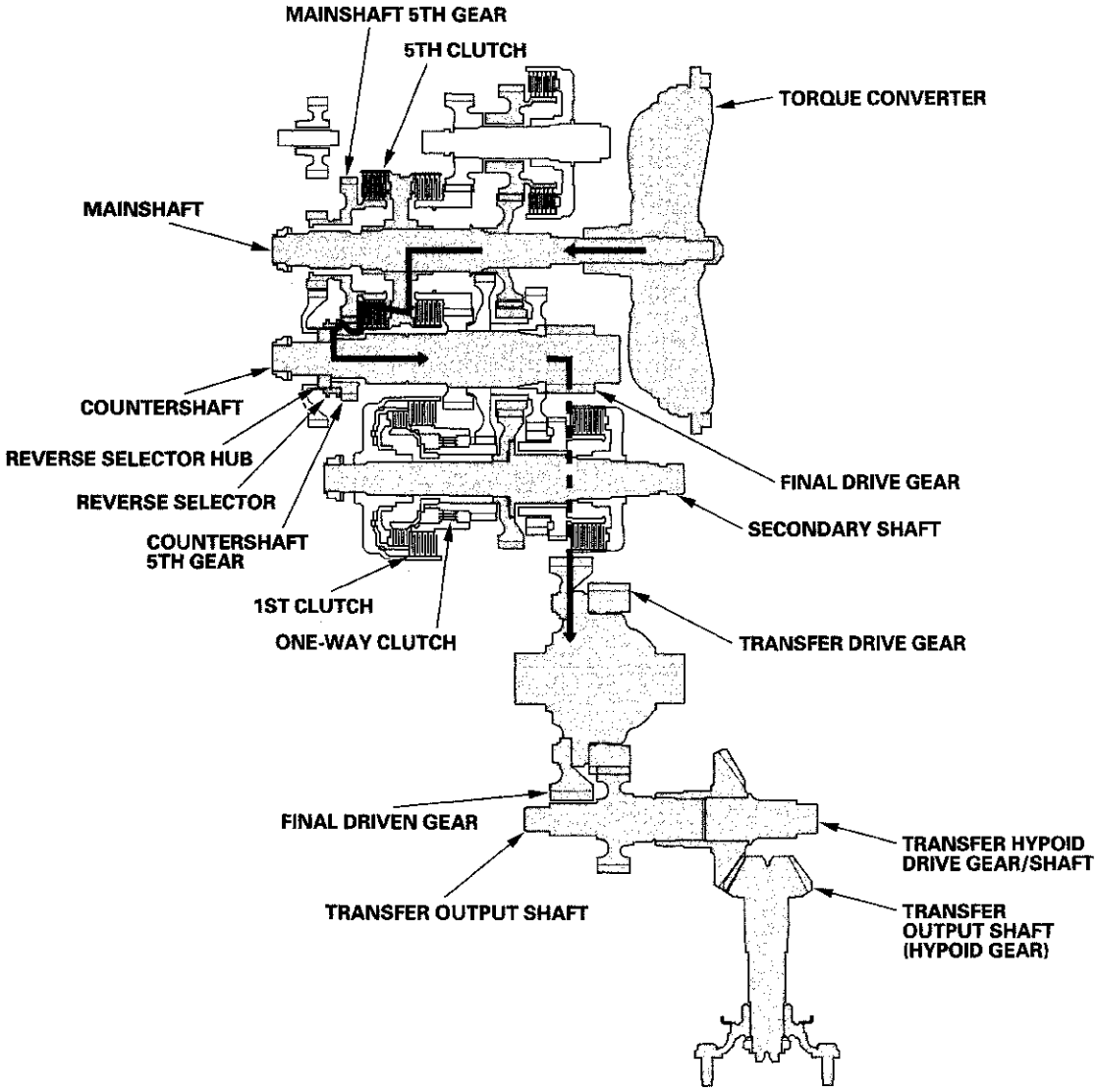
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System Description (cont'd)

Power Flow (cont'd)

In 5th gear

- Hydraulic pressure is applied to the servo valve to engage the reverse selector with the countershaft 5th gear while the shift lever in the forward range (D and S).
- Hydraulic pressure is applied to the 5th clutch, then the 5th clutch engages the mainshaft 5th gear with the mainshaft.
- The mainshaft 5th gear drives the countershaft 5th gear, which drives the reverse selector hub and the countershaft.
- Power is transmitted to the final drive gear, which in turn drives the final driven gear and the transfer drive gear.
- The transfer output shaft drives the transfer hypoid drive gear/shaft and the transfer output shaft (hypoid gear).
- Hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of 5th gear exceeds that of 1st gear, power from 1st gear is cut off at the one-way clutch.

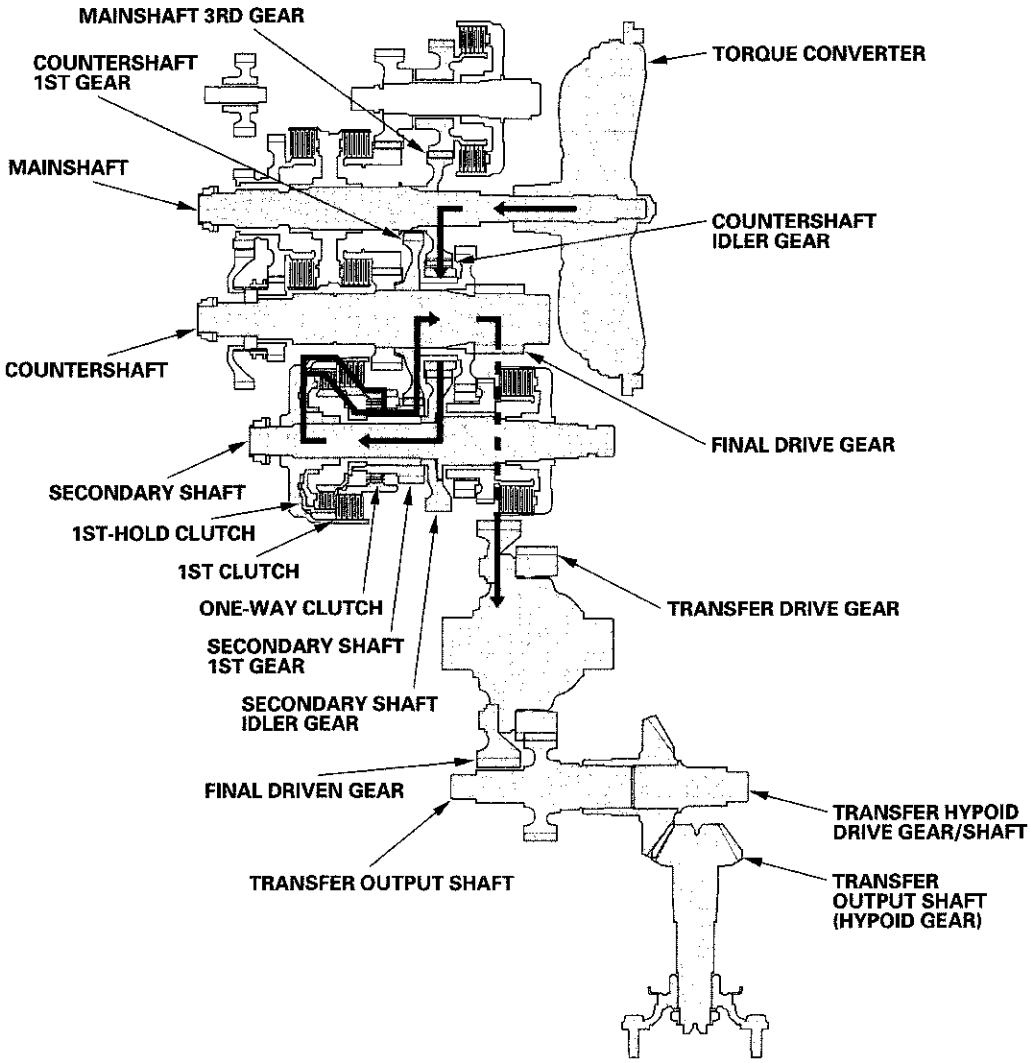


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Acceleration in 1st gear in S with sequential sportshift mode, and in D with D-paddle shift mode

In S with sequential sportshift mode, and in D with D-paddle shift mode under an acceleration, hydraulic pressure is applied to the 1st clutch and the 1st-hold clutch. The power flow when accelerating is as follows:

- Hydraulic pressure is applied to the 1st clutch, then the 1st clutch engages the secondary shaft 1st gear with the secondary shaft by the one-way clutch.
- The mainshaft 3rd gear drives the secondary shaft via the countershaft idler gear and secondary shaft idler gear.
- The secondary shaft 1st gear drives the countershaft 1st gear and the countershaft.
- Hydraulic pressure is also applied to the 1st-hold clutch, and the 1st-hold clutch engages the secondary shaft 1st gear with the secondary shaft.
- Power is transmitted to the final drive gear, which in turn drives the final driven gear and the transfer drive gear.
- The transfer output shaft drives the transfer hypoid drive gear/shaft and the transfer output shaft (hypoid gear).



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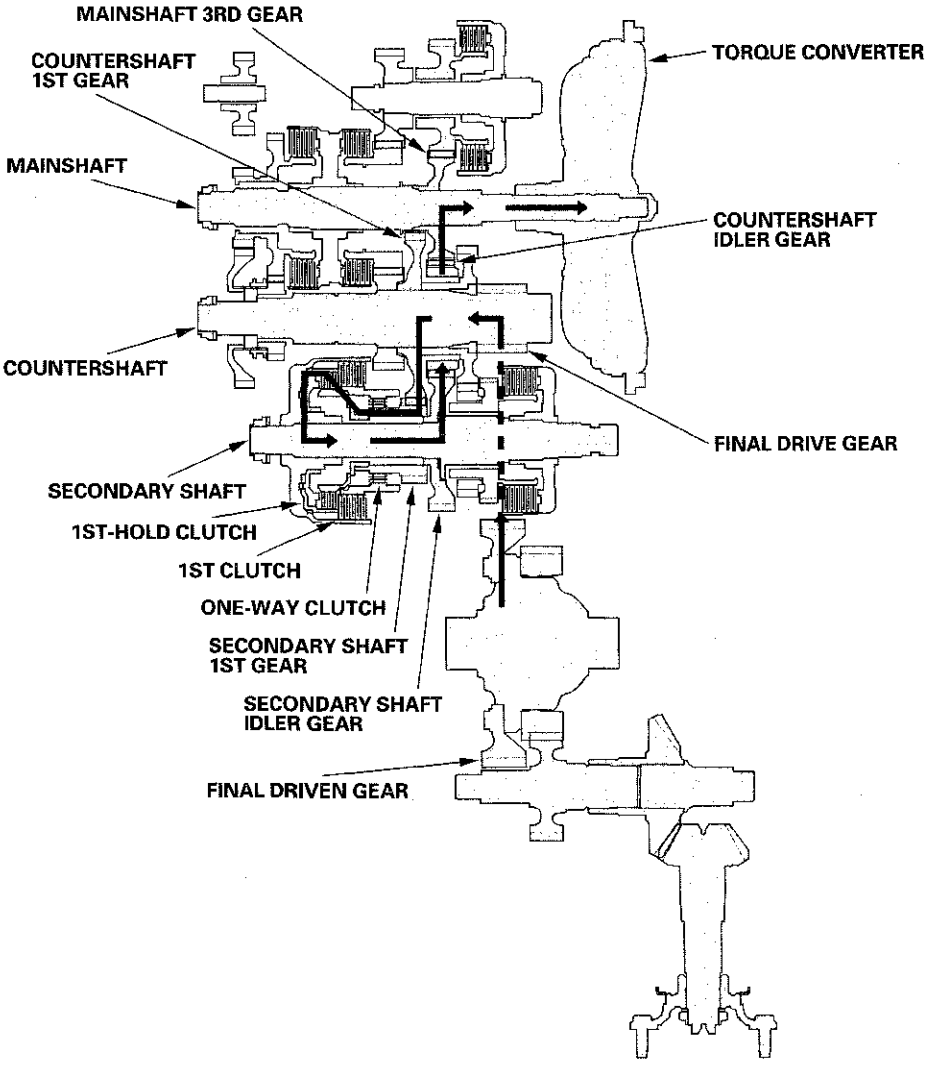
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System Description (cont'd)

Power Flow (cont'd)

Deceleration in 1st gear in S with sequential sportshift mode, and in D with D-paddle shift mode
The power flow in 1st gear in S with sequential sportshift mode, and in D with D-paddle shift mode when decelerating is as follows:

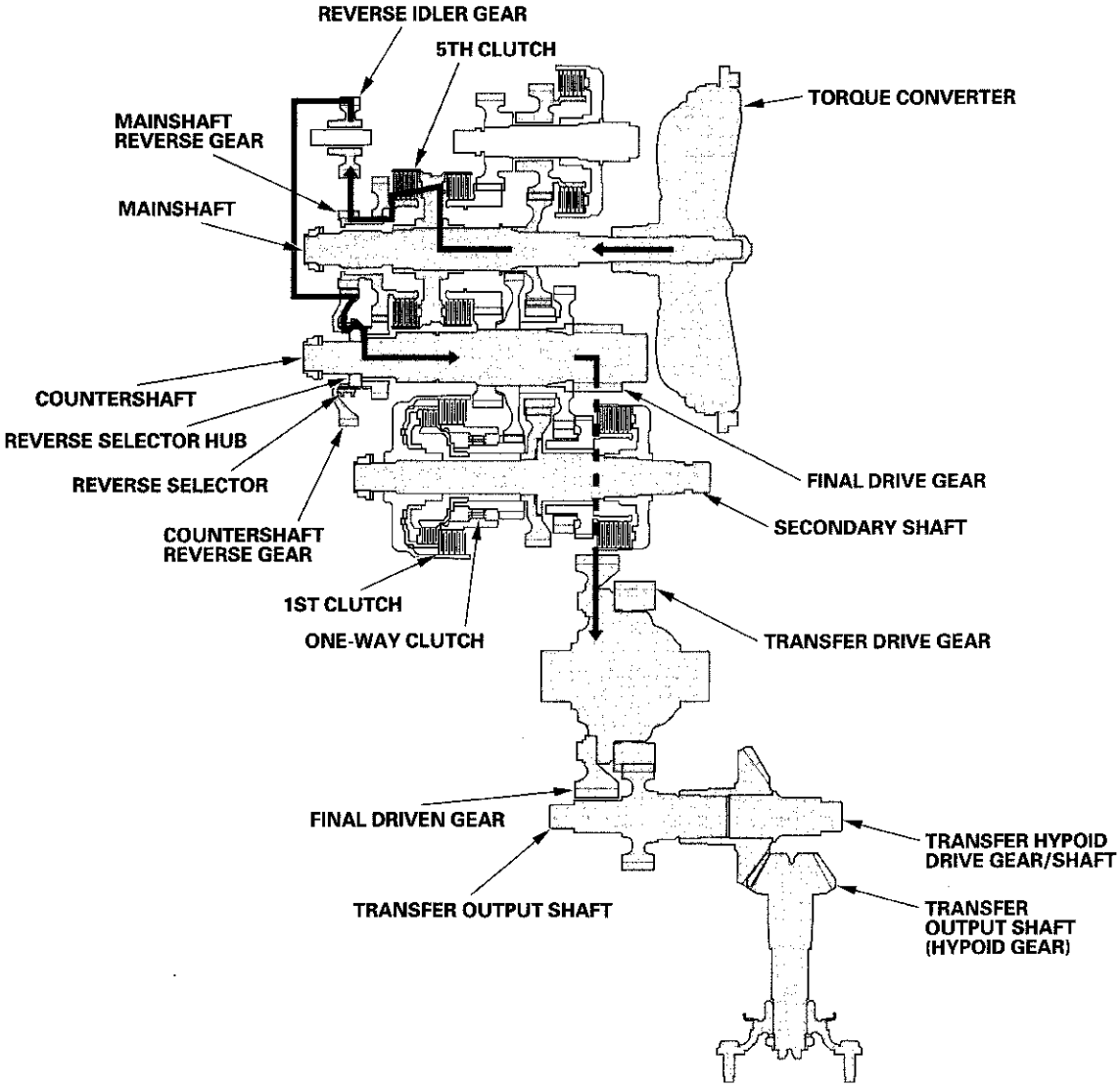
- Hydraulic pressure is applied to the 1st clutch and the 1st-hold clutch.
- Rolling resistance from the road surface goes through the front wheels to the final driven gear, then to the countershaft idler gear.
- The one-way clutch disengages because the application of torque is reversed.
- The force conveyed to the secondary shaft idler gear turns the mainshaft 3rd gear via the countershaft idler gear. As a result, engine braking can be obtained with 1st gear.



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R Position

- Hydraulic pressure is applied to the servo valve to engage the reverse selector with the countershaft reverse gear while the shift lever is in R.
- Hydraulic pressure is applied to the 5th clutch, then the 5th clutch engages the mainshaft reverse gear with the mainshaft.
- The mainshaft reverse gear drives the countershaft reverse gear via the reverse idler gear.
- The countershaft reverse gear drives the countershaft via the reverse selector which drives the reverse selector hub.
- The rotation direction of the countershaft is changed by the reverse idler gear.
- Power is transmitted to the final drive gear, which in turn drives the final driven gear and the transfer drive gear.
- The transfer output shaft drives the transfer hypoid drive gear/shaft and the transfer output shaft (hypoid gear).



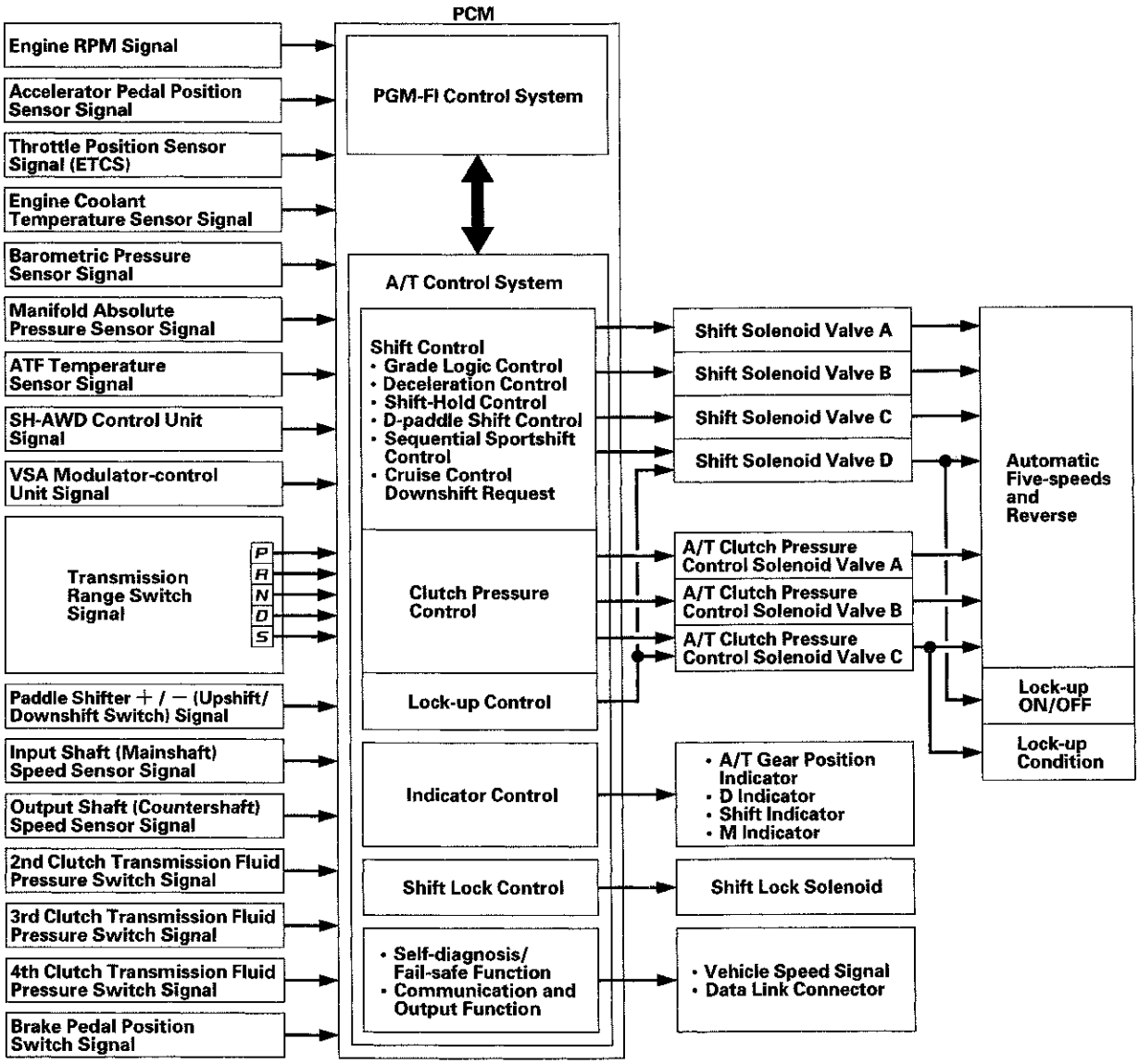
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System Description (cont'd)

Electronic Control System

Electronic Control
The electronic control system consists of the powertrain control module (PCM), the sensors, and the seven solenoid valves. Shifting and lock-up are electronically controlled for comfortable driving under all conditions.

Functional Diagram
The PCM receives input signals from the sensors, the switches, and other control units then processes the data, and sends output signals to the engine control system and the A/T control system. The A/T control system includes shift control, clutch pressure control, and lock-up control. The PCM switches the shift solenoid valves and the A/T clutch pressure control solenoid valves on and off to control gear selection and torque converter clutch lock-up.



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Shift Control

The PCM instantly determines which gear should be selected by various signals sent from the sensors and the switches, and it actuates the shift solenoid valves A, B, C, and D to control gear selection.

There are two types of shift solenoid valves:

- Shift solenoid valves A and D use the ON-OPEN/OFF-CLOSE type; the shift solenoid valve opens the port of shift solenoid valve pressure while the shift solenoid valve is turned ON by the PCM, and closes the port when shift solenoid valve is OFF.
- Shift solenoid valves B and C use the ON-CLOSE/OFF-OPEN type; the shift solenoid valve closes the port of shift solenoid valve pressure while the shift solenoid valve is turned ON by the PCM, and opens the port when shift solenoid valve is OFF.

The combination of driving signals to shift solenoid valves A, B, C, and D are shown in the table.

Position	Gear position	Shift solenoid valves			
		A	B	C	D
D and S	Shifting from N	OFF	ON	OFF	OFF
	Stays in 1st	OFF	ON	ON	OFF or ON
	Shifting gears between 1st and 2nd	ON	ON	ON	OFF or ON
	Stays in 2nd	ON	ON	OFF	OFF or ON
	Shifting gears between 2nd and 3rd	ON	ON	ON	OFF or ON
	Stays in 3rd	ON	OFF	ON	OFF or ON
	Shifting gears between 3rd and 4th	ON	OFF	OFF	OFF or ON
	Stays in 4th	OFF	OFF	OFF	OFF or ON
D	Shifting gears between 4th and 5th	OFF	OFF	ON	OFF or ON
	Stays in 5th	OFF	ON	ON	OFF or ON
S with sequential sportshift mode	1st	OFF	ON	ON	OFF or ON
	2nd	ON	ON	OFF	OFF or ON
	3rd	ON	OFF	ON	OFF or ON
	4th	OFF	OFF	OFF	OFF or ON
	5th	OFF	ON	ON	OFF or ON
N	Neutral	OFF	ON	OFF	OFF
R	Shifting from P and N	OFF	ON	ON	ON
	Stays in reverse	ON	ON	OFF	ON
	Reverse inhibit control	OFF	ON	OFF	OFF
P	Park	OFF	ON	OFF	ON

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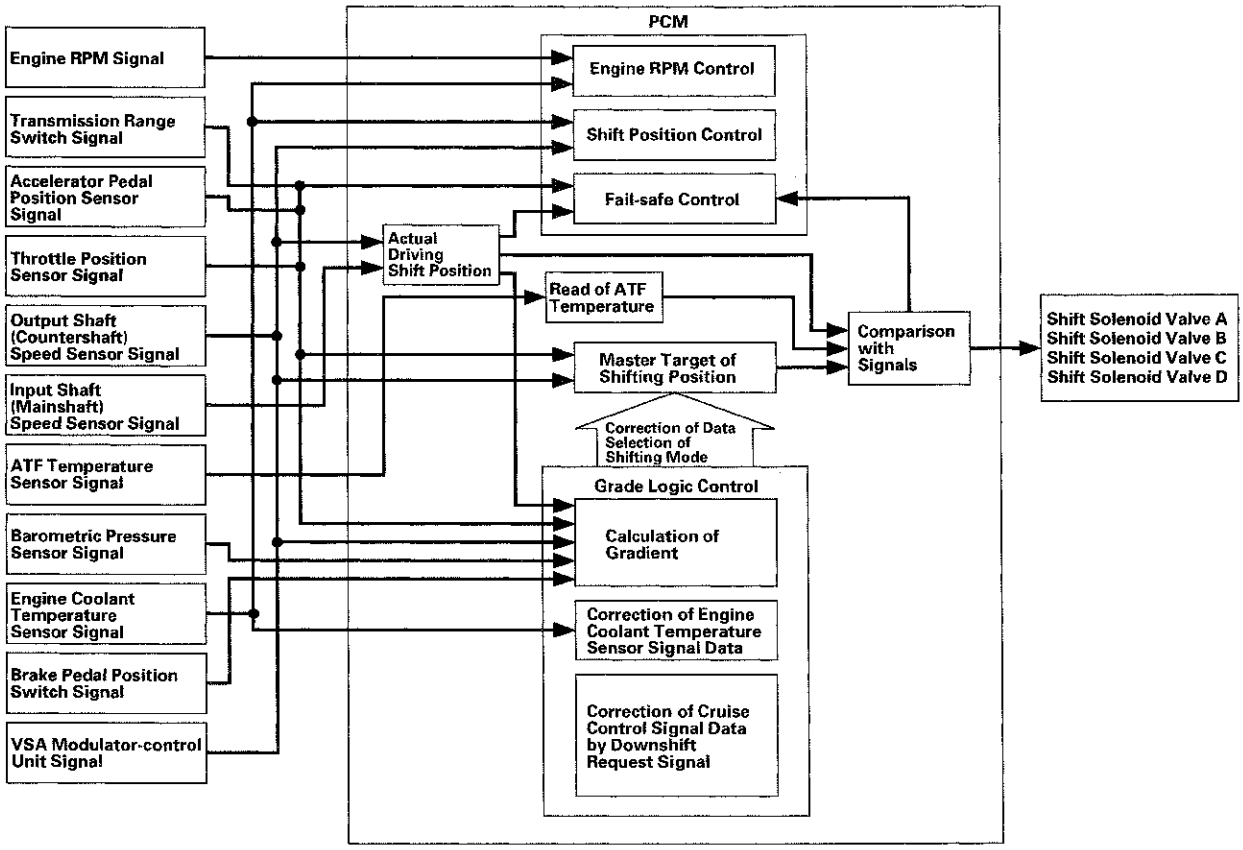
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System Description (cont'd)

Electronic Control System (cont'd)

Shift Control - Grade Logic Control

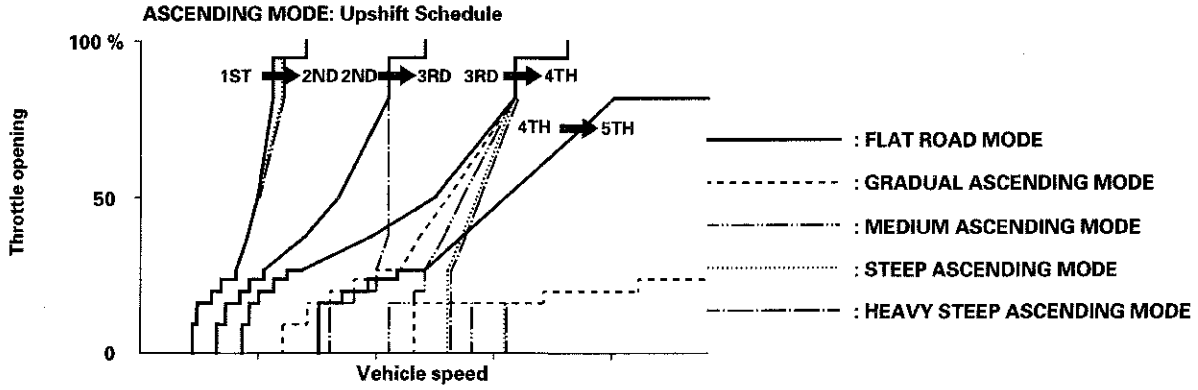
The grade logic control system is used to control shifting in D, and in S with automatic shift mode. The PCM compares actual driving conditions with programmed driving conditions, based on the input from the throttle position sensor, the engine coolant temperature sensor, the barometric pressure sensor, the brake pedal position switch signal, and the shift lever position signal, to control shifting while the vehicle is ascending or descending a slope.



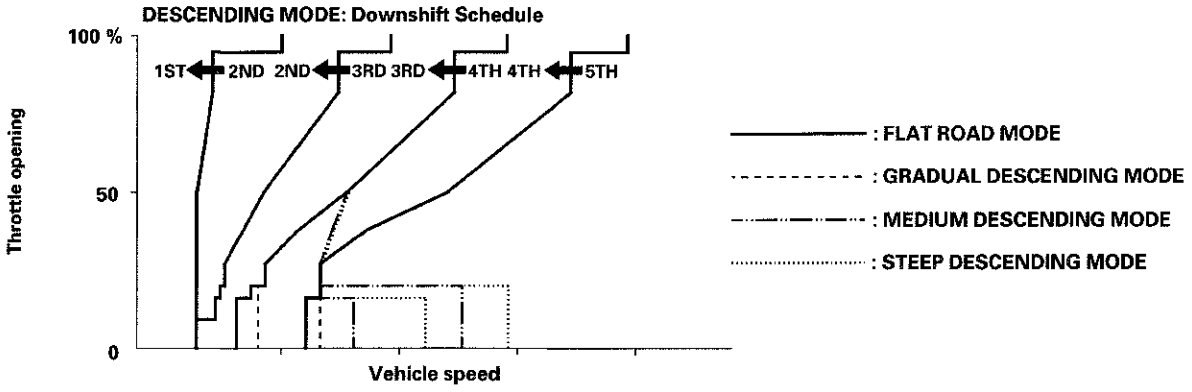
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Grade Logic Control: Ascending Control
When the PCM determines that the vehicle is climbing a hill in D, and in S with automatic shift mode, the system extends the engagement area of 2nd gear, 3rd gear, and 4th gear to prevent the transmission from frequently shifting between 2nd and 3rd gears, between 3rd and 4th gears, and between 4th and 5th gears, so the vehicle can run smoothly and have more power when needed.

NOTE: Shift commands stored in the PCM between 2nd and 3rd gears, between 3rd and 4th gears, and between 4th and 5th gears, enable the PCM to automatically select the most suitable gear based on the steepness of the grade.



Grade Logic Control: Descending Control
When the PCM determines that the vehicle is going down a hill in D, and in S with automatic shift mode, the upshift speed from 4th to 5th gear, 3rd to 4th gear, and from 2nd to 3rd (when the throttle is closed) becomes higher than the set speed for flat road driving to extend the 4th gear, 3rd gear, and 2nd gear driving areas. This, in combination with engine braking from the deceleration lock-up, achieves smooth driving when the vehicle is descending. There are three descending modes with different 4th gear driving areas, 3rd gear driving areas, and 2nd gear driving areas based on the steepness of the grade stored in the PCM. When the vehicle is in 5th or 4th gear and you are decelerating while applying the brakes on a steep hill, the transmission downshifts to a lower gear. When you accelerate, the transmission then returns to a higher gear.



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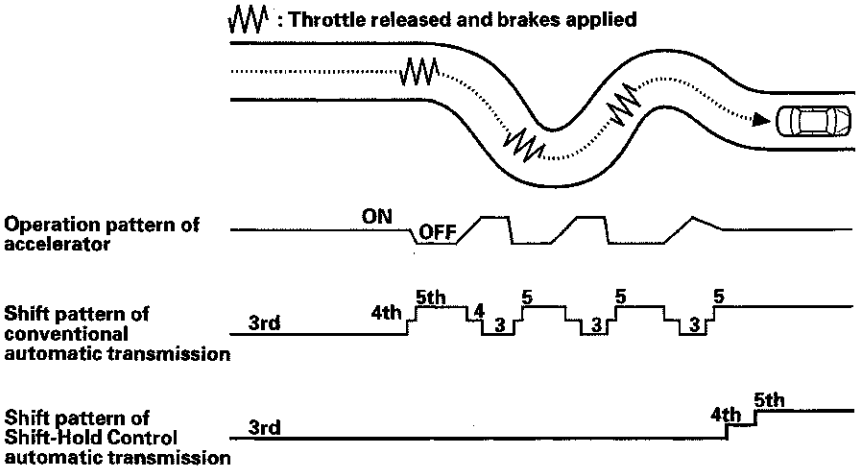
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System Description (cont'd)

Electronic Control System (cont'd)

Deceleration Control
When the vehicle goes around a corner and needs to decelerate first and then accelerate, the PCM goes into the deceleration control mode to reduce the number of times the transmission shifts. When the vehicle is decelerating from speeds above 27 mph (43 km/h), the PCM shifts the transmission from 4th to 3rd earlier than normal to cope with upcoming acceleration.

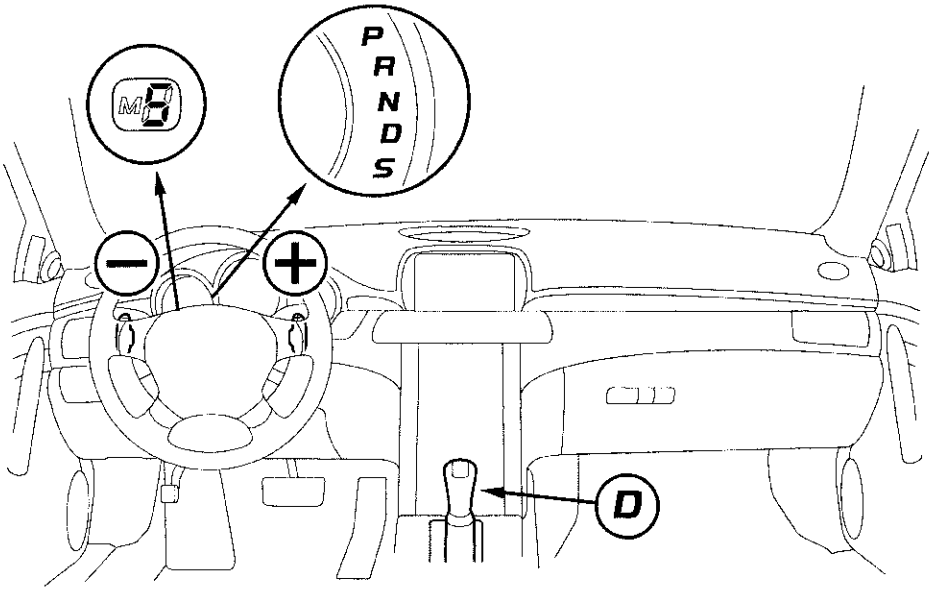
Shift-Hold Control
When negotiating winding roads, the throttle is suddenly released and the brakes are applied, as is the case when decelerating at the entrance of a corner, Shift-Hold Control keeps the transmission in its current (lower) gear as it negotiates the corner and accelerates out.
When the vehicle is driven aggressively on a winding road, the PCM extends the engagement time of 3rd gear and 4th gear to prevent the transmission from frequently shifting between 3rd, 4th, and 5th gears. This allows the driver to have more control for both acceleration and deceleration.
The PCM monitors the average change in vehicle speed and throttle over time. When these values exceed those for normal driving conditions, the upshift from 3rd to 4th gear and 4th to 5th gear is delayed. This gives more control over power, and engine braking when the driver is driving aggressively around winding roads. The transmission resumes the normal upshift pattern after the PCM determines that normal driving has resumed.



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Shift Control - Manual Shift Mode
The RL transmission is provided with a D-paddle shift mode in D, and with a sequential sportshift mode in S. Either mode can be activated by pressing the paddle shifter + (upshift switch) or paddle shifter — (downshift switch) while driving with the shift lever in D and S.

D-Paddle Shift Mode
To engage the D-paddle shift mode, press either of the steering wheel mounted paddle shifters while driving in the D position. In this mode, the transmission can downshift by pressing the paddle shifter — or upshift by pressing the paddle shifter +. Each time the transmission is shifted using the paddles, the shift indicator in the gauge control module displays the current position. The display turns off when the transmission upshifts or downshifts automatically while coasting.
The transmission stays in 5th gear if the paddle shifter + is pressed when driving in 5th gear, and the shift indicator displays "5" for 2 seconds, then goes off. The transmission stays in 1st gear if the paddle shifter — is pressed when driving in 1st gear, and the shift indicator displays "1" for 2 seconds, then goes off.
The transmission stays in the current gear and does not upshift to the next higher gear if the paddle shifter + is pressed while driving below the minimum allowable speed, and the shift indicator blinks the number of the next higher gear several times, then returns to the number of the current gear.



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(cont'd)

System Description (cont'd)

Electronic Control System (cont'd)

S Position Automatic Shift Mode and Sequential Sportshift Mode

The S position has two shifting modes; the automatic shift mode and the sequential sportshift mode. In the S position automatic shift mode, the transmission upshifts and downshifts automatically from 1st through 4th gear, and the paddle shifters are ready to be activated to switch to the sequential sportshift mode. In the automatic shift mode, the shift indicator and the M indicator in the gauge control module do not come on.

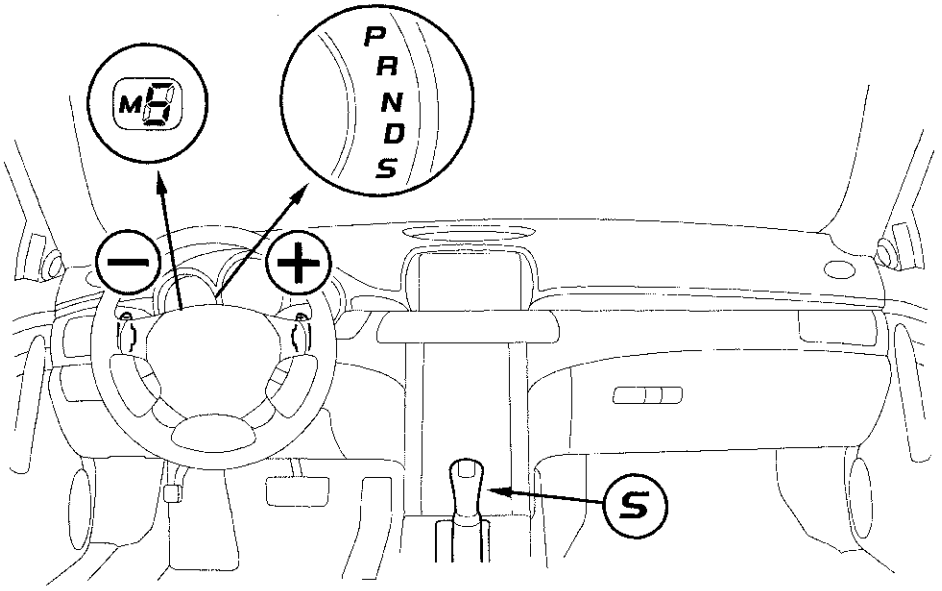
When the paddle shifter + (upshift switch) or paddle shifter — (downshift switch) is pressed, the automatic shift mode is canceled and the sequential sportshift mode comes into operation. The shift indicator displays the number of the selected gear, and the M indicator comes on. In the sequential sportshift mode, the driver can shift up and down manually from 1st through 5th gear by using the paddle shifters, much like a manual transmission. The paddle shifters are installed on the back of the steering wheel, and the driver can shift gears by pressing the paddle shifters without taking either hand off the steering wheel.

In the sequential sportshift mode, the transmission must be shifted up and down by pressing the paddle shifters. However, if the vehicle is coasting at a speed that would cause the engine to over-rev by downshifting, the transmission will not shift when the paddle shifter — is pressed. The shift indicator blinks the number of the selected stage position several times, then returns to the current stage. If the vehicle speed reaches an appropriate speed while the shift indicator is blinking, the transmission downshifts and the shift indicator displays the selected stage. Likewise, if the vehicle is driving below an appropriate speed to upshift when the paddle shifter + is pressed, the transmission will not shift. The shift indicator blinks the number of the selected stage several times, and then returns to the number of the current stage. If the vehicle speed reaches an appropriate upshift speed while the shift indicator is blinking, the transmission upshifts and the shift indicator displays the selected stage.

This mode has automatic downshifting areas so the vehicle can run smoothly with more power to cope with upcoming acceleration. When coasting in 5th gear or 4th gear, the transmission downshifts to the next lower gear if the vehicle slows down to the programmed speed, or by pressing the brake pedal.

When the transmission decelerates to a stop, the transmission shifts to 1st gear automatically. The transmission can be shifted to 2nd gear by pressing the paddle shifter + while the vehicle is stopped, and the vehicle can start off in 2nd gear.

The sequential sportshift mode is canceled when moving the shift lever to any position other than S.

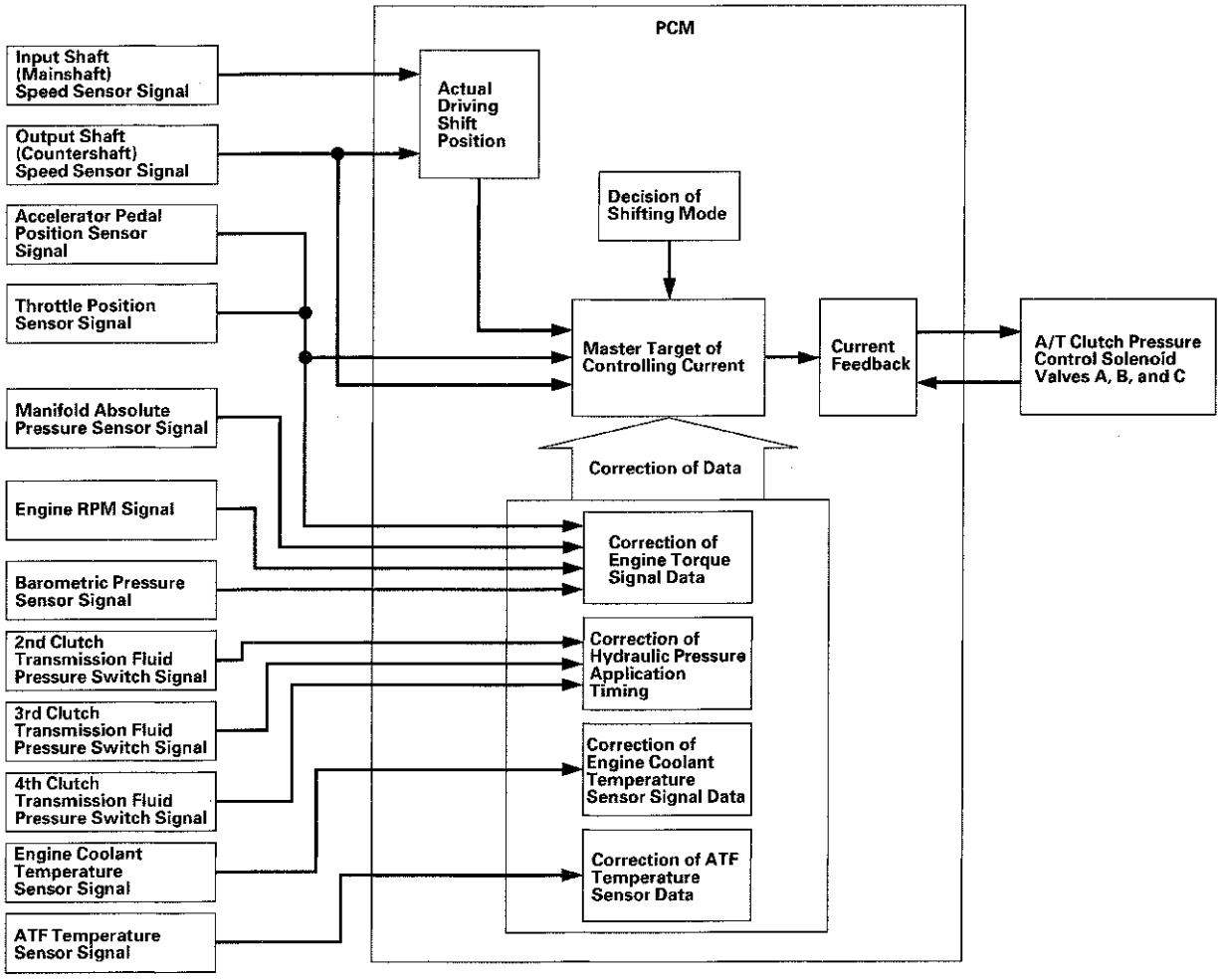


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Clutch Pressure Control

The PCM actuates A/T clutch pressure control solenoid valves A, B, and C to control the clutch pressure. When shifting between gears, the clutch pressure regulated by A/T clutch pressure control solenoid valves A, B, and C engages and disengages the clutch smoothly.

The PCM receives input signals from the various sensors and switches, processes the data, and outputs current to A/T clutch pressure control solenoid valves A, B, and C.



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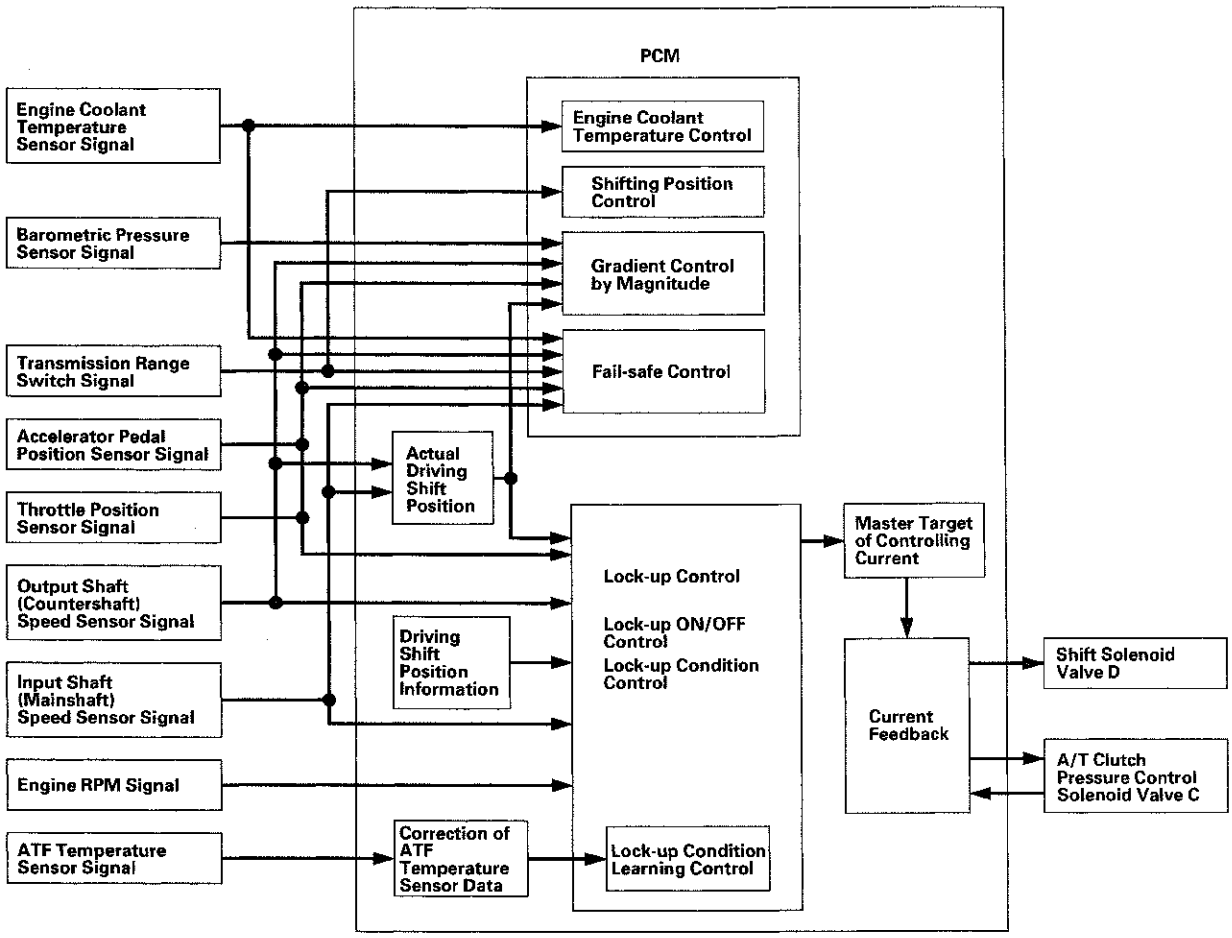
System Description (cont'd)

Electronic Control System (cont'd)

Lock-up Control

Shift solenoid valve D controls the hydraulic pressure to switch the lock-up shift valve and lock-up ON and OFF. When the PCM actuates the shift solenoid valve D and A/T clutch pressure control solenoid valve C ON, lock-up starts. A/T clutch pressure control solenoid valve C regulates and applies hydraulic pressure to the lock-up control valve to control the amount of lock-up.

The lock-up mechanism operates in 2nd, 3rd, 4th, and 5th gears in D and S with sequential sportshift mode, and 3rd and 4th gears in S with automatic shift mode.

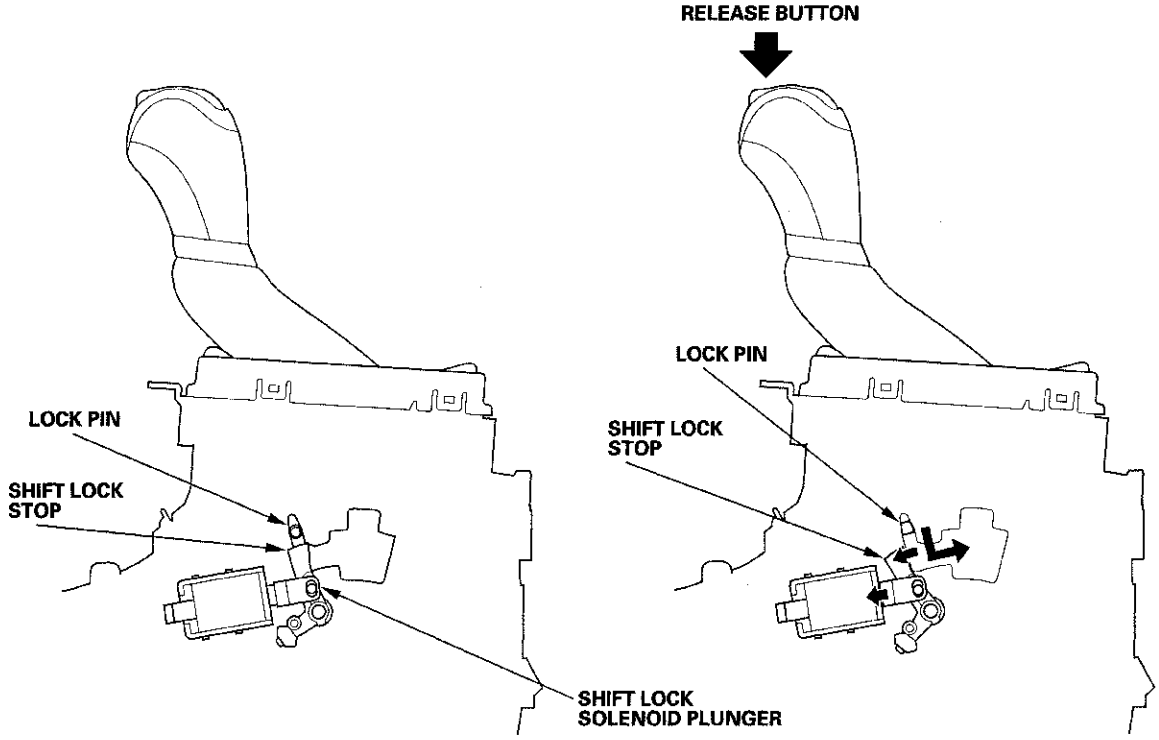


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Shift Lock Control

The shift lock control system reduces the risk of the unintentional engine starting. Starting the engine is possible only in P and N, and the shift lever cannot be shifted out of P without pressing the brake pedal and releasing the accelerator. The shift lock mechanism consists of the shift lock solenoid, shift lock stop, shift lock release, and reated parts. The shift lock solenoid is electronically controlled by the shift lock control system signals.

In P without pressing the brake pedal or while pressing the accelerator, the shift lock solenoid remains OFF, and the shift lever cannot be shifted out of P because the shift lock stops the lock pin. However while the brake pedal is pressed and the accelerator is released, the shift lock solenoid is turned ON, and the shift lock solenoid plunger is retracted, releasing the shift lock stop. Pushing the release button on the top of the shift lever passes the lock pin through the shift lock stop, and allows the shift lever to be shifted out of P.



SHIFT LOCK SOLENOID: OFF

SHIFT LOCK SOLENOID: ON

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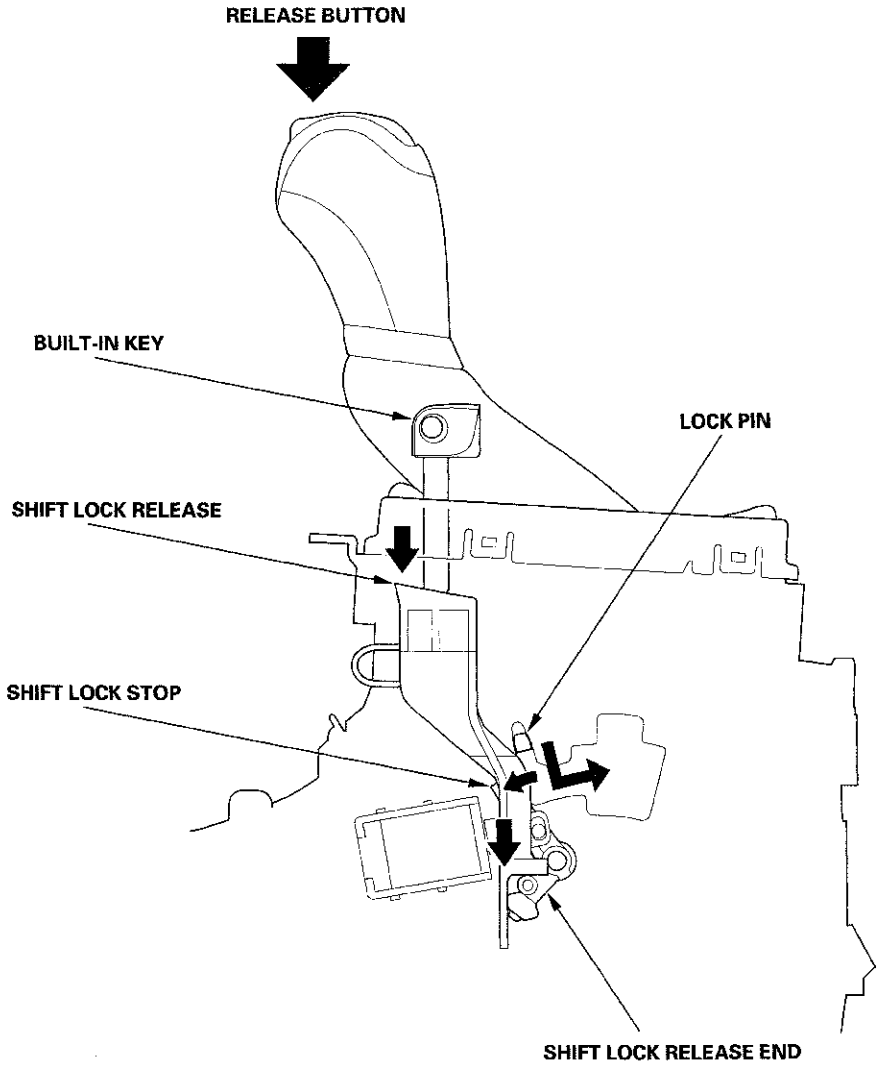
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System Description (cont'd)

Electronic Control System (cont'd)

Shift Lock Control (cont'd)

When a shift lock control system malfunction or a mechanical problem occurs, the shift lever can be shifted out of P temporarily by pressing the shift lock release with the built-in key or a screwdriver. Pushing the shift lock release releases the shift lock stop, and allow the shift lever to be shifted out of P.



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Self-diagnosis
If the PCM detects the failure of a signal from a sensor, a switch, a solenoid valve, or from another control unit, it stores a Pending or Confirmed DTCs. Depending on the failure, a Confirmed DTC is stored in either the first or the second drive cycle. When a DTC is stored, the PCM blinks the D indicator and/or turns on the malfunction indicator lamp (MIL) by a signal sent to the gauge control module via F-CAN.

- **One Drive Cycle Detection Method**
  When an abnormality occurs in the signal from a sensor, a switch, a solenoid valve, or from another control unit, the PCM stores a Confirmed DTC for the failure and blinks the D indicator and/or turns on the MIL immediately.

- **Two Drive Cycle Detection Method**
  When an abnormality occurs in the signal from a sensor, a switch, a solenoid valve, or from another control unit in the first drive cycle, the PCM stores a Pending DTC. The D indicator and the MIL do not turns on at this time. If the failure continues in the second drive cycle, the PCM stores a Confirmed DTC and blinks the D indicator and/or turns on the MIL.

Fail-safe Function
When an abnormality occurs in the signal from a sensor, a switch, a solenoid valve, or from another control unit, the PCM ignores that signal and substitutes a pre-programmed value for that signal to allow the automatic transmission to continue operating. This causes a DTC to be stored and the D indicator to blink and/or the MIL to come on. The transmission may not shift normally during fail-safe operation. Do not run the test driving diagnosis when the MIL is ON, or the D indicator is blinking.

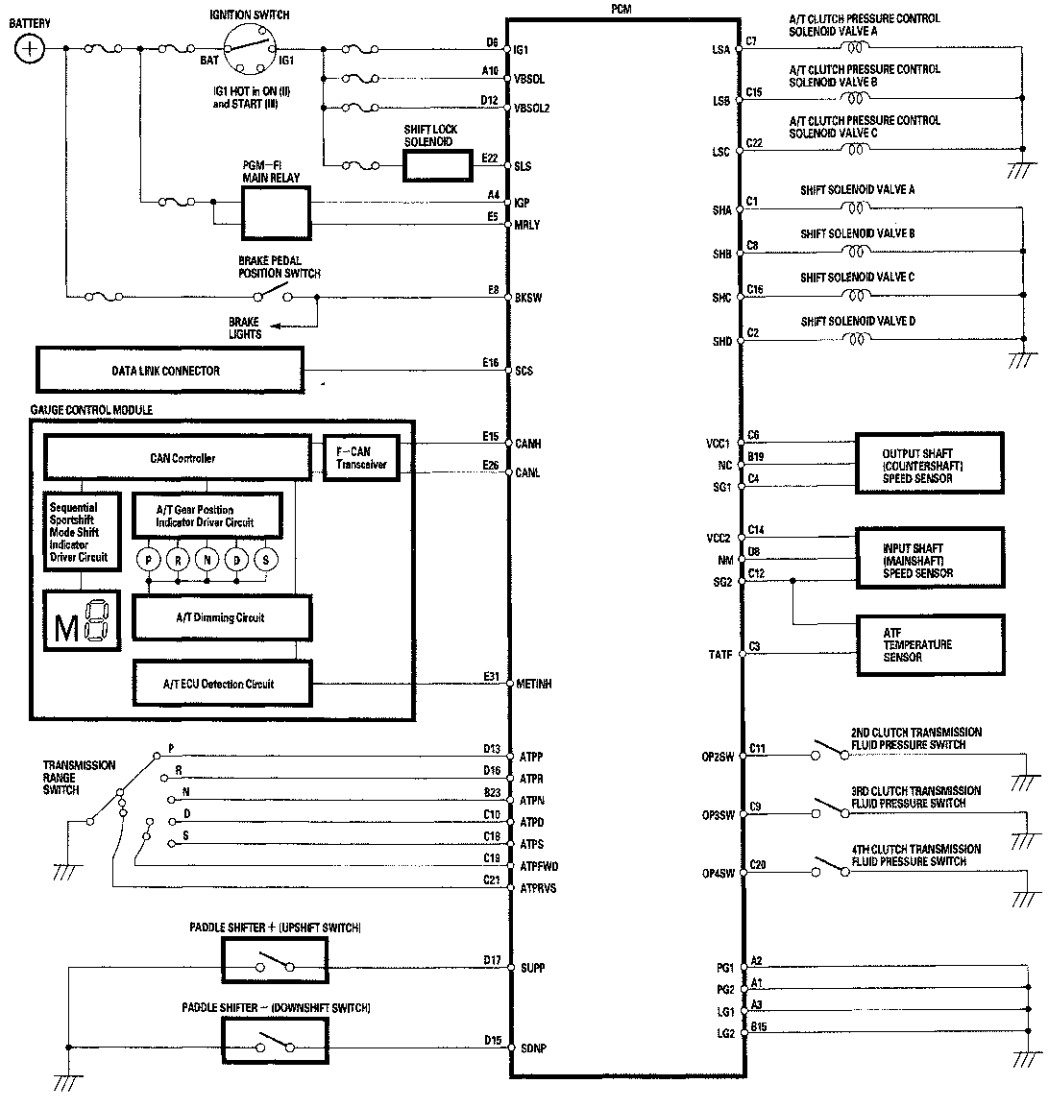
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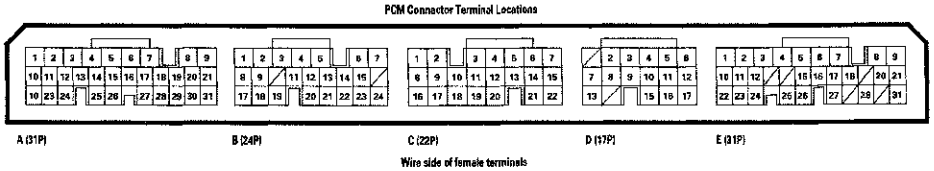
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System Description (cont'd)

Electronic Control System (cont'd)

PCM A/T Control System Electrical Connections

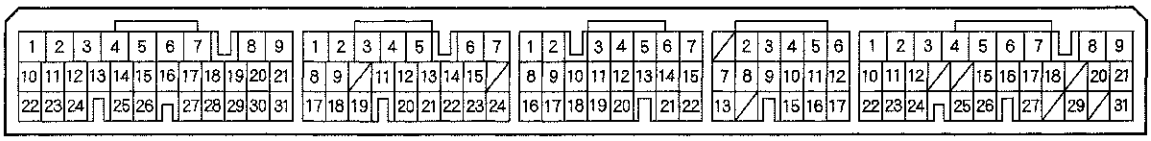




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PCM A/T Control System Inputs and Outputs

PCM Connector Terminal Locations



A (31P) **B (24P)** **C (22P)** **D (17P)** **E (31P)**

Wire side of female terminals

PCM CONNECTOR A (31P)

Terminal number	Wire color	Terminal name	Description	Signal
1	BLK	PG2 (POWER GROUND)	Ground circuit for PCM	Less than 1.0 V at all times
2	BLK	PG1 (POWER GROUND)	Ground circuit for PCM	Less than 1.0 V at all times
3	BRN/YEL	LG1 (LOGIC GROUND)	Ground circuit for PCM	Less than 1.0 V at all times
4	YEL/BLK	IGP (POWER SOURCE)	Power source for PCM	With ignition switch ON (II): battery voltage With ignition switch OFF: about 0 V
10	BLK/YEL	VBSOL (POWER SOURCE FOR SOLENOID VALVES)	Power source for solenoid valves	With ignition switch ON (II): battery voltage With ignition switch OFF: about 0 V

PCM CONNECTOR B (24P)

Terminal number	Wire color	Terminal name	Description	Signal
15	BRN/YEL	LG2 (LOGIC GROUND)	Ground circuit for PCM	Less than 1.0 V at all times
19	BLU	NC (OUTPUT SHAFT (COUNTERSHAFT) SPEED SENSOR)	Detects output shaft (countershaft) speed sensor signals	With ignition switch ON (II): about 0 V or about 5.0 V With driving: pulses
23	RED/BLK	ATPN (TRANSMISSION RANGE SWITCH N POSITION)	Detects transmission range switch N position signal	In N: about 0 V In any position other than N: battery voltage

PCM CONNECTOR C (22P)

Terminal number	Wire color	Terminal name	Description	Signal
1	BLU/YEL	SHA (SHIFT SOLENOID VALVE A)	Drives shift solenoid valve A	With engine running in D (in 2nd and 3rd gears), S (in 2nd and 3rd gears), and R: battery voltage With engine running in P, N, D (in 1st, 4th, and 5th gears), and S (in 1st, 4th, and 5th gears): about 0 V
2	GRN/RED	SHD (SHIFT SOLENOID VALVE D)	Drives shift solenoid valve D	With engine running in N and D: about 0 V With engine running in P, N, and D: battery voltage In any other position: depending on conditions

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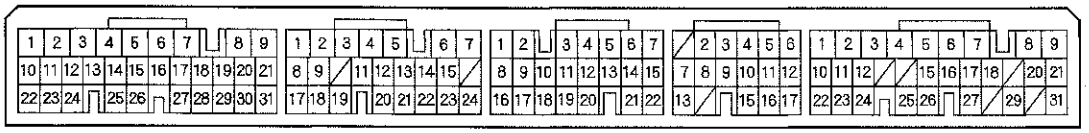
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System Description (cont'd)

Electronic Control System (cont'd)

PCM A/T Control System Inputs and Outputs (cont'd)

PCM Connector Terminal Locations



A (31P) B (24P) C (22P) D (17P) E (31P)

Wire side of female terminals

PCM CONNECTOR C (22P)

Terminal number	Wire color	Terminal name	Description	Signal
3	BLU/YEL	TATF (ATF TEMPERATURE SENSOR)	Detects ATF temperature sensor signal	With ignition switch ON (II): about 0.2—4.0 V (depending on ATF temperature)
4	GRN/WHT	SG1 (SENSOR GROUND)	Sensor ground	Less than 1.0 V at all times
6	YEL/RED	VCC1 (SENSOR VOLTAGE)	Provides sensor voltage	With ignition switch ON (II): about 5.0 V With ignition switch OFF: about 0 V
7	RED	LSA (A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE A)	Drives A/T clutch pressure control solenoid valve A	With ignition switch ON (II): pulses
8	GRN/WHT	SHB (SHIFT SOLENOID VALVE B)	Drives shift solenoid valve B	With engine running in P, R, N, D (in 1st, 2nd, and 5th gears), and S (in 1st, 2nd, and 5th gears): battery voltage With engine running in D (in 3rd and 4th gears) and S (in 3rd and 4th gears): about 0 V
9	BLU/WHT	OP3SW (3RD CLUTCH TRANSMISSION FLUID PRESSURE SWITCH)	Detects 3rd clutch transmission fluid pressure switch input signal	With ignition switch ON (II): • Without 3rd clutch pressure: about 5.0 V • With 3rd clutch pressure: about 0 V
10	YEL/GRN	ATPD (TRANSMISSION RANGE SWITCH D POSITION)	Detects transmission range switch D position input signal	In D: about 0 V In any position other than D: battery voltage
11	BLU/BLK	OP2SW (2ND CLUTCH TRANSMISSION FLUID PRESSURE SWITCH)	Detects 2nd clutch transmission fluid pressure switch input signal	With ignition switch ON (II): • Without 2nd clutch pressure: about 5.0 V • With 2nd clutch pressure: about 0 V
12	GRN/YEL	SG2 (SENSOR GROUND)	Sensor ground	Less than 1.0 V at all times
14	YEL/BLU	VCC2 (SENSOR VOLTAGE)	Provides sensor voltage	With ignition switch ON (II): about 5.0 V With ignition switch OFF: about 0 V
15	BRN/WHT	LSB (A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE B)	Drives A/T clutch pressure control solenoid valve B	With ignition switch ON (II): pulses
16	GRN	SHC (SHIFT SOLENOID VALVE C)	Drives shift solenoid valve C	With engine running in D (in 1st, 3rd, and 5th gears) and S (in 1st, 3rd, and 5th gears): battery voltage With engine running in P, R, N, D (in 2nd and 4th gears), and S (in 2nd and 4th gears): about 0 V
18	RED	ATPS (TRANSMISSION RANGE SWITCH S)	Detects transmission range switch S input signal	In S: about 0 V In any position other than S: battery voltage
19	BLU/YEL	ATPFWD (TRANSMISSION RANGE SWITCH FWD POSITION)	Detects transmission range switch signal D and S position input signal	In D and S: about 0 V In any position other than D and S: battery voltage
20	BLU/YEL	OP4SW (4TH CLUTCH TRANSMISSION FLUID PRESSURE SWITCH)	Detects 4th clutch transmission fluid pressure switch input signal	With ignition switch ON (II): • Without 4th clutch pressure: about 5.0 V • With 4th clutch pressure: about 0 V
21	RED/WHT	ATPRVS (TRANSMISSION RANGE SWITCH RVS POSITION)	Detects transmission range switch P, R, and N position input signal	In P, R, and N: about 0 V In any position other than P, R, and N: battery voltage
22	GRN/RED	LSC (A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE C)	Drives A/T clutch pressure control solenoid valve C	With ignition switch ON (II): pulses

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PCM CONNECTOR D (17P)

Terminal number	Wire color	Terminal name	Description	Signal
6	YEL	IG1 (IGNITION SIGNAL)	Detects ignition signal	With ignition switch ON (II): battery voltage With ignition switch OFF: about 0 V
8	RED	NM (INPUT SHAFT (MAINSHAFT) SPEED SENSOR)	Detects input shaft (mainshaft) speed sensor signal	With ignition switch ON (II): about 0 V or about 5.0 V With engine running in N: about 2.5 V
12	ORN	VBSOL2 (POWER SOURCE FOR SOLENOID VALVES)	Power source for solenoid valves	With ignition switch ON (II): battery voltage With ignition switch OFF: about 0 V
13	GRN	ATPP (TRANSMISSION RANGE SWITCH P POSITION)	Detects transmission range switch P position input signal	In P: about 0 V In any position other than P: battery voltage
15	PUR	SDNP (PADDLE SHIFTER − (DOWNSHIFT SWITCH))	Detects paddle shifter − (downshift switch) signal	With ignition switch ON (II): • Paddle shifter − (downshift switch) pressed: about 0 V • Paddle shifter − (downshift switch) released: battery voltage
16	PUR	ATPR (TRANSMISSION RANGE SWITCH R POSITION)	Detects transmission range switch R position input signal	In R: about 0 V In any position other than R: battery voltage
17	BLU	SUPP (PADDLE SHIFTER + (UPSHIFT SWITCH))	Detects paddle shifter + (upshift switch) signal	With ignition switch ON (II): • Paddle shifter + (upshift switch) pressed: about 0 V • Paddle shifter + (upshift switch) released: battery voltage

PCM CONNECTOR E (31P)

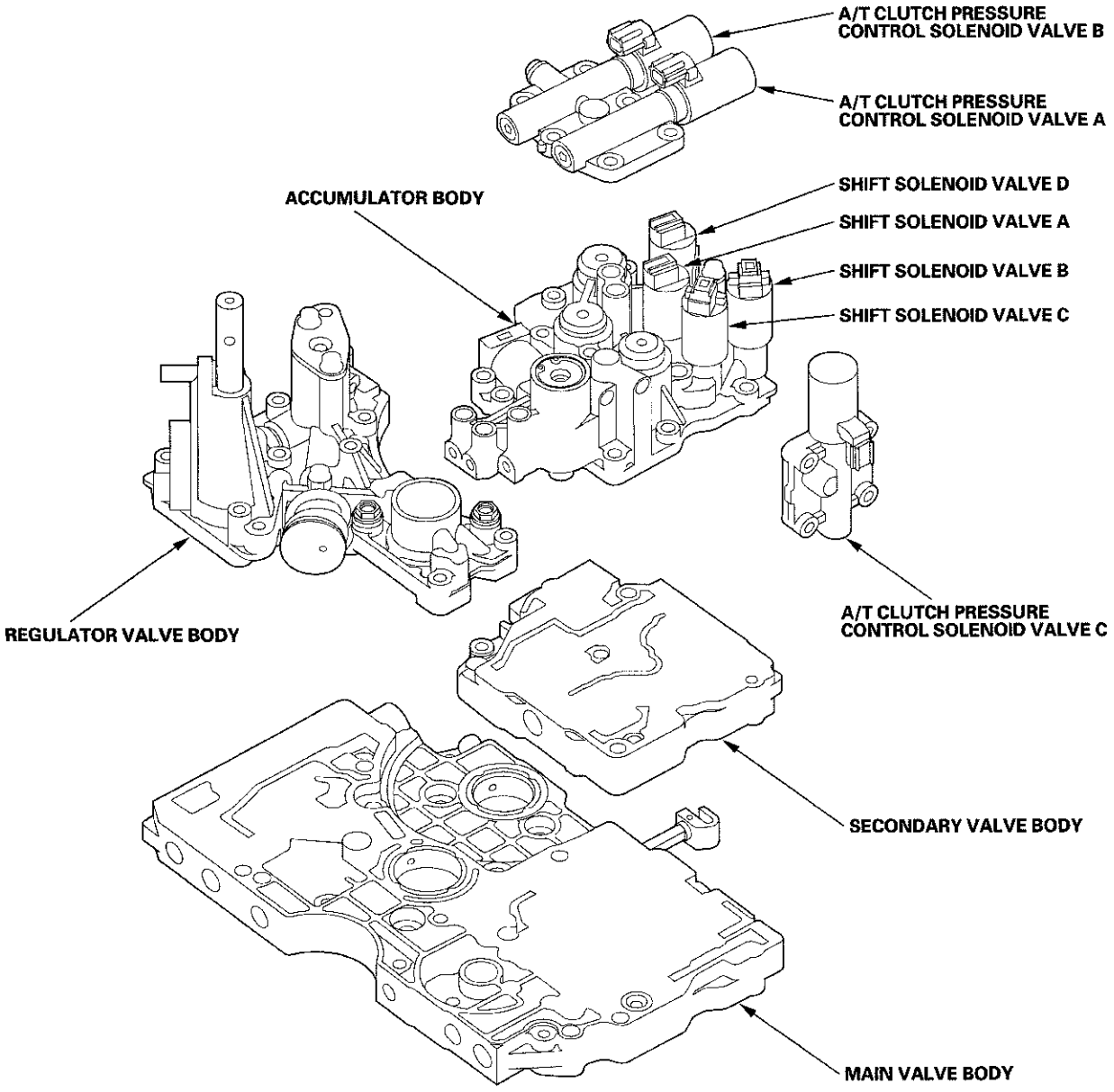
Terminal number	Wire color	Terminal name	Description	Signal
5	GRN	MRLY (PGM-FI MAIN RELAY)	Drives PGM-FI main relay 1 (FI MAIN) Power source for DTC memory	With ignition switch ON (II): about 0 V With ignition switch OFF: battery voltage
8	LT GRN	BKSW (BRAKE PEDAL POSITION SWITCH)	Detects brake pedal position switch signal	With brake pedal released: about 0 V With brake pedal pressed: battery voltage
15	WHT	CANH (CAN COMMUNICATION SIGNAL HIGH)	Sends communication signal	With ignition switch ON (II): pulses
16	BRN	SCS (SERVICE CHECK SIGNAL)	Detects service check signal	With the service check signal shorted with the HDS: about 0 V With the service check signal opened: about 5.0 V
22	PNK	SLS (SHIFT LOCK SOLENOID)	Drives shift lock solenoid	With ignition switch ON (II), in P, brake pedal pressed, and accelerator released: about 0 V
26	RED	CANL (CAN COMMUNICATION SIGNAL LOW)	Sends communication signal	With ignition switch ON (II): pulses
31	GRN	METINH (METER DISPLAY INHIBIT SIGNAL)	Sends A/T shift position inhibit signal	With ignition switch ON (II): about 10.0 V

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System Description (cont'd)

Hydraulic Controls

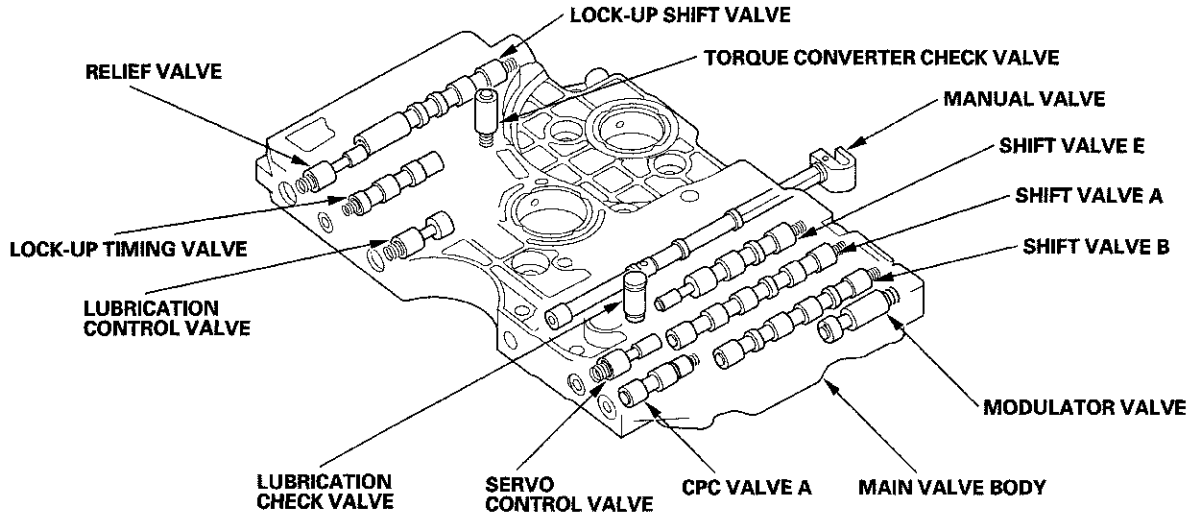
The valve body includes the main valve body, the regulator valve body, the secondary valve body, and the accumulator body. The ATF pump is driven by splines on the end of the torque converter which is attached to the engine. Fluid flows through the regulator valve to maintain specified pressure through the main valve body to the manual valve, directing pressure to each of the clutches. The shift solenoid valves A, B, C, and D are mounted on the accumulator body. The A/T clutch pressure control solenoid valves A, B, and C are mounted on the transmission housing.



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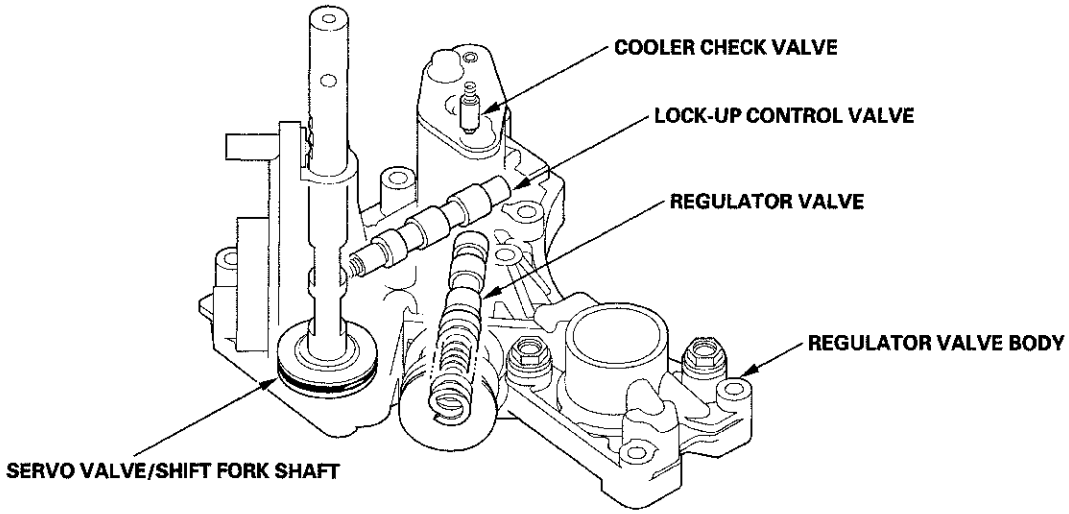
Main Valve Body

The main valve body contains the manual valve, the modulator valve, the torque converter check valve, the shift valve A, the shift valve B, the shift valve E, the CPC valve A, the servo control valve, the relief valve, the lock-up shift valve, the lock-up timing valve, the lubrication control valve, the lubrication check valve, and the ATF pump gears. The primary function of the main valve body is to switch fluid pressure on and off to control hydraulic pressure going to the hydraulic control system.



Regulator Valve Body

The regulator valve body is located on the main valve body. The regulator valve body contains the regulator valve, the cooler check valve, the lock-up control valve, the servo valve, and the 3rd accumulator.



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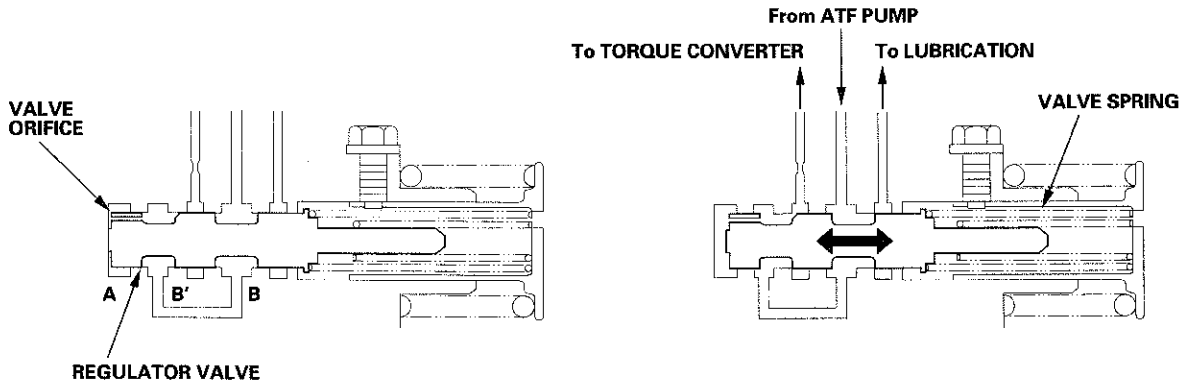
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System Description (cont'd)

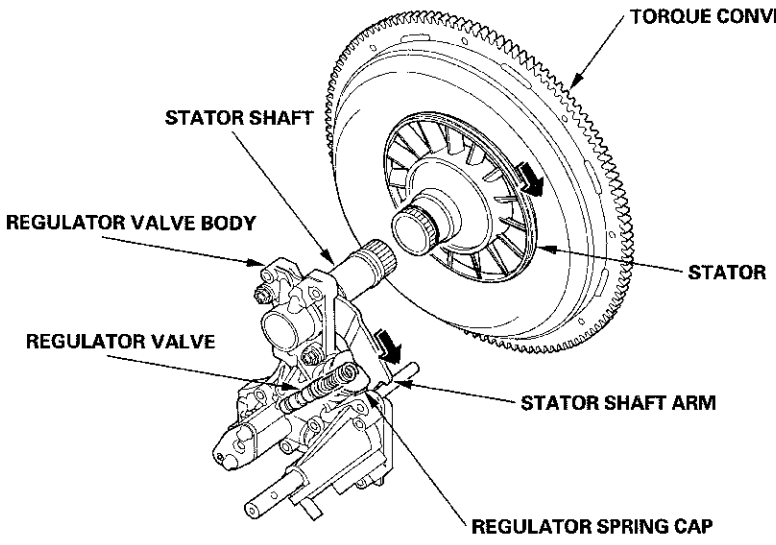
Hydraulic Controls (cont'd)

Regulator Valve

The regulator valve maintains constant hydraulic pressure from the ATF pump to the hydraulic control system, while also furnishing fluid to the lubrication system and torque converter. Fluid from the ATF pump flows through B and B'. Fluid entering from B flows through the valve orifice to the A cavity. This pressure of the A cavity pushes the regulator valve to the spring 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 the regulator valve returns under spring force. According to the level of the hydraulic pressure through B, the position of the regulator valve changes, and the amount of fluid from B' through the torque converter changes. This operation is continued, maintaining the line pressure.



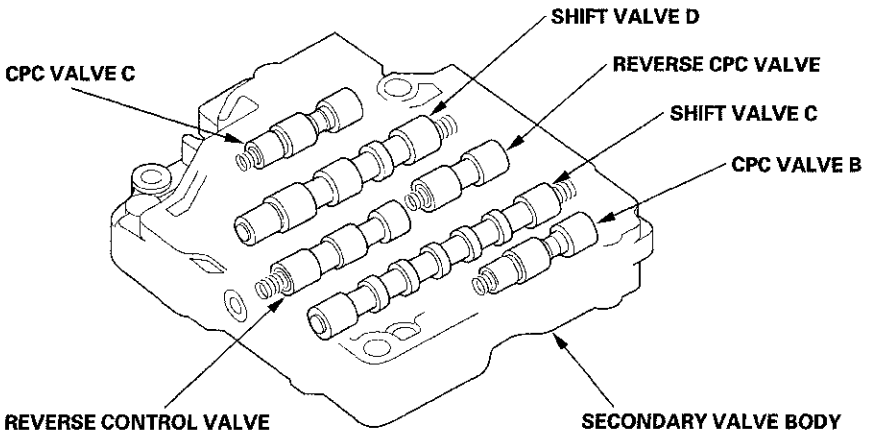
Increases in hydraulic pressure according to torque are regulated by the regulator valve using stator torque reaction. The stator shaft is splined to the stator in the torque converter, and its arm end contacts the regulator spring cap. When the vehicle is accelerating or climbing (torque converter range), 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.



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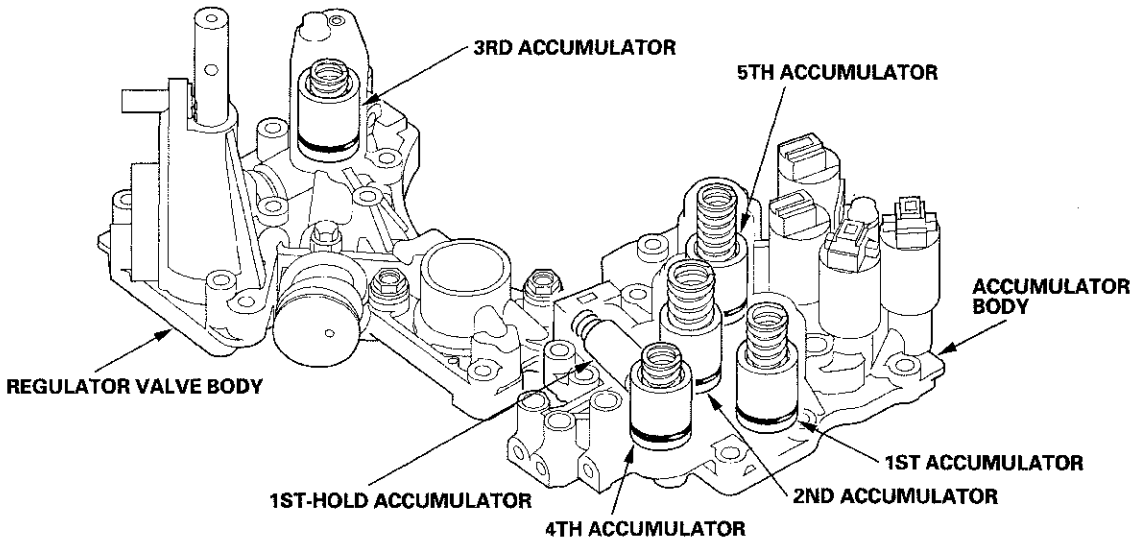
Secondary Valve Body

The secondary valve body is on the main valve body. The secondary valve body contains the shift valve C, the shift valve D, the CPC valve B, the CPC valve C, the reverse control valve, and the reverse CPC valve.



Accumulator Body

The accumulator body is on the secondary valve body, and contains the 1st, 1st-hold, 2nd, 4th, and 5th accumulators. The 3rd accumulator is in the regulator valve body.



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System Description (cont'd)

Hydraulic Flow

Distribution of Hydraulic Pressure

As the engine turns, the ATF pump starts to operate. Automatic transmission fluid (ATF) is drawn through the ATF strainer (filter) and discharged into the hydraulic circuit. Then, ATF flowing from the ATF pump becomes line pressure that is regulated by the regulator valve. Torque converter pressure from the regulator valve enters the torque converter through the lock-up shift valve and lock-up control valve, and it is discharged from the torque converter. The torque converter check valve prevents torque converter pressure from rising.

The PCM switches shift solenoid valves A, B, C, and D ON and OFF, and the shift solenoid valves control shift solenoid pressure to the shift valves. Applying shift solenoid pressure to the shift valves moves the position of the shift valve, and switches the port of hydraulic pressure. The PCM also controls A/T clutch pressure control solenoid valves A, B, and C. The A/T clutch pressure control solenoid valves regulate hydraulic pressure, and apply the pressure to CPC valves A, B, and C.

When shifting between gears, the clutches are engaged by pressure from the CPC pressure mode. The PCM actuates one of the shift solenoid valves to move the position of the shift valve. This movement switches the port of CPC pressure and line pressure. Line pressure is then applied to the clutch, and CPC pressure is released. The clutch is engaged with line pressure after shifting is completed.

Hydraulic Pressure at the Port for use in the hydraulic circuit:

Port	Hydraulic pressure	Port	Hydraulic pressure
1	Line	SC	Shift solenoid valve C
2	Line	SC'	Shift solenoid valve C
3	Line	SD	Shift solenoid valve D
3'	Line	10	1st clutch
3''	Reverse CPC or Line	15	1st-hold clutch
3A	Line	20	2nd clutch
3B	Reverse CPC	30	3rd clutch
4	Line	40	4th clutch
4'	Line	50	5th clutch
4''	Line	51	5th clutch
4A	CPC A	56	A/T clutch pressure control solenoid valve A
4B	CPC B	57	A/T clutch pressure control solenoid valve B
4C	CPC C	5R	A/T clutch pressure control solenoid valve B
5A	CPC A	58	A/T clutch pressure control solenoid valve C
5B	CPC A or Line	90	Torque converter
5C	CPC B or Line	90'	Torque converter
5D	CPC B	91	Torque converter
5E	CPC C	91'	Torque converter
5F	CPC C	92	Torque converter
5G	CPC C	93	ATF cooler
5H	CPC B or Line	94	Torque converter
5J	CPC B or Line	95	Lubrication
5K	CPC A or Line	95'	Lubrication
5L	CPC A or Line	96	Torque converter
5M	Line	99	Suction
5N	CPC C	X	Drain
6	Modulator	HX	High position drain
SA	Shift solenoid valve A	AX	Air drain
SB	Shift solenoid valve B	—	—

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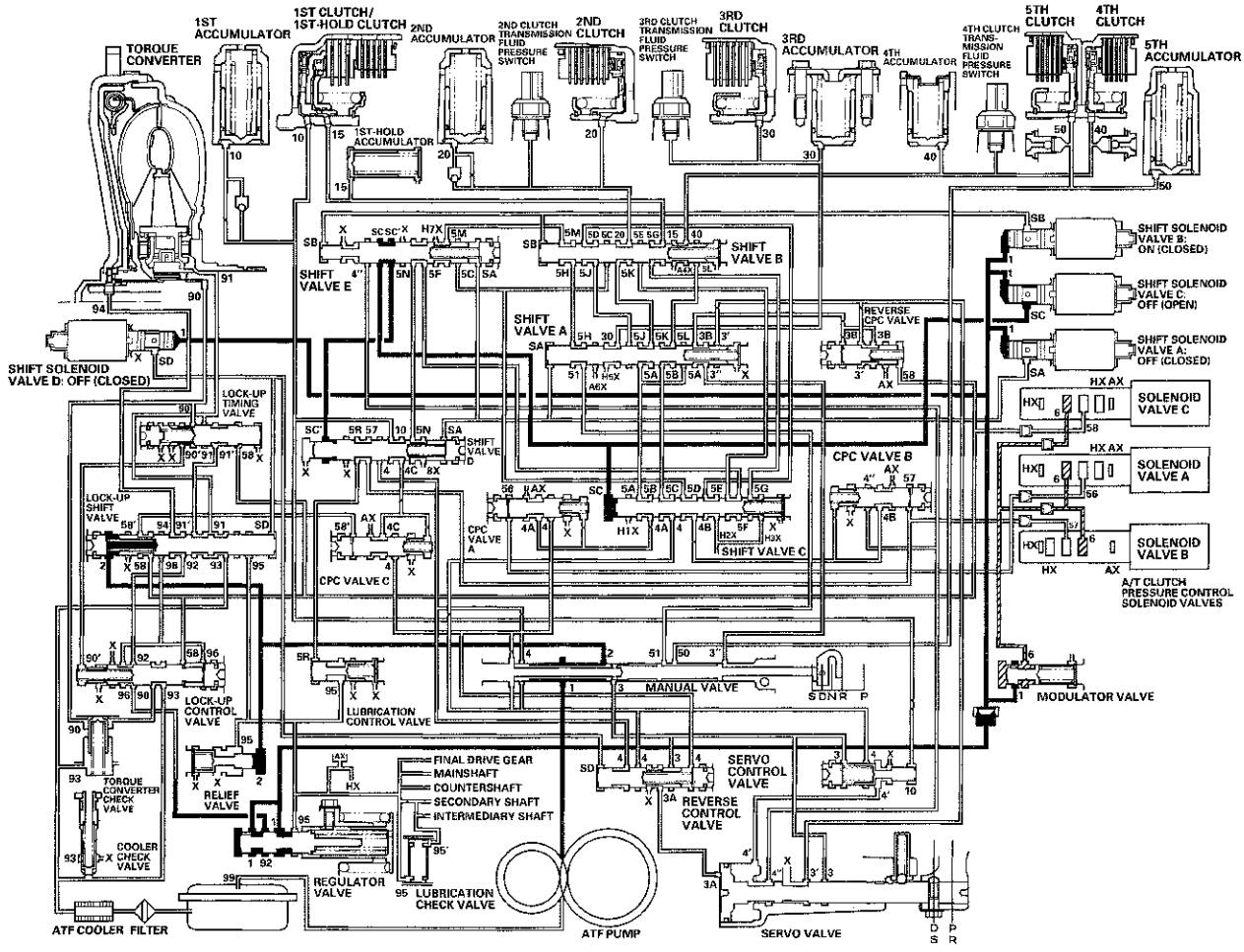
N Position

Line pressure (1) regulated by the regulator valve flows to shift solenoid valves. The PCM switches the shift solenoid valves ON and OFF. The conditions of the shift solenoid valves and the positions of the shift valves are as follows:

- Shift solenoid valve A is OFF, and closes shift solenoid valve A pressure port (SA); shift valve A remains on the left side.
- Shift solenoid valve B is turned ON, and closes shift solenoid valve B pressure port (SB); shift valve B and shift valve E remain on the left side.
- Shift solenoid valve C is OFF, and opens shift solenoid valve C pressure port (SC); shift valve C and shift valve D move to the right side.
- Shift solenoid valve D is OFF, and closes shift solenoid valve D pressure port (SD).

Line pressure (1) also flows to the modulator valve and becomes modulator pressure (6). Modulator pressure (6) flows to the A/T clutch pressure control solenoid valves. The manual valve covers the port leading pressure to the clutches, and hydraulic pressure is not applied to the clutches.

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



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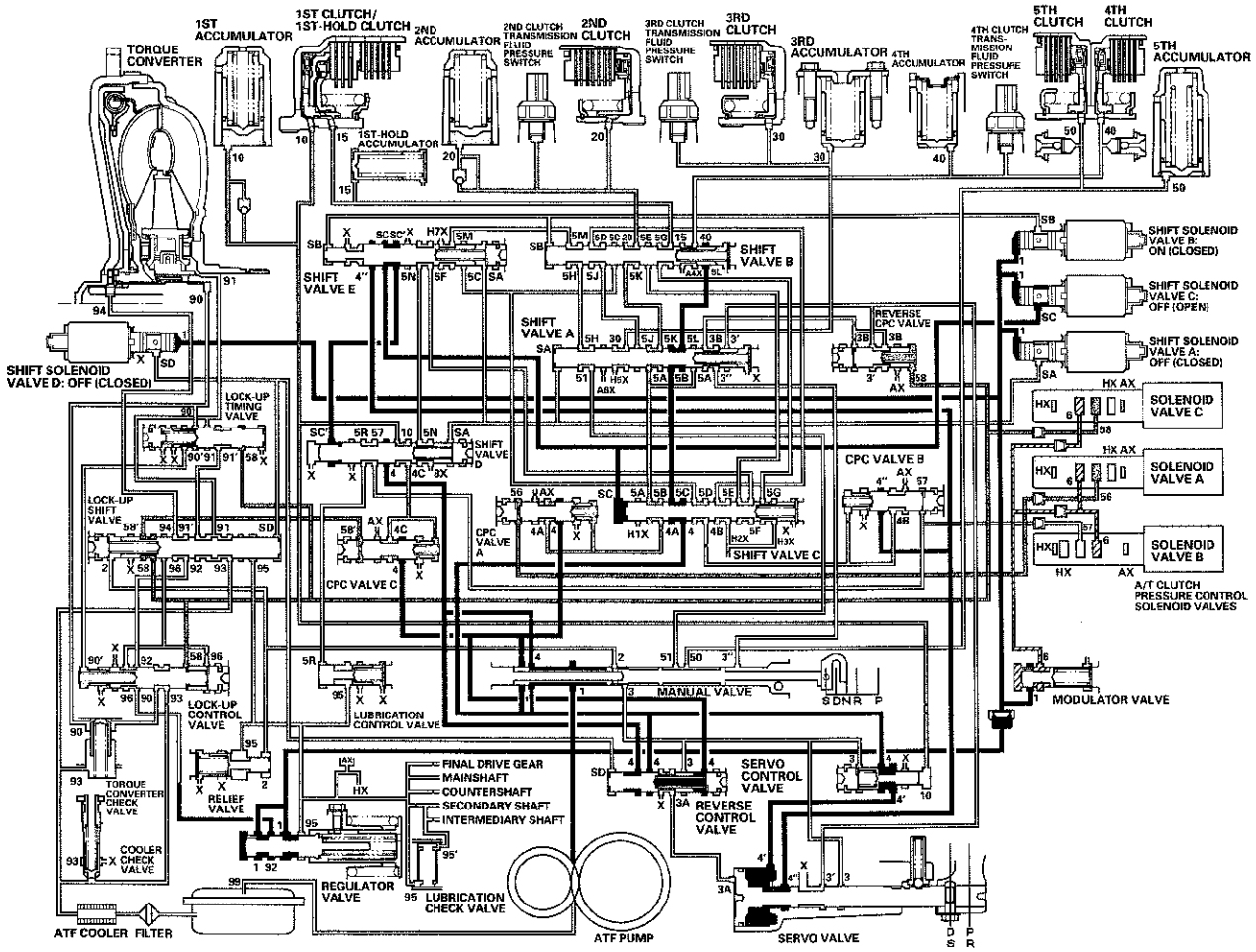
System Description (cont'd)

Hydraulic Flow (cont'd)

Shifting to D and S from N

When shifting to the D or S from N, the condition of the shift solenoid valves remains the same as in N. The manual valve is moved to the D position, and uncovers the line pressure port (4) leading to CPC valves A and C. The PCM actuates the A/T clutch pressure control solenoid valves A and C, A/T clutch pressure control solenoid valve A pressure (56) flows to the CPC valve A, and A/T clutch pressure control solenoid valve C pressure (58) flows to the CPC valve C. CPC valves A and C regulate line pressure (4), line pressure (4) becomes CPC C pressure (4C) at the CPC valve C, and becomes CPC A pressure at CPC valve A. CPC C pressure (4C) becomes 1st clutch pressure (10) at shift valve D, and 1st clutch pressure flows to the 1st clutch. CPC A pressure (4A) becomes 2nd clutch pressure (20) at shift valve B via shift valves A and C. The 1st clutch and 2nd clutch engage gently by the CPC pressure.

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

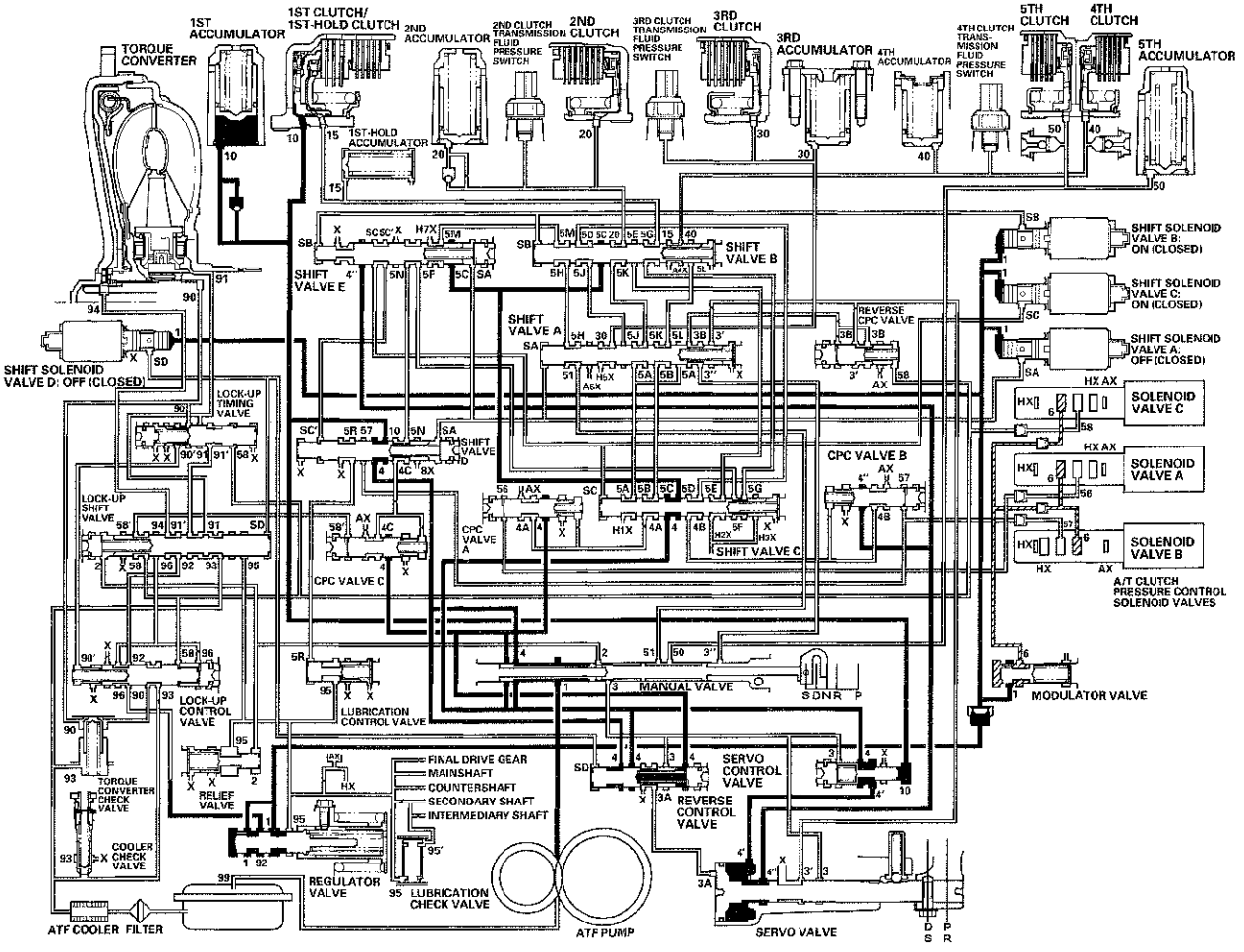


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Driving in 1st gear in D and S with automatic shift mode

The PCM turns shift solenoid valve C ON, and shift solenoid valve C covers shift solenoid valve C pressure port (SC) to shift valve C, and shift valve D via shift valve E. Shift solenoid valve A remains OFF, and shift solenoid valve B remains ON. Shift valves C and D are moved to the left side, shift valve D switches the line pressure port (4) and CPC C pressure port (4C) leading to the 1st clutch, and shift valve C switches the CPC A pressure port (5A) releasing 2nd clutch pressure. Line pressure (4) becomes 1st clutch pressure (10) at shift valve D, and flows to the 1st clutch. The 1st clutch is engaged securely by the line pressure.

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



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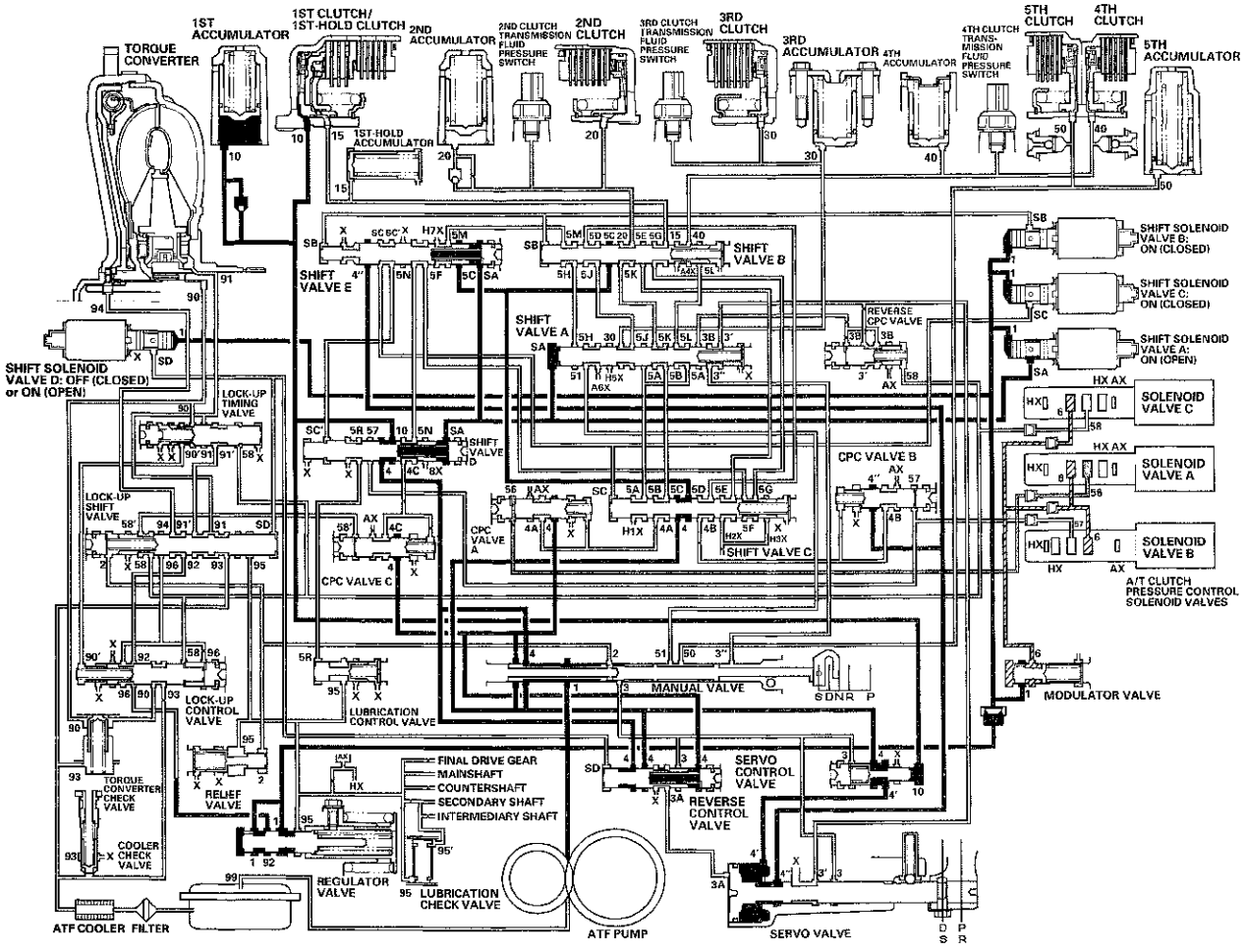
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System Description (cont'd)

Hydraulic Flow (cont'd)

Shifting between 1st gear and 2nd gear in D and S with automatic shift mode
As the speed of the vehicle reaches the programmed value, the PCM turns shift solenoid valve A ON, and shift solenoid valve A uncovers shift solenoid valve A pressure port (SA) to shift valve A. Shift solenoid valves B and C remain ON. Shift valve A is moved to the right side to uncover the CPC A pressure port (4A) leading to the 2nd clutch. The PCM actuates A/T clutch pressure control solenoid valve A, and A/T clutch pressure control solenoid valve A pressure (56) is applied to CPC valve A. CPC valve A regulates line pressure (4), and line pressure (4) becomes CPC A pressure (4A). CPC A pressure (4A) flows to shift valve B via shift valves C and A, and becomes 2nd clutch pressure (20) at shift valve B. The 2nd clutch is engaged by the CPC pressure. The 1st clutch is also engaged, but no power is transmitted because of the one-way clutch.

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

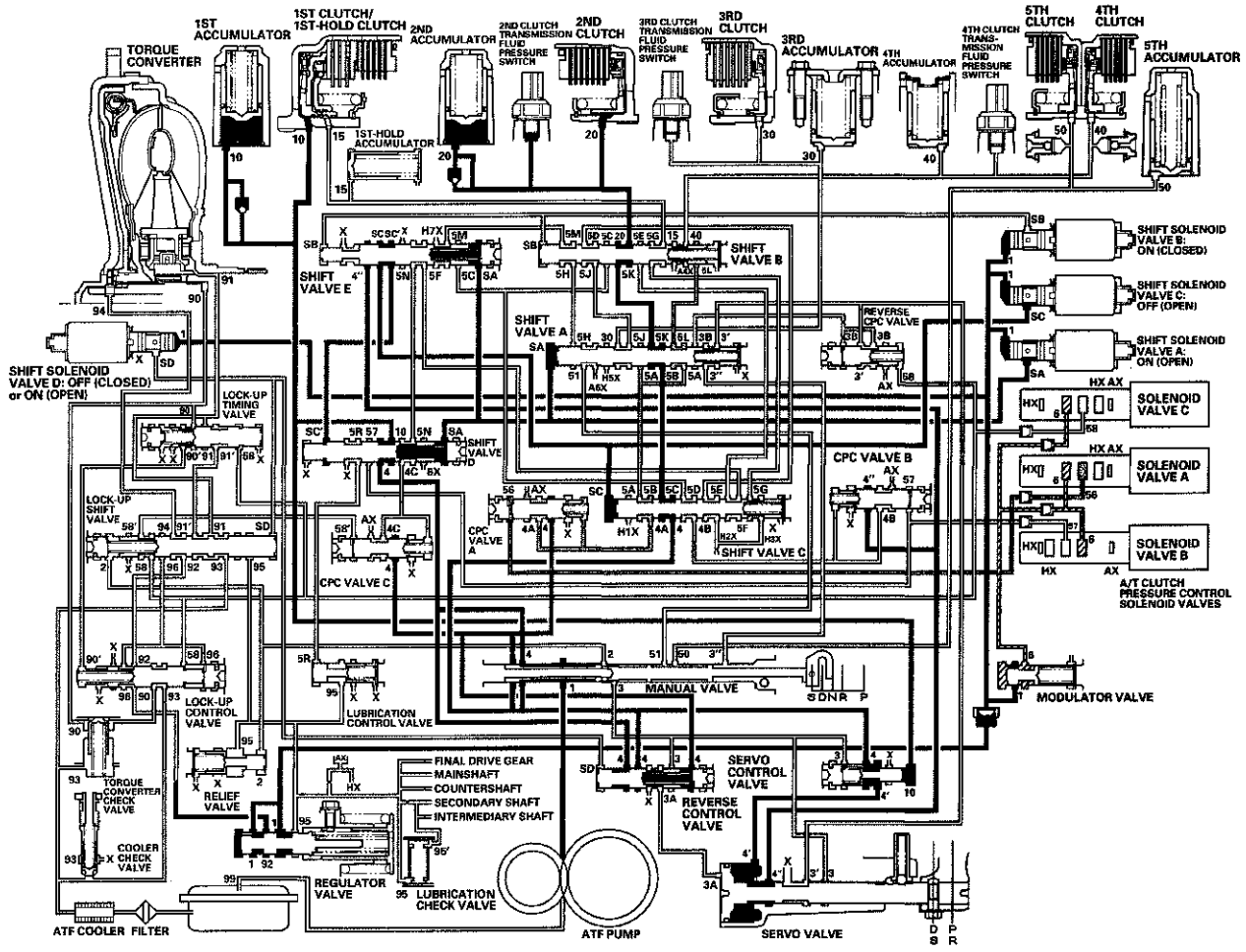


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Driving in 2nd gear in D and S with automatic shift mode

The PCM turns shift solenoid valve C OFF, and shift solenoid valve C uncovers shift solenoid valve C pressure port (SC) to shift valve C. Shift solenoid valves A and B remain ON. Shift valve C is moved to the right side to switch the line pressure port (4) and CPC A pressure port (4A) leading to the 2nd clutch. CPC A pressure (5B) (5K) changes to line pressure (5B) (5K) and 2nd clutch pressure (20) is changed to line pressure mode, and the 2nd clutch is engaged by the line pressure. The 1st clutch is also engaged, but no power is transmitted because of the one-way clutch.

