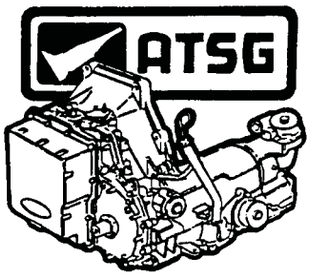

INDEX

ACURA LEGEND 1991

Automatic Transmission Service Group
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Technical Service Information

INTRODUCTION
ACURA LEGEND 1991

The 1991 Legend transaxle is a completely new unit. As you will notice the engine is mounted in a north south direction. Similiar to most rear drive units. However this is a front wheel drive four speed automatic transaxle.

This unit is fully computerized with a converter clutch. The valve body is accessible with the unit in the vehicle. It has a removeable oil pan that gives us access. This manual includes all the electrical diagnosis information needed when working on this vehicle along with the teardown and assembly

We thank the Honda Motor Corporation for the illustrations and information that have made this booklet possible.

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The automatic transmission is a combination of a 3-element torque converter and a dual-shaft electronically controlled automatic transmission which provides 4 speeds forward and 1 reverse. The entire unit is positioned in line with the engine.

Torque Converter, Gears and Clutches

The torque converter consists of a pump, turbine and stator, assembled in a single unit.
They are connected to the engine crankshaft so they turn together as a unit as the engine turns.
Around the outside of the drive plate is a ring gear which meshes with the starter pinion when the engine is being started.
The entire torque converter assembly serves as a flywheel while transmitting power to the transmission mainshaft.
The transmission has two parallel shafts, the mainshaft and the countershaft. The mainshaft is in line with the engine crankshaft.
The mainshaft includes the clutches for 1st, 4th and 2nd, and gears for 4th, 1st, 2nd and reverse (3rd gear is integral with the mainshaft).
The countershaft includes the clutches for 3rd, 1st-hold and reverse, and gears for 3rd, 4th, 1st, 2nd and reverse. The secondary drive gear is integrated with the countershaft.
The gears on the mainshaft are in constant mesh with those on the countershaft.
When certain combinations of gears in the transmission are engaged by clutches, power is transmitted from the mainshaft to the countershaft to provide [1], [2], [D3], and [D4].

Electronic Control

The electronic control system consists of PGM-FI/AT Electronic Control Unit (ECU), sensors, a linear solenoid and 4 solenoid valves. Shifting and lock-up are electronically controlled for comfortable driving under all conditions.
The ECU is located below the dashboard, under the front lower panel on the passenger's side.

Hydraulic Control

The lower valve body assembly includes the main valve body, secondary valve body, throttle valve body, linear solenoid, shift control solenoid valves and the oil pass body. They are bolted on the lower part of the transmission housing.
Other valve bodies, the regulator valve body, oil pump body and the accumulator body, are bolted to the torque converter housing.
The main valve body contains the manual valve, 1-2 shift valve, 2-3 shift valve, 3-4 shift valve, 4-3 kick-down valve and Clutch Pressure Control(CPC) valve.
The secondary valve body contains the 3-4 orifice control valve, shift timing valve, modulator valve and accumulator pistons.
The throttle valve body includes the throttle valve which is bolted onto the secondary valve body.
The linear solenoid is joined to the throttle valve body.
The regulator valve body contains the regulator valve, lock-up shift valve and cooler relief valve.
Fluid from the regulator passes through the manual valve to the various control valves.
The oil pump body contains the lock-up timing valve, lock-up control valve and relief valve. The torque converter check valve is located in the torque converter housing under the oil pump body.
The accumulator body contains the accumulator pistons. The reverse accumulator and 1st-hold accumulator pistons are assembled in the rear cover.
The 1st, 1st-hold and reverse clutches receive oil from their respective feed pipes.

Shift Control Mechanism

Input from various sensors located throughout the car determines which shift control solenoid valve the ECU will activate. Activating a shift control solenoid valve changes modulator pressure, causing a shift valve to move. This pressurizes a line to one of the clutches, engaging that clutch and its corresponding gear.

Lock-up Mechanism

In [D4] position, in 2nd, 3rd and 4th, pressurized fluid is drained from the back of the torque converter through an oil passage, causing the lock-up piston to be held against the torque converter cover. As this takes place, the mainshaft rotates at the same speed as the engine crankshaft. Together with hydraulic control, the ECU optimizes the timing of the lock-up mechanism. The lock-up valves control the range of lock-up according to lock-up control solenoid valves A and B, and throttle valve. When lock-up control solenoid valves A and B activate, modulator pressure changes. The lock-up control solenoid valves A and B are mounted on the torque converter housing, and are controlled by the ECU.

(cont'd)

The Acura four speed automatic transmission uses hydraulically actuated clutches to engage or disengage the transmission gears. When clutch pressure is introduced into the clutch drum, the clutch piston is applied. 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 clutch pressure is bled from the clutch pack, the piston releases the friction discs and steel plates, and they are free to slide past each other while disengaged. This allows the gear to spin independently of its shaft, transmitting no power.

[1st Clutch]
The first clutch engages/disengages first gear, and is located at the right of center on the mainshaft. The first clutch is joined back-to-back to the fourth clutch. The first clutch is supplied clutch pressure by its oil feed pipe within the mainshaft.

[1st-hold Clutch]
The first hold clutch engages/disengages first hold, 1 position or 2 position, and is located at the center of the countershaft. The first hold clutch is supplied clutch pressure by its oil feed pipe within the countershaft.

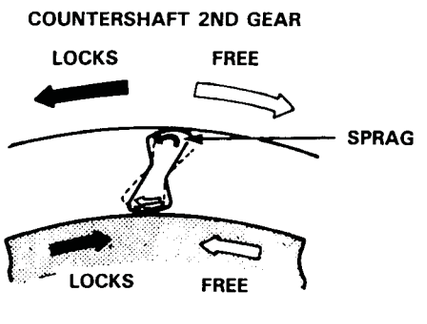
[2nd Clutch]
The second clutch engages/disengages second gear, and is located at the right of the mainshaft. The second clutch is supplied clutch pressure by its oil feed pipe within the mainshaft.

[3rd Clutch]
The third clutch engages/disengages third gear, and is located at the end of the countershaft, opposite the rear cover. The third clutch is supplied clutch pressure by its oil feed pipe within the countershaft.

[4th Clutch]
The fourth clutch engages/disengages fourth gear, and is located at the left of center on the mainshaft. The fourth clutch is joined back-to-back to the first clutch. The fourth clutch is supplied clutch pressure by its oil feed pipe within the mainshaft.

[Reverse Clutch]
The reverse clutch engages/disengages reverse gear, and is located at the right of the countershaft. The reverse clutch is supplied clutch pressure by its oil feed pipe within the countershaft.

[One-way Clutch]
This transmission has two one-way clutches, the first gear one-way clutch and the second gear one-way clutch. The first gear one-way clutch is positioned between the first gear and the one-way clutch hub, with the one-way clutch hub splined to second gear. The first gear provides the outer race surface. The second gear one-way clutch is positioned between the second gear and the parking gear, with the parking gear splined to the countershaft. The second gear provides the outer race surface, and the parking gear provides the inner race surface. The one-way clutches lock up when power is transmitted from the mainshaft first gear to the countershaft first gear. The second gear one-way clutch locks up when power is transmitted from the mainshaft second gear to the countershaft second gear.
The first clutch and gears remain engaged in the 1st, 2nd, 3rd, and 4th gear ranges in the D_3 or D_4 position. However, the first gear one-way clutch disengages when the 2nd, 3rd, or 4th clutches/gears are applied in the D_3 or D_4 position. This is because the increased rotational speed of the gears on the countershaft over-ride the locking ''speed range'' of the one-way clutch. Thereafter, the one-way clutch freewheels with the first clutch still engaged.



Gear Selection

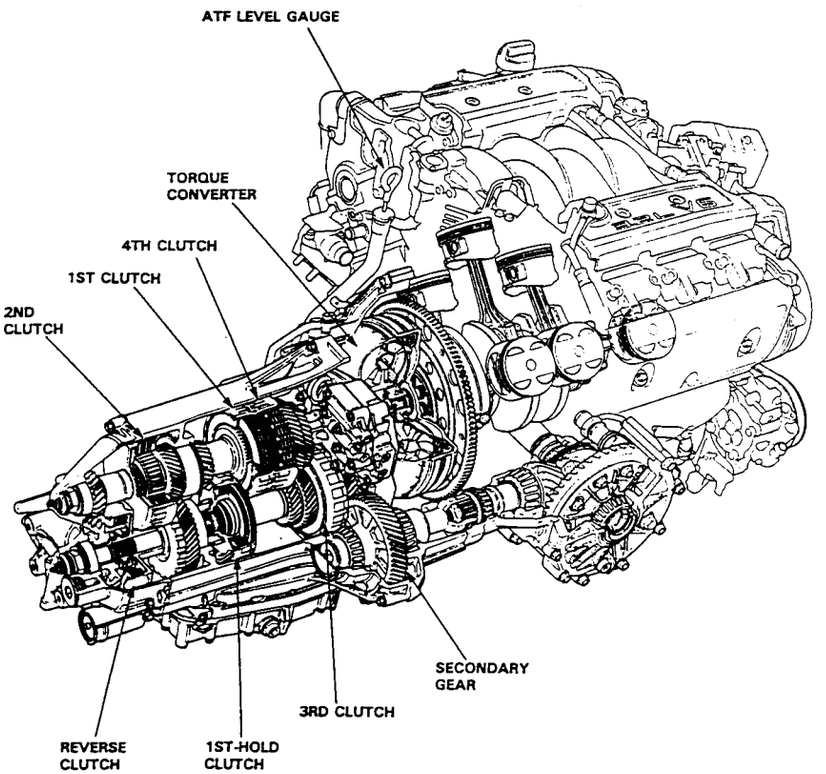
The selector lever has seven positions; [P] PARK, [R] REVERSE, [N] NEUTRAL, [D4] 1st through 4th positions, [D3] 1st through 3rd positions, [2] 2nd gear and [1] 1st gear.

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

Starting is possible only in [P] and [N] position through use of a slide-type, neutral-safety switch.

Position Indicator

A position indicator in the instrument panel shows what gear has been selected without having look down at the console.

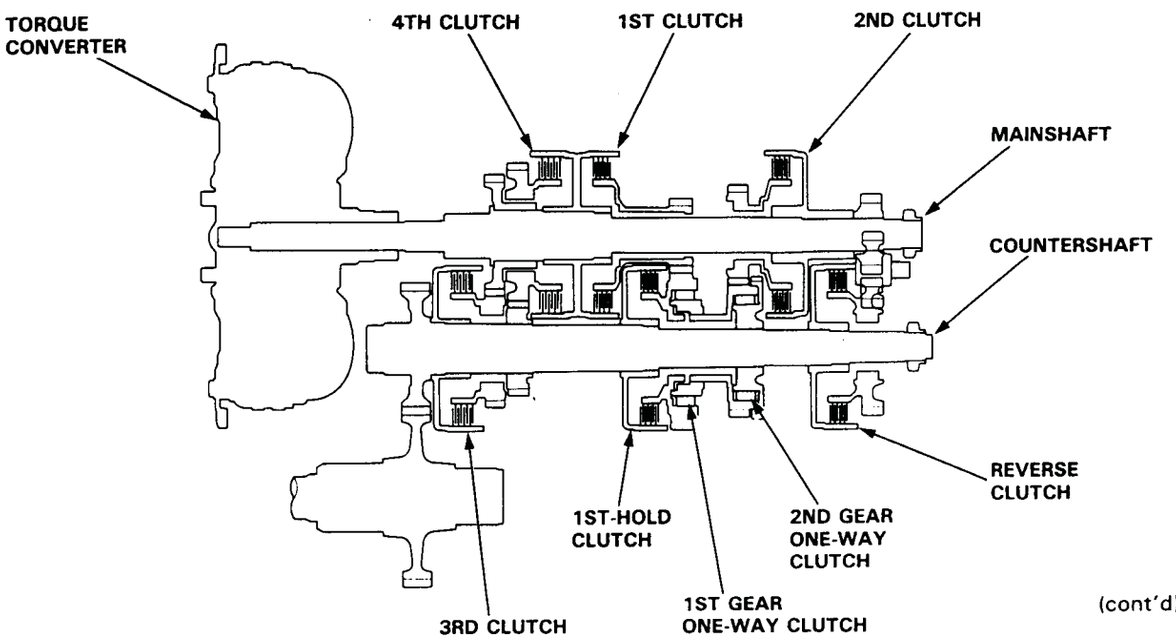


PART / RANGE		TORQUE CONVERTER	1ST HOLD CLUTCH	1ST GEAR 1ST CLUTCH	2ND GEAR 2ND CLUTCH	3RD GEAR 3RD CLUTCH	4TH GEAR 4TH CLUTCH	RVS. GEAR REVERSE CLUTCH	PARKING GEAR
P		○	×	×	×	×	×	×	○
R		○	×	×	×	×	×	○	×
N		○	×	×	×	×	×	×	×
D4	1ST	○	×	○	×	×	×	×	×
	2ND	○	×	○*	○	×	×	×	×
	3RD	○	×	○*	○*	○	×	×	×
	4TH	○	×	○*	○*	×	○	×	×
D3	1ST	○	×	○	×	×	×	×	×
	2ND	○	×	○*	○	×	×	×	×
	3RD	○	×	○*	○*	○	×	×	×
2		○	○	×	○	×	×	×	×
1		○	○	○	×	×	×	×	×

○: Operates, ×: Doesn't operate, *: Although the 1st clutch engages, driving power is not transmitted as the one-way clutch slips.

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

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



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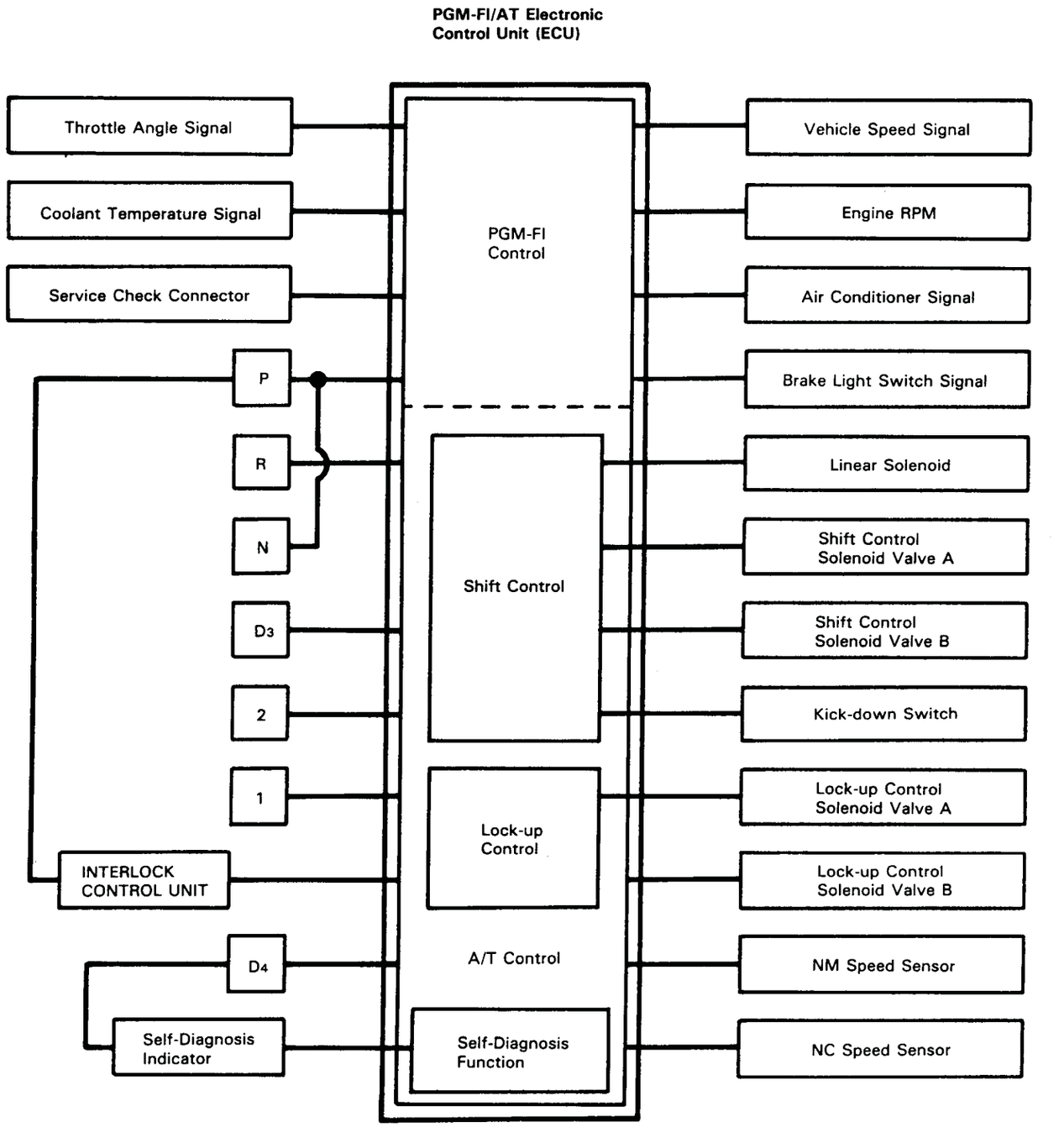
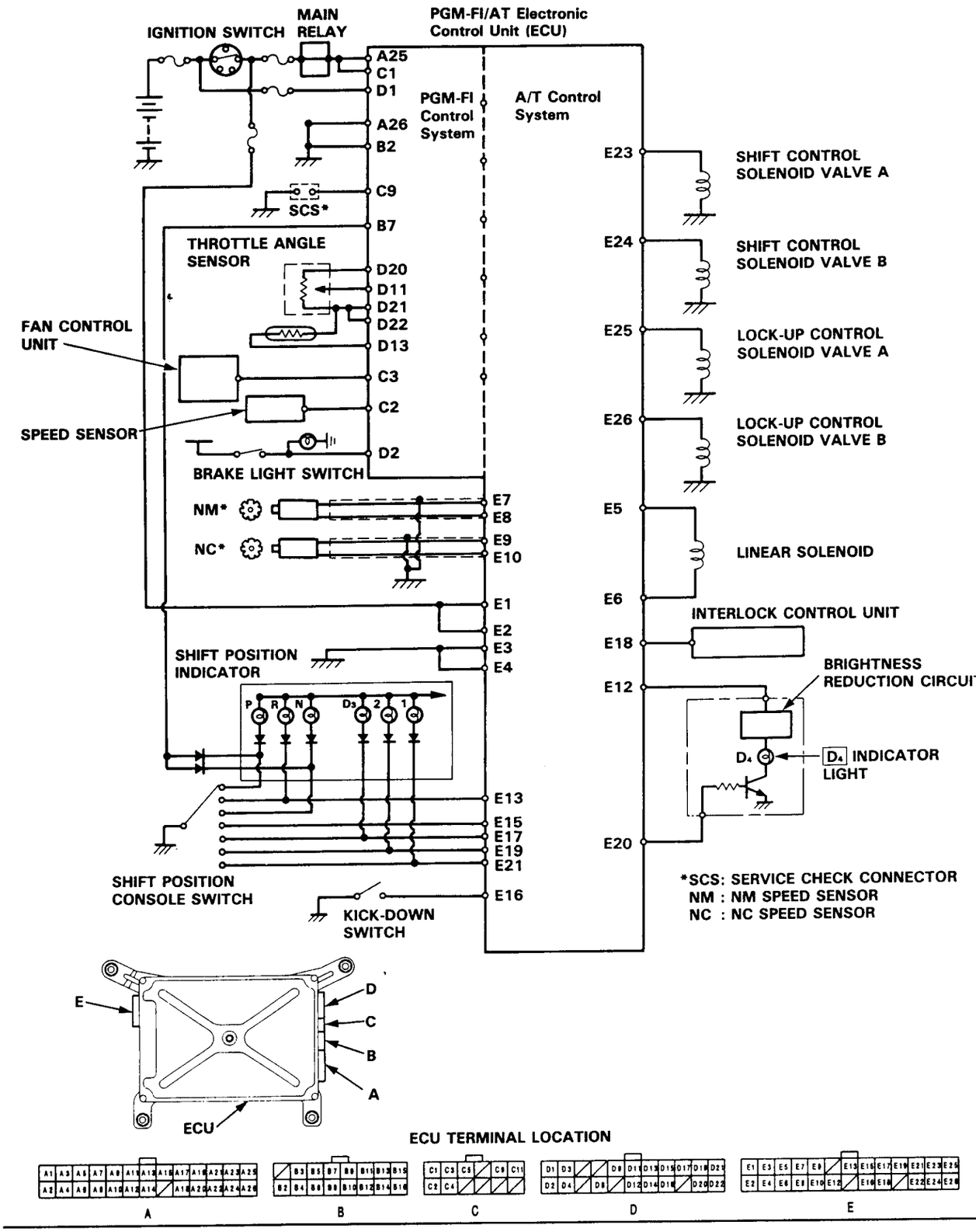
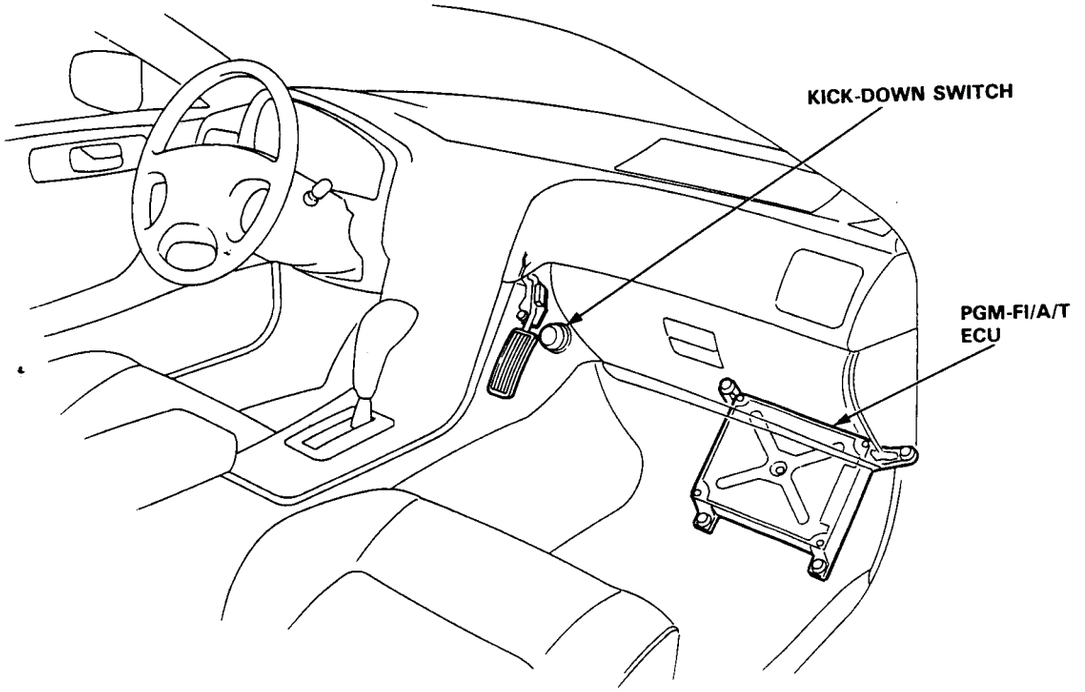
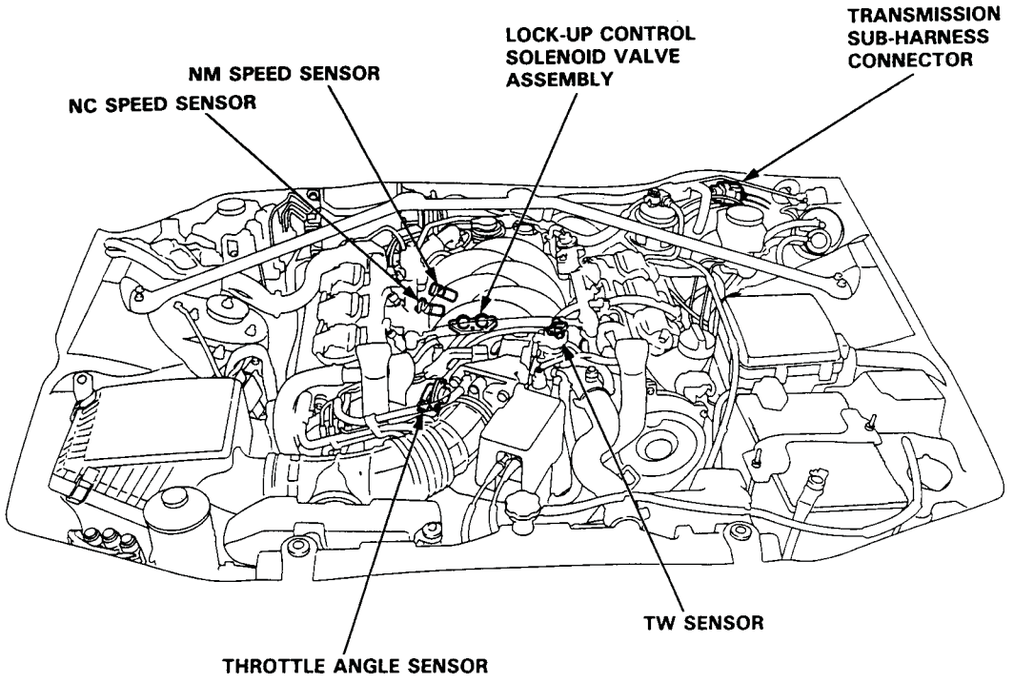
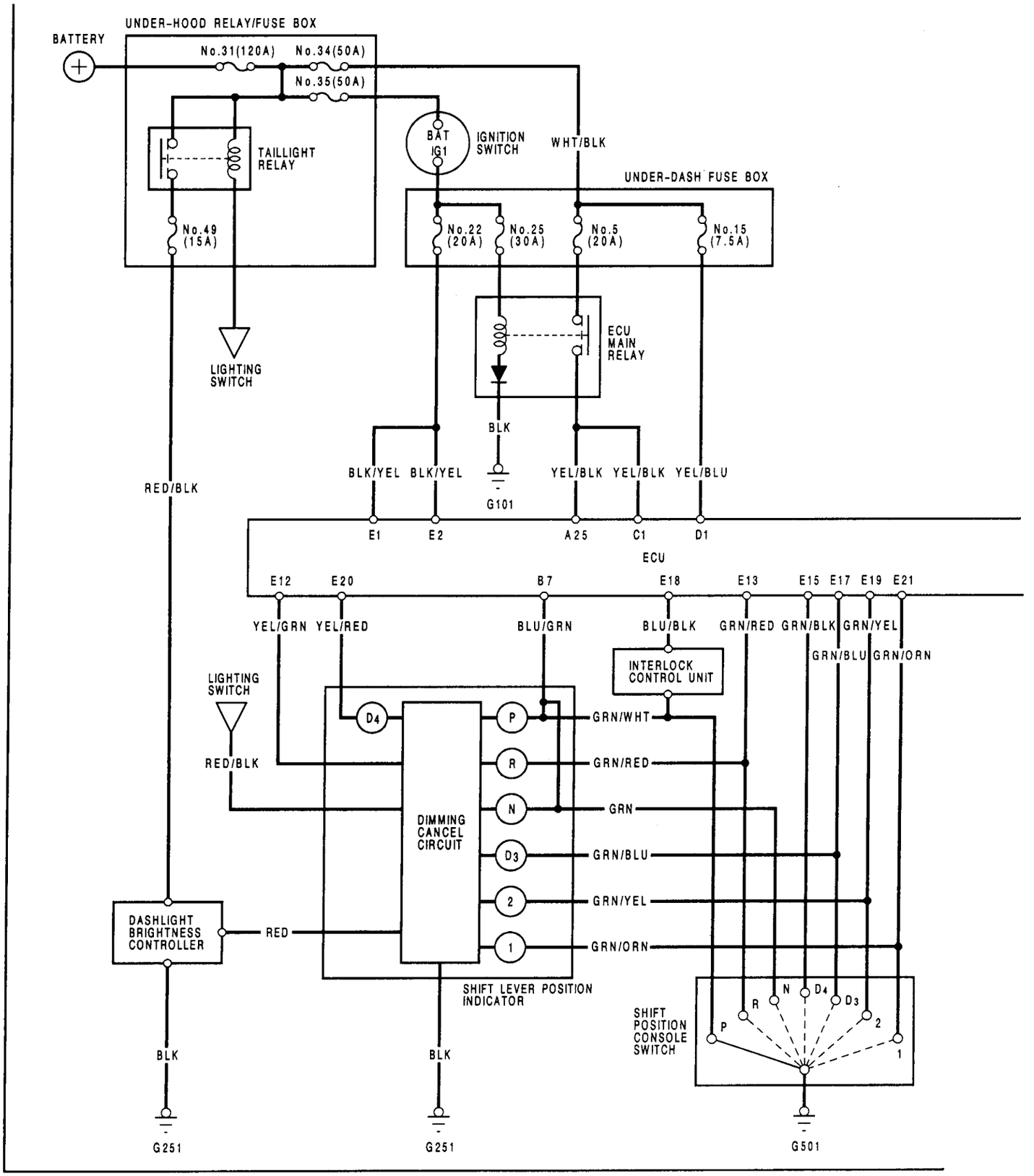


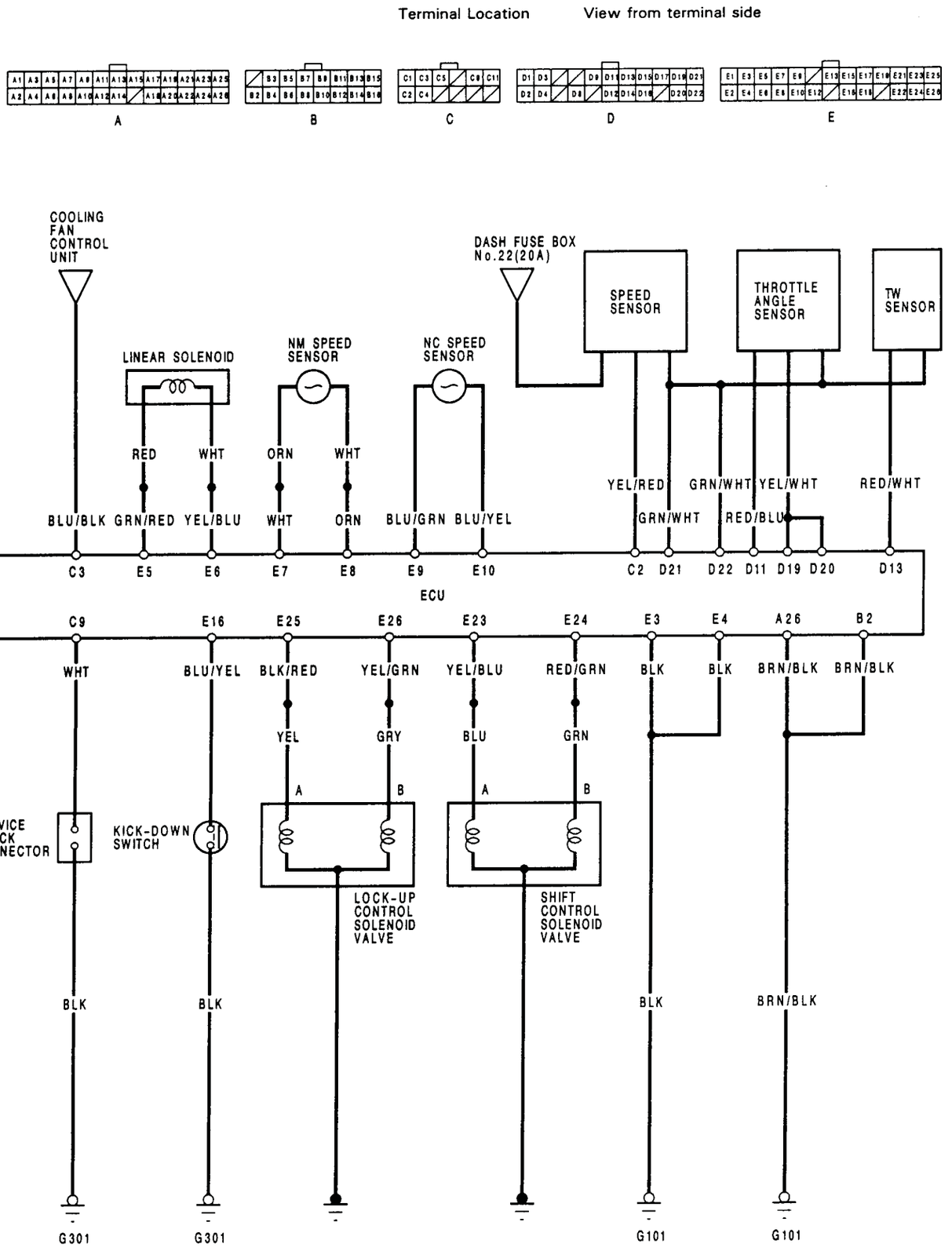
Circuit Diagram





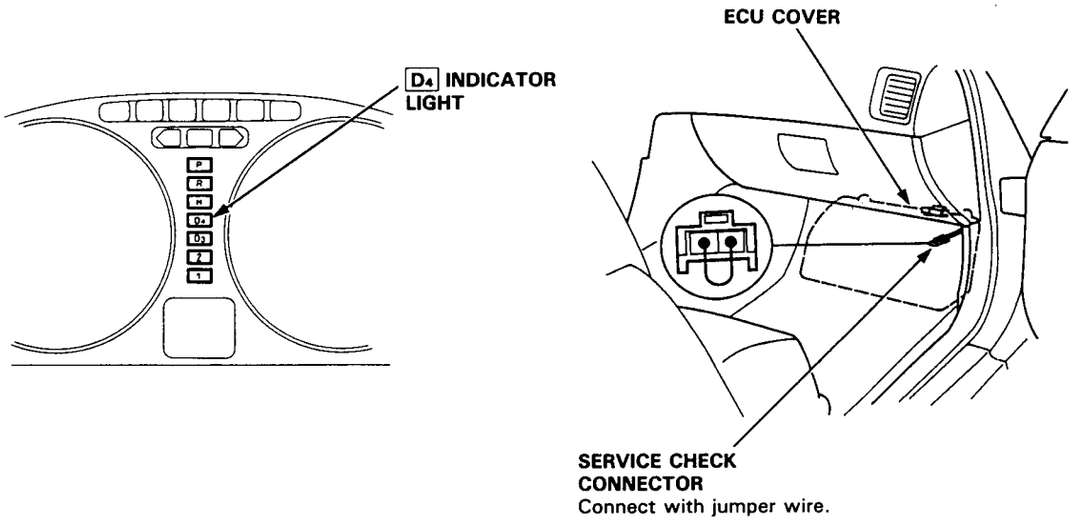




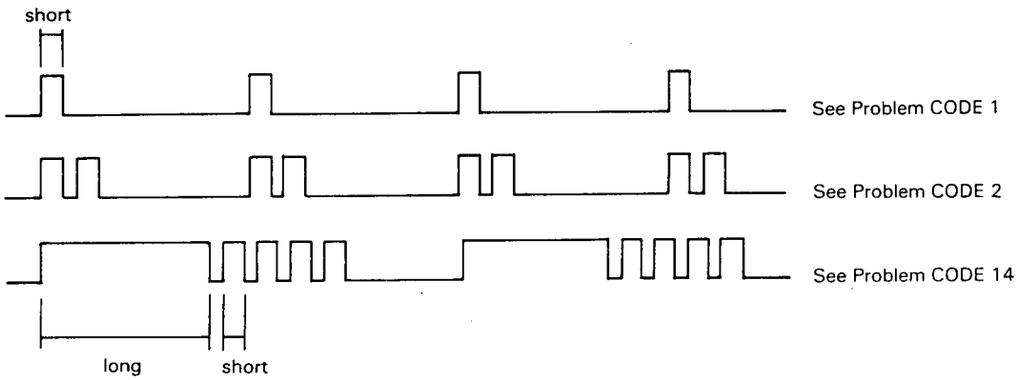


When the PGM-FI/AT Electronic Control Unit (ECU) senses an abnormality in the input or output systems, the [D4] indicator light in the gauge assembly will blink. However, when the Service Check Connector (located on the ECU cover) is connected with a jumper wire, the [D4] indicator light will blink the problem code when the ignition switch is turned on.

When the [D4] indicator light has been reported on, connect the two terminals of the Service Check Connector together. Then turn on the ignition switch and observe the [D4] indicator light.



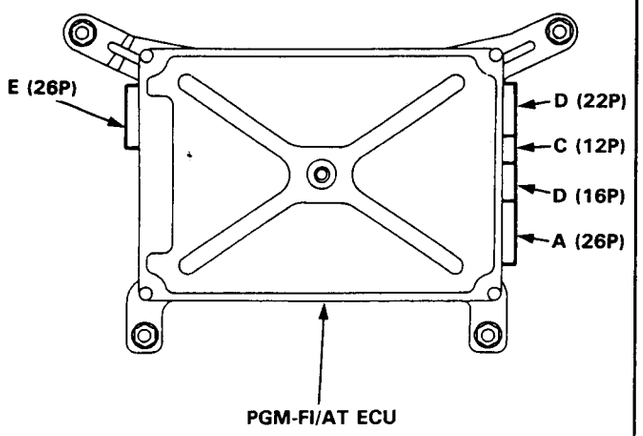
Problem codes 1 through 9 are indicated by individual short blinks, Problem codes 10 through 17 are indicated by a series of long and short blinks. One long blink equals 10 short blinks. Add the long and short blinks together to determine the problem code. After determining the problem code, refer to the electrical system Symptom-to-Component Chart on page 14-48.



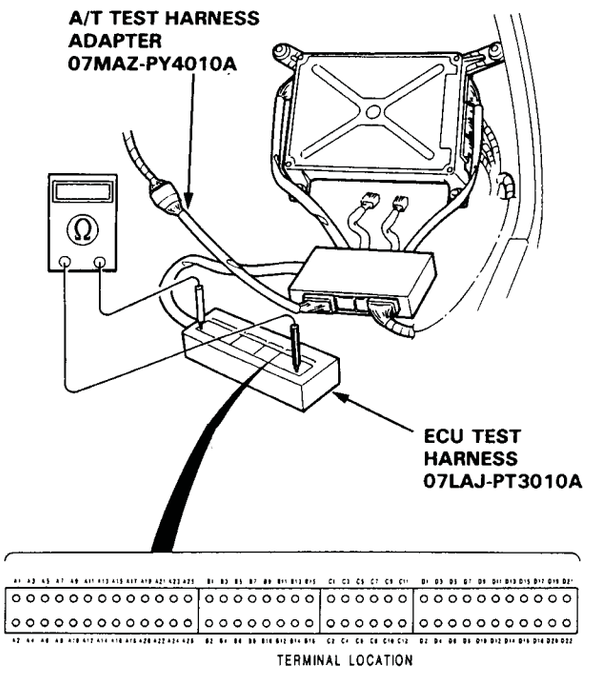
Some PGM-FI problems will also make the [D4] indicator light come on. After repairing the PGM-FI system, disconnect the No.15 : ACG (S) fuse (7.5 A) in the under dash fuse box for more than 10 seconds to reset the ECU memory.

1. Connect the A/T Test Harness Adapter (P/N 07MAZ-PY40100) to the ECU Test Harness (P/N 07LAJ-PT3010A).

2. Disconnect the E (26P) connector and/or D (22P) connector from the ECU.



3. Connect the ECU Test Harness with A/T Test Harness Adapter between the ECU and connector(s).



NOTE:
- The A section of the ECU Test harness corresponds to the E (26P) connector, while connecting to test the A/T Test Harness Adapter.
- Unless otherwise noted, use only the Digital Multimeter, KS-AHM-32-003, for testing.

Number of D4 indicator light blinks while Service Check Connector is jumped.	D4 indicator light	Possible Cause	Symptom
1	Blinks	• Disconnected lock-up control solenoid valve A connector • Short or open in lock-up control solenoid valve A wire • Faulty lock-up control solenoid valve A	• Lock-up clutch does not engage. • Lock-up clutch does not disengage. • Unstable idle speed.
2	Blinks	• Disconnected lock-up control solenoid valve B connector • Short or open in lock-up control solenoid valve B wire • Faulty lock-up control solenoid valve B	• Lock-up clutch does not engage.
3	Blinks or OFF	• Disconnected throttle angle sensor connector • Short or open in throttle angle sensor wire • Faulty throttle angle sensor	• Lock-up clutch does not engage.
4	Blinks	• Disconnected speed sensor connector • Short or open in speed sensor wire • Faulty speed sensor	• Lock-up clutch does not engage.
5	Blinks	• Short in shift position console switch wire • Faulty shift position console switch	• Fails to shift other than 2nd ↔ 4th gears. • Lock-up clutch does not engage.
6	OFF	• Disconnected shift position console switch connector • Open in shift position console switch wire • Faulty shift position console switch	• Fails to shift other than 2nd ↔ 4th gears. • Lock-up clutch does not engage. • Lock-up clutch engages and disengages alternately.
7	Blinks	• Disconnected shift control solenoid valve A connector • Short or open in shift control solenoid valve A wire • Faulty shift control solenoid valve A	• Fails to shift (between 1st ↔ 4th, 2nd ↔ 4th or 2nd ↔ 3rd gears only). • Fails to shift (stuck in 4th gear)
8	Blinks	• Disconnected shift control solenoid valve B connector • Short or open in shift control solenoid valve B wire • Faulty shift control solenoid valve B	• Fails to shift (stuck in 1st or 4th gears).
9	Blinks	• Disconnected NC speed sensor connector • Short or open in the NC speed sensor wire • Faulty NC speed sensor	• Lock-up clutch does not engage.

Number of D4 indicator light blinks while Service Check Connector is jumped.	D4 indicator light	Possible Cause	Symptom
10	Blinks	• Disconnected water temperature sensor connector • Short or open in the water temperature sensor wire • Faulty water temperature sensor	• Lock-up clutch does not engage.
11	OFF	• Trouble in ECU	• Lock-up clutch does not engage.
14	OFF	• Trouble in ECU	• Transmission jerks hard when shifting.
15	OFF	• Disconnected NM speed sensor connector • Short or open in NM speed sensor wire • Faulty NM speed sensor	• Transmission jerks hard when shifting.
16	Blinks	• Disconnected linear solenoid connector • Short or open in linear solenoid wire • Faulty linear solenoid	• Transmission jerks hard when shifting • Lock-up clutch does not engage.
17	OFF	• Short in kick-down switch wire • Faulty kick-down switch	• 4th → 2nd kick-down speed is low.

If the self-diagnosis D4 indicator light does not blink, perform an inspection according to the table listed below.

Symptom	Probable Cause
D4 indicator light does not come on for 2 seconds after ignition is first turned on.	—
D4 indicator light is on steady, not blinking whenever the ignition is on.	—
Transmission does not kick-down when the kick-down switch is on.	Check kick-down switch signal.

- If a customer describes the symptoms for codes 3, 6, 11 or 17, yet the D4 indicator light is not blinking, it will be necessary to recreate the symptom by test driving, and then checking the D4 indicator light with the ignition still ON.
- If the D4 indicator light displays codes 1, 2, 3, 7, 8, or 16, check first the No. 31, 25, 5 and 22 fuse before electrical troubleshooting. If any of the fuses have blown, repair them and then recheck.
- If the D4 indicator light displays codes other than those listed above or stays lit continuously, the ECU is faulty.
- Sometimes the D4 indicator light and the Check Engine light may come on simultaneously. If so, check the PGM-FI system according to the number of blinks on the PGM-FI self-diagnosing indicator, then reset the memory by removing the BACK UP fuse in the under-hood fuse box for more than 10 seconds. Drive the vehicle for several minutes at speeds over 30 mph (50 Km/h), then recheck the lights.

Self-diagnosis D4 indicator light blinks once.

Disconnect the E(26P) connector from the ECU.

Turn the ignition switch ON.

Measure the voltage between the E25 (BLK/RED) and E3/E4 (BLK) terminals.

Is there voltage? YES → **Repair short to power source in BLK/RED wire between the E25 terminal and the lock-up control solenoid valve A.**

NO

Turn the ignition switch OFF.

Disconnect the transmission sub-harness connector.

Check for continuity between the E25 (BLK/RED) and E3/E4 (BLK) terminals.

Is there continuity? YES → **Repair short to ground in BLK/RED wire between the E25 terminal and the lock-up control solenoid valve A.**

NO

Connect the transmission sub-harness connector.