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



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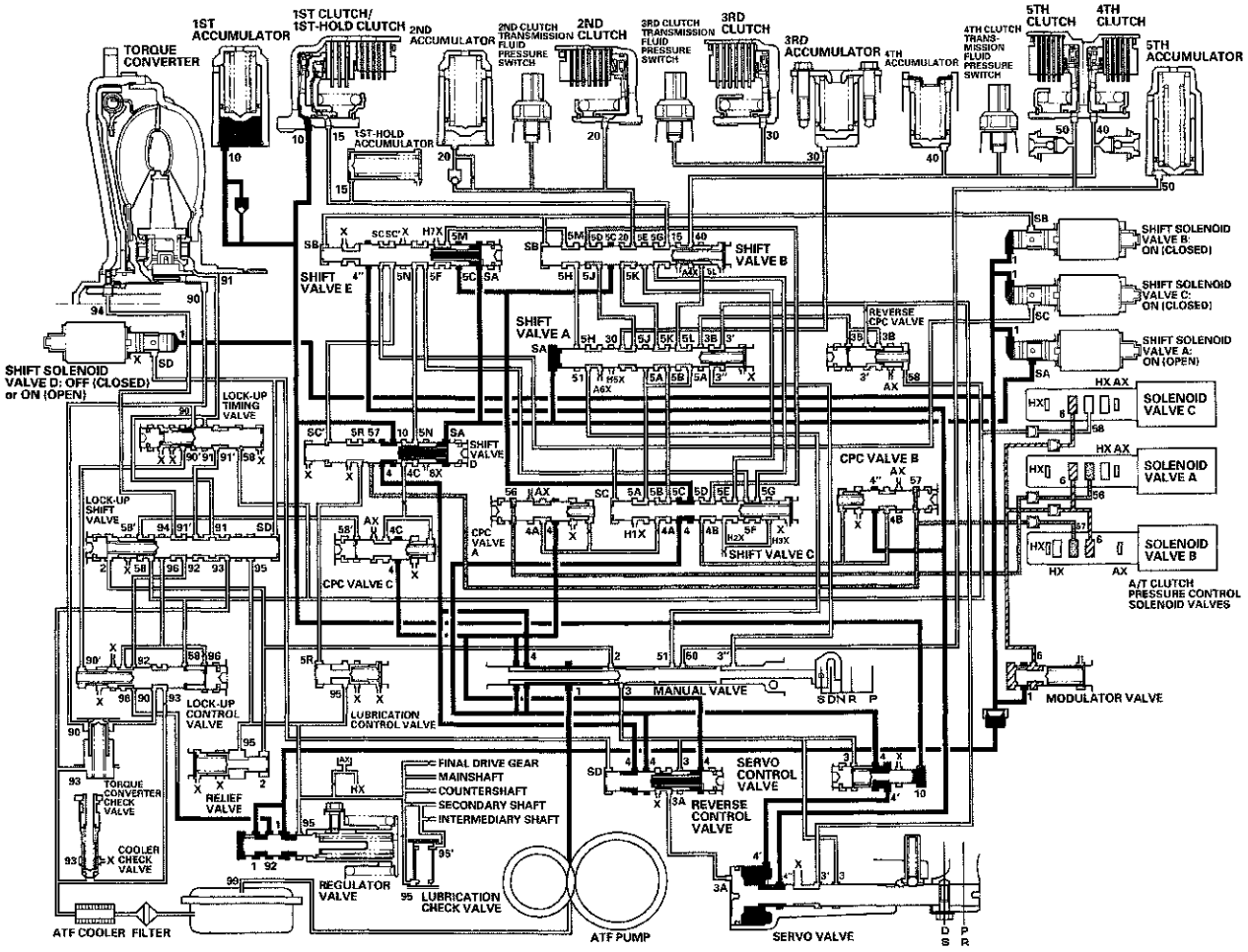
(cont'd)

System Description (cont'd)

Hydraulic Flow (cont'd)

Shifting between 2nd gear and 3rd gear in D and S with automatic shift mode
As the speed of the vehicle reaches the programmed value, the PCM turns shift solenoid valve C ON, and shift solenoid valve C covers shift solenoid valve C pressure port (SC) to shift valve C. Shift solenoid valves A and B remain ON. Shift valve C is moved to the left side to switch the line pressure port (4) and CPC A pressure port (4A) leading to the 2nd clutch. Shift valve C also uncovers the CPC B pressure port (4B) leading to the 3rd clutch. The PCM actuates A/T clutch pressure control solenoid valves A and B. A/T clutch pressure control solenoid valve A pressure (56) is applied to CPC valve A, and A/T clutch pressure control solenoid valve B pressure (57) is applied to CPC valve B. CPC valve B regulates line pressure (4"), and line pressure (4") becomes CPC B pressure (4B). CPC B pressure flows to shift valve A via shift valves C and B, and becomes 3rd clutch pressure (30) at shift valve A. The 2nd clutch pressure (20) is changed to CPC pressure mode, and the 3rd clutch is engaged by the CPC pressure. The 1st clutch is also engaged, but no power is transmitted because of the one-way clutch.

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

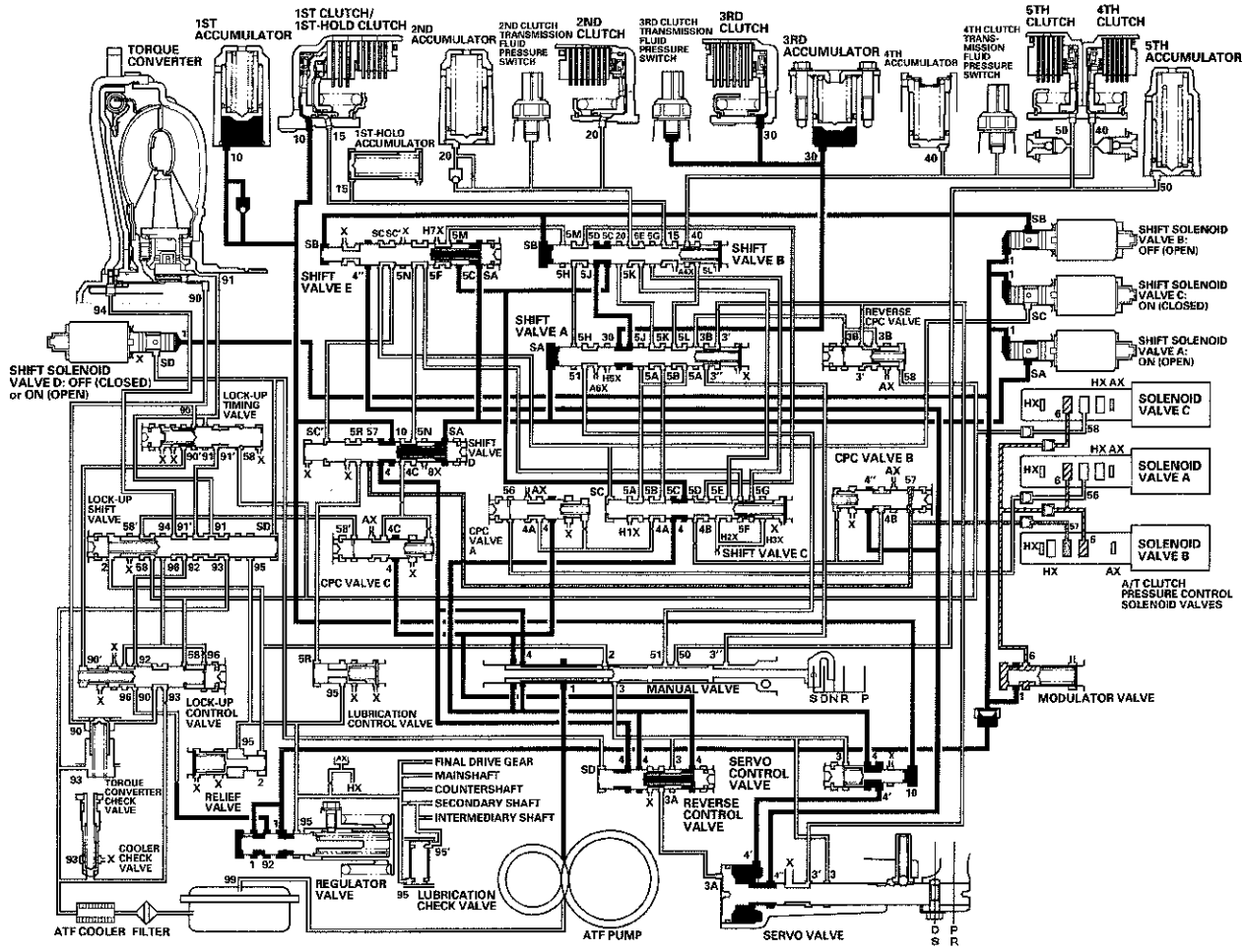


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Driving in 3rd gear in D and S with automatic shift mode

The PCM turns shift solenoid valve B OFF, and shift solenoid valve B uncovers shift solenoid valve B pressure port (SB) to shift valve B. Shift solenoid valves A and C remain ON. Shift valve B is moved to the right side to switch the line pressure port (5C), CPC B pressure port (5J) leading to the 3rd clutch, and 2nd clutch pressure port (20) releasing 2nd clutch pressure. CPC B pressure (5J) changes to line pressure (5J) and 3rd clutch pressure (30) is changed to line pressure mode, and the 3rd clutch is engaged by the line pressure. The 1st clutch is also engaged, but no power is transmitted because of the one-way clutch.

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



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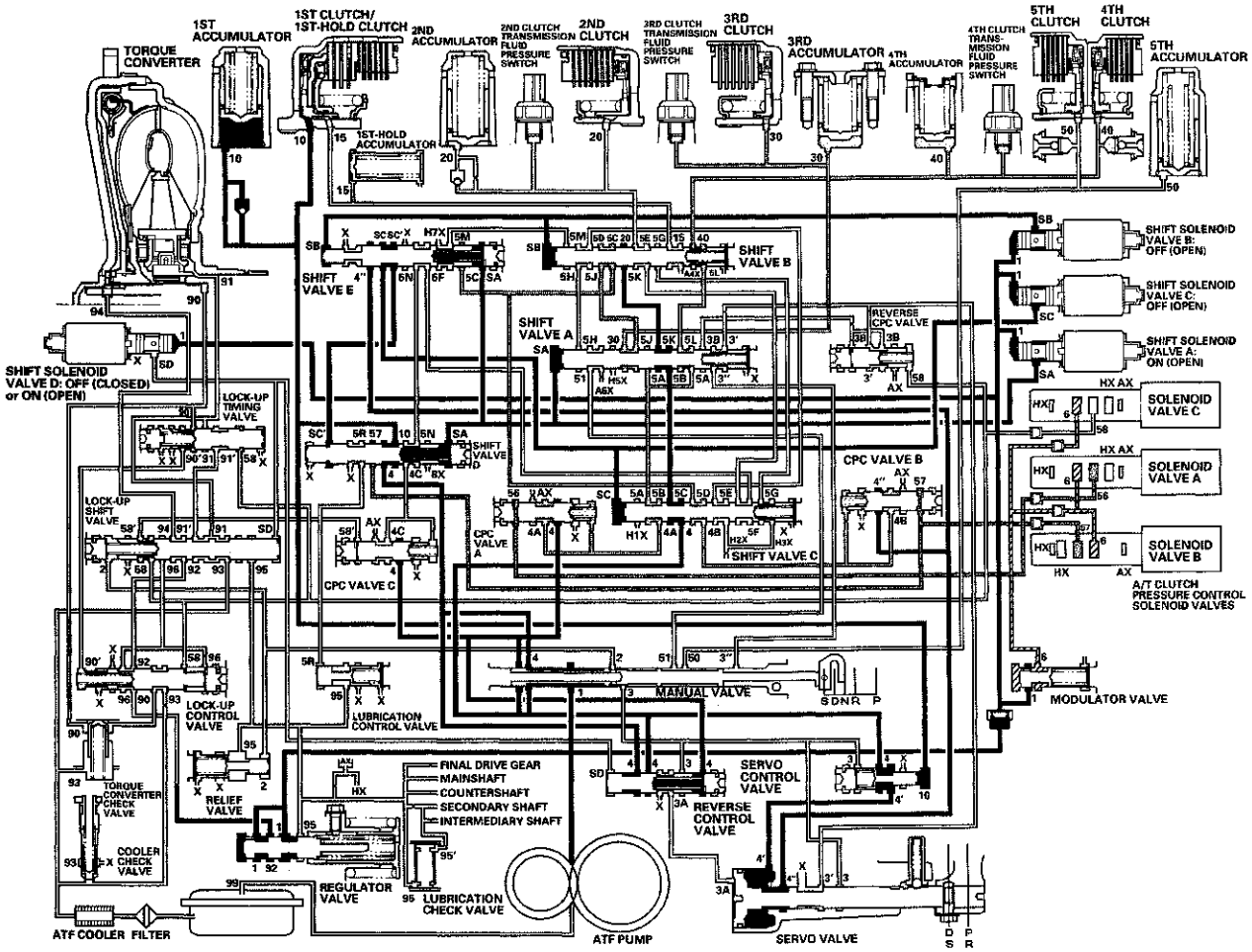
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System Description (cont'd)

Hydraulic Flow (cont'd)

Shifting between 3rd gear and 4th gear in D and S with automatic shift mode
As the speed of the vehicle reaches the programmed value, the PCM turns shift solenoid valve C OFF, and shift solenoid valve C uncovers shift solenoid valve C pressure port (SC) to shift valve C. Shift solenoid valve A remains ON, and shift solenoid valve B remains OFF. Shift valve C is moved to the right side to switch the line pressure port (4) and CPC B pressure port (4B) leading to the 3rd clutch. Shift valve C also uncovers the CPC A pressure port (4A) leading to the 4th clutch. The PCM actuates A/T clutch pressure control solenoid valves A and B. A/T clutch pressure control solenoid valve A pressure (56) is applied to CPC valve A, and A/T clutch pressure control solenoid valve B pressure (57) is applied to CPC valve B. CPC valve A regulates line pressure (4), and line pressure (4) becomes CPC A pressure (4A). CPC A pressure (4A) flows to shift valve B via shift valves C and A, and becomes 4th clutch pressure (40) at shift valve B. The 3rd clutch pressure (30) is changed to CPC pressure mode, and the 4th clutch is engaged by the CPC pressure. The 1st clutch is also engaged, but no power is transmitted because of the one-way clutch.

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

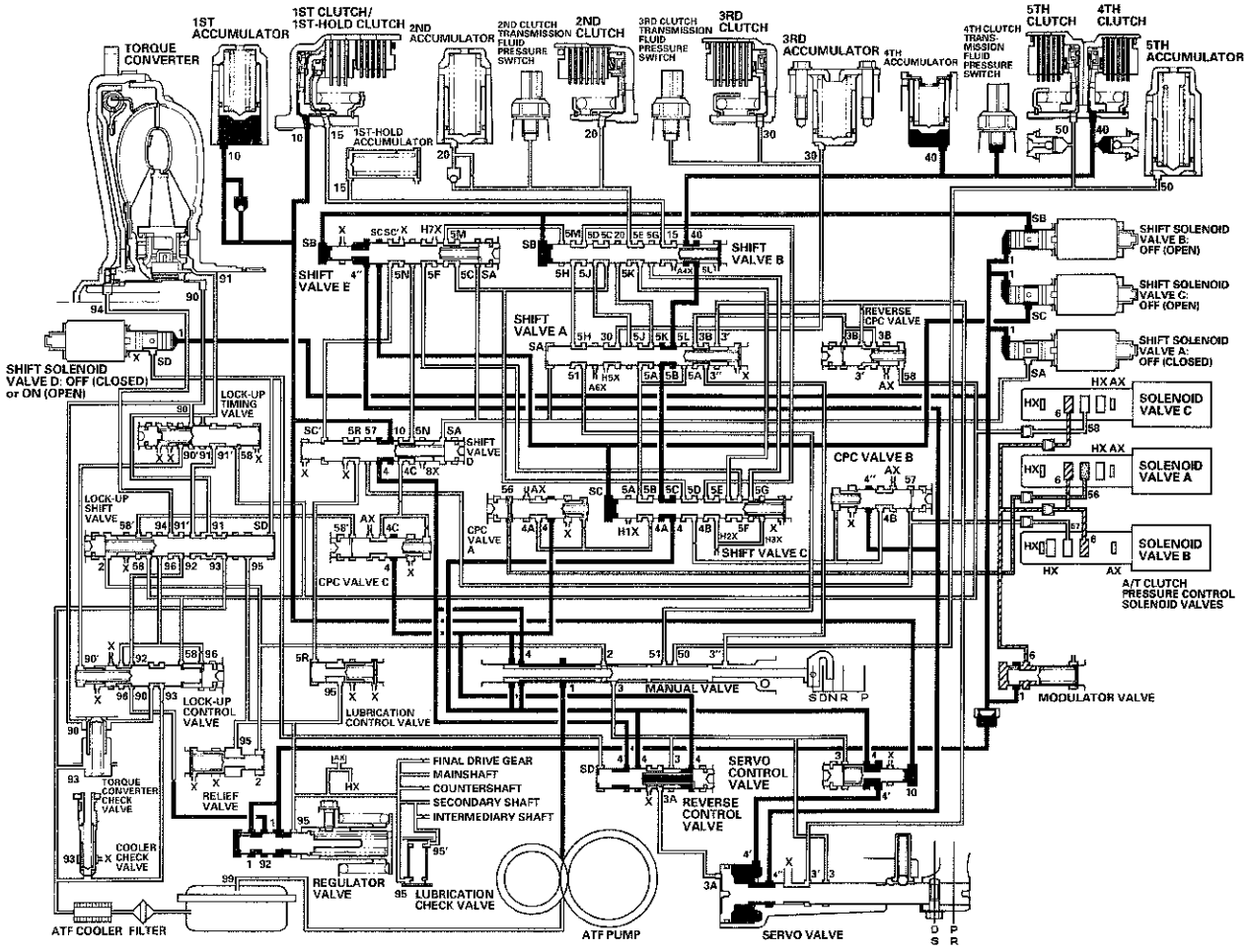


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Driving in 4th gear in D and S with automatic shift mode

The PCM turns shift solenoid valve A OFF, and shift solenoid valve A covers shift solenoid valve A pressure port (SA) to shift valve A. Shift solenoid valves B and C remain OFF. Shift valve A is moved to the left side to switch the pressure port (5B), CPC A pressure ports (5A) (5L) leading to the 4th clutch, and 3rd clutch pressure port (30) releasing 3rd clutch pressure. CPC A pressure (5L) changes to line pressure (5L) and 4th clutch pressure (40) is changed to line pressure mode, and the 4th clutch is engaged by the line pressure. The 1st clutch is also engaged, but no power is transmitted because of the one-way clutch.

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



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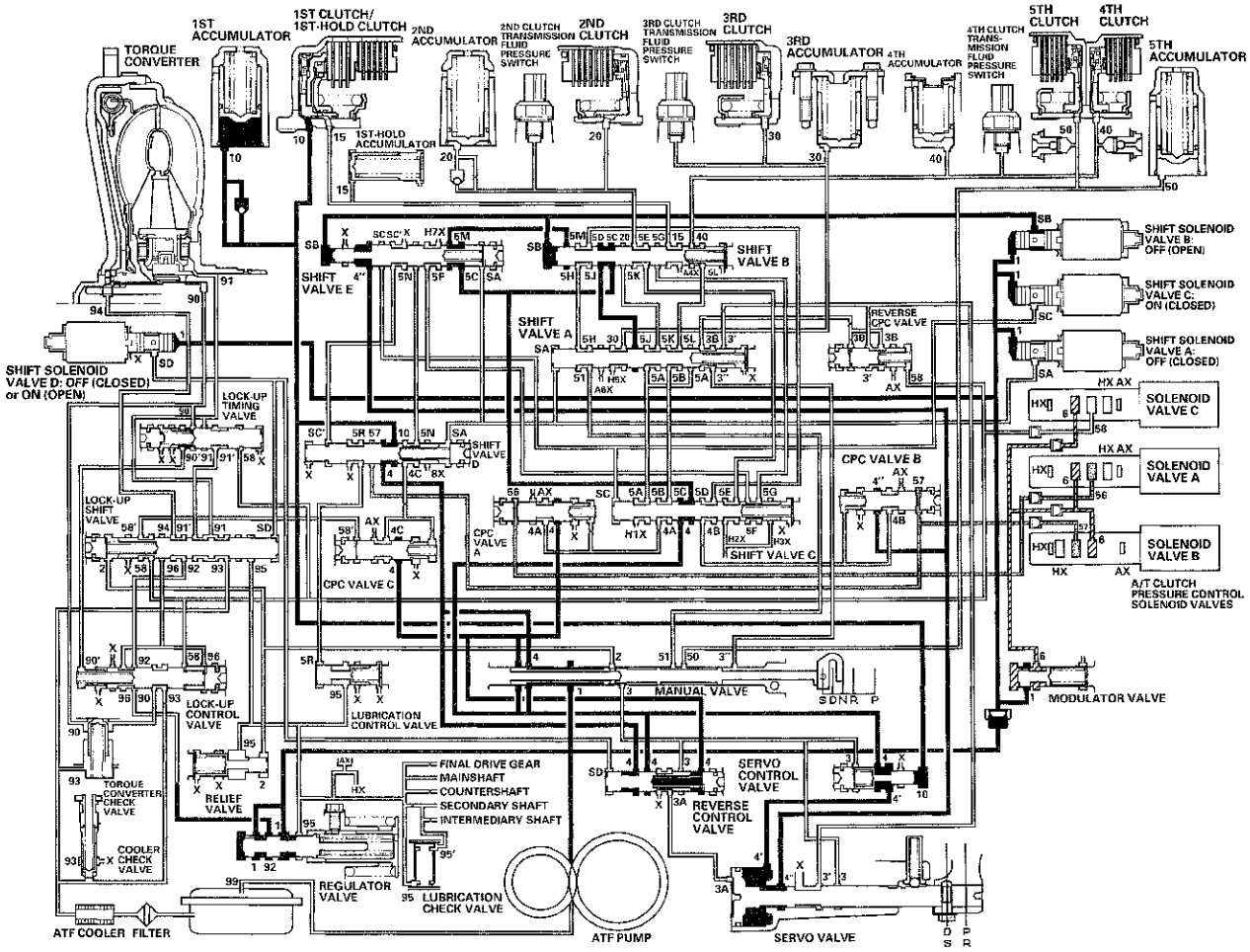
System Description (cont'd)

Hydraulic Flow (cont'd)

Shifting between 4th gear and 5th gear in D

As the speed of the vehicle reaches the programmed value, the PCM turns shift solenoid valve C ON, and shift solenoid valve C covers shift solenoid valve C pressure port (SC) to shift valve C. Shift solenoid valve A remains OFF, and shift solenoid valve B remains OFF. Shift valve C is moved to the left side to switch the line pressure port (4) and CPC A pressure port (4A) leading to the 4th clutch. Shift valve C also uncovers the CPC B pressure port (4B) leading to the 5th clutch. The PCM actuates A/T clutch pressure control solenoid valves A and B. A/T clutch pressure control solenoid valve A pressure (56) is applied to CPC valve A, and A/T clutch pressure control solenoid valve B pressure (57) is applied to CPC valve B. CPC valve B regulates line pressure (4"), and line pressure (4") becomes CPC B pressure (4B). CPC B pressure (4B) flows to shift valve A via shift valves C and B, and becomes 5th clutch pressure (51) at shift valve A. The 4th clutch pressure (40) is changed to CPC pressure mode, and the 5th clutch is engaged by the CPC pressure. The 1st clutch is also engaged, but no power is transmitted because of the one-way clutch.

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

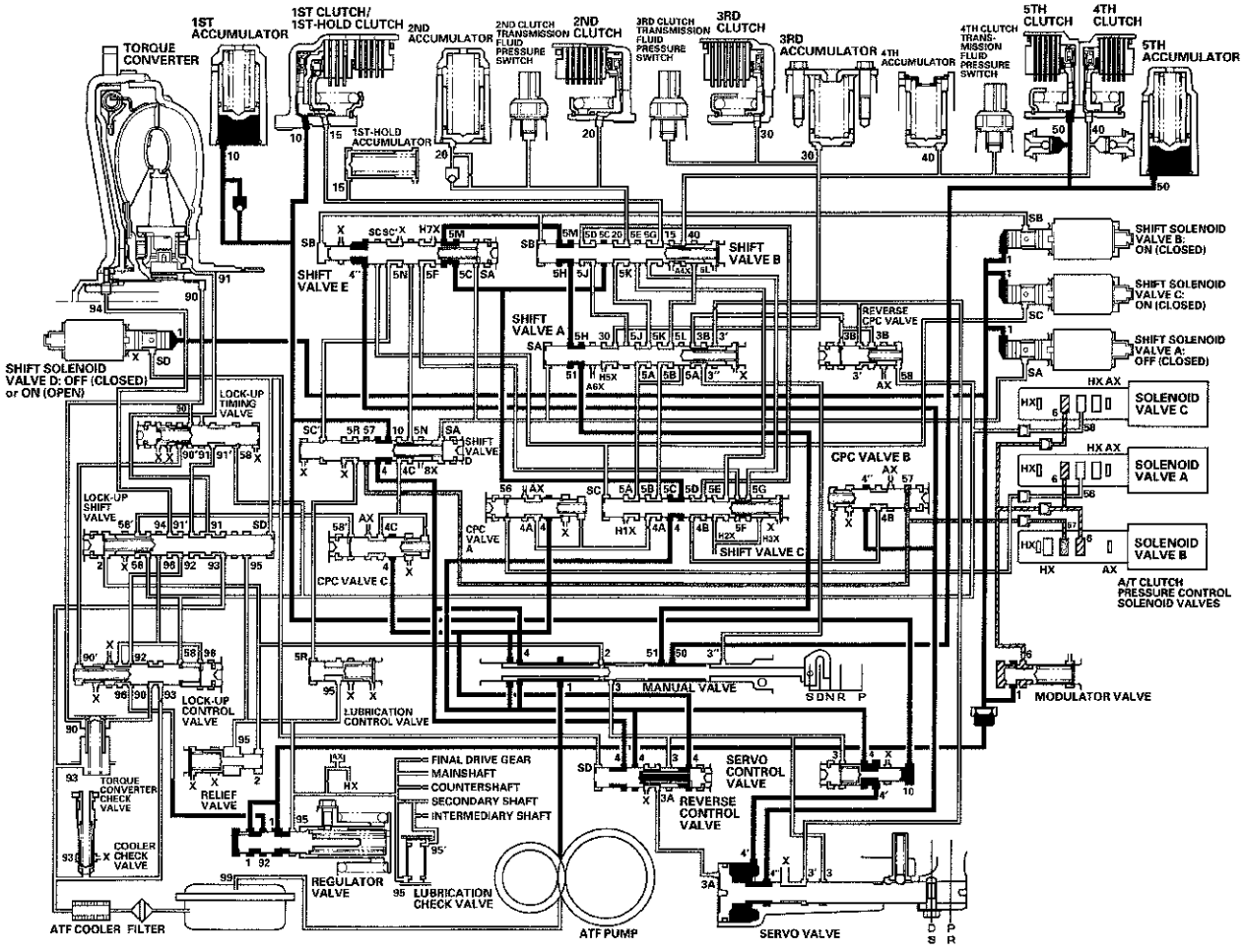


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Driving in 5th gear in D

The PCM turns shift solenoid valve B ON, and shift solenoid valve B covers shift solenoid valve B pressure port (SB) to shift valve B. Shift solenoid valve A remains OFF, and shift solenoid valve C remains ON. Shift valve B is moved to the left side to switch the line pressure port (5H), CPC B pressure port (5D) leading to the 5th clutch, and 4th clutch pressure port (40) which releases the 4th clutch pressure. CPC B pressure (5H) changes to line pressure (5H) and 5th clutch pressure (51) (50) is changed to line pressure mode, and the 5th clutch is engaged by the line pressure. The 1st clutch is also engaged, but no power is transmitted because of the one-way clutch.

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



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System Description (cont'd)

Hydraulic Flow (cont'd)

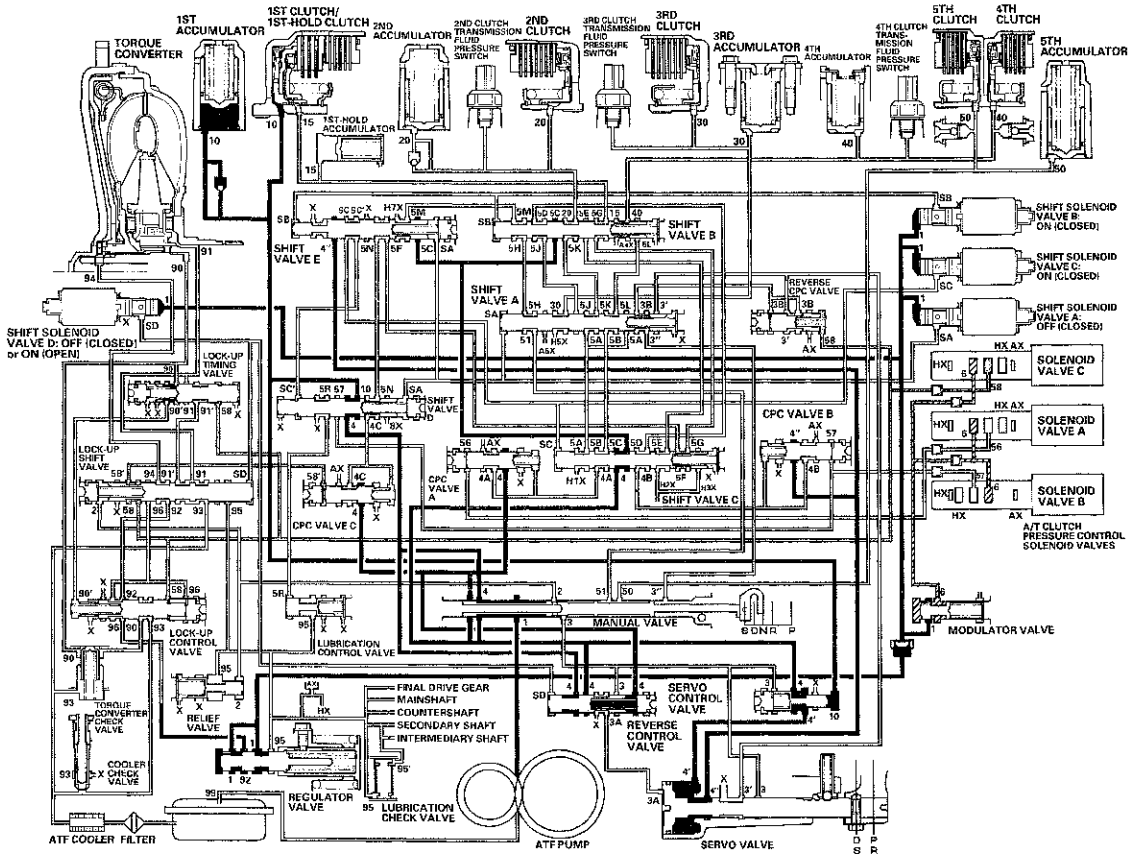
Driving in 1st gear (engaged with 1st and 1st-hold clutches) in the sequential sportshift mode, and the D-paddle shift mode

Line pressure (1) regulated by the regulator valve flows to shift solenoid valves. The PCM switches the shift solenoid valves ON and OFF. The conditions of the shift solenoid valves and the positions of the shift valves are as follows:

- Shift solenoid valve A is OFF, and closes shift solenoid valve A pressure port (SA); shift valve A remains on the left side.
- Shift solenoid valve B is turned ON, and closes shift solenoid valve B pressure port (SB); shift valve B and shift valve E remain on the left side.
- Shift solenoid valve C is turned ON, and closes shift solenoid valve C pressure port (SC); shift valve C and shift valve D remain on the left side.
- Shift solenoid valve D is OFF, and closes shift solenoid valve D pressure port (SD).

Line pressure (4) becomes 1st clutch pressure (10) at shift valve D, and flows to the 1st clutch. The 1st clutch is engaged. The PCM actuates A/T clutch pressure control solenoid valve C, and A/T clutch pressure control solenoid valve C pressure (58) is applied to CPC valve C via the lock-up shift valve. CPC valve C regulates line pressure (4), and line pressure (4) becomes CPC C pressure (4C). CPC C pressure (4C) flows to shift valve B via shift valves D, E, and C, and becomes 1st-hold clutch pressure (15) at shift valve B. 1st-hold clutch pressure (15) is applied to the 1st-hold clutch, and the 1st-hold clutch is engaged.

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



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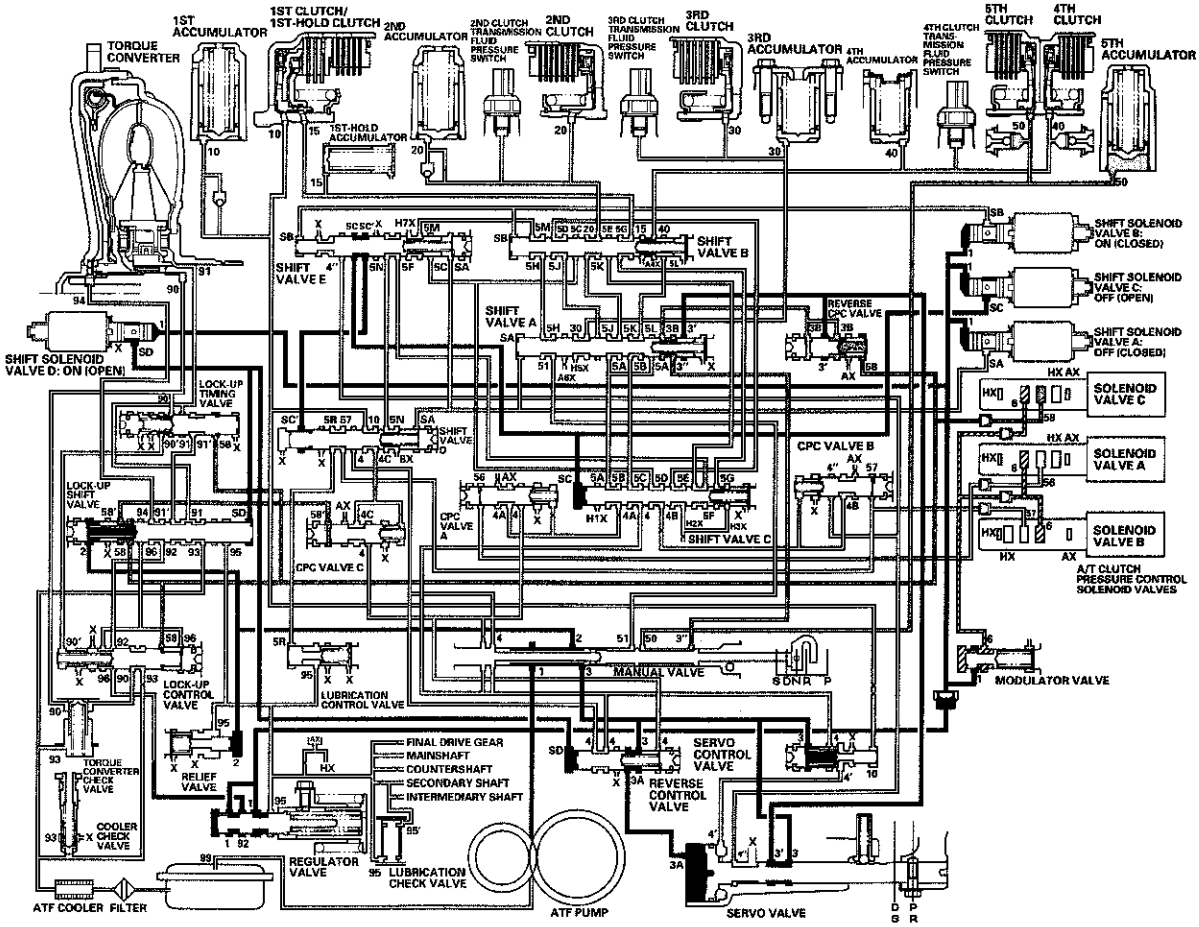
Shifting to R from P or N

The PCM switches the shift solenoid valves ON and OFF. The conditions of the shift solenoid valves and the positions of the shift valves are as follows:

- Shift solenoid valve A is OFF, and closes shift solenoid valve A pressure port (SA); shift valve A remains on the left side.
- Shift solenoid valve B is turned ON, and closes shift solenoid valve B pressure port (SB); shift valve B and shift valve E remain on the left side.
- Shift solenoid valve C is OFF, and opens shift solenoid valve C pressure port (SC); shift valve C and shift valve D move to the right side.
- Shift solenoid valve D is turned ON, and opens shift solenoid valve D pressure port (SD); reverse control valve moves to the right side.

The manual valve is moved to the R position, and line pressure (1) becomes line pressure (3) at the manual valve. Line pressure (3) passes through the reverse control valve, and becomes line pressure (3A), then flows to the servo valve. Line pressure (3A) pushes the servo valve to the reverse position. Line pressure (3) also flows to the reverse CPC valve, and becomes reverse CPC pressure (3B) (3''). Reverse CPC pressure (3'') becomes 5th clutch pressure (50) at the manual valve, and 5th clutch pressure (50) flows to the 5th clutch. The 5th clutch is engaged with reverse CPC pressure mode.

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



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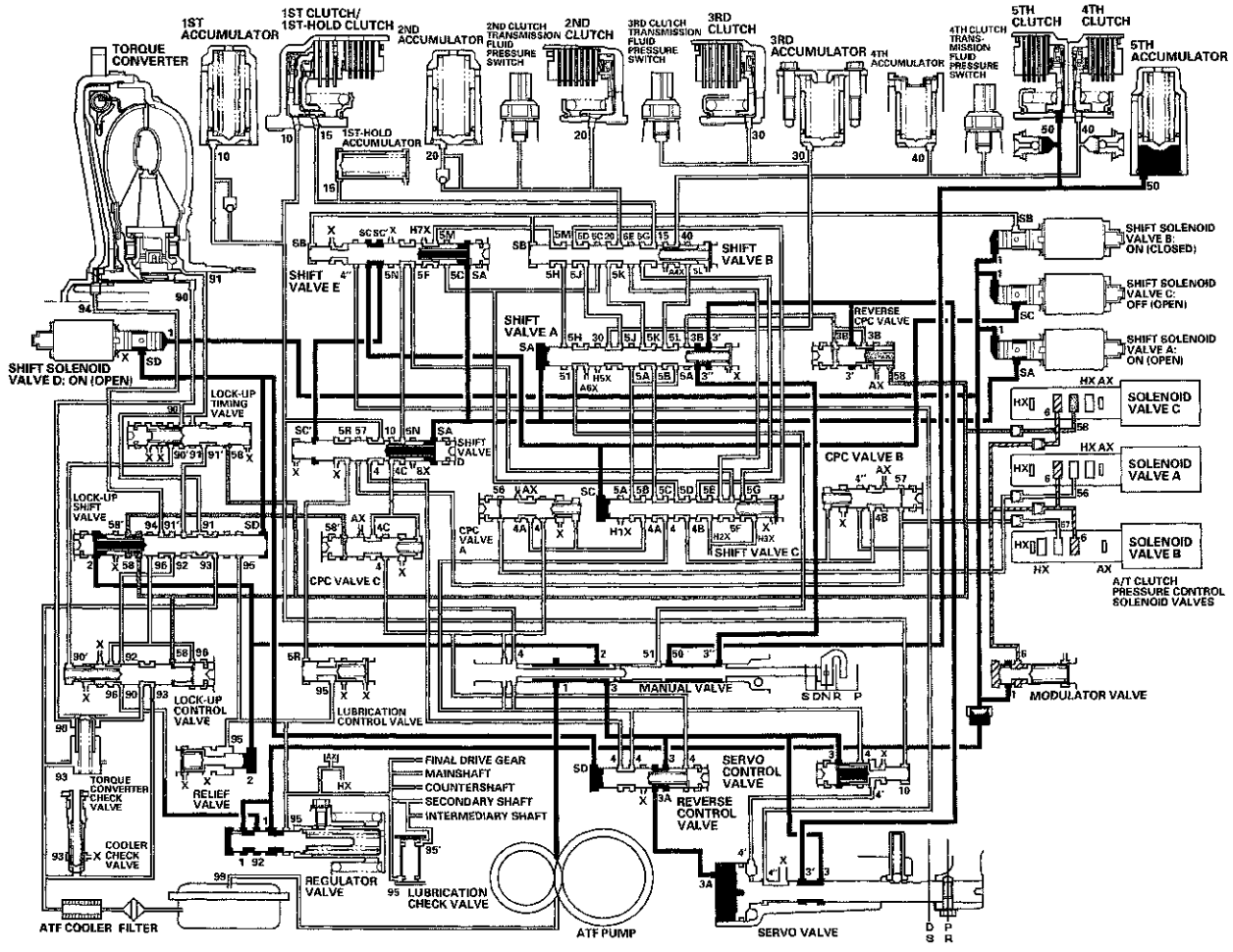
System Description (cont'd)

Hydraulic Flow (cont'd)

Driving in reverse gear in R
When R is selected, the PCM turns shift solenoid valve A ON, and shift solenoid valve A uncovers shift solenoid valve A pressure port (SA) to shift valve A. Shift valve A is moved to the right side to switch the line pressure port (3') and reverse CPC pressure port (3B) leading to the 5th clutch. Line pressure (3) flows to the manual valve via the servo valve and shift valve A, and becomes 5th clutch pressure (50) at the manual valve. The 5th clutch pressure (50) flows to the 5th clutch, and the 5th clutch is engaged by the line pressure.

Reverse Inhibitor Control
When R is selected while the vehicle is moving forward at speeds over 6 mph (10 km/h), the PCM commands shift solenoid valve D to remain OFF so that shift solenoid valve D pressure (SD) is not applied to the reverse control valve. Line pressure (3) stops at the reverse control valve, and is not applied to the servo valve. No power is transmitted to the reverse direction.

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



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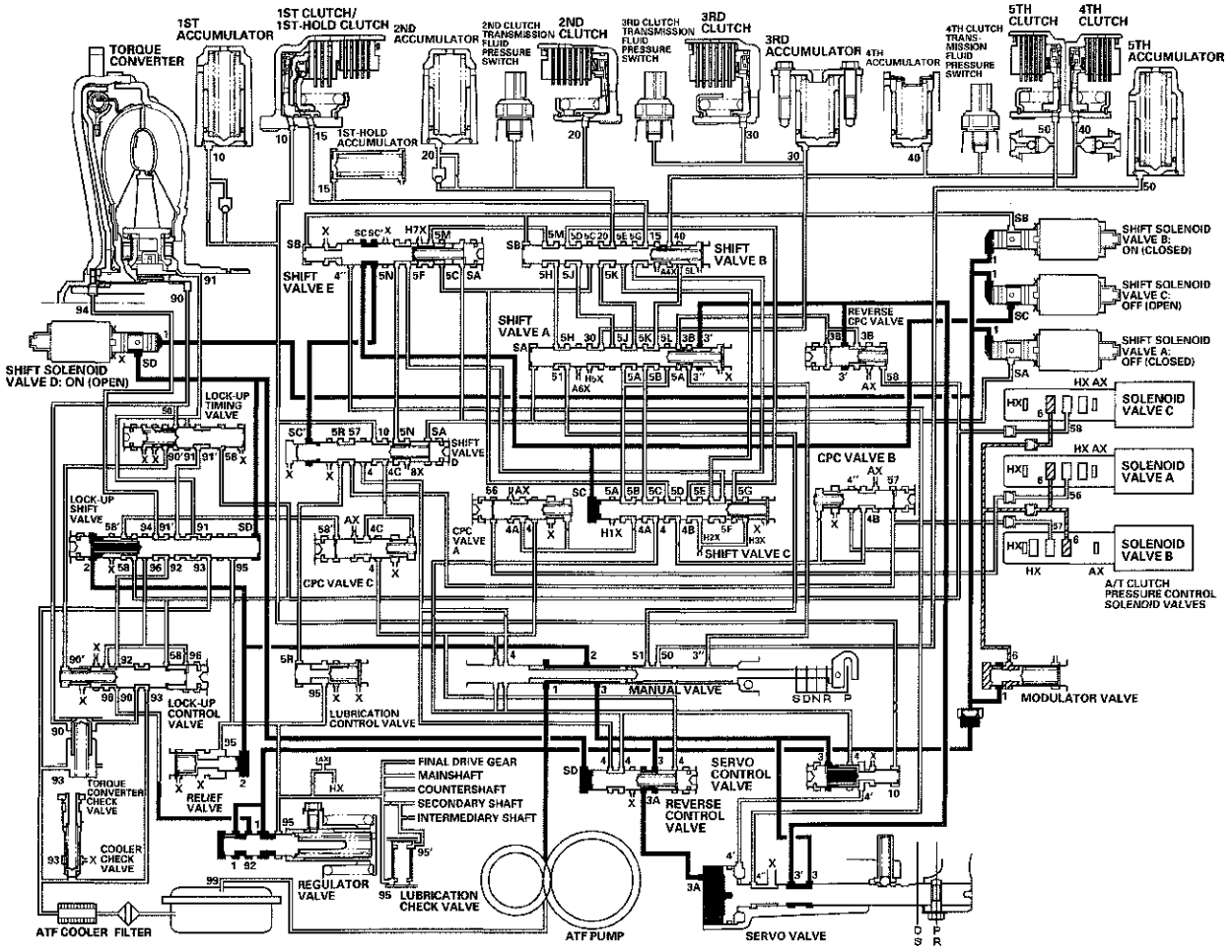
P Position

The PCM switch the shift solenoid valves ON and OFF. The conditions of the shift solenoid valves and the positions of the shift valves are as follows:

- Shift solenoid valve A is OFF, and closes shift solenoid valve A pressure port (SA); shift valve A remains on the left side.
- Shift solenoid valve B is turned ON, and closes shift solenoid valve B pressure port (SB); shift valve B and shift valve E remain on the left side.
- Shift solenoid valve C is OFF, and opens shift solenoid valve C pressure port (SC); shift valve C and shift valve D move to the right side.
- Shift solenoid valve D is turned ON, and opens shift solenoid valve D pressure port (SD); reverse control valve moves to the right side.

The manual valve is moved to the P position, and line pressure (1) becomes line pressure (3) at the manual valve. Line pressure (3) passes through the reverse control valve, and becomes line pressure (3A), then flows to the servo valve. Line pressure (3A) pushes the servo valve to the reverse position. Line pressure (3) flows to the manual valve via the reverse CPC valve and shift valve A, and stops at the manual valve. Hydraulic pressure is not applied the clutches.

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



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System Description (cont'd)

Lock-up System

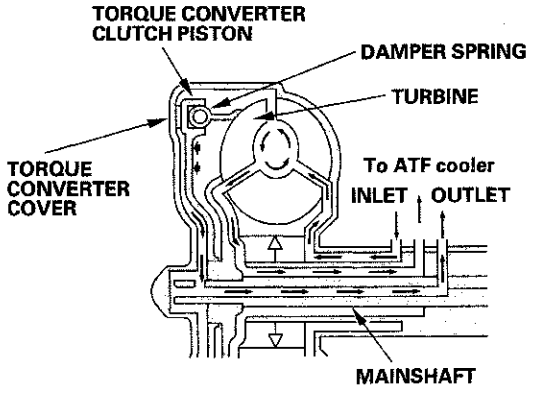
The lock-up mechanism of the torque converter clutch operates in 2nd, 3rd, 4th, and 5th gears in D and S with sequential sportshift mode, and 3rd and 4th gears in S with automatic shift mode. The pressurized fluid is drained from the back of the torque converter through a fluid passage, causing the torque converter clutch 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 optimizes the timing and amount of the lock-up mechanism. When shift solenoid valve D is turned on by the PCM, shift solenoid valve D pressure switches the lock-up shift valve lock-up on and off. The A/T clutch pressure control solenoid valve C, the lock-up control valve, and lock-up timing valve control the amount of lock-up.

Torque Converter Clutch Lock-up ON (Engaging Torque Converter Clutch)
Fluid in the chamber between the torque converter cover and the torque converter clutch piston is drained off, and fluid entering from the chamber between the pump and stator exerts pressure through the torque converter clutch piston against the torque converter cover. The torque converter clutch piston engages with the torque converter cover; torque converter clutch lock-up ON, and the mainshaft rotates at the same as the engine.

Power flow

The power flows by way of:

Engine
↓
Drive plate
↓
Torque converter cover
↓
Torque converter clutch piston
↓
Damper spring
↓
Turbine
↓
Mainshaft

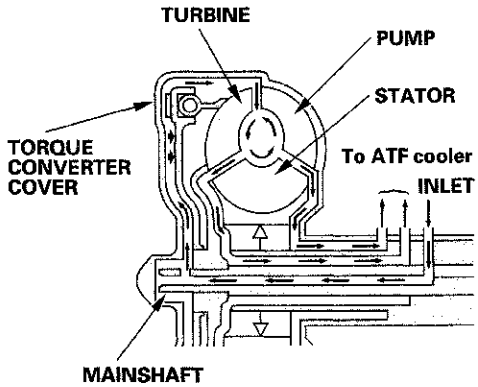


Torque Converter Clutch Lock-up OFF (Disengaging Torque Converter Clutch)
Fluid entered from the chamber between the torque converter cover and the torque converter clutch piston passes through the torque converter and goes out from the chambers between the turbine and the stator, and between the pump and the stator. As a result, the torque converter clutch piston moves away from the torque converter cover, and the torque converter clutch lock-up is released; torque converter clutch lock-up OFF.

Power flow

The power flows by way of:

Engine
↓
Drive plate
↓
Torque converter cover
↓
Pump
↓
Turbine
↓
Mainshaft

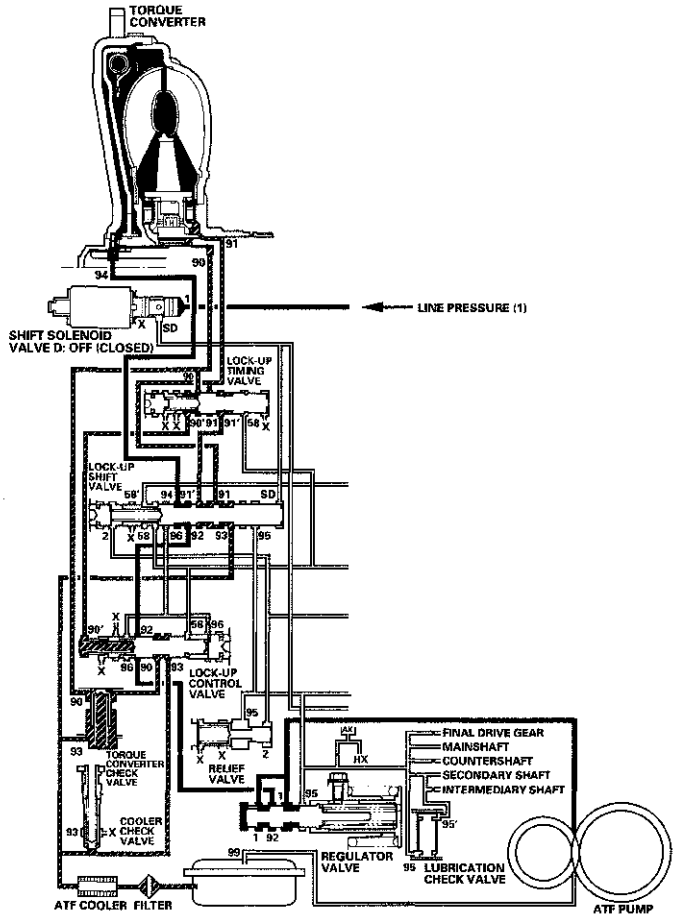


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No Lock-up

The PCM commands shift solenoid valve D to remain OFF, and shift solenoid valve D covers shift solenoid valve D pressure port (SD) to the lock-up shift valve. The lock-up shift valve is in the right side, and uncovers the port leading torque converter pressure (92) to the left side of the torque converter. Torque converter pressure (92) from regulator valve becomes torque converter pressure (94) at the lock-up shift valve, and enters into the left side of the torque converter to disengage the torque converter clutch. The torque converter clutch is OFF.

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



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(cont'd)

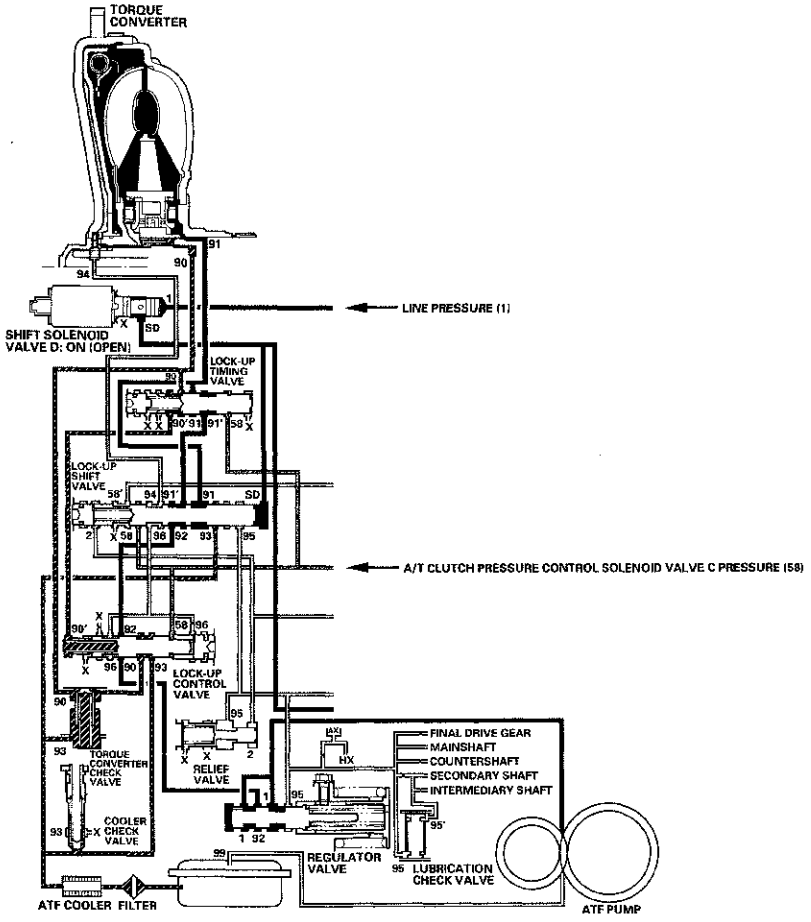
System Description (cont'd)

Lock-up System (cont'd)

Partial Lock-up

As the speed of the vehicle reaches the programmed value, the PCM turns shift solenoid valve D ON, and shift solenoid valve D uncovers shift solenoid valve D pressure port (SD) to the lock-up shift valve. The lock-up shift valve is moved to the left side which uncovers the torque converter pressure port (91) leading to the right side of the torque converter to engage the torque converter clutch. The PCM also actuates A/T clutch pressure control solenoid valve C, and A/T clutch pressure control solenoid valve C pressure (58) is applied to the lock-up control valve and lock-up timing valve. When A/T clutch pressure control solenoid valve C pressure (58) is low, torque converter pressure (91) from the lock-up timing valve is low. The torque converter clutch is engaged partially. A/T clutch pressure control solenoid valve C pressure (58) increases, and the lock-up timing valve is moved to the left side to uncover the port leading torque converter pressure to high. Under this condition, the torque converter clutch is engaged by pressure from the right side of the torque converter; this condition is partial lock-up.

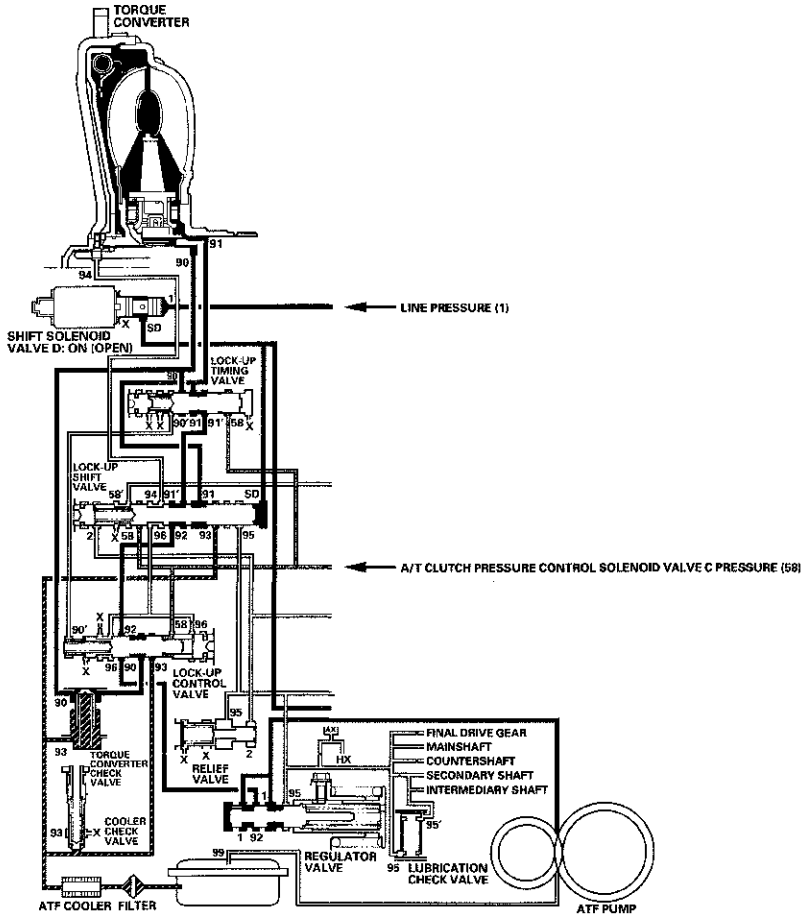
NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



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Full Lock-up
When the vehicle speed further increases, the PCM actuates A/T clutch pressure control solenoid valve C to increase A/T clutch pressure control solenoid valve C pressure (58). A/T clutch pressure control solenoid valve C pressure (58) is applied to the lock-up control valve and lock-up timing valve, and the lock-up control valve and lock-up timing valve are moved to the left side. Torque converter pressure (94) from the left side of the torque converter releases at the lock-up control valve, and lock-up timing valve uncovers the torque converter pressure port (91) leading to the right side of the torque converter. Torque converter back pressure is released fully, and torque converter clutch is engaged fully.

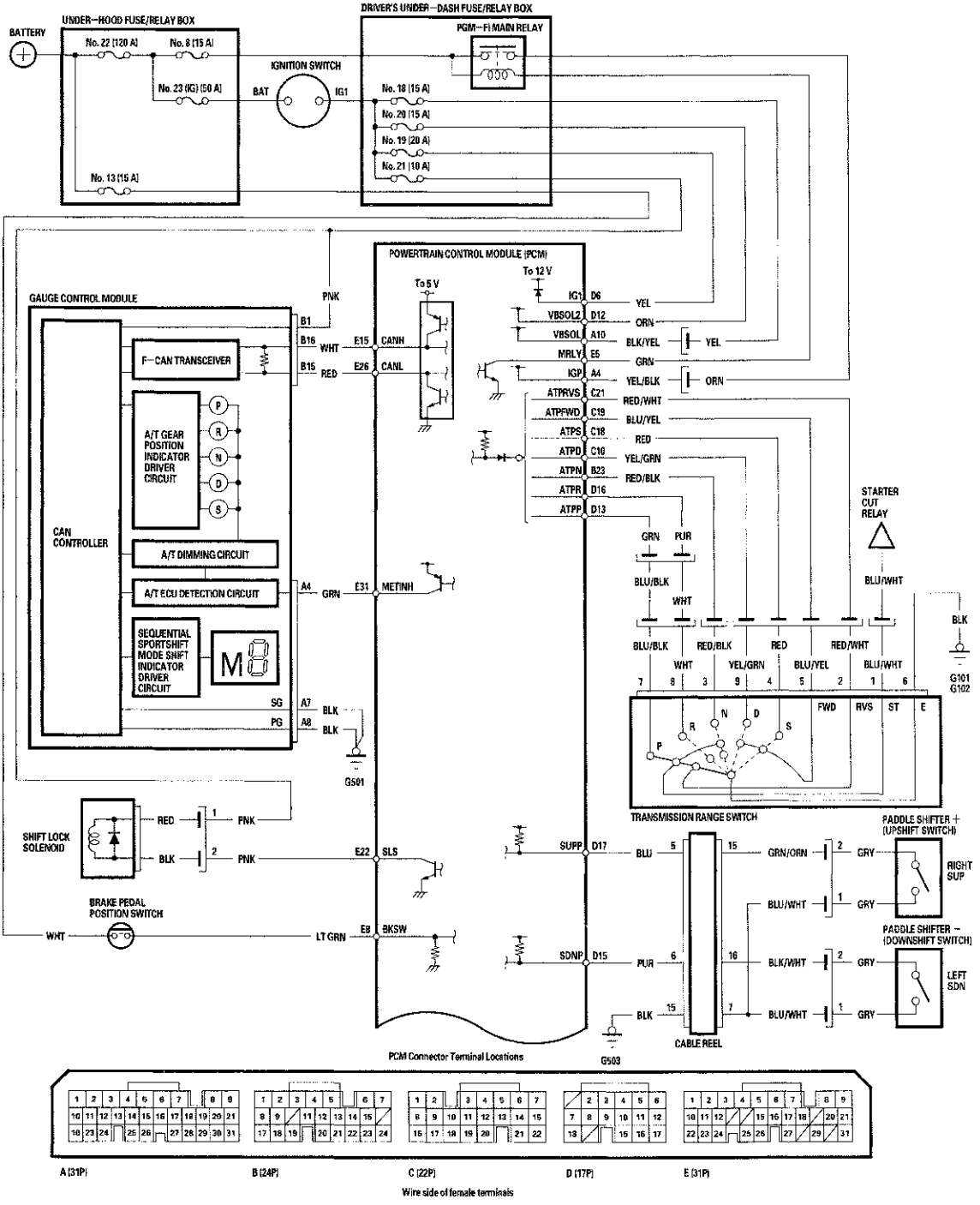
NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



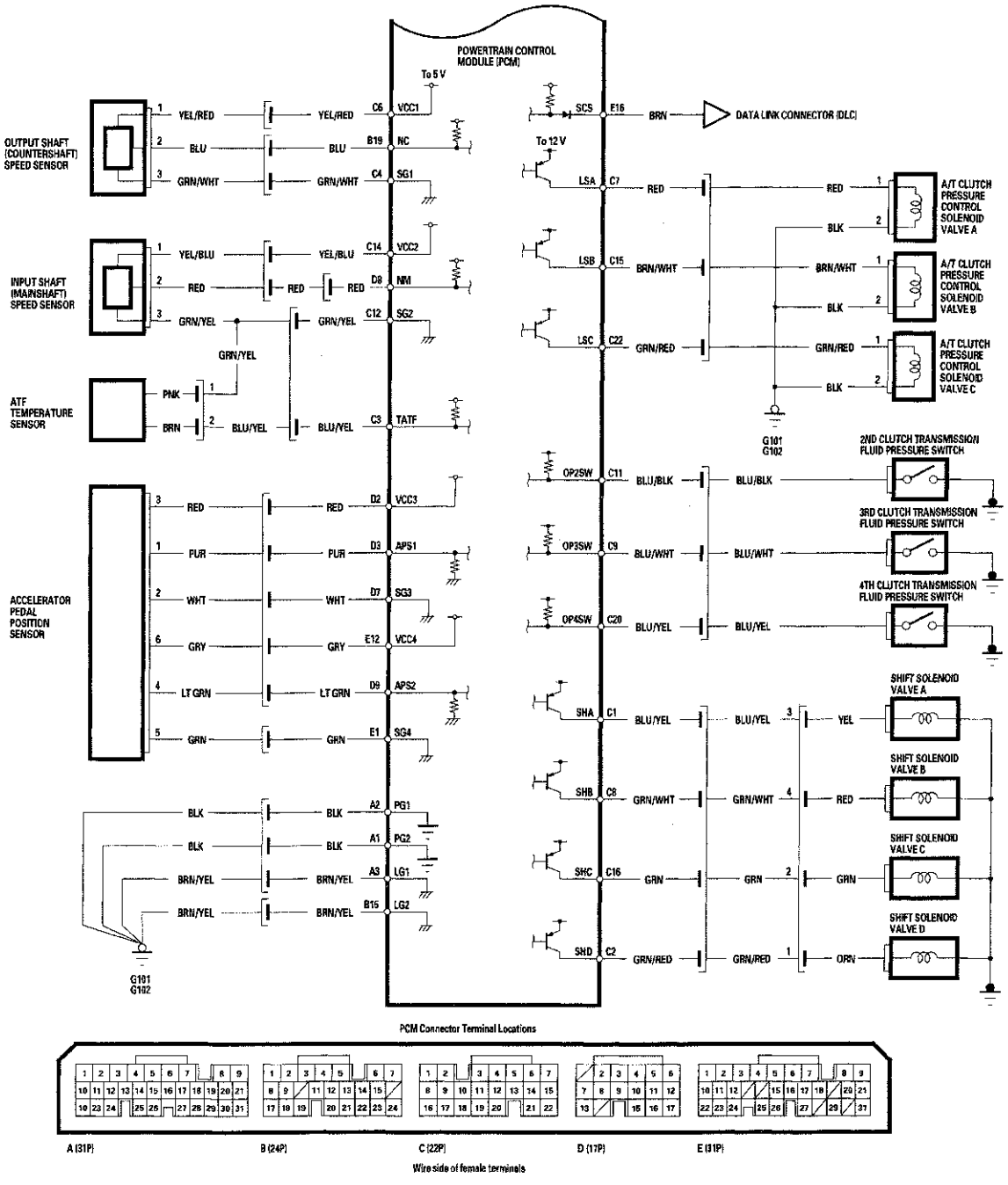
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System Description (cont'd)

Circuit Diagram - PCM A/T Control System



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DTC Troubleshooting

DTC P0705: Transmission Range Switch (Multiple Shift-position Input)

NOTE: This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

1. Turn the ignition switch to ON (II).
2. Compare the ATPP, ATPR, ATPN, ATPD, ATPS, ATPFWD, and ATPRVS inputs with the HDS to the following table, in each gear position.

	ATPP	ATPR	ATPN	ATPD	ATPS	ATP FWD	ATP RVS
P	○	×	×	×	×	×	○
R	×	○	×	×	×	×	○
N	×	×	○	×	×	×	○
D	×	×	×	○	×	○	×
S	×	×	×	×	○	○	×

○: ON × : OFF

Do the transmission range switch signals match?

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

NO—Go to step 3.

3. Compare the ATPP, ATPR, ATPN, ATPD, ATPS, ATPFWD, and ATPRVS inputs with the HDS to the table in step 2, in each gear position.

Are any transmission range signals ON in all shift lever positions?

YES—Go to step 7.

NO—Go to step 4.

4. Disconnect the transmission range switch connector.
5. Connect the transmission range switch connector terminal which incorrectly indicates ON in step 3 to body ground with a jumper wire.
6. Compare the ATPP, ATPR, ATPN, ATPD, ATPS, ATPFWD, and ATPRVS inputs with the HDS to the table in step 2.

Do multiple transmission range switch signals indicate ON?

YES—Repair short in the wires between the transmission range switch and the PCM. Refer to the following table.■

NO—Replace the transmission range switch (see page 14-245).

	ATPP	ATPR	ATPN	ATPD	ATPS	ATP FWD	ATP RVS
PCM	D13	D16	B23	C10	C18	C19	C21
Range Switch	7	8	3	9	4	5	2

7. Disconnect the transmission range switch connector.
8. Check the abnormal transmission range switch signal with the HDS.

Do any transmission range switch signals remain ON?

YES—Go to step 9.

NO—Replace the transmission range switch (see page 14-245).

9. Check continuity to body ground in the circuit which remained ON, refer to the table in step 2.

Does the circuit that indicated ON have continuity to ground?

YES—Repair a short to body ground in the wire between the transmission range switch and the PCM.■

NO—Replace the PCM.■

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DTC P0706: Transmission Range Switch (Open)

NOTE:
- Before you troubleshoot, record all freeze data and any on-board snapshot with the HDS, and review General Troubleshooting Information (see page 14-4).
- This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

1. Check the shift cable is adjusted properly.

2. Turn the ignition switch to ON (II).

3. Compare the ATPP, ATPR, ATPN, ATPD, ATPS, ATPFWD, and ATPRVS inputs with the HDS to the following table, in each gear position.

	ATPP	ATPR	ATPN	ATPD	ATPS	ATP FWD	ATP RVS
P	○	×	×	×	×	×	○
R	×	○	×	×	×	×	○
N	×	×	○	×	×	×	○
D	×	×	×	○	×	○	×
S	×	×	×	×	○	○	×

○: ON ×: OFF

Do the transmission range switch signals match?

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

NO—Go to step 4.

4. Compare the ATPP, ATPR, ATPN, ATPD, ATPS, ATPFWD, and ATPRVS inputs with the HDS to the table in step 3, in each gear position.

Do all shift positions remain OFF?

YES—Go to step 12.

NO—Go to step 5.

5. Turn the ignition switch to LOCK (0).

6. Disconnect the transmission range switch connector.

7. Connect the transmission range switch connector terminal which did not indicate ON in step 4 to body ground with a jumper wire.

8. Turn the ignition switch to ON (II).

9. Check the transmission range switch signal which did not indicate ON with the HDS.

Does the transmission range switch indicate ON?

YES—Replace the transmission range switch (see page 14-245).

NO—Go to step 10.

10. Turn the ignition switch to LOCK (0).

11. Check for continuity between the transmission range switch circuit terminal and the PCM terminal of the input which indicated OFF. Refer to the following table.

	ATPP	ATPR	ATPN	ATPD	ATPS	ATP FWD	ATP RVS
PCM	D13	D16	B23	C10	C18	C19	C21
Range Switch	7	8	3	9	4	5	2

Is there continuity?

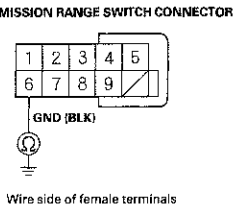
YES—Replace the PCM. ■

NO—Repair an open in the wire between the transmission range switch and the PCM. ■

12. Turn the ignition switch to LOCK (0).

13. Disconnect the transmission range switch connector.

14. Check for continuity between transmission range switch connector terminal No. 6 and body ground.



Is there continuity?

YES—Replace the transmission range switch (see page 14-245).

NO—Repair an open in the wire between the transmission range switch and body ground (G101), or repair poor body ground (G101). ■

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DTC Troubleshooting (cont'd)

DTC P0711: ATF Temperature Sensor (Range/ Performance)

NOTE:
- Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).
- This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

1. Turn the ignition switch to ON (II), and wait for 20 seconds.

2. Check the ATF Temperature with the HDS in the A/T Data List.

   Does the ATF Temperature indicate −4 °F (−20 °C) or below?

   YES—Go to step 3.

   NO—Go to step 5.

3. Start the engine, and warm it up to normal operating temperature (the radiator fan comes on).

4. Check the ATF Temperature with the HDS in the A/T Data List.

   Does the ATF Temperature remain −4 °F (−20 °C) or below?

   YES—Replace the ATF temperature sensor (see page 14-194), then go to step 14.

   NO—Intermittent failure, the system is OK at this time. If there is an abnormal temperature rise in the ATF temperature sensor, go to step 8.■

5. Check that the ATF Temperature with the HDS in the A/T Data List.

   Does the ATF Temperature exceed 230 °F (110 °C)?

   YES—Go to step 6.

   NO—Intermittent failure, the system is OK at this time.■

6. Leave the engine off until the Engine Coolant Temperature reads 122 °F (50 °C) with the HDS in the A/T Data List.

7. Check the ATF Temperature with the HDS in the A/T Data List.

   Does the ATF temperature remain 230 °F (110 °C) or higher?

   YES—Replace the ATF temperature sensor (see page 14-194), then go to step 14.

   NO—Intermittent failure, the system is OK at this time. If there is an abnormal decrease in temperature of the ATF temperature sensor, go to step 8.■

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8. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).

9. Turn the ignition switch to ON (II), and wait for 20 seconds, then start the engine. Warm the engine up to normal operating temperature (the radiator fan comes on).

10. Turn the engine off, and leave it off until the engine coolant cools to ambient air temperature (the Engine Coolant Temperature reads the same as ambient air temperature with the HDS).

11. Turn the ignition switch to ON (II), and wait for 20 seconds, then start the engine. Warm the engine up to normal operating temperature (the radiator fan comes on). Start off in D, accelerate at 4-degree-opened throttle or more opened throttle, and run the vehicle at speeds over 19 mph (30 km/h) for at least 5 minutes.

12. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0711 indicated?

    YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

    NO—Go to step 13.

13. Monitor the OBD STATUS for P0711 in the DTCs MENU with the DHS.

    Does the HDS indicate PASSED?

    YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 12, go to the indicated DTC's troubleshooting. ■

    NO—Check for poor connections and loose terminals at the ATF temperature sensor and the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 9 and recheck.

14. Clear the DTC with the HDS.

15. Turn the ignition switch to ON (II), and wait for 20 seconds, then start the engine. Warm the engine up to normal operating temperature (the radiator fan comes on).

16. Turn the engine off, and leave it off until the engine coolant cools to ambient air temperature (the Engine Coolant Temperature reads the same as ambient air temperature with the HDS).

17. Turn the ignition switch to ON (II), and wait for 20 seconds, then start the engine. Warm the engine up to normal operating temperature (the radiator fan comes on). Start off in D, accelerate at 4-degree-opened throttle or more opened throttle, and run the vehicle at speeds over 19 mph (30 km/h) for at least 5 minutes.

18. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0711 indicated?

    YES—Check for poor connections and loose terminals at the ATF temperature sensor and the PCM, then go to step 1.

    NO—Go to step 19.

19. Monitor the OBD STATUS for P0711 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 18, go to the indicated DTC's troubleshooting. ■

    NO—Check for poor connections and loose terminals at the ATF temperature sensor and the PCM, then go to step 1. If the HDS indicates NOT COMPLETED, return to step 15 and recheck.

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DTC Troubleshooting (cont'd)

DTC P0712: ATF Temperature Sensor (Short)

NOTE:
- Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).
- This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

1. Turn the ignition switch to ON (II), and wait for 20 seconds.
2. Check the ATF temperature sensor voltage with the HDS in the A/T Data List.

   Is the ATF Temp Sensor (V) 0.07 V or less?

   YES—Go to step 3.

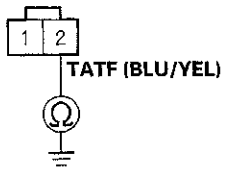
   NO—Intermittent failure, the system is OK at this time. Check for an intermittent short in the wire between the ATF temperature sensor and the PCM.■
3. Turn the ignition switch to LOCK (0).
4. Disconnect the ATF temperature sensor connector at the transmission end cover.
5. Turn the ignition switch to ON (II).
6. Check the ATF temperature sensor voltage with the HDS.

   Is the ATF Temp Sensor (V) 0.07 V or less?

   YES—Go to step 7.

   NO—Replace the ATF temperature sensor (see page 14-194), then go to step 16.
7. Turn the ignition switch to LOCK (0).
8. Jump the SCS line with the HDS.
9. Disconnect PCM connector C (22P).
10. Check for continuity between ATF temperature sensor connector terminal No. 2 and body ground.

ATF TEMPERATURE SENSOR CONNECTOR



Wire side of female terminals

Is there continuity?

YES—Repair a short in the wire between PCM connector terminal C3 and ATF temperature sensor connector terminal No. 2, then go to step 16.

NO—Go to step 11.

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11. Reconnect all connectors.

12. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).

13. Turn the ignition switch to ON (II), and wait for 20 seconds, then start the engine in P. Run the engine for at least 10 seconds.

14. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0712 indicated?

    YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

    NO—Go to step 15.

15. Monitor the OBD STATUS for P0712 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 14, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at the ATF temperature sensor and the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 13 and recheck.

16. Reconnect all connectors.

17. Clear the DTC with the HDS.

18. Turn the ignition switch to ON (II), and wait for 20 seconds, then start the engine in P. Run the engine for at least 10 seconds.

19. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0712 indicated?

    YES—Check for poor connections and loose terminals at the ATF temperature sensor and the PCM, then go to step 1.

    NO—Go to step 20.

20. Monitor the OBD STATUS for P0712 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 19, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at the ATF temperature sensor and the PCM, then go to step 1. If the HDS indicates NOT COMPLETED, return to step 18 and recheck.

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DTC Troubleshooting (cont'd)

DTC P0713: ATF Temperature Sensor (Open)

NOTE:
- Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).
- This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

1. Turn the ignition switch to ON (II), and wait for 20 seconds.

2. Check the ATF temperature sensor voltage with the HDS in the A/T Data List.

   Does the ATF Temp Sensor (V) exceed 4.93 V?

   YES—Go to step 3.

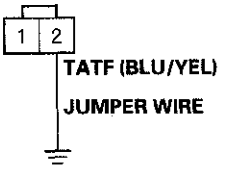
   NO—Intermittent failure, the system is OK at this time. Check for poor connections or loose terminals at the ATF temperature sensor and the PCM. ■

3. Turn the ignition switch to LOCK (0).

4. Disconnect the ATF temperature sensor connector at the transmission end cover.

5. Connect the ATF temperature sensor connector terminal No. 2 to body ground with a jumper wire. Turn the ignition switch to ON (II), and check the ATF temperature sensor voltage with the HDS in the A/T Data List.

ATF TEMPERATURE SENSOR CONNECTOR



Wire side of female terminals

Does the ATF Temp Sensor (V) drop to 0.07 V or below?

YES—Go to step 6.

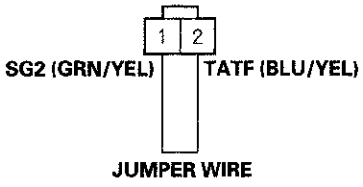
NO—Go to step 8.

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6. Turn the ignition switch to LOCK (0).

7. Connect a jumper wire between ATF temperature sensor connector terminals No. 1 and No. 2. Turn the ignition switch to ON (II), and check the ATF temperature sensor voltage with the HDS in the A/T Data List.

ATF TEMPERATURE SENSOR CONNECTOR



Wire side of female terminals

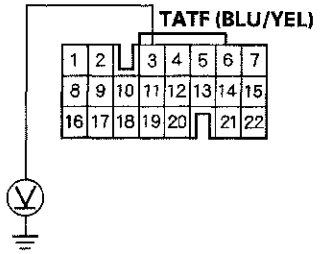
Does the ATF Temp Sensor (V) remain 0.07 V or below?

YES—Replace the ATF temperature sensor, then go to step 14.

NO—Repair an open in the wire between PCM connector terminal C12 and the ATF temperature sensor connector terminal No. 1, then go to step 14.

8. Measure the voltage between PCM connector terminal C3 and body ground.

PCM CONNECTOR C (22P)



Wire side of female terminals

Is there about 5 V?

YES—Repair an open in the wire between PCM connector terminal C3 and the ATF temperature sensor, then go to step 14.

NO—Go to step 9.

(cont'd)

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DTC Troubleshooting (cont'd)

9. Connect the ATF temperature sensor connector.

10. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).

11. Turn the ignition switch to ON (II), and wait for 20 seconds, then start the engine in P. Run the engine for at least 10 seconds.

12. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0713 indicated?

    YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

    NO—Go to step 13.

13. Monitor the OBD STATUS for P0713 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 12, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at the ATF temperature sensor and the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 11 and recheck.

14. Connect the ATF temperature sensor connector.

15. Clear the DTC with the HDS.

16. Turn the ignition switch to ON (II), and wait for 20 seconds, then start the engine in P. Run the engine for at least 10 seconds.

17. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0713 indicated?

    YES—Check for poor connections and loose terminals at the ATF temperature sensor and the PCM, then go to step 1.

    NO—Go to step 18.

18. Monitor the OBD status for P0712 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 17, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at the ATF temperature sensor and the PCM, then go to step 1. If the HDS indicates NOT COMPLETED, return to step 16 and recheck.

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DTC P0716: Problem in Input Shaft (Mainshaft) Speed Sensor Circut

DTC P0721: Problem in Output Shaft (Countershaft) Speed Sensor Circuit

NOTE: This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

1. Turn the ignition switch to ON (II).
2. Clear the DTC with the HDS.
3. Raise the vehicle on a lift, make sure it is securely supported, and allow the all four wheels to rotate freely.
4. Start the engine, disable the VSA by pressing the VSA OFF button, run the vehicle with the shift lever in D, and at speeds over 12 mph (20 km/h) for at least 10 seconds. Slow down, and stop the wheels.
5. Check for pending or Confirmed DTCs with the HDS.

   Is DTC P0718 or P0723 indicate?

   YES—Go to the DTC P0718 troubleshooting (see page 14-90) or the DTC P0723 troubleshooting (see page 14-92).■

   NO—Go to step 6.
6. Check for pending or Confirmed DTCs with the HDS.

   Is DTC P0716 or P0721 indicated?

   YES—Go to step 7.

   NO—Intermittent failure, the system is OK at this time.■
7. Check the input shaft (mainshaft) speed sensor or the output shaft (countershaft) speed sensor for poor conection and proper installation.

   Are there connections and installation OK?

   YES—Replace the input shaft (mainshaft) speed sensor or the output shaft (countershaft) speed sensor, then go to step 8.

   NO—Connect the speed sensor connector and reinstall the speed sensor, then go to step 8.
8. Turn the ignition switch to ON (II).
9. Clear the DTC with HDS.
10. Start the engine, disable the VSA by pressing the VSA OFF button, run the vehicle with the shift lever in D,and at speeds over 12 mph (20 km/h) for at least 10 seconds. Slow down, and stop the wheels.
11. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0716 or P0721 indicated?

    YES—Go to step 1.

    NO—Troubleshooting is complete.■

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DTC Troubleshooting (cont'd)

DTC P0717: Input Shaft (Mainshaft) Speed Sensor Circuit (No Signal Input)

DTC P0718: Input Shaft (Mainshaft) Speed Sensor (Intermittent Failure)

NOTE: This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

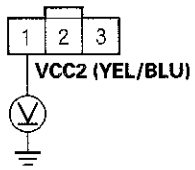
1. Turn the ignition switch to ON (II).
2. Clear the DTC with the HDS.
3. Raise the vehicle on a lift, make sure it is securely supported, and allow the all four wheels to rotate freely.
4. Start the engine, disable the VSA by pressing the VSA OFF button, run the vehicle with the shift lever in D, and at speeds over 12 mph (20 km/h). Check the input shaft (mainshaft) speed and the output shaft (countershaft) speed in the Data List with the HDS. Slow down, and stop the wheels.

   Are they same speed?

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

   NO—Go to step 5.
5. Turn the ignition switch to LOCK (0).
6. Disconnect the input shaft (mainshaft) speed sensor connector.
7. Turn the ignition switch to ON (II).
8. Measure the voltage between input shaft (mainshaft) speed sensor connector terminal No. 1 and body ground.

INPUT SHAFT (MAINSHAFT) SPEED SENSOR CONNECTOR



Wire side of female terminals

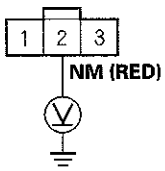
Is there about 5 V?

YES—Go to step 9.

NO—Repair an open in the wire between PCM connector terminal C14 and the input shaft (mainshaft) speed sensor, then go to step 15.

9. Measure the voltage between input shaft (mainshaft) speed sensor connector terminal No. 2 and body ground.

INPUT SHAFT (MAINSHAFT) SPEED SENSOR CONNECTOR



Wire side of female terminals

Is there about 5 V?

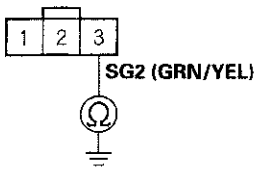
YES—Go to step 10.

NO—Go to step 11.

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10. Check for continuity between input shaft (mainshaft) speed sensor connector terminal No. 3 and body ground.

INPUT SHAFT (MAINSHAFT) SPEED SENSOR CONNECTOR



Wire side of female terminals

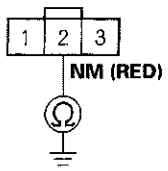
Is there continuity?

YES—Replace the input shaft (mainshaft) speed sensor (see page 14-191), then go to step 15.

NO—Repair an open in the wire between the input shaft (mainshaft) speed sensor connector and PCM connector terminal C12, then go to step 15.

11. Turn the ignition switch to LOCK (0).
12. Jump the SCS line with the HDS.
13. Disconnect PCM connector D (17P).
14. Check for continuity between input shaft (mainshaft) speed sensor connector terminal No. 2 and body ground.

INPUT SHAFT (MAINSHAFT) SPEED SENSOR CONNECTOR



Wire side of female terminals

Is there continuity?

YES—Repair a short to body ground in the wire between PCM connector terminal D8 and the input shaft (mainshaft) speed sensor, then go to step 15.

NO—Repair an open in the wire between PCM connector terminal D8 and the input shaft (mainshaft) speed sensor, then go to step 15.

15. Reconnect all connectors.
16. Turn the ignition switch to ON (II).
17. Clear the DTC with the HDS.
18. Start the engine, disable the VSA by pressing the VSA OFF button, run the vehicle with the shift lever in D, and at speeds over 12 mph (20 km/h). Check the input shaft (mainshaft) speed and output shaft (countershaft) speed in the Data List with the HDS. Slow down, and stop the wheels.

Are they same speed?

YES—Troubleshooting is complete.■

NO—Go to step 1.

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DTC Troubleshooting (cont'd)

DTC P0722: Output Shaft (Countershaft) Speed Sensor Circuit (No Signal Input)

DTC P0723: Output Shaft (Countershaft) Speed Sensor (Intermittent Failure)

NOTE: This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

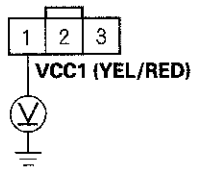
1. Turn the ignition switch to ON (II).
2. Clear the DTC with the HDS.
3. Raise the vehicle on a lift, make sure it is securely supported, and allow the all four wheels to rotate freely.
4. Start the engine, disable the VSA by pressing the VSA OFF button, run the vehicle with the shift lever in D, and at speeds over 12 mph (20 km/h). Check the input shaft (mainshaft) speed and the output shaft (countershaft) speed in the Data List with the HDS. Slow down, and stop the wheels.

   Are they same speed?

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

   NO—Go to step 5.
5. Turn the ignition switch to LOCK (0).
6. Disconnect the output shaft (countershaft) speed sensor connector.
7. Turn the ignition switch to ON (II).
8. Measure the voltage between output shaft (countershaft) speed sensor connector terminal No. 1 and body ground.

OUTPUT SHAFT (COUNTERSHAFT) SPEED SENSOR CONNECTOR



Wire side of female terminals

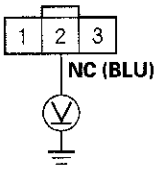
Is there about 5 V?

YES—Go to step 9.

NO—Repair an open in the wire between PCM connector terminal C6 and the output shaft (countershaft) speed sensor, then go to step 15.

9. Measure the voltage between output shaft (countershaft) speed sensor connector terminal No. 2 and body ground.

OUTPUT SHAFT (COUNTERSHAFT) SPEED SENSOR CONNECTOR



Wire side of female terminals

Is there about 5 V?

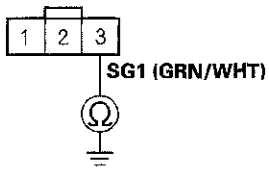
YES—Go to step 10.

NO—Go to step 11.

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10. Check for continuity between output shaft (countershaft) speed sensor connector terminal No. 3 and body ground.

OUTPUT SHAFT (COUNTERSHAFT) SPEED SENSOR CONNECTOR



Wire side of female terminals

Is there continuity?

YES—Replace the output shaft (countershaft) speed sensor (see page 14-192), then go to step 15.

NO—Repair an open in the wire between the output shaft (countershaft) speed sensor and PCM connector terminal C4, then go to step 15.

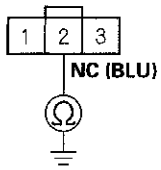
11. Turn the ignition switch to LOCK (0).

12. Jump the SCS line with the HDS.

13. Disconnect PCM connector B (24P).

14. Check for continuity between output shaft (countershaft) speed sensor connector terminal No. 2 and body ground.

OUTPUT SHAFT (COUNTERSHAFT) SPEED SENSOR CONNECTOR



Wire side of female terminals

Is there continuity?

YES—Repair a short to body ground in the wire between PCM connector terminal B19 and the output shaft (countershaft) speed sensor, then go to step 15.

NO—Repair an open in the wire between PCM connector terminal B19 and the output shaft (countershaft) speed sensor, then go to step 15.

15. Reconnect all connectors.

16. Turn the ignition switch to ON (II).

17. Clear the DTC with the HDS.

18. Start the engine, disable the VSA by pressing the VSA OFF button, run the vehicle with the shift lever in D, and at speeds over 12 mph (20 km/h). Check the input shaft (mainshaft) speed and output shaft (countershaft) speed in the Data List with the HDS. Slow down, and stop the wheels.

Are they same speed?

YES—Troubleshooting is complete.■

NO—Go to step 1.

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DTC Troubleshooting (cont'd)

DTC P0731: 1st Gear Incorrect Ratio

NOTE: Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).

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

2. Make sure that the transmission is filled to the proper level, and check for fluid leaks.

3. Drain the ATF (see step 4 on page 14-196) through a strainer. Inspect the strainer for metal debris or excessive clutch material.

   Does the strainer have metal debris or excessive clutch material?

   YES—Replace the transmission, then go to step 11.

   NO—Replace the ATF (see step 6 on page 14-196), then go to step 4.

4. Measure the line pressure (see page 14-174).

   Is the line pressure within the service limits?

   YES—Go to step 5.

   NO—Repair the ATF pump and the regulator valve, or replace the transmission, then go to step 10.

5. Measure the 1st clutch pressure (see page 14-174).

   Is the 1st clutch pressure within the service limits?

   YES—Go to step 6.

   NO—Shift valves B and C are stuck. Repair these valves and the related hydraulic circuit, or replace the transmission, then go to step 10.

6. Clear the DTC with the HDS.

7. Start the engine. With the brake pedal pressed, shift to D, and press the accelerator pedal for 5 seconds at about 3 % opened-throttle, then release the accelerator until the engine speed comes down below 1,000 rpm. Release the brake pedal, and drive the vehicle in 1st gear for at least 1 second, then press the accelerator pedal so that the transmission upshifts to 2nd gear, then 3rd gear. Slow down and stop the wheels.

8. Check for Pending or Confirmed DTCs with the HDS.

   Is DTC P0731 indicated?

   YES—Repair the 1st clutch, or replace the transmission, then go to step 10.

   NO—Go to step 9.

9. Monitor the OBD STATUS for P0731 in the DTCs MENU with the HDS.

   Does the HDS indicate PASSED?

   YES—Intermittent failure, the system is OK at this time. If any other Pending or Confirmed DTCs were indicated on step 8, go to the indicated DTC's troubleshooting. ■

   NO—Check for poor connections and loose terminals at the input shaft (mainshaft) speed sensor, the output shaft (countershaft) speed sensor, and the PCM, then recheck. If the HDS indicates NOT COMPLETED, return to step 7 and recheck.

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10. Clear the DTC with the HDS.

11. Start the engine. With the brake pedal pressed, shift to D, and press the accelerator pedal for 5 seconds at about 3 % opened-throttle, then release the accelerator until the engine speed comes down below 1,000 rpm. Release the brake pedal, and drive the vehicle in 1st gear for at least 1 second, then press the accelerator pedal so that the transmission upshifts to 2nd gear, then 3rd gear. Slow down and stop the wheels.

12. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0731 indicated?

    YES—Check for poor connections and loose terminals at the input shaft (mainshaft) speed sensor, the output shaft (countershaft) speed sensor, and the PCM, then go to step 1.

    NO—Go to step 13.

13. Monitor the OBD STATUS for P0731 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other DTCs were indicated on step 12, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at the input shaft (mainshaft) speed sensor, the output shaft (countershaft) speed sensor, and the PCM, then go to step 4. If the HDS indicates NOT COMPLETED, return to step 11 and recheck.

DTC P0732: 2nd Gear Incorrect Ratio

NOTE: Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).

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

2. Make sure that the transmission is filled to the proper level, and check for fluid leaks.

3. Drain the ATF (see step 4 on page 14-196) through a strainer. Inspect the strainer for metal debris or excessive clutch material.

   Does the strainer have metal debris or excessive clutch material?

   YES—Replace the transmission, then go to step 11.

   NO—Replace the ATF (see step 6 on page 14-196), then go to step 4.

4. Measure the line pressure (see page 14-174).

   Is the line pressure within the service limits?

   YES—Go to step 5.

   NO—Repair the ATF pump and the regulator valve, or replace the transmission, then go to step 10.

5. Measure the 2nd clutch pressure (see page 14-174).

   Is the 2nd clutch pressure within the service limits?

   YES—Go to step 6.

   NO—Shift valves A, B, and C are stuck. Repair these valves and the hydraulic circuit, or replace the transmission, then go to step 10.

(cont'd)

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DTC Troubleshooting (cont'd)

6. Clear the DTC with the HDS.
7. Test-drive the vehicle in 2nd gear in D at speeds over 9 mph (15 km/h) with the engine speed at 500 rpm or higher, for at least 12 seconds. Slow down and stop the wheels.
8. Check for Pending or Confirmed DTCs with the HDS.

   Is DTC P0732 indicated?

   YES—Repair the 2nd clutch, or replace the transmission, then go to step 10.

   NO—Go to step 9.
9. Monitor the OBD STATUS for P0732 in the DTCs MENU with the HDS.

   Does the HDS indicate PASSED?

   YES—Intermittent failure, the system is OK at this time. If any other Pending or Confirmed DTCs were indicated on step 8, go to the indicated DTC's troubleshooting.■

   NO—Check for poor connections and loose terminals at the input shaft (mainshaft) speed sensor, the output shaft (countershaft) speed sensor, and the PCM, then recheck. If the HDS indicates NOT COMPLETED, return to step 7 and recheck.
10. Clear the DTC with the HDS.
11. Test-drive the vehicle in 2nd gear in D at speeds over 9 mph (15 km/h) with the engine speed at 500 rpm or higher, for at least 12 seconds. Slow down and stop the wheels.
12. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0732 indicated?

    YES—Check for poor connections and loose terminals at the input shaft (mainshaft) speed sensor, the output shaft (countershaft) speed sensor, and the PCM, then go to step 1.

    NO—Go to step 13.
13. Monitor the OBD STATUS for P0732 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 12, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at the input shaft (mainshaft) speed sensor, the output shaft (countershaft) speed sensor, and the PCM, then go to step 4. If the HDS indicates NOT COMPLETED, return to step 11 and recheck.

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DTC P0733: 3rd Gear Incorrect Ratio

NOTE: Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).

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

2. Make sure that the transmission is filled to the proper level, and check for fluid leaks.

3. Drain the ATF (see step 4 on page 14-196) through a strainer. Inspect the strainer for metal debris or excessive clutch material.

   Does the strainer have metal debris or excessive clutch material?

   YES—Replace the transmission, then go to step 11.

   NO—Replace the ATF (see step 6 on page 14-196), then go to step 4.

4. Measure the line pressure (see page 14-174).

   Is the line pressure within the service limits?

   YES—Go to step 5.

   NO—Repair the ATF pump and the regulator valve, or replace the transmission, then go to step 10.

5. Measure the 3rd clutch pressure (see page 14-174).

   Is the 3rd clutch pressure within the service limits?

   YES—Go to step 6.

   NO—Shift valves A, B, and C are stuck. Repair these valves and the hydraulic circuit, or replace the transmission, then go to step 10.

6. Clear the DTC with the HDS.

7. Test-drive the vehicle in 3rd gear in D at speeds over 9 mph (15 km/h) with the engine speed at 500 rpm or higher, for at least 12 seconds. Slow down and stop the wheels.

8. Check for Pending or Confirmed DTCs with the HDS.

   Is DTC P0733 indicated?

   YES—Repair the 3rd clutch, or replace the transmission, then go to step 10.

   NO—Go to step 9.

9. Monitor the OBD STATUS for P0733 in the DTCs MENU with the HDS.

   Does the HDS indicate PASSED?

   YES—Intermittent failure, the system is OK at this time. If any other Pending or Confirmed DTCs were indicated on step 8, go to the indicated DTC's troubleshooting. ■

   NO—Check for poor connections and loose terminals at the input shaft (mainshaft) speed sensor, the output shaft (countershaft) speed sensor, and the PCM, then recheck. If the HDS indicates NOT COMPLETED, return to step 7 and recheck.

(cont'd)

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DTC Troubleshooting (cont'd)

10. Clear the DTC with the HDS.

11. Test-drive the vehicle in 3rd gear in D at speeds over 9 mph (15 km/h) with the engine speed at 500 rpm or higher, for at least 12 seconds. Slow down and stop the wheels.

12. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0733 indicated?

    YES—Check for poor connections and loose terminals at the input shaft (mainshaft) speed sensor, the output shaft (countershaft) speed sensor, and the PCM, then go to step 1.

    NO—Go to step 13.

13. Monitor the OBD STATUS for P0733 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 12, go to the indicated DTC's troubleshooting. ■

    NO—Check for poor connections and loose terminals at the input shaft (mainshaft) speed sensor, the output shaft (countershaft) speed sensor, and the PCM, then go to step 4. If the HDS indicates NOT COMPLETED, return to step 11 and recheck.

DTC P0734: 4th Gear Incorrect Ratio

NOTE: Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).

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

2. Make sure that the transmission is filled to the proper level, and check for fluid leaks.

3. Drain the ATF (see step 4 on page 14-196) through a strainer. Inspect the strainer for metal debris or excessive clutch material.

   Does the strainer have metal debris or excessive clutch material?

   YES—Replace the transmission, then go to step 11.

   NO—Replace the ATF (see step 6 on page 14-196), then go to step 4.

4. Measure the line pressure (see page 14-174).

   Is the line pressure within the service limits?

   YES—Go to step 5.

   NO—Repair the ATF pump and the regulator valve, or replace the transmission, then go to step 10.

5. Measure the 4th clutch pressure (see page 14-174).

   Is the 4th clutch pressure within the service limits?

   YES—Go to step 6.

   NO—Shift valves A, B, C, and D are stuck. Repair these valves and the hydraulic circuit, or replace the transmission, then go to step 10.

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6. Clear the DTC with the HDS.

7. Test-drive the vehicle in 4th gear in D at speeds over 9 mph (15 km/h) with the engine speed at 500 rpm or higher, for at least 12 seconds. Slow down and stop the wheels.

8. Check for Pending or Confirmed DTCs with the HDS.

   Is DTC P0734 indicated?

   YES—Repair the 4th clutch, or replace the transmission, then go to step 10.

   NO—Go to step 9.

9. Monitor the OBD STATUS for P0734 in the DTCs MENU with the HDS.

   Does the HDS indicate PASSED?

   YES—Intermittent failure, the system is OK at this time. If any other Pending or Confirmed DTCs were indicated on step 8, go to the indicated DTC's troubleshooting.■

   NO—Check for poor connections and loose terminals at the input shaft (mainshaft) speed sensor, the output shaft (countershaft) speed sensor, and the PCM, then recheck. If the HDS indicates NOT COMPLETED, return to step 7 and recheck.

10. Clear the DTC with the HDS.

11. Test-drive the vehicle in 4th gear in D at speeds over 9 mph (15 km/h) with the engine speed at 500 rpm or higher, for at least 12 seconds. Slow down and stop the wheels.

12. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0734 indicated?

    YES—Check for poor connections and loose terminals at the input shaft (mainshaft) speed sensor, the output shaft (countershaft) speed sensor, and the PCM, then go to step 1.

    NO—Go to step 13.

13. Monitor the OBD STATUS for P0734 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 12, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at the input shaft (mainshaft) speed sensor, the output shaft (countershaft) speed sensor, and the PCM, then go to step 4. If the HDS indicates NOT COMPLETED, return to step 11 and recheck.

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DTC Troubleshooting (cont'd)

DTC P0735: 5th Gear Incorrect Ratio

NOTE: Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).

1. Warm up the engine to normal operating temperature (the radiator fan comes on).
2. Make sure that the transmission is filled to the proper level, and check for fluid leaks.
3. Drain the ATF (see step 4 on page 14-196) through a strainer. Inspect the strainer for metal debris or excessive clutch material.

   Does the strainer have metal debris or excessive clutch material?

   YES—Replace the transmission, then go to step 11.

   NO—Replace the ATF (see step 6 on page 14-196), then go to step 4.
4. Measure the line pressure (see page 14-174).

   Is the line pressure within the service limits?

   YES—Go to step 5.

   NO—Repair the ATF pump and the regulator valve, or replace the transmission, then go to step 10.
5. Measure the 5th clutch pressure (see page 14-174).

   Is the 5th clutch pressure within the service limits?

   YES—Go to step 6.

   NO—Shift valves A, B, C, and D are stuck. Repair these valves and the hydraulic circuit, or replace the transmission, then go to step 10.
6. Clear the DTC with the HDS.
7. Test-drive the vehicle in 5th gear in D at speeds over 9 mph (15 km/h) with the engine speed at 500 rpm or higher, for at least 12 seconds. Slow down and stop the wheels.
8. Check for Pending or Confirmed DTCs with the HDS.

   Is DTC P0735 indicated?

   YES—Repair the 5th clutch, or replace the transmission, then go to step 10.

   NO—Go to step 9.
9. Monitor the OBD STATUS for P0735 in the DTCs MENU with the HDS.

   Does the HDS indicate PASSED?

   YES—Intermittent failure, the system is OK at this time. If any other Pending or Confirmed DTCs were indicated on step 8, go to the indicated DTC's troubleshooting. ■

   NO—Check for poor connections and loose terminals at the input shaft (mainshaft) speed sensor, the output shaft (countershaft) speed sensor, and the PCM, then recheck. If the HDS indicates NOT COMPLETED, return to step 7 and recheck.

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10. Clear the DTC with the HDS.

11. Test-drive the vehicle in 5th gear in D at speeds over 9 mph (15 km/h) with the engine speed at 500 rpm or higher, for at least 12 seconds. Slow down and stop the wheels.

12. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0735 indicated?

    YES—Check for poor connections and loose terminals at the input shaft (mainshaft) speed sensor, the output shaft (countershaft) speed sensor, and the PCM, then go to step 1.

    NO—Go to step 13.

13. Monitor the OBD STATUS for P0735 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 12, go to the indicated DTC's troubleshooting. ■

    NO—Check for poor connections and loose terminals at the input shaft (mainshaft) speed sensor, the output shaft (countershaft) speed sensor, and the PCM, then go to step 4. If the HDS indicates NOT COMPLETED, return to step 11 and recheck.

DTC P0741: Torque Converter Clutch Circuit Performance or Stuck OFF

NOTE: Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).

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

2. Make sure that the transmission is filled to the proper level, and check for fluid leaks.

3. Drain the ATF (see step 4 on page 14-196) through a strainer. Inspect the strainer for metal debris or excessive clutch material.

   Does the strainer have metal debris or excessive clutch material?

   YES—Replace the transmission, then go to step 12.

   NO—Replace the ATF (see step 6 on page 14-196), then go to step 4.

4. Clear the DTC with the HDS.

5. Select Shift Solenoid D in the Miscellaneous Test Menu, and check that shift solenoid valve D operates with the HDS.

   Is a clicking sound heard?

   YES—Go to step 6.

   NO—Replace shift solenoid valve D (see page 14-178), then go to step 11.

6. Run the engine until the engine coolant temperature reaches 176 °F (80 °C).

7. Select Clutch Pressure Control (Linear) Solenoid C in the Miscellaneous Test Menu, and test A/T clutch pressure control solenoid valve C with the HDS.

   Does the HDS indicate NORMAL?

   YES—Go to step 8.

   NO—Follow the instructions indicated on the HDS by the test result, but if the HDS has not determined the cause of the failure, go to step 10. If any part is replaced, go to step 11.

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DTC Troubleshooting (cont'd)

8. Test-drive the vehicle on a level road with a steady throttle at 60 mph (96 km/h) for at least 22 seconds, or test-drive the vehicle for several minutes under the same conditions as those indicated by the freeze data.

9. Monitor the OBD STATUS for P0741 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Repair the faulty torque converter clutch mechanism, torque converter clutch hydraulic circuit, lock-up shift valve, or lock-up control valve, or replace the transmission, then go to step 11.

   NO—Intermittent failure, the system is OK at this time. If the HDS indicates NOT COMPLETED, return to step 8 and recheck.■

10. Inspect A/T clutch pressure control solenoid valve C (see page 14-187).

    Does A/T clutch pressure control solenoid valve C work properly?

    YES—Repair the hydraulic system related to the lock-up shift valve, lock-up control valve, and lock-up timing valve, or replace the transmission, then go to step 11.

    NO—Replace A/T clutch pressure control solenoid valve C (see page 14-190), then go to step 11.

11. Clear the DTC with the HDS.

12. Test-drive the vehicle on a level road with a steady throttle at 60 mph (96 km/h) for at least 22 seconds, or test-drive the vehicle for several minutes under the same conditions as those indicated by the freeze data.

13. Monitor the OBD STATUS for P0741 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete.■

    NO—Return to step 5 and recheck. If the HDS indicates NOT COMPLETED, return to step 12 and recheck.

DTC P0746: A/T Clutch Pressure Control Solenoid Valve A Stuck OFF

DTC P0747: A/T Clutch Pressure Control Solenoid Valve A Stuck ON

NOTE: Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).

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

2. Make sure that the transmission is filled to the proper level, and check for fluid leaks.

3. Drain the ATF (see step 4 on page 14-196) through a strainer. Inspect the strainer for metal debris or excessive clutch material.

   Does the strainer have metal debris or excessive clutch material?

   YES—Replace the transmission, then go to step 11.

   NO—Replace the ATF (see step 6 on page 14-196), then go to step 4.

4. Clear the DTC with the HDS.

5. Test-drive the vehicle with the shift lever in D for at least 20 seconds, and let the transmission shift through all five gears, then slow down to a stop.

6. Monitor the OBD STATUS for P0746 or P0747 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Go to step 7.

   NO—Intermittent failure, the system is OK at this time. If the HDS indicates NOT COMPLETED, return to step 5 and recheck.■

7. Clear the DTC with the HDS.

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8. Select Clutch Pressure Control (Linear) Solenoid A in the Miscellaneous Test Menu, and test A/T clutch pressure control solenoid valve A with the HDS.

   Does the HDS indicate NORMAL?

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

   NO—Follow the instructions indicated on the HDS by the test result, but if the HDS has not determined the cause of the failure, go to step 9. If any part is replaced, go to step 10.

9. Inspect A/T clutch pressure control solenoid valve A (see page 14-182).

   Does A/T clutch pressure control solenoid valve A work properly?

   YES—Repair the hydraulic system related with shift valve A, or replace the transmission, then go to step 10.

   NO—Replace A/T clutch pressure control solenoid valve A (see page 14-185), then go to step 10.

10. Clear the DTC with the HDS.

11. Test-drive the vehicle with the shift lever in D for at least 20 seconds, and let the transmission shift through all five gears, then slow down to a stop.

12. Monitor the OBD STATUS for P0746 or P0747 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete.■

    NO—Return to step 7 and recheck. If the HDS indicates NOT COMPLETED, return to step 11 and recheck.

DTC P0751: Shift Solenoid Valve A Stuck OFF

DTC P0752: Shift Solenoid Valve A Stuck ON

NOTE: Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).

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

2. Make sure that the transmission is filled to the proper level, and check for fluid leaks.

3. Drain the ATF (see step 4 on page 14-196) through a strainer. Inspect the strainer for metal debris or excessive clutch material.

   Does the strainer have metal debris or excessive clutch material?

   YES—Replace the transmission, then go to step 12.

   NO—Replace the ATF (see step 6 on page 14-196), then go to step 4.

4. Clear the DTC with the HDS.

5. Test-drive the vehicle with the shift lever in D for at least 11 seconds, and let the transmission shift through all five gears, then slow down to a stop.

6. Monitor the OBD STATUS for P0751 or P0752 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Go to step 7.

   NO—Intermittent failure, the system is OK at this time. If the HDS indicates NOT COMPLETED, return to step 5 and recheck.■

7. Clear the DTC with the HDS.

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DTC Troubleshooting (cont'd)

8. Select Shift Solenoid A in the Miscellaneous Test Menu, and check that shift solenoid valve A operates with the HDS.

   Is a clicking sound heard?

   YES—Go to step 9.

   NO—Replace shift solenoid valve A (see page 14-178), then go to step 11.

9. Test-drive the vehicle with the shift lever in D for at least 11 seconds, and let the transmission shift through all five gears, then slow down to a stop.

10. Monitor the OBD STATUS for P0751 or P0752 in the DTCs MENU with the HDS.

    Does the HDS indicate FAILED?

    YES—Repair shift valve A, or replace the transmission, then go to step 11.

    NO—Intermittent failure, the system is OK at this time. If the HDS indicates NOT COMPLETED, return to step 9 and recheck.■

11. Clear the DTC with the HDS.

12. Test-drive the vehicle with the shift lever in D for at least 11 seconds, and let the transmission shift through all five gears, then slow down to a stop.

13. Monitor the OBD STATUS for P0751 or P0752 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete.■

    NO—Return to step 7 and recheck. If the HDS indicates NOT COMPLETED, return to step 12 and recheck.

DTC P0756: Shift Solenoid Valve B Stuck OFF

DTC P0757: Shift Solenoid Valve B Stuck ON

NOTE: Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).

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

2. Make sure that the transmission is filled to the proper level, and check for fluid leaks.

3. Drain the ATF (see step 4 on page 14-196) through a strainer. Inspect the strainer for metal debris or excessive clutch material.

   Does the strainer have metal debris or excessive clutch material?

   YES—Replace the transmission, then go to step 12.

   NO—Replace the ATF (see step 6 on page 14-196), then go to step 4.

4. Clear the DTC with the HDS.

5. Test-drive the vehicle with the shift lever in D for at least 20 seconds, and let the transmission shift through all five gears, then slow down to a stop.

6. Monitor the OBD STATUS for P0756 or P0757 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Go to step 7.

   NO—Intermittent failure, the system is OK at this time. If the HDS indicates NOT COMPLETED, return to step 5 and recheck.■

7. Clear the DTC with the HDS.

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8. Select Shift Solenoid B in the Miscellaneous Test Menu, and check that shift solenoid valve B operates with the HDS.

   Is a clicking sound heard?

   YES—Go to step 9.

   NO—Replace shift solenoid valve B (see page 14-178), then go to step 11.

9. Test-drive the vehicle with the shift lever in D for at least 20 seconds, and let the transmission shift through all five gears, then slow down to a stop.

10. Monitor the OBD STATUS for P0756 or P0757 in the DTCs MENU with the HDS.

    Does the HDS indicate FAILED?

    YES—Repair shift valve B, or replace the transmission, then go to step 11.

    NO—Intermittent failure, the system is OK at this time. If the HDS indicates NOT COMPLETED, return to step 9 and recheck.■

11. Clear the DTC with the HDS.

12. Test-drive the vehicle with the shift lever in D for at least 20 seconds, and let the transmission shift through all five gears, then slow down to a stop.

13. Monitor the OBD STATUS for P0756 or P0757 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete.■

    NO—Return to step 7 and recheck. If the HDS indicates NOT COMPLETED, return to step 12 and recheck.

DTC P0761: Shift Solenoid Valve C Stuck OFF

DTC P0762: Shift Solenoid Valve C Stuck ON

NOTE: Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).

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

2. Make sure that the transmission is filled to the proper level, and check for fluid leaks.

3. Drain the ATF (see step 4 on page 14-196) through a strainer. Inspect the strainer for metal debris or excessive clutch material.

   Does the strainer have metal debris or excessive clutch material?

   YES—Replace the transmission, then go to step 12.

   NO—Replace the ATF (see step 6 on page 14-196), then go to step 4.

4. Clear the DTC with the HDS.

5. Test-drive the vehicle with the shift lever in D for at least 20 seconds, and let the transmission shift through all five gears, then slow down to a stop.

6. Monitor the OBD STATUS for P0761 or P0762 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Go to step 7.

   NO—Intermittent failure, the system is OK at this time. If the HDS indicates NOT COMPLETED, return to step 5 and recheck.■

7. Clear the DTC with the HDS.

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DTC Troubleshooting (cont'd)

8. Select Shift Solenoid C in the Miscellaneous Test Menu, and check that shift solenoid valve C operates with the HDS.

   Is a clicking sound heard?

   YES—Go to step 9.

   NO—Replace shift solenoid valve C (see page 14-178), then go to step 11.

9. Test-drive the vehicle with the shift lever in D for at least 20 seconds, and let the transmission shift through all five gears, then slow down to a stop.

10. Monitor the OBD STATUS for P0761 or P0762 in the DTCs MENU with the HDS.

    Does the HDS indicate FAILED?

    YES—Repair shift valve C, or replace the transmission, then go to step 11.

    NO—Intermittent failure, the system is OK at this time. If the HDS indicates NOT COMPLETED, return to step 9 and recheck.■

11. Clear the DTC with the HDS.

12. Test-drive the vehicle with the shift lever in D for at least 20 seconds, and let the transmission shift through all five gears, then slow down to a stop.

13. Monitor the OBD STATUS for P0761 or P0762 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete.■

    NO—Return to step 7 and recheck. If the HDS indicates NOT COMPLETED, return to step 12 and recheck.

DTC P0766: Shift Solenoid Valve D Stuck OFF

DTC P0767: Shift Solenoid Valve D Stuck ON

NOTE: Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).

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

2. Make sure that the transmission is filled to the proper level, and check for fluid leaks.

3. Drain the ATF (see step 4 on page 14-196) through a strainer. Inspect the strainer for metal debris or excessive clutch material.

   Does the strainer have metal debris or excessive clutch material?

   YES—Replace the transmission, then go to step 12.

   NO—Replace the ATF (see step 6 on page 14-196), then go to step 4.

4. Clear the DTC with the HDS.

5. Test-drive the vehicle with the shift lever in D for at least 11 seconds, and let the transmission shift through all five gears, then slow down to a stop.

6. Monitor the OBD STATUS for P0766 or P0767 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Go to step 7.

   NO—Intermittent failure, the system is OK at this time. If the HDS indicates NOT COMPLETED, return to step 5 and recheck.■

7. Clear the DTC with the HDS.

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8. Select Shift Solenoid D in the Miscellaneous Test Menu, and check that shift solenoid valve D operates with the HDS.

   Is a clicking sound heard?

   YES—Go to step 9.

   NO—Replace shift solenoid valve D (see page 14-178), then go to step 11.

9. Test-drive the vehicle with the shift lever in D for at least 11 seconds, and let the transmission shift through all five gears, then slow down to a stop.

10. Monitor the OBD STATUS for P0766 or P0767 in the DTCs MENU with the HDS.

    Does the HDS indicate FAILED?

    YES—Repair shift valve D, or replace the transmission, then go to step 11.

    NO—Intermittent failure, the system is OK at this time. If the HDS indicates NOT COMPLETED, return to step 9 and recheck.■

11. Clear the DTC with the HDS.

12. Test-drive the vehicle with the shift lever in D for at least 11 seconds, and let the transmission shift through all five gears, then slow down to a stop.

13. Monitor the OBD STATUS for P0766 or P0767 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete.■

    NO—Return to step 7 and recheck. If the HDS indicates NOT COMPLETED, return to step 12 and recheck.

DTC P0776: A/T Clutch Pressure Control Solenoid Valve B Stuck OFF

DTC P0777: A/T Clutch Pressure Control Solenoid Valve B Stuck ON

NOTE: Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).

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

2. Make sure that the transmission is filled to the proper level, and check for fluid leaks.

3. Drain the ATF (see step 4 on page 14-196) through a strainer. Inspect the strainer for metal debris or excessive clutch material.

   Does the strainer have metal debris or excessive clutch material?

   YES—Replace the transmission, then go to step 11.

   NO—Replace the ATF (see step 6 on page 14-196), then go to step 4.

4. Clear the DTC with the HDS.

5. Test-drive the vehicle with the shift lever in D for at least 20 seconds, and let the transmission shift through all five gears, then slow down to a stop.

6. Monitor the OBD STATUS for P0776 or P0777 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Go to step 7.

   NO—Intermittent failure, the system is OK at this time. If the HDS indicates NOT COMPLETED, return to step 5 and recheck.■

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DTC Troubleshooting (cont'd)

7. Clear the DTC with the HDS.

8. Select Clutch Pressure Control (Linear) Solenoid B in the Miscellaneous Test Menu, and test A/T clutch pressure control solenoid valve B with the HDS.

   Does the HDS indicate NORMAL?

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

   NO—Follow the instructions indicated on the HDS by the test result, but if the HDS has not determined the cause of the failure, go to step 9. If any part is replaced, go to step 10.

9. Inspect A/T clutch pressure control solenoid valve B (see page 14-182).

   Does A/T clutch pressure control solenoid valve B work properly?

   YES—Repair the hydraulic system related to shift valve B, or replace the transmission, then go to step 10.

   NO—Replace A/T clutch pressure control solenoid valve B (see page 14-185), then go to step 10.

10. Clear the DTC with the HDS.

11. Test-drive the vehicle with the shift lever in D for at least 20 seconds, and let the transmission shift through all five gears, then slow down to a stop.

12. Monitor the OBD STATUS for P0776 or P0777 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete.■

    NO—Return to step 7 and recheck. If the HDS indicates NOT COMPLETED, return to step 11 and recheck.

DTC P0796: A/T Clutch Pressure Control Solenoid Valve C Stuck OFF

NOTE: Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).

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

2. Make sure that the transmission is filled to the proper level, and check for fluid leaks.

3. Drain the ATF (see step 4 on page 14-196) through a strainer. Inspect the strainer for metal debris or excessive clutch material.

   Does the strainer have metal debris or excessive clutch material?

   YES—Replace the transmission, then go to step 11.

   NO—Replace the ATF (see step 6 on page 14-196), then go to step 4.

4. Clear the DTC with the HDS.

5. Start the engine. With the brake pedal pressed, shift to D, and wait for at least 3 seconds. Shift to R, wait for at least 3 seconds, then drive the vehicle for at least 3 seconds. Slow down and stop the wheels.

6. Monitor the OBD STATUS for P0796 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Go to step 7.

   NO—Intermittent failure, the system is OK at this time. If the HDS indicates NOT COMPLETED, return to step 5 and recheck.■

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7. Clear the DTC with the HDS.

8. Select Clutch Pressure Control (Linear) Solenoid C in the Miscellaneous Test Menu, and test A/T clutch pressure control solenoid valve C with the HDS.

   Does the HDS indicate NORMAL?

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

   NO—Follow the instructions indicated on the HDS by the test result, but if the HDS has not determined the cause of the failure, go to step 9. If any part is replaced, go to step 10.

9. Inspect A/T clutch pressure control solenoid valve C (see page 14-187).

   Does A/T clutch pressure control solenoid valve C work properly?

   YES—Repair the hydraulic system related to shift valve C, or replace the transmission, then go to step 10.

   NO—Replace A/T clutch pressure control solenoid valve C (see page 14-190), then go to step 10.

10. Clear the DTC with the HDS.

11. Test-drive the vehicle with the shift lever in D, and let the transmission shift through all five gears, then slow down to a stop.

12. Monitor the OBD STATUS for P0796 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete.■

    NO—Return to step 7 and recheck. If the HDS indicates NOT COMPLETED, return to step 11 and recheck.

DTC P0797: A/T Clutch Pressure Control Solenoid Valve C Stuck ON

NOTE: Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).

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

2. Make sure that the transmission is filled to the proper level, and check for fluid leaks.

3. Drain the ATF (see step 4 on page 14-196) through a strainer. Inspect the strainer for metal debris or excessive clutch material.

   Does the strainer have metal debris or excessive clutch material?

   YES—Replace the transmission, then go to step 11.

   NO—Replace the ATF (see step 6 on page 14-196), then go to step 4.

4. Clear the DTC with the HDS.

5. Test-drive the vehicle with the shift lever in D for at least 11 seconds, and let the transmission shift through all five gears, then slow down to a stop.

6. Monitor the OBD STATUS for P0797 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Go to step 7.

   NO—Intermittent failure, the system is OK at this time. If the HDS indicates NOT COMPLETED, return to step 5 and recheck.■

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DTC Troubleshooting (cont'd)

7. Clear the DTC with the HDS.

8. Select Clutch Pressure Control (Linear) Solenoid C in the Miscellaneous Test Menu, and test A/T clutch pressure control solenoid valve C with the HDS.

   Does the HDS indicate NORMAL?

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

   NO—Follow the instructions indicated on the HDS by the test result, but if the HDS has not determined the cause of the failure, go to step 9. If any part is replaced, go to step 10.

9. Inspect A/T clutch pressure control solenoid valve C (see page 14-187).

   Does A/T clutch pressure control solenoid valve C work properly?

   YES—Repair the hydraulic system related to shift valve C, or replace the transmission, then go to step 10.

   NO—Replace A/T clutch pressure control solenoid valve C (see page 14-190), then go to step 10.

10. Clear the DTC with the HDS.

11. Test-drive the vehicle with the shift lever in D for at least 11 seconds, and let the transmission shift through all five gears, then slow down to a stop.

12. Monitor the OBD STATUS for P0797 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. ■

    NO—Return to step 7 and recheck. If the HDS indicates NOT COMPLETED, return to step 11 and recheck.

DTC P0812: Transmission Range Switch ATP R Switch (Open)

NOTE:
- Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).
- This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

1. Turn the ignition switch to ON (II).

2. Shift to R, and verify the A/T R Switch signal with the HDS in the A/T Data List.

   Is the A/T R Switch ON?

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

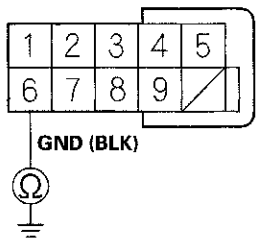
   NO—Go to step 3.

3. Turn the ignition switch to LOCK (0).

4. Disconnect the transmission range switch connector.

5. Check for continuity between transmission range switch connector terminal No. 6 and body ground.

TRANSMISSION RANGE SWITCH CONNECTOR



Wire side of female terminals

Is there continuity?

YES—Go to step 6.

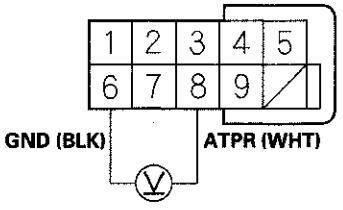
NO—Repair an open in the wire between transmission range switch connector terminal No. 6 and ground (G101, G102), or repair poor ground (G101, G102), then go to step 14.

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6. Turn the ignition switch to ON (II).

7. Measure the voltage between transmission range switch connector terminals No. 6 and No. 8.

TRANSMISSION RANGE SWITCH CONNECTOR



Wire side of female terminals

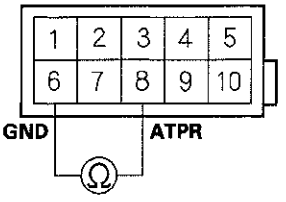
Is there voltage?

YES—Go to step 8.

NO—Repair an open in the wire between PCM connector terminal D16 and the transmission range switch, then go to step 14.

8. Check for continuity between transmission range switch connector terminals No. 6 and No. 8 while the shift lever is in R, and when the shift lever is shifted to any position other than R.

TRANSMISSION RANGE SWITCH CONNECTOR



Terminal side of male terminals

Is there continuity while the shift lever is in R, and no continuity when the shift lever is shifted to any position other than R?

YES—Check for poor connections and loose terminals at the transmission range switch and the PCM. If the connections are OK, go to step 9.

NO—Replace the transmission range switch (see page 14-245), then go to step 14.

(cont'd)

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DTC Troubleshooting (cont'd)

9. Connect the transmission range switch connector.

10. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).

11. Test-drive the vehicle in R at speeds below 3 mph (5 km/h) for at least 2 seconds, then increase the speed and test-drive at speeds over 3 mph (5 km/h) for at least 2 seconds. Slow down and stop the wheels.

12. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0812 indicated?

    YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

    NO—Go to step 13.

13. Monitor the OBD STATUS for P0812 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 12, go to the indicated DTC's troubleshooting. ■

    NO—Check for poor connections and loose terminals at the transmission range switch and the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 11 and recheck.

14. Connect the transmission range switch connector.

15. Clear the DTC with the HDS.

16. Test-drive the vehicle in R at speeds below 3 mph (5 km/h) for at least 2 seconds, then increase the speed and test-drive at speeds over 3 mph (5 km/h) for at least 2 seconds. Slow down and stop the wheels.

17. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0812 indicated?

    YES—Check for poor connections and loose terminals at the transmission range switch and the PCM, then go to step 1.

    NO—Go to step 18.

18. Monitor the OBD STATUS for P0812 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 17, go to the indicated DTC's troubleshooting. ■

    NO—Check for poor connections and loose terminals at the transmission range switch and the PCM, then go to step 1. If the HDS indicates NOT COMPLETED, return to step 16 and recheck.

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DTC P0842: 2nd Clutch Transmission Fluid Pressure Switch (Short or Stuck ON)

NOTE:
- Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).
- This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

1. Clear the DTC with the HDS.
2. Check the 2nd Pressure Switch signal with the HDS in the A/T Data List when not in 2nd gear.

   Is the 2nd Pressure Switch OFF?

   YES—Go to step 3.

   NO—Go to step 6.
3. Start the engine and warm it up to normal operating temperature (the radiator fan comes on).
4. Test-drive the vehicle in 3rd gear in the sequential sportshift mode in S for at least 2 seconds, then slow down to a stop.
5. Monitor the OBD STATUS for P0842 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Go to step 6.

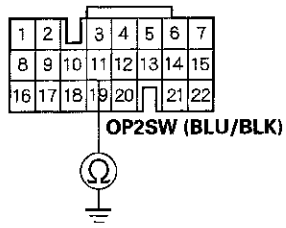
   NO—Intermittent failure, the system is OK at this time. Check the OP2SW wire for an intermittent short between the 2nd clutch transmission fluid pressure switch and the PCM. If the HDS indicates NOT COMPLETED, return to step 4 and recheck.
6. Turn the ignition switch to LOCK (0).
7. Disconnect the 2nd clutch transmission fluid pressure switch connector.
8. Turn the ignition switch to ON (II).
9. Check the 2nd Pressure Switch signal with the HDS in the A/T Data List.

   Is the 2nd Pressure Switch OFF?

   YES—Replace the 2nd clutch transmission fluid pressure switch (see page 14-192), then go to step 19.

   NO—Go to step 10.
10. Turn the ignition switch to LOCK (0).
11. Jump the SCS line with the HDS.
12. Disconnect PCM connector C (22P).
13. Check for continuity between PCM connector terminal C11 and body ground.

PCM CONNECTOR C (22P)



Wire side of female terminals

Is there continuity?

YES—Repair a short in the wire between PCM connector terminal C11 and the 2nd clutch transmission fluid pressure switch, then go to step 19.

NO—Go to step 14.

(cont'd)

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DTC Troubleshooting (cont'd)

14. Reconnect all connectors.

15. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).

16. Test-drive the vehicle in 2nd gear in the sequential sportshift mode in S for at least 2 seconds, then upshift to 4th gear, and drive in 4th gear for at least 2 seconds. Slow down and stop the wheels.

17. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0842 indicated?

    YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

    NO—Go to step 18.

18. Monitor the OBD STATUS for P0842 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 17, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at the 2nd clutch transmission fluid pressure switch and the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 16 and recheck.

19. Clear the DTC with the HDS.

20. Test-drive the vehicle in 2nd gear in the sequential sportshift mode in S for at least 2 seconds, then upshift to 4th gear, and drive in 4th gear for at least 2 seconds. Slow down and stop the wheels.

21. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0842 indicated?

    YES—Check for poor connections and loose terminals at the 2nd clutch transmission fluid pressure switch and the PCM, then go to step 1.

    NO—Go to step 22.

22. Monitor the OBD STATUS for P0842 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 21, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at the 2nd clutch transmission fluid pressure switch and the PCM, then go to step 1. If the HDS indicates NOT COMPLETED, return to step 20 and recheck.

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DTC P0843: 2nd Clutch Transmission Fluid Pressure Switch (Open or Stuck OFF)

NOTE: Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).

1. Clear the DTC with the HDS.
2. Start the engine, and warm it up to normal operating temperature (the radiator fan comes on).
3. Shift the shift lever into S while pressing the brake pedal, upshift to 2nd gear by pressing the paddle shifter + (upshift switch), and verify that the shift command indicates 2nd in the A/T Data List.
4. Check the 2nd Pressure Switch signal with the HDS in the A/T Data List.

   Is the 2nd Pressure Switch ON?

   YES—Go to step 5.

   NO—Go to step 7.

5. Test-drive the vehicle in 2nd gear in the sequential sportshift mode in S for at least 2 seconds, then slow down to a stop.
6. Monitor the OBD STATUS for P0843 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Go to step 7.

   NO—Intermittent failure, the system is OK at this time. Check for poor connections and loose terminals at the 2nd clutch transmission fluid pressure switch and the PCM. If the HDS indicates NOT COMPLETED, return to step 5 and recheck.

7. Measure the 2nd clutch pressure (see page 14-174).

   Is the 2nd clutch pressure within the service limits?

   YES—Go to step 8.

   NO—Repair shift valves A and C, and related hydraulic circuit, or replace the transmission, then go to step 18.

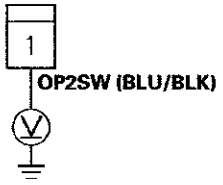
(cont'd)

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DTC Troubleshooting (cont'd)

8. Turn the ignition switch to LOCK (0).
9. Disconnect the 2nd clutch transmission fluid pressure switch connector.
10. Turn the ignition switch to ON (II).
11. Measure the voltage between the 2nd clutch transmission fluid pressure switch connector terminal and body ground.

2ND CLUTCH TRANSMISSION FLUID PRESSURE SWITCH CONNECTOR



Wire side of female terminals

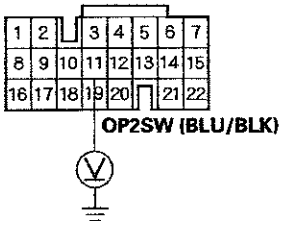
Is there about 5 V?

YES—Replace the 2nd clutch transmission fluid pressure switch (see page 14-192), then go to step 18.

NO—Go to step 12.

12. Measure the voltage between PCM connector terminal C11 and body ground.

PCM CONNECTOR C (22P)



Wire side of female terminals

Is there about 5 V?

YES—Repair an open in the wire between PCM connector terminal C11 and the 2nd clutch transmission fluid pressure switch, then go to step 18.

NO—Go to step 13.

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13. Connect the 2nd clutch transmission fluid pressure switch connector.

14. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).

15. Test-drive the vehicle in 2nd gear in the sequential sportshift mode in S for at least 2 seconds, then upshift to 4th gear, and drive in 4th gear for at least 2 seconds. Slow down and stop the wheels.

16. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0843 indicated?

    YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

    NO—Go to step 17.

17. Monitor the OBD STATUS for P0843 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 16, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at the 2nd clutch transmission fluid pressure switch and the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 15 and recheck.

18. Clear the DTC with the HDS.

19. Test-drive the vehicle in 2nd gear in the sequential sportshift mode in S for at least 2 seconds, then upshift to 4th gear, and drive in 4th gear for at least 2 seconds. Slow down and stop the wheels.

20. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0843 indicated?

    YES—Check for poor connections and loose terminals at the 2nd clutch transmission fluid pressure switch and the PCM, then go to step 1.

    NO—Go to step 21.

21. Monitor the OBD STATUS for P0843 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 20, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at the 2nd clutch transmission fluid pressure switch and the PCM, then go to step 1. If the HDS indicates NOT COMPLETED, return to step 19 and recheck.

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DTC Troubleshooting (cont'd)

DTC P0847: 3rd Clutch Transmission Fluid Pressure Switch (Short or Stuck ON)

NOTE:
- Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).
- This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

1. Clear the DTC with the HDS.
2. Check the 3rd Pressure Switch signal with the HDS in the A/T Data List when not in 3rd gear.

   Is the 3rd Pressure Switch OFF?

   YES—Go to step 3.

   NO—Go to step 6.
3. Start the engine, and warm it up to normal operating temperature (the radiator fan comes on).
4. Test-drive the vehicle in 3rd gear in the sequential sportshift mode in S for at least 2 seconds, then slow down to a stop.
5. Monitor the OBD STATUS for P0847 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

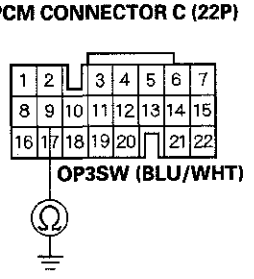
   YES—Go to step 6.

   NO—Intermittent failure, the system is OK at this time. Check the OP3SW wire for an intermittent short between the 3rd clutch transmission fluid pressure switch and the PCM. If the HDS indicates NOT COMPLETED, return to step 4 and recheck.
6. Turn the ignition switch to LOCK (0).
7. Disconnect the 3rd clutch transmission fluid pressure switch connector.
8. Turn the ignition switch to ON (II).
9. Check the 3rd Pressure Switch signal with the HDS in the A/T Data List.

   Is the 3rd Pressure Switch OFF?

   YES—Replace the 3rd clutch transmission fluid pressure switch (see page 14-193), then go to step 19.

   NO—Go to step 10.
10. Turn the ignition switch to LOCK (0).
11. Jump the SCS line with the HDS.
12. Disconnect PCM connector C (22P).
13. Check for continuity between PCM connector terminal C9 and body ground.



Wire side of female terminals

Is there continuity?

YES—Repair a short in the wire between PCM connector terminal C9 and the 3rd clutch transmission fluid pressure switch, then go to step 19.

NO—Go to step 14.

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14. Reconnect all connectors.

15. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).

16. Test-drive the vehicle in 3rd gear in the sequential sportshift mode in S for at least 2 seconds, then upshift to 4th gear, and drive in 4th gear for at least 2 seconds. Slow down and stop the wheels.

17. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0847 indicated?

    YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

    NO—Go to step 18.

18. Monitor the OBD STATUS for P0847 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 17, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at the 3rd clutch transmission fluid pressure switch and the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 16 and recheck.

19. Clear the DTC with the HDS.

20. Test-drive the vehicle in 3rd gear in the sequential sportshift mode in S for at least 2 seconds, then upshift to 4th gear, and drive in 4th gear for at least 2 seconds. Slow down and stop the wheels.

21. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0847 indicated?

    YES—Check for poor connections and loose terminals at the 3rd clutch transmission fluid pressure switch and the PCM, then go to step 1.

    NO—Go to step 22.

22. Monitor the OBD STATUS for P0847 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 21, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at the 3rd clutch transmission fluid pressure switch and the PCM, then go to step 1. If the HDS indicates NOT COMPLETED, return to step 20 and recheck.

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DTC Troubleshooting (cont'd)

DTC P0848: 3rd Clutch Transmission Fluid Pressure Switch (Open or Stuck OFF)

NOTE: Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).

1. Clear the DTC with the HDS.
2. Start the engine, and warm it up to normal operating temperature (the radiator fan comes on).
3. Test-drive the vehicle in 3rd gear in the sequential sportshift mode in S, and verify with the HDS in the A/T Data List that the Shift Command indicates 3rd.
4. Check the 3rd Pressure Switch signal with the HDS in the A/T Data List.

   Is the 3rd Pressure Switch ON?

   YES—Go to step 5.

   NO—Go to step 7.

5. Test-drive the vehicle in 3rd gear in the sequential sportshift mode in S for at least 2 seconds, then slow down to a stop.
6. Monitor the OBD STATUS for P0848 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Go to step 7.

   NO—Intermittent failure, the system is OK at this time. Check for poor connections or loose terminals at the 3rd clutch transmission fluid pressure switch and the PCM. If the HDS indicates NOT COMPLETED, return to step 5 and recheck.

7. Measure the 3rd clutch pressure (see page 14-174).

   Is the 3rd clutch pressure within the service limits?

   YES—Go to step 8.

   NO—Repair shift valves A and B, and related hydraulic circuit, or replace the transmission, then go to step 18.

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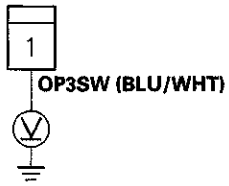
8. Turn the ignition switch to LOCK (0).

9. Disconnect the 3rd clutch transmission fluid pressure switch connector.

10. Turn the ignition switch to ON (II).

11. Measure the voltage between the 3rd clutch transmission fluid pressure switch connector terminal and body ground.

3RD CLUTCH TRANSMISSION FLUID PRESSURE SWITCH CONNECTOR



Wire side of female terminals

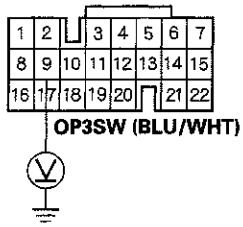
Is there about 5 V?

YES—Replace the 3rd clutch transmission fluid pressure switch (see page 14-193), then go to step 18.

NO—Go to step 12.

12. Measure the voltage between PCM connector terminal C9 and body ground.

PCM CONNECTOR C (22P)



Wire side of female terminals

Is there about 5 V?

YES—Repair an open in the wire between PCM connector terminal C9 and the 3rd clutch transmission fluid pressure switch, then go to step 18.

NO—Go to step 13.

(cont'd)

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DTC Troubleshooting (cont'd)

13. Connect the 3rd clutch transmission fluid pressure switch connector.

14. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).

15. Test-drive the vehicle in 3rd gear in the sequential sportshift mode in S for at least 2 seconds, then upshift to 4th gear, and drive in 4th gear for at least 2 seconds. Slow down and stop the wheels.

16. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0848 indicated?

    YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

    NO—Go to step 17.

17. Monitor the OBD STATUS for P0848 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 16, go to the indicated DTC's troubleshooting. ■

    NO—Check for poor connections and loose terminals at the 3rd clutch transmission fluid pressure switch and the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 15 and recheck.

18. Clear the DTC with the HDS.

19. Test-drive the vehicle in 3rd gear in the sequential sportshift mode in S for at least 2 seconds, then upshift to 4th gear, and drive in 4th gear for at least 2 seconds. Slow down and stop the wheels.

20. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0848 indicated?

    YES—Check for poor connections and loose terminals at the 3rd clutch transmission fluid pressure switch and the PCM, then go to step 1.

    NO—Go to step 21.

21. Monitor the OBD STATUS for P0848 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 20, go to the indicated DTC's troubleshooting. ■

    NO—Check for poor connections and loose terminals at the 3rd clutch transmission fluid pressure switch and the PCM, then go to step 1. If the HDS indicates NOT COMPLETED, return to step 19 and recheck.

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DTC P0872: 4th Clutch Transmission Fluid Pressure Switch (Short or Stuck ON)

NOTE:
- Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).
- This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

1. Clear the DTC with the HDS.
2. Check the 4th Pressure Switch signal with the HDS in the A/T Data List when not in 4th gear.

   Is the 4th Pressure Switch OFF?

   YES—Go to step 3.

   NO—Go to step 6.
3. Start the engine, and warm it up to normal operating temperature (the radiator fan comes on).
4. Test-drive the vehicle in 5th gear in the sequential sportshift mode in S for at least 2 seconds, then slow down to a stop.
5. Monitor the OBD STATUS for P0872 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Go to step 6.

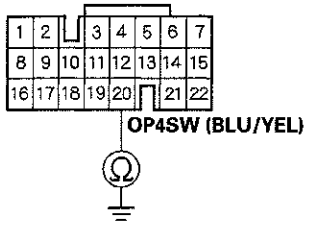
   NO—Intermittent failure, the system is OK at this time. Check the OP4SW wire for an intermittent short between the 4th clutch transmission fluid pressure switch and the PCM. If the HDS indicates NOT COMPLETED, return to step 4 and recheck.
6. Turn the ignition switch to LOCK (0).
7. Disconnect the 4th clutch transmission fluid pressure switch connector.
8. Turn the ignition switch to ON (II).
9. Check the 4th Pressure Switch signal with the HDS in the A/T Data List.

   Is the 4th Pressure Switch OFF?

   YES—Replace the 4th clutch transmission fluid pressure switch (see page 14-193), then go to step 19.

   NO—Go to step 10.
10. Turn the ignition switch to LOCK (0).
11. Jump the SCS line with the HDS.
12. Disconnect PCM connector C (22P).
13. Check for continuity between PCM connector terminal C20 and body ground.

PCM CONNECTOR C (22P)



Wire side of female terminals

Is there continuity?

YES—Repair a short in the wire between PCM connector terminal C20 and the 4th clutch transmission fluid pressure switch, then go to step 19.

NO—Go to step 14.

(cont'd)

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DTC Troubleshooting (cont'd)

14. Reconnect all connectors.

15. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).

16. Test-drive the vehicle in 4th gear in the sequential sportshift mode in S for at least 2 seconds, then upshift to 5th gear, and drive in 5th gear for at least 2 seconds. Slow down and stop the wheels.

17. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0872 indicated?

    YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

    NO—Go to step 18.

18. Monitor the OBD STATUS for P0872 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 17, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at the 4th clutch transmission fluid pressure switch and the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 16 and recheck.

19. Clear the DTC with the HDS.

20. Test-drive the vehicle in 4th gear in the sequential sportshift mode in S for at least 2 seconds, then upshift to 5th gear, and drive in 5th gear for at least 2 seconds. Slow down and stop the wheels.

21. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0872 indicated?

    YES—Check for poor connections and loose terminals at the 4th clutch transmission fluid pressure switch and the PCM, then go to step 1.

    NO—Go to step 22.

22. Monitor the OBD STATUS for P0872 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 21, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at the 4th clutch transmission fluid pressure switch and the PCM, then go to step 1. If the HDS indicates NOT COMPLETED, return to step 20 and recheck.

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DTC P0873: 4th Clutch Transmission Fluid Pressure Switch (Open or Stuck OFF)

NOTE: Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).

1. Clear the DTC with the HDS.
2. Start the engine, and warm it up to normal operating temperature (the radiator fan comes on).
3. Test-drive the vehicle in 4th gear in the sequential sportshift mode in S, and verify with the HDS in the A/T Data List that the Shift Command indicates 4th.
4. Check the 4th Pressure Switch signal with the HDS in the A/T Data List.

   Is the 4th Pressure Switch ON?

   YES—Go to step 5.

   NO—Go to step 7.

5. Test-drive the vehicle in 4th gear in the sequential sportshift mode in S for at least 2 seconds, then slow down to a stop.
6. Monitor the OBD STATUS for P0873 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Go to step 7.

   NO—Intermittent failure, the system is OK at this time. Check for poor connections or loose terminals at the 4th clutch transmission fluid pressure switch and the PCM. If the HDS indicates NOT COMPLETED, return to step 5 and recheck.

7. Measure the 4th clutch pressure (see page 14-174).

   Is the 4th clutch pressure within the service limits?

   YES—Go to step 8.

   NO—Repair shift valves B, C, and E, and related hydraulic circuit, or replace the transmission, then go to step 18.

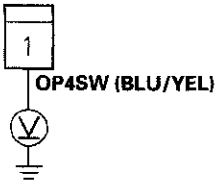
(cont'd)

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DTC Troubleshooting (cont'd)

8. Turn the ignition switch to LOCK (0).
9. Disconnect the 4th clutch transmission fluid pressure switch connector.
10. Turn the ignition switch to ON (II).
11. Measure the voltage between the 4th clutch transmission fluid pressure switch connector terminal and body ground.

4TH CLUTCH TRANSMISSION FLUID PRESSURE SWITCH CONNECTOR



Wire side of female terminals

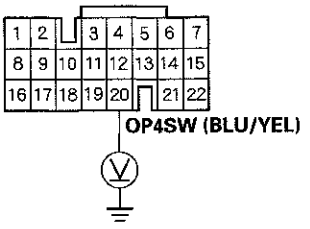
Is there about 5 V?

YES—Replace the 4th clutch transmission fluid pressure switch (see page 14-193), then go to step 19.

NO—Go to step 12.

12. Measure the voltage between PCM connector terminal C20 and body ground.

PCM CONNECTOR C (22P)



Wire side of female terminals

Is there about 5 V?

YES—Repair an open in the wire between PCM connector terminal C20 and the 4th clutch transmission fluid pressure switch, then go to step 18.

NO—Go to step 13.

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13. Connect the 4th clutch transmission fluid pressure switch connector.

14. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).

15. Test-drive the vehicle in 4th gear in the sequential sportshift mode in S for at least 2 seconds, then upshift to 5th gear, and drive in 5th gear for at least 2 seconds. Slow down and stop the wheels.

16. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0873 indicated?

    YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

    NO—Go to step 17.

17. Monitor the OBD STATUS for P0873 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 16, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at the 4th clutch transmission fluid pressure switch and the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 15 and recheck.

18. Clear the DTC with the HDS.

19. Test-drive the vehicle in 4th gear in the sequential sportshift mode in S for at least 2 seconds, then upshift to 5th gear, and drive in 5th gear for at least 2 seconds. Slow down and stop the wheels.

20. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0873 indicated?

    YES—Check for poor connections and loose terminals at the 4th clutch transmission fluid pressure switch and the PCM, then go to step 1.

    NO—Go to step 21.

21. Monitor the OBD STATUS for P0873 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 20, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at the 4th clutch transmission fluid pressure switch and the PCM, then go to step 1. If the HDS indicates NOT COMPLETED, return to step 19 and recheck.

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DTC Troubleshooting (cont'd)

DTC P0962: A/T Clutch Pressure Control Solenoid Valve A (Open)

NOTE:
- Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).
- This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

1. Clear the DTC with the HDS.
2. Check if DTC P0962 records.

   Is DTC P0962 indicated?

   YES—Go to step 6.

   NO—Go to step 3.
3. Select Clutch Pressure Control (Linear) Solenoid A in the Miscellaneous Test Menu, and test A/T clutch pressure control solenoid valve A with the HDS.

   Does the HDS indicate NORMAL?

   YES—Go to step 4.

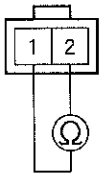
   NO—Go to step 6.
4. In the Clutch Pressure Control Solenoid Valve Control menu, select A/T Clutch Pressure Control Solenoid Valve A at 1.0 A.
5. Monitor the OBD STATUS for P0962 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Go to step 6.

   NO—Intermittent failure, the system is OK at this time. Check for poor connections or loose terminals at A/T clutch pressure control solenoid valve A and the PCM. If the HDS indicates NOT COMPLETED, return to step 3 and recheck.■
6. Turn the ignition switch to LOCK (0).
7. Disconnect the A/T clutch pressure control solenoid valve A connector.
8. Measure the resistance between A/T clutch pressure control solenoid valve A connector terminals No. 1 and No. 2.

A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE A CONNECTOR



Terminal side of male terminals

Is there 3– 10 Ω ?

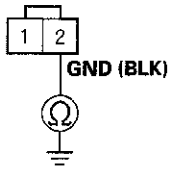
YES—Go to step 9.

NO—Replace A/T clutch pressure control solenoid valve A (see page 14-185), then go to step 21.

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9. Check for continuity between A/T clutch pressure control solenoid valve A connector terminal No. 2 and body ground.

A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE A CONNECTOR



Wire side of female terminals

Is there continuity?

YES—Go to step 10.

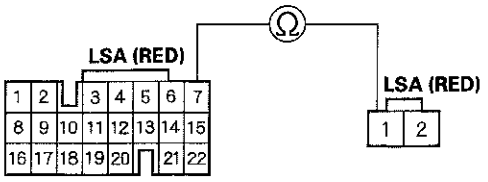
NO—Repair an open in the wire between A/T clutch pressure control solenoid valve A and ground (G101, G102), or repair poor ground (G101, G102), then go to step 21.

10. Jump the SCS line with the HDS.

11. Disconnect PCM connector C (22P).

12. Check for continuity between PCM connector terminal C7 and A/T clutch pressure control solenoid valve A connector terminal No. 1.

PCM CONNECTOR C (22P) **A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE A CONNECTOR**



Wire side of female terminals

Is there continuity?

YES—Go to step 13.

NO—Repair an open in the wire between PCM connector terminal C7 and A/T clutch pressure control solenoid valve A, then go to step 21.

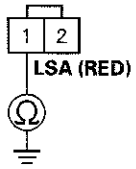
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DTC Troubleshooting (cont'd)

13. Check for continuity between A/T clutch pressure control solenoid valve A connector terminal No. 1 and body ground.

A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE A CONNECTOR



Wire side of female terminals

Is there continuity?

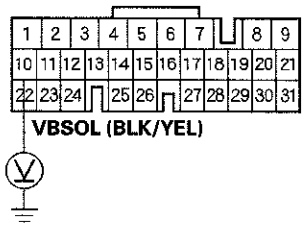
YES—Repair a short in the wire between PCM connector terminal C7 and A/T clutch pressure control solenoid valve A, then go to step 21.

NO—Go to step 14.

14. Turn the ignition switch to ON (II).

15. Measure the voltage between PCM connector terminal A10 and body ground.

PCM CONNECTOR A (31P)



Wire side of female terminals

Is there battery voltage?

YES—Turn the ignition switch to LOCK (0), then go to step 16.

NO—Check for blown No. 18 fuse in the driver's under-dash fuse/relay box. If the fuse is OK, repair an open in the wire between PCM connector terminal A10 and the driver's under-dash fuse/relay box, then go to step 21.

16. Reconnect all connectors.

17. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).

18. Start the engine, and wait for at least 1 second.

19. Check for Pending or Confirmed DTCs with the HDS.

Is DTC P0962 indicated?

YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

NO—Go to step 20.

20. Monitor the OBD STATUS for P0962 in the DTCs MENU with the HDS.

Does the HDS indicate PASSED?

YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 19, go to the indicated DTC's troubleshooting. ■

NO—Check for poor connections and loose terminals at A/T clutch pressure control solenoid valve A and the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 18 and recheck.

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21. Clear the DTC with the HDS.

22. Start the engine, and wait for at least 1 second.

23. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0962 indicated?

    YES—Check for poor connections and loose terminals at A/T clutch pressure control solenoid valve A and the PCM, then go to step 1.

    NO—Go to step 24.

24. Monitor the OBD STATUS for P0962 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 23, go to the indicated DTC's troubleshooting. ■

    NO—Check for poor connections and loose terminals at A/T clutch pressure control solenoid valve A and the PCM, then go to step 1. If the HDS indicates NOT COMPLETED, return to step 22 and recheck.

DTC P0963: A/T Clutch Pressure Control Solenoid Valve A (Short)

NOTE:
- Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).
- This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

1. Clear the DTC with the HDS.

2. Check if DTC P0963 records.

   Is DTC P0963 indicated?

   YES—Go to step 6.

   NO—Go to step 3.

3. Select Clutch Pressure Control (Linear) Solenoid A in the Miscellaneous Test Menu, and test A/T clutch pressure control solenoid valve A with the HDS.

   Does the HDS indicate NORMAL?

   YES—Go to step 4.

   NO—Go to step 6.

4. In the Clutch Pressure Control Solenoid Valve Control menu, select A/T Clutch Pressure Control Solenoid Valve A at 0.2 A.

5. Monitor the OBD STATUS for P0963 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Go to step 6.

   NO—Intermittent failure, the system is OK at this time. Check for poor connections or loose terminals at A/T clutch pressure control solenoid valve A and the PCM. If the HDS indicates NOT COMPLETED, return to step 3 and recheck.

6. Turn the ignition switch to LOCK (0).

7. Disconnect the A/T clutch pressure control solenoid valve A connector.

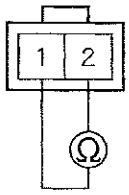
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DTC Troubleshooting (cont'd)

8. Measure the resistance between A/T clutch pressure control solenoid valve A connector terminals No. 1 and No. 2.

A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE A CONNECTOR



Terminal side of male terminals

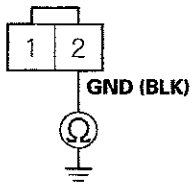
Is there 3— 10 Ω ?

YES—Go to step 9.

NO—Replace A/T clutch pressure control solenoid valve A (see page 14-185), then go to step 15.

9. Check for continuity between A/T clutch pressure control solenoid valve A connector terminal No. 2 and body ground.

A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE A CONNECTOR



Wire side of female terminals

Is there continuity?

YES—Go to step 10.

NO—Repair an open in the wire between A/T clutch pressure control solenoid valve A and ground (G101, G102), or repair poor ground (G101, G102), then go to step 15.

10. Connect the A/T clutch pressure control solenoid valve A connector.

11. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).

12. Start the engine, and wait for at least 1 second.

13. Check for Pending or Confirmed DTCs with the HDS.

Is DTC P0963 indicated?

YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

NO—Go to step 14.

14. Monitor the OBD STATUS for P0963 in the DTCs MENU with the HDS.

Does the HDS indicate PASSED?

YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 13, go to the indicated DTC's troubleshooting. ■

NO—Check for poor connections and loose terminals at A/T clutch pressure control solenoid valve A and the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 12 and recheck.

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15. Clear the DTC with the HDS.

16. Start the engine, and wait for at least 1 second.

17. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0963 indicated?

    YES—Check for poor connections and loose terminals at A/T clutch pressure control solenoid valve A and the PCM, then go to step 1.

    NO—Go to step 18.

18. Monitor the OBD STATUS for P0963 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 17, go to the indicated DTC's troubleshooting. ■

    NO—Check for poor connections and loose terminals at A/T clutch pressure control solenoid valve A and the PCM, then go to step 1. If the HDS indicates NOT COMPLETED, return to step 16 and recheck.

DTC P0966: A/T Clutch Pressure Control Solenoid Valve B (Open)

NOTE:
- Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).
- This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

1. Clear the DTC with the HDS.

2. Check if DTC P0966 records.

   Is DTC P0966 indicated?

   YES—Go to step 6.

   NO—Go to step 3.

3. Select Clutch Pressure Control (Linear) Solenoid B in the Miscellaneous Test Menu, and test A/T clutch pressure control solenoid valve B with the HDS.

   Does the HDS indicate NORMAL?

   YES—Go to step 4.

   NO—Go to step 6.

4. In the Clutch Pressure Control Solenoid Valve Control menu, select A/T Clutch Pressure Control Solenoid Valve B at 1.0 A.

5. Monitor the OBD STATUS for P0966 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Go to step 6.

   NO—Intermittent failure, the system is OK at this time. Check for poor connections or loose terminals at A/T clutch pressure control solenoid valve B and the PCM. If the HDS indicates NOT COMPLETED, return to step 3 and recheck. ■

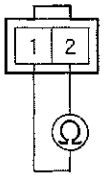
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DTC Troubleshooting (cont'd)

6. Turn the ignition switch to LOCK (0).
7. Disconnect the A/T clutch pressure control solenoid valve B connector.
8. Measure the resistance between A/T clutch pressure control solenoid valve B connector terminals No. 1 and No. 2.

A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE B CONNECTOR



Terminal side of male terminals

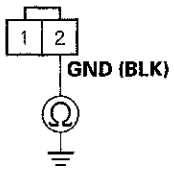
Is there 3—10 Ω ?

YES—Go to step 9.

NO—Replace A/T clutch pressure control solenoid valve B (see page 14-185), then go to step 21.

9. Check for continuity between A/T clutch pressure control solenoid valve B connector terminal No. 2 and body ground.

A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE B CONNECTOR



Wire side of female terminals

Is there continuity?

YES—Go to step 10.

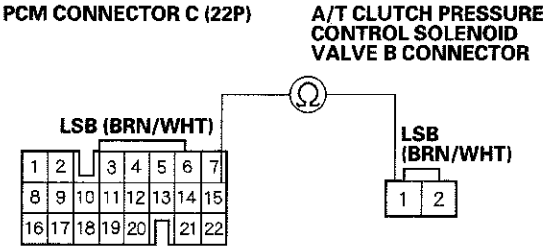
NO—Repair an open in the wire between A/T clutch pressure control solenoid valve B and ground (G101, G102), or repair poor ground (G101, G102), then go to step 21.

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10. Jump the SCS line with the HDS.

11. Disconnect PCM connector C (22P).

12. Check for continuity between PCM connector terminal C15 and A/T clutch pressure control solenoid valve B connector terminal No. 1.



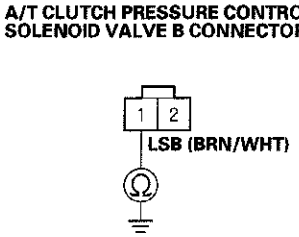
Wire side of female terminals

Is there continuity?

YES—Go to step 13.

NO—Repair an open in the wire between PCM connector terminal C15 and A/T clutch pressure control solenoid valve B, then go to step 21.

13. Check for continuity between A/T clutch pressure control solenoid valve B connector terminal No. 1 and body ground.



Wire side of female terminals

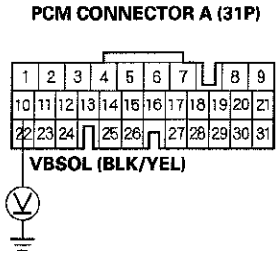
Is there continuity?

YES—Repair a short in the wire between PCM connector terminal C15 and A/T clutch pressure control solenoid valve B, then go to step 24.

NO—Go to step 14.

14. Turn the ignition switch to ON (II).

15. Measure the voltage between PCM connector terminal A10 and body ground.



Wire side of female terminals

Is there battery voltage?

YES—Turn the ignition switch to LOCK (0), then go to step 16.

NO—Check for blown No. 18 fuse in the driver's under-dash fuse/relay box. If the fuse is OK, repair an open in the wire between PCM connector terminal A10 and the driver's under-dash fuse/relay box, then go to step 21.

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DTC Troubleshooting (cont'd)

16. Reconnect all connectors.

17. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).

18. Start the engine, and wait for at least 1 second.

19. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0966 indicated?

    YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

    NO—Go to step 20.

20. Monitor the OBD STATUS for P0966 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 19, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at A/T clutch pressure control solenoid valve B and the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 18 and recheck.

21. Clear the DTC with the HDS.

22. Start the engine, and wait for at least 1 second.

23. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0966 indicated?

    YES—Check for poor connections and loose terminals at A/T clutch pressure control solenoid valve B and the PCM, then go to step 1.

    NO—Go to step 24.

24. Monitor the OBD STATUS for P0966 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 23, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at A/T clutch pressure control solenoid valve B and the PCM, then go to step 1. If the HDS indicates NOT COMPLETED, return to step 22 and recheck.

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DTC P0967: A/T Clutch Pressure Control Solenoid Valve B (Short)

NOTE:
- Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).
- This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

1. Clear the DTC with the HDS.
2. Check if DTC P0967 records.

   Is DTC P0967 indicated?

   YES—Go to step 6.

   NO—Go to step 3.
3. Select Clutch Pressure Control (Linear) Solenoid B in the Miscellaneous Test Menu, and test A/T clutch pressure control solenoid valve B with the HDS.

   Does the HDS indicate NORMAL?

   YES—Go to step 4.

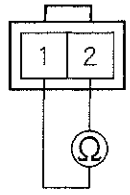
   NO—Go to step 6.
4. In the Clutch Pressure Control Solenoid Valve Control menu, select A/T Clutch Pressure Control Solenoid Valve B at 0.2 A.
5. Monitor the OBD STATUS for P0967 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Go to step 6.

   NO—Intermittent failure, the system is OK at this time. Check for poor connections or loose terminals at A/T clutch pressure control solenoid valve B and the PCM. If the HDS indicates NOT COMPLETED, return to step 3 and recheck.
6. Turn the ignition switch to LOCK (0).
7. Disconnect the A/T clutch pressure control solenoid valve B connector.
8. Measure the resistance between A/T clutch pressure control solenoid valve B connector terminals No. 1 and No. 2.

A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE B CONNECTOR



Terminal side of male terminals

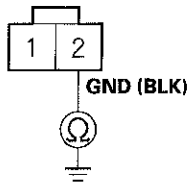
Is there 3— 10 Ω ?

YES—Go to step 9.

NO—Replace the A/T clutch pressure control solenoid valve B (see page 14-185), then go to step 15.

9. Check for continuity between A/T clutch pressure control solenoid valve B connector terminal No. 2 and body ground.

A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE B CONNECTOR



Wire side of female terminals

Is there continuity?

YES—Go to step 10.

NO—Repair an open in the wire between A/T clutch pressure control solenoid valve B and ground (G101, G102), or repair poor ground (G101, G102), then go to step 15.

(cont'd)

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DTC Troubleshooting (cont'd)

10. Connect the A/T clutch pressure control solenoid valve B connector.

11. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).

12. Start the engine, and wait for at least 1 second.

13. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0967 indicated?

    YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

    NO—Go to step 14.

14. Monitor the OBD STATUS for P0967 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 13, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at A/T clutch pressure control solenoid valve B and the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 12 and recheck.

15. Clear the DTC with the HDS.

16. Start the engine, and wait for at least 1 second.

17. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0967 indicated?

    YES—Check for poor connections and loose terminals at A/T clutch pressure control solenoid valve B and the PCM, then go to step 1.

    NO—Go to step 18.

18. Monitor the OBD STATUS for P0967 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 17, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at A/T clutch pressure control solenoid valve B and the PCM, then go to step 1. If the HDS indicates NOT COMPLETED, return to step 16 and recheck.

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DTC P0970: A/T Clutch Pressure Control Solenoid Valve C (Open)

NOTE:
- Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).
- This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

1. Clear the DTC with the HDS.
2. Check if DTC P0970 records.

   Is DTC P0970 indicated?

   YES—Go to step 6.

   NO—Go to step 3.
3. Select Clutch Pressure Control (Linear) Solenoid C in the Miscellaneous Test Menu, and test A/T clutch pressure control solenoid valve C with the HDS.

   Does the HDS indicate NORMAL?

   YES—Go to step 4.

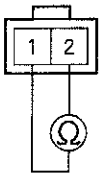
   NO—Go to step 6.
4. In the Clutch Pressure Control Solenoid Valve Control menu, select A/T Clutch Pressure Control Solenoid Valve C at 1.0 A.
5. Monitor the OBD STATUS for P0970 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Go to step 6.

   NO—Intermittent failure, the system is OK at this time. Check for poor connections or loose terminals at A/T clutch pressure control solenoid valve C and the PCM. If the HDS indicates NOT COMPLETED, return to step 3 and recheck. ■
6. Turn the ignition switch to LOCK (0).
7. Disconnect the A/T clutch pressure control solenoid valve C connector.
8. Measure the resistance between A/T clutch pressure control solenoid valve C connector terminals No. 1 and No. 2.

A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE C CONNECTOR



Terminal side of male terminals

Is there 3— 10 Ω ?

YES—Go to step 9.

NO—Replace A/T clutch pressure control solenoid valve C (see page 14-190), then go to step 21.

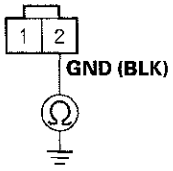
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DTC Troubleshooting (cont'd)

9. Check for continuity between A/T clutch pressure control solenoid valve C connector terminal No. 2 and body ground.

A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE C CONNECTOR



Wire side of female terminals

Is there continuity?

YES—Go to step 10.

NO—Repair an open in the wire between A/T clutch pressure control solenoid valve C and ground (G101, G102), or repair poor ground (G101, G102), then go to step 21.

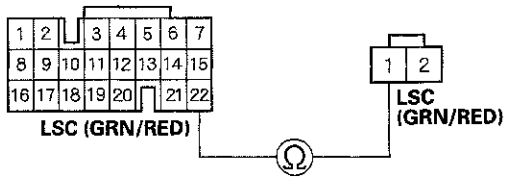
10. Jump the SCS line with the HDS.

11. Disconnect PCM connector C (22P).

12. Check for continuity between PCM connector terminal C22 and A/T clutch pressure control solenoid valve C connector terminal No. 1.

PCM CONNECTOR C (22P)

A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE C CONNECTOR



Wire side of female terminals

Is there continuity?

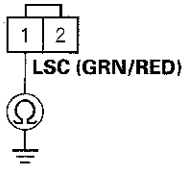
YES—Go to step 13.

NO—Repair an open in the wire between PCM connector terminal C22 and A/T clutch pressure control solenoid valve C, then go to step 21.

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13. Check for continuity between A/T clutch pressure control solenoid valve C connector terminal No. 1 and body ground.

A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE C CONNECTOR



Wire side of female terminals

Is there continuity?

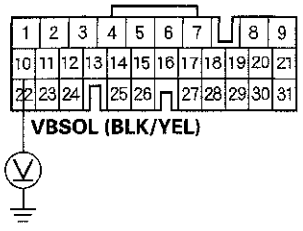
YES—Repair a short in the wire between PCM connector terminal C22 and A/T clutch pressure control solenoid valve C, then go to step 24.

NO—Go to step 14.

14. Turn the ignition switch to ON (II).

15. Measure the voltage between PCM connector terminal A10 and body ground.

PCM CONNECTOR A (31P)



Wire side of female terminals

Is there battery voltage?

YES—Turn the ignition switch to LOCK (0), then go to step 16.

NO—Check for blown No. 18 fuse in the driver's under-dash fuse/relay box. If the fuse is OK, repair an open in the wire between PCM connector terminal A10 and the driver's under-dash fuse/relay box, then go to step 21.

16. Reconnect all connectors.

17. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).

18. Start the engine, and wait for at least 1 second.

19. Check for Pending or Confirmed DTCs with the HDS.

Is DTC P0970 indicated?

YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

NO—Go to step 20.

20. Monitor the OBD STATUS for P0970 in the DTCs MENU with the HDS.

Does the HDS indicate PASSED?

YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 19, go to the indicated DTC's troubleshooting. ■

NO—Check for poor connections and loose terminals at A/T clutch pressure control solenoid valve C and the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 18 and recheck.

(cont'd)

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DTC Troubleshooting (cont'd)

21. Clear the DTC with the HDS.

22. Start the engine, and wait for at least 1 second.

23. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0970 indicated?

    YES—Check for poor connections and loose terminals at A/T clutch pressure control solenoid valve C and the PCM, then go to step 1.

    NO—Go to step 24.

24. Monitor the OBD STATUS for P0970 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 23, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at A/T clutch pressure control solenoid valve C and the PCM, then go to step 1. If the HDS indicates NOT COMPLETED, return to step 22 and recheck.

DTC P0971: A/T Clutch Pressure Control Solenoid Valve C (Short)

NOTE:
- Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).
- This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

1. Clear the DTC with the HDS.

2. Check if DTC P0971 records.

   Is DTC P0971 indicated?

   YES—Go to step 6.

   NO—Go to step 3.

3. Select Clutch Pressure Control (Linear) Solenoid C in the Miscellaneous Test Menu, and test A/T clutch pressure control solenoid valve C with the HDS.

   Does the HDS indicate NORMAL?

   YES—Go to step 4.

   NO—Go to step 6.

4. In the Clutch Pressure Control Solenoid Valve Control menu, select A/T Clutch Pressure Control Solenoid Valve C at 0.2 A.

5. Monitor the OBD STATUS for P0971 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Go to step 6.

   NO—Intermittent failure, the system is OK at this time. Check for poor connections or loose terminals at A/T clutch pressure control solenoid valve C and the PCM. If the HDS indicates NOT COMPLETED, return to step 3 and recheck.

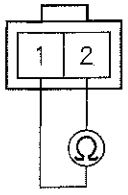
6. Turn the ignition switch to LOCK (0).

7. Disconnect the A/T clutch pressure control solenoid valve C connector.

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8. Measure the resistance between A/T clutch pressure control solenoid valve C connector terminals No. 1 and No. 2.

A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE C CONNECTOR



Terminal side of male terminals

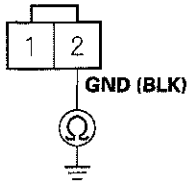
Is there 3– 10 Ω ?

YES—Go to step 9.

NO—Replace the A/T clutch pressure control solenoid valve C (see page 14-190), then go to step 15.

9. Check for continuity between A/T clutch pressure control solenoid valve C connector terminal No. 2 and body ground.

A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE C CONNECTOR



Wire side of female terminals

Is there continuity?

YES—Go to step 10.

NO—Repair an open in the wire between A/T clutch pressure control solenoid valve C and ground (G101, G102), or repair poor ground (G101, G102), then go to step 15.

10. Connect the A/T clutch pressure control solenoid valve C connector.

11. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).

12. Start the engine, and wait for at least 1 second.

13. Check for Pending or Confirmed DTCs with the HDS.

Is DTC P0971 indicated?

YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

NO—Go to step 14.

14. Monitor the OBD STATUS for P0971 in the DTCs MENU with the HDS.

Does the HDS indicate PASSED?

YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 13, go to the indicated DTC's troubleshooting. ■

NO—Check for poor connections and loose terminals at A/T clutch pressure control solenoid valve C and the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 12 and recheck.

(cont'd)

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DTC Troubleshooting (cont'd)

15. Clear the DTC with the HDS.
16. Start the engine, and wait for at least 1 second.
17. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0971 indicated?

    YES—Check for poor connections and loose terminals at A/T clutch pressure control solenoid valve C and the PCM, then go to step 1.

    NO—Go to step 18.

18. Monitor the OBD STATUS for P0971 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 17, go to the indicated DTC's troubleshooting. ■

    NO—Check for poor connections and loose terminals at A/T clutch pressure control solenoid valve C and the PCM, then go to step 1. If the HDS indicates NOT COMPLETED, return to step 16 and recheck.

DTC P0973: Shift Solenoid Valve A (Short)

NOTE:
- Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).
- This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

1. Clear the DTC with the HDS.
2. Start the engine. With the brake pedal pressed, shift to R, and wait for at least 1 second.
3. Check if DTC P0973 records.

   Is DTC P0973 indicated?

   YES—Go to step 7.

   NO—Go to step 4.

4. Select Shift Solenoid A in Miscellaneous Test Menu, and test shift solenoid valve A with the HDS.

   Is a clicking sound heard?

   YES—Go to step 5.

   NO—Go to step 7.

5. Start the engine. With the brake pedal pressed, shift to R, and wait for at least 1 second.
6. Monitor the OBD STATUS for P0973 in the DTCs MENU with the HDS.

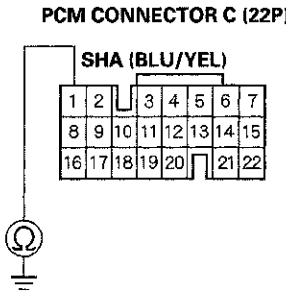
   Does the HDS indicate FAILED?

   YES—Go to step 7.

   NO—Intermittent failure, the system is OK at this time. Check the SHA wire for an intermittent short between shift solenoid valve A and the PCM. If the HDS indicates NOT COMPLETED, return to step 4 and recheck.

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7. Turn the ignition switch to LOCK (0).
8. Jump the SCS line with the HDS.
9. Disconnect PCM connector C (22P).
10. Measure the resistance between PCM connector terminal C1 and body ground.



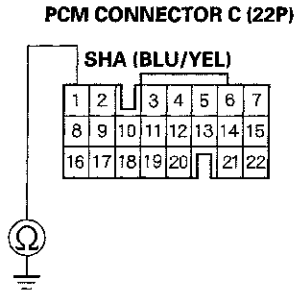
Wire side of female terminals

Is there less than 12 Ω ?

YES—Go to step 11.

NO—Go to step 16.

11. Disconnect the shift solenoid harness connector at the transmission housing.
12. Check for continuity between PCM connector terminal C1 and body ground.



Wire side of female terminals

Is there continuity?

YES—Repair a short in the wire between PCM connector terminal C1 and the shift solenoid harness connector, then go to step 21.

NO—Go to step 13.

13. Inspect shift solenoid valve A (see page 14-178).

Is shift solenoid valve A OK?

YES—Go to step 14.

NO—Replace shift solenoid valve A or the shift solenoid harness (see page 14-178), then go to step 22.

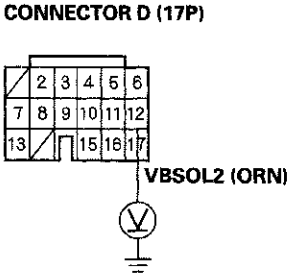
14. Turn the ignition switch to ON (II).

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DTC Troubleshooting (cont'd)

15. Measure the voltage between PCM connector terminal D12 and body ground.



Wire side of female terminals

Is there battery voltage?

YES—Go to step 21.

NO—Check for blown No. 20 fuse in the driver's under-dash fuse/relay box. If the fuse is OK, repair an open in the wire between PCM connector terminal D12 and the driver's under-dash fuse/relay box, then go to step 21.

16. Reconnect all connectors.

17. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).

18. Start the engine in P. With the brake pedal pressed, shift to R, and wait for at least 1 second, then move the shift lever back into P.

19. Check for Pending or Confirmed DTCs with the HDS.

Is DTC P0973 indicated?

YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

NO—Go to step 20.

20. Monitor the OBD STATUS for P0973 in the DTCs MENU with the HDS.

Does the HDS indicate PASSED?

YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 19, go to the indicated DTC's troubleshooting. ■

NO—Check for poor connections and loose terminals at shift solenoid valve A and the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 18 and recheck.

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21. Clear the DTC with the HDS.

22. Start the engine in P. With the brake pedal pressed, shift to R, and wait for at least 1 second, then move the shift lever back into P.

23. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0973 indicated?

    YES—Check for poor connections and loose terminals at shift solenoid valve A and the PCM, then go to step 1.

    NO—Go to step 24.

24. Monitor the OBD STATUS for P0973 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 23, go to the indicated DTC's troubleshooting. ■

    NO—Check for poor connections and loose terminals at shift solenoid valve A and the PCM, then go to step 1. If the HDS indicates NOT COMPLETED, return to step 22 and recheck.

DTC P0974: Shift Solenoid Valve A (Open)

NOTE:
- Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).
- This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

1. Clear the DTC with the HDS.

2. Start the engine in P, and wait for at least 1 second.

3. Check if DTC P0974 records.

    Is DTC P0974 indicated?

    YES—Go to step 7.

    NO—Go to step 4.

4. Select Shift Solenoid A in Miscellaneous Test Menu, and test shift solenoid valve A with the HDS.

    Is a clicking sound heard?

    YES—Go to step 5.

    NO—Go to step 7.

5. Start the engine in P, and wait for at least 1 second.

6. Monitor the OBD STATUS for P0974 in the DTCs MENU with the HDS.

    Does the HDS indicate FAILED?

    YES—Go to step 7.

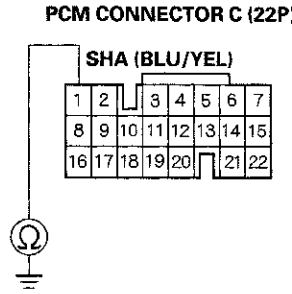
    NO—Intermittent failure, the system is OK at this time. Check for poor connections or loose terminals at shift solenoid valve A and the PCM. If the HDS indicates NOT COMPLETED, return to step 4 and recheck.

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DTC Troubleshooting (cont'd)

7. Turn the ignition switch to LOCK (0).
8. Jump the SCS line with the HDS.
9. Disconnect PCM connector C (22P).
10. Measure the resistance between PCM connector terminal C1 and body ground.



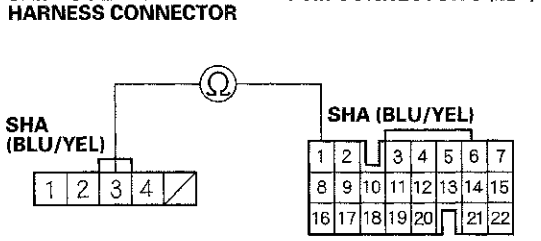
Wire side of female terminals

Is there 12–25 Ω ?

YES—Go to step 15.

NO—Go to step 11.

11. Disconnect the shift solenoid harness connector.
12. Check for continuity between PCM connector terminal C1 and shift solenoid harness connector terminal No. 3.



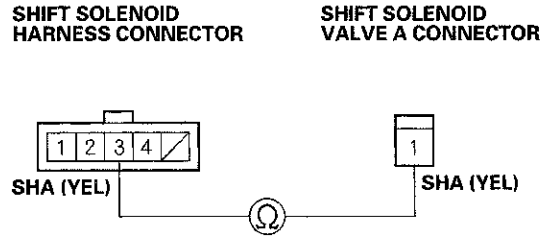
Wire side of female terminals

Is there continuity?

YES—Go to step 13.

NO—Repair an open in the wire between PCM connector terminal C1 and the shift solenoid harness connector, then go to step 20.

13. Remove the shift solenoid harness connector (see page 14-178).
14. Check for continuity between shift solenoid harness connector terminal No. 3 and the shift solenoid valve A connector terminal.



Terminal side of male terminals

Wire side of female terminals

Is there continuity?

YES—Replace shift solenoid valve A (see page 14-178), then go to step 20.

NO—Replace the shift solenoid harness (see page 14-178), then go to step 20.

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15. Connect PCM connectors A (31P), B (24P), and C (22P).

16. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).

17. Start the engine in P. With the brake pedal pressed, shift to R, and stop for at least 1 second. Then move the shift lever back into P, and wait for at least 1 second.

18. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0974 indicated?

    YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

    NO—Go to step 19.

19. Monitor the OBD STATUS for P0974 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 18, go to the indicated DTC's troubleshooting. ■

    NO—Check for poor connections and loose terminals at shift solenoid valve A and the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 17 and recheck.

20. Clear the DTC with the HDS.

21. Start the engine in P. With the brake pedal pressed, shift to R, and stop for at least 1 second. Then move the shift lever back into P, and wait for at least 1 second.

22. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0974 indicated?

    YES—Check for poor connections and loose terminals at shift solenoid valve A and the PCM, then go to step 1.

    NO—Go to step 23.

23. Monitor the OBD STATUS for P0974 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 22, go to the indicated DTC's troubleshooting. ■

    NO—Check for poor connections and loose terminals at shift solenoid valve A and the PCM, then go to step 1. If the HDS indicates NOT COMPLETED, return to step 21 and recheck.

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DTC Troubleshooting (cont'd)

DTC P0976: Shift Solenoid Valve B (Short)

NOTE:
- Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).
- This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

1. Clear the DTC with the HDS.
2. Start the engine in P, and wait for at least 1 second.
3. Check if DTC **P0976** records.

   Is DTC P0976 indicated?

   YES—Go to step 7.

   NO—Go to step 4.
4. Select Shift Solenoid B in Miscellaneous Test Menu, and test shift solenoid valve B with the HDS.

   Is a clicking sound heard?

   YES—Go to step 5.

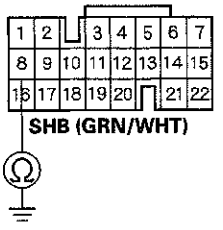
   NO—Go to step 7.
5. Start the engine in P, and wait for at least 1 second.
6. Monitor the OBD STATUS for P0976 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Go to step 7.

   NO—Intermittent failure, the system is OK at this time. Check the SHB wire for an intermittent short between shift solenoid valve B and the PCM. If the HDS indicates NOT COMPLETED, return to step 4 and recheck.
7. Turn the ignition switch to LOCK (0).
8. Jump the SCS line with the HDS.
9. Disconnect PCM connector C (22P).
10. Measure the resistance between PCM connector terminal C8 and body ground.

PCM CONNECTOR C (22P)



Wire side of female terminals

Is there less than 12 Ω ?

YES—Go to step 11.

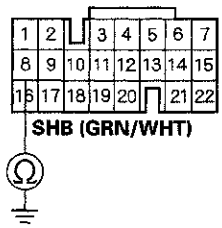
NO—Go to step 14.

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11. Disconnect the shift solenoid harness connector at the transmission housing.

12. Check for continuity between PCM connector terminal C8 and body ground.

PCM CONNECTOR C (22P)



Wire side of female terminals

Is there continuity?

YES—Repair a short in the wire between PCM connector terminal C8 and the shift solenoid harness connector, then go to step 19.

NO—Go to step 13.

13. Inspect shift solenoid valve B (see page 14-178).

Is shift solenoid valve B OK?

YES—Go to step 14.

NO—Replace shift solenoid valve B or the shift solenoid harness (see page 14-178), then go to step 19.

14. Reconnect all connectors.

15. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).

16. Start the engine in P, wait for at least 1 second, then test-drive the vehicle in D. Run the vehicle in 3rd or 4th gear at least 1 second, then slow down to a stop.

17. Check for Pending or Confirmed DTCs with the HDS.

Is DTC P0976 indicated?

YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

NO—Go to step 18.

18. Monitor the OBD STATUS for P0976 in the DTCs MENU with the HDS.

Does the HDS indicate PASSED?

YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 17, go to the indicated DTC's troubleshooting. ■

NO—Check for poor connections and loose terminals at shift solenoid valve B and the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 16 and recheck.

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DTC Troubleshooting (cont'd)

19. Clear the DTC with the HDS.

20. Start the engine in P, wait for at least 1 second, then test-drive the vehicle in D. Run the vehicle in 3rd or 4th gear at least 1 second, then slow down to a stop.

21. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0976 indicated?

    YES—Check for poor connections and loose terminals at shift solenoid valve B and the PCM, then go to step 1.

    NO—Go to step 22.

22. Monitor the OBD STATUS for P0976 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 21, go to the indicated DTC's troubleshooting. ■

    NO—Check for poor connections and loose terminals at shift solenoid valve B and the PCM, then go to step 1. If the HDS indicates NOT COMPLETED, return to step 20 and recheck.

DTC P0977: Shift Solenoid Valve B (Open)

NOTE:
- Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).
- This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

1. Clear the DTC with the HDS.

2. Test-drive the vehicle in 3rd or 4th gear in D for at least 1 second, then slow down to a stop.

3. Check if DTC P0977 records.

   Is DTC P0977 indicated?

   YES—Go to step 7.

   NO—Go to step 4.

4. Select Shift Solenoid B in Miscellaneous Test Menu, and test shift solenoid valve B with the HDS.

   Is a clicking sound heard?

   YES—Go to step 5.

   NO—Go to step 7.

5. Test-drive the vehicle in 3rd or 4th gear in D for at least 1 second, then slow down to a stop.

6. Monitor the OBD STATUS for P0977 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Go to step 7.

   NO—Intermittent failure, the system is OK at this time. Check for poor connections or loose terminals at shift solenoid valve B and the PCM. If the HDS indicates NOT COMPLETED, return to step 4 and recheck.

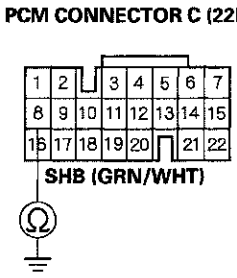
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7. Turn the ignition switch to LOCK (0).

8. Jump the SCS line with the HDS.

9. Disconnect PCM connector C (22P).

10. Measure the resistance between PCM connector terminal C8 and body ground.



Wire side of female terminals

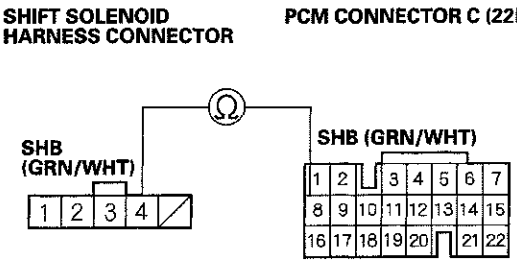
Is there 12—25 Ω ?

YES—Go to step 15.

NO—Go to step 11.

11. Disconnect the shift solenoid harness connector.

12. Check for continuity between PCM connector terminal C8 and shift solenoid harness connector terminal No. 4.



Wire side of female terminals

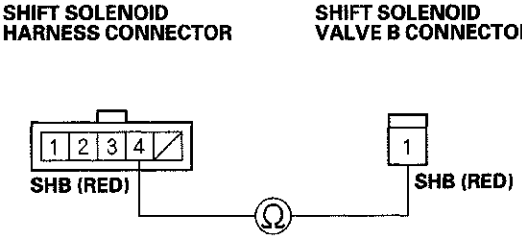
Is there continuity?

YES—Go to step 13.

NO—Repair an open in the wire between PCM connector terminal C8 and the shift solenoid harness connector, then go to step 20.

13. Remove the shift solenoid harness connector (see page 14-178).

14. Check for continuity between shift solenoid harness connector terminal No. 4 and the shift solenoid valve B connector terminal.



Terminal side of male terminals

Wire side of female terminals

Is there continuity?

YES—Replace shift solenoid valve B (see page 14-178), then go to step 20.

NO—Replace the shift solenoid harness (see page 14-178), then go to step 20.

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DTC Troubleshooting (cont'd)

15. Reconnect all connectors.

16. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).

17. Start the engine in P, wait for at least 1 second, then test-drive the vehicle in D. Run the vehicle in 3rd or 4th gear at least 1 second, then slow down to a stop.

18. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0977 indicated?

    YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

    NO—Go to step 19.

19. Monitor the OBD STATUS for P0977 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 18, go to the indicated DTC's troubleshooting. ■

    NO—Check for poor connections and loose terminals at shift solenoid valve B and the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 17 and recheck.

20. Clear the DTC with the HDS.

21. Start the engine in P, wait for at least 1 second, then test-drive the vehicle in D. Run the vehicle in 3rd or 4th gear at least 1 second, then slow down to a stop.

22. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0977 indicated?

    YES—Check for poor connections and loose terminals at shift solenoid valve B and the PCM, then go to step 1.

    NO—Go to step 23.

23. Monitor the OBD STATUS for P0977 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 22, go to the indicated DTC's troubleshooting. ■

    NO—Check for poor connections and loose terminals at shift solenoid valve B and the PCM, then go to step 1. If the HDS indicates NOT COMPLETED, return to step 21 and recheck.

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DTC P0979: Shift Solenoid Valve C (Short)

NOTE:
- Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).
- This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

1. Clear the DTC with the HDS.
2. Start the engine, and run the vehicle in 1st gear in D for at least 1 second.
3. Check if DTC P0979 records.

   Is DTC P0979 indicated?

   YES—Go to step 7.

   NO—Go to step 4.
4. Select Shift Solenoid C in Miscellaneous Test Menu, and test shift solenoid valve C with the HDS.

   Is a clicking sound heard?

   YES—Go to step 5.

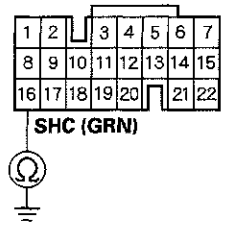
   NO—Go to step 7.
5. Start the engine, and run the vehicle in 1st gear in D for at least 1 second.
6. Monitor the OBD STATUS for P0979 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Go to step 7.

   NO—Intermittent failure, the system is OK at this time. Check the SHC wire for an intermittent short between shift solenoid valve C and the PCM. If the HDS indicates NOT COMPLETED, return to step 4 and recheck.
7. Turn the ignition switch to LOCK (0).
8. Jump the SCS line with the HDS.
9. Disconnect PCM connector C (22P).
10. Measure the resistance between PCM connector terminal C16 and body ground.

PCM CONNECTOR C (22P)



Wire side of female terminals

Is there less than 12 Ω ?

YES—Go to step 11.

NO—Go to step 14.

(cont'd)

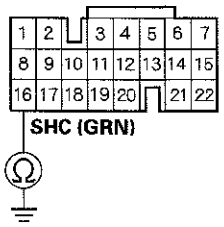
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DTC Troubleshooting (cont'd)

11. Disconnect shift solenoid harness connector at the transmission housing.

12. Check for continuity between PCM connector terminal C16 and body ground.

PCM CONNECTOR C (22P)



Wire side of female terminals

Is there continuity?

YES—Repair an short in the wire between PCM connector terminal C16 and the shift solenoid harness connector, then go to step 19.

NO—Go to step 13.

13. Inspect shift solenoid valve C (see page 14-178).

Is shift solenoid valve C OK?

YES—Go to step 14.

NO—Replace shift solenoid valve C or the shift solenoid harness (see page 14-178), then go to step 19.

14. Reconnect all connectors.

15. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).

16. Start the engine in P, wait for at least 1 second, then test-drive the vehicle in D. Run the vehicle in 1st gear at least 1 second, then slow down to a stop.

17. Check for Pending or Confirmed DTCs with the HDS.

Is DTC P0979 indicated?

YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

NO—Go to step 18.

18. Monitor the OBD STATUS for P0979 in the DTCs MENU with the HDS.

Does the HDS indicate PASSED?

YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 17, go to the indicated DTC's troubleshooting. ■

NO—Check for poor connections and loose terminals at shift solenoid valve C and the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 16 and recheck.

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19. Clear the DTC with the HDS.

20. Start the engine in P, wait for at least 1 second, then test-drive the vehicle in D. Run the vehicle in 1st gear at least 1 second, then slow down to a stop.

21. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0979 indicated?

    YES—Check for poor connections and loose terminals at shift solenoid valve C and the PCM, then go to step 1.

    NO—Go to step 22.

22. Monitor the OBD STATUS for P0979 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 21, go to the indicated DTC's troubleshooting. ■

    NO—Check for poor connections and loose terminals at shift solenoid valve C and the PCM, then go to step 1. If the HDS indicates NOT COMPLETED, return to step 20 and recheck.

DTC P0980: Shift Solenoid Valve C (Open)

NOTE:
- Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).
- This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

1. Clear the DTC with the HDS.

2. Start the engine in P, and wait for at least 1 second.

3. Check if DTC P0980 records.

   Is DTC P0980 indicated?

   YES—Go to step 7.

   NO—Go to step 4.

4. Select Shift Solenoid C in Miscellaneous Test Menu, and test shift solenoid valve C with the HDS.

   Is a clicking sound heard?

   YES—Go to step 5.

   NO—Go to step 7.

5. Start the engine in P, and wait for at least 1 second.

6. Monitor the OBD STATUS for P0980 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Go to step 7.

   NO—Intermittent failure, the system is OK at this time. Check for poor connections or loose terminals at shift solenoid valve C and the PCM. If the HDS indicates NOT COMPLETED, return to step 4 and recheck.

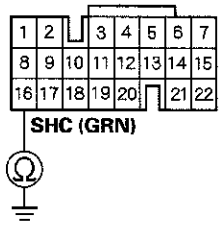
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DTC Troubleshooting (cont'd)

7. Turn the ignition switch to LOCK (0).
8. Jump the SCS line with the HDS.
9. Disconnect PCM connector C (22P).
10. Measure the resistance between PCM connector terminal C16 and body ground.

PCM CONNECTOR C (22P)



Wire side of female terminals

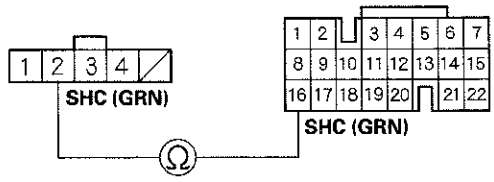
Is there 12—25 Ω ?

YES—Go to step 15.

NO—Go to step 11.

11. Disconnect the shift solenoid harness connector.
12. Check for continuity between PCM connector terminal C16 and shift solenoid harness connector terminal No. 2.

SHIFT SOLENOID HARNESS CONNECTOR **PCM CONNECTOR C (22P)**



Wire side of female terminals

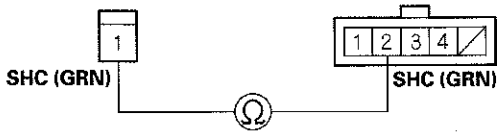
Is there continuity?

YES—Go to step 13.

NO—Repair an open in the wire between PCM connector terminal C16 and the shift solenoid harness connector, then go to step 20.

13. Remove the shift solenoid harness connector (see page 14-178).
14. Check for continuity between shift solenoid harness connector terminal No. 2 and the shift solenoid valve C connector terminal.

SHIFT SOLENOID VALVE C CONNECTOR **SHIFT SOLENOID HARNESS CONNECTOR**



Wire side of female terminals

Terminal side of male terminals

Is there continuity?

YES—Replace shift solenoid valve C (see page 14-178), then go to step 20.

NO—Replace the shift solenoid harness (see page 14-178), then go to step 20.

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15. Reconnect all connectors.

16. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).

17. Start the engine in P, wait for at least 1 second, then test-drive the vehicle in D. Run the vehicle in 1st gear at least 1 second, then slow down to a stop.

18. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0980 indicated?

    YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

    NO—Go to step 19.

19. Monitor the OBD STATUS for P0980 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 18, go to the indicated DTC's troubleshooting. ■

    NO—Check for poor connections and loose terminals at shift solenoid valve C and the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 17 and recheck.

20. Clear the DTC with the HDS.

21. Start the engine in P, wait for at least 1 second, then test-drive the vehicle in D. Run the vehicle in 1st gear at least 1 second, then slow down to a stop.

22. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0980 indicated?

    YES—Check for poor connections and loose terminals at shift solenoid valve C and the PCM, then go to step 1.

    NO—Go to step 23.

23. Monitor the OBD STATUS for P0980 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 22, go to the indicated DTC's troubleshooting. ■

    NO—Check for poor connections and loose terminals at shift solenoid valve C and the PCM, then go to step 1. If the HDS indicates NOT COMPLETED, return to step 21 and recheck.

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DTC Troubleshooting (cont'd)

DTC P0982: Shift Solenoid Valve D (Short)

NOTE:
- Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).
- This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

1. Clear the DTC with the HDS.
2. Start the engine in P, and wait for at least 1 second.
3. Check if DTC P0982 records.

   Is DTC P0982 indicated?

   YES—Go to step 7.

   NO—Go to step 4.
4. Select Shift Solenoid D in Miscellaneous Test Menu, and test shift solenoid valve D with the HDS.

   Is a clicking sound heard?

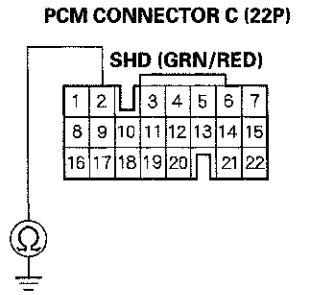
   YES—Go to step 5.

   NO—Go to step 7.
5. Start the engine in P, and wait for at least 1 second.
6. Monitor the OBD STATUS for P0982 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Go to step 7.

   NO—Intermittent failure, the system is OK at this time. Check the SHD wire for an intermittent short between shift solenoid valve D and the PCM. If the HDS indicates NOT COMPLETED, return to step 4 and recheck.
7. Turn the ignition switch to LOCK (0).
8. Jump the SCS line with the HDS.
9. Disconnect PCM connector C (22P).
10. Measure the resistance between PCM connector terminal C2 and body ground.



Wire side of female terminals

Is there less than 12 Ω ?

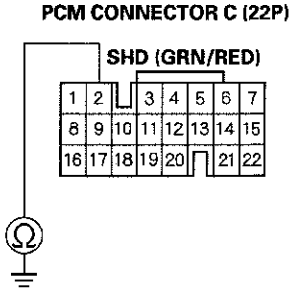
YES—Go to step 11.

NO—Go to step 16.

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11. Disconnect shift solenoid harness connector at the transmission housing.

12. Check for continuity between PCM connector terminal C2 and body ground.



Wire side of female terminals

Is there continuity?

YES—Repair a short in the wire between PCM connector terminal C2 and the shift solenoid harness connector, then go to step 21.

NO—Go to step 13.

13. Inspect shift solenoid valve D and shift solenoid harness (see page 14-178).

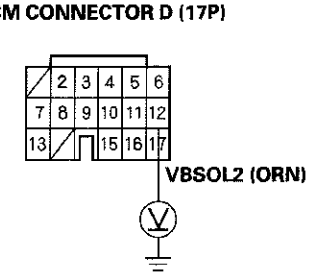
Is shift solenoid valve D and shift solenoid harness OK?

YES—Go to step 14.

NO—Replace shift solenoid valve D or the shift solenoid harness (see page 14-178), then go to step 21.

14. Turn the ignition switch to ON (II).

15. Measure the voltage between PCM connector terminal D12 and body ground.



Wire side of female terminals

Is there battery voltage?

YES—Go to step 16.

NO—Check for blown No. 20 fuse in the driver's under-dash fuse/relay box. If the fuse is OK, repair an open in the wire between PCM connector terminal D12 and the driver's under-dash fuse/relay box, then go to step 21.

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DTC Troubleshooting (cont'd)

16. Reconnect all connectors.

17. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).

18. Start the engine in P, and wait for at least 1 second. With the brake pedal pressed, shift to N, and wait for at least 1 second.

19. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0982 indicated?

    YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

    NO—Go to step 20.

20. Monitor the OBD STATUS for P0982 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 19, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at shift solenoid valve D and the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 18 and recheck.

21. Clear the DTC with the HDS.

22. Start the engine in P, and wait for at least 1 second. With the brake pedal pressed, shift to N, and wait for at least 1 second.

23. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0982 indicated?

    YES—Check for poor connections and loose terminals at shift solenoid valve D and the PCM, then go to step 1.

    NO—Go to step 24.

24. Monitor the OBD STATUS for P0982 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 23, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at shift solenoid valve D and the PCM, then go to step 1. If the HDS indicates NOT COMPLETED, return to step 22 and recheck.

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DTC P0983: Shift Solenoid Valve D (Open)

NOTE:
- Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).
- This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

1. Clear the DTC with the HDS.
2. Start the engine in P. With the brake pedal pressed, shift to N, and wait for at least 1 second.
3. Check if DTC P0983 records.

   Is DTC P0983 indicated?

   YES—Go to step 7.

   NO—Go to step 4.
4. Select Shift Solenoid D in Miscellaneous Test Menu, and test shift solenoid valve D with the HDS.

   Is a clicking sound heard?

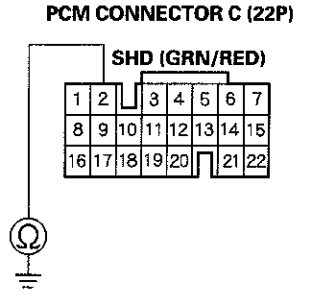
   YES—Go to step 5.

   NO—Go to step 7.
5. Start the engine in P. With the brake pedal pressed, shift to N, and wait for at least 1 second.
6. Monitor the OBD STATUS for P0983 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Go to step 7.

   NO—Intermittent failure, the system is OK at this time. Check for poor connections or loose terminals at shift solenoid valve D and the PCM. If the HDS indicates NOT COMPLETED, return to step 4 and recheck.
7. Turn the ignition switch to LOCK (0).
8. Jump the SCS line with the HDS.
9. Disconnect PCM connector C (22P).
10. Measure the resistance between PCM connector terminal C2 and body ground.



Wire side of female terminals

   Is there 12—25 Ω ?

   YES—Go to step 15.

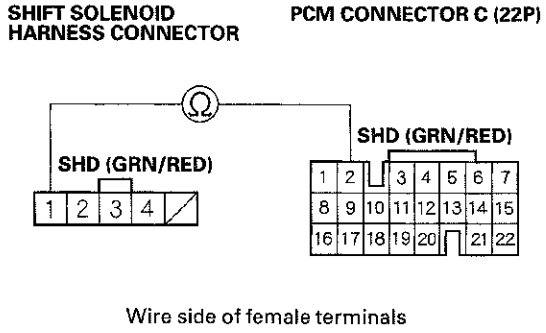
   NO—Go to step 11.
11. Disconnect the shift solenoid harness connector.

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DTC Troubleshooting (cont'd)

12. Check for continuity between PCM connector terminal C2 and shift solenoid harness connector terminal No. 1.



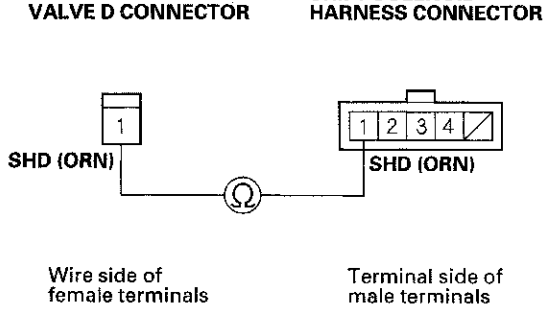
Is there continuity?

YES—Go to step 13.

NO—Repair an open in the wire between PCM connector terminal C2 and the shift solenoid harness connector, then go to step 20.

13. Remove the shift solenoid harness connector (see page 14-178).

14. Check for continuity between shift solenoid harness connector terminal No. 1 and the shift solenoid valve D connector terminal.



Is there continuity?

YES—Replace shift solenoid valve D (see page 14-178), then go to step 20.

NO—Replace the shift solenoid harness (see page 14-178), then go to step 20.

15. Reconnect all connectors.

16. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).

17. Start the engine in P, and wait for at least 1 second. With the brake pedal pressed, shift to N, and wait for at least 1 second.

18. Check for Pending or Confirmed DTCs with the HDS.

Is DTC P0983 indicated?

YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

NO—Go to step 19.

19. Monitor the OBD STATUS for P0983 in the DTCs MENU with the HDS.

Does the HDS indicate PASSED?

YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 18, go to the indicated DTC's troubleshooting. ■

NO—Check for poor connections and loose terminals at shift solenoid valve D and the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 17 and recheck.

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20. Clear the DTC with the HDS.

21. Start the engine in P, and wait for at least 1 second. With the brake pedal pressed, shift to N, and wait for at least 1 second.

22. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P0983 indicated?

    YES—Check for poor connections and loose terminals at shift solenoid valve D and the PCM, then go to step 1.

    NO—Go to step 23.

23. Monitor the OBD STATUS for P0983 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 22, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at shift solenoid valve D and the PCM, then go to step 1. If the HDS indicates NOT COMPLETED, return to step 21 and recheck.

DTC P1717: Transmission Range Switch ATP RVS Switch (Open)

NOTE:
- Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).
- This code is caused by an electrical circuit problem and cannot be caused by a mechanical problem in the transmission.

1. Turn the ignition switch to ON (II).

2. Shift to R, and verify the A/T R SWITCH signal with the HDS in the A/T Data List.

   Is the A/T R SWITCH ON?

   YES—Go to step 3.

   NO—Check for proper transmission range switch installation (see page 14-245), adjust the shift cable (see page 14-238), then recheck.

3. Check the Reverse Switch (ATP RVS) signal with the HDS.

   Is the Reverse Switch (ATP RVS) ON?

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

   NO—Go to step 4.

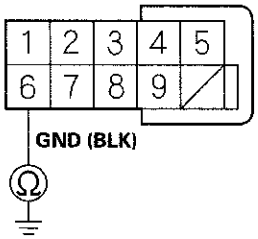
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DTC Troubleshooting (cont'd)

4. Turn the ignition switch to LOCK (0).
5. Disconnect the transmission range switch connector.
6. Check for continuity between transmission range switch connector terminal No. 6 and body ground.

TRANSMISSION RANGE SWITCH CONNECTOR



Wire side of female terminals

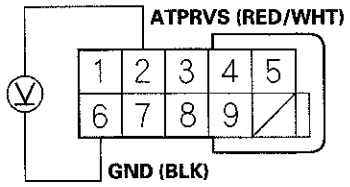
Is there continuity?

YES—Go to step 7.

NO—Repair an open in the wire between transmission range switch connector terminal No. 6 and ground (G101, G102), or repair poor ground (G101, G102), then go to step 15.

7. Turn the ignition switch to ON (II).
8. Measure the voltage between transmission range switch connector terminals No. 2 and No. 6.

TRANSMISSION RANGE SWITCH CONNECTOR



Wire side of female terminals

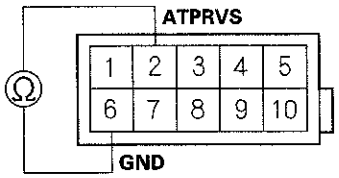
Is there battery voltage?

YES—Go to step 9.

NO—Repair an open in the wire between PCM connector terminal C21 and the transmission range switch, then go to step 15.

9. Check for continuity between the No. 2 and No. 6 terminals at the transmission range switch in all five shift lever positions.

TRANSMISSION RANGE SWITCH CONNECTOR



Terminal side of male terminals

Is there continuity when the shift lever is in P, R, and N, and no continuity when the shift lever is in D and S?

YES—Go to step 10.

NO—Replace the transmission range switch (see page 14-245), then go to step 15.

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10. Connect the transmission range switch connector.

11. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).

12. Start the engine in P. With the brake pedal pressed, shift to R, and stop for at least 2 seconds in R, then shift to N.

13. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P1717 indicated?

    YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

    NO—Go to step 14.

14. Monitor the OBD STATUS for P1717 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 13, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at the transmission range switch and the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7). then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 12 and recheck.

15. Clear the DTC with the HDS.

16. Start the engine in P. With the brake pedal pressed, shift to R, and stop for at least 2 seconds in R, then shift to N.

17. Check for Pending or Confirmed DTCs with the HDS.

    Is DTC P1717 indicated?

    YES—Check for poor connections and loose terminals at the transmission range switch and the PCM, then go to step 1.

    NO—Go to step 18.

18. Monitor the OBD STATUS for P1717 in the DTCs MENU with the HDS.

    Does the HDS indicate PASSED?

    YES—Troubleshooting is complete. If any other Pending or Confirmed DTCs were indicated on step 17, go to the indicated DTC's troubleshooting.■

    NO—Check for poor connections and loose terminals at the transmission range switch and the PCM, then go to step 1. If the HDS indicates NOT COMPLETED, return to step 16 and recheck.

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DTC Troubleshooting (cont'd)

DTC P1743: Shift Error

NOTE: Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).

1. Warm up the engine to normal operating temperature (the radiator fan comes on).
2. Make sure that the transmission is filled to the proper level, and check for fluid leaks.
3. Drain the ATF (see step 4 on page 14-196) through a strainer. Inspect the strainer for metal debris or excessive clutch material.

   Does the strainer have metal debris or excessive clutch material?

   YES—Replace the transmission, then go to step 8.

   NO—Replace the ATF (see step 6 on page 14-196), then go to step 4.
4. Clear the DTC with the HDS.
5. Test-drive the vehicle with the shift lever in D, and let the transmission shift through all five gears, then slow down to a stop.
6. Monitor the OBD STATUS for P1743 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Repair shift valve E in the main valve body (see page 14-278), replace the main valve body, or replace the transmission, then go to step 7.

   NO—Intermittent failure, the system is OK at this time. If the HDS indicates NOT COMPLETED, return to step 5 and recheck.■
7. Clear the DTC with the HDS.
8. Test-drive the vehicle with the shift lever in D, and let the transmission shift through all five gears, then slow down to a stop.
9. Monitor the OBD STATUS for P1743 in the DTCs MENU with the HDS.

   Does the HDS indicate PASSED?

   YES—Troubleshooting is complete.■

   NO—Return to step 4 and recheck. If the HDS indicates NOT COMPLETED, return to step 8 and recheck.

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DTC P1744: Shift Error

NOTE: Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).

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

2. Make sure that the transmission is filled to the proper level, and check for fluid leaks.

3. Drain the ATF (see step 4 on page 14-196) through a strainer. Inspect the strainer for metal debris or excessive clutch material.

   Does the strainer have metal debris or excessive clutch material?

   YES—Replace the transmission, then go to step 8.

   NO—Replace the ATF (see step 6 on page 14-196), then go to step 4.

4. Clear the DTC with the HDS.

5. Test-drive the vehicle with the shift lever in D, and let the transmission shift through all five gears, then slow down to a stop.

6. Monitor the OBD STATUS for P1744 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Repair shift valve E in the main valve body (see page 14-278), replace the main valve body, or replace the transmission, then go to step 7.

   NO—Intermittent failure, the system is OK at this time. If the HDS indicates NOT COMPLETED, return to step 4 and recheck.■

7. Clear the DTC with the HDS.

8. Test-drive the vehicle with the shift lever in D, and let the transmission shift through all five gears, then slow down to a stop.

9. Monitor the OBD STATUS for P1744 in the DTCs MENU with the HDS.

   Does the HDS indicate PASSED?

   YES—Troubleshooting is complete.■

   NO—Return to step 4 and recheck. If the HDS indicates NOT COMPLETED, return to step 8 and recheck.

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DTC Troubleshooting (cont'd)

DTC P1745: Shift Error

NOTE: Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).

1. Warm up the engine to normal operating temperature (the radiator fan comes on).
2. Make sure that the transmission is filled to the proper level, and check for fluid leaks.
3. Drain the ATF (see step 4 on page 14-196) through a strainer. Inspect the strainer for metal debris or excessive clutch material.

   Does the strainer have metal debris or excessive clutch material?

   YES—Replace the transmission, then go to step 8.

   NO—Replace the ATF (see step 6 on page 14-196), then go to step 4.
4. Clear the DTC with the HDS.
5. Test-drive the vehicle with the shift lever in D, and let the transmission shift through all five gears, then slow down to a stop.
6. Monitor the OBD STATUS for P1745 in the DTCs MENU with the HDS.

   Does the HDS indicate FAILED?

   YES—Repair the servo control valve in the main valve body (see page 14-278), servo valve in the regulator valve body (see page 14-281), or replace the main valve body, regulator valve body, or replace the transmission, then go to step 7.

   NO—Intermittent failure, the system is OK at this time. If the HDS indicates NOT COMPLETED, return to step 5 and recheck.■
7. Clear the DTC with the HDS.
8. Test-drive the vehicle with the shift lever in D, and let the transmission shift through all five gears, then slow down to a stop.
9. Monitor the OBD STATUS for P1745 in the DTCs MENU with the HDS.

   Does the HDS indicate PASSED?

   YES—Troubleshooting is complete.■

   NO—Return to step 4 and recheck. If the HDS indicates NOT COMPLETED, return to step 8 and recheck.

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DTC P1780: Shift Control System (Transmission Default Mode)

NOTE: Before you troubleshoot, record all freeze data and any on-board snapshot, and review General Troubleshooting Information (see page 14-4).

1. Clear the DTC with the HDS.
2. Test-drive the vehicle with the shift lever in D, and let the transmission shift through all five gears, then slow down to a stop.
3. Check for Pending or Confirmed DTCs with the HDS.

   NOTE: DTC P1780 means there is one or more A/T DTCs about the shift control system.

   Are there other DTCs?

   YES—Troubleshoot the problem indicated by the DTC. ■

   NO—Go to step 4.

4. Update the A/T software in the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7).
5. Test-drive the vehicle with the shift lever in D, and let the transmission shift through all five gears, then slow down to a stop.
6. Check for Pending or Confirmed DTCs with the HDS.

   Is DTC P1780 indicated?

   YES—If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1.

   NO—Go to step 7.

7. Monitor the OBD STATUS for P1780 in the DTCs MENU with the HDS.

   Does the HDS indicate PASSED?

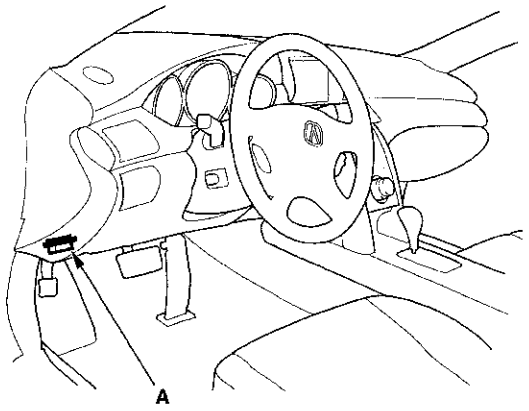
   YES—If the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see page 11-232). If any other Pending or Confirmed DTCs were indicated on step 6, go to the indicated DTC's troubleshooting. ■

   NO—Check for poor connections and loose terminals at the PCM. If the PCM was updated, substitute a known-good PCM (see page 11-7), then recheck. If the PCM was substituted, go to step 1. If the HDS indicates NOT COMPLETED, return to step 5 and recheck.

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Road Test

1. Warm up the engine to normal operating temperature (the radiator fan comes on).
2. Apply the parking brake, and block all four wheels. Start the engine, then shift to D while pressing the brake pedal. Press the accelerator pedal, and release it suddenly. The engine should not stall.
3. Repeat step 2 in all shift lever positions.
4. Connect the HDS to the DLC (A) located under the driver's side of the dashboard.



5. Turn the ignition switch to ON (II). Make sure the HDS communicates with the PCM. If it does not, go to the DLC circuit troubleshooting (see page 11-211).
6. Prepare the HDS to take a HIGH SPEED SNAPSHOT (refer to the HDS user's guide for more details if needed):
   - Select High Speed icon.
   - Select these parameters:
     - Vehicle Speed
     - Output Shaft (Countershaft) Speed (rpm)
     - Input Shaft (Mainshaft) Speed (rpm)
     - Engine Speed
     - TP Sensor (1)
     - APP Sensor A (V)
     - ATF Temp sensor (V)
     - Battery Voltage
     - Shift Control
     - Brake Switch
   - Set the Trigger Type to Parameter.
   - Adjust the Parameter setting to APP Sensor A above 0.75 V.
   - Set the recording time to 60 seconds.
   - Set the trigger point to −30 seconds.
7. Find a suitable level road. When you are ready to do the test, press OK on the HDS.
8. Monitor the HDS, and accelerate quickly until the APP Sensor A reads 0.75 V. Maintain a steady throttle until the transmission shifts to 5th gear, then slow the vehicle and come to a stop.
9. Save the snapshot if the entire event was recorded, or increase the recording time setting as necessary, and repeat step 8.
10. Adjust the parameter setting to 2.25 V. Test-drive the vehicle again. While monitoring the HDS, accelerate quickly until the APP Sensor A reads 2.25 V. Maintain a steady throttle until the transmission shifts to 5th gear (or reasonable speed), then slow the vehicle and come to a stop.
11. Save the snapshot if the entire event was recorded, or increase the recording time setting as necessary, and repeat step 10.
12. Accelerate quickly until the accelerator pedal is to the floor. Maintain a steady pedal until the transmission shifts to 3rd gear, then slow to a stop, and save the snapshot.
13. Review each snapshot individually, and compare the Shift Control, the APP Sensor A voltage, and the Vehicle Speed to the table below.

Upshift: D Position

Accelerator pedal position sensor voltage: 0.75 V	
1st→2nd	9—10 mph (14—16 km/h)
2nd→3rd	14—16 mph (23—26 km/h)
3rd→4th	24—27 mph (38—43 km/h)
4th→5th	43—47 mph (69—75 km/h)
Lock-up ON	48—51 mph (78—82 km/h)
Accelerator pedal position sensor voltage: 2.25 V	
1st→2nd	21—22 mph (33—36 km/h)
2nd→3rd	40—44 mph (65—71 km/h)
3rd→4th	70—74 mph (113—119 km/h)
4th→5th	99—103 mph (159—165 km/h)
Lock-up ON	99—103 mph (159—165 km/h)
Fully-opened throttle Accelerator pedal position sensor voltage: 4.5 V	
1st→2nd	34—38 mph (55—61 km/h)
2nd→3rd	63—67 mph (102—108 km/h)
3rd→4th	98—101 mph (157—163 km/h)

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Downshift: D Position (reference)

Accelerator pedal position sensor voltage: 0.75 V	
Lock-up OFF	45—47 mph (73—75 km/h)
5th→4th	35—39 mph (57—63 km/h)
4th→3rd	16—18 mph (25—29 km/h)
2nd→1st	6—8 mph (9—13 km/h)
Accelerator pedal position sensor voltage: 2.25 V	
Lock-up OFF	66—70 mph (107—113 km/h)
5th→4th	56—60 mph (90—96 km/h)
4th→3rd	25—29 mph (40—46 km/h)
3rd→2nd	14—18 mph (23—29 km/h)
2nd→1st	5—9 mph (8—14 km/h)
Fully-opened throttle Accelerator pedal position sensor voltage: 4.5 V	
4th→3rd	84—88 mph (135—141 km/h)
3rd→2nd	53—57 mph (85—91 km/h)
2nd→1st	26—30 mph (42—48 km/h)

14. Drive the vehicle in 4th or 5th gear in the sequential sportshift mode in S, then downshift to 2nd gear. The vehicle should immediately begin to slow down from engine braking.

15. Shift to R, accelerate from a stop at full throttle momentarily, and check for abnormal noise and clutch slippage.

16. Park the vehicle on a slope (about 16 degrees), apply the brake, and shift into P. Release the brake; the vehicle should not move.

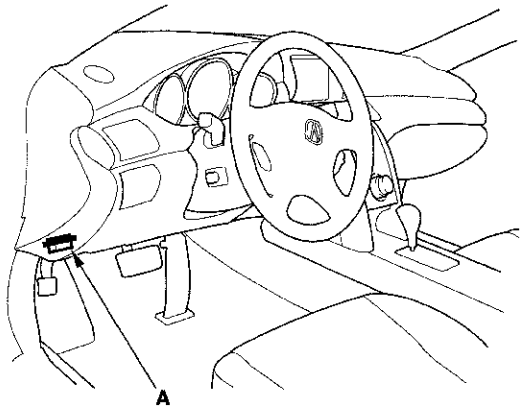
    NOTE: Always use the brake to hold the vehicle, when stopped on an incline in gear. Depending on the grade of the incline, the vehicle could roll if the brake is released.

Stall Speed Test

1. Make sure the transmission fluid is filled to the upper level (see page 14-195).

2. Apply the parking brake, and block all four wheels.

3. Connect the HDS to the DLC (A) located under the driver's side of the dashboard.



4. Turn the ignition switch to ON (II). Make sure the HDS communicates with the PCM. If it does not, go to the DLC circuit troubleshooting (see page 11-211).

5. Make sure the A/C switch OFF.

6. After the engine has warmed up to normal operating temperature (the radiator fan comes on), shift to D.

7. Firmly press and hold the brake pedal, then fully press the accelerator pedal for 6 to 8 seconds, and note the engine speed. Do not move the shift lever while raising the engine speed.

(cont'd)

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Stall Speed Test (cont'd)

8. Allow 2 minutes for cooling, then repeat the test in R.

   NOTE:
   - Do not test stall speed for more than 10 seconds at a time.
   - Record the engine speed at 6—8 seconds after pressing the accelerator pedal. Higher engine speed will be indicated for 5 seconds.
   - Stall speed tests should be used for diagnostic purposes only.
   - The stall speed should be the same in D and R.
   - Do not test stall speed with the A/T pressure gauges installed.

   Stall Speed rpm:
   Specification: 1,850 rpm
   Service Limit: 1,700—2,000 rpm

9. If any of the stall speeds are out of the service limit, refer to the problems and probable causes listed in the table.

Problem	Probable causes
Stall speed rpm high in D and R	• ATF pump output low • Regulator valve stuck • Slipping clutch
Stall speed rpm high in R	Slippage of 5th clutch
Stall speed rpm low in D and R	• Engine output low • Engine throttle valve closed • Torque converter one-way clutch slipping

Pressure Test

Special Tools Required
- A/T pressure gauge set 07406-0020400 or 07406-0020401
- A/T pressure hose, 2,210 mm 07MAJ-PY4011A
- A/T pressure hose adapter 07MAJ-PY40120

NOTE:
- Disable the VSA by pressing the VSA OFF switch.
- VSA DTC(s) may come on during the test-drive. If the VSA DTC(s) come on, clear the DTC(s) with the HDS.

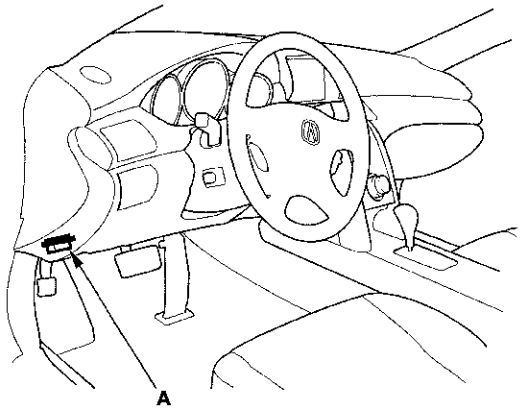
1. Make sure the transmission fluid is filled to the proper level (see page 14-195).

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

3. Allow all four wheels to rotate freely.

4. Remove the splash shield.

5. Connect the HDS to the DLC (A) located under the driver's side of the dashboard.

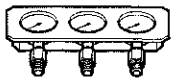


6. Turn the ignition switch to ON (II). Make sure the HDS communicates with the PCM. If it does not, go to the DLC circuit troubleshooting (see page 11-211).

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7. Connect the oil pressure gauge to the line pressure inspection hole (A). Do not allow dust or other foreign particles to enter the hole while connecting the gauge.

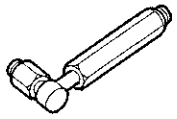
A/T PRESSURE GAUGE SET 07406-0020400 or 07406-0020401

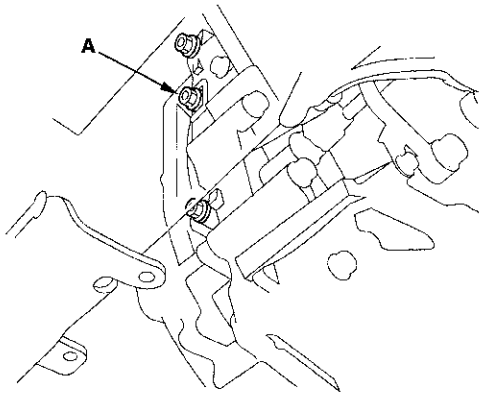


A/T PRESSURE HOSE, 2,210 mm 07MAJ-PY4011A



A/T PRESSURE HOSE ADAPTER 07MAJ-PY40120





8. Start the engine, and warm it up to normal operating temperature (the radiator fan comes on).

9. Measure the line pressure at the line pressure inspection port (A) in the P or N position while holding the engine speed at 2,000 rpm.

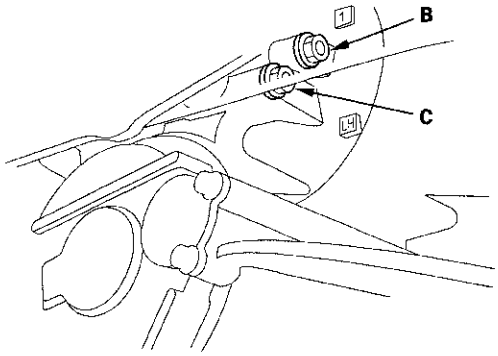
   NOTE: Higher pressure may be indicated if measurements are made in the shift lever position other than P or N.

Pressure	Fluid Pressure	
	Standard	Service Limit
Line (A)	950—1,010 kPa (9.7—10.3 kgf/cm², 140—146 psi)	900 kPa (9.2 kgf/cm², 130 psi)

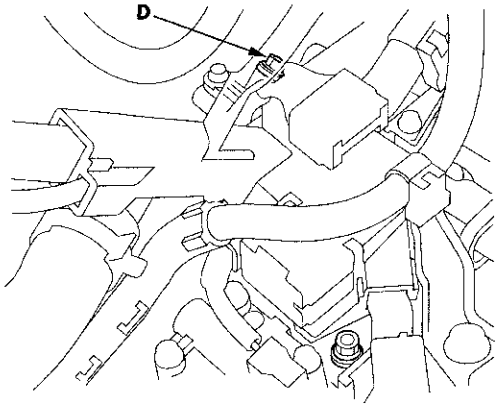
10. Turn the engine off, then disconnect the oil pressure gauge from the line pressure inspection port.

11. Install the sealing bolt to the line pressure inspection port with a new sealing washer, and tighten the bolt to 18 N·m (1.8 kgf·m, 13 lbf·ft). Do not reuse the old sealing washer.

12. Connect the oil pressure gauge to the 1st clutch pressure inspection port (B) and the 1st-hold clutch pressure inspection port (C).



13. Remove the air cleaner (see page 11-366), and connect the oil pressure gauge to the 2nd clutch pressure inspection port (D). Then temporarily install the air cleaner.



(cont'd)

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Pressure Test (cont'd)

14. Start the engine, and shift into S.

15. Press the paddle shifter + (upshift switch), and make sure the transmission is in 1st gear. Measure the 1st clutch pressure at the 1st clutch pressure inspection port and 1st-hold clutch pressure at the 1st-hold clutch pressure inspection port while holding the engine speed at 2,000 rpm.