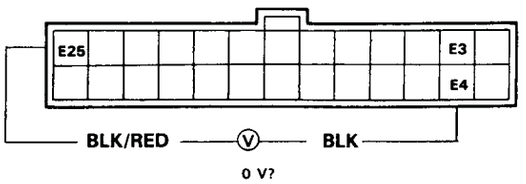
Measure the resistance between the E25 (BLK/RED) and E3/E4 (BLK) terminals.

Is the resistance 12—24 Ω? NO → **Check for open in BLK/RED wire between the E25 terminal and the lock-up control solenoid valve A. If wire is OK, check the lock-up control solenoid valve A. (See page 37)**

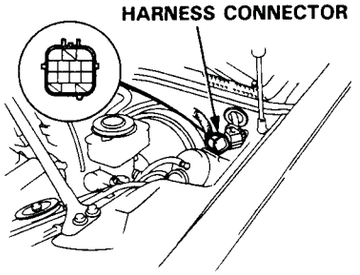
YES

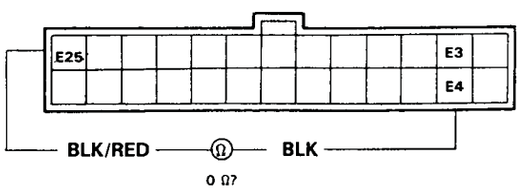
Check for loose ECU connectors. If necessary, substitute a known-good ECU and recheck.

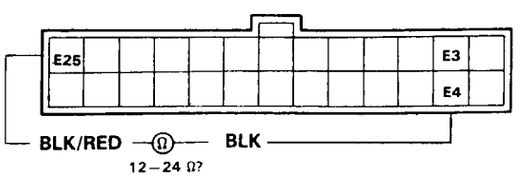
NOTE: View from terminal side.



TRANSMISSION SUB-HARNESS CONNECTOR







Self-diagnosis D4 indicator light blinks twice.

Disconnect the E(26P) connector from the ECU.

Turn the ignition switch ON.

Measure the voltage between the E26 (YEL/GRN) and E3/E4 (BLK) terminals.

Is there voltage? — YES → **Repair short to power source in YEL/GRN wire between the E26 terminal and the lock-up control solenoid valve B.**

NO

Turn the ignition switch OFF.

Measure the resistance between the E26 (YEL/GRN) and E3/E4 (BLK) terminals.

Is the resistance 12—24 Ω? — NO → **Check for open in YEL/GRN wire between the E26 terminal and the lock-up control solenoid valve B. If wire is OK, check the lock-up control solenoid valve B. (See page 37**

YES

Disconnect the transmission sub-harness connector.

Check for continuity between the E26 (YEL/GRN) and E3/E4 (BLK) terminals.

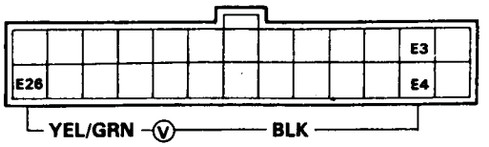
Is there continuity? — YES → **Repair short to ground in YEL/GRN wire between the E26 terminal and the lock-up control solenoid valve B.**

NO

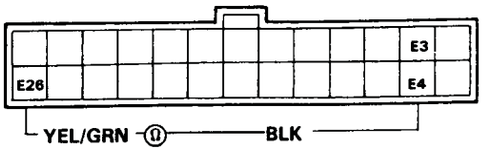
Connect the transmission sub-harness connector.

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

NOTE: View from terminal side.

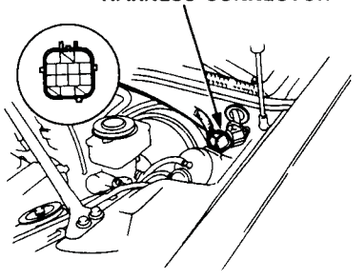


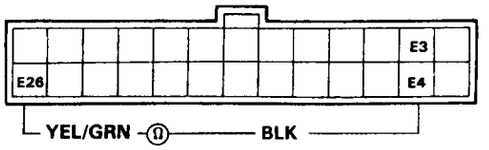
0 V?



12—24 Ω?

TRANSMISSION SUB-HARNESS CONNECTOR





0 Ω?

(cont'd)

Self-diagnosis D4 indicator light blinks three times.

Turn the ignition switch ON.

Check whether the PGM-FI self-diagnosis indicator blinks (Section 11).

Does the Self-diagnosis indicator blink? — YES → **Repair the PGM-FI System.**

NO ↓

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

Self-diagnosis D4 indicator light blinks four times.

Raise the car.

Shift transmission to [N].

Disconnect the E (26P) and C (12P) connectors from the ECU.

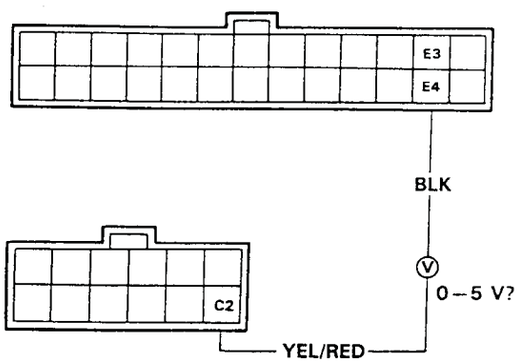
Turn the ignition switch ON.

Rotate the front wheel and check for voltage between the C2 (YEL/RED) and E3/E4 (BLK) terminals. Block the other wheel so it does not turn.

Does the voltage 0—5 V appear alternately? — NO → **Check for short or open in YEL/RED wire between the C2 terminal and the speed sensor. If wire is OK, check the speed sensor.**

YES

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



NOTE: View from terminal side.

Self-diagnosis D4 indicator light blinks five times.

Turn the ignition switch ON.

Observe the A/T shift indicator and select each position separately.

Does the indicator light properly? NO → **See A/T shift position indicator inspection**

YES

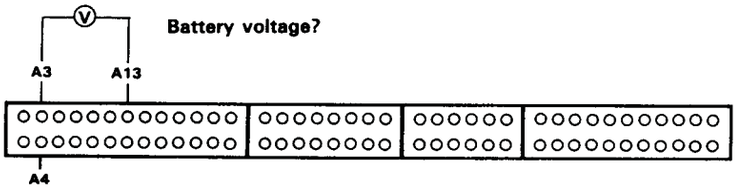
Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connectors.

NOTE: The section A of the Test Harness with the A/T Test Harness Adapter corresponds to the E (26P) connector of the ECU.

Turn the ignition switch ON.

Shift to other than [R] position.



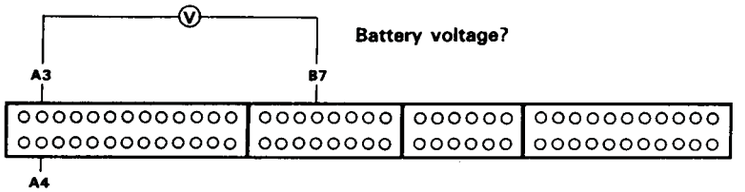
ECU TEST HARNESS TERMINAL

Measure the voltage between the A13 and A3/A4 terminals.

Is there battery voltage? NO → **Check for short in GRN/RED wire between the E13 terminal and the shift position console switch or shift position indicator. If wire is OK, check for loose ECU connectors. If necessary, substitute a known-good ECU and recheck.**

YES

Shift to other than [N] and [P] position.



Measure the voltage between the B7 and A3/A4 terminals.

Is there battery voltage? NO → **Check for short in BLU/GRN wire between the B7 terminal and the shift position console switch. If wire is OK, check for loose ECU connectors. If necessary, substitute a known-good ECU and recheck.**

YES

To page 20

From page 19

Shift to other than D4 position.

Measure the voltage between the A15 and A3/A4 terminals.

Is there battery voltage?

NO → **Check for short in GRN/BLK wire between the E15 terminal and the shift position console switch. If wire is OK, check for loose ECU connectors. If necessary, substitute a known-good ECU and recheck.**

YES

Shift to other than D3 position.

Measure the voltage between the A17 and A3/A4 terminals.

Is there battery voltage?

NO → **Check for short in GRN/BLU wire between the E17 terminal and the shift position console switch or shift position indicator. If wire is OK, check for loose ECU connectors. If necessary, substitute a known-good ECU and recheck.**

YES

Shift to other than 2 position.

Measure the voltage between the A19 and A3/A4 terminals.

Is there battery voltage?

NO → **Check for short in GRN/YEL wire between the E19 terminal and the shift position console switch or shift position indicotor. If wire is OK, check for loose ECU connectors. If necessary, substitute a known-good ECU and recheck.**

YES

Shift to other than 1 position.

Measure the voltage between the A21 and A3/A4 terminals.

Is there battery voltage?

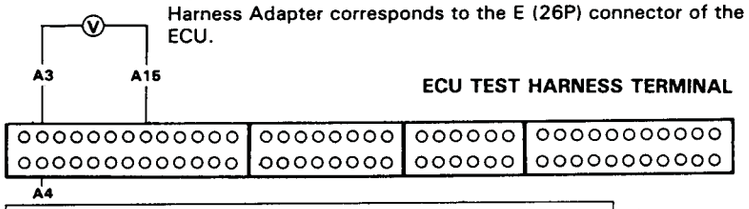
NO → **Check for short in GRN/ORN wire between the E21 terminal and the shift position console switch or shift position indicator. If wire is OK, check for loose ECU connectors. If necessary, substitute a known-good ECU and recheck.**

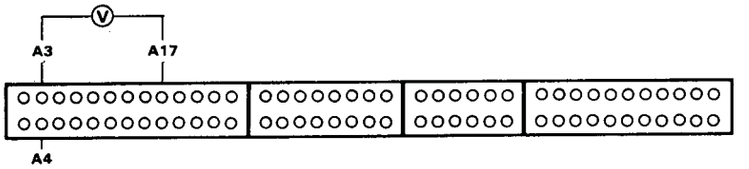
YES

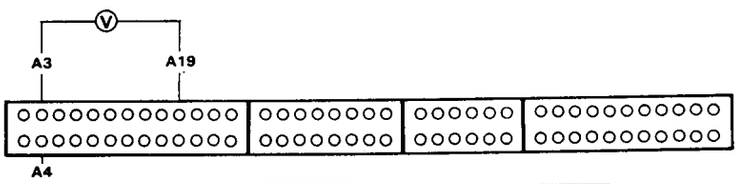
Check for loose ECU connectors. If necessary, substitute a known-good ECU and recheck.

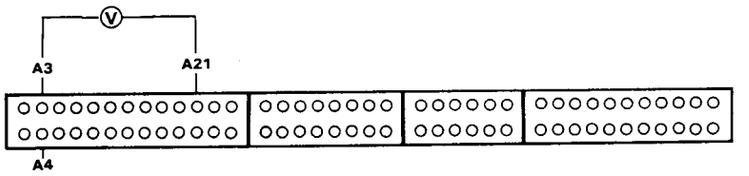
NOTE: The section A of the Test Harness with the A/T Test Harness Adapter corresponds to the E (26P) connector of the ECU.

ECU TEST HARNESS TERMINAL









(cont'd)

Self-diagnosis D4 indicator light blinks six times.

Turn the ignition switch ON.

Observe the A/T shift indicator and select each position separately.

Does the indicator light properly? NO → **See A/T shift position indicator inspection.**

YES

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connectors.

Turn the ignition switch ON.

Shift to [R] position.

Measure the voltage between the A13 and A3/A4 terminals.

Is there voltage? YES → **Repair open in GRN/RED wire between the E13 terminal and the shift position console switch.**

NO

Shift to [N] or [P] position.

Measure the voltage between the B7 and A3/A4 terminals.

Is there voltage? YES → **Repair open in BLU/GRN wire between the B7 terminal and the shift position console switch.**

NO

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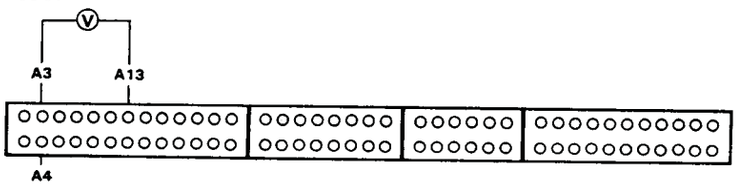
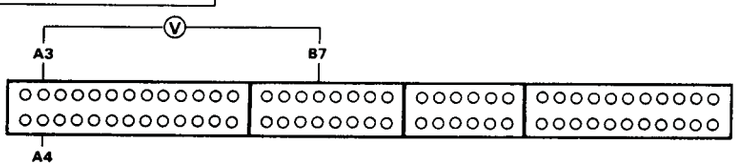
NOTE: The section A of the Test Harness with the A/T Test Harness Adapter corresponds to the E (26P) connector of the ECU.



ECU TEST HARNESS TERMINAL



ECU TEST HARNESS TERMINAL

From page 21

NOTE: The section A of the Test Harness with the A/T Test Harness Adapter corresponds to the E (26P) connector of the ECU.

Shift to [D4] position.

Measure the voltage between the A15 and A3/A4 terminals.

Is there voltage?

YES → Repair open in GRN/BLK wire between the E15 terminal and the shift position console switch.

NO

Shift to [D3] position.

Measure the voltage between the A17 and A3/A4 terminals.

Is there voltage?

YES → Repair open in BRN/BLU wire between the E17 terminal and the shift position console switch.

NO

Shift to [2] position.

Measure the voltage between the A19 and A3/A4 terminals.

Is there voltage?

YES → Repair open in GRN/YEL wire between the E19 terminal and the shift position console switch.

NO

Shift to [1] position.

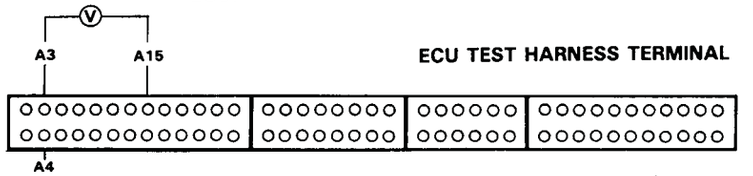
Measure the voltage between the A21 and A3/A4 terminals.

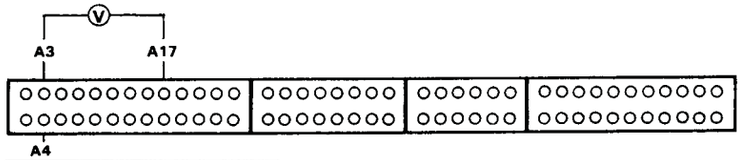
Is there voltage?

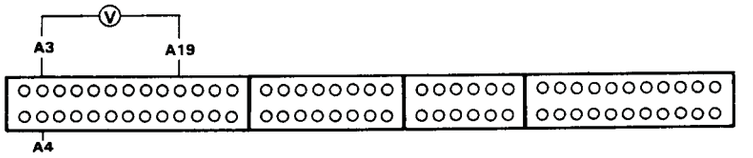
YES → Repair open in GRN/ORN wire between the E21 terminal and the shift position console switch.

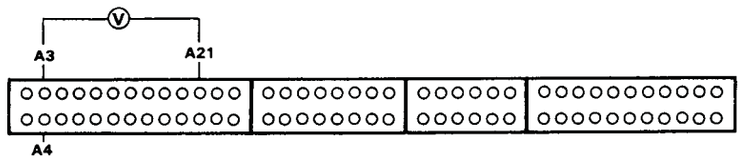
NO

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









(cont'd)

Self-diagnosis D4 indicator light blinks seven times.

Disconnect the E(26P) connector from the ECU.

Turn the ignition switch ON.

Measure the voltage between the E23 (YEL/BLU) and E3/E4 (BLK) terminals.

Is there voltage? YES → **Repair short to power source in YEL/BLU wire between the E23 terminal and the shift control solenoid valve A.**

NO

Turn the ignition switch OFF.

Measure the resistance between the E23 (YEL/BLU) and E3/E4 (BLK) terminals.

Is the resistance 12 – 24 Ω? NO → **Check for open in YEL/BLU wire between the E23 terminal and the shift control solenoid valve A. If wire is OK, check the shift control solenoid valve A. (See page 74**

YES

Disconnect the transmission sub-harness connector.

Check for continuity between the E23 (YEL/BLU) and E3/E4 (BLK) terminals.

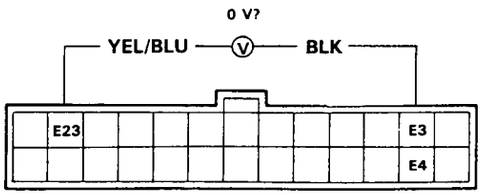
Is there continuity? YES → **Repair short to ground in YEL/BLU wire between the E23 terminal and the shift control solenoid valve A.**

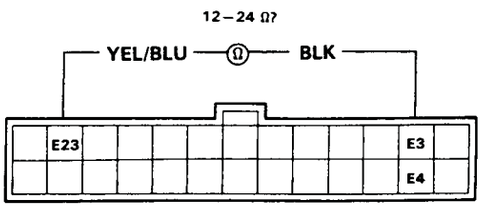
NO

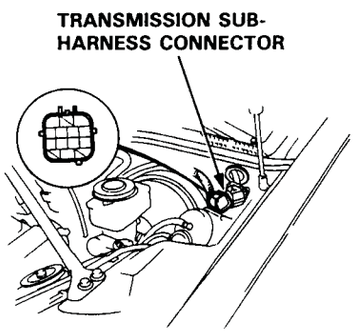
Connect the transmission sub-harness connector.

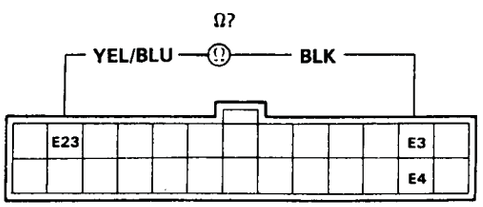
Check for loose ECU connectors. If necessary, substitute a known-good ECU and recheck.

NOTE: View from terminal side.









Self-diagnosis D4 indicator light blinks eight times.

Disconnect the E (26P) connector from the ECU.

Turn the ignition switch ON.

Measure the voltage between the E24 (RED/GRN) and E3/E4 (BLK) terminals.

Is there voltage? YES → **Repair short to power source in RED/GRN wire between the E24 terminal and shift control solenoid valve B.**

NO

Turn the ignition switch OFF.

Measure the resistance between the E24 (RED/GRN) and E3/E4 (BLK) terminals.

Is the resistance 12-24 Ω? NO → **Check for open in RED/GRN wire between the E24 terminal and the shift control solenoid valve B. If wire is OK, check the shift control solenoid valve B. (See page 74**

YES

Disconnect the transmission sub-harness connector.

Check for continuity between the E24 (RED/GRN) and E3/E4 (BLK) terminals.

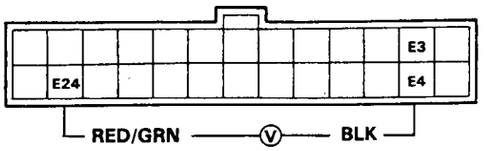
Is there continuity? YES → **Repair short to ground in RED/GRN wire between the E24 terminal and the shift control solenoid valve B.**

NO

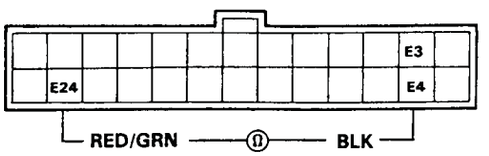
Connect the transmission sub-harness connector.

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

NOTE: View from terminal side.

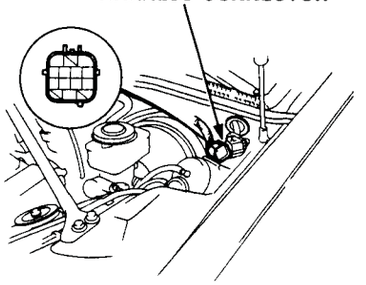


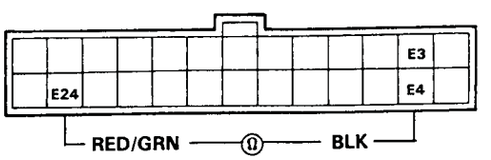
0 V?



12–24 Ω?

TRANSMISSION SUB-HARNESS CONNECTOR





Ω?

(cont'd)

Self-diagnosis D4 indicator light blinks nine times.

Check the state of installation of the NC speed sensor.

OK? — NO → **Reinstall and recheck.**

YES

Disconnect the transmission sub-harness connector.

Measure the resistance between the No.9 terminal and No.10 for the NC speed sensor.

Is the resistance 400—600 ohms? (70°F, 20°C) — NO → **Replace the NC speed sensor.**

YES

Reconnect the transmission sub-harness connector.

Disconnect the E(26P) connector from the ECU.

Measure the resistance between E9 (BLU/GRN) and E10 (BLU/YEL).

Is the resistance 400—600 ohms? (70°F, 20°C) — NO →

YES

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

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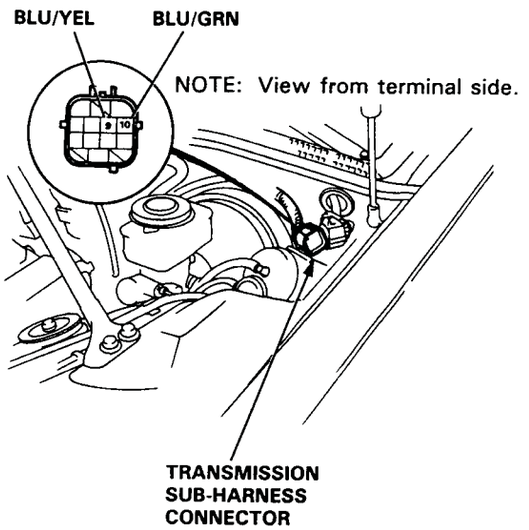

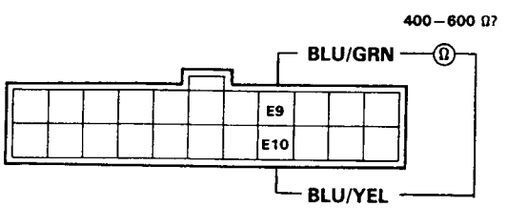

NOTE: View from terminal side.

NOTE: View from terminal side.

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Check for continuity between E9 (BLU/GRN) terminal and body ground.

Is there continuity?

YES — **Repair short in BLU/GRN wire between E9 terminal and the NC speed sensor.**

NO

Check for continuity between E9 (BLU/GRN) terminal and the NC speed sensor.

Is there continuity?

NO — **Repair open in E9 wire between D17 terminal and NC speed sensor.**

YES

Check for continuity between E10 (BLU/YEL) terminal and body ground.

Is there continuity?

YES — **Repair short in BLU/YEL wire between E10 terminal and NC speed sensor.**

NO

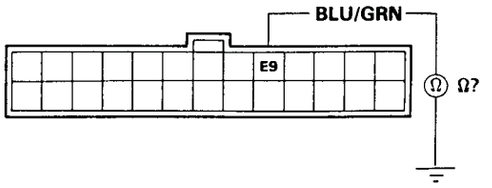
Check for continuity between E10 (BLU/YEL) terminal and NC speed sensor.

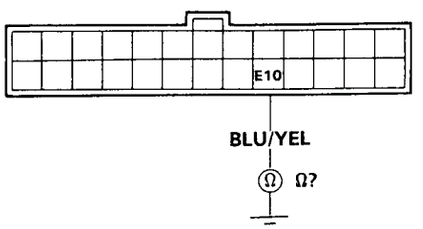
Is there continuity?

NO — **Repair open in BLU/YEL between E10 terminal and NC speed sensor.**

YES

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





(cont'd)

Self-diagnosis D4 indicator light blinks ten times.

Turn the Ignition switch ON.

Check whether the PGM-FI self-diagnosis indicator blinks (Section 11).

Does the self-diagnosis indicator blink? YES → **Repair the PGM-FI System. See Section 11.**

NO

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

Self-diagnosis D4 indicator light blinks eleven times.

Disconnect No. 15: ACG(s) fuse in the under dash fuse box for 10 seconds to reset the ECU.

Drive the car for several miles so that the transmission upshifts and down-shifts several times.

Does self-diagnosis D4 indicator light blink eleven times? NO → **Intermittent failure, system is OK at this time.**

YES

Replace the ECU.

Self-diagnosis D4 indicator light blinks fifteen times.

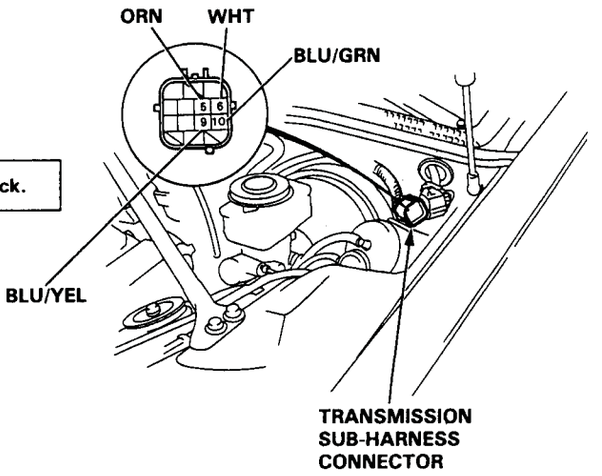
Check the state of installation of NM (NC) speed sensor.

OK? — NO → **Reinstall and recheck.**

YES

Disconnect the transmission sub-harness connector.

Measure the resistance between the No.5 terminal and No.6 for the NM speed sensor.

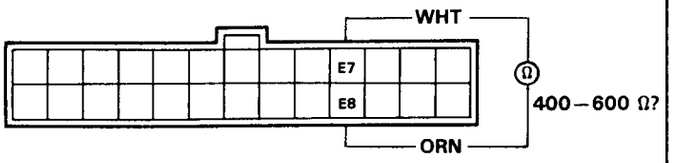


Is the resistance 400—600 ohms? — NO → **Replace the NM speed sensor.**

YES

Reconnect the transmission sub-harness connector.

Disconnect the E(26P) connector from the ECU.



NOTE: View from terminal side.

Measure the resistance between E8 (ORN) and E7 (WHT) terminals.

Is the resistance 400—600 ohms? (20°C) — NO → Check for continuity between E8 (ORN) terminal and body ground.

YES

Disconnect the transmission sub-harness connector.

Is there continuity? — YES → **Repair short in ORN or WHT wires between E8 terminal and the NM speed sensor.**

NO

Measure the resistance between the No.9 terminal of the transmission sub-harness connecter and No.10 for the NC speed sensor.

Check for continuity between E8 (ORN) terminal and the NM speed sensor.

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(cont'd)

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Is there continuity? — NO → **Repair open in ORN wire between E8 terminal and the NM speed sensor.**

YES

Check for continuity between E7 (WHT) terminal and body ground.

Is there continuity? — YES → **Repair short in WHT wire between E7 terminal and the NM speed sensor.**

NO

Check for continuity between E7 (WHT) terminal and the NM speed sensor.

Is there continuity? — NO → **Repair open in WHT wire between E7 terminal and the NM speed sensor.**

YES

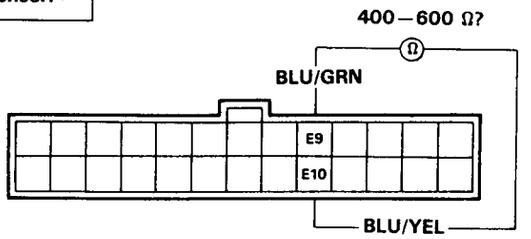
Check for loose ECU connectors. If necessary, substitute a known-good ECU and recheck.

Is the resistance 400—600 ohms? (20°C) — NO → **Replace the NC speed sensor.**

YES

Reconnect the transmission sub-harness connector.

Measure the resistance between E9 (BLU/GRN) and E10 (BLU/YEL) terminals.



NOTE: View from terminal side.

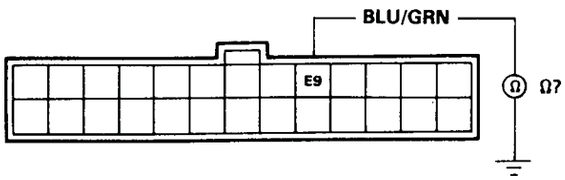
Is the resistance 400—600 ohms? (20°C) — YES → **Check for loose ECU connectors. If necessary, substitute a known-good ECU and recheck.**

NO

To page

From page

NOTE: View from terminal side.



Check for continuity between E9 (BLU/GRN) terminal and body ground.

Is there continuity? — YES → **Repair short in BLU/GRN wire between E9 terminal and the NC speed sensor.**

NO

Check for continuity between E9 (BLU/GRN) terminal and the NC speed sensor.

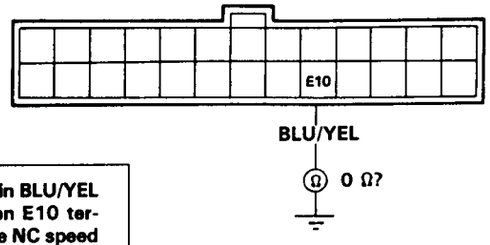
Is there continuity? — NO → **Repair open in BLU/GRN wire between E9 terminal and the NC speed sensor.**

YES

Check for continuity between E10 (BLU/YEL) terminal and body ground.

Is there continuity? — YES → **Repair short in BLU/YEL wire between E10 terminal and the NC speed sensor.**

NO



Check for continuity between E10 (BLU/YEL) terminal and the NC speed sensor.

Is there continuity? — NO → **Repair open in BLU/YEL wire between E10 terminal and the NC speed sensor.**

YES

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

(cont'd)

Self-diagnosis D4 indicator light blinks sixteen times.

Disconnect the E (26P) connector from the ECU.

Measure the resistance between the E5 (GRN/RED) and the E6 (YEL/BLU) terminals.

Is the resistance approximately 5 Ω? — YES → **Check for loose ECU connectors. If necessary, substitute a known-good ECU and recheck.**

NO

Disconnect the transmission sub-harness connector.

Measure the resistance between the No.7 (RED) and the No.8 (WHT) terminals of the transmission sub-harness connector.

Is the resistance approximately 5 Ω? — NO → **Check the Linear Solenoid. See pages 14-77 and 92.**

YES

check the continuity between E5 (GRN/RED) terminal and the No.18 (GRN/RED) terminal of the engine room harness connector.

Is there continuity? — NO → **Repair open in GRN/RED wire between E5 terminal and the No.18 of the engine room harness connector.**

YES

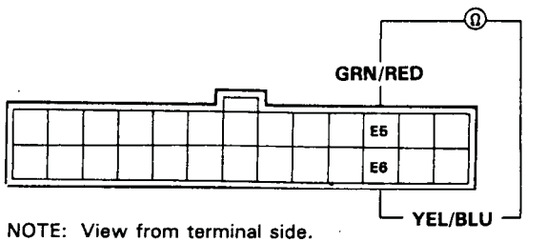
Check the continuity between E6 (YEL/BLU) terminal and the No.19 (YEL/BLU) terminal of the engine room harness connector.

Is there continuity? — NO → **Repair open in YEL/BLU wire between E6 terminal and the No.19 terminal of the engine room harness connector.**

YES

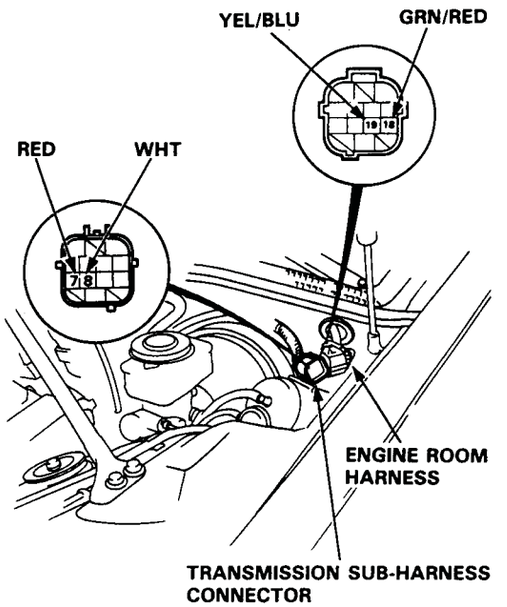
Reconnect the transmission sub-harness connectors.

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



NOTE: View from terminal side.

View from terminal side.



Self-diagnosis D4 indicator light blinks seventeen times.

Disconnect the E(26P) connector from the ECU.

Check for continuity between the E16 (BLU/YEL) and body ground.

Is there continuity? YES → **Repair short in BLU/YEL wire between E16 terminal and the kick-down switch. If wire is OK, replace the kick-down switch.**

NO

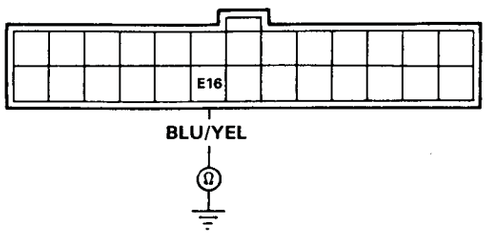
Check for continuity between the E16 (BLU/YEL) and body ground with the kick-down switch pushed.

Is there continuity? NO → **Repair open in BLU/YEL wire between E16 terminal and the kick-down switch. If wire is OK, check for loose kick-down switch connector. Check the BLK wire and ground connection. Check the kick-down switch.**

YES

Check for loose ECU and kick-down switch connectors. If necessary, substitute a known-good ECU and recheck.

NOTE: View from terminal side.



(cont'd)

D4 indicator light does not come on with the ignition switch ON. (It should come on for about 2 seconds.)

Is the service check connector jumped? YES → **Disconnect the jumper wire and recheck.**

NO

Shift to [D4] position.

Does the [D4] indicator light come on? YES → **Check for loose ECU connectors. If necessary, substitute a known-good ECU and recheck.**

NO

Turn the ignition switch OFF.

Disconnect the E126P connector from the ECU.

Check for continuity between the E3(BLK) terminal and body ground and E4(BLK) and body ground.

Is there continuity? NO → **Repair open BLK wire between E3 and E4 terminal and G101.**

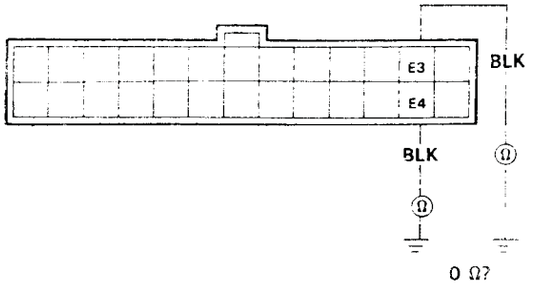
YES

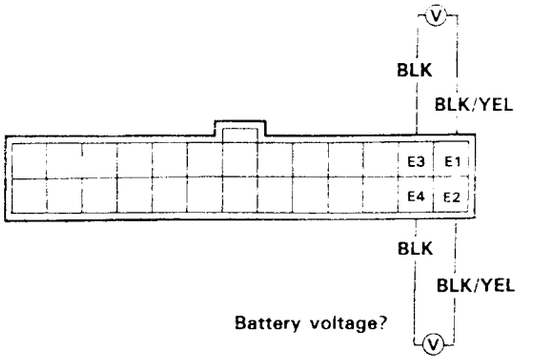
Turn the ignition switch ON.

Measure voltage between the E1 or E2 (BLK/YEL) and E3 or E3 (BLK) terminals.

To page 34

NOTE: View from terminal side.





From page 33

Is there battery voltage?

NO → **Repair open or short BLK/YEL wire between the E1 and/or E2 terminals and dash fuse box.**

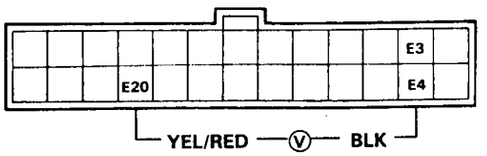
YES

Turn the ignition switch OFF.

Reconnect the E (26P) connector to the ECU.

Turn the ignition switch ON. Be sure that voltage is available for 2 seconds between the E20 (YEL/RED) terminal and E3/E4 (BLK) terminal.

NOTE: View from terminal side.



Is there voltage?

YES → **Check for open or short in YEL/RED wire between the E20 terminal and the gauge assembly.**

NO

Turn the ignition switch OFF.

Disconnect the E (26P) connector from the ECU.

Check for continuity between the E20 (YEL/RED) terminal and the gauge assembly.

Is there continuity?

NO → **Repair open in YEL/RED wire between the E20 terminal and the gauge assembly.**

YES

Check for loose ECU connectors. Check the shift position console switch. If necessary, substitute a known-good ECU and recheck.

(cont'd)

D4 indicator light is on steady, not blinking whenever the ignition switch is turned ON.

Check the shift position console switch.

Is the shift position console switch OK? — NO → **Replace the shift position console switch.**

YES

Shift to [P] position.

Disconnect the E (26P) connector from the ECU.

Turn the ignition switch ON.

Measure voltage between the E20 (YEL/RED) terminal and body ground.

Is there voltage? — YES → **Replace the ECU.**

NO

Reconnect the E (26P) connector to the ECU.

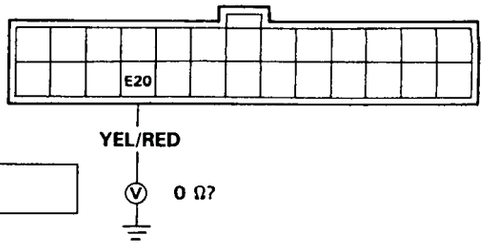
Measure voltage between the YEL/RED wire at the gauge assembly and body ground.

Is there voltage? — NO → **Replace faulty shift position indicator.**

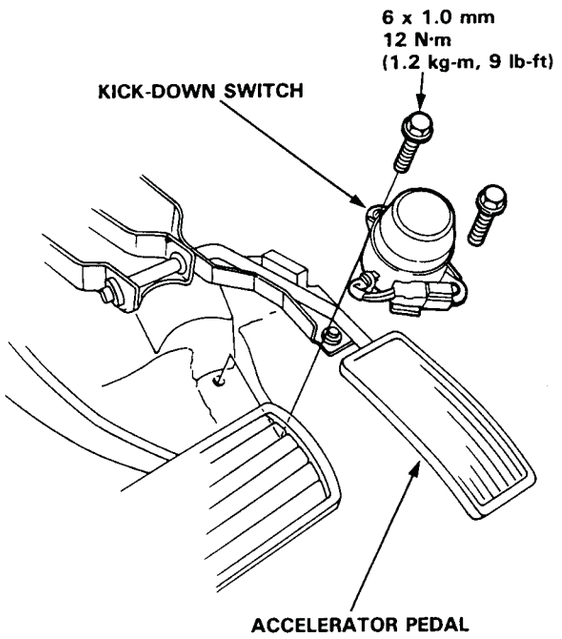
YES

Repair short to power source on YEL/RED wire between the E20 terminal and gauge assembly.

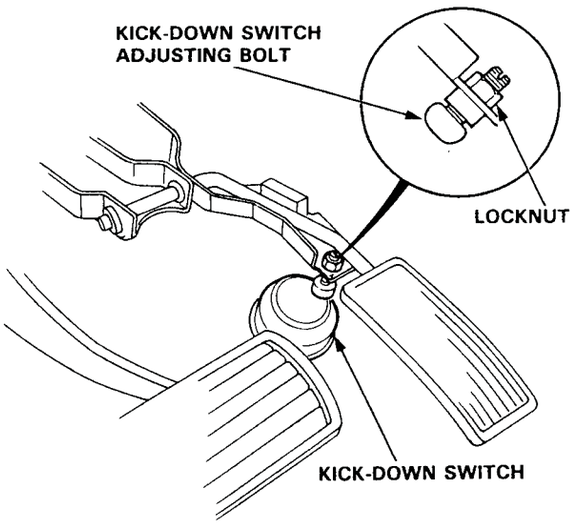
NOTE: View from terminal side.



1. Remove the 6 mm bolts.
2. Disconnect the connector.
3. Replace the kick-down switch.

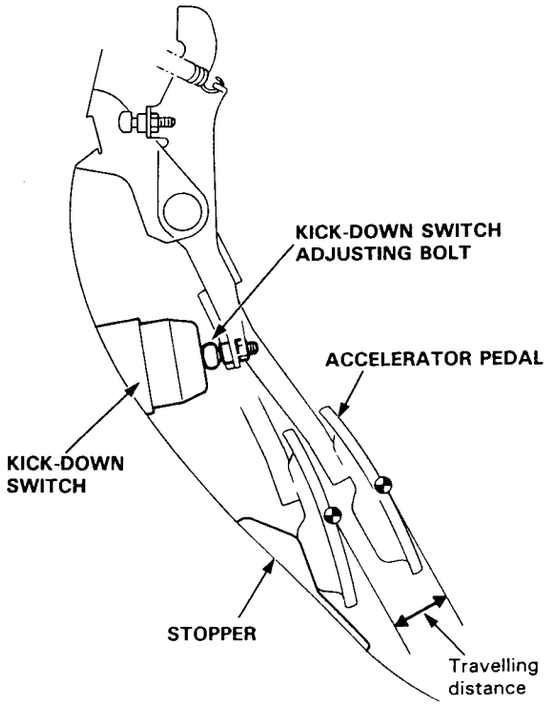


1. Loosen the locknut.



2. Adjust the length of the kick-down switch adjusting bolt so that the accelerator pedal travelling distance between the point where the bolt first contacts with the kick-down switch and the point where the accelerator pedal hits the stopper becomes the specified value.

STANDARD: 11—17 mm (0.43—0.70 in)

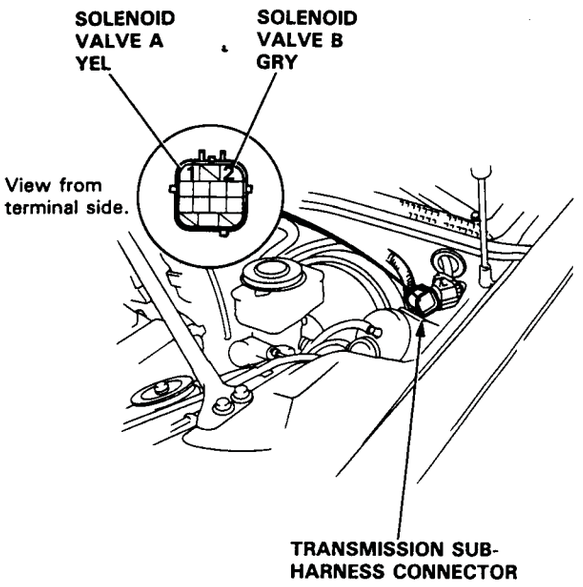


3. Tighten the locknut.

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

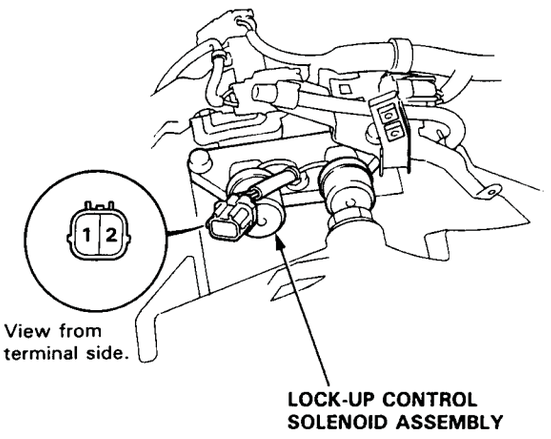
1. Disconnect the transmission sub harness connector.
2. Measure the resistance between the No.1 terminal (SOL. V A) of the transmission sub-harness connector and body ground and between the No.2 terminal (SOL.V B) and body ground.

   STANDARD: 12—24 Ω



3. If the resistance is out of specification, disconnect the connector from the lock-up control solenoid valve A/B.
4. Measure the resistance between the No.1 terminal (SOL. V A) of the lock-up control solenoid valve connector and body ground and between the No.2 terminal (SOL. VB) and body ground.

   STANDARD: 12—24 Ω

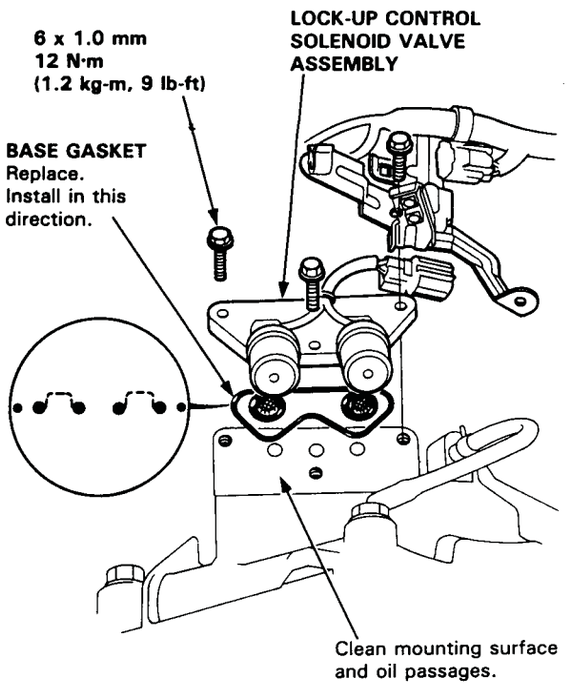


5. If the resistance is OK, replace the transmission sub-harness.
6. Replace the lock-up control solenoid valve assembly if the resistance is out of specification.
7. Connect the No.1 terminal of the lock-up control solenoid valve connector to the battery positive terminal. A clicking sound should be heard. Connect the No.2 terminal to the battery positive terminal. A clicking sound should be heard.
8. If not, check for continuity between the ECU E25 or E26 harness and body ground (page 14-50, 51).
9. Replace the lock-up control solenoid valve assembly if there is continuity between the ECU E25 or E26 harness and body ground (page 14-50, 51).