16. Upshift to 2nd gear by pressing the paddle shifter +, and measure the 2nd clutch pressure at the 2nd clutch pressure inspection port while holding the engine speed at 2,000 rpm.

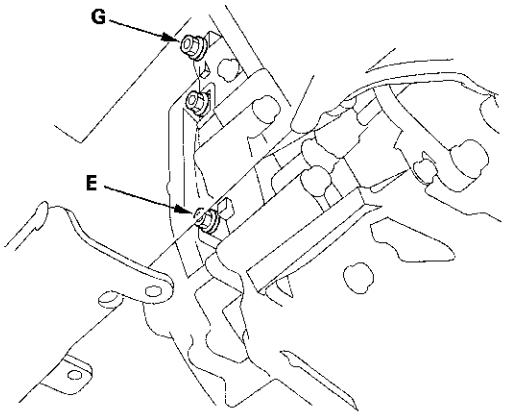
Pressure	Fluid Pressure	
	Standard	Service Limit
1st clutch (B) 2nd clutch (D)	940—1,020 kPa (9.6—10.4 kgf/cm², 140—148 psi)	890 kPa (9.1 kgf/cm², 130 psi)
1st-hold clutch (C)	680—760 kPa (6.9—7.7 kgf/cm², 98—110 psi)	630 kPa (6.4 kgf/cm², 91 psi)

17. Turn the engine off, remove the air cleaner, then disconnect the oil pressure gauges from the 1st clutch pressure, 1st-hold clutch pressure, and 2nd clutch pressure inspection ports.

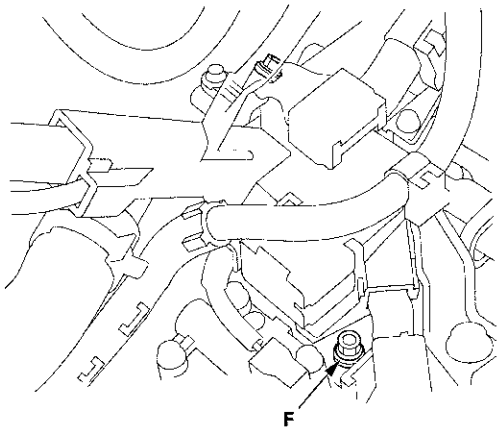
18. Install the sealing bolts in the 1st clutch pressure, 1st-clutch hold clutch pressure, and 2nd clutch pressure inspection ports with new sealing washers, and tighten the bolts to 18 N·m (1.8 kgf·m, 13 lbf·ft). Do not reuse the old sealing washers.

19. Install the air cleaner (see page 11-366).

20. Connect the oil pressure gauge to the 3rd clutch pressure inspection port (E) and the 5th clutch pressure inspection port (G).



21. Connect the oil pressure gauge to the 4th clutch pressure inspection port (F).



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22. Start the engine, and shift into S.

23. Upshift to 3rd gear by pressing the paddle shifter +, and measure the 3rd clutch pressure at the 3rd clutch pressure inspection port while holding the engine speed at 2,000 rpm.

24. Upshift to 4th gear by pressing the paddle shifter +, and measure the 4th clutch pressure at the 4th clutch pressure inspection port while holding the engine speed at 2,000 rpm.

25. Upshift to 5th gear by pressing the paddle shifter +, and measure the 5th clutch pressure at the 5th clutch pressure inspection port while holding the engine speed at 2,000 rpm.

Pressure	Fluid Pressure	
	Standard	Service Limit
3rd clutch (E) 4th clutch (F) 5th clutch (G)	940—1,020 kPa (9.6—10.4 kgf/cm², 140—148 psi)	890 kPa (9.1 kgf/cm², 130 psi)

26. Bring the engine back to an idle, then apply the brake pedal to stop the wheels from rotating.

27. Shift to R, then release the brake pedal. Raise the engine speed to 2,000 rpm, and measure the 5th clutch pressure at the 5th clutch pressure inspection port.

Pressure	Fluid Pressure	
	Standard	Service Limit
5th clutch (G) in R	940—1,020 kPa (9.6—10.4 kgf/cm², 140—148 psi)	890 kPa (9.1 kgf/cm², 130 psi)

28. Turn the engine off, then disconnect the oil pressure gauges from the 3rd, 4th, and 5th clutch pressure inspection ports.

29. Install the sealing bolts in the 3rd, 4th, and 5th clutch pressure inspection ports with new sealing washers, and tighten the bolts to 18 N·m (1.8 kgf·m, 13 lbf·ft). *Do not reuse the old sealing washers.*

30. If any of the pressures are out of the service limit, refer to the problems and probable causes listed in the table.

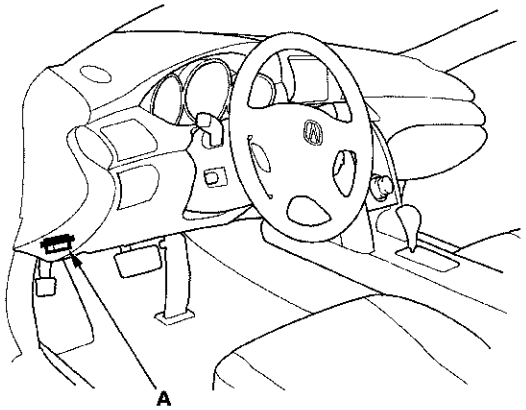
Problem	Probable causes
No or low line pressure	• Torque converter • ATF pump • Regulator valve • Torque converter check valve • Clogged ATF strainer
No or low 1st clutch pressure	• 1st clutch • O-rings
No or low 2nd clutch pressure	• 2nd clutch • O-rings
No or low 3rd clutch pressure	• 3rd clutch • O-rings
No or low 4th clutch pressure	• 4th clutch • O-rings
No or low 5th clutch pressure	• 5th clutch • O-rings
No or low 5th clutch pressure in the R position	• Servo valve • 5th clutch • O-rings
No or low 1st-hold clutch pressure	• 1st-hold clutch • O-rings

31. Install the splash shield.

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Shift Solenoid Valve Test, Replacement, and Shift Solenoid Wire Harness Replacement

1. Connect the HDS to the DLC (A) located under the driver's side of the dashboard.



2. Turn the ignition switch to ON (II). Make sure the HDS communicates with the PCM. If it does not, go to the DLC circuit troubleshooting (see page 11-211).

3. Select Shift Solenoid A, B, C, or D in the Miscellaneous Test Menu on the HDS.

4. Check that shift solenoid valves A, B, C, and D operate with the HDS. A clicking sound should be heard.

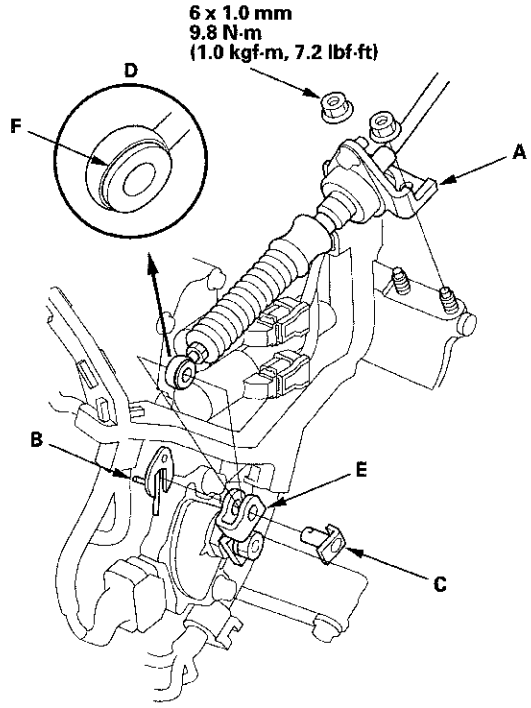
   - If a clicking sound is heard, the valves are OK. The test is complete, disconnect the HDS.
   - If no clicking sound is heard, go to step 5, and test the solenoid valves.

5. Do the battery removal procedure (see page 22-92).

6. Remove the air cleaner (see page 11-366).

7. Remove the battery base.

8. Remove the nuts securing the shift cable bracket (A).

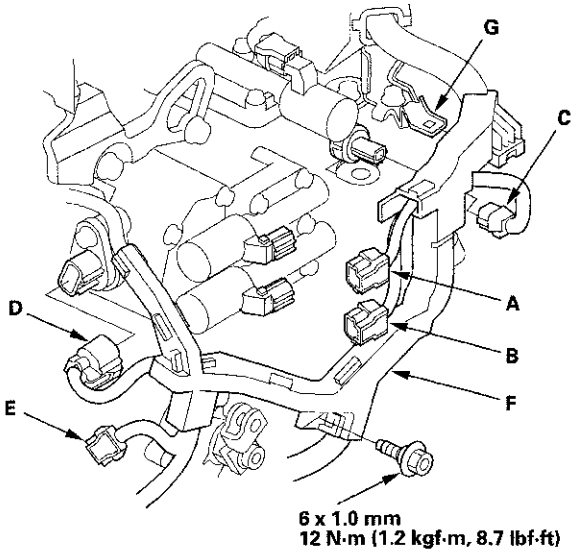


9. Remove the spring clip/washer (B) and control pin (C), then separate the shift cable end (D) from the control lever (E).

10. Check the bushing (F) in the shift cable end for a proper fit and wear. If the bushing is loose or worn, replace the shift cable (see page 14-235).

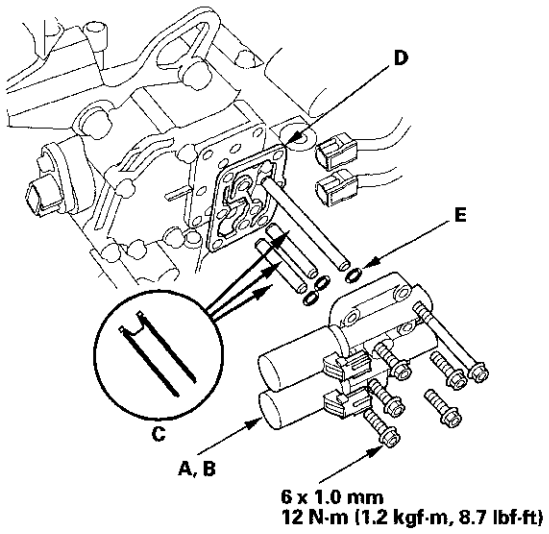
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11. Disconnect the A/T clutch pressure control solenoid valve A connector (A), A/T clutch pressure control solenoid valve B connector (B), 4th clutch transmission fluid pressure switch connector (C), shift solenoid harness connector (D), and input shaft (mainshaft) speed sensor connector (E).



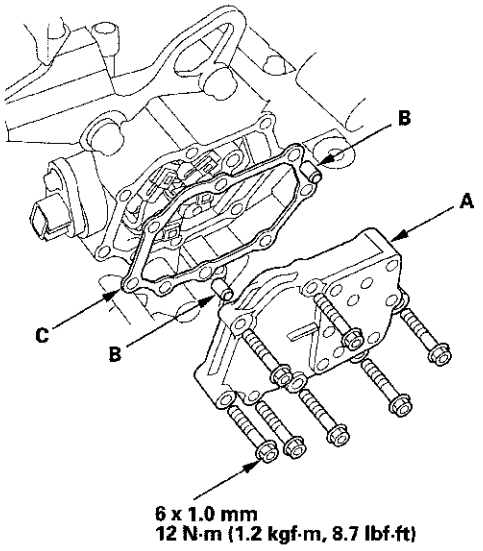
12. Remove the bolt securing the harness cover (F), and remove the harness cover from its bracket (G).

13. Remove the A/T clutch pressure control solenoid valves A and B, ATF pipes (C), and gasket (D).



14. Replace the gasket and O-rings (E) with new ones when installing the A/T clutch pressure control solenoid valves A and B.

15. Remove the solenoid valve cover (A), dowel pins (B), and gasket (C).



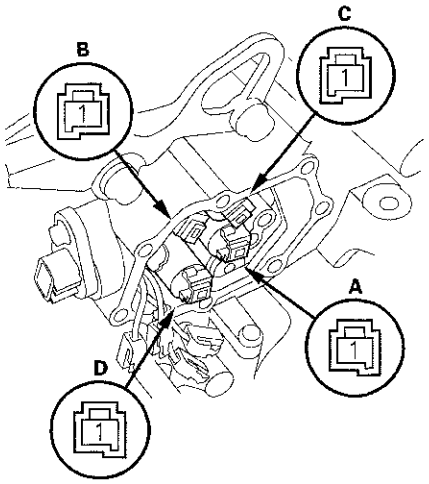
16. Replace the gasket with a new one when installing the solenoid valve cover.

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Shift Solenoid Valve Test, Replacement, and Shift Solenoid Wire Harness Replacement (cont'd)

17. Disconnect the connectors from the shift solenoid valve(s) that did not click.



18. Measure the resistance of the shift solenoid valve between the connector terminal and body ground.

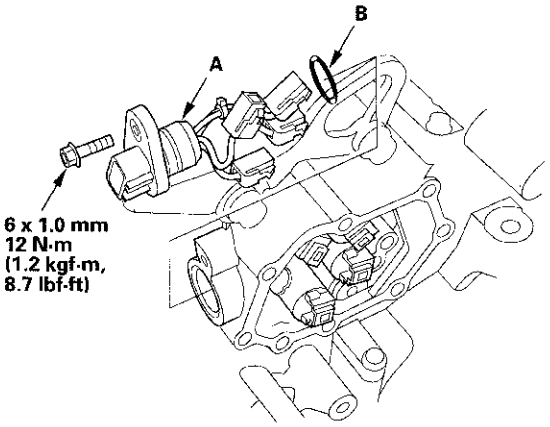
    Standard: 12—25 Ω

    - If the resistance is out of standard, go to step 21 and replace the shift solenoid valve.
    - If the resistance is within the standard, go to step 19 and check solenoid valve for a clicking sound.

19. Connect a jumper wire from the negative battery terminal to the body ground, and connect another jumper wire from the positive battery terminal to each solenoid valve terminal individually. A clicking sound should be heard.

    - If a clicking sound is heard, go to step 20 and replace the shift solenoid harness.
    - If no clicking sound is heard, go to step 21 and replace the shift solenoid valve.

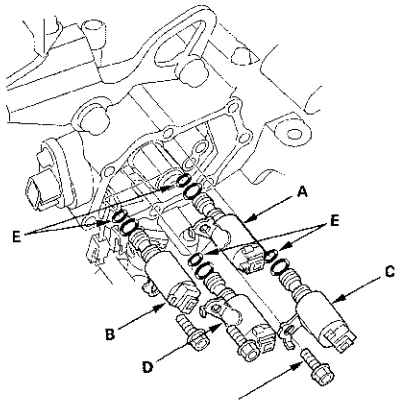
20. Remove the shift solenoid harness connector (A), and replace it. Install a new O-ring (B) on the shift solenoid harness connector, and install the connector in the transmission housing, then go to step 27.



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21. Remove the necessary mounting bolts, then remove the affected shift solenoid valves.

    NOTE: Shift solenoid valves A and C use the same mounting bolt.



22. Install new O-rings (two O-rings per solenoid valve) (E) on the reused solenoid valves.

    NOTE: A new solenoid valve comes with new O-rings. If you install a new solenoid valve, use the O-rings provided with it.

23. If shift solenoid valve D was replaced, install shift solenoid valve D (black connector) by holding the shift solenoid valve body; make sure the mounting bracket contacts the accumulator body.

    NOTE: Do not hold the solenoid valve by the connector when installing the solenoid valve. Be sure to hold the solenoid valve body.

24. If shift solenoid valve A was replaced, install shift solenoid valve A (black connector) by holding the shift solenoid valve body; make sure the mounting bracket contacts the accumulator body.

25. If shift solenoid valve C was replaced, install shift solenoid valve C (brown connector) by holding the shift solenoid valve body; make sure the mounting bracket contacts the bracket of shift solenoid valve A.

    NOTE: Do not install shift solenoid valve C before installing shift solenoid valve A. If shift solenoid valve C is installed before installing shift solenoid valve A, it may damage the hydraulic control system.

26. If shift solenoid valve B was replaced, install shift solenoid valve B (brown connector) by holding the shift solenoid valve body; make sure the mounting bracket contacts the accumulator body.

27. Connect the harness terminals to the solenoids:

    - YEL wire connector to shift solenoid valve A.
    - GRN wire connector to shift solenoid valve C.
    - RED wire connector to shift solenoid valve B.
    - ORN wire connector to shift solenoid valve D.

28. Install the shift solenoid valve cover, dowel pins, and a new gasket.

29. Install the new solenoid valve body gasket on the solenoid valve cover, and install the ATF pipes with their filter side into the transmission housing. Install new O-rings over the ATF pipes.

30. Install A/T clutch pressure control solenoid valves A and B.

31. Install the harness cover on its bracket, and secure it with the bolt.

32. Check the connectors for rust, dirt, or oil, and clean or repair if necessary, then connect the connectors securely.

33. Apply molybdenum grease to the hole in the bushing in the shift cable end. Attach the shift cable end to the control lever, then insert the control pin into the control lever hole through the shift cable end, and secure the control pin with the spring clip/ washer.

34. Secure the shift cable bracket with the nuts.

35. Install the battery base.

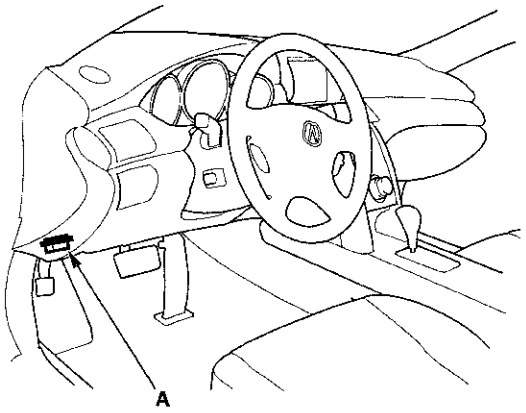
36. Install the air cleaner (see page 11-366).

37. Do the battery installation procedure (see page 22-92).

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A/T Clutch Pressure Control Solenoid Valve A and B Test

1. Connect the HDS to the DLC (A) located under the driver's side of the dashboard.



2. Turn the ignition switch to ON (II). Make sure the HDS communicates with the PCM. If it does not, go to the DLC circuit troubleshooting (see page 11-211).

3. Select Clutch Pressure Control (Linear) Solenoid A or B in the Miscellaneous Test Menu on the HDS.

4. Test A/T clutch pressure control solenoid valve A or B with the HDS.

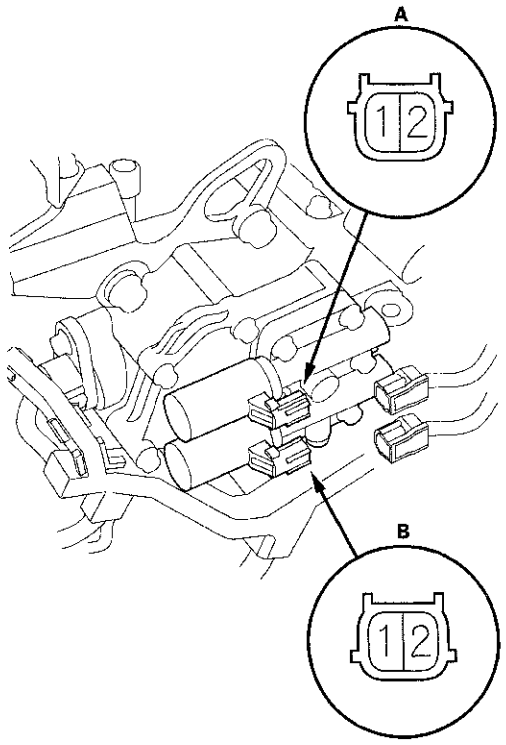
   - If the valve tests OK, the test is complete. Disconnect the HDS.
   - If the valve does not test OK, follow the instructions on the HDS.
   - If the valve does not test OK, and the HDS does not determine the cause, go to step 5.

5. Do the battery removal procedure (see page 22-92).

6. Remove the air cleaner (see page 11-366).

7. Remove the battery base.

8. Disconnect the A/T clutch pressure control solenoid valve A and B connectors.



9. Measure A/T clutch pressure control solenoid valve A or B resistance at the connector terminals.

   Standard: 3—10 Ω

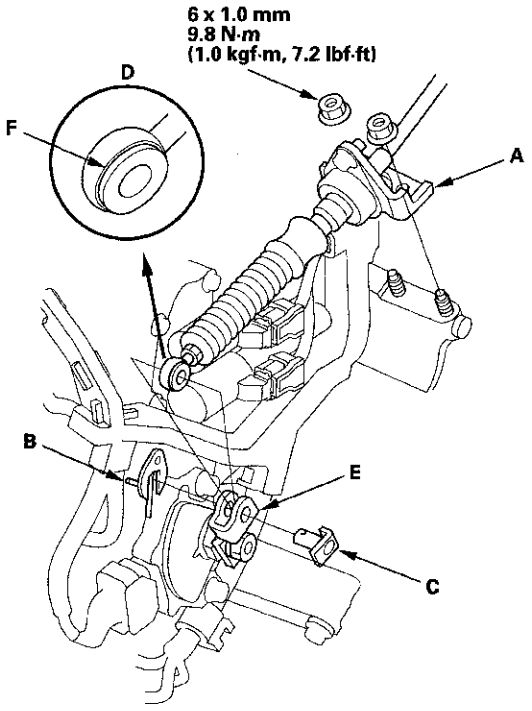
   - If the resistance is out of standard, replace A/T clutch pressure control solenoid valve A and B (see page 14-185).
   - If the resistance is within the standard, go to step 10.

10. Connect a jumper wire from the negative battery terminal to the solenoid valve A or B connector terminal No. 2, and connect another jumper wire from the positive battery terminal to the connector terminal No. 1. A clicking sound should be heard.

    - If a clicking sound is heard, the valve is OK. Reconnect the connector, and install all removed parts.
    - If no clicking sound is heard, go to step 11.

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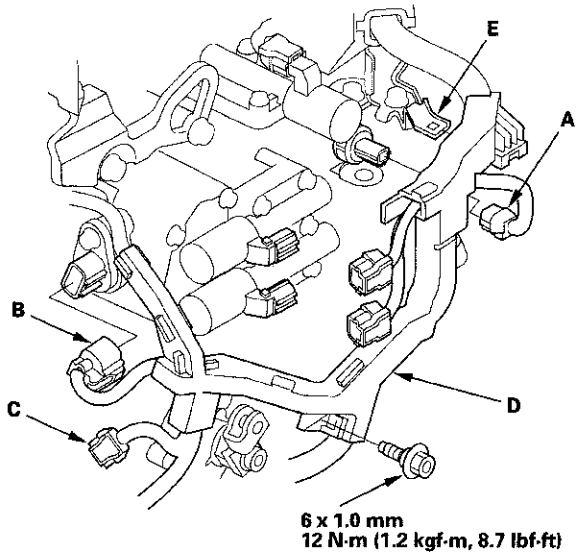
11. Remove the nuts securing the shift cable bracket (A).



12. Remove the spring clip/washer (B) and control pin (C), then separate the shift cable end (D) from the control lever (E).

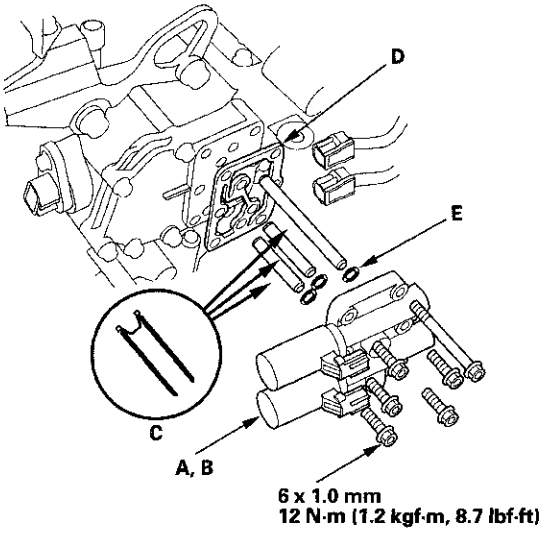
13. Check the bushing (F) in the shift cable end for a proper fit and wear. If the bushing is loose or worn, replace the shift cable (see page 14-235).

14. Disconnect the 4th clutch transmission fluid pressure switch connector (A), the shift solenoid harness connector (B), and the input shaft (mainshaft) speed sensor connector (C).



15. Remove the bolt securing the harness cover (D), and remove the harness cover from its bracket (E).

16. Remove the A/T clutch pressure control solenoid valves A and B, ATF pipes (C), gasket (D), and O-rings (E).



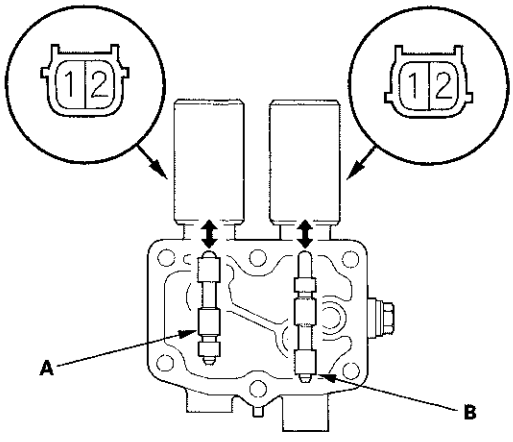
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A/T Clutch Pressure Control Solenoid Valve A and B Test (cont'd)

17. Check the fluid passage of the solenoid valve for contamination.

18. Connect a jumper wire from the negative battery terminal to A/T clutch pressure control solenoid valve A or B connector terminal No. 2, and connect another jumper wire from the positive battery terminal to connector terminal No. 1. Make sure A/T clutch pressure control solenoid valve A or B moves.



19. Disconnect one of the jumper wires, and check valve movement at the fluid passage in valve body mounting surface. If the valve binds or moves sluggishly, or if the solenoid valve does not operate, replace A/T clutch pressure control solenoid valves A and B.

20. Clean the mounting surface and fluid passage of the solenoid valve body and solenoid valve cover.

21. Install the new solenoid valve body gasket on the solenoid valve cover, and install the ATF pipes with the filter end in the transmission housing. Install new O-rings over the ATF pipes.

22. Install A/T clutch pressure control solenoid valves A and B.

23. Install the harness cover on its bracket, and secure it with the bolt.

24. Check the connectors for rust, dirt, or oil, and clean or repair if necessary, then connect the connectors securely.

25. Apply molybdenum grease to the hole in the bushing in the shift cable end. Attach the shift cable end to the control lever, then insert the control pin into the control lever hole through the shift cable end, and secure the control pin with the spring clip/ washer.

26. Secure the shift cable bracket with the nuts.

27. Install the battery base.

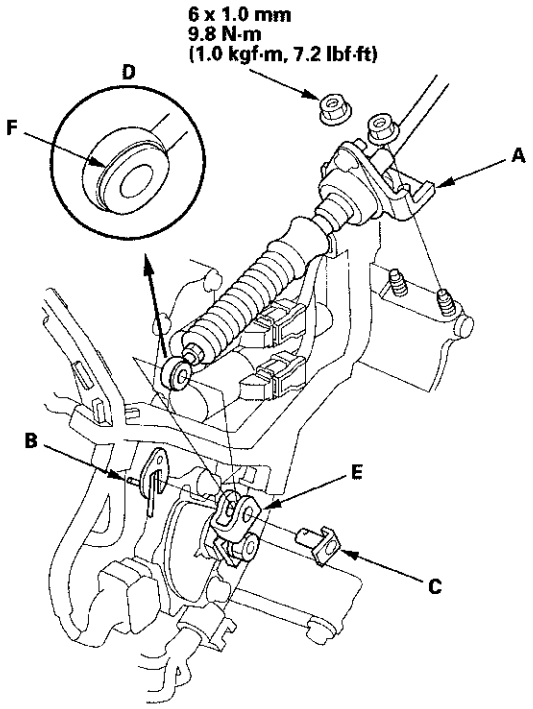
28. Install the air cleaner assembly (see page 11-366).

29. Do the battery installation procedure (see page 22-92).

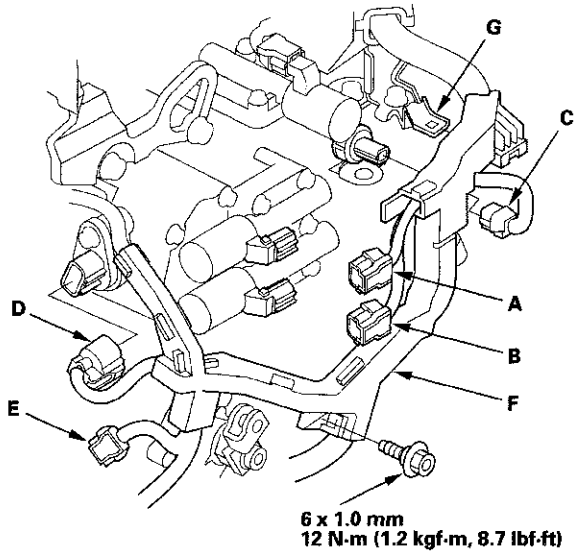
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A/T Clutch Pressure Control Solenoid Valve A and B Replacement

1. Do the battery removal procedure (see page 22-92).
2. Remove the air cleaner (see page 11-366).
3. Remove the battery base.
4. Remove the nuts securing the shift cable bracket (A).



5. Remove the spring clip/washer (B) and control pin (C), then separate the shift cable end (D) from the control lever (E).
6. Check the bushing (F) in the shift cable end for a proper fit and wear. If the bushing is loose or worn, replace the shift cable (see page 14-235).
7. Disconnect the A/T clutch pressure control solenoid valve A connector (A), A/T clutch pressure control solenoid valve B connector (B), 4th clutch transmission fluid pressure switch connector (C), shift solenoid harness connector (D), and input shaft (mainshaft) speed sensor connector (E).



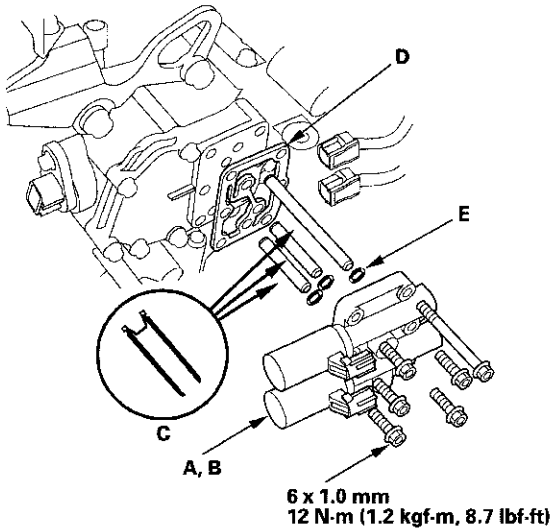
8. Remove the bolt securing the harness cover (F), and remove the harness cover from its bracket (G).

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A/T Clutch Pressure Control Solenoid Valve A and B Replacement (cont'd)

9. Remove the A/T clutch pressure control solenoid valves A and B, ATF pipes (C), gasket (D), and O-rings (E).



10. Check the fluid passage of the A/T clutch pressure control solenoid valve for dust or dirt, and clean the passage.

11. Install the new solenoid valve body gasket on the solenoid valve cover, and install the ATF pipes with the filter end in the transmission housing. Install the new O-rings over the ATF pipes.

12. Install A/T clutch pressure control solenoid valves A and B.

13. Install the harness cover on its bracket, and secure it with the bolt.

14. Check the connectors for rust, dirt, or oil, and clean or repair if necessary, then connect the connectors securely.

15. Apply molybdenum grease to the hole in the bushing in the shift cable end. Attach the shift cable end to the control lever, then insert the control pin into the control lever hole through the shift cable end, and secure the control pin with the spring clip/ washer.

16. Secure the shift cable bracket with the nuts.

17. Install the battery base.

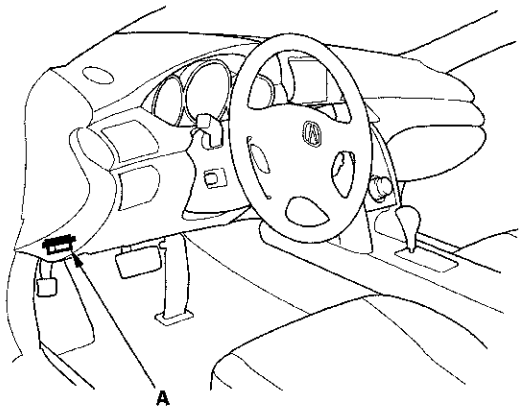
18. Install the air cleaner (see page 11-366).

19. Do the battery installation procedure (see page 22-92).

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A/T Clutch Pressure Control Solenoid Valve C Test

1. Connect the HDS to the DLC (A) located under the driver's side of the dashboard.



2. Turn the ignition switch to ON (II). Make sure the HDS communicates with the PCM. If it does not, go to the DLC circuit troubleshooting (see page 11-211).

3. Select Clutch Pressure Control (Linear) Solenoid C in the Miscellaneous Test Menu on the HDS.

4. Test A/T clutch pressure control solenoid valve C with the HDS.

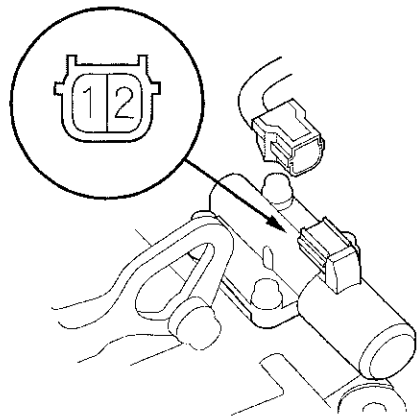
   - If the valve tests OK, the test is complete. Disconnect the HDS.
   - If the valve does not test OK, follow the instructions on the HDS.
   - If the valve does not test OK, and the HDS does not determine the cause, go to step 5.

5. Do the battery removal procedure (see page 22-92).

6. Remove the air cleaner (see page 11-366).

7. Remove the battery base.

8. Disconnect the A/T clutch pressure control solenoid valve C connector.



9. Measure A/T clutch pressure control solenoid valve C resistance at the connector terminals.

   Standard: 3—10 Ω

   - If the resistance is out of standard, replace A/T clutch pressure control solenoid valve C (see page 14-190).
   - If the resistance is within the standard, go to step 10.

10. Connect a jumper wire from the negative battery terminal to the solenoid valve C connector terminal No. 2, and connect another jumper wire from the positive battery terminal to the connector terminal No. 1. A clicking sound should be heard.

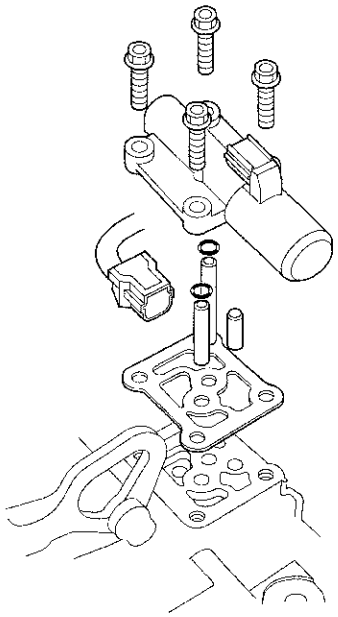
    - If a clicking sound is heard, the valve is OK. Reconnect the connector, and install all removed parts.
    - If no clicking sound is heard, go to step 11.

(cont'd)

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A/T Clutch Pressure Control Solenoid Valve C Test (cont'd)

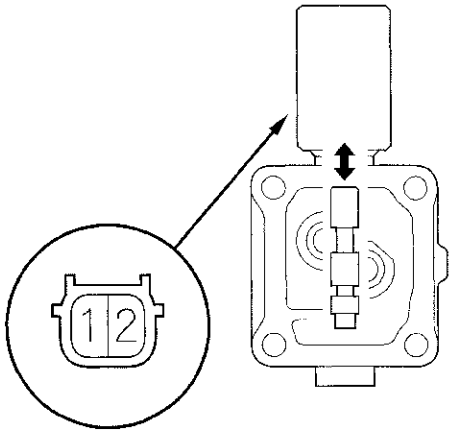
11. Remove A/T clutch pressure control solenoid valve C.



12. Remove the ATF joint pipes, O-rings, ATF pipe, and gasket.

13. Check the fluid passage of the solenoid valve for contamination.

14. Connect a jumper wire from the negative battery terminal to A/T clutch pressure control solenoid valve C connector terminal No. 2, and connect another jumper wire from the positive battery terminal to connector terminal No. 1. Make sure A/T clutch pressure control solenoid valve C moves.

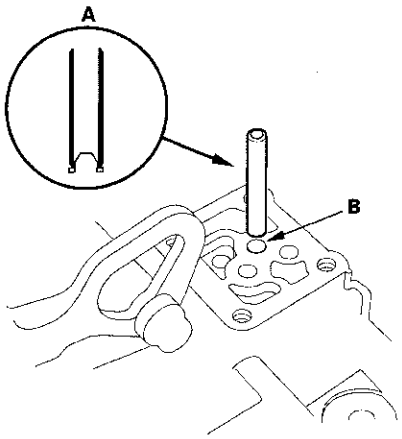


15. Disconnect one of the jumper wires, and check valve movement at the fluid passage in valve body mounting surface. If the valve binds or moves sluggishly, or if the solenoid valve does not operate, replace A/T clutch pressure control solenoid valve C.

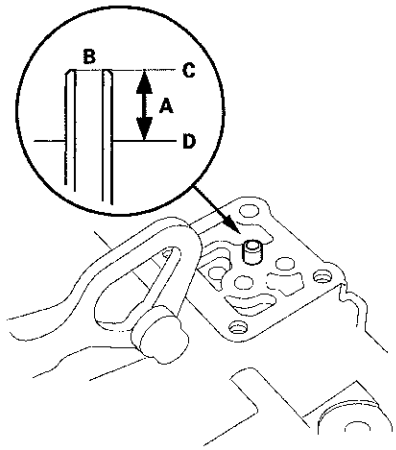
16. Clean the mounting surfaces and the fluid passages of the solenoid valve body and transmission housing.

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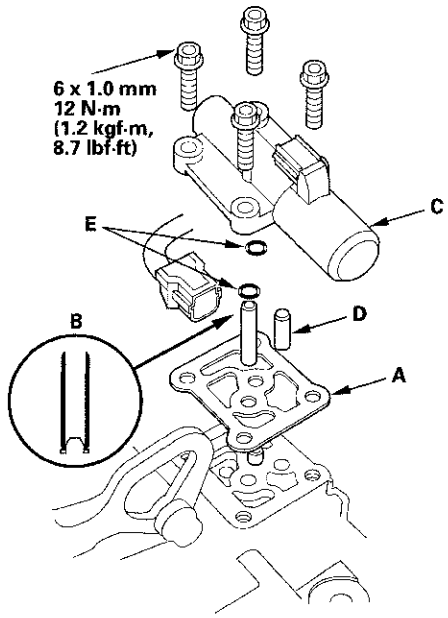
17. Install the 8 x 53 mm ATF joint pipe (A) with the filter end into its mounting hole (B).



18. Check the height (A) of the 8 x 53 mm ATF joint pipe (B) between the top (C) of the pipe and solenoid valve body mounting surface (D). The height is about 7 mm (0.3 in). If the height is over 7 mm (0.3 in), push the pipe until it bottoms in the accumulator body.



19. Install the new gasket (A) on the transmission housing, and install the 8 x 34.5 mm ATF joint pipe (B) with the filter end into the transmission housing and 8 x 25.2 mm ATF pipe (D).

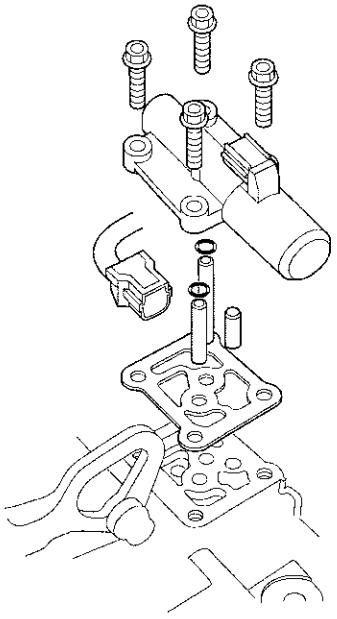


20. Install new O-rings (E) over the ATF joint pipes.
21. Install A/T clutch pressure control solenoid valve C.
22. Check the connector for rust, dirt, or oil, and clean or repair if necessary, then connect the connector securely.
23. Install the air cleaner (see page 11-366).
24. Install the battery base.
25. Do the battery installation procedure (see page 22-92).

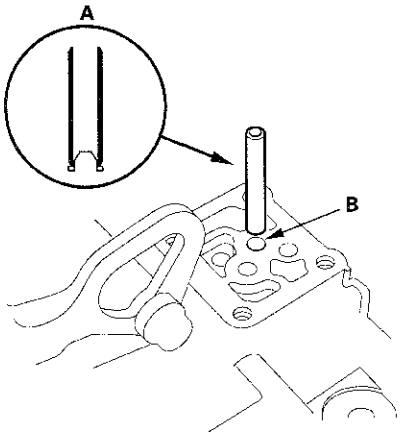
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A/T Clutch Pressure Control Solenoid Valve C Replacement

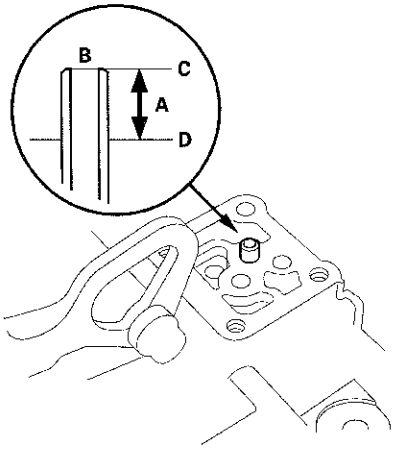
1. Do the battery removal procedure (see page 22-92).
2. Remove the air cleaner (see page 11-366).
3. Remove the battery base.
4. Disconnect the A/T clutch pressure control solenoid valve C connector.



5. Remove A/T clutch pressure control solenoid valve C.
6. Remove the ATF joint pipes, O-rings, ATF pipe, and gasket.
7. Clean the mounting surfaces and the fluid passages of the solenoid valve body and transmission housing.
8. Install the 8 x 53 mm ATF joint pipe (A) with the filter end into its mounting hole (B).

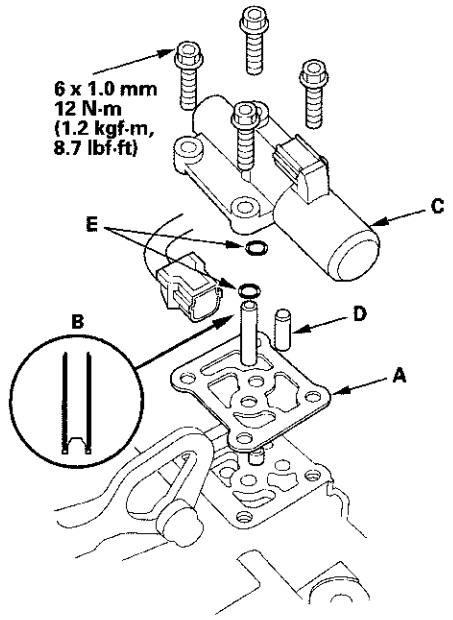


9. Check the height (A) of the 8 x 53 mm ATF joint pipe (B) between the top (C) of the pipe and solenoid valve body mounting surface (D). The height is about 7 mm (0.3 in). If the height is over 7 mm (0.3 in), push the pipe until it bottoms in the accumulator body.



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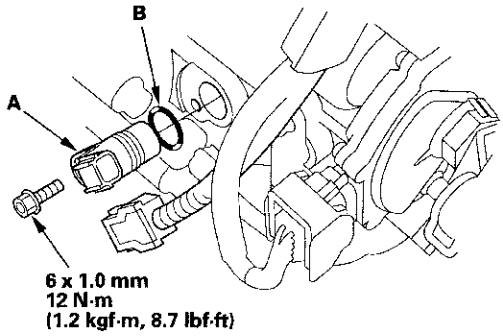
10. Install the new gasket (A) on the transmission housing, and install the 8 x 34.5 mm ATF joint pipe (B) with the filter end into the transmission housing and 8 x 25.2 mm ATF pipe (D).



11. Install new O-rings (E) over the ATF joint pipes.
12. Install A/T clutch pressure control solenoid valve C.
13. Check the connector for rust, dirt, or oil, and clean or repair if necessary, then connect the connector securely.
14. Install the air cleaner (see page 11-366).
15. Install the battery base.
16. Do the battery installation procedure (see page 22-92).

Input Shaft (Mainshaft) Speed Sensor Replacement

1. Do the battery removal procedure (see page 22-92).
2. Remove the air cleaner (see page 11-366).
3. Remove the battery base.
4. Disconnect the input shaft (mainshaft) speed sensor connector, and remove the input shaft (mainshaft) speed sensor (A).

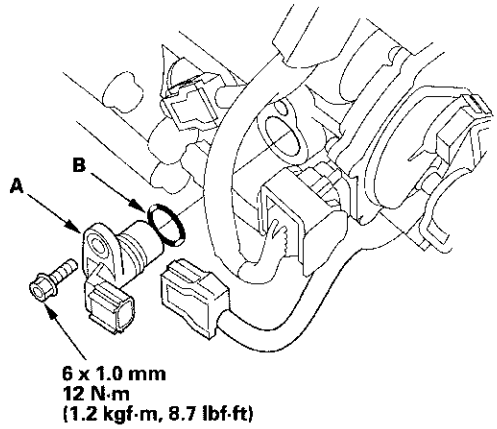


5. Install the new O-ring (B) on the new input shaft (mainshaft) speed sensor, then install the input shaft (mainshaft) speed sensor.
6. Check the connector for rust, dirt, or oil, and clean or repair if necessary, then connect the connector securely.
7. Install the battery base.
8. Install the air cleaner (see page 11-366).
9. Do the battery installation procedure (see page 22-92).

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Output Shaft (Countershaft) Speed Sensor Replacement

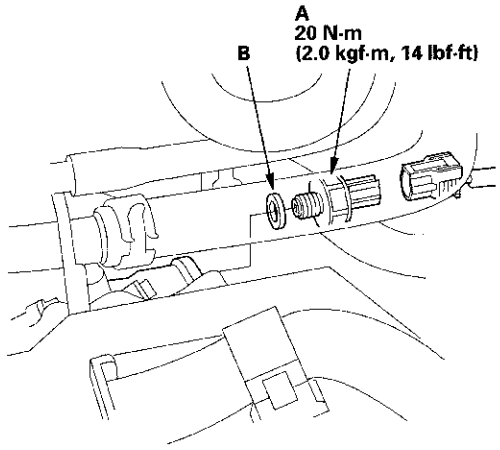
1. Do the battery removal procedure (see page 22-92).
2. Remove the air cleaner (see page 11-366).
3. Remove the battery base.
4. Disconnect the output shaft (countershaft) speed sensor connector, and remove the output shaft (countershaft) speed sensor (A).



5. Install the new O-ring (B) on the new output shaft (countershaft) speed sensor, then install the output shaft (countershaft) speed sensor.
6. Check the connector for rust, dirt, or oil, and clean or repair if necessary, then connect the connector securely.
7. Install the battery base.
8. Install the air cleaner (see page 11-366).
9. Do the battery installation procedure (see page 22-92).

2nd Clutch Transmission Fluid Pressure Switch Replacement

1. Do the battery removal procedure (see page 22-92).
2. Remove the air cleaner (see page 11-366).
3. Disconnect the 2nd clutch transmission fluid pressure switch connector, and remove the switch.

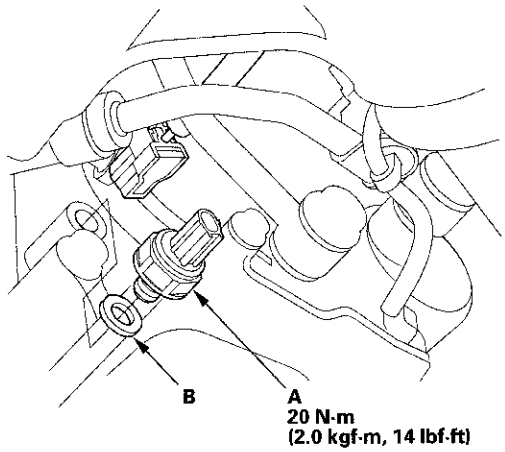


4. Install the new 2nd clutch transmission fluid pressure switch (A) and a new sealing washer (B), and tighten the switch.
5. Check the connector for rust, dirt, or oil, and clean or repair if necessary, then connect the connector securely.
6. Install the air cleaner (see page 11-366).
7. Do the battery installation procedure (see page 22-92).

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3rd Clutch Transmission Fluid Pressure Switch Replacement

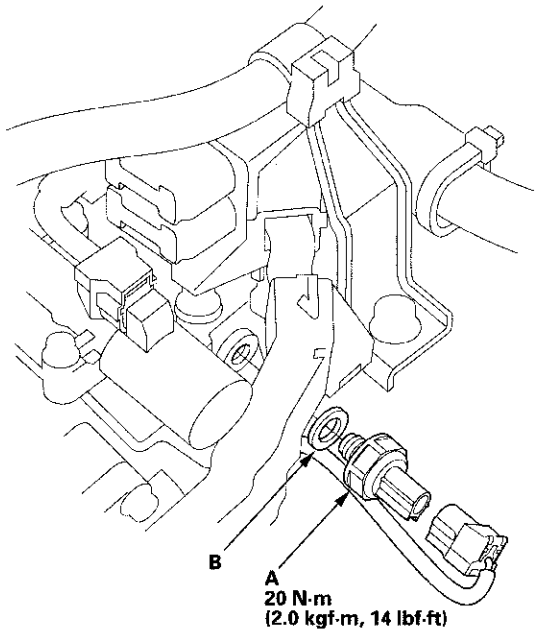
1. Raise the vehicle on a lift, or apply the parking brake, block both rear wheels, and raise the front of the vehicle. Make sure it is securely supported.
2. Remove the splash shield.
3. Disconnect the 3rd clutch transmission fluid pressure switch connector, and remove the 3rd clutch transmission fluid pressure switch (A).



4. Install the new 3rd clutch transmission fluid pressure switch and a new sealing washer (B), and tighten the switch.
5. Check the connector for rust, dirt, or oil, and clean or repair if necessary, then connect the connector securely.
6. Install the splash shield.

4th Clutch Transmission Fluid Pressure Switch Replacement

1. Do the battery removal procedure (see page 22-92).
2. Remove the air cleaner (see page 11-366).
3. Disconnect the 4th clutch transmission fluid pressure switch connector, and remove the switch (A).

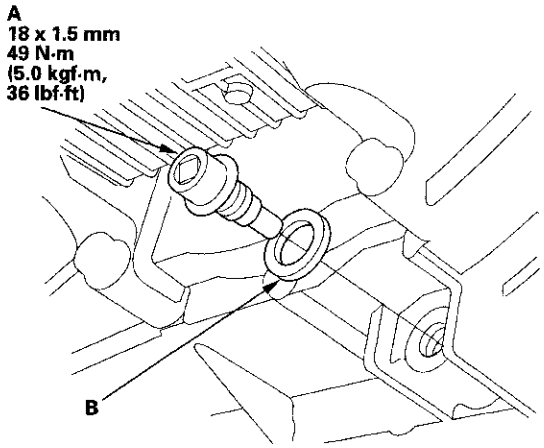


4. Install the new 4th clutch transmission fluid pressure switch and a new sealing washer (B), and tighten the switch.
5. Check the connector for rust, dirt, or oil, and clean or repair if necessary, then connect the connector securely.
6. Install the air cleaner (see page 11-366).
7. Do the battery installation procedure (see page 22-92).

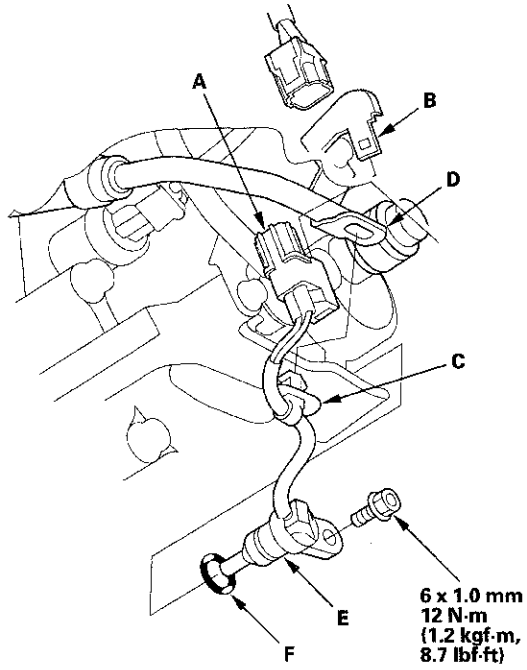
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ATF Temperature Sensor Replacement

1. Raise the vehicle on a lift, or apply the parking brake, block both rear wheels, and raise the front of the vehicle. Make sure it is securely supported.
2. Remove the splash shield.
3. Remove the drain plug (A), and drain the automatic transmission fluid (ATF).



4. Reinstall the drain plug with a new sealing washer (B).
5. Disconnect the ATF temperature sensor connector (A), then remove the connector from the connector bracket (B).



6. Remove the harness clamp (C) from its bracket (D).
7. Remove the ATF temperature sensor (E), and replace the sensor.
8. Install the new O-ring (F) on the new ATF temperature sensor, and install the ATF temperature sensor.
9. Check the connector for rust, dirt, or oil, and clean or repair if necessary. Connect the connector securely, and install it on its bracket.
10. Install the harness clamp on its bracket.
11. Refill the transmission with ATF (see step 6 on page 14-196).
12. Install the splash shield.

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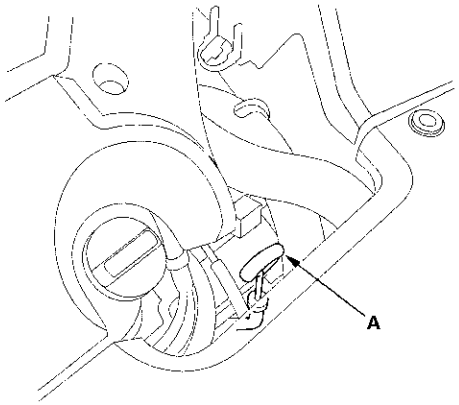
ATF Level Check

NOTE:
- Keep all foreign particles out of the transmission.
- Check the fluid level within 60—90 seconds after turning the engine off. Higher fluid level may be indicated if the radiator fan comes on twice or more.

1. Park the vehicle on the level ground.

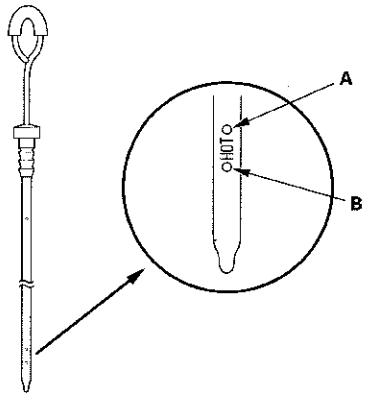
2. Warm up the engine to normal operating temperature (the radiator fan comes on), and turn the engine off.

3. Remove the dipstick (yellow loop) (A) from the dipstick guide tube, and wipe it with a clean cloth.



4. Insert the dipstick into the guide tube.

5. Remove the dipstick and check the fluid level. It should be between the upper mark (A) and lower mark (B).



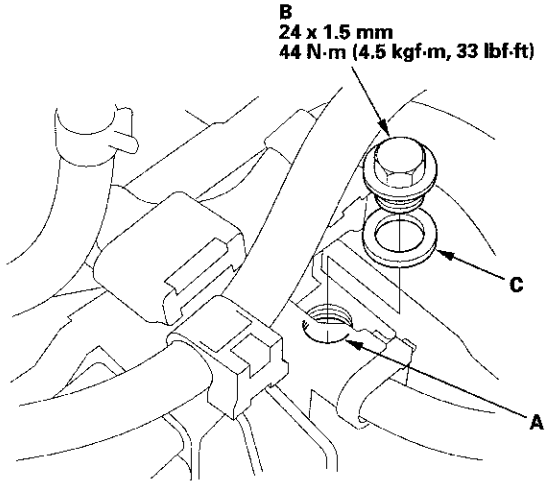
6. If the level is below the lower mark, check for fluid leaks at the transmission, and hose and line joints. If a problem is found, fix it before filling the transmission.

   NOTE: If the vehicle is driven when the ATF level is below the lower mark one or more of these symptoms may occur:
   - Transmission damage.
   - Vehicle does not move in any gear.
   - Vehicle accelerates poorly, and flares when starting off in D and R.
   - The engine vibrates at idle.

7. If the level is above the upper mark, drain the ATF to proper level (see page 14-196).

   NOTE: If the vehicle is driven when the ATF level is above the upper mark, the vehicle may creep forward while in N, or have shifting problems.

8. If necessary, fill the transmission with the recommended fluid through the filler hole (A). To bring the fluid level midway between the upper mark and lower mark of the dipstick. Do not fill past the upper mark. Always use Acura ATF-Z1 Automatic Transmission Fluid (ATF). Using a non-Acura ATF can affect shift quality.



9. Install the ATF filler bolt (B) and a new sealing washer (C).

10. Insert the dipstick back into the dipstick guide tube.

11. Check the ATF level.

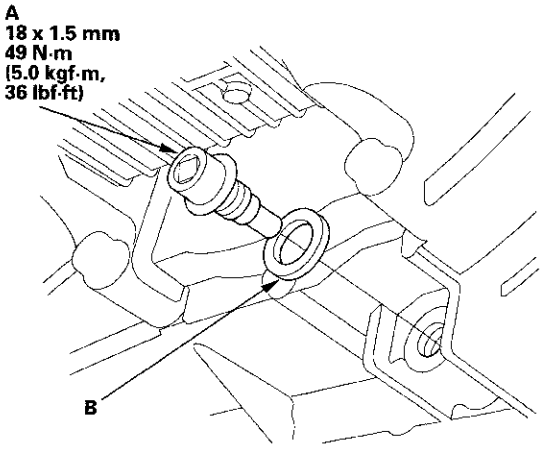
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ATF Replacement

NOTE: Keep all foreign particles out of the transmission.

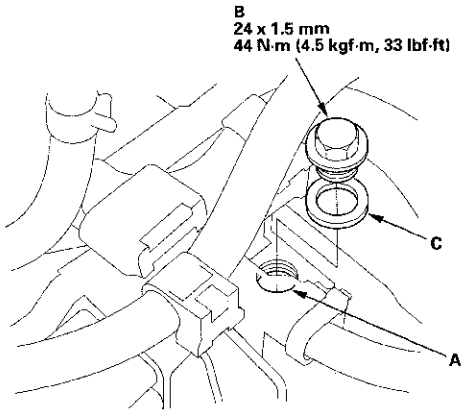
1. Warm up the engine to normal operating temperature (the radiator fan comes on), and turn the engine off.
2. Raise the vehicle on a lift, or apply the parking brake, block both rear wheels, and raise the front of the vehicle. Make sure it is securely supported.
3. Remove the splash shield.
4. Remove the ATF filler bolt and drain plug (A), and drain the automatic transmission fluid (ATF).

   NOTE: If a cooler cleaning is done, refer to ATF Cooler Cleaning (see page 14-227).



5. Reinstall the drain plug with a new sealing washer (B).
6. Refill the transmission with the recommended fluid through the filler hole (A). Always use Acura ATF-Z1 Automatic Transmission Fluid (ATF). Using a non-Acura ATF can affect shift quality.

   Automatic Transmission Fluid Capacity:
   2.8 L (3.0 US qt) at change
   7.7 L (8.1 US qt) at overhaul

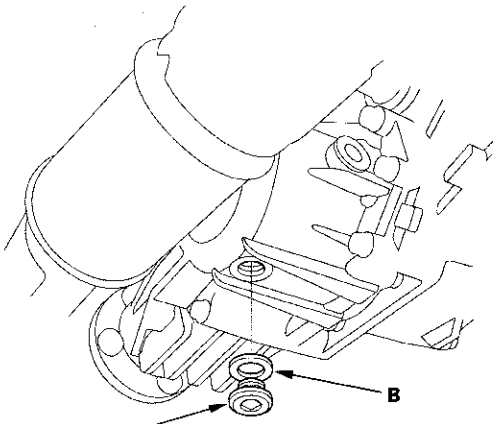


7. Install the ATF filler bolt (B) and a new sealing washer (C).
8. Check the ATF level (see page 14-195).
9. If the maintenance minder required to replace the ATF, reset the maintenance minder (see page 3-7), and this procedure is complete. If the maintenance minder did not require you to replace the ATF, go to step 10.
10. Connect the HDS to the data link connector (DLC) located under the driver's side of the dashboard.
11. Turn the ignition switch to ON (II). Make sure the HDS communicates with the PCM. If it does not, go to the DLC circuit troubleshooting (see page 11-211).
12. Select BODY ELECTRICAL with the HDS.
13. Select ADJUSTMENT in the GAUGE MENU with the HDS.
14. Select RESET in the MAINTENANCE MINDER with the HDS.
15. Select MAINTENANCE SUB ITEM 3 RESET, and reset the ATF life with the HDS.

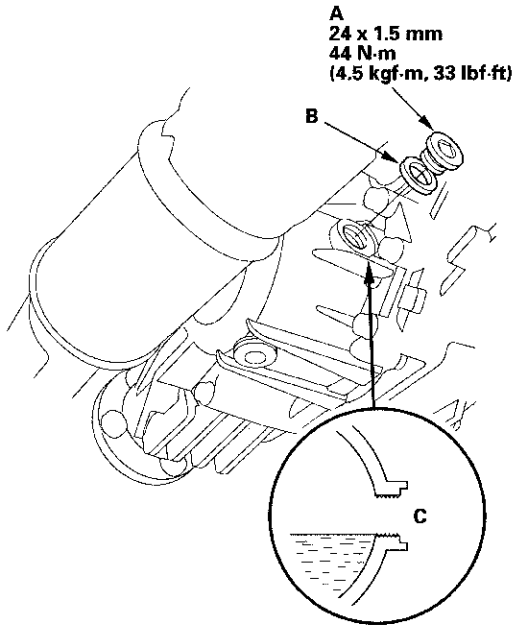
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Transfer Assembly Fluid Replacement

1. Warm up the engine to normal operating temperature (the radiator fan comes on), then turn the engine off.
2. Raise the vehicle on a lift, and make sure it is securely supported.
3. Remove the drain plug (A), and drain the transfer fluid (hypoid gear oil).



4. Reinstall the drain plug with a new sealing washer (B).
5. Remove the filler plug (A) and sealing washer (B).



6. Refill the transfer assembly with the recommended fluid (hypoid gear oil) through the filler hole (C) until the fluid flows out. Use a SAE 90 or SAE 80W-90 viscosity hypoid gear oil, API classified GL4 or GL5 only.

   Viscosity:
   SAE 90: Above 0 °F (−18 °C)

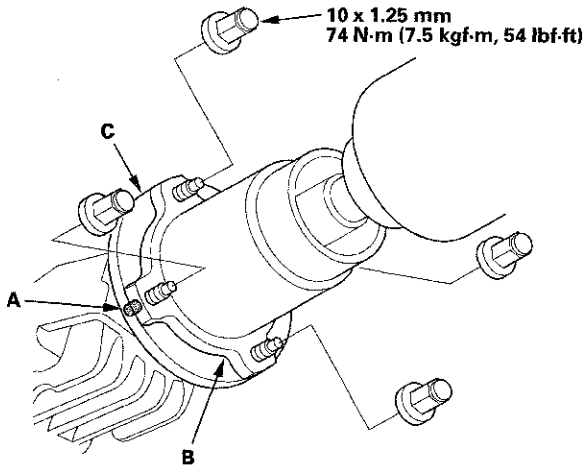
   Transfer Fluid (Hypoid Gear Oil) Capacity:
   0.43 L (0.45 US qt) at fluid change

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

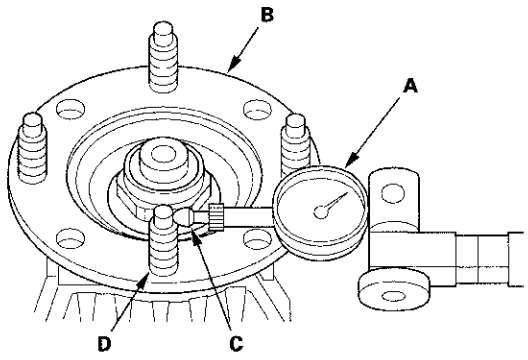
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Transfer Assembly Inspection

1. Raise the vehicle on a lift, and make sure it is supported securely.
2. Shift the transmission into N.
3. Make a reference mark (A) across the propeller shaft (B) and the transfer companion flange (C).



4. Separate the propeller shaft from the transfer companion flange.
5. Set a dial indicator (A) on the transfer companion flange (B); position the dial indicator tip (C) on the top of the bolt (D).



6. Measure the transfer gear backlash.

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

7. If the backlash is out of standard, remove the transfer assembly, and adjust the transfer gear backlash (see page 14-357).
8. Check for fluid leaks between the mating surfaces of the transfer assembly and the transmission.
9. If there is a leak, remove the transfer assembly, remove the transfer cover, and replace the O-ring.
10. Check for fluid leaks between the transfer companion flange and the transfer oil seal.
11. If there is a leak, remove the transfer assembly from the transmission, and replace the transfer oil seal and O-ring on the transfer output shaft (hypoid gear). If an oil seal and O-ring replacement is required, you will need to check and adjust the transfer gear tooth contact, the transfer gear backlash, the tapered roller bearing starting torque, and the total starting torque (see page 14-357). Do not replace the oil seal with the transfer assembly on the transmission.

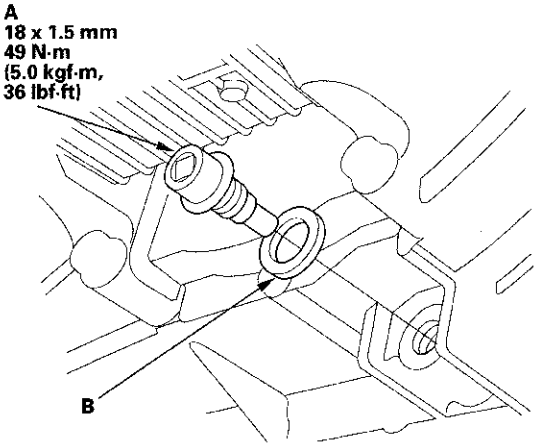
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Transfer Assembly Removal

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

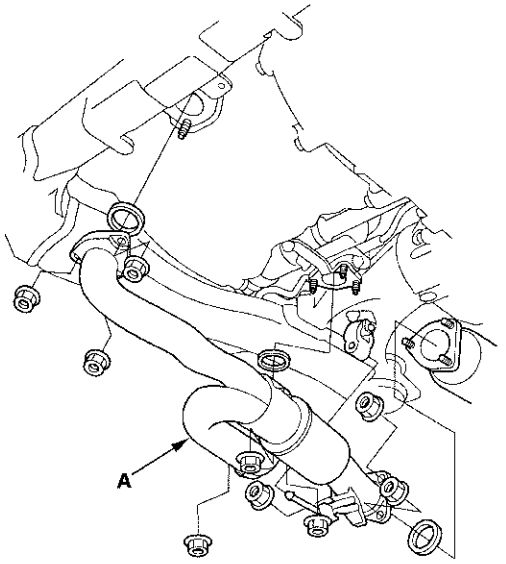
2. Shift the transmission into N.

3. Remove the drain plug (A), and drain the automatic transmission fluid (ATF).

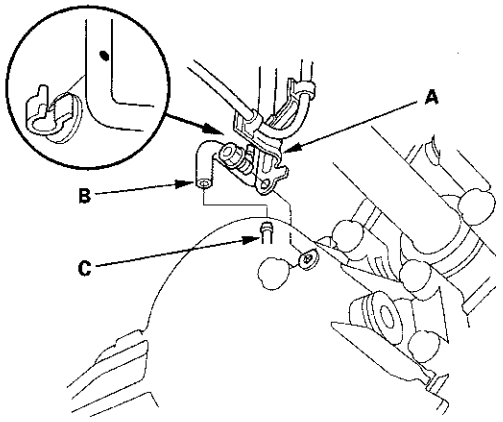


4. Reinstall the drain plug with a new sealing washer (B).

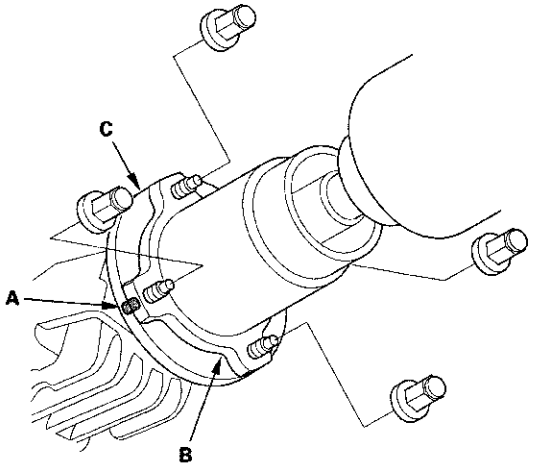
5. Remove exhaust pipe A.



6. Remove the bolt securing the transfer breather hose bracket (A), and disconnect the breather hose (B) from the breather pipe (C) on the transfer assembly.



7. Make a reference mark (A) across the propeller shaft (B) and the transfer companion flange (C).



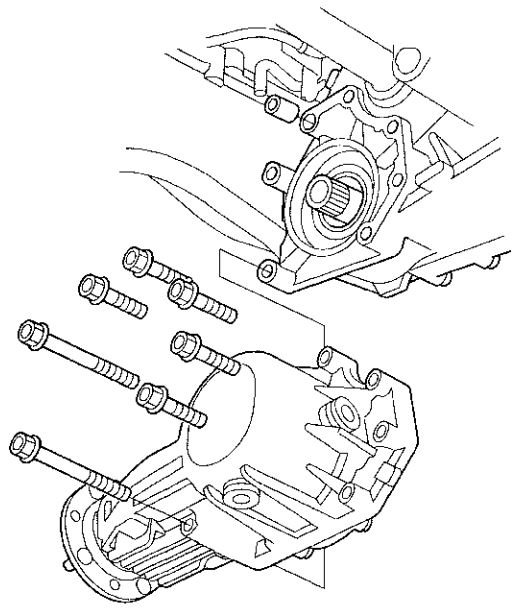
8. Separate the propeller shaft from the transfer companion flange.

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Transfer Assembly Removal (cont'd)

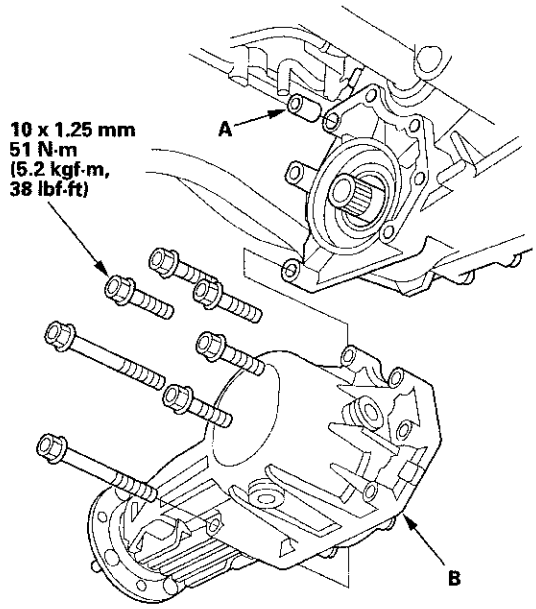
9. Remove the transfer assembly from the transmission.



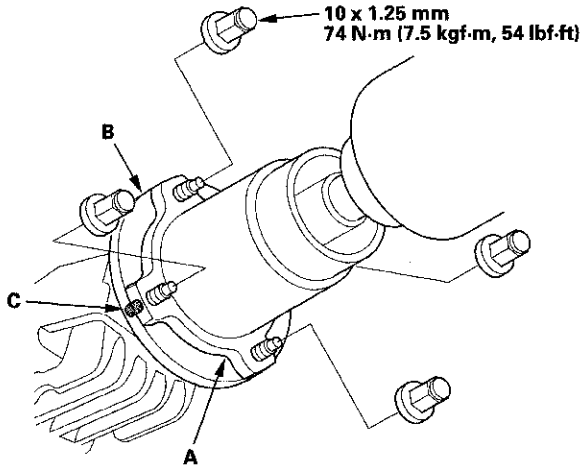
Transfer Assembly Installation

1. Clean the areas where the transfer assembly contacts the transmission with solvent, and dry with compressed air. Then apply transmission fluid to the contact area.

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

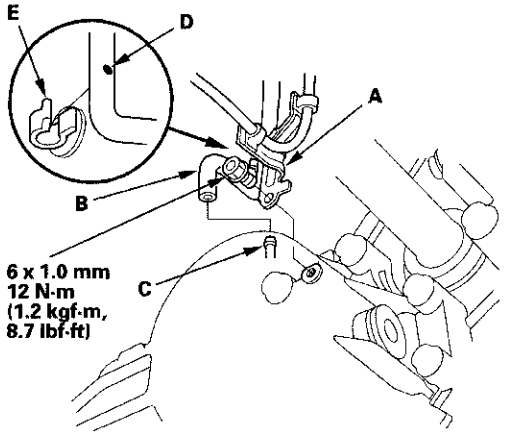


3. Install the propeller shaft (A) to the transfer companion flange (B) by aligning the reference mark (C).

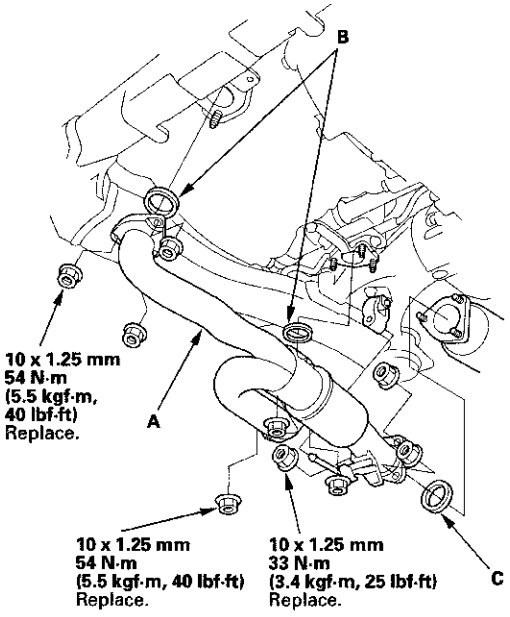


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4. Secure the transfer breather tube bracket (A) on the transfer assembly with the bolt, and install the breather tube (B) over the breather pipe (C). If the breather tube was removed from the clamp, install the tube at the dot (D) on the clamp (E).



5. Install exhaust pipe A with the new self-locking nuts and new gaskets (B) (C).



6. Refill the transfer assembly with the transfer fluid (hypoid gear oil), if necessary (see page 14-197).

7. Refill the transmission with ATF (see step 6 on page 14-196).

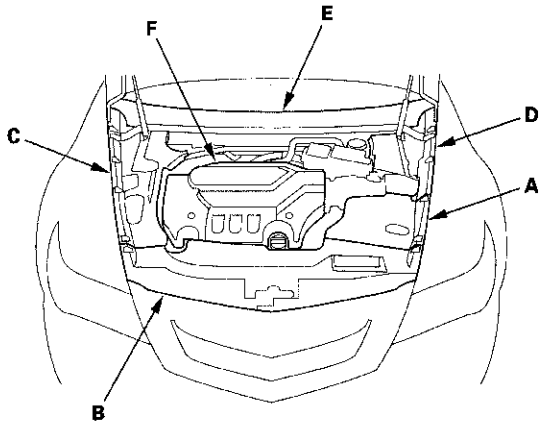
Transmission Removal

Special Tools Required
- Engine support hanger, A and Reds AAR-T1256 *
- 2008 V6 Attachment arm SIL02C00033
- Engine hanger balancer bar VSB02C000019 *
- Front subframe adapter VSB02C000016 *

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

NOTE:
- Use fender covers to avoid damaging painted surfaces.
- Special tool Reds engine support hanger AAR-T1256 must be used with the side engine mount installed.

1. Remove the covers in the following order; battery trim (A), upper grille cover (B), right upper fender trim (C), left upper fender trim (D), cowl cover upper trim (E), and intake manifold cover (F).



2. Remove the passenger's side windshield wiper arm (see page 22-386).

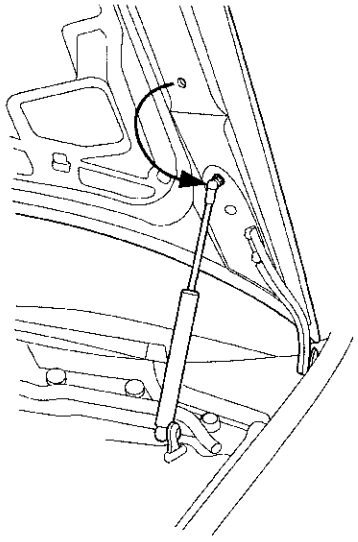
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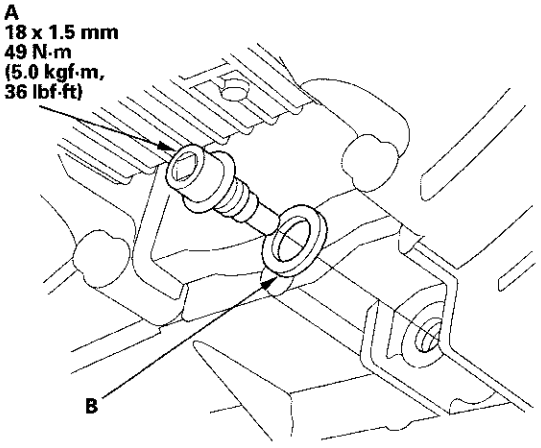
Transmission Removal (cont'd)

3. Disconnect the support strut from the pivot ball on both sides of the hood. Raise and secure the hood in a vertical position. Remove the right side pivot ball and install it into the lower threaded hole, then reattach the support strut.

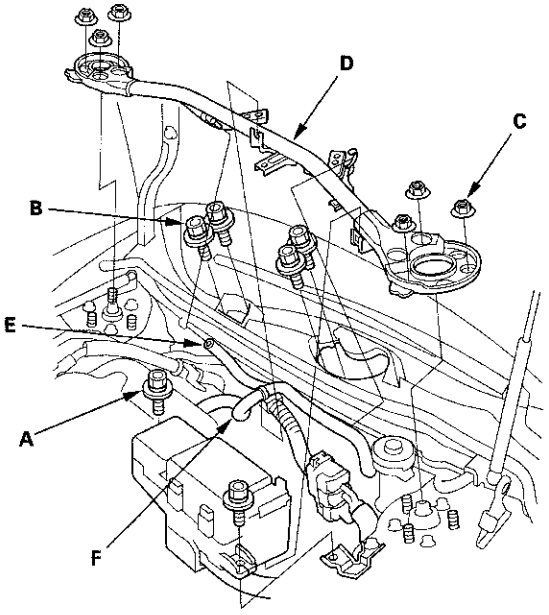
   NOTE: Do not attempt to close the hood with the support strut in the vertical position; it will damage the support strut and the hood.



4. Set the wheels in the straight ahead position, and lock the steering wheel.
5. Drain the power steering system fluid from the reservoir (see page 17-13).
6. Do the battery removal procedure (see page 22-92).
7. Remove the air cleaner (see page 11-366).
8. Remove the battery base.
9. Raise the vehicle on a lift, and make sure it is supported securely.
10. Remove the front wheels.
11. Remove the splash shield.
12. Remove the drain plug (A), and drain the automatic transmission fluid (ATF).



13. Reinstall the drain plug with a new sealing washer (B).
14. Remove the bolts (A) securing the under-hood fuse/relay box.

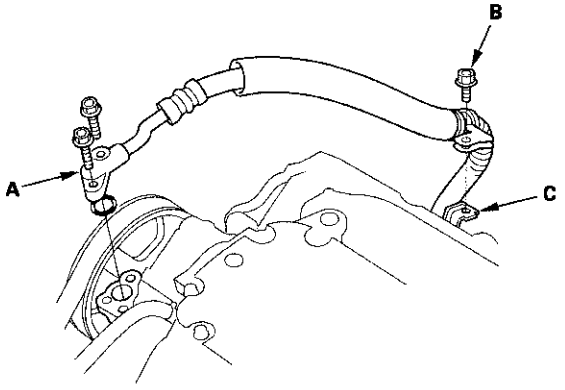


15. Remove the bolts (B) and nuts (C) securing the strut brace (D).
16. Remove the breather tube end (E) and vacuum hose (F), then remove the strut brace.

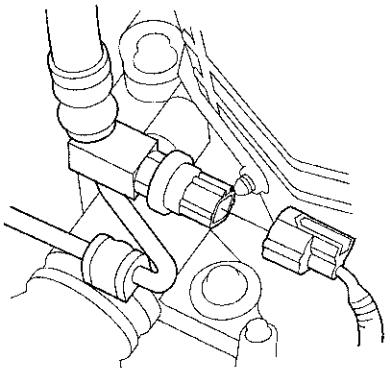
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17. Disconnect the steering joint (see page 17-25).

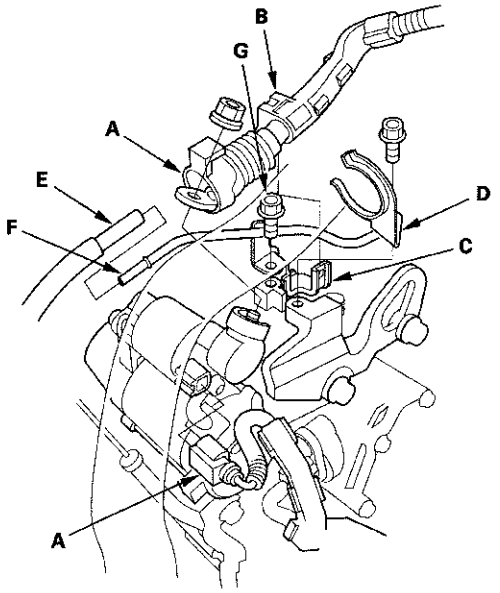
18. Remove the power steering pump outlet line (A) from the power steering pump, and remove the bolt (B) securing the hose clamp bracket (C).



19. Disconnect the power steering pressure switch connector.



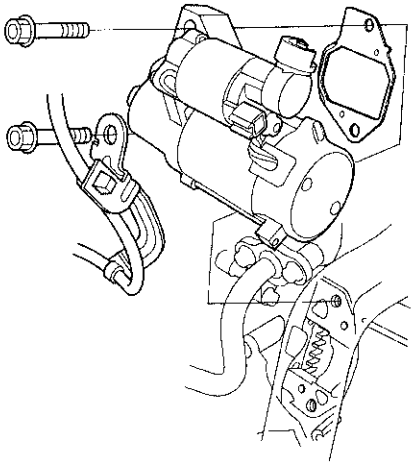
20. Remove the starter cables (A) from the starter, and remove the harness clamp (B) from the clamp bracket (C).



21. Remove the bolt securing the radiator hose clamp (D).

22. Disconnect the vacuum hose (E) from the vacuum line (F), and remove the vacuum line bolt (G).

23. Remove the starter and gasket from the transmission.

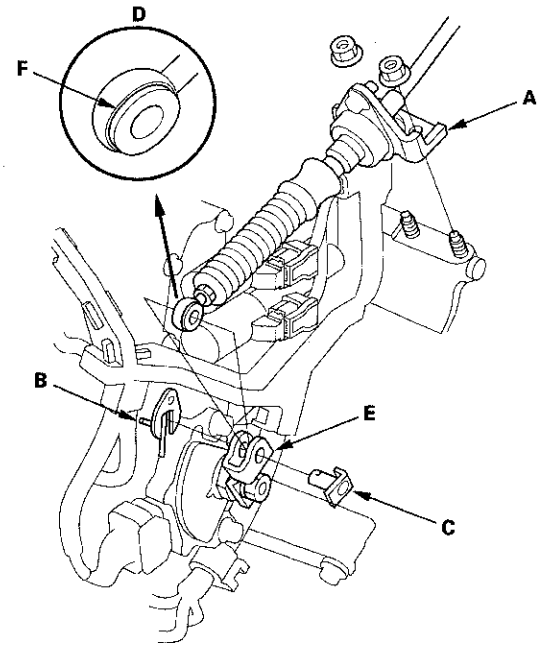


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Transmission Removal (cont'd)

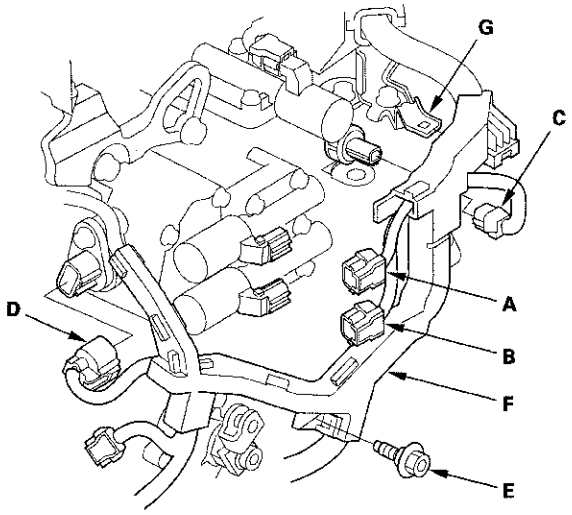
24. Remove the nuts securing the shift cable bracket (A).



25. Remove the spring clip/washer (B) and control pin (C), then separate the shift cable end (D) from the control lever (E).

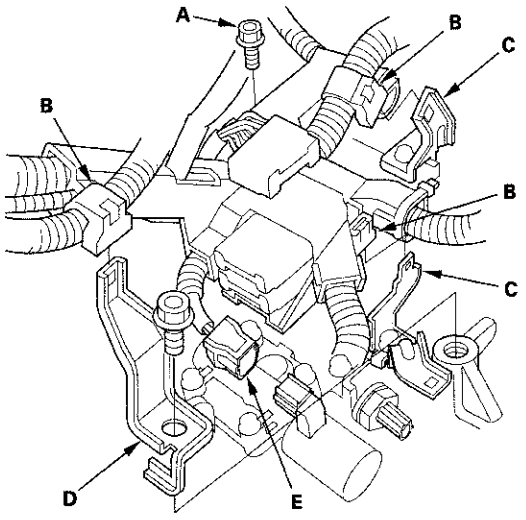
26. Check the bushing (F) in the shift cable end for a proper fit and wear. If the bushing is loose or worn, replace the shift cable (see page 14-235).

27. Disconnect A/T clutch pressure control solenoid valve A connector, A/T clutch pressure control solenoid valve B connector, 4th clutch transmission fluid pressure switch connector (C), and shift solenoid harness connector (D).



28. Remove the harness cover mounting bolt (E), and remove the harness cover (F) from its bracket (G).

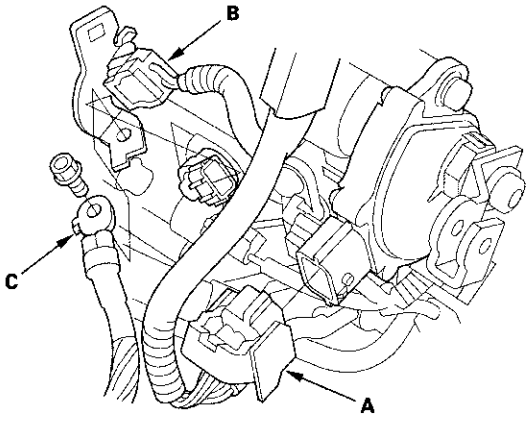
29. Remove the harness cover mounting bolt (A), and remove the harness clamps (B) from the clamp brackets (C). Remove the harness clamp bracket (D).



30. Disconnect A/T clutch pressure control solenoid valve C connector (E).

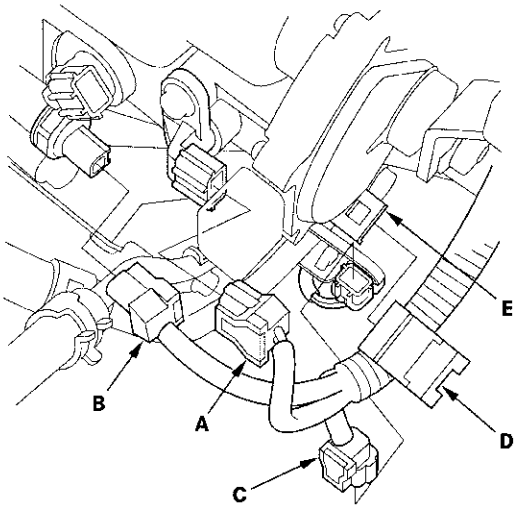
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31. Disconnect the transmission range switch connector (A) and input shaft (mainshaft) speed sensor connector (B).

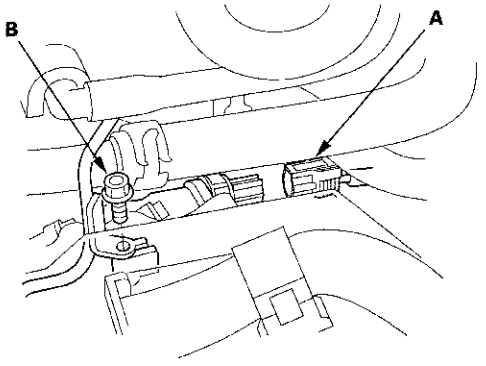


32. Remove the transmission ground cable (C).

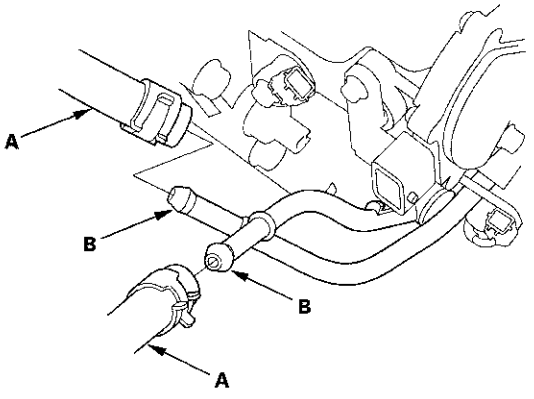
33. Disconnect the output shaft (countershaft) speed sensor connector (A), 3rd clutch transmission fluid pressure switch connector (B), and ATF temperature sensor connector (C), and remove the harness clamp (D) from the clamp bracket (E).



34. Disconnect the 2nd clutch transmission fluid pressure switch connector (A), and remove the vacuum line bolt (B).



35. Disconnect the ATF cooler hoses (A) from the ATF cooler lines (B). Turn the ends of the cooler hoses up to prevent ATF from flowing out, then plug the cooler hoses and lines.



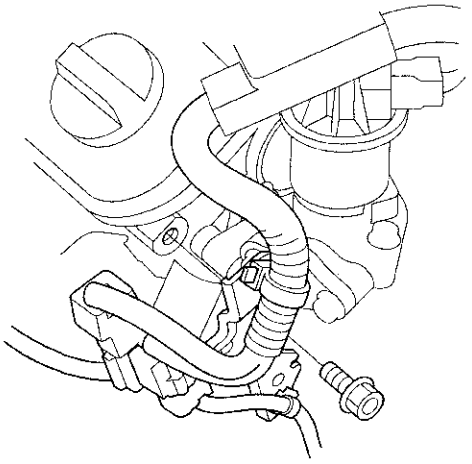
36. Check for any signs of leakage at the hose joints.

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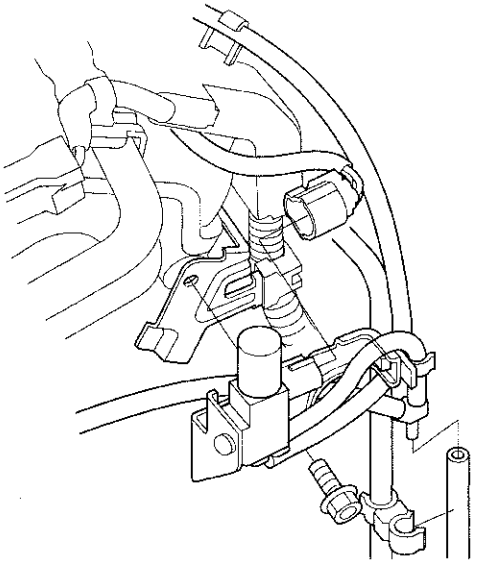
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Transmission Removal (cont'd)

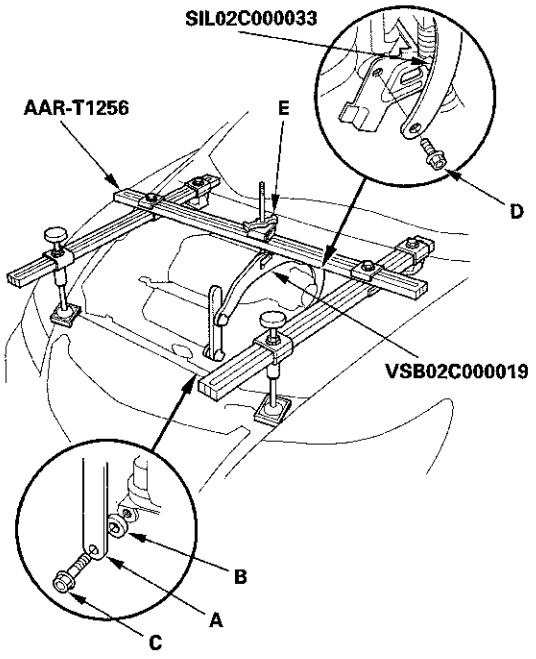
37. Remove the connector bracket from the front cylinder head; use the bracket bolt hole to attach engine hanger balancer bar front arm.



38. Disconnect the solenoid connector, disconnect the vacuum tube from the joint, then remove the bracket from the rear cylinder head; use the bracket bolt hole to attach the 2008 V6 attachment arm (SIL02C000033).



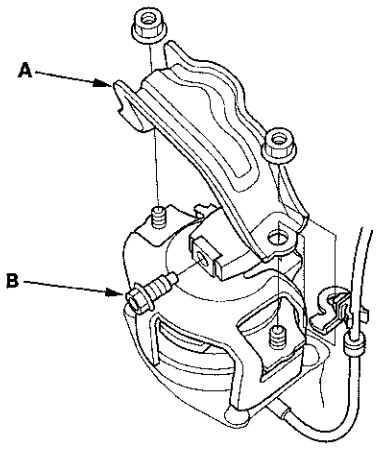
39. Install the engine balancer bar (VSB02C000019); attach the front arm (A) to the front cylinder head with some spacers (B) and the 10 x 1.25 mm bolt (C). Attach the 2008 V6 attachment arm (SIL02C000033) to the rear cylinder head and the 8 x 1.25 mm bolt (D), then attach the rear arm to the 2008 V6 attachment arm.



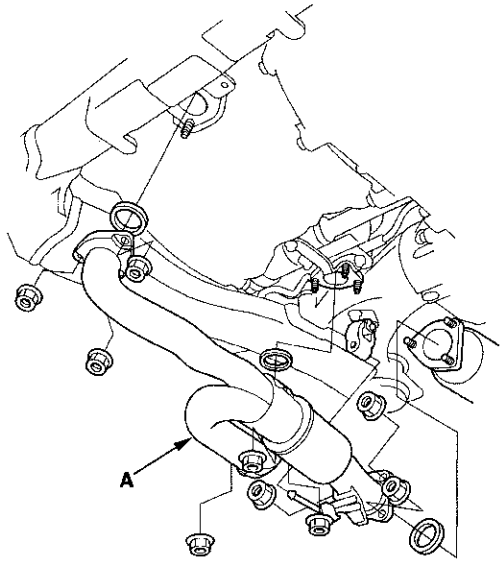
40. Install the engine support hanger (AAR-T1256) to the vehicle, and attach the hook to the engine balancer bar slot. Tighten the wing nut (E) by hand, and lift and support the engine.

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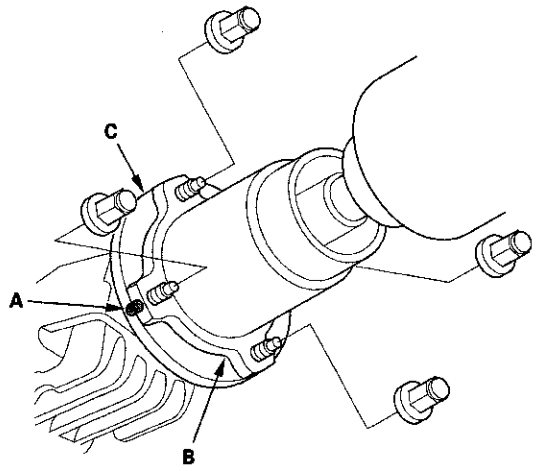
41. Remove the front mount stop (A) and front mount bolt (B).



42. Remove exhaust pipe A.



43. Make a reference mark (A) across the propeller shaft (B) and the transfer companion flange (C).



44. Separate the propeller shaft from the transfer companion flange.

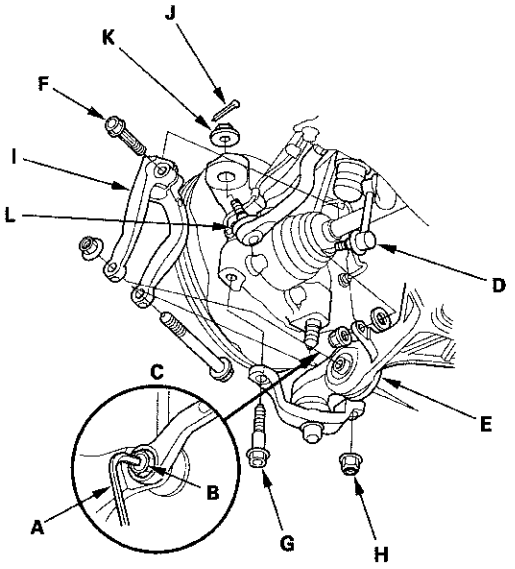
45. Remove the propeller shaft (see page 16-44).

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Transmission Removal (cont'd)

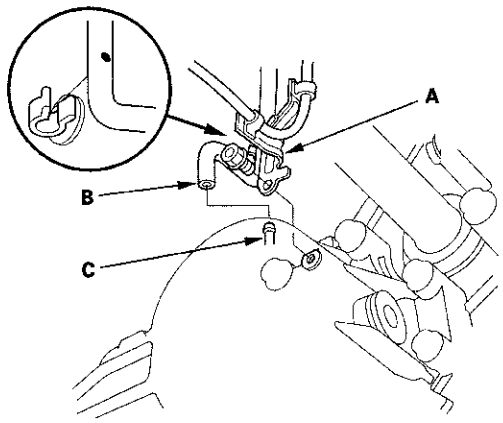
46. Insert a 6 mm Allen wrench (A) in the top of the ball joint pin (B), and remove the nuts (C), then separate the stabilizer link (D) from the lower arms (E).



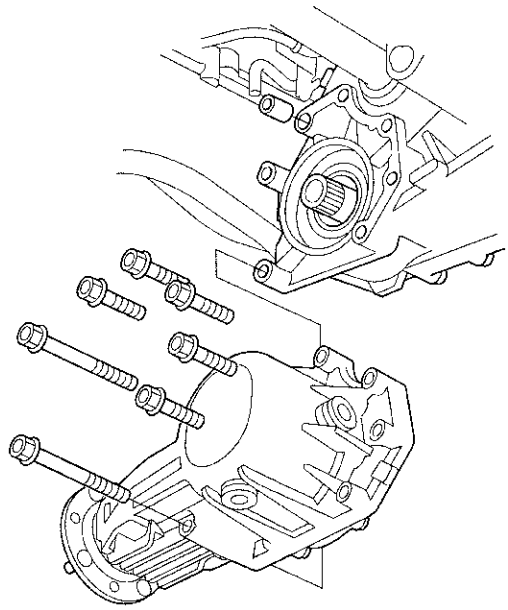
47. Remove the damper pinch bolts (F), damper fork bolts and self-locking nuts, knuckle holder bolts (G) and nuts (H). Remove the damper forks (I).

48. Remove the cotter pins (J) and nuts (K), and separate the steering tie-rod end ball joints (L) from the knuckle (see step 14 on page 17-36).

49. Remove the bolt securing the transfer breather tube bracket (A), and disconnect the breather tube (B) from the breather pipe (C) on the transfer assembly.

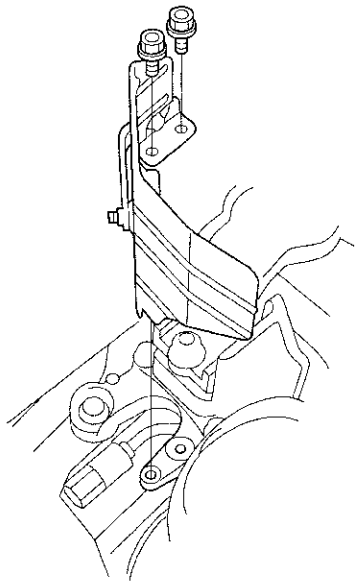


50. Remove the transfer assembly from the transmission.

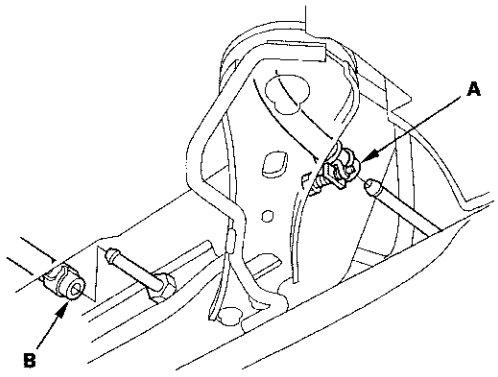


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51. Remove the steering gearbox heat shield.

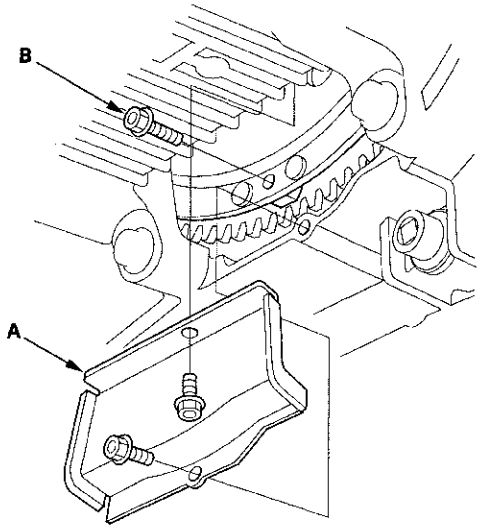


52. Loosen the hose clamp bolt, then disconnect the power steering fluid hose (A) from the line at the right front of the subframe.

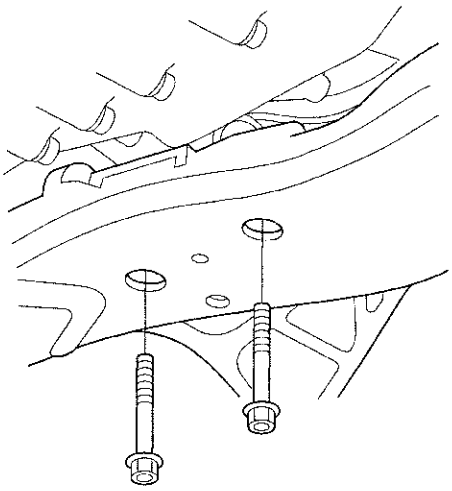


53. Disconnect the ATF cooler hose (B) from the ATF cooler. Turn the end of the cooler hose up to prevent ATF from flowing out, then plug the hose.

54. Remove the torque converter cover (A), and remove the drive plate bolts (B) (8) while rotating the crankshaft pulley.



55. Remove the transmission lower mount bolts.

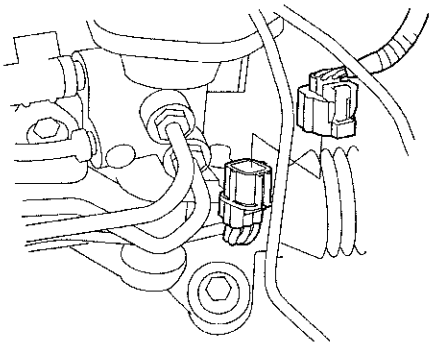


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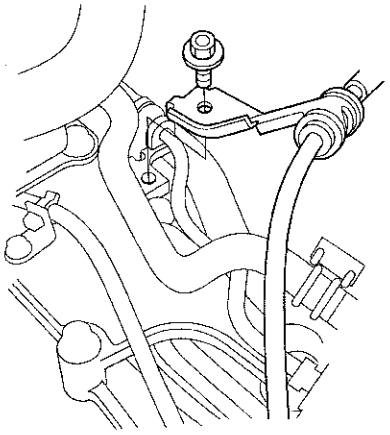
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Transmission Removal (cont'd)

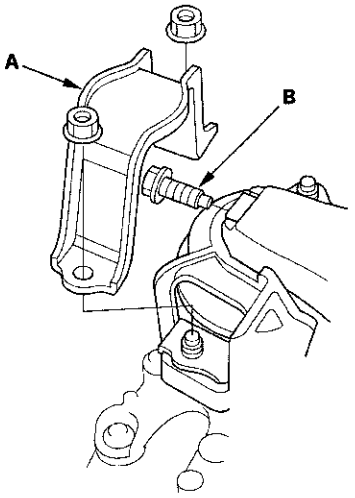
56. Disconnect the power steering angle sensor connector.



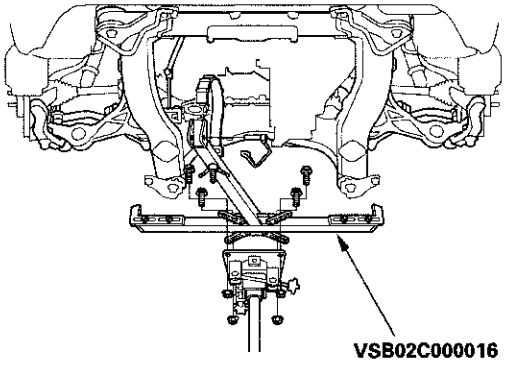
57. Remove the shift cable bracket on the steering gearbox stiffener.



58. Remove the rear mount stop (A), and remove the rear mount bolt (B).



59. Attach the front subframe adapter (VSB02C000016) to the subframe by looping the belt over the front of the subframe, then secure the belt with its stop.

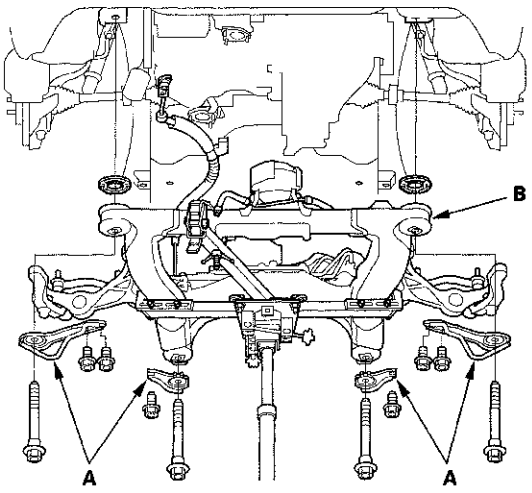


60. Raise the jack and line up the slots in the arms with the bolt holes on the corner of the jack base, then attach them with bolts.

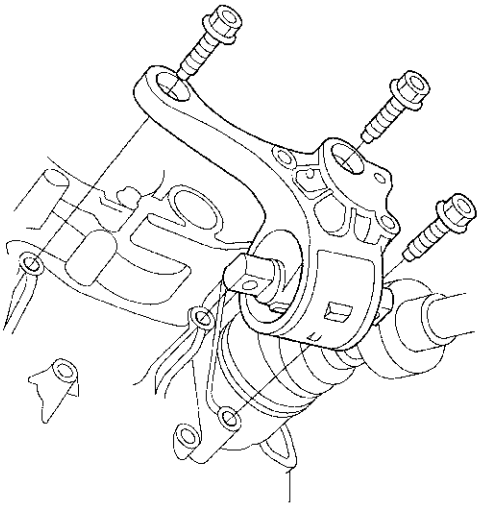
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61. Remove the four bolts securing the stiffeners (A) and the four bolts securing the front subframe (B), and lower the front subframe.

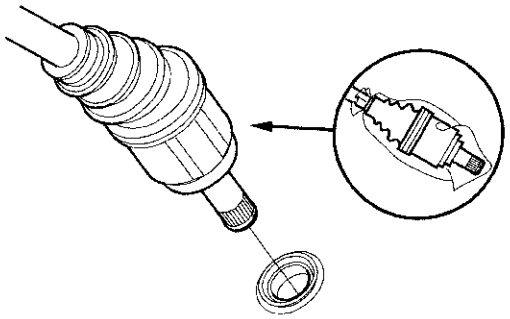
NOTE: Check that the front subframe is free of the vacuum hose, the ATF cooler hoses, and the electrical wiring.



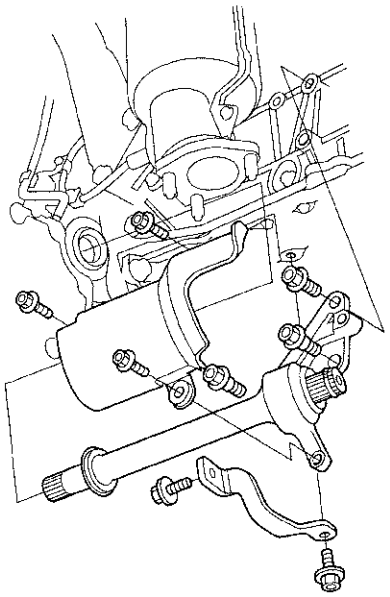
62. Remove the transmission lower mount.



63. Pry out the driveshafts from the differential and the intermediate shaft.



64. Remove the exhaust manifold bracket and heat shield.



65. Remove the intermediate shaft.

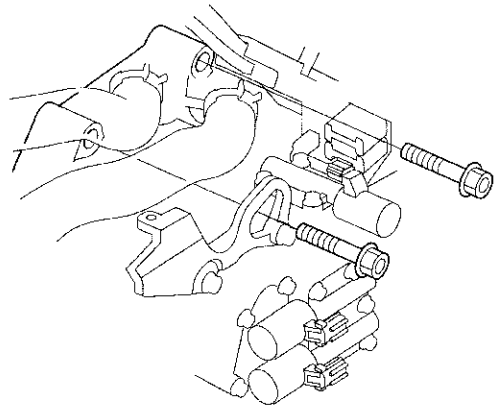
66. Coat all precision finished surfaces with clean engine oil, then the plastic bags over driveshaft ends and intermediate shaft ends.

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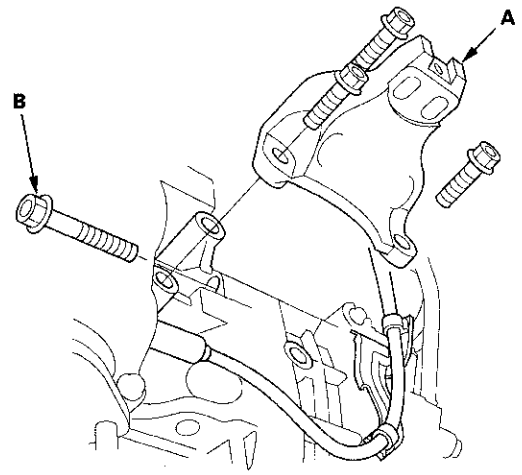
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Transmission Removal (cont'd)

67. Remove the upper transmission housing mounting bolts.

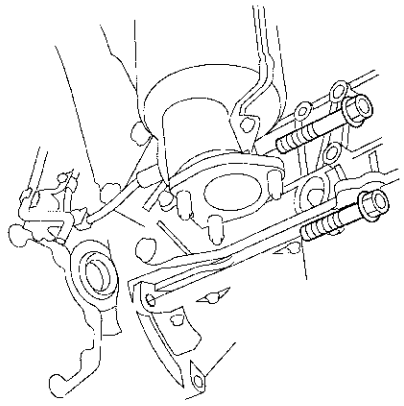


68. Remove the front mount bracket (A).



69. Remove the front transmission housing mounting bolt (B) using a socket 22 mm long.

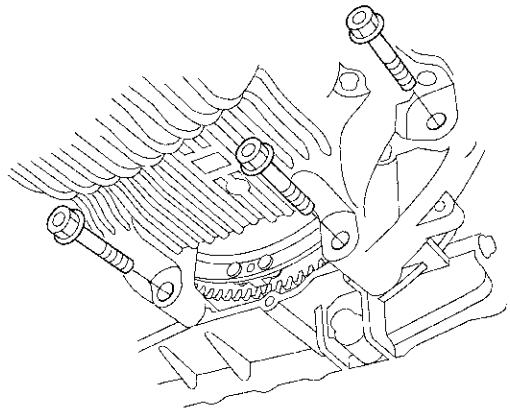
70. Remove the rear transmission housing mounting bolts.