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

   NOTE: Be sure to remove or replace the lock-up control solenoid valves A and B as an assembly.

2. Check the lock-up control solenoid valve oil passages for dust or dirt and replace as an assembly, if necessary.



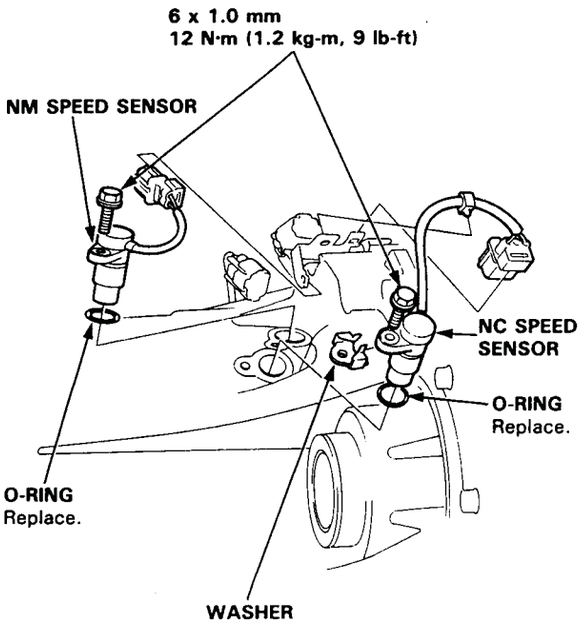
3. Clean the mounting surface and oil passages of the lock-up control solenoid valve assembly and install a new base gasket.

   NOTE: Install the base gasket in the direction shown.

4. Check connector for rust, dirt or oil and reconnect it securely.

1. Remove the 6 mm bolt from the transmission housing and remove the A/T speed sensor.

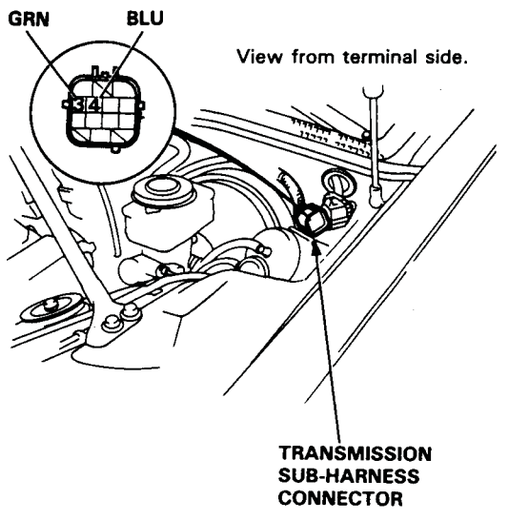
2. Replace the O-ring with a new one before reassembling the A/T speed sensor.



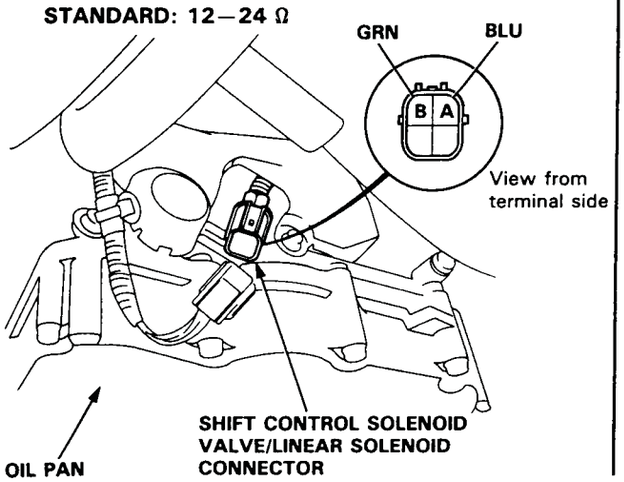
NOTE: Install the washer to the NC speed sensor before reassembling the NC speed sensor.

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

1. Disconnect the transmission sub-harness connector.
2. Measure the resistance between the No.3 terminal of the transmission sub-harness and body ground and between the No.4 terminal and body ground.
   STANDARD : 12 - 24 Ω



3. If the resistance is out of specification, disconnect the transmission sub-harness from the shift control solenoid valve/linear solenoid harness.
4. Measure the resistance between the A terminal of the shift control solenoid valve/linear solenoid harness and body ground and between the B terminal and body ground.
   STANDARD: 12—24 Ω

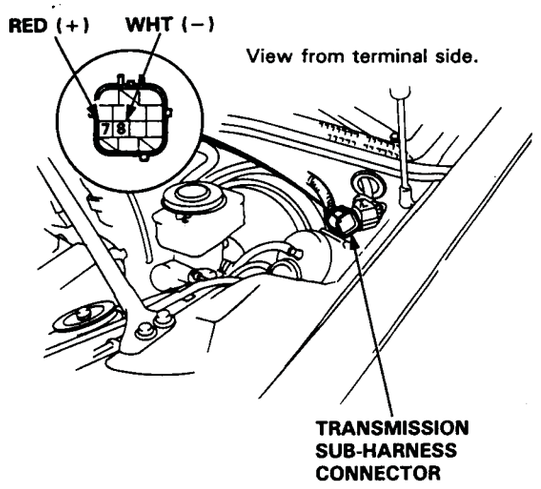


5. Replace the transmission sub-harness if the resistance is within specification.
6. Replace the shift control solenoid valve assembly if the resistance is out of specification.
7. Connect the A terminal of the shift control solenoid valve/linear solenoid connector to the battery positive terminal. A clicking sound should be heard. Connect the B terminal to the battery positive terminal. A clicking sound should be heard.
8. If not, check for continuity between the ECU E23 or E24 terminal harness and body ground (page 23 and 24
9. Replace the shift control solenoid valve assembly if there is continuity between the ECU E23 or E24 harness and body ground.

NOTE: See Shift Control Solenoid Valve Replacement, page

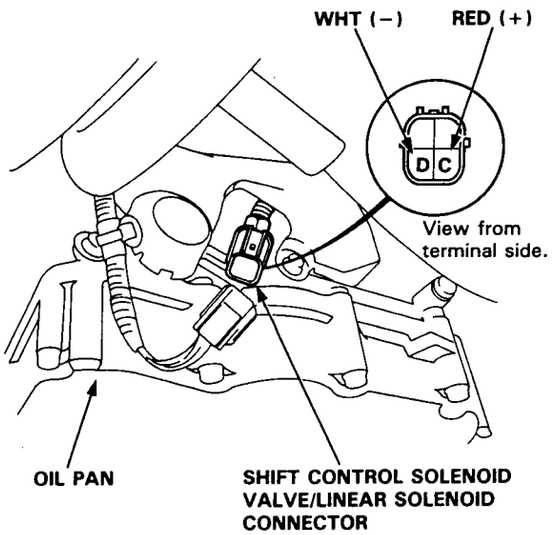
1. Disconnect the transmission sub-harness connector.
2. Measure the resistance between the No.7 and 8 terminals of the transmission sub-harness.

   STANDARD: 5.0—5.6 Ω (at 70°F, 20°C)



3. If the resistance is out of specificaion, disconnect the transmission sub-harness from the shift control solenoid valve/linear solenoid harness.
4. Measure the resistance between the C and D terminals of the shift control solenoid valve/linear solenoid harness.

   STANDARD: 5.0—5.6 Ω (at 70°F, 20°C)



5. Replace the transmission sub-harness if the resistance is within specification.
6. Replace the linear solenoid if the resistance is out of specification.
7. Connect the C terminal of the shift control solenoid valve/linear solenoid connector to the battery positive terminal and connect the D terminal to the battery negative terminal. A clicking sound should be heard.
8. If not, replace the linear solenoid.

NOTE: See Throttle Valve Body/Linear Solenoid Replacement, page 55 and 56

SYMPTOM	Check these items on the PROBABLE CAUSE LIST	Check these items on the NOTES CHART
Engine runs, but car does not move in any gear.	1, 6, 7, 16, 42, 43	K, L, R, S
Car moves in [2] but not in [D4] or [D3].	1, 8, 23, 29, 44, 48	C, M, O
Car moves in [D4], [D3], [1], [R] but not in [2].	1, 9, 30, 48, 49	C, L
Car moves in [D4], [D3], [2], [1] but not in [R].	1, 39, 40	C, L, Q
Car moves in [N].	1, 8, 9, 10, 11, 46, 47	C, D
Excessive idle vibration.	5, 6, 17, 36	B, K, L
Slips in all gears.	6, 7, 16	C, L, U
No engine braking in [1] position.	8, 12	C, D, L
No engine braking in [2] position.	9, 12, 48	C, D, L
Slips in 1st gear.*	8, 29, 44, 48	C, N, O, U
Slips in 2nd gear.	9, 20, 23, 30, 48, 49	C, L, U
Slips in 3rd gear.	10, 21, 23, 31, 44	C, L, U
Slips in 4th gear.	11, 23, 32	C, L, U
Slips in reverse gear.	34, 39, 40	C
Flares on 1—2 upshift.	2, 3, 15, 19, 30, 48	E, L, V
Flares on 2—3 upshift.	2, 3, 15, 20, 31, 44, 48	E, L, V
Flares on 3—4 upshift.	2, 3, 15, 21, 25, 32, 44	E, L, V
No upshift, trans stays in 1st gear.	14, 19, 23	G, L
No downshift to 1st gear.	12, 19	G, L
Late upshift.	14	L, V
Erratic shifting.	14, 26	V
Harsh shift (up and down shifting).	2, 3, 4, 15, 23, 26, 27, 47	A, E, H, I, L, V
Harsh shift (1—2).	2, 9	C, D, V
Harsh shift (2—3).	2, 10, 23, 26	C, D, H, L, V
Harsh shift (3—4).	2, 11, 23, 25	C, D, I, L, V
Harsh kick-down shifts.	2, 3, 23, 26, 27	L, V, Q
Harsh kick-down shift (2—1).	8, 25, 48	O
Harsh downshift at closed throttle.	15	E, T
Harsh shift when manually shifting to [1].	33	L
Axle(s) slips out of trans on turns.	43, 50	L, P, Q
Axle(s) stuck in trans.	43	L, Q
Ratcheting noise when shifting into [R].	6, 7, 39, 40	K, L, Q
Loud popping noise when taking off in [R].	39, 40	L, Q
Ratcheting noise when shifting from [R] to [P] or from [R] to [N].	39, 40	L, Q
Noise from trans in all selector lever positions.	6, 17	K, L, Q
Noise from trans only when wheels are rolling.	39, 42	L, Q
Gear whine, rpm related (pitch changes with shifts).	8, 41	K, L, Q
Gear whine, speed related (pitch changes with speed).	42	L, Q
Trans will not shift into 4th gear in [D4].	1, 21, 25, 32	L
Lock-up clutch does not lock up smoothly.	17, 36, 37	L
Lock-up clutch does not operate properly.	2, 3, 15, 18, 35, 36, 37	E, L, V
Transmission has multitude of problems shifting. At disassembly, large particles of metal are found on magnet.	43	L, Q

	PROBABLE CAUSE
1.	Shift cable broken/out of adjustment.
2.	Throttle valve body/throttle valve misadjust.
3.	Linear solenoid defective/damaged.
4.	Wrong type ATF.
5.	Idle rpm too low/high.
6.	Oil pump worn or binding.
7.	Pressure regulator stuck.
8.	1st clutch defective.
9.	2nd clutch defective.
10.	3rd clutch defective.
11.	4th clutch defective.
12.	1st hold clutch defective.
14.	Modulator valve stuck.
15.	Throttle valve B stuck.
16.	ATF strainer clogged.
17.	Torque converter defective.
18.	Torque converter check valve stuck.
19.	1—2 shift valve stuck.
20.	2—3 shift valve stuck.
21.	3—4 shift valve stuck.
22.	EAT D inhibitor valve stuck.
23.	Clutch pressure control valve stuck.
24.	2nd orifice control valve stuck.
25.	3—4 orifice control valve stuck.
26.	Shift timing valve stuck.
27.	4—3 kick-down valve stuck.
28.	4th exhaust valve stuck.
29.	1st accumulator defective.
30.	2nd clutch accumulator defective.
31.	3rd clutch accumulator defective.
32.	4th accumulator defective.
33.	1st hold clutch accumulator defective.
34.	Reverse clutch accumulator defective.
35.	Lock-up clutch timing valve stuck.
36.	Lock-up clutch shift valve stuck.
37.	Lock-up clutch control valve stuck.
38.	Shift fork bent.
39.	Reverse gears worn/damaged (3 gears).
40.	Reverse clutch worn.
41.	3rd gears worn/damaged (2 gears)
42.	Final gears worn/damaged (2 gears)
43.	Extension shaft worn.
44.	Feedpipe O-ring broken.
45.	4th gears worn/damaged (2 gears).
46.	Gear clearance incorrect.
47.	Clutch clearance incorrect.
48.	Sprag clutch defective.
49.	Sealing rings/guide worn.
50.	Axle-inboard joint clip missing.

(cont'd)

The following symptoms can be caused by improper repair or assembly.	Check these items on the PROBABLE CAUSE DUE TO IMPROPER REPAIR	Items on the NOTES CHART
Car creeps in [N].	R1, R2	
Car does not move in [D4] or [D3].	R4	
Trans locks up in [R].	R3	
Excessive drag in trans.	R6	R, K
Excessive vibration, rpm related.	R7	
Noise with wheels moving only.	R1	
Main seal pops out.	R8	S
Various shifting problems.	R9, R10	
Harsh upshifts.	R11	

PROBABLE CAUSE DUE TO IMPROPER REPAIR	
R1.	Improper clutch clearance.
R2.	Improper gear clearance.
R3.	Parking brake lever installed upside down.
R4.	Sprag clutch installed upside down.
R5.	Reverse hub installed upside down.
R6.	Oil pump binding.
R7.	Torque converter not fully seated in oil pump.
R8.	Main seal improperly installed.
R9.	Springs improperly installed.
R10.	Valves improperly installed.
R11.	Ball check valves not installed.
R12.	Shift fork bolt not installed.

NOTES	
A.	See flushing procedure, page 14-162 and 163.
B.	Set idle rpm in gear to specified idle speed. If still no good, adjust motor mounts as outlined in engine section of service manual.
C.	If the large clutch piston O-ring is broken, inspect the piston groove for rough machining.
D.	If the clutch pack is seized or is excessively worn, inspect the other clutches for wear and check the orifice control valves and throttle valves for free movement.
E.	If throttle valve B is stuck, inspect the clutches for wear.
G.	If the 1—2 valve is stuck closed, the transmission will not upshift. If stuck open the transmission has no 1st gear.
H.	If the shift timing valve is stuck, inspect the 2nd and 3rd clutch packs for wear.
I.	If the 3—4 orifice control valve is stuck, inspect the 3rd and 4th clutch packs for wear.
J.	If the clutch pressure control valve is stuck closed, the transmission will not shift out of 1st gear.
K.	Improper alignment of oil pump body and torque converter case may cause oil pump seizure. The symptoms are mostly an rpm-related ticking noise or a high pitched squeak.

NOTES	
L.	If the oil screen is clogged with particles of steel or aluminum, inspect the oil pump. If OK and no cause for the contamination is found, replace the torque converter.
M.	If the 1st clutch feedpipe guide in the rear cover is scored by the mainshaft, inspect the ball bearing for excessive movement in the transmission housing. If OK, replace the rear cover as it is dented. The O-ring under the guide is probably worn.
N.	Replace the mainshaft if the bushings for the 1st and 2nd feedpipe are loose or damaged. If the 1st feedpipe is damaged or out of round, replace it. If the 2nd feedpipe is damaged or out of round, replace the rear cover.
O.	A worn or damaged sprag clutch is mostly a result of shifting the trans in D_3 or D_4 while the wheels rotate in reverse, such as rocking the car in snow.
P.	Inspect the frame for collision damage.
Q.	Inspect the reverse clutch for damage or wear. Inspect bottom of 3rd clutch for swirl marks. Replace reverse clutch if worn or damaged. If trans makes clicking, grinding or whirring noise, also replace mainshaft reverse gear and reverse idler gear and countershaft reverse gear. If bottom of 3rd clutch is swirled and trans makes gear noise, replace the countershaft.
R.	Be very careful not to damage the torque converter housing when replacing the main ball bearing. You may also damage the oil pump when you torque down the oil pump body. This will result in oil pump seizure if not detected. Use proper tools.
S.	Install the main seal flush with the torque converter housing. If you push it into the torque converter case until it bottoms out, it will block the oil return passage and result in damage.
T.	Harsh downshifts when coasting to a stop with zero throttle may be caused by the linear solenoid not working.
U.	Check if servo valve stopper cap is installed. If it was not installed, the check valve may have been pushed out by hydraulic pressure causing a leak (internal) affecting all forward gears.
V.	Adjusting the throttle valve body, throttle valve and linear solenoid is essential for proper operation of the transmission. Not only does it affect the shift quality if misadjusted, but also the lock-up clutch operation.

NOTE: Warm up the engine to operating temperature.

D4 and D3 Range

1. Apply parking brake and block the wheels. Start the engine, then move the selector lever to D4 while depressing the brake pedal. Depress the accelerator pedal, and release it suddenly. Engine should not stall.
2. Check that the shift points occur at approximate speeds shown. Also check for abnormal noise and clutch slippage.
3. Apply parking brake and block the wheels. Start the engine, then move the selector lever to D3 while depressing the brake pedal. Depress the accelerator pedal, and release it suddenly. Engine should not stall.

U.S. Model
D4 range

- **Upshift**

		1st—2nd	2nd—3rd	3rd—4th	Lock up Clutch ON
0.5/8 throttle * Coasting down-hill from a stop	km/h	5.6—7.5	9.6—11.8	14.3—17.1	10.3—12.4
	mph	9—12	15.5—19	23—27.5	16.5—20
3.5/8 throttle * Acceleration from a stop	km/h	15.5—18	22.4—25.8	31.7—35.4	44.4—47.8
	mph	25—29	36—41.5	51—57	71.5—77
Full-throttle Acceleration from a stop	km/h	23—26.4	40.4—45.7	61.5—68.4	62.8—69.6
	mph	37—42.5	65—73.5	99—110	101—112

- **Downshift**

		Lock up Clutch OFF	4th—3rd	3rd—2nd	2nd—1st
0.5/8 throttle * Coasting or braking to a stop	km/h	9.6—11.8	10.9—13	—	4.7—6.8
	mph	15.5—19	17.5—21	—	7.5—11
3.5/8 throttle * When car is slowed by increased grade, wind, etc.	km/h	36.4—39.8	—	—	—
	mph	58.5—64	—	—	—
Full-throttle When car is slowed by increased grade, wind, etc.	km/h	59.7—66.2	52.8—59.3	33.6—37.9	15.5—19
	mph	96—106.5	85—95.5	54—61	25—30.5

CANADA model:
D4 range

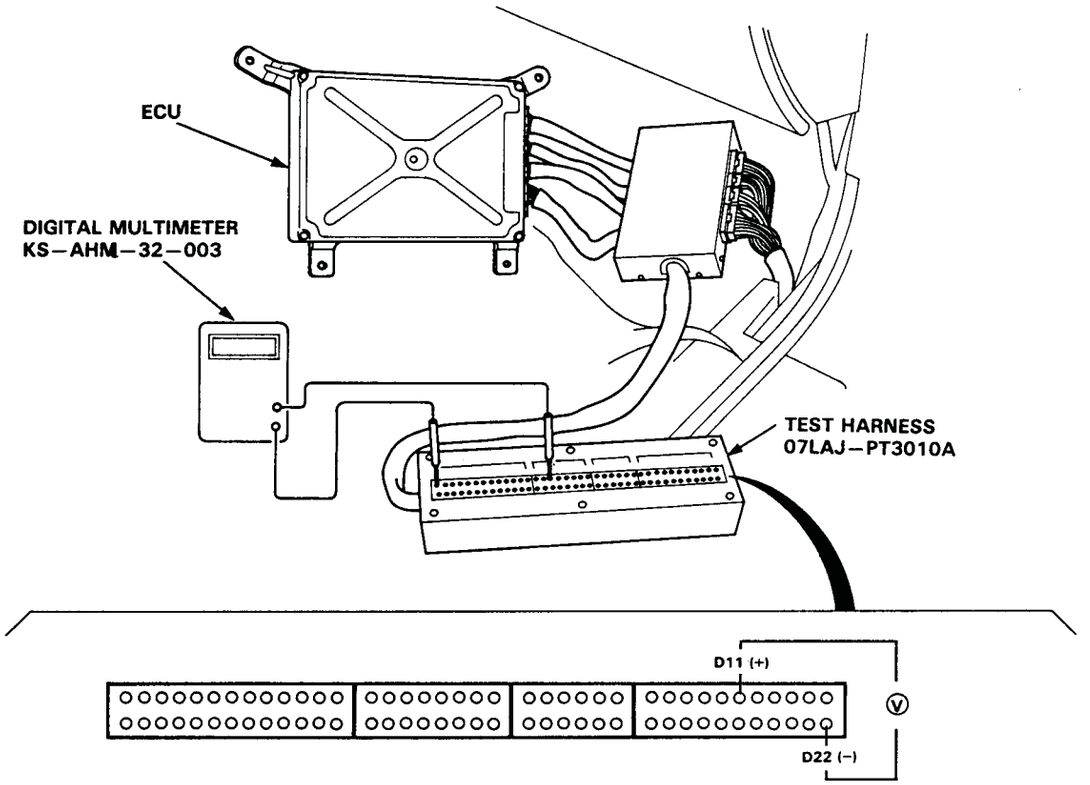
- **Upshift**

		1st—2nd	2nd—3rd	3rd—4th	Lock up Clutch ON
0.5/8 throttle * Coasting down-hill from a stop	km/h	5.6—7.5	9.6—11.8	14.3—17.1	10.3—12.4
	mph	9—12	15.5—19	23—27.5	16.5—20
3.5/8 throttle * Acceleration from a stop	km/h	12.7—15.2	23.6—27	33.9—37.6	44.4—47.8
	mph	20.5—24.5	38—43.5	54.5—60.5	71.5—77
Full-throttle Acceleration from a stop	km/h	23.6—27	42.3—47.5	62.6—71.5	65.9—72.7
	mph	38—43.5	68—76.5	104—115	106—117

- **Downshift**

		Lock up Clutch OFF	4th—3rd	3rd—2nd	2nd—1st
0.5/8 throttle * Coasting or braking to a stop	km/h	9.6—11.8	10.9—13	—	4.7—6.8
	mph	15.5—19	17.5—21	—	7.5—11
3.5/8 throttle * When car is slowed by increased grade, wind, etc.	km/h	36.4—39.8	—	—	—
	mph	58.5—64	—	—	—
Full-throttle When car is slowed by increased grade, wind, etc.	km/h	62.8—69.3	55.3—61.8	35.4—39.8	16.8—20.2
	mph	101—111.5	89—99.5	57—64	27—32.5

NOTE:
- Connect the ECU Test Harness.
- Set the digital multimeter to check voltage between D11 (+) terminal and D22 (−) terminal for the throttle angle sensor.
- At 0.5/8 throttle, voltage is 0.822 — 0.878 V.
- At 3.5/8 throttle, voltage is 2.175 — 2.325 V.



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

   CAUTION: Do not shift from [D4] or [D3] to [2] or [1] at speeds over 62.5 mph (100 km/h); you may damage the transmission.

[1] (1st Gear)
1. Accelerate from a stop at full throttle. Check that there is no abnormal noise or clutch slippage.
2. Upshifts and downshifts should not occur with the selector in this position.

[2] (2nd Gear)
1. Accelerate from a stop at full throttle. Check that there is no abnormal noise or clutch slippage.
2. Upshifts and downshifts should not occur with the selector in this position.

[R] (Reverse)
Accelerate from a stop at full throttle, and check for abnormal noise and clutch slippage.

[P] (Park)
Park car on slope (approx. 16°), apply the parking brake, and shift into Park. Release the brake; the car should not move.

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

1. Engage the parking brake and block all four wheels.
2. Connect the tachometer, and start the engine.
3. After the engine has warmed up to normal operating temperature, shift into [2] position.
4. Fully depress the brake pedal and accelerator for 6 to 8 seconds, and note engine speed.
5. Allow 2 minutes for cooling, then repeat same test in [1], [D4] and [R] position.

NOTE:
- Stall speed test must be made only for checking the cause of trouble.
- Stall speed in [D4], [2], [1] and [R] must be same, and must also be within limits.

Stall Speed RPM: 1,850 – 2,150 rpm

TROUBLE	PROBABLE CAUSE
Stall rpm high in [D4], [2], [1] and [R] position	• Low fluid level or oil pump output • Clogged oil strainer • Pressure regulator valve stuck closed • Slipping clutch
Stall rpm high in [1] position	• Slippage of 1st clutch, 1st-hold clutch or 1st gear one-way clutch
Stall rpm high in [2] position	• Slippage of 2nd clutch, 1st-hold clutch or 2nd gear one-way clutch
Stall rpm high in [D4] position	• Slippage of 1st clutch, 2nd clutch, 1st gear one-way clutch or 2nd gear one-way clutch
Stall rpm high in [R] position	• Slippage of reverse clutch
Stall rpm low in [D4], [2], [1] and [R] position	• Engine output low • Torque converter one-way clutch slipping

Checking

With the car on level ground, pull the transmission dipstick and check the level of fluid immediately after the engine is shut off (within one minute).
The fluid level should be between the full and low marks. Push the dipstick all the way in to check the fluid level. If the level is at, or below, the low mark, add Honda Premium Formula Automatic Transmission Fluid or an equivalent DEXRON-II type automatic transmission fluid.

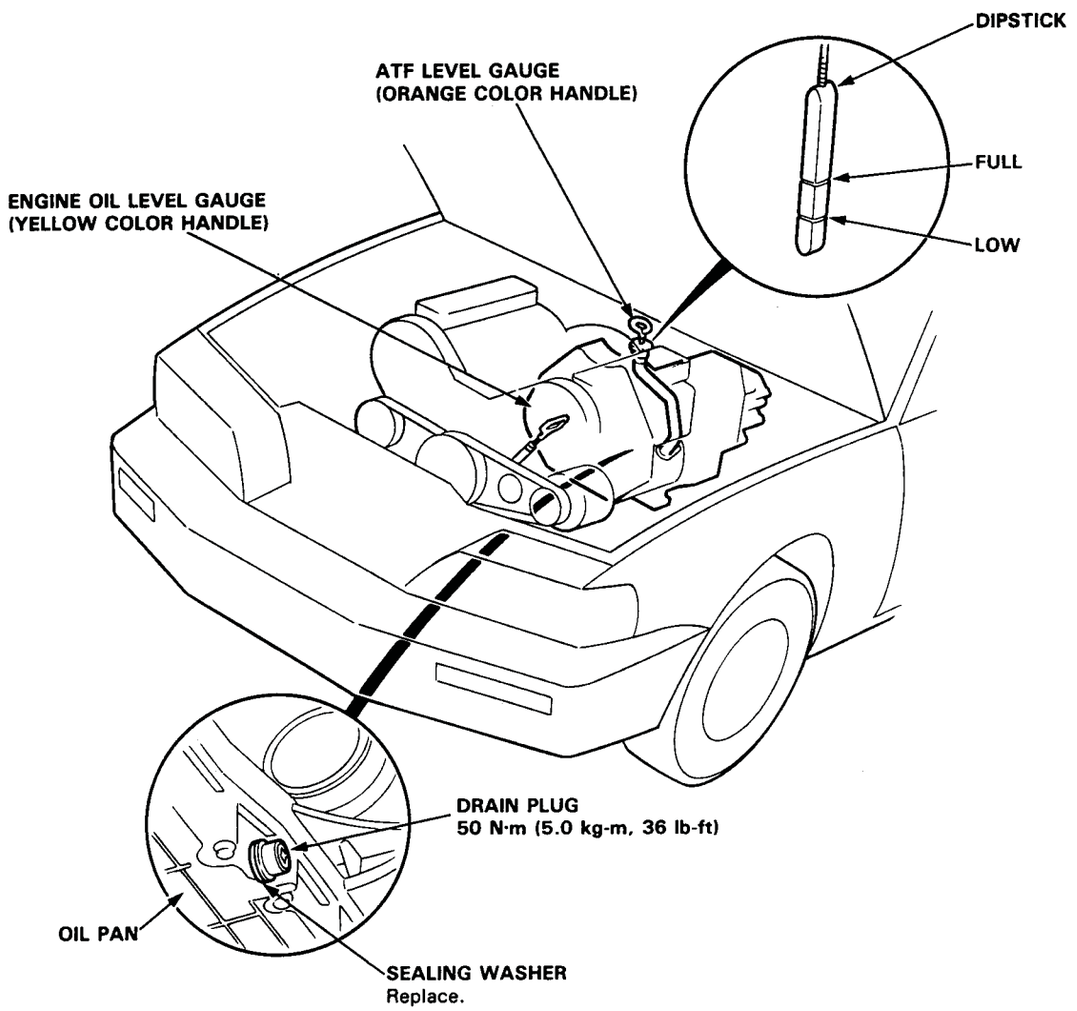
Changing

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

   NOTE: If a cooler flusher is to be used, see page 14-162 and 163.

2. Reinstall the drain plug with a new washer, then refill the transmission to the full mark on the dipstick.

   Automatic Transmission Fluid Capacity:
   3.3 ℓ (3.5 US qt., 2.9 Imp. qt.) at change
   8.7 ℓ (9.2 US qt., 7.7 Imp. qt.) after overhaul
   7.2 ℓ (7.6 US qt., 6.3 Imp. qt.) after overhaul with new torque converter



⚠ WARNING

- **While testing, be careful of the rotating front wheels.**
- **Make sure lifts, jacks and safety stands are placed properly.**

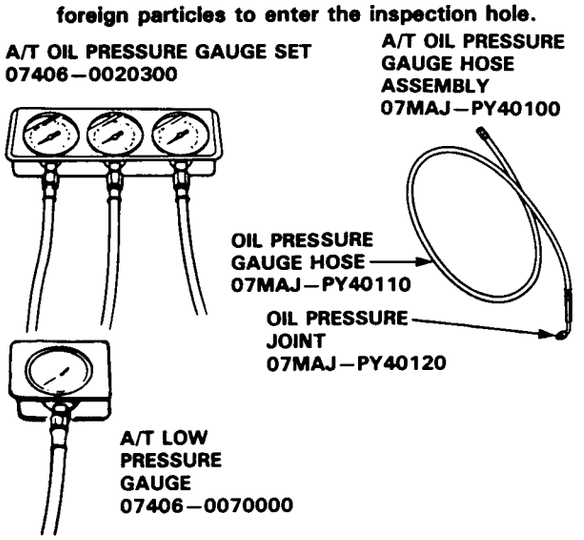
CAUTION:

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

1. Raise the car. (See page 1-6.)
2. Warm up the engine, then stop the engine and connect a tachometer.
3. Connect the oil pressure gauge to each inspection hole(s).

   18 N·m (1.8 kg-m, 12 lb-ft)

   CAUTION: Connect the oil pressure gauge securely, being sure not to allow dust and other foreign particles to enter the inspection hole.



NOTE: Use the A/T Oil Pressure Gauge Set or A/T Low Pressure Gauge replacing the oil pressure gauge hose assembly.

4. Start the engine and measure the respective pressure as follows.
   - Line Pressure
   - Clutch Pressure
   - Clutch Low/High Pressure
   - Throttle B Pressure
5. Install a new washer and the sealing bolt in the inspection hole and tighten to the specified torque. 18 N·m (1.8 kg-m, 12 lb-ft)

   NOTE: Do not reuse old aluminum washers.

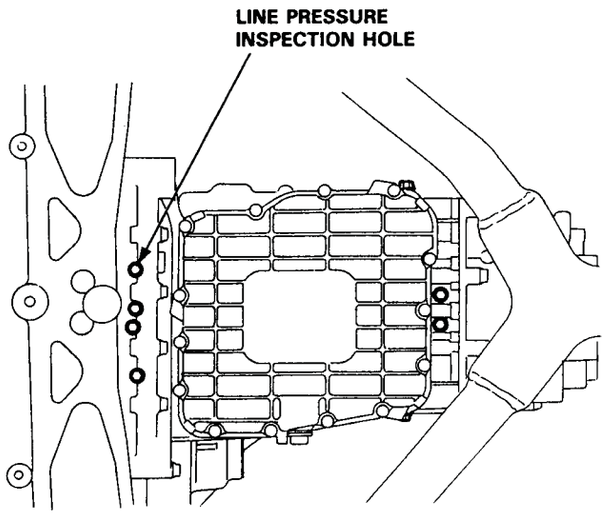
   - Line Pressure

   -1. Set the parking brake and block both wheels securely.

   -2. Run the engine at 2,000 rpm.

   -3. Shift the select lever to [N] or [P].

   -4. Measure line pressure.



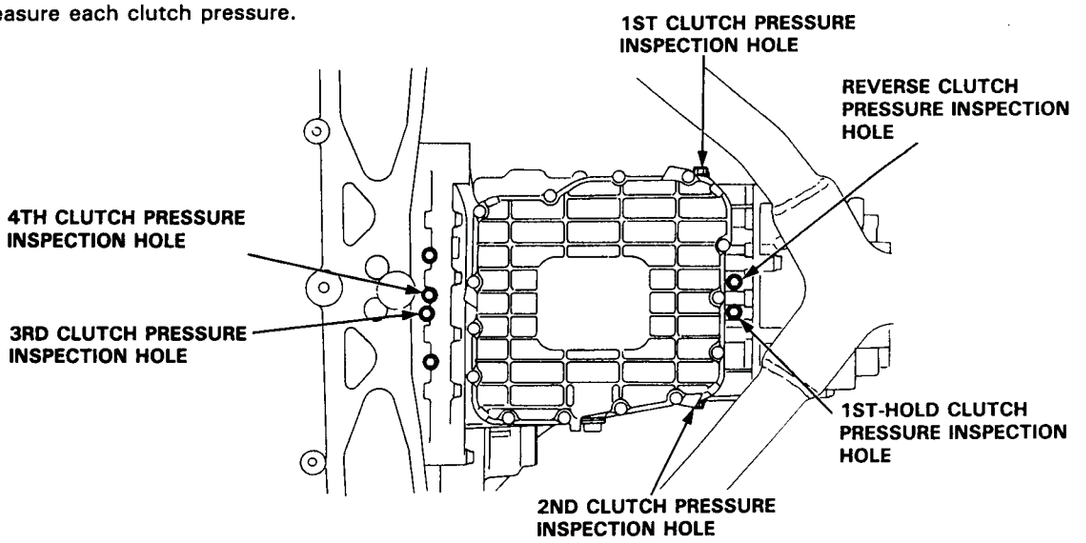
PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Line	[N] or [P]	No (or low) line pressure	Torque converter, oil pump pressure regulator, torque converter check valve, oil pump.	800—860 kPa (8.0—8.6 kg/cm², 114—122 psi)	750 kPa (7.5 kg/cm², 107 psi)

NOTE: Higher pressures may be indicated if measurements are made in selector positions other than [N] or [P].

- **Clutch Pressure Measurement**

⚠ WARNING While testing, be careful of the rotating front wheels.

-1. Set the parking brake and block both rear wheels securely.
-2. Raise the front of the car and support with safety stands.
-3. Allow the front wheels to rotate freely.
-4. Run the engine at 2,000 rpm.
-5. Measure each clutch pressure.



PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
1st Clutch	D4 or D3	No or low 1st pressure	1st Clutch	800—860 kPa (8.0—8.6 kg/cm², 113—123 psi)	750 kPa (7.5 kg/cm², 107 psi)
2nd Clutch	D4	No or low 2nd pressure	2nd Cluth	460 kPa (4.6 kg/cm², 65 psi) (throttle fully closed) 860 kPa (8.6 kg/cm², 123 psi) (throttle more than 2/8 opened)	430 kPa (4.3 kg/cm², 61 psi) (throttle fully closed) 750 kPa (7.5 kg/cm², 107 psi) (throttle more than 2/8 opened)
3rd Clutch		No or low 3rd pressure	3rd Clutch		
4th Clutch		No or low 4th pressure	4th Clutch		
1st Clutch	2 or 1	No or low 1st pressure	1st Clutch	800—860 kPa (8.0—8.6 kg/cm², 113—123 psi)	750 kPa (7.5 kg/cm², 107 psi)
2nd Clutch		No or low 2nd pressure	2nd Clutch		
1st-Hold Clutch		No or low 1st-hold pressure	1st-Hold Clutch		
Reverse Clutch	R	No or low Reverse pressure	Reverse Clutch	1,190—1,270 kPa (11.9—12.7 kg/cm², 169—181 psi)	1,150 kPa (11.5 kg/cm², 163 psi)

(cont'd)

- **Clutch Low/High Pressure Measurement**

⚠ WARNING While testing, be careful of the rotating front wheels.

-1. Allow the front wheels to rotate freely.

-2. Start the engine and let it idle.

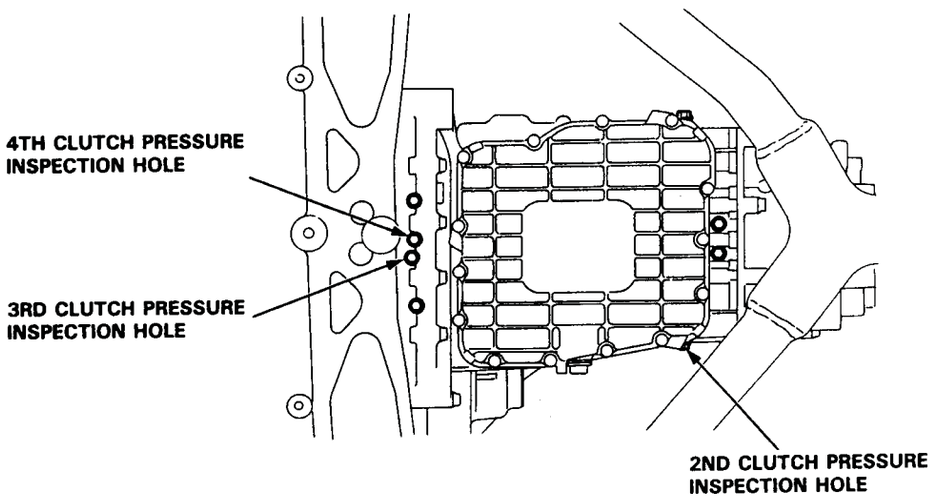
-3. Shift the select lever to [D4] position.

-4. Slowly press down the accelerator pedal to increase engine rpm until pressure is indicated on the oil pressure gauge. Then release the accelerator pedal, allowing the engine return to an idle, and measure the pressure reading.

-5. Repeat step -4 for each clutch pressure being inspected.

-6. With the engine idling, press down the accelerator pedal approximately 1/2 of its possible travel and increase the engine rpm until pressure is indicated on the gauge, measure the highest pressure reading obtained.

-7. Repeat step -6 for each clutch pressure being inspected.



PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
2nd Clutch	[D4]	No or low 2nd pressure	2nd Clutch	460—860 kPa (4.6—8.6 kg/cm², 65—123 psi) varies with throttle opening	430 kPa (4.3 kg/cm², 61 psi) with accelerator pedal released 750 kPa (7.5 kg/cm², 107 psi) with accelerator pedal more than 2/8 opened
3rd Clutch		No or low 3rd pressure	3rd Clutch		
4th Clutch		No or low 4th pressure	4th Clutch		

- **Throttle B Pressure Measurement**

⚠ WARNING While testing, be careful of the rotating front wheels.

-1. Allow the front wheels to rotate freely.

-2. Disconnect the transmission sub-harness connector.

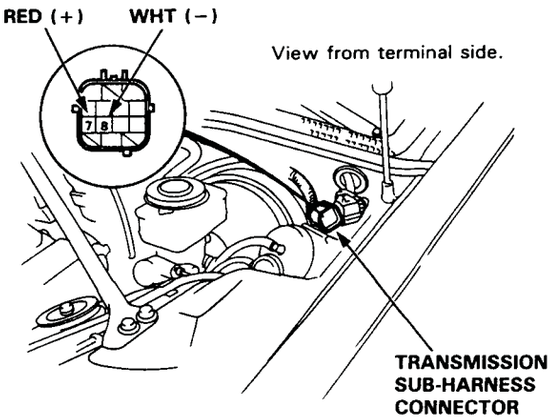
-3. Shift the select lever to [D4] position.

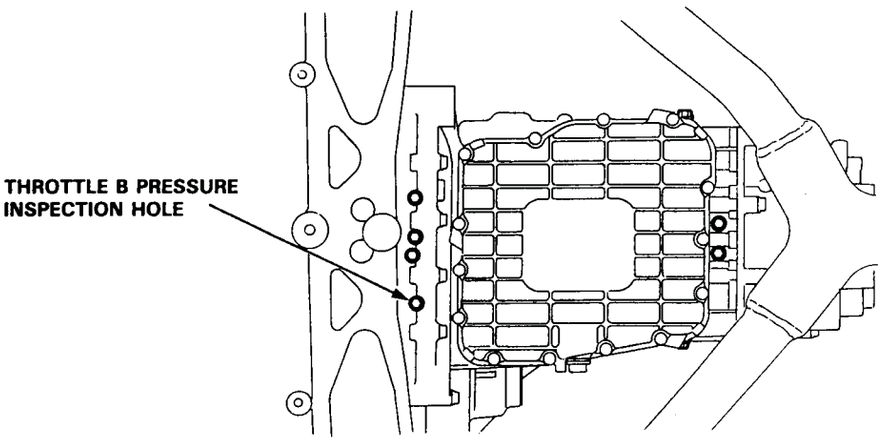
-4. Run the engine at 1,000 rpm.

-5. Measure full open throttle B pressure.

-6. Connect battery voltage to the linear solenoid terminals of the transmission sub-harness connector.

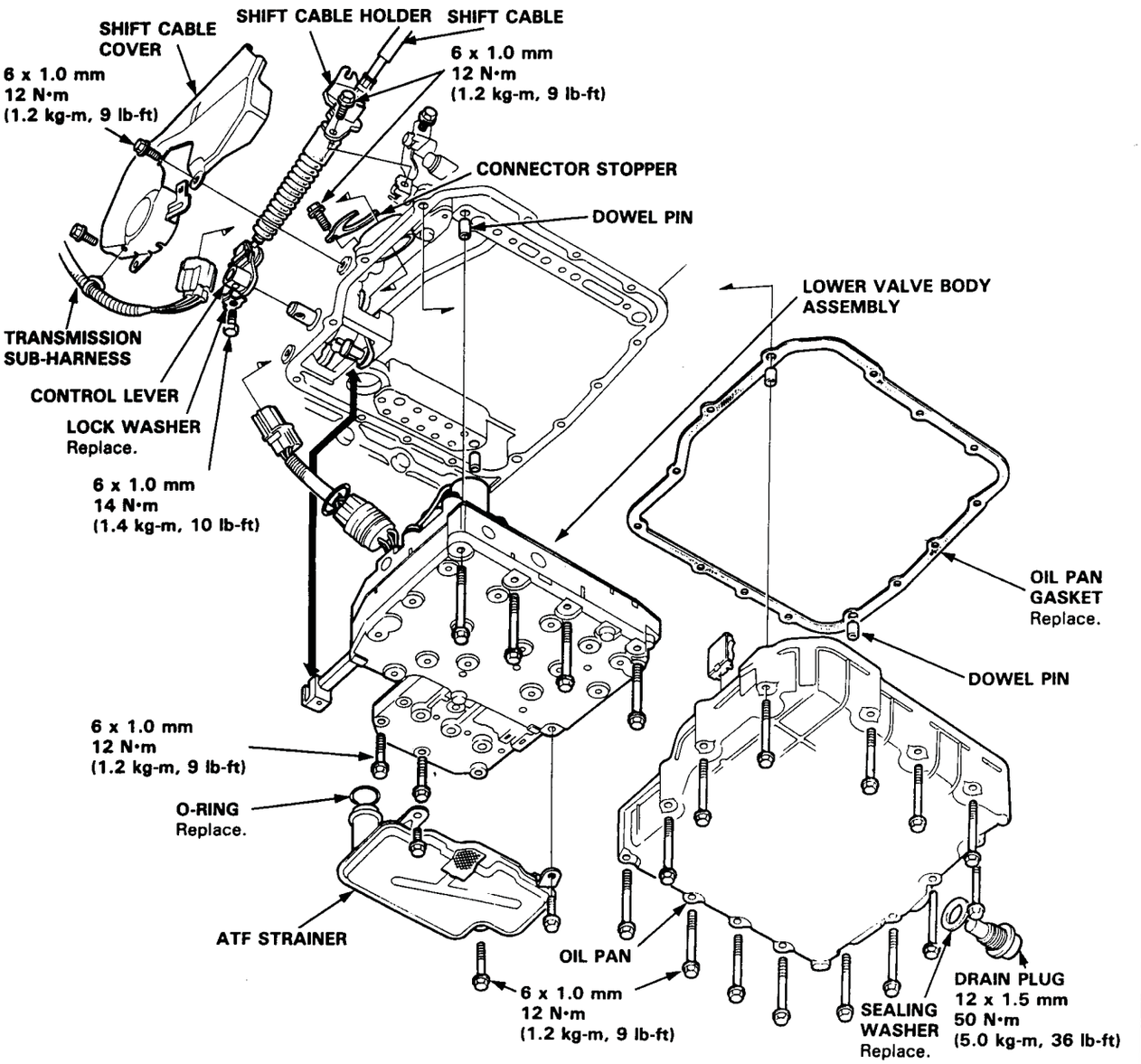
-7. Measure full closed throttle B pressure.