71. Lower the transmission by loosening the wing nut of the engine support hanger, and tilt the engine just enough for the transmission end to clear the side frame.

72. Place a jack under the transmission.

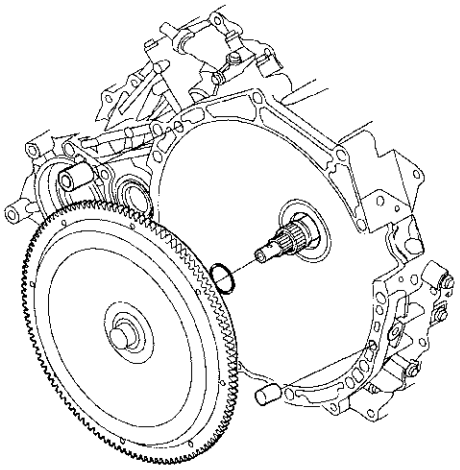
73. Remove the lower transmission housing mounting bolts.



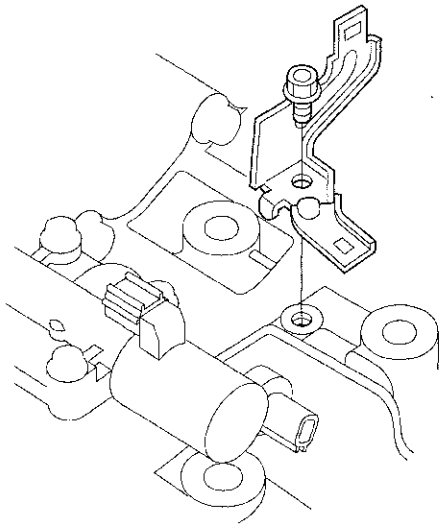
74. Slide the transmission away from the engine to remove it from the vehicle.

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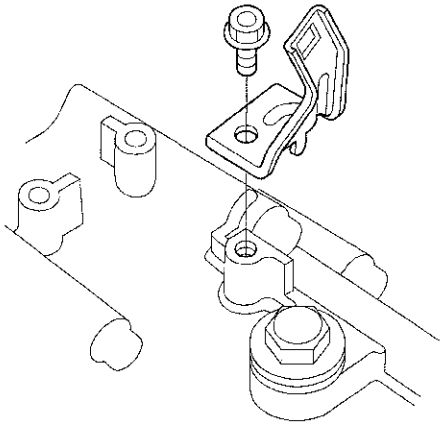
75. Remove the torque converter and dowel pins.



76. Remove the clamp bracket from the transmission.



77. Remove the harness clamp bracket from the transmission.



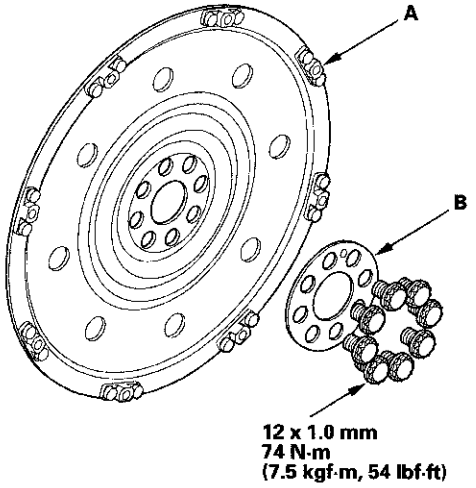
78. Inspect the drive plate, and replace if it's damaged (see page 14-214).

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Drive Plate Removal and Installation

1. Remove the transmission assembly (see page 14-201).

2. Remove the drive plate (A) and washer (B) from the engine crankshaft.



3. Install the drive plate and washer on the engine crankshaft, and tighten the eight bolts in a crisscross pattern in two or more steps.

4. Install the transmission assembly (see page 14-214).

Transmission Installation

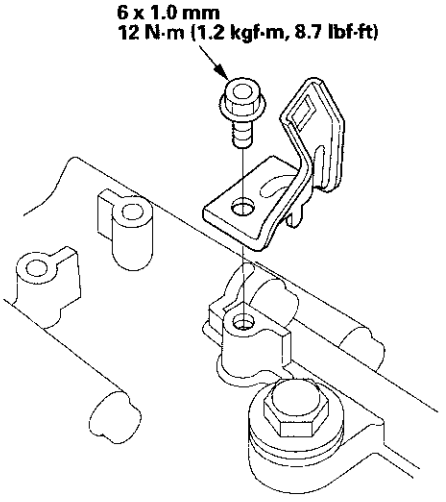
Special Tools Required
- Subframe alignment pin 070AG-SJAA10S
- 2008 V6 Attachment arm SIL02C000033
- Engine support hanger, A and Reds AAR-T1256 *
- Engine hanger balancer bar VSB02C000019 *
- Front subframe adapter VSB02C000016 *

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

NOTE: Use fender covers to avoid damaging painted surfaces.

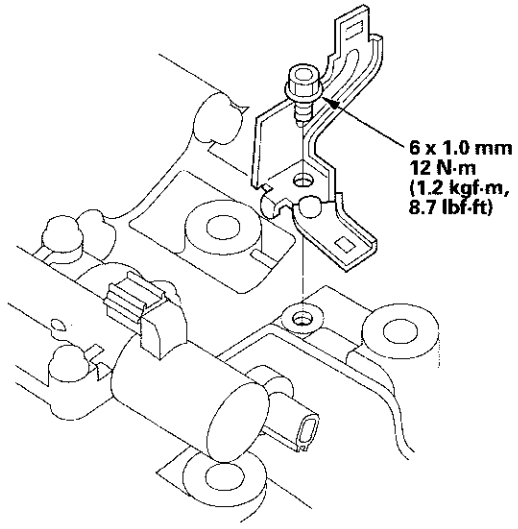
1. Clean the ATF cooler (see page 14-227).

2. Install the harness clamp bracket.



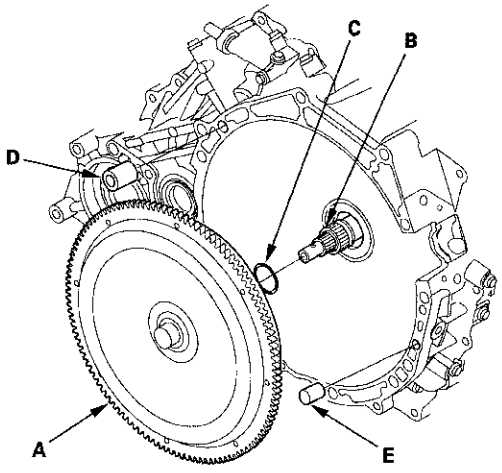
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3. Install the clamp bracket.



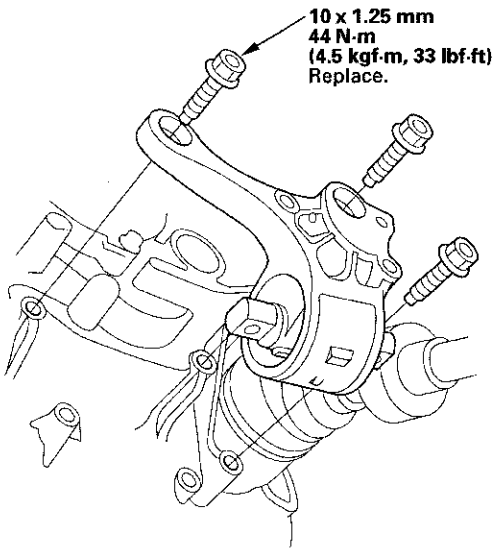
4. Install the torque converter (A) on the mainshaft (B) with the new O-ring (C).

   NOTE: Make sure the torque converter is fully engaged on the mainshaft, starter shaft and the ATF pump gear. Failure to do so will result in severe transmission or engine damage.



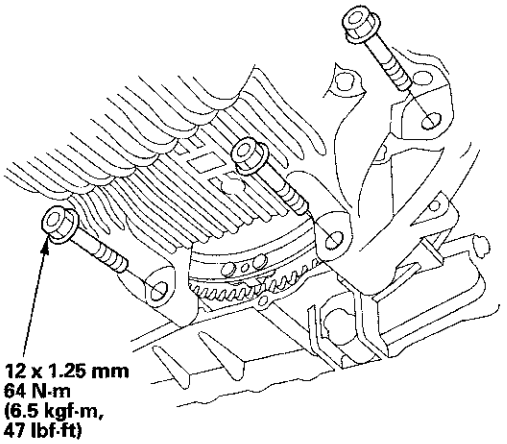
5. Install the 14 mm dowel pin (D) and 10 mm dowel pin (E) in the torque converter housing.

6. Install the transmission lower mount with the new bolts.



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

8. Attach the transmission to the engine, and install the lower transmission housing mounting bolts.

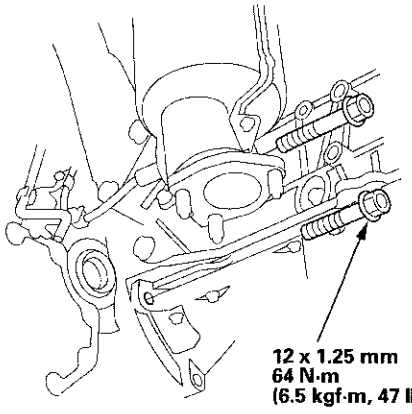


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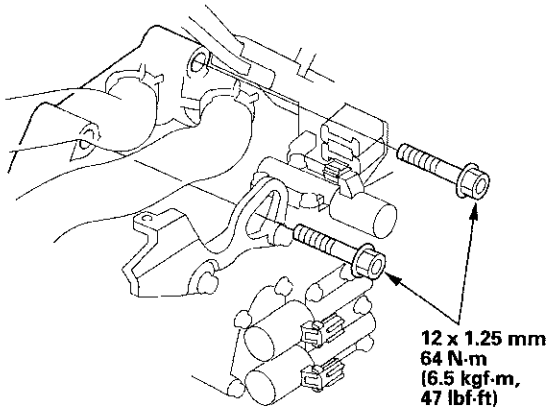
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Transmission Installation (cont'd)

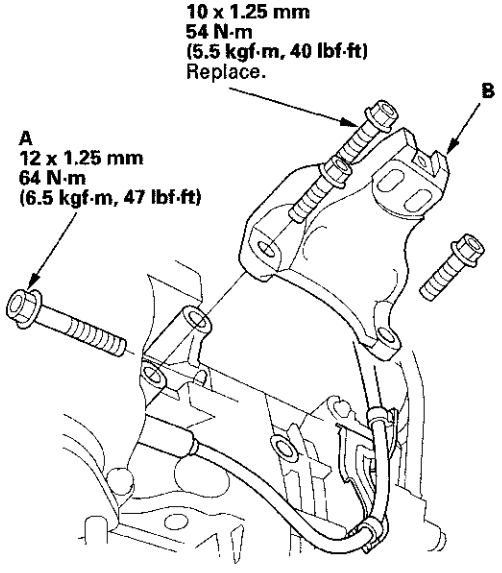
9. Install the transmission housing mounting bolts.



10. Install the upper transmission housing mounting bolts.



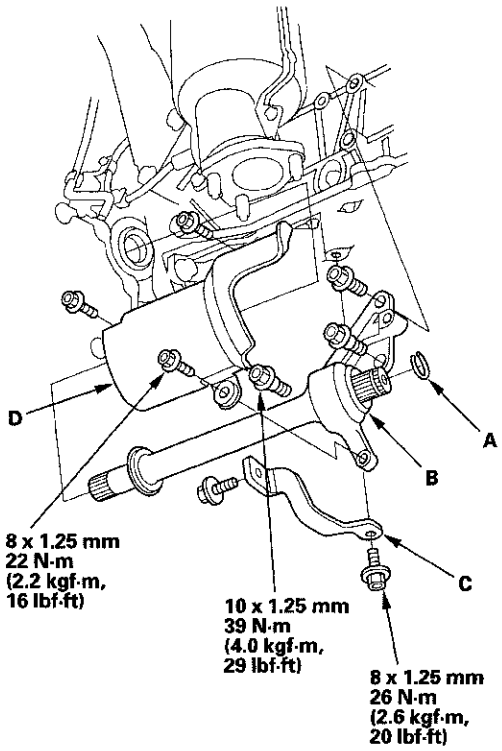
11. Install the front transmission housing mounting bolt (A) with a socket 22 mm long and a torque wrench.



12. Install the front mount bracket (B) with the new mounting bolts.

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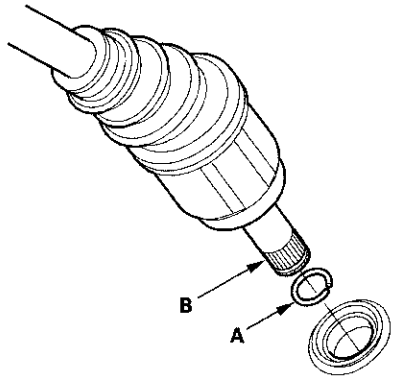
13. Install the new set ring (A) on the intermediate shaft (B).



14. Clean the areas where the intermediate shaft contacts the transmission (differential) with solvent, and dry with compressed air. Apply ATF to the intermediate shaft splines, then install the intermediate shaft; be sure not to allow dust or other foreign particles to enter the transmission.

15. Install the exhaust manifold bracket (C) and heat shield (D).

16. Install the new set ring (A) on the left driveshaft (B).



17. Clean the areas where the left driveshaft contacts the transmission (differential) with solvent, and dry with compressed air. Then install the left driveshaft; be sure not to allow dust or other foreign particles to enter the transmission. Turn the steering knuckle fully outward, and slide the driveshaft into the differential until you feel its set ring fully engage the side gear.

18. Apply right driveshaft inboard-joint splines with the recommended grease.

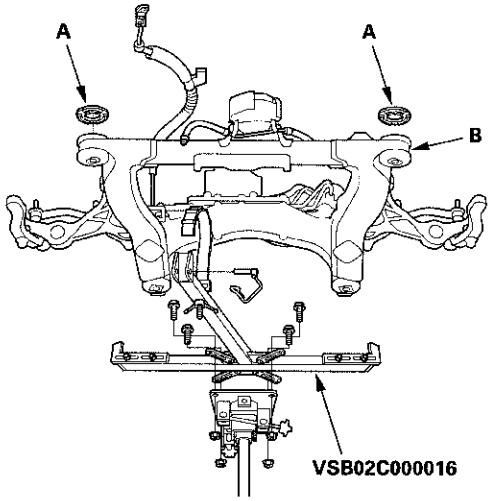
19. Slide the right driveshaft over the intermediate shaft splines until you feel the driveshaft fully engage the intermediate shaft set ring.

(cont'd)

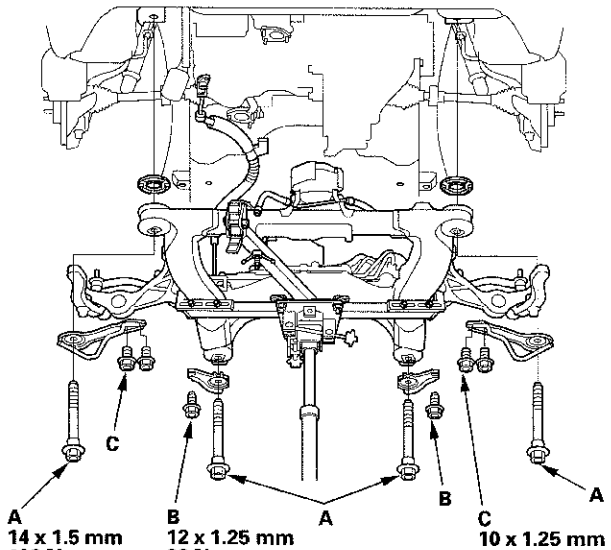
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Transmission Installation (cont'd)

20. Install the front subframe stop rubbers (A) on the front of the subframe (B), and support the front subframe with the front subframe adapter (VSB02C000016) and a jack, and lift it up to body.



21. Loosely install the new subframe mounting bolts (A), rear stiffener mounting bolts (B), front stiffener mounting bolts (C), and front and rear stiffeners.

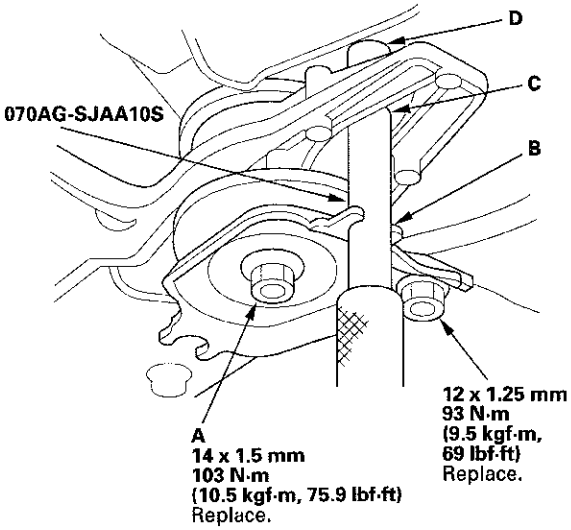


A
14 x 1.5 mm
103 N·m
(10.5 kgf·m, 75.9 lbf·ft)
Replace.

B
12 x 1.25 mm
93 N·m
(9.5 kgf·m, 69 lbf·ft)
Replace.

C
10 x 1.25 mm
38 N·m
(3.9 kgf·m, 28 lbf·ft)

22. Partially tighten the right rear subframe mounting bolt (A); insert the special tool through the positioning slot (B) on the rear stiffener, through the positioning hole (C) on the subframe, and into the positioning hole (D) on the body, then tighten the subframe mounting bolt.



A
14 x 1.5 mm
103 N·m
(10.5 kgf·m, 75.9 lbf·ft)
Replace.

23. Partially tighten the left rear subframe mounting bolt in the same manner in step 22.

24. Partially tighten the right and left front subframe mounting bolts.

25. Loosen the right rear mounting bolt, then tighten the bolt to the specified torque with the special tool in the positioning hole.

26. Tighten the left rear mounting bolt to the specified torque with the special tool in the positioning hole.

27. Tighten the right and left front mounting bolts to the specified torque.

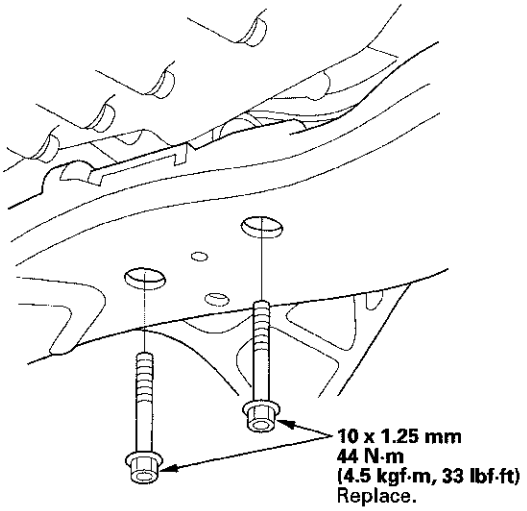
28. Check that the positioning holes and slot are aligned using the special tool.

29. Tighten the rear and front stiffener mounting bolts to the specified torque.

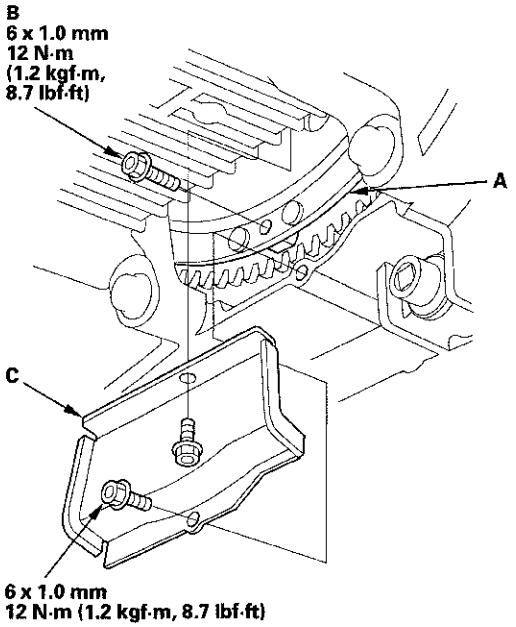
30. Remove the jack and front subframe adapter.

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31. Install the new transmission lower mount bolts.

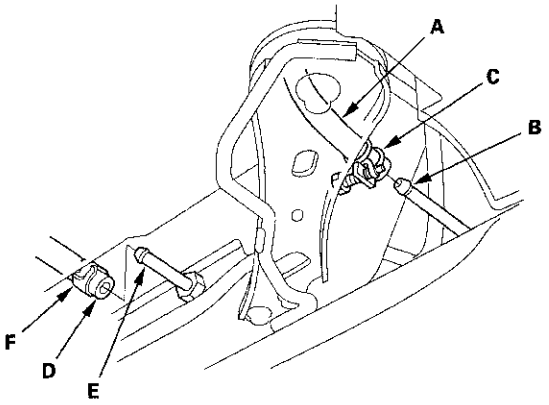


32. Attach the torque converter to the drive plate (A) with eight bolts (B). Rotate the crankshaft pulley as necessary to tighten the bolts to half of the specified torque, then to the final torque, in a crisscross pattern. After tightening the last bolt, check that the crankshaft rotates freely.



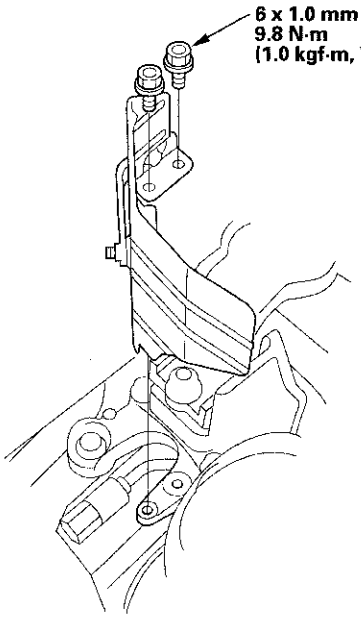
33. Install the torque converter cover (C).

34. Connect the power steering fluid hose (A) to the line (B) at the right front of the front subframe, and secure the hose with its hose clamp (C).



35. Connect the ATF cooler hose (D) to the ATF cooler (E), and secure the hose with the clip (F) (see page 14-229).

36. Install the steering gearbox heat shield.

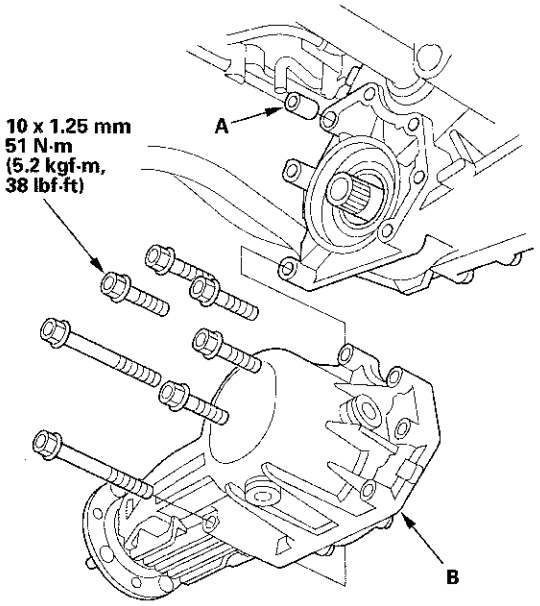


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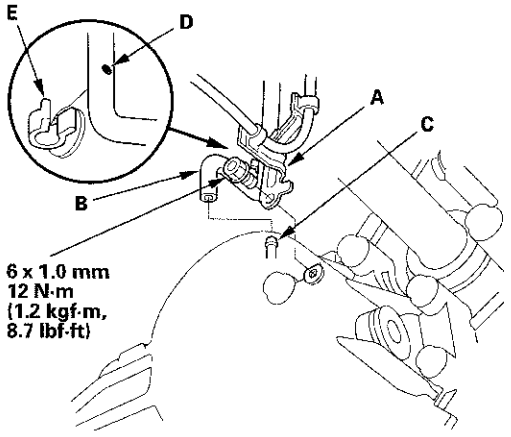
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Transmission Installation (cont'd)

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

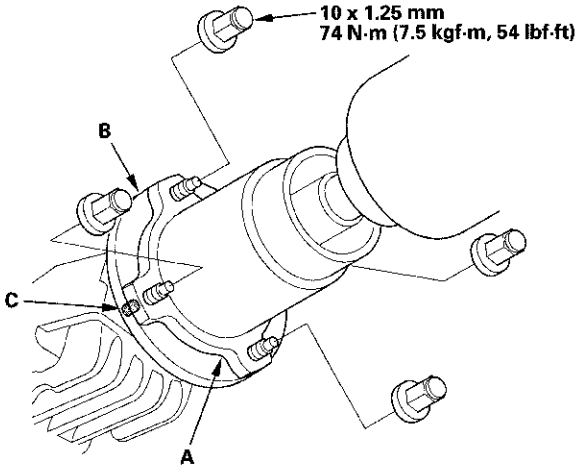


38. Secure the transfer breather tube bracket (A) on the transfer assembly with the bolt, and install the breather tube (B) over the breather pipe (C). If the breather tube was removed from the clamp, install the tube at the dot (D) on the clamp (E).

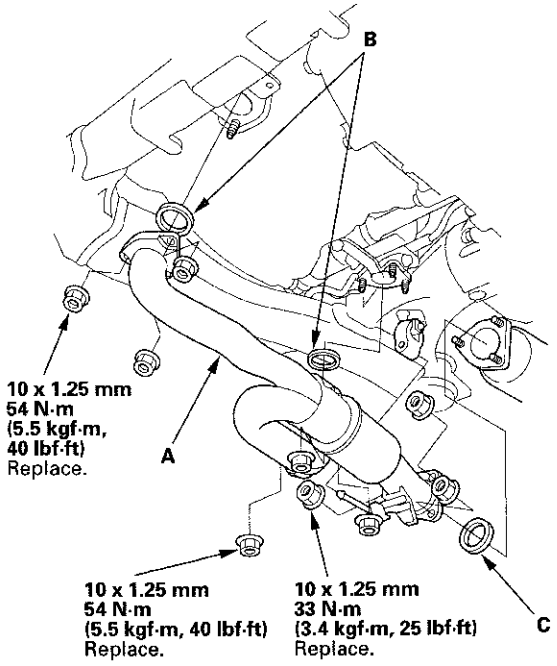


39. Install the propeller shaft (see page 16-45).

40. Install the propeller shaft (A) to the transfer companion flange (B) by aligning the reference mark (C).

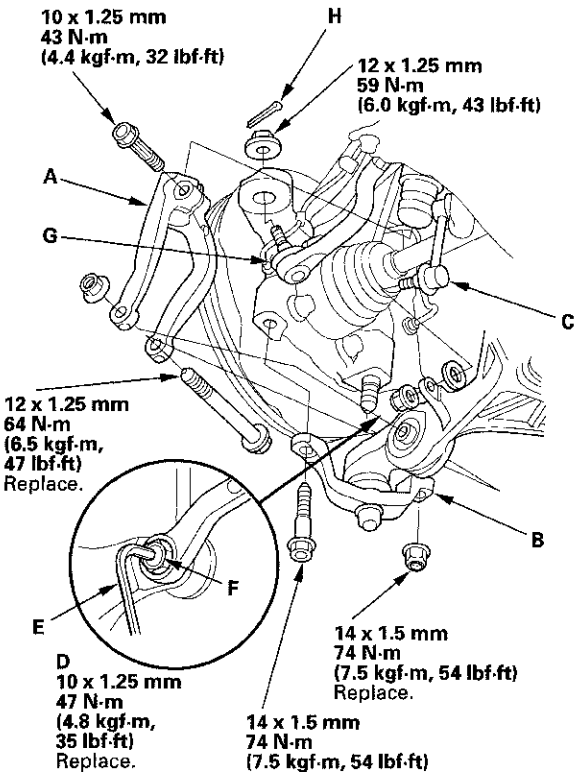


41. Install exhaust pipe A with the new self-locking nuts and new gaskets (B) (C).



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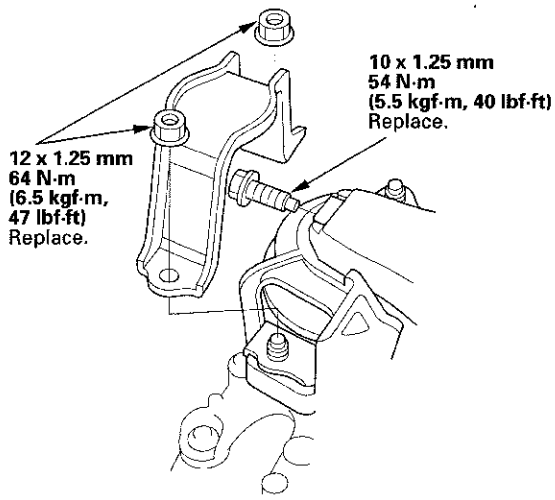
42. Install the damper forks (A) with damper pinch bolts, new damper fork bolts, and new self-locking nuts. Attach the knuckle holder (B) to the knuckle, and secure the knuckle holder with the bolt and new nut.



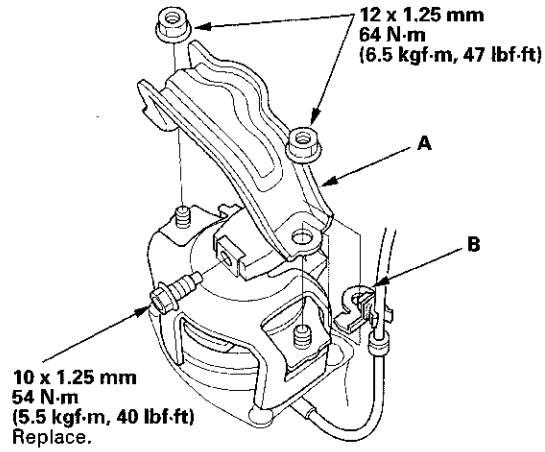
43. Install the stabilizer links (C) to the lower arms, and install the nuts (D). Insert a 6 mm Allen wrench (E) in the ball joint pin (F), and tighten the nuts.

44. Install the tie-rod end ball joints (G) to each knuckle with the nuts and new cotter pins (H).

45. Install the new rear mount bolt, and install the rear mount stop with the new nuts.



46. Install the new front mount bolt, and install the front mount stop (A) and vacuum hose clamp (B).



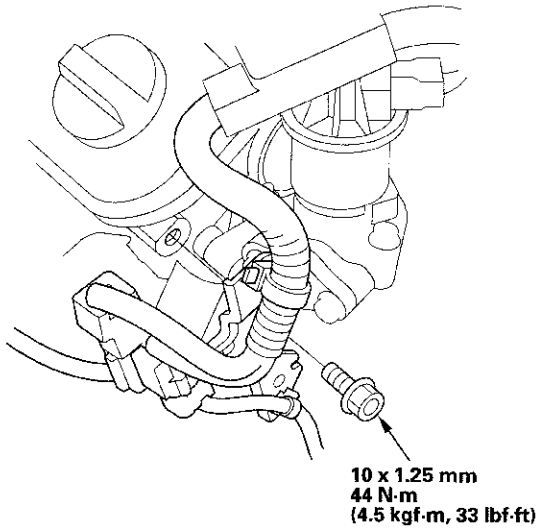
47. Remove the engine support hanger and engine hanger balancer bar.

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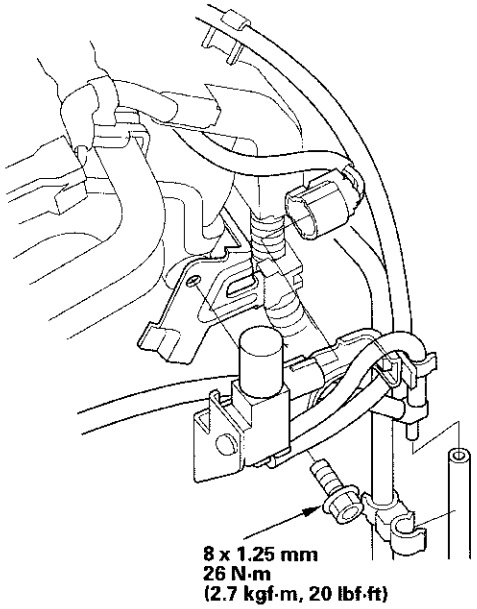
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Transmission Installation (cont'd)

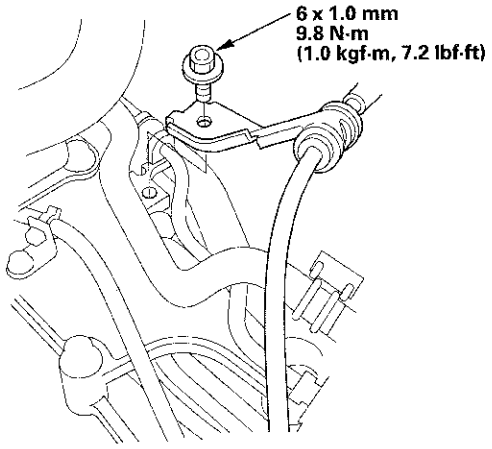
48. Install the connector bracket on the engine front cylinder head.



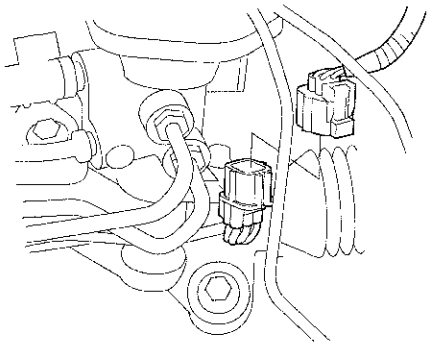
49. Install the clamp brackets on the engine rear cylinder head, and connect the vacuum tube and solenoid connector.



50. Install the shift cable bracket on then steering gearbox stiffener.

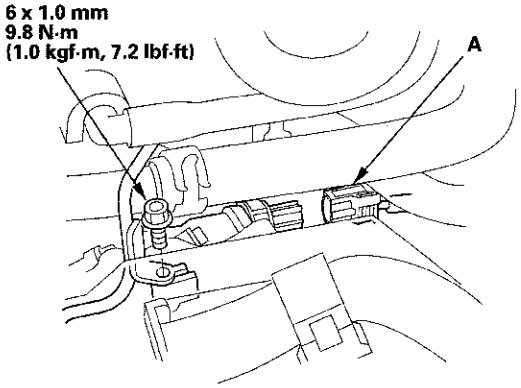


51. Connect the power steering angle sensor connector.

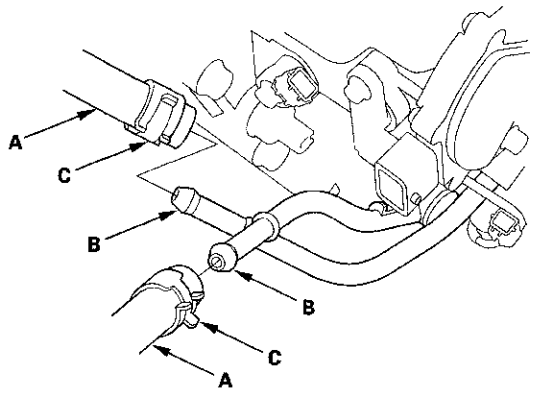


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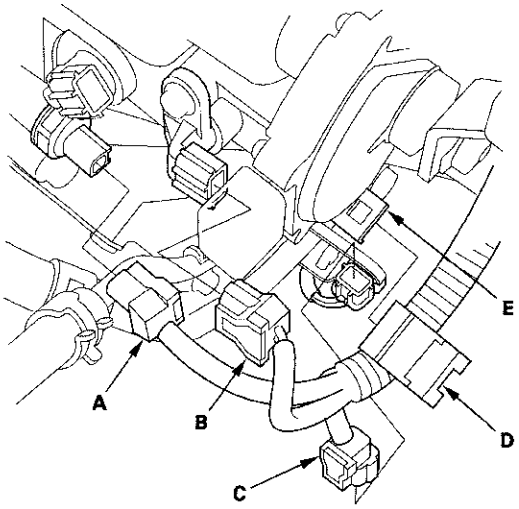
52. Connect the 2nd clutch transmission fluid pressure switch connector (A), and secure the vacuum line with the bolt.



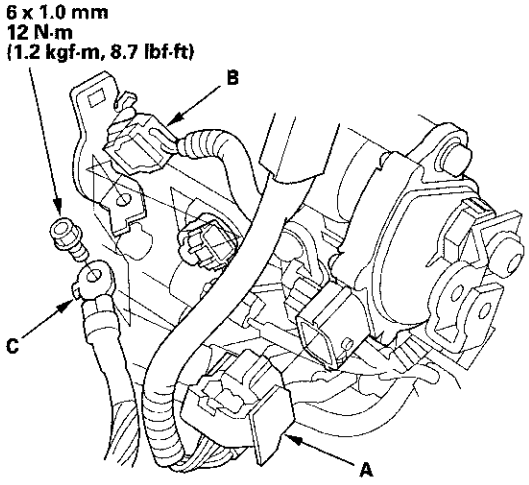
53. Connect the ATF cooler hoses (A) to the ATF cooler lines (B), and secure the hoses with the clips (C) (see page 14-229).



54. Connect the 3rd clutch transmission fluid pressure switch connector (A), output shaft (countershaft) speed sensor connector (B), and ATF temperature sensor connector (C), and install the harness clamp (D) on its bracket (E).



55. Connect the transmission range switch connector (A) and input shaft (mainshaft) speed sensor connector (B).



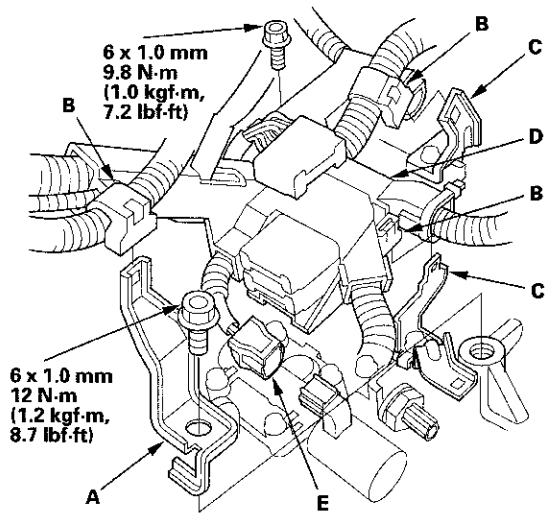
56. Install the transmission ground cable (C).

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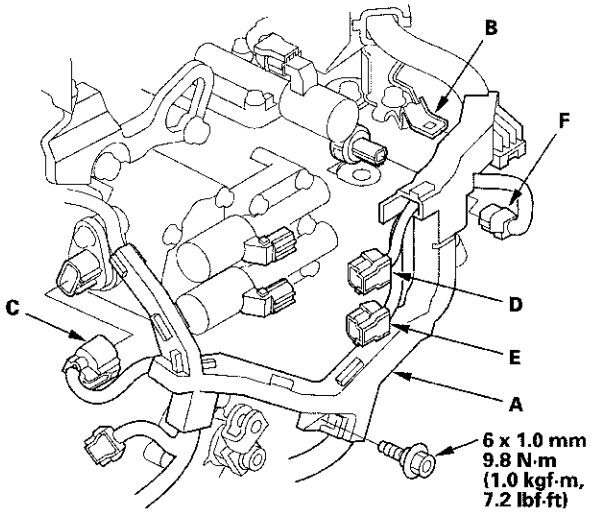
Transmission Installation (cont'd)

57. Install the harness clamp bracket (A), and install the harness clamps (B) on the clamp brackets (C).



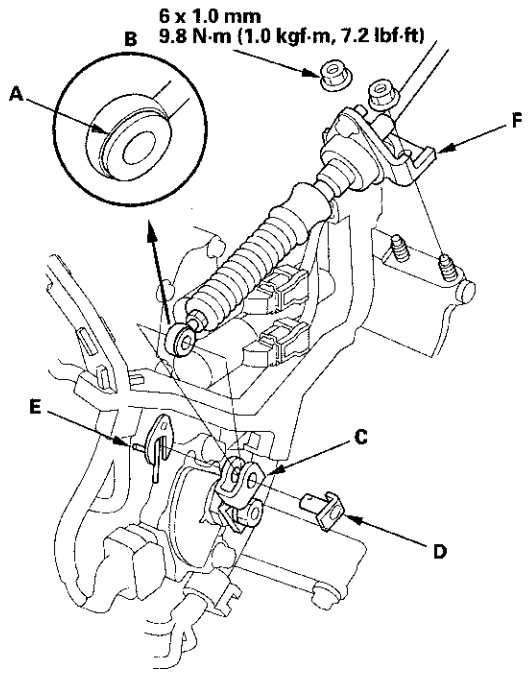
58. Secure the harness cover (D) with the bolt, and connect A/T clutch pressure control solenoid valve C connector (E).

59. Install the harness cover (A) on its bracket (B), and secure the with the bolt.



60. Connect the shift solenoid harness connector (C), A/T clutch pressure control solenoid valve A connector (D), A/T clutch pressure control solenoid valve B connector (E), and 4th clutch transmission fluid pressure switch connector (F).

61. Apply molybdenum grease to the hole in the bushing (A) in the shift cable end (B).

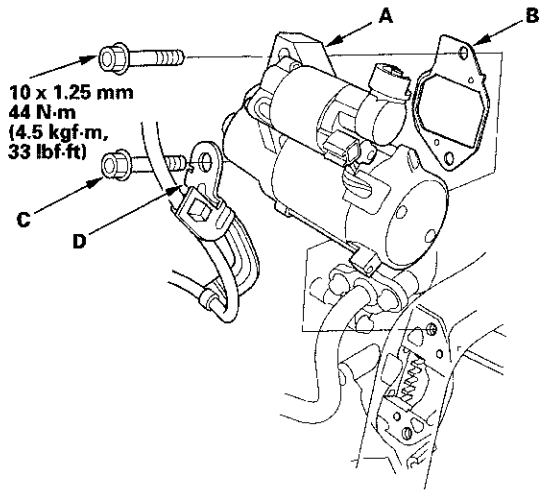


62. Attach the shift cable end to the control lever (C), then insert the control pin (D) into the control lever hole through the shift cable end, and secure the control pin with the spring clip/washer (E).

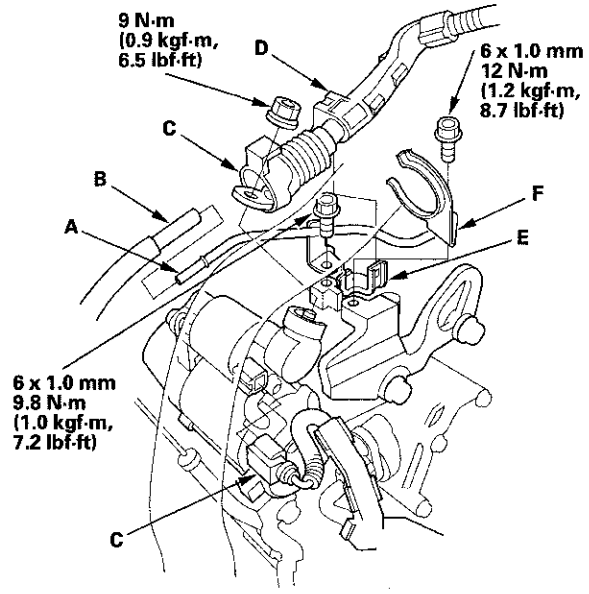
63. Secure the shift cable bracket (F) with the nuts.

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64. Install the starter (A) and the new gasket (B); install the lower bolt (C) through the sensor harness clamp bracket (D).



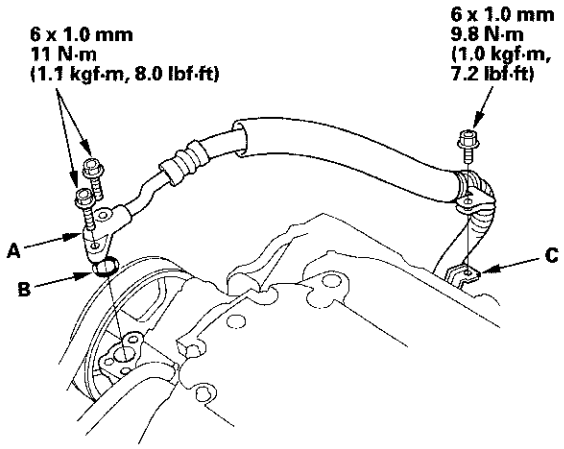
65. Secure the vacuum line (A) with the bolt, and connect the vacuum hose (B) to the vacuum line.



66. Install the starter cables (C), and install the harness clamp (D) on the clamp bracket (E).

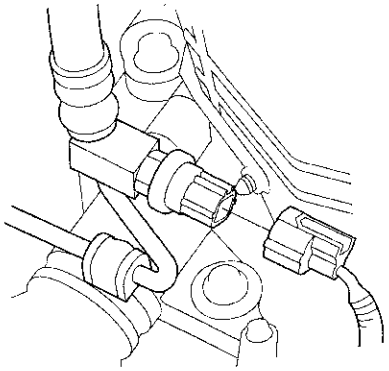
67. Secure the radiator hose clamp (F) with the bolt.

68. Install the power steering pump outlet line (A) with the new O-ring (B) to the pump.



69. Secure the power steering fluid hose clamp with the bolt on its clamp bracket (C).

70. Connect the power steering pressure switch connector.

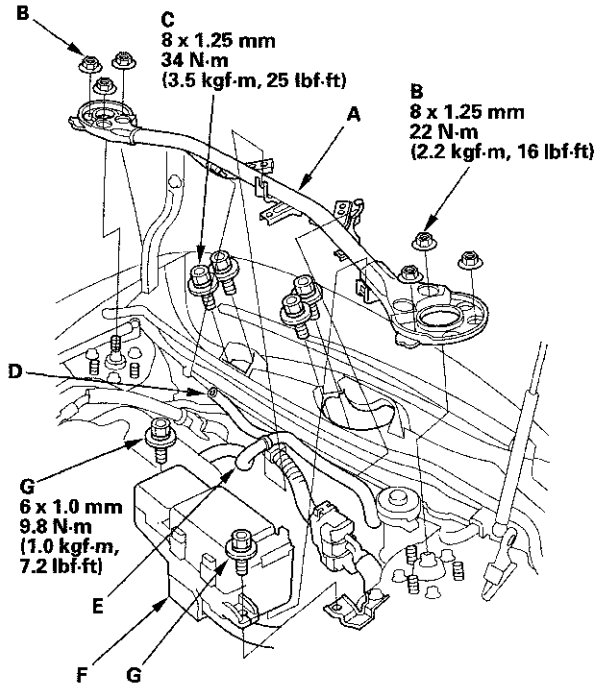


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Transmission Installation (cont'd)

71. Install the strut brace (A) on the body, and secure it with nuts (B) and bolts (C).



72. Connect the breather tube end (D), and install the vacuum hose (E) on the strut brace.

73. Install the under-hood fuse/relay box (F) on its bracket, and secure it with the bolts (G).

74. Connect the steering joint (see page 17-25).

75. Remove the steering wheel (see page 17-22).

76. Center the SRS cable reel, and install the steering wheel (see page 17-24).

77. Refill the power steering fluid reservoir with fluid upper level line (see page 17-13).

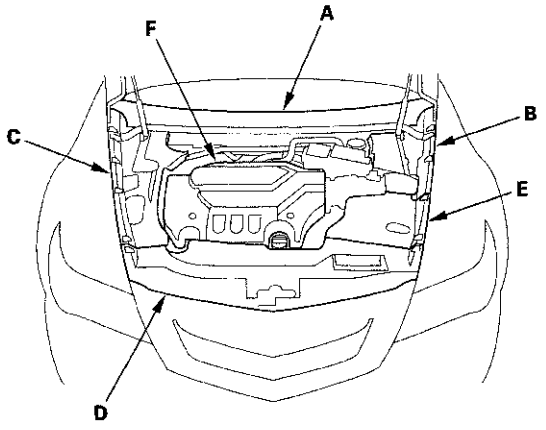
78. Refill the transmission with ATF (see step 6 on page 14-196).

79. Install the battery base.

80. Install the air cleaner (see page 11-366).

81. Do the battery installation procedure (see page 22-92).

82. Install the covers in the following order; cowl cover upper trim (A), left upper fender trim (B), right upper fender trim (C), upper grille cover (D), battery trim (E), and intake manifold cover (F).



83. Reinstall the hood support struts to the upper location on both sides of the hood.

84. Install the passenger's side windshield wiper arm (see page 22-386).

85. Install the splash shield.

86. Install the front wheels.

87. Set the parking brake. Start the engine, and shift the transmission through all positions three times. Check the shift lever operation, A/T gear position indicator operation, and shift cable adjustment.

88. Check and adjust the front wheel alignment (see page 18-5).

89. Start the engine in P or N position, and warm it up to normal operating temperature (the radiator fan comes on).

90. Turn off the engine, and check the ATF level (see page 14-195).

91. Do the road test (see page 14-172).

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ATF Cooler Cleaning

Special Tools Required
- ATF cooler cleaner GHTTTCF6H
- Magnetic nonbypass spin-on filter GTHGNBP2

These special tools are available through the Acura Tool and Equipment Program 888-424-6857.

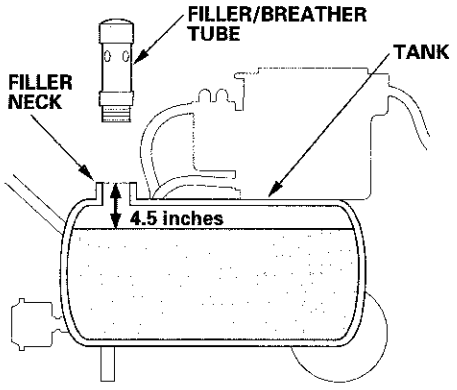
Before installing an overhauled or remanufactured automatic transmission, you must thoroughly clean the ATF cooler to prevent system contamination. Failure to do so could cause a repeat automatic transmission failure.

The cleaning procedure involves heated ATF-Z1 delivered under high pressure (100 psi). Check the security of all hoses and connections. Always wear safety glasses or a face shield, along with gloves and protective clothing. If you get ATF in your eyes or on your skin, rinse with water immediately.

⚠ WARNING

- Improper use of the ATF cooler cleaner can result in burns and other serious injuries.
- Always wear eye protection and protective clothing, and follow this procedure.

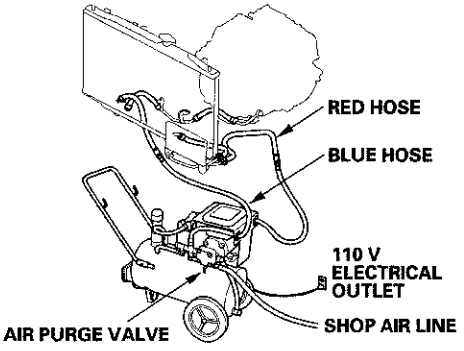
1. Check the fluid in the cooler cleaner tank (The fluid level should be 4.5 inches from the top of the filler neck.). Adjust the level if needed; do not overfill. Use only Acura ATF-Z1; do not use any additives.



2. Plug the cooler cleaner into a 110 V grounded electrical outlet.

NOTICE

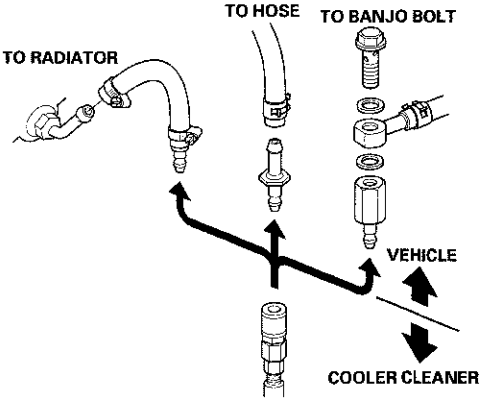
Make sure the outlet has no other appliances (light fixtures, drop lights, extension cords) plugged into it. Also, never plug the cooler cleaner into an extension cord or drop light; you could damage the unit.



3. Flip the HEAT toggle switch to ON; the green indicator above the toggle switch comes on. Wait 1 hour for the cooler cleaner to reach its operating temperature (The cooler cleaner is ready to use when the temperature gauge reads 140 °to 150 °F.).

   NOTE: If the red indicator above the HEAT toggle switch comes on, the fluid level in the tank is too low for the tank heater to work (see step 1 of this procedure).

4. Select the appropriate pair of fittings, and attach them to the radiator, to the hoses, or to the banjo bolts for flow through the ATF cooler cleaner.



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ATF Cooler Cleaning (cont'd)

5. Connect the red hose to the cooler outlet line (the line that normally goes to the external filter on the transmission).

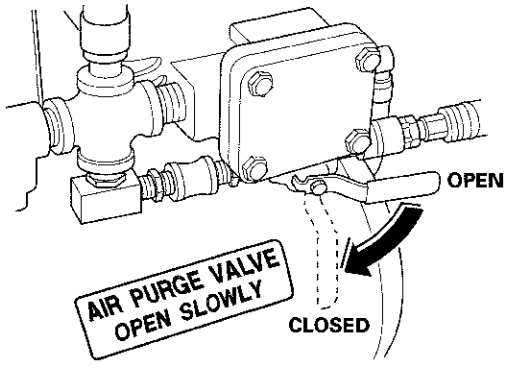
6. Connect the blue hose to the cooler inlet line.

7. Connect a shop air hose (regulated to 100 to 125 psi) to the air purge valve.

   NOTICE
   The quick-connect fitting has a one-way check valve to keep ATF from entering your shop's air system. Do not remove or replace the fitting. Attach the coupler provided with the cooler cleaner to your shop air line if your coupler is not compatible.

8. Flip the MOTOR toggle switch to ON; the green indicator above the toggle switch comes on. Let the pump run for 5 minutes. While the pump is running, open and close the air purge valve periodically to cause agitation and improve the cleaning process. Always open the valve slowly. At the end of the 5-minutes cleaning period, leave the air purge valve open.

   NOTE: While the pump is running with the air purge valve open, it is normal to see vapor coming from the filler/breather tube vents.



9. With the air purge valve open, flip the MOTOR toggle switch to OFF; the green indicator goes off. Leave the air purge valve open for at least 15 seconds to purge the lines and hoses of residual ATF, then close the valve.

10. Disconnect the red and blue hoses from the ATF cooler. Now connect the red hose to the cooler inlet line.

11. Now connect the blue hose to the cooler outlet line.

12. Flip the MOTOR toggle switch to ON, and let the pump run for 5 minutes. While the pump is running, open and close the air purge valve periodically. Always open the valve slowly. At the end of the 5-minutes cleaning period, leave the air purge valve open.

    NOTE: While the pump is running with the air purge valve open, it is normal to see vapor coming from the filler/breather tube vents.

13. With the air purge valve open, flip the MOTOR toggle switch to OFF. Leave the air purge valve open for at least 15 seconds to purge the lines and hoses of residual ATF, then close the valve.

14. Disconnect the red and blue hoses from the ATF cooler lines.

15. Connect the red and blue hoses to each other.

16. Disconnect the shop air from the air purge valve. Disconnect and stow the coupler if used.

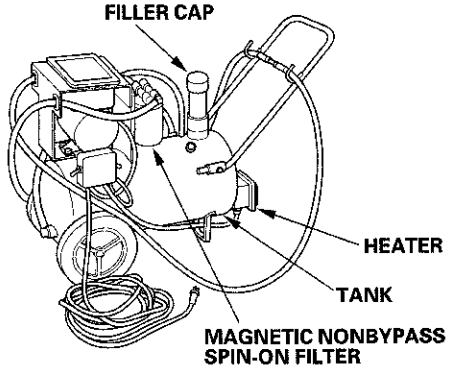
17. Disconnect and stow the fittings from the ATF cooler inlet and outlet lines.

18. Unplug the cooler cleaner from the 110 V outlet.

Tool Maintenance

Follow these instructions to keep the ATF cooler cleaner working properly:

- Replace the two magnetic nonbypass spin-on filters after every 20 hours of use, based on the hour meter, or when you notice a restriction in the ATF flow.
- Check the level and condition of the fluid in the tank before each use.
- Replace the ATF in the tank when it looks dark or dirty.

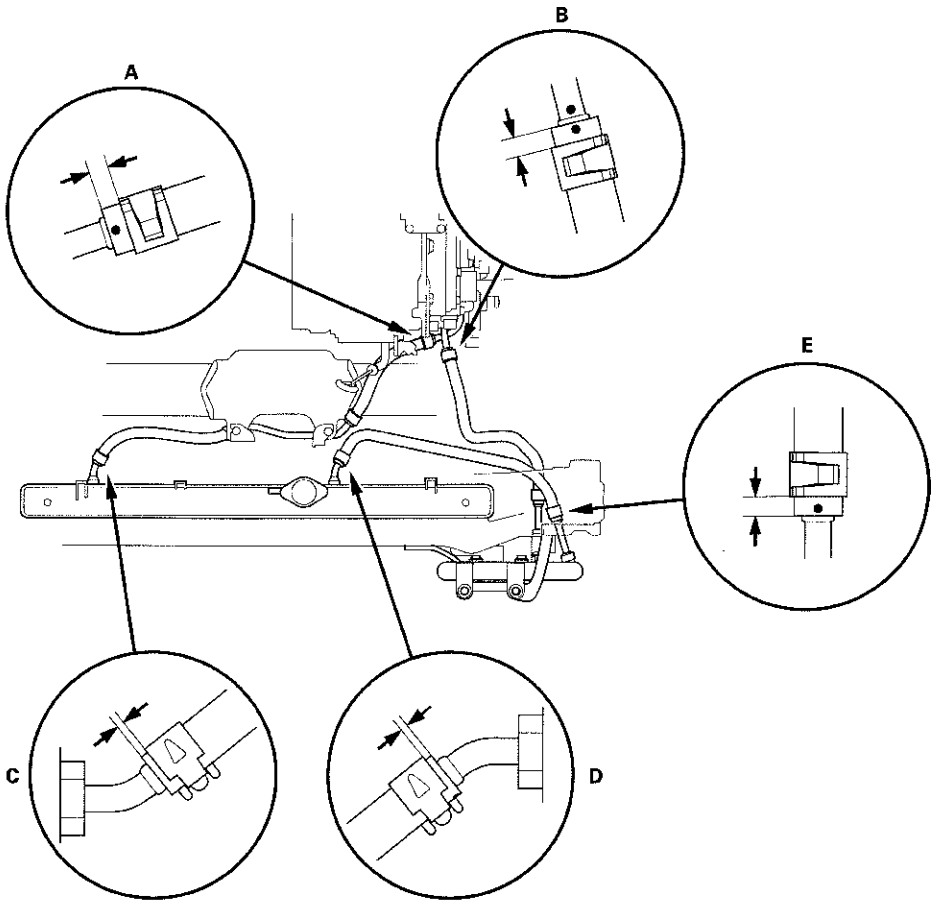


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ATF Cooler Hose Replacement

1. Drain the automatic transmission fluid (ATF) (see page 14-196).

2. Install the ATF cooler hoses over the ATF cooler lines, and secure the hoses with the cilps as shown in the details (A) (B) (C) (D) (E), shown in the following list. Keep the tabs of the clips clear of other parts.



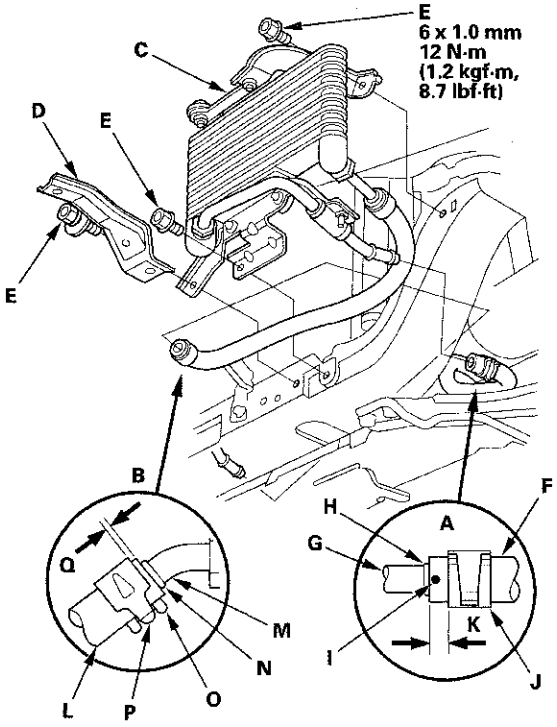
Details	Cooler Hose End	Installed Distance of Clip
A (View from on high)	Contacts the bulge on the line	Between clip end and hose end: 6—8 mm (0.24—0.31 in)
B (View from on high)	Contacts the bulge on the line with aligning the dots	Between clip end and hose end: 6—8 mm (0.24—0.31 in)
C (View from left side)	Contacts the bulge on the line	Between clip end and hose end: 2—4 mm (0.08—0.16 in)
D (View from right side)	Contacts the bulge on the line with facing the dot on the hose in the downward direction	Between clip end and hose end: 2—4 mm (0.08—0.16 in)
E (View from under body)	Contacts the bulge on the line with facing the dot on the hose in the downward direction	Between clip end and hose end: 6—8 mm (0.24—0.31 in)

3. Refill the transmission with ATF (see step 6 on page 14-196).

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ATF Cooler Replacement

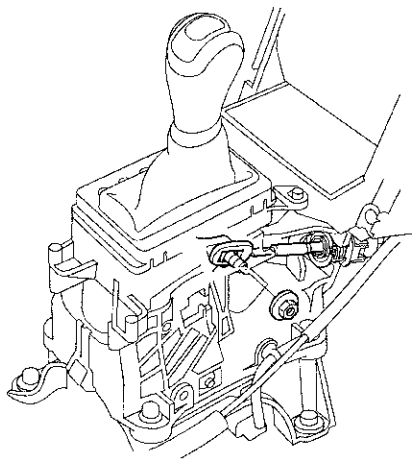
1. Remove the front bumper (see page 20-149).
2. Disconnect the ATF cooler outlet hose (A) from the ATF cooler, and disconnect the ATF cooler hose (B) from the ATF cooler line.



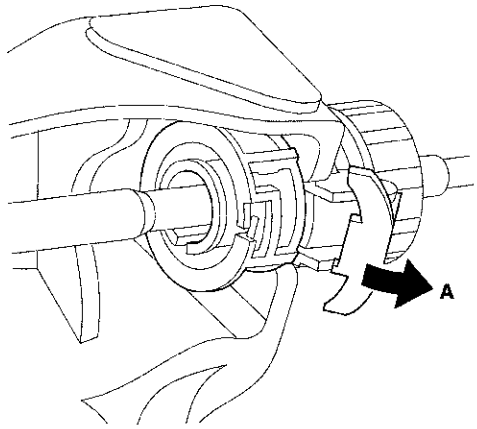
3. Remove the ATF cooler (C), and replace it. Install the new cooler and the bumper stiffener (D) with the bolts (E).
4. Slide the ATF cooler outlet hose (F) over the ATF cooler line (G) until the hose end contacts with the bulge (H) of the ATF cooler line. Face down the dot (I) on the hose end, and secure the hose with the clip (J) at 6—8 mm (0.2—0.3 in) (K) from the hose end.
5. Slide the ATF cooler hose (L) over the ATF cooler line (M) until the hose end contacts with the bulge (N) of the ATF cooler line. Face down the dot (O) on the hose end, and secure the hose with the clip (P) at 2—4 mm (0.1—0.2 in) (Q) from the hose end.
6. Install the front bumper (see page 20-149).

Shift Lever Removal

1. Remove the center console (see page 20-92).
2. Shift the shift lever into R.
3. Remove the nut securing the shift cable end.

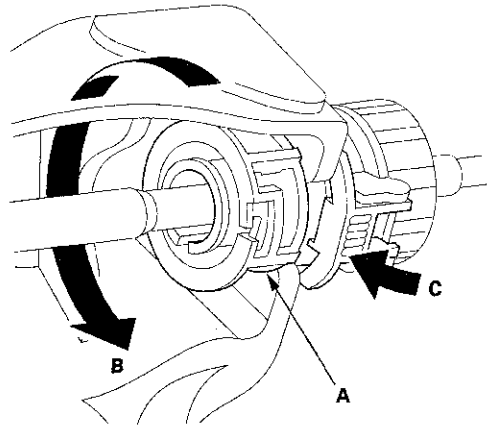


4. Unlock the retainer (A).

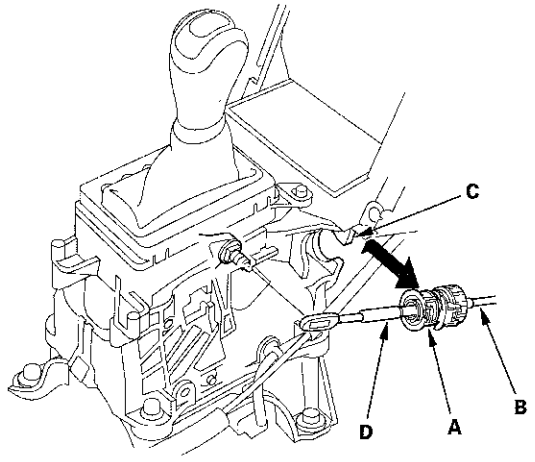


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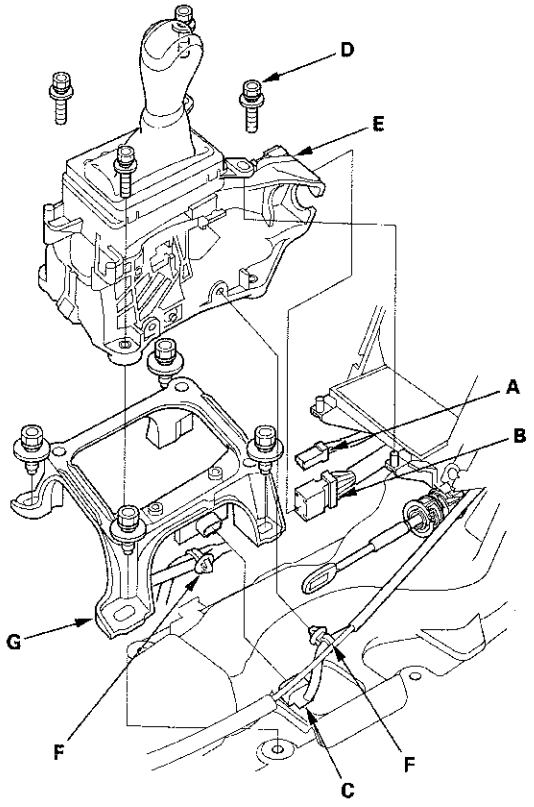
5. Rotate the socket holder retainer (A) counterclockwise (B) until it stops, and push in the retainer (C) to lock it.



6. Push the socket holder retainer (A) forward, then slide it to remove the shift cable (B) from the shift lever bracket (C). Do not remove the shift cable by pulling the shift cable guide (D).



7. Disconnect the shift lock solenoid connector (A), park pin switch/A/T gear position indicator panel light connector (B), and the sensor cluster connector (C).



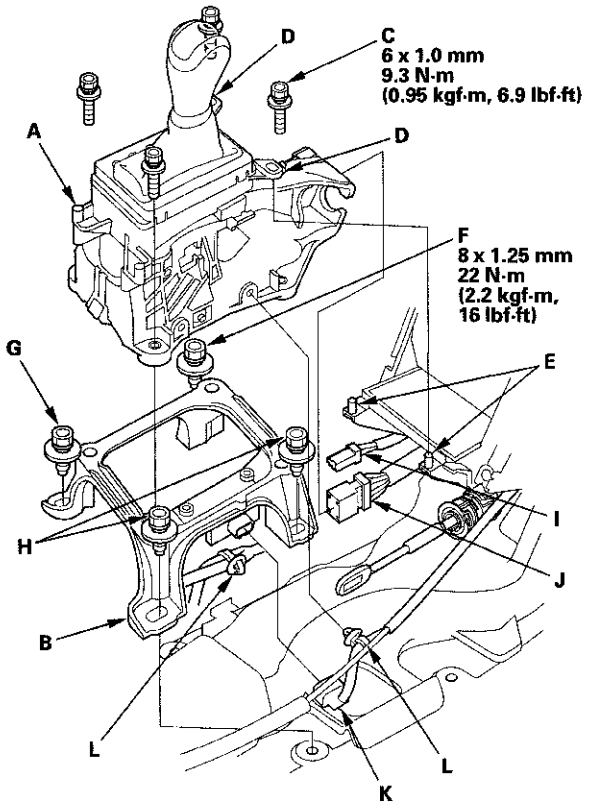
8. Remove the four bolts (D) securing the shift lever bracket (E), and remove the harness clamps (F), then remove the shift lever bracket.

9. Remove the shift lever bracket base (G).

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Shift Lever Installation

1. Install the shift lever bracket (A) on the shift lever bracket base (B) with the four bolts (C).



2. Install the shift lever assembly by aligning the positioning holes (D) with the pins (E) on the console panel.

3. Loosely install the mounting bolt (F) on the left front of the shift lever, then install and tighten the mounting bolt (G) on the left rear to 22 N·m (2.2 kgf·m, 16 lbf·ft).

4. Install and tighten the mounting bolts (H) on the right side, then tighten the left front bolt to 22 N·m (2.2 kgf·m, 16 lbf·ft).

5. Connect the shift lock solenoid connector (I), park pin switch/A/T gear position indicator panel light connector (J), and the sensor cluster connector (K).

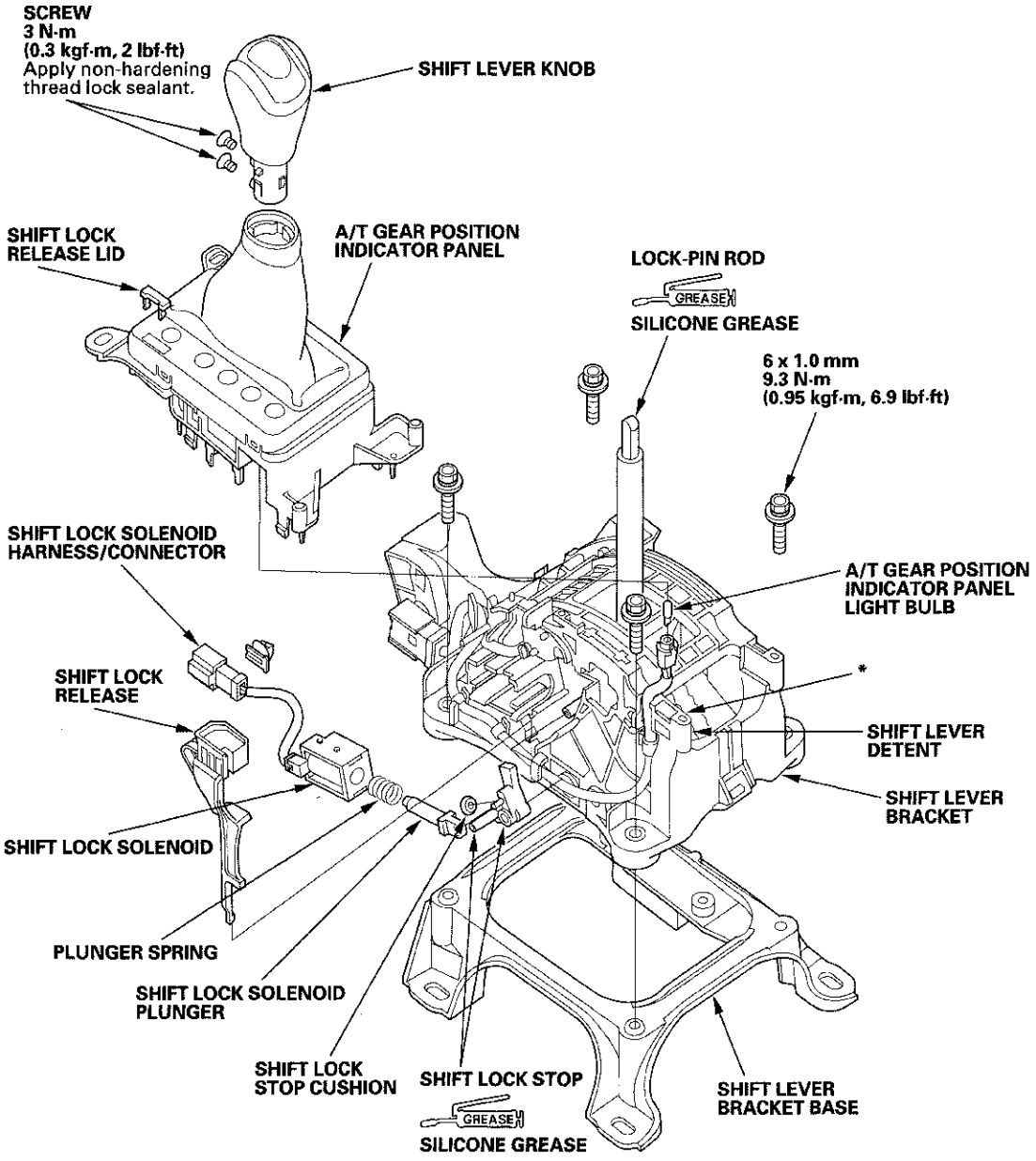
6. Install the harness clamps (L) on the shift lever bracket.

7. Install the shift cable on the shift lever bracket, and adjust the shift cable (see step 7 on page 14-239).

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Shift Lever Disassembly/Reassembly

NOTE:
- Make sure not to get any silicone grease on the terminal part of the connectors and switches, especially if you have silicone grease on your hands or gloves.
- Do not wipe off the grease that is applied to the portion of the shift lever marked with an asterisk (*) when you disassemble or assemble it because a special grease is used.

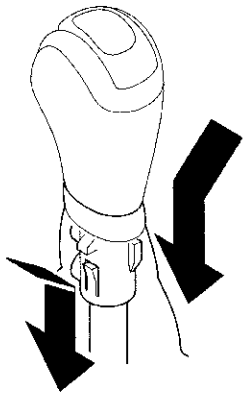


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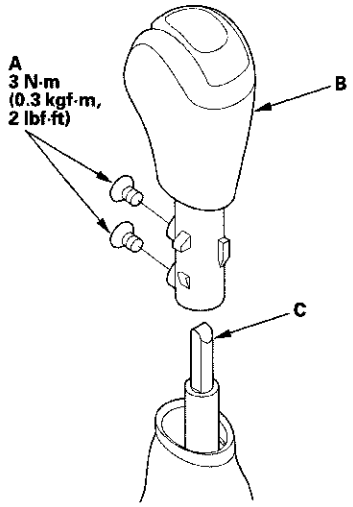
Shift Lever Knob Replacement

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

1. Grasp the shift lever boot ring, and slip it out of the shift lever knob.



2. Remove the screws (A), and remove the shift lever knob (B).



3. Apply silicone grease to the top of the lock-pin rod (C), and install the new shift lever knob over the shift lever.

4. Apply non-hardening thread lock sealant to the screw threads, and secure the shift lever knob with the screws.

5. Install the shift lever boot ring on the shift lever knob.

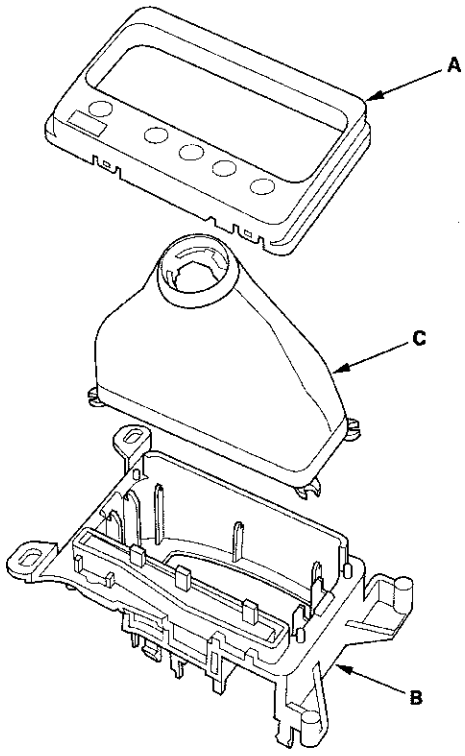
Shift Lever Boot and A/T Gear Position Indicator Panel Replacement

1. Remove the center console panel (see page 20-92).

2. Remove the shift lever knob (see page 14-234).

3. Remove the A/T gear position indicator panel light bulb socket from the indicator panel, and remove the indicator panel/shift lever boot assembly.

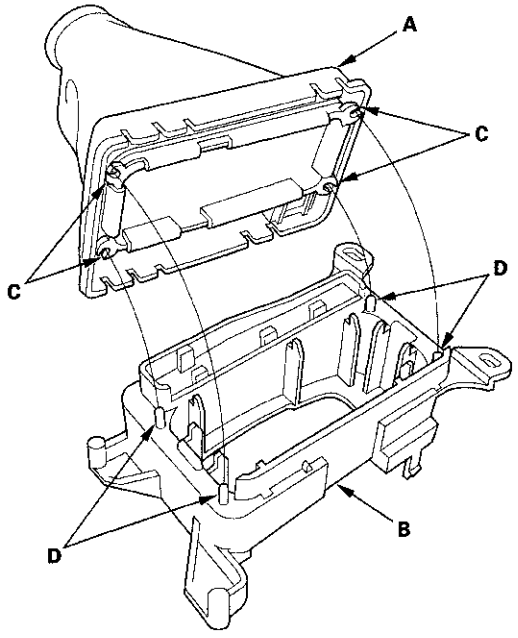
4. Disassemble the indicator panel upper (A), lower (B), and boot (C).



5. Replace the shift lever boot or A/T gear position indicator panel.

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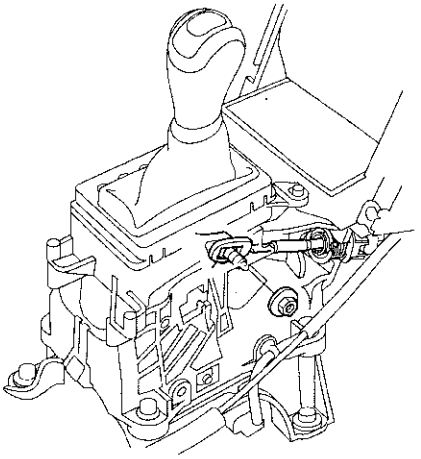
6. Install the shift lever boot (A) on the A/T gear position indicator lower panel (B) with aligning the corner slots (C) with the tabs (D) on the lower panel.



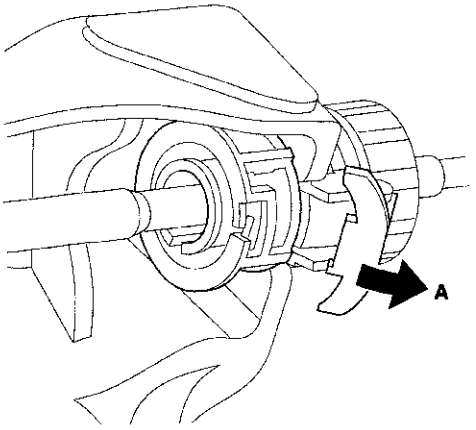
7. Install the upper panel on the lower panel.
8. Install the indicator panel/boot assembly on the shift lever bracket.
9. Install the A/T gear position indicator panel light bulb socket in the indicator panel.
10. Install the shift lever knob (see page 14-234).
11. Install the center console panel (see page 20-92).

Shift Cable Replacement

1. Raise the vehicle on a lift, and make sure it is supported securely.
2. Remove the center console (see page 20-92).
3. Shift the shift lever into R.
4. Remove the nut securing the shift cable end.



5. Unlock the retainer (A).

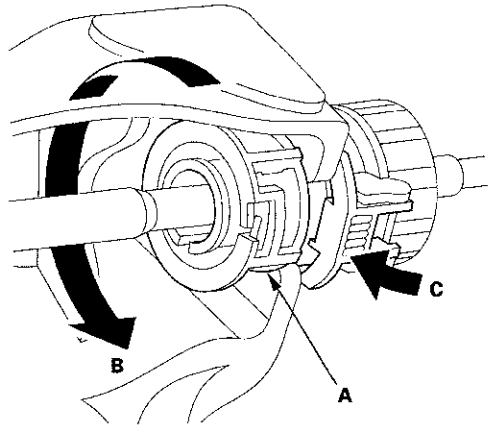


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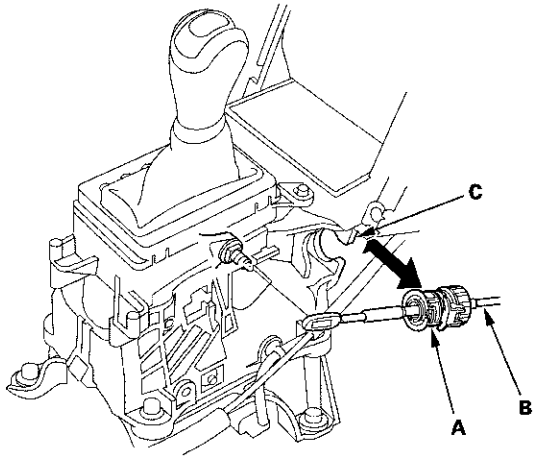
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Shift Cable Replacement (cont'd)

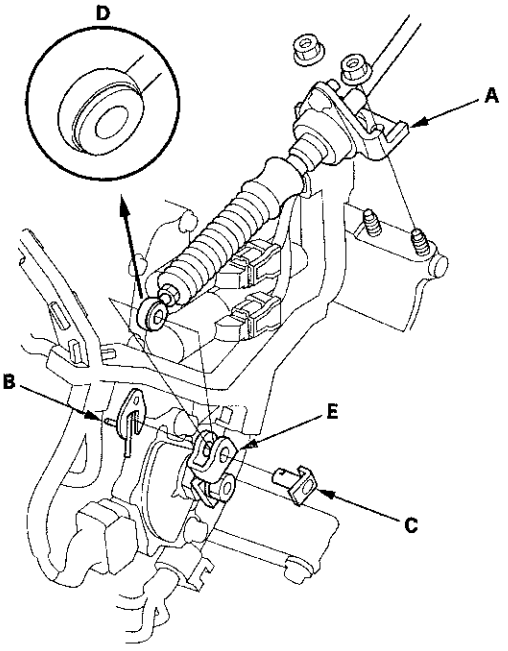
6. Rotate the socket holder retainer (A) counterclockwise (B) until it stops, and push in the retainer (C) to lock it.



7. Push the socket holder retainer (A) forward, then slide it to remove the shift cable (B) from the shift lever bracket (C).



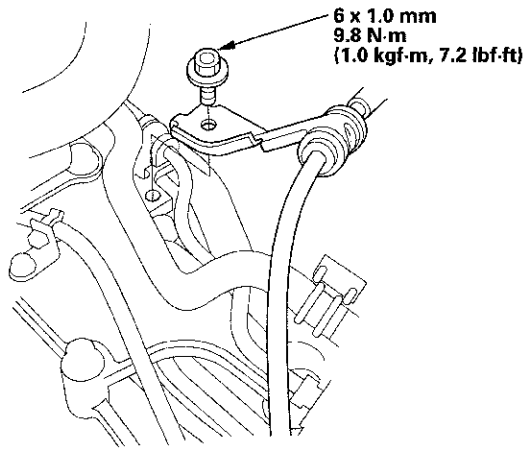
8. Do the battery removal procedure (see page 22-92).
9. Remove the battery base.
10. Remove the air cleaner (see page 11-366).
11. Remove the nuts securing the shift cable bracket (A).



12. Remove the spring clip/washer (B) and control pin (C), then separate the shift cable end (D) from the control lever (E).

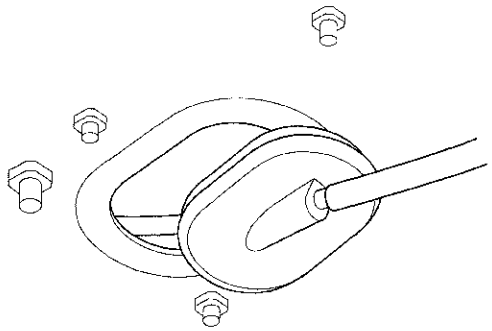
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13. Remove the shift cable bracket from the steering gearbox stiffener.



14. Remove the heat shield under the shift cable grommet.

15. Remove the shift cable grommet, and pull out the shift cable.

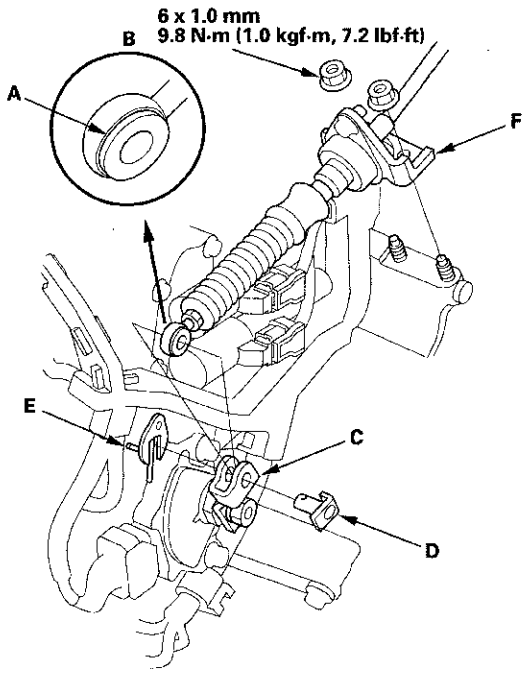


16. Insert the new shift cable through the grommet hole, and install the grommet in its hole. Do not bend the shift cable excessively.

17. Install the heat shield.

18. Secure the shift cable bracket on the steering gearbox stiffener with the bolt.

19. Apply molybdenum grease to the hole in the bushing (A) in the shift cable end (B).



20. Attach the shift cable end to the control lever (C), then insert the control pin (D) into the control lever hole through the shift cable end, and secure the control pin with the spring clip/washer (E).

21. Secure the shift cable bracket (F) with the nuts.

22. Install the shift cable on the shift lever bracket, and adjust the shift cable (see step 7 on page 14-239).

23. Install the air cleaner (see page 11-366).

24. Install the battery base.

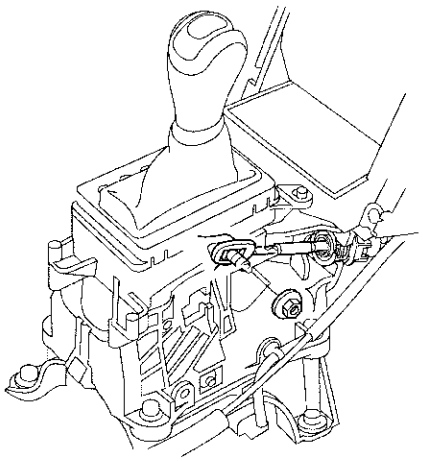
25. Do the battery installation procedure (see page 22-92).

26. Reinstall the center console (see page 20-92).

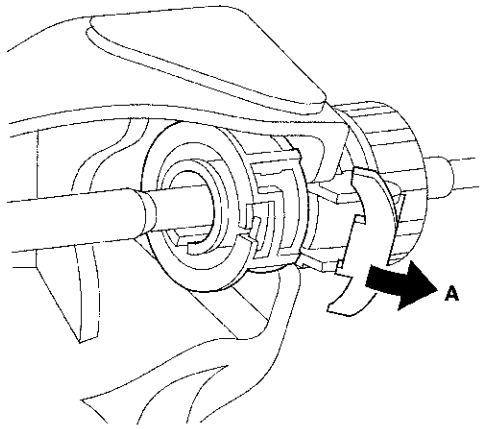
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Shift Cable Adjustment

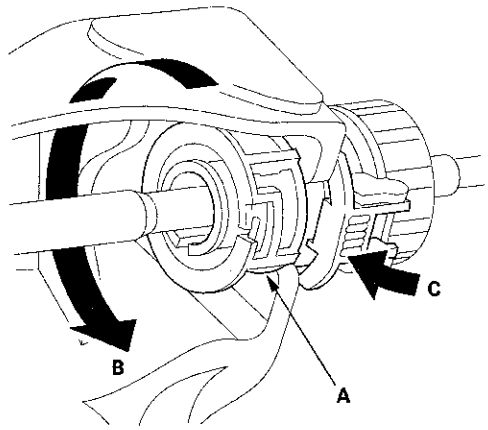
1. Remove the center console (see page 20-92).
2. Shift the shift lever into R.
3. Remove the nut securing the shift cable end.



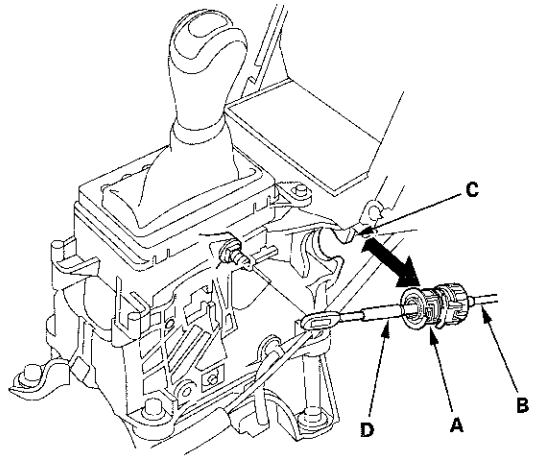
4. Unlock the retainer (A).



5. Rotate the socket holder retainer (A) counterclockwise (B) until it stops, and push in the retainer (C) to lock it.

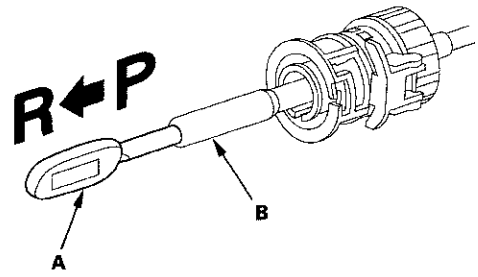


6. Push the socket holder retainer (A) forward, then slide it to remove the shift cable (B) from the shift lever bracket (C). Do not remove the shift cable by pulling the shift cable guide (D).

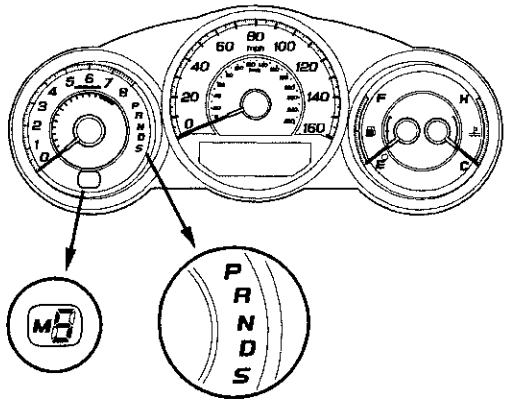


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7. Push the shift cable (A) until it stops, then release it. Pull the shift cable back one step so that the shift position is in R. Do not hold the shift cable guide (B) to adjust the shift cable.

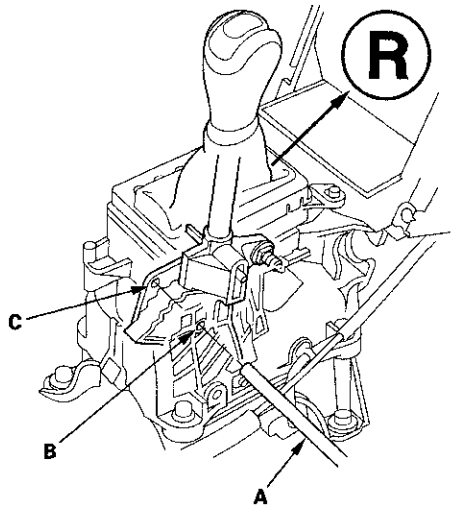


8. Turn the ignition switch to ON (II), and verify that the R position indicator comes on.



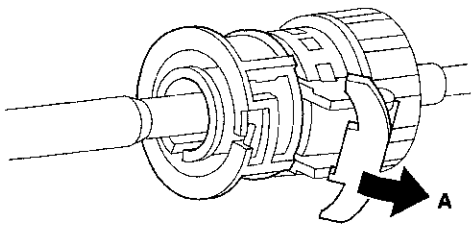
9. Turn the ignition switch to LOCK (0).

10. Place the shift lever in the R position, then insert a 6.0 mm (0.24 in) pin (A) through the positioning hole (B) on the shift lever bracket, through the positioning hole (C) on the shift lever, and into the positioning hole on the shift lever bracket.



11. Check that the shift lever is secured in the R position.

12. Unhinge the retainer lock (A).

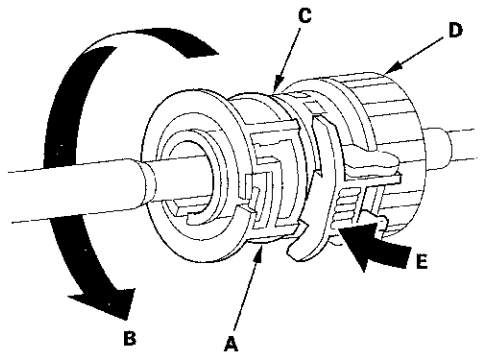


(cont'd)

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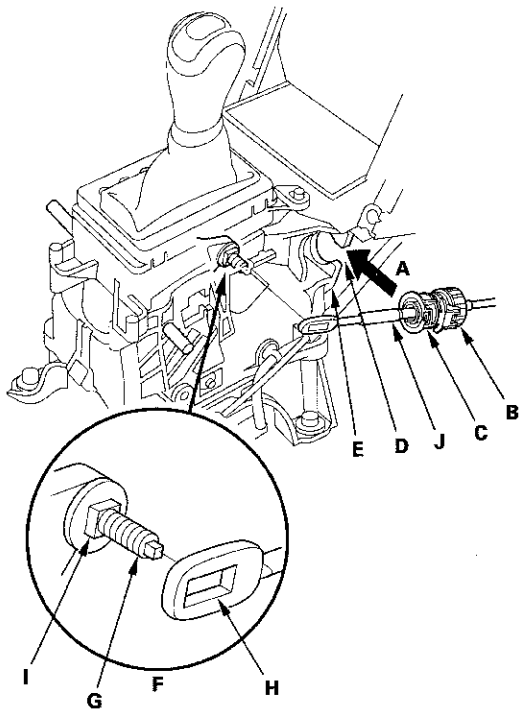
Shift Cable Adjustment (cont'd)

13. Rotate the socket holder retainer (A) counterclockwise (B) until it stops to create clearance (C) between the socket holder (D) and holder retainer, and push the retainer lock (E) into the socket holder retainer to lock the retainer.



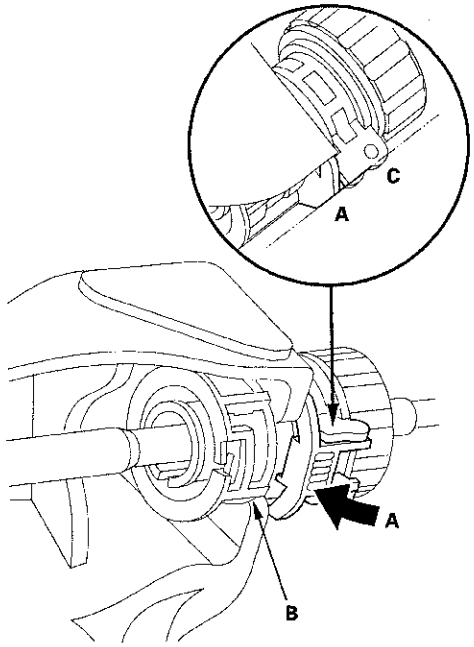
14. Align the clearance (A) between the socket holder (B) and the socket holder retainer (C) with the opening (D) in the shift lever bracket (E), then slide the holder into the bracket with installing the shift cable end (F) over the mounting stud (G) by aligning its square hole (H) with the square fitting (I) at the bottom of the stud. Do not install the shift cable by holding the shift cable guide (J).

NOTE: When the socket holder is installed in the shift lever bracket, the retainer lock is unhinged and releases the holder retainer lock, then the holder retainer returns under spring force to secure the shift cable.

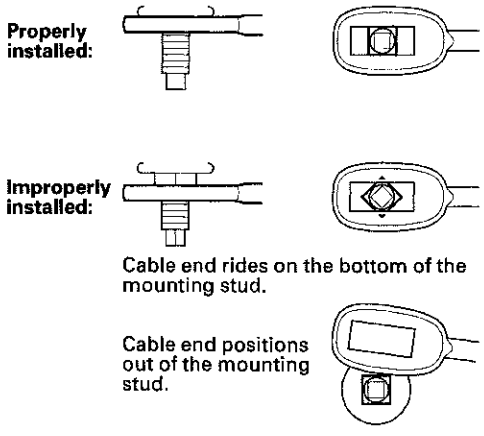


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15. Push the retainer lock (A) fully to lock the socket holder retainer (B), and make sure that the retainer lock fits into the hinged-joint (C). If the retainer lock does not fit with the edge of the hinged-joint, rotate the holder retainer counterclockwise while pushing the retainer lock until it locks.

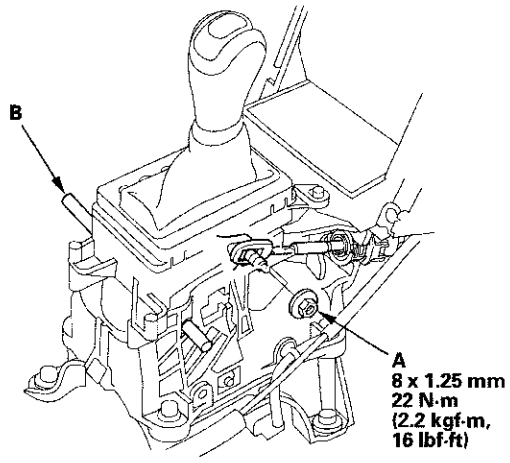


16. Check that the shift cable end is properly installed on the mounting stud.



17. If the cable end is out of position on the mounting stud, remove the shift cable from the bracket, and reinstall the shift cable. Do not install the shift cable end on the mounting stud while the shift cable is on the bracket. If the cable end rides on the bottom of the mounting stud, rotate the stud and align the square fitting with the hole.

18. Secure the shift cable end with the nut (A).



19. Remove the 6.0 mm (0.24 in) pin (B) that was installed to hold the shift lever.

20. Turn the ignition switch to ON (II). Move the shift lever to each position, and check that the A/T gear position indicator follows the transmission range switch.

21. Allow all four wheels to rotate freely.

22. Start the engine, and check the shift lever operation in all shift lever positions.

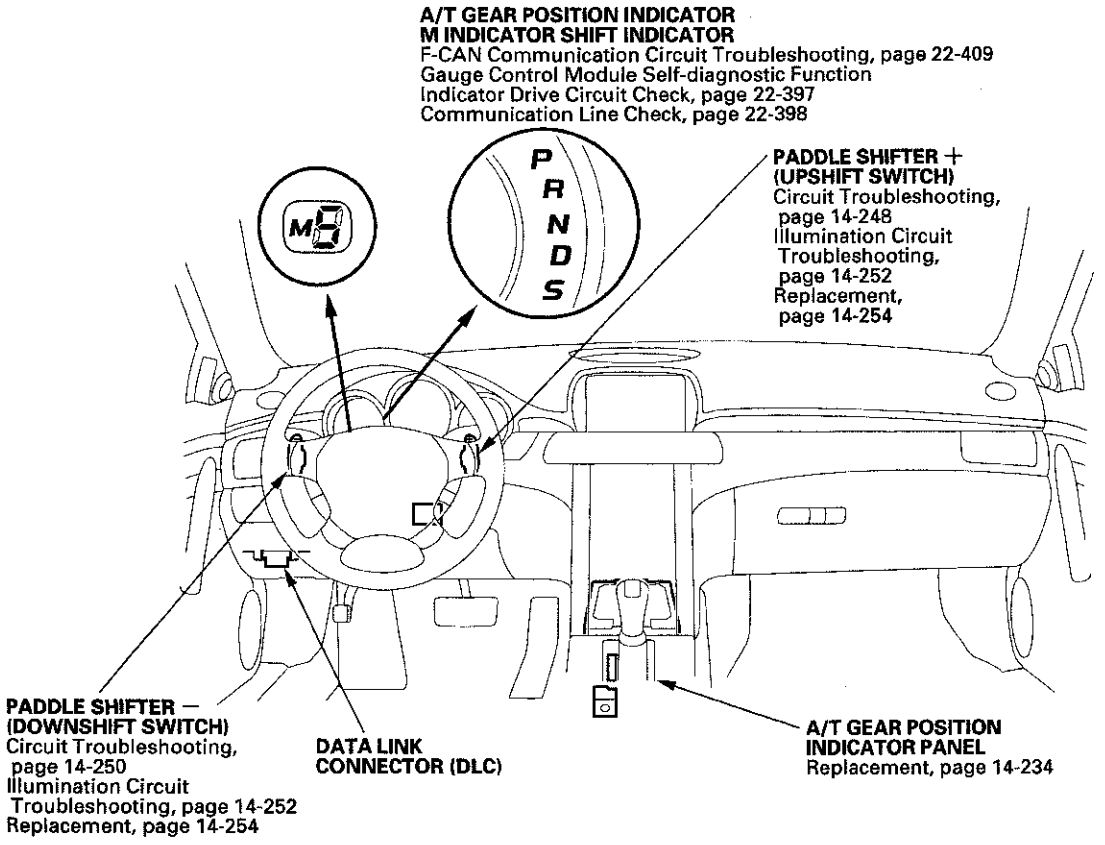
23. Turn the engine off, shift into P, and check that the shift lock works properly. Push the shift lock release, and check that the shift lever releases.

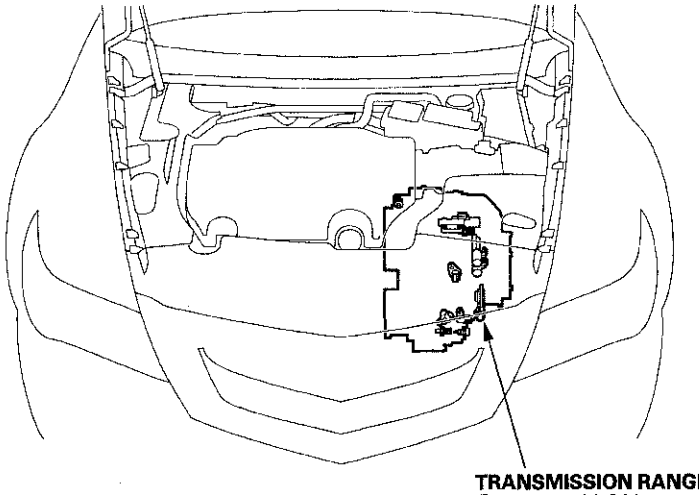
24. Reinstall the center console (see page 20-92).

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A/T Gear Position Indicator

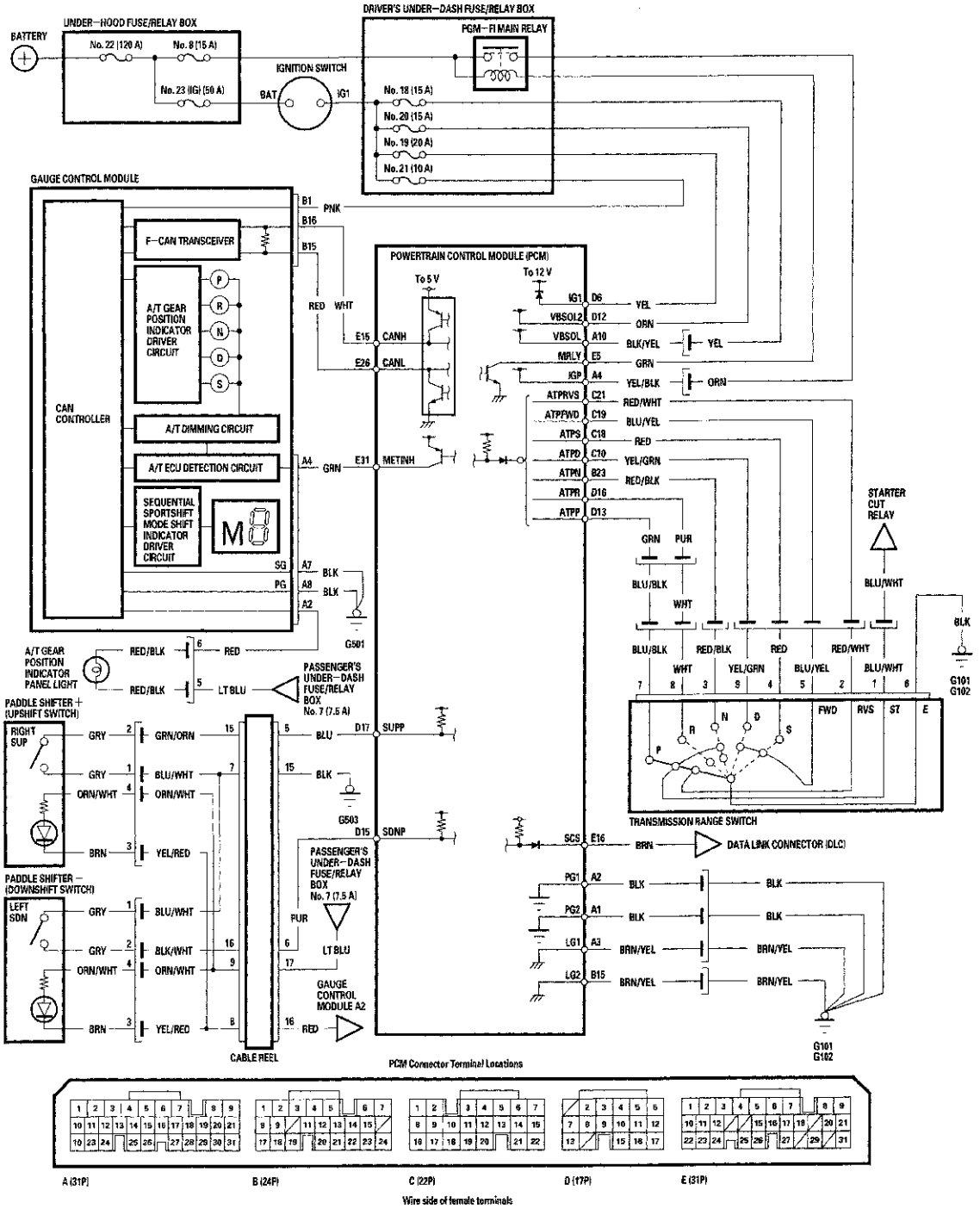
Component Location Index





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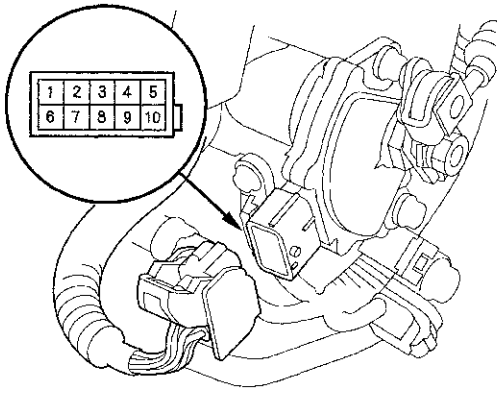
Circuit Diagram



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Transmission Range Switch Test

1. Do the battery removal procedure (see page 22-92).
2. Remove the battery base.
3. Remove the air cleaner (see page 11-366).
4. Disconnect the transmission range switch connector.



5. Check for continuity between terminals at the switch connector. There should be continuity between the terminals in the following table for each switch position.

Transmission Range Switch Connector

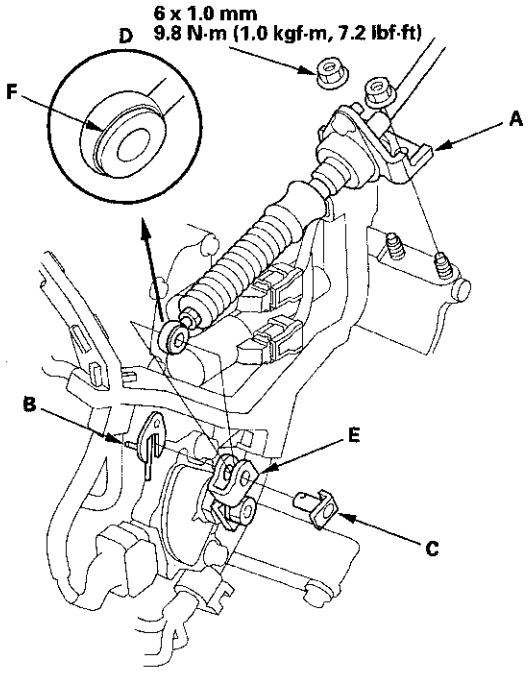
Position/Connector Terminal/Signal Connections										
	1	2	3	4	5	6	7	8	9	10
	ATP ST	ATP RVS	N	S	ATP FWD	GND	P	R	D	—
P	○	○				○	○			
R		○				○		○		
N	○	○	○			○				
D					○	○			○	
S				○	○	○				

6. Transmission range switch test is finished if the test results are OK.
   If there is no continuity between any terminals, check that the transmission range switch installation. If the switch installation is OK, replace the switch (see page 14-245).
7. Install the air cleaner (see page 11-366).
8. Install the battery base.
9. Do the battery installation procedure (see page 22-92).

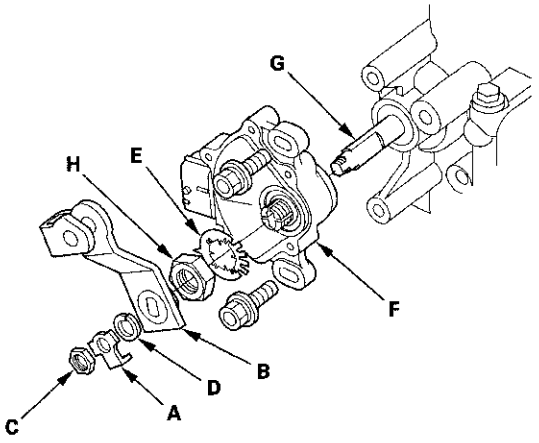
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Transmission Range Switch Replacement

1. Do the battery removal procedure (see page 22-92).
2. Remove the air cleaner (see page 11-366).
3. Remove the battery base.
4. Remove the nuts securing the shift cable bracket (A).



5. Remove the spring clip/washer (B) and control pin (C), then separate the shift cable end (D) from the control lever (E).
6. Check the bushing (F) in the shift cable end for a proper fit and wear. If the bushing is loose or worn, replace the shift cable (see page 14-235).
7. Disconnect the transmission range switch connector.
8. Pry the lock tab of the lock washer (A) on the control lever (B), and remove the nut (C), lock washer, spring washer (D) and control lever.



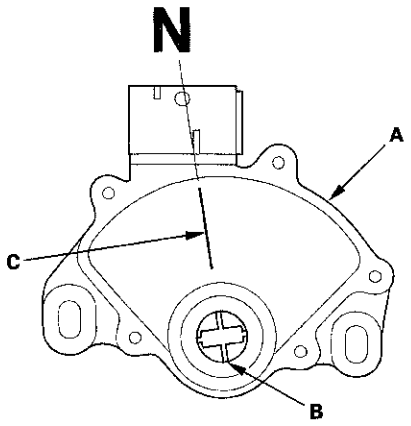
9. Pry the lock tabs of the lock washer (E) on the transmission range switch (F), hold the selector control shaft (G) with a 6.0 mm wrench, and loosen the locknut (H).
10. Remove the locknut and lock washer, then remove the transmission range switch (two bolts).