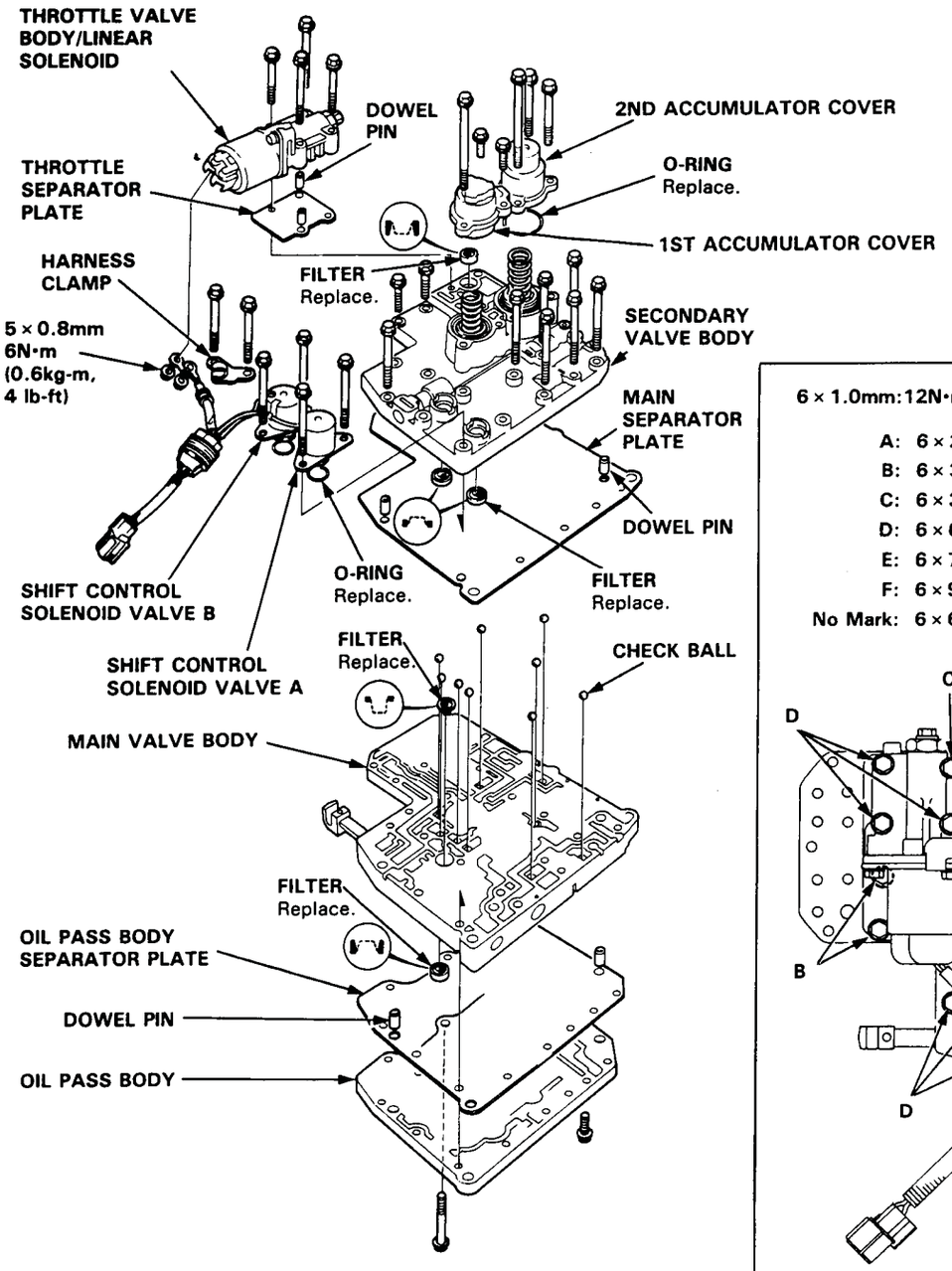
PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Throttle B	[D4]	Pressure too high	Throttle Valve Body Assembly	0−15 kPa (0−0.15 kg/cm², 0−2 psi) throttle full closed	———
		No or low pressure		590−640 kPa (5.9−6.4 kg/cm², 84−91 psi) throttle full opened	550 kPa (5.5 kg/cm², 78 psi) throttle full opened

1. Remove the drain plug, and drain automatic transmission fluid (ATF). Reinstall the drain plug with a new washer.
2. Remove the shift cable cover and remove the control lever from the control shaft.
3. Remove the shift control solenoid valve/linear solenoid harness connector stopper.
4. Disconnect the shift control solenoid valve/linear solenoid connector from the transmission connector.
5. Remove the oil pan and oil pan gasket.
6. Remove 3 bolts and the ATF strainer.
7. Remove 6 bolts and the lower valve body assembly.
8. Install the lower valve body assembly in the reverse order of removal.



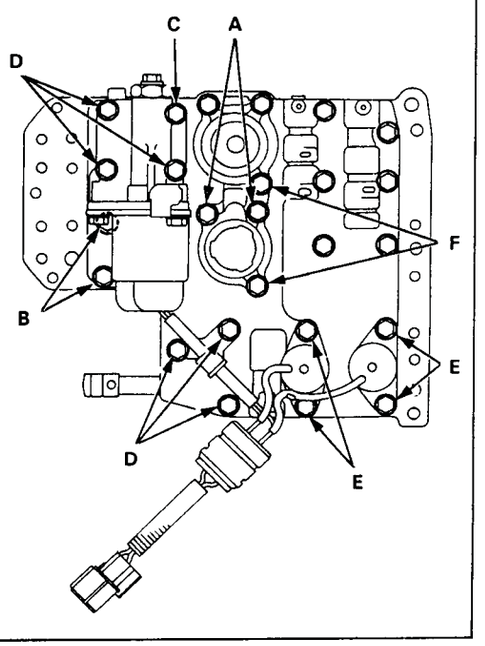
NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Coat all parts with ATF before reassembly.
- Replace the O-rings and filters.
- Install the filters in the direction shown.

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



6 x 1.0mm:12N·m (1.2 kg-m, 9 lb-ft)

A: 6 x 20mm 2 Bolts
B: 6 x 30mm 2 Bolts
C: 6 x 35mm 1 Bolt
D: 6 x 60mm 6 Bolts
E: 6 x 70mm 4 Bolts
F: 6 x 95mm 2 Bolts
No Mark: 6 x 65mm 8 Bolts

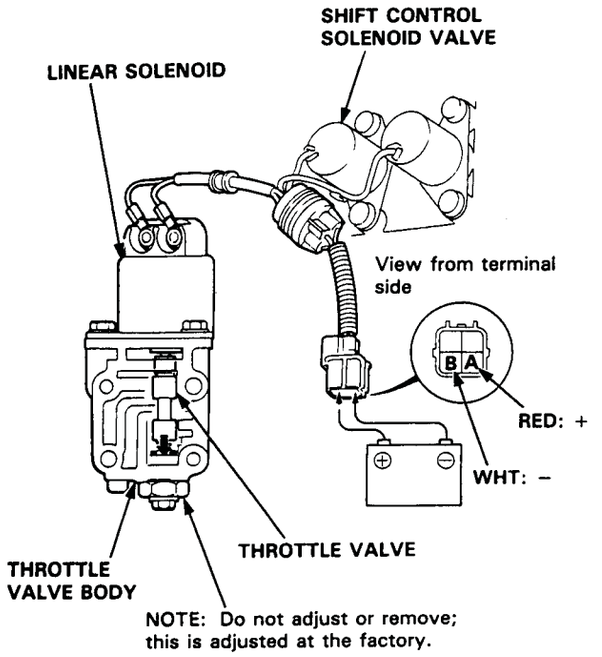


1. Connect the A(RED: +) terminal of the shift control solenoid valve/linear solenoid to the positive battery terminal and the B(WHT: −) terminal to the negative battery terminal. Check that the throttle valve moves.

2. Disconnect the battery terminals and check that the throttle valve is released.

3. Repeat the above steps 1-2.

   NOTE: You can see the movement of the throttle valve through the oil passage in the attaching surface of the throttle valve body.



4. If the throttle valve binds, or moves but sluggishly, or the linear solenoid does not operate, replace the throttle valve body/linear solenoid as an assembly.

5. If the linear solenoid does not operate, disconnect the linear solenoid harness from the linear solenoid assembly. Connect the battery terminals directly to the linear solenoid.

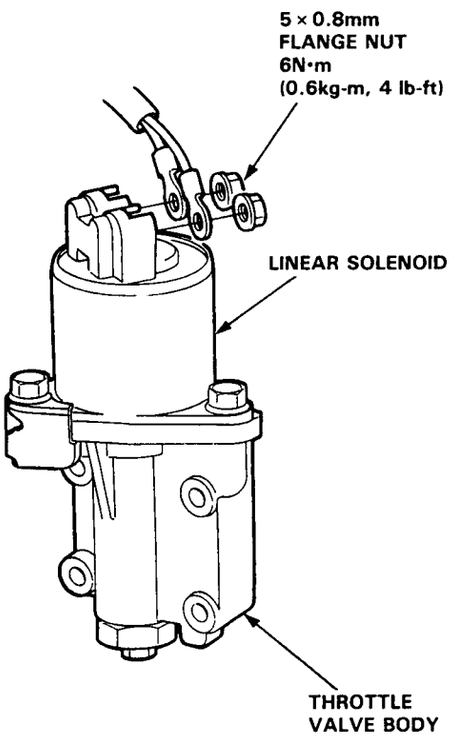
6. If the linear solenoid operates after connecting the battery, and the throttle valve movement is OK, replace the shiftcontrol solenoid valve assembly.

NOTE: Throttle valve body/linear solenoid must be replaced as an assembly.

1. Check the throttle valve body passages for dust or dirt and replace as an assembly, if necessary.

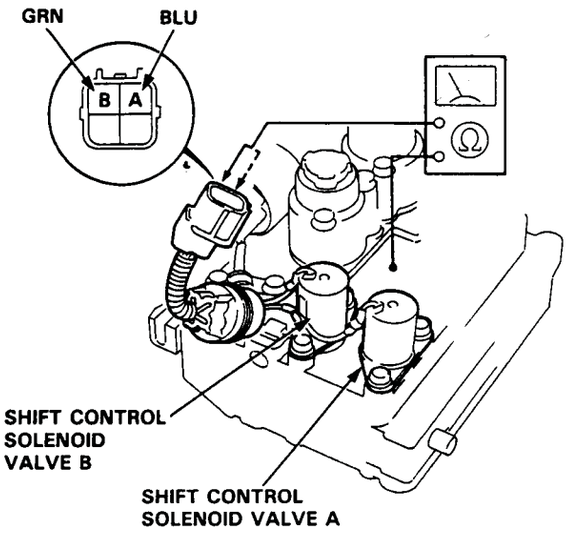
2. Clean the mounting surface and oil passages of the throttle valve body.

3. Assemble the throttle valve body/linear solenoid to the secondary valve body.



1. Measure the resistance between the A temrinal (BLU; SOL.V.A) of the shift control solenoid valve/ linear solenoid connector and body ground and between the B terminal (GRN; SOL.V.B) and body ground.

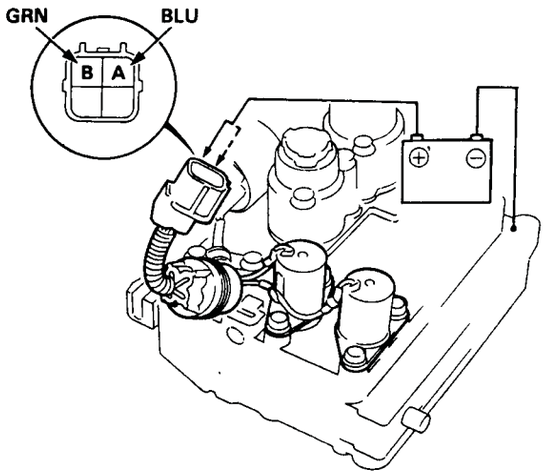
   STANDARD : 12—24 Ω



2. Replace the shift control solenoid valve assembly if the resistance is out of specification.

3. Connect the A terminal of the shift control solenoid valve/linear solenoid connector to the battery positive terminal and the negative terminal to body ground. A clicking sound should be heard. Connect the B terminal to the battery positive terminal. A clicking sound should be heard.

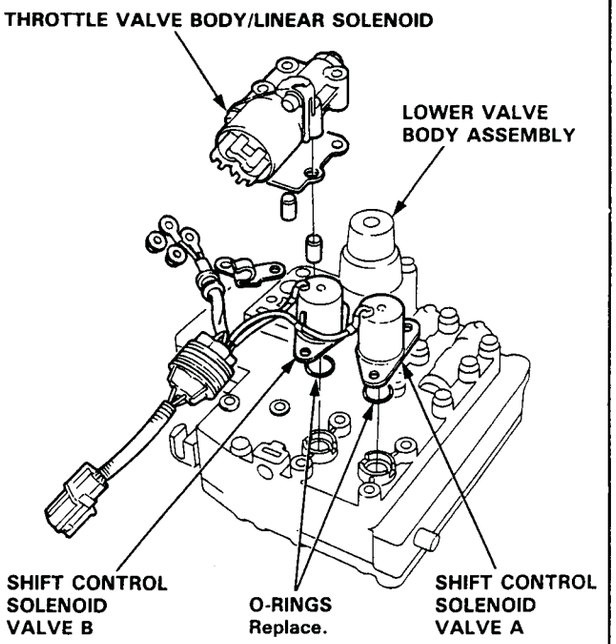
4. If a cliking sound is not heard, replace the shift control solenoid valve assembly.



NOTE: Shift control solenoid valve A and B must be replaced as an assembly.

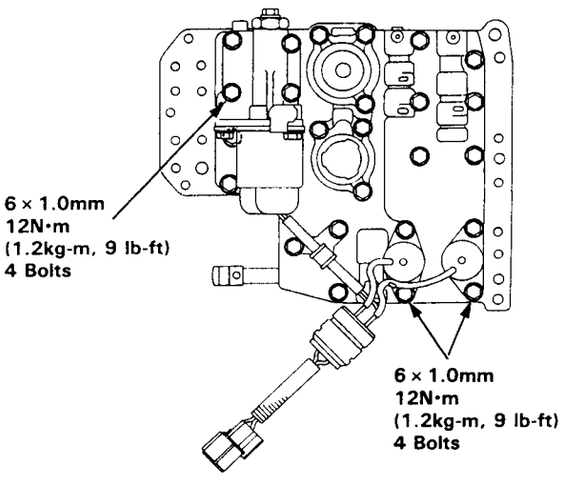
1. Remove the shift control solenoid valve A, B and linear solenoid/throttle valve body from the lower valve body assembly.

2. Disconnect the linear solenoid terminals.

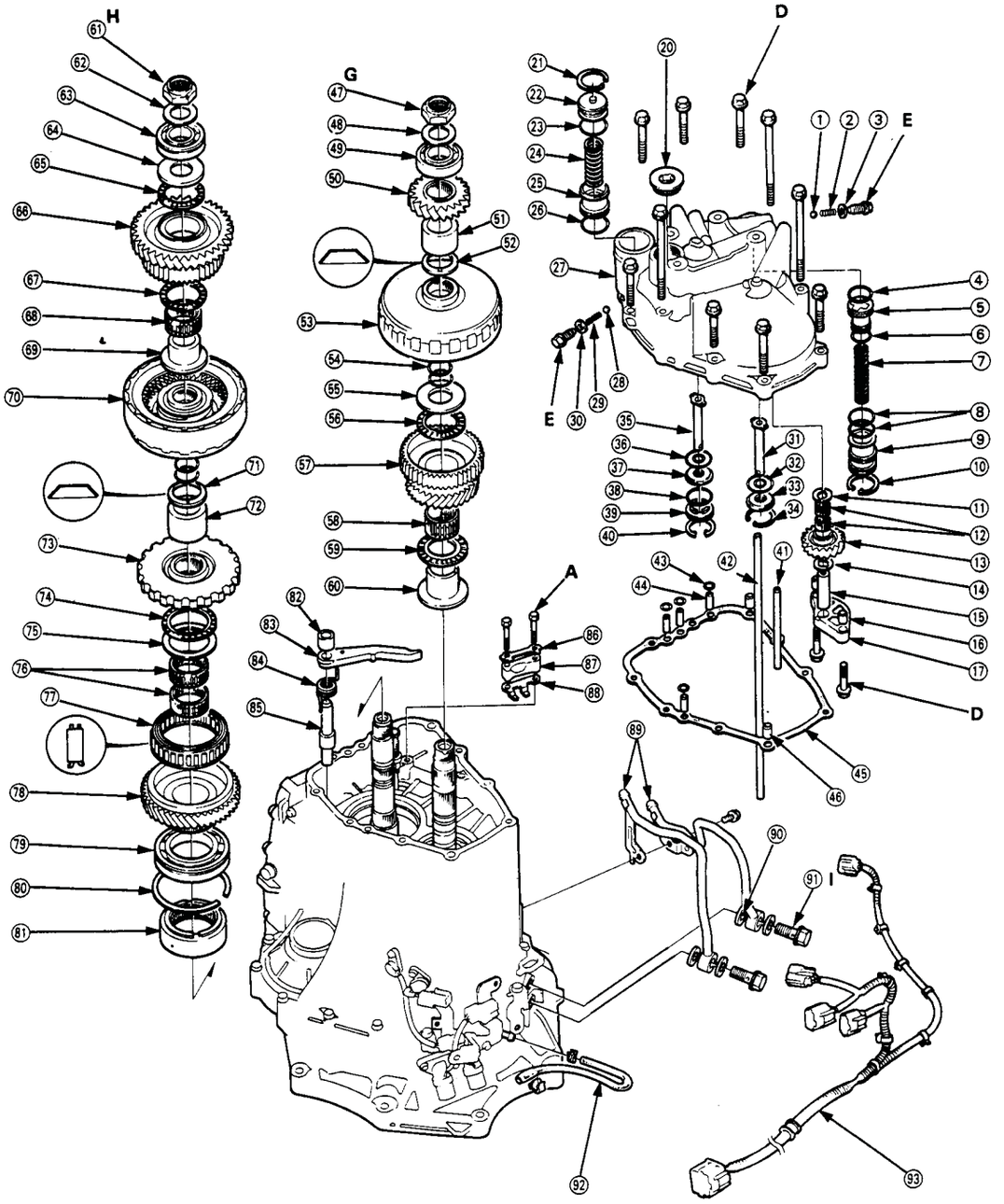


3. Clean the mounting surfaces and oil passages.

4. Connect the linear solenoid terminal then install the shift control solenoid valve A, B and linear solenoid/throttle valve body on the lower valve body.



Rear Cover

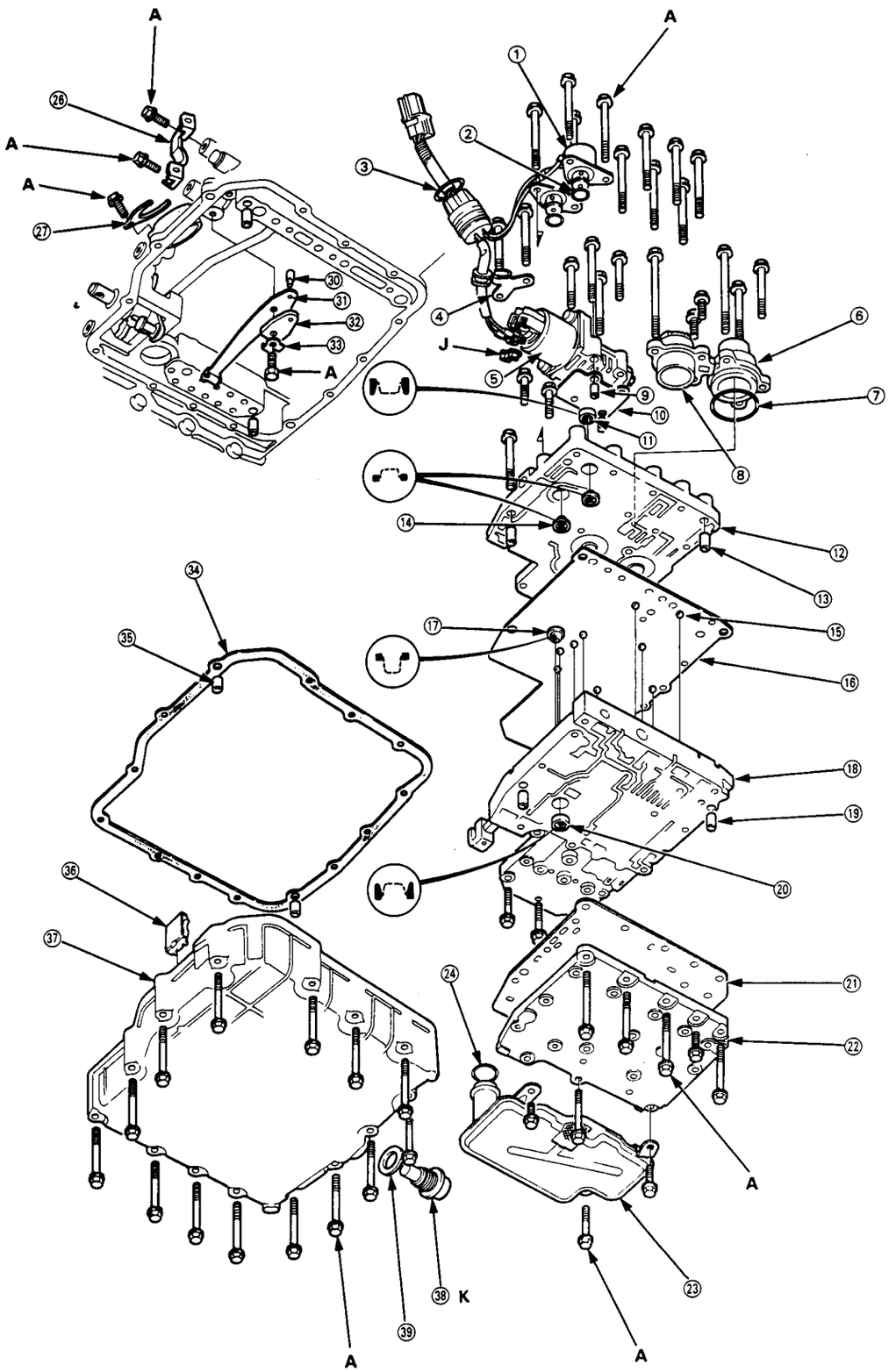


① STEEL BALL
② ONE-WAY BALL SPRING
③ SEALING WASHER Replace.
④ O-RING Replace.
⑤ REVERSE ACCUMULATOR PISTON
⑥ O-RING Replace.
⑦ REVERSE ACCUMULATOR SPRING
⑧ O-RING Replace.
⑨ REVERSE ACCUMULATOR SLEEVE
⑩ SNAP RING
⑪ THRUST SHIM 14 x 30 mm
⑫ NEEDLE BEARINGS
⑬ REVERSE IDLER GEAR
⑭ THRUST SHIM 14 x 25 mm
⑮ REVERSE IDLER GEAR SHAFT
⑯ DOWEL PIN
⑰ REVERSE IDLER GEAR SHAFT HOLDER
⑳ SEALING BOLT 34 x 1.25 mm
㉑ SNAP RING
㉒ 1ST-HOLD ACCUMULATOR SLEEVE
㉓ O-RING Replace.
㉔ 1ST-HOLD ACCUMULATOR SPRING
㉕ 1ST-HOLD ACCUMULATOR PISTON
㉖ O-RING Replace.
㉗ REAR COVER
㉘ STEEL BALL
㉙ ONE-WAY BALL SPRING
㉚ SEALING WASHER Replace.
㉛ 2ND CLUTCH FEED PIPE
㉜ O-RING Replace.
㉝ FEED PIPE GUIDE
㉞ SNAP RING
㉟ REVERSE CLUTCH FEED PIPE
㊱ O-RING Replace.
㊲ FEED PIPE GUIDE
㊳ O-RING Replace.
㊴ OIL FEED GUIDE
㊵ SNAP RING
㊶ FEED PIPE
㊷ FEED PIPE
㊸ O-RING Replace.
㊹ OIL PIPE
㊺ REAR COVER GASKET Replace.
㊻ DOWEL PIN
㊼ MAINSHAFT LOCKNUT 24 x 1.25 mm Replace.
㊽ WASHER 24 mm
㊾ BALL BEARING
㊿ MAINSHAFT REVERSE GEAR
(51) MAINSHAFT REVERSE GEAR DISTANCE COLLAR
(52) MAINSHAFT DISC SPRING 28 mm Replace.
(53) 2ND CLUTCH ASSEMBLY
(54) O-RING Replace.
(55) THRUST SHIM 29 mm
(56) THRUST NEEDLE BEARING
(57) MAINSHAFT 2ND GEAR
(58) NEEDLE BEARING
(59) THRUST NEEDLE BEARING
(60) MAINSHAFT 2ND GEAR COLLAR
(61) COUNTERSHAFT LOCKNUT 24 x 1.25 mm Replace.
(62) WASHER 24 mm
(63) BALL BEARING
(64) THRUST SHIM 25 mm
(65) THRUST NEEDLE BEARING
(66) COUNTERSHAFT REVERSE GEAR
(67) THRUST NEEDLE BEARING
(68) NEEDLE BEARING
(69) COUNTERSHAFT REVERSE GEAR COLLAR
(70) REVERSE CLUTCH ASSEMBLY
(71) COUNTERSHAFT DISC SPRING 29 mm Replace.
(72) REVERSE CLUTCH DISTANCE COLLAR
(73) PARKING GEAR
(74) THRUST NEEDLE BEARING
(75) THRUST SHIM 48 x 60 mm Selective part
(76) NEEDLE BEARINGS
(77) 2ND GEAR ONE-WAY CLUTCH
(78) COUNTERSHAFT 2ND GEAR
(79) BALL BEARING
(80) SNAP RING
(81) ONE-WAY CLUTCH HUB
(82) PARKING BRAKE PAWL SHAFT SLEEVE
(83) PARKING BRAKE PAWL
(84) PARKING BRAKE PAWL SPRING
(85) PARKING BRAKE PAWL SHAFT
(86) LOCK PLATE Replace.
(87) PARKING BRAKE ROD HOLDER
(88) PARKING BRAKE ROD GUIDE
(89) ATF COOLER PIPES
(90) SEALING WASHER Replace.
(91) JOINT BOLT
(92) BREATHER PIPE
(93) TRANSMISSION SUB-HARNESS

TORQUE SPECIFICATIONS

No.	Torque Value	Bolt Size	Remarks
A	12 N·m (1.2 kg-m, 9 lb-ft)	6 x 1.0 mm	
D	27 N·m (2.7 kg-m, 20 lb-ft)	8 x 1.25 mm	
E	18 N·m (1.8 kg-m, 13 lb-ft)	8 x 1.25 mm	Sealing Bolt
G	170 N·m (17.0 kg-m, 123 lb-ft)	24 x 1.25 mm	Mainshaft Locknut
H	170 N·m (17.0 kg-m, 123 lb-ft)	24 x 1.25 mm	Countershaft Locknut (Left-hand threads)
I	40 N·m (4.0 kg-m, 29 lb-ft)	14 x 1.5 mm	Joint Bolt

Transmission Housing/Lower Valve Body

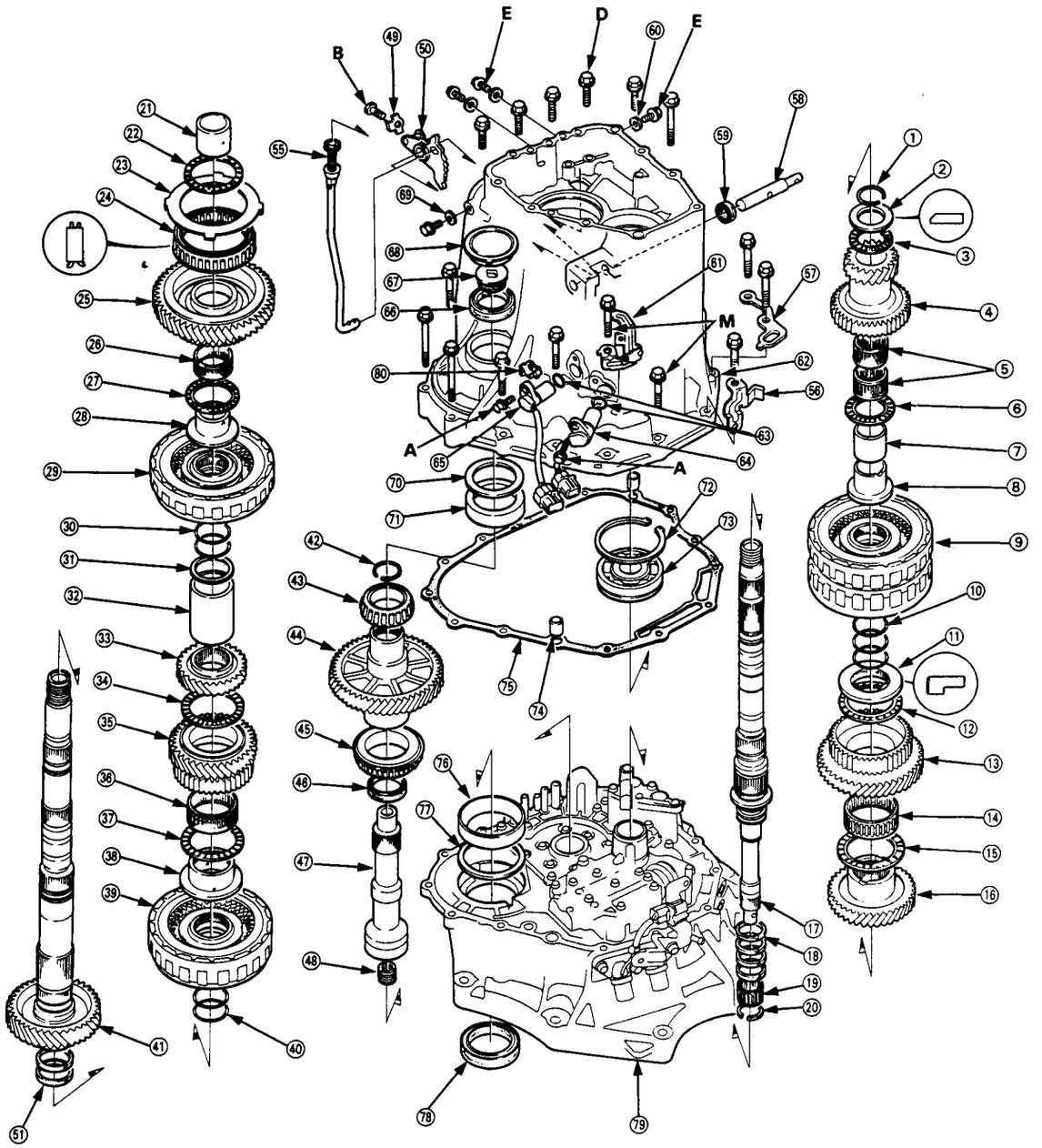


① **SHIFT CONTROL SOLENOID VALVE A/B**
② **O-RING** Replace.
③ **O-RING** Repaice.
④ **HARNESS CLAMP**
⑤ **LINEAR SOLENOID/THROTTLE VALVE BODY**
⑥ **2ND ACCUMULATOR COVER**
⑦ **O-RING** Replace.
⑧ **1ST ACCUMULATOR COVER**
⑨ **DOWEL PIN**
⑩ **THROTTLE SEPARATOR PLATE**
⑪ **FILTER** Replace.
⑫ **SECONDARY VALVE BODY**
⑬ **DOWEL PIN**
⑭ **FILTER** Replace.
⑮ **CHECK BALLS**
⑯ **MAIN SEPARATOR PLATE**
⑰ **FILTER** Replace.
⑱ **MAIN VALVE BODY**
⑲ **DOWEL PIN**
⑳ **FILTER** Replace.
㉑ **OIL PASS BODY SEPARATOR PLATE**
㉒ **OIL PASS BODY**
㉓ **ATF STRAINER**
㉔ **O-RING** Replace.
㉕ **SHIFT CABLE HOLDER BASE**
㉗ **CONNECTOR STOPPER**
㉚ **DETENT SPRING FIX PIN**
㉛ **DETENT SPRING**
㉜ **DETENT SPRING PLATE**
㉝ **LOCK WASHER** Replace.
㉞ **OIL PAN GASKET** Replace.
㉟ **DOWEL PIN**
㊱ **ATF MAGNET**
㊲ **OIL PAN**
㊳ **DRAIN PLUG**
㊴ **SEALING WASHER** Replace.

TORQUE SPECIFICATIONS

No.	Torque Value	Bolt Size	Remarks
A	12 N·m (1.2 kg-m, 9 lb-ft)	6 x 1.0 mm	
J	6 N·m (0.6 kg-m, 4 lb-ft)	5 x 0.8 mm	Flange Nut
K	50 N·m (5.0 kg-m, 36 lb-ft)	18 x 1.5 mm	Drain Plug

Transmission Housing

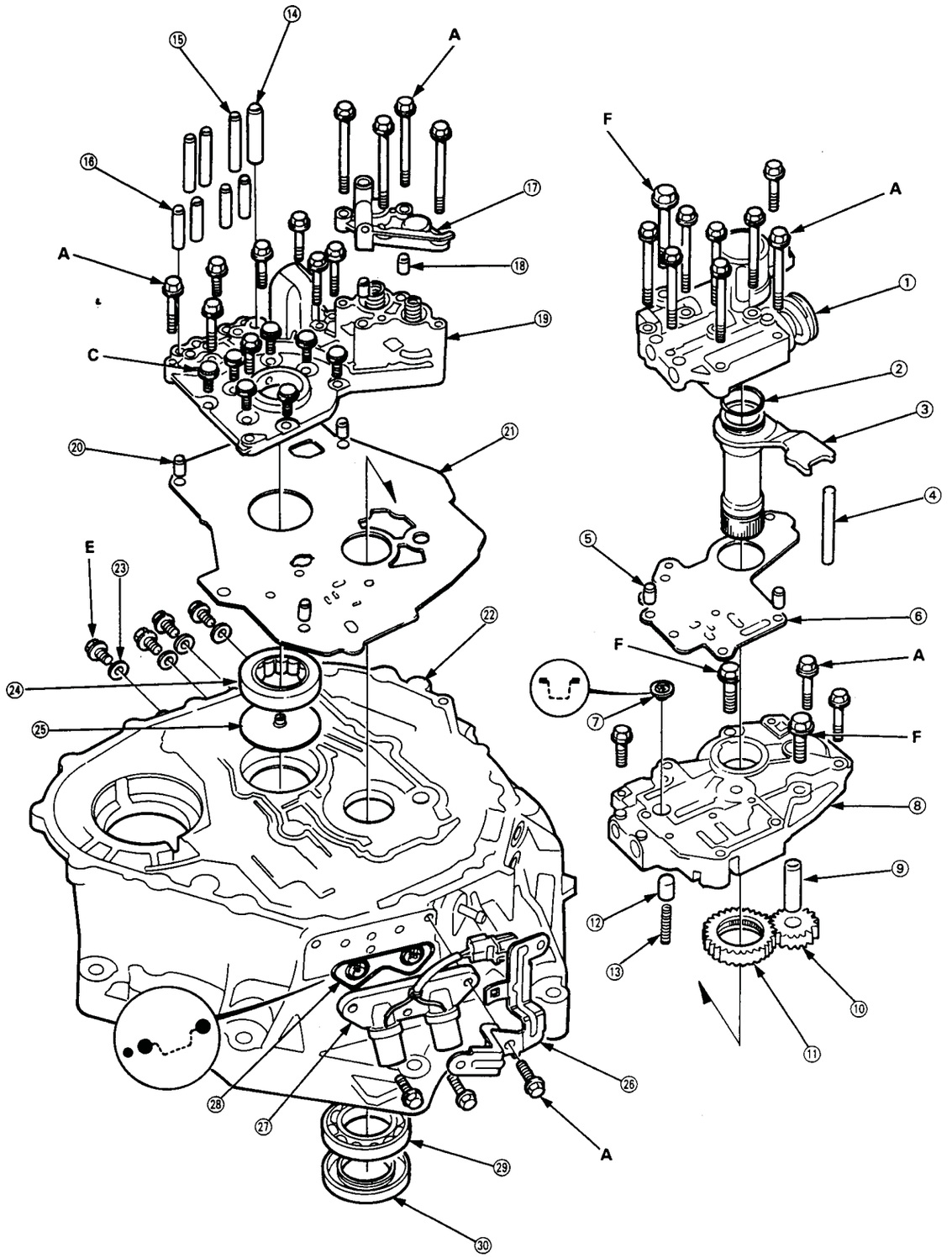


① SNAP RING
② THRUST WASHER
③ THRUST NEEDLE BEARING
④ MAINSHAFT 1ST GEAR
⑤ NEEDLE BEARINGS
⑥ THRUST NEEDLE BEARING
⑦ MAINSHAFT 1ST GEAR DISTANCE COLLAR
⑧ MAINSHAFT 1ST GEAR COLLAR
⑨ 1ST/4TH CLUTCH ASSEMBLY
⑩ O-RING Replace.
⑪ 4TH CLUTCH COLLAR Selective part
⑫ THRUST NEEDLE BEARING
⑬ MAINSHAFT 4TH GEAR
⑭ NEEDLE BEARING
⑮ THRUST NEEDLE BEARING
⑯ MAINSHAFT 3RD GEAR
⑰ MAINSHAFT
⑱ SEALING RING 37 mm
⑲ NEEDLE BEARING
⑳ SET RING
㉑ COUNTERSHAFT 2ND GEAR COLLAR
㉒ THRUST NEEDLE BEARING
㉓ SET PLATE
㉔ 1ST GEAR ONE-WAY CLUTCH
㉕ COUNTERSHAFT 1ST GEAR
㉖ NEEDLE BEARING
㉗ THRUST NEEDLE BEARING
㉘ COUNTERSHAFT 1ST GEAR COLLAR
㉙ 1ST-HOLD CLUTCH ASSEMBLY
㉚ O-RING Replace.
㉛ THRUST SHIM 38.8 x 47 mm Selective part
㉜ 1ST-HOLD CLUTCH DISTANCE COLLAR
㉝ COUNTERSHAFT 4TH GEAR
㉞ THRUST NEEDLE BEARING
㉟ COUNTERSHAFT 3RD GEAR
㊱ NEEDLE BEARING
㊲ THRUST NEEDLE BEARING
㊳ COUNTERSHAFT 3RD GEAR COLLAR
㊴ 3RD CLUTCH ASSEMBLY
㊵ O-RING Replace.
㊶ COUNTERSHAFT
㊷ SET RING Replace.
㊸ TAPERED ROLLER BEARING
㊹ SECONDARY GEAR SHAFT
㊺ TAPERED ROLLER BEARING
㊻ SECONDARY GEAR SHAFT OIL SEAL Replace.
㊼ EXTENSION SHAFT
㊽ SECONDARY SPRING
㊾ LOCK WASHER Replace.
㊿ DETENT LEVER
(51) SEALING RING 42 mm
(55) PARKING BRAKE ROD
(56) HARNESS STAY
(57) TRANSMISSION HANGER
(58) CONTROL SHAFT
(59) OIL SEAL Replace.
(60) SEALING WASHER Replace.
(61) SPEED SENSOR CONNECTOR STAY
(62) TRANSMISSION HOUSING
(63) O-RINGS Replace.
(64) NM SPEED SENSOR
(65) NC SPEED SENSOR
(66) TRANSMISSION HOUSING OIL SEAL Replace.
(67) SEALING BOLT
(68) SECONDARY COVER
(69) SEALING WASHER Replace.
(70) THRUST SHIM 75 mm Selective part
(71) BEARING OUTER RACE
(72) SNAP RING
(73) TRANSMISSION HOUSING MAINSHAFT BEARING
(74) DOWEL PIN
(75) TRANSMISSION HOUSING GASKET Replace.
(76) BEARING OUTER RACE
(77) WASHER
(78) TORQUE CONVERTER HOUSING OIL SEAL Replace.
(79) TORQUE CONVERTER HOUSING
(80) NC SPEED SENSOR WASHER

TORQUE SPECIFICATIONS

No.	Torque Value	Bolt Size	Remarks
A	12 N·m (1.2 kg-m, 9 lb-ft)	6 x 1.0 mm	
B	14 N·m (1.4 kg-m, 10 lb-ft)	6 x 1.0 mm	Special Bolt
D	34 N·m (3.4 kg-m, 26 lb-ft)	8 x 1.25 mm	14 Bolts
E	18 N·m (1.8 kg-m, 13 lb-ft)	8 x 1.25 mm	Oil Pressure Check Bolt
M	27 N·m (2.7 kg-m, 20 lb-ft)	8 x 1.25 mm	2 Bolts (with connector stay)

Torque Converter Housing/Valve Body



① **REGULATOR VALVE BODY**
② **O-RING** Replace.
③ **STATOR SHAFT**
④ **STOPPER PIN**
⑤ **DOWEL PIN**
⑥ **REGULATOR SEPARATOR PLATE**
⑦ **OIL PUMP BODY FILTER** Replace.
⑧ **OIL PUMP BODY**
⑨ **OIL PUMP DRIVEN GEAR SHAFT**
⑩ **OIL PUMP DRIVEN GEAR**
⑪ **OIL PUMP DRIVE GEAR**
⑫ **TORQUE CONVERTER CHECK VALVE**
⑬ **TORQUE CONVERTER CHECK VALVE SPRING**
⑭ **OIL PIPE 10 x 60 mm**
⑮ **OIL PIPE 8 x 57.5 mm**
⑯ **OIL PIPE 8 x 40 mm**
⑰ **ACCUMULATOR COVER**
⑱ **DOWEL PIN**
⑲ **ACCUMULATOR BODY**
⑳ **DOWEL PIN**
㉑ **ACCUMULATOR BODY SEPARATOR PLATE**
㉒ **TORQUE CONVERTER HOUSING**
㉓ **SEALING WASHER** Replace.
㉔ **TORQUE CONVERTER HOUSING COUNTERSHAFT BEARING** Replace.
㉕ **OIL GUIDE PLATE** Replace.
㉖ **LOCK-UP CONTROL SOLENOID VALVE CONNECTOR STAY**
㉗ **LOCK-UP CONTROL SOLENOID VALVE ASSEMBLY**
㉘ **LOCK-UP CONTROL SOLENOID FILTER/GASKET** Replace.
㉙ **TORQUE CONVERTER HOUSING MAINSHAFT BEARING** Replace.
㉚ **MAINSHAFT OIL SEAL** Repalce.

TORQUE SPECIFICATIONS

No.	Torque Value	Bolt Size	Remarks
A	12 N·m (1.2 kg-m, 9 lb-ft)	6 x 1.0 mm	
C	12 N·m (1.2 kg-m, 9 lb-ft)	6 x 1.0 mm	Special Bolt
E	18 N·m (1.8 kg-m, 13 lb-ft)	8 x 1.25 mm	Oil Pressure Check Bolt
F	18 N·m (1.8 kg-m, 13 lb-ft)	8 x 1.25 mm	

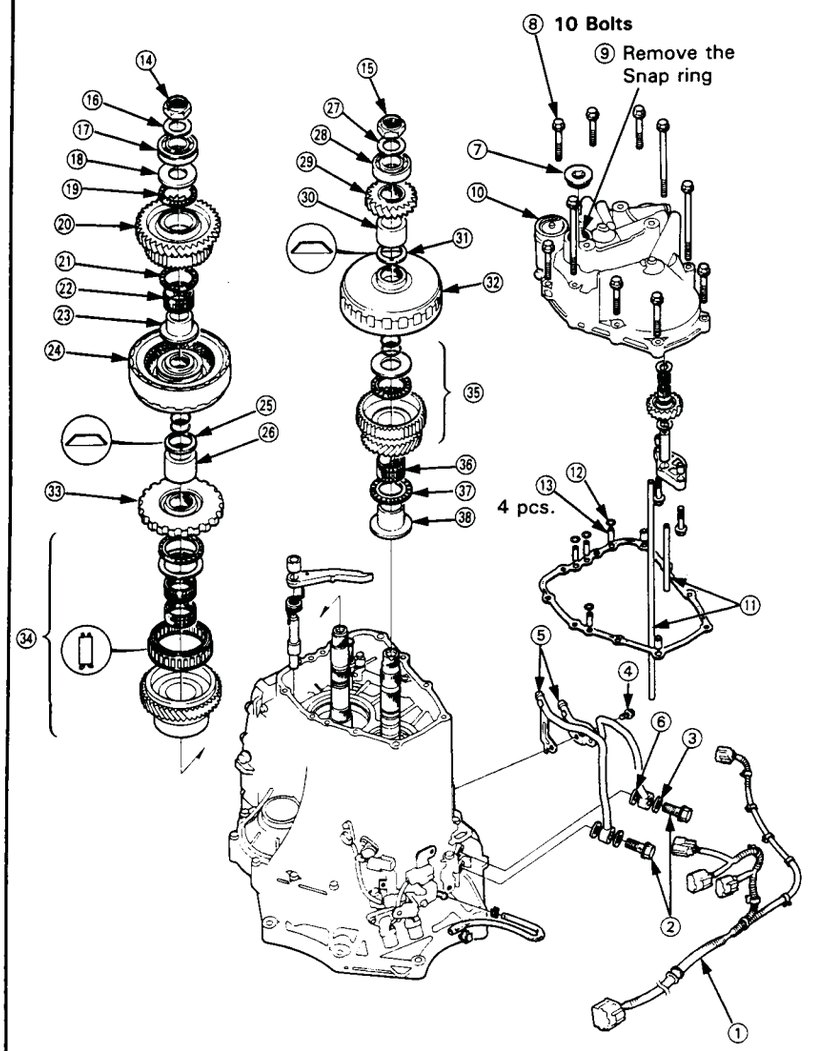
Rear Cover

Removal

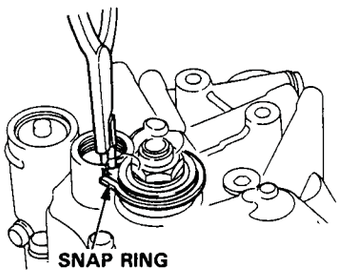
NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner and dry with compressed air.
- Blow out all passages.
- Cut the lock tab and raise it, then remove the locknut on each shaft.
- Countershaft locknut has left-hand threads.

1. Disconnect the transmission sub-harness connector from the shift control solenoid valve/linear solenoid connector.
2. Remove the transmission rear cover following the numbered sequence.

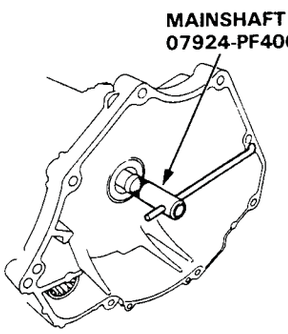
   NOTE: Remove the special tool from the mainshaft after removing the locknuts.



⑨ Using snap ring pliers, expand the snap ring on the countershaft ball bearing and remove it.



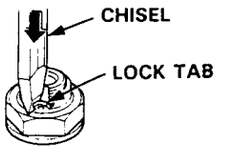
Slip the special tool onto the mainshaft and engage the parking brake pawl with the parking gear.



⑭ ⑮

NOTE: Using a chisel, cut the lock tab. Pry it up and then remove the locknut from each shaft.

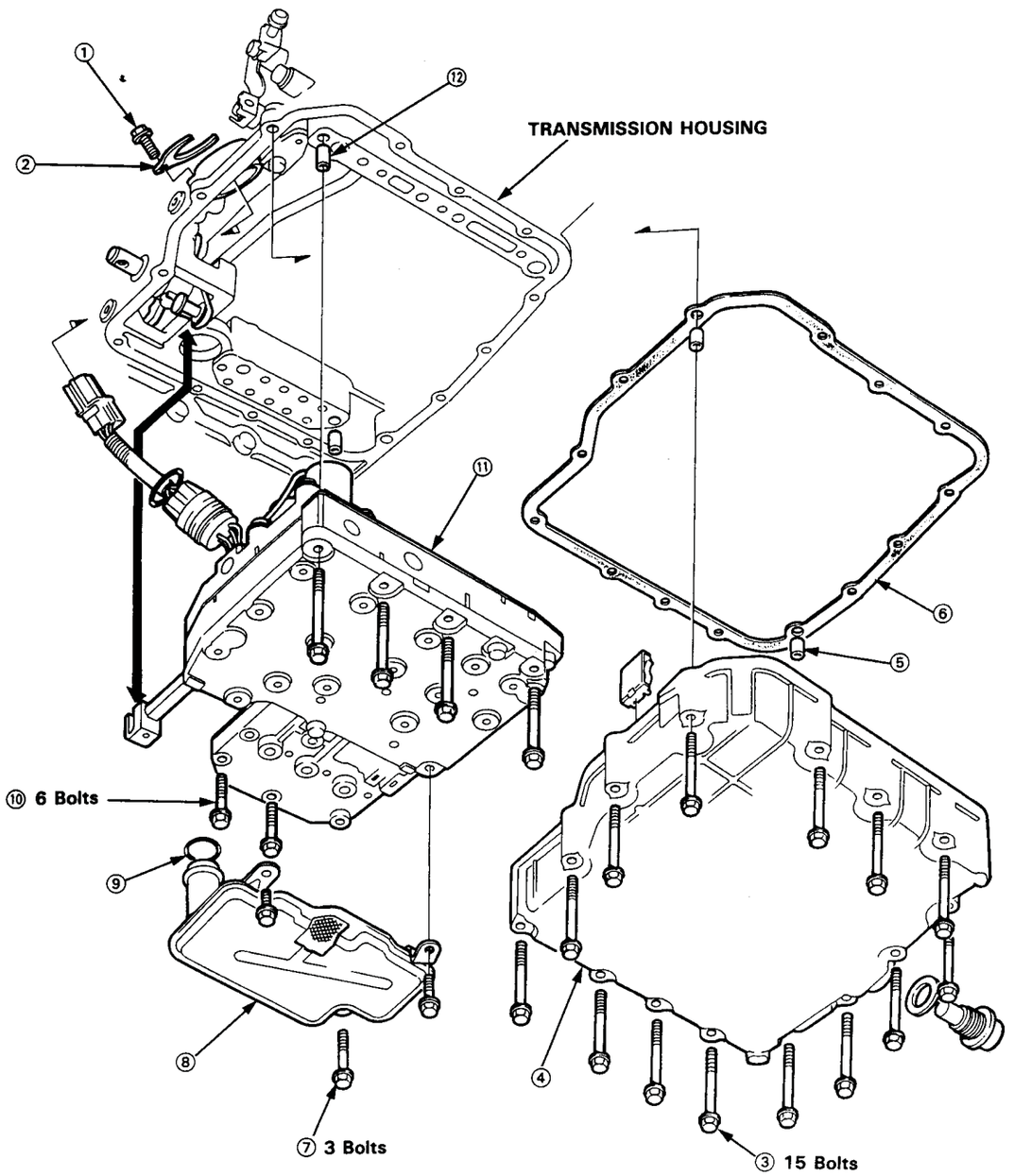
CAUTION: Keep all of the chiseled particles out of the transmission.



NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner and dry with compressed air.
- Blow out all passages.

1. Remove the lower valve body following the numbered sequence.

CAUTION: Do not turn over the transmission before removing the oil pan.

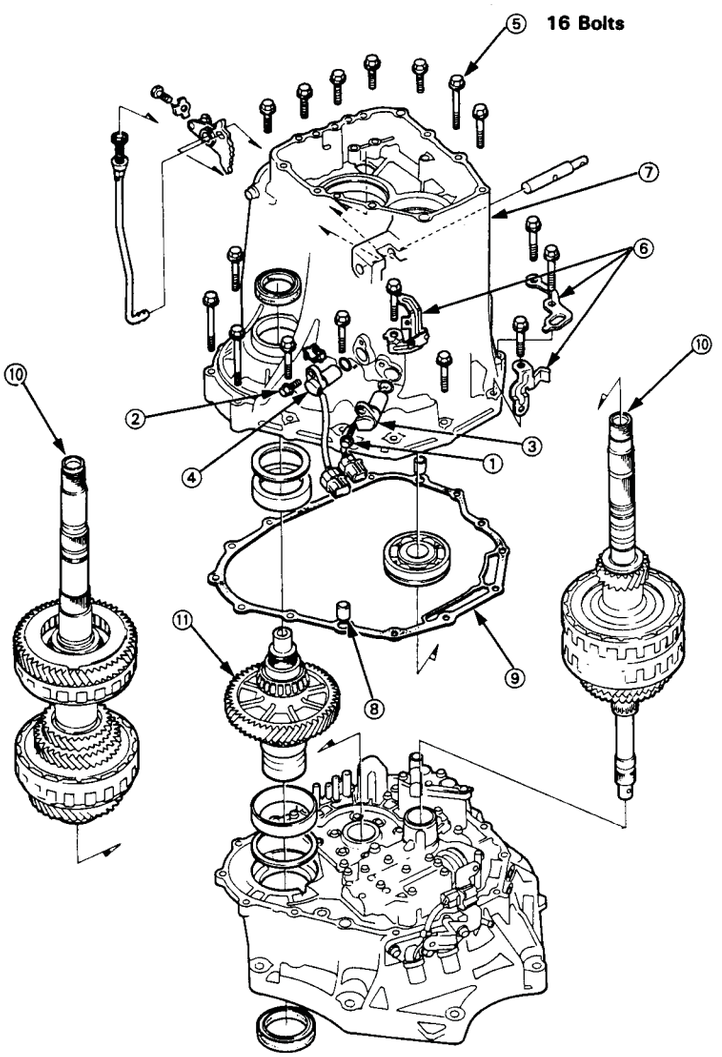


NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner and dry with compressed air.
- Blow out all passages.

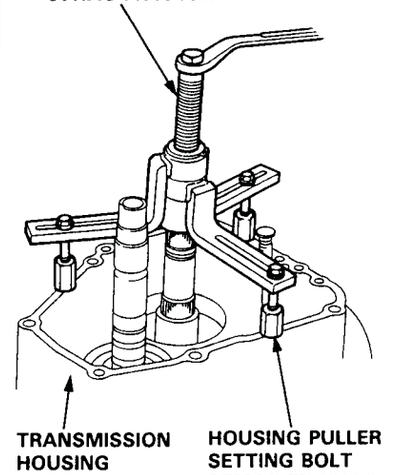
1. Remove the transmission housing following the numbered sequence.

   NOTE: Install the special tools as shown to remove the transmission housing.

CAUTION: Make sure that the NM and NC speed sensors are removed from the transmission housing before removing the transmission housing from the torque converter housing.

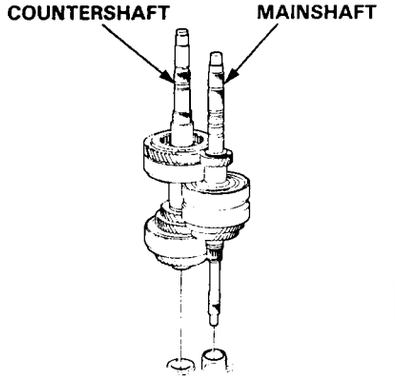


⑦



⑩

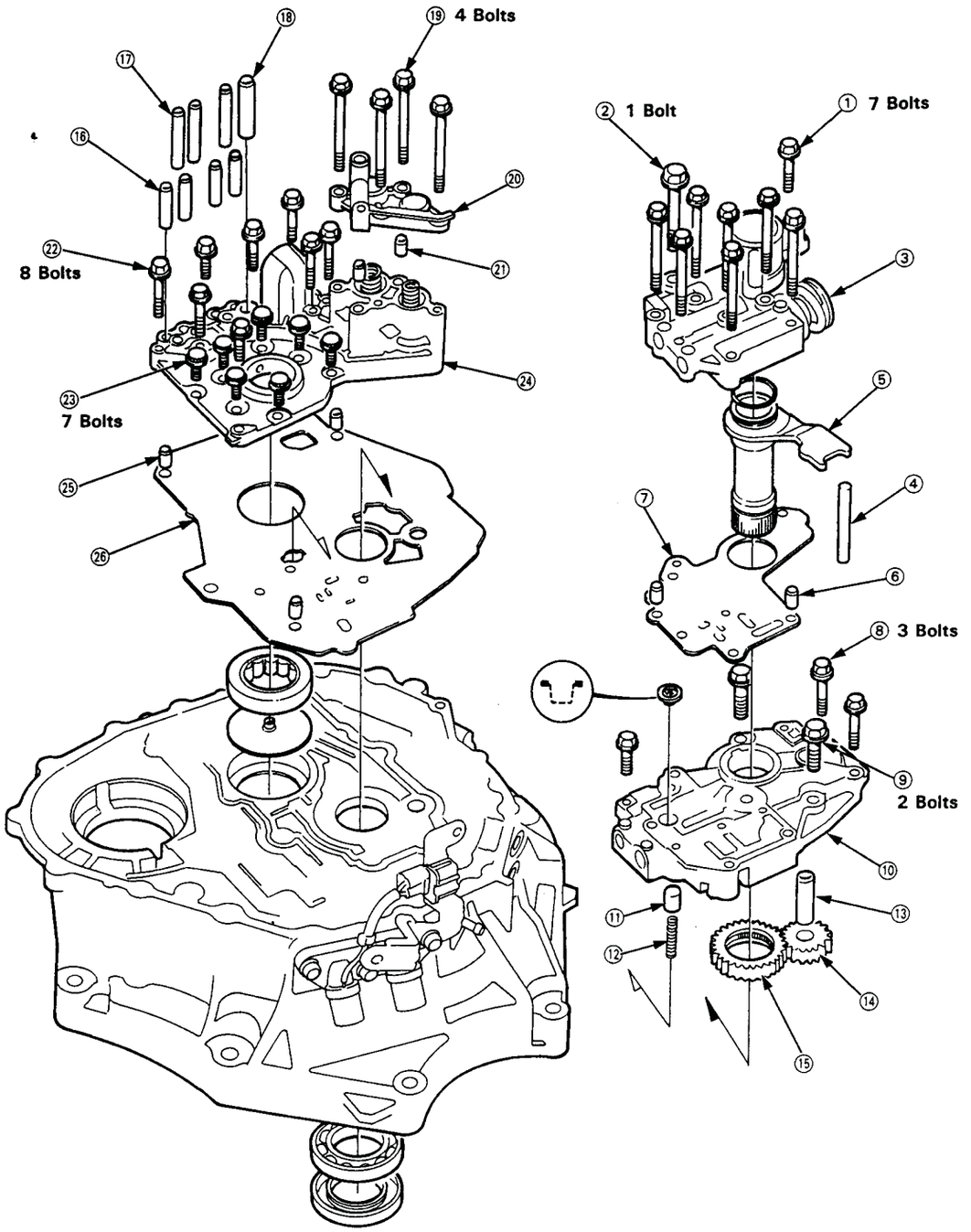
NOTE: Remove two shafts together.



Removal

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner and dry with compressed air.
- Blow out all passages.
- Accumulator cover is spring loaded; to prevent stripping the threads in the torque converter housing, press down on the accumulator cover while unscrewing the bolts in a crisscross pattern.

1. Remove the valve body following the numbered sequence.



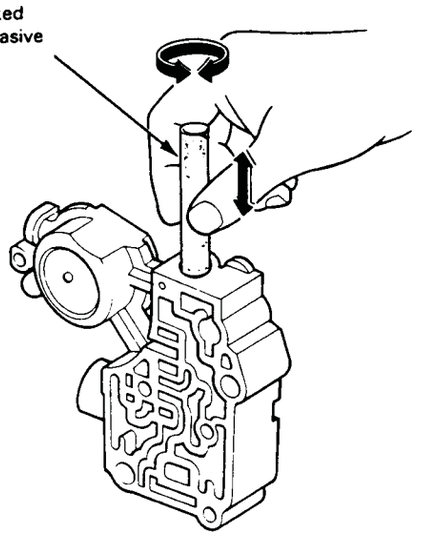
Repair

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

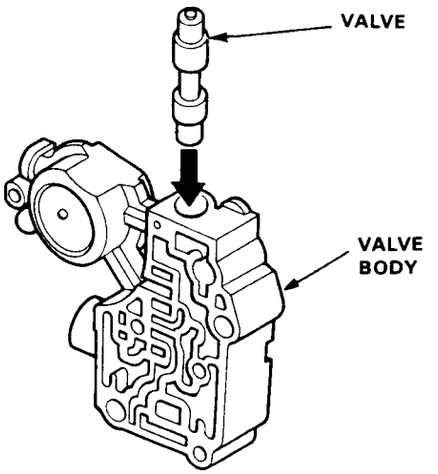
1. Soak a sheet of #600 abrasive paper in ATF for about 30 minutes.
2. Carefully tap the valve body so the sticking valve drops out of its bore.

   CAUTION: It may be necessary to use a small screwdriver to pry the valve free. Be careful not to scratch the bore with the screwdriver.
3. Inspect the valve for any scuff marks. Use the ATF-soaked #600 paper to polish off any burrs that are on the valve, then wash the valve in solvent and dry it with compressed air.
4. Roll up half a sheet of ATF-soaked paper and insert it in the valve bore of the sticking valve.
   Twist the paper slightly, so that it unrolls and fits the bore tightly, then polish the bore by twisting the paper as you push it in and out.

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



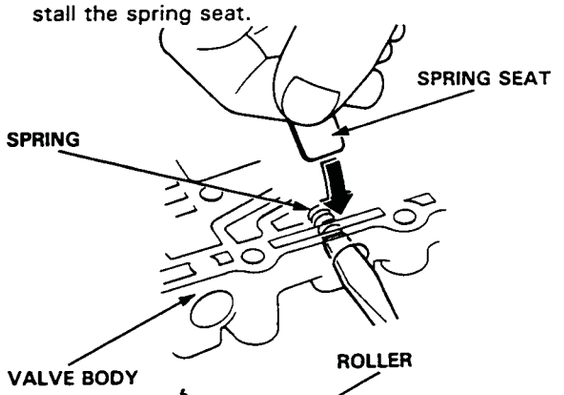
5. Remove the #600 paper and thoroughly wash the entire valve body in solvent, then dry with compressed air.
6. Coat the valve with ATF then drop it into its bore. It should drop to the bottom of the bore under its own weight. If not, repeat step 4, then retest.

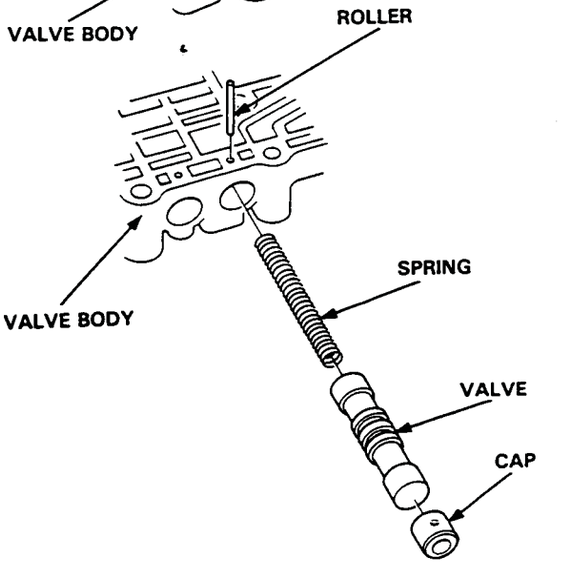


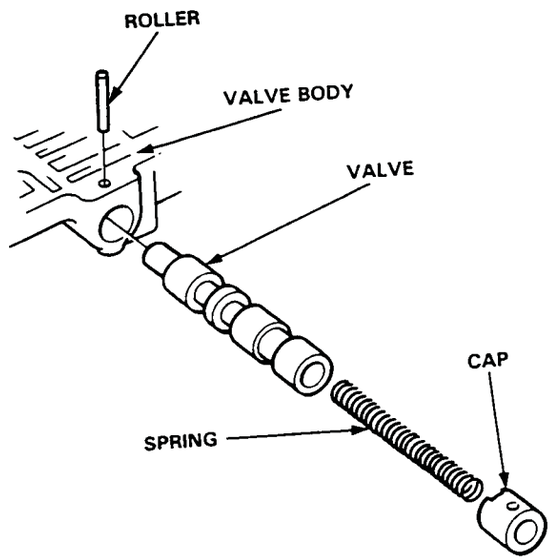
7. Remove the valve and thoroughly clean it and the valve body with solvent. Dry all parts with compressed air, then reassemble using ATF as a lubricant.

NOTE: Coat all parts with ATF before assembly.

1. Install the valve, valve spring and cap in the valve body and secure with the roller.
2. Set the spring in the valve and install it in the valve body. Push the spring in with a screwdriver then install the spring seat.







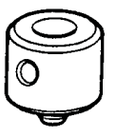
- Caps with one projected tip and one flat end are installed with the flat end toward the spring.
- Caps with a projected tip on each end are installed with the smaller tip toward the spring. The small tip is a spring guide.

Toward outside of valve body.

Toward spring.

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

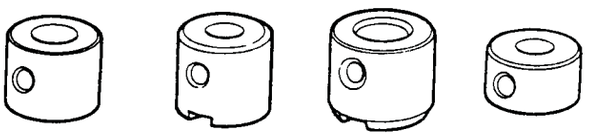
Toward outside of valve body.



Toward spring.

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

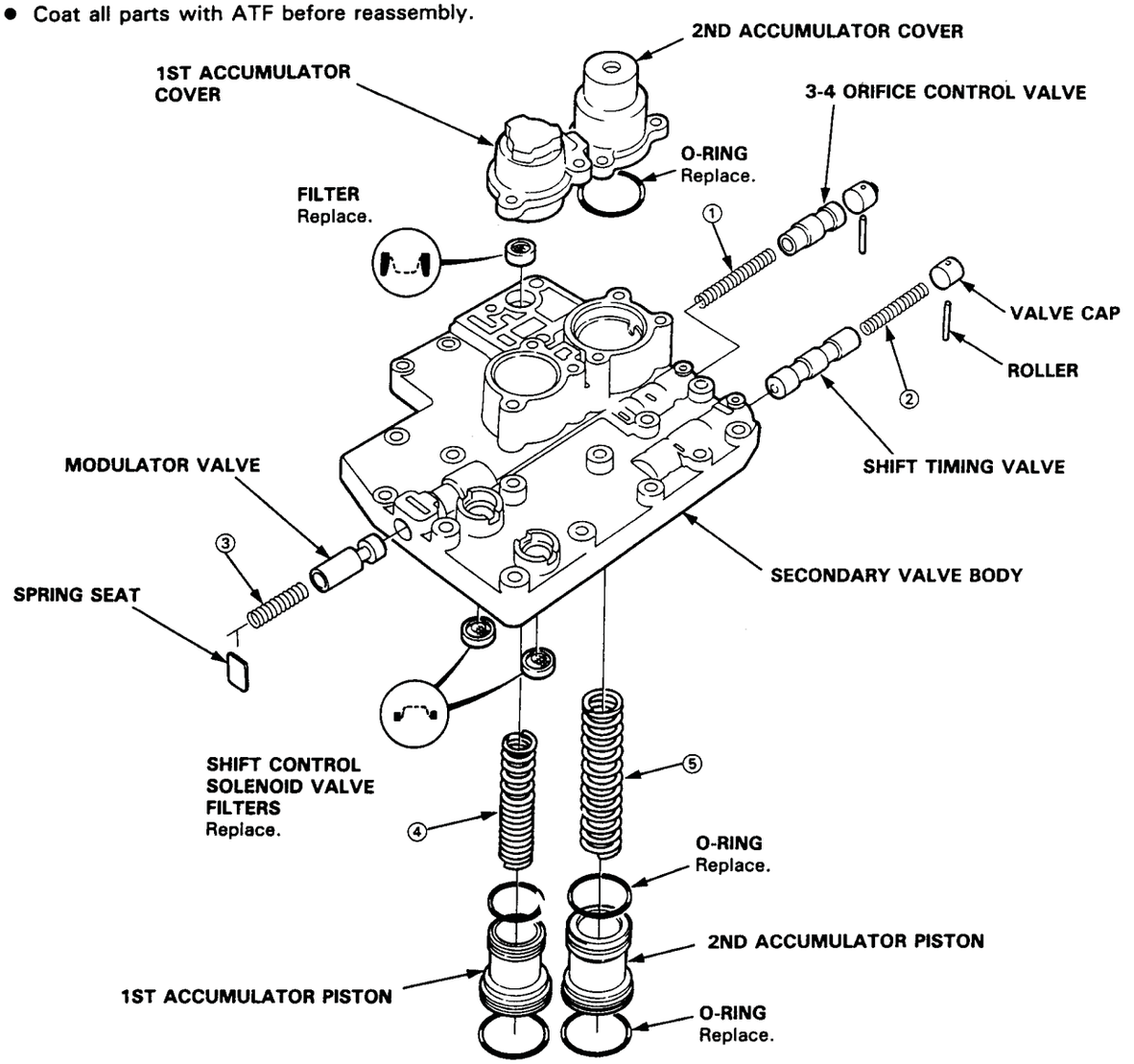
Toward outside of valve body.



Toward spring.

Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Check all valves for free movement. If any fail to slide freely, see Valve Body
- Coat all parts with ATF before reassembly.



SPRING SPECIFICATIONS

Unit of length: mm (in)

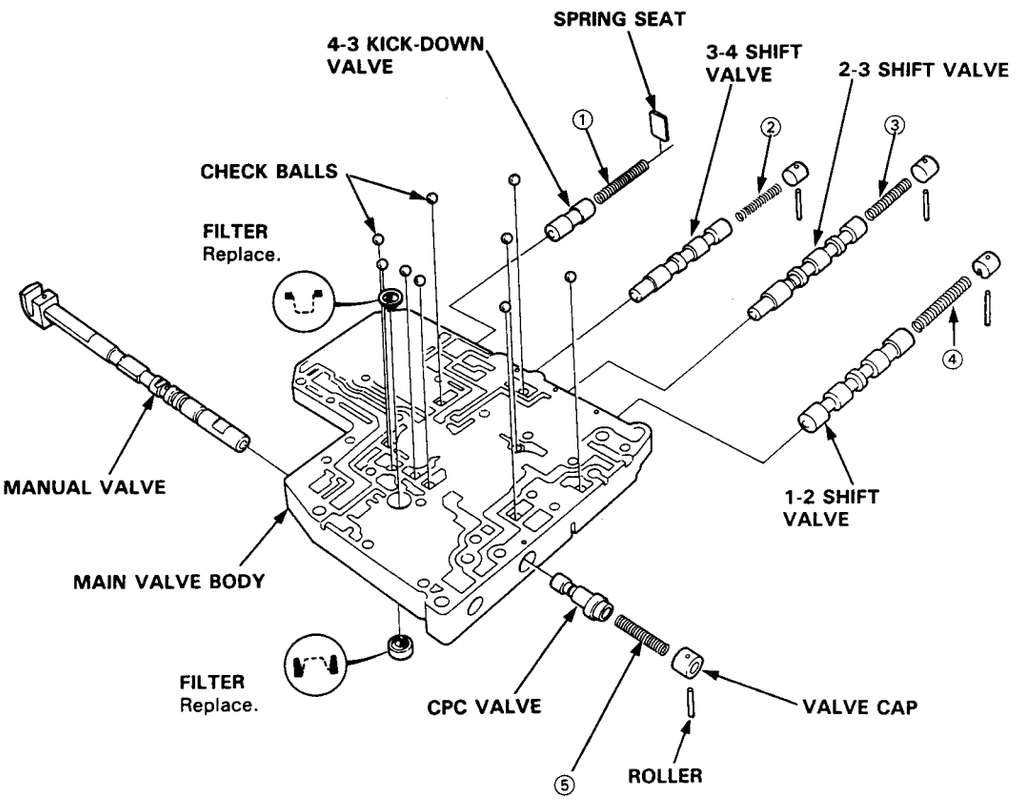
No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	3—4 orifice control valve spring	1.0 (0.039)	6.6 (0.260)	52.2 (2.055)	26.0
②	Shift timing valve spring	0.8 (0.031)	6.6 (0.260)	54.8 (2.157)	30.0
③	Modulator valve spring A	1.5 (0.059)	9.4 (0.370)	30.6 (1.205)	9.9
	Modulator valve spring A, B	1.4 (0.055)	9.4 (0.370)	33.0 (1.299)	10.5
④	1st accumulator spring	3.0 (0.118)	18.0 (0.709)	74.1 (2.917)	9.88/4.72
⑤	2nd accumulator spring	3.9 (0.154)	22.0 (0.866)	92.9 (3.657)	12.1

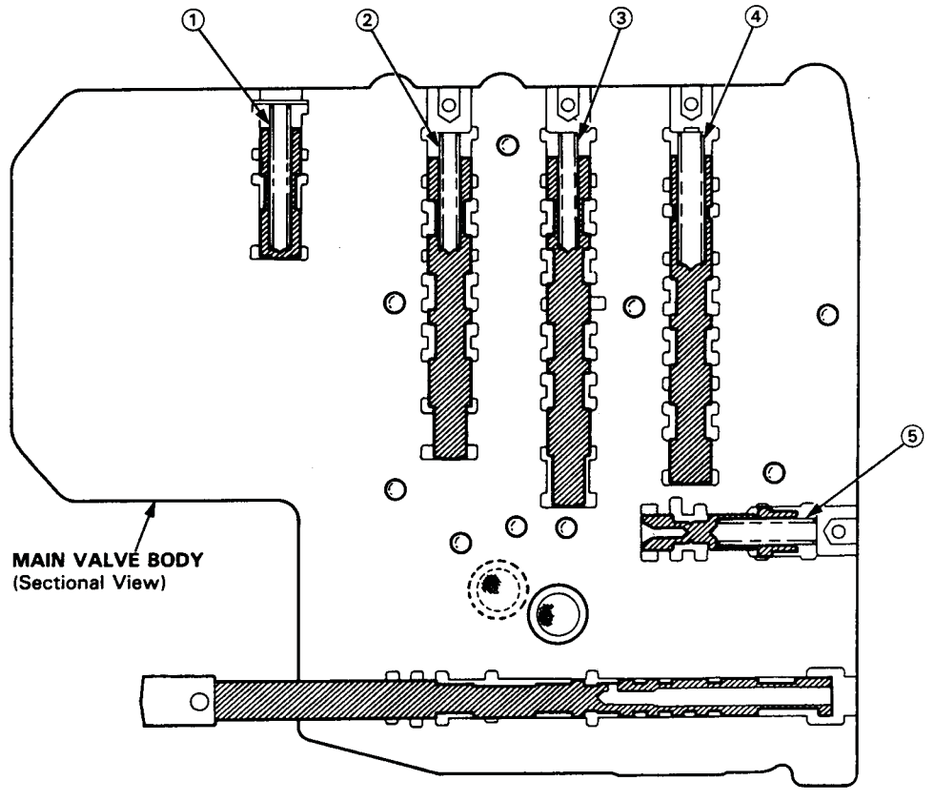
Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Replace valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 69
- Coat all parts with ATF before reassembly.

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





SPRING SPECIFICATIONS

Unit of length: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	4—3 kick-down valve spring	1.1 (0.043)	7.1 (0.280)	51.3 (2.020)	22.5
②	3—4 shift valve spring	0.8 (0.031)	6.6 (0.260)	42.1 (1.657)	22.0
③	2—3 shift valve spring	0.8 (0.031)	6.6 (0.260)	42.1 (1.657)	22.0
④	1—2 shift valve spring	0.9 (0.035)	7.6 (0.299)	55.5 (2.185)	24.0
⑤	CPC valve spring	1.2 (0.047)	8.6 (0.339)	39.1 (1.539)	14.0

Disassembly/Inspection/Reassembly

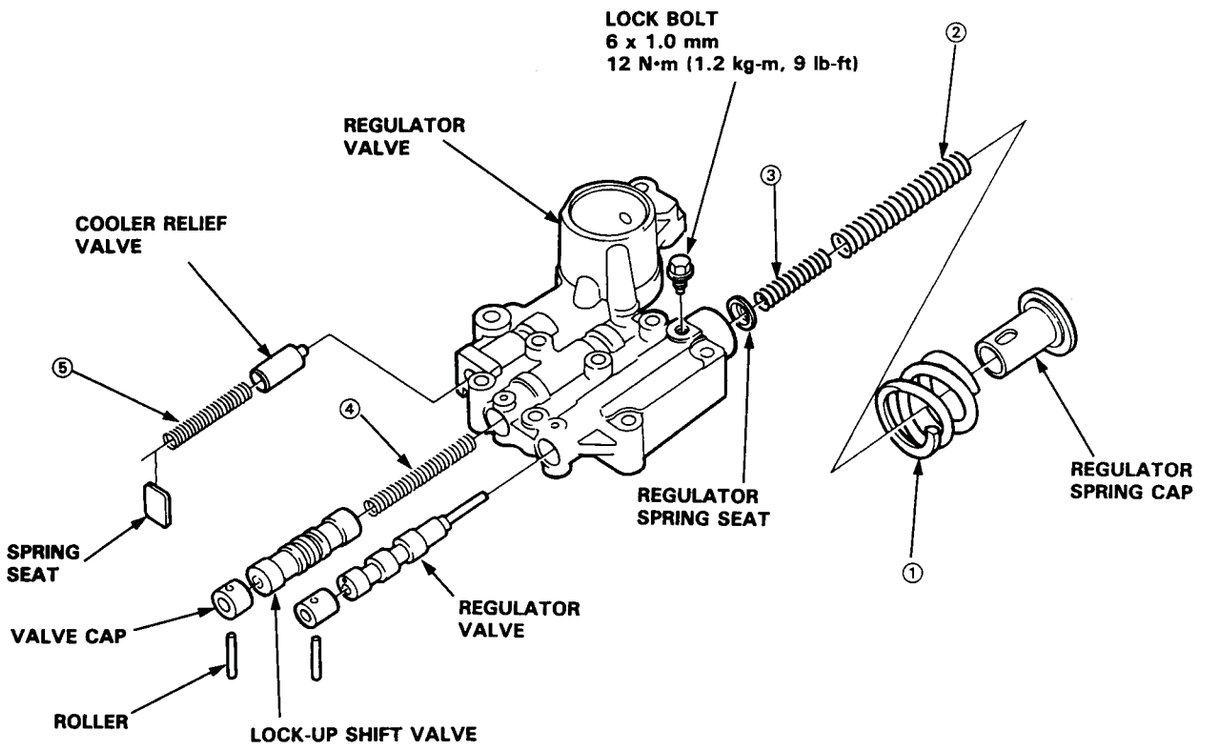
NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Replace valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 69

1. Hold the regulator spring cap in place while removing the lock bolt. Once the bolt is removed, release the spring cap slowly.

   CAUTION: The regulator spring cap can pop out when the lock bolt is removed.

2. Reassembly is in the reverse order of disassembly.

   NOTE:
   - Coat all parts with ATF.
   - Align the hole in the regulator cap with the hole in the valve body, press the spring cap into the body and tighten the lock bolt.



SPRING SPECIFICATIONS

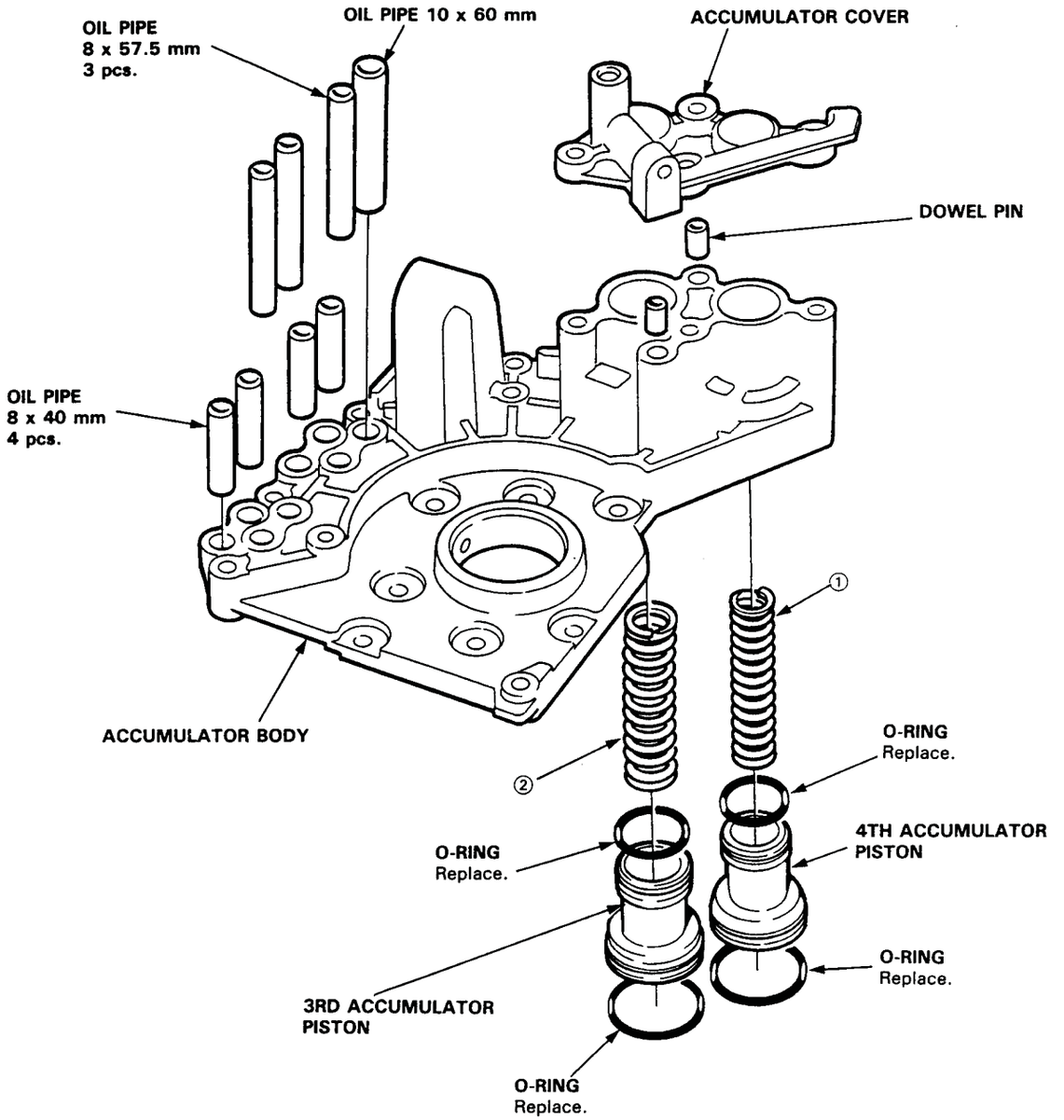
Unit of length: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Stator reaction spring	6.5 (0.256)	26.4 (1.039)*	30.3 (1.193)	1.9
②	Regulator valve spring A	1.8 (0.071)	14.7 (0.579)	86.5 (3.406)	16.5
③	Regulator valve spring B	1.7 (0.067)	6.0 (0.236)*	43.0 (1.693)	13.5
④	Lock-up shift valve spring	0.9 (0.035)	7.6 (0.299)	73.7 (2.902)	32.0
⑤	Cooler relief valve spring	1.1 (0.043)	8.4 (0.331)	46.8 (1.843)	17.0

*: Inside Diameter

Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 69.
- Coat all parts with ATF before reassembly.



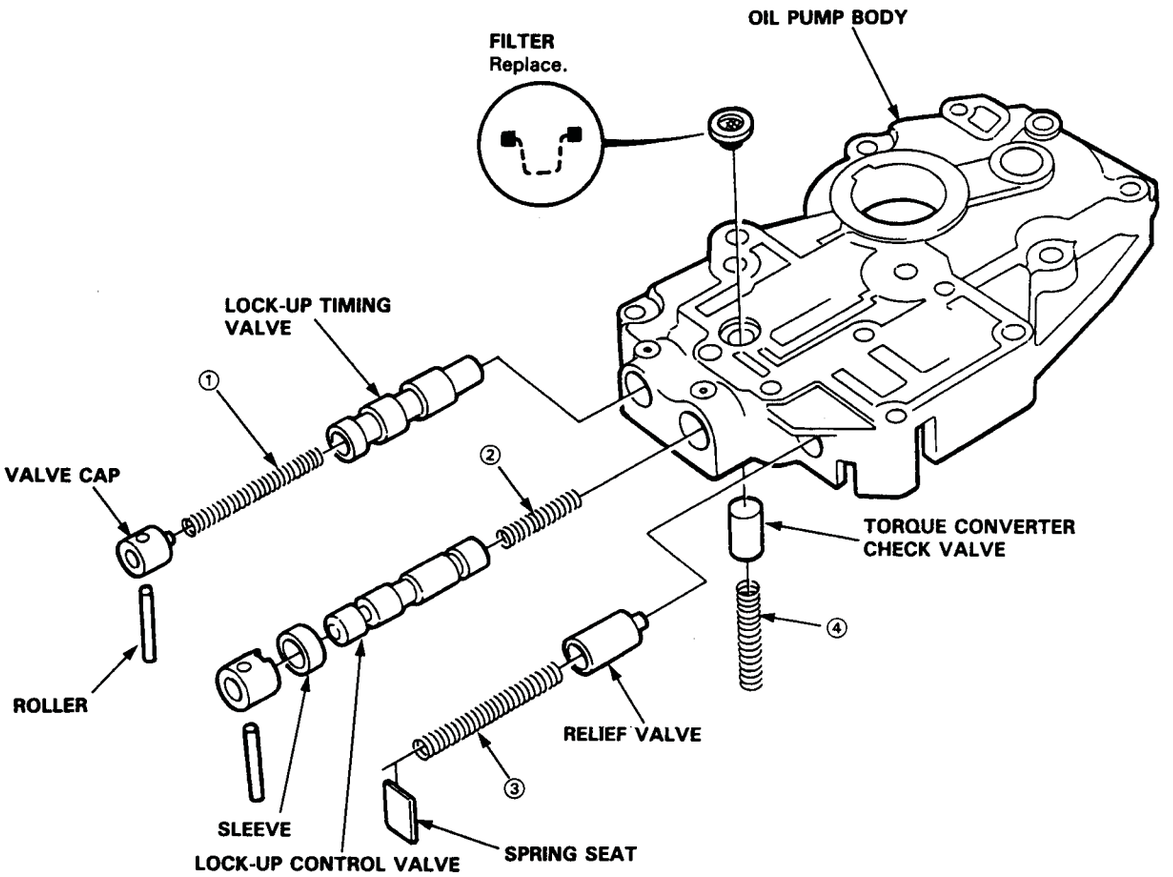
SPRING SPECIFICATIONS

Unit of length: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	4th accumulator spring	2.8 (0.110)	16.5 (0.650)	78.1 (3.075)	13.5
②	3rd accumulator spring	3.2 (0.126)	19.0 (0.748)	78.6 (3.094)	11.7

Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Replace valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 69
- Coat all parts with ATF before reassembly.