(cont'd)

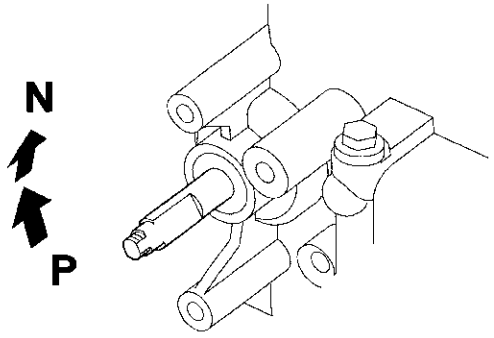
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Transmission Range Switch Replacement (cont'd)

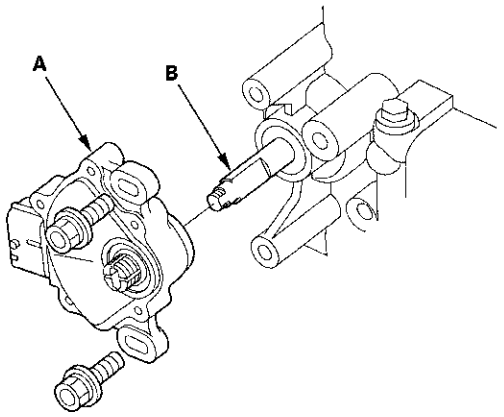
11. Set the new transmission range switch (A) to the N position. The transmission range switch clicks in the N position, and the control shaft hole (B) aligns with the N position line (C).



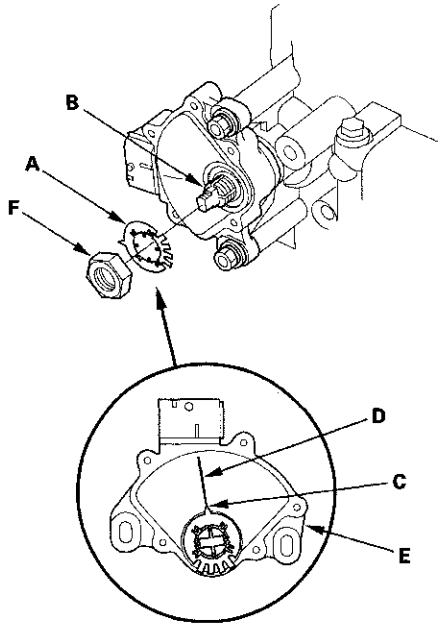
12. With a 6.0 mm wrench, turn the control shaft fully counterclockwise (viewed from the shaft end) to the P position. Turn the control shaft back two click-stopped positions so that it is in the N position.



13. Install the transmission range switch (A) gently over the control shaft (B), and install the bolts loosely.

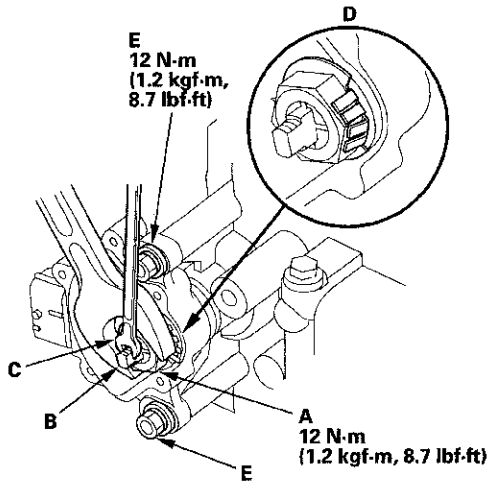


14. Install the new lock washer (A) over the control shaft (B) while aligning the indicator tab (C) of the lock washer with the N positioning line (D) on the transmission range switch (E), and install the locknut (F).



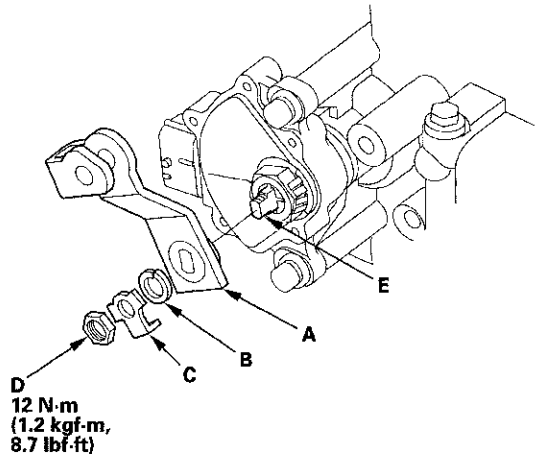
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15. Push the locknut against the transmission housing to seat the transmission range switch into the control shaft, and tighten the locknut (A) to 12 N·m (1.2 kgf·m, 8.7 lbf·ft) while holding the control shaft (B) with a 6.0 mm wrench (C), then bend the lock tabs (D) of the lock washer against the locknut.



16. Tighten the bolts (E) securing the transmission range switch to 12 N·m (1.2 kgf·m, 8.7 lbf·ft).

17. Install the control lever (A), spring washer (B), lock washer (C), and locknut (D) on the control shaft (E).



18. Check the connectors for rust, dirt, or oil, and clean or repair if necessary, then connect the connector securely.

19. Apply molybdenum grease to the hole in the bushing in the shift cable end. Attach the shift cable end to the control lever, then insert the control pin into the control lever hole through the shift cable end, and secure the control pin with the spring clip/ washer.

20. Secure the shift cable bracket with the nuts.

21. Install the battery base.

22. Install the air cleaner (see page 11-366).

23. Do the battery installation procedure (see page 22-92).

24. Turn the ignition switch ON (II). Move the shift lever through all positions, and verify that the transmission range switch matches with the A/T gear position indicator.

25. Check that the engine starts in P and N, and does not start in any other shift lever position.

26. Check that the back-up lights come on when the shift lever is in R.

27. Raise the vehicle on a lift, allow all four wheels to rotate freely, then start the engine, and check the shift lever operation.

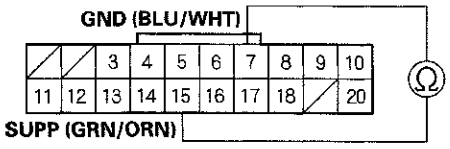
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Paddle Shifter + (Upshift Switch) Circuit Troubleshooting

SRS components are located in this area. Review the SRS component locations (see page 24-12) and the precautions and procedures (see page 24-14) in the SRS before doing repair or service.

1. Remove the steering wheel (see page 17-22).
2. Check for continuity between steering switch harness 20P connector terminals No. 7 and No. 15 while pressing and releasing paddle shifter.

STEERING SWITCH HARNESS 20P CONNECTOR



Wire side of female terminals

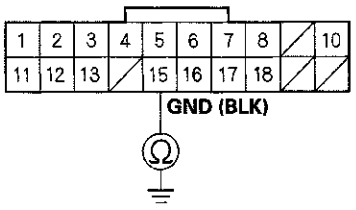
Is there continuity while pressing the paddle shifter + (upshift switch), and no continuity when the paddle shifter + is released?

YES—Go to step 3.

NO—Go to step 9.

3. Remove the cable reel (see page 24-212).
4. Check for continuity cable reel 20P connector terminal No. 15 and body ground.

CABLE REEL 20P CONNECTOR



Wire side of female terminals

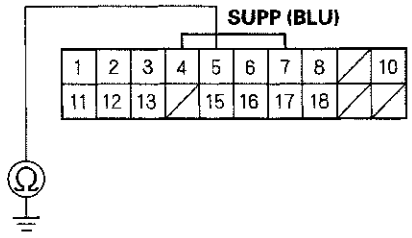
Is there continuity?

YES—Go to step 5.

NO—Repair an open in the wire between cable reel 20P connector terminal No. 15 and ground (G503), or repair poor ground (G503). ■

5. Check for continuity between cable reel 20P connector terminal No. 5 and body ground.

CABLE REEL 20P CONNECTOR



Wire side of female terminals

Is there continuity?

YES—Repair a short in the wire between cable reel 20P connector terminal No. 5 and PCM connector terminal D17. ■

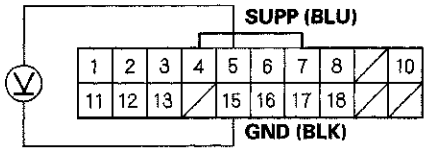
NO—Go to step 6.

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6. Turn the ignition switch to ON (II), and shift to S.

7. Measure the voltage between cable reel 20P connector terminals No. 5 and No. 15.

CABLE REEL 20P CONNECTOR



Wire side of female terminals

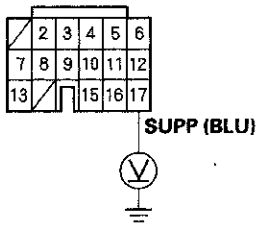
Is there battery voltage?

YES—Replace the cable reel (see page 24-212).■

NO—Go to step 8.

8. Measure the voltage between PCM connector terminal D17 and body ground.

PCM CONNECTOR D (17P)



Wire side of female terminals

Is there battery voltage?

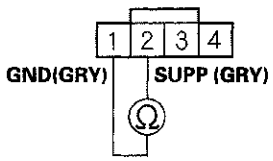
YES—Repair an open in the wire between PCM connector terminal D17 and cable reel 20P connector.■

NO—Check for loose or poor connections at PCM connector terminal D17. If the connection is OK, substitute a known-good PCM (see page 11-7) and recheck.■

9. Disconnect the paddle shifter + (upshift switch) connector.

10. Check for continuity between paddle shifter + (upshift switch) connector terminals No. 1 and No. 2 while pressing and releasing the paddle shifter.

PADDLE SHIFTER +
(UPSHIFT SWITCH) CONNECTOR



Wire side of female terminals

Is there continuity while pressing the paddle shifter +, and no continuity when the paddle shifter + is released?

YES—Replace the steering switch harness (see page 17-23).■

NO—Replace the paddle shifter + (upshift switch) (see page 14-254).■

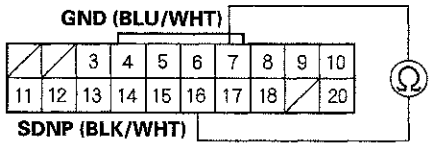
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Paddle Shifter - (Downshift Switch) Circuit Troubleshooting

SRS components are located in this area. Review the SRS component locations (see page 24-12) and the precautions and procedures (see page 24-14) in the SRS before doing repair or service.

1. Remove the steering wheel (see page 17-22).
2. Check for continuity between steering switch harness 20P connector terminals No. 7 and No. 16 while pressing and releasing paddle shifter.

STEERING SWITCH HARNESS 20P CONNECTOR



Wire side of female terminals

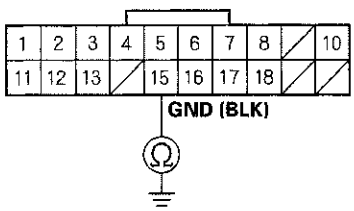
Is there continuity while pressing the paddle shifter — (downshift switch), and no continuity when the paddle shifter — is released?

YES—Go to step 3.

NO—Go to step 9.

3. Remove the cable reel (see page 24-212).
4. Check for continuity cable reel 20P connector terminal No. 15 and body ground.

CABLE REEL 20P CONNECTOR



Wire side of female terminals

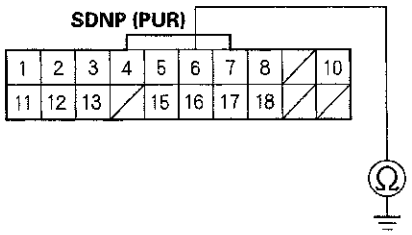
Is there continuity?

YES—Go to step 5.

NO—Repair an open in the wire between cable reel 20P connector terminal No. 15 and ground (G503), or repair poor ground (G503).■

5. Check for continuity between cable reel 20P connector terminal No. 6 and body ground.

CABLE REEL 20P CONNECTOR



Wire side of female terminals

Is there continuity?

YES—Repair a short in the wire between cable reel 20P connector terminal No. 6 and PCM connector terminal D15.■

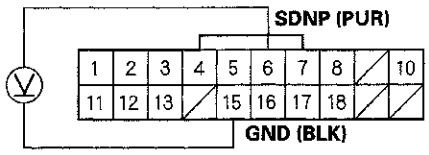
NO—Go to step 6.

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6. Turn the ignition switch to ON (II), and shift to S.

7. Measure the voltage between cable reel 20P connector terminals No. 6 and No. 15.

CABLE REEL 20P CONNECTOR



Wire side of female terminals

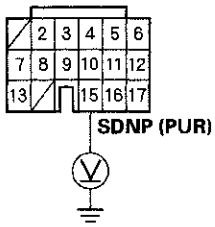
Is there battery voltage?

YES—Replace the cable reel (see page 24-212).■

NO—Go to step 8.

8. Measure the voltage between PCM connector terminal D15 and body ground.

PCM CONNECTOR D (17P)



Wire side of female terminals

Is there battery voltage?

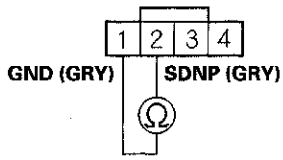
YES—Repair an open in the wire between PCM connector terminal D15 and cable reel 20P connector.■

NO—Check for loose or poor connections at PCM connector terminal D15. If the connection is OK, substitute a known-good PCM (see page 11-7) and recheck.■

9. Disconnect the paddle shifter — (downshift switch) connector.

10. Check for continuity between paddle shifter — (downshift switch) connector terminals No. 1 and No. 2 while pressing and releasing the paddle shifter.

PADDLE SHIFTER — (DOWNSHIFT SWITCH) CONNECTOR



Wire side of female terminals

Is there continuity while pressing the paddle shifter —, and no continuity when the paddle shifter — is released?

YES—Replace the steering switch harness (see page 17-23).■

NO—Replace the paddle shifter — (downshift switch) (see page 14-254).■

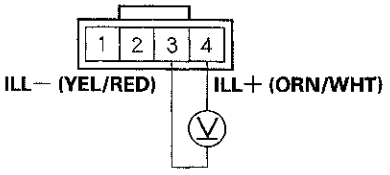
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Paddle Shifter Illumination Circuit Troubleshooting

SRS components are located in this area. Review the SRS component locations (see page 24-12), and the precautions and procedures (see page 24-14) in the SRS before doing repair or service.

1. Remove the driver's airbag from the steering wheel (see page 24-197).
2. Disconnect the paddle shifter + (upshift switch) connector or the paddle shifter — (downshift switch) connector.
3. Turn the ignition switch to ON (II), and turn the lighting switch ON.
4. Measure the voltage between paddle shifter (+ or —) connector terminals No. 3 and No. 4.

PADDLE SHIFTER CONNECTOR



Terminal side of male terminals

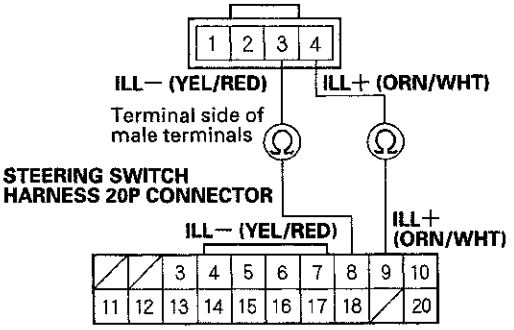
Is there battery voltage?

YES—
- Replace the paddle shifter + (upshift switch) (see page 14-254) when you check the paddle shifter + illumination line.■
- Replace the paddle shifter — (downshift switch) (see page 14-254) when you check the paddle shifter — illumination line.■

NO—Go to step 5.

5. Turn off the lighting switch, and turn the ignition switch to LOCK (0).
6. Remove the steering wheel (see page 17-22).
7. Check for continuity between steering switch harness 20P connector terminal No. 8 and paddle shifter connector terminal No. 3, and between 20P connector terminal No. 9 and paddle shifter connector terminal No. 4.

PADDLE SHIFTER CONNECTOR



Wire side of female terminals

Are there continuity?

YES—Go to step 8.

NO—Replace the steering switch harness (see page 17-23).■

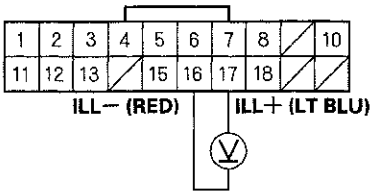
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8. Remove the cable reel (see page 24-212).

9. Turn the ignition switch to ON (II), and turn the lighting switch ON.

10. Measure the voltage between cable reel 20P connector terminals No. 16 and No. 17.

CABLE REEL 20P CONNECTOR



Wire side of female terminals

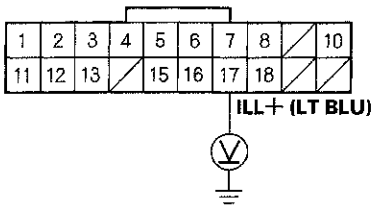
Is there battery voltage?

YES—Replace the cable reel (see page 24-212). ■

NO—Go to step 11.

11. Measure the voltage between cable reel 20P connector terminal No. 17 and body ground.

CABLE REEL 20P CONNECTOR



Wire side of female terminals

Is there battery voltage?

YES—Repair an open in the wire between cable reel 20P connector terminal No. 16 and gauge control module. ■

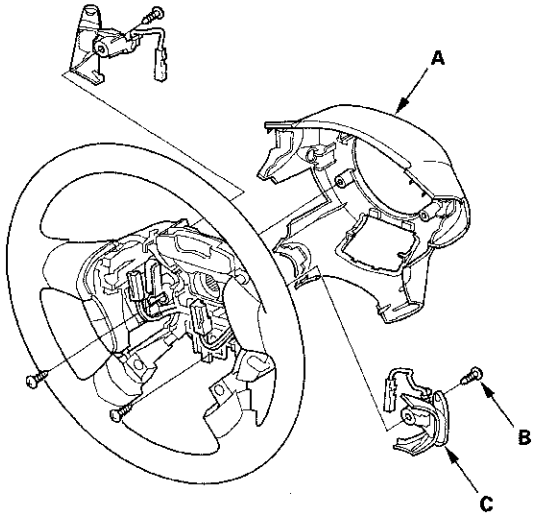
NO—Check for a blown No. 7 (7.5 A) fuse in the passenger's under-dash fuse/relay box. If the fuse is OK, repair an open or a short in the wire between cable reel 20P connector terminal No. 17 and the passenger's under-dash fuse/relay box. ■

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Paddle Shifter + (Upshift Switch) or Paddle Shifter - (Downshift Switch) Replacement

SRS components are located in this area. Review the SRS component locations (see page 24-12) and the precautions and procedures (see page 24-14) in the SRS before doing repair or service.

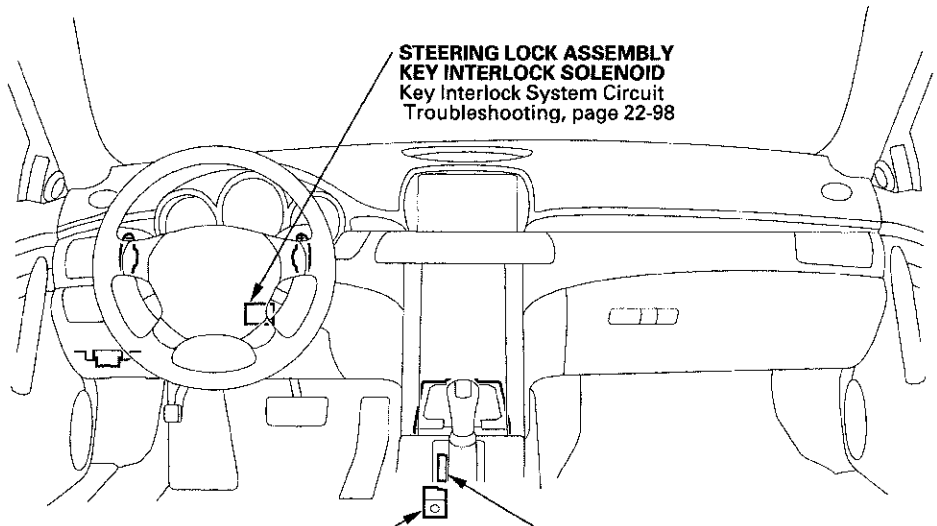
1. Remove the steering wheel (see page 17-22).
2. Remove the steering wheel rear cover (A).



3. Remove the paddle shifter + (upshift switch) or the paddle shifter — (downshift switch) connector from its holder, and disconnect the connector.
4. Remove the screw (B) securing the paddle shifter + or paddle shifter — (C), then remove and replace the paddle shifter + or paddle shifter —.
5. Install the new paddle shifter + or paddle shifter — with the screw, connect the connector, and install the connector in the holder.
6. Install the steering wheel rear cover.
7. Install the steering wheel (see page 17-24).

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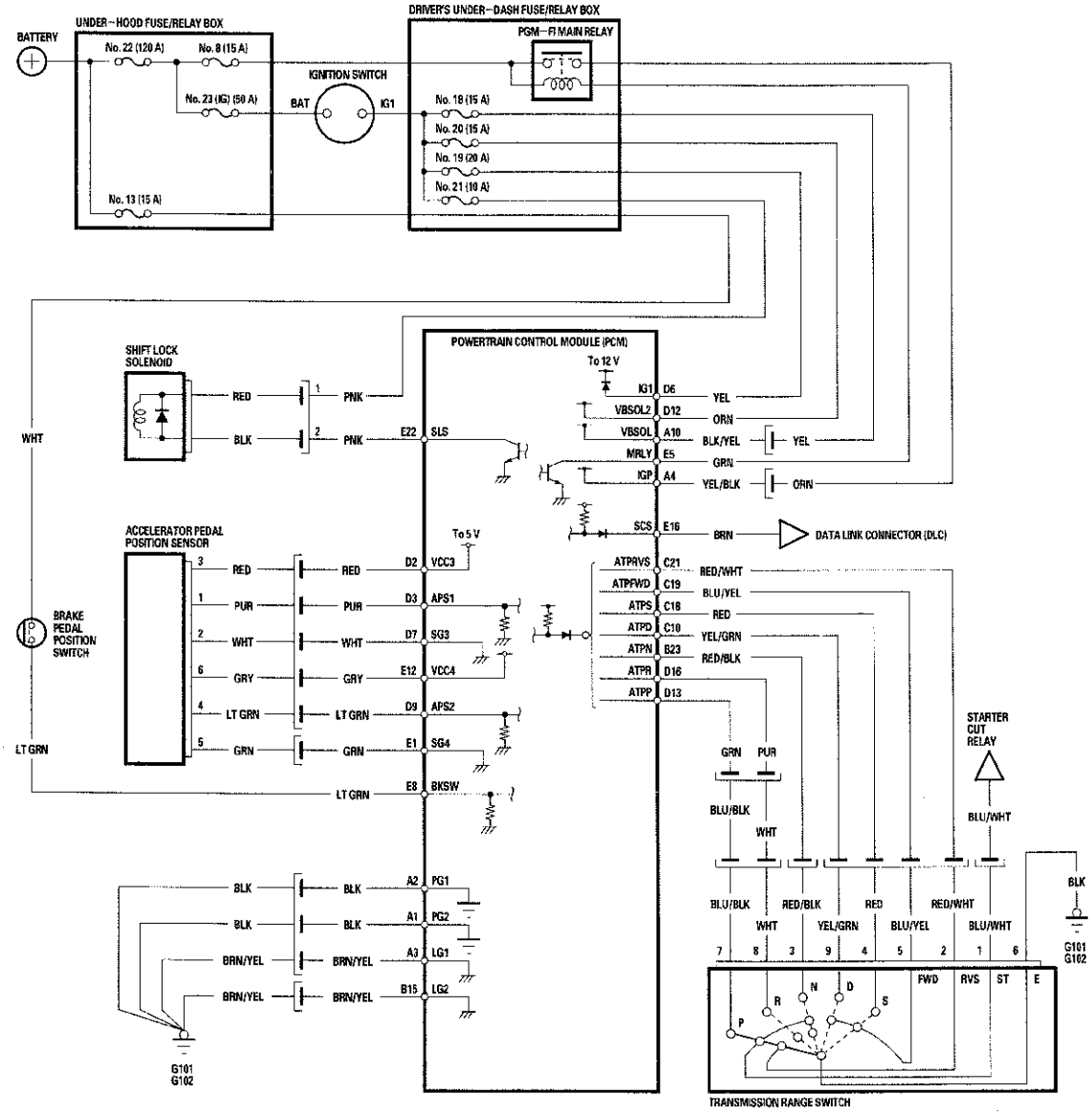
Component Location Index



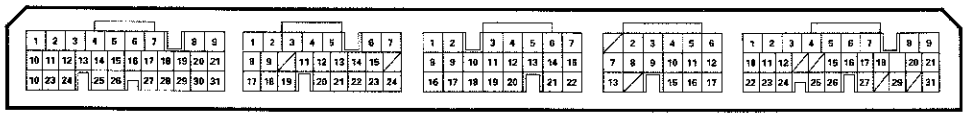
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A/T Interlock System

Circuit Diagram



PCM Connector Terminal Locations



A (31P) B (24P) C (22P) D (17P) E (31P)

Wire side of female terminals

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Shift Lock System Circuit Troubleshooting

1. Connect the HDS to the DLC.
2. Turn the ignition switch to ON (II). Make sure the HDS communicates with the PCM. If it does not, go to the DLC circuit troubleshooting (see page 11-211).
3. Select Shift Lock Solenoid Test in the Miscellaneous Test Menu, and check that the shift lock solenoid operates with the HDS.

   Does the shift lock solenoid work properly?

   YES—Go to step 4.

   NO—Go to step 7.
4. Check the Brake Switch signal with the HDS in the A/T data list while pressing and releasing the brake pedal.

   Does the brake switch signal change from on to off while pressing and releasing the brake pedal?

   YES—Go to step 5.

   NO—Troubleshoot the brake pedal position switch signal circuit (see page 11-311).■
5. Check the ATP Switch signal with the HDS in the A/T data list. The shift lever must be in P.

   Is the ATP Switch ON?

   YES—Go to step 6.

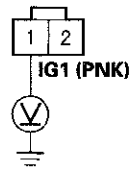
   NO—Go to step 20.
6. Check the accelerator pedal position (APP) sensor A with the HDS in the A/T data list. Do not press the accelerator.

   Is the APP sensor A opening 5 % or more, or the APP sensor A voltage 1.16 V or higher?

   YES—Check the APP sensor (see page 11-281).■

   NO—Update the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7), and recheck. If the symptom goes away with a known-good PCM, replace the original PCM (see page 11-232).■
7. Turn the ignition switch to LOCK (0).
8. Remove the center console (see page 20-92).
9. Disconnect the shift lock solenoid connector.
10. Turn the ignition switch to ON (II).
11. Measure the voltage between shift lock solenoid connector terminal No. 1 and body ground.

SHIFT LOCK SOLENOID CONNECTOR



Wire side of female terminals

Is there battery voltage?

YES—Go to step 12.

NO—Check for a blown No. 21 (10 A) fuse in the driver's under-dash fuse/relay box. If the fuse is OK, repair an open or a short in the wire between the shift lock solenoid connector and the driver's under-dash fuse/relay box.■

(cont'd)

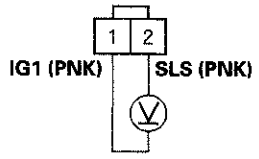
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Shift Lock System Circuit Troubleshooting (cont'd)

12. Shift to P, and press the brake pedal. Do not press the accelerator.

13. Measure the voltage between shift lock solenoid connector terminals No. 1 and No. 2 while pressing the brake pedal.

SHIFT LOCK SOLENOID CONNECTOR



Wire side of female terminals

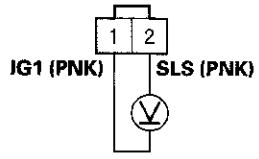
Is there battery voltage?

YES—Go to step 14.

NO—Go to step 16.

14. Release the brake pedal, and measure the voltage between shift lock solenoid connector terminals No. 1 and No. 2. The shift lever must be in P.

SHIFT LOCK SOLENOID CONNECTOR



Wire side of female terminals

Is there battery voltage?

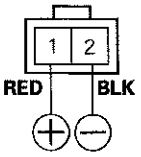
YES—Repair a short in the wire between PCM connector terminal E22 and the shift lock solenoid connector.■

NO—Go to step 15.

15. Connect a jumper wire from the negative battery terminal to shift lock solenoid connector terminal No. 2, and connect another jumper wire from the positive battery terminal to connector terminal No. 1, then check that the shift lock solenoid operates.

NOTE: Do not connect the positive battery terminal to the connector terminal No. 2 or you will damage the diode inside the shift lock solenoid.

SHIFT LOCK SOLENOID CONNECTOR



Terminal side of male terminals

Does the shift lock solenoid operate properly?

YES—Check the shift lock mechanism. Replace the shift lock stop and stop cushion (see page 14-262), if the shift lock stop is worn or stuck.■

NO—Replace the shift lock solenoid (see page 14-261).■

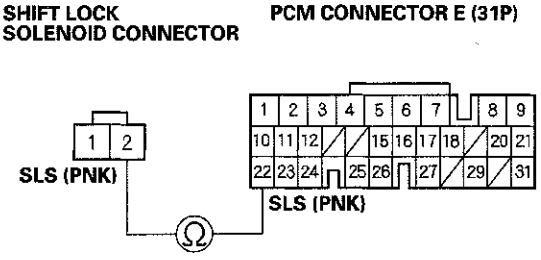
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16. Turn the ignition switch to LOCK (0).

17. Jump the SCS line with the HDS.

18. Disconnect PCM connector E (31P).

19. Check for continuity between PCM connector terminal E22 and shift lock solenoid connector terminal No. 2.



Wire side of female terminals

Is there continuity?

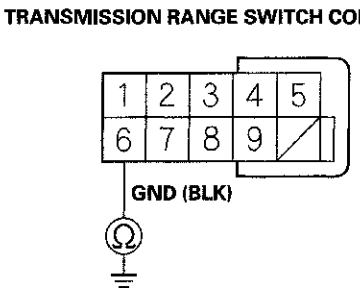
YES—Update the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7), and recheck. If the symptom goes away with a known-good PCM, replace the original PCM (see page 11-232). ■

NO—Repair an open in the wire between PCM connector terminal E22 and shift lock solenoid connector. ■

20. Turn the ignition switch to LOCK (0).

21. Disconnect the transmission range switch connector.

22. Check for continuity between transmission range switch connector terminal No. 6 and body ground.



Wire side of female terminals

Is there continuity?

YES—Go to step 23.

NO—Repair an open in the wire between transmission range switch and ground (G101, G102), or repair poor ground (G101, G102). ■

(cont'd)

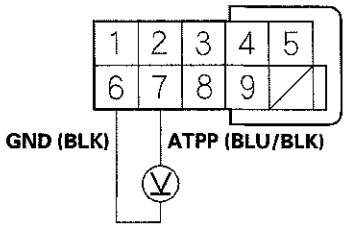
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Shift Lock System Circuit Troubleshooting (cont'd)

23. Turn the ignition switch to ON (II).

24. Measure the voltage between transmission range switch connector terminals No. 6 and No. 7.

TRANSMISSION RANGE SWITCH CONNECTOR



Wire side of female terminals

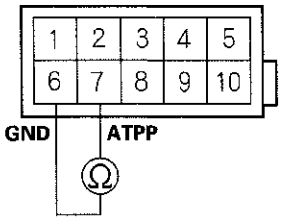
Is there battery voltage?

YES—Go to step 25.

NO—Repair an open in the wire between PCM connector terminal D13 and the transmission range switch. ■

25. Check for continuity between transmission range switch connector terminals No. 6 and No. 7 in all five shift lever position.

TRANSMISSION RANGE SWITCH CONNECTOR



Terminal side of male terminals

Is there continuity while the shift lever is in P and no continuity while the shift lever is in R, N, D, and S?

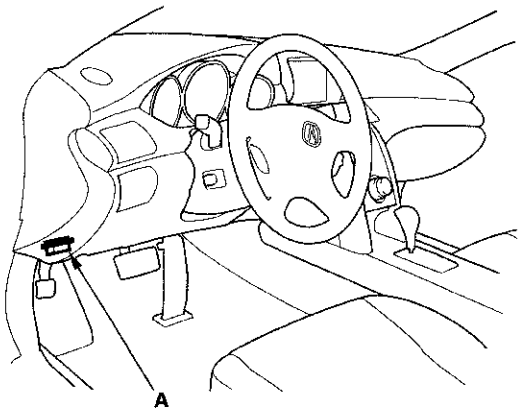
YES—Update the PCM if it does not have the latest software (see page 11-230), or substitute a known-good PCM (see page 11-7), and recheck. If the symptom goes away with a known-good PCM, replace the original PCM (see page 11-232). ■

NO—Replace the transmission range switch (see page 14-245). ■

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Shift Lock Solenoid Test

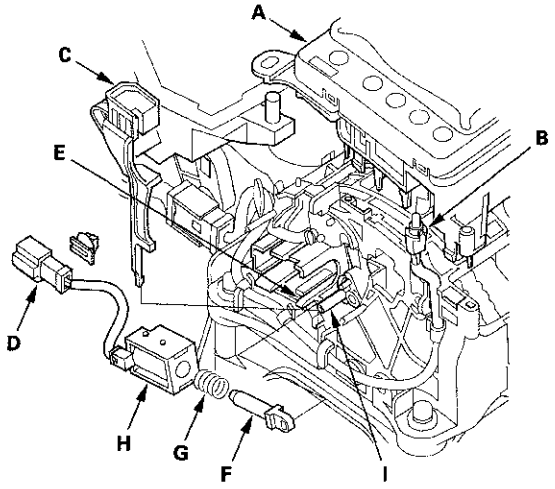
1. Connect the HDS to the DLC (A).
2. Turn the ignition switch to ON (II). Make sure the HDS communicates with the PCM. If it does not, go to the DLC circuit troubleshooting (see page 11-211).



3. Select Shift Lock Solenoid Test in the Miscellaneous Test Menu, and check that the shift lock solenoid operates with the HDS.
4. Check that the shift lever can be moved out of P when Shift Lock Solenoid: ON. Move the shift lever back in P, and make sure it locks with Shift Lock Solenoid: OFF.
5. Check that the shift lock releases when the shift lock release is pushed, and check that it locks when the shift lock release is released.
6. If the shift lock solenoid works improperly, troubleshoot shift lock system circuit (see page 14-257).

Shift Lock Solenoid Replacement

1. Remove the center console (see page 20-92).
2. Move the A/T gear position indicator panel (A) up from the shift lever bracket by releasing the locks, and remove the indicator light socket (B) from the indicator panel.



3. Remove the shift lock release (C).
4. Remove the shift lock solenoid connector (D) from the shift lever bracket.
5. Release the lock tab (E) retaining the shift lock solenoid to slide the shift lock solenoid out.
6. Install the shift lock solenoid plunger (F) and plunger spring (G) in the new shift lock solenoid (H).
7. Apply silicone grease to the tip of the shift lock stop (I) and solenoid plunger. Keep the connector terminals free of silicone grease.
8. Install the new shift lock solenoid assembly by aligning the joint of the shift lock solenoid plunger with the tip of the shift lock stop.
9. Install the shift lock solenoid connector on the shift lever bracket.
10. Install the shift lock release.

(cont'd)

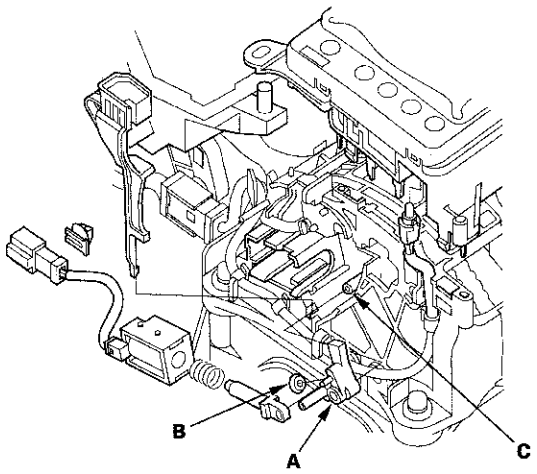
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Shift Lock Solenoid Replacement (cont'd)

11. Install the A/T gear position indicator panel on the shift lever bracket by aligning the positioning holes with the tips on the console panel.
12. Install the A/T gear position indicator panel light socket in the indicator panel.
13. Install the center console (see page 20-92).

Shift Lock Stop, Shift Lock Stop Cushion Replacement

1. Remove the shift lock solenoid assembly (see page 14-261).
2. Remove the shift lock stop (A) and shift lock stop cushion (B), and replace the shift lock stop and/or shift lock stop cushion.

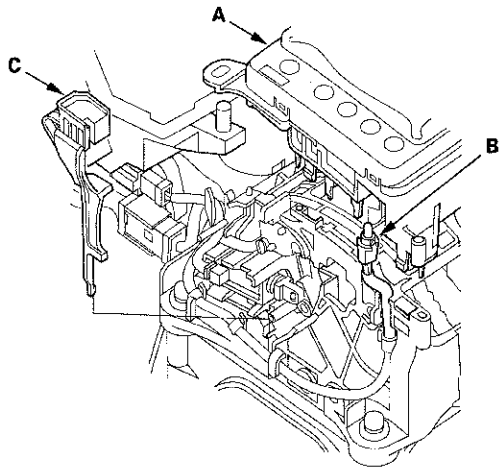


3. Apply silicone grease to the pin (C) on the shift lever bracket base, and install the shift lock stop over the pin. Keep the connector terminals free of silicone grease.
4. Install the shift lock solenoid assembly (see page 14-261).

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Shift Lock Release Replacement

1. Remove the center console (see page 20-92).
2. Move the A/T gear position indicator panel (A) up from the shift lever bracket by releasing the locks, and remove the indicator light socket (B) from the indicator panel.



3. Remove the shift lock release (C), and replace it.
4. Install the shift lock release.
5. Install the A/T gear position indicator panel on the shift lever bracket by aligning the positioning holes with the tips on the console panel.
6. Install the A/T gear position indicator panel light socket in the indicator panel.
7. Install the center console (see page 20-92).

Park Pin Switch Replacement

NOTE: The park pin switch is installed in the shift lever bracket, and not available separately from the shift lever bracket; replace the park pin switch and the shift lever bracket.

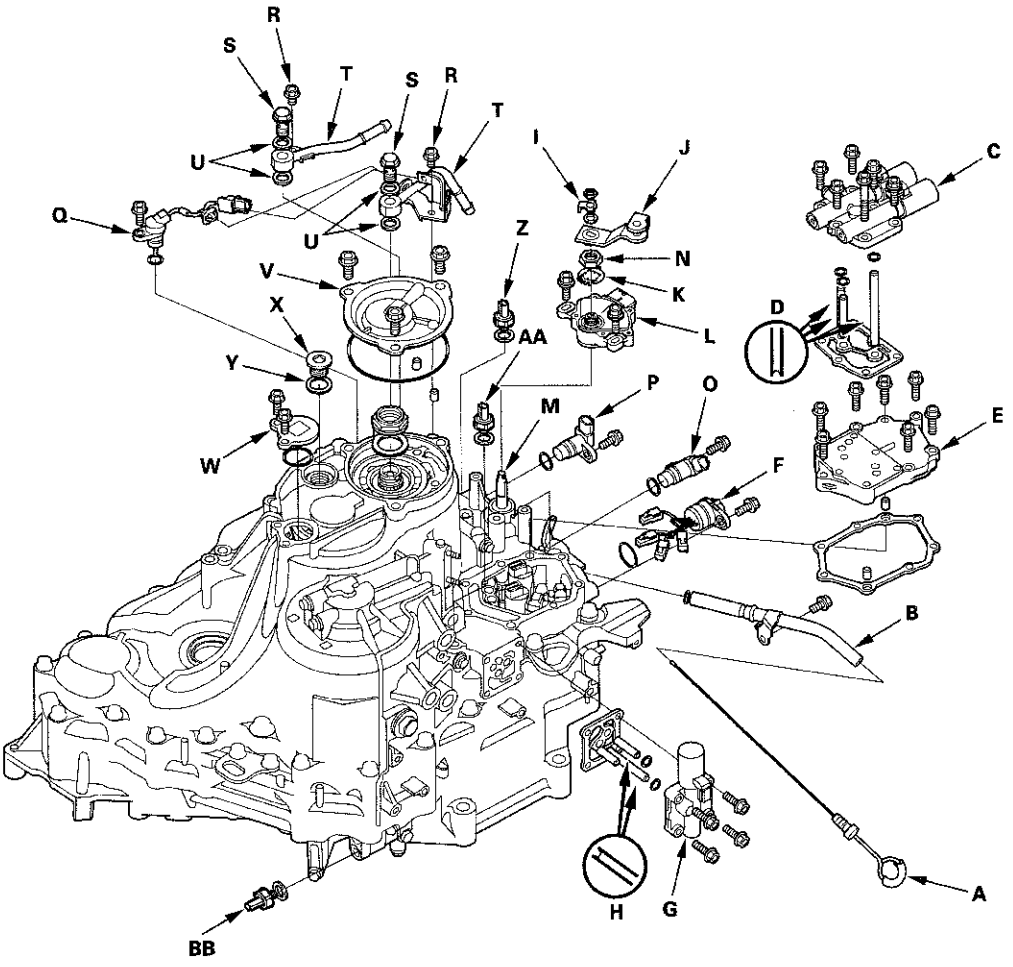
1. Remove the shift lever (see page 14-230).
2. Disassemble the shift lever (see page 14-233).
3. Replace the park pin switch and the shift lever bracket.
4. Assemble the shift lever.
5. Install the shift lever (see page 14-232).

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Transmission Disassembly

Special Tools Required
Mainshaft holder 07GAB-PF50101 or 07GAB-PF50100

1. Remove the ATF dipstick (A) and the dipstick tube (B).



2. Remove A/T clutch pressure control solenoid valves A and B (C) (six bolts), ATF feed pipes (D) (three), O-rings (three), and gasket.

3. Remove the solenoid valve cover (E) (seven bolts), dowel pins (two), and gasket.

4. Disconnect the solenoid valve connectors, then remove the solenoid harness connector (F).

5. Remove A/T clutch pressure control solenoid valve C (G) (four bolts), ATF feed pipes (H) (three), O-rings (two), and gasket.

6. Pry the lock tab of the lock washer (I) on the control lever (J), and remove the nut, lock washer, spring washer, and control lever.

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7. Pry the lock tabs of the lock washer (K) on the transmission range switch (L), hold the control shaft (M) with a 6.0 mm wrench, and loosen the locknut (N).

8. Remove the locknut and lock washer, then remove the transmission range switch (two bolts).

9. Remove the input shaft (mainshaft) speed sensor (O) and output shaft (countershaft) speed sensor (P).

10. Remove the ATF temperature sensor connector from the clamp bracket on the ATF cooler line, then remove the ATF temperature sensor (Q).

11. Remove the 6.0 mm bolts (R), line bolts (S), ATF cooler lines (T), and sealing washers (U).

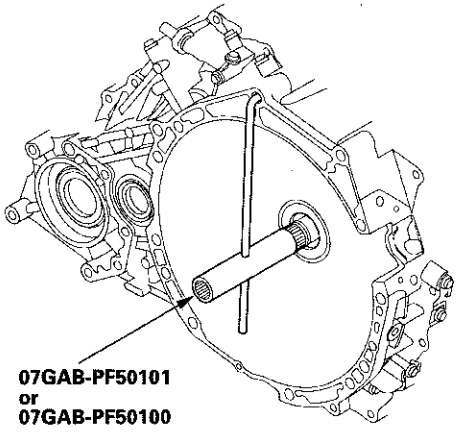
12. Remove the end cover (V) (three bolts), snap ring cap (W) (two bolts), sealing plug (X), and washer (Y).

13. Remove the 3rd clutch transmission fluid pressure switch (Z) and sealing washer.

14. Remove the 4th clutch transmission fluid pressure switch (AA) and sealing washer.

15. Remove the 2nd clutch transmission fluid pressure switch (BB) and sealing washer.

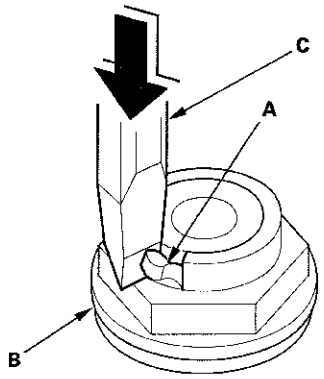
16. Slip the mainshaft holder onto the mainshaft.



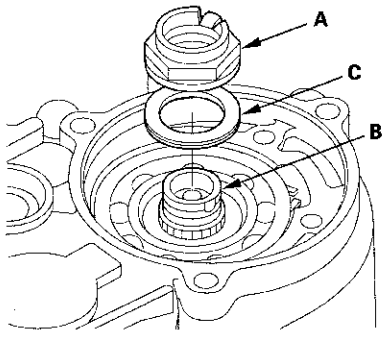
07GAB-PF50101
or
07GAB-PF50100

17. Cut the lock tab (A) off the mainshaft locknut (B) using a chisel (C).

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



18. Remove the locknut (A) from the mainshaft (B).



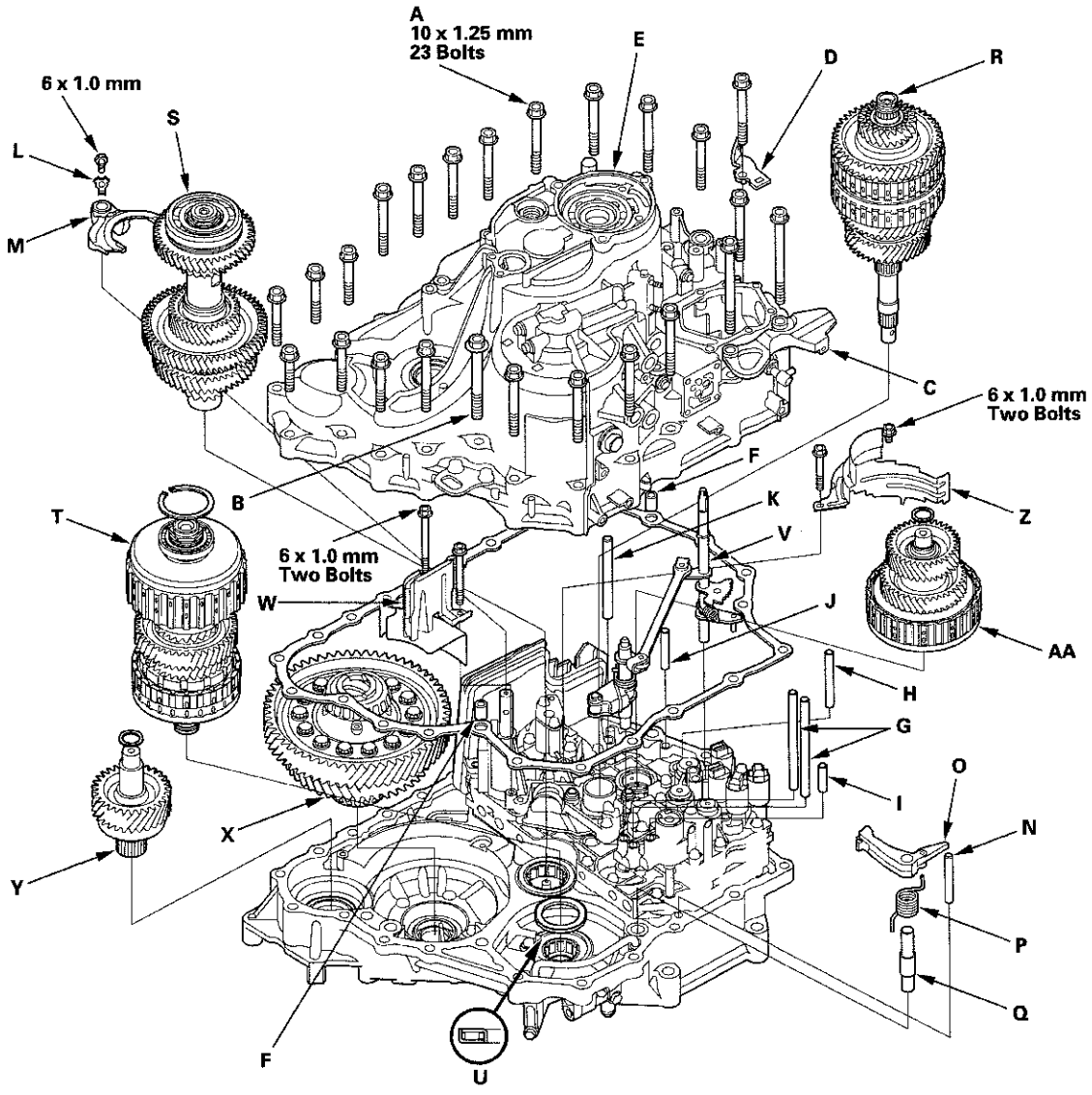
19. Pry the splined washer (C) and remove it.

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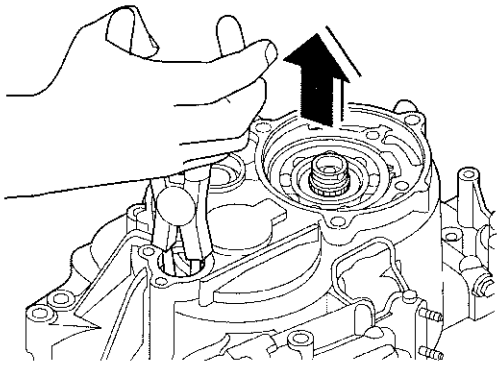
Transmission Disassembly (cont'd)

20. Remove the transmission housing mounting bolts (A) (23 bolts), 12 x 1.25 mm bolt (B), transmission hanger (C), and ground terminal bracket (D).



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21. While expanding the snap ring of the countershaft bearing with snap ring pliers, lift the transmission housing.



22. Release the pliers, and remove the transmission housing (E), two dowel pins (F), and gasket.

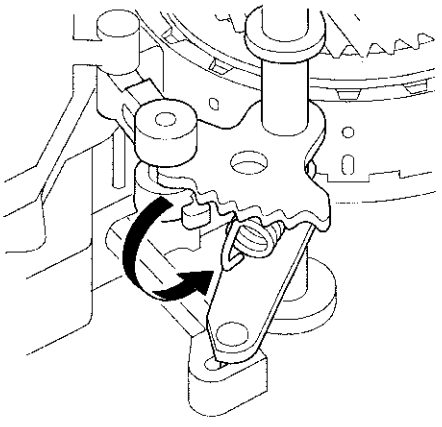
23. Remove the 8 x 151.5 mm ATF feed pipes (G) (two), 8 x 85 mm pipe (H), and 8 x 40 mm pipe (I) from the accumulator body.

24. Remove the 8 x 57.5 mm ATF feed pipe (J) and 10 x 123 mm pipe (K) from the torque converter housing.

25. Remove the mainshaft holder from the mainshaft.

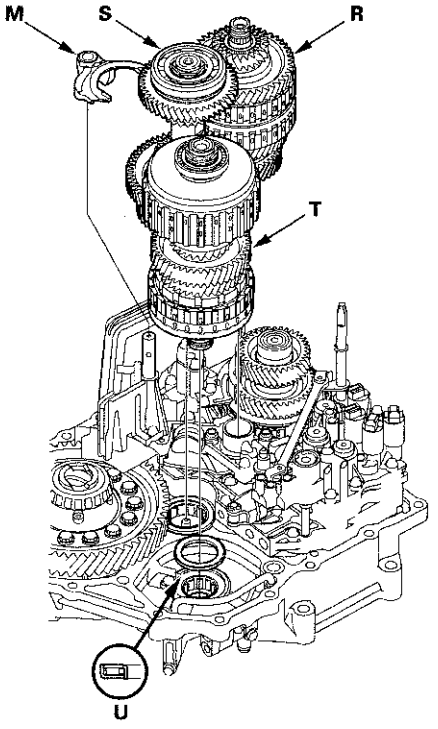
26. Pry the lock tab of the lock washer (L) on the shift fork (M), then remove the bolt and lock washer.

27. Unhook the detent spring from the detent arm.



28. Remove the park pawl stop (N), park pawl (O), pawl spring (P), and pawl shaft (Q).

29. Remove the mainshaft (R), countershaft (S), shift fork (M), and secondary shaft (T) together, and remove the needle bearing (U) from the torque converter housing.



30. Remove the selector control shaft and park lever link (V).

31. Remove the baffle plate (W).

32. Remove the differential assembly (X).

33. Remove the transfer output shaft (Y).

34. Remove the baffle plate (Z).

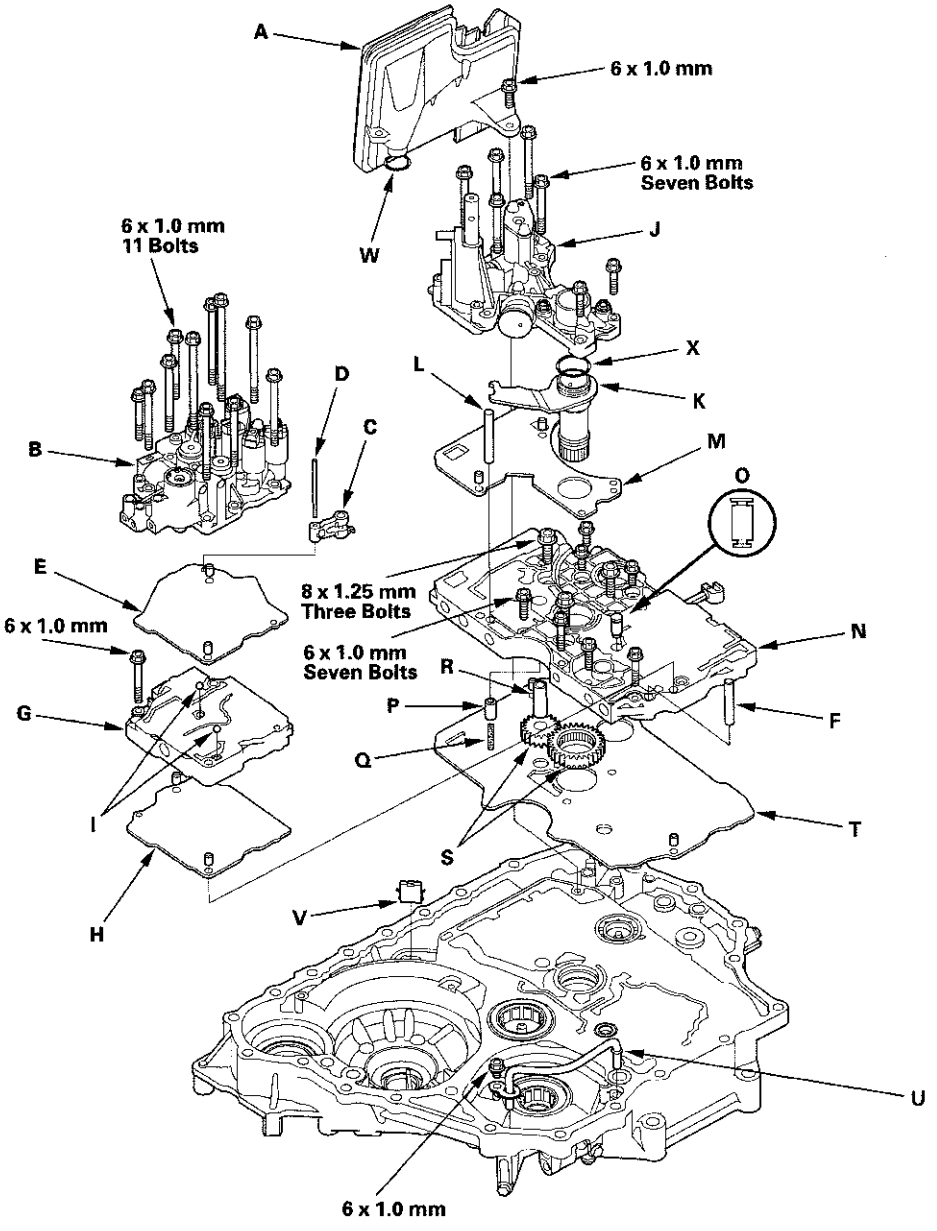
35. Remove the intermediary shaft (AA).

(cont'd)

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Transmission Disassembly (cont'd)

36. Remove the ATF strainer (A) (one bolt).



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37. Remove the accumulator body (B) (11 bolts), dowel pins (two), detent arm (C), arm shaft (D), and separator plate (E).

38. Remove the 8 x 62 mm ATF feed pipe (F) from the main valve body.

39. Remove the secondary valve body (G) (one bolt), dowel pins (two), and separator plate (H). Do not let the check balls (I) (two) fall out.

40. Remove the regulator valve body (J) (seven bolts), stator shaft (K), stator shaft stop (L), dowel pins (two), and separator plate (M).

41. Remove the main valve body (N) (8 mm: three bolts, 6 mm: seven bolts). Do not let the lubrication check valve (O) fall out.

42. Remove the torque converter check valve (P) and valve spring (Q).

43. Remove the ATF pump driven gear shaft (R), then remove the ATF pump gears (S).

44. Remove the dowel pins (two) and main separator plate (T).

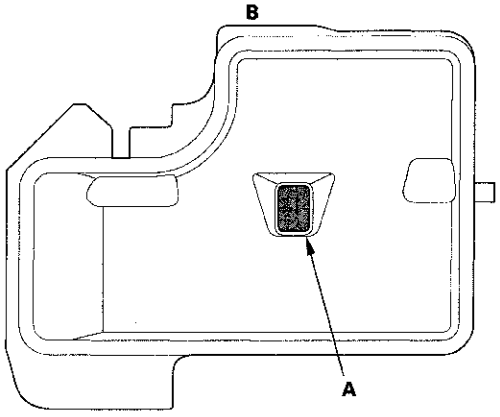
45. Remove the ATF passage pipe (U) (one bolt).

46. Remove the ATF magnet (V), clean it, then reinstall it in the torque converter housing.

47. Remove the O-ring (W) from the ATF strainer, and replace it with a new O-ring when reassembling the transmission.

48. Remove the O-ring (X) from the stator shaft, and replace it with a new O-ring when reassembling the transmission.

49. Clean the inlet opening (A) of the ATF strainer (B) thoroughly with compressed air, then check that it is good condition and that the inlet opening is not clogged.

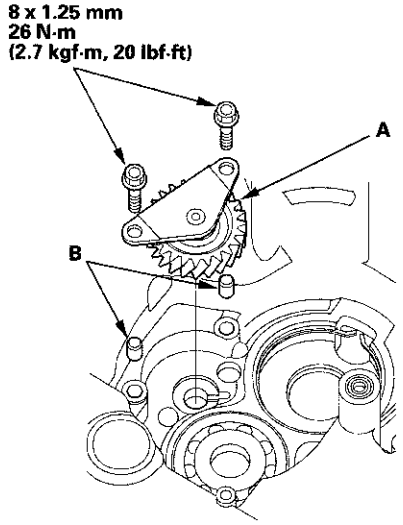


50. Test the ATF strainer by pouring clean ATF through the inlet opening, and replace if it is clogged or damaged.

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Reverse Idler Gear Removal/ Installation

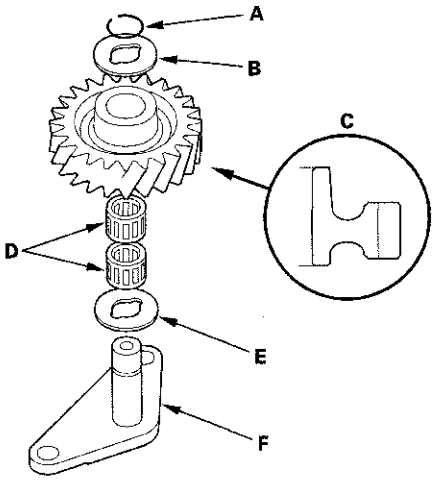
1. Remove the reverse idler gear assembly (A) from the transmission housing.



2. Install the reverse idler gear assembly with the two dowel pins (B) in the transmission housing.

Reverse Idler Gear Disassembly/ Inspection/Reassembly

1. Remove the snap ring (A), then remove the thrust washer (B), reverse idler gear (C), needle bearings (D), and thrust washer (E) from the reverse idler gear shaft/holder (F).

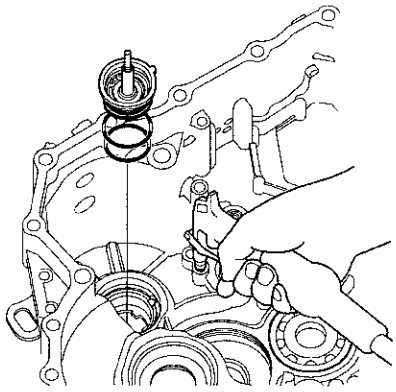


2. Inspect the reverse idler gear and gear shaft for excessive wear and damage.
3. Inspect the needle bearings for galling and rough movement.
4. Install the thrust washer and needle bearings over the gear shaft.
5. Install the reverse idler gear in the direction shown.
6. Install the thrust washer, then install the snap ring to secure the idler gear.

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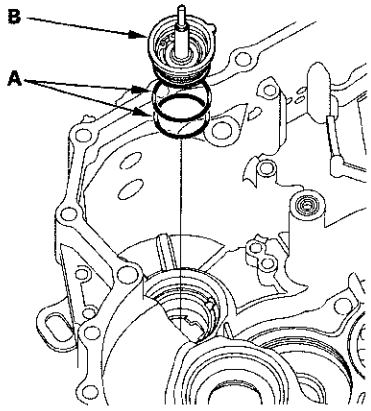
Secondary Shaft ATF Feed Pipe Cap Removal

1. Cover the tip of the 1st-hold clutch ATF feed pipe with a shop rag.
2. Apply air pressure to the ATF feed pipe hole of the 1st-hold clutch pressure circuit, and remove the ATF feed pipe cap from the transmission housing.



Secondary Shaft ATF Feed Pipe Cap Installation

1. Install the new O-rings (A) on the ATF feed pipe cap (B).



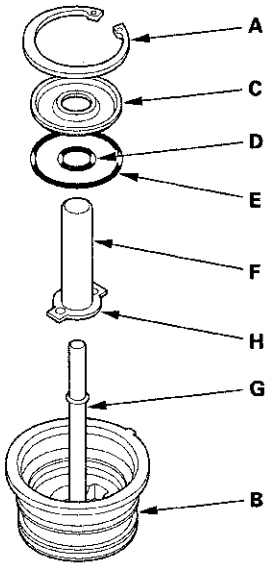
2. Install the ATF feed pipe cap in the transmission housing. Do not pinch the O-rings.

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Secondary Shaft ATF Feed Pipe Cap, Feed Pipe Replacement

1. Remove the ATF feed pipe cap from the transmission housing (see page 14-271).

2. Remove the snap ring (A) from the feed pipe cap (B), then remove the feed pipe guide (C), O-rings (D) (E), and 1st clutch ATF feed pipe (F).



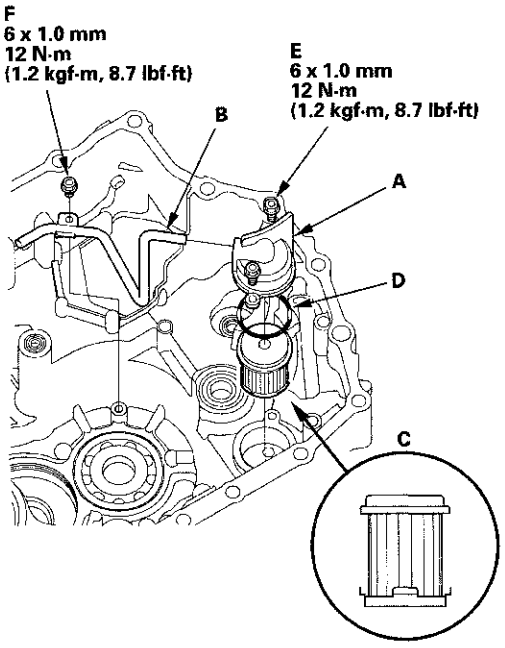
3. Replace the 1st clutch ATF feed pipe or 1st-hold clutch ATF feed pipe/ATF feed pipe cap assembly. The 1st-hold clutch ATF feed pipe/ATF feed pipe cap is not available separately.

4. Install the new O-ring (D) over the 1st clutch ATF feed pipe, then install the feed pipe over the 1st-hold clutch ATF feed pipe (G) while aligning the feed pipe tabs (H) with the guide in the cap.

5. Install the new O-ring (E) in the cap and feed pipe guide, then secure the guide with the snap ring.

ATF Filter Removal/Inspection/ Installation

1. Remove the three 6.0 mm bolts securing the ATF filter cover (A) and ATF pipe (B).



2. Remove the ATF pipe from the ATF filter cover, and remove the ATF filter (C) from the cover.

3. Clean the ATF filter, then check that it is in good condition, and is not clogged. Replace the ATF filter if it is clogged or damaged.

4. Install the ATF filter with the new O-ring (D) in the filter cover, and, install the ATF pipe in the cover, then install them in the transmission housing.

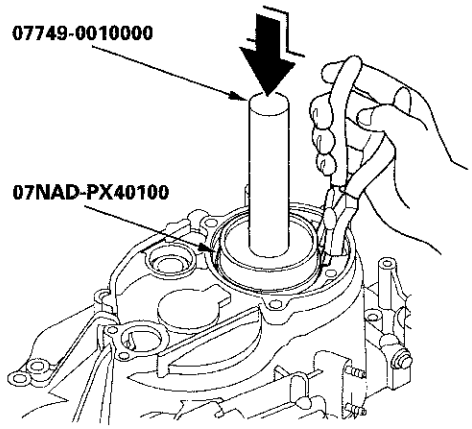
5. Secure the ATF filter cover with the two bolts (E), then secure the ATF pipe with the bolt (F).

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Mainshaft Bearing Removal

Special Tools Required
- Driver 07749-0010000
- Attachment, 78 x 80 mm 07NAD-PX40100

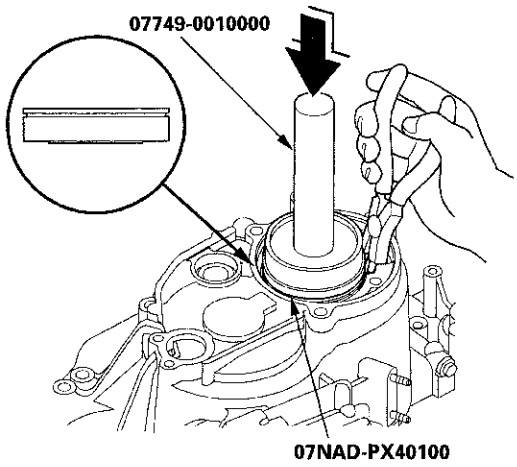
1. To remove the mainshaft bearing, expand the snap ring with the snap ring pliers, then push the bearing out. Do not remove the snap ring unless it's necessary to clean the groove in the housing.



Mainshaft Bearing Installation

Special Tools Required
- Driver 07749-0010000
- Attachment, 78 x 80 mm 07NAD-PX40100

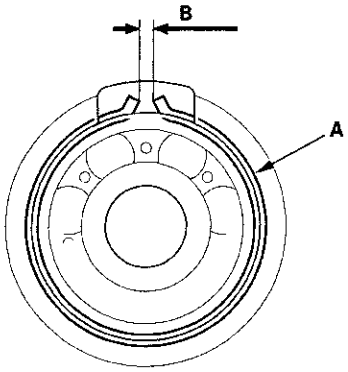
1. Install the bearing in the direction shown.



2. Expand the snap ring with the snap ring pliers, and insert the bearing part-way into the housing.

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

4. After installing the bearing, check that the snap ring (A) is seated in the bearing and housing groove, and that the ring end gap (B) is 0—7 mm (0—0.28 in).

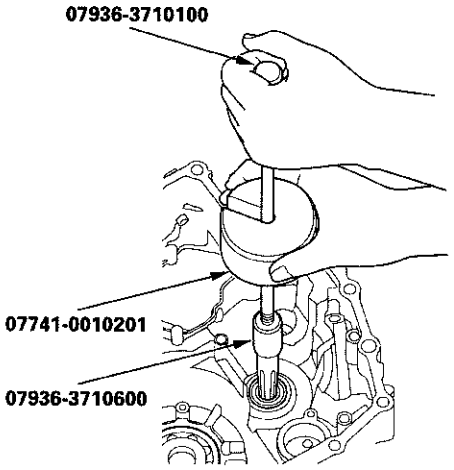


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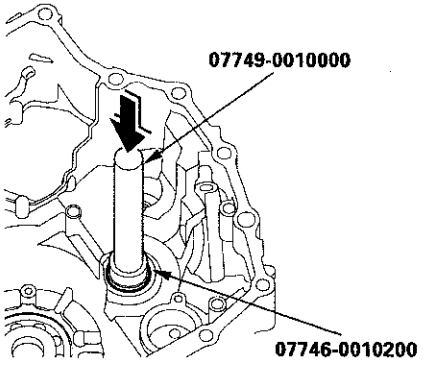
Intermediary Shaft Bearing Replacement

Special Tools Required
- Bearing remover shaft set, 20 mm 07936-3710600
- Bearing remover shaft handle 07936-3710100
- Sliding hammer weight 07741-0010201
- Driver 07749-0010000
- Attachment, 37 x 40 mm 07746-0010200

1. Remove the intermediary shaft bearing from the transmission housing using the bearing remover shaft set (20 mm), the bearing shaft handle, and the sliding hammer weight.



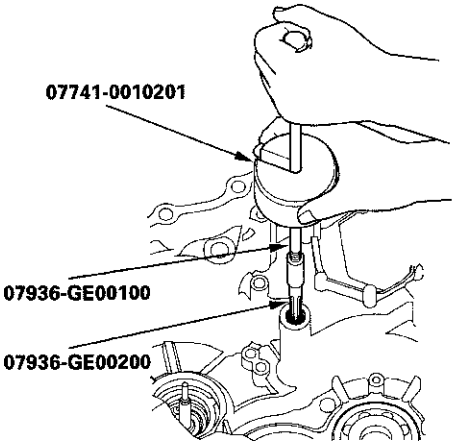
2. Install the new bearing until it bottoms in the transmission housing using the driver and the attachment (37 x 40 mm).



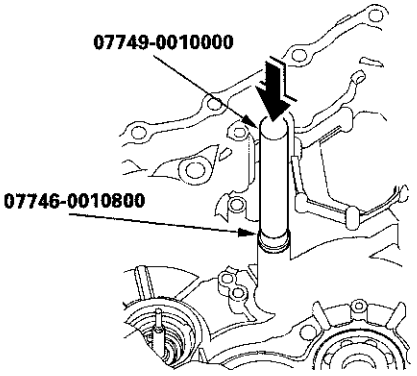
Park Lever Shaft Bearing Replacement

Special Tools Required
- Bearing remover shaft, 10 mm 07936-GE00100
- Bearing remover head, 10 mm 07936-GE00200
- Sliding hammer weight 07741-0010201
- Driver 07749-0010000
- Attachment, 22 x 24 mm 07746-0010800

1. Remove the park lever shaft bearing from the transmission housing using the bearing remover head (10 mm), the bearing remover shaft (10 mm), and the sliding hammer weight.



2. Install the new bearing until it bottoms in the transmission housing using the driver and the attachment (22 x 24 mm).

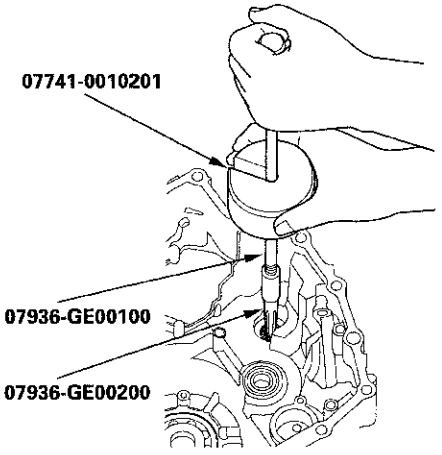


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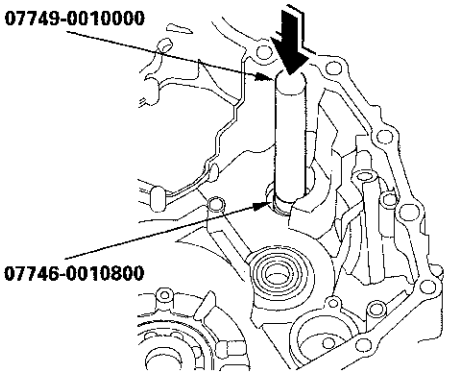
Selector Control Shaft Bearing Replacement

Special Tools Required
- Bearing remover shaft, 10 mm 07936-GE00100
- Bearing remover head, 10 mm 07936-GE00200
- Sliding hammer weight 07741-0010201
- Driver 07749-0010000
- Attachment, 22 x 24 mm 07746-0010800

1. Remove the control shaft bearing from the transmission housing using the bearing remover head (10 mm), the bearing remover shaft (10 mm), and the sliding hammer weight.



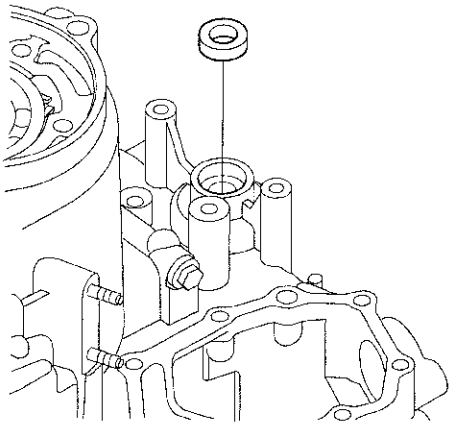
2. Install the new bearing in the transmission housing using the driver and the attachment (22 x 24 mm).



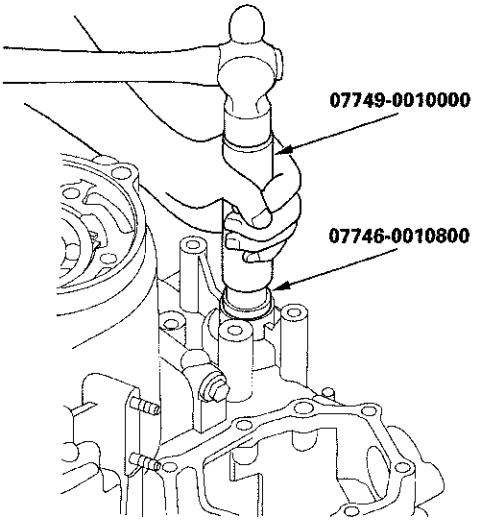
Selector Control Shaft Oil Seal Replacement

Special Tools Required
- Driver 07749-0010000
- Attachment, 22 x 24 mm 07746-0010800

1. Remove the oil seal from the transmission housing.



2. Install the new oil seal in the transmission housing using the driver and the attachment (22 x 24 mm).



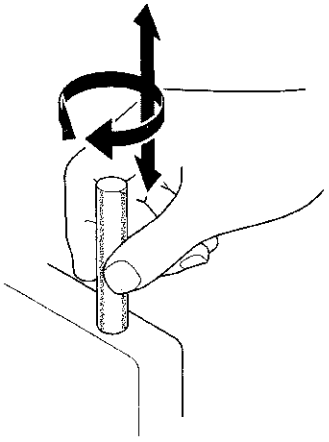
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Valve Body Repair

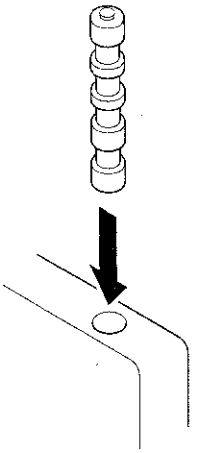
NOTE: Valve body repair is only necessary if one or more of the valves in a valve body do not slide smoothly in their bores. Use this procedure to free the valves.

1. Soak a sheet of #600 abrasive paper in ATF for about 30 minutes.
2. Carefully tap the valve body so the sticking valve drops out of its bore. It may be necessary to use a small screwdriver to pry the valve free. Be careful not to scratch the bore with a 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 of the ATF-soaked #600 paper and insert it in the valve bore of the sticking valve. Twist the paper slightly, so that it unrolls and fits the bore tightly, then polish the bore by twisting the paper as you push it in and out.

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



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



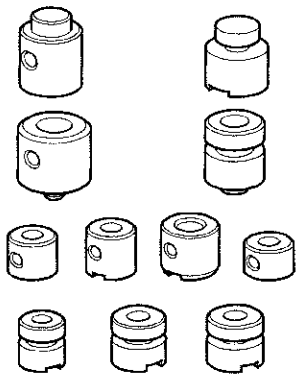
7. Remove the valve, and thoroughly clean it and the valve body with solvent. Dry all parts with compressed air, then reassemble using ATF as a lubricant.

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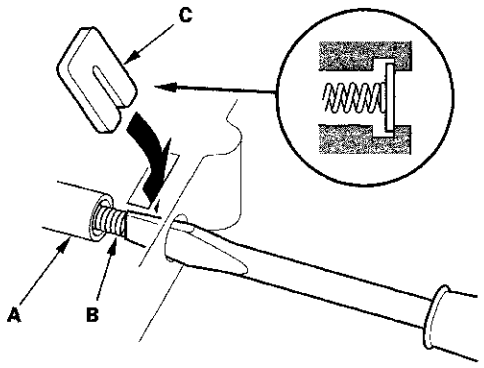
Valve Body Valve Installation

1. Coat all parts with ATF before assembly.

2. Install the valves and springs in the sequence shown for the main valve body (see page 14-278), secondary valve body (see page 14-280), regulator valve body (see page 14-281), and accumulator body (see page 14-282). Refer to the following valve cap illustrations, and install each valve cap so the end shown facing up will be facing the outside of the valve body, then secure the valve cap with the valve cap clip.



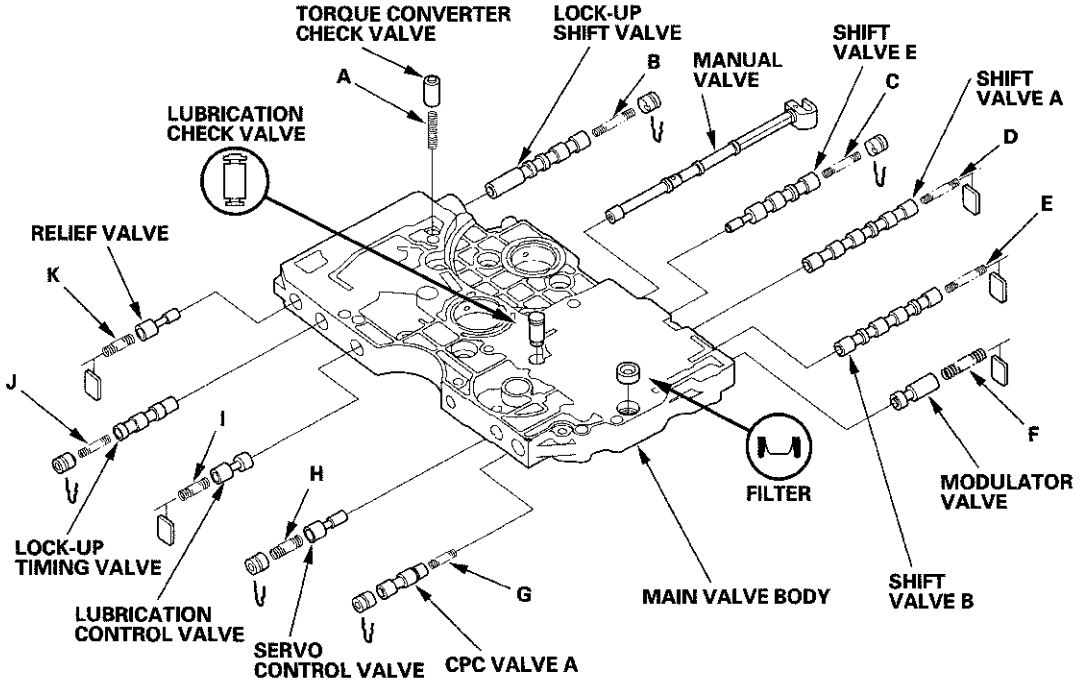
3. Install the valve (A) and valve spring (B) in the valve body. Push the valve spring in with a screwdriver, then install the spring seat (C).



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Main Valve Body Disassembly, Inspection, and Reassembly

1. Clean all parts thoroughly in solvent, and dry them with compressed air. Blow out all passages.
2. Inspect the main valve body for scoring and damage.
3. Check all valves for free movement. If any fail to slide freely, refer to valve body repair (see page 14-276).
4. Coat all parts with ATF during assembly.
5. Replace the filter with a new one, and install it and the lubrication check valve in the direction shown.



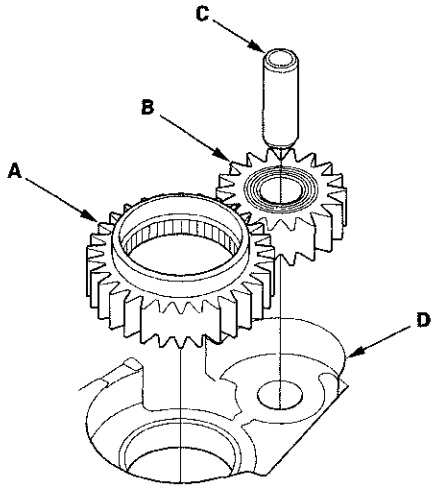
VALVE SPRING SPECIFICATIONS

Valve Springs		Standard (New)-Unit: mm (in)			
		Wire Diameter	O.D.	Free Length	No. of Coils
A	Torque converter check valve spring	1.1 (0.043)	8.6 (0.339)	34.3 (1.350)	10.1
B	Lock-up shift valve spring	1.0 (0.039)	6.6 (0.260)	35.5 (1.398)	18.2
C	Shift valve E spring	0.7 (0.028)	6.6 (0.260)	42.4 (1.669)	17.6
D	Shift valve A spring	0.9 (0.035)	6.6 (0.260)	50.5 (1.988)	23.3
E	Shift valve B spring	0.8 (0.031)	6.6 (0.260)	49.1 (1.933)	21.7
F	Modulator valve spring	1.6 (0.063)	10.4 (0.409)	33.5 (1.319)	9.8
G	CPC valve A spring	0.7 (0.028)	6.1 (0.240)	17.8 (0.701)	7.9
H	Servo control valve spring	0.9 (0.035)	9.6 (0.378)	30.2 (1.189)	8.4
I	Lubrication control valve spring	0.9 (0.035)	8.7 (0.343)	25.0 (0.984)	7.2
J	Lock-up timing valve spring	0.6 (0.024)	6.6 (0.260)	30.9 (1.217)	11.1
K	Relief valve spring	1.0 (0.039)	9.6 (0.378)	28.1 (1.106)	7.7

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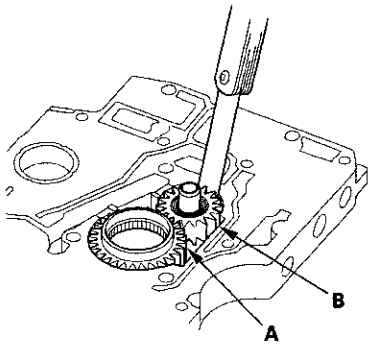
ATF Pump Inspection

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



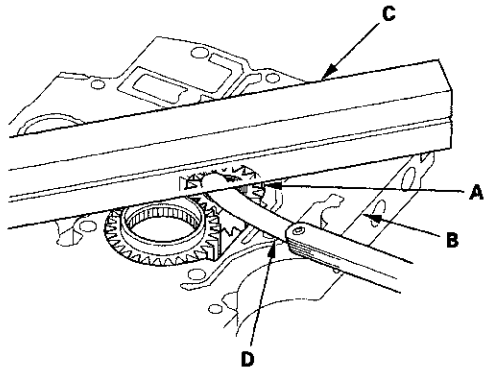
2. Measure the side clearance of the ATF pump drive gear (A) and driven gear (B).

ATF Pump Gears Side (Radial) Clearance
Standard (New):
ATF Pump Drive Gear:
0.210—0.265 mm (0.008—0.010 in)
ATF Pump Driven Gear:
0.070—0.125 mm (0.003—0.005 in)



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

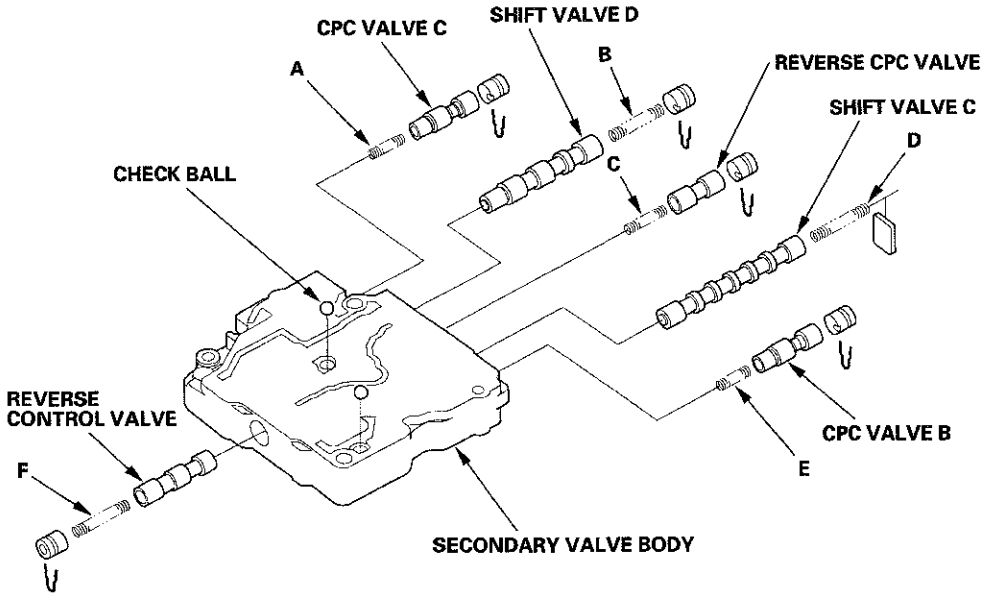
ATF Pump Drive/Driven Gear Thrust (Axial) Clearance:
Standard (New): 0.03—0.06 mm (0.001—0.002 in)
Service Limit: 0.07 mm (0.003 in)



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Secondary Valve Body Disassembly, Inspection, and Reassembly

1. Clean all parts thoroughly in solvent, and dry them with compressed air. Blow out all passages.
2. Do not use a magnet to remove the check balls, it may magnetize the check balls.
3. Inspect the secondary valve body for scoring and damage.
4. Check all valves for free movement. If any fail to slide freely, refer to valve body repair (see page 14-276).
5. Coat all parts with ATF during assembly.



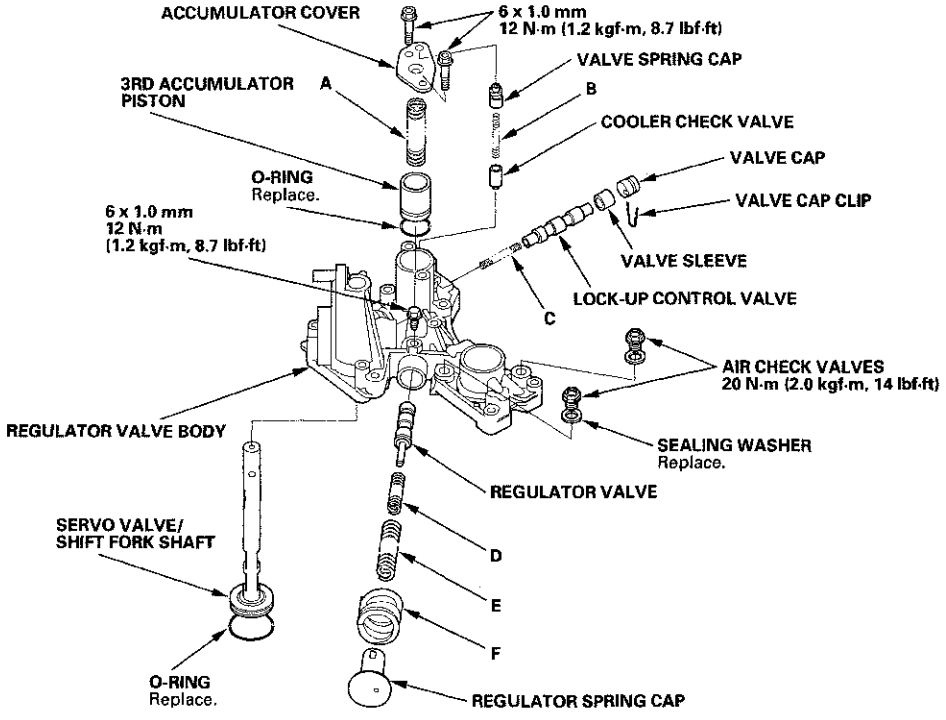
VALVE SPRING SPECIFICATIONS

Valve Springs		Standard (New)-Unit: mm (in)			
		Wire Diameter	O.D.	Free Length	No. of Coils
A	CPC valve C spring	0.7 (0.028)	6.1 (0.240)	17.8 (0.701)	7.9
B	Shift valve D spring	0.7 (0.028)	6.6 (0.260)	42.4 (1.669)	17.6
C	Reverse CPC valve spring	0.8 (0.031)	6.1 (0.240)	24.4 (0.961)	14.6
D	Shift valve C spring	0.8 (0.031)	6.6 (0.260)	49.1 (1.933)	21.7
E	CPC valve B spring	0.7 (0.028)	6.1 (0.240)	17.8 (0.701)	7.9
F	Reverse control valve spring	0.8 (0.031)	6.6 (0.260)	49.1 (1.933)	21.7

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Regulator Valve Body Disassembly, Inspection, and Reassembly

1. Clean all parts thoroughly in solvent, and dry them with compressed air. Blow out all passages.
2. Inspect the regulator valve body for scoring and damage.
3. 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.
4. Check all valves for free movement. If any fail to slide freely, refer to valve body repair (see page 14-276).
5. Coat all parts with ATF during assembly.
6. Align the hole in the regulator spring cap with the stop bolt hole, then press the spring cap into the valve body, and tighten the stop bolt.
7. Install the servo valve with the new O-ring, and 3rd accumulator piston with the new O-ring.



VALVE SPRING SPECIFICATIONS

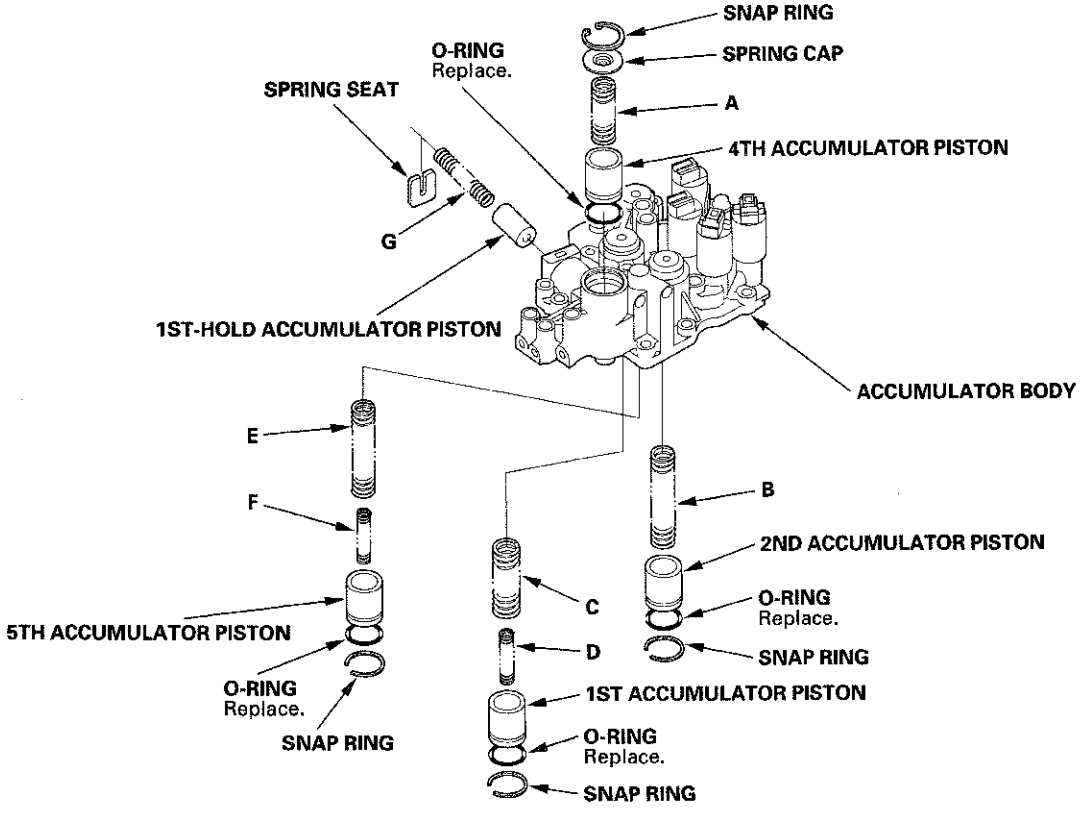
Valve Springs		Standard (New)-Unit: mm (in)			
		Wire Diameter	O.D.	Free Length	No. of Coils
A	3rd accumulator spring	3.1 (0.122)	19.6 (0.772)	41.4 (1.630)	5.5
B	Cooler check valve spring	0.9 (0.035)	6.7 (0.264)	31.5 (1.240)	14.2
C	Lock-up control valve spring (type A)	0.7 (0.028)	6.6 (0.260)	42.9 (1.689)	14.2
	Lock-up control valve spring (type B)	0.8 (0.031)	6.6 (0.260)	44.3 (1.744)	25.5
D	Regulator valve spring B	1.4 (0.055)	8.8 (0.346)	44.0 (1.732)	12.0
E	Regulator valve spring A	1.85 (0.073)	14.7 (0.579)	86.9 (3.421)	16.2
F	Stator reaction spring	5.5 (0.217)	37.4 (1.472)	30.3 (1.193)	2.1

NOTE: As for the lock-up control valve spring, either type A or type B is applied.

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Accumulator Body Disassembly, Inspection, and Reassembly

1. Clean all parts thoroughly in solvent, and dry them with compressed air. Blow out all passages.
2. Inspect the accumulator body for scoring and damage.
3. Coat all parts with ATF during assembly.
4. Replace the O-rings with new ones.



VALVE SPRING SPECIFICATIONS

Valve Springs		Standard: (New)-Unit mm (in)			
		Wire Diameter	O.D.	Free Length	No. of Coils
A	4th accumulator spring	3.3 (0.130)	19.6 (0.772)	39.1 (1.539)	5.8
B	2nd accumulator spring	3.1 (0.122)	19.6 (0.772)	53.4 (2.102)	7.5
C	1st accumulator spring A	2.3 (0.091)	19.6 (0.772)	60.8 (2.394)	9.5
D	1st accumulator spring B	2.5 (0.098)	12.8 (0.504)	46.0 (1.811)	9.5
E	5th accumulator spring A	2.4 (0.094)	19.6 (0.772)	65.5 (2.579)	12.0
F	5th accumulator spring B	2.6 (0.102)	13.2 (0.520)	50.5 (1.988)	10.1
G	1st-hold accumulator spring	2.0 (0.079)	13.1 (0.516)	42.9 (1.689)	9.8

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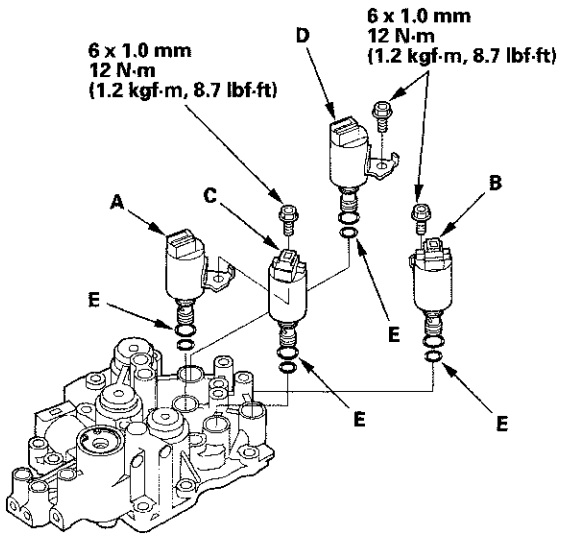
Shift Solenoid Valve Removal and Installation

NOTE: Do not hold the solenoid valve connector to remove and install the shift solenoid valve. Be sure to hold the solenoid valve body.

1. Remove the mounting bolts, then remove the solenoid valves by holding the solenoid valve body.

2. Install the new O-rings (E) on each shift solenoid valve.

   NOTE: If you are installing a new shift solenoid valve, it comes with new O-rings already installed.



3. Install shift solenoid valve D (black connector) by holding the shift solenoid valve body; be sure the mounting bracket contacts the accumulator body.

4. Install shift solenoid valve A (black connector) by holding the shift solenoid valve body; be sure the mounting bracket contacts the accumulator body.

5. Install shift solenoid valve C (brown connector) by holding the shift solenoid valve body; be sure to position the mounting bracket on top of the bracket of shift solenoid valve A.

   NOTE: Do not install shift solenoid valve C before installing shift solenoid valve A. If shift solenoid valve C is installed before installing shift solenoid valve A, it may damage the hydraulic control system.

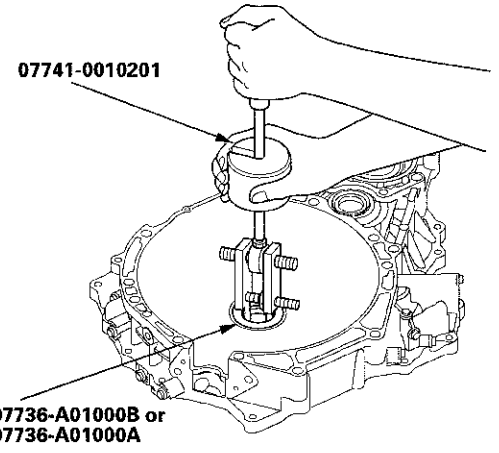
6. Install shift solenoid valve B (brown connector) by holding the shift solenoid valve body; be sure the mounting bracket contacts the accumulator body.

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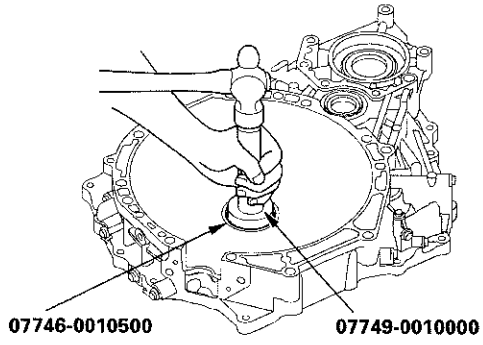
Mainshaft Bearing and Oil Seal Replacement

Special Tools Required
- Adjustable bearing puller, 25—40 mm 07736-A01000B or 07736-A01000A
- Sliding hammer weight 07741-0010201
- Driver 07749-0010000
- Attachment, 62 x 68 mm 07746-0010500
- Attachment, 72 x 75 mm 07746-0010600

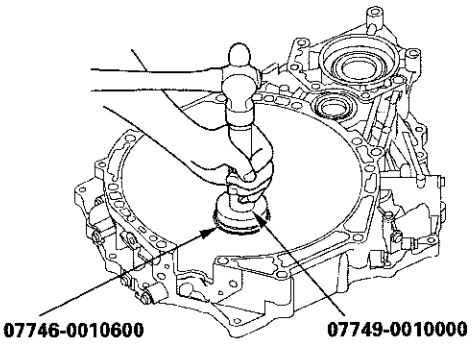
1. Remove the mainshaft bearing and oil seal using the adjustable bearing remover and the sliding hammer weight.



2. Install the new mainshaft bearing until it bottoms in the housing using the driver and the attachment (62 x 68 mm).



3. Install the new oil seal flush to the housing using the driver and the attachment (72 x 75 mm).

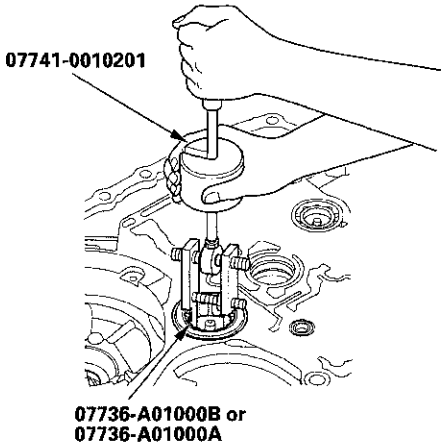


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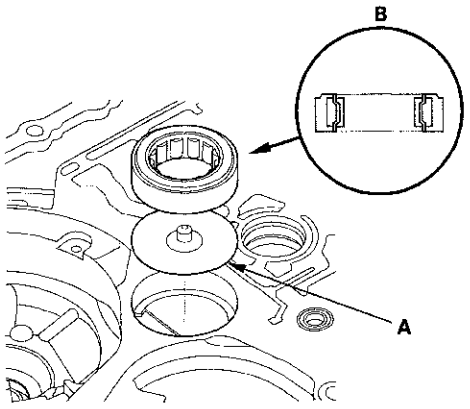
Countershaft Bearing Replacement

Special Tools Required
- Adjustable bearing puller, 25—40 mm 07736-A01000B or 07736-A01000A
- Sliding hammer weight 07741-0010201
- Driver 07749-0010000
- Attachment, 78 x 80 mm 07NAD-PX40100

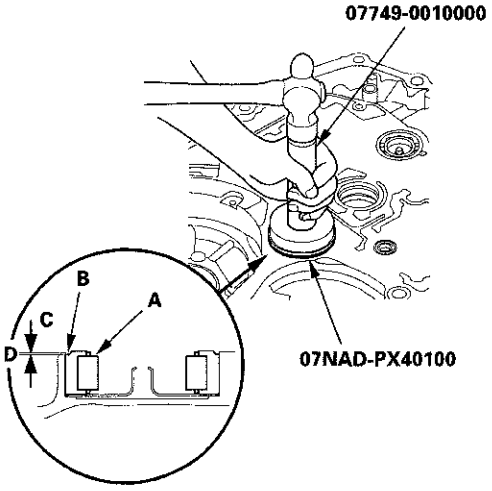
1. Remove the countershaft bearing from the torque converter housing using the adjustable bearing remover and the sliding hammer weight.



2. Install the ATF guide plate (A) into the housing, then install the new bearing (B) in the direction shown.



3. Install the bearing (A) in the housing using the driver and the attachment (78 x 80 mm); install the bearing outer notch-cut (B) in depth (C) of 0—0.03 mm (0—0.001 in) below the housing surface (D).

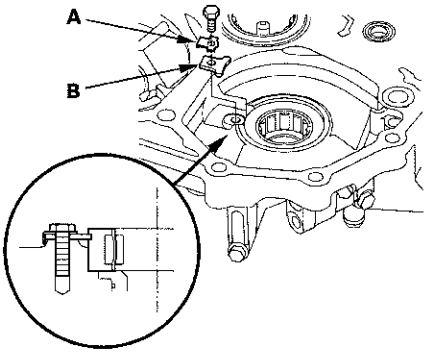


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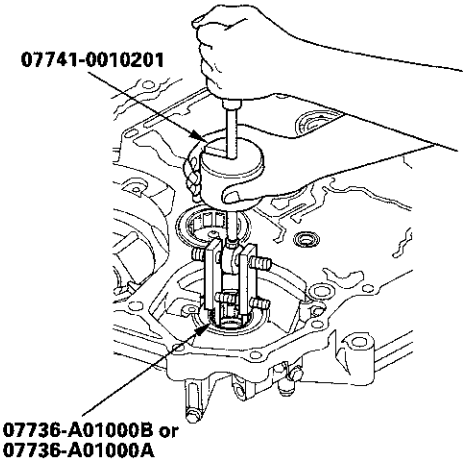
Secondary Shaft Bearing Replacement

Special Tools Required
- Adjustable bearing puller, 25—40 mm 07736-A01000B or 07736-A01000A
- Bearing remover shaft set, 30 mm 07936-8890300
- Bearing remover shaft handle 07936-3710100
- Sliding hammer weight 07741-0010201
- Driver 07749-0010000
- Attachment, 37 x 40 mm 07746-0010200
- Attachment, 62 x 68 mm 07746-0010500

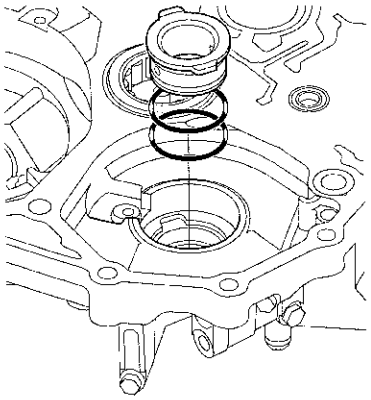
1. Remove the bolt, then remove the lock washer (A) and bearing set plate (B).



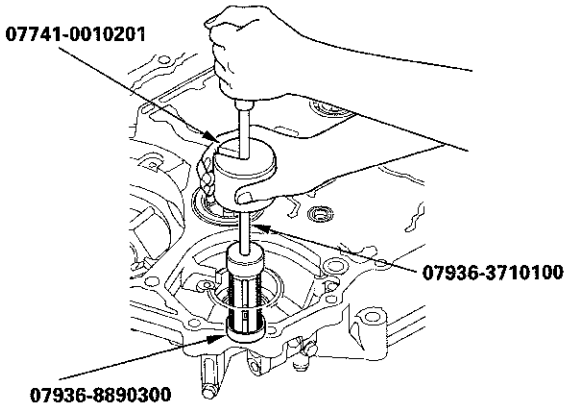
2. Remove the secondary shaft bearing from the torque converter housing using the adjustable bearing remover and the sliding hammer weight.



3. Remove the ATF guide collar from the torque converter housing.

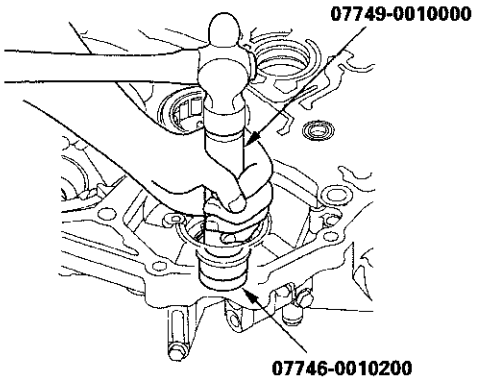


4. Remove the 29 x 39 x 9.5 mm secondary shaft bearing from the torque converter housing using the bearing remover shaft set (30 mm), the bearing remover shaft handle, and the sliding hammer weight.

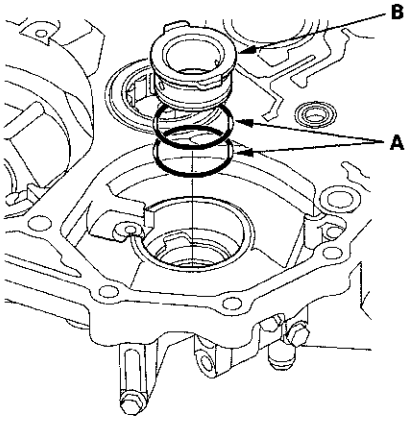


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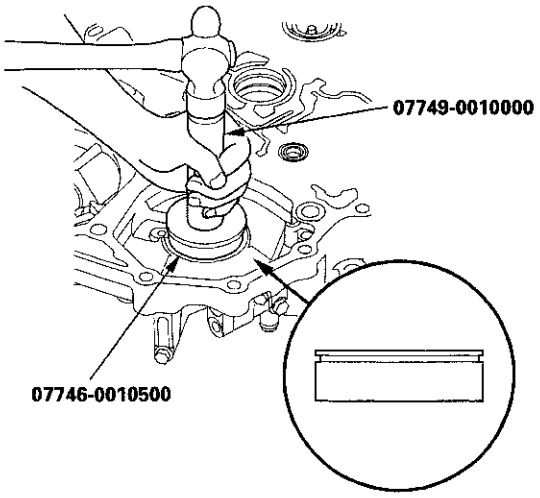
5. Install the 29 x 39 x 9.5 mm bearing into the torque converter housing using the driver and the attachment (37 x 40 mm).



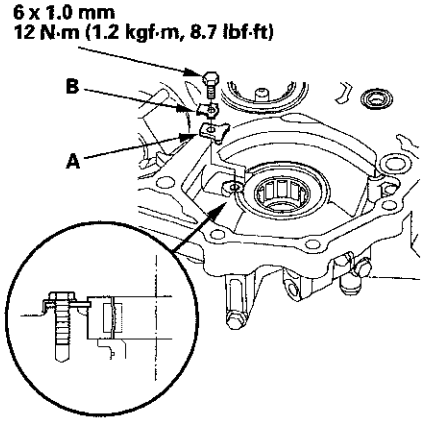
6. Install the new O-rings (A) on the ATF guide collar (B), then install the guide collar in the torque converter housing.



7. Install the bearing in the direction shown in the housing using the driver and the attachment (62 x 68 mm).



8. Check that the bearing groove aligns with the set plate mounting surface, then install the set plate (A) by aligning it with the bearing groove.



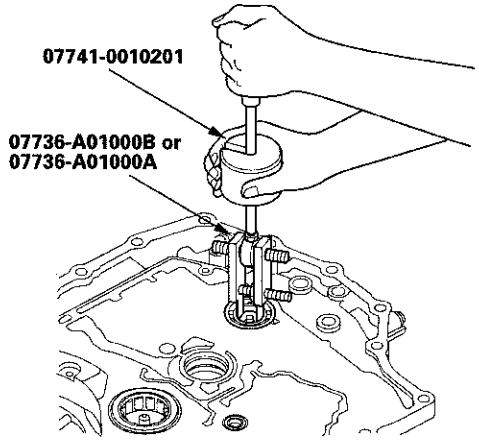
9. Install the new lock washer (B) and bolt, then bend the lock tab of the lock washer against the bolt head.

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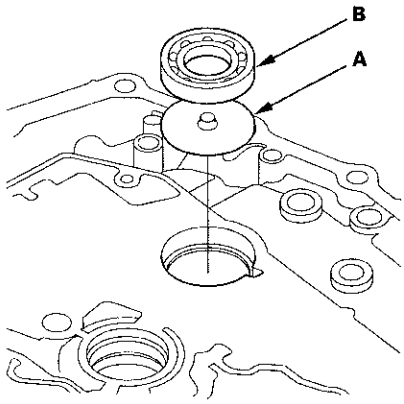
Intermediary Shaft Bearing Replacement

Special Tools Required
- Adjustable bearing puller, 25—40 mm 07736-A01000B or 07736-A01000A
- Sliding hammer weight 07741-0010201
- Driver 07749-0010000
- Attachment, 52 x 55 mm 07746-0010400

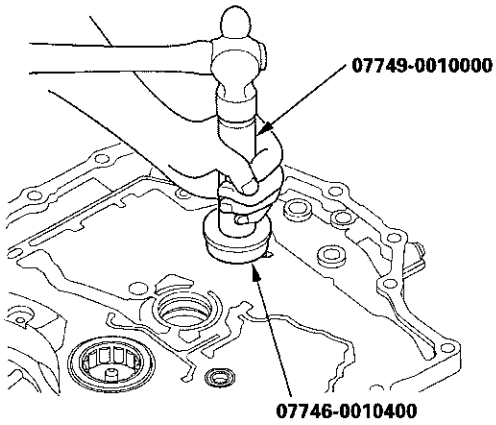
1. Remove the intermediary shaft bearing from the torque converter housing using the adjustable bearing remover and the sliding hammer weight.



2. Install the ATF guide plate (A), then install the new bearing (B) in the housing.



3. Drive the bearing into the housing using the driver and the attachment (52 x 55 mm).

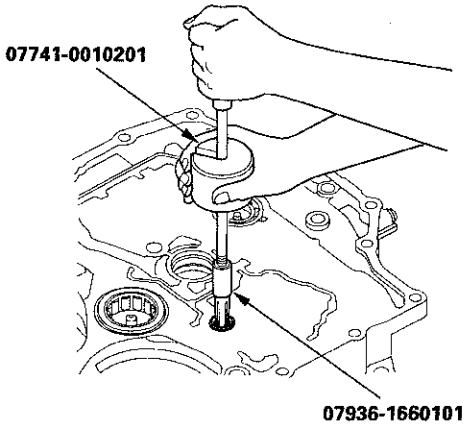


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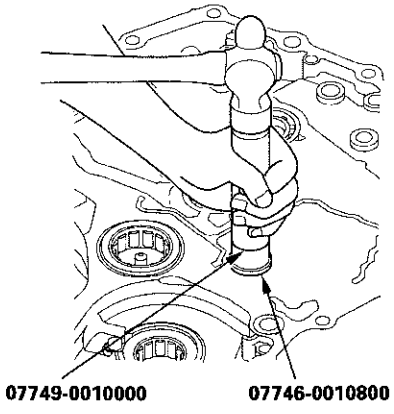
Park Lever Shaft Bearing Replacement

Special Tools Required
- Bearing remover shaft set, 12 mm 07936-1660101
- Sliding hammer weight 07741-0010201
- Driver 07749-0010000
- Attachment, 22 x 24 mm 07746-0010800

1. Remove the park lever shaft bearing from the torque converter housing using the bearing remover shaft set (12 mm) and the sliding hammer weight.