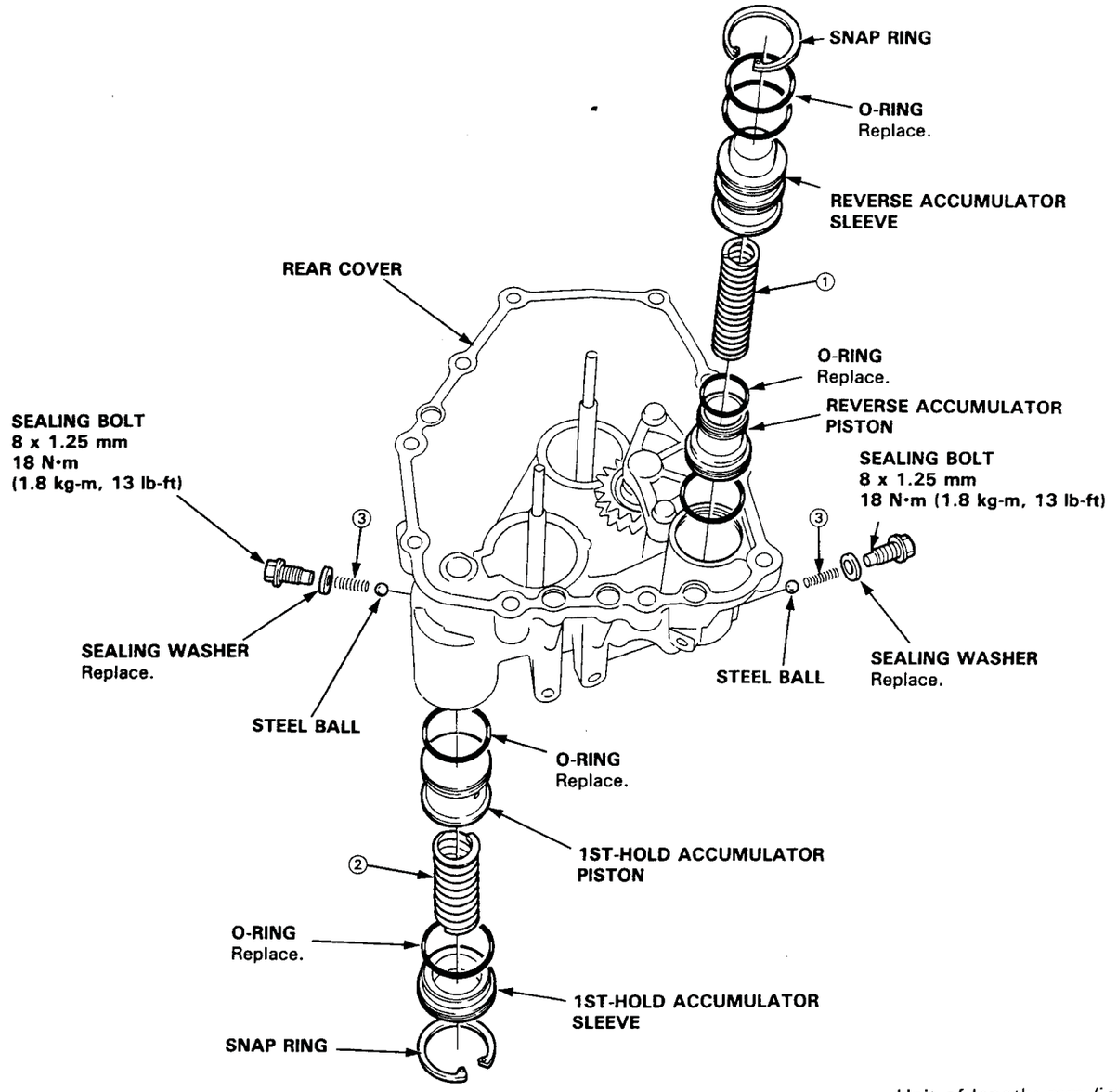
SPRING SPECIFICATIONS

Unit of length: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Lock-up timing valve spring	0.8 (0.031)	6.6 (0.260)	61.2 (2.409)	38.5
		0.7 (0.026)	6.6 (0.260)	36.3 (1.429)	14.1
②	Lock-up control valve spring	0.7 (0.026)	6.6 (0.260)	37.5 (1.476)	24.6
		0.7 (0.026)	6.6 (0.260)	38.5 (1.516)	24.6
③	Relief valve spring	0.9 (0.035)	8.4 (0.331)	56.5 (2.224)	22.4
④	Torque converter check valve spring	1.1 (0.043)	8.4 (0.331)	41.8 (1.646)	15.7

Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Replace the O-rings.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 69
- Coat all parts with ATF before reassembly.



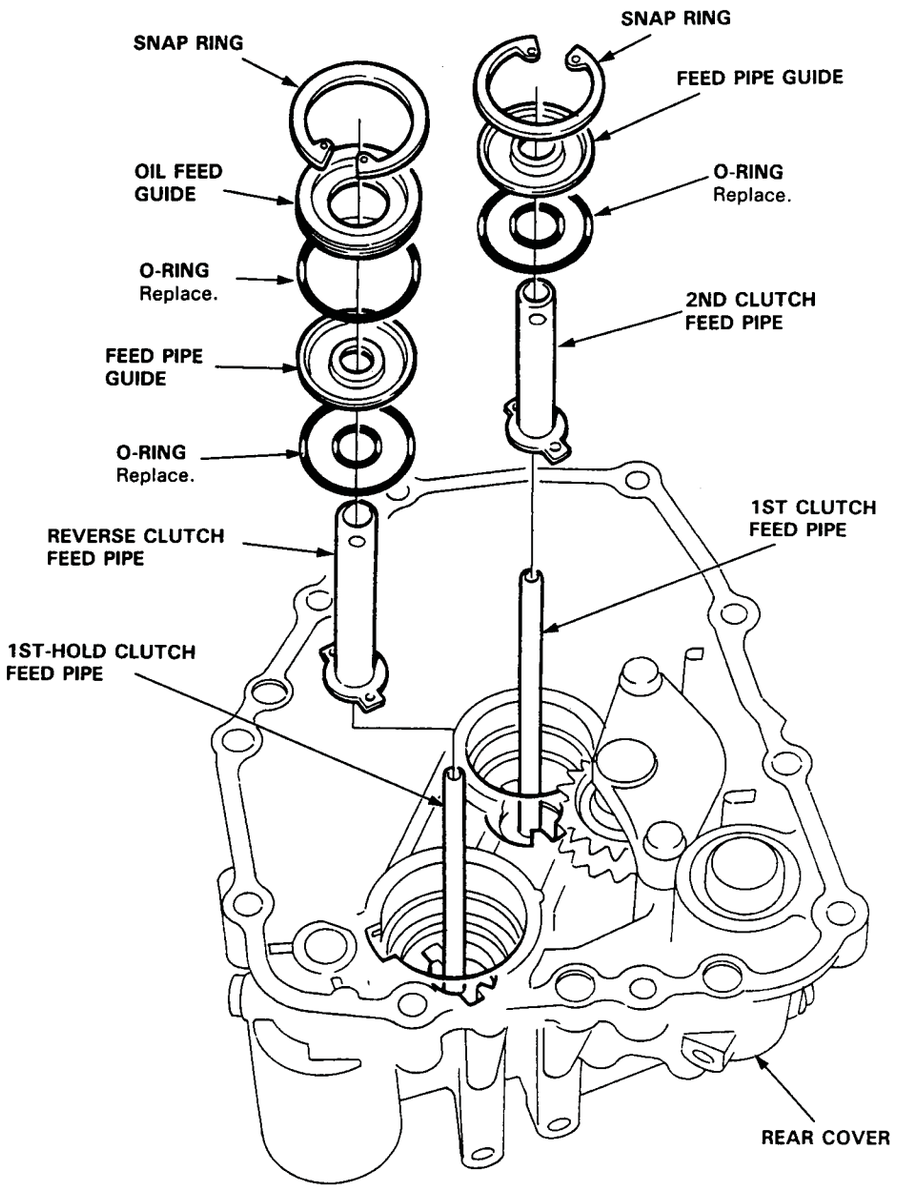
SPRING SPECIFICATIONS

Unit of length: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Reverse accumulator spring	3.5 (0.138)	18.6 (0.732)	94.4 (3.717)	15.2
②	1st-hold accumulator spring	4.0 (0.157)	25.0 (0.984)	68.4 (2.693)	7.2
③	One-way ball spring	0.29 (0.011)	4.0 (0.157)	14.0 (0.551)	13.0

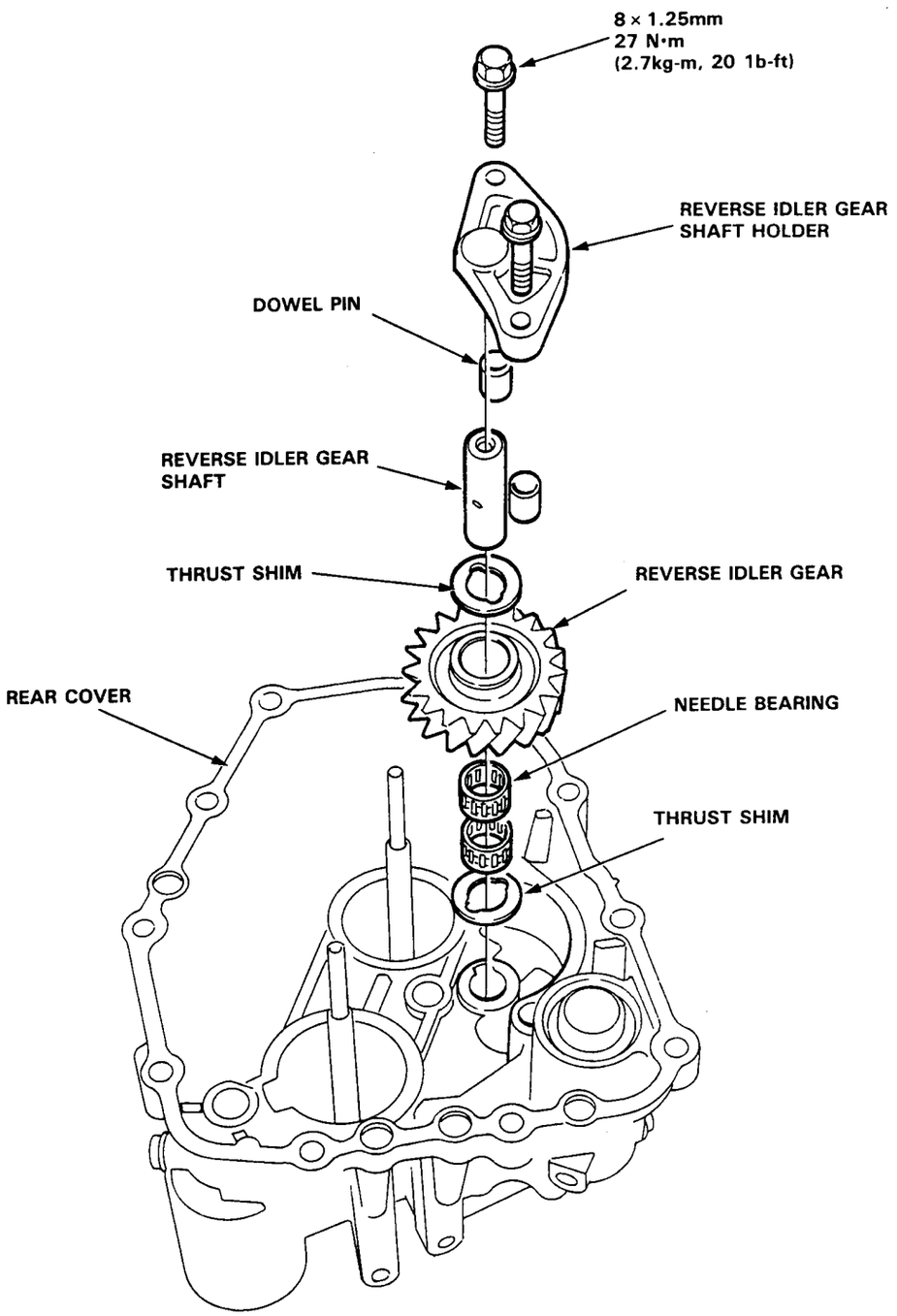
Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Replace the O-rings.
- Coat all parts with ATF before reassembly.



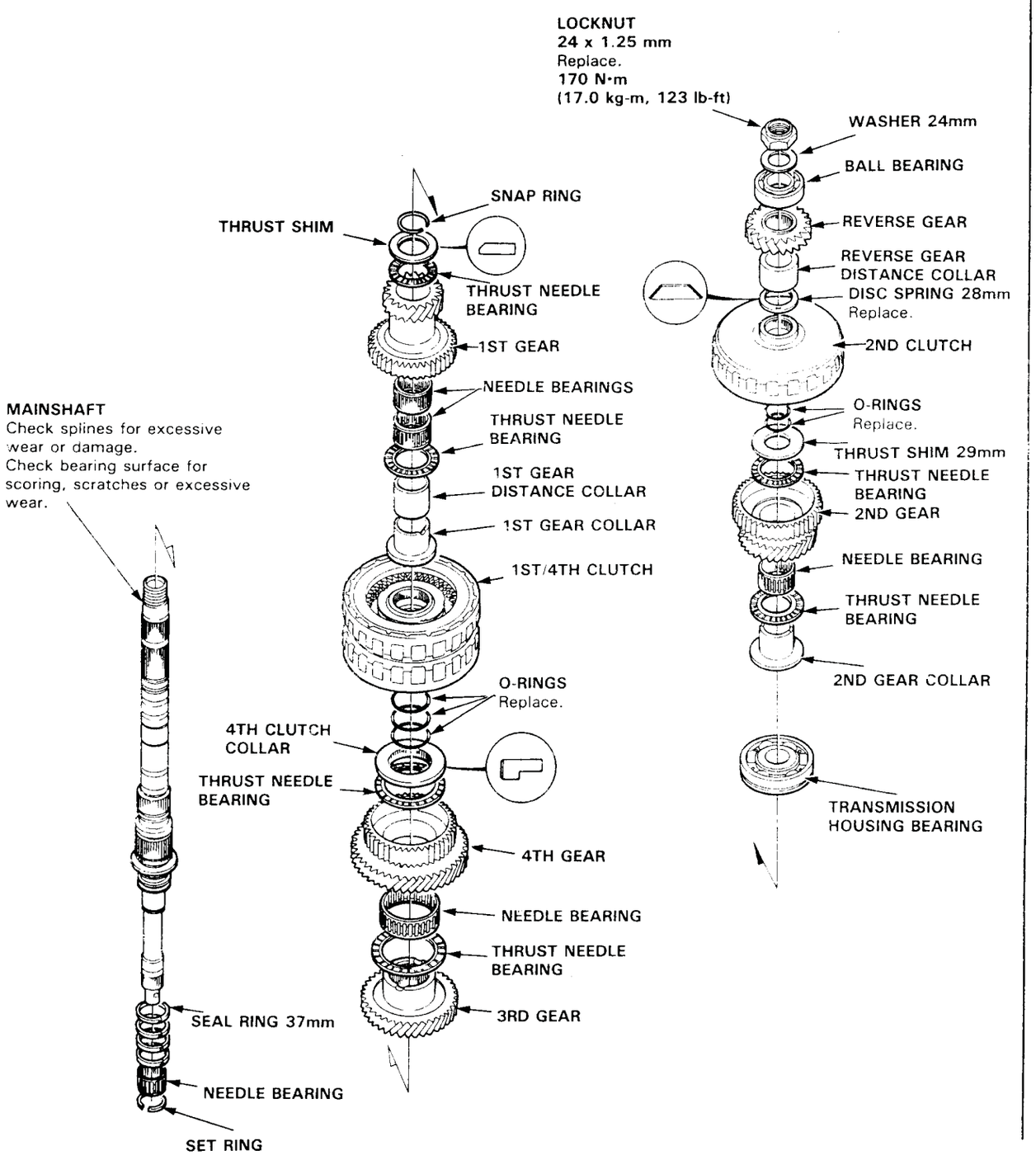
Disassembly/Inspection/Reassembly

NOTE:
- Inspect the needle bearings for galling and rough movement.
- Coat all parts with ATF before reassembly.



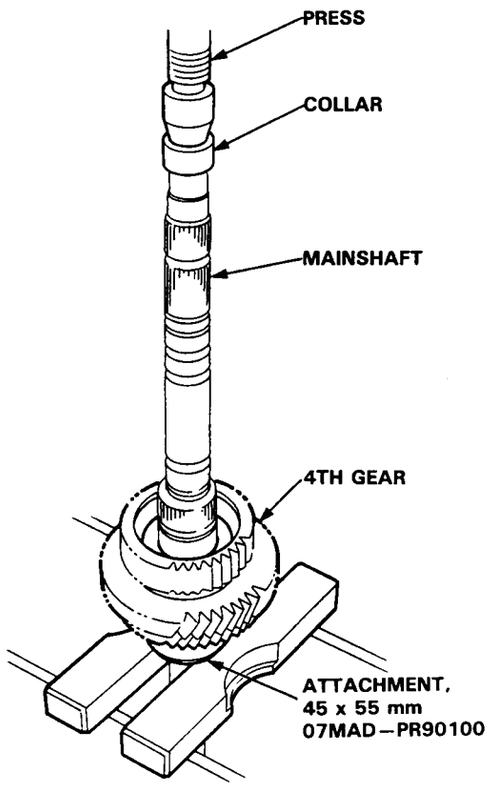
Disassembly/Inspection/Reassembly

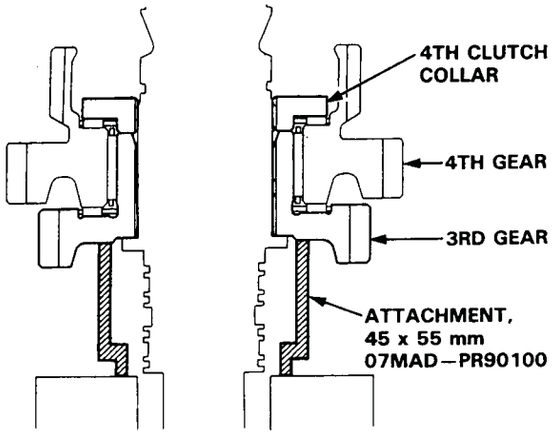
NOTE:
- Lubricate all parts with ATF during reassembly.
- Install thrust needle bearings with unrolled edge of bearing retainer facing washer.
- Inspect thrust needle and needle bearings for galling and rough movement.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damage to the O-rings.



Disassembly

1. Remove the mainshaft 3rd gear, 4th gear and 4th clutch collar from the mainshaft using the special tool and a press as shown.

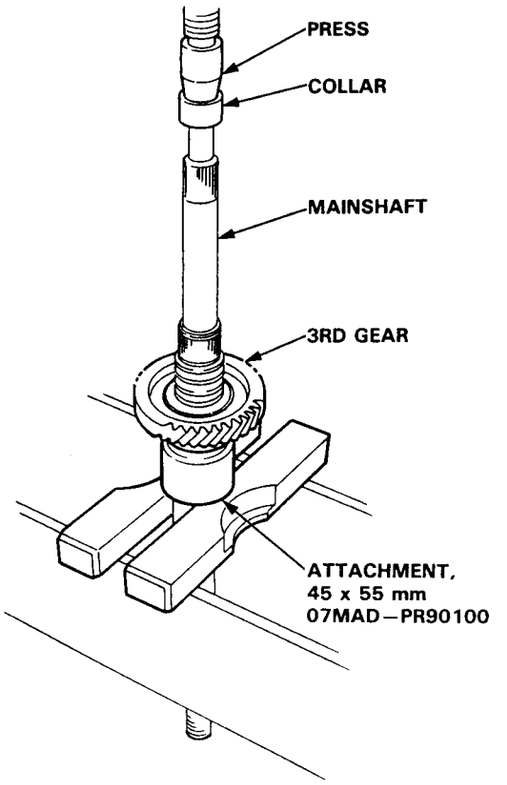


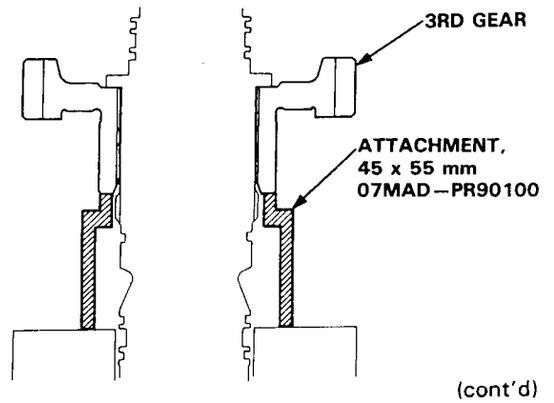


Inspection

NOTE:
- Inspect and adjust the 4th clutch collar when disassembling the mainshaft assembly or replacing the mainshaft 3rd gear and/or 1st/4th clutch assembly.
- Lubricate all parts with ATF during assembly.

1. Install the mainshaft 3rd gear on the mainshaft using the special tool and a press as shown.



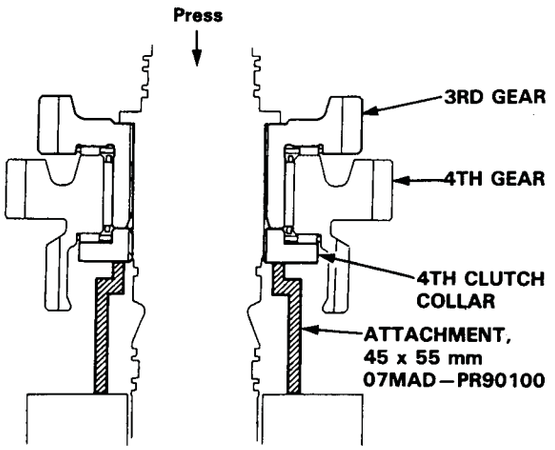


(cont'd)

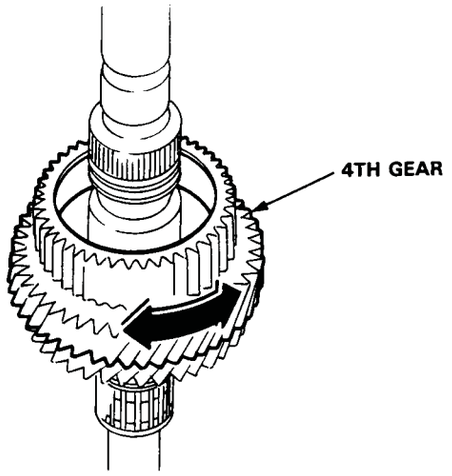
Inspection (cont'd)

2. Assemble the thrust needle bearing, needle bearing and 4th gear, and install the 4th clutch collar using the special tool and a press as shown.

   NOTE: Replace the 4th clutch collar, if it can be installed by pressing with your hand.

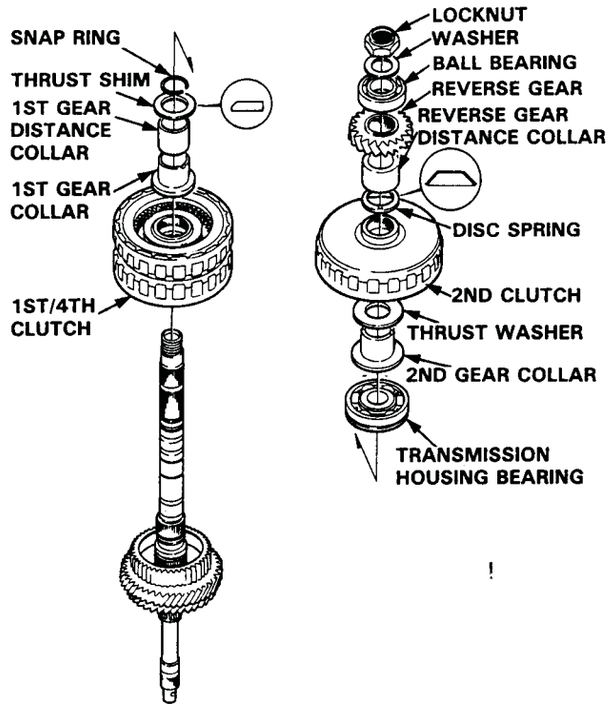


3. Spin the mainshaft 4th gear by hand to check for clearance. The clearance is considered normal if it turns freely without binding.

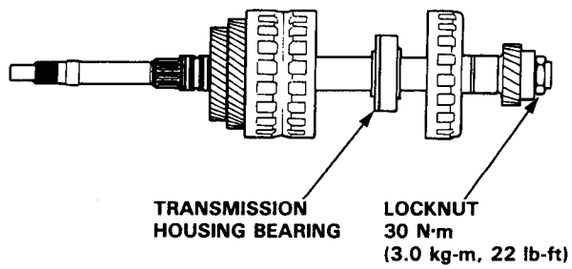


4. Remove the mainshaft bearing from the transmission housing See page 106

5. Assemble the parts below on the mainshaft.
   NOTE: Do not assemble the O-rings and mainshaft 1st gear.



6. Torque the mainshaft locknut to 30 N·m (3.0 kg-m, 22 lb-ft).

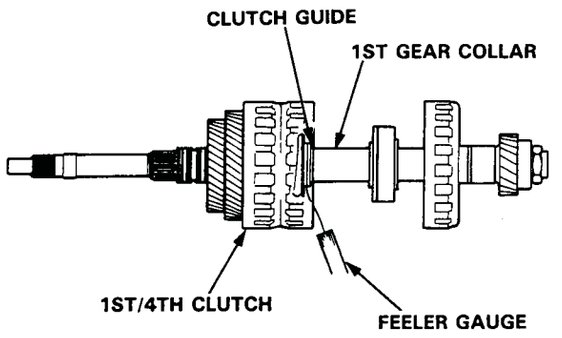


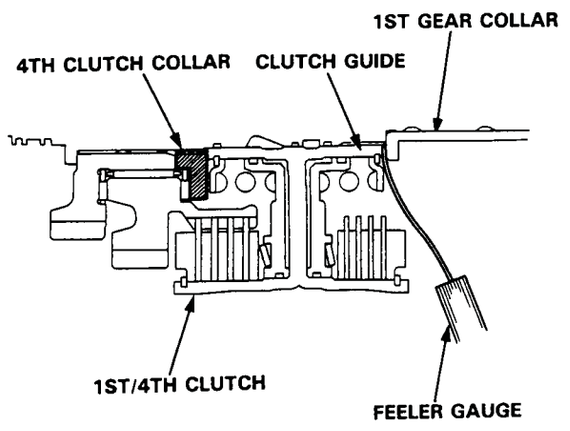
7. Move the 1st/4th clutch assembly to check the axial clearances.

8. Measure the clearance between the 1st/4th clutch guide and 1st gear collar with a feeler gauge.

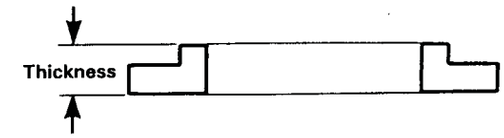
   STANDARD: 0—0.08 mm (0—0.003 in)

   NOTE:
   - Take measurements in at least three places and take the average as the actual clearance.
   - If the 0.08 mm (0.003 in) feeler gauge can be inserted, replace the 4th clutch collar.





9. If the clearance is out of specification, remove the 4th clutch collar and measure the thickness.



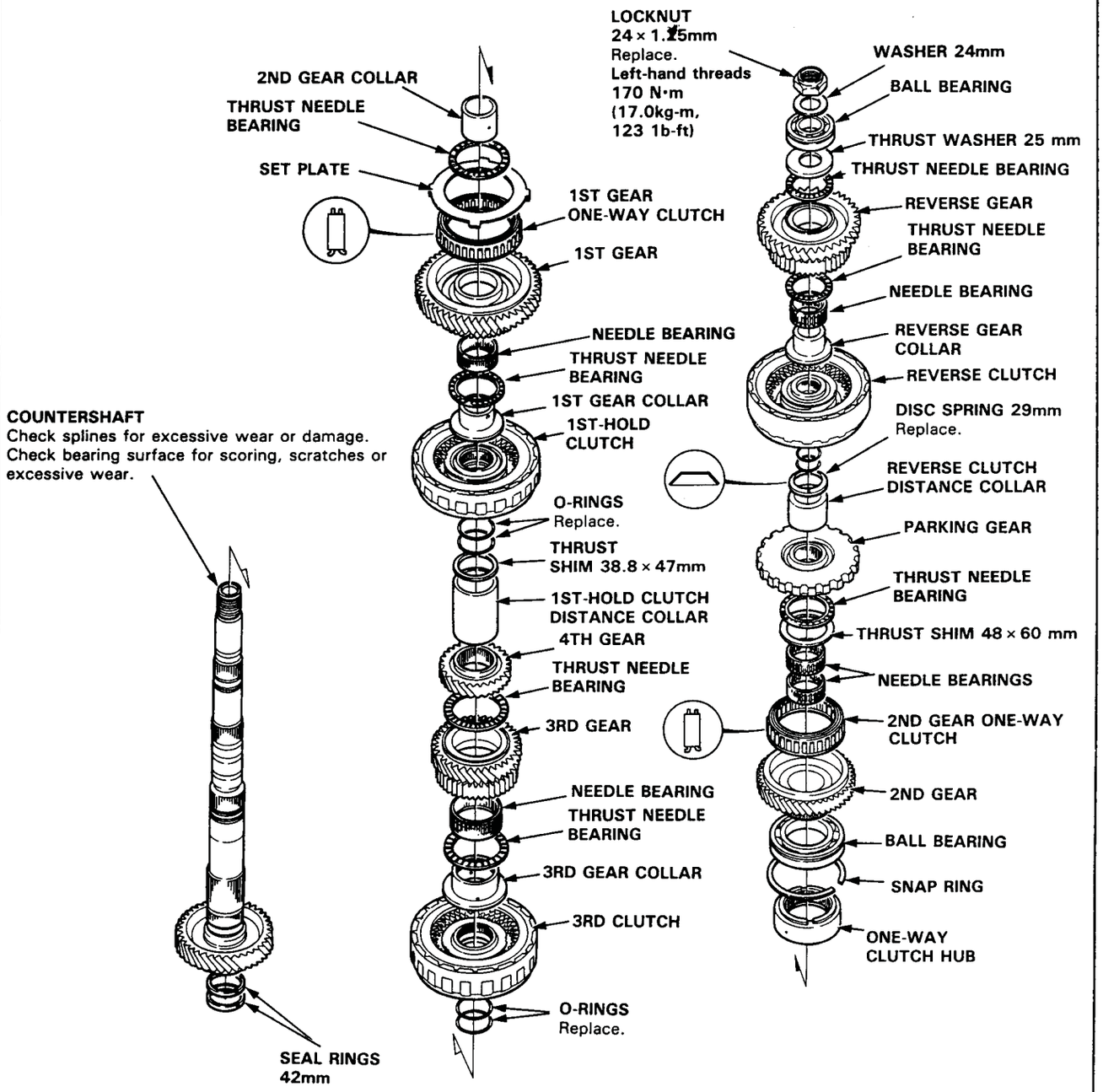
10. Select and install a new 4th clutch collar then recheck.

4TH CLUTCH COLLAR

No.	Part Number	Thickness mm (in)
1	90431-PY4-010	9.67—9.70 (0.381—0.382)
2	90432-PY4-010	9.72—9.75 (0.383—0.384)
3	90433-PY4-010	9.77—9.80 (0.385—0.386)
4	90434-PY4-010	9.82—9.85 (0.387—0.388)
5	90435-PY4-010	9.87—9.90 (0.389—0.390)
6	90436-PY4-010	9.92—9.95 (0.391—0.392)
7	90437-PY4-010	9.97—10.00 (0.393—0.394)

Disassembly/Inspection/Reassembly

NOTE:
- Lubricate all parts with ATF during reassembly.
- Install thrust needle bearings with unrolled edge of bearing retainer facing washer.
- Inspect thrust needle and needle bearings for galling and rough movement.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damage to the O-rings.
- Locknut has left-hand threads.



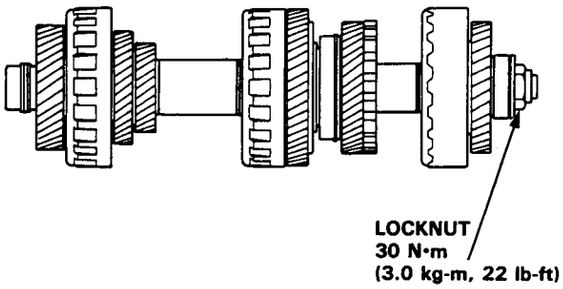
Inspection

- **Clearance Measurements**

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

1. Assemble all parts on the countershaft.

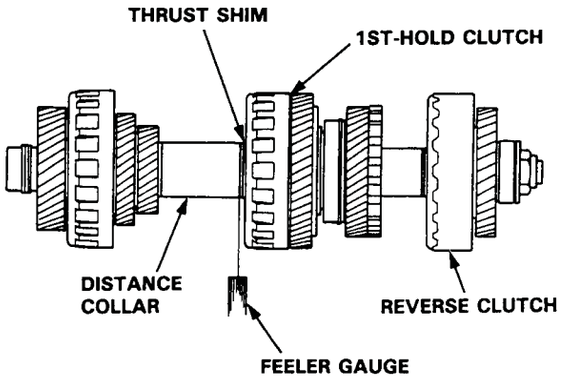
2. Torque the countershaft locknut to 30 N·m (3.0 kg-m, 22 lb-ft).

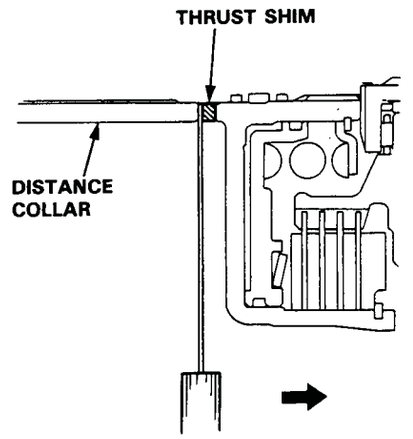


3. Hold the 1st-hold clutch assembly against the reverse clutch. Measure the clearance between the thrust shim 38.8 x 47 mm and the 1st-hold clutch distance collar with a feeler gauge.

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

   STANDARD: 0—0.08 mm (0—0.003 in)





Push in this direction, while measuring.

4. If the clearance is out of tolerance, select and install a new thrust shim.

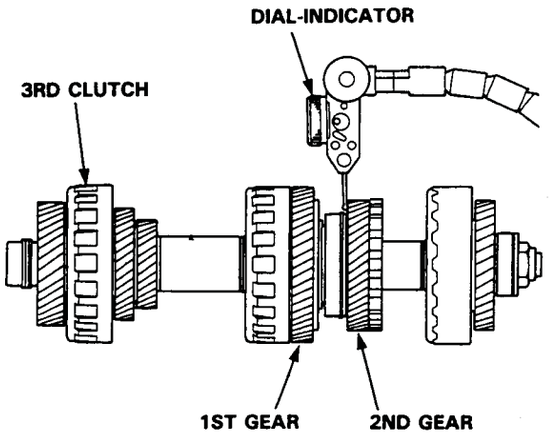
THRUST SHIM 38.3 x 47 mm

No.	Part Number	Thickness mm (in)
1	90451-PY4-000	2.97—3.00 (0.117—0.118)
2	90452-PY4-000	3.02—3.05 (0.119—0.120)
3	90453-PY4-000	3.07—3.10 (0.121—0.122)
4	90454-PY4-000	3.12—3.15 (0.123—0.124)
5	90455-PY4-000	3.17—3.20 (0.125—0.126)
6	90456-PY4-000	3.22—3.25 (0.127—0.128)
7	90457-PY4-000	3.27—3.30 (0.129—0.130)
8	90458-PY4-000	3.32—3.35 (0.131—0.132)
9	90459-PY4-000	3.37—3.40 (0.133—0.134)
10	90460-PY4-000	3.42—3.45 (0.135—0.136)
11	90461-PY4-000	3.47—3.50 (0.137—0.138)

(cont'd)

Inspection (cont'd)

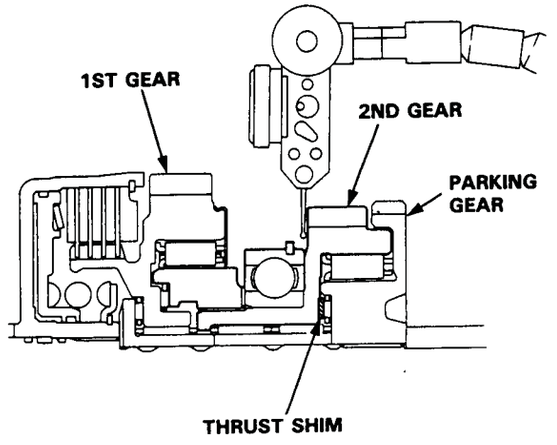
5. Attach the dial-indicator to the countershaft 2nd gear.



6. Measure the 2nd gear axial clearance while pushing 1st gear towards the 1st-hold clutch assembly.

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

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

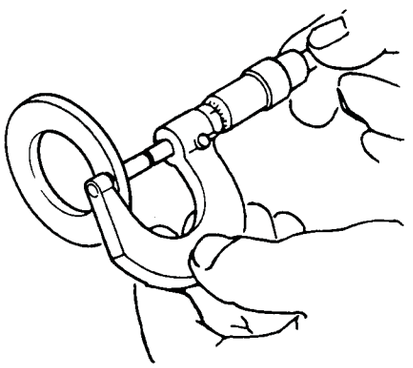


7. If the clearance is out of tolerance, select and install a new thrust shim.

THRUST SHIM 48 x 60 mm

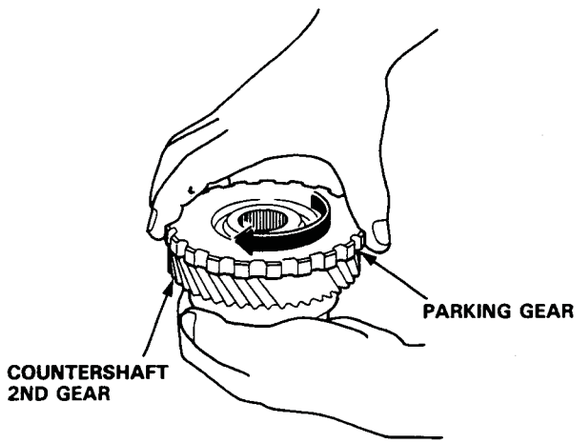
No.	Part Number	Thickness mm (in)
1	90411-PY4-000	1.27—1.30 (0.050—0.051)
2	90412-PY4-000	1.32—1.35 (0.052—0.053)
3	90413-PY4-000	1.37—1.40 (0.054—0.055)
4	90414-PY4-000	1.42—1.45 (0.056—0.057)
5	90415-PY4-000	1.47—1.50 (0.058—0.059)
6	90416-PY4-000	1.52—1.55 (0.060—0.061)
7	90417-PY4-000	1.57—1.60 (0.062—0.063)
8	90418-PY4-000	1.62—1.65 (0.064—0.065)
9	90419-PY4-000	1.67—1.70 (0.066—0.067)
10	90420-PY4-000	1.72—1.75 (0.068—0.069)
11	90421-PY4-000	1.77—1.80 (0.070—0.071)
12	90422-PY4-000	1.82—1.85 (0.072—0.073)
13	90423-PY4-000	1.87—1.90 (0.074—0.075)

Note: After replacing the thrust shim, make sure that the clearance is within tolerance.

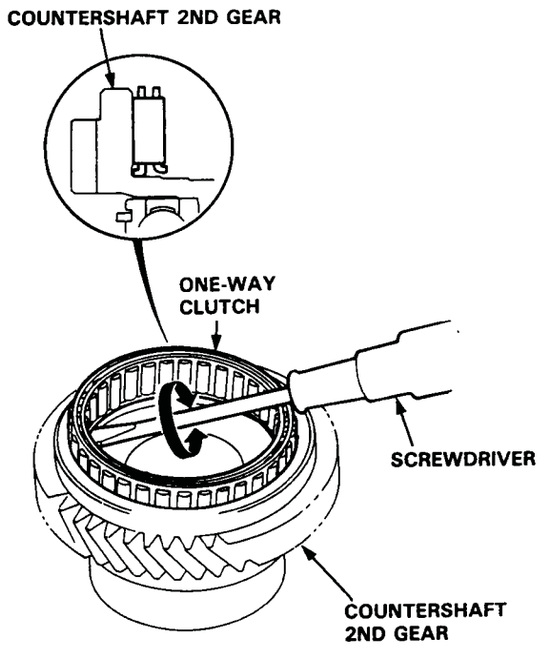


Disassembly

1. Separate the countershaft 2nd gear from the parking gear by turning the parking gear in the direction shown.

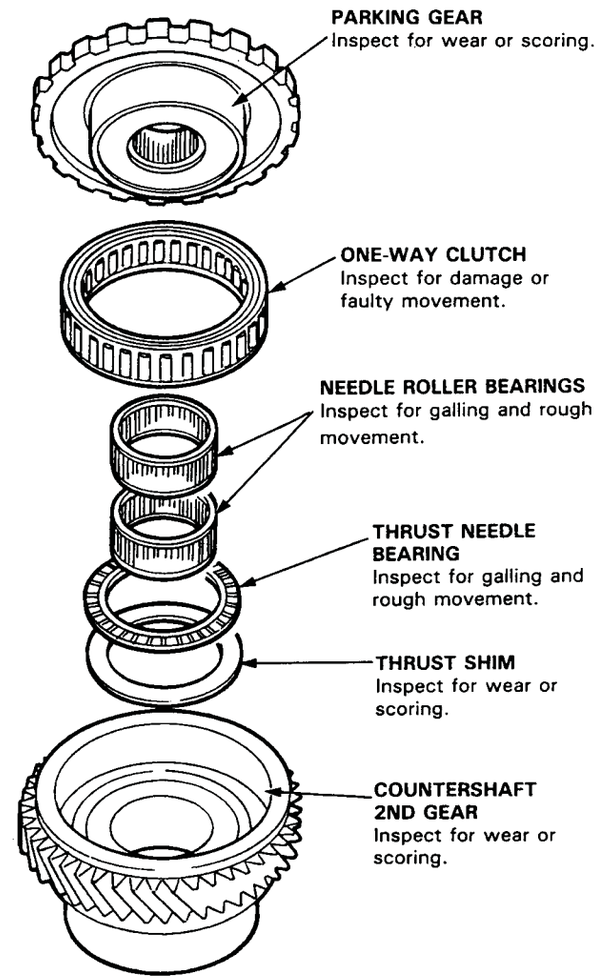


2. Remove the one-way clutch by prying it up with the end of a screwdriver.



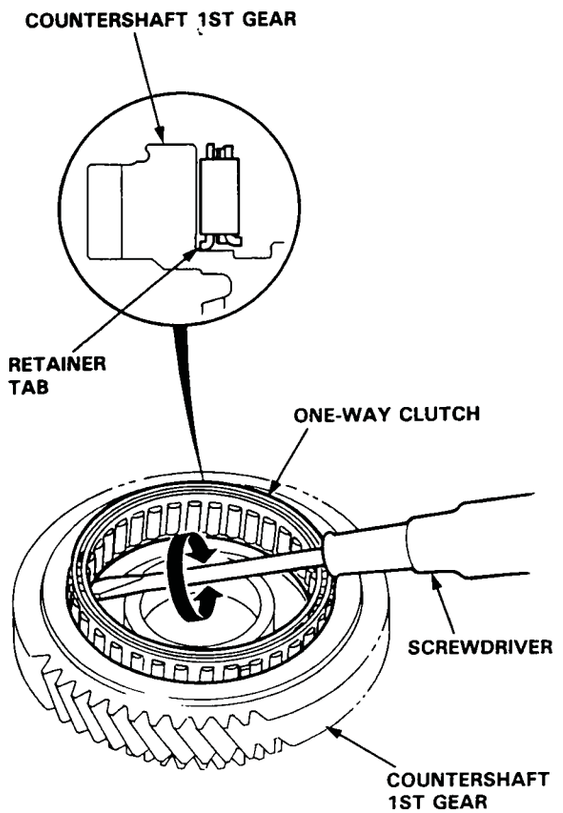
Inspection

Inspect the parts as follows:

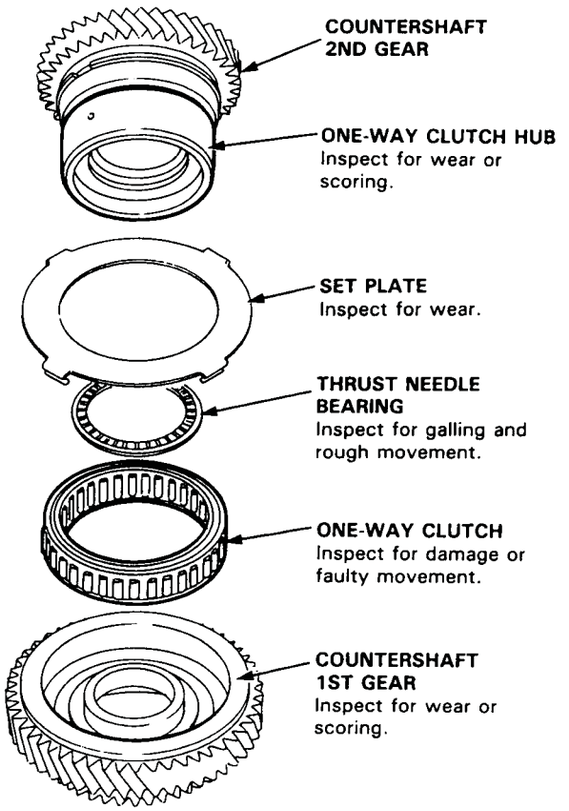


Disassembly/Inspection/Reassembly

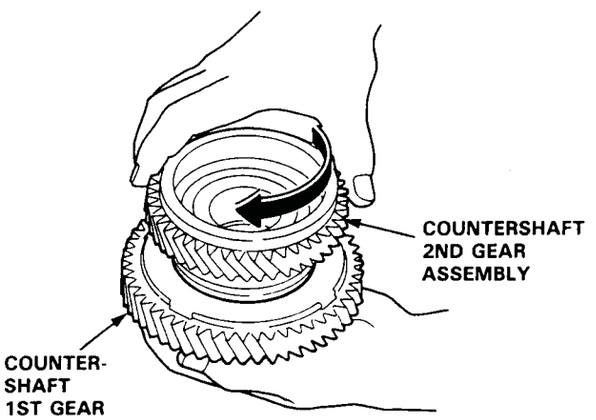
1. Remove the set plate from the countershaft 1st gear.
2. Remove the one-way clutch by prying it up with the end of a screwdriver.



3. Inspect the following parts.

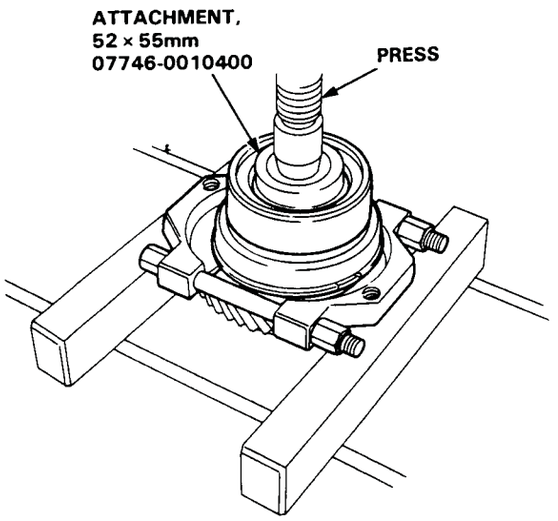


4. Assemble the one-way clutch, thrust needle bearing and set plate.
5. Hold the countershaft 1st gear and turn the countershaft 2nd gear assembly in direction shown to be sure it turns freely.



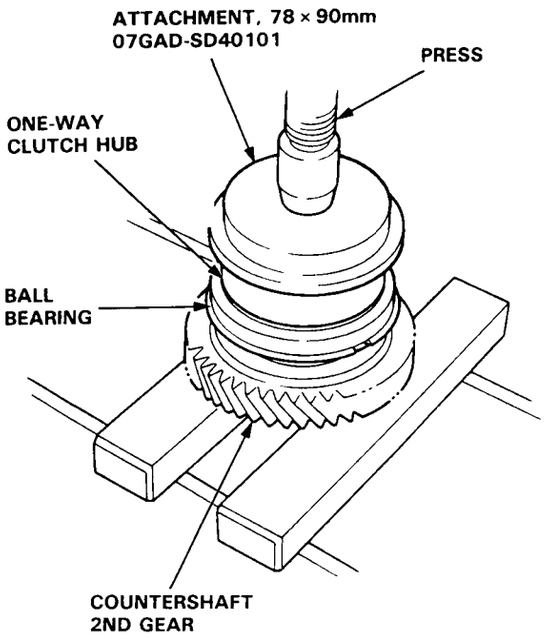
Disassembly

1. Remove the one-way clutch hub and ball bearing from the countershaft 2nd gear using the special tool and a press.

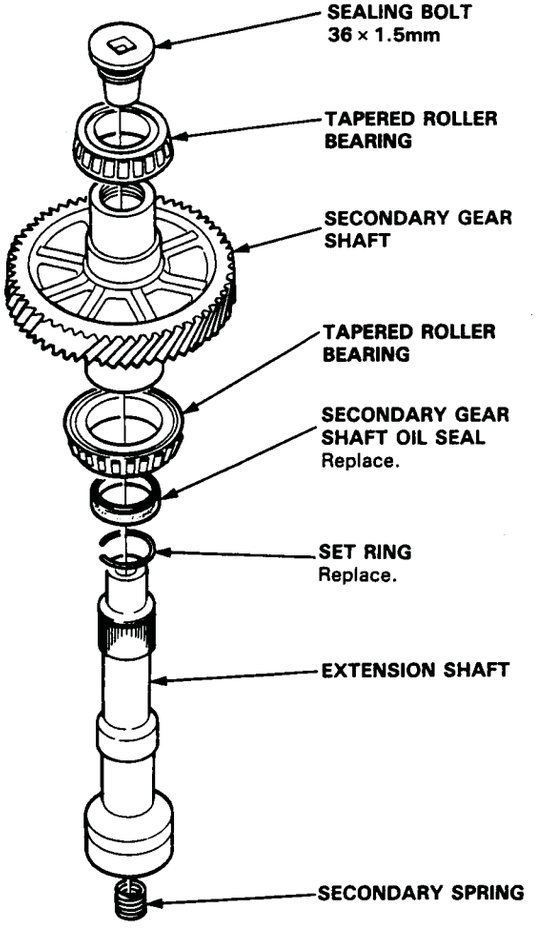


Reassembly

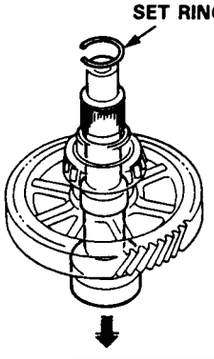
1. Install the ball bearing and one-way clutch hub to the countershaft 2nd gear using the special tool and a press.



Disassembly

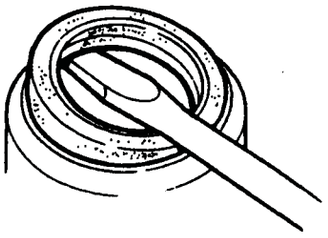


1. Remove the set ring.
2. Remove the extension shaft from the secondary gear shaft.

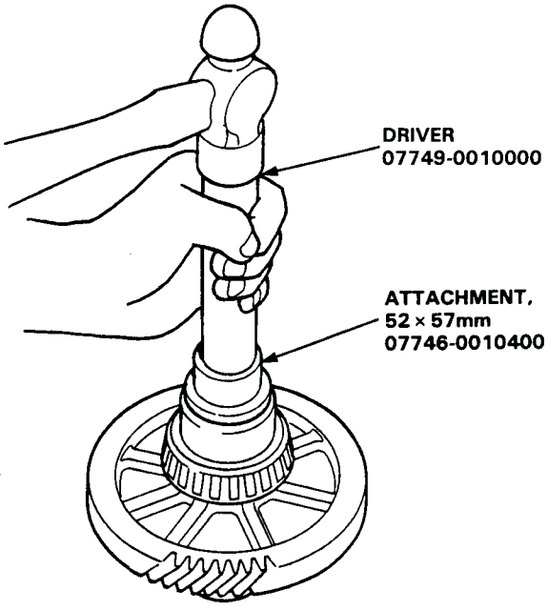


Replacement

1. Remove the oil seal from the secondary gear shaft.



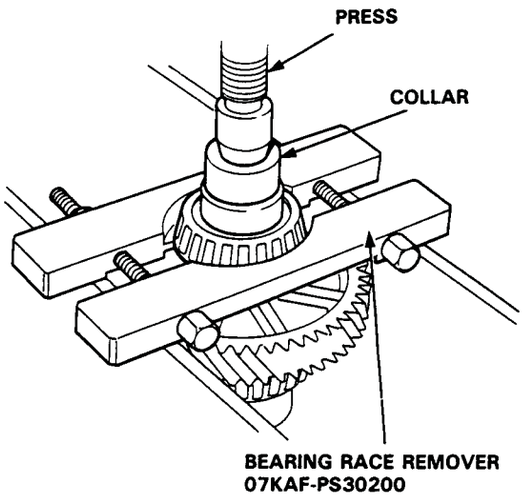
2. Drive the oil seal into the secondary gear shaft, using the special tools as shown.



Replacement

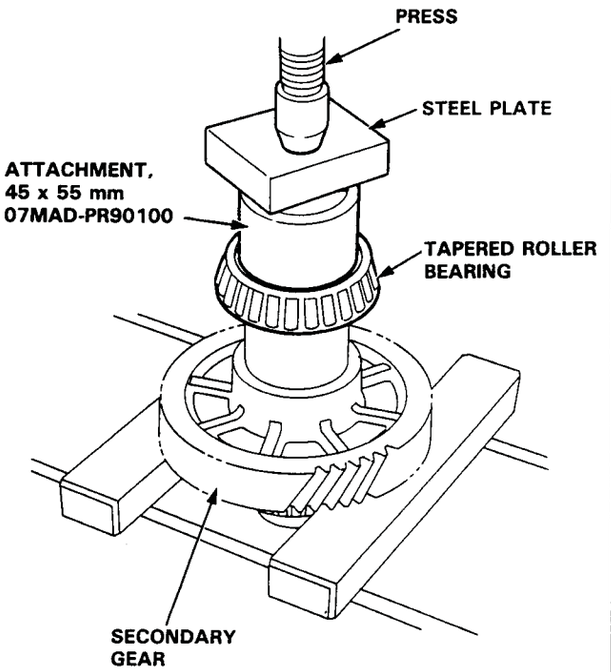
NOTE:
- The bearing and outer race should be replaced as a set.
- If the bearing is replaced, inspect and adjust the bearing preload .page

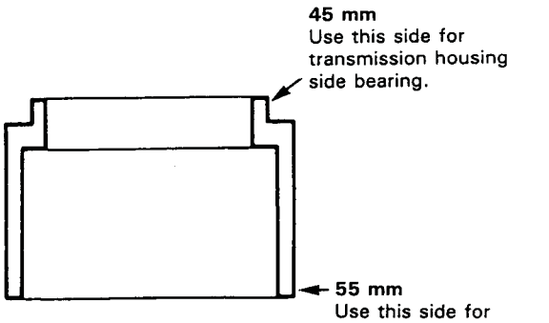
1. Remove the tapered roller bearings from the secondary gear shaft, using the special tool and a press as shown.



2. Install the bearings using the special tool and a press as shown.

   NOTE: Press the bearings in squarely until they bottom.

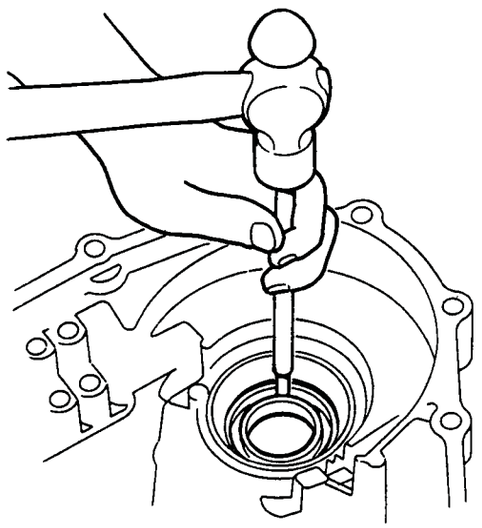




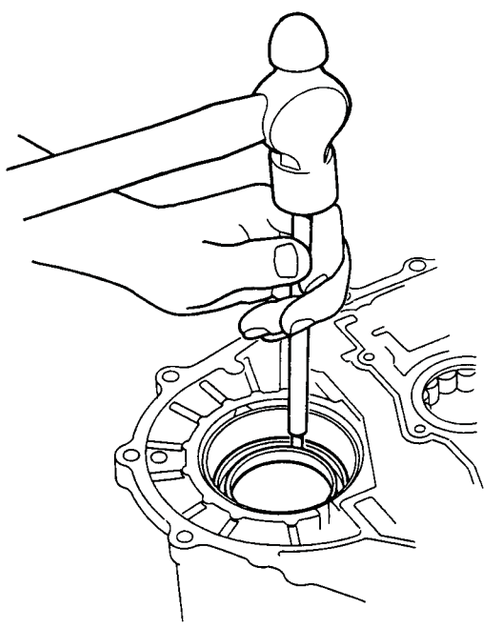
ATTACHMENT
45 x 55mm
07MAD-PR90100

Removal

1. Remove the oil seal from the transmission housing.



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

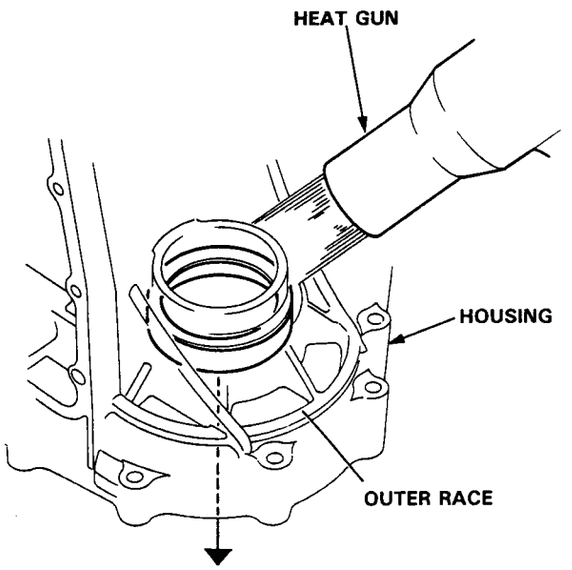


Replacement

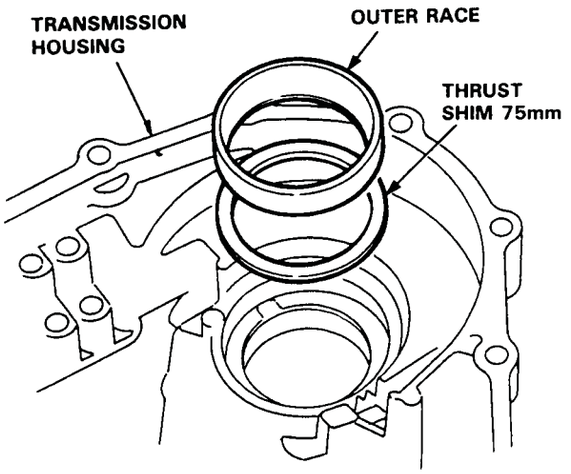
NOTE:
- The bearing and outer race should be replaced as a set.
- If the bearings, thrust shim and/or washer are replaced, inspect and adjust the bearing preload

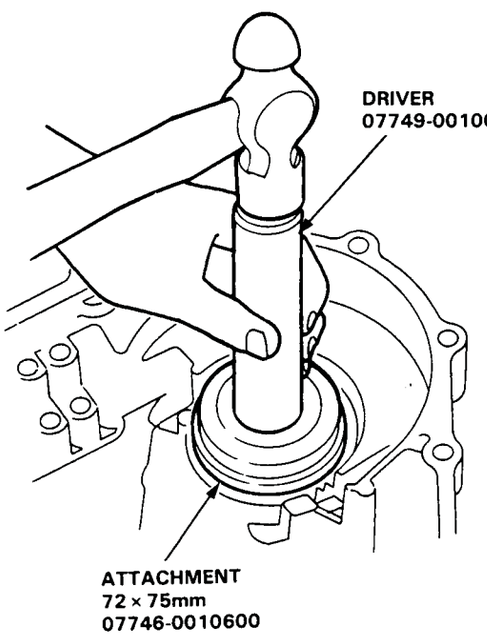
1. Remove the bearing outer race by heating the housings to 100°C (212°F) with a heat gun, then tap the housing until the bearing outer race falls out.

   CAUTION: Do not heat the housings in excess of 100°C (212°F).

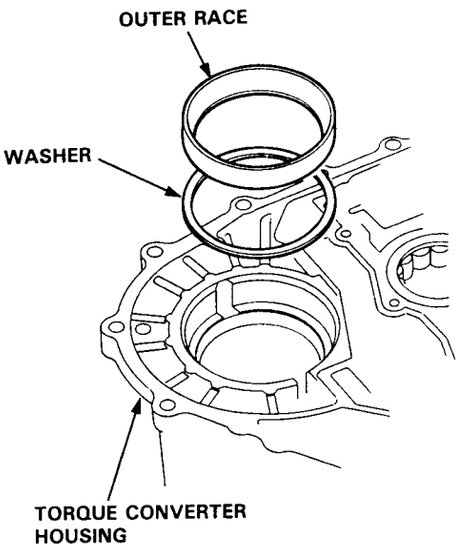


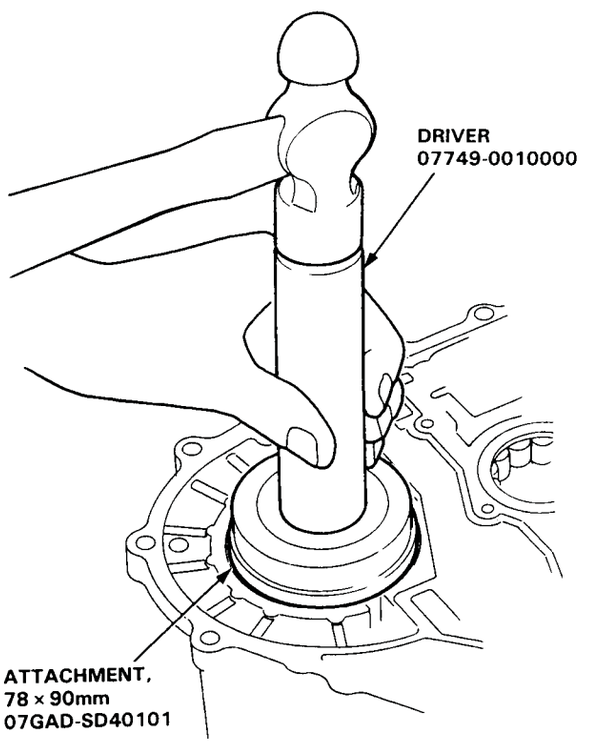
2. Install the thrust shim and bearing outer race.
3. Drive the outer race into the transmission housing, using the special tools as shown.





4. Install the washer and bearing outer race.
5. Drive the outer race into the torque converter housing, using the special tools as shown.





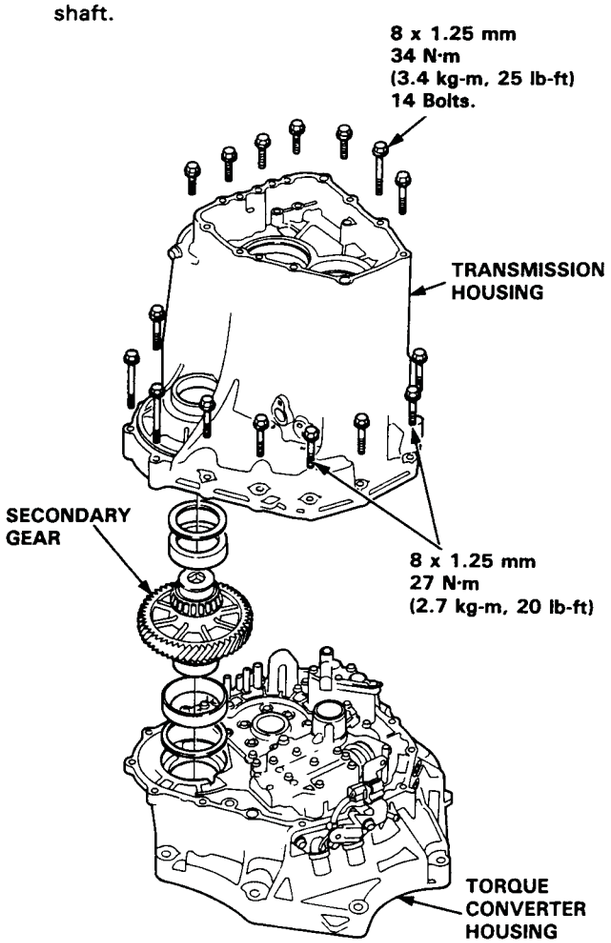
Adjustment

NOTE:
- If any of the listed parts were replaced, the bearing preload must be adjusted:
  - Transmission Housing
  - Torque Converter Housing
  - Tapered Roller Bearing/Bearing Outer Race
  - 75 mm Thrust Shim
  - 90 mm Washer

CAUTION: Let the transmission cool down to room temperature if the outer race was removed by heating the housing before adjusting the bearing preload.

1. Remove the oil seals from both housings.
2. Install the sealing bolt to the secondary gear shaft and torque to 20 N·m (2.0 kg-m, 14 lb-ft).
3. Install the secondary gear in the torque converter housing, then install the transmission housing.

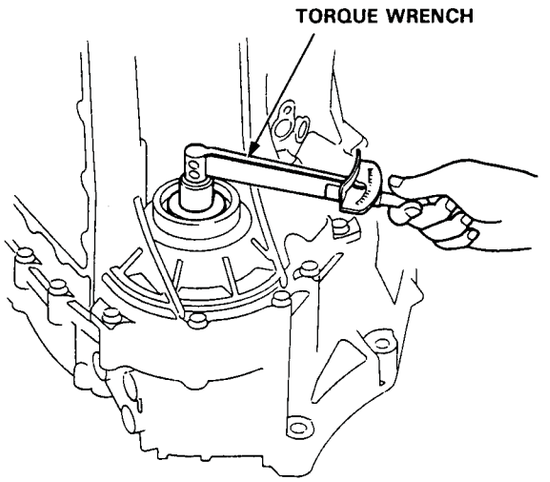
   NOTE: Do not install the mainshaft and countershaft.



4. Rotate the secondary gear in both directions to seat the bearings.
5. Measure the starting torque of the secondary gear with a torque wrench.

   STANDARD: 3.5—4.5 N·m (35—45 kg-cm, 30—39 lb-in)

   NOTE:
   - Measure the preload at room temperature in both directions.
   - Do not use more than one thrust shim to adjust the bearing preload.



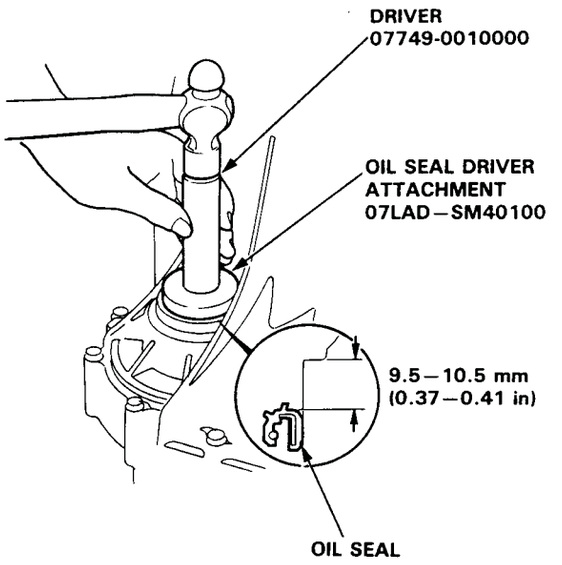
6. If the bearing preload is out of tolerance, select and install a new thrust shim then recheck.

THRUST SHIM 75 mm

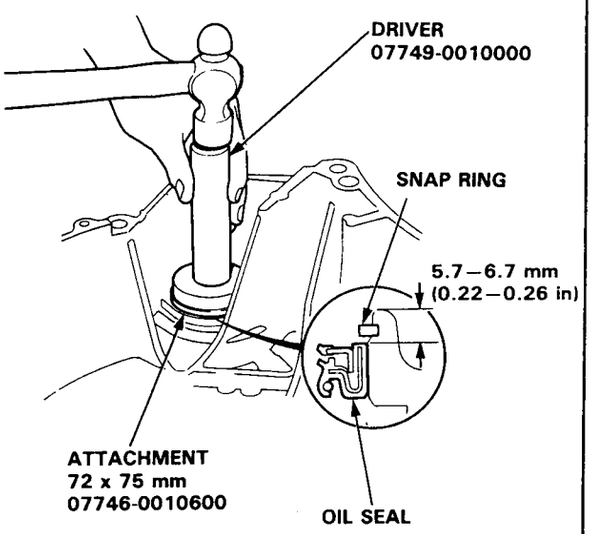
No.	Part Number	Thickness mm (in)
A	23941-PY5-000	1.56 (0.061)
B	23942-PY5-000	1.59 (0.063)
C	23943-PY5-000	1.62 (0.064)
D	23944-PY5-000	1.65 (0.065)
E	23945-PY5-000	1.68 (0.066)
F	23946-PY5-000	1.71 (0.067)
G	23947-PY5-000	1.74 (0.069)
H	23948-PY5-000	1.77 (0.070)
I	23949-PY5-000	1.80 (0.071)
J	23950-PY5-000	1.83 (0.072)
K	23951-PY5-000	1.86 (0.073)
L	23952-PY5-000	1.89 (0.074)
M	23953-PY5-000	1.92 (0.076)
N	23954-PY5-000	1.95 (0.077)
O	23955-PY5-000	1.98 (0.078)
P	23956-PY5-000	2.01 (0.079)
Q	23957-PY5-000	2.04 (0.080)
R	23958-PY5-000	2.07 (0.081)
S	23959-PY5-000	2.10 (0.083)
T	23960-PY5-000	2.13 (0.084)
U	23961-PY5-000	2.16 (0.085)
V	23962-PY5-000	2.19 (0.086)
W	23963-PY5-000	2.22 (0.087)
X	23964-PY5-000	2.25 (0.089)
Y	23965-PY5-000	2.28 (0.090)
Z	23966-PY5-000	2.31 (0.091)
AA	23967-PY5-000	2.34 (0.092)
AB	23968-PY5-000	2.37 (0.093)
AC	23969-PY5-000	2.40 (0.094)
AD	23970-PY5-000	2.43 (0.096)

Installation

1. Install the oil seal in the transmission housing, using the special tools.

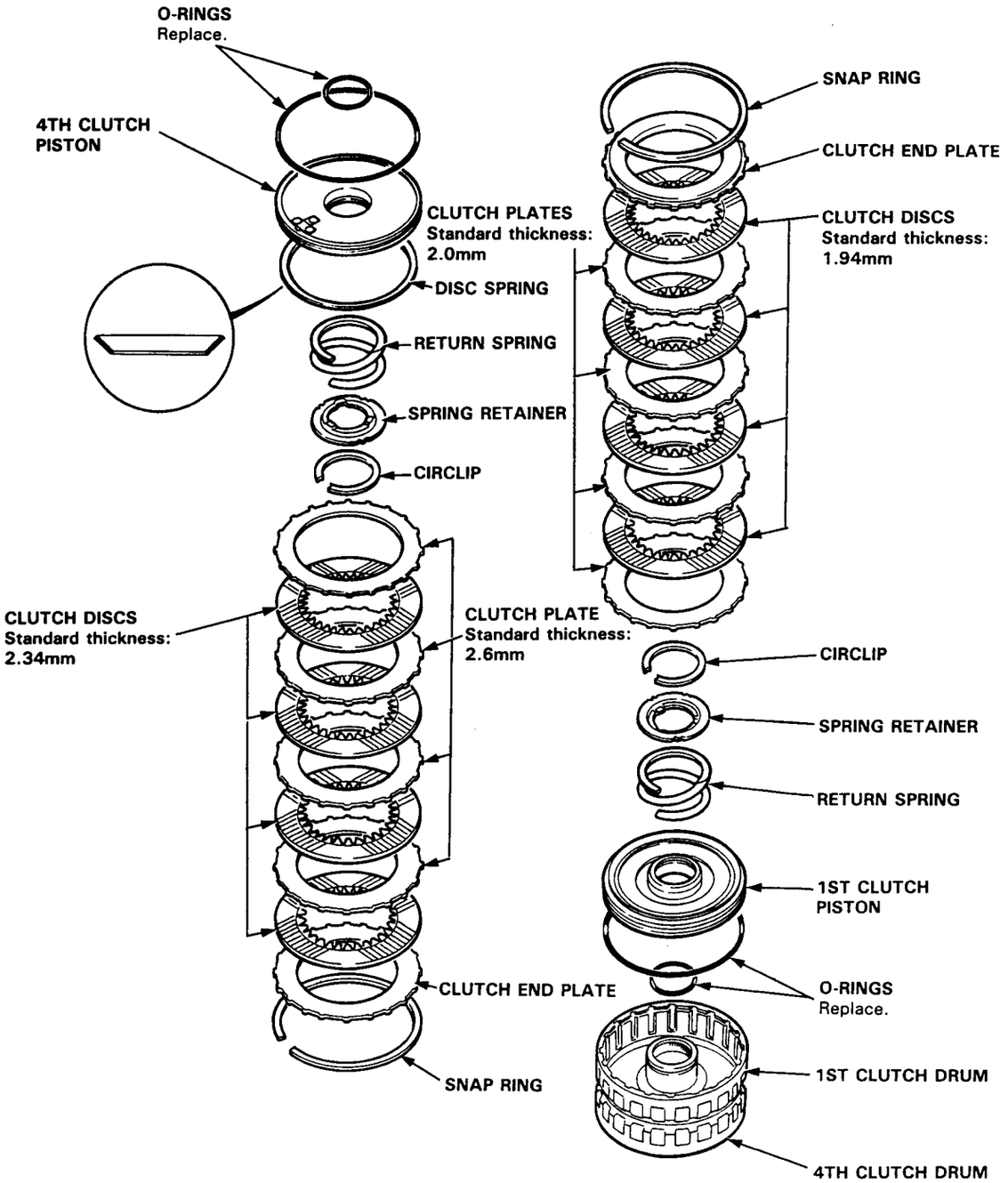


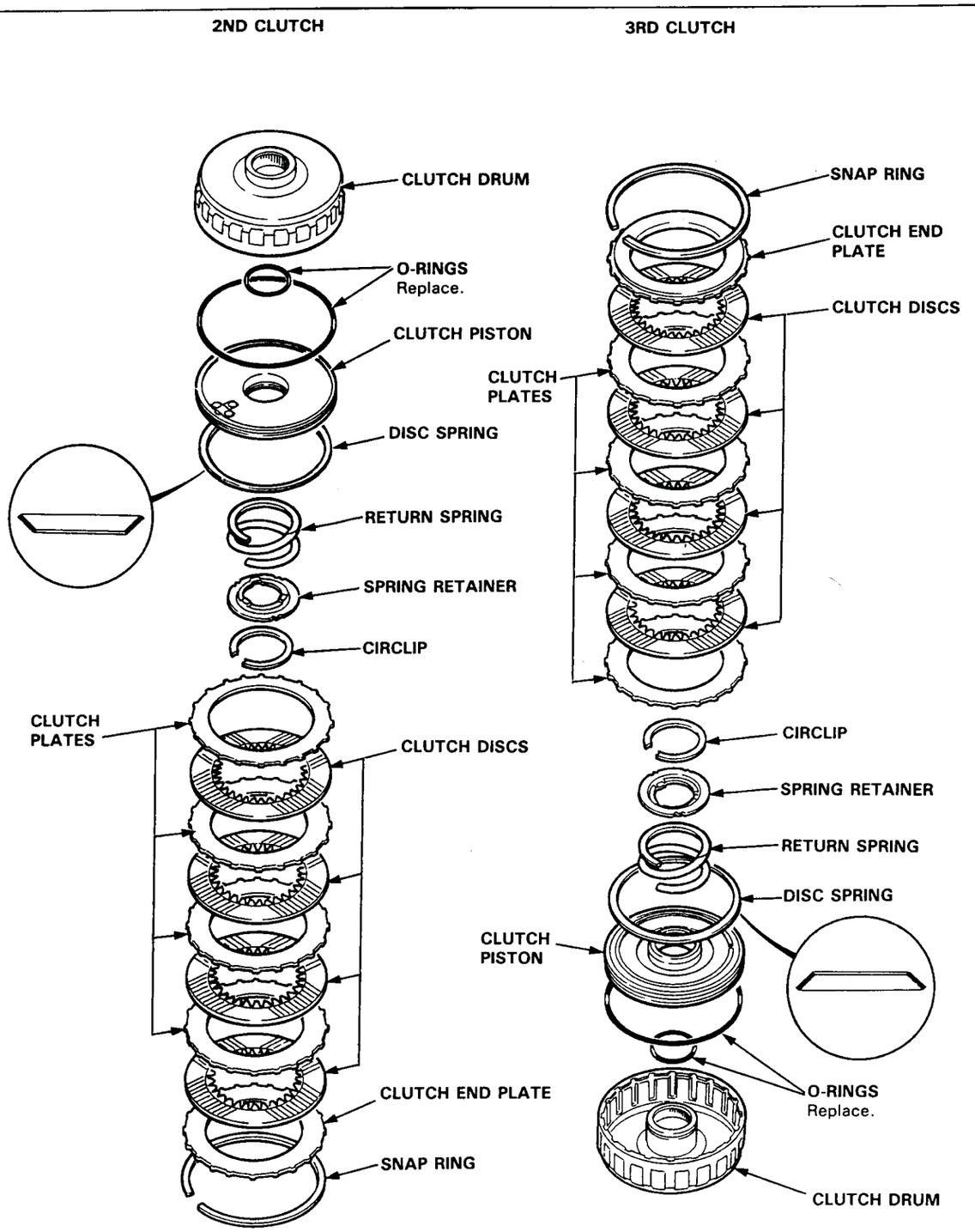
2. Install the oil seal in the torque converter housing, using the special tools as shown.
3. Install the snap ring in the torque converter housing.



Illustrated Index

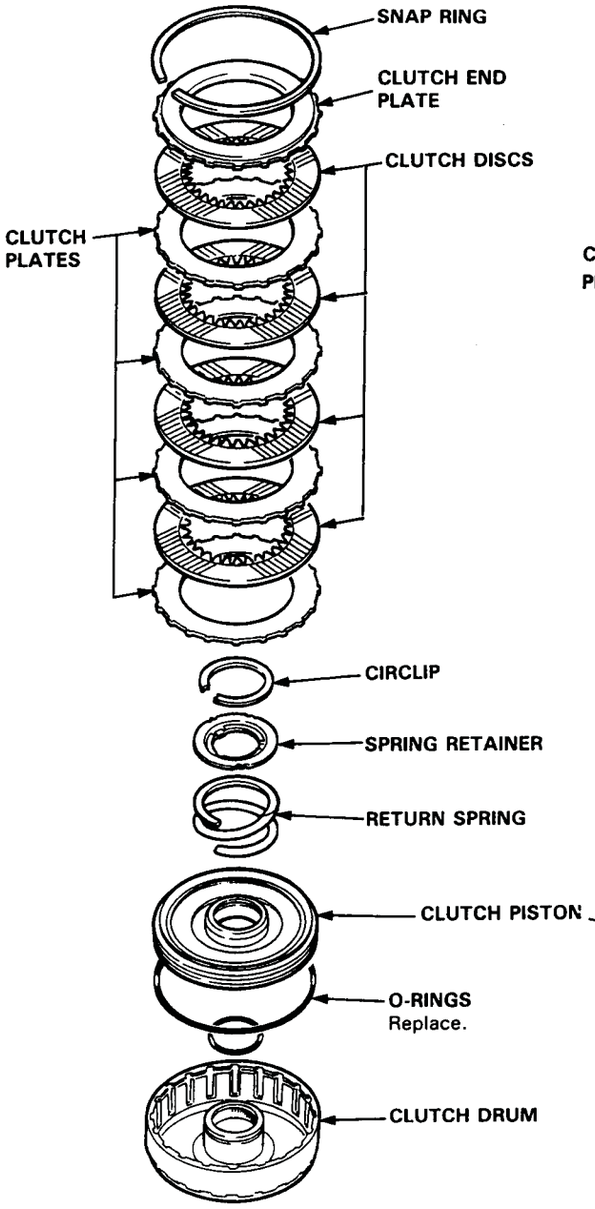
1ST/4TH CLUTCH



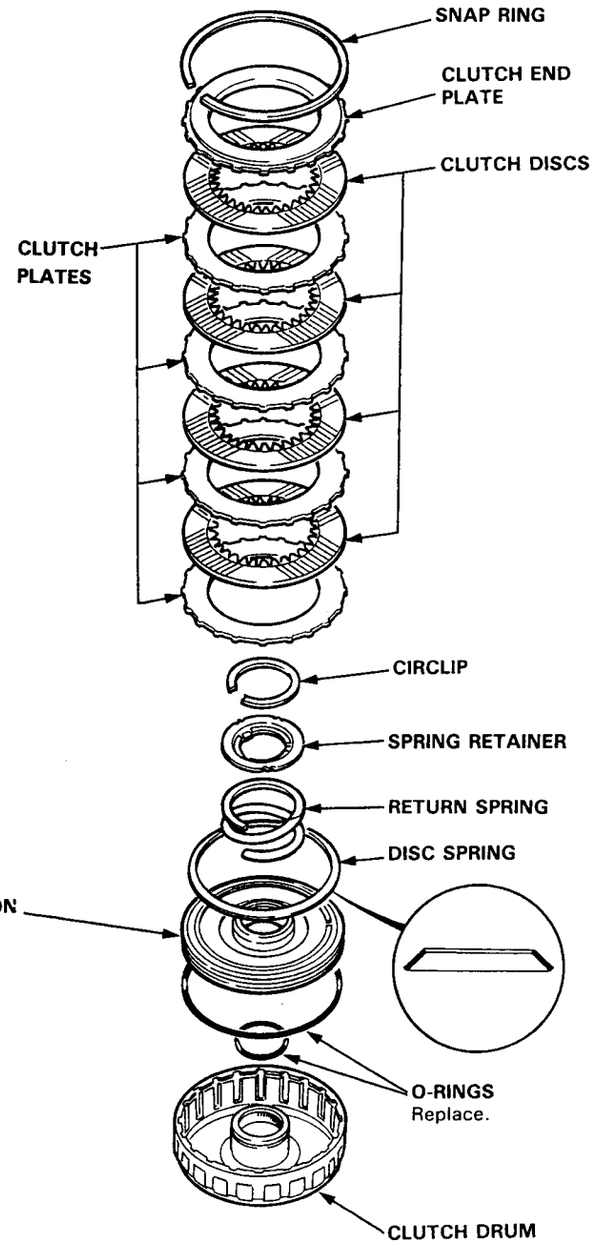


Illustrated Index (cont'd)

REVERSE CLUTCH

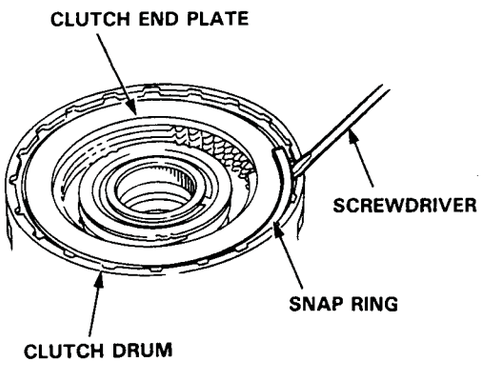


1ST-HOLD CLUTCH



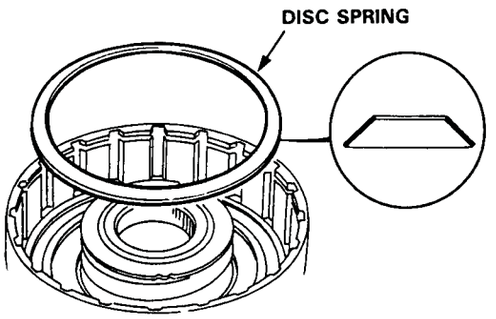
Disassembly

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

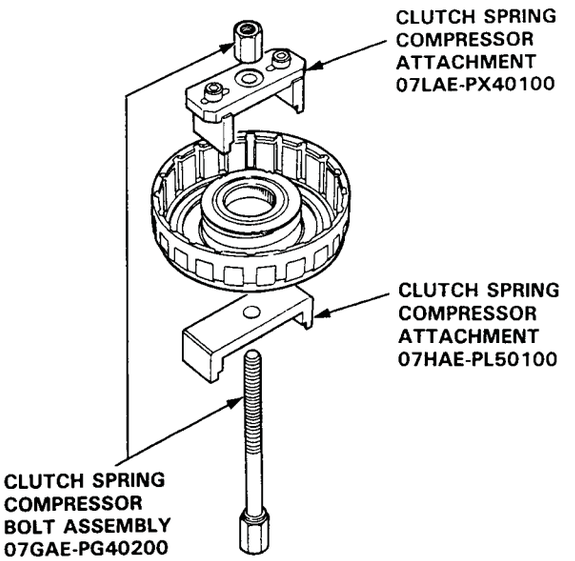


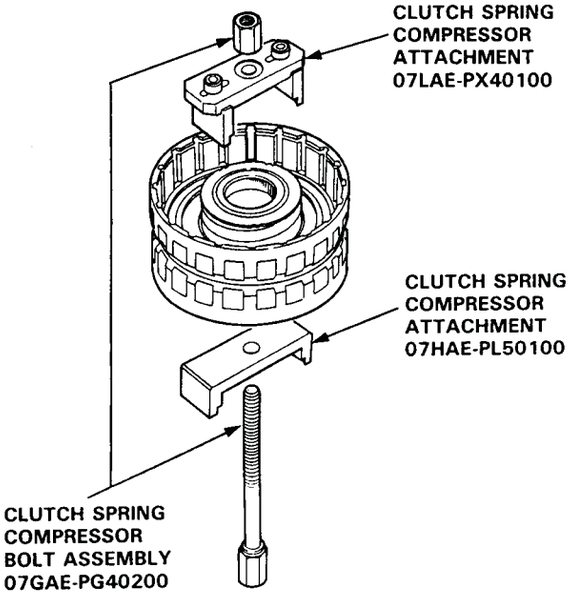
2. Remove the disc spring.

   NOTE: For 2nd, 3rd, 4th and 1st-hold clutches



3. Install the special tools as shown.

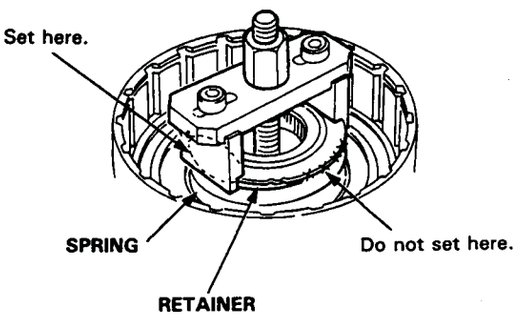




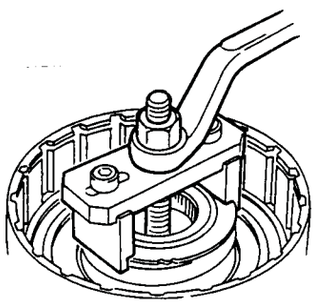
(cont'd)

Disassembly (cont'd)

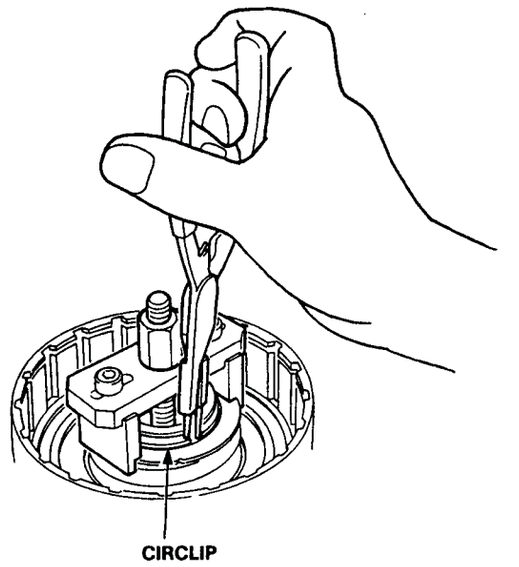
CAUTION: If either end of the compressor attachment is set over an area of the spring retainer which is unsupported by the return spring, the retainer may be damaged.



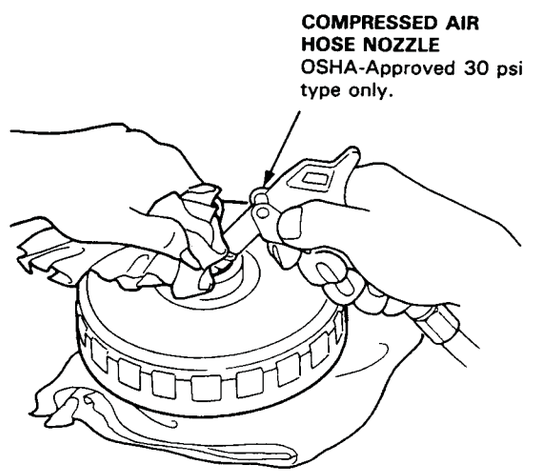
4. Compress the clutch return spring.



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



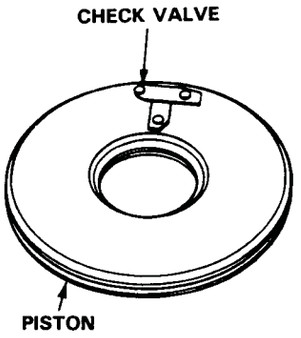
6. Wrap a shop towel around the clutch drum and apply air pressure to the oil passage to remove the piston. Place a finger tip on the other end while applying air pressure.