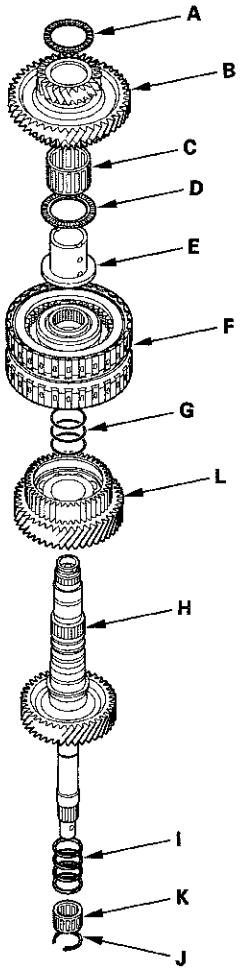
2. Install the new bearing until it bottoms in the housing using the driver and the attachment (22 x 24 mm).



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Mainshaft Disassembly, Inspection, and Reassembly

1. Remove the thrust needle bearing (A), mainshaft 5th gear (B), needle bearing (C), thrust needle bearing (D), mainshaft 5th gear collar (E), 4th/5th clutch (F), and O-rings (G) from the mainshaft (H).



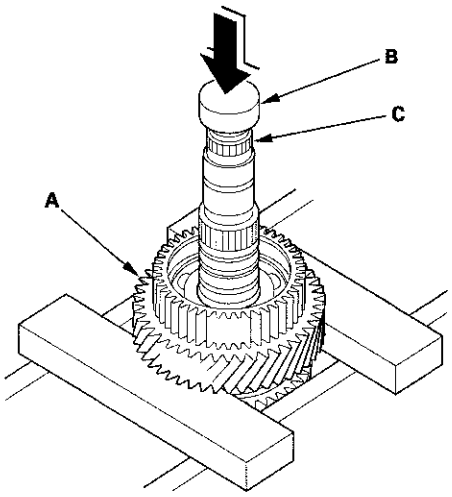
2. Inspect the condition of the sealing rings (I). If the sealing rings are worn, distorted, or damaged, remove the set ring (J) and needle bearing (K), and replace the sealing rings with new ones.
3. Inspect the thrust needle bearing and needle bearing for wear and rough movement.
4. Inspect the splines for excessive wear and damage.
5. Inspect the 4th gear for wear and damage, and inspect the 4th gear bearing for wear and rough rotation.
6. Replace the mainshaft 4th gear (L) if the 4th gear is worn or damaged, or the bearing is worn or damaged.
7. Check the shaft bearing surfaces for scoring and excessive wear.
8. Lubricate all parts with ATF during reassembly.
9. Wrap the shaft splines with tape to prevent O-ring damage, install the new O-rings on the mainshaft, then remove the tape.
10. Install the 4th/5th clutch.
11. Install the mainshaft 5th gear collar, thrust needle bearing, needle bearing, mainshaft 5th gear, and thrust needle bearing.

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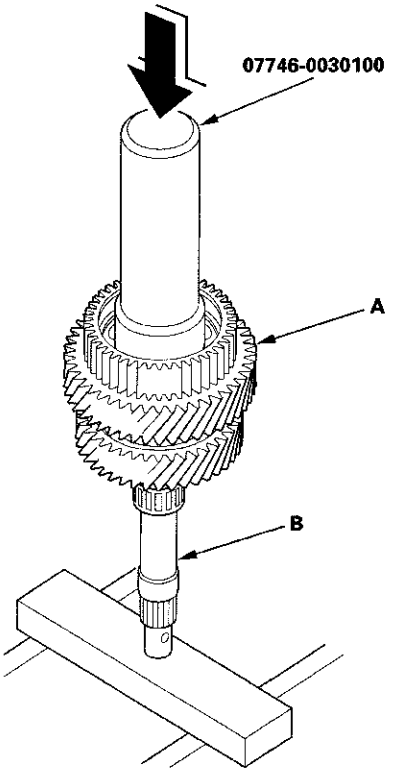
Mainshaft 4th Gear Replacement

Special Tools Required
Driver, 40 mm I.D. 07746-0030100

1. Remove the mainshaft 4th gear (A) with the press. Place a shaft protector (B) between the press and mainshaft (C) to prevent damaging the mainshaft.



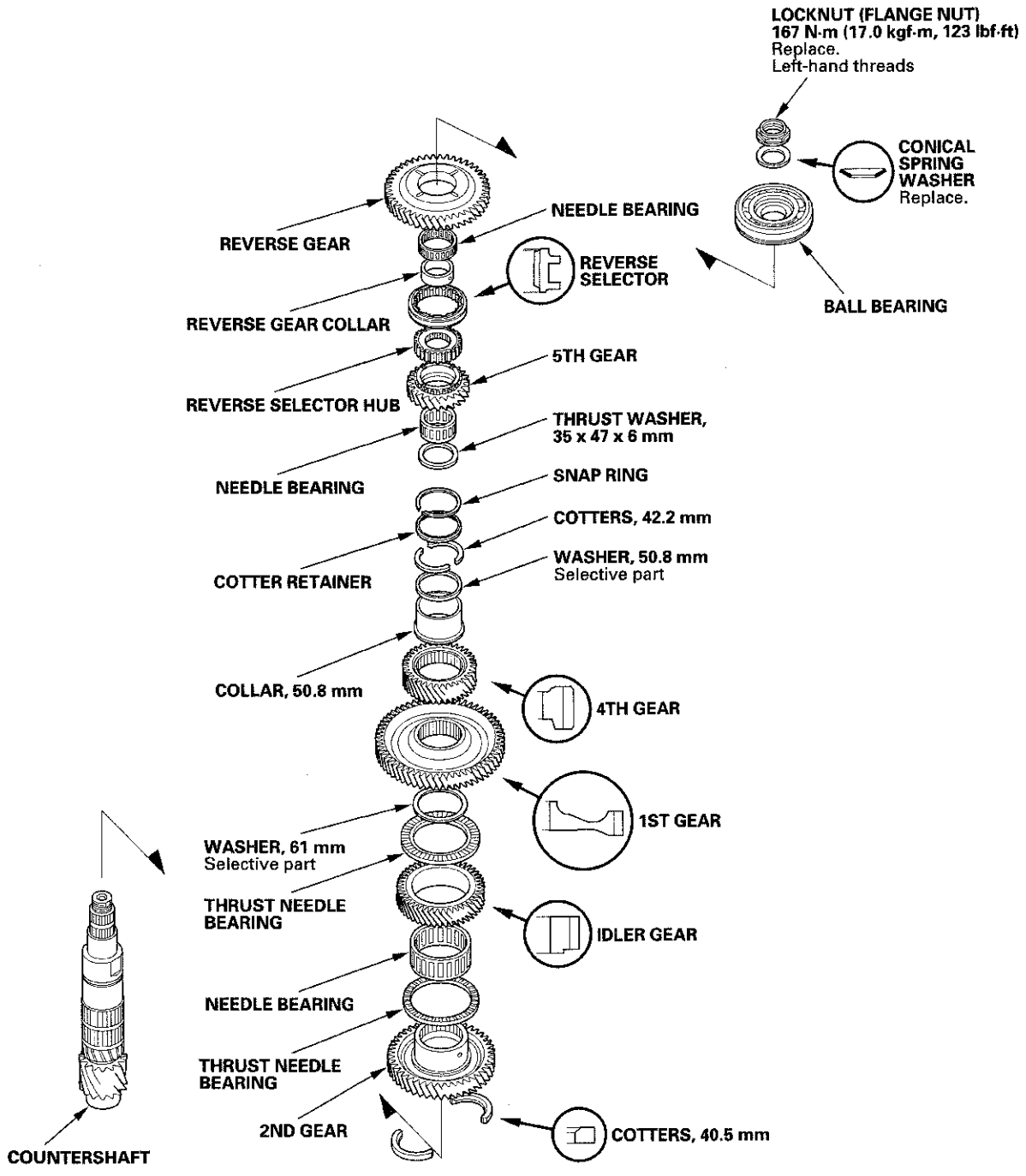
2. Slide the new mainshaft 4th gear (A) over the mainshaft (B), then press it into place using the driver (40 mm I.D.) and the press.



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Countershaft Disassembly

Exploded View

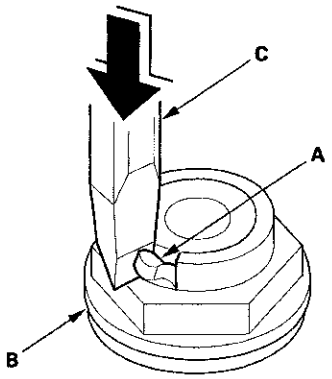


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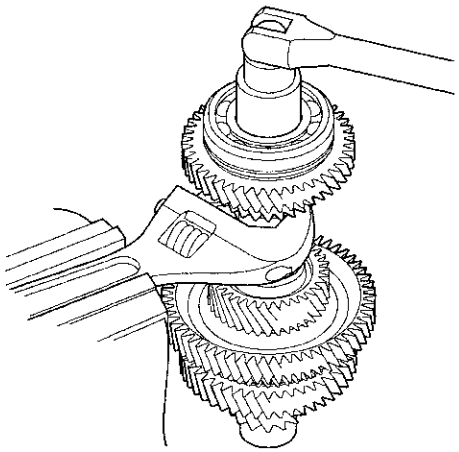
NOTE: Refer to the Exploded View as needed during the following procedure.

1. Cut the lock tab (A) off the countershaft locknut (B) using a chisel (C).

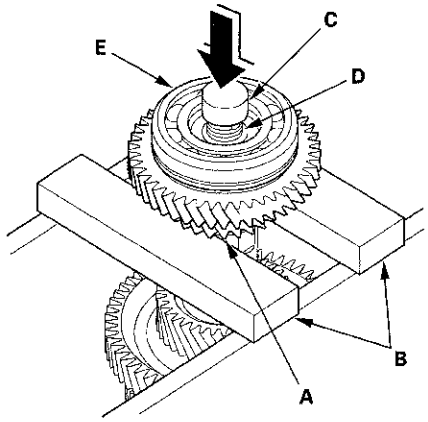
   NOTE: Keep all of the chiseled particles out of the countershaft.



2. Hold the countershaft securely with a wrench and a vise, loosen the locknut, and remove it. The locknut has left-hand threads.



3. Place the countershaft 5th gear (A) on press bases (B), and place a shaft protector (C) between the countershaft (D) and the press to prevent damaging the countershaft.



4. Support the bottom of the countershaft with one hand, then press the countershaft out of the press-fitted bearing (E) and the press-fitted reverse selector hub. Some reverse selector hubs are not press-fitted, and the countershaft may drop out of the press-fitted bearing.

5. Remove the remaining parts from the countershaft.

6. Inspect the bearing for galling and rough movement.

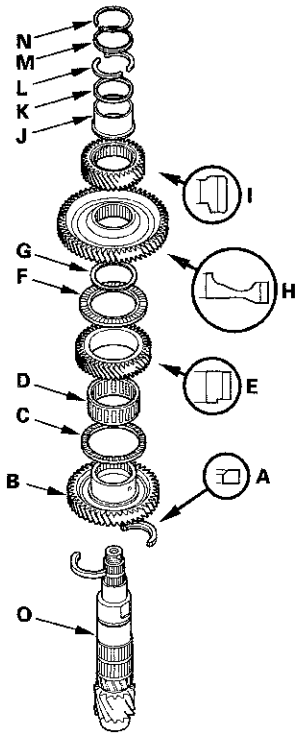
7. Check the shaft bearing surfaces for scoring and excessive wear, and check the shaft splines for excessive wear and damage.

8. Check the idler gear axial clearance and 4th gear axial clearance (see page 14-294).

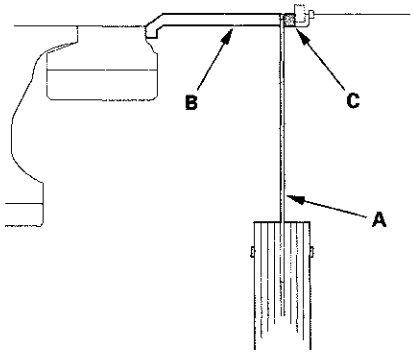
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Countershaft Idler Gear and 4th Gear Axial Clearance Inspection

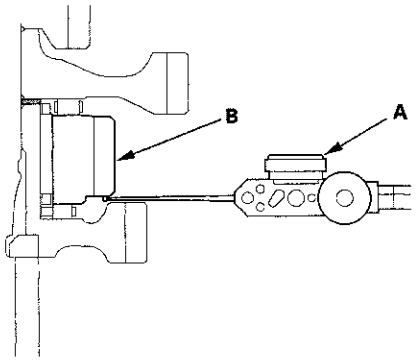
1. Install the 40.5 mm cotters (A), 2nd gear (B), thrust needle bearing (C), needle bearing (D), idler gear (E), thrust needle bearing (F), 61 mm washer (G), 1st gear (H), 4th gear (I), 50.8 mm collar (J), 50.8 mm washer (K), 42.2 mm cotters (L), cotter retainer (M), and snap ring (N) on the countershaft (O). Install the 40.5 mm cotters, idler gear, 1st gear, and 4th gear in the direction shown.



2. Insert a feeler gauge blade (A) as thick as possible between the 50.8 mm collar (B) and 50.8 mm washer (C).

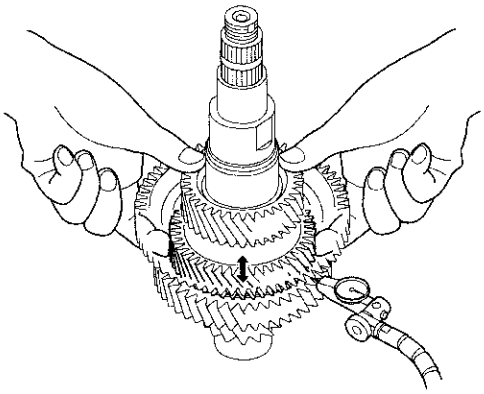


3. Set the dial indicator (A) on the idler gear (B).



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

Standard: 0.005—0.040 mm (0.0002—0.0016 in)



5. If the measurement is out of standard, remove the 61 mm washer and measure its thickness.

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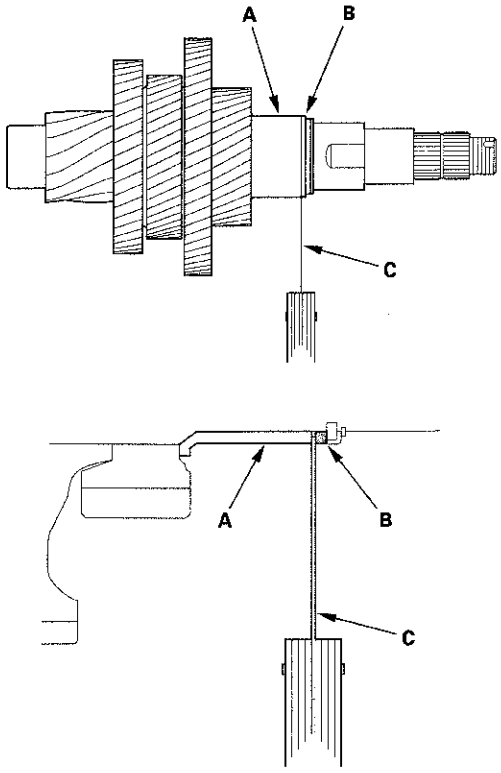
6. From the table below, select the proper washer. Then install the washer and recheck the clearance.

WASHER, 61 mm

No.	Thickness
A	1.525 mm (0.0600 in)
B	1.505 mm (0.0593 in)
C	1.485 mm (0.0585 in)
D	1.465 mm (0.0577 in)
E	1.445 mm (0.0569 in)
F	1.425 mm (0.0561 in)
G	1.405 mm (0.0553 in)

7. Measure the clearance between the 50.8 mm collar (A) and the 50.8 mm washer (B) with a feeler gauge (C) in at least three places. Use the average as the actual clearance.

Standard: 0.005—0.040 mm (0.0002—0.0016 in)



8. If the measurement is out of standard, remove the 50.8 mm washer and measure its thickness.

9. From the table below, select the proper washer. Then install the washer and recheck the clearance.

WASHER, 50.8 mm

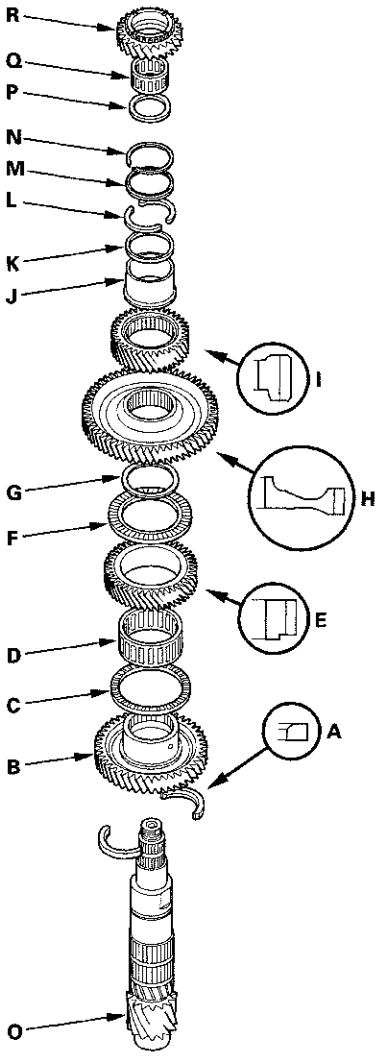
No.	Thickness
A	1.91 mm (0.0752 in)
B	1.93 mm (0.0760 in)
C	1.95 mm (0.0768 in)
D	1.97 mm (0.0776 in)
E	1.99 mm (0.0783 in)
F	2.01 mm (0.0791 in)
G	2.03 mm (0.0799 in)
H	2.05 mm (0.0807 in)
I	2.07 mm (0.0815 in)
J	2.09 mm (0.0823 in)
K	2.11 mm (0.0831 in)
L	2.13 mm (0.0839 in)
M	2.15 mm (0.0846 in)
N	2.17 mm (0.0854 in)
O	2.19 mm (0.0862 in)
P	2.21 mm (0.0870 in)
Q	2.23 mm (0.0878 in)
R	2.25 mm (0.0886 in)
S	2.27 mm (0.0894 in)
T	2.29 mm (0.0902 in)
U	2.31 mm (0.0909 in)
V	2.33 mm (0.0917 in)
W	2.35 mm (0.0925 in)
X	2.37 mm (0.0933 in)
Y	2.39 mm (0.0941 in)
Z	2.41 mm (0.0949 in)
AA	2.43 mm (0.0957 in)
AB	2.45 mm (0.0965 in)

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Countershaft Reassembly

Special Tools Required
Driver, 40 mm I.D. 07746-0030100

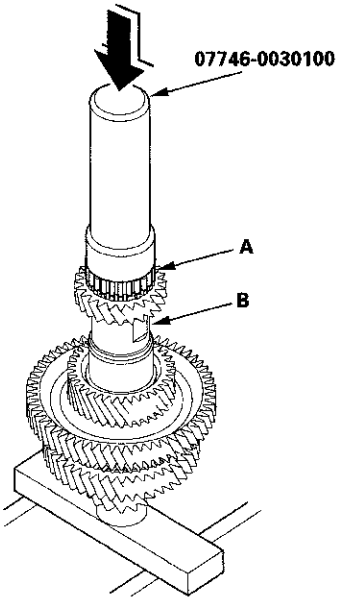
1. Install the 40.5 mm cotters (A), 2nd gear (B), thrust needle bearing (C), needle bearing (D), idler gear (E), thrust needle bearing (F), 61 mm washer (G), 1st gear (H), 4th gear (I), 50.8 mm collar (J), 50.8 mm washer (K), 42.2 mm cotters (L), cotter retainer (M), and snap ring (N) on the countershaft (O). Install the 40.5 mm cotters, idler gear, 1st gear, and 4th gear in the direction shown.



2. Install the thrust washer (P), needle bearing (Q) and 5th gear (R).

3. Slide the reverse selector hub (A) over the countershaft (B), then press it into place using the driver (40 mm I. D.) and the press.

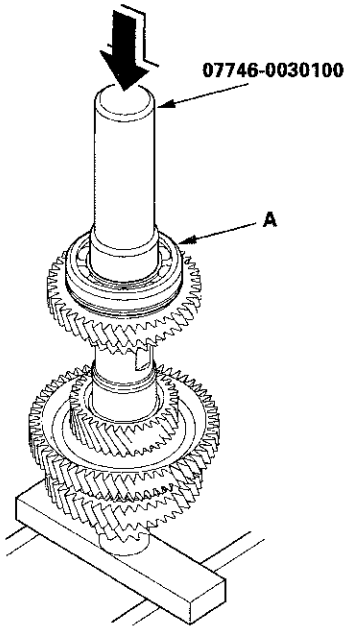
   NOTE: Some reverse selector hubs are not press-fitted, and can be installed without using the driver and a press.



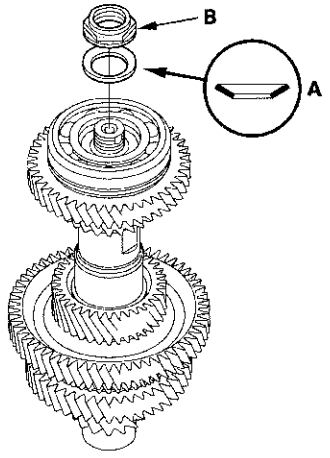
4. Install the reverse selector, reverse gear collar, needle bearing, and reverse gear over the reverse selector hub.

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5. Install the ball bearing (A) over the countershaft, then press it into place using the driver (40 mm I.D.) and the press.

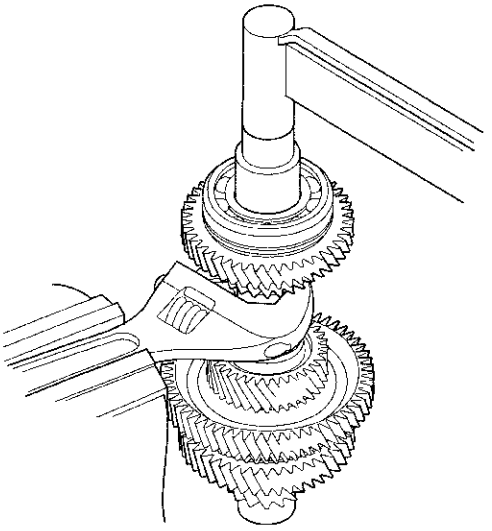


6. Install the conical spring washer (A) in the direction shown, and install the new locknut (B).

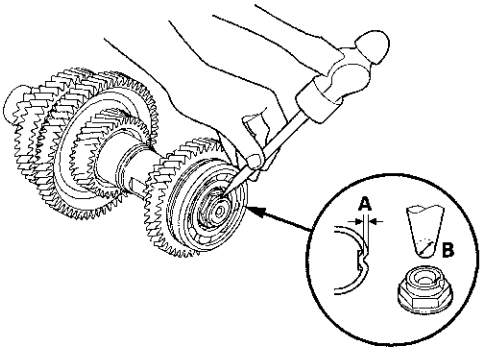


7. Hold the countershaft securely with a wrench and a vise, and tighten the locknut to 167 N·m (17.0 kgf-m, 123 lbf-ft).

NOTE:
- Use a torque wrench to tighten the locknut. Do not use an impact wrench.
- The locknut has left-hand threads.



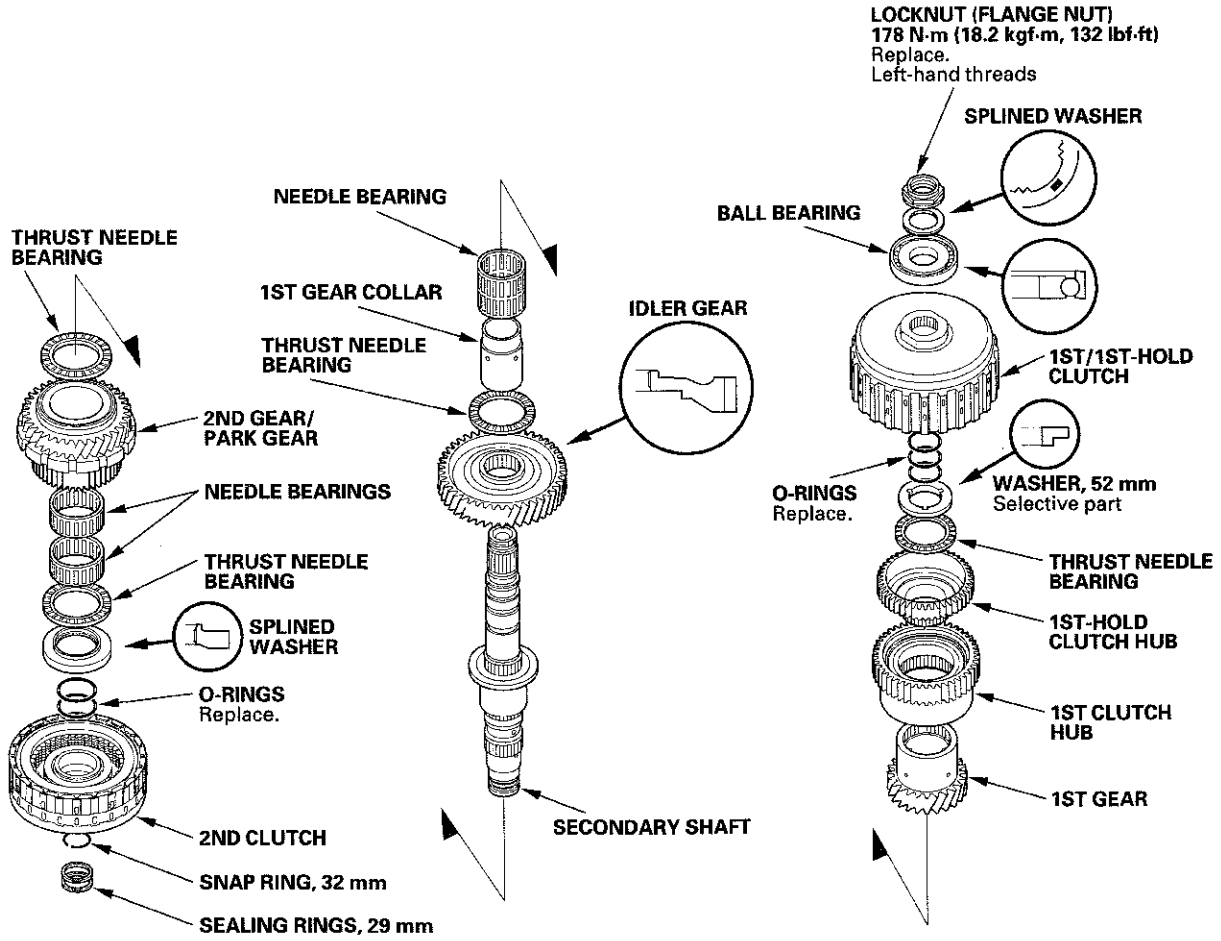
8. Stake the locknut into its shaft in depth (A) of 0.7—1.3 mm (0.03—0.05 in) using a 3.5 mm punch (B).



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Secondary Shaft Disassembly

Exploded View



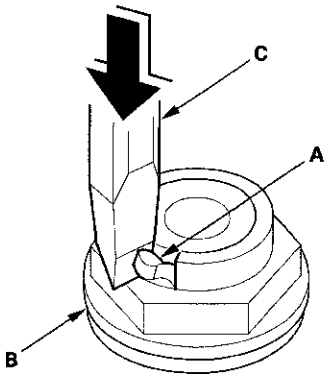
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Special Tools Required
Wrench, 40 x 42 mm 07XAA-002010A

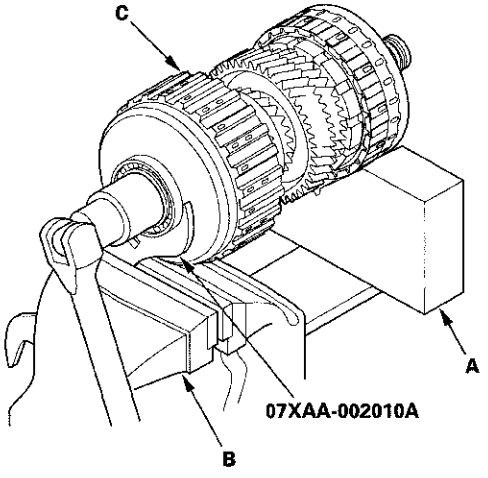
NOTE: Refer to the Exploded View as needed during the following procedure.

1. Cut the lock tab (A) off the secondary shaft locknut (B) using a chisel (C).

   NOTE: Keep all of the chiseled particles out of the secondary shaft.

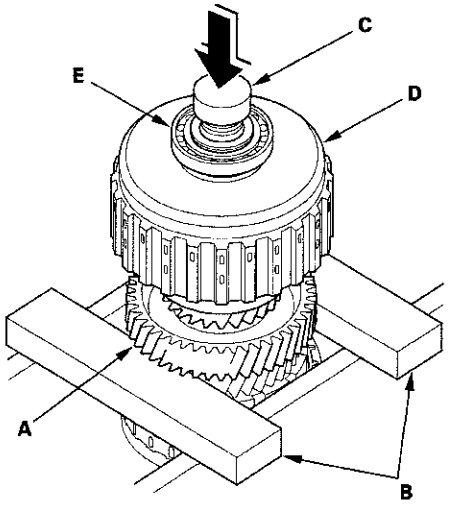


2. Place a V-block (A) on a vise (B), and put the secondary shaft (C) on the V-block and vise.



3. Attach the wrench (40 x 42 mm) onto the 1st clutch guide, and secure the wrench (40 x 42 mm) with the vise to hold the secondary shaft. Loosen the locknut, and remove it. Remove any burrs from splines on the shaft and splined washer.

4. Place the idler gear (A) on press bases (B), and place a shaft protector (C) between the secondary shaft (D) and the press to prevent damaging the secondary shaft.



5. Support the bottom of the secondary shaft with one hand, then press the secondary shaft out of the press-fitted bearing (E).

6. Remove the 1st/1st-hold clutch, 52 mm washer, thrust needle bearing, 1st gear assembly, needle bearings, 1st gear collar, thrust needle bearing, and idler gear.

7. Remove the 32 mm snap ring, and remove the 2nd clutch, splined washer, thrust needle bearing, needle bearing, 2nd gear/park gear, and thrust needle bearing.

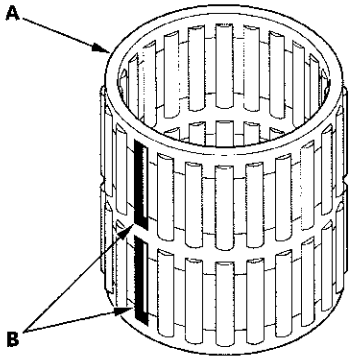
(cont'd)

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Secondary Shaft Disassembly (cont'd)

8. Inspect the bearings for galling and rough movement.

   NOTE: The needle bearing (A) on the 1st gear collar contains the only two no-roller cavities (B); this is normal.



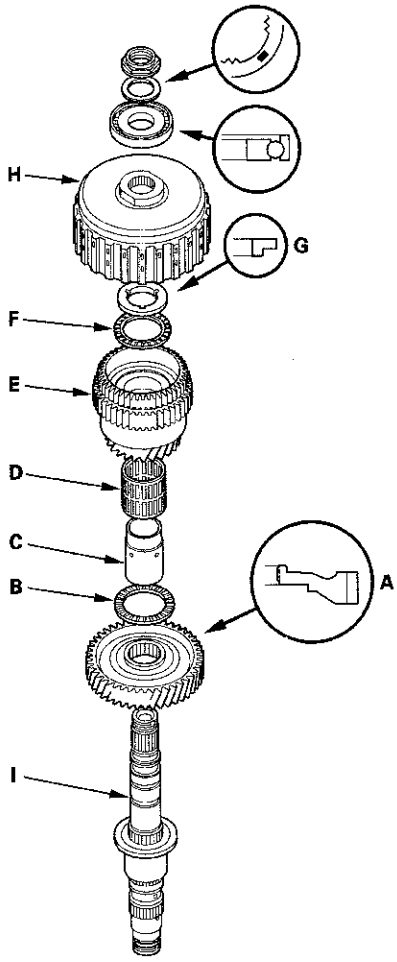
9. Check the shaft bearing surfaces for scoring and excessive wear, and check the shaft splines for excessive wear and damage.

10. Check the 1st gear axial clearance (see page 14-300), 1st gear one-way clutch (see page 14-302), and secondary shaft installation height (see page 14-306).

Secondary Shaft 1st Gear Axial Clearance Inspection

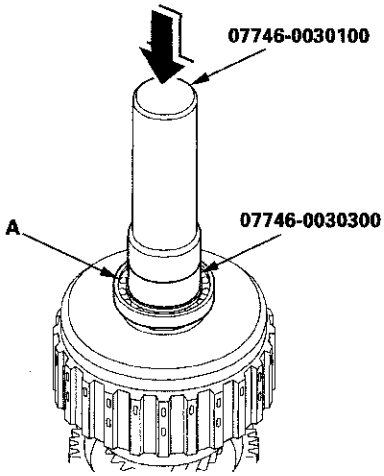
Special Tools Required
- Driver, 40 mm I.D. 07746-0030100
- Attachment, 30 mm I.D. 07746-0030300

1. Install the idler gear (A), thrust needle bearing (B), 1st gear collar (C), needle bearing (D), 1st gear assembly (E), thrust needle bearing (F), 52 mm washer (G), and 1st/1st-hold clutch (H) on the secondary shaft (I). Install the idler gear and 52 mm washer in the direction shown. Do not install the O-rings during inspection.



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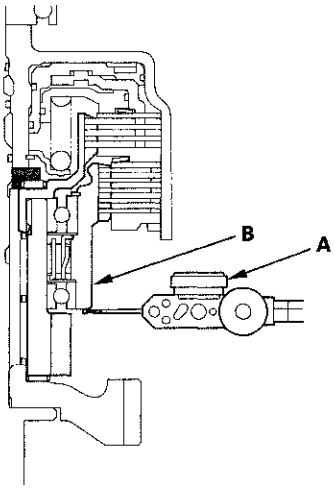
2. Install the ball bearing (A) over the 1st/1st-hold clutch guide using the driver (40 mm I.D.), the attachment (30 mm I.D.), and the press.



3. Install the splined washer with the marked side up over the ball bearing in the same manner as installing the ball bearing using the driver (40 mm I.D.), the attachment (30 mm I.D.), and the press.

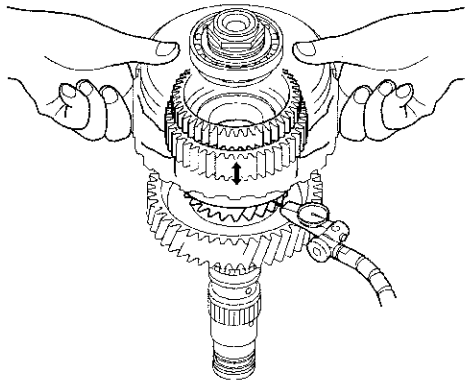
4. Install the old locknut and tighten it to 29 N·m (3.0 kgf·m, 22 lbf·ft).

5. Set the dial indicator (A) on the 1st clutch hub (B).

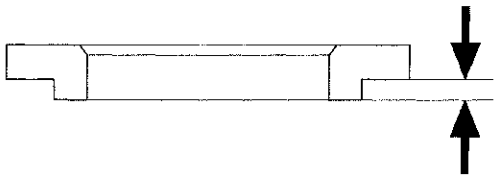


6. Measure the 1st gear axial clearance in at least three places while moving 1st gear. Use the average as the actual clearance.

Standard: 0.100—0.145 mm (0.004—0.006 in)



7. If the clearance is out of the standard, remove the washer and measure its height difference.



8. Select and install a new washer, then recheck the clearance.

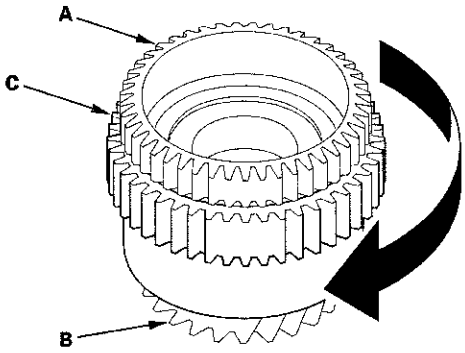
WASHER, 52 mm

No.	Thickness
A	2.705 mm (0.106 in)
B	2.680 mm (0.106 in)
C	2.655 mm (0.105 in)
D	2.630 mm (0.104 in)
E	2.605 mm (0.103 in)
F	2.580 mm (0.102 in)
G	2.555 mm (0.101 in)
H	2.530 mm (0.100 in)
I	2.505 mm (0.099 in)
J	2.480 mm (0.098 in)
K	2.455 mm (0.097 in)
L	2.430 mm (0.096 in)
M	2.405 mm (0.095 in)

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1st Gear One-way Clutch Inspection

1. Hold the 1st-hold clutch hub (A), and turn the 1st gear (B) in the direction shown to be sure it turns freely. Also make sure the 1st gear locks in the opposite direction.



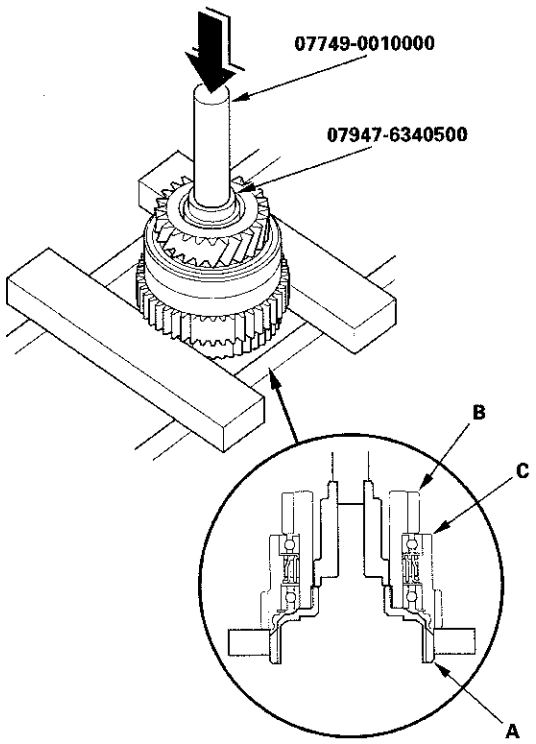
2. If any problem occurs on the 1st gear one-way clutch, replace the 1st clutch hub (C). The 1st gear one-way clutch is not available separately from the 1st clutch hub.

3. Also check the 1st gear and the 1st-hold clutch hub for wear and damage. If the 1st gear and 1st-hold clutch hub are worn or damaged, replace the damaged part, refer to 1st Clutch Hub Replacement (see page 14-302).

1st Clutch Hub Replacement

Special Tools Required
- Driver 07749-0010000
- Driver attachment 07947-6340500
- Attachment, 78 x 90 mm 07GAD-SD40101

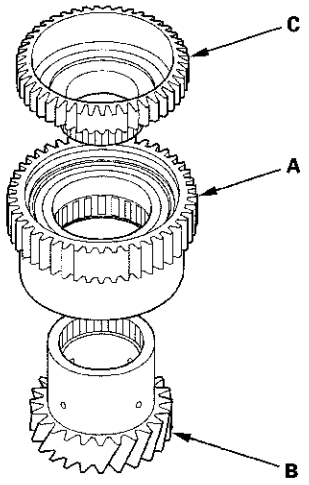
1. Remove the 1st-hold clutch hub (A) from 1st gear (B) using the driver, the driver attachment, and the press.



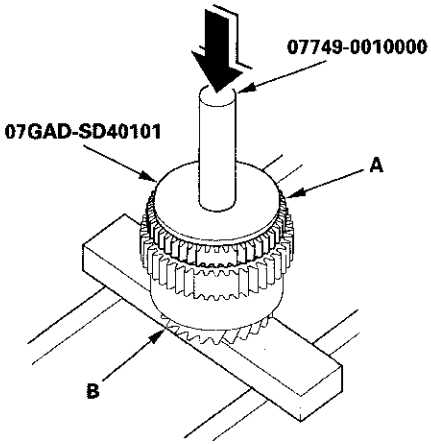
2. Remove the 1st clutch hub (C) from 1st gear.

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3. Install the new 1st clutch hub (A) over 1st gear (B), and install the 1st-hold clutch hub (C) in 1st gear.



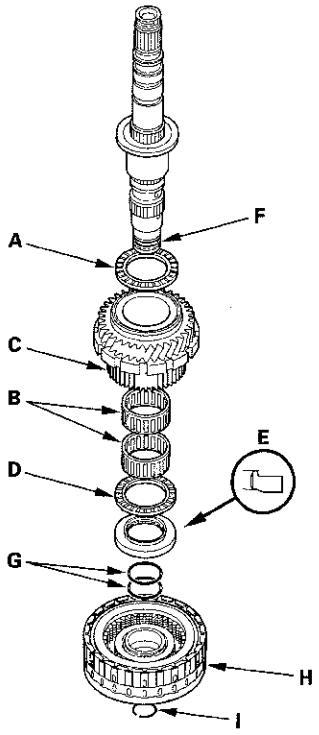
4. Install the 1st-hold clutch hub (A) in 1st gear (B) using the driver, the attachment (78 x 90 mm), and the press.



Secondary Shaft Reassembly

Special Tools Required
- Driver, 40 mm I.D. 07746-0030100
- Attachment, 30 mm I.D. 07746-0030300
- Wrench, 40 x 42 mm 07XAA-002010A

1. Install the thrust needle bearing (A), needle bearings (B), 2nd gear/park gear (C), thrust needle bearing (D), and splined washer (E) in the direction shown on the secondary shaft (F).



2. Wrap the shaft splines with tape, and install the new O-rings (G) in the 2nd clutch O-ring grooves, then remove the tape.

   NOTE: To prevent damaging the O-rings, be sure to install the O-rings after installing the splined washer.

3. Install the 2nd clutch (H) on the secondary shaft, and secure the 2nd clutch with the snap ring (I).

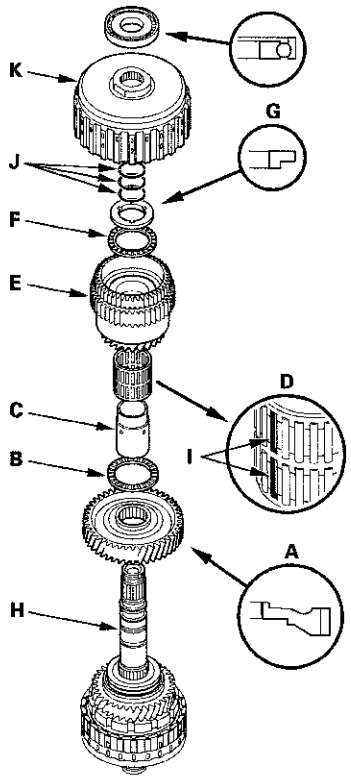
(cont'd)

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Secondary Shaft Reassembly (cont'd)

4. Install the idler gear (A) in the direction shown, thrust needle bearing (B), 1st gear collar (C), needle bearing (D), 1st gear assembly (E), thrust needle bearing (F), and 52 mm washer (G) in the direction shown on the secondary shaft (H).

   NOTE: The needle bearing contains the only two no-roller cavities (I); this is normal.

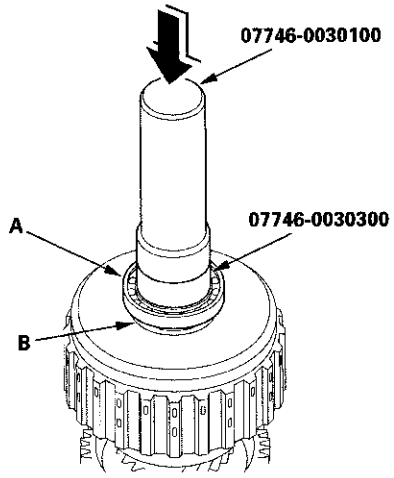


5. Wrap the shaft splines with tape, and install the new O-rings (J) in 1st/1st-hold clutch O-ring grooves, then remove the tape.

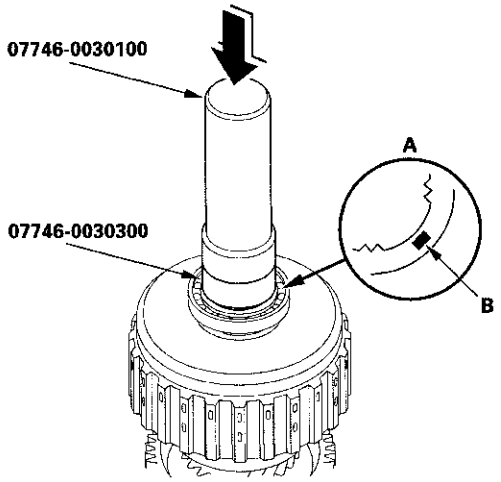
   NOTE: To prevent damaging the O-rings, be sure to install the O-rings after installing the 1st gear collar and 52 mm washer.

6. Install the 1st/1st-hold clutch (K).

7. Install the ball bearing (A) over the 1st/1st-hold clutch guide (B) using the driver (40 mm I.D.), the attachment (30 mm I.D.), and the press.

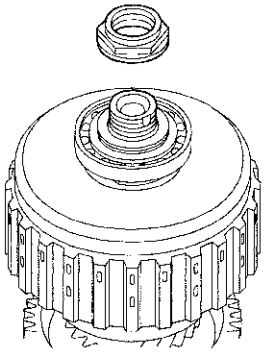


8. Install the new splined washer (A) with the marked side (B) up over the ball bearing using the driver (40 mm I.D.), the attachment (30 mm I.D.), and the press.

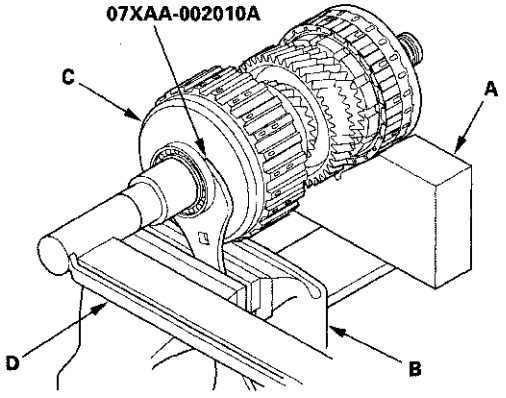


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9. Install the new locknut.



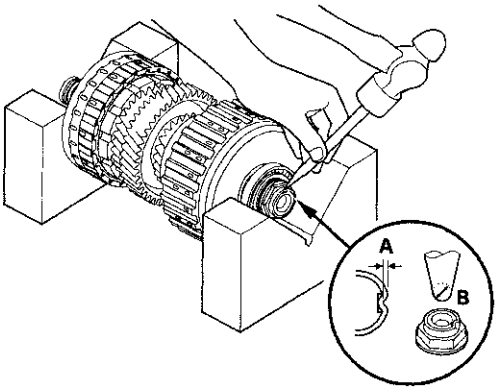
10. Place a V-block (A) on a vise (B), and put the secondary shaft (C) on the V-block and the vise.



11. Attach the wrench (40 x 42 mm) onto the top of the 1st clutch guide, and secure the wrench (40 x 42 mm) with the vise to hold the secondary shaft. Tighten the locknut to 178 N·m (18.2 kgf·m, 132 lbf·ft) with the torque wrench (D).

    NOTE:
    - Use a torque wrench to tighten the locknut. Do not use an impact wrench.
    - The locknut has left-hand threads.

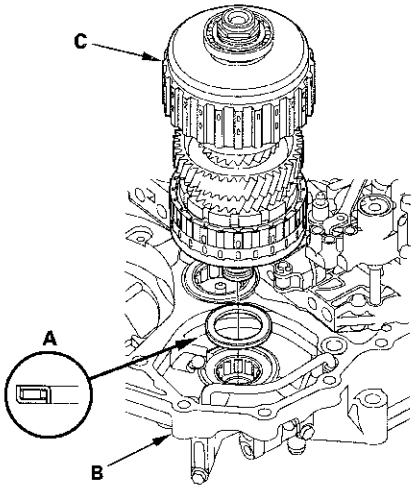
12. Stake the locknut to a depth (A) of 0.7—1.3 mm (0.03—0.05 in) using a 3.5 mm punch (B).



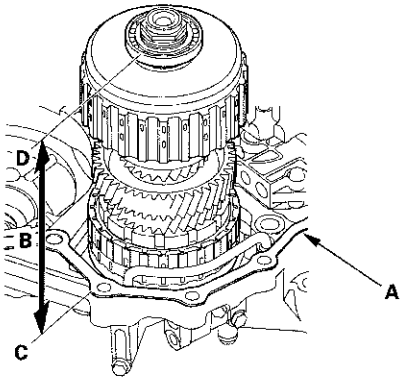
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Secondary Shaft Installation Height Inspection/Adjustment

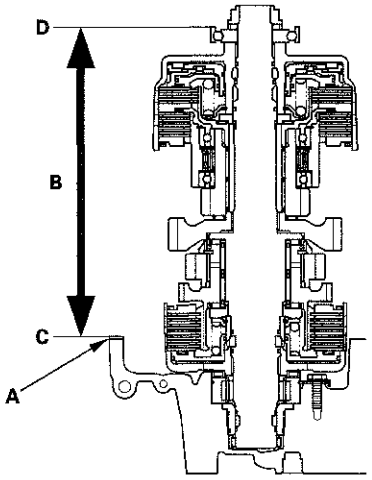
1. Install the thrust needle bearing (A) in the torque converter housing (B) in the direction shown, and install the secondary shaft assembly (C).



2. Install the new gasket (A) on the torque converter housing.

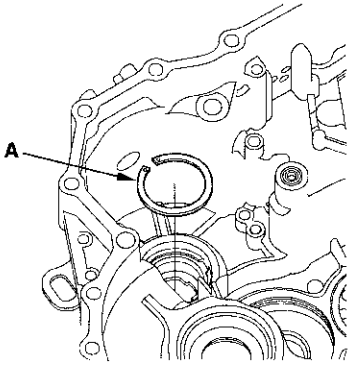


Secondary Shaft Cutaway View



3. Measure the height (B) of the secondary shaft installation between the surface (C) of the gasket and the top of the ball bearing outer race (D), then note the measurement.

4. Remove the 65 mm thrust shim (A) from the transmission housing, and measure its thickness.



5. Calculate the thickness of the 65 mm thrust shim using the formula.

Formula:
65 mm Thrust Shim Thickness
= Secondary Shaft Installation Height Standard
— Measurement

Secondary Shaft Installation Height Standard:
228.04—228.13 mm (8.9779—8.9815 in)

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6. Select the 65 mm thrust shim from the following table.

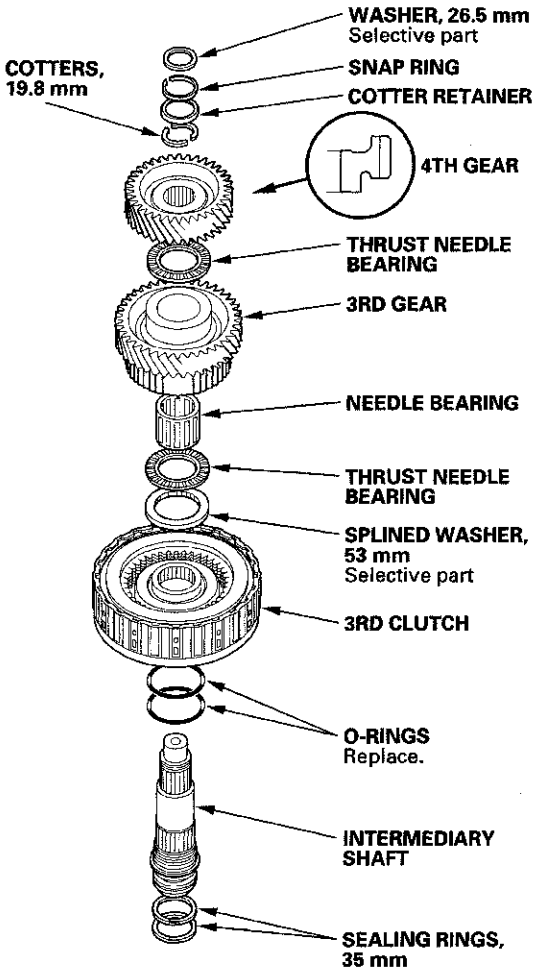
THRUST SHIM, 65 mm

No.	Thickness
0A	0.80 mm (0.031 in)
A	0.84 mm (0.033 in)
B	0.88 mm (0.035 in)
C	0.92 mm (0.036 in)
D	0.96 mm (0.038 in)
E	1.00 mm (0.039 in)
F	1.04 mm (0.041 in)
G	1.08 mm (0.043 in)
H	1.12 mm (0.044 in)
I	1.16 mm (0.046 in)
J	1.20 mm (0.047 in)
K	1.24 mm (0.049 in)
L	1.28 mm (0.050 in)
M	1.32 mm (0.052 in)
N	1.36 mm (0.054 in)
O	1.40 mm (0.055 in)
P	1.44 mm (0.057 in)
Q	1.48 mm (0.058 in)
R	1.52 mm (0.060 in)
S	1.56 mm (0.061 in)
T	1.60 mm (0.063 in)
U	1.64 mm (0.065 in)
V	1.68 mm (0.066 in)
W	1.72 mm (0.068 in)
X	1.76 mm (0.069 in)
Y	1.80 mm (0.071 in)
Z	1.84 mm (0.072 in)
AA	1.88 mm (0.074 in)
AB	1.92 mm (0.076 in)
AC	1.96 mm (0.077 in)
AD	2.00 mm (0.079 in)
AE	2.04 mm (0.080 in)
AF	2.08 mm (0.082 in)
AG	2.12 mm (0.083 in)
AH	2.16 mm (0.085 in)
AI	2.20 mm (0.087 in)
AJ	2.24 mm (0.088 in)
AK	2.28 mm (0.090 in)
AL	2.32 mm (0.091 in)
AM	0.76 mm (0.030 in)

7. Install the thrust shim in the transmission housing.

Intermediary Shaft Disassembly, Inspection, and Reassembly

1. Remove the 26.5 mm washer, snap ring, cotter retainer, and cotters from the intermediary shaft.



2. Remove the intermediary shaft 4th gear using the press (see page 14-308), and disassemble the shaft and gears.

3. Inspect the bearings for galling and rough movement.

(cont'd)

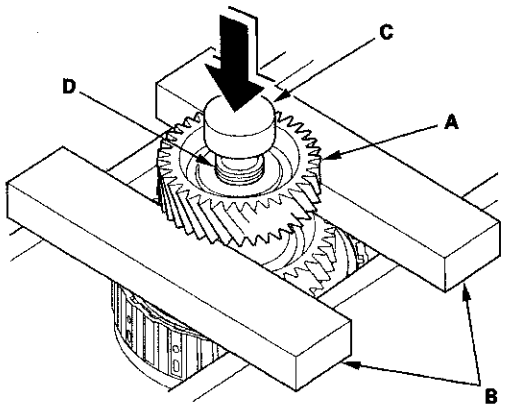
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Intermediary Shaft Disassembly, Inspection, and Reassembly (cont'd)

4. Check the shaft bearing surfaces for scoring and excessive wear, and check the shaft splines for excessive wear and damage.
5. Check the sealing rings for excessive wear and damage.
6. Check the 3rd gear axial clearance (see page 14-309), and intermediary shaft installation height (see page 14-311).
7. Before installing the O-rings, wrap the shaft splines with tape to prevent damaging the O-rings.
8. Lubricate all parts with ATF, and reassemble the shaft and gears.
9. Install the press-fitted 4th gear using the driver (40 mm I.D.) and the press (see page 14-309) in the direction shown.

Intermediary Shaft 4th Gear Removal

1. Place 4th gear (A) on press bases (B), and place a shaft protector (C) between the intermediary shaft (D) and the press to prevent damaging the intermediary shaft.



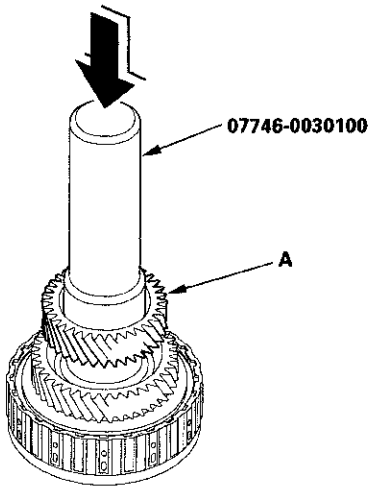
2. Support the bottom of the intermediary shaft with one hand, then press the intermediary shaft out of the press-fitted gear, and the intermediary shaft out of the press-fitted gear.
3. Remove the remaining parts from the intermediary shaft.

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Intermediary Shaft 4th Gear Installation

Special Tools Required
Driver, 40 mm I.D. 07746-0030100

1. Wrap the shaft splines with tape, and install the new O-rings in the 3rd clutch O-ring grooves, then remove the tape.
2. Install the 3rd clutch, 53 mm splined washer, thrust needle bearing, needle bearing, 3rd gear, and thrust needle bearing on the intermediary shaft.
3. Install 4th gear (A) using the driver (40 mm I.D.) and the press.

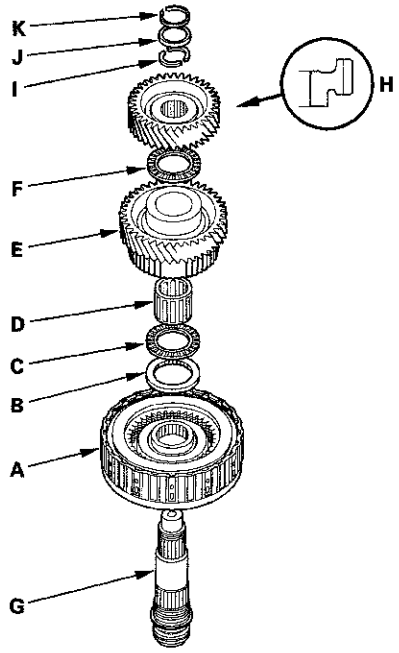


4. Install the 19.8 mm cotters, cotter retainer, and snap ring.
5. Install the 26.5 mm washer on the top of the intermediary shaft.

Intermediary Shaft 3rd Gear Axial Clearance Inspection

Special Tools Required
Driver, 40 mm I.D. 07746-0030100

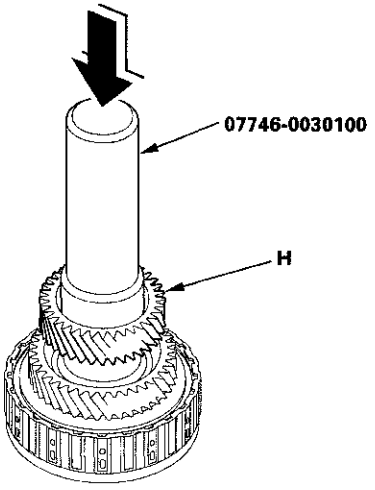
1. Install the 3rd clutch (A), the original thickness 53 mm splined washer (B), thrust needle bearing (C), needle bearing (D), 3rd gear (E), and thrust needle bearing (F) on the intermediary shaft (G). Do not install the O-rings during inspection.



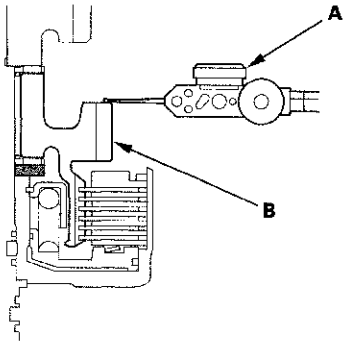
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Intermediary Shaft 3rd Gear Axial Clearance Inspection (cont'd)

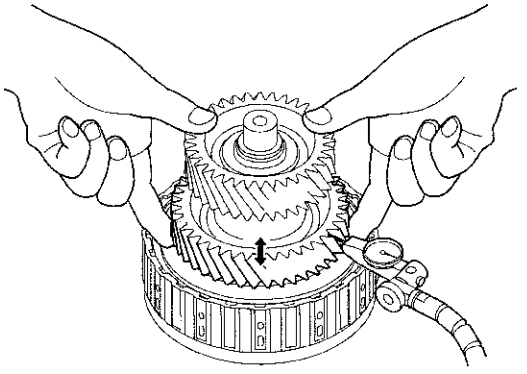


2. Install 4th gear (H) using the driver (40 mm I.D.) and the press.
3. Install the cotters (I), cotter retainer (J), and snap ring (K).
4. Set the dial indicator (A) on 3rd gear (B).



5. Measure the 3rd gear axial clearance in at least three places while moving 3rd gear. Use the average as the actual clearance.

Standard: 0.005—0.045 mm (0.0002—0.0018 in)



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

SPLINED WASHER, 53 mm

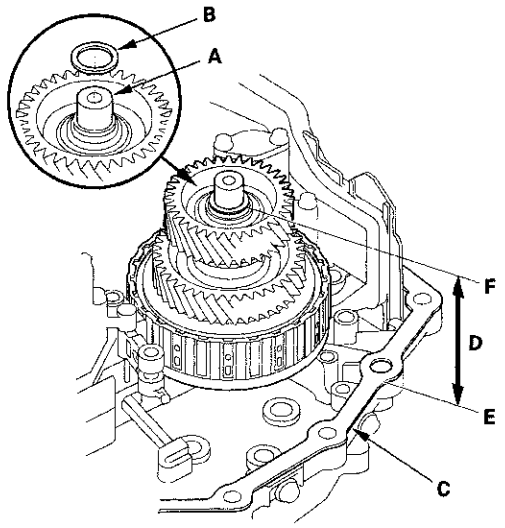
No.	Thickness
A	3.995 mm (0.1573 in)
B	4.015 mm (0.1581 in)
C	4.035 mm (0.1589 in)
D	4.055 mm (0.1596 in)
E	4.075 mm (0.1604 in)
F	4.095 mm (0.1612 in)
G	4.115 mm (0.1620 in)
H	4.135 mm (0.1628 in)
I	4.155 mm (0.1636 in)
J	4.175 mm (0.1644 in)
K	4.195 mm (0.1652 in)
L	4.215 mm (0.1659 in)
M	4.235 mm (0.1667 in)
N	4.255 mm (0.1675 in)

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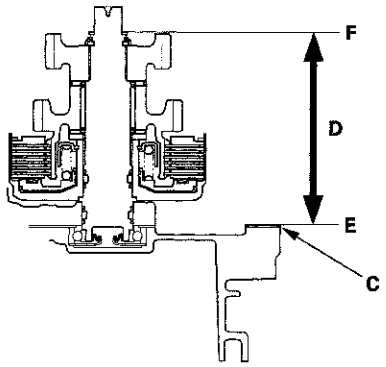
Intermediary Shaft Installation Height Inspection/Adjustment

1. Install the intermediary shaft (A) in the torque converter housing, and install the original thickness 26.5 mm washer (B) on the intermediary shaft.

   Intermediary Shaft Installation Height:
   Standard:
   137.285—137.385 mm (5.40491—5.40885 in)



Intermediary Shaft Cutaway View



2. Install the new gasket (C) on the torque converter housing.

3. Measure the height (D) of the intermediary shaft installation between the surface (E) of the gasket and the surface of the 26.5 mm washer (F).

4. If the measurement is out of standard, remove the 26.5 mm washer and measure its thickness.

5. Select and install a new washer, then recheck the installation height.

WASHER, 26.5 mm

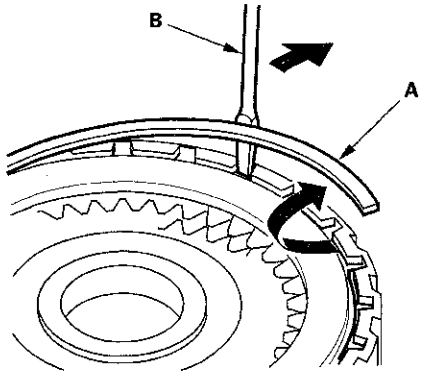
No.	Thickness
A	1.05 mm (0.041 in)
B	1.13 mm (0.044 in)
C	1.21 mm (0.048 in)
D	1.29 mm (0.051 in)
E	1.37 mm (0.054 in)
F	1.45 mm (0.057 in)
G	1.53 mm (0.060 in)
H	1.61 mm (0.063 in)
I	1.69 mm (0.067 in)
J	1.77 mm (0.070 in)
K	1.85 mm (0.073 in)
L	1.93 mm (0.076 in)
M	2.01 mm (0.079 in)
N	2.09 mm (0.082 in)
O	0.97 mm (0.038 in)

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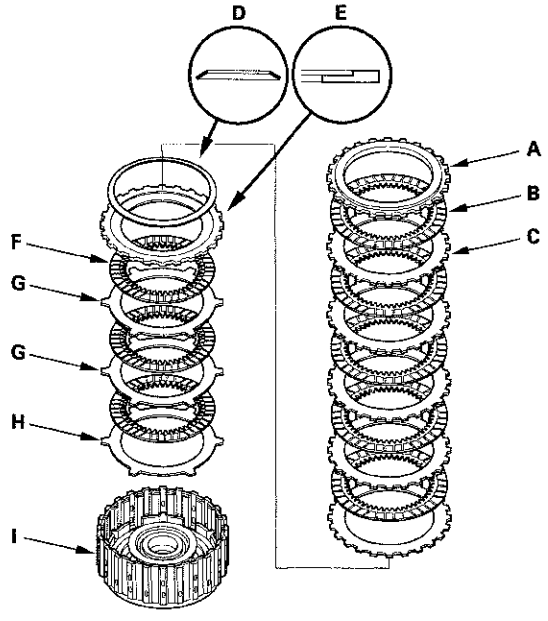
Clutch Disassembly

Special Tools Required
Clutch spring compressor set 07LAE-PX40000

1. Remove the snap ring (A) with a screwdriver (B).

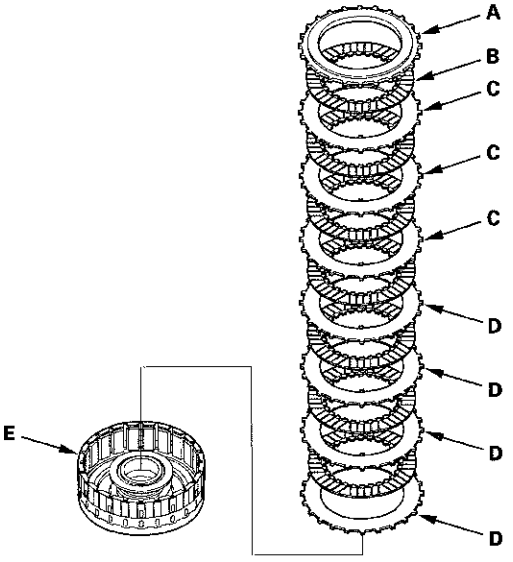


2. Remove the 1st clutch end-plate (A), 1st clutch discs (B) (5), 1st clutch wave-plates (C) (5), disc spring (D), 1st-hold clutch plate B (E), 1st-hold clutch discs (F) (3), 1st-hold clutch wave-plates (G) (2), and flat-plate (H) from the 1st/1st-hold clutch drum (I).



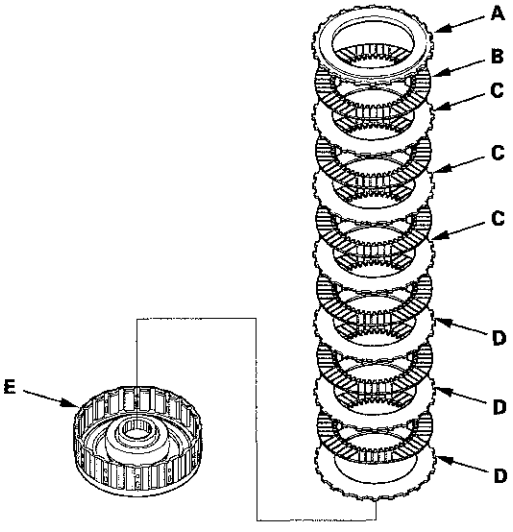
3. Make reference marks on the clutch wave-plate.

4. Remove the clutch end-plate (A), clutch discs (B) (7), clutch wave-plates (C) (3), and clutch flat-plates (D) (4) from the 2nd clutch drum (E).



5. Make reference marks on the clutch wave-plates.

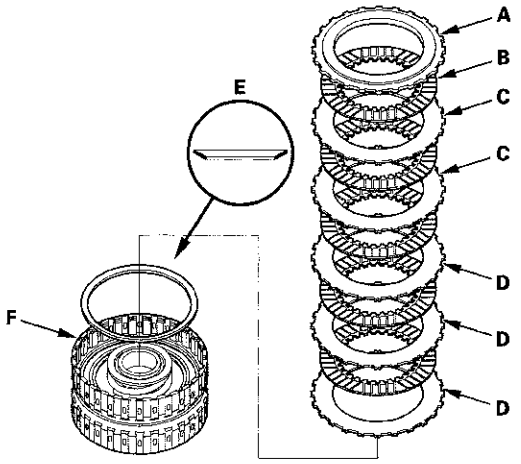
6. Remove the clutch end-plate (A), clutch discs (B) (6), clutch wave-plates (C) (3), and clutch flat-plates (D) (3) from the 3rd clutch drum (E).



7. Make reference marks on the clutch wave-plates.

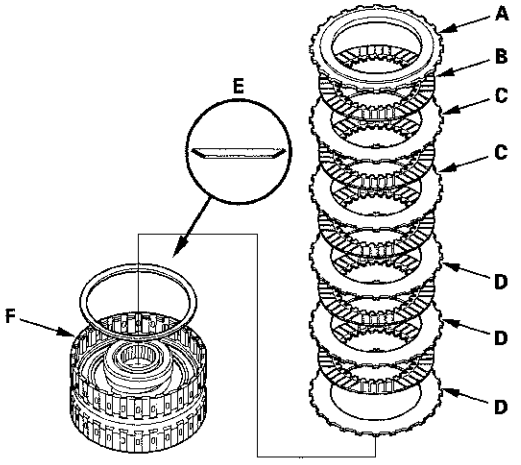
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8. Remove the clutch end-plate (A), clutch discs (B) (5), clutch wave-plates (C) (2), clutch flat-plates (D) (3), and the disc spring (E) from the 4th clutch drum (F).



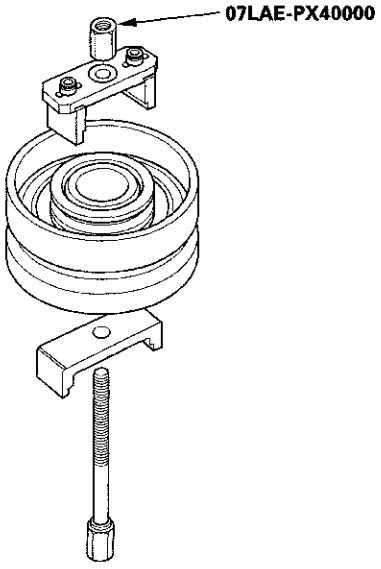
9. Make reference marks on the clutch wave-plates.

10. Remove the clutch end-plate (A), clutch discs (B) (5), clutch wave-plates (C) (2), clutch flat-plates (D) (3), and the disc spring (E) from the 5th clutch drum (F).

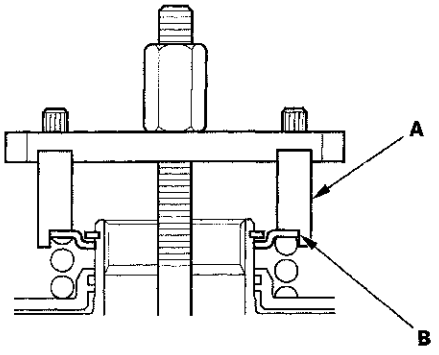


11. Make reference marks on the clutch wave-plates.

12. Install the clutch spring compressor set.



13. Be sure the clutch spring compressor attachment (A) is adjusted to make full contact with the spring retainer (B) on the 1st, 2nd, and 4th clutches.

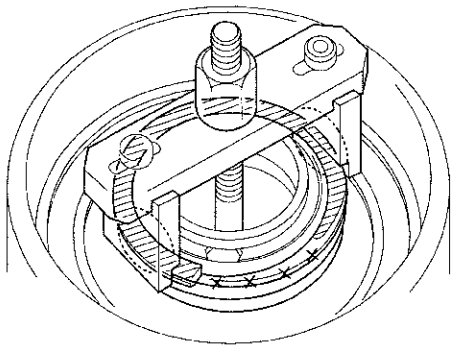


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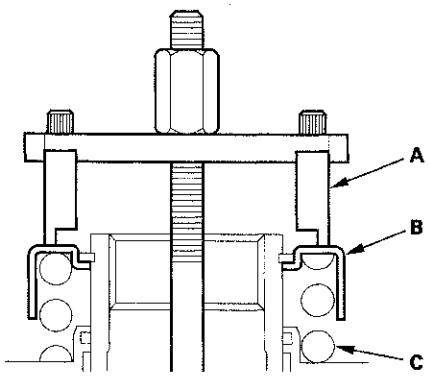
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Clutch Disassembly (cont'd)

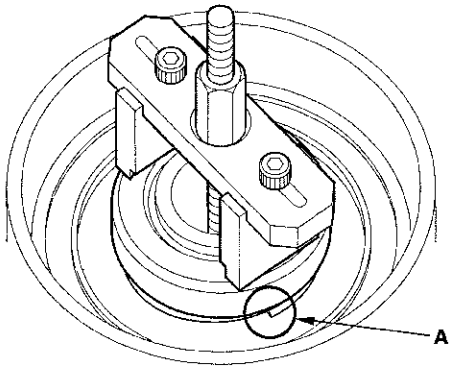
14. Check the placement of the clutch spring compressor attachment. If either end of the clutch spring compressor attachment is set over an area of the spring retainer that is unsupported by the return spring, reset the clutch spring compressor attachment over the proper position.



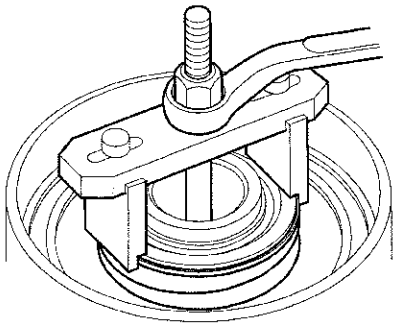
15. Set the clutch spring compressor attachment (A) on the spring retainer (B) of the 3rd and 5th clutches so the clutch spring compressor attachment works on the clutch return spring (C).



16. Check the placement of the clutch spring compressor attachment. If either end of the clutch spring compressor attachment is not set over the clutch return spring end (A), reset the clutch spring compressor attachment over the return spring end.

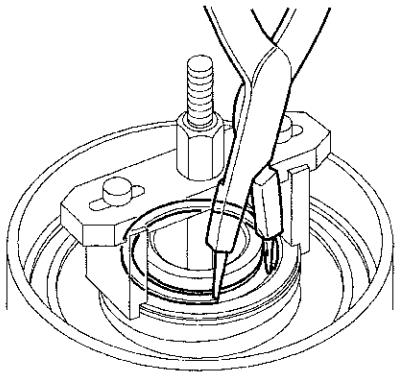


17. Compress the return spring until the snap ring can be removed.



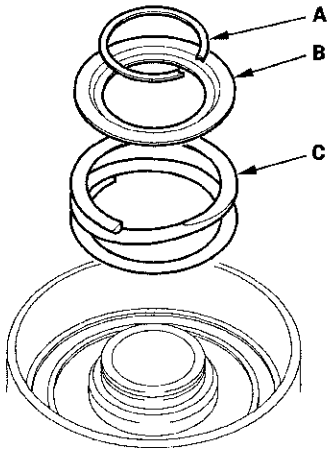
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18. Remove the snap ring with snap ring pliers.

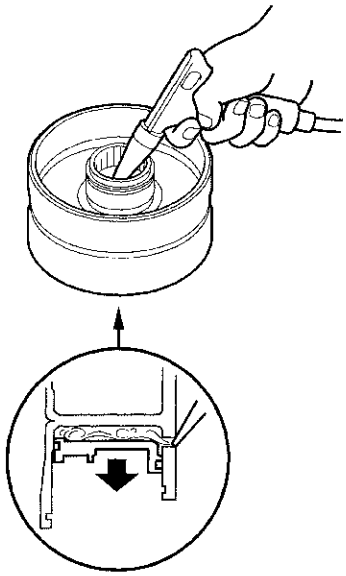


19. Remove the clutch spring compressor set.

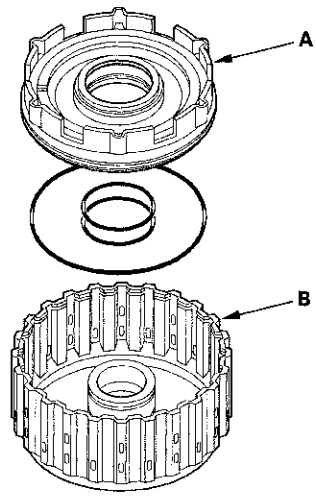
20. Remove the snap ring (A), spring retainer (B), and return spring (C).



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



22. Remove the 1st/1st-hold clutch piston (A) from the clutch drum (B), and remove the O-rings from the 1st clutch piston.

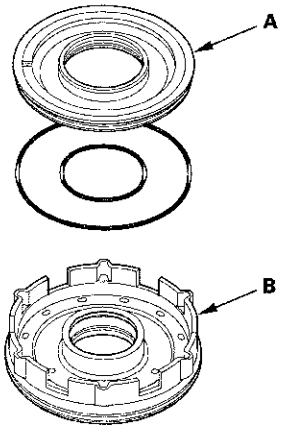


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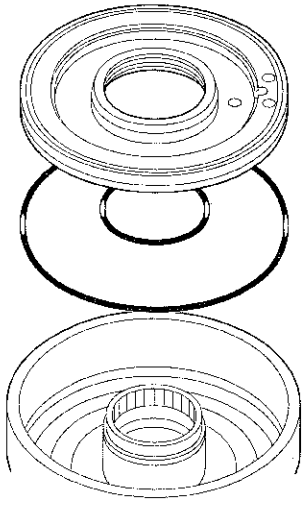
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Clutch Disassembly (cont'd)

23. Remove the 1st-hold clutch piston (A) from the 1st clutch piston (B), and remove the O-rings from the 1st-hold clutch piston.

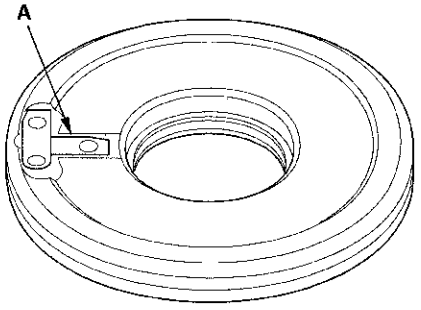


24. Remove the clutch piston, and remove the O-rings from the 2nd, 3rd, 4th, and 5th clutch pistons.



Clutch Inspection

1. Inspect the clutch pistons and clutch piston check valves (A).



2. If the clutch piston check valve is loose or damaged, replace the clutch piston.
3. Check the spring retainer for wear and damage.
4. If the spring retainer is worn or damaged, replace it.
5. Inspect the clutch discs, clutch plates, and clutch end plate for wear, damage, and discoloration.

Clutch Discs:
Standard Thickness: 1.94 mm (0.076 in)

Clutch Flat-plates and Clutch Wave-plates
Standard Thickness:

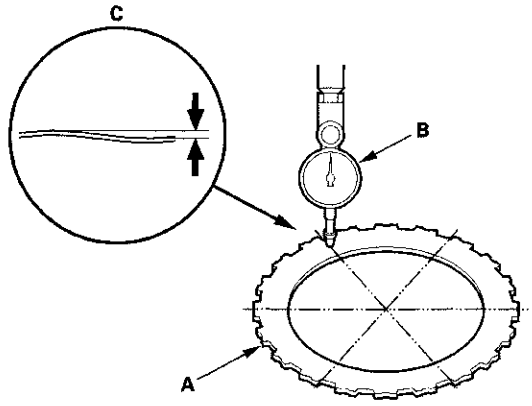
1st Clutch:	**1.6 mm (0.063 in)**
1st-hold Clutch:	**1.8 mm (0.071 in)**
2nd Clutch:	**1.8 mm (0.071 in)**
3rd Clutch:	**1.8 mm (0.071 in)**
4th Clutch:	**1.6 mm (0.063 in)**
5th Clutch:	**1.6 mm (0.063 in)**

6. If the clutch discs are worn or damaged, replace them as a set. If the clutch discs are replaced, inspect the clearance between the clutch end-plate and the disc.
7. If any plate is worn, damaged, or discolored, replace the damaged plate with a new plate, and inspect the other wave-plates for a phase difference. If the clutch plate is replaced, inspect the clearance between the clutch end-plate and the disc.
8. If the clutch end plate is worn, damaged, or discolored, inspect the clutch end-plate disc clearance, then replace the clutch end plate.

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Clutch Wave-plate Phase Difference Inspection

1. Place the clutch wave-plate (A) on a surface plate, and set a dial indicator (B) on the wave-plate.



2. Find the bottom (C) of a phase difference of the wave-plate, zero the dial indicator and make a reference mark on the bottom of the wave-plate.

3. Measure the phase differences of 1st, 1st-hold, 2nd, and 3rd clutch wave-plates.

   -1 Rotate the clutch wave-plate a bout 60-degrees while holding the wave-plate by its circumference. The dial indicator should be at the top of a phase difference. Do not rotate the wave-plate while holding its surface, always rotate it by holding its circumference.

   -2 Read the dial indicator. The dial indicator reads the phase difference of the wave-plate between the bottom and top.

   Standard Phase Difference:
   1st Clutch: 0.17—0.30 mm (0.007—0.012 in)
   1st-hold Clutch: 0.07—0.20 mm (0.003—0.008 in)
   2nd Clutch: 0.07—0.20 mm (0.003—0.008 in)
   3rd Clutch: 0.1—0.2 mm (0.004—0.008 in)

   -3 Rotate the wave-plate a bout 60-degrees. The dial indicator should be at the bottom of a phase difference, and zero the dial indicator.

   -4 Measure the phase difference at the other two tops of the wave-plate by following steps -1 thru -3.

4. Measure the phase differences of 4th and 5th clutch wave-plates.

   -1 Rotate the clutch wave-plate 5-teeth or 4-teeth while holding the wave-plate by its circumference. The dial indicator should be at the top of a phase difference. Do not rotate the wave-plate while holding its surface, always rotate it by holding its circumference.

   -2 Read the dial indicator. The dial indicator reads the phase difference of the wave-plate between the bottom and top.

   Standard Phase Difference:
   4th Clutch: 0.07—0.20 mm (0.003—0.008 in)
   5th Clutch: 0.07—0.20 mm (0.003—0.008 in)

   -3 Rotate the wave-plate 5-teeth or 4-teeth. The dial indicator should be at the bottom of a phase difference, and zero the dial indicator.

   -4 Measure the phase difference at the other two tops of the wave-plate by following steps -1 thru -3.

5. If two of the three measurements are within the standard, the wave-plate is OK. If two of the measurements are out of standard, replace the wave-plate.

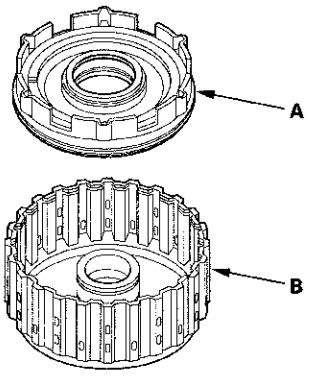
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Clutch Clearance Inspection

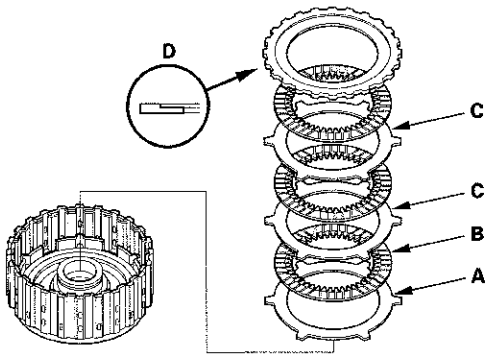
Special Tools Required
Clutch compressor attachment 07ZAE-PRP0100

1. Inspect the clutch piston, discs, plates, and end-plate for wear and damage (see page 14-316), and inspect the clutch wave-plate phase difference (see page 14-317), if necessary.

2. Install the 1st-hold clutch piston in the 1st clutch piston, and install 1st/1st-hold clutch piston (A) in the 1st/1st-hold clutch drum (B). Do not install the O-rings on the clutch pistons during inspection.

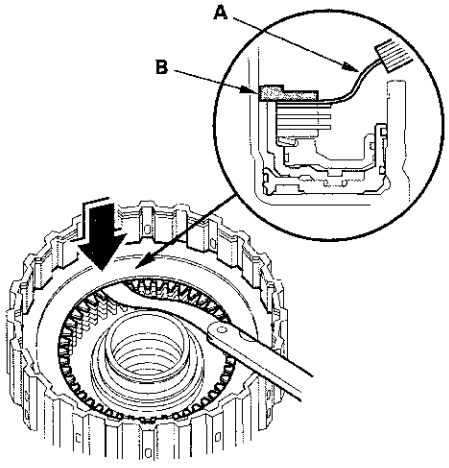


3. Install the 1st-hold clutch flat-plate (A), and alternately install the clutch discs (B) (3) and clutch wave-plates (C) (2) starting with the disc, then install 1st-hold clutch plate B (D) with the flat side down on the top disc.



4. Measure the clearance between the 1st-hold clutch plate B and top disc with a feeler gauge (A) while pressing the 1st-hold clutch plate B down. Take measurements in at least three places, and use the average as the actual clearance.

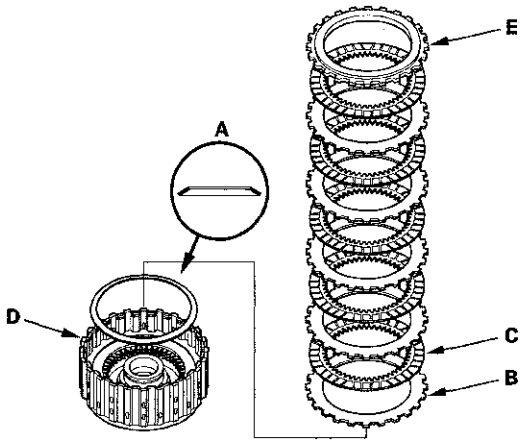
Clearance Between 1st-hold Clutch Plate B and Top Disc
Service Limit: 0.6—1.0 mm (0.024—0.039 in)



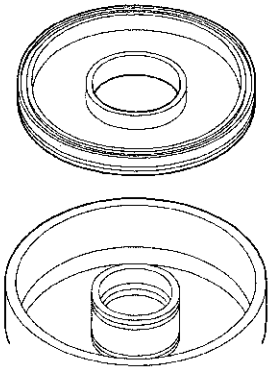
5. If the clearance is out of the standard, replace the 1st-hold clutch plates and discs as a set, and recheck.

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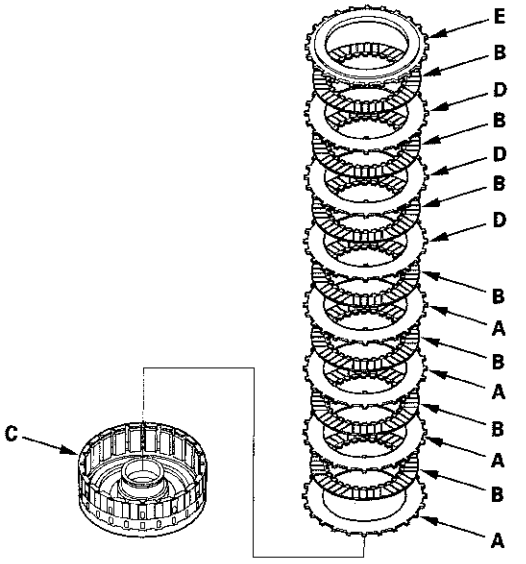
6. Install the disc spring (A) on 1st-hold clutch plate B in the direction shown. Starting with the 1st clutch wave-plate, alternately install the wave-plates (B) (5) and discs (C) (5) in the 1st clutch drum (D), then install the clutch end-plate (E) with the flat side down on the top disc.



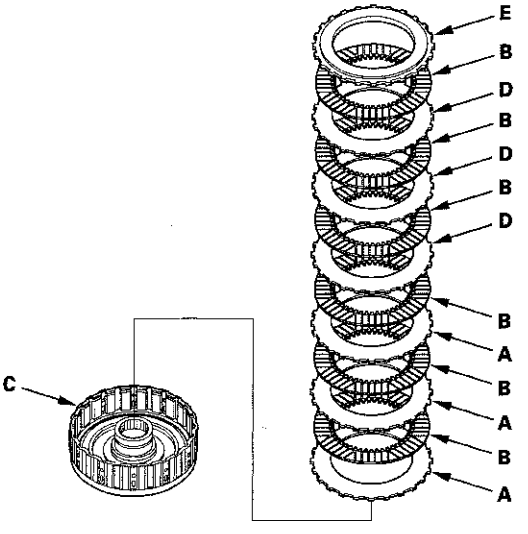
7. Install the clutch pistons in the 2nd, 3rd, 4th, and 5th clutch drums. Do not install the O-rings on the clutch pistons during inspection.



8. Starting with the 2nd clutch flat-plate, alternately install the flat-plates (A) (4) and discs (B) (4) in the 2nd clutch drum (C), and alternately install the wave-plates (D) (3) and discs (B) (3). Install the clutch end-plate (E) with the flat side down on the top disc.



9. Starting with the 3rd clutch flat-plate, alternately install the flat-plates (A) (3) and discs (B) (3) in the 3rd clutch drum (C), and alternately install the wave-plates (D) (3) and discs (B) (3). Install the clutch end-plate (E) with the flat side down on the top disc.

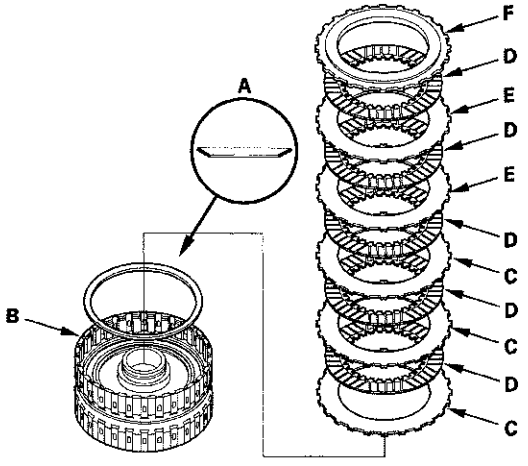


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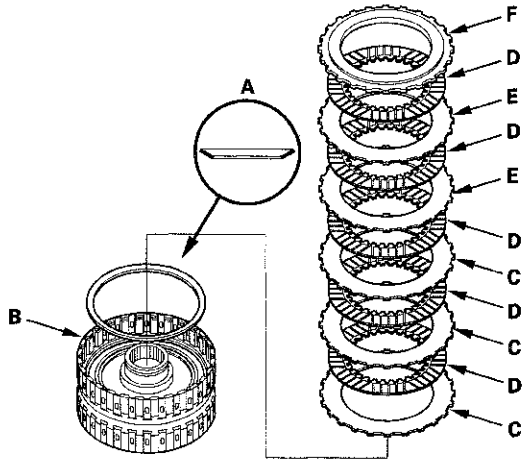
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Clutch Clearance Inspection (cont'd)

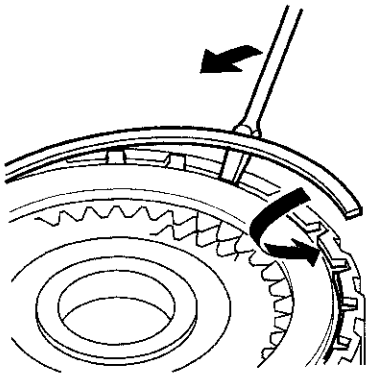
10. Install the disc spring (A) in the 4th clutch drum (B) in the direction shown. Starting with the 4th clutch flat-plate, alternately install the flat-plates (C) (3) and discs (D) (3), and alternately install the wave-plates (E) (2) and discs (D) (2). Install the clutch end-plate (F) with the flat side down on the top disc.



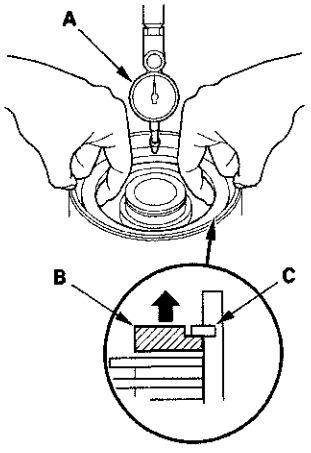
11. Install the disc spring (A) in the 5th clutch drum (B) in the direction shown. Starting with the 5th clutch flat-plate, alternately install the flat-plates (C) (3) and discs (D) (3), and alternately install the wave-plates (E) (2) and discs (D) (2). Install the clutch end-plate (F) with the flat side down on the top disc.



12. Install the snap ring with a screwdriver to secure the clutch end-plate.



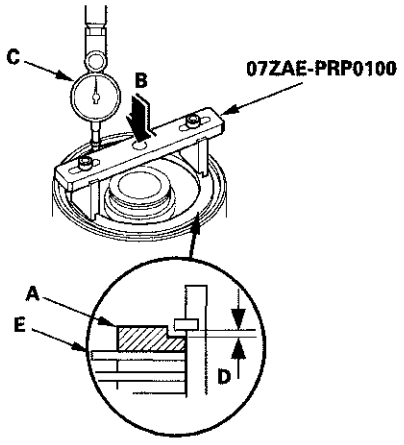
13. Set a dial indicator (A) on the clutch end-plate (B).



14. Zero the dial indicator with the clutch end-plate lifted up to the snap ring (C).

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15. Release the clutch end-plate to lower the clutch end-plate, then put the clutch compressor attachment on the end-plate (A).

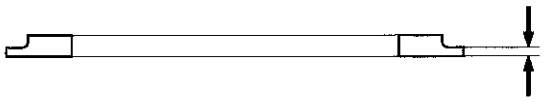


16. Press the clutch compressor attachment down with 150—160 N (15—16 kgf, 33—35 lbf) (B) using a force gauge, and read the dial indicator (C).

17. The dial indicator reads the clearance (D) between the clutch end-plate and top disc (E). Take measurements in at least three places, and use the average as the actual clearance.

Clearance Between the Clutch End-plate and the Top Disc
Service Limit:
1st Clutch: 1.15—1.35 mm (0.045—0.053 in)
2nd Clutch: 1.05—1.25 mm (0.041—0.049 in)
3rd Clutch: 0.9—1.1 mm (0.035—0.043 in)
4th Clutch: 0.75—0.95 mm (0.030—0.037 in)
5th Clutch: 0.75—0.95 mm (0.030—0.037 in)

18. If the clearance is out of the service limit, select a new clutch end-plate from the following table.



1ST CLUTCH END PLATES

Plate No.	Thickness
1	3.1 mm (0.122 in)
2	3.2 mm (0.126 in)
3	3.3 mm (0.130 in)
4	3.4 mm (0.134 in)
5	3.5 mm (0.138 in)
6	3.6 mm (0.142 in)
7	3.7 mm (0.146 in)
8	3.8 mm (0.150 in)
9	3.9 mm (0.154 in)

2ND, 3RD, 4TH, and 5TH CLUTCH END PLATES

Plate No.	Thickness
1	2.1 mm (0.083 in)
2	2.2 mm (0.087 in)
3	2.3 mm (0.091 in)
4	2.4 mm (0.094 in)
5	2.5 mm (0.098 in)
6	2.6 mm (0.102 in)
7	2.7 mm (0.106 in)
8	2.8 mm (0.110 in)
9	2.9 mm (0.114 in)

19. Install the new clutch end-plate, and recheck the clearance. If the thickest clutch end-plate is installed, but the clearance is still over the service limit, replace the clutch discs and plates.

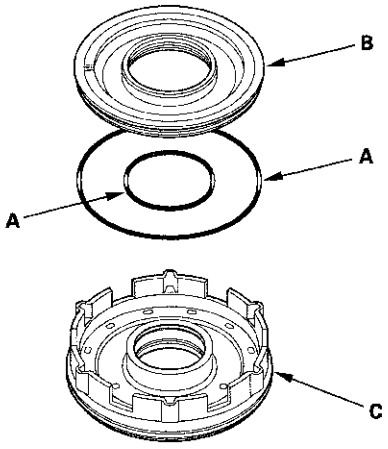
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Clutch Reassembly

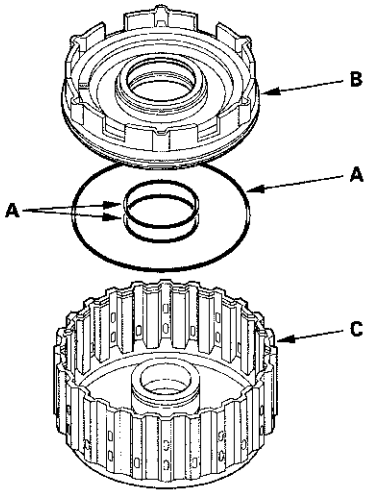
Special Tools Required
Clutch spring compressor set 07LAE-PX40000

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

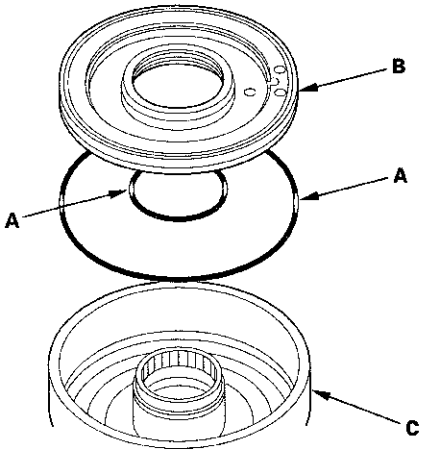
2. Install the new O-rings (A) on the 1st-hold clutch piston (B), and install the 1st-hold clutch piston in the 1st clutch piston (C).



3. Install the new O-rings (A) on the 1st clutch piston (B), and install the 1st/1st-hold clutch piston in the 1st/1st-hold clutch drum (C) while applying pressure and rotating to ensure proper seating. Do not pinch the O-ring.

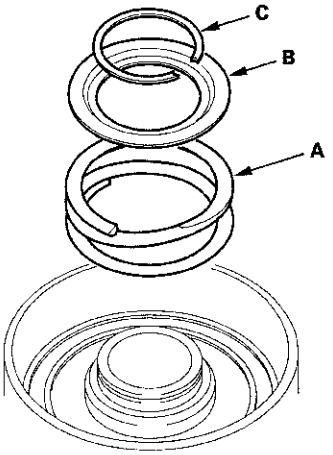


4. Install the O-rings (A) on the 2nd, 3rd, 4th, and 5th clutch piston (B).



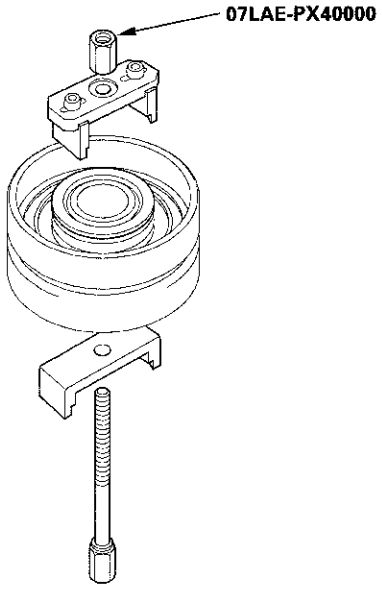
5. Install the clutch pistons in the clutch drums (C) while applying pressure and rotating to ensure proper seating. Do not pinch the O-ring.

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

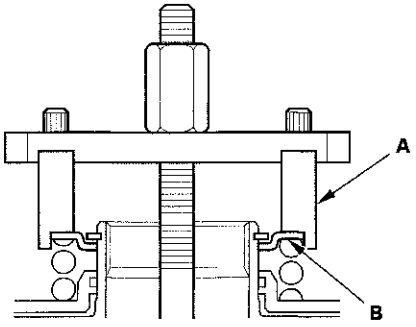


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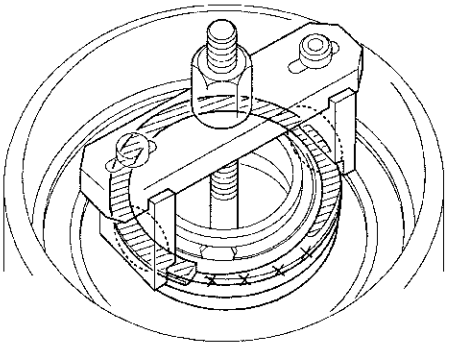
7. Install the clutch spring compressor set.



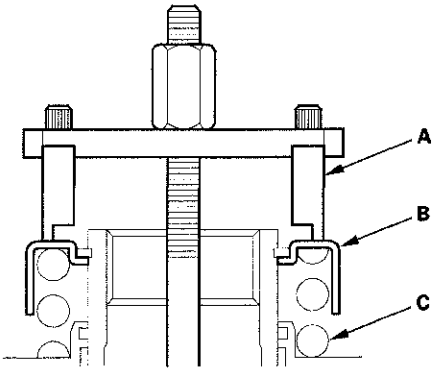
8. Be sure the clutch spring compressor attachment (A) is adjusted to make full contact with the spring retainer (B) on the 1st, 2nd, and 4th clutches.



9. Check the placement of the clutch spring compressor attachment. If either end of the clutch spring compressor attachment is set over an area of the spring retainer that is unsupported by the return spring, reset the clutch spring compressor attachment over the proper position.



10. Set the clutch spring compressor attachment (A) on the spring retainer (B) of the 3rd and 5th clutches so the clutch spring compressor attachment works on the clutch return spring (C).

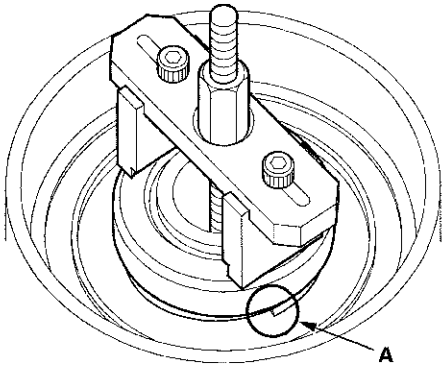


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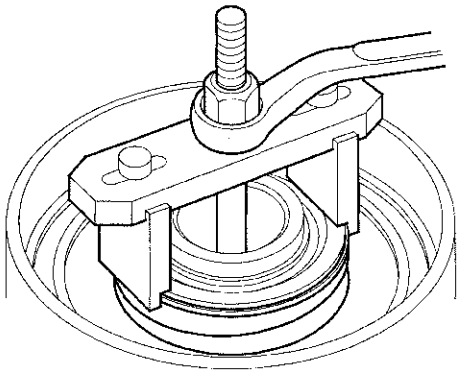
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Clutch Reassembly (cont'd)

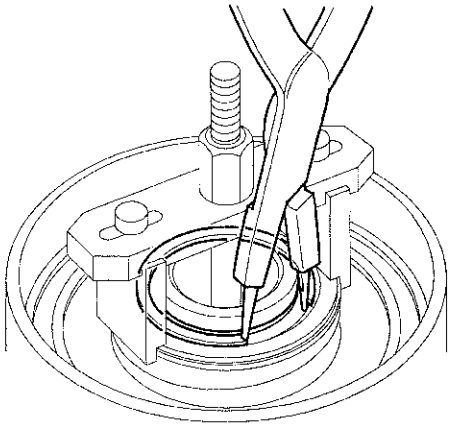
11. Check the placement of the clutch spring compressor attachment. If either end of the clutch spring compressor attachment is not set over the clutch return spring end (A), reset the clutch spring compressor attachment over the return spring end.



12. Compress the return spring until the snap ring can be installed.

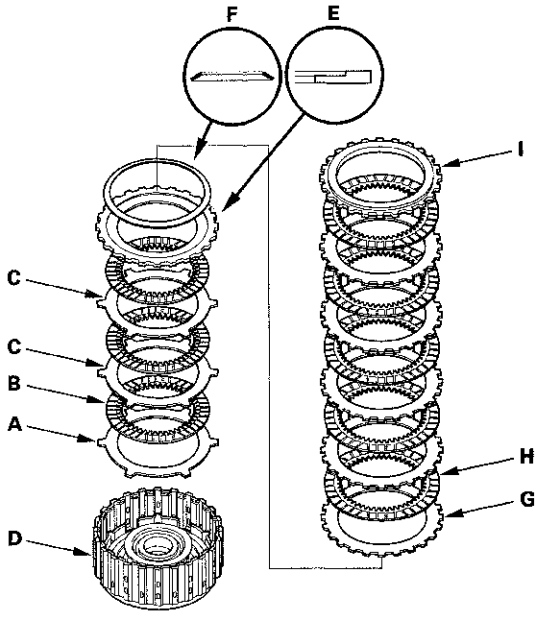


13. Install the snap ring with snap ring pliers.



14. Remove the clutch spring compressor set.

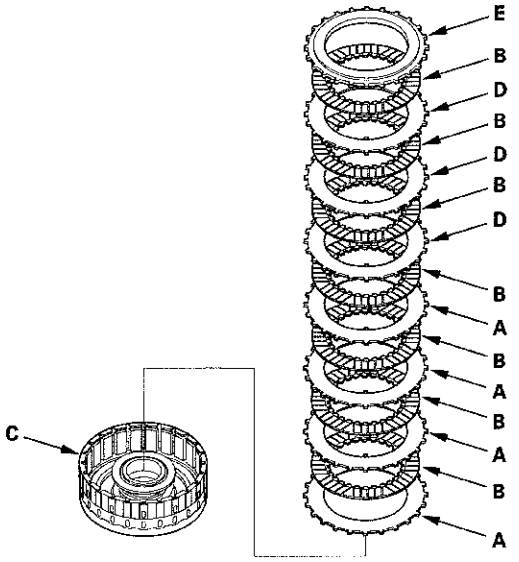
15. Install the 1st-hold clutch flat-plate (A), and alternately install the clutch discs (B) (3) and clutch wave-plates (C) (2) starting with the disc in the 1st/1st-hold clutch drum (D), then install 1st-hold clutch plate B (E) with the flat side down on the top disc.



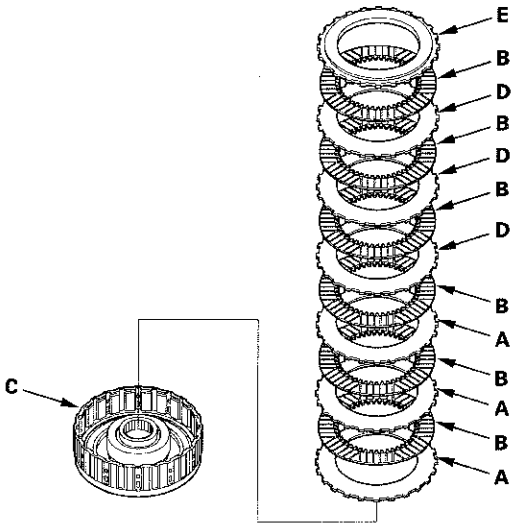
16. Install the disc spring (F) on 1st-hold clutch plate B in the direction shown. Starting with the 1st clutch wave-plate, alternately install the wave-plates (G) (5) and discs (H) (5), then install the clutch end-plate (I) with the flat side down on the top disc.

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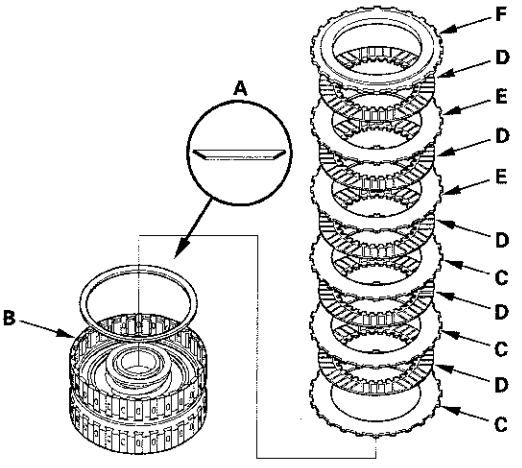
17. Starting with the 2nd clutch flat-plate, alternately install the flat-plates (A) (4) and discs (B) (4) in the 2nd clutch drum (C), and alternately install the wave-plates (D) (3) and discs (B) (3). Install the clutch end-plate (E) with the flat side down on the top disc.



18. Starting with the 3rd clutch flat-plate, alternately install the flat-plates (A) (3) and discs (B) (3) in the 3rd clutch drum (C), and alternately install the wave-plates (D) (3) and discs (B) (3). Install the clutch end-plate (E) with the flat side down on the top disc.



19. Install the disc spring (A) in the 4th clutch drum (B) in the direction shown. Starting with the 4th clutch flat-plate, alternately install the flat-plates (C) (3) and discs (D) (3), and alternately install the wave-plates (E) (2) and discs (D) (2). Install the clutch end-plate (F) with the flat side down on the top disc.

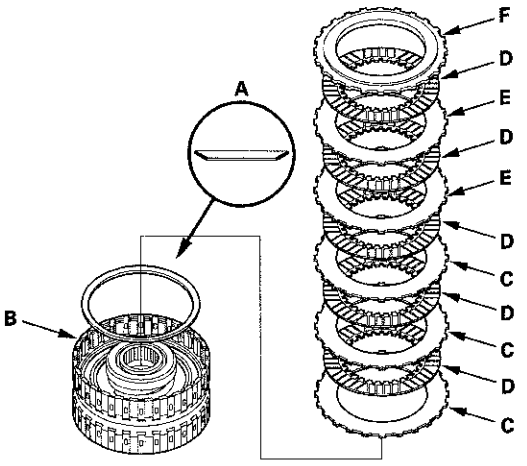


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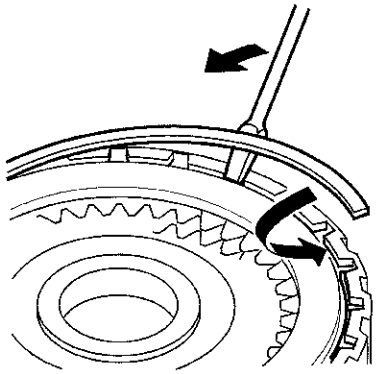
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Clutch Reassembly (cont'd)

20. Install the disc spring (A) in the 5th clutch drum (B) in the direction shown. Starting with the 5th clutch flat-plate, alternately install the flat-plates (C) (3) and discs (D) (3), and alternately install the wave-plates (E) (2) and discs (D) (2). Install the clutch end-plate (F) with the flat side down on the top disc.