Reassembly

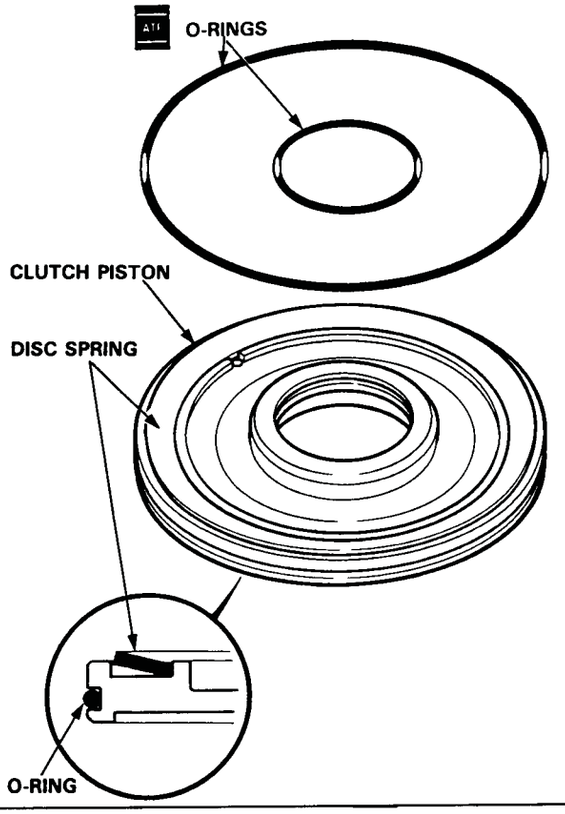
NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Lubricate all parts with ATF before assembly.

1. Inspect for a loose check valve.



2. Install a new O-ring on the clutch piston.

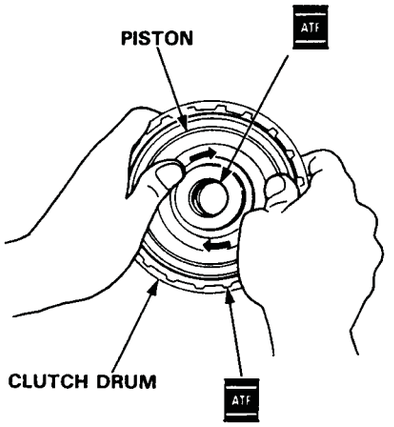
3. Be sure that the disc spring is securely staked.
NOTE: For 1st and reverse clutches.



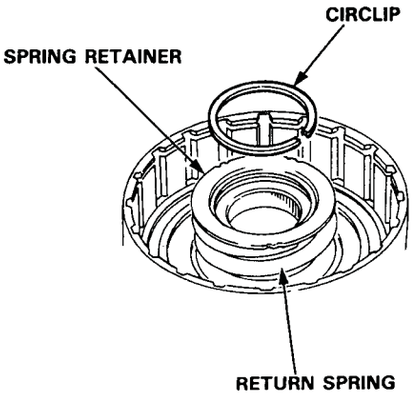
4. Install the piston in the clutch drum. Apply pressure and rotate to ensure proper seating.

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

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



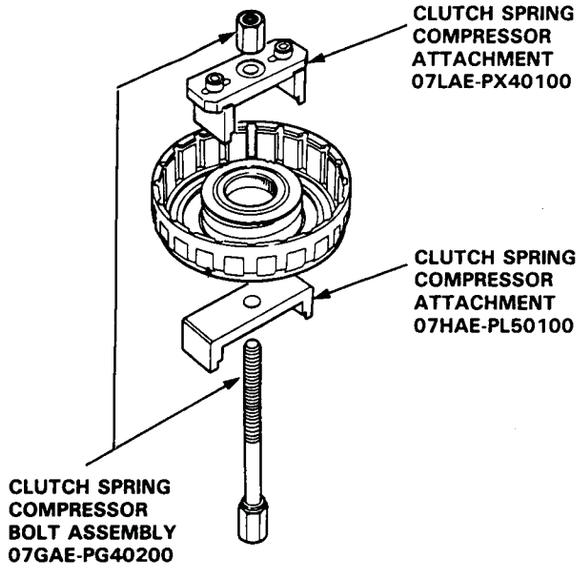
5. Install the return spring and spring retainer and position the circlip on the retainer.

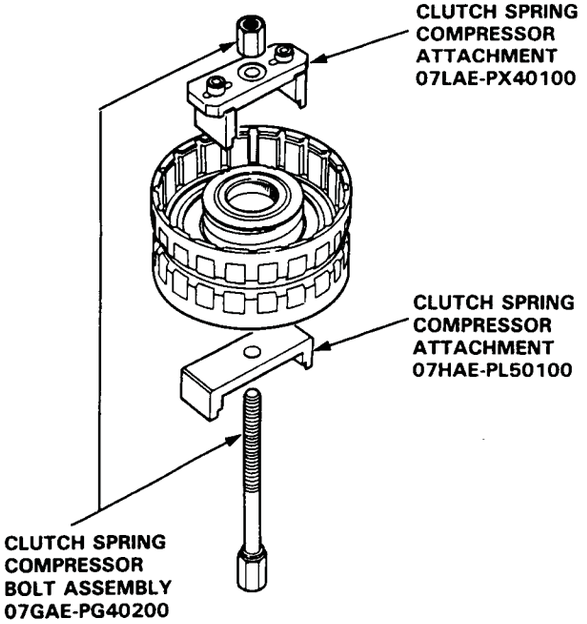


(cont'd)

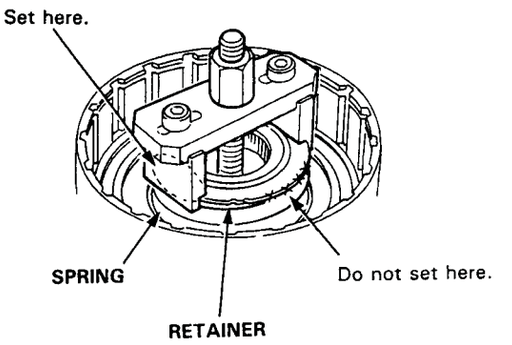
Reassembly (cont'd)

6. Install the special tools as shown.

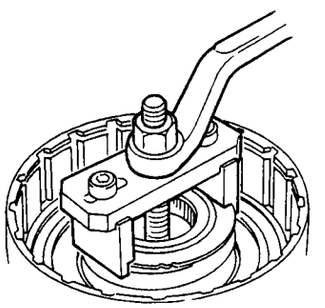




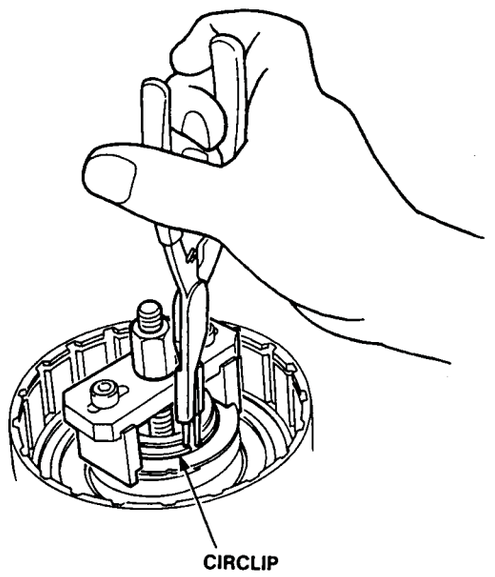
CAUTION: If either end of the compressor attachment is set over an area of the spring retainer which is unsupported by the retainer spring, the retainer may be damaged.



7. Compress the clutch return spring.

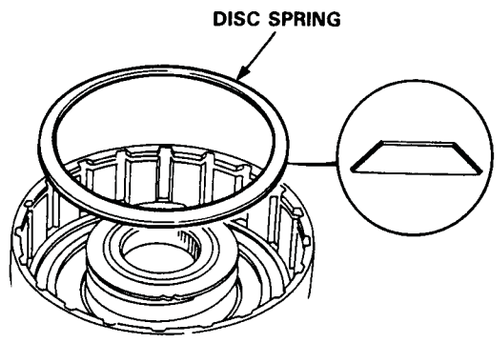


8. Install the circlip, then remove the special tools.



9. Install the disc spring.

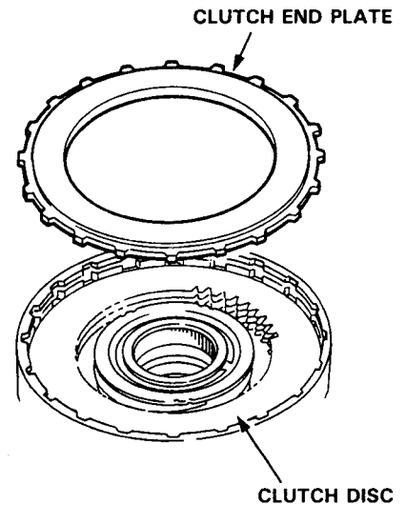
NOTE:
- For 2nd, 3rd, 4th and 1st-hold clutches
- Install the disc spring in the direction shown.



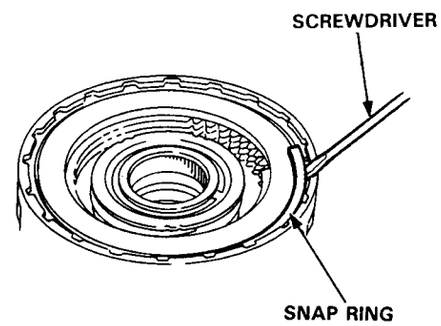
10. Soak the clutch discs thoroughly in ATF for a minimum of 30 minutes.

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

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



12. Install the snap ring.



(cont'd)

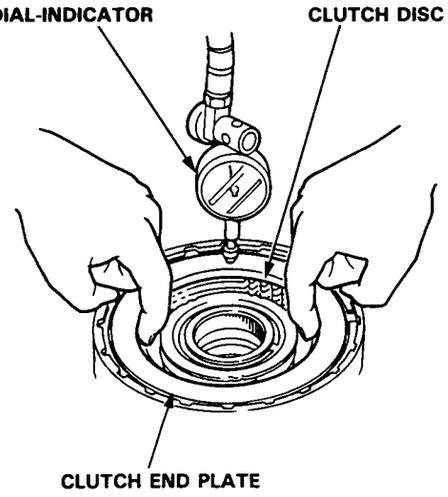
Reassembly (cont'd)

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

    NOTE: Measure at three locations.

End Plate-to-Top Disc Clearance:

Clutch	Service Limit
1st	0.65–0.85 mm (0.026–0.033 in)
2nd	0.60–0.80 mm (0.024–0.031 in)
3rd	0.60–0.80 mm (0.024–0.031 in)
4th	0.50–0.70 mm (0.020–0.028 in)
1st-Hold	0.70–0.90 mm (0.028–0.035 in)
Reverse	0.75–0.95 mm (0.030–0.037 in)



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

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

1ST, 2ND, 3RD and 4TH CLUTCH

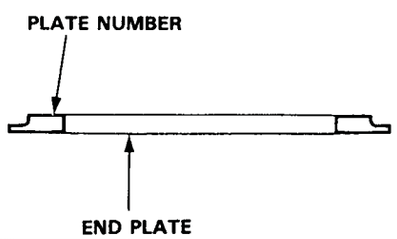
Part Number	Plate No.	Thickness mm (in)
22551–PY4–003	1	2.1 (0.083)
22552–PY4–003	2	2.2 (0.087)
22553–PY4–003	3	2.3 (0.091)
22554–PY4–003	4	2.4 (0.094)
22555–PY4–003	5	2.5 (0.098)
22556–PY4–003	6	2.6 (0.102)
22557–PY4–003	7	2.7 (0.106)
22558–PY4–003	8	2.8 (0.110)
22559–PY4–003	9	2.9 (0.114)

1ST-HOLD CLUTCH

Part Number	Plate No.	Thickness mm (in)
22351–PY4–003	L1	2.1 (0.083)
22352–PY4–003	L2	2.2 (0.087)
22353–PY4–003	L3	2.3 (0.091)
22354–PY4–003	L4	2.4 (0.094)
22355–PY4–003	L5	2.5 (0.098)
22356–PY4–003	L6	2.6 (0.102)
22357–PY4–003	L7	2.7 (0.106)
22358–PY4–003	L8	2.8 (0.110)
22359–PY4–003	L9	2.9 (0.114)

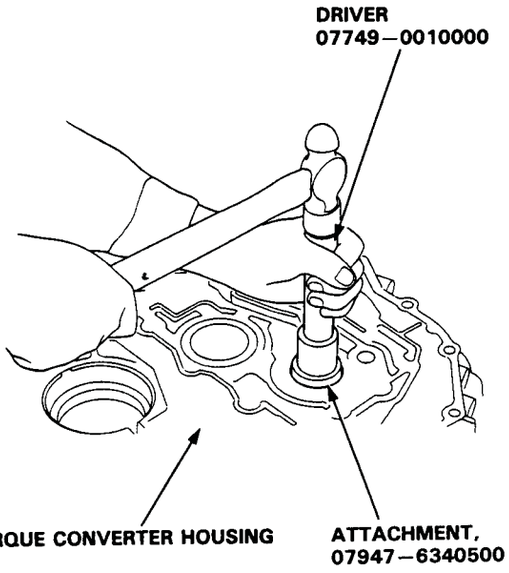
REVERSE CLUTCH

Part Number	Plate No.	Thickness mm (in)
22451–PY4–003	R1	4.1 (0.161)
22452–PY4–003	R2	4.2 (0.165)
22453–PY4–003	R3	4.3 (0.169)
22454–PY4–003	R4	4.4 (0.173)
22455–PY4–003	R5	4.5 (0.177)
22456–PY4–003	R6	4.6 (0.181)
22457–PY4–003	R7	4.7 (0.185)
22458–PY4–003	R8	4.8 (0.189)
22459–PY4–003	R9	4.9 (0.193)

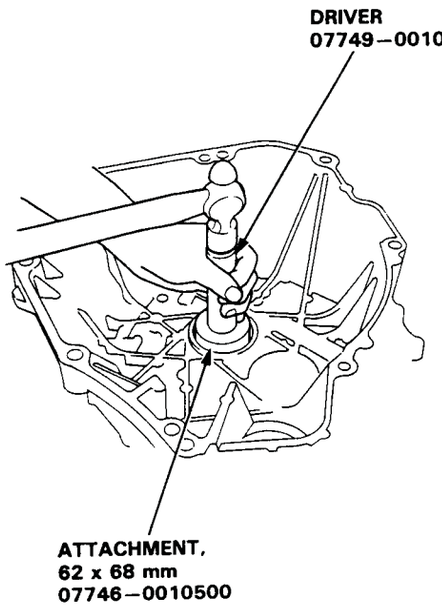


Mainshaft Bearing Replacement

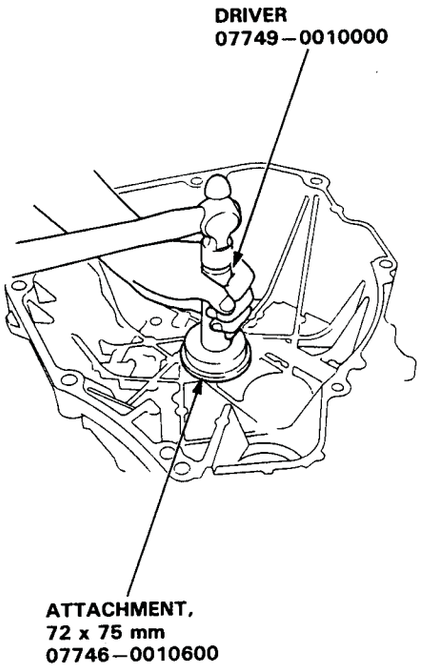
1. Drive out the mainshaft bearing and oil seal using the special tools.



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

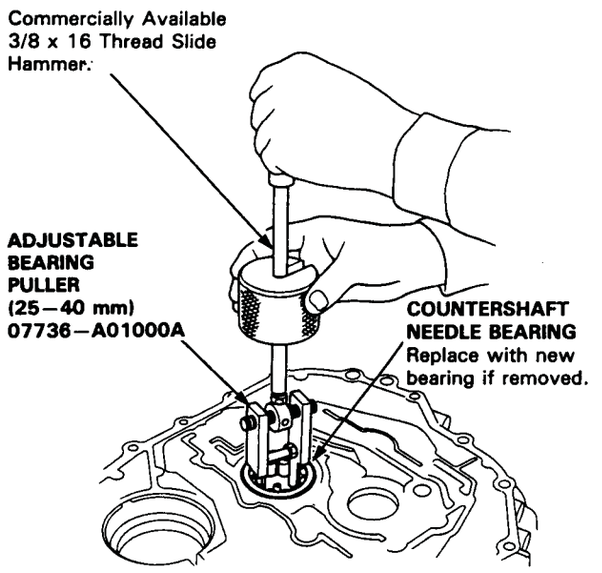


3. Install the new oil seal flush with the housing using the special tools.



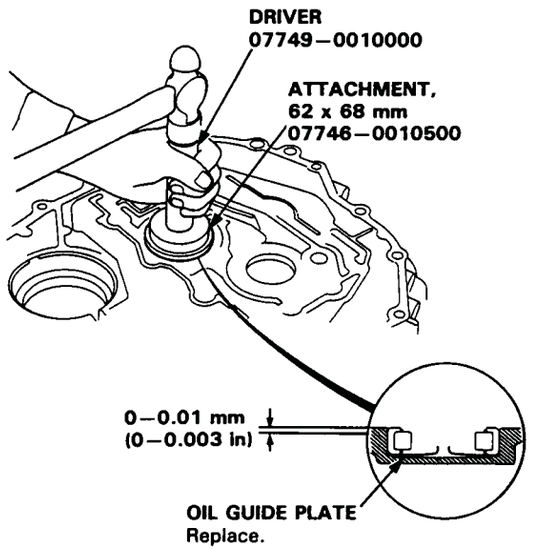
Countershaft Bearing Replacement

1. Remove the countershaft bearing using the special tool.



2. Replace the oil guide plate.

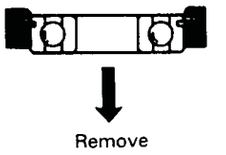
3. Drive the new bearing into the housing using the special tools.

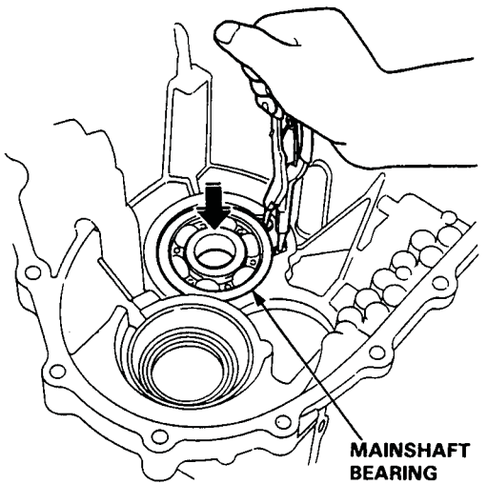


Replacement

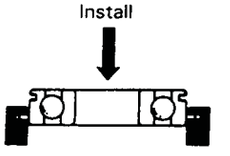
1. To remove the mainshaft bearing from the transmission housing, expand each snap ring with the snap ring pliers, then push the bearing out.

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



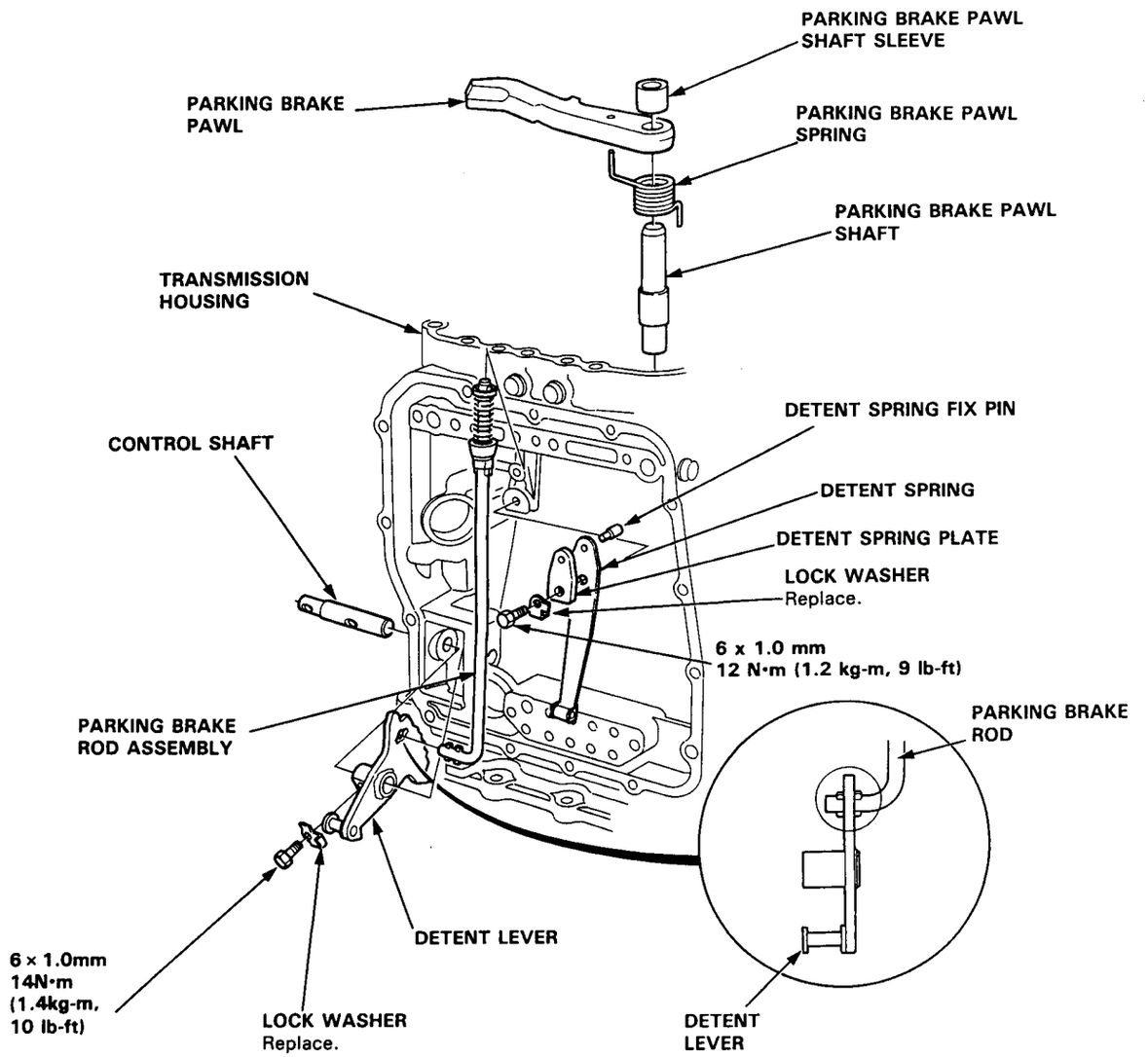


2. Expand each snap ring with the snap ring pliers, insert the new bearing part-way into it, then release the pliers. Push the bearing down into the transmission until the ring snaps in place around it.



Disassembly/Inspection/Reassembly

1. Remove the parking brake pawl shaft sleeve, parking brake pawl and parking brake pawl spring.
2. Remove the control shaft.
3. Remove the detent lever and parking brake rod from the transmission housing.
4. Assemble the parking brake mechanism in the reverse order of disassembly.



Reassembly

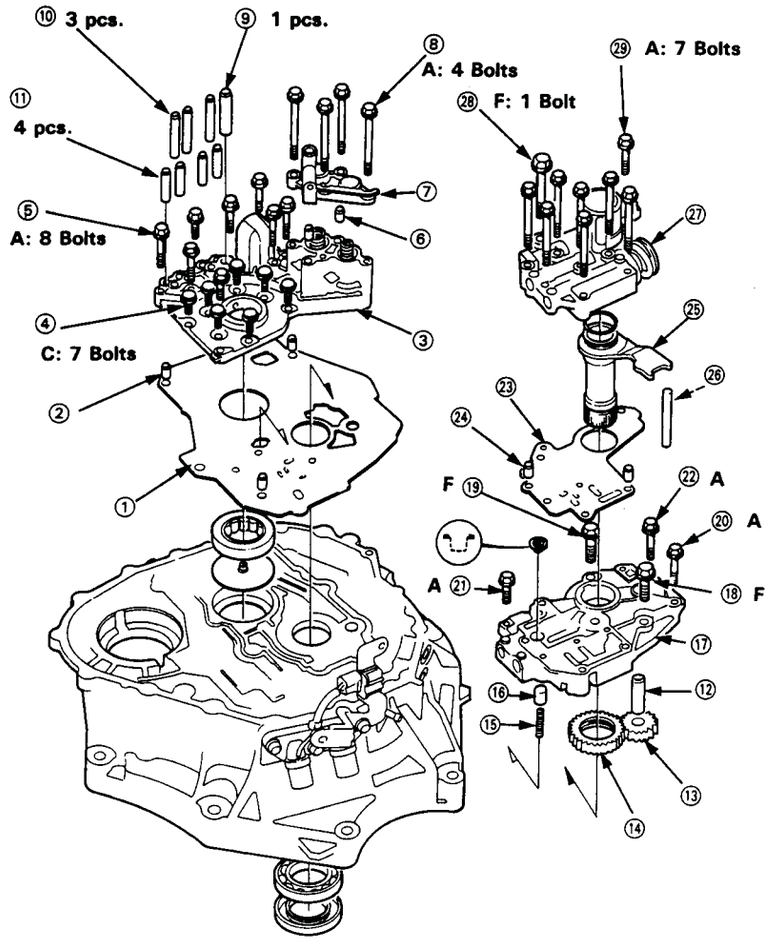
NOTE: Coat all parts with ATF.

1. Assemble the valve bodies following the numbered sequence.

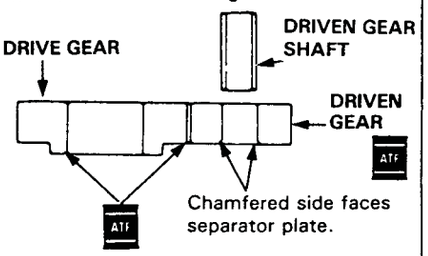
CAUTION: To prevent stripping the threads, press down on the accumulator cover while installing the bolts.

TORQUE SPECIFICATIONS

No.	Torque Value	Bolt Size	Number
A	12 N·m (1.2 kg-m, 9 lb-ft)	6 x 1.0 mm	⑤ ⑧ ⑳ ㉑ ㉒ ㉙
B	12 N·m (1.2 kg-m, 9 lb-ft)	6 x 1.0 mm	④
C	18 N·m (1.8 kg-m, 13 lb-ft)	8 x 1.25 mm	⑱ ⑲ ㉘

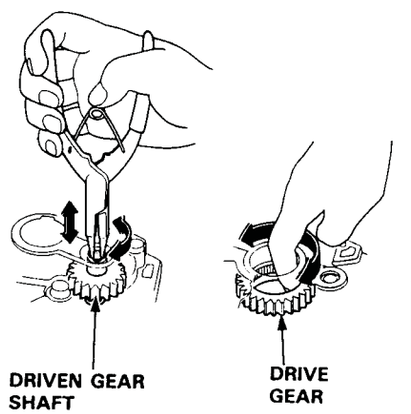


NOTE: Install the oil pump driven gear with its chamfered side facing down.



NOTE: Make sure the pump drive gear rotates smoothly in the normal operating direction and the pump shaft moves smoothly in the axial and normal operating directions.

CAUTION: If the pump gear and pump shaft do not move freely, loosen the valve body bolts, realign the shaft, and then retighten to the specified torque. Failure to align the pump shaft correctly will result in seized pump gear or pump shaft.

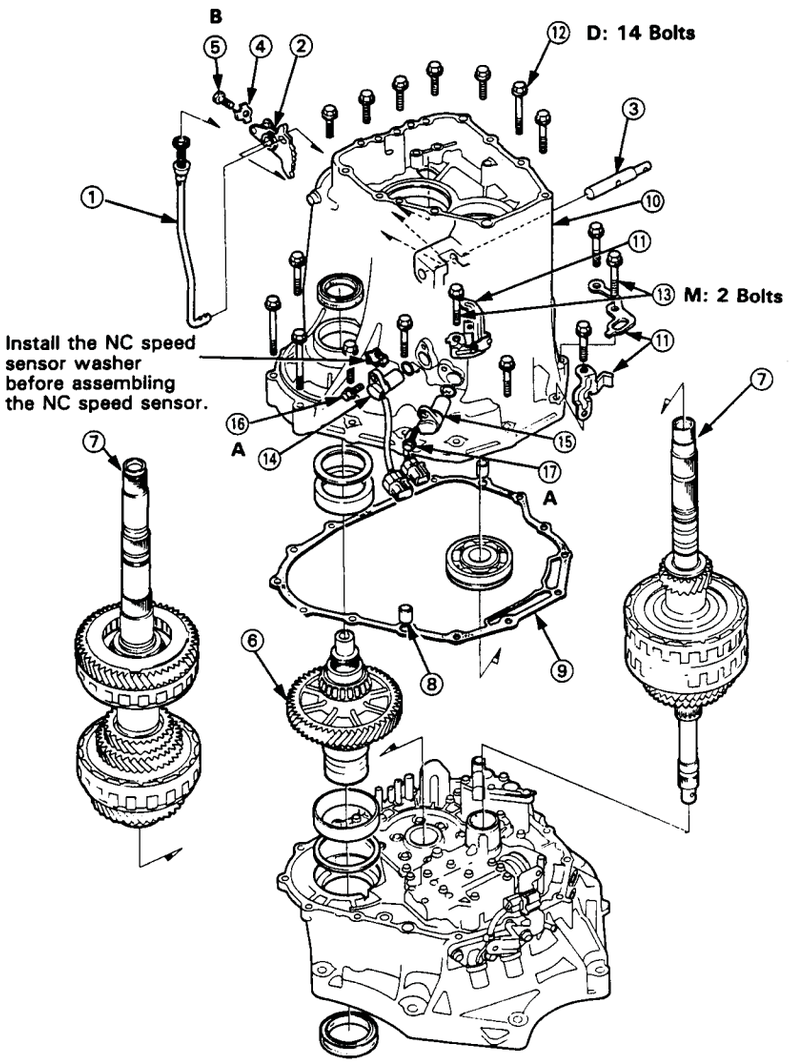


2. Assemble the transmission housing following the numbered sequence.

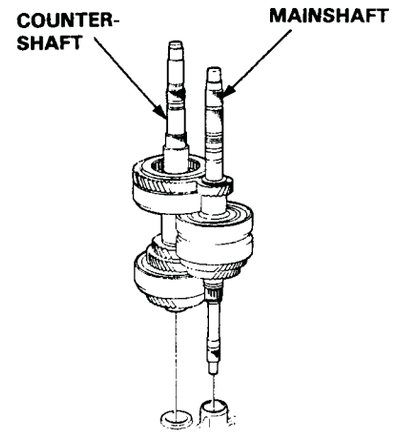
CAUTION: Make sure that the NM and NC speed sensors are not installed in the transmission housing before installing the transmission on the torque converter housing.

TORQUE SPECIFICATIONS

No.	Torque Value	Bolt Size	Number
A	12 N·m (1.2 kg-m, 9 lb-ft)	6 x 1.0 mm	⑯ ⑰
B	14 N·m (1.4 kg-m, 10 lb-ft)	6 x 1.0 mm	⑤
D	34 N·m (3.4 kg-m, 25 lb-ft)	8 x 1.25 mm	⑫
M	27 N·m (2.7 kg-m, 20 lb-ft)	8 x 1.25 mm	⑬

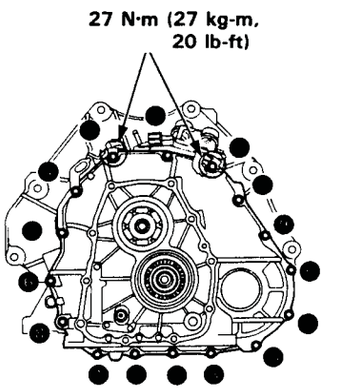


⑦ NOTE: Install the two shafts together.



⑫ ⑬

NOTE: Torque bolt ① thru ⑭ to 34 N·m (3.4 kg-m, 25 lb-ft), ⑮ and ⑯ to 27 N·m (2.7 kg-m, 20 lb-ft).

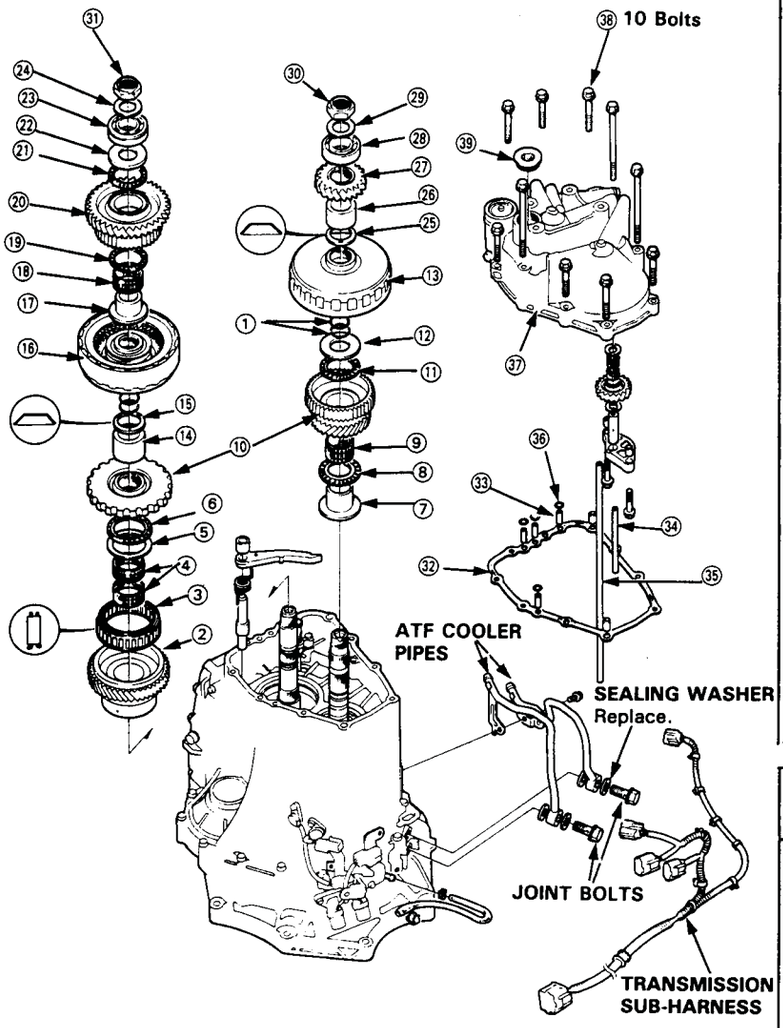


(cont'd)

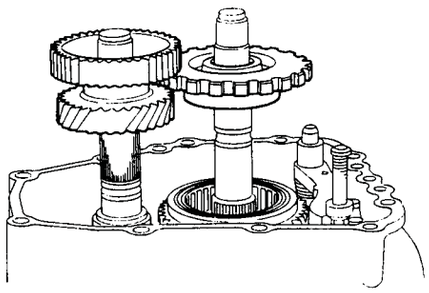
Reassembly (cont'd)

3. Assemble the rear cover following the numbered sequence.

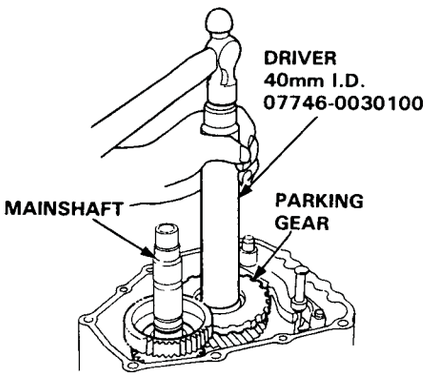
NOTE: Before installing the O-rings, wrap the shaft splines with tape to prevent damage to the O-rings.



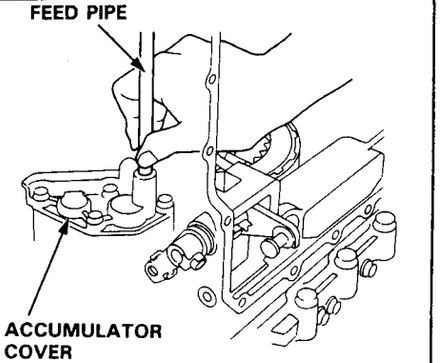
⑩ Combine the mainshaft 2nd gear with the parking gear.



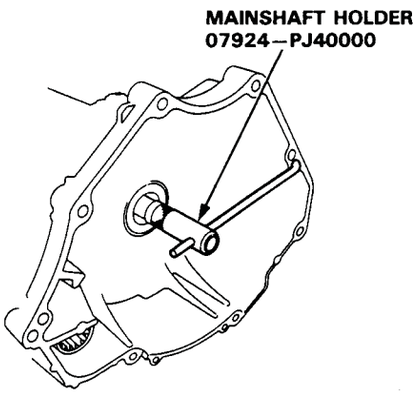
Tap the parking gear using the special tool as shown.



⑮ Install the feed pipe in the accumulator cover.



4. Install the special tool onto the mainshaft as shown, and engage the parking brake pawl with the parking gear.

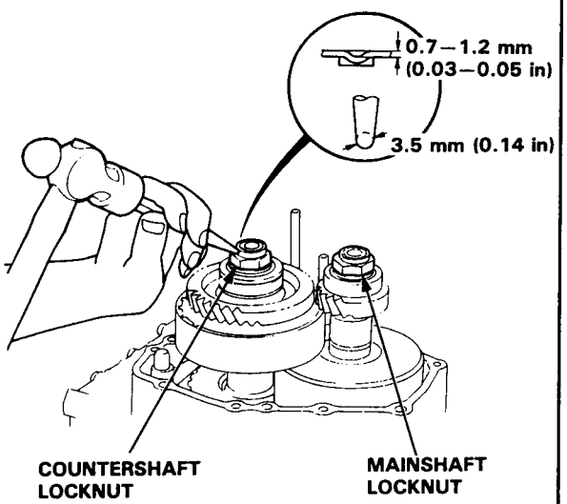


5. Install and torque the new locknuts. Tighten to specified torque, then loosen and retighten to specified torque.

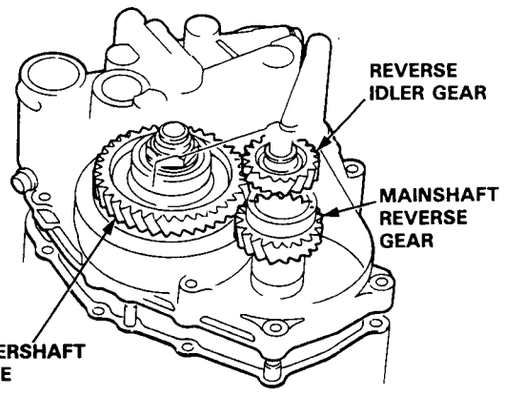
TORQUE: 170 N·m (17.0 kg-m, 123 lb-ft)

NOTE: Countershaft locknut has left-hand threads.

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

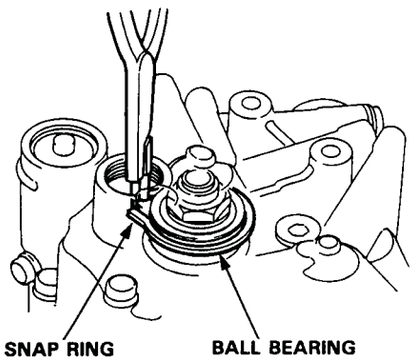


7. Install the rear cover and engage the reverse gears while rotating the mainshaft.



8. Install the snap ring in the ball bearing.

NOTE: Make sure the snap ring fits in place around the bearing. If not, raise the countershaft to fit the snap ring in place.



9. Torque the bolts on the rear cover.

TORQUE: 27 N·m (2.7 kg-m, 20 lb-ft)

10. Apply liquid gasket (P/N: 08718—0001)to the sealing bolt threads and install it on the rear cover.

TORQUE: 80 N·m (8.0 kg-m, 58 lb-ft)

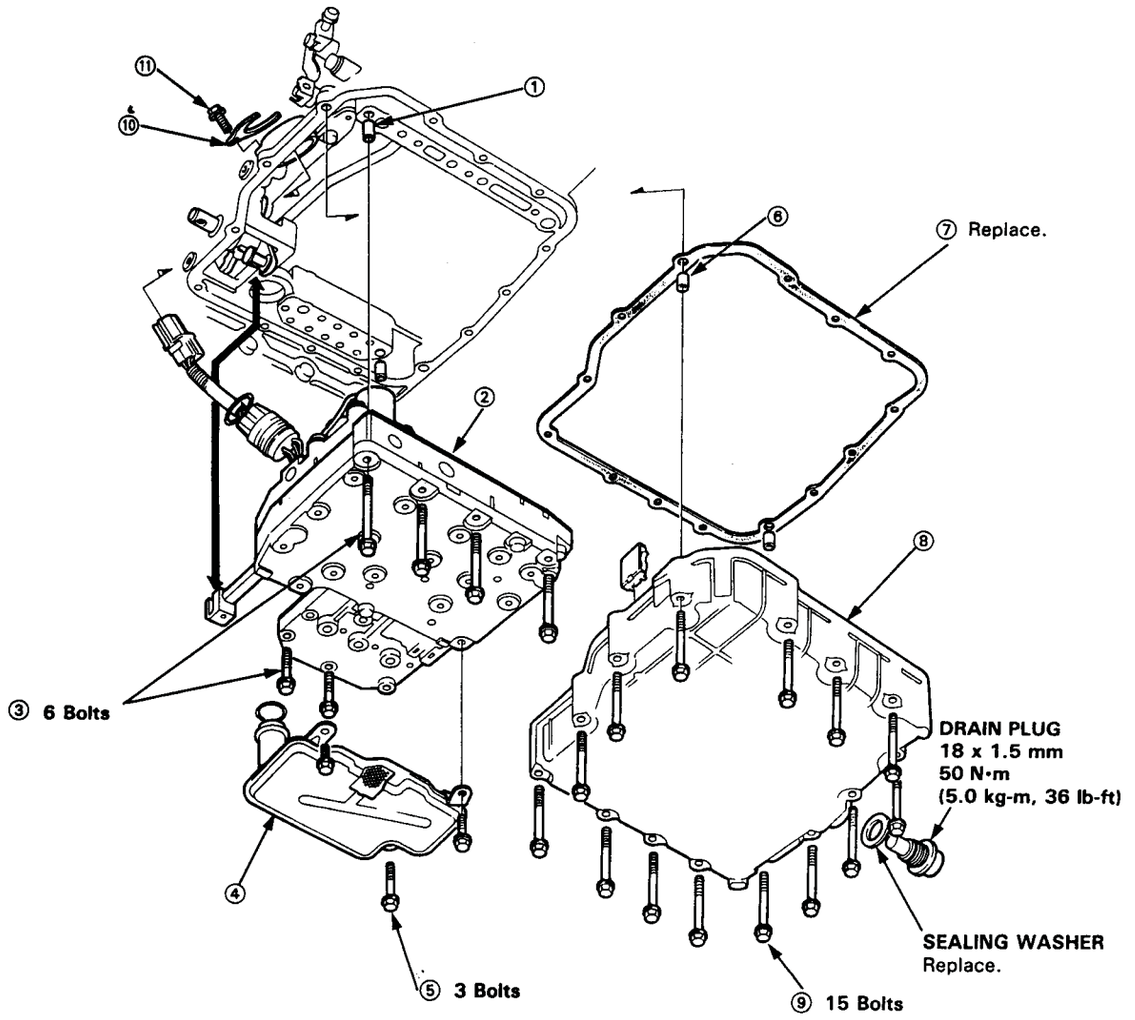
(cont'd)

Reassembly (cont'd)

11. Assemble the lower valve body assembly and oil pan following the numbered sequence.

    NOTE: Pass the shift control solenoid valve/linear solenoid harness through the transmission housing and put the manual valve and detent lever together, then install the valve body.

    TORQUE: 6 x 1.0mm; all bolts: 12N·m (1.2kg-m, 9 lb-ft)



12. Install the ATF cooler pipes and torque the joint bolts.

    TORQUE: 40 N·m (4.0 kg-m, 29 lb-ft)

13. Connect the transmission sub-harness connector to the shift control solenoid valve/linear solenoid harness connector, and install it on the transmission housing.