21. Install the snap ring with a screwdriver to secure the clutch end-plate.



22. Check that the clutch piston moves by applying air pressure into the fluid passage.

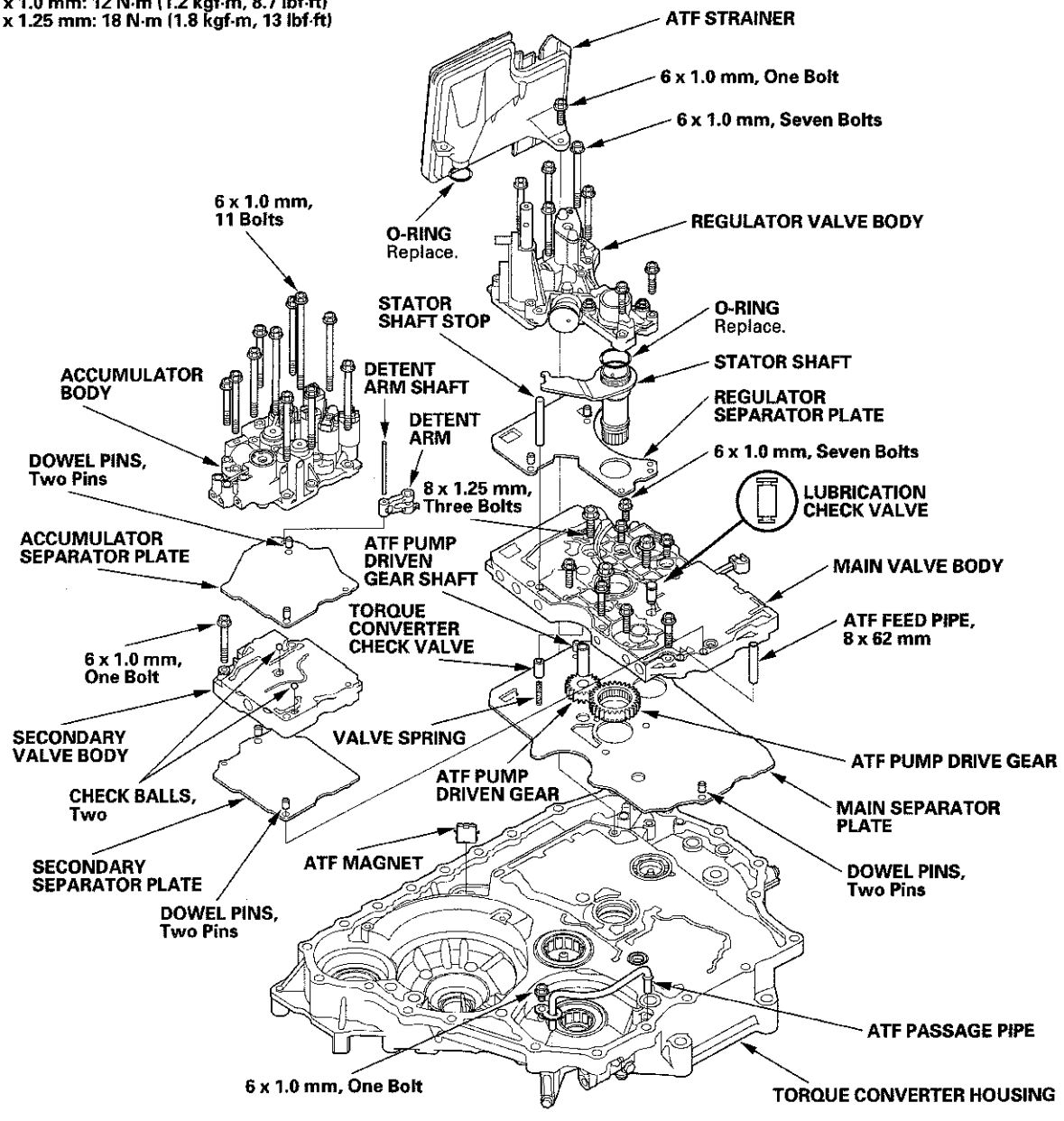
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Transmission Reassembly

Special Tools Required
Mainshaft holder 07GAB-PF50101 or 07GAB-PF50100

1. Make sure that the ATF magnet is cleaned and installed in the torque converter housing. Clean and install the ATF magnet, If necessary.

Bolt Tightening Torque
6 x 1.0 mm: 12 N·m (1.2 kgf·m, 8.7 lbf·ft)
8 x 1.25 mm: 18 N·m (1.8 kgf·m, 13 lbf·ft)

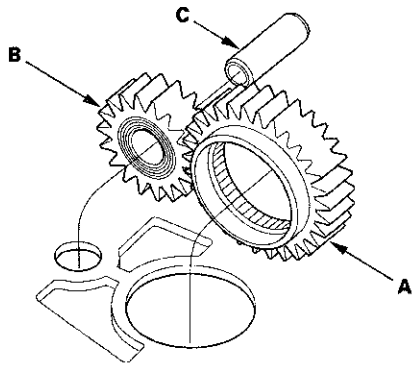


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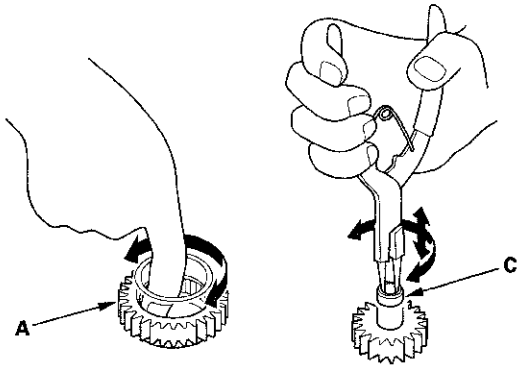
Transmission Reassembly (cont'd)

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



3. Install the torque converter check valve spring and valve in the torque converter housing.

4. Install the main valve body (seven 6 mm bolts and three 8 mm bolts). Make sure the ATF pump drive gear (A) rotates smoothly in the normal operating direction, and the ATF pump driven gear shaft (C) moves smoothly in the axial and normal operating direction.



5. If the ATF pump drive gear and ATF pump driven gear shaft do not move smoothly, loosen the main valve body bolts. Realign the ATF pump driven gear shaft, and retighten the bolts to the specified torques, then recheck. 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.

6. Install the lubrication check valve in the main valve body, in the direction shown in the exploded view.

7. Install the secondary separator plate and the two dowel pins on the main valve body, and install the secondary valve body (one bolt).

8. Install the two check balls in the secondary valve body.

9. Install the accumulator separator plate and the two dowel pins on the secondary valve body.

10. Position the detent arm on the accumulator separator plate, and install the detent arm shaft into the detent arm through the separator plates to the main valve body.

11. Install the 8 x 62 mm ATF feed pipes in the main valve body, and install the accumulator body (11 bolts).

12. Install the regulator separator plate and the two dowel pins on the main valve body.

13. Install the stator shaft with the new O-ring, and install the regulator valve body (seven bolts).

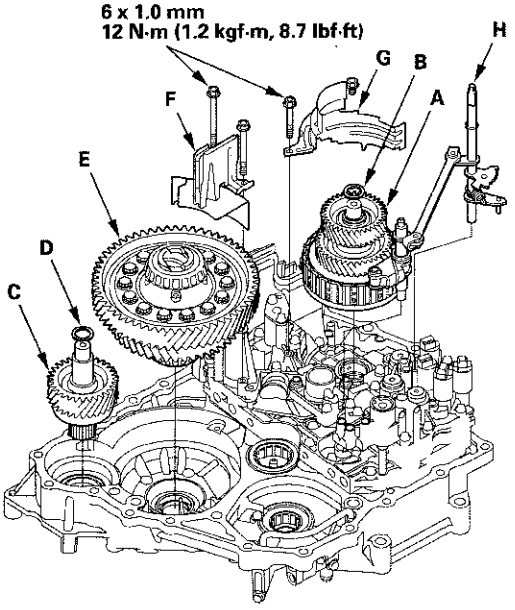
14. Install the stator shaft stop in the main valve body.

15. Install the ATF strainer with the new O-ring (one bolt).

16. Install the ATF passage pipe (one bolt) in the torque converter housing.

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17. Install the intermediary shaft (A) into the main valve body, and install the 26.5 mm washer (B) on the top of the intermediary shaft.



18. Install the transfer output shaft (C) in the torque converter housing, and install the thrust shim (D) on the top of the transfer output shaft.

19. Install the differential assembly (E) in the torque converter housing.

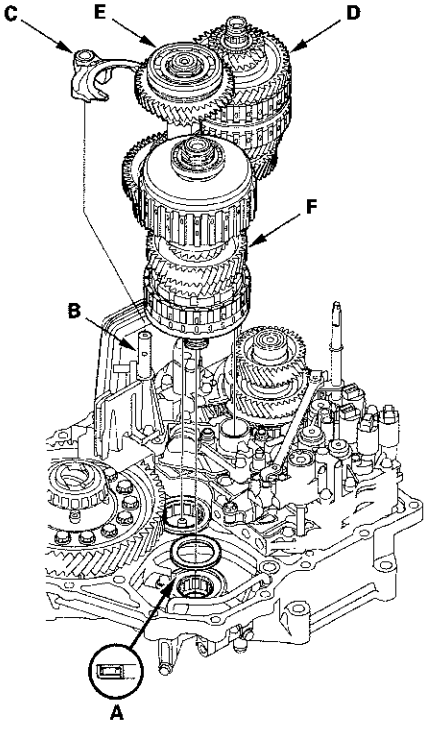
20. Install the baffle plate (F), and make sure if the differential is clear of the baffle plate.

21. Install the baffle plate (G), and make sure if the intermediary shaft is clear of the baffle plate.

22. Install the control shaft and park lever link (H).

23. Assemble the mainshaft, countershaft, and secondary shaft.

24. Install the needle bearing (A) on the secondary shaft roller bearing in the torque converter housing.



25. Turn the shift fork shaft (B) so the large chamfered hole is facing the fork bolt hole of the shift fork.

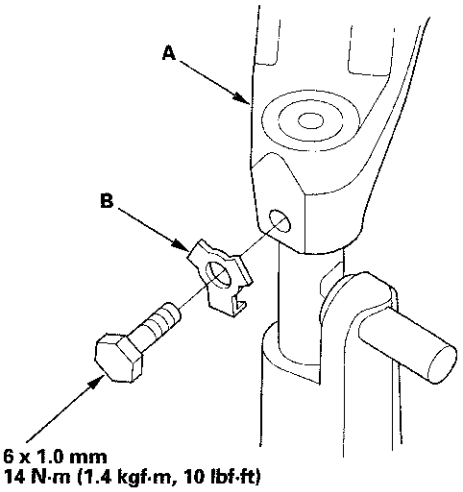
26. Engage the shift fork (C) with the reverse selector on the countershaft, and join the mainshaft (D), countershaft (E), and secondary shaft (F), then install them in the torque converter housing and shift fork on the shift fork shaft.

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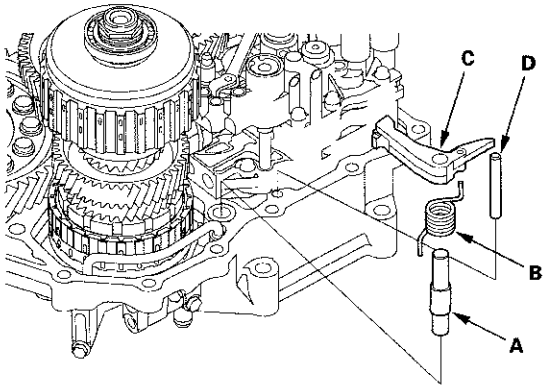
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Transmission Reassembly (cont'd)

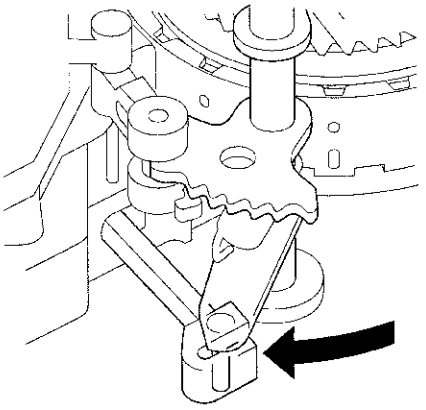
27. Secure the shift fork (A) to the shift fork shaft with the lock bolt and the new lock washer (B), then bend the lock tab of the lock washer against the bolt head.



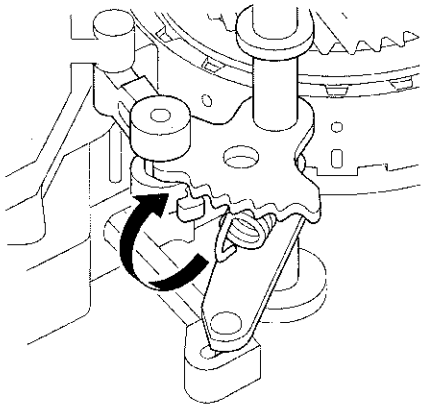
28. Install the park pawl shaft (A), pawl spring (B), park pawl (C), and park pawl stop (D).



29. Align the control lever pin with the manual valve guide.

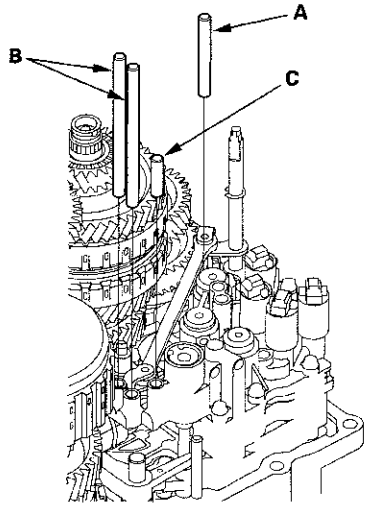


30. Hook the detent spring to the detent arm.

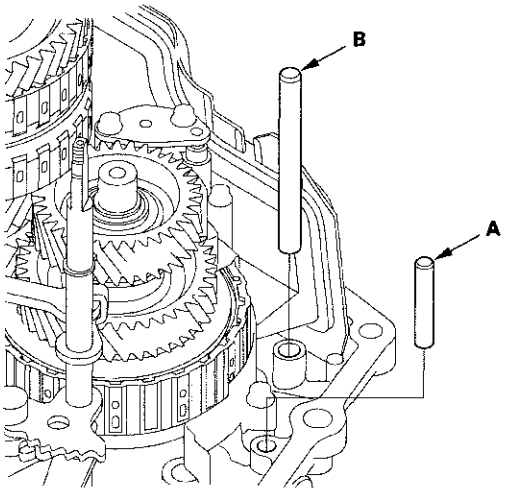


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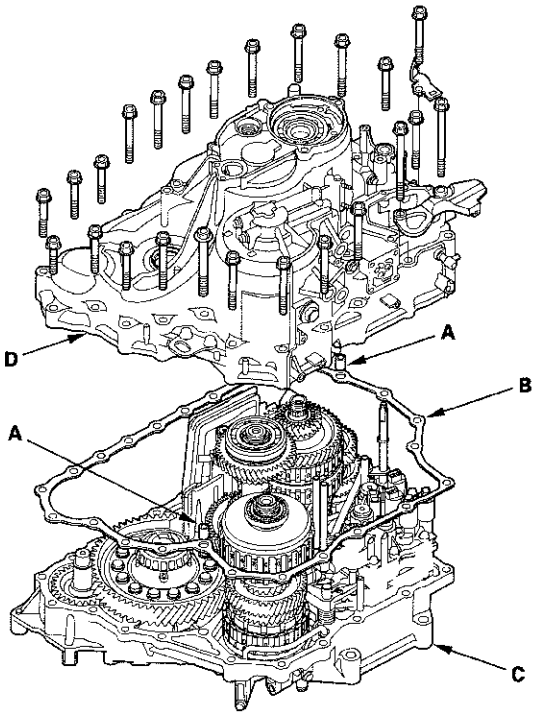
31. Install the 8 x 85 mm ATF feed pipe (A), the 8 x 151.5 mm pipes (B), and the 8 x 40 mm pipe (C) in the accumulator body.



32. Install the 8 x 57.5 mm ATF feed pipe (A) and the 10 x 123 mm pipe (B) in the torque converter housing.

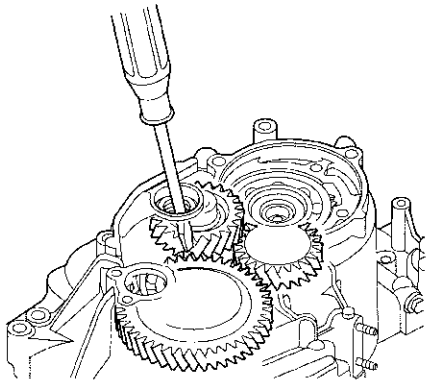


33. Install the two dowel pins (A) and the new gasket (B) on the torque converter housing (C).



34. Place the transmission housing (D) on the torque converter housing.

35. Wrap a screwdriver tip with tape to prevent damage to the reverse idler gear teeth. Engage the reverse idler gear with the reverse gears by rotating the idler gear with the screwdriver.

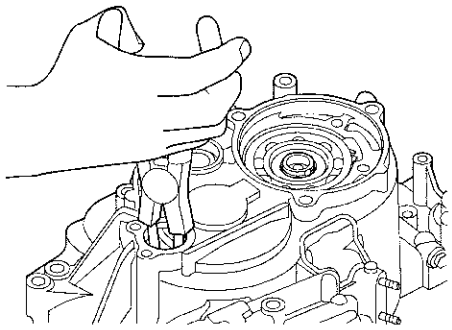


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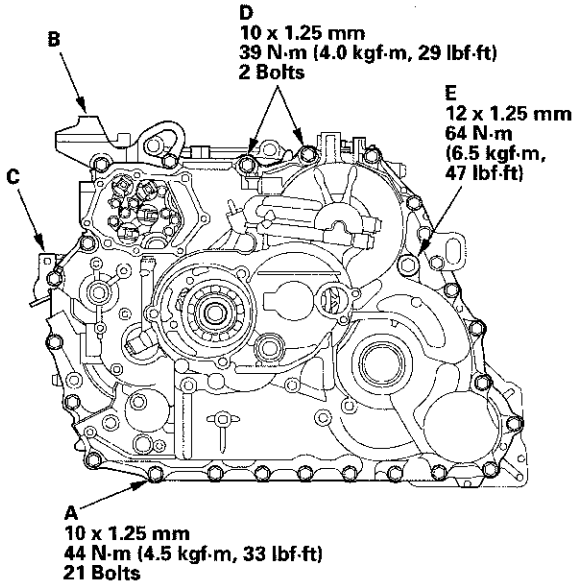
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Transmission Reassembly (cont'd)

36. While expanding the snap ring of the countershaft bearing using snap ring pliers, install the transmission housing onto the bearing part-way. Then release the snap ring pliers, and push down on the housing until it bottoms and the snap ring snaps into place in the transmission housing snap ring groove.



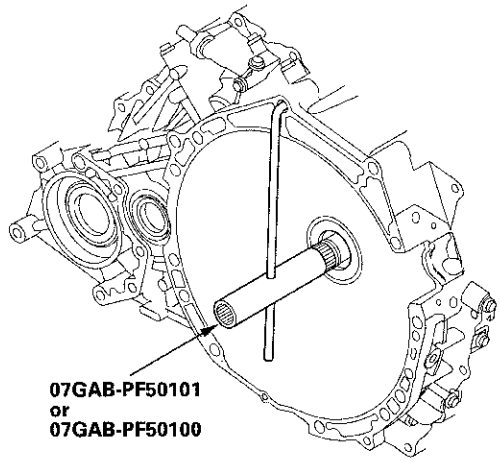
37. Install the transmission housing mounting bolts (A) (21 bolts) along with the transmission hanger (B) and ground terminal bracket (C), and tighten the bolts in at least two steps in a criss-cross pattern to 44 N·m (4.5 kgf·m, 33 lbf·ft).



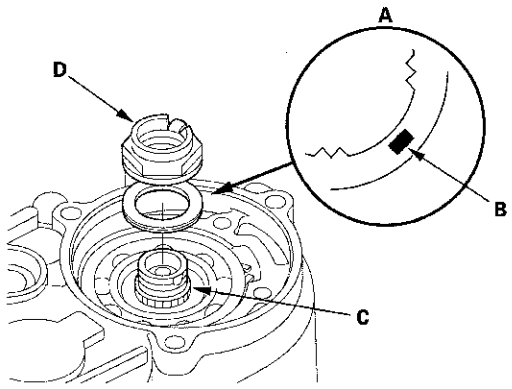
38. Install and tighten the two mounting bolts (D) to 39 N·m (4.0 kgf·m, 29 lbf·ft). Keep the mounting bolts free of grease or oil.

39. Install and tighten the 12 x 1.25 mm bolt (E) to 64 N·m (6.5 kgf·m, 47 lbf·ft).

40. Install the special tool onto the mainshaft.



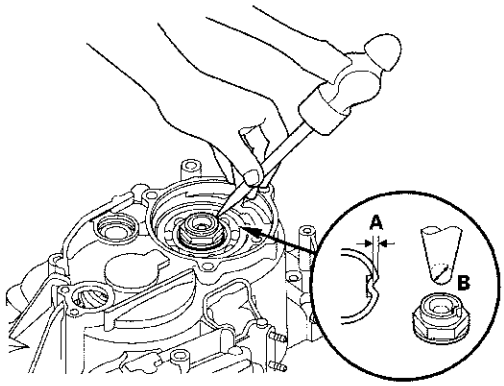
41. Install the new splined washer (A) with the marked side (B) up over the mainshaft (C), and apply ATF to surfaces of the splined washer and old locknut (D).



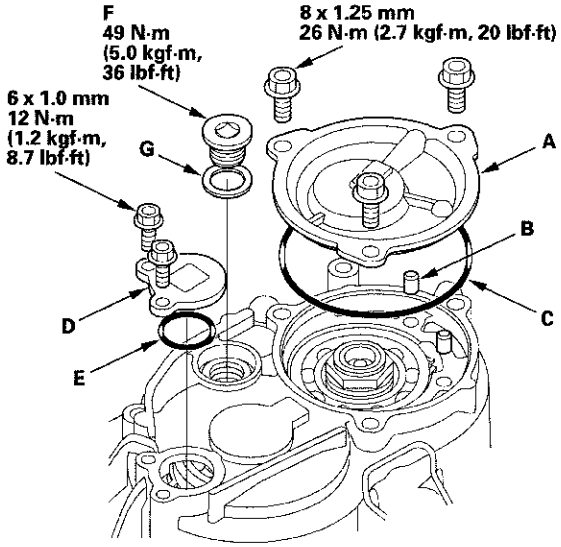
42. Install the old locknut, and tighten it to seat the lock washer to 178 N·m (18.2 kgf·m, 132 lbf·ft), then remove the old locknut.

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43. Install the new locknut and tighten it to 178 N·m (18.2 kgf·m, 132 lbf·ft), then stake the locknut to a depth (A) of 0.7—1.3 mm (0.03—0.05 in.) using a 3.5 mm punch (B).



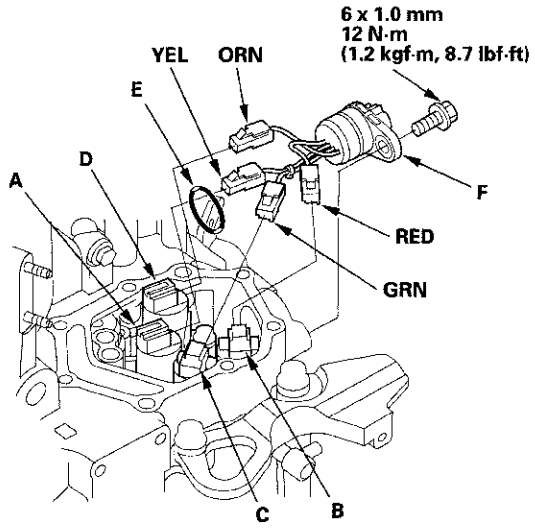
44. Install the end cover (A), dowel pin (B), and new O-ring (C).



45. Install the snap ring cap (D) and the new O-ring (E).

46. Apply thread lock sealant to the threads of the sealing plug (F), and install the sealing plug and the new sealing washer (G).

47. Install the new O-ring (E) on the solenoid harness connector (F).



48. Route the solenoid harness through the transmission housing, and install the solenoid harness connector.

49. Connect the harness terminals to the solenoid:

- YEL wire connector to shift solenoid valve A.
- GRN wire connector to shift solenoid valve C.
- RED wire connector to shift solenoid valve B.
- ORN wire connector to shift solenoid valve D.

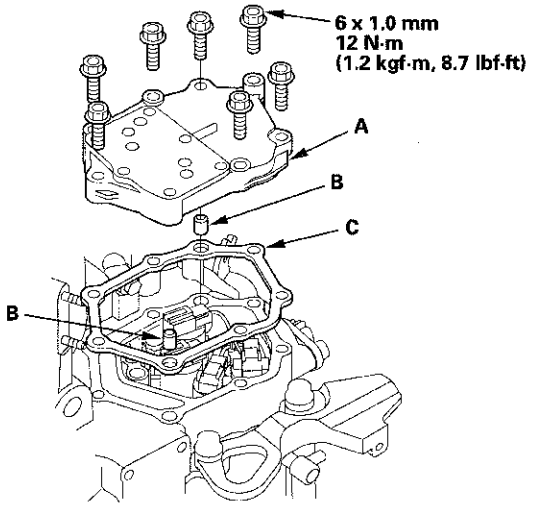
50. Secure the solenoid harness connector with the bolt on the transmission housing.

(cont'd)

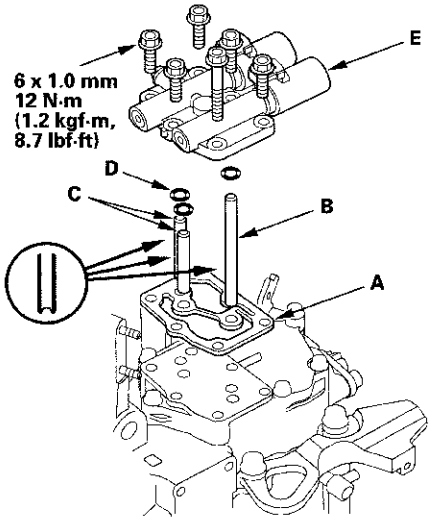
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Transmission Reassembly (cont'd)

51. Install the solenoid valve cover (A) with the two dowel pins (B) and the new gasket (C), and secure it with the seven bolts.

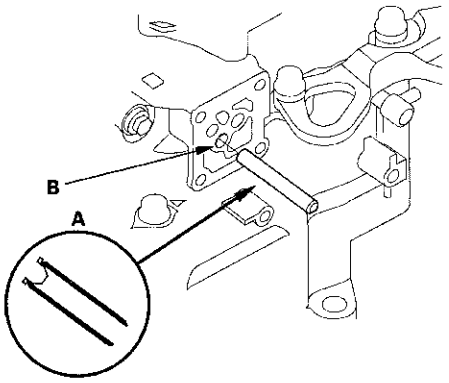


52. Place the new gasket (A) on the solenoid valve cover, then install the 8 x 105.8 mm ATF feed pipe (B) and the 8 x 58.3 mm pipes (C) with the filter end in the transmission housing.

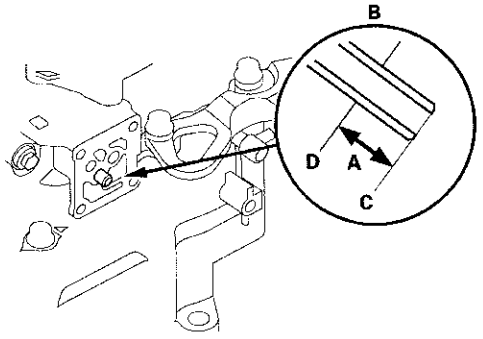


53. Install the new O-rings (D) over the ATF feed pipes, and install A/T clutch pressure control solenoid valves A and B (E).

54. Install the 8 x 53 mm ATF joint pipe (A) with the filter end into its mounting hole (B).

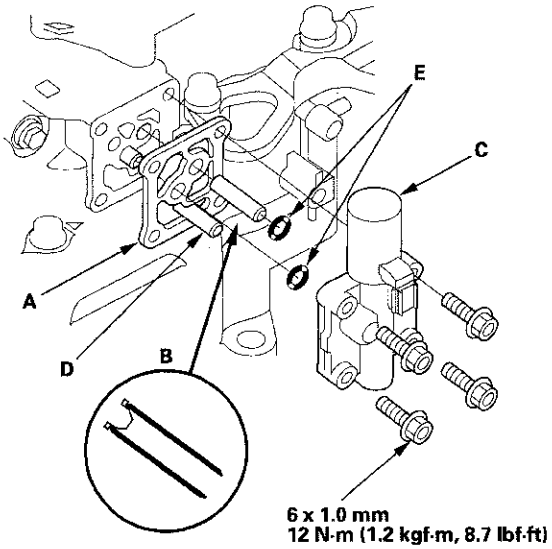


55. Check the height (A) of the 8 x 53 mm ATF joint pipe (B) between the top (C) of the pipe and the solenoid valve body mounting surface (D). The height is about 7 mm (0.3 in). If the height is over 7 mm (0.3 in), install the pipe securely until it stops the accumulator body.



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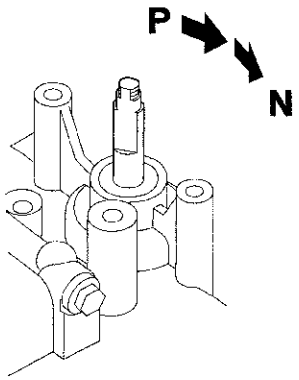
56. Install the new gasket (A) on the transmission housing. Install the 8 x 34.5 mm ATF pipe (B) with the filter end in the transmission housing, and install the 8 x 25.5 mm ATF pipe (D).



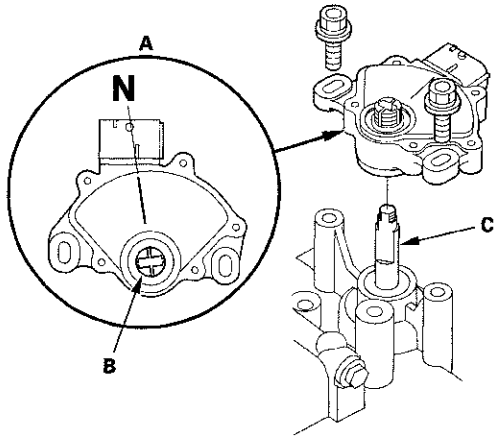
57. Install new O-rings (E) over the ATF joint pipes.

58. Install A/T clutch pressure control solenoid valve C.

59. With a 6.0 mm wrench, turn the control shaft fully counterclockwise (viewed from the shaft end) to the P position. Turn the control shaft back two click-stopped positions so that it is in the N position.

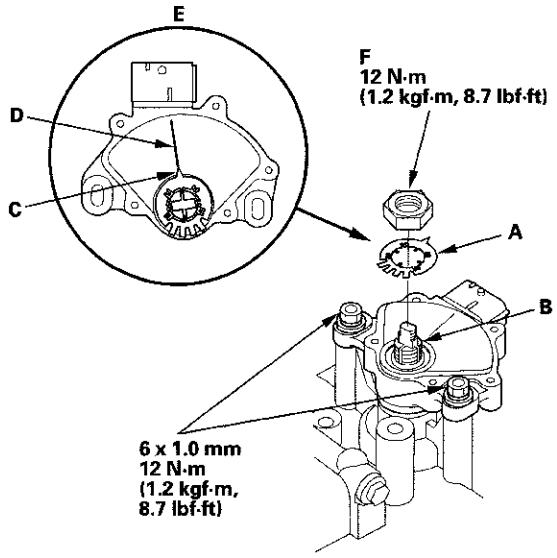


60. Set the transmission range switch (A) to the N position. The transmission range switch clicks in the N position, and the selector control shaft hole (B) aligns with the N positioning line.



61. Install the transmission range switch gently over the selector control shaft (C), and install the bolts loosely.

62. Install the new lock washer (A) over the selector control shaft (B) by aligning the indicator tab (C) of the lock washer with the N positioning line (D) on the transmission range switch (E), and install the locknut (F).

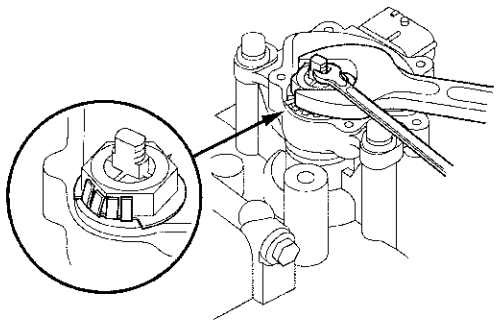


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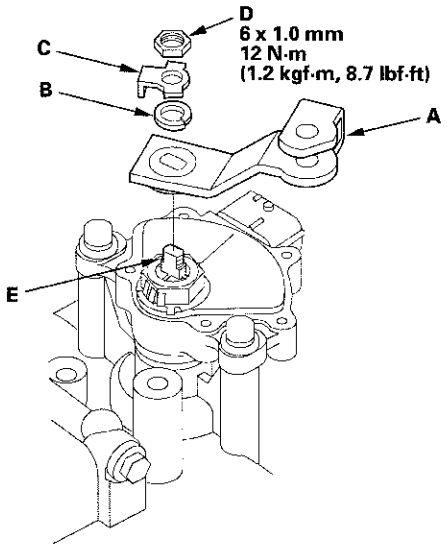
Transmission Reassembly (cont'd)

63. Push the locknut against the transmission housing to seat the range switch into the selector control shaft, and tighten the locknut to 12 N·m (1.2 kgf·m, 8.7 lbf·ft) while holding the selector control shaft with a 6 mm wrench, then bend the lock tabs against the locknut.

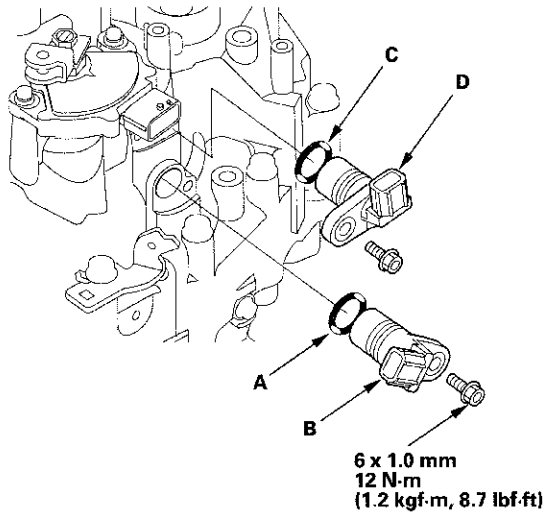


64. Tighten the range switch mounting bolts to 12 N·m (1.2 kgf·m, 8.7 lbf·ft).

65. Install the control lever (A), spring washer (B), lock washer (C), and locknut (D) on the selector control shaft (E). Bend the lock tab of the lock washer against the locknut.

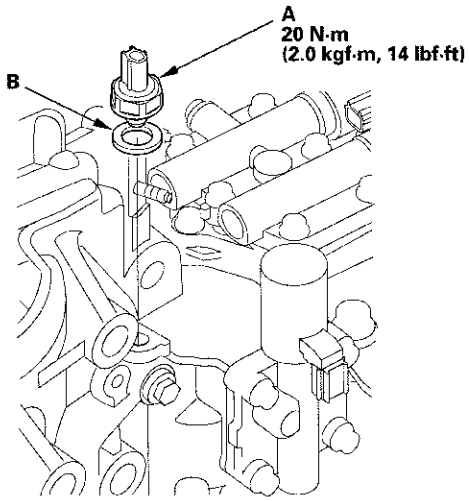


66. Install the new O-ring (A) on the input shaft (mainshaft) speed sensor (B), and install the input shaft (mainshaft) speed sensor.



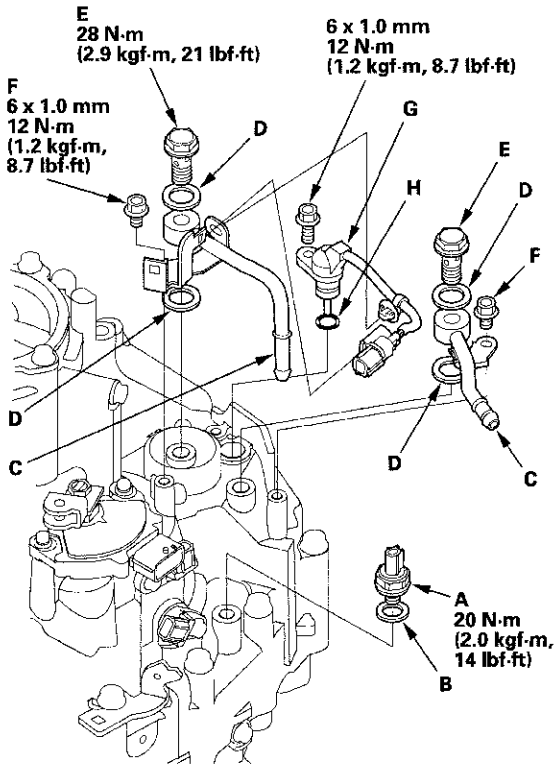
67. Install the new O-ring (C) on the output shaft (countershaft) speed sensor (D), and install the output shaft (coutershaft) speed sensor.

68. Install the 4th clutch transmission fluid pressure switch (A) with the new sealing washer (B). Tighten the switch by gripping the metal part.



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69. Install the 3rd clutch transmission fluid pressure switch (A) with the new sealing washer (B). Tighten the switch by gripping the metal part.

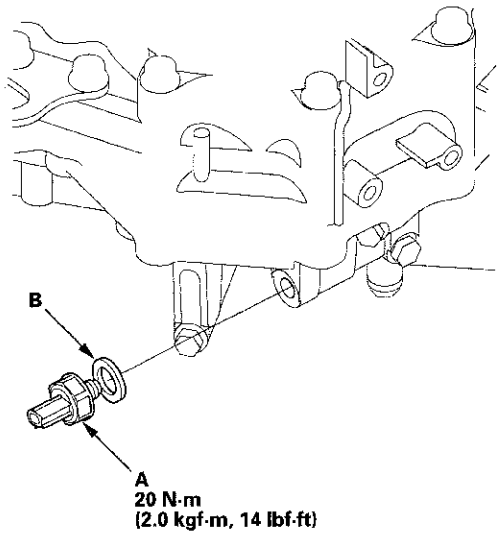


70. Install the ATF cooler lines (C) with the new sealing washers (D) and the line bolts (E).

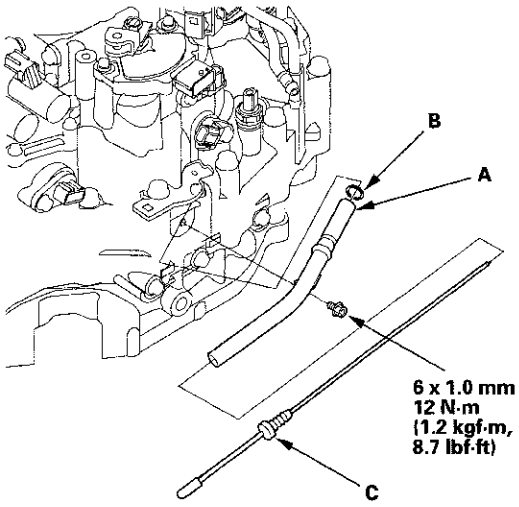
71. Secure the ATF lines with the 6.0 mm bolts (F). Tighten the bolt to 12 N·m (1.2 kgf·m, 8.7 lbf·ft).

72. Install the ATF temperature sensor (G) with the new O-ring (H). Install the harness clamp on the clamp bracket, and install the connector on the connector bracket.

73. Install the 2nd clutch transmission fluid pressure switch (A) with the new sealing washer (B). Tighten the switch by gripping the metal part.



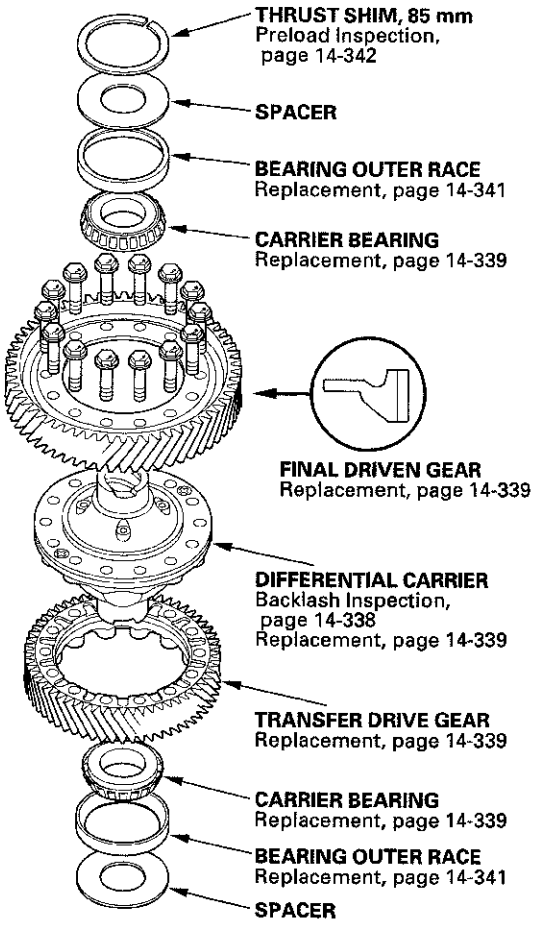
74. Install the ATF dipstick guide tube (A) with the new O-ring (B).



75. Install the ATF dipstick (C) in the guide tube.

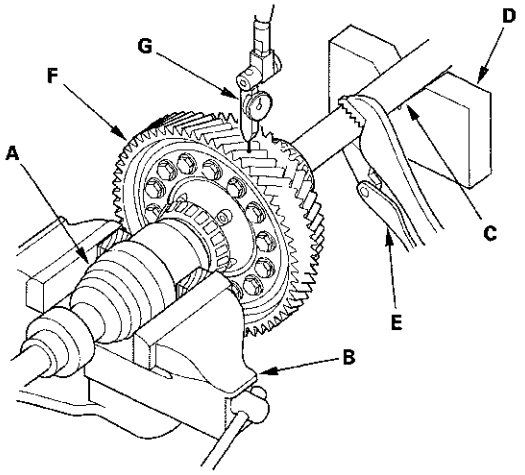
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Component Location Index



Backlash Inspection

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



3. Place the intermediate shaft (C) on a V-block (D), then hold the intermediate shaft with locking pliers (E).
4. Measure backlash of the final driven gear (F) with a dial indicator (G). If the backlash is not within the standard, replace the differential carrier.

Standard (New): 1.2—1.8 mm (0.047—0.071 in)

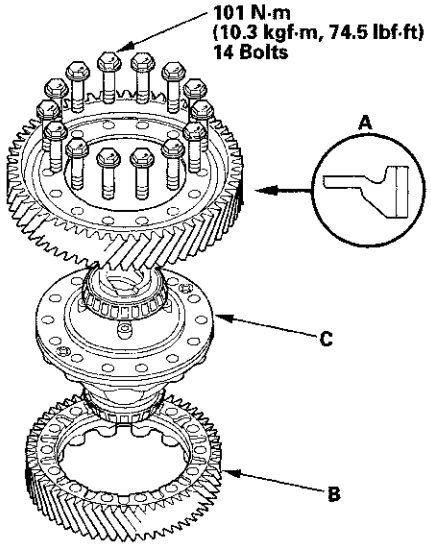
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Differential Carrier, Final Driven Gear, and Transfer Drive Gear Replacement

NOTE: Inspect and adjust the bearing preload whenever the carrier is replaced.

1. Remove the final driven gear (A) and transfer drive gear (B) from the differential carrier (C).

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



2. Install the final driven gear with the chamfered side on the inner bore facing the differential carrier.

3. Install the bolts through the differential carrier to the transfer drive gear.

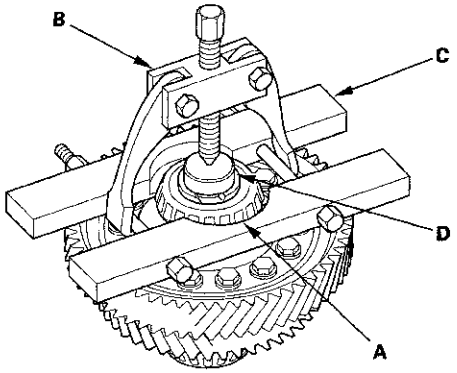
4. Tighten the bolts to the specified torque in a crisscross pattern.

Carrier Bearing Replacement

Special Tools Required
Attachment, 45 x 55 mm 07MAD-PR90100

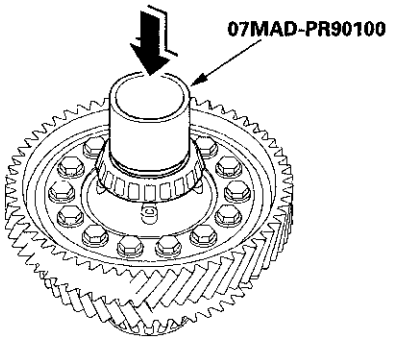
NOTE:
- The bearing and outer race should be replaced as a set.
- Inspect and adjust the bearing preload whenever the bearing is replaced.
- Check the bearing for wear and rough rotation. If the bearing is OK, removal is not necessary.

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



2. Install the new carrier bearings using the attachment (45 x 55 mm) and a press.

   NOTE:
   - Press the bearing on until it bottoms.
   - Use the small end of the attachment (45 x 55 mm) to install the bearings.
   - Press the bearing on securely so there is no clearance between the bearing and the differential carrier.

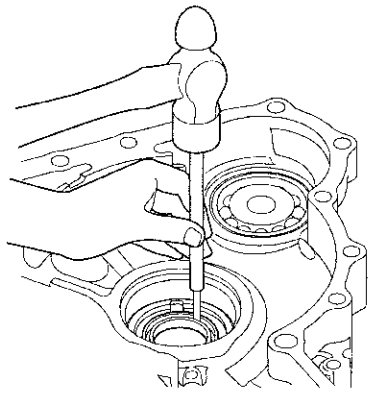


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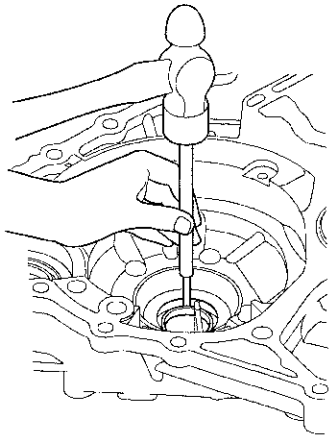
Oil Seal Replacement

Special Tools Required
- Driver 07749-0010000
- Oil seal driver attachment 07GAD-PG40100
- Oil seal driver attachment 07JAD-PH80101

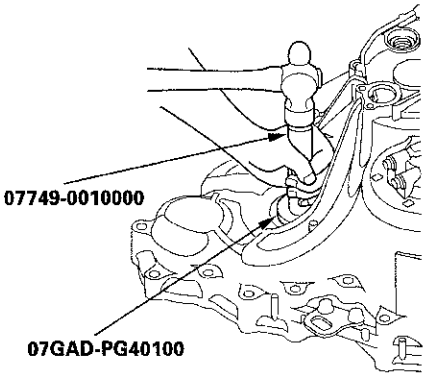
1. Remove the oil seal from the transmission housing.



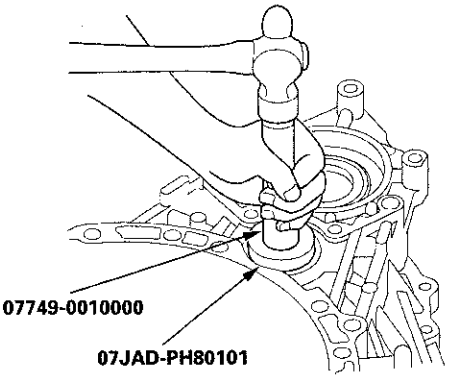
2. Remove the oil seal from the torque converter housing.



3. Install the new oil seal flush to the transmission housing using the drive and the oil seal driver attachment.



4. Install the new oil seal to the torque converter housing using the drive and the oil seal driver attachment.



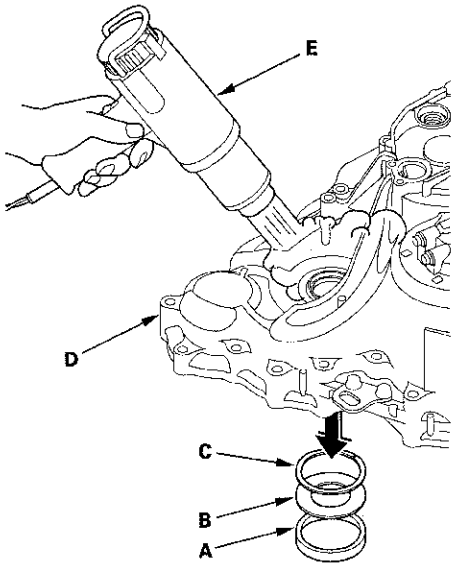
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Carrier Bearing Outer Race Replacement

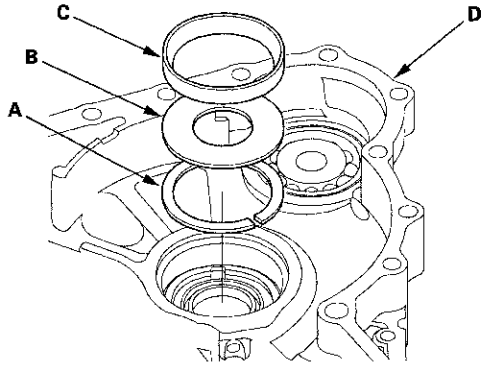
Special Tools Required
- Driver 07749-0010000
- Attachment, 83 mm 07HAD-SG00100
- Attachment, 78 x 80 mm 07NAD-PX40100

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

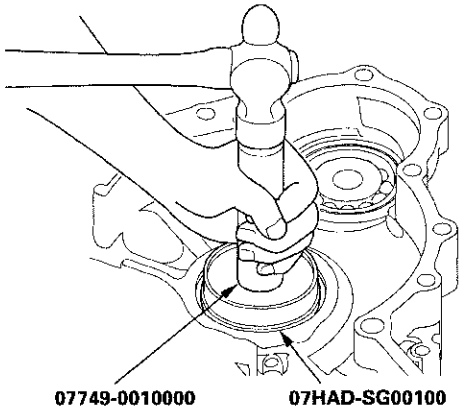
1. Remove the bearing outer race (A), spacer (B), and 85 mm thrust shim (C) from the transmission housing (D) by heating the housing to about 212 °F (100 °C) with a heat gun (E). Do not heat the housing more than 212 °F (100 °C).



2. Install the 85 mm thrust shim (A), spacer (B), and outer race (C) in the transmission housing (D).



3. Using the driver and the attachment (83 mm), drive the outer race securely in the housing so there is no clearance between the outer race, spacer, shim, and housing.

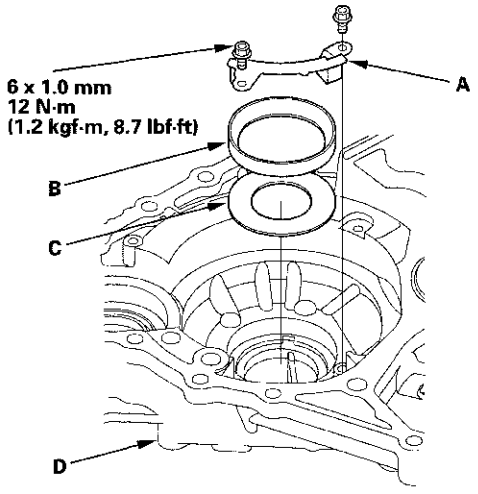


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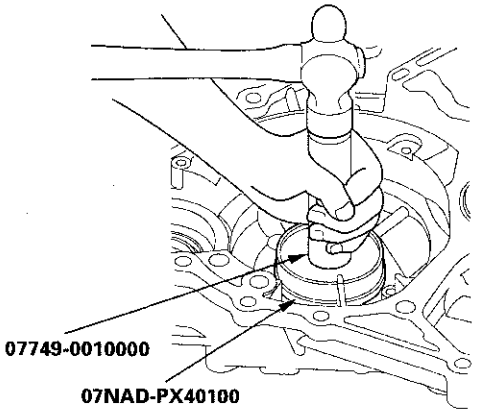
Carrier Bearing Outer Race Replacement (cont'd)

4. Remove the plate (A), and remove the bearing outer race (B) and spacer (C) from the torque converter housing (D).



5. Install the spacer and the new outer race in the torque converter housing.

6. Drive the bearing outer race securely in the housing using the driver and the attachment (78 x 80 mm).



7. Install the plate over the outer race in the torque converter housing.

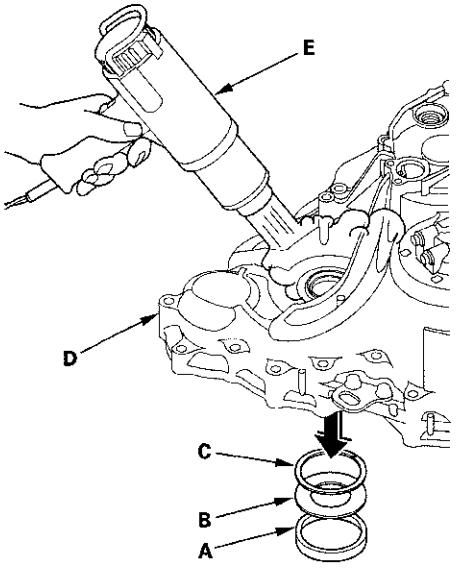
Carrier Bearing Preload Inspection

Special Tools Required
- Driver 07749-0010000
- Attachment, 83 mm 07HAD-SG00100
- Preload inspection tool 070AJ-0020101

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

1. Remove the bearing outer race (A), spacer (B), and 85 mm thrust shim (C) from the transmission housing (D) by heating the housing to about 212 °F (100 °C) with a heat gun (E). Do not heat the housing more than 212 °F (100 °C).

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

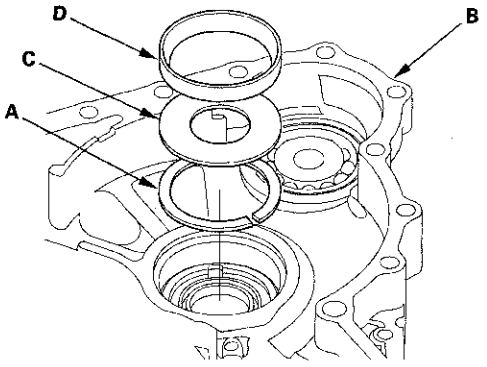


2. Replace the tapered roller bearing when the outer race is to be replaced.

3. Do not use a shim on the torque converter housing side.

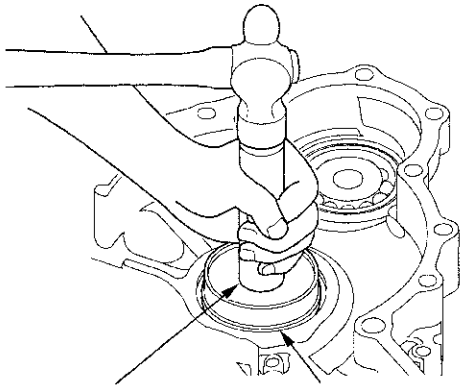
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4. Install the 85 mm thrust shim (A) in the transmission housing (B). If you replace the 85 mm thrust shim with a new one, use the same thickness shim as the old one.

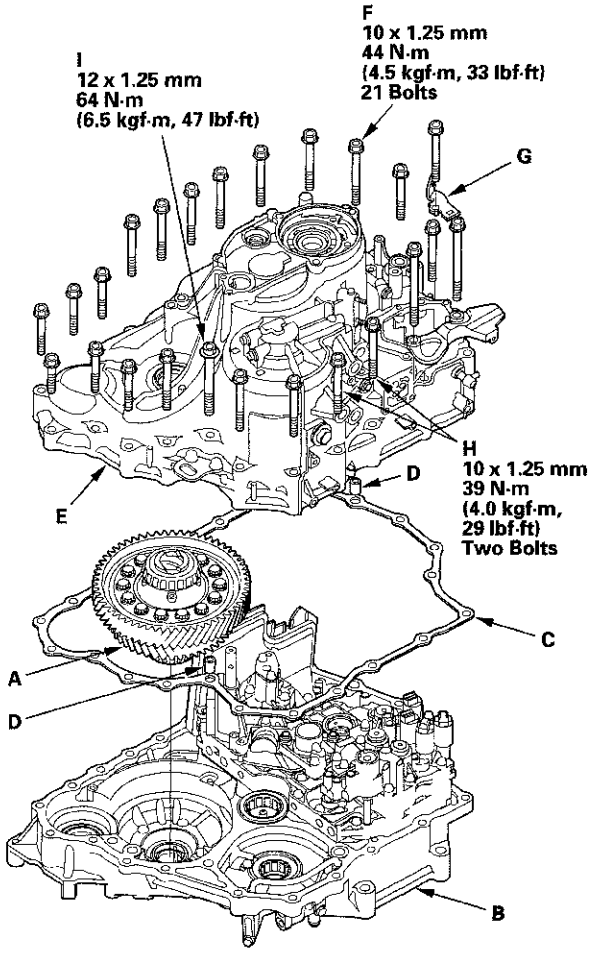


5. Install the spacer (C), and the bearing outer race (D) in the transmission housing.

6. Drive the outer race securely in the housing using the driver and the attachment (83 mm) so there is no clearance between the outer race, spacer, shim, and housing.



7. Install the differential assembly (A) in the torque converter housing (B), and install the gasket (C) and the two dowel pins (D) on the housing.



8. Install the transmission housing (E), and install the mounting bolts (F) (21 bolts) with the ground terminal bracket (G), two mounting bolts (H), and 12 x 1.25 mm bolt (I), then tighten the bolts.

(cont'd)

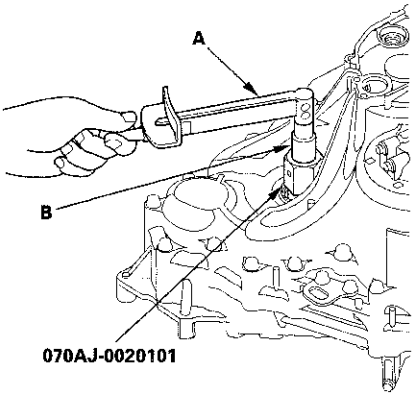
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Carrier Bearing Preload Inspection (cont'd)

9. Rotate the differential assembly in both directions to seat the bearings.

10. Measure the starting torque of the differential assembly with the preload inspection tool, a torque wrench (A), and a socket (B). Measure the starting torque at normal room temperature in both directions.

Standard
New Bearings:
3.9—5.1 N·m (40—52 kgf·cm, 35—45 lbf·in)
Reused Bearings:
3.6—4.8 N·m (37—49 kgf·cm, 32—43 lbf·in)



11. If the measurement is out of standard, remove the thrust shim and measure its thickness.

12. Select a new thrust shim. To increase the starting torque, increase thickness of the thrust shim. To decrease the starting torque, decrease the thickness of the thrust shim.
Changing the shim to the next size will increase or decrease the starting torque about 0.5—0.6 N·m (5—6 kgf·cm, 5—5 lbf·in).

THRUST SHIM, 85 mm

No.	Thickness
A	1.350 mm (0.0531 in)
B	1.375 mm (0.0541 in)
C	1.400 mm (0.0551 in)
D	1.425 mm (0.0561 in)
E	1.450 mm (0.0571 in)
F	1.475 mm (0.0581 in)
G	1.500 mm (0.0591 in)
H	1.525 mm (0.0600 in)
I	1.550 mm (0.0610 in)
J	1.575 mm (0.0620 in)
K	1.600 mm (0.0630 in)

(cont'd)

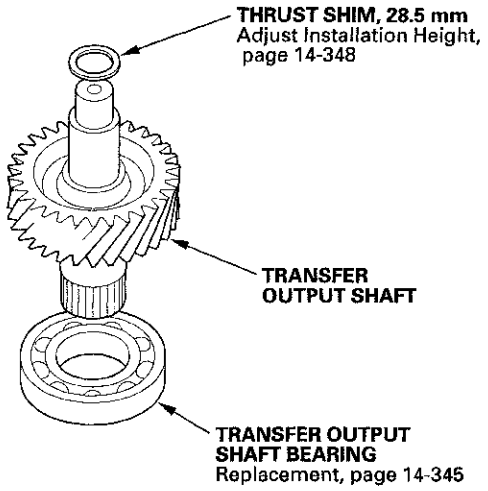
THRUST SHIM, 85 mm (cont'd)

No.	Thickness
L	1.625 mm (0.0640 in)
M	1.650 mm (0.0650 in)
N	1.675 mm (0.0659 in)
O	1.700 mm (0.0669 in)
P	1.725 mm (0.0679 in)
Q	1.750 mm (0.0689 in)
R	1.775 mm (0.0699 in)
S	1.800 mm (0.0709 in)
T	1.825 mm (0.0719 in)
U	1.850 mm (0.0728 in)
V	1.875 mm (0.0738 in)
W	1.900 mm (0.0748 in)
X	1.925 mm (0.0758 in)
Y	1.950 mm (0.0768 in)
Z	1.975 mm (0.0778 in)
AA	2.000 mm (0.0787 in)
AB	2.025 mm (0.0797 in)
AC	2.050 mm (0.0807 in)
AD	2.075 mm (0.0817 in)
AE	2.100 mm (0.0827 in)
AF	2.125 mm (0.0837 in)
AG	2.150 mm (0.0846 in)
AH	2.175 mm (0.0856 in)
AI	2.200 mm (0.0866 in)
AJ	2.225 mm (0.0876 in)
AK	2.250 mm (0.0886 in)
AL	2.275 mm (0.0896 in)
AM	2.300 mm (0.0906 in)
AN	2.325 mm (0.0915 in)
AO	2.350 mm (0.0925 in)
AP	1.250 mm (0.0492 in)
AQ	1.275 mm (0.0502 in)
AR	1.300 mm (0.0512 in)
AS	1.325 mm (0.0522 in)

13. Install the new thrust shim, then recheck the starting torque.

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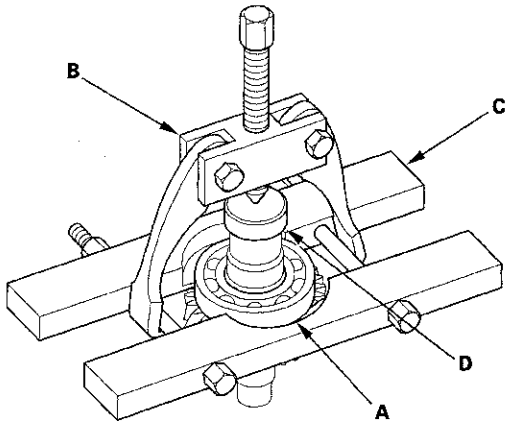
Component Location Index



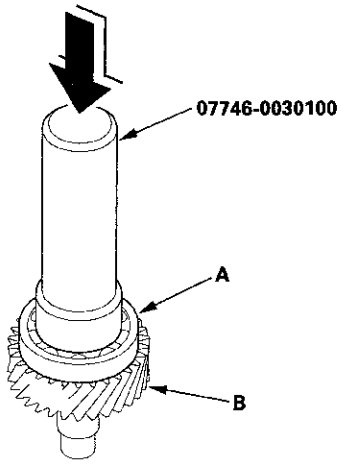
Transfer Output Shaft Bearing Replacement

Special Tools Required
Driver, 40 mm I.D. 07746-0030100

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



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

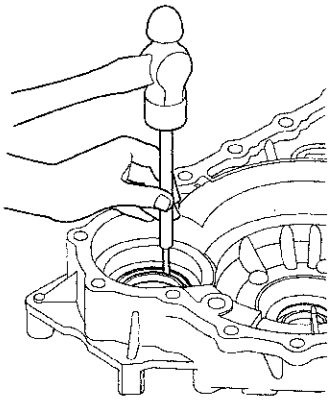


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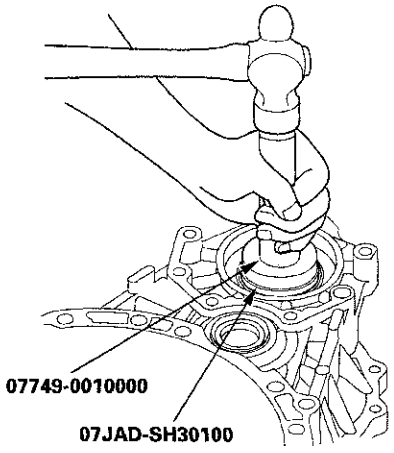
Oil Seal Replacement

Special Tools Required
- Driver 07749-0010000
- Attachment, 65 mm 07JAD-SH30100

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



2. Install the new oil seal flush to the torque converter housing using the driver and the attachment (65 mm).

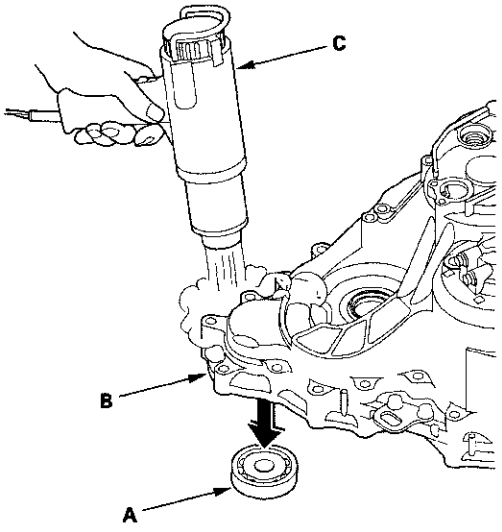


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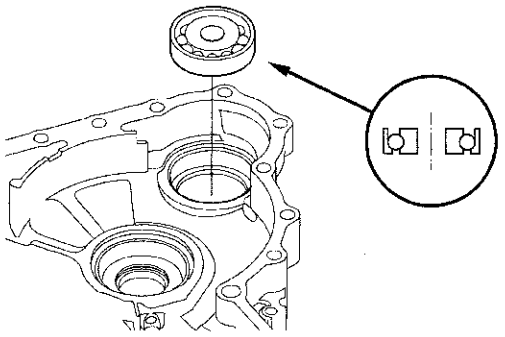
Transmission Housing Bearing Replacement

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

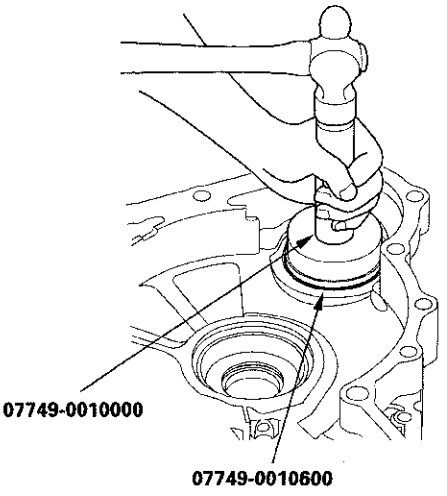
1. Remove the transfer output shaft bearing (A) from the transmission housing (B) by heating the housing to about 212 °F (100 °C) with a heat gun (C). Do not heat the housing more than 212 °F (100 °C).



2. Install the new bearing in the housing in the direction shown.



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



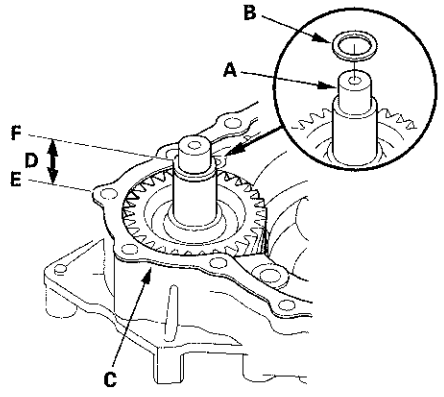
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Transfer Output Shaft Installation Height Inspection/Adjustment

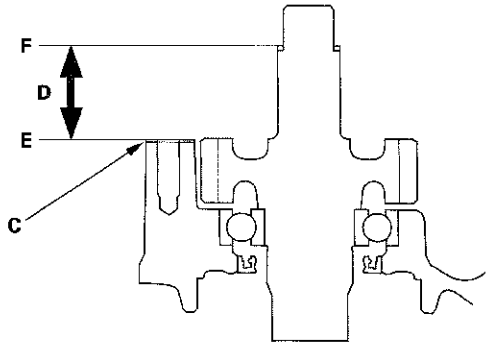
NOTE: If the transfer output shaft, transfer output shaft bearing, transfer output shaft transmission housing bearing, transmission housing, or torque converter housing were replaced, adjust the transfer output shaft installation height with the 28.5 mm thrust shim.

1. Install the transfer output shaft (A) in the torque converter housing, and install the 28.5 mm thrust shim (B) on the top of the shaft. If you replace the 28.5 mm thrust shim with a new one, use the same thickness shim as the old one.

Standard: 42.81—42.85 mm (1.685—1.687 in)



Transfer Output Shaft Cutaway View



2. Install the new gasket (C) on the torque converter housing.

3. Measure the installed height (D) of the transfer output shaft between the surface (E) of the gasket and the top (F) of the 28.5 mm thrust shim in at least three places. Use the average as the actual height.

4. If the measurement is out of standard, remove the 28.5 mm thrust shim and measure its thickness.

5. Select and install a new thrust shim, then recheck the installation height.

THRUST SHIM, 28.5 mm

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

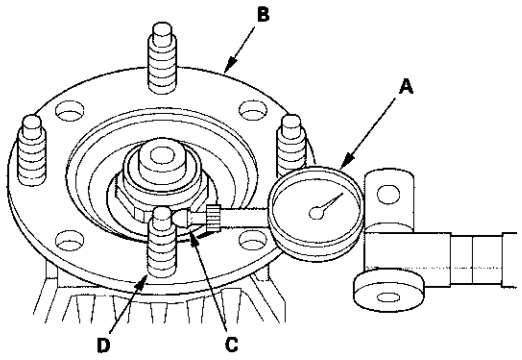
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Inspection

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

Transfer Gear Backlash Measurement

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

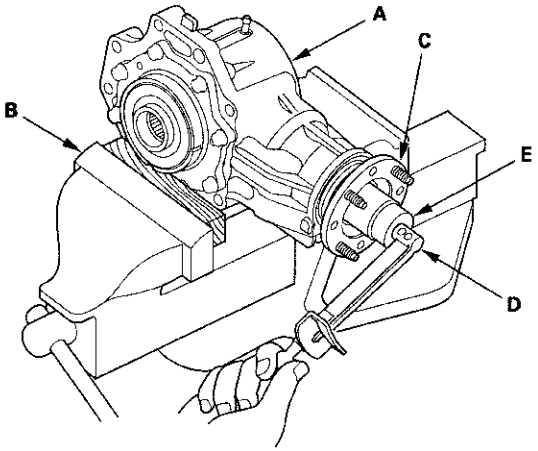


2. Measure transfer gear backlash.

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

Total Starting Torque Measurement

3. Secure the transfer housing (A) in a bench vise (B) with soft jaws. To prevent damaging the transfer housing, always use soft jaws or equivalent materials between the transfer housing and the vise.



4. Rotate the transfer companion flange several times to seat the tapered roller bearings.

5. Measure the starting torque at the companion flange (C) using a torque wrench (D) and a socket (E).

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

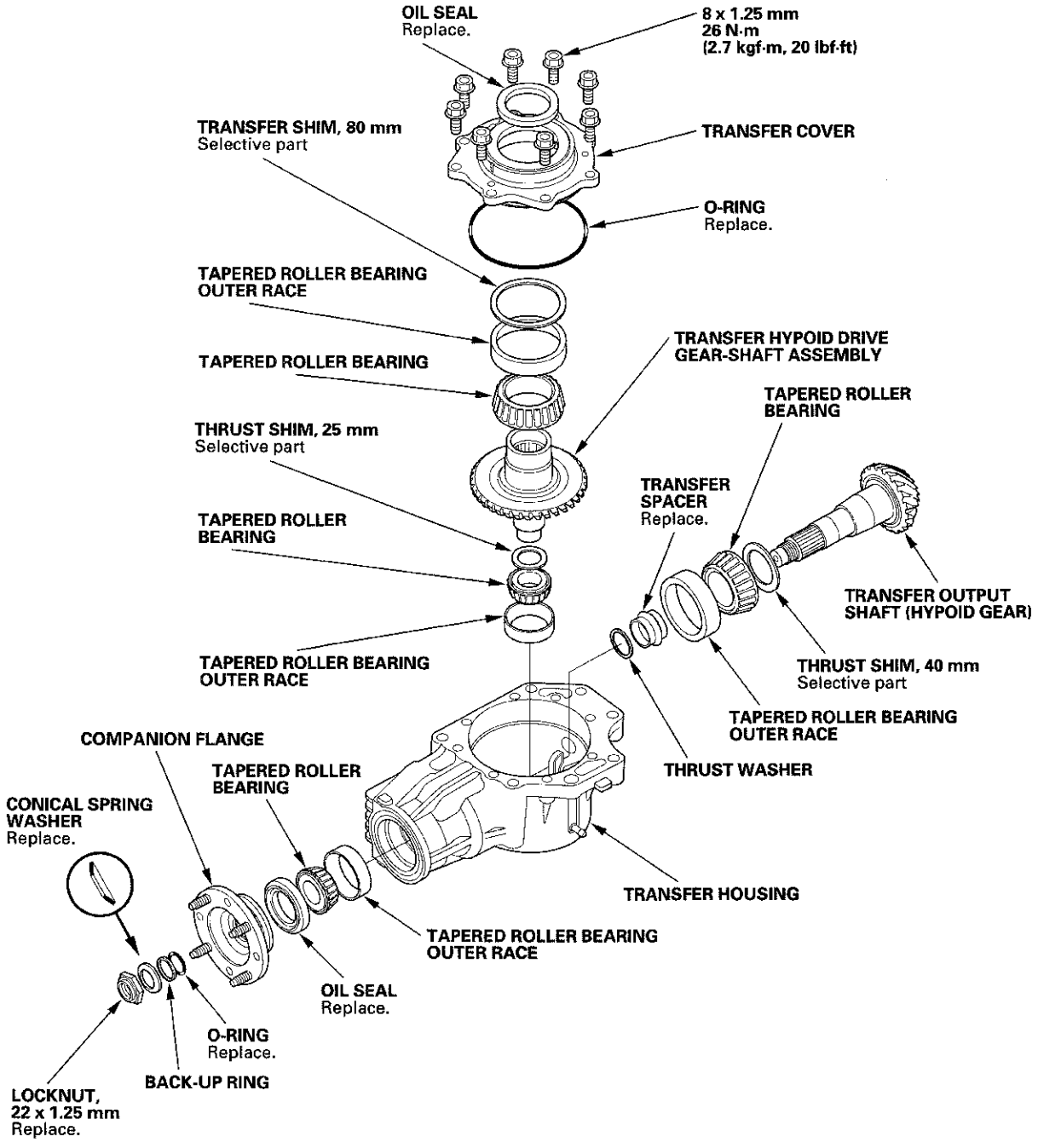
6. If the starting torque is out of standard, disassemble the transfer assembly and repair it.

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Transfer Assembly

Disassembly

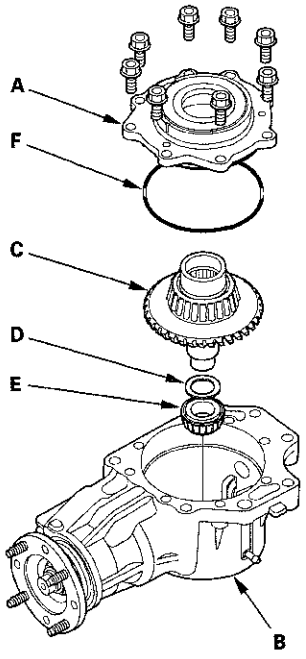
Exploded View



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Special Tools Required
Companion flange holder 07XAB-0010101

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

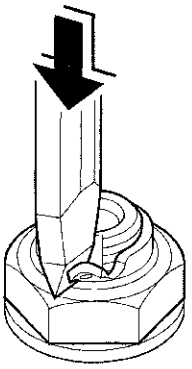


2. Remove the transfer hypoid drive gear/shaft assembly (C), 25 mm thrust shim (D), and tapered roller bearing (E).

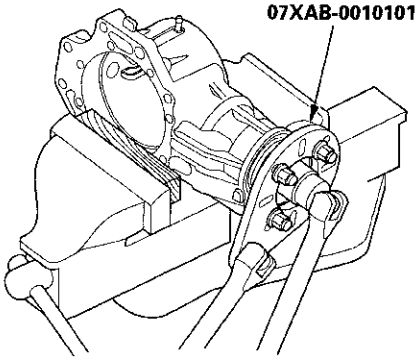
3. Remove the O-ring (F) from the cover.

4. Drain the transfer fluid (hypoid gear oil) from the transfer housing.

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



6. Secure the transfer housing in a bench vise with soft jaws. To prevent damage to the transfer housing, always use soft jaws or equivalent materials between the transfer housing and the vise.



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

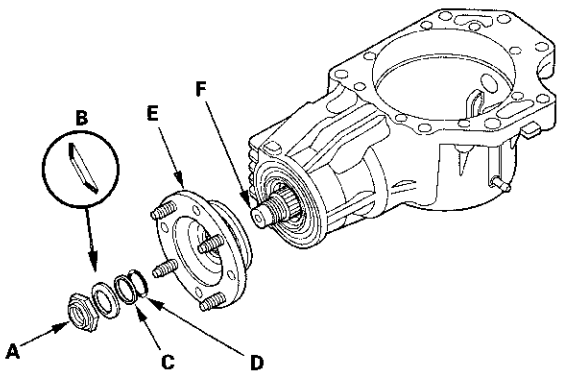
8. Remove the companion flange holder.

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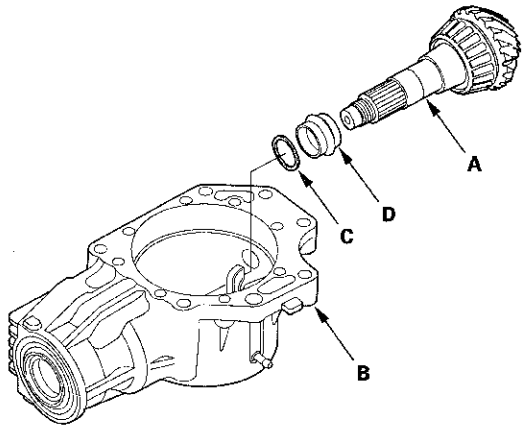
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Disassembly (cont'd)

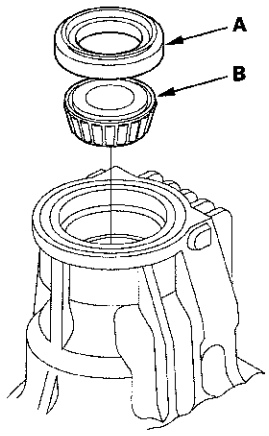
9. Remove the locknut (A), conical spring washer (B), back-up ring (C), O-ring (D), and companion flange (E) from the transfer output shaft (hypoid gear) (F).



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



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

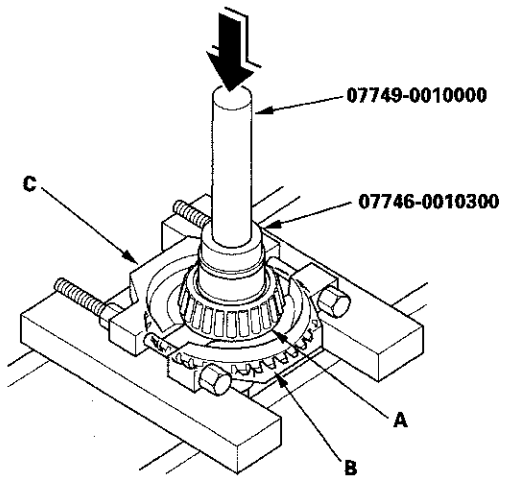


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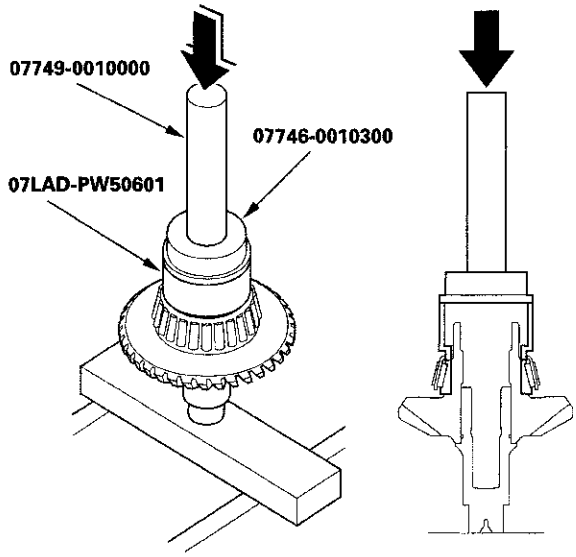
Transfer Hypoid Drive Gear Bearing Replacement

Special Tools Required
- Driver 07749-0010000
- Attachment, 42 x 47 mm 07746-0010300
- Attachment, 40 x 50 mm 07LAD-PW50601

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



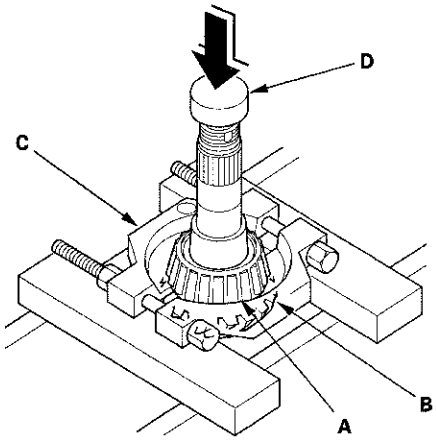
2. Install the new bearing on the transfer hypoid drive gear using the driver, the attachment (40 x 50 mm), and a press.



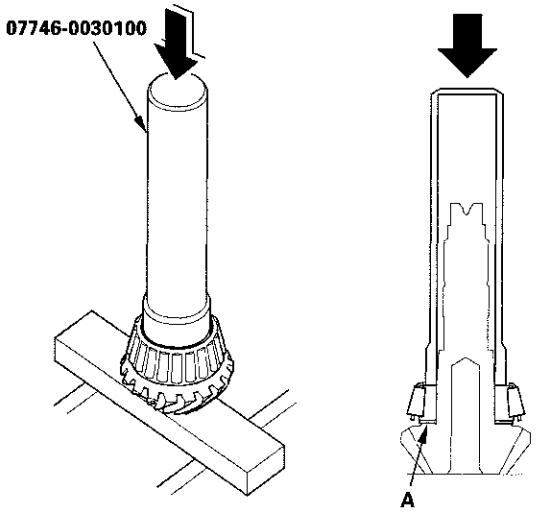
Transfer Output Shaft (Hypoid Gear) Bearing Removal/Installation

Special Tools Required
Driver, 40 mm I.D. 07746-0030100

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



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



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

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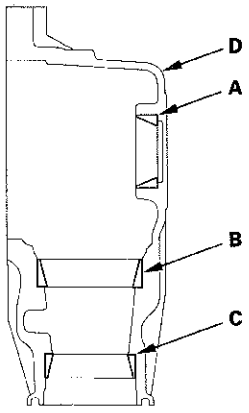
Transfer Housing Tapered Roller Bearing Outer Race Replacement

Special Tools Required
- Driver 07749-0010000
- Attachment, 52 x 55 mm 07746-0010400
- Attachment, 65 mm 07JAD-SH30100
- Tapered bearing race installer A 07MAF-SP0011A
- Installer shaft 07MAF-SP0013A

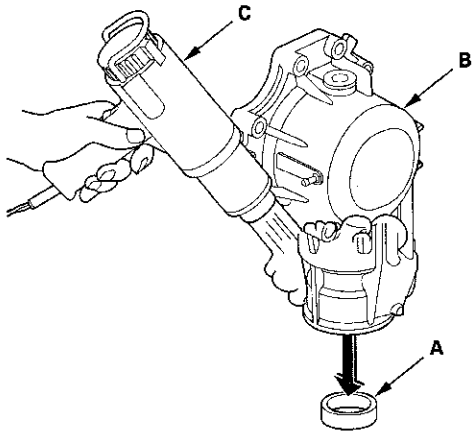
NOTE: Replace the bearing with a new one whenever the outer race is replaced.

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

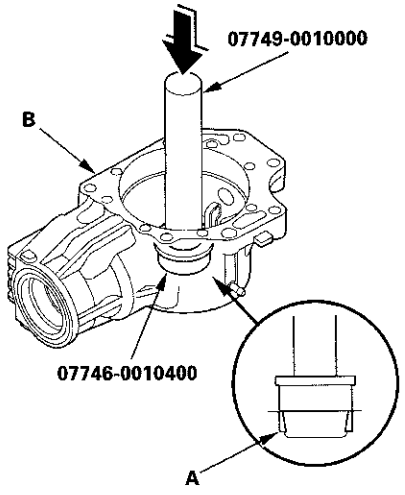
   NOTE: Some bearing outer races (52 mm, 65 mm, and 75 mm) are press-fitted in the housing and must be removed by heating the housing.



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

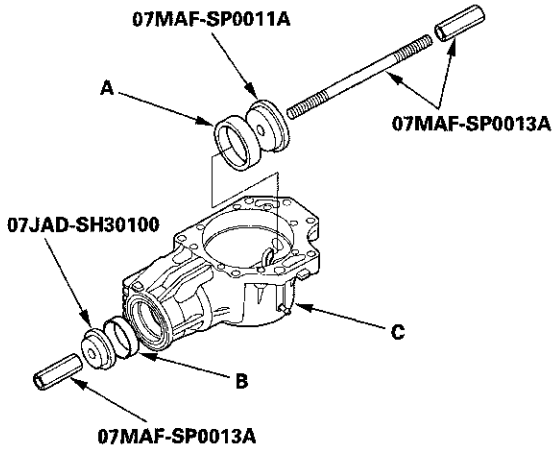


3. Install the 52 mm bearing outer race (A) until it bottoms in the transfer housing (B) using the driver and the attachment (52 x 55 mm).

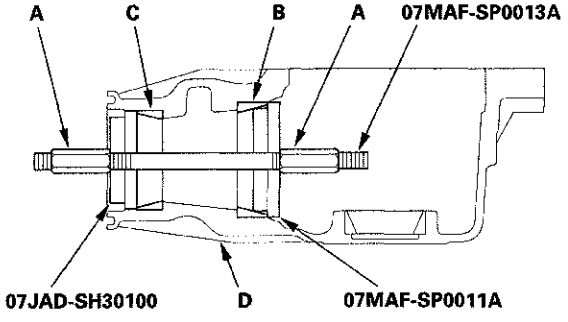


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4. Install the 75 mm bearing outer race (A) and 65 mm bearing outer race (B) in the transfer housing (C), set the attachment (65 mm) and the tapered bearing race installer A over the races, and install the installer shaft through the attachment and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



5. Tighten the installer shaft nut (A) to install the races (B) (C) into the transfer housing (D) securely.

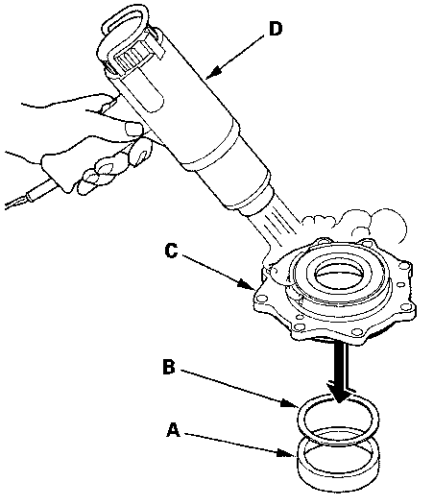


Transfer Cover Tapered Roller Bearing Outer Race Removal/ Installation

Special Tools Required
- Driver 07749-0010000
- Attachment, 78 x 80 mm 07NAD-PX40100

NOTE: Replace the bearing with a new one whenever the outer race is replaced.

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

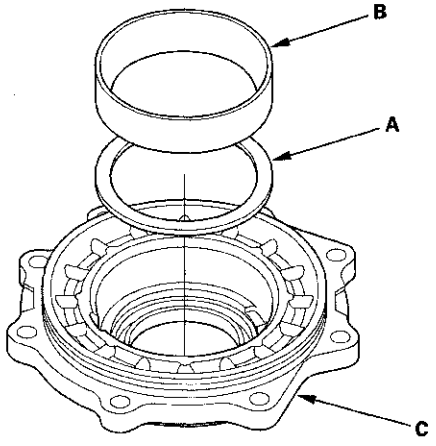


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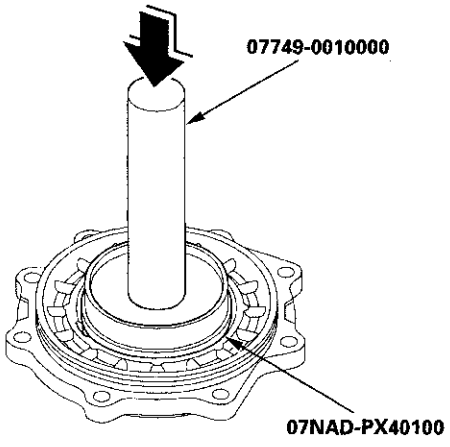
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Transfer Cover Tapered Roller Bearing Outer Race Removal/ Installation (cont'd)

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



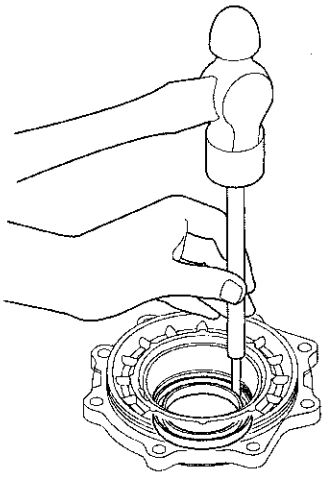
3. Drive the outer race securely in the cover using the driver and the attachment (78 x 80 mm) so there is no clearance between the outer race, thrust shim, and cover.



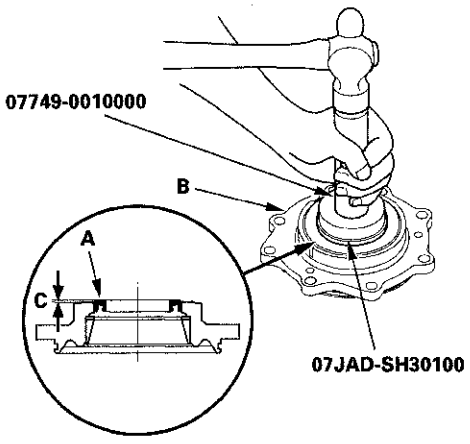
Transfer Cover Oil Seal Replacement

Special Tools Required
- Driver 07749-0010000
- Attachment, 65 mm 07JAD-SH30100

1. Remove the oil seal from the transfer cover.



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



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Reassembly

Special Tools Required
- Driver, 40 mm I.D. 07746-0030100
- Driver 07749-0010000
- Attachment, 65 mm 07JAD-SH30100
- Companion flange holder 07XAB-0010101
- Attachment, 78 x 80 mm 07NAD-PX40100

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

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

   FORMULA: A/100 − B/100 + C = X

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

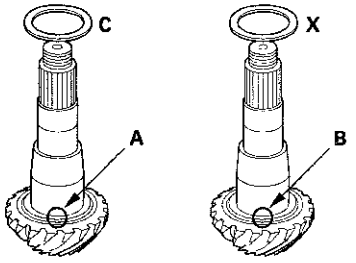
   NOTE: The number on the transfer output shaft (hypoid gear) is shown in 1/100 mm.

EXAMPLE

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

X = A/100 − B/100 + C
= 2/100 − (−1)/100 + 1.05
= 0.02 + 0.01 + 1.05 = 1.08 (mm)

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



THRUST SHIM, 40 mm

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

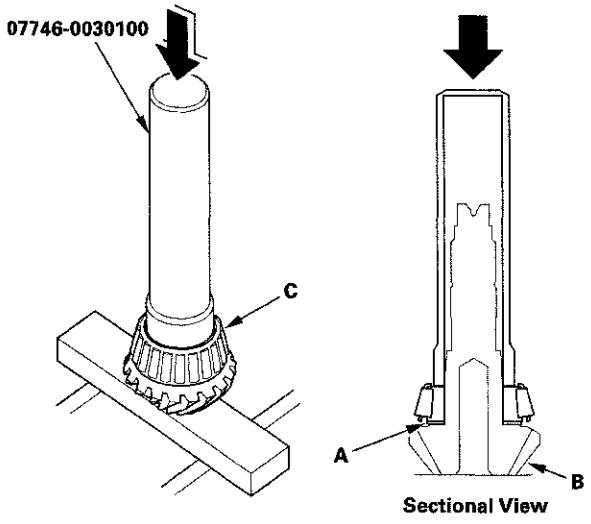
2. Select the 40 mm thrust shim if the tapered roller bearing on the transfer output shaft (hypoid gear) is replaced. Measure the thickness of the replacement bearing and the existing bearing, and calculate the difference of the bearing thickness. Adjust the thickness of the existing 40 mm thrust shim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

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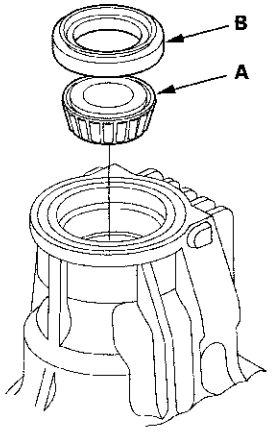
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Reassembly (cont'd)

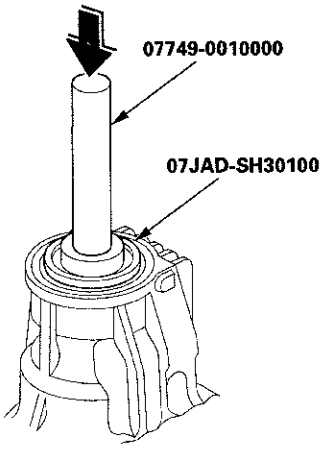
3. Install the 40 mm thrust shim (A) on the transfer output shaft (hypoid gear) (B), then install the tapered roller bearing (C) using the driver (40 mm I.D.) and a press.



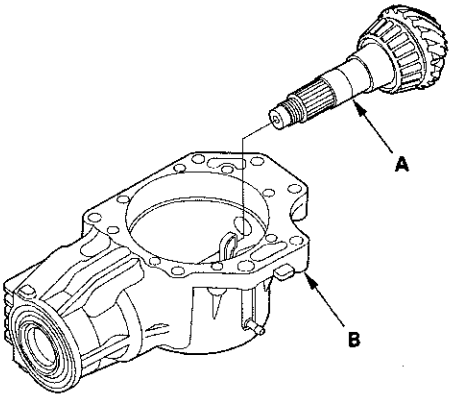
4. Place the tapered roller bearing (A) on the bearing outer race of the companion flange side of the transfer housing, and install the new oil seal (B).



5. Drive the oil seal securely in the transfer housing using the driver and the attachment (65 mm).

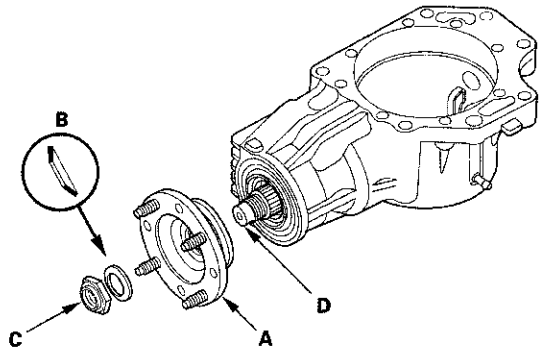


6. Install the transfer output shaft (hypoid gear) (A) in the transfer housing (B). Do not install the transfer spacer and thrust washer on the transfer output shaft (hypoid gear).

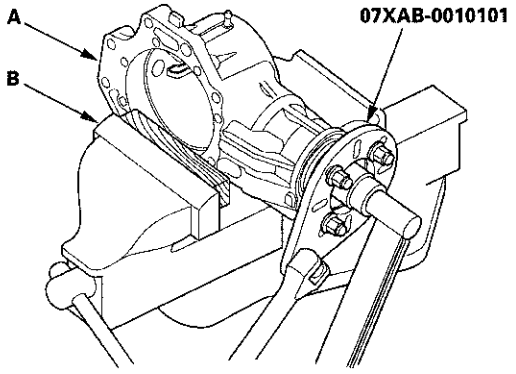


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7. Install the companion flange (A), conical spring washer (B) (in the direction shown), and locknut (C) on the transfer output shaft (hypoid gear) (D). Do not install the O-ring and back-up ring.



8. Secure the transfer housing (A) in a bench vise (B) with soft jaws. To prevent damage to the transfer housing, always use soft jaws or equivalent materials between the transfer housing and the vise.



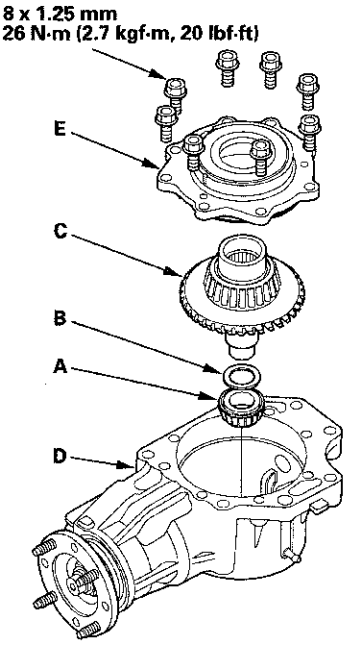
9. Install the companion flange holder on the companion flange.

10. Tighten the locknut while measuring the starting torque of the transfer output shaft (hypoid gear) so the starting torque is within 1.15—1.71 N·m (11.7—17.4 kgf·cm, 10.2—15.1 lbf·in). Do not stake the locknut in this step.

11. Remove the companion flange holder.

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

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



14. Install the transfer cover (E), and secure it with the bolts. Do not install the O-ring on the transfer cover.

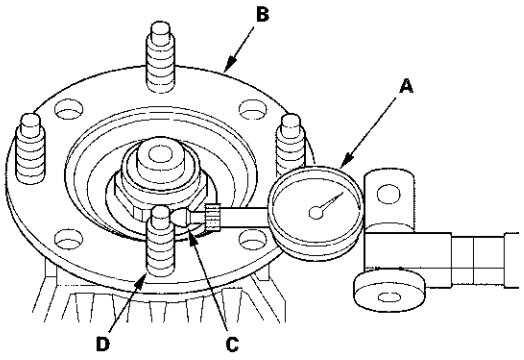
15. Rotate the companion flange in both directions until the transfer gears rotate one full turn in both directions.

(cont'd)

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Reassembly (cont'd)

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

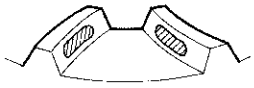


17. Measure transfer gear backlash.

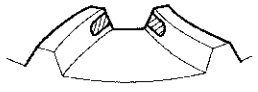
Standard: 0.06—0.16 mm (0.002—0.006 in)

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

CORRECT TOOTH CONTACT PATTERN



INCORRECT TOOTH CONTACT PATTERN



TOE CONTACT



HEEL CONTACT



FLANK CONTACT



FACE CONTACT

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

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

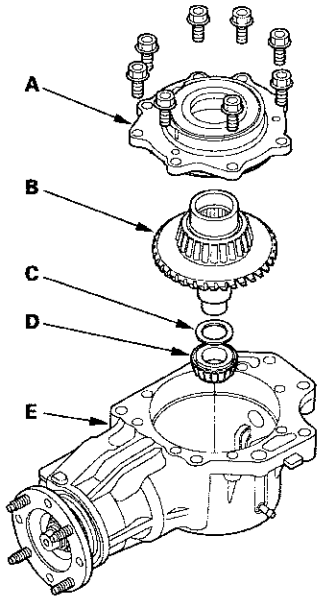
- Toe Contact
  Use a thinner 40 mm thrust shim to move the transfer output shaft (hypoid gear) away from the transfer hypoid drive gear. Because this movement causes the transfer gear backlash to change, move the transfer hypoid drive gear toward the transfer output shaft (hypoid gear) to adjust the transfer gear backlash as follows:
  – Reduce the thickness of the 25 mm thrust shim.
  – Increase the thickness of the 80 mm thrust shim by amount the 25 mm thrust shim was reduced.
- Heel Contact
  Use a thicker 40 mm thrust shim to move the transfer output shaft (hypoid gear) toward the transfer hypoid drive gear. Because this movement causes the transfer backlash to change, move the transfer hypoid drive gear away from the transfer output shaft (hypoid gear) to adjust the transfer gear backlash as follows:
  – Increase the thickness of the 25 mm thrust shim.
  – Reduce the thickness of the 80 mm thrust shim by the amount the 25 mm thrust shim was reduced.
- Flank Contact
  Use a thicker 25 mm thrust shim to move the transfer hypoid drive gear away from the transfer output shaft (hypoid gear).
  Flank contact must be adjusted within the limits of the transfer gear backlash. If the backlash exceeds the limits, adjust as described under Heel Contact.
- Face Contact
  Use a thinner 25 mm thrust shim to move the transfer hypoid drive gear toward the transfer output shaft (hypoid gear).
  Face contact must be adjusted within the limits of the transfer gear backlash. If the backlash exceeds the limits, adjust as described under Toe Contact.

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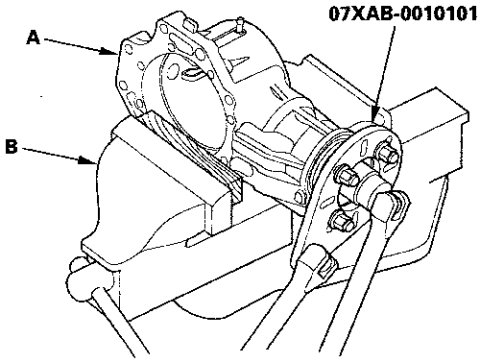
THRUST SHIM, 25 mm

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

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



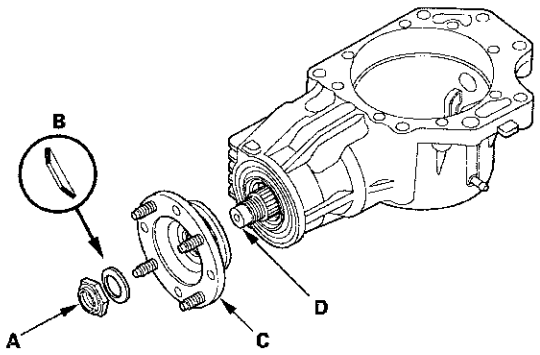
22. Secure the transfer housing (A) in a bench vise (B) with soft jaws. To prevent damage to the transfer housing, always use soft jaws or equivalent materials between the transfer housing and the vise.



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

24. Remove the companion flange holder.

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



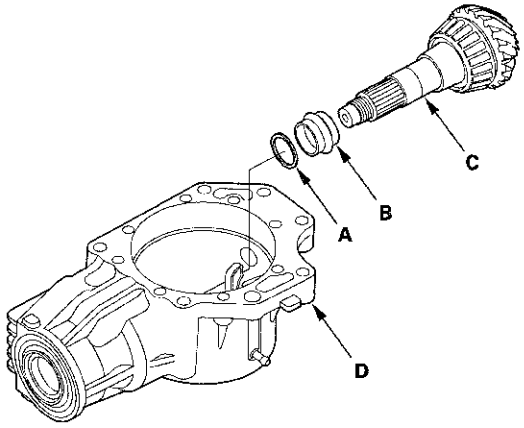
26. Remove the transfer output shaft (hypoid gear) from the transfer housing.

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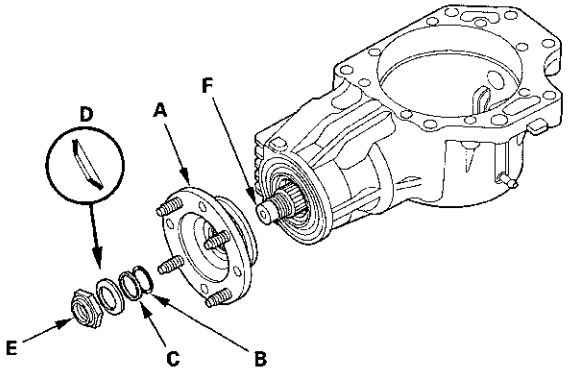
Reassembly (cont'd)

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

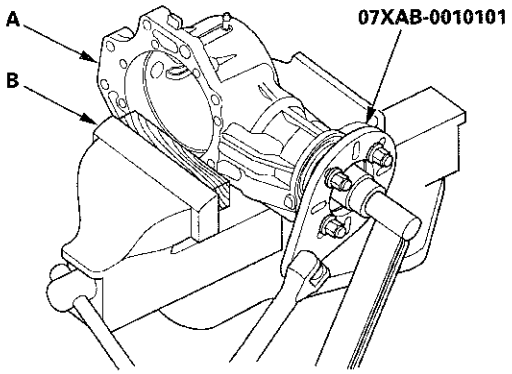


28. Coat the threads of the locknut and transfer output shaft (hypoid gear) with transfer fluid (hypoid gear oil).

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



30. Secure the transfer housing (A) in a bench vise (B) with soft jaws. To prevent damage to the transfer housing, always use soft jaws or equivalent materials between the transfer housing and the vise.



31. Install the companion flange holder on the companion flange.

32. Tighten the locknut while measuring the starting torque of the transfer output shaft (hypoid gear) so the starting torque is within 1.15—1.71 N·m (11.7—17.4 kgf·cm, 10.2—15.1 lbf·in).

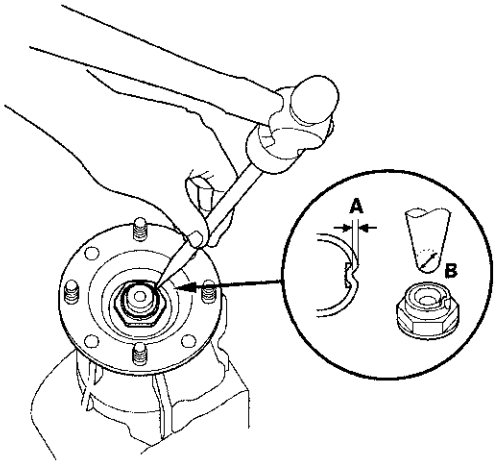
Tightening Torque:
108—294 N·m
(11.0—30.0 kgf·m, 79.6—217 lbf·ft)
Starting Torque:
1.15—1.71 N·m
(11.7—17.4 kgf·cm, 10.2—15.1 lbf·in)

NOTE:
- Rotate the companion flange several times to seat the tapered roller bearings, then measure the starting torque.
- If the starting torque exceeds 1.71 N·m (17.4 kgf·cm, 15.1 lbf·in), replace the transfer spacer and reassemble the parts. Do not adjust the torque with the locknut loose.
- If the tightening torque exceeds 294 N·m (30.0 kgf·m, 217 lbf·ft), replace the transfer spacer and reassemble the parts.

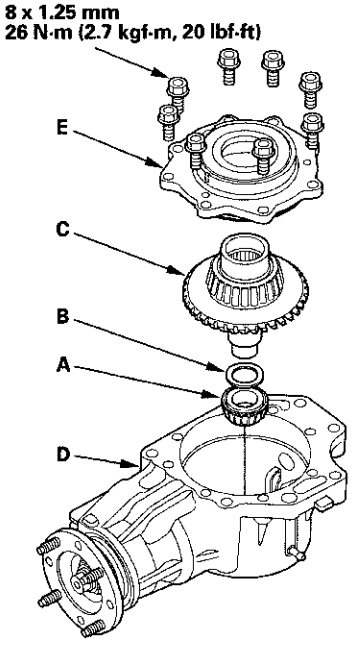
33. Remove the companion flange holder.

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34. Stake the locknut to a depth (A) of 0.7—1.2 mm (0.03—0.05 in) using a 3.5 mm punch (B).

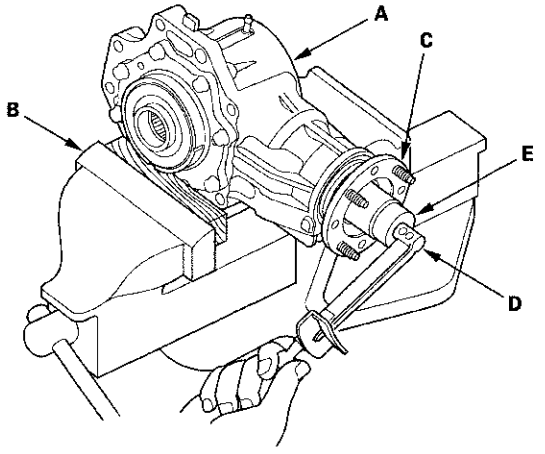


35. Install the tapered roller bearing (A), 25 mm thrust shim (B), and transfer hypoid drive gear/shaft assembly (C) in the transfer housing (D).



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

37. Secure the transfer housing (A) in a bench vise (B) with soft jaws. To prevent damage to the transfer housing, always use soft jaws or equivalent materials between the transfer housing and the vise.



38. Rotate transfer companion flange (C) several times to seat the tapered roller bearings.

39. Measure the starting torque at the companion flange using a torque wrench (D) and a socket (E).

Total Starting Torque:
2.64—4.23 N·m
(26.9—43.1 kgf·cm, 23.3—37.4 lbf·in)

40. Remove the transfer cover from the transfer housing.

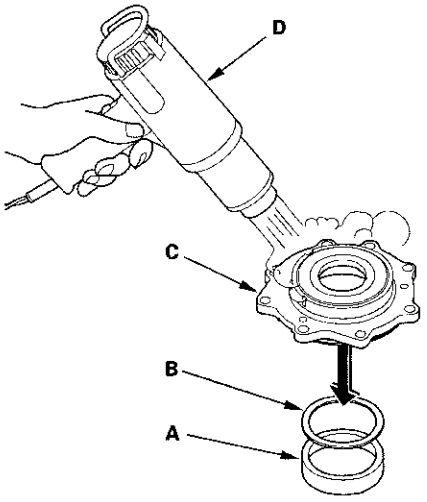
41. If the starting torque is within the standard, go to step 47.

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Reassembly (cont'd)

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



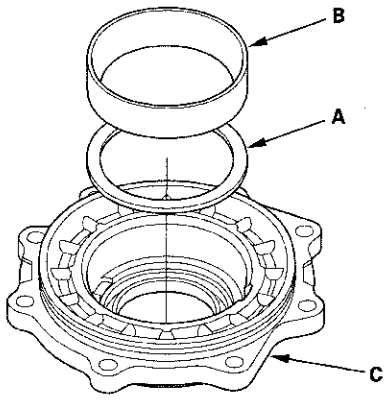
43. Measure thickness of the removed 80 mm thrust shim, and select the new 80 mm shim.

THRUST SHIM, 80 mm

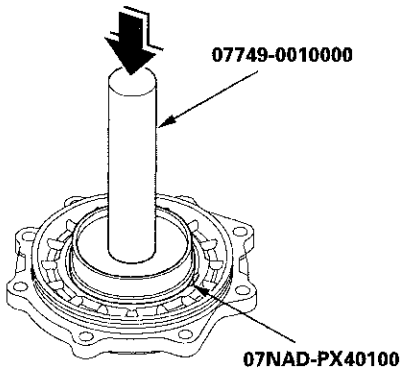
Shim No.	Thickness
A	1.52 mm (0.060 in)
B	1.55 mm (0.061 in)
C	1.58 mm (0.062 in)
D	1.61 mm (0.063 in)
E	1.64 mm (0.065 in)
F	1.67 mm (0.066 in)
G	1.70 mm (0.067 in)
H	1.73 mm (0.068 in)
I	1.76 mm (0.069 in)
J	1.79 mm (0.070 in)
K	1.82 mm (0.072 in)
L	1.85 mm (0.073 in)
M	1.88 mm (0.074 in)
N	1.91 mm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

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

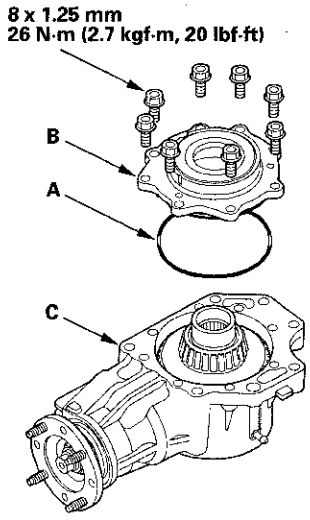


45. Drive the outer race securely in the cover using the driver and the attachment (78 x 80 mm) so there is no clearance between the outer race, thrust shim, and cover.



46. After replacing the 80 mm thrust shim, recheck and make sure that the total starting torque is within the specification.

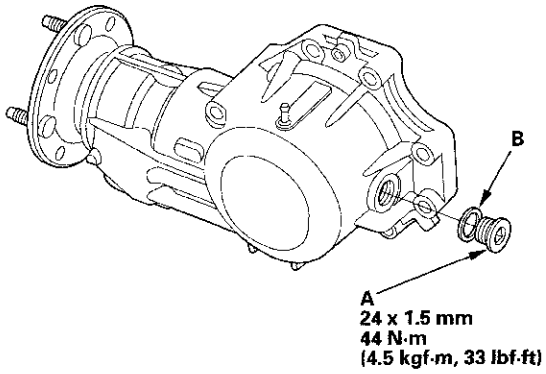
47. Install the new O-ring (A) on the transfer cover (B), then install the cover on the transfer housing (C).



48. Remove the filler plug (A), then refill the transfer assembly with transfer fluid (hypoid gear oil). Use an SAE 90 or SAE 80W-90 viscosity hypoid gear oil, API classified GL4 or GL5 only.

Viscosity:
SAE 90: Above 0 °F (−18 °C)

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



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

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